

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences



Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Roos Boerma
Student number	4856538

Studio		
Name / Theme	Revitalising Heritage	
Main mentor	Nol Hermkens	Architecture mentor
Second mentor	Marie-Thérèse van Thoor	Research mentor
Argumentation of choice of the studio	I chose the Heritage studio because of its deep connection to history, maritime landscape, and architecture —subjects that genuinely captivate me. My fascination with the Dutch landscape and its evolution, especially in light of climate change, made this studio a perfect fit.	

Graduation project	
Title of the graduation project	Tides of change
Goal	
Location:	Delta Shipyard Sliedrecht
The posed problem,	Climate change threatens the maritime heritage of the Waterdriehoek, a historically rich yet vulnerable delta in the Netherlands. Rising sea levels, unpredictable river peaks, and wetter winters increase flood risks, overwhelming current water management systems and endangering cultural heritage. To protect the area's ecological and historical significance, new adaptive strategies are essential for preserving and reinforcing its maritime infrastructure. This research explores the landscape history of the Waterdriehoek, focusing on the Beneden Merwede region, to develop climate-resilient design solutions that safeguard

	both cultural and natural heritage for the future.
research questions and	<p>Main question: <i>How can insights from the historical landscape and architectural strategies in the Waterdriehoek inform the design of flood-resilient buildings in the maritime heritage context of this delta?</i></p> <p>Subquestions:</p> <ol style="list-style-type: none"> 1. <i>What key historical transformations in the Waterdriehoek's landscape were driven by climate and water management?</i> 2. <i>What lessons can be drawn from historical architectural adaptations in the Waterdriehoek to address water-related risks?</i> 3. <i>How can these historical measures be combined with contemporary approaches to design flood-resilient buildings in the Waterdriehoek?</i>
design assignment in which these result.	How can the the Watertower terrain be made flood-resilient in its transformation from maritime heritage to a new purpose?
Process	
Method description	
<p>Literature research</p> <p>Literature research will be a major component of the study, providing insights into the historical developments of the Waterdriehoek in the field of maritime architecture and the relationship with the waterscape. The history of the maritime heritage in the Waterdriehoek can tell us more about the architecture and its position in society. This research will also offer substantial background on general subject, such as climate change and designing climate-resilient. Information will be gathered from books, municipal documents, and other public records, which are available through the faculty library, the library of <i>Rijksdienst voor het Cultureel Erfgoed</i> and online databases as <i>Scopus</i> or <i>Google Scholar</i>. This literature provides a foundation for a deeper understanding of the topics and forms the basis for the research.</p>	

Spatial analysis

Spatial analysis is another essential method. By comparing historical and current maps, a visual overview of changes in the area is created, encompassing both landscape transformations and changes in the built environment of the Waterdriehoek. With the St. Elizabeth's Flood as one of the most impactful changes in the landscape, this event is used as the starting point for the research. The website *Topotijdreis* provides access to maps over the years; however, as this resource only goes back to the 19th century, other sources will be needed for earlier periods for the historical cartographic analysis. On the website of *De Vereniging voor Waterstaatgeschiedenis*, the 1st and 5th editions of the 'Waterstaatkaart' can be found, which illustrate the water management situation in the Netherlands over the years. Additionally, *De Atlas Leefomgeving*, a governmental website with various climate-related maps, will support the climate-adaptive design component of the research.

Archival research

Archival research involves examining historical documents, drawings, and photographs from the Waterdriehoek, offering insights into the maritime structures and their relation with the waterscape, and the architectural styles of the structures. This method substantiates the historical research, providing a basis for design research for the maritime heritage structures in the area. Municipal archives within the Waterdriehoek as Sliedrecht, Dordrecht, Alblasserdam and Gorinchem will be consulted for this purpose.

Literature and general practical references

Arcadis, (2024). [file:///C:/Users/RAMBo/Downloads/verkenning-herijking-erfgoedlijn-waterdriehoek%20\(1\).pdf](file:///C:/Users/RAMBo/Downloads/verkenning-herijking-erfgoedlijn-waterdriehoek%20(1).pdf)

Atlas Leefomgeving | Atlas Leefomgeving. (n.d.). <https://www.atlasleefomgeving.nl/>

Daamen, T. A. (null), & Taylor, Z. (null). (2022). "Gebiedsontwikkelaars moeten keihard met klimaatadaptatie aan de slag". Gebiedsontwikkeling.nu. <https://www.gebiedsontwikkeling.nu/artikelen/gebiedsontwikkelaars-moeten-keihard-met-klimaatadaptatieaan-de-slag/>

Beekman, A. A. (2007). *De strijd om het bestaan: Geschiedenis en tegenwoordige staat van de lage gronden van Nederland, voor niet-technici* [E book]. W.J. Thieme & Cie. https://books.google.nl/books?hl=nl&lr=&id=O60OAAAAYAAJ&oi=fnd&pg=PA1&dq=beneden+merwede+historie&ots=2wcUCTsBE9&sig=mIICsdSRpE4wnz7xNH6PNPbc6mk&redir_esc=y#v=onepage&q&f=false (Oorspronkelijk gepubliceerd 1887)

Gramsbergen, E. H., Rutte, R. J., Engel, H. J., Diesfeldt, O. R., Pane, I., & Fraune, J. (Eds.) (2021). *OverHolland 21: Water management and cultural heritage*. (21 ed.) (OverHolland; Vol. 13, No. 21). Koninklijke Nederlandse Oudheidkundige Bond (KNOB). <https://doi.org/10.7480/overholland.2021.21>

Hein, C. (Ed.) (2020). *Adaptive Strategies for Water Heritage: Past, Present and Future*. Springer. <https://doi.org/10.1007/978-3-030-00268-8>

Klijn, F., Asselman, N., Mosselman, E., & Sperna Weiland, F. (2019). Klimaatadaptatie in het rivierengebied: Een geo-ecologisch perspectief. . *Landschap: tijdschrift voor landschapsecologie en milieukunde*, 36(2), 105-113

Kuipers, M., & De Jonge, W. (2017). *Designing from Heritage: Strategies for Conservation and Conversion* [Pdf]. TU Delft - Heritage & Architecture. <https://books.bk.tudelft.nl/press/catalog/book/521>

Maas, G.J., 2000. *Historische geomorfologie Maas en Benedenrivieren; Oude Maas, Merwede-Hollandse Biesbosch, Afgedamde Maas en Maaskant*. Wageningen, Alterra, Research Instituut voor de Groene Ruimte. Alterra-rapport 075. <https://edepot.wur.nl/26555>

Meurs, P. (2016). Heritage-based design. TU Delft. <https://books.bk.tudelft.nl/press/catalog/view/484/493/107>

Planbureau voor de Leefomgeving (2024). *Kleine kansen, grote gevolgen*. <https://themasites.pbl.nl/o/risico-overstromingen/>

Sarfati, H. (2006). *Dordracum excavatum : Opgravingen in Dordrecht, archeologie van een deltastad* [PhD dissertation]. In Universiteit van Amsterdam, UvA-DARE. https://pure.uva.nl/ws/files/3803934/41204_Dissertatie_Sarfati_tekst.pdf

Toebast, J. (2012). Voor als de dijken doorgingen. Maatregelen tegen rivieroverstromingen bij boerderijen, zeventiende-negentiende eeuw. *Tijdschrift Voor Waterstaatgeschiedenis*, 21(1–2), 11–22. https://www.waterstaatsgeschiedenis.nl/tijdschrift/2012-1-2/TWG2012-1-2_11-22.pdf

Van Veelen, P.C. (2016). *Adaptive planning for resilient coastal waterfronts: Linking flood risk reduction with urban development in Rotterdam and New York City*. A+BE | Architecture and the Built environment, 6 (19), <https://doi.org/10.7480/isbn.9789492516213>

Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

This study connects with the Graduation Studio through its focus on maritime heritage in the Waterdriehoek and its connection between water and land. Research into the area's history and the interaction between landscape and built environment creates a stronger understanding of the area's past and present, laying the groundwork for the design project. Through the design, insights gained during the research process are applied to the future of this area.

Additionally, also the transformation of heritage is increasingly important for minimising our environmental footprint, while also creating new opportunities for future heritage. The reuse, adaptation, and redesign of heritage can enhance the quality of the urban environment and with making it more climate-resilient it becomes more future proof. Understanding and analysing the relationship between water and heritage can also aid in a better understanding of both tangible and intangible heritage.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

The study is relevant not only to this project but also to the entire Waterdriehoek. Climate change presents various challenges, especially in this vulnerable area. Changing landscapes, climate threats, material shortages, and increased pollution are factors that must not be ignored in current design projects.

Considerable research has been conducted on maritime heritage, past developments, current issues, and future strategies. Particularly in the Netherlands, extensive information is available on this topic, as it is a common occurrence. Out of the 13 Dutch sites on the UNESCO World Heritage list, seven have a relationship with water. Moreover, research on climate change and its impact on the Dutch delta landscape has already been conducted. However, the link between these two subjects has not yet been established specifically for the Waterdriehoek. Additionally, previous research has not emphasised the architecture of maritime heritage itself, with climate adaptation mainly focused on the landscape scale. This study bridges these topics within the context of the Waterdriehoek.