Oslo Hydropolis

Transplanting traditional water management techniques into Greater Oslo's urban landscape

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Abstract

Oslo Hydropolis is a running landscape and urbanism design studio at the Oslo School of Architecture and Design that investigates how water can play a socially, ecologically, and economically active role in shaping life in the Oslo region. Historically a water-rich area, weather extremes and seasonal abnormalities question the functionality of cultural landscapes in the Oslo region, which is characterised by rain-fed agriculture in the soils of limited valley areas. Excess and scarcity of water—flood and drought—are exacerbated by the uncertainty of climate change, but even more so by the effects of urbanisation. Population in the Oslo region is growing and new models of how water, urbanisation, and social life integrate have to be defined.

Keywords

landscape architecture, transplant, water management, design methodology, decentralised systems

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To cope with the present challenges, Oslo Hydropolis looks to contexts in which societies have always had to mediate the highs and lows of water. Balancing the seasonal differences and geographical allocation of resources has been a driver of cultural intelligence throughout history. An unmeasurable body of practical knowledge in irrigation and in harvesting, retaining, storing, and distributing fresh or rainwater, exists implicitly as cultural landscapes. It has been made available and developed through research in rural engineering to improve agricultural yields especially in arid climates (e.g. Prinz & Malik 2003). However, as Hein (2020) points out, traditional techniques and heritage landscapes transcend the disciplinary boundaries that in our modern societies divide water into multiple domains. Techniques building on heritage are strikingly integrated, as their intelligence in managing water resources is tied to their aesthetics, place-specificity, and potential to evoke social practices around what often is an open routing of water flows driven by gravity.

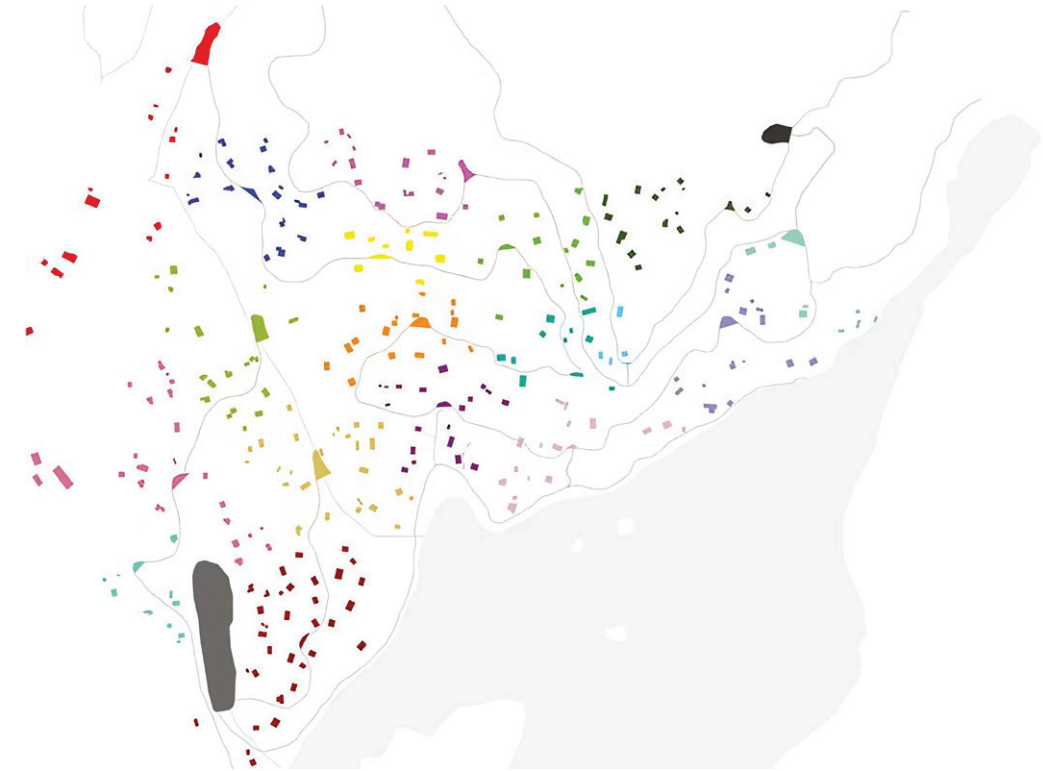
The innovation in the Hydropolis projects lies in the act of *transplanting* these techniques to a different climate and society. *Translating* a technique from the past to the present is a common practice, and contemporary works often reference traditions to anchor interventions adequately in a place and climate (e.g. the park in Saõ Vicente, Madeira, modelled on the historical levadas (Hauswald, 2007)). Teresa Galí-Izard (2006) has added mobility to techniques by isolating them as ideas, allowing many interpretations. Following this track, and conceptually borrowing from the agricultural practice of transplanting, the Hydropolis projects carefully *extract* traditional rural techniques such as run-off agriculture, channelling and damming from their original arid or semi-arid context and introduce them into a very different climate in the Oslo region. Extraction here means to conduct a precedent analysis (Van den Toorn & Guney, 2011) as a way of making implicit design knowledge explicit. The technique's system from source to sink is studied in a three-dimensional flow diagram, in sections to help understand its relationship with topography, and by interpreting the functional elements as a space related to human scale and usage. The transfer is facilitated by a blunt scale comparison and overlay of the original landscape pattern on the new site, followed by a careful adjustment and editing of the transplant to fit the geomorphology, existing patterns of inhabitation, and cultural context.

The following projects are examples from a series of transplants explored within the Hydropolis studios. Two are based in locations where summer cabins are increasingly used throughout the year and the pressure to connect them to the municipal freshwater network is high. The third project is situated in one of the few remaining agricultural areas in greater Oslo. All share a common goal: creating *supplementary systems* that reduce the pressure on the inland reservoirs struggling to quench the thirst of the growing metropolis. However, their ambition extends beyond that, to creating *places* where the harvested water leaves its purely utilitarian purpose and turns into a set of social, recreational spaces. The fine-grained, visible water supply structures that weave into the social realm facilitate greater urban permeability. As devices, the projects bring water to the people but also bring people to the water: to swim, to fish, to skate on the ice, or even to wash clothes.

Transplanting traditional water systems into a contemporary context is a utopian project, both experimental and realistic, that explores the interaction between the geographical base of water and land, and the patterns of inhabitation. Instead of re-inventing the wheel, the projects modify it to better fit the local conditions, changing the tires to match the weather and the terrain.

FIGURE 1 Madeira's open water channels, *levadas*, stem from the irrigation systems introduced to the Portuguese by the Moors. The levadas were built to "walk" water along contour lines from the many springs on the island's northwestern, steep slopes to the drier southeastern side that is more suitable for agriculture. Most of them have paths running alongside them for maintenance purposes, that before roads often provided the only connection from one village to another. The channels' very gentle inclination creates an easily walkable path system and the canopy of leaves that slows down evaporation generates a comfortable microclimate. These qualities have made hiking along levadas a popular outdoor activity.

FIGURE 2 Project Water Walk borrows from the levadas the gently sloping coupling of water and path. Hallangspollen is a popular location of weekend houses off the water grid just south of Oslo. Channels zigzag from the top of the steep hill all the way down to the fjord, harvesting rainwater and bringing it close(r) to the cabins using simply gravity. Introducing waterways simultaneously opens up paths for visiting hikers through the highly privatised area and creates new common spaces: a win-win scenario!



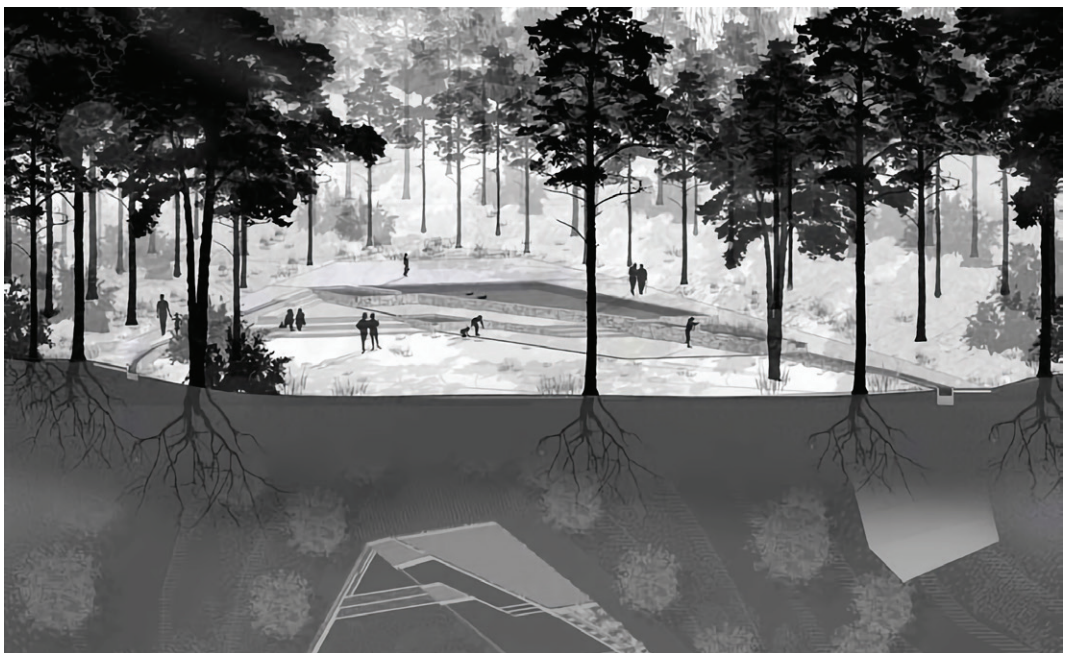


FIGURE 3 Like in many historical precedents, the water network in Hallangspollen provides not only a resource but places for the inhabitants to gather in, socialise or perform household chores such as washing clothes and rugs. The *water foyer* is a clearing around a small dam with household functions. It serves a community of water users, a "neighbourshed", represented on the left by different colours. The new water infrastructure with its community-based water places introduces a new urbanity into the summer cabin culture around the Oslo fjord.

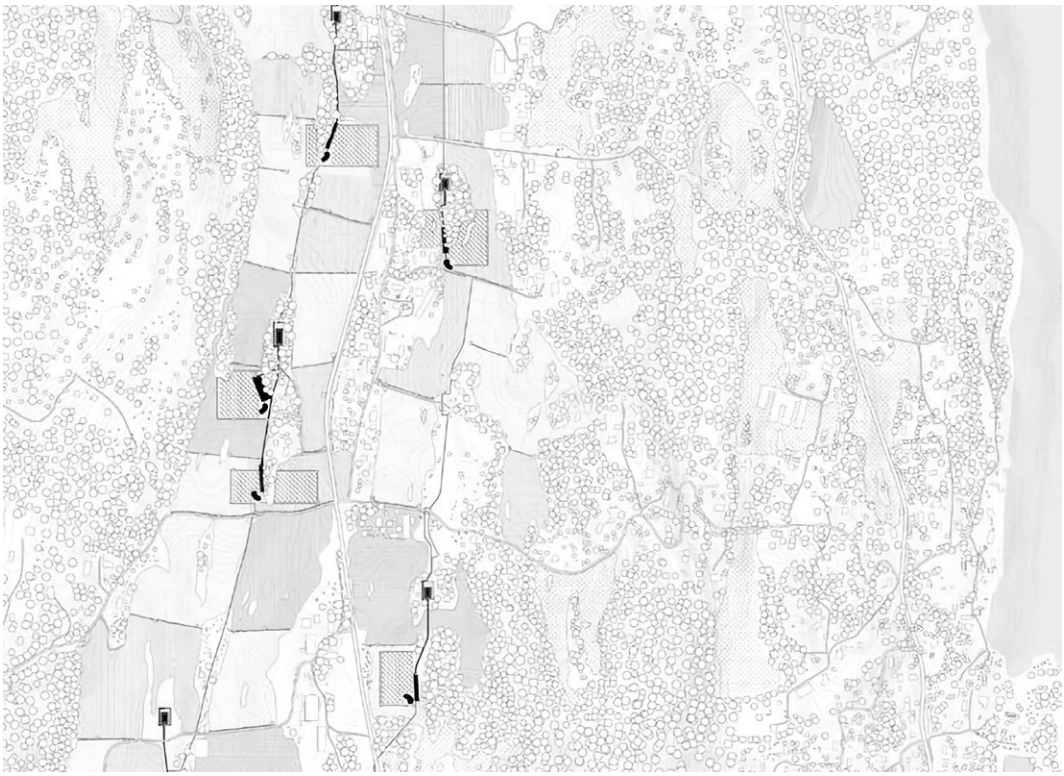


FIGURE 4 Project Melt takes more liberties than Water Walk in interpreting its precedent, the *liman* system in Israel's Negev desert. In the Nesodden peninsula, a recent shift from seasonal to permanent inhabitants and the strong increase in population have pushed residents and farmers to compete for fresh water. Like the two other projects, to offset the strain on the municipal water network Melt leverages precipitation—but in the form of snow. The project develops a snow storing and irrigation prototype that not only responds to a need but seeks to activate Nesodden's agricultural hinterland for higher value horticulture, hikers and cultural events.

FIGURE 5 The liman is a device developed from traditional run-off agriculture in arid climates. It retains water to feed trees that create shaded areas used for stop-overs when driving in the desert. In Melt this is translated into snow collection points and a recreational path network that replicates the limans' way of following road infrastructure.

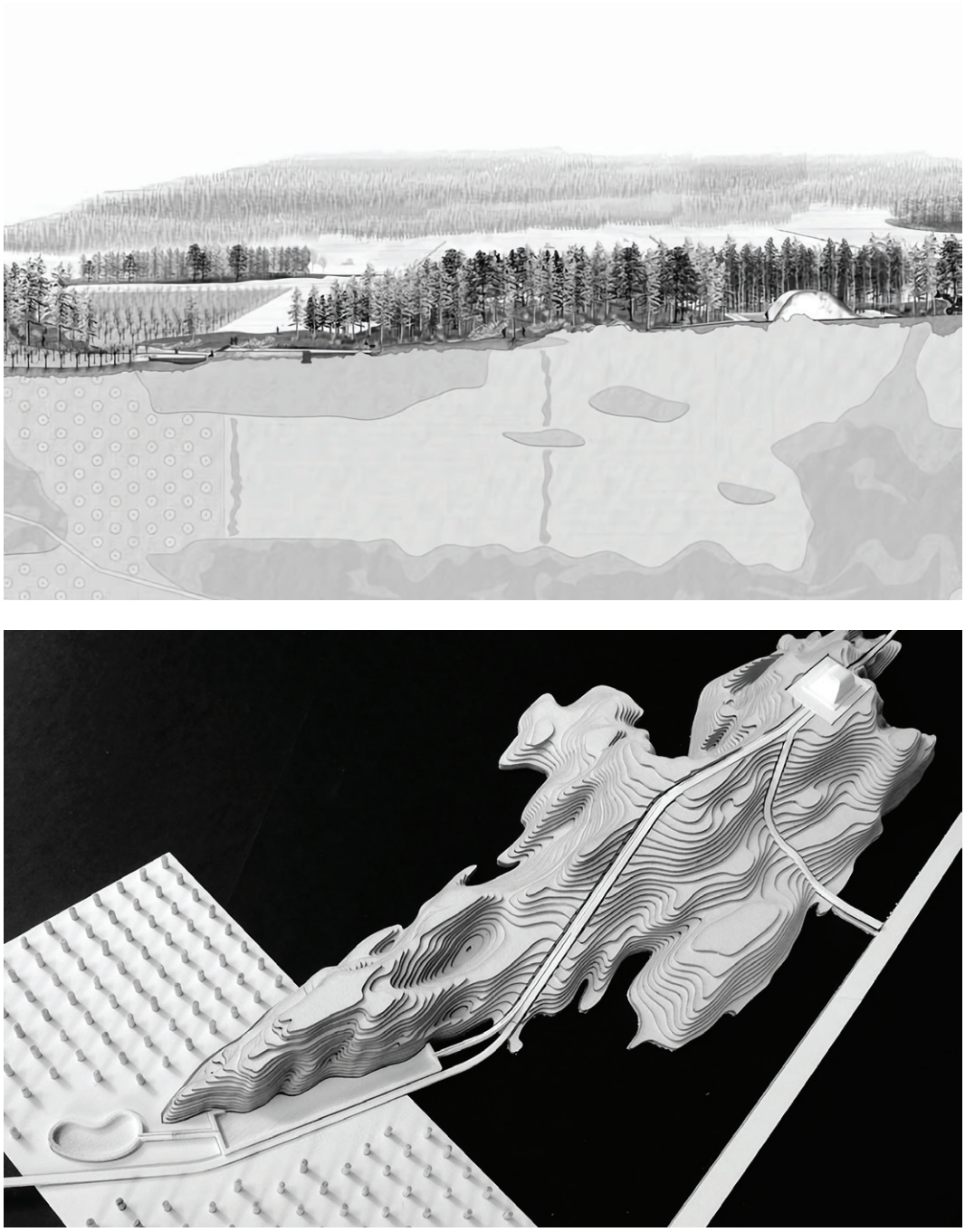


FIGURE 6 Stored and piled on islands of bedrock among agricultural fields, the melting snow trickles into channels instead of infiltrating into the ground. By gravity, the water flows first into a treatment basin and eventu- ally to a retention pond before being used to irrigate orchards. Not only water runs through these spaces and corridors: like Water Walk, Melt uses water as a means to give the public access to areas of the land- scape that were previously inaccessible. The pathways parallel to the channels provide new recreational routes for people to follow in between agricultural fields. In the winter, the white snow mounds become canvases for installations and projections that connect Nesodden's large artist community with a broader resident audience.

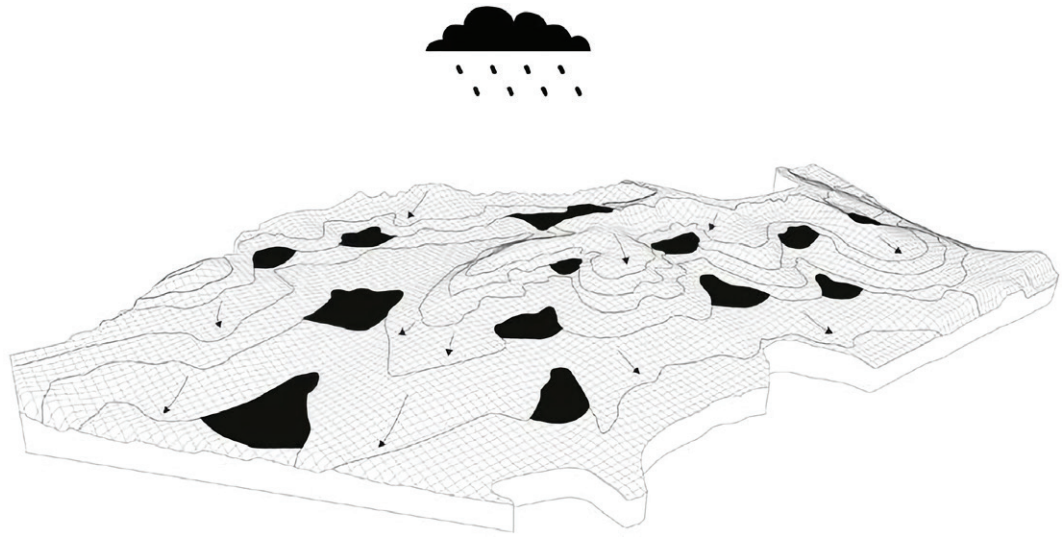


FIGURE 7 Groovy Raindrops draws on the hydrological principles developed by P. A. Yeomans in Australia. To turn dry land into fertile pastures Yeomans experimented with a system he called the Keyline technique which aims at keeping water on site as long as possible, without resorting to terracing. Small ditches dug along contours catch the water that runs off ridges and slopes, and slow it down enough to allow it to infiltrate the soil. The excess is stored in small interrelated dams.

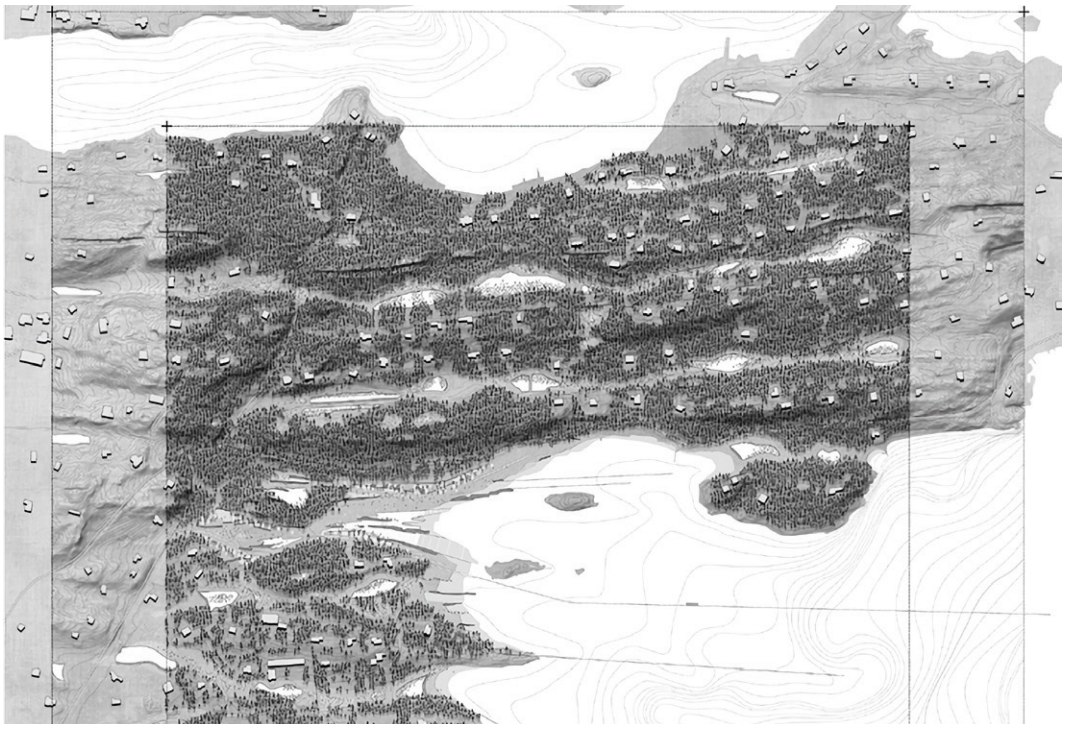


FIGURE 8 The island of Brønnøya is marked by a very specific geology, shallow topsoil and no groundwater. Rainwater runs down from the parallel crests and accumulates at the bottom of narrow, elongated valleys, where it is dammed into dozens of tiny reservoirs through subtle interventions. Much like its precedent, Groovy Raindrops harvests precipitation in wetter times to be used in the increasingly dry months of summer.

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FIGURE 9 The project proposes a counter strategy to the centralised and piped water system, that serves the island but is at its limits. This strategy introduces a network of small dams distributed between the characteristic ridges like drops of rain on a spiderweb. Using a decentralised alternative where possible reduces strain on the increasingly vulnerable municipal water source and helps guarantee availability to those who don't have other options.

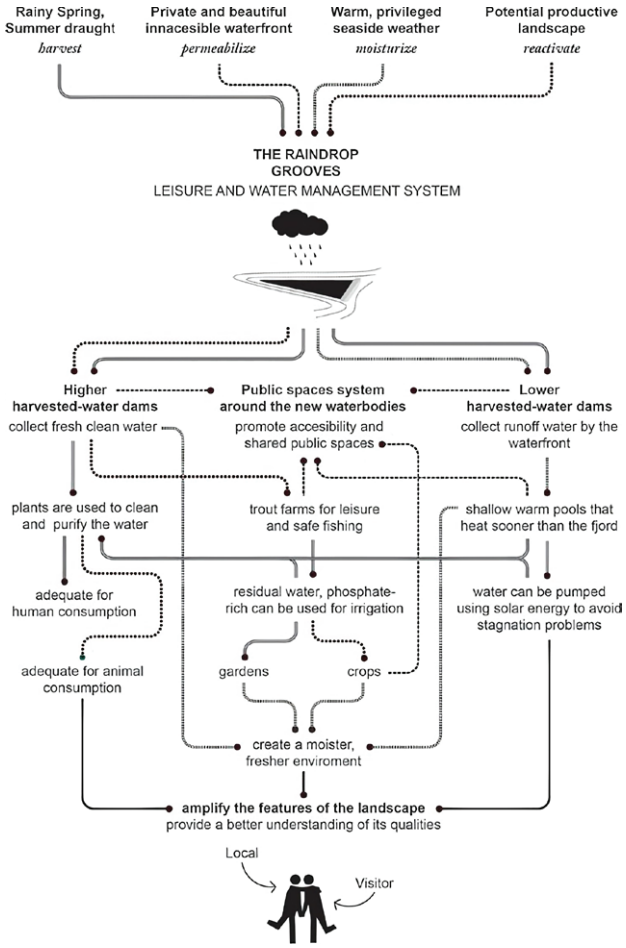

FIGURE 10 Groovy Raindrops strives to create a hybrid system of water management and leisure, taking into account the different social practices around and related to water. The dams are not all the same: they are destined for different uses of water—from utilitarian to recreational to both—and the designs of the spaces reflect these functions.

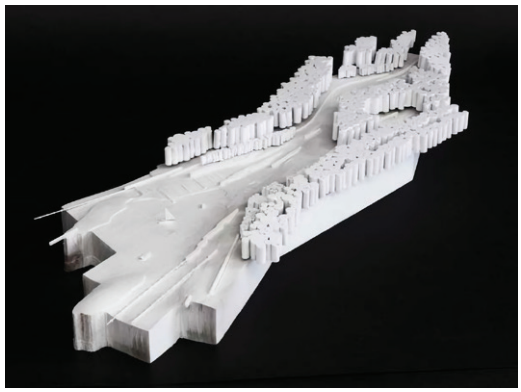

FIGURE 11 On hot summer days, Oslo's inhabitants flee the city to spend time on the waterfront. Some of the dams become extensions of the overcrowded beaches, social spaces wrapped in a cool microclimate. They extend the swimming season earlier in the spring, when the fjord is still too cold to dip in or promote different activities like paddling or recreational fishing.

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