STAKEHOLDER ENGAGEMENT FOR NATURE-BASED SOLUTIONS

A COLLABORATIVE APPROACH FOR CLIMATE ADAPTATION AT THE URBAN ENVIRONMENT

Master Thesis

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Abstract

Nature-based solutions have lately received considerable attention from scientists who focus on climate change. They can prove beneficial for flood resilience by contributing to sustainable water management, natural water retention, floodplain restoration, and biodiversity conservation. They are more sustainable & cost-effective than traditional engineering solutions. Despite their application for a variety of purposes, there is still a lack of understanding of the influence of stakeholder engagement in their design and implementation process.

The purpose of this study is to contribute to the understanding of the role of stakeholders in planning processes, in particular the design of nature-based solutions, focusing on flood resilience in urban areas. The research is supported by the study of the Dakpark Project (Rotterdam), a community-based initiative, that addresses climate change effects, including flood resilience and aims at enhancing inclusiveness and public participation. Foundation for this study is the theory of collaborative planning.

The aim of this study is to explore the potential of stakeholder engagement on NBS projects, based on the concept of collaborative planning. Literature review, interviews, and site visits are analyzed to answer the main research question of "How stakeholder engagement in the design process of nature-based solutions, addressing flood resilience, can increase the acceptance of them among stakeholders?" Additionally, factors that can influence the process of collaborative planning and barriers are studied to provide room for future developments in the planning practice. This is qualitative research that focuses on the societal aspect of the planning practice and hopefully, its results will steer future planning approaches to make them more inclusive.

Keywords: *Climate change adaptation, flood resilience, nature-based solutions, stakeholder engagement, collaborative planning, public acceptance.*

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List of Abbreviations

BGI – Blue-Green Infrastructure

CCA – Climate Change Adaptation

CRED – Centre for Research on the Epidemiology of Disasters

CPT – Collaborative Planning Theory

EEA – European Environment Agency

EBA – Ecosystem-Based Adaptation

EC – European Commision

Eco-DRR – Ecosystem-based Disaster Risk Reduction

EU – European Union

FD – Flood Directive

FRM – Flood Risk Management

GI – Green Infrastructure

IPCC – Intergovernmental Panel on Climate Change

IUCN – International Union for Conservation of Nature & Natural Resources

MFA – Multiple Factorial Analysis

NAS – National Climate Adaptation Strategy

NBS – Nature-Based Solutions

SDGs – Sustainable Development Goals

SuDs – Sustainable Urban Drainage systems

UNA – Urban Nature Atlas

WFD – Water Framework Directive

WHO – World Health Organization

WMO – World Meteorological Organization

WSUD – Water-Sensitive Urban Design

1. Introduction

Urban environments are of special importance as they can be seen as mechanisms of socio-cultural exchange, economic growth, and development and can offer better livelihoods. Half of the world's population resides in cities since 2017 and, according to United Nations (2020), 5 billion people are projected to live in cities by 2030, while the share of the population living in cities will continue to grow. Cities are currently coping with extreme weather events because of climate change. This includes floods, heat waves, droughts, windstorms, forest fires, and extreme precipitation, all of which typically have devastating impacts on urban settlements (IPCC,2022). As a result, basic services, human well-being, health, and the economy of urban areas are threatened by climate change effects (Ruangpan et al., 2020). Thus, there is an urgent necessity to find ways to cope with these challenges and to find the correct means to increase awareness among the public to build resilience and ensure sustainable development.

Goal 13, of the Sustainable Development Goals explicitly addresses the necessity to take urgent action to combat climate change and its impacts. This means that urban settlements must increase their resilience & adaptive capacity to climate related hazards (e.g., floods), by integrating climate change measures into their national/local policies & by raising awareness on climate change adaptation among a diverse group of stakeholders (Doni et al., 2020). The discussion about climate change adaptation & ecosystem-based adaptation will mainly focus on Nature-based solutions (NBS), specifically addressing pluvial flooding. According to the European Commission NBS are "actions inspired by, supported by or copied from nature" (Pauleit, 2017).

Motivational factors for this study is the recent flood events that took place in Central Europe causing the loss of hundreds of lives and livestock, damage to infrastructure, destruction of crops, and disturbances in financial & commercial activities. In August 2021, floods occurred across Germany, Belgium & the Netherlands due to extreme precipitation of up to 200mm in the Eifel-Ardennes mountains (Germany) between 13-15 July, caused by an atmospheric low (named Bernd). Among the consequences of this flood event were inundated cities and villages, damaged or destroyed properties and infrastructure, injured and dead people, and lots of monetary and psychological costs (Lehmkuhl et al., 2022). According to Krammer & Ware (2021) the summer floods of 2021 cost over EU 46 billion.

Similarly, in October 2017 series of flash floods, named Storm Herwart, in combination with strong winds across Germany, Poland, and Czech Republic caused river overflows, and landslides resulting in major infrastructure and property damages. The rivers of Danube (Germany) and Vltava (Czech Republic) reached their highest level resulting in villages and towns evacuations, infrastructure

and building damages, and widespread power outages. At least 11 people were killed, and many others were injured (Schumacher, 2017).

There are many more similar events around Europe, and according to projections by the IPCC (Seneviratne et al., 2021) and WHO (2013) the number of pluvial floodings will continue to rise in the future. Thus, this research is grounded in existing knowledge concerning NBS, collaborative planning approaches, and the relation of stakeholder engagement to NBS. By drawing on insights from available literature, and through the conduction of interviews, this research aims to contribute to the growing body of knowledge in the field of climate adaptation. It seeks to emphasize the importance of stakeholder engagement and the effects of collaboration on facilitating public acceptance and increasing flood resilience.

1.1 Problem Statement

Various studies have focused on potential collaborative approaches that address CCA, to increase flood resilience in urban areas. NBS has lately received great attention for its benefits to climate change but also to human wellbeing (Frantzeskaki,2019; Kabisch et al.,2016). According to Ferreira et al. (2020), NBS is considered a viable solution to climate change effects in European countries. Similarly, in a report by UNEP (2021) NBS is highlighted for its benefits on climate change and on aspects of human wellbeing, namely physical or mental health and recreation. Despite its growing popularity, the concept of NBS has still undiscovered aspects relevant to its application and successful implementation. One of these aspects that will be studied in the research is that of collaboration. In particular, the focus of the study will be the effect of collaborative planning among involved & affected stakeholders in the design of NBS. According to Ruangpan et al. (2020), there is a knowledge gap concerning stakeholder engagement in relation to the realization of NBS. Notably, there are no well-developed frameworks that effectively incorporate stakeholder participation in planning methods, implementing, and evaluating of co-benefits of NBS. The EEA (2021) addressed the need to engage diverse stakeholders in a collaborative design process of NBS to enhance the social acceptability of these solutions.

Authors from the academic world support that it would be beneficial for stakeholders to understand and support the benefits of NBS from a socio-environmental perspective to encourage participation as an approach to increase flood resilience (Pauleit et al.,2017). This is where the hypothesis of this research is based on. *If stakeholders are engaged in the design process of NBS,*

addressing flood resilience, then their implementation will be accepted and supported by them, eventually leading to flood resilience. Ferreira et al. (2020) highlighted the importance of involving citizens, & stakeholders' perceptions & ideas in the creation of NBS. Based on this argument & on the knowledge gap that exists regarding the results of stakeholder engagement in the design of NBS, this thesis will examine the role of stakeholders in relation to the acceptance of NBS addressing flood resilience.

1.1.1 Context of the research

Rotterdam's Response to pluvial flooding

This research covers the geographical context of the city of Rotterdam, Netherlands. Dakpark, one of the largest roof parks in Europe, will be the case of this study since it is considered a good example of NBS with multiple functions (e.g., spatial renewal, urban development, community engagement), inspired and initiated by local communities. More detailed information regarding the case study will be given in the third chapter. The reason behind the selection of this case study is twofold. Firstly, by studying an already implemented project, the understanding and analysis of the results of stakeholder engagement in the design process and the level of acceptance of this project is facilitated. Secondly, the city of Rotterdam has recently faced several climate change and societal challenges, thus the municipality focuses on its sustainable development through innovative and collaborative approaches, encouraging and supporting community initiatives for the development of CCA-related projects (Rotterdam 2022). Rotterdam has adopted an integrated climate adaptation approach with a focus on land use and water management. Rotterdam's approach is characterized by a combination of water management, climate-proofing infrastructure, nature-based solutions, and collaborative governance. Its approach is laid down by Rotterdam Climate Proof (2008) and the Rotterdam Climate Change Adaptation Strategy (2013) (C40 CITIES, 2016). Rotterdam's Climate Change Adaptation Strategy (2013) is based on the following key components, each of them including specific measures.

1. *Outer-dike flood protection*: Optimizing the protection provided by the Maeslant storm surge barrier, replacement of existing barrier or construction of a second barrier, making buildings flood-proof, flood-proof design of public areas, construction of floating communities, placing essential infrastructure (power stations) on higher ground, increasing risk awareness among inhabitants and businesses.

2. *Inner-dike flood protection*: Optimizing the Maeslant and Hollandsche IJssel storm surge barriers, reinforcing dikes, the addition of stretches of open water, green roofs, water squares, and water storage.

3. *Extreme rainfall*: focus on adaptive measures whereby the rainwater is captured, and drainage is delayed, removing paving, infiltrating vegetation, water squares, green & blue roofs, façade gardens, and construction of underground water storage.

4. *Drought*: Creation of extra surface of water, creation or expansion of lakes, canals, waterways, ditches, an increase of flora, removal of paving, construction of private rain gardens, façade gardens, bioswales, pavement planters, irrigation of plants and bushes, porous paving

5. *High temperatures*: Incorporate green in the city, increase heat stress awareness among citizens, remove paving, good management and extension of parks and greenbelts, green roofs, façade, and private gardens, incorporate highly reflective materials in public areas,

A key feature of Rotterdam's adaptation strategy is the development of public-private partnerships, and the involvement of various stakeholders to achieve its objectives for a climate-proof city (De URBANISTEN, 2013)

1.2 Research Objectives

Disastrous flood events require urgent action and holistic approaches based on CCA that aim at protecting societies in the long-term while simultaneously preserving biodiversity. Various studies represent the amount of attention that NBS has lately received for their potential applications and co-benefits regarding flood protection and EBA (EEA, 2021; Kumar et al.,2021; Neumann & Hack, 2022; Brears, 2020; Frantzeskaki, 2019).

However, the scientific literature about the function and benefits of NBS reveals a knowledge gap concerning the role of stakeholders during the decision-making and design of NBS interventions for flood resilience. There is yet limited knowledge regarding stakeholder engagement, their perspectives-interests, and capacities (Brillinger et al., 2021). As a result, it is still unclear to what extent and how stakeholder engagement in the design process can influence, encourage, or delay the uptake of NBS in urban settlements. The main objective of this study is to determine the role of stakeholders in the conceptualization and realization of NBS for flood resilience. Additionally, this study aims to give insights into enabling or constraining features of public participation in NBS implementation.

By synthesizing various bodies of literature alongside interviews, the aim of this study is to contribute to the academic knowledge concerning NBS for CCA at the local scale, collaborative planning, and participation by exploring the effect that stakeholder engagement has on public acceptance of NBS. This research is addressed to every stakeholder that can influence the process of EBA but can also be affected by it. These include urban planners, governmental bodies, cities, businesses, public/private organizations, residents, NGOs, scientists, and urban development experts. The results of this study can be valuable and useful to other municipalities, especially coastal areas that aim for approaches to increase their flood resilience. Moreover, research will add to the understanding of the interrelation of urban planning with the social perspective of the subject, namely the potential of stakeholder engagement, and how they can contribute to the overall sustainable development of an urban area. Finally, the research will shed light on the underlying causes of barriers to stakeholder engagement.

1.3 Research Questions

The research aim and objectives are supported by the following research question and sub-questions:

RQ: **How does stakeholder engagement in the design process of nature-based solutions, addressing flood resilience, increase the acceptance of NBS among the stakeholders?**

SRQ.1: Which motivations trigger stakeholder engagement in the design of NBS?

SRQ.2: What are the challenges or barriers that can influence stakeholder engagement?

SRQ.3: How do collaboration, communication, and shared decision-making enhance stakeholder acceptance of NBS?

1.4 Scientific & Societal Relevance

The impacts of anthropogenic climate change are already experienced and acknowledged by scholars (Milman & Jagannathan, 2017). Human society and natural ecosystems are constantly faced with extreme weather events, such as sea level rise, long-period droughts, floodings and increased precipitation (Wamsler et al.,2016).

A wide variety of publications is now focusing on the importance of NBS for CCA through ecosystem-based approaches, since there are connections to the benefits that natural solutions can provide to the environment, the economy & society (Geneletti & Zardo, 2026; Ruangpan et al., 2020). However, discussions around NBS, and therefore EBA approaches are controversial. According to

Wamsler et al. (2016), EBA approaches could potentially provide optimal solutions to societal challenges. These challenges might include but are not limited to health, food security, well-being, migration, water security, cultural identity & other risks (World Bank, No Date).

Although EBA approaches might be beneficial for CCA, a crucial role in their implementation and effectiveness is played by "how" and "whom" they will be decided, designed, managed, and implemented. This is where stakeholder engagement becomes relevant and can hopefully lead to increased acceptance of NBS adopted by stakeholders. According to Choptiary et al. (2019) participatory outweighs other conventional approaches in the sense that it is cost-efficient, and can sufficiently address complex and multi-dimensional, dynamic issues, such as CCA. What is more, by involving various stakeholders in decision-making processes, knowledge is shared and there is a better understanding of the issues to be addressed. Additionally, ownership & responsibility for achieving a common goal is further enhanced. This will not only facilitate the implementation of NBS but will also increase the level of stakeholder acceptance.

Thus, the insights of this study aim to act as a guide for the various stakeholders involved (urban planners, NGOS, public/private authorities, governments) in the design of NBS aiming at CCA. Collaboration will lead to more improved communication among stakeholders which might result in more efficient climate adaptation.

1.5 Reading Guide

Chapter 1. The introduction includes the foundation of this study and an overview of the identified problem to be examined, supported by general facts and information that inspired this study. Research questions and the aim of the study are formulated, as well as the scientific and societal relevance of the study.

Chapter 2. The theoretical Framework provides the theoretical background of this study. Based on the literature review the main concepts of the study are defined and discussed to be combined and formulate a conceptual framework. Secondary related concepts are also discussed for a better understanding as well as gaps in the literature that guide the research aims are identified. Finally, the conceptual framework of this study is presented.

Chapter 3. Research Methodology presents the methodology of the study, research strategy, data collection and analysis techniques, ethical considerations, and includes a description of the case study.

Chapter 4. Research Results include the presentation of the research findings and empirical results. Findings from the case study are discussed in a comprehensive way to help answer the research questions.

Chapter 5. Discussion includes a reflection on the research results. Key findings are aligned with the theoretical framework and research questions and the hypothesis are answered.

Chapter 6. The conclusion summarizes the main findings, and provides closure to the overall investigation.

Chapter 7. Reflection discusses what went well and bad during the research process and what could have been done differently.

2. Theoretical Framework

Floods are of the oldest natural disasters that affect human and animal civilizations. Flood prone cities are constantly faced with climate change's effects such as sea level rise, storm surges and floods resulting from increase in precipitation patterns. The need for flood safety and prevention has been evident since ancient times. Despite the long history in flood defense based on engineering measures, approaches of FRM might vary based on geographical context and intensity of flood events. The growth in the number of flood events (CRED,2022) indicates a challenge for present FRM approaches, as traditional approaches may no longer be sufficient to protect communities and infrastructure from flood impacts. Researchers have already addressed the need to transition away from the conventional FRM which was particularly conducted in a top-down way, by only governmental bodies (Matczak & Hegger, 2020).

According to van der Brugge, Rotmans & Loorbach (2005) there has been a transition in water management since the 1970s towards more adaptive and participatory forms of FRM, but this is still an ongoing process. In response, there has been a growing emphasis on CCA through participatory approaches which have foundations on the CPT (Soderholm et al., 2018). In the next section CPT is explored. Additionally, relevant concepts of this study will be defined, analysed and related to each other, where applicable, in order to move closer to the answers to the research questions.

2.1 Collaborative Planning Theory

CPT was introduced during the 1970s. It emerged as a response to the limitations of top-down, expert-driven planning approaches that were criticized by scholars for their effectiveness in FRM (Matczak & Hegger, 2020; Ansell & Gash,2008). The theory has been widely adopted in the field of planning and emphasizes the importance of stakeholder collaboration to address shared concerns and employ methods such as consensus building and public participation during decision-making (Purbani,2017; Koutsovili, 2023). It aims to enhance stakeholder engagement in decision-making processes and to achieve equitable power distribution among them (Mercurio,2019).

The foundations were built upon the works of various scholars of the 20th century and were associated with the idea of communicative and collaborative rationale. Godschalk & Mills were among the first theorists that promoted a collaborative approach to planning. They supported the idea that effective planning must be based on a two-way communication flow between the public and the planning agency. Later, Arnstein supported the meaningful role of the public in decision-making processes (Margerum, 2002). Professor Patsy Healey was another prominent contributor to the new paradigm. She based her work on the complexities of planning processes, and she promoted inclusive

decision-making by engaging various stakeholders. In her book "Collaborative Planning: Shaping Places in Fragmented Societies" (2006), she highlighted the limitations of traditional planning approaches that were top-down and failed to capture the diverse interests and perspectives of stakeholders. In contrast, although CPT is closely associated with Patsy Healey, CPT was also influenced by the work of Habermas on communicative action, which emphasizes the importance of rational discourse and mutual understanding in democratic decision-making (Allmendinger,2017). Democratic decision-making refers to open and inclusive discussions among stakeholders where they are actively engaged in authentic argumentation (Purbani, 2017), and listen to other's perspectives to come to agreed solutions.

Similarly, Ansell & Gash supported inclusiveness and argued that face-to-face dialogues, trust building, and the development of commitment and shared understanding are necessary for inclusionary argumentation (Purbani,2017). John Forester was among the scholars that advocated for a shift in planning practice towards more participatory and inclusive processes. He was another theorist that focused on the benefits of engaging diverse stakeholders in decision-making processes and creating discussion arenas for dialogue and deliberation. Furthermore, he explored the role of communication in collaborative planning. He highlighted the significance of effective communication among stakeholders to build trust, understand diverse perspectives, and find common ground. He argued that communication processes can shape planning outcomes and influence the distribution of power among stakeholders (Westin, 2022). Nevertheless, Forester acknowledged that power imbalances can exist among stakeholders, and these imbalances can affect the outcomes of collaborative processes (Allmendinger, 2017). He called for the recognition and mitigation of power asymmetries to ensure more equitable and inclusive planning processes. Overall, Forester's work has been influential in advancing the understanding and practice of collaborative planning. His research sheds light on the role of communication, power dynamics, and practical considerations in shaping inclusive and participatory planning processes.

CPT emerged as a response to the limitations of centralized planning, aiming to address complex urban challenges through inclusive decision-making processes and collaborative partnerships (Allmendinger & Tewdwr-Jones, 2002). It represents a paradigm shift that seeks consensus-building among stakeholders, promoting equal empowerment, shared information, and meaningful dialogue (Purbani, 2017). CPT is based on participatory approaches that foster trust, co-creation, and dialogue. It can be used as a basis for the development of adaptation strategies through collaborative networks, partnerships involving government, community organizations, and private sector actors. Examples include participatory forums, workshops, and public consultations prioritizing community engagement in urban design decision-making.

2.2 Climate Change Adaptation and its Evolution in the Policy Arena

Natural disasters, as an effect of climate, change put pressure on flood defense systems of urban settings worldwide. Various studies have addressed the impacts of pluvial floodings, caused by heavy precipitation, leading to monetary losses, affecting human health & well-being, and increasing ecosystems' vulnerability (IPCC,2022; ECDC,2021; Yin et al.,2016; Kryzanowski et al.,2013). According to a report by IUCN (Monty et al.,2017) a rise in flood occurrence is observed since the 1970s. As visible in Figure 1, the number of flood events almost quintupled in a period of 40 years, and it was the second in frequency of natural disasters among others. Translating that in monetary costs, floods accounted for almost EUR 108 billion, according to WMO (2021). More recent data (CRED,2022) reveal that floods were the second biggest disaster in terms of human impact per continent. However, floods have also a significant impact on the environment and the ecosystem, eventually leading to the loss of biodiversity, therefore urgen action is needed (Aldardasawi & Eren, 2021).
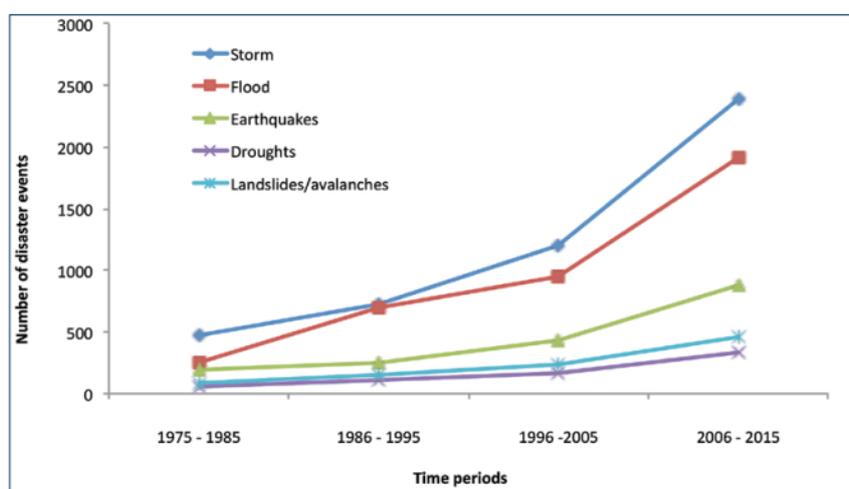
Figure 1 Number of Flood Events during 1975-2015 (Monty et al., 2017)

Recent studies criticize the conventional approaches to flood protection (Lavers, Berry & Booth, 2020; Schoeman, Allan & Finlayson,2014; Ogie, Adam & Perez, 2013). Hard engineering measures aimed at controlling water flow are now considered insufficient, expensive, and potentially harmful to the ecosystem and biodiversity preservation. As a result, there is now increasing awareness of the need to adopt sustainable responses to flood protection that focus on adaptation. Although, there are studies that support the idea that better and more sustainable outcomes can be achieved with a

combination of mitigation and adaptation measures (Laukonnen et al., 2009). Adaptation can be beneficial for stakeholders and increase legitimacy in a planning process since the emphasis is given to local needs (Locatelli et al., 2011).

CCA has been around for centuries since communities have been always forced to adapt to changing climate conditions. However, in the world of modern environmental sciences, it was first conceptualized around the late 20th century. It was the IPCC that first used the term "climate change adaptation" in its report on climate change, in 1990 (IPCC, 1992). This report highlighted the importance of CCA in combination with mitigation measures that should be taken in order to minimize the risk of climate change effects and decrease the vulnerability of societies and ecosystems. CCA was defined by the IPCC (2014) as 'the process of adjustment to actual or expected climate change and its effects'. The report particularly called for coordinated research and stressed the importance of integration of the adaptation measures into development strategies of specific regions and sectors. Overall, the IPCC's first assessment report laid the groundwork for the modern concept of CCA as a necessary complement to mitigation efforts. The report recognized that climate change impacts were inevitable and that adaptation measures would be necessary to reduce the vulnerability of human societies and ecosystems.

For Europe, it was in the early 2000s that they started to pay attention to the concept of CCA and developed policies and strategies to address the impacts of climate change and increase its resilience to it. Following the steps of the IPCC, the EU issued a series of documents and studies for the development of policies to increase resilience to climate change in various sectors (EC, 2023). In 2009, the first climate adaptation policy of the EU was published, the so-called "White Paper on Adapting to Climate Change". Apart from guidance and support to the EU member states in their efforts to adapt to climate change effects highlighted the importance of global cooperation and coordination among the member states and stakeholders. It encouraged stakeholder engagement in the development and implementation of CCA measures and highlighted their role in generating information on climate impacts and vulnerabilities (EC, 2009). Since then, stakeholder engagement has been extensively mentioned in the EU's adaptation policies. The 2013 and 2018 EU Adaptation Strategies emphasized the importance of participatory approaches in the efforts of the member states to develop and implement adaptation solutions at all levels (EC, 2013; EC, 2018). In the latest EU climate adaptation strategy of 2021, the importance of stakeholder involvement and participation in decision-making processes is highlighted. The strategy proposes that different stakeholders from various sectors and levels of governance are involved during the development, implementation, and monitoring of CA policies. Furthermore, it supports more inclusive and participatory processes of decision-making by

involving marginalized or vulnerable groups. Another important aspect that is mentioned is the access to information and knowledge that stakeholders should have. This can be achieved by an open network among different sectors where dialogue and the exchange of best practices are facilitated. Finally, the strategy emphasizes the need for transparency and accountability in adaptation decision-making processes, and the importance of communicating the rationale behind adaptation policies and actions to stakeholders (EC, 2021).

Overall, stakeholder engagement has been a key element of the EU's climate adaptation policies. It has received a lot of attention in the last decades since there is the belief that it can improve the quality of decision-making processes, by increasing legitimacy and eventually increase the effectiveness and acceptance of the adaptation measures.

2.3 Flood Resilience

Europe has a long history of dealing with natural and man-made disasters, from floods and earthquakes to war, pandemics, economic, and recently energy crisis (Schramm & Wessels, 2023; Smetkowski & Dabrowski, 2019; EC, no date). The last decades have been challenging for the European countries which have been coping with sea level rise and extreme weather events (EEA,2017).

Previous research has highlighted the urgent need to deal with flood events (de Silva et al.,2020; Bertilsson, 2019; Laurien, 2020) and to develop flood management strategies that can handle future, severe flood events (Wang et al.,2022). It has been clearly stated that the conventional engineering approaches employed in the past for flood defense might not work for future protection against floods, since climate change will continue to cause unpredictable extreme weather events and natural disasters (Bloemen et al.,2018; Bertilsson et al., 2019). The rapid urbanization resulting in more impermeable surfaces and modified flow routes has increased flood events and the number of potential future risks. As stated in the environmental management literature, resilience is key to reducing vulnerability resulting from unpredictable events (Morisson et al., 2017).

The concept of *resilience* has a long history in academic literature. It is a well-studied and interdisciplinary topic that has received great attention worldwide (Laurien et al., 2020). Researchers and scientists from various fields (e.g., engineering, geography, social sciences) tried to define resilience since the 1060s (McAslan,2010; Alexander, 2013; Amirzadeh et al.,2022). The most used definition in the field of environmental studies is that by Davoudi (2012), who defined resilience as "the ability of social-ecological systems to change, adapt, and crucially, transform in response to stresses and strains". (p.302). After the concept's introduction into the field of environment and ecology, it has been widely

used by scholars in academic literature and policy documentation (Oulahen, 2019; National Research Council, 201o; UNISDR, 2017; IPCC, 2022). Scholars (Rybski & Gonzalez, 2022; Terblanche et al.,2022; Minati,2008) have considered cities as complex systems consisting of diverse interacting sub-systems and co-dependent elements and entities (e.g., people, infrastructure, nature, institutions). Restemeyer et al. (2015) in their effort to unravel flood resilience, gave three attributes to the concept. First. *robustness* refers to the ability of a city to withstand floods, mostly with the use of hard infrastructure (e.g., dikes, storm surge barriers). Second, *adaptability* is about the capacity of communities to adjust, respond and learn from flood events. This entails adjustments in the physical and built environment (e.g., elevating houses) to minimise damage in case of flood events. Third, transformability implies a city's capacity to undergo a transition from "fighting the water" to "living with the water". Although, the authors support that a crucial success factor of such a transition is the change in people's mentality.

2.3.1 What does Stakeholder Engagement mean for flood resilience?

Researchers often emphasize the significance of stakeholder engagement as a key component of effective flood resilience. Driessen et al. (2018) supported the development of public-private partnerships of stakeholders to increase cities' adaptive capacity and flood resilience. According to the authors, the diversity of stakeholders provides the necessary resources, input, and knowledge to develop efficient FRM approaches that lead to flood resilience. Additionally, the involvement of stakeholders in decision-making processes increases the legitimacy of measures and approaches and leads to public acceptance. Similarly, Matczak & Hegger (2021) emphasized the role of stakeholders in the development of flood resilience strategies. The authors supported the idea that stakeholder diversity results in more informed and effective decisions since they can share concerns, identify vulnerabilities, and propose context-specific solutions based on local knowledge. Stakeholder engagement enables education and increases awareness about flood risks resulting in increased response capacity and preparedness (Burnshide-Lawry & Carvalho, 2016).

Overall, stakeholder engagement in the academic discourse on flood resilience is recognized as a critical factor for developing inclusive, context-specific, and sustainable approaches to reduce the impacts of floods and enhance community resilience.

2.4 Nature-Based Solutions

Nature-based solutions (NBS) is a promising concept that was first introduced by the World Bank in 2008 (Swierkosz & Garcia, 2022). They are strategies that focus on land and ocean ecosystems protection, restoration, and management using nature and natural processes, while simultaneously addressing societal challenges (World Bank,2021). NBS deliver sustainable solutions to human needs that can provide multiple benefits for the environment and economy as well.

Many authors have addressed the benefits of NBS for environmental and socio-economic challenges (Somarakis, Stagakis & Chrysoulakis, 2019; Xie & Bulkeley,2020; Pauleit et al,2017; Kabisch et al., 2017). The last report by the World Bank and the GFDR (Zanten et al., 2023) also highlighted a plethora of co-benefits that emerge from the implementation of NBS. In their effort to describe the concept and understand its dynamics within the urban environment, the EC defined NBS as "solutions that aim to help societies address a variety of environmental, social, and economic challenges in sustainable ways. They are actions inspired by, supported by, or copied from nature, both using and enhancing existing solutions to challenges as well as exploring more novel solutions. NBSs use the features and complex system processes of nature, such as its ability to store carbon and regulate water flows, to achieve desired outcomes, such as reduced disaster risk and an environment that improves human well-being and socially inclusive green growth" (EC,2015). Complementary to that definition IUCN described NBSs as "actions to protect, sustainably manage and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits" (Cohen-Shacham et al.,2016). They are considered an umbrella concept that encompasses approaches such as EBA, GI, BGI, ESS, SuDs, WSUDs, and Eco-DRR (Sowińska-Świerkosz & Garcia, 2022; Ruangpan et al., 2020; Pauleit et al., 2017). Although, this study particularly focuses on EBA approaches for practical reasons. EBA originated in 2009 and refers to "the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change" (Geneletti & Zardo, 2016). EBA aims to reduce the vulnerability of communities to climate change and offer multiple benefits beyond climate adaptation, such as biodiversity conservation, climate mitigation, the livelihood of local communities, and recreation and tourism opportunities.

NBS are approaches that can be applied on different spatial scales and settings in and around cities. As these solutions are usually beyond sectoral boundaries, they might require cross-sectoral partnerships. Although, the context of this study is small-scale NBS at the neighborhood level. They can be structural, non-structural, or hybrid. Hybrid measures refer to interventions that can be used in

combination with other GI (engineering) measures such as dams, flood walls, levees, stormwater drainage systems, etc. (World Bank, 2021).

Examples include green walls, green roofs, pocket parks, urban farming, green corridors on the streets, open green spaces, terraces and slopes, green buildings, etc. Apart from reducing disaster risk and protecting urban settings from flooding, NBS can offer other co-benefits, such as an increase in urban resilience, food, and water security, restoration of biodiversity, opportunities for recreation, community well-being, aesthetic improvement, education, social cohesion, an increase of local/regional value, urban regeneration. (Somarakis, Stagakis,Chrysoulakis, 2019). Table 1 includes some examples of NBS and their benefits to climate adaptation that can be implemented in the urban environment, at the neighborhood scale. Specific hazards that can be regulated by the mentioned NBS are also addressed. The examples were chosen in relation to the case of this study, as Dakpark includes some of the measures included in the table.

Table 1 Examples of NBS at the neighbourhood level for flood protection (SCORE, 2023; World Bank, 2021)

Type of NBS	Flooding Regulation	Other Environmental Benefits	Co-Benefits
Urban Forests	Runoff reduction, Slow water flow, Wave height reduction	Water storage regulation, Affecting evapotranspiration, Recharging groundwater, Heat stress reduction, Shading, Stabilizing soil with root network	Tourism & Recreation, Carbon Storage, Human health, Enhancing biodiversity, Resource production,
Urban Parks Open Green Spaces Green Corridors	Water Storage, Water infiltration, Slow water flow	Affecting evapotranspiration, Shading, Stabilizing soil, Heat stress reduction	Tourism & recreation, Carbon Storage, Human health improvement, Benefiting local economies, job creation
Terraces & Slopes	Delay runoff, Runoff reduction, Water infiltration, Water storage	Stabilizing soil, Shading, Heat stress reduction, Affecting evapotranspiration, Erosion control	Enhancing biodiversity, Food security, Tourism & recreation, Cultural,
Green Buildings	Water storage, Delay runoff, Runoff reduction,	Heat regulation, Shading, Cooling	Enhancing biodiversity, Air pollution

	Recycling rainwater, Reduction of peak stormwater load, Water infiltration	effect, drought regulation	regulation, Human health,
Green Roofs	Water storage, Recycling rainwater, Delay runoff, Runoff reduction, water infiltration	Heat regulation, Cooling effect, Heat stress reduction, Air quality, Absorption & reflection of solar radiation, Mitigate urban heat island effect,	Socioeconomic benefits, Human health, Food supply, Job opportunities, Recreation, Education, Enhancing biodiversity, Social interaction
Small Water bodies Ponds Lakes Bioswales Floodable parks	Water storage, Runoff reduction, Delay runoff, Mitigating peak water loads, Water infiltration	Heat regulation, Pollution regulation, Soil stabilization,	Carbon storage, Sequestration, Socioeconomic benefits, Job creation, Education, Enhancing biodiversity, Recreation,
Urban Farming	Water storage, Water infiltration, Runoff reduction, Water retention,	Heat stress regulation, Air quality, Soil stabilization,	Food supply, Food security, Job opportunities, Education, Recreation, Carbon storage, Human health, Social Interaction

2.4.1 NBS and Collaborative Planning

NBS and collaborative planning paradigm are closely connected as they both aim to address environmental challenges and promote sustainable development through participatory and inclusive approaches. Here are some key commonalities between the two concepts:

1.   Shared Goals: Both NBS and CP share a common goal of promoting sustainable development and addressing environmental issues. They recognize the importance of integrating nature and the environment into decision-making processes to achieve long-term ecological, social, and economic benefits.

2.   Participatory Approach: CP emphasizes involving diverse stakeholders, including government agencies, local communities, NGOs, and experts, in the decision-making process. Similarly, NBS recognizes the importance of engaging local communities, indigenous peoples, and

other stakeholders to ensure the design and implementation of nature-based solutions align with their needs and aspirations (Malekpour et al.,2021; Margerum, 2002; Frantzeskaki, 2019).

3. Integrated and Holistic Approach: CP and NBS encourage an integrated and holistic approach to problem-solving. CP aims to consider various perspectives, interests, and knowledge systems to develop comprehensive solutions. NBS also promotes the integration of ecological, social, and economic considerations to ensure that nature-based interventions deliver multiple benefits (Malekpour et al.,2017).

4. Co-creation and Co-design: CP involves co-creation and co-design processes where stakeholders actively contribute their knowledge and expertise to shape decisions and actions. Similarly, NBS emphasizes the co-design and co-development of nature-based interventions, recognizing that local knowledge and expertise are vital for effective and context-specific solutions (Morello et al., 2018; Radulescu et al.,2022; Bogatinoska et al., 2022).

5. Adaptive Management: Both NBS and CP recognize the need for adaptive management approaches. They emphasize ongoing monitoring, evaluation, and learning to ensure that implemented solutions are effective, and they can be adjusted based on new information or changing circumstances (Moreau et al., 2022).

By integrating NBS into CP processes, stakeholders can harness the power of nature to address environmental challenges more effectively and create sustainable solutions that benefit both people and the planet. The CP paradigm provides a framework for inclusive decision-making, while nature-based solutions offer a range of strategies that utilize and enhance ecosystem services to achieve sustainable development goals.

2.4.2 Policy context in the EU and the Netherlands

The EU has prioritized NBS research and innovation in its effort to support its policy agenda which consists of the European Green Deal, the biodiversity and climate adaptation strategy. Thus, the EC has funded and initiated the Horizon 2020 programme which consists of multiple research projects focused on tackling climate change, to achieve the UN's SDGs and boost the EU's growth (EC, N/D).

Due to the extreme vulnerability of the Netherlands to sea level rise, extreme weather events, and flooding (Jorissen, Kraaij & Tromp,2016), NBS have been already incorporated into the national and municipal climate adaptation policy framework. The following documents are considered relevant for this study since they contribute to the understanding of how flood resilience is addressed in the Netherlands.

- **National Climate Adaptation Strategy of the Netherlands, (NAS):**

This is the Dutch strategy for climate adaptation. Which was first published in 2016. The strategy is built upon the main climate risks that the Netherlands face and sets out the plans and actions required for risk reduction by 2050. The NAS desires to unite all parties and promotes participatory approaches for the development and implementation of climate adaptation measures. It recognizes the importance of collaboration between various stakeholders and policy domains, and the establishment of partnerships to facilitate knowledge sharing and collaboration. The NAS invites the government, public sector authorities (local-regional), academic institutes, private sectors, communities, societal organizations, and individuals to actively contribute to the development of measures against climate change through public consultations, workshops, and online platforms (Ministry of Infrastructure & Environment, 2016).

*"Climate adaptation measures are not the responsibility of government alone: companies and individuals also have a part to play. Good communication and information about developments in policy and research will raise awareness and encourage action." (*Ministry of Infrastructure & Environment*, 2016, p.31)*

- **Rotterdam Climate Change Adaptation Strategy:**

The Rotterdam adaptation strategy is an answer to the increasing vulnerability of the city due to climate change and extreme weather events. Since it is a delta city, the municipality developed a set of plans for the development of adaptation measures to increase its resilience against climate change impacts. A combination of mitigation and adaptation approaches is suggested under the development of partnerships between the public and private sectors. The strategy highlights the sense of joint responsibility and the importance of public participation in the development and implementation of adaptation measures. A crucial factor of stakeholder engagement is good communication and information sharing that lead to increased awareness of the adaptation measures, facilitating their speed up and uptake by individuals. According to the strategy, climate change adaptation is both a top-down and bottom-up process (DE URBANISTEN,2013). Under the strategy's guidelines, the regional authorities need to become active facilitators and supporters of community initiatives for

small-scale measures (e.g., green roofs) that contribute to the city's climate resilience. Citizens and businesses are called to play an active role in these plans.

"Small-scale adaptive measures throughout the 'veins' of the city provide opportunities for active participation and lead to broader cooperation between the regional authorities and other parties." (DE URBANISTEN, 2013, p.26)

2.4.3 Knowledge Gap and the Relation to Stakeholder Engagement

While there is a growing emergence of research and studies about NBS, there are still some knowledge gaps, including stakeholders' awareness of NBS benefits for their daily life (network nature,2021). This lack of awareness is enhanced by the fact that there is difficulty in identifying appropriate indicators and metrics to measure the social-ecological effectiveness of NBS (Seddon et al., 2020). Ruangpan et al. (2020) in their study referred to knowledge gaps that exist concerning stakeholder engagement. They highlighted challenges in incorporating stakeholder participation within the assessment and implementation process of NBS. Furthermore, the authors referred to difficulties relating to governance and the provision of information to the actors. Similarly, Lupp et al. (2021) referred to unsupportive governance frameworks and a lack of inter-sectoral communication and information sharing that halt the implementation process of NBS. They proposed more participative approaches for NBS implementation to increase the interest among stakeholders and enhance the feeling of co-ownership, thus acceptance.

2.5 Stakeholder Engagement

In the quest for sustainable and flood-resilient cities, stakeholder engagement cannot be neglected for its benefits. Considering the complexity of urban environments and their ever-evolving nature, they require integrated planning approaches that involve multiple stakeholders, including local communities, individuals, government agencies, non-profit organizations, and private enterprises. CP has emerged in the context of ecosystem management as a powerful tool for empowering communities and fostering inclusive decision-making processes (Spyra et al., 2019). Successful sustainable development of cities and ecosystems can be achieved by cross-sectoral communication and the involvement of various stakeholders in decision-making processes (Arlati et al.,2021). It is globally promoted as a democratic process that supports decentralized environmental and natural resources

management, by recognizing the inherent knowledge, experiences, and aspirations of diverse stakeholders (Fagerholm et al.,2019).

For a better understanding of stakeholder engagement, it is essential to define and categorize stakeholders upon their power and the influence they can have on the decision-making process of a planning project (Bogatinoska et al.,2022; Etxebarria et al., 2022). The stakeholder was originally defined and conceptualized by Dr R. Edward Freeman, who is credited with the development of the "Stakeholder Theory" (Silvius & Schipper, 2019). He defined a stakeholder as any individual, a group of people, or an organization that can affect or get affected by the achievement of the organization's objectives (Zhuang et al., 2019). Based on this definition, the authors refer to stakeholders as those involved in the decision-making process of a planning issue. They participate and can influence the decision-making process and depending on the decision results their interests are positively or negatively affected. Similarly, Bogatinoska et al. (2022) referred to stakeholders as "individuals, groups, and organizations who are affected by or can affect the design, implementation, and evaluation of measures in their catchment.

In the context of this study, stakeholders are considered individuals and groups of people, private businesses, NGOs, or local organizations that have a common interest in identifying, designing, and implementing NBS at the neighborhood level to increase flood resilience. Based on the stakeholder mapping framework of Zingraff-Hamed et al. (2019) stakeholders are divided into two categories, those with regulatory power (primary stakeholders), who can formulate decisions, and those who can only influence decisions but do not have the power and authority to make decisions. Thus, primary stakeholders include government agencies (e.g., ministries, municipalities), environmental agencies, building and construction authorities, and water boards. Secondary stakeholders include residents, NGOs, business and industry associations, academic institutes, media, and community-based organizations. According to Zingraff-Hamed et al. (2019), public authorities are those most associated with the role of coordinators. (e.g., planning staff, water agencies) and often acted as "decision-makers". Although positive research findings highlight the involvement of civil society in the design of NBS. The importance of stakeholders' role in decision-making for NBS implementation is gaining more and more acceptance by academics and environmental organizations (Brill, Carlin. McNeeley, 2022; Mok et al.,2021). Involving stakeholders in partnerships and collaborative planning practices increases the chances of acceptance, however, it is crucial for the efficiency of the planning process to identify the most relevant stakeholders (Zingraff-Hamed et al,2019; Etxebarria et al., 2022).

A critical factor for stakeholder identification and selection is diversity (Etxebarria et al., 2022). Diversity in this context means stakeholders with different ages, ethnicity, cultural ethics and principles, gender, religious and political orientations. The authors support that diversity among stakeholders will provide a plethora of perceptions shaped by their interests, needs, and values. As a result, a broad spectrum of viable NBS can be developed. Among other benefits of diversity and the mutual exchange of perspectives is increased legitimacy and credibility of the decision-making process. The feeling of co-ownership, co-creation, and co-design can be enhanced, and therefore increase equity and inclusivity in NBS (Brill et al., 2022).

2.6 Public Acceptance of NBS

Public acceptance of NBS is a subject that has recently gained attention in the academic discourse. It refers to the degree to which the public or stakeholders support and are willing to adopt and implement these approaches. According to scholars, it plays a crucial role in the successful implementation of NBS and their long-term effectiveness. It can also lead to NBS upscale and repetition (Anderson & Renaud, 2021; Giordano et al., 2020), however, there is still hesitation about their implementation in places where stakeholders are not familiar with the concept of NBS, and policymakers have not invested time to promote them (Bernello et al., 2022). Public acceptance is often discussed in terms of individuals' motivations and the extent to which they support these adaptation measures. According to Bernello et al. (2022), the optimal location for positioning NBS is at the source of runoff. In urban areas, this translates to installing NBS near buildings, and impervious surfaces. This means that NBS will be located on or close to private properties, therefore property owners' perceptions may hinder their implementation. Scholars have focused on studying the attitudes, beliefs, and values of individuals and various stakeholders concerning flood risk, nature, and places in their attempt to investigate motivational factors toward the design and uptake of NBS.

2.6.1 How Stakeholder Engagement Fosters Public Acceptance

Stakeholder engagement has a strong relation to the recognition and acceptance of NBS (Frantzeskaki, 2019). According to the author, NBS require collaborative governance approaches. Different actors can create inclusive designs of NBS under collaborative design approaches to deliver sustainability and flood resilience.

There are various influence factors under which public acceptance can be influenced and facilitated. They can be distinguished between those related to the measures and those dependent on the individuals. The first category includes the *benefits and trade-offs* of the measure. These are among the most influential factors of public acceptance. They refer to the perceived function of the measure as well as any co-benefits. If the public believes that NBS can beneficially address environmental and social challenges, then they are most likely to support them (Giordani et al., 2020). Second, the *effectiveness* of measures for risk reduction is also a crucial factor of influence (Anderson & Renaud, 2021). The overall *costs and funding* of the measure's implementation is another important factor (Beery, 2018). Findings have shown that if the implementation and maintenance costs are cheap and if financial assistance is provided to individuals, then it is more likely that they will support their uptake (Bernello et al.,2022).

In terms of individuals' perceptions, the most influential factor is the degree of *perceived natural hazard*. This may translate to feelings of threat, fear of danger, or concern for disastrous consequences. Past experiences with flood events may contribute to this factor. Next, follows *awareness and understanding* of the measure to be implemented. The more informed and aware of the benefits the stakeholders are the more willing they are to accept and implement NBS. Increased awareness may be achieved with effective communication and education regarding NBS (Anderson & Renaud, 2021). According to Anderson et al. (2021), the *sense of responsibility* that stakeholders may develop during collaborative processes can also influence the degree of NBS acceptance. A common phenomenon is the displacement of responsibility to the government which leads to less interest in engagement in design and implementation processes (Toxopeus et al., 2020). Consequently, the level of acceptance may decrease. In contrast, the active participation of the stakeholders in the decision-making and design process creates feelings of *co-ownership* which leads to public acceptance (Anderson & Renaud, 2021). Furthermore, when stakeholders feel that their needs and concerns are addressed in the design process can foster acceptance since NBS can better align with stakeholders' interests. Finally, the collaborative design enhances transparent communication by providing stakeholders with accurate information about NBS. As a result, *trust and credibility* are built leading to acceptance (Ruangpan et al., 2021).

Acknowledging these factors in the early stages of an NBS project and incorporating them into collaboration processes can help increase stakeholder acceptance of NBS. By addressing concerns, sharing crucial information, considering stakeholders' values and interests, and actively engaging them, the likelihood of common acceptance and successful implementation of NBS may increase (Brill et al., 2022).

2.7 Conceptual Framework

The following diagram represents the conceptual model of this study, containing the key concepts of the research and their interrelation. The conceptual model was constructed based on information retrieved from the literature review. The independent variables of this model are stakeholder engagement, CCA, and NBS. The dependent variables include public acceptance and flood resilience. Public acceptance is first considered dependent on factors of influence discussed in section 2.6.1, second it depends on the degree of stakeholder engagement and finally, there is a significant interplay with flood resilience. The latter is based on the scenario where stakeholders' acceptance of NBS is enhanced when they acknowledge that flood resilience is brought through NBS implementation and their acceptance.

Overall, it is hypothesized that stakeholder engagement in the design process of NBS contributing to CCA, creates the feeling of co-creation, co-ownership and shared responsibility, thus enhances the chances of NBS acceptance. This eventually facilitates NBS implementation, which results in flood resilience in urban areas. Respectively, increased flood resilience and the sense of safety against floods also increases public acceptance, based on the perceived sense of safety by the stakeholders (Giordani et al., 2020).
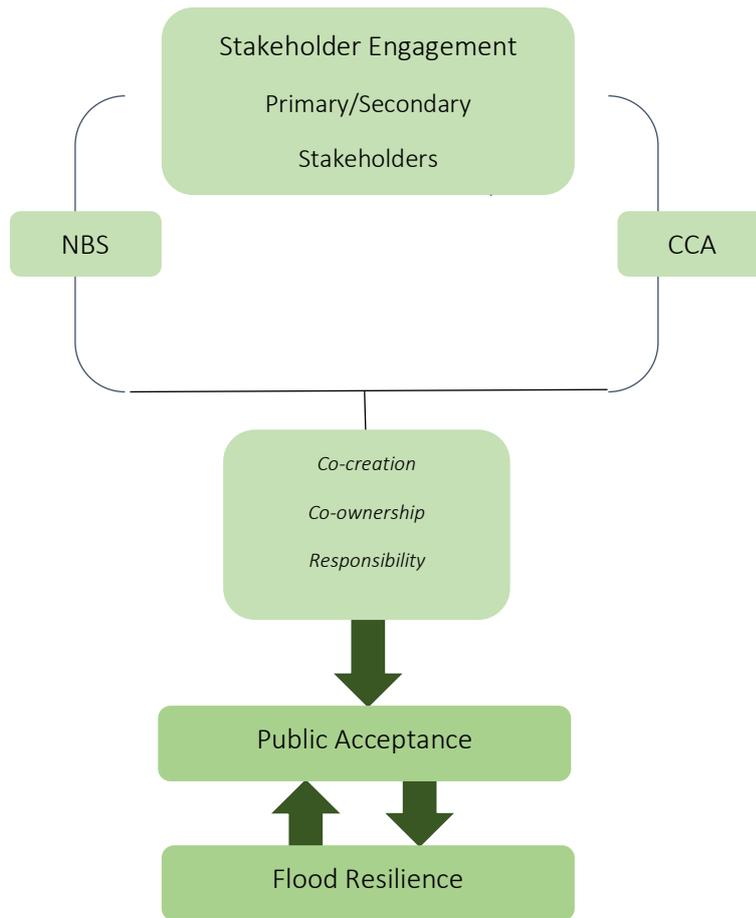
Figure 2 Conceptual Model

3. Research Methodology
3.1 Research Strategy

The main goal of this research is to investigate how stakeholder engagement in the design of NBS can enhance their public acceptance. To achieve this goal a qualitative approach is adopted. A single case study is used to help answer the research questions. This method is chosen as it enables an in-depth analysis of the case and contributes to the investigation of individuals' views and perceptions (Punch, 2014). In combination, literature review, site visits, and semi-structured interviews with key stakeholders that were involved in the case of Dakpark were employed. For a better understanding of the case and of stakeholders' perceptions, personal involvement in a workshop was part of the site visits. This was a gardening workshop, called "Groengroep" for the maintenance of the Dakpark, organized by the local community. This provided useful insights for the context of the study and stakeholders' values and perceptions for their contribution to the Dakpark design and decision-making process. Table 2 relates the different strategies that were employed to the research questions that were answered.

Table 2 Research strategies in relation to research questions

Title	Description
RQ1	Literature Review, Interviews
RQ2	Interviews, Literature Review
RQ3	Literature Review, Interviews, Site Visits

3.2 Data Collection & Analysis

Due to the mixed-method approach of the research, the data collection techniques vary. To ensure a comprehensive investigation, both primary and secondary data are employed. The primary data collection involved gathering information through discussions, site-visits, and semi-structured interviews. The secondary data encompassed already existing information from published research, academic journals, government reports, and publications.

Stage 1: Literature Review

The research process included 4 different stages. The first stage involved conducting a thorough review of academic articles and publications to gain a comprehensive understanding of the concepts and theory mentioned in Chapter 2. To locate relevant academic literature, SmartCat, and Googles Scholar were utilized. Key search terms (e.g., stakeholder engagement, flood resilience, NBS, FRM, ecosystem-based adaptation, collaborative planning, climate adaptation, participatory planning) were used to facilitate the identification of relevant literature. Policy documents (see Table 3) were studied to gain insights into the existing institutional context in the Netherlands and the municipality of Rotterdam. The documents give an overview of Rotterdam's climate resilience strategies, particularly for flood protection, and determined the degree to which stakeholder's are encouraged to actively participate in the design process of flood resilient measures.

Table 3 Overview of reviewed policy documents.

Title	Year of Publication	Description
National Climate Adaptation Strategy (NAS)	2016	The NAS aims to address climate change effects and enhance country's resilience. The strategy is based on the principle of integrated risk management, through a proactive approach to managing climate risks in various sectors and at different spatial scales. It serves as a guiding framework for policy makers, practitioners and stakeholders involved in climate adaptation. Key aspect of the strategy is the collaboration between different stakeholders in implementing climate adaptation.
Rotterdam Climate Change Adaptation Strategy	2013	Rotterdam's CCA strategy outlines the city's approach to address climate change challenges. The strategy is based on the integration of water management into urban planning. It emphasizes collaboration among stakeholders and public engagement to create a resilient urban environment and makes clear that traditional flood defense systems fall short in the face of changing climate patterns.
Rotterdam Resilience Strategy	2022	This document refers to strategies that can increase Rotterdam's resilience and adaptive capacity. The strategy outlines a broad approach to address city's various challenges, including flood resilience. Depending on the nature of each challenge, particular stakeholders that can act as strategic partners are mentioned.

Stage 2: Site Visits & Semi-structured Interviews

In the second stage site visits, and semi-structured interviews (see table 4) are employed. These methods offer real-time information regarding stakeholders' behavior, interactions, and values. The semi-structured interviews validate the information obtained by literature review and verify the accuracy of the secondary data, thus improving the overall credibility of the research findings. The interviews' flexibility and structure allow for a more in-depth exploration of interviewees' opinions, experiences, and insights. All interviews are recorded with prior informed consent of the interviewees. They are transcribed with Descript software and finally analyzed with the use of Atlas.ti. Interviews took place in Rotterdam and remotely, through Google Meets and by email. They lasted for approximately 45 minutes. The interview guides and transcriptions can be found in Appendix A and C,D,E respectively. The site visits took place in Dakpark on 22, 23, and 24 June and they lasted for approximately 3 hours. They benefited the research since they enhanced the feeling of trust (Haessgen, 2019) among the researcher and the involved stakeholders in the interviews.

Stage 3: Data Analysis & Findings

The third stage of the research includes the analysis of literature review & interviews and the development of findings. The interviews are analyzed through a deductive coding framework that is developed based on common themes referenced in the theoretical background. The Atlas.ti software is used for the data analysis. Findings are developed through comparison and combination of the primary and secondary data. The various codes and themes (see Appendix B) are led by the research questions and are relevant to the concepts described in the theoretical framework. The theoretical framework, the insights from the theory, and the interviews help to comprehend how stakeholder engagement is operationalized within the case study and to answer the research question in terms of public acceptance.

Finally, a comparison between results and findings from the literature review and interviews help to confirm or falsify the hypothesis and check if the research findings correspond to reality. In the conclusion section, the research questions are finally answered based on a coherent summary of the research outcomes.

Table 2 Overview of Interviews

	Stakeholder	Number of Participants	Date	Duration
Recorded Interview	Volunteers (Local community)	2	23/06/2023	32:26
Recorded Interview	Landscape Architect (SantenCO)	1	27/06/2023	1:08
Email	Landscape Architect (Municipality of Rotterdam)	1	20/7/2023	-

3.3 Case Study

Located in Rotterdam, the Dakpark serves as an intriguing case study that showcases the remarkable possibilities and transformative effects of NBS within urban settings. This example highlights how integrating green infrastructure can bring about innovative and cost-effective changes to urban environments and societal benefits.

The Dakpark situated on the west side of the city, in the Delfshaven area, is the largest roof park in Europe, covering 80,000m^2. It is built on top of a multi-story car park above a shopping center and integrates a sea barrier for flood protection. Its multifunctional character makes it an exemplary project that responds to the needs of the local community but also assures environmental protection and co-benefits. The park features vegetation, trees, flowers, and shrubs which create aesthetic value but also provide numerous environmental benefits. A thick layer of soil was included in the construction plans to guarantee a water buffering capacity of approximately 100 to 200 liters per square meter (Buro Sant en Co, N/D). This ensures delayed runoff and water storage in case of heavy rainfall. In addition to environmental benefits, the Dakpark offers a variety of amenities and opportunities for recreational activities for the local community and its visitors. The park includes walking and cycling paths, sports facilities, a playground, thematic gardens, a restaurant, and a winter greenhouse. The park serves as a vibrant hub for outdoor activities, cultural events, and community engagement fostering a sense of ownership and belonging to the inhabitants.

The Interest in this case study lies in its collaborative design process, which involved the active engagement and collaboration of different stakeholders since the start of the project. Co-design was key for the project's successful realization since multiple stakeholders would be affected (Raaphorst, 2017). Originally, the place where Dakpark is located, used to be a rail yard for freight trains. However,

illegal activities in the area during the late nineties kept the residents worried about their neighborhood. When the Port Authority decided to give up the rail yard, competing ideas for the redevelopment plans of the area swiftly emerged. On the one hand, the landowner (Port Authority) and the Council of Rotterdam wanted to build shops and other real estate while on the other hand, the local community wanted a park. The solution was found in common through the organization of consultation meetings with residents, the municipality, a Landscape Architect, and developers (Tillie & van der Heijden, 2016). The involvement of residents in the meetings played a crucial role in the development of the park. The architect ensured to incorporate their ideas and wishes of them in the design plans and residents' satisfaction was apparent (Raaphorst, 2017).

The design phase took place in the period of 2002-2007 while the construction phase began in 2009 and lasted for about five years when the Dakpark was officially opened to the public. After the opening of the park, maintenance activities of the park were handed to volunteers from the local community (Buro Sant en Co, N/D).

3.4 Ethical Considerations

The qualitative nature and context of this research require compliance with principles as they are framed by the Netherlands Code of Conduct for Research Integrity (NWO, 2018). These principles refer to transparency, informed consent, confidentiality, data handling and storage and potential risk and benefits of this research. Ethical challenges mainly arise during the phase of data collection, since it involves the use of semi-structured interviews with different stakeholders.

Transparency is crucial to this research and was maintained during all the phases to ensure the credibility of the results. Prior to conducting interviews and observations during the site visits, participants were provided with detailed explanations of the research objectives, procedures and potential benefits. One of the benefits of their participation into the research is the opportunity to express and share their perspectives and contribute to the understanding of research's topic. Consent was obtained before every interview and participants were informed for their right to not answer questions or withdraw at any point during the interview. Confidentiality and anonymity are also ensured, respecting the privacy of participants. Pseudonyms are assigned to participants during data analysis. All collected data are handled and stored securely in password protected folders to protect participants' confidentiality. Data are stored until the completion of the study and permanently deleted by the end of it.

4. Results

The Aim of this chapter is to provide sufficient evidence to answer the research questions and determine the role of stakeholders in both conceiving and realizing NBS (RQ). Through literature review and the conduction of interviews, factors that enable or inhibit stakeholder engagement in the design of NBS are explored (RQ1, RQ2). Furthermore, the impact of stakeholder engagement upon public acceptance of NBS at local scale is assessed (RQ3). The presentation of findings aims to cover the knowledge gap concerning the effects of stakeholder engagement in NBS, as stated in chapter 1.

4.1 The driving forces: Stakeholder motivation in shaping NBS

Scholars are focusing on exploring the motives that lie behind stakeholder's participation in NBS (Ferreira et al., 2020). According to the authors, motives are distinguished in three categories: individual, communal, and environmental. Concerning individual factors, it has been highlighted that stakeholders' proximity to a source of disruption can influence the degree of involvement to the design and uptake of NBS (Ferreira et al., 2020). Stakeholders such as citizens, are eager to participate in NBS for learning opportunities (e.g., gardening), to exercise and improve their physical and mental health, and to defend their properties (Asha & Blahna, 2012). Furthermore, what individuals consider is the perceived function of the measure in combination with co-benefits. Stakeholders are more likely to support an NBS when they recognize environmental and societal benefits.

Environmental motives are driven by the threshold of stakeholders for environmental protection and risk reduction (Anderson & Renaud, 2021). Research highlights that the more guilty stakeholders feel for the environmental degradation, the more willing they are to contribute to the design of NBS (Asha & Blahna, 2012). Another factor is awareness of the project's goals, environmental benefits, and importance. Enhancing prior comprehensive understanding of NBS increases stakeholder engagement and support (Giordani et al., 2020). Studies confirm that when stakeholders believe that NBS can effectively address environmental and social challenges, they are most likely to contribute to their realization (Fors et al., 2019; Giordani et al., 2020).

The last category of motives corresponds to social aspects. Studies highlight the fact that some stakeholders, in particular the public, feel more motivated to engage in NBS for the social interaction with other community members or stakeholders (Asha & Blahna, 2012). They want to enjoy the experience of co-creation with friends, neighbors, and meet new people or even make new friends.

"The more volunteers wanted to be with friends, meet, converse and interact with likeminded people, and enjoy that experience, the more frequently they volunteered with their favorite stewardship organization" (Asha & Blahna, 2012).

The results from the interviews revealed that the most influential factor for stakeholder engagement was the recognition of environmental benefits, the desire for a greener city and finally, the recreational and educational opportunities for them and the rest of the neighborhood. Volunteers from the local community, mostly residents close to Dakpark, highlighted the importance of a nice and neat environment. They highly valued the presence of greenery and vegetation, and they supported the benefits of it for the preservation of biodiversity.

"I think nature is important for cities, and nature can be beautiful to recreate, but also for education for the children, that they can see where the apple grow. Not in the supermarket, but on the trees. And, yeah, I wanted a greener city. – Volunteer A"

The interview with the municipality's landscape architect and the appointed designer confirmed the importance of greenery and vegetation for the residents but also for themselves. However, when referring to stakeholders with property rights they mentioned their threshold to get involved in the design phase for monetary reasons.

"I like to make my assignments as green as possible. – External Designer of the Dakpark"

"The underlying district needed a green living space. - Municipality Landscape Architect"

Moreover, during the site visits, one of the discussions with the volunteers revealed that they saw the design process as an opportunity to meet and interact with their neighbors and other volunteers.

4.2 Challenges for Stakeholder Engagement

For the second research question interviews with both volunteers and the designers of the Dakpark were conducted which revealed factors that hindered the design process and impeded stakeholder engagement.

The factor that was mostly mentioned by the volunteers was the competing visions and interests they had. Residents wanted a safe place, with a lot of greenery, and natural elements, but they all had a different perception of how the park would look like.

"Everyone wanted the park but in a different way." – Volunteer A

"The more people you have, the more ideas you have." – Volunteer B

The Landscape Architect from the municipality of Rotterdam revealed that the district wanted a park and the port authority (owner of the plot) wanted to earn money from that land. Particularly he mentioned:

"Everyone had their own interests. A very extensive and costly remediation has taken place."- Municipality Landscape Architect

During the consultation phase, a lot of discussion was driven by the competing ideas that stakeholders had for the designs of the park. Sometimes there was opposition to designs between the local community and the authorities. Volunteers also highlighted that even though they actively participated in the design process and the consultation meetings, they found out that in the end some of their ideas were not considered and incorporated into the final designs. This resulted in dissatisfaction among the volunteers.

"The really cooperate, and work together. And it didn't feel on the same level. We can talk, they ask, what do you want? And then they go back to the city hall and make their plans. And don't take the ideas of the people who live here seriously. They do their own plans." – Volunteer B

"Resistance from the port authority, colleagues, and residents. The Port Authority and colleagues thought it was a complicated plan and preferred a separate building and separate park on the ground. Residents preferred a normal park on the ground. Lots of consultation. Take you step by step through the process. Making it clear that stacking from park to building was best for everyone." – Municipality Landscape Architect

Financial challenges occurred during the design process as well. The creation of a rooftop park with a thick soil to handle the weight from the vegetation and trees was a challenge and it turned out to be a costly project.

"Lots of challenges. Expensive remediation, a park that was getting higher and higher and therefore more difficult to reach, a roof of a building that had to remain watertight, high costs to make the roof strong enough to support tall trees." – Municipality Landscape Architect

When Volunteers were asked if their ideas were incorporated into the plans they answered:

"Sometimes. Cause they make decisions because they have the budget, the decide how to spend it. So, when the budget already finished. "No, we can't do that. We just can do a little bit of that." So, they already made the decisions. Then we find out what the decisions were. So, we were not always happy with the decisions they took. Or how they took it." – Volunteer B

Another issue that brought tension and discrepancy among the stakeholders was the safety and security concerns that Volunteers had for the development of the park. Before the development of the Dakpark, the neighborhood was not a safe place for the residents due to illegal activities that were taking place. That made the residents hesitant in the beginning and influenced the way that residents visioned the park. They wanted a park, but a safe park with a fence which came in opposition with the design from the external designer and the municipality. This resulted in time consuming negotiations and adjustments of plans.

"This neighborhood had to do with challenges of.. It was not a safe neighborhood. So, people were afraid a park could be a place where people can hide, prostitutes can work, and junks. So a lot of people had a lot of trouble with junks' hangouts, robberies." – Volunteer A

"Lots of challenges. Expensive remediation… residents who were afraid of bums and junkies in the park and therefore wanted the park to be lockable. Etc. As a result, a lengthy planning process with many adjustments to the design and many cutbacks."

4.3 Collaborative and shared decision-making.

From the interviews and the site visit discussions, collaboration among the stakeholder during the design phase of the Dakpark and the decision-making was discussed to understand how it was conceptualized.

Every participant in the interviews confirmed that collaboration was facilitated with consultation meetings for two months. They called it the "Dakpark Cafe". The meetings were organized by the appointed Designer of the Dakpark and took place in combination with interviews, design studios and excursions to take inspiration from other exemplary parks. During the consultation meetings, residents, representatives from the port authority (owner of the plot), the planning team, and a supervisor from the municipality of Rotterdam were actively engaged in the decision-making process.

The residents already knew what they needed for their neighborhood, and they co-created a plan with several "commands" which they presented to the designer of the park and the municipality. The interviews revealed that residents had a sense of responsibility and co-ownership for their neighborhood, while they wanted to contribute to the design of the park but also its maintenance. Thus, they expressed their needs and tried to bring ideas for the designs.

"The discussions were arranged by the project manager of the city, and then there was a meeting. I tried to always be there and include my ideals in the discussion" – Volunteer A

"But here, the whole idea was because the people were already involved. They were already being asked, what are the most important points? If we make a park, what should be in it? So they make, they had a list of 10 demands. ...So, they were already pretty involved and they got the opportunity to make the decision" – External Designer of the Dakpark

"An extensive planning team and an intensive participation process with residents, including a two-monthly Dakparkcafe." – Municipality Landscape Architect

Communication was facilitated in the consultation meetings and inclusivity and diversity was ensured among the stakeholders. However, it was highlighted by the volunteers that most of the people who participated in the design process were Dutch and of a limited age range. The stakeholders that were involved in the design process were the developer of the building under the Dakpark, port authority, ProRail, municipality of Rotterdam, residents, the water board and Eneco.

"There was a group of people talking about the plans for the park with all the neighbours. There was a project leader paid by the city who arranged meetings for the plans. And the oldest people of a safe park with gates. And we talked about the diversity of planting." – Volunteer A

"We met a group of people who could easily talk with us about design possibilities. And some people are not suitable for going through all those design steps, but others are. So, we selected a group of about 40 people. We invited this group every Wednesday afternoon to go to the place we rented at the edge of the Dakpark." *– External Designer of the Dakpark*

Transparency and Legitimacy was another aspect of the design process. Through the discussions, residents had the opportunity to express their opinion on designs, make their needs clear and negotiate plans with the designers and developers of the project. In that way, designers were able to better understand the needs of the local community.

"Listening and trying to understand what they meant was 50% of the work. And then of course, I make the drawing.." – External Designer of the Dakpark

Nevertheless, when a particular issue emerged with the construction of a restaurant's installation at the park which was not initially at the plan, residents felt that they were not sufficiently informed from the beginning and their dissatisfaction with the plan was not considered by authorities and the other stakeholders.

4.4 Stakeholder Engagement Impact

The active involvement of the various stakeholders in the design phase of the Dakpark had its advantages and disadvantages for the stakeholders. The results varied in accordance with the perceptions of different stakeholders. Nonetheless, few times it was mentioned that the more the people and ideas the harder it was to come to an agreed solution, many benefits emerged from stakeholder engagement. According to the Landscape Architect from the municipality of Rotterdam, stakeholder involvement had a major influence on the final designs.

"Had a major influence on the design. The design has mainly become simpler and more robust. Sometimes given the benefit of the doubt. Sometimes against my better judgement." – Municipality Landscape Architect

On the other hand, when residents were asked if they felt satisfied with the consultation process and the design phase, they answered that they were not always happy with that. Sometimes they felt that their inputs were not appreciated and incorporated in the plans by the municipality and the external designer.

Another impact of stakeholder engagement that emerged from the interviews and the site visits was the overall acceptance of the project. The external designer of the park and the Landscape architect stated the participation of stakeholders in the consultation meetings enhanced information sharing, increased the feeling of co-creation and ownership, and therefore resulted in acceptance of the Dakpark from most of the parties. Few residents were hesitant and negative to some plans. However, the residents didn't confirm that acceptance was influenced by their participation. They already wanted the park although they visioned it in a different way. Similarly, findings from the literature review confirmed that stakeholder engagement strongly relates to NBS acceptance and implementation (Frantzeskaki, 2019). According to the theoretical framework NBS require collaborative governance and inclusive decision making for successful results.

Overall, the collected data revealed several key insights for the design process. Collaboration was facilitated through consultation meetings involving various stakeholders. The project's success was influenced by transparent communication and addressing stakeholder's needs. Competing visions and interest among the involved stakeholders hindered the design process. Dissatisfaction among volunteers and authorities arose in combination with monetary constraints. Security concerns from the neighbourhood's history of illegal activities led to negotiations and adjustments in the park's design. Communication, inclusivity, and diversity were promoted. Despite challenges, stakeholder engagement contributed to improved designs, co-ownership and acceptance of the project, though not all residents felt their inputs were valued.

5.Discussion

5.1 Aligning Research Findings with Theoretical Constructions

The research findings shed light on the significant relationship between stakeholder engagement in the design process of NBS and the subsequent acceptance of them. Through a comprehensive exploration of motivations, challenges, and factors that influence the collaboration and decision-making process, the study offers insights into how stakeholder engagement enhances the acceptance of NBS projects aimed at addressing flood resilience.

The findings extracted from the discussions, and the interviews in general align with the results from the literature review, however there are few points addressed in the literature review that were not confirmed by the interviews. For example, stakeholders did not mention that hesitation emerged from their limited knowledge about NBS. In contrast, though residents that participated in the design process were already concerned with the environmental benefits of the park and they supported its implementation although at the design phase climate change was not a big concern for officials. Another finding that was falsified by the interviewees was the displacement of the responsibility to the government (Toxopeus et al.,2020). Stakeholders, especially residents, already felt responsible for their neighborhood, thus they were actively involved in the design process. The aspect of involving residents and developing public and private partnerships in the design process was highlighted in interviews and in literature review (Ferreira et al., 2020; Arlati et al., 2021), as there is diversity in the ideas and perceptions of NBS. The involvement of various stakeholders and cross-sectoral communication was also a key feature of Rotterdam's Climate Adaptation Strategy (DE URBANISTEN, 2013). Partnerships can prove beneficial for communication and ideas sharing, leading to increased acceptance of NBS.

A remarkable finding is that flood resilience was not an issue addressed during the design process of the Dakpark. The interviewees did not address flood resilience as a key point of the consultation meetings. When interviewees were asked how flood resilience was incorporated into the plans, they answered that the park was located on an already existing dike, and they didn't pay much attention to the issue at that period. This comes in contrast with the recent developments in the academic discourse which supports that stakeholder engagement leads to more informed decisions that effectively address flood resilience.

Diversity is another factor that was both addressed in the interviews and literature review. As scholars of the CP support, the benefit of involving various stakeholders in a design process of NBS (Purbani, 2017; Driessen et al., 2018; Ruangpan et al., 2021), the interviews revealed contradictive results. On the one hand, diversity enhances shared knowledge, builds trust, legitimacy, and increases

awareness of the risks to be addressed, whereas on the other hand it can lead to competing ideas and eventually result in time consuming processes. Thus, a balance and a correct identification of stakeholders is suggested. Scholars have already developed frameworks that address stakeholder identification for inclusion to decision-making processes, to achieve the optimal results in a reasonable time frame. Such frameworks are addressed by Zingraff-Hamed et al. (2019) and Etxebarria et al. (2022). Further research is recommended on how to achieve optimization in balancing the correct stakeholders upon their competing interests and power to influence an NBS project.

Overall, the literature review, site visits and interviews revealed that each stakeholder had their own values and motives to engage in the design process of the Dakpark. Motivational factors mainly include appreciation for the natural and environmental benefits, coupled with a collective desire for a greener urban landscape. The recognition of the park's potential to provide both recreational and educational opportunities, in addition to social interaction within the community supported the rational for active involvement and participation.

The results seem to validate the theory of CP described in chapter 2. Collaborative decision-making, transparent and inclusive discussions that foster the active engagement of stakeholders can prove beneficial for the planning practice, based on the results of the research.

5.2 Validating the Conceptual Framework

The conceptual model of this study was created based on key findings derived from the literature review. It illustrates the interrelation of stakeholder engagement with NBS, CCA, public acceptance and finally flood resilience. The interplay within the model is multifaceted. Public acceptance is contingent upon influencing factors such as: the benefits and trade-offs of the measures, their perceived effectiveness for flood protection, financial factors, the safety concerns of stakeholders, the awareness and understanding of the measure, the sense of responsibility that stakeholders have and the interests and needs of the various stakeholders. In addition, acceptance depends on the degree of stakeholder engagement. Stakeholder engagement in turn, is closely related with NBS implementation that contributes to CCA. According to the findings, stakeholder engagement in NBS design fosters feelings of co-creation, co-ownership, and shared responsibility, whereas also legitimacy and inclusivity. These feelings in turn increase the likelihood of NBS acceptance. Consequently, this facilitates the actual implementation of NBS, that might lead to increased flood resilience within urban areas. Although, the model proposes that enhanced flood resilience resulting from NBS reinforces public acceptance, research findings did not confirm this relationship.

5.3 Answering the research questions & hypothesis

The results of the research prove to be valuable based on the theoretical framework. Findings help to answer the research questions and the hypothesis.

Research question 1:

The motives that can influence and increase stakeholder engagement include natural and environmental values and benefits, desire for a greener environment, recreational, educational, and social interaction opportunities. In addition, stakeholders' proximity to a source of disturbance, awareness of the NBS goals, function and co-benefits can also increase stakeholder engagement. Finally depending on the background of stakeholder monetary profits can also trigger the involvement of a stakeholder in the design process.

Research question 2:

The study uncovered a range of factors that might hinder the process of stakeholder engagement in the design phase of NBS. Such factors include diversity of perceptions that lead to competing visions among stakeholders, financial constraints, security concerns, and instances of dissatisfaction hinder the engagement process. These challenges resonate with the literature's discussions on hesitation, and limited threshold to participate in the design phase.

Research question 3:

The literature review and interviews revealed that collaboration, communication, and shared decision-making are success factors in planning practice. Collaboration among stakeholders brings knowledge and ideas exchange, fostering shared understanding of the challenges and opportunities related to NBS. Effective communication can increase awareness of the environmental benefits of NBS and flood resilience. It can also enhance transparency of discussions which can increase stakeholders' trust to the project, leading to higher acceptance. The Dakpark Café fostered shared decision-making which enhance the feelings of co-creation and co-ownership among stakeholders. These findings align with theoretical frameworks that emphasize the importance of participatory approaches, effective communication, and shared decision-making in promoting stakeholder acceptance.

Hypothesis:

It was hypothesized that stakeholder engagement in the design process of NBS contributing to CCA, creates the feeling of co-creation, co-ownership and shared responsibility, thus enhances the chances of NBS acceptance. Respectively, increased flood resilience and the sense of safety against floods also increases public acceptance.

The results confirm the hypothesized relationship between stakeholder engagement and public acceptance of NBS. However, it is not validated from the interviews that increased flood resilience due to NBS results in increased acceptance of NBS.

Overall research question:

The results from the literature review and interviews suggest that stakeholder engagement in the design process of NBS does contribute to feelings of co-creation, co-ownership, collaboration, trust building and shared responsibility. These feelings result in enhanced likelihood of NBS acceptance among stakeholders. According to the findings, collaborative decision-making fosters a sense of shared responsibility leading to an overall support and acceptance of NBS. Furthermore, the alignment of stakeholders' interests, safety concerns, and perceived benefits increase their support and acceptance for NBS.

6. Conclusion

In the face of climate challenges, the integration of NBS into urban planning has emerged as a promising approach to enhance flood resilience while fostering sustainable development. The aim of this study was to unravel the relationship between stakeholder engagement and the successful design and implementation of NBS projects, particularly those addressing flood resilience in urban areas. The main objective of this thesis was to explore how stakeholder engagement in the design process of NBS for flood resilience can increase the acceptance of NBS among stakeholders.

Through an in-depth case study of the Dakpark in Rotterdam and a comprehensive analysis of literature, interviews and site-visits, this research provides valuable insights to answer the research questions and illuminate the critical role of stakeholder engagement. Collaborative planning, effective communication, and shared decision-making are considered success factors in the planning practice. They can raise awareness, facilitate exchange of ideas and information among stakeholders and contribute to a shared understanding of the challenges and opportunities of NBS. The findings of this study illuminate the multifaceted motivations that drive stakeholder engagement in the design of NBS, whereas also highlights influential factors that hinder stakeholder engagement and can result in decreased acceptance of NBS. Recognizing these factors can be valuable for the planning practice since their mitigation can foster a sense of co-ownership among stakeholders, enhancing NBS outcomes.

The study's hypothesis, which developed a positive correlation between stakeholder engagement and NBS acceptance, found partial confirmation in the research outcomes. While stakeholder engagement contributes to feelings of shared responsibility and co-creation, the direct influence of increase flood resilience on NBS acceptance was not verified, paving the way for further research.

To conclude, this research provides a comprehension of NBS within the context of urban planning, offering insights that resonate within both theoretical frameworks and practical application. By focusing on the dynamic interplay between stakeholder engagement and NBS acceptance, this study highlights the importance of collaboration, effective communication, and shared decision-making in developing sustainable solutions for flood resilience. As cities worldwide are confronted with the urgent need of adapting to climate changes and sustainable urban development, the findings of this research provide a guide for planners, policymakers, and stakeholders seeking to navigate the complex landscape of NBS. Through these insights, we step closer to a future where resilience, environmental integrity, and community well-being harmoniously coexist in urban landscapes.

7. Reflection

The thesis focuses on a single case study that allows to explore in depth the subject of stakeholder engagement and stakeholder's behavior and perceptions. For the purposes of the research, semi-structured interviews were conducted with a limited sample size, but included diverse stakeholders, such as residents, architects, and a representative from the municipality of Rotterdam. Although interviewees were immediately willing to participate in discussions and share their experience and thoughts, not all interviews revealed the expected information. Interviews with more stakeholders of diverse background are recommended for future research since it will provide more diverse and valid results. Research results could have been different if the perceptions of other stakeholders and more volunteers were investigated. Furthermore, the aspect of flood resilience is not reflected in the discussions. This resonates in the fact that when the design process took place climate change was not a concern as it is now. Thus, stakeholders did not provide insights regarding flood resilience during the interviews.

The use of multiple cases and from other countries could make the results about the research more accurate, as different cultural, social, and environmental factors in other regions can influence stakeholder engagement and acceptance. Finally, comparison of the findings with similar studies conducted in different contexts or with different nature-based solutions can provide a broader understanding of the effects of stakeholder engagement on acceptance.

Overall, semi structured interviews and discussions during site-visits gave the freedom to interviewees to express their perspectives and experiences in their own words, providing nuanced and detailed insights. The research was grounded on existing knowledge and prior research. Thus, findings were built upon a strong foundation of theory. Furthermore, the benefit of focusing on an implemented project is that it can potentially contribute to other ongoing or future projects by providing insights into success or hindering factors of stakeholder engagement and acceptance and can be used for the development of stakeholder involvement strategies.

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Appendices

Appendix A

Interview Guide with external Designer of Dakpark

- Introduction of Interviewer: personal background, topic of the thesis, explanation of key concepts, purpose of the interview
- Assure confidentiality and obtain consent for recording & notetaking.

- Could you please describe your role and responsibilities as the Designer of the Dakpark?
- What motivated you to design the Dakpark?
- What were the key stakeholders involved in the design process?
- What specific motivations did you observe among the stakeholders involved in the design of project? (in terms of stakeholders' perceptions of the environmental and social benefits of the Dakpark)
- Did you face any challenges during your collaboration with other stakeholders? Can you discuss any specific instances where you had to reconcile conflicting opinions or ideas among the stakeholders? How did you navigate those situations?
- Did you observe any resistance or skepticism toward your plans as the design process unfolded? If yes, what factors contributed to that resistance and how did you address it?
- Were there any major design decisions that were particularly challenging or required extensive collaboration to reach a consensus? How did you overcome those challenges?
- How were stakeholders invited to participate in the design process? What strategies or tools did you employ to foster effective communication and collaboration among the various stakeholders throughout the design process?
- How did you incorporate feedback and suggestions from the community into the park's design? Did this input significantly influence the final outcome?
- Looking back, do you believe that the collaborative design process influenced the stakeholder's overall acceptance and support for the Dakpark? If so how ?

Closing of interview:

- Thank Architect for his time and insights.
- Offer the opportunity to share any additional thoughts or information.

*Helps Answer RQ1

*Helps Answer RQ2

*Helps Answer RQ3

Interview Guide Volunteers

- Introduction of Interviewer: personal background, topic of the thesis, explanation of key concepts, purpose of the interview
- Assure confidentiality and obtain consent for recording & notetaking.

- Could you please describe your role and tasks in the design process of the Dakpark?
- What was your motivation to participate in the design of Dakpark?
- Were there any specific goals or benefits that you aimed to achieve through your engagement at the design process, either for you or the local community?
- How would you describe your level of involvement in the design process? Were you able to actively contribute your ideas and opinions?
- What challenges or obstacles did you face during your involvement in the design process of the Dakpark?
- Were there any factors that hindered your engagement/participation at the design process?
- How was communication facilitated among you and other stakeholders during the design process? Can you describe a consultation meeting/ collaboration activity?
- Do you feel your inputs and ideas were valued and incorporated into the final design? Could you provide some examples?
- Did your contribution to the design of the Dakpark enhanced your understanding and appreciation of the project? Would you support the uptake of similar projects for your city?
- Based on your experience, how important do you think it is for stakeholders (local residents) to have a say in the design of community projects like the Dakpark?

Closing of interview:

- Thank Volunteers for their time and insights.
- Offer the opportunity to share any additional thoughts or information.

*Helps Answer RQ1

*Helps Answer RQ2

*Helps Answer RQ3

Interview Guide Designer/Landscape Architect of Dakpark (Gemeente Roterdam)

- Introduction of Interviewer: personal background, topic of the thesis, explanation of key concepts, purpose of the interview
- Assure confidentiality and obtain consent for recording & note-taking

- Could you please describe your role and responsibilities as the Designer of the Dakpark?
- What was the municipality's motivation for constructing this park? Were there events/circumstances that made it necessary?
- What were the key stakeholders involved in the design process?
- What motivations have you observed among the other stakeholders involved in the design process? Were they concerned about the environment?
- Have you encountered any challenges while collaborating with the other stakeholders? If so, to what extent has this influenced the design process?
- Did you notice any resistance or skepticism towards the council's plans during the design process? If so, what factors contributed to that resistance and how did you address them?
- How was the cooperation between the municipality and the other stakeholder facilitated? How were stakeholders involved in the design process?
- How were stakeholders invited to participate in the design process? What strategies or tools did you employ to foster effective communication and collaboration among the various stakeholders throughout the design process?
- How did you incorporate feedback and suggestions from the community into the park's design? Did this input significantly influence the final outcome?
- Looking back, how did the collaboration and shared decision-making contribute to the acceptance of the park by various stakeholders, including the community and other relevant parties?

Closing of interview:

- Thank Architect for his time and insights.
- Offer the opportunity to share any additional thoughts or information

*Helps Answer RQ1

*Helps Answer RQ2

*Helps Answer RQ3

Appendix B

Coding Scheme

Theme	Description	Code
Motivation for participation	Stakeholders have their own incentives to get involved in the design process of NBS, including their perception of the environment, sustainable development and opportunities that can be created for the community.	Natural & environmental Benefits
		Desire for greener city
		Recreational & educational Values
Challenges	Difficulties faced by stakeholders during and after the design process that can hinder the design or implementation of an NBS project.	Competing visions & interests
		Dissatisfaction with other stakeholders
		Financial
		Safety and security concerns
Collaboration	A process of interaction and building consensus among stakeholders towards a shared goal. (e.g., the design of NBS)	Co-creation
		Co-ownership
		Collaborative decision-making
		Transparency & Legitimacy
		Facilitating communication
		Inclusivity & diversity
Stakeholder Engagement Impact	The outcome of stakeholder engagement process on both stakeholders and the project itself.	Stakeholder Acceptance
		Influence of design plans

Appendix C

Interview the external designer of the Dakpark

Interviewer: First of all, could you please describe your role and the responsibilities you had as a designer of the dark park?

Interviewee: Yeah. It was quite a long process. So, where I begin.. Maybe the selection. That's an important moment. I have my private company Buro Sant and Co. And there are a few other offices who are capable to design in a public situation like this.
So there was a kind of competition and there was about 16 people in the jury. There was the developer of the building itself and the shopping mall underneath, there was the municipality, but the large part of the group were the community people the inhabitants of the nearby living area Bosch polder because it's a very complex very expensive project.
There are three levels of government. The Central Dutch government would pay money when there was a success in a good example of double ground use or a very effective ground use something very big on a very small plot or with, with staggering functions. The central city would give money because we needed extra money. It's not only a shopping mall and a car park garage, but the costs are enormous when you make a landscape on top. The second layer of the city of Rotterdam, Rotterdam would give money if we were succeeding in the fact that we created jobs. And then a few million after the municipality came. And then there was a local the part municipality because the whole orthodon chops into different local entities. Delfshaven, that's the name of the, the area around. That's a municipality on its own. They could give money if we had local support, if, the people were felt involved and if they had the feeling that it was also their design and their wish. So those three levels were very important to get all the money. The roof park itself costs about, 12 million, the trees and the layer of soil and the valve, the facilities. But then the roof itself of the building underneath had to be much more heavy, more concrete, more steel in it to carry the weight of the earth and the trees and so on.
So that's why we needed extra money. So that meant that I had to do the process very close to the the people living around. So we organized every Wednesday meeting in a local house close to the Dakpark where, where they could walk in during the design process. In fact, there were meetings, all kind of points, but we were there with our drawing tables and so they could reach us very easy.
And then there was a meeting and sometimes a discussion. But we worked there every week. That's pretty unique, but normally you get an assignment offer. Contract of a municipality or a developer. Then you make the design and sometimes you presented to people, then there are some things you have to change and that's it. But here, the whole idea was because the people were already involved. They were already being asked, what are the most important points? If we make a park, what should be in it? So they make, they had a list of 10 demands. They wanted to have thousand trees. They wanted to have one meter of soil. They wanted Intimacy. So all kind of things they wanted. So they were already pretty involved and they got the opportunity to make the decision, which architect do we want here to be? The designer and there was a very good office out Utrecht.
They asked the question, why are you designing this? And they answered. I heard it later. Oh, we want to be in the magazines. And I didn't know because I was one hour later and they asked me, why are you doing this? And then I said, oh, I am totally not interested to be in the booklets or the magazines.
I want, if I walk there and park has realized that you are satisfied because it's a very local, maybe it's a big thing, but the meaning is the functional meaning is pretty local and it's for the neighborhoods there and, and the stepping stone to the arm area on the opposite side. Okay. But 90% of the importance of the thing is the local improvement on the quality. So it's for you. And and that answer, maybe there are some more points, but I can remember they liked that answer that I didn't want to be in, in Renaissance. But I wanted that they were satisfied at the end of the whole process.

And that's really true. Nevertheless, I came in a lot of magazines with this design because it's pretty unique, it's very big, the one km long and very narrow, and it's on top of a building. And that still the parking garage. So there's maybe a thousand parking places.I don't know exactly, but it's still pretty empty inside. One of the things is it was the backside of Rotterdam with the infrastructure and the dead ending ends of the train and and petrol stations and all kind of early things. The, harbor area on the west side, they are being developed into dwellings. So all the ship activities are going away and it would be more and more city. So making a quality step is turning the backside of infrastructure and sss into a kind of stepping stone a front side, the green where the city can orientate on so that in fact, that's the most important urban meaning of the implementation of a quality space like that.

Interviewer: Okay. So the biggest motivation you had, as I understood, is to provide something to the local community that would satisfy their interests, their and their needs.

Interviewee: Yeah, because I know the process, because everyone wants to, feed the ducks and simple things. And if they want intimacy on top of a roof park, there's always wind there.
You cannot make it intimacy. So, I know the process of listening very good to what's in their mind. We didn't plant thousand trees because then you have a forest, not a park. So we sometimes you don't have to take the things too literally, but you have to take the people seriously.
And then you try to, why are they saying this? And then can you imagine that we do it like this? And then can you imagine we do it like that? And if you make open field, you can Work with a kite in the air because the wind is nice. And if you are have a place where you can overlook the whole city, that's very nice.
And in the distance you can see all the big buildings and so on. So that then you have the opportunity to explain the unique qualities of a lifted part like that. And so, and, and if you are in the process of talking about it, then they accept you as a professional. I know what I'm doing and I'm not afraid of listening, I'm not afraid that I draw something someone else shouts. I'm gonna draw that. No, that's not, not a way. It's too simple. So that doesn't work like that. So I also became aware that listening and trying to understand what they meant was 50% of the work. And then of course, then I make the drawing, then I.
Also do this. And if it's, and it's not that big, you can, they also want a tennis court. So they wanted far too much things in it. And if you plan everything full, there's no flexibility, then you can't organize bigger markets and all kind of other things. So we have had all kind of discussions like that.
But the nice thing is Rotterdam is very Quicken a lot of things quicker than Amsterdam. They made a choice for me in the evening at 11 o'clock. And they said tomorrow morning at six o'clock there was a big bus going to Paris. And then we gonna. We take the whole neighborhoods with us. All, all kinds of different people from all parts of the world living there, and some politicians, a few bureaucrats.
But most of them were just very Connected people who wanted that roof park also. So I had to pack my suitcase and I didn't sleep that well. And we went to Paris to see all kind of examples. There is a high line in Paris. There is a station going to Bordeaux where on top of the station itself, there's complete roof park.
We went to LA. It's an important statement of making a nice program, public space. So we saw all the highlights in one city, the Paris, together to create a common reference image, what you can make of it. Because if you looked on the place it was 20 years ago, it was empty space with rusty rail tracks and fences and so on. For a lot of people it's difficult to understand that, if you want, you can make something as a roof park, a building, and then a park on top. So and you, you are together and you know each other. All the different groups of people and you can just chat about what you see.
You have a journey a few days, four days, I think, something like that. And that's a very nice start of the design process. And the complexity is that you start with an urban plan. So that's pretty abstract. You do it with the main planners of the municipality. Then there was about stakeholders.

It was absolutely not clear. There were, I think eight or 10 railway tracks. They were that far that they could skip a few tracks. Within the middle there should stay two tracks. So then we had a very narrow, onsight is dyke, then there's the railroad track, and then you have a very small long line, also green.

So it's defined it into two linear strips, and I hated that idea because you can better skip the train. It's dead end. And there's a lot of train system in Rotterdam. And if you ask the railway people, can you miss it? And they say, no, it's the beginning of the betterland going to Germany.

So we cannot miss it. But if you constantly repeat can you get rid of it? And if you make the drawing, what you can make of it when there's no track in the middle of that park And that's much more space now you can football on top of the, of the park. And still it's only 80 meters wide or 60.

It's not that wide. But, but yeah, so that's how it started. And for me, the local people were very important. So we did from the big scale to the details, it was process of years. So I made urban plan. Then we developed a kind of starting points, and I did the preliminary design.

Preliminary design is, is the most important design stadium. Together with them, the municipalities responsible for the technical design. So they, they detailed my preliminary design. So and there were pretty much people involved.

Interviewer: So the key stakeholders in this was the municipality, the residents, the local community?

Interviewee: Yeah, absolutely, their presence was very important.

Interviewer: Any other construction company?

Interviewee: Yeah, the railway company. But don't forget the Rijkswaterstaat. Because the dike system when there is high tide in the sea and there's a dam in the water, which can be go down in closer to the sea itself, but when that breaks, the salt water will come into the center of water damm.

So and there is a dike. It's a working dike, on one side of the park, the eastern side. So if the salt water is coming. Then still there is a functional dike in the, in the Dakpark integrated. So the water people and the government about water, they were very important. They were very strict.

They said, you cannot plant, squeezing the dike because if a tree falls down there's a gap and then the water streams in. So we could in a certain line not make foundation for fences and so on in the dike. We couldn't plant trees in the dike, because it's dyke. So they were very important as a stakeholder.

And then it was better the idea that there was also a guy, don know, if you call it the stakeholder, but there was a quality guy, we call it supervision guy who was dealing about the general quality. So I was just working with everyone a little bit, bureaucrats, the people living there and, the more technical people.

But then there was a kind of supervision with the Batang it all man. And he was the one who could say this is quality or this is not quality, and especially the integration of architecture. And logical roots and landscape and the way you make a real integrated plan. That was his topic.

And that's good because I designed a lot with the architects of the developer. Where are the lifts? How do we enter the building? Can we have a little constructions on the living side? I didn't want to, I only wanted to have landscape. How can we yeah avoid that. There will be pipes going through the roof and, and so on and so on, but normally, You end in a fight with architects .

And then it's important that there is someone who is above the parties, not as a designer, but as a decision maker. So we go this way of this is a good idea. We stop this. So, so that's the way it was organized. And so first you have to make content. You have to explain and get with the public. You have to solve problems with the bureaucrats and the technical people.

And at the end there's someone kind of person from above who can say yes or no and then tell a certain time. Then he was. He was, he got another job, he disappeared, and then there was no supervision anymore. But this project, I started to do it in 2003, I think. I'm not completely sure. I think it's the selection.

We designed it. The preliminary design at the end, we did in 2006 or seven. Then they made a technical preparation and the whole thing was, it was an economical crisis at that time and it was a severe crisis. There was no money in the, it was not just in the banking system. And so developers couldn't organize money and they all went bankrupt in that time.

So I thought, This is typically a project which is not going to be built because it's very expensive, a lot of extra costs and the crisis was severe. But, the strange thing is because of all the different layers and all the appointments we made and the enthusiasm of the process, the opposite happened. It was being built during the crisis.

Interviewer: Oh I thought that this would lag the project..

Interviewee: That's the very typical. The strange thing is that...I don't know the English word for it. We met a group of people who could easily talk with us about design possibilities choices lists of demands. And some people are not suitable for going through all those design steps, but others are. And [00:18:00] so we selected a group of about 40 people. This, the group we invited every Wednesday afternoon to go to the place we rented at the edge of the Dakpark. But the group is not one group.

The, person's changed. The average time people live in that part of Rotterdam is only one year. You live there one year and then you go away. I don't know. Why so quickly? It's not the best part of Rotterdam. There's a lot of

Interviewer: Yeah, they call it like a slum.

Interviewee: So at the end there were totally different people than the beginning. And a lot of people don't understand that it takes such a long time. To make all those steps because of the ns. The railway company was complicated and the water people were complicated, so it, it lasts pretty long and some people.. You have to think very positively to make a nice process and lot of people, it's easier for a lot of people to disagree.

You draw something and they, "oh, I don't like it". But thinking more positive is difficult. And some people were very negative. They didn't believe in it at all. They saw all kind of problems. The biggest prostitution area of Rotterdam was close by... now it's closed.

They were the drugs addict prostitutes. So when it's. Nighttime it's completely chaos there. So that's a bit the atmosphere where we develop this area. And so the big discussion was when it's dark, we need a fence around the park. But because you cannot imagine it's safe when you walk there in the dark, the police cannot see from the cars what's going on in the park.

So everyone was convinced we need to have a fence with which we, we can close off. In certain periods of the [00:20:00] day. And that was because of the, yeah, the harsh conditions of the the drugs problems and the prostitution problems who were there in the surroundings. And then, yeah, it's stupid, but.

I wanted to have more functions in the restaurants and so on. Restaurants will be open at night. So we had to think when the restaurants are open, when the public goes out where are the fence and how can they go in and out and can they walk in the park? But you can see in the glass, in the middle, that's the restaurant.

Yeah. It works less or more. And then the other thing is I don't think they close the fence. I'm not co they closed the fence in the first years, but I'm not sure whether they close it now. Closing off public green is normal in England and sometimes in France, in the big cities in England is, is pretty normal that a lot of parks in London and other cities are private.

And then there's a fence around and then it's, it's of somebody, but here it's public.

Interviewer: I think from my last visit to the park, I had the opportunity to discuss with some volunteers from the neighborhood, and I think they told me that they are responsible for opening and closing the fence.

Interviewee: They're doing it. I designed, so in intimacy was a big theme, so the human tail and not too big and so on. So I introduced the idea to make three gardens that Mediterranean garden with a glasshouse, a play garden and a neighborhood garden neighborhood for vegetables and chicken and sheep and so on.

And then there's the intimacy. On the slopes and you make the nice surroundings with all kind of things. And then if you are outside the garden, you are, it's more extra far, you can see the city. And then it's more, more open and wide. So I, choose that contrast. And I think it's nice that if you don't go to a restaurant, you want to sit outside, you're not in a huge space, but something in between.

And that was a choice. So, and there's a choice I made, I did the, the proposal, but then the discussion starts with the people who wanted in intimacy and instead what they meant. And then the supervision guy who wanted romantic shapes. I didn't want, I didn't want to make it because I said it's building with a slope.

So it's more a dyke park. Linear and on a certain angle, different angle maybe, but a bit like a dyke. So the language of shape should be related to that phenomenon a bit. So, you have all kind of discussions. And sometimes you think if you're a designer, it's nice to make you have an idea, you make something, you make a nice drawing, and then that's the design.

Sometimes it is in the process, but the problem is you have to talk about it. You have to convince the supervision. You have to convince maybe you know, the there's a control mechanism in Holland, which controls the quality of architecture and also the quality of public space. That's a certain layer in the municipality.

You have to convince them. What you are doing, what you're proposing, and that's more on the level of professionals. So the discussions are very basic, but sometimes you have a nice agreement with the local people and then you come to the wellstone and then they say, can, can you make a bit more organic shapes or something, which you already passed, you already had the discussion.

You have the idea that you most of the people nodes in the same direction. And then there's someone who is disturbed with some power, some influence, and then you have to deal with it. So, that's, for a designer that's problematic because it doesn't have [00:24:00] too much to do with creativity. It more with how handy are you in between people and how can you yeah.

Go through all the. All different problem people.. . So, but , that takes a lot of energy and when you walk through the park and you see the simple parts and sometimes a tree, then you "think that's not so simple to get on a drawing and have an idea like that." But yeah, most of the energy is the acceptance, and then all the layers where you have to go through too.

Because everyone wants to have a kind of power also in the, in the organization of the municipality. And then it must still be a design if you listen to it, to all the opinions and you do a little bit like this and a little bit like this. Yeah. Then it's..

Interviewer: You need to balance.. May I ask you what, what were the motivations of the municipality to do this park?

Interviewee: Now there was discussion in the urban planning group of the municipality. There was one group who said, you cannot make mono functional. Area lifted from the ground. Then you get a they have a big shopping mall in the south of Rot terdam which doesn't function after six o'clock because it's two more functional, it's only shopping and two, two less dwellings two little dwellings and so on.

No multi, multi-functional areas. You have to do combination. Combination of living and, and then a little bit of green. And there was a group of bureaucrats partly the as Simon who said, let's make a February. Convincing concept of a green as as it is. So there was a kind of struggle. I had to present my ideas also in the whole organization of urban planning

and then you got the whole discussion again. It's not good to make more functional area like that. You have to make more mixed function, all kind of urban functions and green, but not green functions too big. So, the problem. Yeah. You assignment give is a bit like a dragon with a lot of heads.

It's not one opinion. And so that was also a little bit difficult. So, but I'm, I'm landscape architect, I like to make my assignments as green as possible, it's in me. So I, I thought it was my task to create a spacial green environment. I proposed a school on one side of the park, the north side, close to the Marconi Towers because I said only then we make a kind of point of a ship and then we can make a type of school.

There was one school that was looking for a new place to have 1600 students. They're pretty big, and I thought, oh, that's a good idea. Then we have a kind of multi functionalism the school on top on of the very edge of the park. It's then the park is filled with students during daytime. It can be problematic, but social control is the best thing you can have.

And then the other side, now they, they are developing in the south southwest side, the deepen vein area. They are making an integration. . There is some old building structure, some monuments are there. There will be ah being made in the park in the park. But they are going to build on top just above the nine meters high park level houses.

So there will be a area where there's integration of living and recreation somewhere. I like that they didn't make the school and the other point, maybe it'll be there. There, there is space enough they can make it if they want. Maybe it's, it's a matter of waiting. But in fact that was the idea. With some urban functions. Yeah.

Interviewer: And how did you incorporate the, the aspect of flood protection, flood resilience to your designs?

Interviewee: if you look.. I don't know if you've seen the drawings if you look in the sections on one side of the slope there's a, on the street side, there's, there's a wall where the shops are straight to the other side is more soft, more dy ke like, and then it, and then there's a horizontal piece. There's the urban heating system going through, and then there is a little dyke going down, and that's the real dke. It's only a few meters higher than the roads that's three meters higher than the road.

The roof park's nine meters high, but that's building, so if the sea is high, the whole roof park will be salt water till the feet on the east side. Where, the real dyke, because the whole volume of the dike is still there. You can walk on top.. And we made a kind of hedge and a fence and so on.

But it's still a dyke. So when the water will come that high, hopefully it'll never happen. But if then the whole building will, its, and the parking garage will fill itself with water till Dyke. . That's a strange idea, that's the ultimate edge of Holland. So a lot of infrastructure in Rotterdam, most of the buildings are made in polders .

That's the structure of Rotterdam and then the infrastructure is a little, yeah, less and more outside the polders , the main infrastructure, the bigger roads and so on. So that's why Rotterdam is a bit divided in, in completely different living areas, because the living areas are built in polders and the infrastructure is around.

It's difficult to explain, but it is less. More is, it's true. So also the dike park. So the building itself is outside a polder. All the houses of Boss polder are in the polder . It's also the name Bosh polder . And that's typically Rotterdam.

Interviewer: And do you think that during the, discussions, the decision making that the community and the other stakeholders, Were aware of the environmental benefits of this project that , your design would provide.

Interviewee: Yeah. It depends who you ask explaining that if you make, if you a city extension, do you know Amsterdam? Yeah. There was the, the old city in the canal structure and then, and then end of the 19th century, they have to go over the defense system of the old city.
And and they wanted to keep the rich people less or more connected to the city because, because all the canals were very dirty and there were a lot of industry in between the house, everything was very

dirty. The problem was that the, that rich people went to their houses along the rivers and the estates and the manir and so on.

So they, they invented the idea of vondelpark , you know, the famous of Amsterdam still. And the whole idea is that you create a lush environment, very green with water and trees. And luxury houses, which you can see on one side of the formal park to, to make it possible that in the extension of Amsterdam, there will be new qualities because you cannot extend all the canals because they are not functional anymore.

But, so you have to think of other things. So making green to create quality, clean air and so on was already done in the Vondelpark . And you can compare it a little bit with the roof park. Because there will be city expansion extension. So extension a lot of houses, very dense. It were backsides of the industrial area, backside of the living areas.

We want to create front sides. You have, to have quality, green quality, a front side quality and, , and to explain that to. People who wants to feed the ducks and want to have a, a send pitch for, for the children. They're not interested in the bigger idea. They only want that they can walk and stroll and people and so, and something to drink.

So you cannot explain everything. But when you have to convince the urban planning group and rather them what's the, the after all meaning if you put quality in a perfect space there , and that you can cross it also for all the directions. And if you develop the harbor area and you want to have Saw through the green, then you go to the green area.

So it is good for the new urban areas and the existing areas. So there you can have that discussion. You cannot have the discussion with the rail company about urban qualities. It's only a matter of yes or no. Can you skip it? And so, and The water people who are managing the di and protection of the city, they are not completely interested in the, the, the after all meaning of making such a big green area on that spot.

So, yeah, that, that makes it difficult. . It's not one, one message you can use on different spots. Yeah, it's, , that's the problem of stakeholders. They have their reasons , to want something or want something not, and then it's a matter of you know, who's the strongest and and convincing other people with visions.

Yeah, you can explain that you have a vision and then there will be the fight, yes or no. And do you want to skip your ideas because we want to make this. And then fis is fight. It's often the, the beginning of explanation where you want to go to.. But that's more the, the more [00:34:00] technical stakeholders.

I didn't do myself, all the talking with water management people, because that's the, the people from municipality water them did it because that's a talking process of years. It's impossible for a designer to do that. I, for me, talking is very important, but when it's getting very bureaucratic And the kind of power play in between all kind of bureaucratic organizations.

Yeah. It's not good for designers. So, so the other people did, did that process and it was, I didn't know whether it should end could we integrate a diet like I proposed? I didn't know. And could we get rid of the railway tracks in the middle? It was a big question. But, but the result is good.

So everything started with a good idea and a nice drawing and the co Marquette and an enthusiasm . At the beginning there's only the idea and without drawings and And yeah. Bird eye perspectives there's no way you have to make, yeah, you have to work on the imagination of people.

And if there's something nice going to be made is there's a kind of promise in the air then and the morning will follow a bit more easy.

Interviewer: Yeah. And did you observe any. Resistance or skepticism for mostly the like bureaucratic stakeholders for your plans?

Interviewee: The problem is it is quite a honor to design something like that.

The in the municipality there were people wanted to design the park themselves and not me. And, and they had to work together with me as a colleague or a clunk board, how do you say it? Reference so you do the talking, but you can feel that they rather had done a themselves.

That's also, that is always a bit problematic if they are also designers. But some designers choose the, the path of going to municipality or more on the national level, and then you are going to be in a talking process. Most of the work you do is talking with other urban planners and landscape and traffic people.

It's talking, talking, and it's not designing. And I've a design firm. I have 16 people design making drawings, doing proposals, and then we talk about the proposals and, and the visions and the concepts. But we are not in a series of meetings. Most of the time. We are just creating something and immediate we talk about it.

And so that's why we are able. To design rather quickly ideas in, in different situations because we are going to the computer. We normally, I don't work on the computer myself. I do it with sketch paper. And when we, and in the office, we start with. When, when, when the solution is not clear, we start just with a discussion on the table, which catch paper, and then we say, oh, what kind of relations are important and how can we do this?

And what's, and what kind of ideas do we have? And then you can give pretty easily your first reaction on the. List of demands or the assignments. And then sometimes we have some examples of other projects who are very interesting for a certain project. So that's a, we start with a creative idea, talking and sketching, and then there will be a process of making section, and we need to computer and making plans and all kind of technical things.

Mm-hmm. But at the office we Yeah, we, we do workshops like that, creative workshops as short as possible. Sometimes 10 minutes, sometimes half an hour. But when it's longer, it's starting to be a meeting. And a meeting is sometimes a bit too dull and Yeah, then everyone wants to create, and sometimes we have one problem and three ideas, different persons, and then we have a discussion which idea is the best and how can we follow a certain line in what we are going to do.

So in our office, a lot of, also for the roof park, which gets a lot of different ideas. So because it's, if you are a designer, sometimes people think that you draw at once the, the final. Solution, but that, that isn't true. Sometimes you go a bit to the left and you make something like this, and sometimes after a few after period you think, no, it's not the best way.

We, we have to go back to where we started and we have to, you go to the right, but to the center, to, to enter any other so I think hesitation is a very good quality. If you don't, s if you are very sure of yourself, you, you don't give space to[00:39:00] think it over what you are doing. And so if you do something you.

Say it's very firmly, then you think that's the only way. But in fact, there are also other possibilities and sometimes you have to be open for that. So hesitation, I think it's a quality in the design process that you say, oh, we can do this, but there is an alternative and you can also do that, and then you get this. So. I think it's important to keep this in a certain period that there are more ways going to wrong than only the one way. So working in different possibilities. But on a certain moment when the preliminary design is coming, you should go to one design because otherwise you cannot make two designs and so, so at the end it must be one.

Yeah, but not too, not too early.

Interviewer: Okay. And for the case of DakPark did it happen that the stakeholders changed the, the original plan you had in mind? How did you incorporate their feedback or suggestions to the plan? To the design?

Interviewee: Yeah. And let's have a look. There was, of course, the builders, the developer of the building underneath, they they were struggling also.

They were, the problem was there is parking space underneath for the inhabitants of Bo Polar. So parking your car and walking through your house daily. He, he said, that must be safe. And so in fact,

the developer wanted stairs and entrance buildings on the east side of the park where the s slopes were.

I didn't want it. I, I said, I want Ady scape. And then the buildings you see are beyond of the harbor and the city, but no functional buildings like that. So we had a discussion, so they are not there. So I want that specific point, but I try to remember what kind of things

now making enough stairs at the roadside where the wall is that you can. Go from the ground level without going through the shops to the part that is reachable from that site. That was very important. Mm-hmm. The urban planners urge that point very well, and I don't know whether there's enough possibility from the west side to enter the party.

East side's. Okay. I just made all kind of. Slopes and stairs for leading from the city streets into the, in the roof park with the west side where, where the walls or the shops did. The accessibility of the lifted park is not that good. So I. Yeah, people pointed out that there are, they're in the middle and where the glasshouse is, there's elevator and stairs.

So you can without going through the buildings, you can reach the park at the north side. You can just, there's a, a bit low you can walk off in, in the Southwest side is now being changed into the more living area where the all time is going to be. So there will be also A, a corridor through the park that you can also easily enter the park from the west side.

And, but that's has to be built. It's not there yet.

Interviewer: Oh. But it was incorporated in the designs.

Interviewee: Yeah. We had already drawn and designed, we, we didn't draw that many houses in a design. We only kept. A kind of historical ensemble on the south. Nice little building. Some functional building, typically Rotterdam.

And then we, we expected that there will be artists in it and so on. So, but, but some of those buildings went down and we plant the, the, the sh the overhang. In one corner, but there was no reason enough to build overtime. But now there is. So now's the moment that that part will be better finished.

That's on the, the south side of the part. And so you see that the big structure, but a lot of program is not built at once. And so I missed the school at the other end. Some very busy urban thing on top of the park. The south by south side is okay when there will be more houses. So there are social control also in the evening.

And you can see Australia, even you are in the green that you see all kind of Yeah. Lights of the living rooms and so on that you see people moving. So the, the, the whole isolation of that park will be a lesson more gone. Because I think that's important. I like parks where. Yeah, well, the program, I made a park in Amsterdam, [00:44:00] but there, I, I made two restaurants in it vegetarian restaurants and a very chic restaurants in all the states.

But so the good thing is that you create a lot of Yeah. People movements and eyes which can see what's happening there. So, yeah, in Dutch is the, I don't know the English word for it. In Dutch we call it the CRE factor. So if you are close to an hill, you see all kind of little end running.

And I like if there are people in the park, I think there's a lot of ants. People in a park and they have a kind of control what's happening there. I think that's good. So you also need a certain amount of people in a park. When a park's too empty, then it's not a good space. Mm-hmm.

Interviewer: Yeah. And my, my last question looking back, do you believe that the.

Collaborative design process influenced the, the stakeholders overall acceptance as support for the project?

Interviewee: Yeah, I think so. Especially we are working together with the with local people, and I then don't think, normally, I don't call them stakeholders. I always communicate with The, the inhabitants, the people, and then there are the stakeholders.

There are big organization with a certain role in the area, so that, that's what I call stakeholders. But in fact, you can also say, okay, the the, the people themselves are the most important stakeholders. So

they had their lists of demands, the thousand trees and the long meter of soil and all the kind, the whole list.

Yeah, I think I listen very properly to to them. And then yeah, I think that that's fair. And the other stakeholders, we had to convince them the in essence of that they. Stop being there. That's difficult[00:46:00] situation and, and the dyke people went to, we had to accept that it's a technical dikes and we couldn't do a lot of things with it.

We could plant trees on it. Okay. Yeah, so we listened. What was not possible on where they were, were about And then the city heating system was also there. We made a kind of path on top with a tile where there was, there's the words heat of warm water in it or something that you explain a little bit why there is something there.

There's a big, where big part of of them is and then that's also integrated close to the summit of the the dike. Yeah, that's a matter of integration. So so you have to yeah, you have to work together. And then about architecture. I didn't make the architecture. There were all architects who made the facade and shopping and, and the garage.

What kind of fence? I wanted that kind of balcony feeling, the kind of open structure where the wind blows through. But other people said, no, there's so much wind. We have to make a a, a railing where the, the wind is partly blocked. And I said, it's not good because if you're on the street and there's green on the roof, that you don't see the green, the green is not given quality enough back to the street.

Because there is less and more closed structure in between. And you can see if you go through the movement that it's a pretty, it's, it's a kind of played with little holes in it. So you can partly look through it, but it blocks the wind and it makes possible that the straps and so on could grow more easy.

But at the other hand, if you're on the street level and you look up, you don't see that much green. And sometimes I think if, if a roof park, there must be a kind of invitation. So the trees must ask you to come and they must be there also, that you can see it from the street. So we are all kind of this, so maybe that point I didn't get my the idea of very transparent illustrate.

But, but you can see that this is what it is has been. Mm-hmm. And then, yeah, so the the, the fence or the bas strait, is it architecture or is it landscape architecture? So it does, the architect has certain role, or is my role more important? So it's more the mix of it. So for me, it was very important that we make a real welcoming outside the fence, more, less, more floating in the air.

In the middle, we, you, you can step outside the building and then you are above the street. And then that's, that's, that's pretty nice because then you can look back. Then you see actually the walls of the shoppings. So you can look back a little bit. You look down then you understand the building better.

Then you see that it is a building with a function underneath. Yeah.

Interviewer: Yeah, I observed that myself last Saturday.

Interviewee: Ah, yeah. A nice warm day then last Saturday. Ooh.

Interviewer: Yes. And I also had the opportunity to participate in the workshop that the community does for the gardening and the maintenance of the gardens.
Oh, nice. Yes. Yeah, it was very nice.

Interviewee: Yeah. Oh, this is nice.

Interviewer: As a visitor, I really enjoyed it.

Interviewee: Oh, very good. Yeah, but it was a very hot day. Yeah. I think personally, if I look back to the design of the park, I plant more scattered trees. I think 10 or 23. Are dead. So they removed the [00:50:00] trees and I didn't see the renewance of the trees.

So I personally think I cannot plant a thousand trees, but I miss 20 or 30 trees. It's sometimes a bit too open for me. And so if I've done it, if I get now the opportunity to design a roof park on a place like that,

I would. Make more layer green, more trees, more thread, more perennials, more volume, more in the three D aspect of green.

And I like the idea of dike. Dike is grass and then I, that's the trees and the lining and the stairs on it. And it's the architecture of the, the landscape that that choice I made. But yeah, more trees. And if some trees died and the problem is not as big now, pretty key essential trees. We bought some trees and met so big they died and they are not going to be replaced.

And I've no influence in, I cannot found someone asking Can you replace tree in the position That doesn't work like that. I hope that if people think that they have to, to, to replant more trees, then I think local people has to come to the elderly men and ask, can you plant more trees in the park as originally designed?

Or maybe I didn't design enough trees when I should have done it now I should make more dense, more dense vegetation.

Interviewer: But do you think that would increase significant, the costs?

Interviewee: And the one meter is there some place. We have only 60 centimeters where the trees are, it's, it's a bit bigger. We planted the trees on top of column structure or wall structure underneath the weight of the trees and are a bit going into the construction. You can't see it if you want there, but we had to find out where you can plant, do more heavy things know everything is possible, but yeah, we made the roof so thick of concrete and steel, so I hope we can, we could have one meter or so everywhere, but in fact, that was too expensive. The extra cost are more than 20 million of making the roof destroyers. So it's a lot of money for Holland. Holland is always a question. If something costs money, what do, what's the gain of it?

And then if there are a few extra trees, it's not enough. And then they skip the 20 million, they make 10 million of it. A [00:01:00] little bit around that. And then how can we improve the, the the heaviness of the rope and it can bury, carry, sorry, carry all the soil on top. At that point, I'm making a lot of roof gardens.

And now the, the whole system of how do you prefer the water when it's raining. In fact water's always a problem on the roof situation when it's raining. If the water doesn't go away, the plant's rot. And then they're going to die because of oxygen stress. But yeah, now we have already five or six week of no rain in Holland.

So then you need a kind of water close by the old roots of plants. So the plants in one time, I proposed a water shell stretch here, kind of. Hollow area where the water could collect underneath the soil, where the roots could pick up the water. And but it was very, it didn't exist in 2006.

Certainly not on that scale. There was, in Germany there was something possible, but they skipped the whole technical aspect of making buffering layer on top of the roof. The building just underneath the soil. So we use granulate and Little Stones. The stones can have some water around a hundred liters every square meter.

It absorbs it less or more. So it will stay okay, one or two weeks. But when it's too long dry, they have to water the trees by hand. And, you are not sure that they're doing that on the right moment? So now I only design gardens where I know there's money enough to make the water buffering system underneath this.

And if there's a lack of money, the borderline is around 200 euros a square meter. Then I say then I'm not a designer because then it won't be working. But that's, that's what I learned of roof park.

Interviewer: Yeah, I saw that a big part of the grass was yellow now due to the drought. And I was wondering how, well, if it's not raining, how it's maintained. .

Interviewee: In fact, this choice, you can decide as municipality to keep the grass everywhere green. Then you'll have to do the. I dunno how you do it with grass. Sometimes there are CHS in the Gulf Track, they do it underneath the soil with little pipes.

But normally you do it like farmers. They're spread out of what's in the, and then got mill or something. They're doing that on the roof. But I think they decided to water trees so only on local points And they. Except that the grass will yellow during dry periods. If there is a week of rain, every yellow grass will turn into green. that's a maintenance decision. You can also decide to keep it green, then you'll have to water it every day. And there's a durability problem with it costs a lot of energy and clean water. So, that's a choice. But in practice that yellow grass like that is within one week okay. So in the end of the summer and the rest of the year, it's green till the drought periods. The drought periods is something of the last years. We hadn't had a series of three years with three months of drought from April, May, and June. Coincidentally, this spring was pretty wet till the beginning of May.

So that's why the grass, it's, it's very high and the, the trees grow very well. Well, the trees are doing still very well because the roots are deep. But the grass and the perennials they suffered the droughts.

Interviewer: Yes.. I guess at that time you couldn't predict the climate conditions after 10, 15 years.

Interviewee:
Yeah.. Climate adaptation is not the biggest thing, you know, my profession. So why do you where the Gulf of water and how can, what's the system of water and the biodiversity and creating coolness with shade. So that's the theme of the last 10 years, 10, 15 years. But the roof board was before that.

So I know that it's. It's cooling with trees. I know that it was there, but it was not a selling point. It's not a way of, you explained your design with treating that themes.. no one did it at that time, we were sure that if you make a plan's better to use different species, there's more chance for all kind of little insects and so on.

So it's more that you are used to think like that. You don't explain your plan with it. Now we explain the plan with it. You do a strip like this because then you get that insect and if you make a combined strip, you can expect nest of birds in it. And so, and in fact you make the same designs. And then you can explain differently.

Interviewer: Okay. I don't want to take more of your time. You, you covered a lot of my questions, actually, all of them. Thank you. Thank you very much for, for your time.

Interviewee: Yeah, I hope you success with your master studies...

Appendix D

Interview with Volunteers of the Dakpark

Interviewer: Shall we begin? First of all, can I have your permission to record this discussion? All the information that you will give will be treated confidentially. It will be strictly used for the research. And then, it'll be deleted. Also, it will be anonymous.

So first of all, could you please describe to your role and tasks in the design process of the Dakpark?

Volunteer A: When I came to live here in the neighborhood in 2005, there was a group of people talking about the plans for the park with all the neighbors. There was a project leader paid by the city who arranged meetings for the plans. And the oldest people of a safe park with gates. And we talked about the diversity of planting.

Interviewer: So you were involved as a volunteer, as a local resident of the area.

Volunteer A: Yeah.

Interviewer: And were you participating in the discussions?

Volunteer A: Yeah.

Interviewer: So, what was your motivation to participate in this process? Did you have any specific interests?

Volunteer A: I think nature is important for cities and, nature can be beautiful to recreate, but also for education for the children, that they can see where the apple spears grow. Not in the supermarket, but in the trees. And, yeah, I wanted a greener city.

Interviewer: So you wanted a nice area for you and also for the rest of the community.

And, how would you describe your level of involvement in the design process? Were you actively contributing to it? Did you share your ideas and were you comfortable in doing that?

Volunteer A: Yeah, but it was arranged, the discussions were arranged by the, uh, project manager of, of the city, and then there was a meeting. I tried to always be there and my ideals in the discussion, but I was not, extra, active to do more than, was arranged.

Interviewer: What challenges or obstacles did you face during your involvement in the design process? If there were any challenges.

Volunteer A: The different visions about public green. This neighborhood had to do with challenges of.. It was not a safe neighborhood. So people were afraid a park could be a place where people can hide, prostitutes can work, and junks.. So a lot of people had a lot of trouble with junks' hangouts, robberies..

Interviewer: So there were people that didn't want the park?

Volunteer A: They want the park, but a very safe park. So with the gates. Now there are gates or a fence, I have to say the fence and the gates. And the fence is in the green. And we worked, we brought ideas that the fence, apart where the fence is ,is not nice. So we said, we make shrubs, so the fence didn't have to be so high. You can't climb over because of the shrubs that are pretty. So we tried to make a combination of a safe fence, but also the green and biodiversity for the insects and a nice view. And in the park, you see a lot of, green meadows. You can look, a kilometer long. People want, no shrubs in the park or no bushes for safety.

Interviewer: Okay, so the main difficulty was the competing ideas you had with the others for the park.

Volunteer A: Everyone wanted the park.

Interviewer: But in a different way.

Volunteer B: The more people you have, the more ideas you have. So you have to make a choice which one is available, which one is payable, how much, how much interest is for that object

Interviewer: And, were there any factors that, uh, hindered your participation in the, at the design process? That make you feel like, okay, I don't want to be part of this, I don't like that we have competing ideas. Was there any case like that?

Volunteer A: No. It was on a typical Dutch basis poldermodel. You know what polder model is?

Volunteer B: There are several kinds of interest groups. Well, sometimes they want the same things but sometimes groups are standing against each other. So then you try to, to balance. We give you something, I get something from you. So that's what we call polder. So you get something. You can only get it when I get something too. So you put some water into the wine.

Interviewer: But that didn't make you stop participating?

Volunteer B: No, because we had to win something if we didn't.. You get something, If I get something in return too. So you put some water into the wine. It's not bad, but also not good. But it's just, well, common.

Interviewer: Okay. And, how was communication facilitated among you and the other stakeholders during the design process?

Can you describe me? A meeting, a consultation, meeting, or collaboration activity?

Volunteer B: All the ideas were together, so they make a big line of it and we get a report of it, and we were discussing about this, this, this, and this, this, the conclusion. And on that basis, we continue the next following, meeting.

Interviewer: How often did you have these meetings?

Volunteer A: Once a month. Once a month. They called it Dakpark Cafe. And the cafe is for, it's not only heavy talk, but also nice to meet and see the plans and they were all these move boards and things. And, yeah, okay. Informal talk with each other. So it was not only hardworking or hard discussion, but looked nice to go there and one of the first things we did for, I think was, not a 10 commands from the

Bible but seven comments. But, as a statement we want for this park, and it was called safety and it was green. And when this park is filled, there shall be green, there shall be, playground for the children. There shall be place to meet, shall be possible for social participation. For the biodiversity, but at that time, not as high, it's 14 years ago..

Volunteer A: It's 50 years ago
Interviewer: You were not so much aware of this, of the environmental

Volunteer B: we were but the point of view of the local government wasn't that high. That for a while it can wit, well, it, it's not that big issue, but people who are doing an environment, they know what the best situation and the condition is. So they will agenda every time we need to do it.We need to develop these things..

Interviewer: But there were not, any people from any kind of environmental agency involved?

Volunteer B: Well, not that much, no. Now it's more, well, more agenda. So it's a higher level now. So when we're talking about the same situation, I guess I will support. Because of the climate change, it's now more visible.

10 years ago, it was not, well, the climate change wasn't that big than these days.

Interviewer: Indeed.
Volunteer B: Yeah. So maybe it was a point of discussion, but a big one.

Volunteer A: Okay. It's difficult to understand now, but. It's, it's, we come from a long way.

Interviewer: Yeah. I understand. Do you feel your inputs and your ideas were well incorporated into the plans, in the final design?

Volunteer B: Sometimes. Cause they make decisions because they have the budget, how to spend it. So when the budget's already finished. "No, we can't do that. We just can do a little bit of that." So they already made the decisions. Then we find out what the decisions were. So we were not always happy with the decisions they took. Or how they took it.

Interviewer: Do you think that your contribution to the design of the park enhanced your understanding and appreciation of the project? Of the benefits that could bring to the area? Would you support it as an idea for future development in another area?

Volunteer B: Uh, every month we have a negotiation with people who are involved in this park. So we have our way, how we want to develop it, how to use it, but the local authorities say, "we already have made a plan for it. We don't want to change it, so let's stay the way we developed it." We talk every

day, every. Meeting up again. But the less they have to do to change the better it is for them.

We have our point of view, developing this area. Cause we are using it every week. And we are sitting with our feet on the ground. They're sitting on the desk, on the desk, on the screen. They have the theory, well that's how they figure it out. But when you are on the park, you get other information which not is the same when in theory.

Volunteer A: And the city is always, has to listen to the neighbors that complain. And there's always discussion about everything. Uh, the hedges we did today. Yeah, they hangovers. They hang over and they prickle. Neighbors, don't like it and complain to the city council. And then we have to..

Volunteer B: they will come with the machine straight away, one level, but that's not good for the biodiversity. So you need people to do it because they are more careful than know what to do, how to do it.

Interviewer: And did your, participation in the design of the park made you feel more responsible for it?

Volunteer B: We tried to convince the local authorities because we are every day here.

Interviewer: So you were, you were already feeling responsible for your neighborhood, then you thought, okay, we should do something nice for our neighborhood.

Volunteer A: Yeah. that's why the groin group started before the park was opened because the group of people, felt responsible for that becoming a nice park, a nice place to be. And keep it as good as it can be, by helping in gardening.

Volunteer B: Because it's so special. Because it's not a natural park. It's created. So you were presented as an extraordinary park, which is not usual, not common, but it has to be clear and, but open public for everyone. So it must be clean too, cause it's not a real, real park so you have to clean it up.

Interviewer: And, based on your experience, how important do you think that is for the stakeholders to have a say in the design of a community project like that, like Dakpark, do you think it's important?

Volunteer B: Yes, because if we don't talk about it with them, about the development of the park and how it should be the situation, then they will go they will follow their own way. So we have always to participate in the developing in the park. Otherwise it's just their party. We want to be a member of the party too. So we are the users. We are living in the neighborhood. They're sitting in the center, in the city hall. So they don't see often this park, maybe they never have seen it. So they're just behind the screen.

Interviewer: Do you remember which other stakeholders were involved? Like, architects? real estate company?

Volunteer B: Yes, yes, both of course.

Interviewer: Anyone else?

Volunteer A: The X that built the Park, and investors. Groups, well, how you call it, investing in the shops and in the restaurant.

Volunteer B: The shareholders from Germany. So if the local community want to change something, then they have to talk with the, Shareholder, "can we change that? Can we change that?" Cause we had a stair on the other side of the building and an elevator with it, for people who are moving with wheelchair, but the cage was too small. The, the wheelchair couldn't get in, so they spent 80,000 euro for it, and it was useless. So they have to take it away. So after a long discussion because there's only one stairway from here to the other side, or they have to the ends to walk around.

Interviewer: So you said it's a German?

Volunteer B: German investment group. So if something says, has to be changed on the park and the shareholder is, in this case, a German one. They have to ask him if it's allowed to build an elevator on the building on the other side. So when after a long discussion they agreed, well, you can build an elevator. But the one who built it didn't inform what kind of people will use it, and they didn't think well about the chair wheels. Yeah. So the cage was too small so no one could get in. So after two years they said, well, it's useless. Get it down. So how to spoil money. So take think it over, get to the building, talk with the people who want to use it.Then build a good elevator. So now you lost it.

Interviewer: Okay, overall, were you satisfied about this, of this discussion process?

Volunteer B: No. We had our discussion at the end of, uh, this park. We have McDonald's. Yeah, they were to build there, there wasn't a shop, which, which left, so they find a new rent part for the location.

So they found McDonald's ready for, to hire that location. But they have a lot of, wholesalers to the, uh, remove the, the well from the backing outreach. But it's not in our plan to build a fast food because we already have three in this area. On the scale Ofwhere in park, there are already three of these fast food shops. So we are a meeting with McDonald's cause they want to rent it, the investor, the local authorities, and the people who are in this neighborhood. So how, cause we were, we didn't agree with the development for another fast food shop because it was too much in our opinion.

Interviewer: So they wanted to build it here? I am kind of confused.

Volunteer B: at the end of the park there's a McDonald's.

Volunteer A: And the big shops. But, they have for the kitchen, the installations on the roof.

Interviewer: Okay. And you didn't want that here

Volunteer B: Because that wasn't in the plans? Environmental plans? Location. How we want to use it. How to run it. So we were against it. But they say as arguments, well, "we offer people a job."

and the government likes money from investments because it's gonna be used. They can offer jobs, and because this is a poor, area. So that's one win situation for the government.

Interviewer: And in the end they..?

Volunteer B: we were the losers because they already made the plans they should give it to McDonald's, even though we were against it.

So for the show, it looks like we are also discussing with them, but plans were already made. However, So that's why we thought, well politics are lying. They're just showing us that we are in participation, but not fully. Cause they're already listen. And hang up their ears on the table because there's coming big amount for it. Okay. So money is a big deal in this area.

Interviewer: So in that case, I wouldn't be satisfied for that.

Volunteer B: So people lose in some occasions. So we weren't happy.

Interviewer: Yeah, I understand. What would you recommend to the municipality for involving people?

Volunteer B: That they all should listen to the users and people in this area. Because they're standing with their feet on it. They're going to the park. They use it, they protect it.

Volunteer A: The really cooperate together, and work together. And it didn't feel on the same level. We, we can talk, they ask, what do you want?

And then they go back to the city hall and make their plans. And don't take the ideas of the people who live here seriously. They do their own plans.

Volunteer B: This is the big politic issue at the moment. There's a lot of confidence between the citizens and the, well, national, local authorities.

Because they prove you a lot, they are telling you, they give you a lot, but in the end, it's very small. Show us before we believe you. That's our stake at the moment. Show us. Don't promise us. Bring it to us.

Interviewer: So I see a little bit of dissatisfaction from you. Okay.

Volunteer B: Yeah, So that's why we are fighting every day to get it done our way. So you have to have a long breath to continue the speakings. And sometimes you win.

Volunteer A: It's too sad the city is very proud of..It's the first Rooftop park. It's the largest rooftop park in Europe. And now in all the pr they say it's important and we love it. But at the end, for us, as we want few things to make it better and to help us to arrange the neighborhood garden, we don't need very much money or support, but a little bit to arrange all the things we do. And then the city council is not helping us. So on one side, they are proud, saying they are proud of Park but the volunteers they don't support that, pretty much. that's the, the tension that there is. And okay, I love to work here and I love to come here.

Interviewer: but is your personal effort and not that the municipality..

Volunteer B: It's all ruined by volunteers. Nobody is a professional. Maybe one or two people at the park who are running it, but most of the people who are involved with it are volunteers, so they have beside that, a job, a regular job.

Interviewer: Yeah.

Volunteer B: Okay. But, uh, what we also notice that most of the people who are here working or well participating are original Dutch. We don't see a lot of people from Turkish or nationality or American people. There's a lot of Dutch people who are involved. So they're not the whole neighborhood is participating.

Interviewer: Okay. And do you see people from different age groups? **Volunteer B:** Uh, well, we have some youngers, but uh, in general it's more

elderly. Elderly people. So the fifties sixties. Interviewer: So there's not a lot of diversity.

Volunteer B: No, no. That, that situation goes well. You are also a youngster, You should have other priorities or interests.

Volunteer A: With Corona, it was different. Then we had a lot of young people, students.. The lockdown, they couldn't, they had to stay at home and the only thing you could do was working outside, that was allowed. So we had a lot of students and young people helping. But after Corona, now everyone is back to the basic.

Interviewer: Yeah. Yeah. Cause you need to have free time to do that.

Volunteer A: Now you can do a lot of other things. Go sports, go to the cafe, meet friends everywhere.

Interviewer: Okay. So that were my questions for you. Thank you very much for your time and your help if you like to add something about the part, your participation here, or would you like to say something more?

Volunteer A: I always tell kind of this story and it sounds, sometimes it sounds a bit sad, the frustration with the city hall people. But at the end it's nice. We have a park and it's a nice park. With little steps, with the help of the University of Wageningen.

Interviewer: Oh, they are involved too?

Volunteer A: No, they did a project for the biodiversity in cities, and this was one of the projects in study. they had helped us with a plan for more biodiversity. And that's, uh, the pruning of the hedge. That's the wild flat flower meadow to make it more bio diverse.

Volunteer A: It was not in first plan, uh, with. So when you making steps, by finding help, from other inspiration, a university or something, research to make the park better in a way we think it's better for the community and better for the environment. But it's always little steps we can make.

Volunteer B: Because sometimes we import ideas from other countries where it's already been developed. So well if we show 'em , if it really works, then we go in a discussion with the city hall.

Interviewer: Okay. if you see that something is effective Yes. Then you want to implement it.

Volunteer B: If it succeed, if it's possible in this area.. Then we try to get it.

Interviewer: Okay. I don't have any other questions. Okay. No. Thank you so much your research. Thank you. And I hope that, uh, we promote the, the park to other people

Appendix E

Interview with Landscape Architect B, designer of the Dakpark (Rotterdam Municipality)

Interviewer: Could you please describe your role and responsibilities as the Designer of the Dakpark?

Interviewee: In the beginning I supervised the external landscape designer. Rotterdam had asked an external designer to make a design. During the preliminary design of the park, the external designer turned out to be unable to make the design. He was out of hours, turned out not to be able to listen well to the client and residents, and was unable to stay within the set budget for the park. The external designer was then removed from the project, and I made the design. I made the design in consultation with the planning team and residents.

Interviewer: What was the municipality's motivation for constructing this park? Were there events/circumstances that made it necessary?

Interviewee: The reason was the disappearance of the marshalling yard. In the beginning, part of the shunting yard disappeared, but eventually the entire shunting yard. The underlying district needed a green living space and the port authority wanted to earn money from that land.

Interviewer: What were the key stakeholders involved in the design process?

Interviewee: Design process: developer of the building under the park, Port Authority, ProRail, municipality of rotterdam, residents, water board (due to dike), eneco (due to substantial district heating) Decision-making: municipality and port authority

Interviewer: What motivations have you observed among the other stakeholders involved in the design process? Were they concerned about the environment?

Interviewee: Everyone had their own interests. A very extensive and costly remediation has taken place.

Interviewer: Have you encountered any challenges while collaborating with the other stakeholders? If so, to what extent has this influenced the design process?

Interviewee: Lots of challenges. Expensive remediation, a park that was getting higher and higher and therefore more difficult to reach, a roof of a building that had to remain watertight, high costs to make the roof strong enough to support tall trees, residents who were afraid of bums and junkies in the park and therefore wanted the park to be lockable. Etc. As a result, a lengthy planning process with many adjustments to the design and many cutbacks.

Interviewer: Did you notice any resistance or skepticism towards the council's plans during the design process? If so, what factors contributed to that resistance and how did you address them?

Interviewee: Resistance from the port authority, colleagues and residents.

The Port Authority and colleagues thought it was a complicated plan and preferred a separate building and separate park on the ground. Residents preferred a normal park on the ground. Lots of

consultation. Take you step by step through the process. Making it clear that stacking from park to building was best for everyone.

Interviewer: How was the cooperation between the municipality and the other stakeholder facilitated? How were stakeholders involved in the design process?

Interviewee: An extensive planning team and an intensive participation process with residents, including a two-monthly roof park cafe.

Interviewer: How were stakeholders invited to participate in the design process? What strategies or tools did you employ to foster effective communication and collaboration among the various stakeholders throughout the design process?

Interviewee: Stakeholders such as developer and port authority through competition and many design studies and design studios. Residents through excursions, roof park cafes, residents interview at the market, design studios

Interviewer: How did you incorporate feedback and suggestions from the community into the park's design? Did this input significantly influence the outcome?

Interviewee: Had a major influence on the design. The design has mainly become simpler and more robust. Sometimes given the benefit of the doubt. Sometimes against my better judgement.

Interviewer: Looking back, how did the collaboration and shared decision-making contribute to the acceptance of the park by various stakeholders, including the community and other relevant parties?

Interviewee: The acceptance among all parties is and was ultimately very great. With the exception of the residents. Acceptance there was very high, but nowadays it is less or at least more diverse. Residents are very different and do not have 1 clear interest and opinion. During the planning process, we worked with the residents who lived there at the time. After the realization of the park, many new residents moved in, all of whom were able to buy expensive houses. This group of residents have their own ideas. The residents during the planning process were absolutely not interested in the underneath stores. As for those residents, you didn't have to be able to get to the shops from the park. Smart connections of the neighborhood and shops through the park have therefore all been removed from the plan. After the realization of the shops and the park, a large number of residents thought that the connection between the neighborhood and the shops was important, but optimization was no longer possible at that time.