Tending to the territory of the river Post flood design for the Ahr Valley, GLA302, NMBU 2022
Fouzhan Fallah

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Tending to the territory of the river Post-flood design for the Ahr Valley (D), GLA302 NMBU 2022
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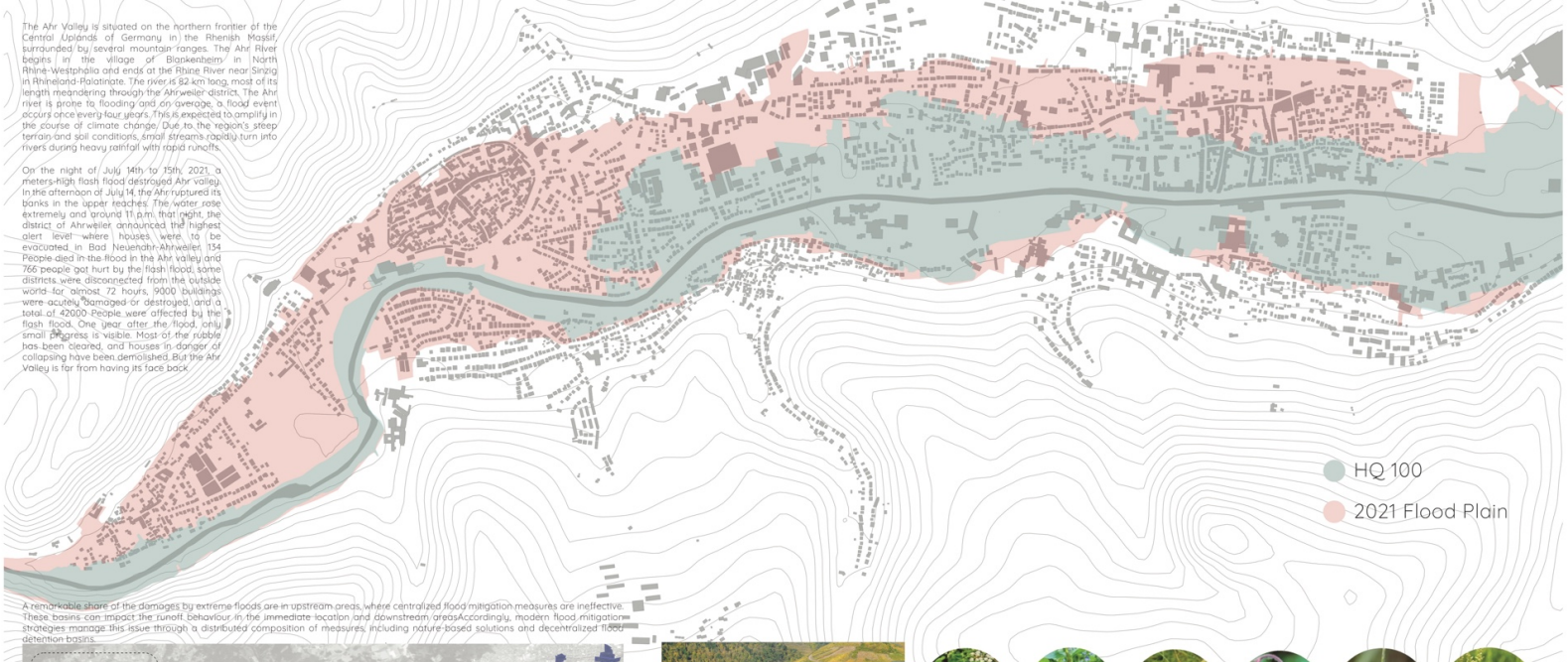
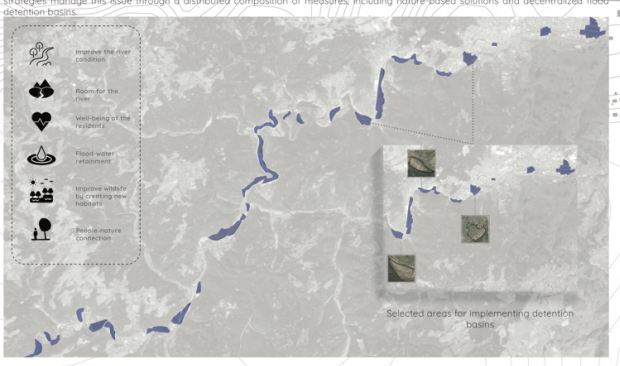
The Ahr Valley is situated on the northern frontier of the Central Uplands of Germany in the Rhenish Massif, surrounded by several mountain ranges. The Ahr River begins in the village of Blankenheim in North Rhine-Westphalia and ends at the Rhine River near Sinzig in Rhineland-Palatinate. The river is 82 km long, most of its length meandering through the Ahrweiler district. The Ahr river is prone to flooding and on average, a flood event occurs once every four years. This is expected to amplify in the course of climate change. Due to the region's steep terrain and soil conditions, small streams rapidly turn into rivers during heavy rainfall with rapid runoffs.

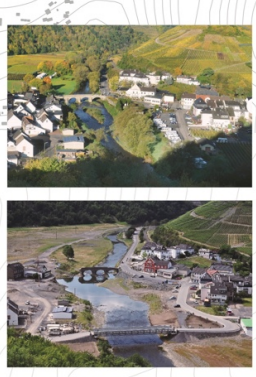
On the night of July 14th to 15th, 2021, a meters-high flash flood destroyed Ahr valley. In the afternoon of July 14, the Ahr ruptured its banks in the upper reaches. The water rose extremely and around 11 p.m. that night, the district of Ahrweiler announced the highest alert level where houses were to be evacuated. In Bad Neuenahr-Ahrweiler, 134 People died in the flood in the Ahr valley and 766 people got hurt by the flash flood, some districts were disconnected from the outside world for almost 72 hours, 9000 buildings were acutely damaged or destroyed, and a total of 42000 People were affected by the flash floods. One year after the flood, only small progress is visible. Most of the rubble has been cleared, and houses in danger of collapsing have been demolished. But the Ahr Valley is far from having its face back.



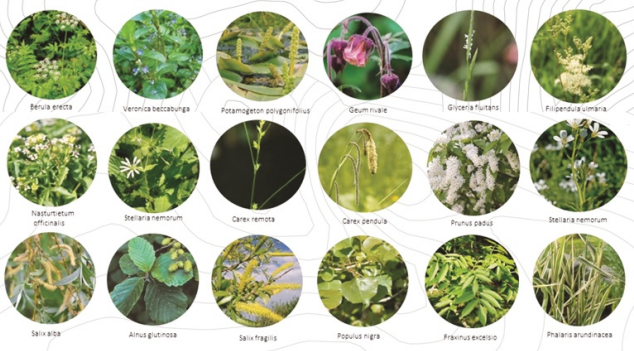
A remarkable share of the damages by extreme floods are in upstream areas, where centralized flood mitigation measures are ineffective.
These basins can impact the runoff behaviour in the immediate location and downstream areasAccordingly, modern flood mitigation strategies manage this issue through a distributed composition of measures, including nature-based solutions and decentralized flood detention basins.



Potential detention basins along the Ahr river



Selected Area in Rech, Before and after 2021 flood



Native Vegetation and trees

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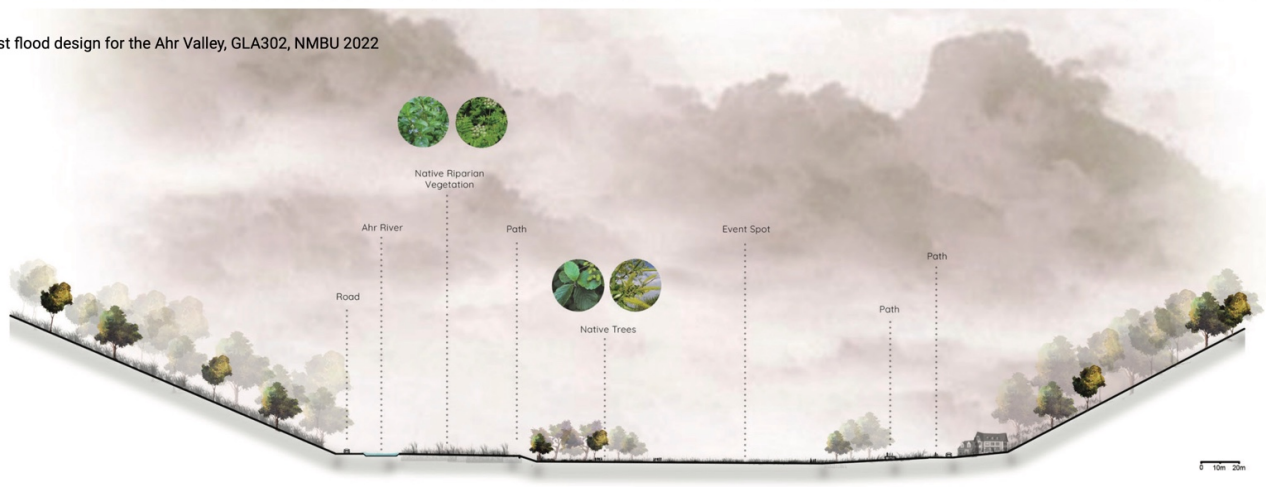
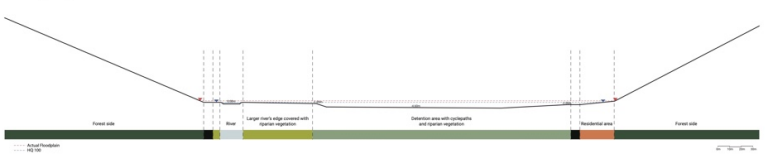
Different applications are proposed for these basins since we believe that they should be avail for the residents in normal situations. In Bad Neuenahr-Ahrweiler we propose a natural playground, a social gathering space for events and cycling paths. in Dernau, a soccer field, and cycling paths, and in Rech, an event spot for wine festivals, cycling and walking paths.

We have used two different slopes in our design relative to the edges of each site. The closer edge to the residential areas is 20:1 (distance: rise) which makes it easier for the elderly and people with strollers to access the basin. For the edges closer to streets or steep areas leading to hills, a 3:1 slope is implemented. Therefore, in normal situations, the basins offer various advantages for the local people, tourists, and native species. And in the course of flood events, these basins work as spots to detain water for rather a long time.



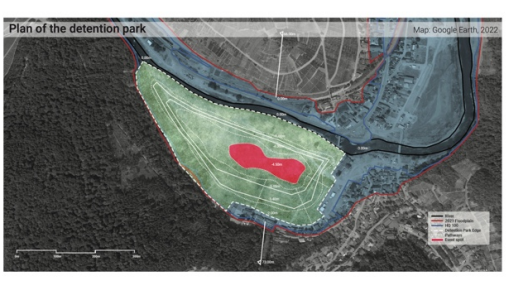
Zoning diagram



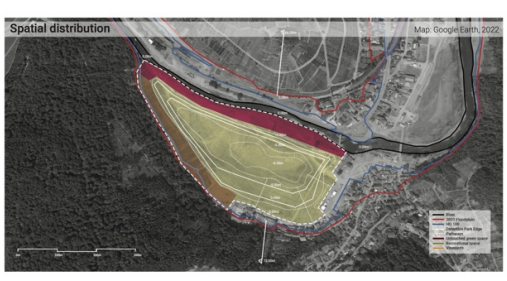
Detention park during a flood

We also researched the native vegetation and trees and are using native riparian shrubs by the riverside to work as buffers in addition to improving the biodiversity and habitats of the river. Within the detention basin, we considered native trees and shrubs to create ecosystems and improve the area's ecological aspects.

Plan of the detention park Map: Google Earth, 2022



Spatial distribution Map: Google Earth, 2022



Cyclepaths