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	Ann Eapen
Student number	5583232

Studio		
Name / Theme	Transitional Territories	
Main mentor	Taneha Kuzniecow Bacchin	Urban Design
Second mentor	Luca Iuorio	Environmental Technology & Design
Argumentation of choice of the studio	The studio takes an interdisciplinary approach to adapt to climate change, that combines knowledge about landscape urbanism, geopolitical frameworks, and social conflicts. It challenges the contemporary approach and definition of resilience by looking past the nature-human dichotomy and instead focusing on how this relationship has shaped each other over time. The idea of climate resilience in the Thames Basin as it faces increasing threats of both flooding and drought is tied to either end of two extreme design ideals. One imagined future involves retreating to a pre-modern archetype of letting nature reclaim its original path. The other involves imposing highly techno-cratic solutions of building walls and diverting the natural flow of rivers. While the proposal to reconstruct an idealized terrain that predates human intervention is criticized for not taking into account the influence and needs of the urban spaces, the infrastructural projects are prone to failure, when the growing demands can not be met by the structure's technical limits. My project draws from this understanding as addressing water sensitivity in the context of the Thames basin is not an acceptance of nature's war against us with climate change, but rather an understanding of the geographical, and social systems in place that have an influence over the challenge of adapting. The studio takes a critical position regarding the paradigm of modernity and helps frame solutions that are conscious of the hybridity of the environmental crises today. This understanding helped me look past decoding water	

	sensitivity through the lens of flows alone, but also in terms of control over infrastructure, and what continues to motivate decisions to invest in massive infrastructural solutions in the Thames Basin.

Graduation project	
Title of the graduation project	Under the Weather : Rewriting Hydro-Social Narratives in the Thames Basin
Goal	
Location:	Thames River Basin, United Kingdom
The posed problem,	**Problem Focus** The River Thames has been one of the most intensely managed rivers in Europe, and as one moves from its source in the countryside of Gloucestershire towards its estuary, the flood plains transition from its unconstrained or semi-natural state to one heavily controlled by a system of embankments, weirs, sluices, and locks. A combination of human and climatic variables is pushing the entire basin into a state of increased water risks, from seasonal flooding, drought, and exposure to high levels of pollutants. The aftermath of the Londons' boom since the industrial revolution, and the continued pressure to sustain it as the world's financial capital have led to heavy modifications of the River Thames to manage these risks near it. Without these measures in place, many regions of London along the tidal stretch of the basin would be inundated with tidal flood water up to twice a day. As the basin is subjected to weather extremes with our changing climate, the varied spatial forms of rurality and urbanity in the basin are united by experiences described as 'flooding in a drying basin'. Intense rainfall events are washing increasing agricultural and urban runoff as pollutants into surface bodies, and triggering the release of untreated sewage from combined sewer systems into river bodies as 'sometimes necessary and permitted to prevent flooding homes, gardens, streets, and open spaces'. With the rising summer temperatures that the semi-arid region of South-East England is subjected to each year, the groundwater and surface water reserves are unable to adequately replenish themselves driving a condition of drought. The record heatwave in the summer of 2022 caused the river levels to reach the lowest marks in nearly a century

	and forced Thames Water, the water company servicing the catchment area, to issue a hosepipe ban that directly affected over 10 million people. **Problem Statement** The increasing instances of human losses in the face of extreme weather events like flooding and drought are a result of improper management of the water cycle within the confines of the Thames Basin. The responses to these crises have been an increased dependence on technocratic and heavily engineered interventions in the basin's hydrological system. The current mode of adapting is indicative of power structures that enable control over both the basin and the water consumption patterns of the citizens, without being held accountable for improving or replacing the existing infrastructure to keep up with the increased pressures of climate change and population increase.
research questions and	**Main Research Question:** As the Thames Basin is subjected to increasing instances of extreme weather events, what is new form landscape infrastructure that can sustain water security and agricultural productivity while regulating imbalances in the hydrosocial cycle? **Sub Research Questions:** *SRQ 1*. How can a form of planning that is responsive to the temporality of natures processes, adapt to uncertain intensities and frequencies of seasonal droughts and floods? *SRQ 2*. What are the historical precedents that need to be examined and redefined in rewriting the water paradigm of the basin? *SRQ 3.* What is the new role of the countryside in working towards securing food and water self sufficiency? *SRQ 4.* What is the maximum level of water self sufficiency, with a focus on domestic and agrarian needs that can be achieved in the basin? *SRQ 5*. What are the context responsive ways in which different forms of flooding events in the basin can be reframed from a risk to an oppurtunity?

	SRQ 6. What are the actions that can be taken upstream, to relieve the extremes of climate change related risks across the basin?
design assignment in which these result.	The project is based on a need for a paradigm shift in the current water management model in the basin. The design goal would be to propose a DR 1 strategic framework at a macro scale to reduce pollution, and socio-economic losses during flooding and drought events DR2 weather responsive model of water infrastructure to replace increased dependence on hard infrastructure and adapt to the uncertainties of extreme weather conditions DR 3 site responsive interventions at meso and micro scales that reduce loss of rainwater to evaporation within the basin DR 4 form of landscape infrastructure that reframes the various categories of flooding events from a risk to a potential to increase infiltration in the basin DR 5 form of agrarian urbanism, whose water demands are not compromised under the pressures of low reserves and high competition for water

Process

Method description

(1) Literature review:
Exploring the scientific literature about the flows of the Thames River and the historical literature about the urbanisation in the basin and its relation to the river, and water infrastructure.
Reviewing the policy documents by Defra, the Environmental Agency, and water companies in addressing integrated river basin systems, flood resiliency, and drought management
(2) Mixed Media Review:
To explore documentaries, news articles, and protest art that has come up in the basin to understand the conflicting narratives that are arising between the citizens, policy makers, and water companies.
(3) Analytic cartography:
Creating maps that reflect the positions of environmental risk in the basin, and broaden understanding of the spatial conditions in relation to the manners of water use.
(4) Statistical data collection:
Collection and visualization of meteorological data, water usage and availability.
(5) Stakeholder Power Analysis:

Creating a framework that identifies power hierarchies that control the hydro-social cycle.

Literature and general practical preference

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Seneviratne, S.I., X. Zhang, M. Adnan, W. Badi, C. Dereczynski, A. Di Luca, S. Ghosh, I. Iskandar, J. Kossin, S. Lewis, F. Otto, I. Pinto, M. Satoh, S.M. Vicente-Serrano, M. Wehner, and B. Zhou, 2021: Weather and Climate Extreme Events in a Changing Climate. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change[Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. *1513–1766,* doi: 10.1017/9781009157896.013.

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

1. Relation Between Graduation Topic and Master Programe in Urbanism

As designers in M.Sc AUBS program, we work at the intersection of scientific and creative thinking. Urbanism specifically presents the challenge of designing for a collective future marred by the uncertainties of climate change, depleting resource reserves, and the ways in which they upset the complex systems that sustain of the urban fabric. Transitional Territories as a studio encourages a trans-disciplinary and critical exploration of the various

dimensions of this shift and encourages a re-imagination of modes of appropriation and operationalization.
The project proposed addresses a part of this larger problem, specifically the intersection of water with the changing paradigm of urbanity. Earlier paradigms are now collapsing under the weight of the climate crises, and a newer approach could be through a renewed sensitivity toward natural processes.

2.1 Professional Relevance of Work

The goal of the project is to propose a design to cope with unpredictable weather extremes through a recognition of the patterns and time frames that nature operates in. Designing for water management in scenarios of drought and flooding would mean recognizing both the seasonal shifts of rainfall events and their duration and how this affects the daily variations in the river's discharge levels. Through acknowledging the time scales within which the hydrological system operates, the goal would be to work towards water cycle restoration and attempt to rehydrate the earth through rainwater retention and infiltration into the sub-surface while decreasing the socio-economic disruptions caused by flooding.

2.2 Social Relevance of Work

The focus of most of the literature surrounding the history of the Thames river, or accounts for the growth of urban water systems, as driven by public health concerns, are all centered around the city of London, which occupies a very dominant position physically, and historically in the basin. The English countryside's role in this changing relationship with the riverine system is absent in most historical literature. Today debates surrounding water management infrastructure, continue to be centered around London's needs, given its high population density and role as a global financial hub. Addressing water needs, and adaptation strategies at a local scale through site-sensitive actions across the basin could help relieve the disproportionate concentration of extreme risks like pollution, or surface water flooding from reservoirs in some parts of the basins, to service the needs of others.

2.3 Scientific Relevance of Work

The scientific literature surrounding the hydro-geological transformation of the basin historically, distribution of flooding risks, data on variable precipitation rates which are increasing vulnerabilities towards prolonged drought periods, and studies about the impact of private sector management of the sub-surface infrastructure seem separated by the domains of their disciplines. These understandings can be combined to understand seasonal water risks, and the challenge of adapting to extreme weather events.