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Graduation Research Report
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Colophon

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Case study lessons in overcoming urban bathing implementation challenges, following an urban systems-based approach.

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Abstract
Ever since the mega project of cleaning the Seine in preparation for the Paris 2024 Olympics gained world-wide attention, a global movement is inspiring urban policymakers and to reclaim urban waters in becoming a 'Swimmable City'. As in many of these cities, the city of Rotterdam, the Netherlands, sees a growing demand for reconnection with the waterfront, urban living quality and resilience to urban transitions, while simultaneously facing the effects of climate change on the city and its residents first-hand. The Municipality of Rotterdam has shared their ambition to develop future urban bathing sites in open-air waters, among which the inner city harbours. However, the urban complexity of these locations goes hand-in-hand with practical and systematic implementation challenges. This research is framed by an urban systems-based approach, in order to identify the place- and actor-related challenges and opportunities in their urban system nature, for three typologies of (floating) urban bathing structures defined in this study (*The Free Style*; *The Protected Plunge*; *The Dip in a Bowl*). Taking lessons from case study interviews with three respective (inter)national urban bathing typology examples (Marineterrein in Amsterdam, La Baignade Villette in Paris, The Floating Pool Lady in New York City), overarching physical and non-physical challenges were overcome by flexible design, creative governance and justification in connecting other local societal agenda's such as the accessibility of public space, improving water quality and swimming programming for local communities. Comparing these lessons with identified challenges and opportunities for Rotterdam's Spoorweghaven, Coolhaven and Persoonshaven, based on case study interviews with local project managers, the conclusions of this research are presented as recommendations for civil servants on how to approach the development of future urban bathing sites. Not only for the City of Rotterdam, but all cities who have the ambition to become 'swimmable'.

Keywords *swimmable harbours*, *urban bathing implementation challenges*, *urban development management*, *urban system-based approach*

Preface

This research report has been written for documentation of a graduation research project, fulfilling the requirements to complete the Master of Science 'Architecture, Urbanism and Building Sciences', within the department of Management in the Built Environment. This master programme is part of the Faculty of Architecture & the Built Environment at Delft University of Technology.

This graduation project was developed in the interdisciplinary graduation studio 'City of the Future', combining multiple disciplines in the built environment within the context of urban transitions and societal challenges. What started with a visit to the Paris Olympics during the summer of 2024, a fascination for urban swimming and a personal interest in urban development management were developed into a research design focusing on the city of Rotterdam, the Netherlands. Over the course of ten months, this research has been conducted in a graduation internship at the Municipality of Rotterdam, the Netherlands.

I would like to express my gratitude to my supervisors from the Faculty of Architecture & the Built Environment, Aksel Ersoy (MBE) and Kristel Aalbers (U), for their guidance, expertise and encouragement. I would also like to thank Jorg Pieneman (City of Rotterdam) for his guidance during my time at the City of Rotterdam and all colleagues and interviewees who have taken the time to participate in my research project. Finally, a special thank you to Matthew Sykes (Swimmable Cities), Chris Romer-Lee (Swimmable Cities), Adriaan van der Linden (Swimmable Cities) and all the experts I was able to meet through the Swimmable Cities network all over the world.

This research was developed out of appreciation for urban life, and an optimistic view on the future of our public space and urban waterways. I hope that by reading this report, this appreciation is transferred to you, the reader, and will inspire you to reclaim your city in your own way.

Let's dive in,

Marilotte Stemerdink

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1. Introduction

Over the summer of 2024, the image of Paris' mayor Anne Hidalgo taking a dive in the Seine river gained world-wide attention. A dive that would prove that the water quality of the inner city river would be sufficient for open-air swimming for the first time in a hundred years, right on time for the Paris 2024 Olympic and Paralympic Games. On their way to achieve this time-sensitive goal, the city of Paris carried out a billion-dollar project in order to clean up the river (TIME, 2023). An enormous rainwater collection tank, Le Bassin d'Austerlitz, buried below the streets of the city centre, would be one of the most prominent measures taken in the project, working towards the overall goal: making the Seine river clean enough for swimming, also continuously after the Olympics come to an end (TIME, 2023). The project received worldwide attention and sparked a movement among many urban planners, policymakers and activists, asking themselves: why are the rivers in our cities not always suitable for swimming, and could this development in Paris be the start of a different approach for the use of urban waters?

Although the cleaning of the Seine was framed by positive developments related to the water quality and biodiversity in the Seine, the costs, complexity and associated drawbacks of the project did not go unnoticed. It seems evident that swimmable rivers require years of urban planning management and careful consideration of actors, resources and time. And major events to push this development, such as the Olympic open-air swimming numbers, are not applicable to most cities. For Paris, the project was also part of something bigger: it could be considered a complex urban redevelopment project that represents the ambition of retaining the river, making it accessible to the Parisians in search of a place to cool down and reconnect with the most prominent and culturally significant body of water in their city.

Figure 1.1: Joel Saget/Reuters (2024). Paris Mayor Anne Hidalgo going for a swim in the Seine. *Le Figaro.*

1.1 The case of Rotterdam, NL

Currently, the city of Rotterdam, the Netherlands, is planning to implement a similar ambition as the city of Paris, concerning the topic of urban swimming. One of the primary redevelopment strategies concern the urban waterfronts of the Nieuwe Maas river, as presented in the *Wateratlas Binnenstedelijke Nieuwe Maas* (Gemeente Rotterdam, 2024). As a prominent port city, the inner city harbours in Rotterdam have been subject to (industrial) naval activity for a very long time. Only recently this transition of port activity moving out of the city, towards the Maasvlakte on the West coast of the Netherlands, has left the city with empty harbours that hold potential for new urban functions and building historic-cultural connections to the city. The *Wateratlas* presents the Nieuwe Maas as the 'main central park' of the inner city and appoints 'hospitable harbours' (Figure 1.2) along the river as areas for further development, each to their own identity. Public access to urban water is a recurring topic in the plans, urban bathing being one of the possible translations of these objectives. Meanwhile, the city notices - and tolerates - that currently many of its inner city harbours are already used for swimming and recreation during warmer weather, even though this is often not facilitated and almost never allowed (NRC, 2024). The city of Rotterdam finds itself within a unique situation compared to other Dutch cities. While the general legal practice states that (wild) swimming is allowed everywhere, unless it is specifically prohibited, for Rotterdam this is the opposite. Due to the fact that the Port of Rotterdam still stretches out over the Nieuwe Maas and its harbours, swimming is prohibited everywhere in the city, except for the designated swimming areas. In Rotterdam, only four designated outdoor swimming locations have been assigned by the Province of South-Holland for the bathing season of 2025. These include de Zevenhuizerplas Nesselande, de Kralingse Plas, de Kralinger Esch and 't Zwarte Plasje (Provincie Zuid-Holland, 2025). Only the first two are publicly accessible.

The Municipality of Rotterdam has shown ambition to make the city more 'swimmable', as they recently joined the Swimmable Cities network: a global alliance of governmental and non-governmental organisations that advocates for an accessible, safe and social outdoor swimming environment (Swimmable Cities, n.d.). Over the summer of 2024, the city experimented with a pilot project for a swimming area in the Rijnhaven, which opened for a second season on the 1st of May 2025, the start of the bathing season (AD, 2025). The swimming area in the Rijnhaven is located on a floating public park, which is planned for extension around the entire harbour over the next few years, as part of a large-scale urban development plan for the area (Gemeente Rotterdam Persberichten, 2025). Apart from the floating park, the plans include three high-rise, multifunctional buildings and a land-park with an urban beach. Waterfront recreation is one of the designated functions of the harbour, which means that over the coming years, urban swimming will remain on the urban redevelopment agenda of the city. On the 16th of April 2025, the zoning plan for the Rijnhaven was approved by the Council of State (Gemeente Rotterdam Persberichten, 2025).

However, so far the Rijnhaven is the first and only urban bathing spot in any of the inner city harbours of Rotterdam. To translate their ambitions to other locations in the city, the Municipality of Rotterdam has developed a list of over a hundred eligible open air swimming areas within the city ring, mostly based on the quality of the place and their accessibility to the waterfronts (Gemeente Rotterdam, 2025, personal communication). On this list, most of the city's inner harbours are included, such as the Coolhaven, Parkhaven and Rederijhaven. However, the Municipality has stated that so far, the implementation of their strategies and development of these harbours into swimming areas has been challenging due to the lack of a general strategy or approach. One of the main reasons for this gap has been the inconsistency and complexity of different obstacles in these projects, which are highly place- and stakeholder-sensitive. Most of the inner city harbours are dense and complex urban areas that have experienced or are currently subject to urban development. The stakeholders and physical context are different in every situation, resulting in the inconsistency of implementation challenges.

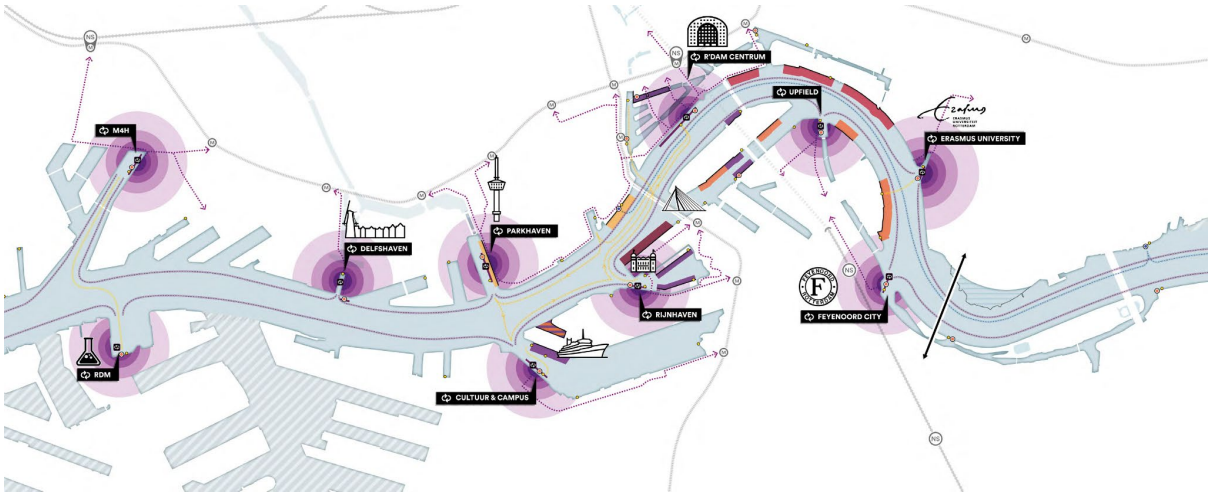

Figure 1.2: Gemeente Rotterdam (2024). Appointed 'hospitable harbours' in the Wateratlas.

1.2 The problem in bigger context

The Rotterdam case is specific, because 'swimmability', or possibility to swim, proposes a strong place-sensitivity. This is why many of the faced implementation challenges could be unique to the case of Rotterdam. Naming a more mature example of urban bathing implementation in Dutch context, the Marineterrein in Amsterdam is a centrally located, former military area which has become a popular swimming spot, due to its favourable environment and waterfront accessibility. As of February 2025, the Binnenhaven at the Marineterrein is now on the list of designated swimming areas in Amsterdam (Provincie Noord-Holland, 2025), the first one located within the city centre. A series of pilot programmes, mostly regarding the monitoring of water quality, has been crucial in establishing the location as it looks like at this moment, which has also faced its fair share

of implementation challenges. Examples like these and global movements such as the Swimmable Cities Network, seem to prove that under the surface the problems might be universal. Many public authorities and NGOs are joining the Swimmable Cities community to share experiences on the topic of swimmability within their cities, hoping to learn from each other in facing their own implementation challenges.

What connects many of these contemporary cities is a growing demand for the reconnection with water and nature, as well as vitality. These demands could play an important part in changing cities for the better, as recent study has shown that blue spaces positively impact the quality of urban life (Bonifácio, 2024), among which significant benefits to mental- and public health (Grellier et al., 2017). Besides this, climate change threatens cities all over the world with more extreme weather conditions, which pose health-related challenges in many cities where living environments are not yet resilient to heatwaves and the effects of the Urban Heat Island effect (Tong et al., 2021). Swimming pools and outdoor swimming areas are important amenities during heat waves or warmer periods. However, a side effect of climate change relating to outdoor swimming is the increasing algae-, bacterial- and other contamination of still natural swimming waters. This results in waters that are unsafe for swimming (European Environment Agency, 2020; NIOO-KNAW, 2025) usually during periods of warmer weather, which is exactly when there is a high demand for places like this. The result is that citizens are looking for alternative places to cool down, be active and meet their peers. The global movement of making cities swimmable often uses the universal 'right to swim' (Regeneration Projects, 2023) in advocating their mission: the right of urban citizens to use and connect with what is often the most prominent public park in their cities.

For the case of Rotterdam, many of the underlying conditions that allow the lack of 'swimmability' to come to the surface, are topics that are equally addressed on other (urban development) agendas by the Municipality of Rotterdam. A main strategy for the City of Rotterdam is presented in the Omgevingsvisie (Environmental Vision), naming compact, healthy, inclusive, sustainable and productive as the key parameters for the future of Rotterdam. New development plans are connected to or designed within these five pillars. Besides the Wateratlas being one of these, the City of Rotterdam executes their climate adaptation agenda Rotterdams Weerwoord, and has recently adapted their strategy programme 'Rotterdam Resilience Strategy: Ready for the 21st Century' in collaboration with the global '100 Resilient Cities Network'. The city has developed seven key resilience goals ranging from clean energy, to climate adaptation and the personal development of citizens (Gemeente Rotterdam, 2022). The topic of urban swimming fits very well in this narrative, as it also explores social and economic opportunities. The question remains whether these ambitions can be aligned into a complementary and holistic strategy to justify the urgency for the implementation of climate adaptation and social resilience measures. This statement proposes the need for a transdisciplinary approach that addresses the local (urban) systems within the complex environment of a

city like Rotterdam in direct company of each other. A systems-based approach has been associated with successful decision-making in addressing multidisciplinary societal challenges (Iacovidou et al., 2020).

1.3 Problem Statement

The problem statement can be formulated as follows:

The inconsistency in facing the complex implementation challenges in realising swimmable harbours in the inner city of Rotterdam can be considered yet unused potential for improving the quality of life and urban resilience.

This graduation thesis will explore the implementation challenges that the Municipality of Rotterdam is facing, placing them into the context of the local urban systems, in order to create a set of practical recommendations to develop and manage the city's inner harbours to swimmable places and fulfilling their ambition.

1.4 Research questions

This research consists of a main research question, which will be answered through a set of three subquestions. The questions are stated the following:

Main research question: *How could the Municipality of Rotterdam learn from (inter)national case examples, to overcome place- and actor-related challenges in implementing urban bathing in the inner city harbours, following an urban systems-based approach?*

SQ1: *What urban system-based aspects enable urban bathing in the inner city harbours of Rotterdam?*

SQ2: *How can place- and actor-related challenges be managed from the urban system perspective to implement urban bathing, based on the lessons learned from (inter)national case examples?*

SQ3: *What place- and actor-related challenges and opportunities are leading in implementing urban bathing in the inner city harbours of Rotterdam?*

The main research question will be answered through the development of a structured set of practical implementation measures, proposed as recommendations for the department of Urban Development at the Municipality of Rotterdam.

1.5 Conceptual framework

The conceptual framework of this research (Figure 1.3) shows the relationship between the actor- and place-related challenges and the implementation of urban bathing, within the urban systems framework that applies to the inner city harbours in Rotterdam. The lessons learned from international case studies will be leading in the development of a framework of implementation strategy measures and opportunities.

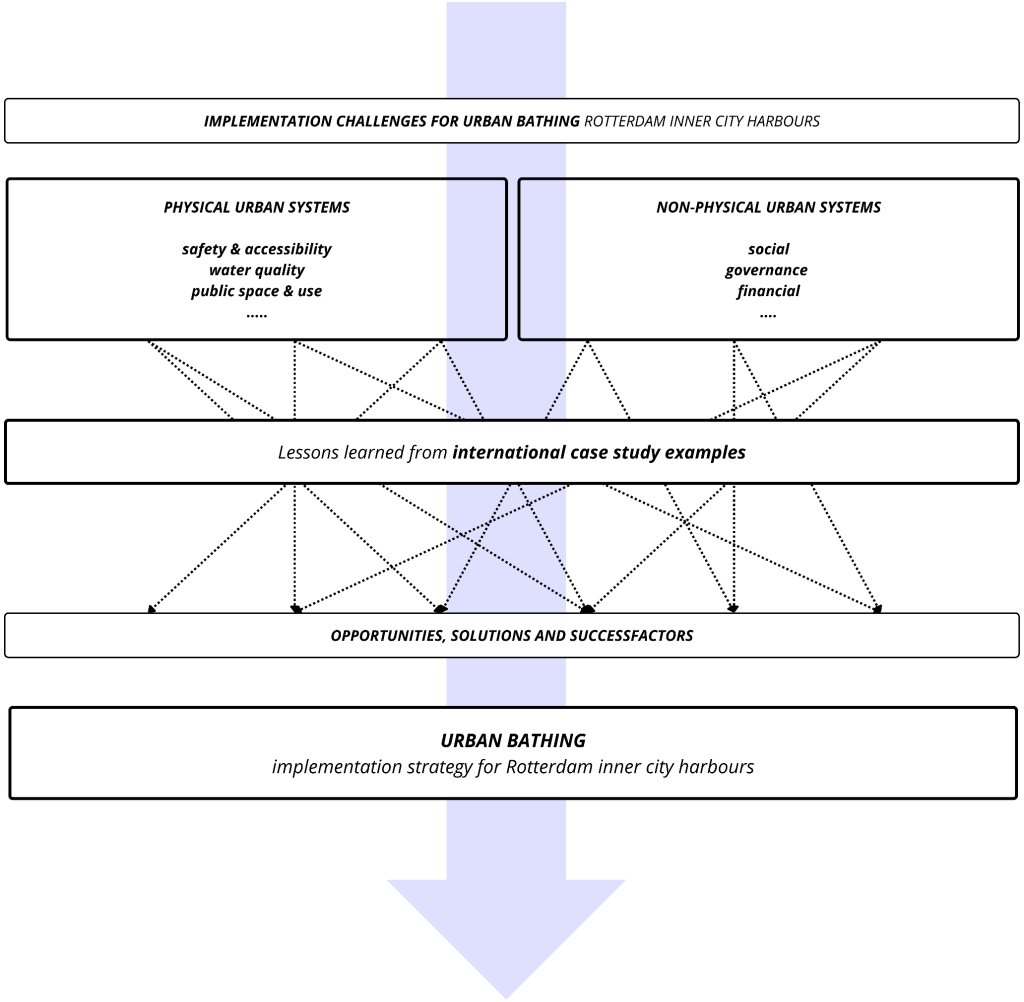

Figure 1.3: Image by author (2025). Conceptual framework.

1.6 Research relevance

Scientific contribution:

The topic of swimmability and urban bathing can be considered quite contemporary, and while the topic has been receiving increasing attention among global media, urban designers and -policymakers, it is yet relatively underrepresented in scientific literature. There is also some inconsistency and complexity in the categorisation of different translations of urban bathing and the different conditions under which realisation of

these types is possible. A closer gap between research and implementation plans could contribute to more efficient practice of urban bathing implementation

The goal is to add to and structure the existing knowledge of underlying systems, actor- and place-related factors regarding urban bathing implementation. Besides this, management-, implementation-, and governance strategies on the realisation of urban bathing sites are limited, and the ones that are available lack a case-specific integration within the existing urban systems network, linking opportunities to other urban ambitions and developments, and division of methods suitable for different timeframes.

Societal contribution:

The global movement of 'swimmable cities' has a lot of affirmation with the increasing need for cities to become more resilient to current and future environmental- and societal challenges. Translating swimmability ambitions into real-life developments – and its additional complex activities, such as improving the water quality in urban rivers - has proven to be a challenging task for many cities around the world. The aimed outcomes of this research focus on possibilities for practical incorporation in the inner city harbours of Rotterdam, specifically for the Municipality of Rotterdam. It has the position to play a part in the ambitions of the city of Rotterdam relating to sustainable development of the city in the context of current and future urban challenges. Hopefully, the outcomes of this research cannot only be valuable to the City of Rotterdam, but all kinds of municipal bodies and built environment professionals in the development of swimmable places in their cities.

1.7 Research structure

The remaining part of this research report is structured in a theoretical framework and international case assessment, research methodology, presentation and analysis of the research results, before discussing and answering the stated research questions in the concluding part of the report. The literature review will provide a theoretical background into the main topics of the study, discussing existing literature and practical examples.

2. Theoretical background

2.1. Swimmable Harbours: beyond swimming laps

In the title of this research study, the word 'swimmable' is used as the prominent adjective for the desired final product of the harbours in the inner city of Rotterdam. 'Swimmable' is an effective term for NGOs and platforms who share the same goal for this desired outcome in their respective cities: reclaiming urban waters and making them accessible to the people, in the shape of the activity which is swimming. In the Netherlands, the 'Swimmable Rivers' platform promotes this mission (Swimmable Rivers, 2024). Globally, the 'Swimmable Cities' network has created a community of organisations with similar objectives (*Swimmable Cities*, n.d.). In literature, the context of swimming as an activity is actually more about general access to the water and use for leisure or informal activity, which would also include playing, paddling your feet or bobbing in the water (Bates & Moles, 2022; Rowlands et al., 2019). In an Australian study on the swimmability of urban waterways as a way to engage the community with the river, swimmability also works as a collective term for all kinds of recreational activity in urban rivers: *"We have used the term 'swimmability' to describe the safe use of waterways for recreation. [..] Primary contact is defined as activities where the body can be fully immersed and there is the potential to swallow water, and you are in direct contact with the water. This includes surfing, water skiing, diving and swimming"* (Rowlands et al., 2019). However, in most existing literature that is related to swimmability, a more widely used term is 'urban bathing', or 'urban swimming'. In this genre of literature, also aligning with the approach for this particular research study, 'urban bathing' is often even preferred over 'urban swimming'. The Swimmable Cities network describes urban swimming as: "*swimming in natural, open air waterways; either fresh or saline; and supported by various kinds of human-made structures*" (Regeneration Projects, 2023). While the actual activity of swimming could also be associated with 'urban bathing', this term also suggests the secondary activities and functions that a certain bathing site could or should have. What separates urban bathing from the target group of dedicated 'wild swimmers', is an audience that is bigger and more diverse. Urban bathing can therefore be considered a more inclusive term that could also apply to user groups that are not necessarily very active swimmers, but instead are looking for something else in visiting the site. Considering all these secondary activities and the character of the sites will be important for further exploration of the implementation process, places and actors.

Besides the character of the activities, another factor that determines the scope of literature on urban bathing is the type of waterway or -body. This ranges from urban wild swimming in lakes and rivers (Bates & Moles, 2022; Cao et al., 2025; Kowalewski, 2014; Meyerhoff et al., 2010), to urban beaches (Stevens & Ambler, 2010) and specifically for urban harbours, a study on the development of the range of Harbour Baths in Copenhagen (Jensen et al., 2015),

For Rotterdam, this research looks into urban environments and swimming in the inner city harbours. Wild swimming, lake- and river bathing are therefore not included in the scope. 'Swimmable harbours' in the scope of this research indicate an urban harbour environment where safe access and contact with (urban) waters in the shape of swimming, bathing and all related activities are facilitated and organised, and when necessary, supported by human-made structures such as jetty's, boardwalks, parks or beaches. Urban bathing will be the leading term in further exploration of the topic.

2.2 International examples

Looking at practical examples from international cases, urban bathing knows an endless variety of different applications. The Harbour Baths of Island Brygge (Figure 2.1) in Copenhagen, a global front-runner in urban bathing, include a number of 'pools' of different depths, the shallowest of them particularly suitable for children. Furthermore, the baths include diving towers and facilitate sunbathing, picnicking and playing (ball)sports in the park on the quays. Opened in 2002 and designed by world-renowned architect Bjarke Ingels, the site has been recognized internationally as an exemplary site for sports and urban public space (*Copenhagen Harbor Bath | BIG | Bjarke Ingels Group*, n.d.). Over the years, the city has implemented more similar bathing sites, including the Fisketorvet-, Sluseholmen- and Kalvebod Brygge Harbour baths where residents and visitors can take a dip in the natural harbour water. Other examples of similar open bassin-pools include the Frihamnen Harbour Baths in Göteborg, Sweden (Figure 2.2) and the Allas Pools in Helsinki, Finland (Figure 2.3). These two sites are similar in the way that the site consists of multiple pools, as well as the combination of natural pools and one or more treated, heated pools. Other well-known global examples of urban (river) bathing show the clear and fast-flowing rivers in Switzerland. An example of an actual urban bathing site includes The Flussbad Unter Letten (Figure 2.4) in Zürich. This site allows swimmers to float along with the strong current in the river, before climbing out of the water safely. The surrounding structure does not resemble a pool in the same way as the Scandinavian examples above, but provides both shaded and sunny space, as well as changing rooms for its visitors. Another, more recent example of an urban bathing site is found in the city of Paris, France. The 'Paris Plages' is a municipal initiative that creates temporary 'city beaches' in several locations in the city during the summer. One of the locations is Bassin de La Villette (Figure 2.5), where La Baignade, a modular, floating 'pool' is constructed in the canal every year for the months of July and August since the opening in 2017. On the quays, facilities like toilets and small bars and cafés accompany the artificial sandy beach. Although different in construction and seasonal character, the site is similar to the harbour baths in Copenhagen in the way that they are both made of closed pools with natural water. The success of La Baignade and the efforts to clean the Seine for the 2024 Olympics is being continued: the city has announced the development of three new bathing sites in the Seine, which are planned to open July 2025.

Looking at an example in Dutch urban context, the Marineterrein (Figure 2.6), located in the city centre of Amsterdam, is a very popular bathing site among locals and visitors.

Swimming in this small harbour is simply facilitated by a pedestrian boardwalk connecting two sides of the quays, and does not include a pool-like structure such as some of the previous examples. Similar examples of urban bathing sites without a supporting pool-like structure include the Bonapartedok in Antwerp, Belgium, during the 'Zalige Zwemdagen' (Figure 2.7), L'Oasis in the port of Québec, Canada (Figure 2.8) and the unrealised plans for Flussbad in Berlin (Figure 2.9). These examples are all quite comparable to the Rijnhaven in Rotterdam based on the supporting structures and natural harbour- or canal water.

However, since the issue of urban (river) water quality has gained more attention along with the world following the journey of the Seine river in the Olympic clean-up, it has become evident that not all urban waterways are suitable for swimming in relation to water quality. As shortly mentioned in the introduction of the heated, treated pools in Göteborg and Helsinki, there are also many examples of urban bathing sites that do not use the natural water from the river or harbour. In Europe, famous examples include La Piscine Joséphine Baker in Paris (Figure 2.10) and the Badeschiffs in Berlin, Germany (Figure 2.11), and Vienna, Austria (Figure 2.12). These are essentially floating pools with water treated similar to a regular pool. The sites have more of a leisure-focused and commercial character. Examples outside of Europe can be found in New York City, where the first part of the '+pool' (Figure 2.13) is planned for opening in the summer of 2025. This pool is similar to the Badeschiff examples, except for the innovative water filtering system, which will treat water extracted directly from the river. Another New York City example shows the possibility of a movable 'floating' pool site: The Floating Pool Lady (Figure 2.14) is a barge ship on which a swimming pool is constructed, that has docked in different locations in the city.

Figure 2.1: Bjarke Ingels Group (n.d.). Copenhagen Harbour Bath.

Figure 2.2: Happy Visuals/Göteborg & Co (n.d.). The Harbour Bath in Frihamnen, Göteborg.

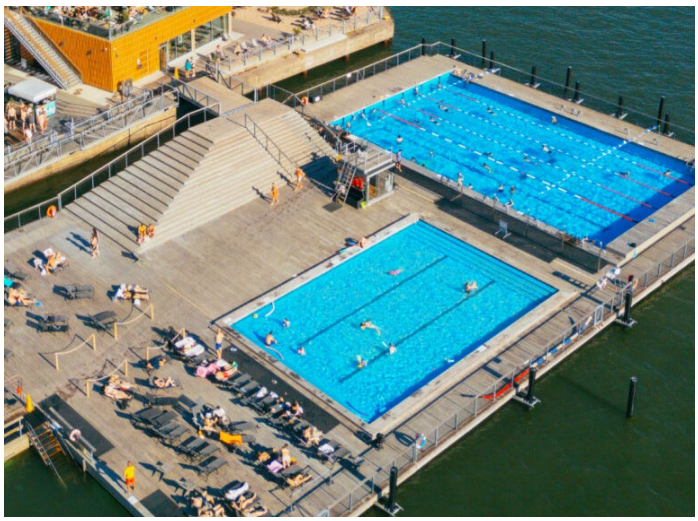

Figure 2.3: Allas Pool (n.d.). Allas Pools in Helsinki.

Figure 2.4: Zuerich.com (n.d.). Flussbad Unterer Letten, Zürich

Figure 2.5: Regis Duvignau/Reuters (2019). Paris Plage: Bassin de la Villette.

Figure 2.6: Bureau Marineterrein (n.d.). Marineterrein harbour in Amsterdam.

Figure 2.7: landschaap (2024). Zalige Zwemdagen in the Bonapartedok in Antwerp.

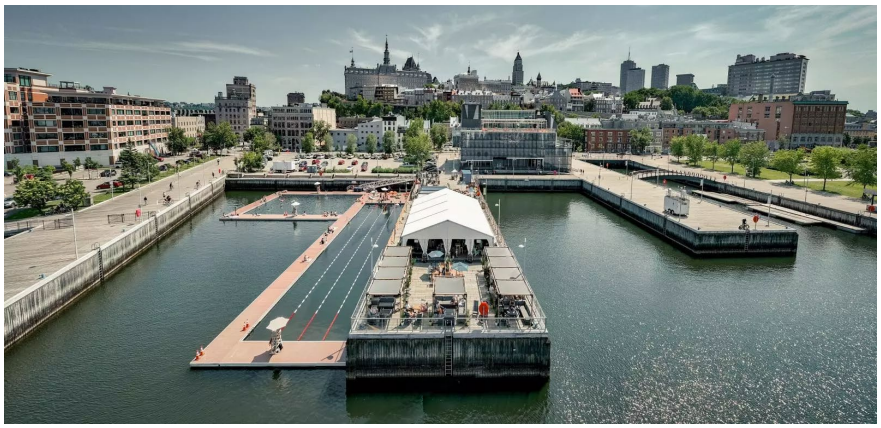

Figure 2.8: Québec cité (n.d.). L'Oasis in the Québec harbour.

Figure 2.9: Adrian König (c) Flussbad Berlin e.V (2019). Render for the Flussbad Berlin.

Figure 2.10: Marc Verhille/Mairie de Paris (n.d.). La Piscine Joséphine Baker in Paris.

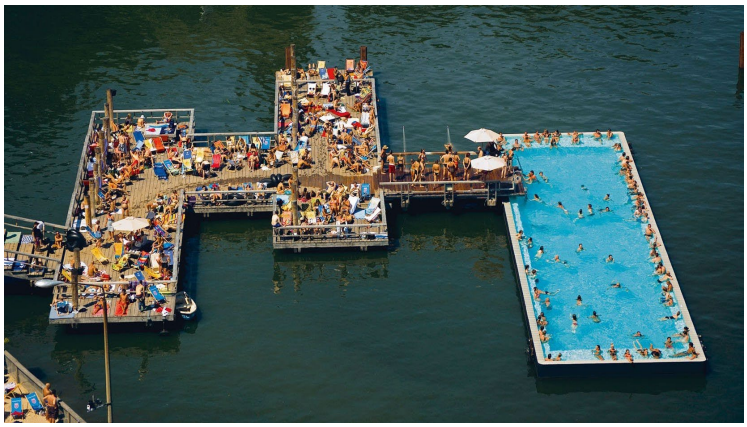

Figure 2.11: Amusing Planet (2010). Badeschiff in Berlin.

Figure 2.12: Vienna Würstelstand (n.d.). Badeschiff in Vienna.

Figure 2.13: +POOL (2024). Design for +POOL in New York City.

Figure 2.14: Daniel Avila/NYC Parks (n.d.). The Floating Pool Lady in Barretto Point Park, New York City.

2.3 Three categories of urban bathing

The portfolio of examples shows that urban bathing knows a wide variety of translations. Making an attempt to categorise these translations can be disputed, since the context of the site seems to be a determining factor in the characteristics of the facility or supporting structures. For example, technical aspects related to the construction often depend on the physical situation of the site. The fluctuation of the water level due to tide effects, but also the effects of currents or wave action can lead to unique circumstances in the design and construction of a structure supporting urban bathing on the particular site (T. Sirola, personal communication, March 25, 2025). The variety of examples also shows that the water quality decides whether a bathing site can allow swimming in natural water, or a treated option is necessary. Looking at other attempts of categorising urban bathing typologies, Belgium-based organisation *POOL = COOL* structures urban (canal) bathing facilities based on the type of structure and the model for achieving sufficient water quality (Figure 2.15). Meanwhile, research by Cao et al. (2025) initially defined four typologies of urban (river) bathing: (i) enclosed floating swimming pools with chlorinated water, (ii) enclosed floating swimming pools with natural water, (iii) riverbanks with man-made facilities and (iv) natural riverbanks with sand. In the study, focused on river bathing specifically, they eventually use two typologies: (i) designated river pools and (ii) free river bathing zones. Conducted for the context of Rotterdam, Studio Marco Vermeulen (2023) made the distinction between a floating bathing facility with either an open- or closed water basin.

For this research, the difference in implementation eligibility and -management for floating pools of natural water or chemically treated water, as well as the development of a supporting pool-like structure are expected to be significant enough to address these typologies separately and include them in the categorisation framework for this particular study. Taking all of this into consideration, a loose categorisation of urban bathing translations will be helpful in defining the implementation requirements and apply them to specific sites or case study locations further in this research, applicable to the context of Rotterdam and desired type of research output. This categorisation is therefore made based on the existence of a pool-like structure on the water (regardless of their fixed or floating nature), and the fact whether the swimming water is untreated or treated (either naturally or chemically). This would result in the following categories:

1. <u>No fixed or floating structure, direct water contact (*The Free Style*)</u>

At the end of the scale would be urban swimming in a state of full safe access to the water, without a supporting structure in or on the water. Facilities are on the shore and the only extra supporting structure might be a boardwalk, jetty or set of stairs to access the water. This category demands the highest water quality (and highest physical safety compared to the other categories). Example cases such as the Marineterrein in Amsterdam fall into this category, as well as the Bonapartedok in Antwerp or the plans for the Flussbad in

Berlin. These examples have some supporting facilities on the shore and sometimes include a designated area only separated by lines or floating buoys. As in its current state, the Rijnhaven in Rotterdam strives to fall into this category.

2. Fixed or floating structure, direct water contact (*The Protected Plunge*)

The second category would be urban swimming in direct access to the water in the river, harbour or other body of water, but within a supporting fixed or floating pool-like structure. These structures usually resemble pools also in the way of having a pool floor, regulating the depth and avoiding people going outside of the structure through underwater. Facilities can be added on this structure or on the shore. Examples in this category include the Harbour baths in Copenhagen and La Baignade la Villette in Paris. For these examples, the water quality needs to be sufficient as well, but physical safety is regulated better by the structure as a barrier.

3. Fixed or floating structure, no direct water contact (*The Dip in a Bowl*)

The third category would be urban swimming in a fixed or floating structure on the water, without swimming in direct contact with the (natural) water. These types of structures can be similar to the examples from the second category, but include a closed or semi-closed 'pool' of chemically or naturally treated water. Sometimes, these pools are constructed inside a barge ship or similar construction. On some occasions, these structures are flexible and therefore movable to different locations. Examples of this category include the Badeschiffs in Berlin and Vienna, the Piscine Joséphine Baker in Paris and the +pool in New York City (all fixed to their location on the shore). The Floating Pool Lady is an example of a barge ship pool that is able to dock at different locations in the city.

Combinations of categories are also possible. The Allas pools in Helsinki include one 'natural' sea pool and two heated, water-treated pools. In Göteborg, a similar construction is made. This way, there is always a pool open even when the water quality is insufficient. Within the developed categories, urban beaches and river waterfronts, as well as pools located on the quays, are left out of the research scope.

There are numerous requirements relating to urban bathing in general, as well as specific to the different typologies. For this categorisation, water quality is an important requirement in investigating the possibilities for an open basin (*The Free Style* and *The Protected Plunge*). The standards for (outdoor) bathing water quality in the Netherlands are legally established in EU regulations (2006/7/EC (European Commission), otherwise referred to as the EU Bathing Water Directive. These standards are also implemented in the Nationaal Besluit Kwaliteit Leefomgeving (Environmental Quality Act), as a part of the general Environmental Act. Monitoring happens during the swimming season (1st May – 1st October). The regulation standards apply to all surface water that is expected to be used as swimming water, where swimming is not explicitly prohibited or permanently strongly unadvised. The four assessment categories are "poor", "sufficient", "good" and

“excellent” and are based on quantities of cyanobacteria and other parameters. When the water quality in a swimming area is assigned the classification “poor”, authorities are obliged to take action.

Among the defined categories, *The Dip in a Bowl* distinguishes itself from the other two because of its closed water basin, as opposed to swimming in direct contact with the water in the harbour. Therefore, bathing sites of this typology could be seen as outdoor pools and depending on the situation, public amenities. This would likely add a number of requirements to the site, since the Municipality of Rotterdam is responsible for establishing, maintaining and exploiting public swimming pools. The availability of facilities such as changing rooms, toilets and showers will therefore have to be included in the development of the site, which differs from the other typologies. This creates a different narrative for the initial investments and operational costs associated with *The Dip in a Bowl*. Furthermore, in policy on public swimming, *Beleidskader Zwemmen* (Gemeente Rotterdam, 2015), it is stated that the Municipality will avoid investing in amenities that mostly suit recreational swimming.

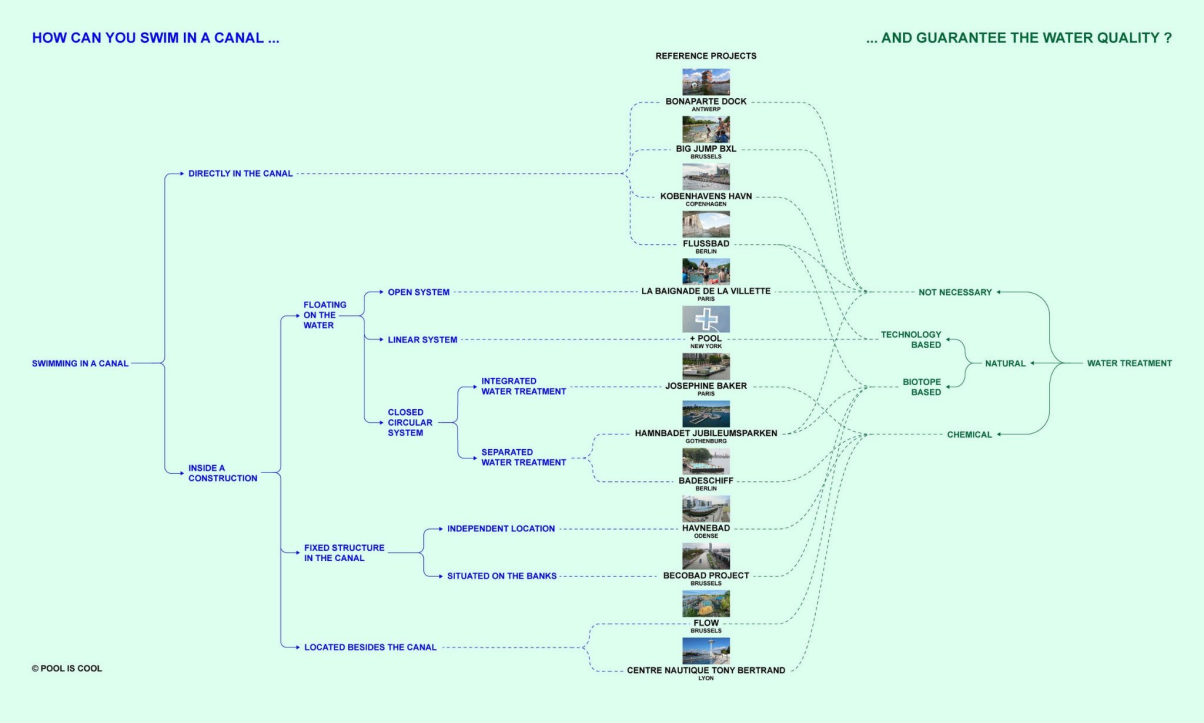

Figure 2.14: POOL IS COOL (2024). *Types of urban bathing facilities and water treatment.*

2.4 Actors and places

Between the inner city harbours included in this research scope, there are significant differences in place-specific characteristics. Place-related factors play an important part in the challenges that occur in development processes in that particular area. Complexity of place also inevitably results in a complex set of related stakeholders, which will add to the possible challenges in the realisation process.

When implementing urban bathing, all parties involved in the development of urban bathing sites, as well as creating a physical and non-physical environment needed to facilitate this, can be stakeholders. In this research, stakeholders can therefore possibly be related back to either their nature in the general urban development process, specifically to the topic of urban bathing implementation or in a certain overlapping area between these two. Challenges may find their origin in certain trade-offs between different urban system-based aspects, conflicting with each other in the process of incorporating swimmability and developing urban bathing sites. This is also often recognized in literature on the governance of safe urban bathing water (Globevnik et al., 2020; Quilliam et al., 2015; Wuijts et al., 2020). The inner city harbours in Rotterdam are historic and complex urban areas, where the water and waterfronts are somewhat shared by many different functions and operating stakeholders. As previously mentioned, many of these harbours have been subject to redevelopment projects, some due to the withdrawal of industry and port activities. In the practice of urban development management, the development of urban bathing sites would include stakeholders from different sides of the 'stakeholder triangle' (Pestoff, 1992), distinguishing public stakeholders, private stakeholders, the community and the 'third sector', which are non-profit organisations or NGOs. For the assignment of urban bathing in the inner city harbours of Rotterdam, a few important (public) stakeholders are:

- The Municipality
- Rijkswaterstaat (Ministry of Infrastructure & Water Management)
- Havenbedrijf (Port of Rotterdam)
- Omgevingsdienst Midden Holland
- Province of South-Holland
- Waterschap Hoogheemraadschap van Schieland en Krimpenerwaard and Waterschap Hollandse delta (Water Authorities)
- Public Health Authority GGD
- Zeehavenpolitie (Harbour Police)
- Safety region Rotterdam-Rijnmond
- Rotterdam Harbour Heritage Organisation

The range of different actors involved in the portfolio of both urban bathing and urban development of the inner city harbours is changing and growing constantly. Apart from the Wateratlas and the previously explained redevelopment plans for the Rijnhaven, other large-scale plans for Rotterdam's Feyenoord City, Merwe-Vierhavens (M4H), Parkhaven

and Lloydkwartier introduce the significance of the positions of these stakeholders in the nearby future. The values and stakes following their core business or responsibility will shape how these future developments will unfold. In the future-oriented approach that is proposed in this research, a valid evaluation of their current stakes puts their future proofness to the test. Are their positions and objectives sustainable for this future, or are they likely to change - either voluntarily or forced - and what effect would this have on the implementation of urban bathing in the Rotterdam harbours?

Some prominent responsibilities and positions of public stakeholders include:

- *The Municipality of Rotterdam:* The Municipality consists of a variety of departments that each hold a different position in the implementation of urban bathing. While the Department of Urban Development would be the initiating party in the implementation plans for an urban bathing site, the other departments could play a part in aspects such as sports- and swimming programming, maintenance, financing or maintenance of real estate (pools and certain bathing sites).
- *The Port of Rotterdam* (*Havenbedrijf, Port Authority*): The Port of Rotterdam is owner of the Nieuwe Maas and several of its adjacent harbours, also within the inner city. Therefore, they have significant power and interest in the future activities on the water. In their vision for the future of the Port, they focus on innovation and a sustainable living environment in the port areas, for example by connecting more ships to electric power sources and on-land sewage systems. The World Ports Climate Action Program (WPCAP), for which the Port of Rotterdam leads 4 of the 5 working groups, aims to accelerate the sustainability transitions for port areas all over the world. Improving the livability around the port and improving the connection between the port and its environment are two of the main ambitions named in the corporate strategy of the Port of Rotterdam for 2025-2029 (Port of Rotterdam, 2025). One of the main values and even more so, concerns, of the Port of Rotterdam is the guarantee of safety. Therefore, the issue of urban bathing is therefore sensitive and difficult.
- *Water Authority*: The water authority is mainly responsible for the supply and quality of fresh surface water and the maintenance of dykes and other water structures. They are involved in any intervention that might impact the water or its environment. For Rotterdam, the *Hoogheemraadschap van Schieland en Krimpenerwaard* carries this responsibility for the impact on the Nieuwe Maas river, as well as the Delftse Schie and the Rotte. Considering the increasing risks of extreme weather, declining surface water quality and increasing drought due to climate change are threatening these activities, their position might become more sensitive and also more important in the conversations on water quality and biodiversity, water safety, climate adaptation and even recreation.
- *Ministry of Infrastructure and Water Management* (*Rijkswaterstaat*): The Ministry of Infrastructure and Water Management is responsible for implementation,

inspection and management of public infrastructure including motorways, bridges, tunnels and locks. This includes the major national waterways, among which the Nieuwe Maas river in Rotterdam, to which some of the inner city harbours are directly connected. Furthermore, Rijkswaterstaat collects data on many water-related issues, such as the water temperature and -flow. This is all valuable information for the assessment of swimming waters. Rijkswaterstaat is an important stakeholder in collaboration with regional authorities, such as the Water Authority and Provinces regarding the management of waterways. However, on top of public infrastructure, national access to a clean water supply is also their concern, as well as the implementation of climate adaptation measures and guarantee of a sustainable living environment. Their position in the practice of urban bathing implementation can therefore be multifaceted.

- *GGD (Public Health Authority)*: The GGD Living Environment informs the public on possible health risks of swimming in natural water, for example regarding blue-green algae or chemical contamination. Regardless of outdoor swimming, the topic of public health will likely become a more important issue due to the effects of climate change. In their position to inform people on these issues, the GGD Living Environment warns of the effects of heat stress and encourages residents to take sufficient measures to cool down during hot weather.

Within the private-, community and third sector, relevant actors could be outdoor swimming societies, schools and sports clubs. They form an interesting position in the development of these projects and the opportunities to partner up with (private) stakeholder parties, such as local entrepreneurs, developers within the urban areas, or local residents. Considering the many large scale urban developments that are ongoing or planned for the coming years, their positions can be valuable in the process of embedding urban bathing implementation in these plans.

2.5 An urban systems-based framework

A large range of different versions of urban system models or frameworks are available in existing literature. While some representations of urban systems models show the systems through interrelations (Alberti, 1999), a common way of representation is a layered method. A 'layered systems' approach ('lagenbenadering' in Dutch), or strata approach (De Hoog, Sijmons en Verschuuren, 1998) is well represented in urban planning practice in the Netherlands and has been repeatedly reimagined and debated (Hagens, 2006; Van Schaick & Klaasen, 2011) since it was first published. This approach distinguishes three subgroups for the physical environment; (sub)soil (the physical, natural base), networks (infrastructure) and occupation (the built environment). And while helpful in understanding the intertwinement of these physical systems, it misses some of the social activities and exchanges that happen within cities that add to the complexity of urban development management. A different model that is also structured

by three system categories is The City Anatomy framework by the City protocol Agreement (Guallart et al., 2015). This model distinguishes urban systems within the layers of *structure*, *interactions* and *society*. The three layers of soil, networks and occupation are similar to the category of *structure*, interactions include non-physical systems such as information, economy or culture, while society represents the systems of the government and civil society.

To try and find a fitting framework for the scope of this research, the starting point could be found through the alignment of used frameworks by the Municipality of Rotterdam. In the Rotterdam Resilience Strategy 2022-2027 (Gemeente Rotterdam, 2022), a version of a layered urban system framework is used to justify the strategy. The urban systems framework is used to show the 'crucial collective' systems on which resilience can or should have its effect. They distinguish:

Social collective urban systems;

- Economic system
- Governance and legal system
- Safety system
- Health system
- Education and science system

And physical collective urban systems;

- Built environment
- Mobility
- Public space
- Among biosphere/natural systems;
    - Information
    - Materials
    - Energy
    - Ecology
    - Air
    - Water
    - Soil

Regardless of the relevancy of certain subsystems and the differences between other urban systems-based frameworks for the case of urban bathing implementation, a common thread among them is the distinction between physical and non-physical systems. In most cases, the main argument for the use of an urban systems-based framework is the ability to show interrelations between different systems. Further in this research, an urban systems-based framework will be developed to fit the case of urban bathing in Rotterdam's inner city harbours.

3. Methods

3.1 Methodological framework

Based on the research questions and developed research design, this research study follows a deductive approach. Following from the theory as explained in the previous chapter, the methods of this research are the result of an hypothesis that will be the leading framework. A visual representation of the methodological framework (Figure 3.1) shows the consecutive research steps.

The main research question will be answered through three sub questions.
The first sub question will be answered mainly through a literature review and conclusions from personal communication within the environment of the Municipality of Rotterdam and the Swimmable Cities network. The consulted literature consists of scientific literature required through Scopus or Google Scholar, policy- and (European) regulation documents, information or documentation provided by NGOs and news articles. The outcomes of this literature review will be leading in the preparation of the interview questions and analysis strategy for the second subquestion. The second subquestion will be answered through a set of in-person, semi-structured case study interviews with professionals from the three international example cases. The interview transcripts will be used for a qualitative analysis, using the Atlas.ti coding tool to identify the place- and actor-related challenges and solutions, opportunities & successfactors mentioned by the interviewees. These results will be leading as implementation lessons in the preparation of the interview questions and analysis strategy for the third subquestion. The third subquestion will be answered through a qualitative case study analysis with three eligible case study locations in Rotterdam's inner city harbours. Through in-person, semi-structured case study interviews with project managers from these cases, the data will be collected and afterwards analysed qualitatively using the interview transcripts and the Atlas.ti coding tool.

The main question will eventually be answered in the shape of a practical implementation strategy for implementing urban bathing in the inner city harbours, written for the use of civil servants at the Municipality of Rotterdam.

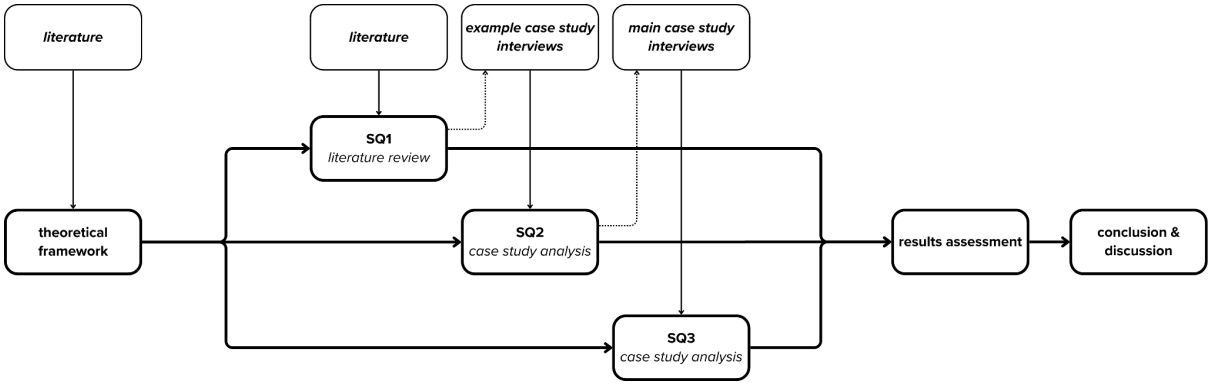

Figure 3.1: Methodological framework. Image by author (2025).

3.2 Case study selection

The case studies will provide qualitative data on relevant, real-life cases of urban bathing projects, that will be obtained through in-person interviews with professionals currently working on the case or have contributed in the past. These professionals can be connected to their case as a policy maker, initiative taker, manager etc. The focus of the case study data collection is on the management of stakeholder relations and area development and the lessons learned while realising urban swimming projects in the respective case study cities. The case study interviews will be the main source in answering the second and third research questions.

3.2.1 Selecting the main case studies

The main research case, as introduced in earlier chapters of this research, is the city of Rotterdam, the Netherlands. Within this main case of Rotterdam, there are a number of eligible harbours that are relevant to include in this study. As presented in the Wateratlas and discussed earlier in this report, the Municipality has appointed a variety of sites along the project area for further investigation of eligibility for urban bathing (Gemeente Rotterdam, 2024). The focus on the inner city harbours is envisioned through the term ‘hospitable harbours’, assigning each of these focus areas a certain identity and character for development, supported by future functions or facilities such as a bathing site (Gemeente Rotterdam, 2024). Furthermore, the Department of Urban Development of the Municipality is continuously investigating locations within the city ring for nomination of becoming an officially designated bathing site. They state to have a list of one hundred new eligible bathing locations (J. Pieneman, personal communication, December 2024), among which many of the inner city harbours are included. The three main research cases will therefore be inner city harbour locations selected from the list of eligible harbours for outdoor swimming areas in Rotterdam, when possible aligned with the designated ‘hospitable harbours’ as presented in the Wateratlas (Figure 3.2) when relevant. The selection criteria for the cases include:

- The (surrounding) area is relatively large and comparable in size;
- The (surrounding) area can be considered complex, relating to the quantity and variety of stakeholders involved;
- The (surrounding) area can be considered complex, relating to the physical characteristics of the area and the variety of use and functions in the area (residential, commercial, etc.).

The inner city harbour project areas that are eligible for use in this research framework based on these selection criteria are presented in Figure 3.3.

The three case study locations will be picked based on their eligibility for the realisation of one the three types of urban bathing locations. In answering the first research question, each of the identified locations (Figure 3.3) will be assessed into an urban-system structured profile. Based on their profiles, each of the three identified types of urban bathing (*The Free Style*; *The Protected Plunge*; *The Bob in a Bowl*) will be connected to one case study location which fits the type's requirements, for the continuation of the research.

3.2.2 Selecting the example case studies

The three example cases used for the qualitative case study analysis will apply to the same selection criteria and will be selected among the cases included in the literature review collection of global urban bathing sites, structured into the three identified types of urban bathing sites. Based on the availability of interview participants from the categories of example projects and their complimentary identity to the selected case study locations in Rotterdam, one example case will be selected from each of the categories. Aspects like a variety of cities and countries between these three examples, as well as their maturity and successfulness, will play a role in the prioritisation of contacting and including the example cases in the study.

3.3 Case study interviews

Both the second and third research question will be answered through sets of semi-structured interviews for each of the case studies. The interviews will be divided into two sets of three separate interviews.

The first three will be conducted with representatives from the Municipality, each relating to one of the three case study locations in Rotterdam, paired with one of the urban bathing types, that will be selected further in this research. The interviews will be conducted in person, by the main researcher. The interview protocol includes questions relating to the professional position of the interviewee regarding the urban bathing case and the expected implementation challenges, as well as the potential of the location.

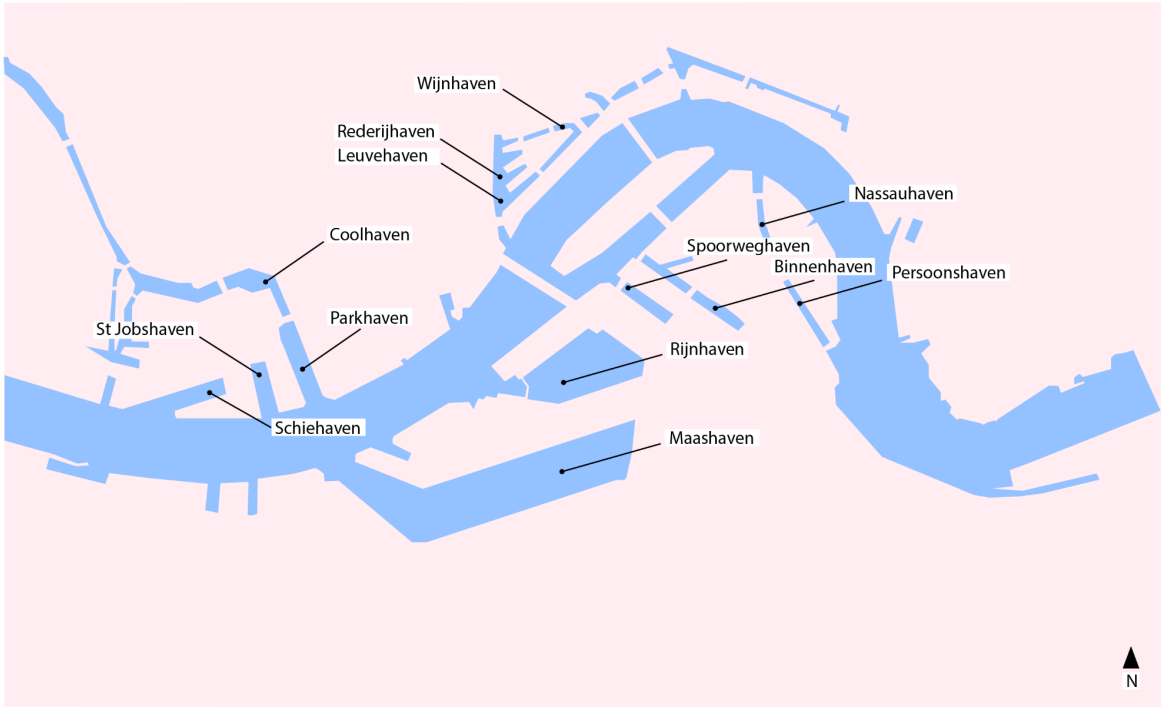

Figure 3.2: Image by author (2025). Case study scope of the inner city harbours in Rotterdam.

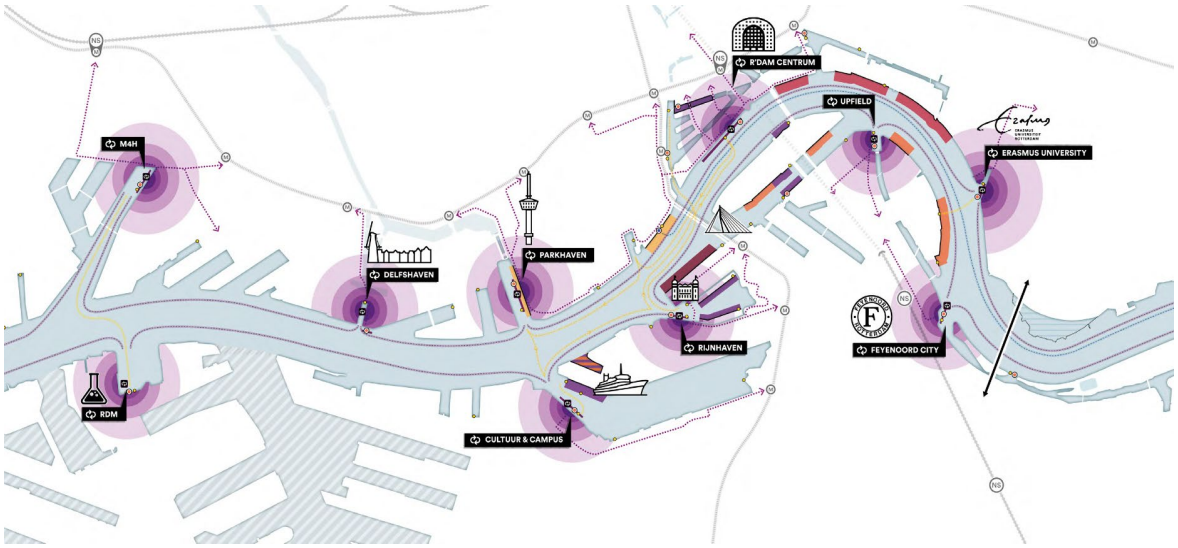

Figure 3.3: Eligible inner city harbours for swimming in Rotterdam. Image by author (2025).

The interview questions are further altered to the results as presented in Chapter 4, where the implementation of urban bathing in the inner city harbours is analysed within the urban systems framework. The interview setting, questions and timing are formulated in the interview protocol (Appendix A).

The second set of interviews will be conducted with representatives from the (inter)national example case studies, each relating to one of the three defined types of urban bathing. The interviews will be conducted by the main researcher and in person when possible, otherwise via an online video call connection. The interview protocol includes questions relating to the professional position of the interviewee regarding the urban bathing case and the experienced implementation challenges, as well as the key success factors or chosen trade-offs in the realisation and overcoming these challenges. The interview questions are altered to the results presented in Chapter 5, in order to customize the questions to the challenges experienced in the Rotterdam case study location connected to the urban bathing typology. The interview setting, questions and timing are formulated in the interview protocol (Appendix B).

3.4 Data coding and analysis methods

The interviews will be audio-recorded and transcribed into text using a transcription tool. The transcripts will then be prepared for data analysis, by coding using the Atlas.ti software. The purpose of using a coding tool like Atlas.ti is to structure relevant quotes from the interviews and make connections within and between them according to the parameters of the respective research questions.

The codes will be structured into codes and subcodes as follows:

- Urban systems, to be determined following results of SQ1
- Implementation challenge
    - Actor-related challenge
    - Place-related challenge
- Implementation solution/opportunity/success factor
    - Actor-related
    - Place-related
- Urban Bathing type
    - The Free Style
    - The Protected Plunge
    - The Dip in a Bowl
- Rotterdam case study locations, to be determined following results of SQ1
- Example case study locations, to be determined following results of SQ1

By using these codes, the following analyses can be made:

- **(SQ2)** What have been solutions/catalysors in overcoming similar implementation challenges in the example case study locations for;
    - Urban bathing type 1
    - Urban bathing type 2

    - Urban bathing type 3
    - In general

There can be made a distinction between general solutions/successful trade-offs in overcoming challenges in implementing urban bathing, as well as for each bathing type.

- In what urban systems can solutions be found?
    - Were certain solutions found in different urban systems than where the challenge originated?

- **(SQ3)** What are the place- and actor-related implementation challenges for implementing;
    - Urban bathing type 1
    - Urban bathing type 2
    - Urban bathing type 3
    - Urban bathing In general

Furthermore, there can be made a distinction between general implementation challenges for all types of urban bathing and each of the three types.

- In what urban systems lie the challenges?
    - In which systems are opportunities or trade-offs expected to be found?

To answer the main research question:

Compare the lessons learned from international cases with the identified challenges and opportunities in Rotterdam:

- Do the challenges align between the (inter)national cases and the Rotterdam cases?
- Do the opportunities align with the success factors in the (inter)national cases?

3.5 Data Management and Ethics

For this research, a Data Management Plan (Appendix C) has been developed to ensure the consideration of data management risks throughout the entire research process. The Data Management Plan is supported by a Human Resource Ethics application for conducting the case study interviews. Interviewees have been informed of the possible risks related to the management of their personal data and participation in the research project. The interviewees that participated in the in-person case study interviews have received and signed an informed consent form (Appendix D) prior to the interview, to inform them of their participation.

4. Results: Swimmable harbours in an urban systems framework

4.1 Introduction

In this chapter, the following question will be answered: *What urban system-based aspects enable the implementation of urban bathing in the inner city harbours of Rotterdam?*

The aim of this chapter is to create a model to assess and evaluate the scope of possible case study locations - Rotterdam's inner city harbours - according to the boundary conditions of urban bathing. The developed approach will be used to address and analyse the scope of eligible inner city harbours and function as a selection tool for the nomination of three case study locations, that will each be connected to one type of urban bathing (*The Free Style*; *The Protected Plunge*; *The Dip in a Bowl*). The starting point is a continuation of the urban systems approach following the Rotterdam Resilience Strategy (Gemeente Rotterdam, 2022), as first addressed in the theoretical background. A critical analysis of this general model is supported by existing literature, research and practical examples, to adjust this model according to the context of Rotterdam. The two facets of the model include the physical eligibility according to the urban systems model, addressing location specific characteristics such as the accessibility, safety and current use of space of the location. The second part will focus on the non-physical related systems such as the social urgency or financial feasibility, which will be leading in determining the urban bathing typology that fits the case study location best, in the context of this research framework.

4.1.1 The Rijnhaven Pilot Case

Looking at the first inner city urban bathing pilot in Rotterdam, the Rijnhaven case highlights some significant examples of urban system-based aspects that have determined the process of implementing the urban bathing pilot. The pilot was launched in 2024, after the safety of the situation around increasing (illegal) swimming along the first section of the floating park called for better regulation and grip by the Municipality (L. Vroom, personal communication, February 24 2025). The floating park is one of the first interventions in the urban redevelopment plans for the Rijnhaven in the coming years. The plans propose building a strong connection between the location and the waterfront, including plans for a waterfront park and urban beach, in addition to the floating park being extended along the quays. The zoning plan was approved on the 16th of April, 2025 (Gemeente Rotterdam Persberichten, 2025). The physical environment around *the Floating Office* was suggestively an attractive place for gathering on the waterfront and the location soon became a popular site for swimming (Figure 4.1). In a bid to address the safety issue of what had became the situation, as well as to test a possibility for urban bathing in the future, agreements with the Port of Rotterdam (owners of the

harbour), harbour police, water taxi company, Safety Region Rotterdam-Rijnmond and other local stakeholders were made to implement a safe solution for the use of the water in the Rijnhaven (L. Vroom, personal communication, February 24, 2025). A line of buoys was placed for demarcation of the designated bathing area and in agreement with the adjacent theatre LantarenVenster, visitors of the site were allowed to use the bathrooms inside. Throughout the bathing season, the composition of actors were forced to experiment collectively with investigating water quality, informing the public and surveying the site.

Analysing the Rijnhaven case according to the urban systems-based model, a more concrete translation of the different systems can be recognised. The process of the area turning into a bathing area was initiated through the physical qualities of the area, rooted in the man-made systems of public space (the floating park) and surrounding built environment. For the issue of safety, one could argue that this was found in the mobility system of boat traffic in the harbour, and further eligibility for the site in bathing water quality, which could be connected to the natural physical system of water. The following steps in creating the bathing site were part of the collaboration between the main public stakeholders in the harbour, along with local parties. This step is arguably the first in addressing the non-physical systems on top of the pyramid and could be connected best to the governance system. Therefore, this process mostly follows the systems pyramid in the opposite direction than it is presented.

Figure 4.1: The floating park in front of The Floating Office in the Rijnhaven, Rotterdam (Image by author, 2025)

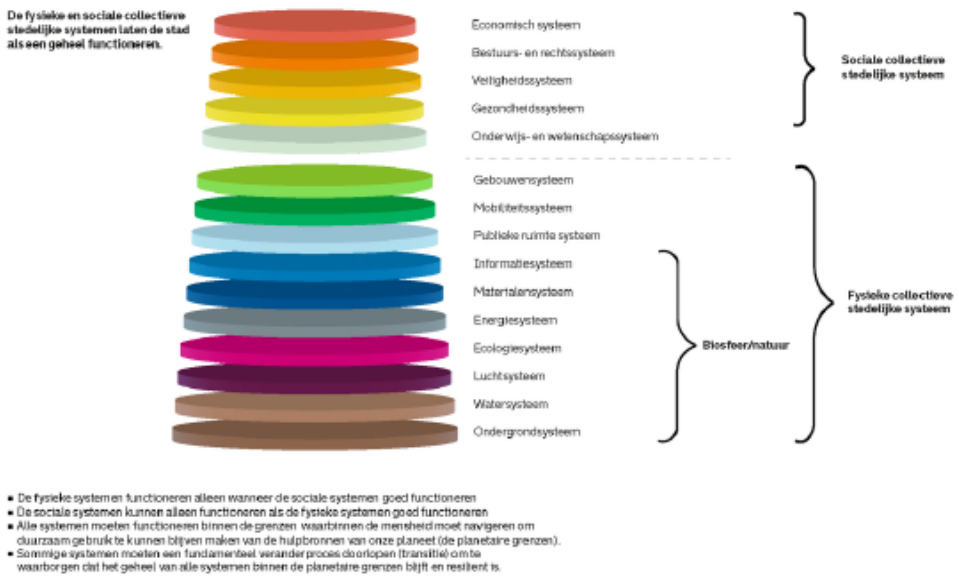

Figure 4.2: the urban systems-based framework following the Rotterdam Resilience Strategy (Gemeente Rotterdam, 2022)

4.1.2 The Allas pools case

As opposed to the Rijnhaven case, where urban bathing happened unintentionally, the Allas pools in Helsinki, Finland, were a planned and designed urban bathing site. According to *Bluet Floating Solutions* founder Tytti Sirola, the design- and delivery model starts with the public- or private nature of the project (T. Sirola, personal communication, March 25 2025). Determining factors such as the budget and the context within bigger urban development activity are considered here to develop a sustainable design-and-delivery proposal. This is followed by a watersite survey where physical safety of swimmers relating to ships and waves is considered, as well as the effects of wind, currents, tides, soil- and water quality. With the implementation of the Allas Pool urban bathing site, physical safety was addressed through strategic allocation of the heated, closed pools. These heavier structures were intentionally placed in their position to limit the risks related to a ferry dock that is located in close distance to the bathing site. An alarm-system and evacuation plan have been developed to further limit the risk from an operational perspective.

After the physical assessment, the defined composition and size of the target group for the bathing site is a determining factor in the product design and therefore the costs. As Bluet has developed standard pool sizes, the cost-effectiveness is based on the standardisation of their products and delivery (T. Sirola, personal communication, March 25 2025).

Different from the Rijnhaven case, this situation initially starts with a justification and scoping of the assignment within non-physical systems relating to governance and financial aspects, along with the context of the built environment. The reason for this difference could be connected to the intentional assignment of the Allas pools, opposite to the more reactive nature of the Rijnhaven site. Then, the natural other physical systems are addressed through the watersite survey, after which the final implementation rooted in non-physical systems include delivery and operational management. Therefore, the two cases have in common that the systems approach starts with addressing eligibility in the physical aspects, followed by the non-physical aspects close to, or after implementation.

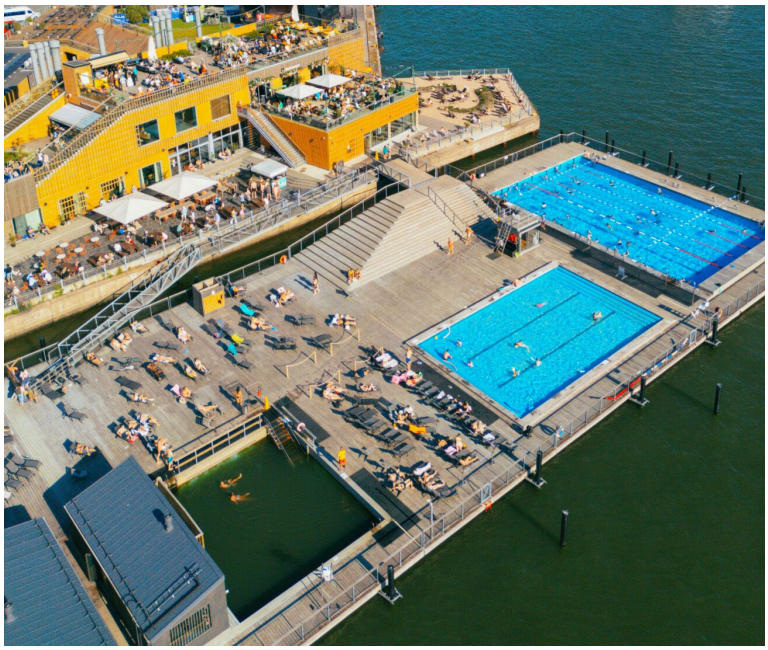

Figure 4.3: Allas Pools in Helsinki, Finland (Allas Pools, n.d.)

4.2 Urban bathing sites through urban systems

Looking at the different models used in the context of urban systems, as addressed in the theoretical framework for this research and recognised in the Rijnhaven pilot case and the Allas pools in Helsinki, a common structure, whether this is intentional or not, is the division of physical and non-physical urban systems. Physical systems including mostly tangible or tangible-based systems, such as existing infrastructure, water or the safety of the site, non-physical systems including social or intangible systems such as governance and financial aspects. To build a framework suitable for the following steps in this research, a sequence in which different urban systems can be addressed, as well as a more specific and relevant translation to the context of urban bathing has to be developed. Based on the two explored mini cases, evaluating the scope of case study locations using an urban systems framework logically calls for an assessment of the physical systems first - given that sufficient reason for investigation of the site is implied - sequentially narrowing it down to the non-physical systems. The substantiation of this

approach lies in the assumption that the systems that would require the largest, possibly most expensive or time-consuming interventions are addressed first, scaling down to the systems that are relatively more convenient to adapt to or change, and have less chance of leading to dismissal of a possible urban bathing project. It also provides the possibility to evaluate the location according to its physical qualities and environmental opportunities. This is followed by addressing the non-physical systems, which play an important part in the social justification of the project itself and can determine the way it will be delivered. The non-physical systems might be leading in elaborating the translation of the urban bathing facility and defining any necessary governance-related changes. 'Trade-offs' such as social urgency, financial feasibility, or flexibility are considered here as well, which might influence the urban bathing site typology that fits the location best, in case physical aspects have not limited the eligibility of other typologies yet.

4.2.1 Physical systems in Rotterdam

Rotterdam based architecture-, urbanism- and research firm 'Studio Marco Vermeulen', has published a spatial research study on the possibilities for realising a floating urban bathing facility in the inner city harbours in Rotterdam. The study was conducted in commission by the Municipality of Rotterdam and published in 2023. This study distinguishes two typologies of urban bathing facilities, which partially align with the typologies as defined in this research. Instead of distinguishing sites with or without a supporting (floating) pool-structure, they define urban bathing within an open water basin (*The Free Style*, A *Protected Plunge*), and urban bathing within a closed water basin (*Dip in a Bowl*) (Studio Marco Vermeulen, 2023). To determine the feasibility of realising one of these urban bathing types within the inner city harbours of Rotterdam, the physical factors ('location requirements') that were leading in the study included the expected water quality, physical nautical safety and accessibility and current use of space on the water (Studio Marco Vermeulen, 2023).

The first of these factors, the expected water quality (Figure 4.4), was based on locations with possible sewage overflows (including discharge from houseboats) and the relative strength of the water flow, for which a strong flow is associated with better water quality. As mentioned before, water quality in Rotterdam is only monitored for officially designated swimming areas, or possible swimming areas under investigation, such as the Rijnhaven. The second factor, physical nautical safety (Figure 4.5), was determined in consultation with the Port of Rotterdam. For this factor, the risk of possible collision of ships with the quays or swimming facility structure is leading in determining the eligibility of the location. While the possibility of constructive collision protection is taken into account for the possibilities within the theme of physical safety, the possibility of limiting or regulating inland shipping and seafaring has not been given a lot of attention. The third factor, accessibility and current use of space (Figure 4.6), was based on the relative level of current use within the harbour or along the quays, regardless of the actual

physical safety of this location, as presented in the previous factor. The current level of use of space is presented alongside the population density of the various neighbourhoods and the locations of existing (indoor) public pools.

Building the framework step-by-step, there are some physical aspects that the study by Studio Marco Vermeulen does not address, but might be a valuable addition to the systems framework. Comparing the three factors to the Rijnhaven and Allas pools cases, water quality might not be the very first concern in assessing a possible location for an urban bathing site. Instead, concerns relating to the physical space and accessibility, safety and spatial character of the harbours seem to come first.

Additional questions that come up for Rotterdam could include:

- Is the inner city harbours spacious enough to facilitate swimming and current or future secondary activities?
- Is it possible to access the water safely from the shore or quays?
    - *If not, is there a feasible way to facilitate this?*
- Are the quays public or publicly accessible?
- Is the location physically safe relating to:
    - strong currents or tides?
    - objects under the surface?
    - overhead infrastructure such as bridges or locks?
    - mooring or passing ships?
- Who are the current users of the quay?
- Who are the current users of the harbour?
    - *Are there any permanent functions or ships that would have to be moved?*
- Is the location already used for swimming? Does it suit the character of the area?

The systems that follow from these questions are defined as Accessibility & Safety for Use and Built Environment & Public Space. Aspects concerning physical safety and current accessibility of the water, which are two separate factors in the study by Studio Marco Vermeulen, will be connected to the first of these two. Aspects relating to public accessibility, the surrounding environment and urban character will be connected to the latter.

A second layer of physical systems include the infrastructure on site. This relates to the mobility issue of passing commercial and recreational ships, but also the infrastructure of utility networks, in case the urban bathing site requires capacity of the water-, electricity and sewage network.

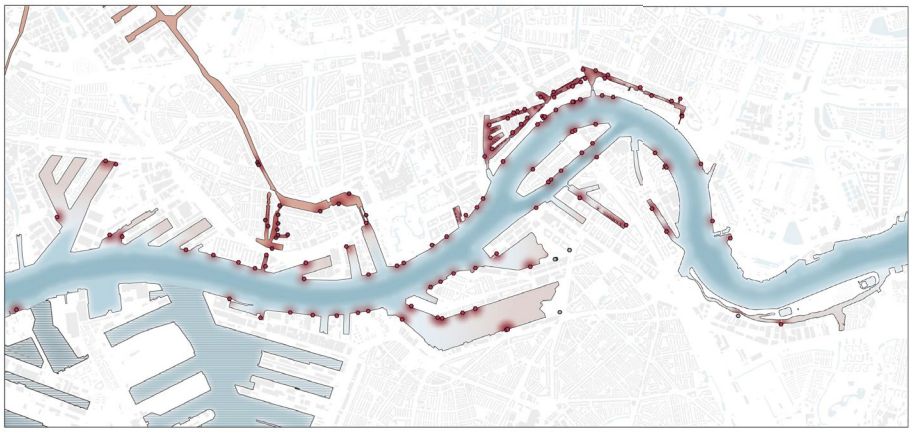

Figure 4.4: *Expected water quality*. Studio Marco Vermeulen (2023).

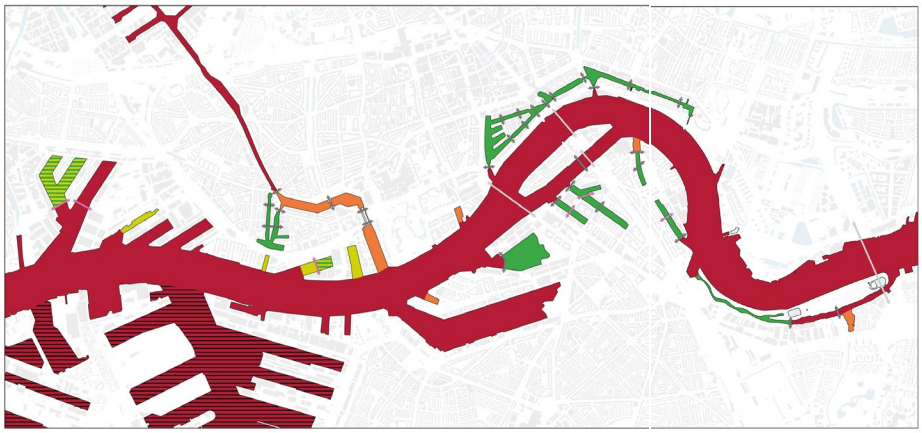

Figure 4.5: *Nautical safety*. Studio Marco Vermeulen (2023).

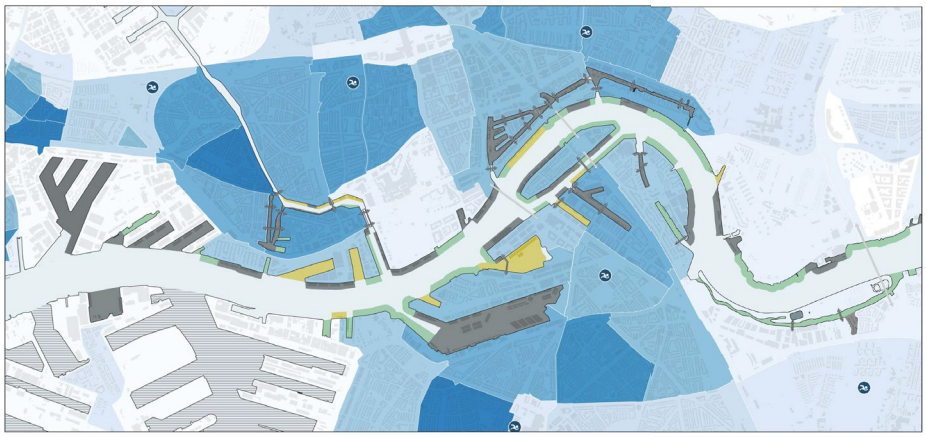

Figure 4.6: *Population density and current use of space*. Studio Marco Vermeulen (2023).

Additional layers that primarily touch upon physical systems include natural systems, such as the ecological context of the area and the water quality of the site. Questions that come up could include:

- Does the ecological situation allow for swimming?
- Does the (expected) water quality allow for swimming (or at least start a promising measuring pilot, since there is limited measurement data on water quality available)?
- Information system - data on water quality, current, temperature.

4.2.2 Non-physical systems

The research study by Studio Marco Vermeulen did not include the entire scope of the urban systems framework within their eligibility assessment for the inner city harbours. As explained in the previous paragraph, the conclusions in the study are mostly based on physical aspects within the urban systems, such as the current physical space, use and infrastructure. While it can be considered a logical sequence to start with these physical systems for the first part of the eligibility assessment, consideration of the non-physical systems might be helpful in creating an understanding of the social issues and -maybe even more important - social urgency of the areas under investigation.

Based on current findings by PhD researcher Clément Brun, in a research on urban bathing sites in Copenhagen, Denmark, a pattern can be recognised between the different typologies of urban bathing and the different kinds of users they attract (Brun, 2024). Brun explained that he recognises three types of users or target groups within urban bathing facilities (C. Brun, personal communication, March 7, 2025). The first one concerns the 'active adult'. These are active users who are focused on using the facility for the physical activity of swimming and are therefore usually year-round users. They are most associated with a type of facility that has space for deeper pools and possibly lanes to swim laps. The second group concerns (young) families. They use the facilities for recreation and they benefit from a facility that suits this activity in a way of protection and safety, facilities specific for children such as diving boards, kiddy pools and space for picnicking or long-term stay. The third and final group concerns recreational adults among each other. As opposed to the 'active adults', this group consists of seasonal users. Ages within this group can range from very young adults to older adults, but their main objective is freedom for recreation. They are looking for a public space to spend their free time, which usually does not include a closed or protected pool-like facility where they feel like being watched. Hospitality functions on the quays could suit this group quite well.

Connecting these types to the defined typologies in this research, you could conclude:

- The first typology (*The Free Style*) primarily suits the recreational adults and active adults, possibly depending on the season, the surrounding environment and secondary functions. This site typology provides a space where they can swim freely, without the feeling of being watched closely. Families might look for more safety, overview and activity programming on the side.

- The second typology (*The Protected Plunge*) could suit all three target groups depending on the translation of the floating or fixed structure and the character that is created around the place. In case the structure stays all year round, like the harbour baths in Copenhagen, this type suits the active adult, especially when the structure provides a pool-like situation. During the bathing season, protected pools might attract more families as well, as this type of urban bathing sites can include 'pools' with different depths suitable for smaller children.

- Finally, the third typology (*The Dip in a Bowl*) is often characterised by its seasonality. Possibly depending on its activity-focused or recreational character, this kind of pool could attract all of the groups, but when separated from secondary functions, probably mostly families and active adults.

Although this distinction allows for a better understanding of different types of users, it is limited to mostly recreational and individual users. A possibly valuable addition to the social urgency issue around urban bathing users, could be target groups such as (swimming) schools for children or adults, or (water)sport associations. Other than that, apart from physical characteristics of the bathing sites, different target groups might base their decision on whether or not to visit a bathing site on other factors, such as the cleanliness of the site, or affordability. Despite not focusing on urban bathing sites similar to the typologies in this research, a study by Meyerhoff et al. (2010), conducted a survey on Berlin region river beaches, where they identified three segments of users based on their 'willingness to pay' for the bathing site. The segments are called 'modest quality seekers', 'pristine seekers' and 'comfort and security seekers'. Respectively, the segments are aligned with the relative income of the respondents. The results pointed out that overall, water quality and cleanliness of the site are most valued by all segments. Segment 3 is more willing to pay extra for factors such as the presence of lifeguards, availability of parking and access to bars or restaurants (Meyerhoff et al., 2010). All these factors can play an important part in creating facilities suitable for a certain target group that fits the identity of the location or preferred development. Additional questions could include:

- What target groups live or stay in this area?
    - What are they looking for in an urban bathing site?
    - Are there any social objectives to which the urban bathing site can be connected?
    - Can swimming- or water sports associations play a part in this narrative?

    - How do the current functions of the area relate to urban bathing? Is there an alternative (green space or public swimming pool) close by? Is there a social urgency for an urban bathing facility like this? *And which typology suits this urgency best?*
    - Does the location have a socio-cultural connection with urban bathing?

From the implementers point of view, the alignment of the urban bathing site with certain target groups or objectives for the area is only one of many issues rooted in non-physical systems. Looking at the Rijnhaven and Allas Pools cases, the governance behind the project is a determining factor in the process of the development of the site and operational management after delivery. In a study by Wuijts et al. (2020) on the governance conditions for realising safe bathing waters in the Netherlands, the complexity of this system was presented through a framework of 'building blocks' that they categorise under the term 'governance'. The building blocks relate to content (*water system knowledge*; *values*, *principles*, *policy discourse*), organisation (*stakeholder involvement*; *trade-offs between social objectives*; *responsibility*, *authority and means*; *regulation and agreements*; *financial agreements*) and realisation (*engineering and monitoring*, *maintenance and follow-up*; *enforcement*; *conflict prevention and resolution*). This proves that many questions that could come up relating to the implementation of a future bathing site, are rooted in this system, which has many interfaces with other aspects mentioned before. It is also where the role of different stakeholders becomes very evident.

- Does swimming and its associated functions or facilities comply with the physical environment plan for this area?
    - *Can it be changed?*
- Is there support from the local community to implement urban bathing?

While the governance system also influences the way finances for the implementation are divided and organised, there are additional circumstances within the financial or economic system. This is also the place where economic opportunity and market activity, as well as external financial challenges are considered. Therefore, this is a separate system.

- Is the project financially feasible?
    - Is there a public budget?
    - Is market activity a possibility?
    - Can the facility be free of charge for users?
    - Can the costs be combined with adjacent interventions in the area?
    - What do the initial costs (realisation, construction, infrastructure) look like compared to the operational costs (maintenance, programming, enforcement)?

For this research, the non-physical systems are financial feasibility, governance and social urgency. In addition to the justification of assignment and the defined physical systems, this shapes the urban systems framework tailored to the case of urban bathing in the inner city harbours of Rotterdam (Figure 4.7).

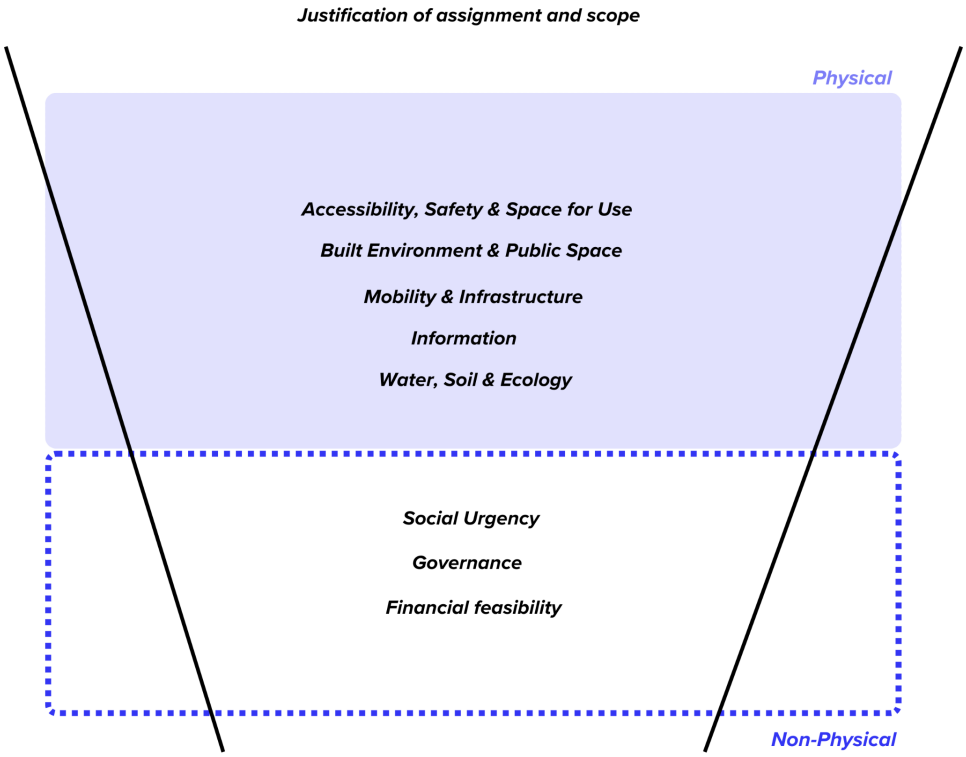

Figure 4.7: Image by author (2025). *Urban systems based framework for the implementation of urban bathing.*

4.3 Eligibility of inner city harbours according to the framework

4.3.1 Physical assessment

Further investigation of the physical eligibility criteria by Studio Marco Vermeulen would be necessary for a more critical assessment of the potential of locations for urban bathing implementation in Rotterdam's inner city harbours. However, for the purpose of this part of the research process, the study works as an instrument to select the three case studies for further exploration in this research. Based on the research by Studio Marco Vermeulen and the first three factors rooted in the physical systems of physical nautical safety, accessibility and current use of space and expected water quality, they have made the following conclusions regarding the eligibility of the inner city harbours to realise a floating urban bathing facility (Studio Marco Vermeulen, 2023):

1. Persoonshaven: *Eligible*
2. Spoorweghaven: *Eligible*
3. Schiehaven: *Eligible, with certain interventions*

4. St Jobshaven: *Eligible, with certain interventions*
5. Tweede Katendrechtsehaven: *Eligible, with certain interventions*
6. Coolhaven: *Eligible, but with a lot of requirements (among which protection measures against possible collisions)*

The Rijnhaven, Middenkous and Buizenwaal and Merwe Vierhavens have been left out of the scope due to;

- The already implemented pilot in the Rijnhaven
- The limited space and options in the Middenkous en Buizenwaal
- The missing urban character of Merwe Vierhavens and the so far still existing industrial activities.

This means that the study has declared the following harbour locations to be unsafe or uneligible:

1. All city centre harbours *(Due to water quality and current use of space)*
2. Parkhaven *(Due to safety)*
3. Nassauhaven *(Due to current use of space)*
4. Binnenhaven/Entrepothaven *(Due to current use of space)*
5. Maashaven *(Due to safety and current use of space)*
6. Veerhaven *(Due to safety and current use of space)*

The remaining harbour and their physical eligibility for the different urban bathing typologies is presented in Figure 4.8.

Harbour	**The Free Style**	**The Protected Plunge**	**The Dip in a Bowl**
Persoonshaven	~	x	x
Spoorweghaven	~	x	x
Schiehaven		~	x
St. Jobshaven		~	x
Tweede Katendrechtse haven		~	x
Coolhaven		~ *	x

*For Coolhaven, a bathing site on the side of Delfshaven and the Machinist would have the preference in terms of safety.

Figure 4.8: Physical eligibility of the inner city harbours of Rotterdam for three urban bathing typologies.

4.3.2 Non-physical assessment

Looking at the relative population density and existing (indoor) swimming facilities in Rotterdam as presented in Figure 4.6, the following locations deserve attention from the perspective of social urgency:

Considering the lack of facilities in close distance, allocating an urban bathing site to Delfshaven would be a logical consideration of priority. Either Schiehaven, St. Jobshaven or Coolhaven, which are all located within Delfshaven, could fulfill this demand. However, the Tuschinski park in Coolhaven has already become a popular swimming spot over the years, regardless of the fact that swimming is prohibited (NRC, 2024). Considering that the Municipality of Rotterdam has expressed their interest in finding a suitable solution to the current situation and demand for this location, Coolhaven could be given the priority in the selection of a case study location for this area.

A different take on social urgency is found through the plans for planned urban development in the coming years. One of the largest urban development agendas for the Municipality of Rotterdam, in collaboration with the State and a variety of public and private stakeholders, is the 'Nationaal Programma Rotterdam Zuid'. As presented in the review of the first half of the national programme, one of the prioritised pillars, concerns the opportunities for the youth growing up in Rotterdam Zuid, in- and outside of their education (Van Rijn, 2022). Together with the planned urban development projects for Feijenoord, including Kop van Feijenoord and Feyenoord City, the social potential of an urban bathing facility deserves further exploration. Considering the expected residential growth and diversity in the Rotterdam Zuid area, compared to the currently limited number of public swimming facilities (Figure 4.6) and absence of any of the four designated outdoor bathing sites, this urban area is prioritised in the selection of case studies.

4.4 Conclusion

In this chapter, the following sub question has been addressed:

What urban system-based aspects enable urban bathing in the inner city harbours of Rotterdam?

4.4.1 The urban systems-based framework

The developed urban system-based framework distinguishes the physical eligibility and non-physical eligibility of a future urban bathing site. Looking at the developed framework, compared to the starting point following the urban systems framework as presented in the Rotterdam Resilience Strategy (Figure 4.2), there are some noteworthy differences. First of all, the developed system follows an opposite reading direction,

starting with the physical systems, down to the non-physical systems. While the Rotterdam Resilience Strategy framework is presented like a layering method, which is similar to the models discussed in the theoretical framework, the developed framework resembles a guide through the different steps and therefore qualifies mostly as an approach. Some systems have been separated, merged or left out for consideration to fit the context of Rotterdam's inner city harbours.

4.4.2 Selecting the case study locations

Aligning the physical research by Studio Marco Vermeulen (2023), the social urgency of the eligible harbour areas and the other arguments made in this chapter, the following conclusions can be drawn relating to the selection of case studies for the continuation in this research study:

1. *The Free Style* - Spoorweghaven: This could suit a year-round character, focused on active adults also outside the general bathing season, but also families from the neighbourhood during the summer. There is no commercial character in the harbour now, which could make it really more of a swimming-focused area. There is an assignment for adding green to the public space in the area, as well as a public function (L. Peels, personal communication, March 25, 2025). There are residents that have mentioned they would like the neighbourhood and harbour to be a little more vibrant, which an urban bathing site could play a part in.

2. *The Protected Plunge* - Coolhaven: This area is almost inevitable to include in this research scope. The urgency for urban bathing in this location is not surprising looking at the population density and lack of recreational water and (indoor) swimming facilities in the area. Implementing urban bathing in the Coolhaven (on the Delfshaven side, next to the Machinist) could be an important contribution to the area. *The Protected Plunge* would possibly fit the users in this area best, families from Delfshaven and the recreational adults. *The Protected Plunge* might be a better fit than *The Dip in a Bowl*, taking the demand and the possible size of the facility in mind. Besides this, located next to the Machinist, the hospitality type of character on the quays suggests secondary activity. It is also the most convenient spot regarding the necessary safety measures (Studio Marco Vermeulen, 2023), although constructing protection from collision seems inevitable. Depending on water quality at the particular moment, its year-round seasonality might not be the case. Looking into the possibilities to create a temporary or flexible facility also suits this type of facility and the location.

3. *The Bob in a Bowl* - the Persoonshaven: This type allows for a focus on a primary function of the facility: swimming in a safe environment for families, but also elderly in the neighbourhood. If desired, this type provides the possibility to

combine the site with programming for swimming, waterpolo, aquarobics or other activities. For this community, it is important to provide programming that is reliable, so the *Bob in a Bowl* could very much suit this reliability. Considering the planned future developments for the area, flexibility might be a valuable characteristic. Therefore, a movable barge ship-turned-pool version of this urban bathing type could dock in other locations, such as the Schiehaven, St Jobshaven or Tweede Katendrechtsehaven and take their programming to other locations in Rotterdam once demand changes.

5. Results: Implementation lessons from example cases

5.1 Introduction

In this chapter, the results of three (inter)national case study interviews will be analysed in order to formulate lessons for the implementation of their respective urban bathing typologies. The following question will be answered: H*ow should place- and actor-related challenges be managed from the urban system perspective to implement urban bathing, based on the lessons learned from (inter)national case examples*?

The results are structured into the identified implementation challenges and opportunities -or success factors- for each of the cases, both presented through the different urban systems.

5.1.1 (Inter)national case study selection

Following the selected case study locations in Rotterdam as determined in the previous chapter, the following example case studies from the theoretical background have been assigned to each case and their respective urban bathing typology:

- The Marineterrein in Amsterdam will be used as the example case for implementing '*The Free Style*'. The harbour of the Marineterrein, a former military terrain in the inner city of Amsterdam, was recently appointed an officially designated bathing site by the Province of North-Holland, after a couple years of monitoring as a pilot project (Provincie Noord-Holland, 2025). The site is located on publicly accessible terrain that includes a boardwalk across the harbour, a lawn, and a couple of bars and restaurants. The terrain is not owned by the Municipality, but instead by the State, and the Bureau Marineterrein was appointed as the independent project bureau responsible for the programming, development and maintenance of the site.
- La Baignade in Bassin de la Villette in Paris is selected as the example case for implementing '*The Protected Plunge*'. La Baignade was opened in 2017 as the first site of a bigger municipal programme of creating more bathing sites in the city, among which three sites that are planned for opening in the Seine river the summer of 2025 ("La Seine S'ouvre À La Baignade. . . Les Trois Sites Dévoilés !," 2025). The pool structure is modular and constructed every year to open during the months of July and August, after which it is deconstructed and stored for the next season. The site consists of a number of pools of different depths, some of them suitable for smaller children and families. Furthermore, the site includes some changing rooms, toilets, small cafés and watersport activities. It attracts a variety of users and allows for hospitality and programming on the shore.

- The Floating Pool Lady in New York City will be used as an example case for implementing '*The Dip in a Bowl*'. The Floating Pool Lady is a barge ship that has been transformed into a floating pool that is able to be transported and dock at different locations.The pool opened in its first location in Brooklyn in 2007 and moved to its current location in Barretto Point Park in the Bronx a year later. Changing rooms and toilets are available on the ship, but there is no hospitality or other secondary functions. Access to the pool is free and focussed on the programming and accessibility of swimming for an underserved community. The mission of this example is therefore quite different from other examples of the 'Dip in the Bowl', but a promising example for the demand in the Kop van Feijenoord area and the Persoonshaven.

5.2 Lessons from the Marineterrein, Amsterdam

For the Marineterrein, a semi-structured interview was conducted with a project director at Bureau Marineterrein in Amsterdam. In the process of the inner harbour of the Marineterrein becoming an official bathing site, important stakeholders apart from the Bureau Marineterrein have been Waternet (Water authority), the State and the different (commercial) tenants, including the Amsterdam Institute of Advanced Metropolitan Solutions (AMS).

5.2.1 Challenges

The Marineterrein was officially appointed a designated bathing site for the bathing season of 2025. However, the site was not developed with the intention of becoming a bathing site, but rather a publicly accessible area in the inner city. Following the outcomes of the interview, the challenges faced during the evolution of the site were mostly rooted in the physical urban systems and related to the characteristics of the place (T. Meijer, 2025). Challenges rooted in non-physical challenges relate mostly to the structure behind the governance of the location in relation to the division of responsibilities and liability between the authorities.

<u>Physical systems</u>

Some of the challenges are specific to the urban bathing typology of *The Free Style*, such as swimmers or recreational boats going beyond the demarcation, the dangers of objects and breakwaters under the surface and surface pollution. The issue of water quality and associated challenges concerning the sewage overflow that was located in the harbour, is also applicable to other urban bathing typologies that allow swimming in untreated harbour water (The Protected Plunge).

Following the sequence of the developed urban system-based framework, physical challenges touch upon:

- *The built environment and public space*: Located on a peninsula, surrounded by water and a wall on the street-side and sharing the area with properties of the Ministry of Defence, the inner harbour took a while to gain attention among the public. Nowadays, the environmental quality and use of the area suggests a public space character. However, since the area is still (privately) owned by the State, it is not like general public space but only publicly accessible. This has an effect on governance, maintenance, surveillance and also the way visitors behave themselves.

- *The accessibility, physical safety and space for use of the location:* Several interventions were necessary to improve the accessibility of the water. Important examples were the construction of a pedestrian- and cyclist bridge connecting the peninsula to the Dijksgracht on the North side, and the floating boardwalk closing the inner harbour. The latter was an important step in addressing the physical safety of the harbour relating to the height of the quays and swimmers getting in and out of the water. It also prevented (recreational) boat traffic from entering or docking in the harbour, as well as swimmers going outside of the designated area - although this is still happening. In an assessment of the harbour (floor) by divers, an important safety issue was identified in the wave barriers in the quays, which can be very dangerous for swimmers who dive deep underwater. While the issue of the wave barriers was solved, the issue of large objects (such as shopping carts) ending up on the harbour floor remains a big risk for the safety of swimmers.

- *Mobility & infrastructure*: With the increasing popularity of the site, logistics related to the parking of bikes was a challenge. Furthermore, a small, local sewage overflow located in the harbour had to be closed and therefore connected elsewhere on the existing network.

- *Water & ecology:* As mentioned before, there was a small, local sewage overflow located in the harbour. This had to be closed and connected elsewhere to prevent defecation and possibly infected water to be discharged in the harbour. Besides water quality related to bacteria like E. Coli, the location is also subject to surface pollution.

<u>Non-physical systems:</u>

Faced challenges rooted in non-physical systems were mostly related to the governance structure behind the operational management of the terrain and the bathing site.

- *Governance*: The unusual construction behind the public accessibility of the area and the growing popularity of the site allowed for the discussion on (financial)

responsibilities and liability to come to the surface, which were intentionally not clarified in the agreement from 2013. One of the translations of this challenge is the maintenance and enforcement on site, for which Bureau Marineterrein is responsible. Management of visitor logistics, such as the parking of bikes, and group behaviour remains a big challenge.

- *Financial feasibility*: There was a difficult trade-off between (operational) costs and the public accessibility of the location that required certain expenses.

5.2.2 Solutions, opportunities and successfactors

As mentioned before, the evolution of the swimming site at the Marineterrein happened intervention by intervention. However, this approach was named to be one of the leading success factors in the realisation of the site, due to its flexibility and reactive problem solving.

Physical:

- With the construction of the boardwalk, many of the (spatial) ambitions for the area were achieved, including accessibility, spatial quality and a nod to historic cultural context. It was also the main catalyst for the area to become a swimming area, together with the attractiveness of the waterfront, restaurant and the Voorwerf park. An important aspect of this has been the step-by-step approach.
- With the experimentation of the design of bushes and higher grasses in the Voorwerf park, the crowdedness was reduced, as well as the noise level, which has made the site more manageable.
- Signs with site information expressed in a more experimental, friendly or informal way has helped with informing users about water quality and its effects, as well as the use of facilities and bike parking in the area.
- An statistics-based early warning system has helped in setting up a reliable preventive system for ensuring a water quality sufficient for swimming.
- The experiments and activities that are conducted for cleaning the harbour and improving water quality, pair very well with the bathing site and contribute to the cause.

Non-physical

- One of the objectives behind the development of the boardwalk, was a nod to the historic context of the area.
- The governance structure and assignment behind the Marineterrein bureau has been the catalyst factor in many of its successes: it has allowed for the placement of interventions such as the boardwalk and physical experiments such as the early warning system. Also financially, the governance structure that revenues from

curation has made it possible to pay for certain physical and operational interventions, spread out over a few years, whenever their need occurred.
- With the involvement and local housing of research institutes like the AMS institute and Wageningen University & Research (WUR), as well as a strong partnership with Waternet and other research partners, they have been able to execute all kinds of experiments in order to successfully form and operate the swimming site

5.2.3 Take-aways for The Free Style

Lessons

- Physical challenges for *The Free Style* are likely to be rooted in the accessibility and physical safety of the place, but also the water quality.
- Development of the swimming area can happen step-by-step, intervention by intervention. Reactive problem solving was named as the reason for the success of the realisation approach, as this also suited the mainly physical system-related challenges
- Interventions can be connected to many other spatial ambitions for the area and play a part in restoring a (historic) connection with the waterfront, improve accessibility and create a vibrant urban area.
- Informing is one of the areas more open for experimentation, especially regarding awareness of safety issues for swimmers.
- Developing a swimming site can be combined perfectly with other urban challenges and transitions, such as improving water quality, reducing surface pollution, improving biodiversity and providing space for innovations. It adds to the awareness around these issues and active, practical involvement.

Quotes

<u>Trade-offs between public accessibility and other things</u>

"*Yes, and of course that is a different perspective, because the fact that everyone can always come here, is also worth something. So there is a certain trade-off, a relationship between liability, between costs, between public accessibility versus privateness. Well, that is a search on how you balance it best.*" (Interviewee A, 2025)

<u>Physical dangers over water quality</u>

"*No, the behaviour. Diving, doing crazy stunts, jumping, swimming where you're not supposed to, that is what's really dangerous.*" (Interviewee A, 2025)

<u>Swimming as a catalyst for water quality, surface pollution or other related issues</u>

"*But it can also be behaviour, right? (...) I also think that it comes to programming, right? So making people aware [of surface pollution].*" (Interviewee A, 2025)

"*And look, regarding bathing water, what we find interesting is that everything is a test. So what you would like to learn about here, are all those worries that you have about swimming, safety, physical safety, but especially also influencing behaviour.*" (Interviewee A, 2025)

Swimming will happen unintentionally

"*But the effect is that because it [the boardwalk] was there, demonstrably, people started swimming here.*" (Interviewee A, 2025)

5.3 Lessons from La Baignade, Paris

For La Baignade La Villette in Paris, an interview was conducted with representatives from the City of Paris. Besides the main case for this research, La Baignade Villette, they were also able to discuss the development of three new bathing sites in the Seine that are planned to open for the summer of 2025. This provides some extra interesting context for the Coolhaven case, since boat traffic and the position of the Port Authority, which is also applicable to Coolhaven, are a much bigger issue in the Seine than in Bassin de La Villette.

5.3.1 Challenges

Physical systems

Physical challenges touch upon:

- *Built environment & public space*: The quays of the canal La Villette are lined with trees, which does not leave that much space for big logistic interventions.

- *Accessibility, physical safety and space for use*: A number of boats that were long-term/permanently located in the Bassin needed to be moved to a different location during the time that the pools were (de)constructed or open.

- *Mobility and infrastructure*: The Baignade La Villette modular pool structure is deconstructed and stored after each opening season. This has caused some significant challenges relating to urban logistics, concerning the preparation of the sites that required human and financial resources on a certain timeframe, as well as the limited available storage space in the city for elements this size.

Non-physical systems

Non-physical challenges were:

- *Financial feasibility*: The urban logistics for constructing and deconstructing the pool each year is an expensive and time-sensitive activity. However, maintaining the pool throughout the year or longer bathing season as it is being operated during the opening season now, would be too expensive. As the pool structure is now slowly reaching its lifespan of 10 years, different models for a more financially

and environmentally sustainable approach for creating the bathing site are investigated.

- *Governance*: Although the City of Paris has ownership of the canal La Villette and the quays, the governance behind the complex urban logistics in the creation of the site requires a lot of attention each season. Balancing negotiation with the owners of to-be-moved boats, planning the (de)construction and political pressure have been challenging. While the City of Paris regulates the activities on the canal, the Port Authority HAROPA Port decides over the traffic on the Seine river, which has been a significant challenge in the process of the development of the three new bathing sites. Regardless of the gained experience from La Baignade de La Villette, the same challenges in obtaining approval and official permits have affected the development of the sites in the Seine.

5.3.2 Solutions, opportunities and success factors

Physical:

- The canal La Villette was a location with a lot of physical potential. It is spacious, without a strong current and limited boat traffic. The quays were publicly accessible and the existing urban infrastructure for water, electricity and sewage provided enough capacity for the addition of the facilities. Prior investigation of the water quality provided positive results for the suitability of an urban bathing site. Relating to physical access to the waterfront, the only necessary intervention was a ramp installed to accommodate disabled users.

- An opportunity for which the representatives from the City of Paris have expressed their interest, is the potential has not really done this for either of the bathing sites in La Villette or the Seine, is the development of these sites in combination with regeneration of public space, making it part of the urban context.

Non-physical:

- Having ownership of the quays and being the regulating authority of the activities on the canal, has been an important factor for the development of La Baignade La Villette. Concerning the Seine bathing sites, the Port Authority HAROPA Port has very different goals for the exploitation of the river. Accepting their position made it easier to work together. Focusing on finding a common goal (improving water quality) or event (the 2024 Olympics) has proved to be helpful in achieving their

ambitions. Apart from internal governance, external political support and priority has been important.

- The Baignade La Villette was very welcomed by the local community of residents and business owners, as it added an extra activity to the area that profited both users and attracted customers to the restaurants and cafés. Again, combining urban bathing with urban regeneration and social demands holds a lot of potential that Paris has not really explored yet.

5.3.3 Take-aways for The Protected Plunge

Lessons

- A modular structure is a suitable way to develop a seasonal and flexible bathing site that attracts also families and people who are looking for a bit more safety, however this requires quite some logistics, which the urban systems have to be able to allow
- A location where the main executing stakeholder, in this case the City of Paris, has ownership over the quays and regulates the activities on the water, makes the development of the site smoother.
- A common goal between conflicting stakeholders, that is not urban bathing, can be very helpful in getting everyone in the same boat, for the benefit of the cause.
- The swimming site can add a lot to the existing activities on the waterfront, and probably even more when this is integrated in the urban regeneration agenda of the area.
- The pool structure and its associated urban logistic challenges do allow for a more financially and environmentally sustainable, time-effective and therefore more simple alternative, if this is a possibility.
- Political support means everything for both the feasibility of the process and the financial feasibility model.

Quotes

<u>Informing as a way to involve the community</u>
"So *it was more about informing and talking about water quality than talking about the equipment and the infrastructure that you need to swim in the water.*" (Interviewee B, 2025)

<u>Common goals as a way of getting all stakeholders on board</u>
[Seine bathing sites] - "*I think the Olympics were obviously very helpful to bring everyone in the same boat and to go in the same direction.*" (Interviewee B, 2025)

"*And I think without that water quality challenge and without that same goal that we need to improve the water quality, first of all, it's for the environment and just for water quality by itself and for biodiversity and then, like the cherry on top, we can put people in the water. But with that same goal we succeeded in putting everyone in the same boat.*" (Interviewee B, 2025)

Swimming as a positive addition to the waterfront activities

"*So it was the easy part to convince them [local restaurant- and business owners]. And we have nothing in this part of this canal, so when you put a new activity, it's kind of, everyone is helping Paris, because we create some activities, some customers. So it's kind of an animation for this neighbourhood.*" (Interviewee C, 2025)

Advice on the integration of swimming sites into public space

"*And if we don't want to do that [allow swimming everywhere in the river], then we need to create specific areas, but don't think about these areas as only swimming areas, but as public space by itself.*" (Interviewee B, 2025)

"*So there are a lot of possibilities of different forms of bathing through all the qualities of your public space*" (Interviewee B, 2025)

5.4 Lessons from The Floating Pool Lady, New York City

For the Floating Pool Lady, an interview was conducted with a representative of the Floating Pool Lady, involved in the project before it was gifted to the NYC Parks and Recreation department for further programming, maintenance and operation (A. Buttenwieser, personal communication, 2025).

5.4.1 Challenges

Physical challenges touch upon:

- *Water & Ecology*: They were in conflict with the ecology department and fined for their lack of a permit.

Non-physical challenge:

- *Governance & social urgency*: For the initial location in Brooklyn, the community was against the development of a park next to the waterfront, where the pool was going to be located.

5.4.2 Solutions, opportunities and successfactors

Physical:

- For the situation for both locations (Brooklyn and the Bronx), it was the case that there was a park that was planned to be developed, but the plans didn't have a lot of support from the local communities. The pool was therefore put as the first intervention in the further development of these plans, after it was very well received by the community. The pool therefore worked as a catalyst for the development of public space.
- The new location in Barretto Point Park already had the necessary infrastructure to connect the pool to water, electricity and sewage.
- Also: because the pool was still a functioning bargeship, it was flexible. When they were not sure if they could use their location in Brooklyn for the new season because of circumstances with the maintenance of the park, the city suggested a different location in the Bronx, where the pool was welcomed as the local community was not happy with an expansion they were doing.

Non-physical:

- The pool was intentionally paired to a location (the Bronx) with an underserved community that did not have much access to swimming. After the relocation of the Floating Pool, it was connected to the cities 'Learn to Swim program', which provided free swimming lessons for children between certain ages (NYC Parks, 2008). The adoption of the pool also aligned well with the cities' objectives for public health and the environment: "*The Floating Pool is helping to advance two important public health and environmental goals: providing recreational facilities and green spaces for New Yorkers in under-served communities and maximizing the use of our waterfront,*" *said Mayor Bloomberg.*" (NYC *park*, 2008).
- The costs for the purchase of the barge ship and all design- and construction costs were covered by a foundation. After delivery, the Floating Pool was gifted to the NYC Parks Department, which included all associated responsibilities and exploitation for all the operational- and maintenance costs.
- The project was carried by the commissioners at the NYC Parks department and a close collaboration was the reason for its successful development, according to founder Ann Buttenwieser (A. Buttenwieser, personal communication, April 2, 2025)

5.4.3 Take-aways for The Dip in a Bowl

Lessons

- A pool that is flexible, can fulfill social demands in different locations, neighbourhoods or communities when opportunities come up. A place-making character is therefore also possible. A prerequisite for its flexibility and temporary character, is the availability of urban infrastructure on the quays, such as water, electricity and sewage

- The pool can also have a catalyst effect in generating public space or other city agency agenda's, such as swimming programming, placemaking and waterfront regeneration.
- Political support can be a key success factor in convincing stakeholders and breaking existing, limiting models.

Quotes

The floating pool as a catalyst for public space development
"*And there was an agency, a city agency that was doing some expansion that the community didn't like and so the Parks Department Commissioner said, you know, why don't you set it up for us and then the community will be will set for the floating pool, the community will be happy and they will extend to what you're doing, yeah.*" (Interviewee D, 2025)

"*There the neighbourhood was [...] We don't want to have a park there. But they decided to have the pool there so that people would find out that in fact it was a very good thing for that community, yeah.*" (Interviewee D, 2025)

Having support from local government as a key factor
"*The head of the Parks Department was a friend of mine. He and I had worked together at the Parks Department and then when he said OK, I can help you with it if I can do it. That was the most important.*" (Interviewee D, 2025)

Connecting the pool to other social agendas
"*The Floating Pool is helping to advance two important public health and environmental goals: providing recreational facilities and green spaces for New Yorkers in under-served communities and maximizing the use of our waterfront," said Mayor Bloomberg.* " (*NYC park, 2008*)

5.5 Conclusion

The lessons analysed in this chapter answer the following subquestion:

How should place- and actor-related challenges be managed from the urban system perspective to implement urban bathing, based on the lessons learned from (inter)national case examples?

A recurring lesson for all urban bathing types is the fact that challenges are often faced through different layers of the urban systems framework. For all case examples, the sites worked as a catalyst for vibrant public space. Furthermore, ownership or a close collaboration with the owner -which has been the City in most cases -, has been an important factor in the realisation. For the Marineterrein, challenges relating to physical

safety and water quality were partially faced through informing the public. For the new bathing sites in the Seine, challenges relating to governance and accessibility, physical safety and space for use were faced through the water quality issue. For The Floating Pool Lady, the challenge of financing the pool was faced through a governance structure and collaboration with the city. It was also connected to different social agendas of the city.

Relating to the three urban bathing typologies, the urban systems-based aspects that are either must-haves, or nice-to-haves based on the lessons from international case studies are presented in Table 5.1.

	Must-haves	***Nice-to-haves***
The Free Style	Physical safety Accessibility Water quality Public space	Flexible governance Information (data) Connection to spatial urban transitions
The Protected Plunge	Physical safety Accessibility Water quality Financial feasibility + governance	Space for use Infrastructure Common goal between stakeholders + governance Political support + governance Connection to public space
The Dip in a Bowl	Accessibility Space for use Infrastructure Social Urgency Financial feasibility + governance	Connection to public space and social agendas Political support

Table 5.1: Urban systems-based must-haves and nice-to-haves for three urban bathing typologies.

6. Results: Actor- and place-related challenges

6.1 Introduction

In this chapter, the following question will be answered:

What place- and actor-related challenges are leading in implementing urban bathing in the inner city harbours of Rotterdam?

To answer this question, three case study locations have been selected following the conclusions of the previous chapter. The inner city harbours that will be investigated further for implementation challenges relating to urban bathing are: the Spoorweghaven, the Coolhaven and the Persoonshaven.

In this chapter, the defined challenges are aligned with the international case examples of their respective urban bathing typologies. Data analysis will therefore focus on the opportunities for the Rotterdam cases to implement lessons learned from these cases and how they fit into the urban systems based framework. Municipal representatives are the 'location experts' for the data collection on these case-related challenges. Three semi-structured interviews have resulted in the following findings.

6.2 Spoorweghaven

6.2.1 (Expected) challenges in the Spoorweghaven

Physical:

- *Accessibility, physical safety and space for use*: The designated function of the space in the Spoorweghaven is appointed to (house)boats in the near future, according to a contract with City Marina, who owns the harbour and is responsible for its activities and maintenance. Besides the space necessary for docking the boats, the remaining space is expected to be needed for maneuvers. The location is still not extremely safe, considering just outside of the harbour, there are many large ships passing through the Koningshaven in the Nieuwe Maas waterway.
- *Built environment & public space*: The harbour is owned by City Marina and the destined function is a marina. The surrounding area of the Spoorweghaven is not available for exploitation, as it is an already developed residential area. This would make the financial feasibility model for bigger interventions to infrastructure, public space or accessibility a challenge.
- *Mobility and infrastructure:* Ships will have to maneuver in and out of the harbour.

Non-physical:

- *Governance*: The legal situation is difficult, since the city of Rotterdam has a contract with City Marina, who own and exploit the harbour. The harbour is legally designated to have a marina function and City Marina is not expected to deviate from their business case. This will likely withhold the development of certain interventions, as well as the activity of swimming. Changing this would include a decision to unbind the contract, which is expected to be both very difficult and expensive.
- *Financial feasibility*: Even if it is possible to unbind the contract, the financial feasibility of big intervention is still a challenge, considering the lack of exploitation possibilities for area development.

6.2.2 Opportunities

Physical:

- *Accessibility and safety for use*: A combination of a marina and other (social) function would be suitable considering the character of the location. In case this can be arranged, this could be combined with historic ships with a social function, as seen in other locations in the city, such as Leuvehaven. There has been a desire for a better pedestrian connection with the Rijnhaven area, by placing an extra bridge or crossing connection over the harbour, considering it is now a relatively long walk around.
- *Built environment & public space*: There is definitely potential and demand for better access to the waterfront and more attractive use of the quays, which are currently quite grey and hard.
- *Water & ecology*: The location could be a suitable and strategic spot for testing out interventions or experiments relating to water quality or, for example, surface pollution. This aligned well with the transition of using the waters in Rotterdam for economic purposes, but in a cleaner, innovative way.

Non-physical:

- *Governance*: An agreement with City Marina could allow for leaving space for a more social function on the water, next to the space saved for the marina. possibly, a temporary facility is possible until activity in the marina commences.
- *Social urgency*: Within the local community, there is a strong desire for a more active and vibrant use of the harbour and its quays. Clean swimming waters are scarce in Rotterdam, maybe the function of a marina is therefore not the ideal use of our water. There is a lot of potential for a better historic-cultural connection with the harbours and the waterfront in Rotterdam (B. Van Hasselt, 2025).
- *Financial feasibility*: There is potential for a new economic model to benefit from our waterways, in a more sustainable and inclusive way.

6.2.3 How do the challenges and opportunities align with the Marineterrein case?

- The Marineterrein is an experimental area for clean/sustainable interventions; this pairs very well with the activity of swimming.
- The Marineterrein also found justification in historical context.

Quotes

Challenges

[...] "*And you can't just terminate the contract. If you could, you would have a free way and I think you could make a completely different plan. And then I also think we would have come up with a different plan, in which perhaps many more ships with a social function who could have been given a place, that also create some vibrance, which you could combine with, for example, [swimming].*" (Interviewee E, 2025)

"*Here it is more complicated to do placemaking, because you don't really, you don't have an exploitation area bigger than that harbour basin. That doesn't mean it can't be done in the existing city, but then you would have to organise that in a different way.* (Interviewee E, 2025)

Demand

[...] "I think the district is open to that [swimming]. I think especially the accessibility of the water, the active use of the water. Right now it is just a dead end. (Interviewee E, 2025)

"*Yes, and the quays are also minimal, [...] hard, little green. There is a lot of demand from the residents to make that more attractive, so the more life there would actually be around the water and on the water, the more attractive it would be to live there.*" (Interviewee E, 2025)

Combining sustainable business with swimming or programming

"*It would be really great to link companies to it [water quality], [...] then we're going to find a combination between water quality, use of the water and swimming. And then you can also build a model around that. And, I think there are enough companies that also have to do research and are looking for space to be able to do that.*" (Interviewee E, 2025)

"*I think it's a really great opportunity to do that, also to simultaneously let new industries grow in the city and give them more space to. Also to use the water which used to be used for industry, that we could see in a different way as an economic model. So don't just use it for entertainment, so to speak, but let a company do business in it, only then in a clean way.*" (Interviewee E, 2025)

6.3 Coolhaven

6.3.1 (Expected) challenges in the Coolhaven

Physical:

- *Accessibility, physical safety and space for use*: The position of the Port Authority is prominently related to the issue of safety. The Water Authority, a different public authority, also contains some objectives that could be connected to the urban bathing topic, including recreation and water quality. However, the Port Authority has very different goals for that particular harbour. The harbour is not directly protected, and intensively used as a shipping route in its entirety.
- *Built Environment & public space:* There is a desire from the spatial planning perspective to keep the quays free for a width of five metres and fully walkable. This would limit the possibilities to put facilities on the quays, such as toilets or changing rooms. A swimming facility like this could be very season-dependent.
- *Mobility and infrastructure*: There are most likely some urban infrastructural interventions necessary, the question is how this should be divided financially. The harbour is important for inland shipping routes.

Non-physical:

- *Governance*: The area is socially sensitive and therefore, the support of local communities and NGOs is very important. If they don't support the initiatives related to urban bathing, further realisation is not very viable. The attractiveness and popularity of the harbour is both a blessing and a curse, as this could introduce a big safety- and surveillance challenge, also relating to facilities like toilets and showers. There are opportunities to connect the development of an urban bathing site to the planned development of the residential project 'Coolbase' on the site. However, the issue of ownership and maintenance would need clarification beforehand. This could be a challenge, but will most likely be necessary considering the popularity of the location
- *Financial feasibility:* A feasible model for maintenance, operation and enforcement is expected to be a challenge.
- *Social urgency:* There is a demand for a facility in this category. However, the area is subject to some socially sensitive issues, and currently struggles with group formation in public places that challenge the inclusivity of these spaces. A popular urban bathing site in this area might draw crowds from all over the city, or even outside the city. A possible threat to the future facility would be that it mostly accommodates certain groups, which would lead to a lack of diverse character for the site to have a positive impact on the Delfshaven neighbourhood. Other social issues such as homelessness, mental health problems and addiction should be addressed in the approach for the social safety of this site.

6.3.2 Opportunities

Physical:

- *Built environment and public space*: The physical potential of the location is perfect for waterfront activity and attractive to residents and visitors. The location also has a lot of potential relating to their position in the urban context and possible connection to surrounding areas, for connectivity 'rondje Coolhaven'. A step-by-step intervention would suit the flexibility of the location well. The development of the waterfront in this location could add to the current lack of green spaces in the area.
- *Mobility and infrastructure*: The area is easily accessible by many different forms of public transport

Non-physical:

- *Social urgency:* There is a demand for more (recreational) activity in this area, that will both accommodate a diverse group of residents and visitors. Swimming in combination with waterfront public space and activities could meet this demand very well. Urban bathing is an inclusive activity, because it could generate all kinds of activities residents could participate in, such as sports or picnicking, and visitors can have the feeling of participation just by watching. This social accessibility is a high-priority issue for Delfshaven. Making the area more vibrant could result in more social control and feeling of safety.
- *Financial feasibility*: A bottom-up initiative might have better chances of generating financial support. The development of the site could be included in the exploitation of 'Coolbase', for which a budget relating to regeneration of the outdoor environment has been saved.
- *Governance*: The presence of several active commercial parties and local associations allow for a collaborative realisation and operational model. The restaurant and event location Machinist is already an active stakeholder in providing programming on the waterfront. A step-by-step approach relating to interventions would suit this location well. The cultural association Tent could also be involved in creating programming.

6.3.3 How do the challenges and opportunities align with the La Baignade case?

- Seasonality effect on the demand has resulted in making a temporary facility in July and August for the Baignade La Villette. The temporary character could also fit the Coolhaven case, considering the Machinist also provides seasonal outdoor activities and could therefore play a part in temporary or flexible use and operation.

- A common goal for a qualitative waterfront and improved water quality could possibly help in gaining support from otherwise somewhat conflicting stakeholders.
- The Protected Plunge could serve a large diversity of groups, among which families. Together with an attractive and inclusive waterfront, this activity could suit the social objectives for the location very well.

Quotes

"*Because this really, because we don't have that many urban bathing sites, it could become a very active place. Yeah, if a hundred people come at once, then you have a completely different safety issue.* (Interviewee F, 2025)

"*And I, yes, I really see this area as a place where a lot of different activities should come together, so that you serve different types of residents, but perhaps also different types of visitors, and you get a very diverse group here.*" (Interviewee F, 2025)

"*Especially in this area I would always look at how you can create a kind of growing realisation model… Look if it is really successful, then you can still add facilities later, instead of trying to completely engineer everything right away. And this also fits in this area to be more in the placemaking side [...].* (Interviewee F, 2025)

"*Well, swimming is perhaps a little less spectacular to watch, but that liveliness and what those people who go swimming bring with them can have a very positive effect, also on the social structure here in this area.*" (Interviewee F, 2025)

6.4 Persoonshaven

6.4.1 Expected challenges in the Persoonshaven

<u>Physical:</u>

- *Accessibility, physical safety & space for use*: The harbour is not dredged completely and the tide has a quite strong effect on the water level. There are some interventions necessary in case you would have a floating pool that is safely accessible from the quays.
- *Built environment & public space:* While the area has a lot of potential to become more attractive for visitors and business owners, this area is still at the beginning of this development. It might be challenging to convince exploiting parties to realise the pool. Considering the area will most likely become more attractive and include higher segment dwellings, there can be a shift in the character of the area and the visitors it attracts. It is important to be aware of the possible impact of

gentrification and the direct effect it can have on the character and inclusivity of the pool.
- *Mobility and infrastructure*: There are currently no amenities on the quays to connect a floating pool to the existing network. This would add some extra technical challenges to the necessary interventions.

Non-physical:
- *Governance*: Parties are hesitant to take responsibility in exploiting the maintenance and operational costs of the pool.
- *Social urgency*: The area is sensitive to loitering youth and vandalism, which could create a hesitant attitude towards a facility like the pool from business owners, restaurant owners, which could be valuable partners in realising a facility for urban bathing.
- *Financial feasibility*: The operational and maintenance costs of the pool would be significant. A collaborative exploitation model is probably needed to make it financially feasible. The pool would also need quite some technical interventions to the quays to make it accessible and connect it to the urban infrastructure. This does add up to the costs and challenge the financial feasibility.

6.4.2 Opportunities

Physical:
- *Accessibility, physical safety & space for use*: Interventions to make the harbour more accessible (among which the initial suggestion to build a pedestrian bridge and connect this to another function), could be connected to the pool function. The harbour is owned by the Municipality and currently not being used and therefore suitable for a new function.
- *Built environment and public space*: The area is subject to some large urban redevelopment programs. The floating pool could play an important part in the regeneration of public space and addition to public amenities for the area, and its necessary interventions to improve the accessibility of the harbour could be connected to that agenda and its budget. The area will be densified and therefore the capacity of public amenities in the area needs to increase, including sport and leisure facilities. There is also an opportunity to connect the pool to the historical context of Mallegat, where there used to be a floating pool structure (similar to the protected plunge) in the Maas river (*Hoe Het Was: Zwemmen Bij Mallegat*, 2024).

Non-physical:
- *Social urgency*: There is a social demand for swimming, for recreation and for sports. There is a high social urgency for programming for the youth in Rotterdam South, relating to accessible sports and cultural activities, to which the pool could be connected. The same applies to resilience and public health. One of the

objectives related to the densifying of the area and embeddedness of new target groups in the area, is the importance of social cohesion. The pool, in case it is accessible to all these groups, could work as a public social amenity, especially in combination with swimming lessons- and programming. Creating an accessible and attractive facility could also add to the image of the area and attract more people to visit Kop van Feijenoord, and create more economic activity. The combination of a pedestrian bridge and the pool function could also improve the social safety around the harbour.

- *Financial feasibility*: Besides the opportunities to include the pool in the exploitation area for the urban redevelopment plans, the development of the floating pool and its programming could be connected to many additional social agendas for the area, for which a part of the budget could support its realisation.
- *Governance*: There are a lot of parties involved in the area redevelopments, which could allow for a collaborative realisation model together with the Municipality. The construction costs and costs for the interventions in the surrounding environment could be financed by the private parties, and the operational and maintenance costs by the Municipality. There is a lot of potential for the pool to connect to the social agendas for the area, even more so when the exploiting party also organises the programming of the pool.

6.4.3 How do the challenges and opportunities align with the Floating Pool Lady case?

- There has been a big focus on the social urgency for swimming, improving social cohesion and programming for youth in the neighbourhood. This indicates the opportunity for Rotterdam to include the Sports department, who can be involved once public swimming programming is on the table.
- A combination of construction costs funded privately and operational management funded by the city, that also provides the programming.
- The pool was used as a catalyst for public space in the area
- Opportunities for the exploitation in the urban area development agendas.

Quotes

"*If you want to ensure that you have a resilient neighbourhood, in all respects, and you place such a function in it, then you approach it from a different perspective and if you look at it socially, you should also say together, OK, maybe the exploitation can round up to zero or sometimes some money should be added, but that weighs up, because we reach so many young people with it, we have children who start swimming again, who exercise, who play sports, who live healthier. You just have to link those kinds of programs to it.*" (Interviewee E, 2025)

"*But making the connection with the development of the waterfront plot, which was the old Feyenoord City, it is really around the corner. And you see that function, the swimming pool used to be at Mallegatpark. Well, you could say from that perspective, well, you also serve that area. If you do that, you get another 3000 homes and you serve a larger area together.*" (Interviewee E, 2025)

"*But the rest of the social amenities are under considerable pressure. And if you look at the space you still have, you see that the built environment is actually already being occupied by all kinds of developers. And you see that the Persoonshaven has no function. It is no longer an active harbour basin. It belongs to the municipality. It is simply not used. It is also not maintained. Nothing is actually done with it.*" (Interviewee E, 2025)

"*I think that if you could add a social function here, where all the residents of the neighborhood can come together, for the youth and you could add a swimming facility where they also learn to swim, where the danger of water is actually removed because you teach them to swim and you can immediately make a social connection. And then you have a huge opportunity for that.*" (Interviewee E, 2025)

"*It has always been the wish, and also the objective, from the area development from the Piekstraat Hunter Douglas to build a pedestrian bridge over the Persoonshaven, of which we have always said: See if you can also connect a function to the vision for such a bridge. So perhaps, you can link that swimming pool to a bridge function. So that you actually kill two birds with one stone.*" (Interviewee E, 2025)

6.5 Conclusion

What place- and actor-related challenges and opportunities are leading in implementing urban bathing in the inner city harbours of Rotterdam?

A main overarching opportunity for the inner city harbours in Rotterdam is the demand for more active use of the water and the waterfronts, in combination with a connection to local environmental and social agendas. Regarding general challenges, finding a feasible governance model for the implementation of an urban bathing site, related to finances, operational management and liability is expected to be a prominent barrier for all harbours in Rotterdam. For some of the cases, this also relates to conversations between stakeholders outside of the Municipality who have a certain authority over the use of the harbour, but represent objectives that might conflict with urban bathing (e.g. physical safety, economic exploitation).

For each of the case study harbours, the leading urban systems-based aspects related to the main challenges and opportunities for urban bathing implementation are presented

in Table 6.1.

	challenges	***opportunities***
Spoorweghaven	governance + space for use accessibility physical safety financial feasibility	public space, accessibility + social demand mobility socio-cultural connection economic opportunity
Coolhaven	governance + financial feasibility governance + social urgency infrastructure physical safety	public space, mobility + accessibility financial feasibility in urban development social urgency
Persoonshaven	accessibility governance + financial feasibility infrastructure	public space, mobility + accessibility financial feasibility + governance in urban development social urgency

Table 6.1: Urban systems-based challenges and opportunities urban bathing implementation in three Rotterdam case study harbours.

7. Conclusions

How could the Municipality of Rotterdam learn from (inter)national case examples, to overcome place- and actor-related challenges in implementing urban bathing in the inner city harbours, following an urban systems-based approach?

7.1 Outcome or output?

From the perspective of urban development management, framed by the urban systems-based framework as developed in this research, two possible process-related directions for the implementation of urban bathing have been identified through the international- and Rotterdam case studies. The first type of process starts with having urban bathing as its initial goal, *the desired outcome*. In other words, the location is chosen for its suitability or demand for this goal and is adapted to facilitate this. Challenges are faced through trade-offs within different physical and non-physical systems. The goal for implementing urban bathing can arise intentionally, but also unintentionally. For example, if the location is already used for swimming illegally. This is the case for Coolhaven, but also applies to its respective example case of La Baignade La Villette in Paris. For the types of challenges that occur in this type of implementation approach, the position of the leading stakeholder - in this case the Municipality- carries a lot of authority as well as (financial) responsibility.

The second type does not start with urban bathing as the initial goal, but rather with a goal or a vision for a particular place, or in this case, a harbour. These goals can range from building a (climate) resilient neighbourhood, improving water quality, to generating an attractive and vibrant waterfront. For this type of approach, urban bathing can work as a catalyst to achieve that goal, also known as *the output*. Reflecting on the international case examples, this applies to both the Marineterrein and the Floating Pool Lady. However, this only happened with initial intention for the latter of the two. For this approach, the realisation model for the urban bathing site seems to be viable when this is a collaboration between private and public parties. Challenges are faced through a certain flexibility and responsiveness, which might suit the private, or semi-private parties, better. On the other hand, the connection to social objectives and creating an environment that allows for the development of the location need the involvement of a leading public stakeholder.

7.2 General implementation strategies for urban bathing

Implementation strategy measures vary based on both their *outcome/output* process direction, as well as their urban bathing site typology. While some are very specific to one of the characteristics related to the site typologies, others are overarching and can be applied to multiple scenarios. Taking lessons from the cases analysed in this research,

cities can overcome physical- and non-physical implementation challenges through different layers of the urban systems framework. Solutions, opportunities and success factors have been found in flexible design (*intervention-by-intervention site development*, *modular pools or floating pool barge ships that are able to move to new locations*), creative and collaborative governance (*public-private partnerships*, *common goals among stakeholders*) and justification in connecting other local social and environmental agenda's (*accessibility of public space*, *improving water quality*, *swimming programming for local communities*). As for all types, the connection to existing urban development plans and financial exploitation holds significant potential.

For *The Free Style*, implementation measures and success factors for when urban bathing is the desired *outcome* seem to include a governance structure in which the development of the site is allowed to happen intervention by intervention. The realisation of necessary interventions for physical accessibility, such as pedestrian bridges, jetty's or boardwalks, can become more attractive in feasibility when connected to existing spatial ambitions for the area and, if possible, included in area development exploitation. Following the opposite direction, when urban bathing is the measure, the strategic *output*, *The Free Style* particularly suits objectives related to the envisioned physical character of the built environment and public space, such as a more attractive and vibrant waterfront, a cultural or historical connection to the area or to create space for urban innovations and experiments related to water quality, biodiversity and surface pollution.

For *The Protected Plunge*, implementation measures and success factors for when urban bathing is the desired *outcome*, point towards a flexible and temporary structure of the site. Through this flexibility, the site seems to have more potential to balance certain safety-, mobility- and governance related barriers, for example concerning the other users and exploiters in the harbour. Additionally, this seasonality is also a way to limit the amount of financial and operational resources necessary to keep the site open. When urban bathing is the *output*, The Protected Plunge can be a strategic (temporary) measure for placemaking and generation of public space. Similar to *The Free Style*, this type also allows for awareness on water quality and can be a strategic asset in creating a vibrant waterfront or building a cultural or historical connection to the area.

For *The Dip in a Bowl*, implementation measures and success factors for when urban bathing is the desired *outcome*, mostly concern creating a model for the initial realisation of the site and further exploitation and programming, including the positions of leading stakeholders. Taking lessons from the cases discussed in this research, the initial realisation of the floating pool might be more effective when executed by a private party or NGO. However, to assure sustainable public accessibility - and possible public swimming programming- of the site, the Municipality plays a key role in providing programming and organising operational management and exploitation, whether or not in collaboration with a private party. In case the swimming site is modular or movable,

the business case is more sustainable for the exploiting party, since the site can be relocated to locations with better opportunities. When urban bathing is the *output*, *The Dip in a Bowl* can be a reliable function for sports- and social programming for all ages. Elevating this value with collaboration with local entrepreneurs or businesses, the site can be a valuable strategy in the generation of public space and community involvement.

7.3 Implementation strategies for urban bathing in Rotterdam

The future of urban bathing in Rotterdam holds a lot of potential in the spatial quality of its inner city harbours and the existing plans and ambitions for urban development. Generally, barriers in the existing system seem to point towards the governance structure behind the future urban bathing locations. A prominent is responsibility, which relates to ownership, finances and safety. Considering the current viewpoints of main stakeholders relating to safety, urban bathing sites categorised by *The Protected Plunge* or the *Dip in the Bowl* typologies are more feasible options for Rotterdam's inner city harbours in the short term. However, these two typologies generally require more financial and operational resources than *The Free Style*, in addition to the fact that these typologies also require a more thorough implementation strategy beforehand. In the long term, *The Free Style* would therefore be more attractive for realisation in Rotterdam, especially considering the size of the group of users that it could accommodate in comparison to other typologies. However, it will require ownership of the quays by the Municipality and specifically, authority on the functions in the harbour and how its uses are regulated. Otherwise, compromises related to the use of the harbours need to be made between the owners and public authorities. This is a process that is expected to be complex and time-consuming and therefore, considering the yet limited experience related to urban bathing sites in Rotterdam, might not favour the implementation of new sites. Urban transitions and social urgencies relating to the ongoing urban development projects, development of the Port of Rotterdam, climate adaptation agenda and environmental vision for the city of Rotterdam might put the necessary pressure on this change of view on the functions of inner city harbours. The solution is likely rooted in the embeddedness of urban bathing within these urban strategies, which also translates to the availability of necessary information and resources for financial and physical feasibility. This is where the urban systems based framework comes in. Using this framework as an instrument to assess eligible locations, challenges found in certain systems of Rotterdam's urban context can be directly confronted with solutions, opportunities or justifications within other urban systems unique to the situation for a specific harbour. With minor adaptations to the specific translations for each of the urban systems related to urban bathing, the framework could also be applied to eligible swimming sites that are not inner city harbours.

7.4 Recommendations and practical implications

The conclusions presented in this research have been designed specifically as recommendations for the Municipality of Rotterdam. Therefore, practical implications of the results could first and foremost include development strategies for the realisation of urban bathing in Rotterdam, either for one of the three cases described in this research (*Spoorweghaven*, *Coolhaven*, *Persoonshaven*), or the same strategy and urban-systems based framework could be applied to other eligible inner city harbours. Considering that the proposed recommendations are directed to the Municipality of Rotterdam, additional policy implications of the results could include both the development of a specific policy vision or strategy for urban bathing in Rotterdam, as well as the application of the topic of urban bathing within existing and new urban policies and development plans, such as:

- Rotterdams Weerwoord (*climate adaptation*)
- Rotterdam Resilience Strategy
- Vision Wateratlas & Cultural heritage
- Tourism policy
- Public swimming policy
- Development strategies for specific areas, e.g. Rotterdam Zuid or Merwe Vierhavens (M4H).

Placing the lessons learned into the identified urban system context of the three Rotterdam cases, specific recommendations for implementation measures are explained through their biggest challenges and opportunities, alongside some of the local stakeholders that hold a prominent position in the process and expectation regarding the influence of urban transitions on this process.

7.4.1 The Free Style - Spoorweghaven

- *Process direction*: Urban bathing as (temporary) *output*
- *Biggest challenge*: The existing contract with City Marina imposes big challenges on the feasibility of realising a swimming site, concerning the ownership and governance structure of the Spoorweghaven that limits the position of the Municipality in leading this implementation, as well as the physical safety measures that would need to be taken due to this current designated function for the harbour (marina).
- *Biggest opportunity*: Primarily, urban bathing in the Spoorweghaven can serve as an output to create active use of the currently underutilized harbour, serve local demand from the community for a public function and improve the connectivity of the harbour within the urban area. Furthermore, implementing *The Free Style* could possibly create a historic connection to former activities in the harbour area, as well as a connection to future activity in Rotterdam's harbours: urban experiments and sustainable innovations by the local network of start-ups, now known as the Rotterdam Makers District. In the short term, a temporary solution in collaboration with City Marina might allow for swimming to happen until

activity commences in the harbour. It would require further investigation and conversation with City Marina to draw conclusions on the practical translation of this possibility.

- *Expectations in relation to urban transitions*: Mindful of the position of the Spoorweghaven in between existing urban development plans for Rotterdam South and the city waterfronts (Wateratlas), the question remains: what is the future of a marina function in the urban context of this harbour? With urban heat stress increasing during the summers, once you make the waterfront in the harbour more attractive and accessible, swimming might soon become popular unintentionally or uncontrollably, similar to the situation in Marineterrein, Amsterdam.

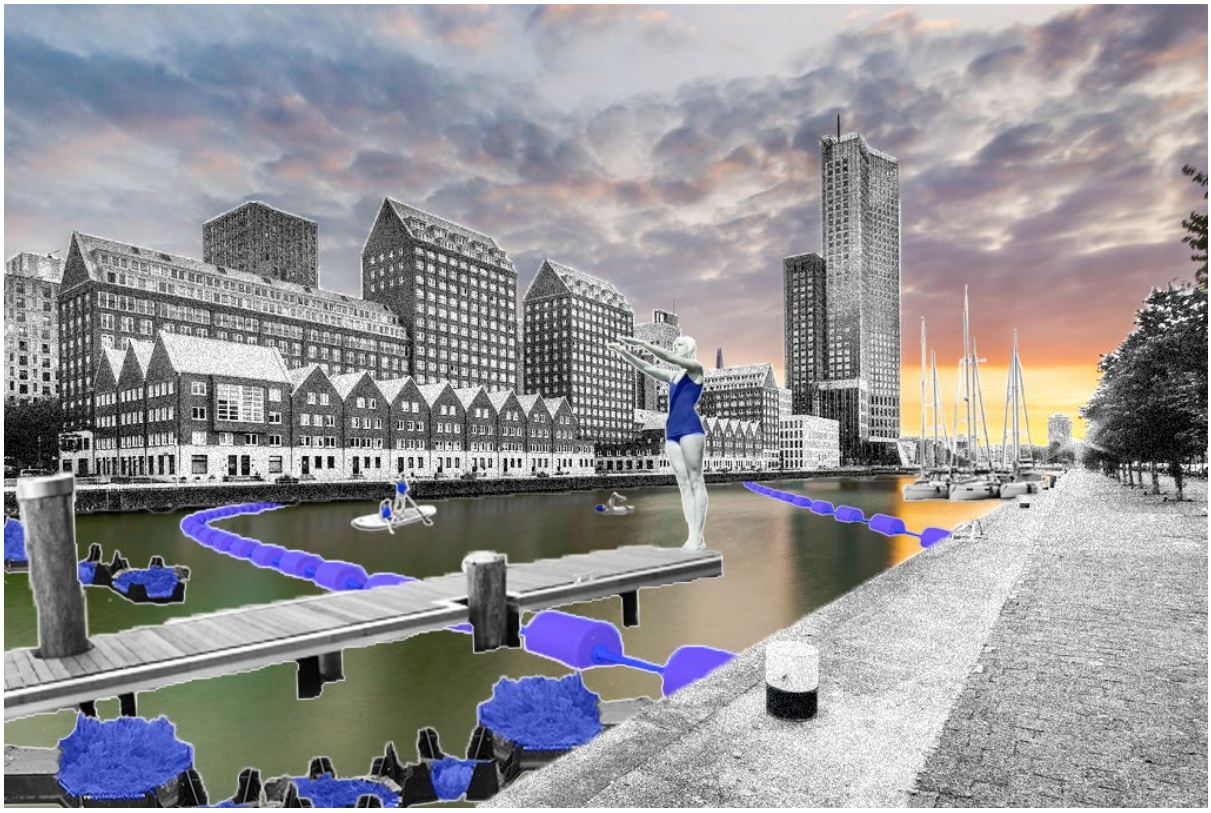

Figure 7.1: Collage, The Free Style in Spoorweghaven. Image by author (2025).

7.4.2 The Protected Plunge - Coolhaven

- *Process direction:* Urban bathing as specific desired *outcome*
- *Biggest challenge*: For the realisation of a swimming site in Coolhaven, even when this includes a demarcating pool structure as characterised by *The Protected Plunge*, guaranteeing the physical safety and organising operational responsibility between the Municipality, Port Authority, Water Authority and Rijkswaterstaat is expected to be a primary challenge. In case the pool structure would be a year-round site, operational management and maintenance is

expected to be a bigger financial challenge. In the opposite situation, a temporary structure might not be eligible for inclusion in the environmental exploitation of the Coolhaven waterfront in relation to the planned development of residential building 'Coolbase' (visual representation pictured in Figure 7.2).

- *Biggest opportunity*: The realisation of a demarcated urban bathing site in Coolhaven can embody a common goal among stakeholders in regulating the current swimming situation in Coolhaven. Additionally, through the appointment of the realisation of a bathing site to the waterfront on the Delfshaven side, local ambitions relating to the environmental quality and connectivity of Coolhaven ('rondje Coolhaven') and the demand for social activity can be achieved.
- *Expectations in relation to urban transitions*: Within the climate resilience transition, the availability of measures limiting the effects of urban heat stress might become more important, which is also an urgent case in Delfshaven. Public organisations such as the Public Health Authority (GGD) might hold a more prominent position in the accessibility and sustainability of (temporary) measures like these. Mindful of the current popularity of Coolhaven for urban bathing and the rising movement for reconnection with the water and waterfront, it seems that trade-offs between current use, physical safety and informing of the community are inevitable steps in the implementation process.

Figure 7.2: Collage, The Protected Plunge in Coolhaven. Image by author (2025).

7.4.3 The Dip in a Bowl - Persoonshaven

- *Process direction*: Urban bathing as (temporary) *output*
- *Biggest challenge*: For the Dip in a Bowl, organising the operational model and exploitation plan might impose the biggest challenge. Of all typologies, this site typology requires the most programming, operational management and (financial) resources that might need to be covered by multiple parties to remain feasible. The Municipality has to play an important part in the organisation of this model, in case the public accessible character of the site is indeed confirmed to be a priority. Apart from the pool itself, initial costs for infrastructure on site are also required for the Persoonshaven, which might threaten the feasibility if a connection to existing urban development exploitation is not possible.
- *Biggest opportunity*: Considering the current plans for development in the Persoonshaven area, a public-private partnership with local entrepreneurs, such as Skateland, might be a valuable model for the realisation of a bathing site in collaboration with the Municipality. Allowing for public swimming, the Municipality Sports Department could be involved in the organisation of this programming, which finds justification in many social ambitions for the area. The implementation of a public waterfront activity can be a valuable placemaking strategy in the urban regeneration in Feijenoord. A modular or movable site could even allow for future repetition of this strategy in other city harbours, such as the Merwe Vierhavens (M4H).
- *Expectations in relation to urban transitions:* Persoonshaven will be subject to some of the biggest urban redevelopment projects in Rotterdam over the coming years. The urgency of inclusive public amenities will only increase, especially considering the expected growth in dwellings and attraction of new target groups.

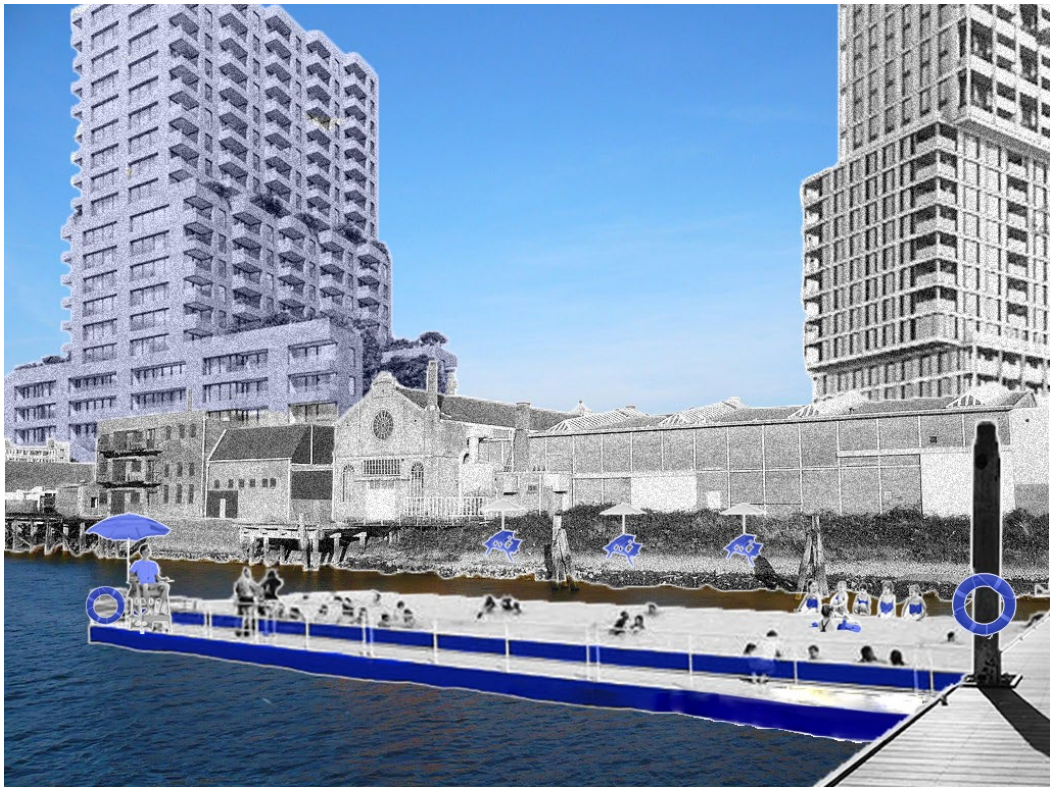

Figure 7.3: Collage, The Dip in a Bowl in Persoonshaven. Image by author (2025).

8. Discussion

8.1 Interpretation and validation of results

Reflecting on different components of the theoretical framework, place- and actor-sensitivity have been prominent variables throughout this research study and the results. Considering the fact that this research scope is strongly framed by urban development management practice that balances process, product, people and place, this is not a surprising outcome. This research was structured by a limited number of specific case studies, for which their faced challenges were each unique to the context of their physical and non-physical urban systems. From a methodological perspective, the opt for a set of qualitative case study analyses can therefore be disputed when raising the question of generalisability of the results. Apart from the two identified approaches for urban bathing implementation (*outcome/output*), the results have been developed into case-specific conclusions and recommendations that are not directly applicable to other cities. Furthermore, these conclusions are based on opportunities and challenges in the foreseeable future. However, many unforeseeable conditions are inevitable when developing an urban bathing site. Even more so, when discussing the influence of social and environmental urban transitions, which equally translates to the position of different stakeholders. Therefore, the conclusions and recommendations in this research still contain abstractions to a certain extent, because they depend on unforeseeable conditions. Among the conclusions presented in this study, governance was one of the main barriers applicable to the case of Rotterdam. This is partially because the term represents a lot of different facets related to other urban systems in the research framework. For instance, governance also includes issues such as financial responsibility, operational management, legislation and enforcement. Challenges related to governance playing an important role in the implementation of urban bathing sites correspond with literature on the governance of safe urban bathing waters. For additional recommendations relating to this discipline, further research is required.

Relating to the theoretical framework containing three typologies for urban bathing sites, the results have shown that mostly the separation of The Free Style on one hand and The Protected Plunge and The Dip in a Bowl on the other has been significant. This is based on the fact that it has generated different results related to the implementation strategies, mainly focused on physical safety, governance- and financial aspects. Meanwhile, the differences between The Protected Plunge and The Dip in a Bowl are smaller. The primary argument for these typologies to be separated originally, was water quality. However, against initial expectations, this factor was not represented that much in the identified challenges in the results. This is in conflict with some of the consulted literature that use similar frameworks of typologies, such as the study by Studio Marco Vermeulen (2023). As stated before in the theoretical framework, the three typologies have been created to fit the scope of this research, urban bathing in the inner city harbours, with a focus on implementation strategy. However, the typology framework

might not necessarily suit other disciplines related to urban bathing sites. For example, a more technical or architectural approach to the design of (floating) urban bathing sites.

The application of the urban systems-based framework was based on the assumption of finding justification for the implementation of urban bathing sites to challenge existing administrative urban practice. Through the urban systems framework, the transdisciplinary dimensions of urban bathing implementation have been presented alongside each other in the results. These results, based on the different case studies, have shown that solutions or opportunities for facing the challenges in the implementation process, are often found in a different urban system. The urban systems-based framework has therefore turned out to be more important as an instrument to collectively show the possible challenges and opportunities, instead of a step-by-step guide to be followed when implementing urban bathing. Overall, the interdisciplinary approach of using the urban systems-based framework is in this way similar to how it is consulted in the Rotterdam Resilience Strategy (2022), which has been one of the frameworks from the consulted theory.

8.2 Research limitations

Throughout the process of conducting this research study, a number of limitations have been identified, that may have influenced the results and conclusions.

Limitations related to the methodological framework concern the selection of a literature review for the first research subquestion. The lack of available literature that is specific enough for the relevant topics in this chapter, may have impacted the viability of results. Concerning the sample size and composition of the research case studies, a number of aspects may have influenced the results. Following the methodological framework of this research study, a limited amount of case studies was conducted to collect data, consisting of one international case study and one Rotterdam case study for each one of the three urban bathing typologies. Therefore, the limited amount of qualitative and comparable data may have influenced the results in a negative way. Concerning the Rotterdam cases, one of the interview participants has represented two different cases in two separate interviews. This limits the sample size and composition and may have impacted the results. Comparing the length of the interviews and quantity of collected data between the six case study interviews, one of the international case study interviews has produced significantly less data. Therefore, this may have influenced the results in a negative way. Furthermore, two case studies were located outside of the country in which the research has been conducted (The Netherlands). Due to time- and budget constraints, the researcher has not visited these locations and therefore lacks the same visual and physical understanding of the site compared to the other case study locations. This may have influenced the results related to the physical and social observations and assumptions made in this research.

The data collected in this research study includes interviews conducted between non-native speakers of the English language. This may have impacted the results through false or out-of-context interpretations of data. The same applies to the data collected through interviews conducted in the Dutch language that has occasionally been translated for further analysis or documentation in this research. This may have impacted the results through false or out-of-context interpretations of data. Most of the interviews have been conducted within the professional environment of the Municipality of Rotterdam. The double position of the researcher within both the TU Delft and the Municipality of Rotterdam may have influenced the results unintentionally. Furthermore, the interviewees may have answered the interview questions with intentional- or unintentional bias, for example out of protection of their professional position in relation to personal experiences or opinions. Finally, relating to other limitations, the main researcher has limited background knowledge on the political, social-cultural, economic and environmental context of the conducted international case study locations, which may have resulted in a bias, false or out-of-context interpretations that have influenced the results in a negative way. Moreover, existing recent theory on the topics explored in this research remains limited, as well as the coverage of Dutch context within this field of work.

8.3 Suggestions for further research

To build on this work, future investigations could consider the long-term positive impacts of urban bathing sites, such as the Rijnhaven bathing site for Rotterdam, on urban issues such as social inclusion, public health or climate adaptation to build on evidence-based justification for the cause. Furthermore, economic implementation models characterised by sustainable public-private partnerships are valuable topics for further exploration of the practical feasibility of urban bathing implementation. The typology driven requirements identified in this research could be seen as a starting point in this assignment.

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Appendix A

Interview Protocol | International case studies

INTERVIEW PROTOCOL | SQ2 | Example case Paris

1. **Informed consent forms**

2. **Opening statement**
   - Explain research topic and case study type: *This research study focuses on overcoming implementation challenges for urban bathing in the inner city harbours of Rotterdam. Taking lessons from (inter)national cases such as [case study location], the results of this interview will eventually be used to propose recommendations to the City of Rotterdam regarding the implementation of urban bathing in the city.*
   - Explain goal of the interview: *The purpose of this interview specifically is to gain insight into the successful implementation of urban bathing in (inter)national cases and the overcame implementation challenges. The results will hopefully include an understanding of implementation strategies within the different urban systems, as well as the recognition of justification arguments relating to the implementation of urban bathing.*
   - Explain structure of the interview: *The interview will touch upon some of the physical characteristics of the location, as well as some social characteristics of the case study project.The interview will be semi-structured, which means it will be a conversation of prepared questions in combination with follow-up questions or clarifications at the moment. Because of this, I would like to audio-record this interview.*
   - Ask for recording permission to start interview

3. **Introduction participant**

Today we are going to talk about [case study location], which you are representing.

- What is your professional relation to [case study location] in general?
- What contributions were you able to make from your position in implementing urban bathing in [case study location]?

4. **Urban bathing type & eligibility of location**
    - How was [case study location] selected or assigned for the implementation of an urban bathing site?
        - Were any other locations considered?
        - Was this location already used for swimming?
        - Was swimming already legal before the site was developed?
    - How did you end up selecting this specific type (structure) of urban bathing for this location?
        - Were any other types considered?

5. **Assessment of the case study location and faced implementation challenges**

Especially in a complex urban (port) area like [case study city], the realisation of urban bathing has probably met many physical requirements. For the realisation of [urban bathing facility type] in [case study location]:

- What would you recognise as some of the main faced challenges relating to:
    - Accessibility of the location itself
    - Accessibility of the water from the quay/shore
    - Physical safety of swimmers
    - Pressure on existing infrastructure
    - Local ecology
    - Expected water quality
    - … more **[adjust to results of SQ1]**

- Who do you identify as the most important stakeholders in [case study location], relating to these -physical- challenges?
- How did you face these challenges?
    - What information did you have to obtain in order to determine these faced challenges?
    - How did you obtain this information?
    - Are there any issues you could not have foreseen?

        - Is there anything you would do differently?

There are different types of urban bathing facilities, which besides physical requirements, also have different social requirements. For the realisation of [urban bathing facility type] in [case study location]:

- What would you recognise as as some of the main faced challenges relating to:
    - Compliance of urban bathing with the physical environment plan//vision for the area or city
    - Financial feasibility
        1. What did the project cost? What kind of public funds?
        2. Market activity?
    - Governance (maintenance and supervision)
    - Acceptance of the local community & participation
    - .. more **[adjust to results of SQ1]**

- Who do you identify as the most important stakeholders in [case study location], relating to these -non-physical- challenges?
- How did you face these challenges?
    - What information did you have to obtain in order to determine these faced challenges?
    - How did you obtain this information?
    - Are there any issues you could not have foreseen?
    - Is there anything you would do differently?

- Are there any challenges (or solutions) we have not mentioned yet?

6. Justification of the implementation of urban bathing

- What have been the most important trade-offs (social value, climate resilience, cost-effectiveness, accessibility, market activity etc.) in realising urban bathing in [case study location] successfully?
- Were any of the urban bathing plans justified by any other (urban development) agenda's, such as climate adaptation, resilience, sports & public swimming, cultural heritage, etc?

- What methods (research, designs, important advocates, collaboration models) did you use to convince stakeholders/validate the urgency of the project to realise urban bathing in [case study location]? What methods/products have been leading the general cause/agenda of urban bathing?
- Do you see a shift in the power balance between involved stakeholders over the next few years? How will this evolve for the future of public governance of urban bathing?

Appendix B

Interview Protocol | Rotterdam case studies

INTERVIEW PROTOCOL | SQ3 | Rotterdam cases NL versie

1. **Geïnformeerd consent formulier (5 min)**

2. **Opening statement (2 min)**
   - Toelichting onderzoek en type case study: *Dit onderzoek focust op het in kaart brengen van implementatie uitdagingen met betrekking tot stedelijk zwemmen in de binnenstedelijke havens van Rotterdam. De [case study haven] is één van de case study locaties in dit onderzoek en voor het gemak en een stukje concreetheid wordt deze locatie gekoppeld aan een specifieke vorm van stedelijk zwemmen, namelijk [type stedelijk zwemmen].De resultaten van dit onderzoek zullen hopelijk gebruikt kunnen worden om de Gemeente Rotterdam een aantal aanbevelingen te doen met betrekking tot een aanpak voor het realiseren van stedelijk zwemmen in de stad.*
   - Toelichting doel van het interview: *Het doel van dit interview specifiek is vooral een beter inzicht krijgen in de fysieke en sociale context van deze locatie. De output van dit interview zal hopelijk bestaan uit een concreet begrip van de huidige/mogelijke uitdagingen die voortkomen vanuit verschillende stedelijke systemen. Ook hoop ik hier een basis uit te kunnen halen voor een stukje validatie van de sociale vraag voor het implementeren van stedelijk zwemmen in [case study haven].*
   - Toelichting structuur van het interview: *Dit interview gaat deels over de fysieke eigenschappen van de locatie en deels over de sociale en niet-fysieke eigenschappen. Als je vragen niet weet te beantwoorden, is dat geen probleem. Ik heb het interview semi-gestructureerd voorbereid. Dat houdt vooral in dat er een aantal vaste vragen zullen zijn, maar het meer als een gesprek zal verlopen. Daarom zou ik het ook graag willen opnemen. Achteraf zal ik het transcript naar je toesturen, stel er zijn dan dingen die je graag verwijderd of verhelderd wil hebben, kan dat natuurlijk.*
   - *Start opname & Vraag om toestemming om het interview op te nemen.*

3. **Introductie deelnemer (5 min)**

Bedankt voor je deelname aan dit interview. Vandaag gaan we het hebben over [case study locatie], die jij hier representeert.

- Wat is jouw professionele relatie met deze locatie?
- Would there be a role for you in case urban bathing is implemented in the [case study location]?
- What contributions can you make from your position in order to implement urban bathing in [case study location]?

4. **Validatie/beargumenteren implementeren stedelijk zwemmen (10 min)**

Gerelateerd aan de [case study location] volgens de huidige situatie:

- Is er een sociale vraag voor zwemmen in de omgeving van [case study location] op dit moment?
- Op wat voor observaties of argumenten is dit antwoord gebaseerd?
- Zie je/Wat voor fysiek-gerelateerde potentie zie je in [case study location] voor de realisatie van stedelijk zwemmen?
- Zie je/wat voor niet-fysiek/sociale potentie zie je in [case study location] voor de realisatie van stedelijk zwemmen?

5. **locatieonderzoek → mogelijke implementatie uitdagingen (20 min)**

Met name in een complexe stedelijke (havengebied) omgeving als Rotterdam, kent het realiseren van stedelijk zwemmen vele fysieke randvoorwaarden.

- Herken je, en zo ja wat voor uitdagingen herken je, met betrekking tot:
  - Bereikbaarheid/toegankelijkheid van de locatie zelf
  - Toegankelijkheid van het water vanaf de kade/kant
  - Fysieke veiligheid van zwemmers
  - Druk op bestaande infrastructuur

        - Lokale ecologie
        - Verwachte waterkwaliteit

    - Wie identificeer je als je belangrijkste stakeholders in relatie tot deze uitdagingen?
    - Mist er nog bepaalde kennis of informatie om deze of andere uitdagingen te bepalen?

Er zijn verschillende vertalingen van stedelijk zwemmen, die naast fysieke randvoorwaarden ook niet-fysieke of sociale randvoorwaarden hebben.

    - Herken je, en zo ja wat voor uitdagingen herken je, met betrekking tot:
        - Naleving van het omgevingsplan en de visie voor het gebied
        - Financiële haalbaarheid (mbt bijvoorbeeld marktactiviteit of juist potjes)
        - Sociale controle/beheer?
        - Draagvlak van de lokale bewoners/omwonenden en gebruikers?

    - Wie identificeer je als je belangrijkste stakeholders in relatie tot deze uitdagingen?
    - Mist er nog bepaalde kennis of informatie om deze of andere uitdagingen te bepalen?
- Zijn er nog uitdagingen die nog niet genoemd zijn?

6. **Post-validatie van het implementeren van stedelijk zwemmen (15 min)**

Het realiseren van stedelijk zwemmen in de complexe stedelijke omgeving is mogelijk onderworpen aan conflicterende belangen of kenmerken. Met het oog op het gewenste toekomstperspectief van de locatie,

    - Wat zie je als de belangrijkste thema-afwegingen/trade-offs (sociale waarde, klimaatadaptatie, kosten effectiviteit, toegankelijkheid, marktactiviteit/aantrekkelijkheid) voor het realiseren van stedelijk zwemmen op deze locatie?
    - Zie je overlap tussen het realiseren van stedelijk zwemmen en visies/meerjarenplannen voor bijvoorbeeld klimaatadaptatie

(Rotterdams Weerwoord) of weerbaarheid/veerkrachtigheid (Rotterdam Resilience Strategie)?
    - Hoe verwacht je (met welke middelen) dat er overtuigd kan worden van stedelijk zwemmen in deze locatie?

Wat zou de rol kunnen zijn van verschillende stakeholders (vooral vanuit Gemeente Rotterdam) in het implementeren hiervan?

Appendix C

Data Management Plan

Plan Overview

A Data Management Plan created using DMPonline

Title: Swimmable Rotterdam Harbours: case study lessons in overcoming urban bathing implementation challenges, following an urban systems-based approach

Creator: Marilotte Stemerdink

Contributor: Kristel Aalbers, Aksel Ersoy

Affiliation: Delft University of Technology

Template: TU Delft Data Management Plan template (2025)

Project abstract:

Ever since the mega project of cleaning the Seine in preparation for the Paris 2024 Olympics gained world-wide attention, a global movement is inspiring urban policymakers and to reclaim urban waters in becoming a ‘Swimmable City’. As in many of these cities, the city of Rotterdam, the Netherlands, sees a growing demand for reconnection with the waterfront, urban living quality and resilience, while simultaneously facing the effects of climate change on the city and its residents first-hand. The Municipality of Rotterdam has outspoken their ambition to develop future urban bathing sites in open-air waters, among which the inner city harbours. However, the urban complexity of these locations goes hand-in-hand with practical and systematic implementation challenges. This research is framed by an urban systems-based approach, in order to identify the place- and actor-related challenges and opportunities in their urban system nature, for three typologies of (floating) urban bathing structures defined in this study (The Free Style; The Protected Plunge; The Dip in a Bowl). Taking lessons from case study interviews with three respective (inter)national urban bathing typology examples (Marineterrein in Amsterdam, La Baignade Villette in Paris, The Floating Pool Lady in New York City), overarching physical and non-physical challenges were overcome by flexible design, creative governance and justification in connecting other local societal agenda’s such as the accessibility of public space, improving water quality and swimming programming for local communities. Comparing these lessons with identified challenges and opportunities for Rotterdam’s Spoorweghaven, Coolhaven and Persoonshaven, based on case study interviews with local project managers, the conclusions of this research are presented as recommendations for civil servants on how to approach the development of future urban bathing sites. Not only for the City of Rotterdam, but all cities who have the ambition to become ‘swimmable’.

ID: 167233

Start date: 10-02-2025

End date: 27-06-2025

Last modified: 14-05-2025

Swimmable Rotterdam Harbours: case study lessons in overcoming urban bathing implementation challenges, following an urban systems-based approach

0. Adminstrative questions

1. Provide the name of the data management support staff consulted during the preparation of this plan and the date of consultation. Please also mention if you consulted any other support staff.

Janine Strandberg, Data Steward at the Faculty of Architecture & the Built Environment, has first reviewed this DMP on 17-01-2025;

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

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

TU Delft [Partner 1] is leading the research design, developing the research hardware and the collection and management of research data. The research will be conducted within a graduation internship environment at the Municipality of Rotterdam (Gemeente Rotterdam) [Partner 2].

I. Data/code description and collection or re-use

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

Type of data/code	**File format(s)**	**How will data/code be collected/generated?** *For re-used data/code: what are the sources and terms of use?*	**Purpose of processing**	**Storage location**	**Who will have access to the data/code?**
Interview audio recordings (may include politically-sensitive data (such as research commissioned by public authorities, research in social issues))	MP3/MP4 files	Live audio recordings of interviews via a personal device with recording function (smartphone or in-video call recording on PC via MS Teams). The audio recordings will be transcribed using an AI transcriber tool such as Vizard or Transkriptor	The audio recordings are necessary to create detailed transcripts of the interviews, which will be used to process the case study data	Recorded and temporarily stored on personal device, primarily stored in TUD OneDrive	The TUD project team, consisting of Marilotte Stemerdink, Aksel Ersoy and Kristel Aalbers
Interview transcripts (may include politically-sensitive data (such as research commissioned by public authorities, research in social issues))	PDF/Microsoft Word files	In-person/via online video call, semi-structured interviews with professionals related to the case study locations and topics, recruited within the internship environment at Gemeente Rotterdam or via their professional network. The main research cases are located within the city of Rotterdam, some reference cases might be located outside of the Netherlands. Interviews will be conducted in the Netherlands, in-person when possible, otherwise via (international) online video call connection.	The interview transcripts are necessary to later process the rsearch data and conduct analyses on the interview contents, using the ATLAS.TI tool.	TUD OneDrive	The TUD Project team

Prepared/anonymised/pseudonimised (interview transcripts) data on case study project details and process details (may include politically-sensitive data (such as research commissioned by public authorities, research in social issues))	PDF/ATLASTI-files	The interview transcripts (row 2) are prepared/anonymised/pseudonimised in correspondance with the accepted terms in the informed consent forms of the particpants.	Using the ATLAS.TI coding software, data is processed to analyse and understand the challenges and circumstances for different case studies in implementing swimmability in cities. The ATLAS.TI tool is used to code certain themes and findings within the transcripts and make connections between analyses.	TUD OneDrive & ATLAS.TI (personal TU Delft license account)	The TUD project team
Personally identifiable information (PII) of participants/interviewees; name, email, phone number	.xlsx files	Contact information retrieved through personal communication	Administrative purposes: To collect and communicate with participants for the case study interviews	Project Data Storage	The TUD project team
Personally identifiable research data of participants/interviewees; occupation, relation to case study project, professional experiences	.xlsx files; PDF/ATLASTI-files	Information retrieved through personal communication prior to and/or during the in-person/via online video call, semi-structured interviews with professionals related to the case study locations and topics, recruited within the internship environment at Gemeente Rotterdam or via their professional network.	To select suitable participants relevant to the research case study locations and topics and understand the participants position within the case study topics.	Project Data Storage	The TUD project team
Informed consent forms	PDF files (physical copy/digital file)	Informed consent forms signed digitally or in-person	To obtain and document informed consent	Personal locker at Intership Environment (temporarily for physical copies)/Project Data Storage (primary storage)	Main corresponding researcher (Marilotte Stemerdink) (Locker storage)/TUD Project team (Project Data Storage)
(Un)published governmental documentation and research on the relevant case study locations and topics	PDF/Microsoft Word/PNG/JPEG/Microsoft Powerpoint/.xlsx files	Through the internship environment at Gemeente Rotterdam	To provide necessary context and background information on case study locations and topics	Internal storage in intership environment at Gemeente Rotterdam	Employees at Gemeente Rotterdam, among which the main corresponding researcher (Marilotte Stemerdink)

II. Storage and backup during the research process

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

- < 250 GB

5. Where will the data/code be stored and backed-up during the project lifetime? (Select all that apply.)

- Another storage system – please explain below, including provided security measures
- Project Data Storage (U:) drive at TU Delft
- TU Delft OneDrive

Personal recording device for interview audio recordings (mobile phone dictation app or video call audio recording application). Only used to do the recordings, after the interviews are conducted the recording files will be copied to the TUD OneDrive storage and removed from the personal device.

Internal storage at internship environment (Gemeente Rotterdam).

ATLAS.TI tool application via TU Delft license account. The transcribed interview files uploaded in ATLAS.TI are only the files that have been prepared/anonymised/pseudomised in correspondance with the accepted terms in the informed consent forms of the particpants.

Personal locker at intership environment (Gemeente Rotterdam). Used as temporary storage of physical copies, until the digital copy can be stored in the Project Data Storage.

III. Data/code documentation

6. What documentation will accompany data/code? (Select all that apply.)

- Data – Data dictionary explaining the variables used
- Procedure – A description of data processing procedure(s) (such as laboratory setup, simulation workflows).
- Data – Methodology of data collection

IV. Legal and ethical requirements, code of conducts

7. Does your research involve human subjects or third-party datasets collected from human participants?

If you are working with a human subject(s), you will need to obtain the HREC approval for your research project.

- Yes – please provide details in the additional information box below

I intend to apply for ethical approval from the Human Research Ethics Committee in combination with my Data Management Plan application.

8. Will you work with personal data? (This is information about an identified or identifiable natural person, either for research or project administration purposes.)

- Yes

9. Will you work with any other types of confidential or classified data or code as listed below? (Select all that apply and provide additional details below.)

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

- Yes, politically-sensitive data (such as research commissioned by public authorities, research in social issues)

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

***For projects involving commercially-sensitive research or research involving third parties, seek advice of your Faculty Contract Manager when answering this question*.**

The intellectual property rights are framed by a graduation agreement between Delft University of Technology, myself and Gemeente Rotterdam.

11. Which personal data or data from human participants do you work with? (Select all that apply.)

- Other types of personal data or other data from human participants – please provide details below
- Proof of consent (such as signed consent materials which contain name and signature)
- Audio recordings
- Telephone number, email addresses and/or other addresses as contact details for administrative purposes
- Names as contact details for administrative purposes

Occupation details, professional experiences and case study project-, stakeholder- or process-related details.
Audio recordings include interview recordings with spoken consent.

12. Please list the categories of data subjects and their geographical location.

Professionals related to the case study locations and topics, recruited within the internship environment at Gemeente Rotterdam or via their professional network. The main research cases are located within the city of Rotterdam, some reference cases and therefore interview participants might be located outside of the Netherlands. Interviews will be conducted in the Netherlands, in-person when possible, otherwise via (international) online video call connection.

13. Will you be receiving personal data from or transferring personal data to third parties (groups of individuals or organisations)?

- Yes – please provide details about the data and third party(ies) below

It is very likely that this research will include interviews with relevant professionals employed by or representing third parties, outside of TUD (Partner 1) or Gemeente Rotterdam (Partner 2). Personal data that could be received from these third parties include: names, telephone numbers, email addresses or other addresses as contact details for administrative purposes; audio recordings (interview recordings with spoken consent); proof of consent (such as signed consent materials which contain name and signature); Occupation details, professional experiences and case study project-, stakeholder- or process-related details.

14. Which countries will you be receiving personal data from or transferring personal data to? (Select all that apply.)

- Other – please indicate which in the box below
- EEA country other than the Netherlands – please check the link in the guidance, and indicate which country in the additional information box
- Netherlands

TBD.

15. What advice did the Privacy team give regarding data transfer? Record below their advice, the data transfer mechanism used, and any agreed security measures.

Question not answered.

16. What are the legal grounds for personal data processing?

- Informed consent

17. Please describe the informed consent procedure you will follow below.

Written informed **consent relating to their data being collected and processed** prior to the interviews. Use of informed consent materials

approved by the TUD HREC beforehand.

- The researcher will inform the potential participants about the goals and procedures of the research project and particularily the interviews. The researcher will also inform them about the personal data that are being processed and for what purpose. This information will be provided to the potential participants in the opening statement of the Informed Consent Form.

Verbal informed consent **relating to audio recording** of interviews.

- All participants will be asked for their consent to be audio-recorded before the start of the interview. Consent is obtained verbally, whereby the participant positively affirms their participation in the interview recording. The consent will be recorded as follows: prior to the start of the interview, included in the audio recording.

18. Where will you store the physical/digital signed consent forms or other types of proof of consent (such as recording of verbal consent)?

The proof of consent (digital copy of signed document) will be preserved on the TU Delft Project Data Storage (U:) drive.

19. Does the processing of the personal data result in a high risk to the data subjects? (Select all that apply.)

If the processing of the personal data results in a high risk to the data subjects, it is required to perform a Data Protection Impact Assessment (DPIA). In order to determine if there is a high risk for the data subjects, please check if any of the options below that are applicable to the processing of the personal data in your research project.

If any category applies, please provide additional information in the box below. Likewise, if you collect other type of potentially sensitive data, or if you have any additional comments, include these in the box below.

If one or more options listed below apply, your project might need a DPIA. Please get in touch with the Privacy team (privacy-tud@tudelft.nl) to get advice as to whether DPIA is necessary.

- None of the above apply

23. What will happen with the personal data used in the research after the end of the research project?

- Personal data will be shared with others – please explain below which personal (pseudonymised) data will be shared, with whom, for what purpose, how and whether you have specified this in the informed consent form

Personal research (in pseudonymised interview transcripts) data on case study project details and process details (may include politically-sensitive data (such as research commissioned by public authorities, research in social issues)), will be processed for analysing. Interview answers and (pseudonymised) quotes will be included in the final research report, which will be shared in the TU Delft repository. Other than the final report, no personal data will be shared outside the TUD project team.

24. For how long will personal research data (including pseudonymised data) be stored?

- Other – please state the duration and explain the rationale below

25. How will your study participants be asked for their consent for data sharing?

- In the informed consent form: participants are informed that their personal data will be anonymised and that the anonymised dataset is shared publicly

V. Data sharing and long term preservation

27. Apart from personal data mentioned in question 23, will any other data be publicly shared?

Please provide a list of data/code you are going to share under 'Additional Information'.

- I do not work with any data other than personal data

29. How will you share research data/code, including those mentioned in question 23?

- I am a Bachelor's/Master's student at TU Delft and I will share the data/code in the body and/or appendices of my thesis/report in the Education Repository

31. When will the data/code be shared?

- Other - please explain

Not applicable

VI. Data management responsibilities and resources

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

My main supervisor Aksel Ersoy, Assistant Professor in Urban Development Management, with email address A.Ersoy@tudelft.nl

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

No dedicated resources are expected to be neccessary. The research report will be uploaded in the TU Delft repository.

Appendix D

Informed Consent Forms

Case Study Interview - Informed Consent Form

MSc Graduation Research Project | Delft University of Technology

Swimmable Rotterdam Harbours: case study lessons in overcoming incorporation challenges, following an urban systems-based approach

Corresponding researcher:	M.L.C. Stemerdink | M.L.C.Stemerdink@student.tudelft.nl
Supervising researcher:	A. Ersoy | A.Ersoy@tudelft.nl
Research period:	10-02-2025 – 27-06-2025

Dear participant,

Thank you for taking the time to take part in this research study.

Please read the information in this consent form with care and answer all questions. We ask you to sign for your informed consent at the end of this form.

Do not hesitate to contact our research team in case you have any questions or concerns.

Kind regards,

Marilotte Stemerdink

Corresponding researcher

1. Opening Statement

You are being invited to participate in a research study titled *'Swimmable Rotterdam Harbours: case study lessons in overcoming incorporation challenges, following an urban systems-based approach*. This study is being done by M.L.C. (Marilotte) Stemerdink from the TU Delft in collaboration with the Municipality of Rotterdam, as part of a MSc graduation research project at the Faculty of Architecture & the Built Environment.

The purpose of this research study is to develop a deeper understanding of place- and stakeholder-related challenges in the incorporation of urban bathing locations in Rotterdam and provide solutions for overcoming these implementation challenges through an urban systems-based approach. This interview is part of a number of research case studies and will take approximately 45-60 minutes to conduct. The data will be used for processing, publication and possibly practical application. We will be asking you to share professional experiences on the implementation- or development practice of the research case study example of your involvement. Questions will relate to implementation challenges and their place-, stakeholder- or system-related nature. The interview will be conducted semi-

structured and therefore you will be asked for your verbal permission to record prior to the start of the interview.

In this form, we ask you for permission to use your name and professional position in the publication of this research. In case you do not wish for this information to be published, we will pseudonymise the interview transcripts to minimize risks of re-identification. Any other personal data that is collected in preparation of or during your participation in this research (such as your email address and phone number), will be stored with limited access (only the TUD project team) during the research period and erased after publication and will under no circumstances be shared with third parties.

To the best of our ability your answers in this study will remain confidential and management of data will be handled with care. However, as this interview includes audio recording (to your consent), professional experiences and possibly details on your relation to the case study and its geographical location, personal (re)identification through the interview transcripts will remain a risk. To give you insight into the data that will be processed relating to your interview, you will have the opportunity to observe and request alterations to the interview transcripts, which is explained further in this opening statement.

All personal data, including the signed copy of this consent form, will be stored in the TU Delft Project Data Storage and will only be accessible to the research team of TU Delft. The research team exists of corresponding researcher M.L.C. Stemerdink (m.l.c.stemerdink@student.tudelft.nl) and responsible researcher A. Ersoy (a.ersoy@tudelft.nl) .

The (pseudonymised) interview transcripts will be stored in the TU Delft OneDrive, with access by the TU Delft research team. After publication, the research report will be publicly available through the TU Delft Education Repository.

Your participation in this study is entirely voluntary **and you can withdraw at any time**. You are free to omit any questions. With your verbal permission for the audio recording of the interview, an interview transcript will be made afterwards and shared with you for your observation. You will be allowed to suggest clarification or removal of your comments for a period of 14 days after the transcript has been shared with you, before the transcript data will be processed and eventually used for publication.

Data management for this research study applies to standard TU Delft practice, in legal context of The Netherlands and General Data Protection Regulation (GDPR) according to EU regulation on management of personal data. Besides the research report, which will be published in the TU Delft repository after the research study is completed, no data will remain stored.

Thank you again for taking the time to participate in this research.

2. Explicit Consent points

Please tick the appropriate boxes and fill out the information in *[parentheses]*.	**Yes**	**No**
A: GENERAL AGREEMENT – RESEARCH GOALS, PARTICPANT TASKS AND VOLUNTARY PARTICIPATION		
1. I have read and understood the study information dated [*DD/MM/YYYY*], or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	☐	☐
2. I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.	☐	☐
3. I understand that taking part in the study involves: • Participation in an in-person, audio-recorded interview, for which I have to give verbal consent included in the recording. • My audio-recorded answers being transcribed into text, after which the audio-recording will be destroyed. • My answers being stored and processed as research data and published in the research report. • My answers -as presented in the research report- possibly being included in practical implementation by the research partner (Municipality of Rotterdam).	☐	☐
4. I understand that the study will end when the MSc graduation research project is completed, which is expectedly by June 27th 2025.	☐	☐
B: POTENTIAL RISKS OF PARTICIPATING (INCLUDING DATA PROTECTION)		
5. I understand that taking part in the study also involves collecting specific personally identifiable information (PII) (name, email address, phone number) and associated personally identifiable research data (PIRD) (professional position, relation to case study project, professional experiences) with the potential risk of my identity being revealed.	☐	☐
6. I understand that the following steps will be taken to minimise the threat of a data breach, and protect my identity in the event of such a breach: • Pseudonymisation of interview transcripts • Secure storage of PII and (personal) data, including this signed consent form, within TU Delft project data storage facilities with limited access by the TUD research team only.	☐	☐
7. I understand that personal information collected about me that can directly identify me, such as my name, professional position, email	☐	☐

Please tick the appropriate boxes and fill out the information in *[parentheses]*.	**Yes**	**No**
address or phone number, will not be shared beyond the study team, unless I give consent in this form (only applicable to name and professional position).		
8. I understand that the unpublished, (directly identifiable) personal data I provide will be destroyed after the research project is completed, which is expectedly by June 27th 2025.	☐	☐
C: RESEARCH PUBLICATION, DISSEMINATION AND APPLICATION		
9. I understand that after the research study the de-identified information I provide will be used for research output in the form of a publicly accessible thesis defense, a research report published in the TU Delft education repository and possible practical application by collaborating research partner the Municipality of Rotterdam.	☐	☐
10. I agree that my responses, views or other input can be quoted pseudonymously in research outputs.	☐	☐
11. I agree that my real name and professional position can be used for quotes in research outputs.	☐	☐

Signatures

_____ _____ _____

Name of participant [printed] Signature Date

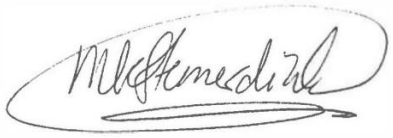
[Add legal representative, and/or amend text for assent where participants cannot give consent as applicable]

I, as legal representative, have witnessed the accurate reading of the consent form with the potential participant and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

_____ _____ _____

Name of witness [printed] Signature Date

I, as researcher, have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands to what they are freely consenting.



M.L.C. Stemerdink

Corresponding researcher Signature Date

Study contact details for further information:

Marilotte Stemerdink

m.l.c.stemerdink@student.tudelft.nl