

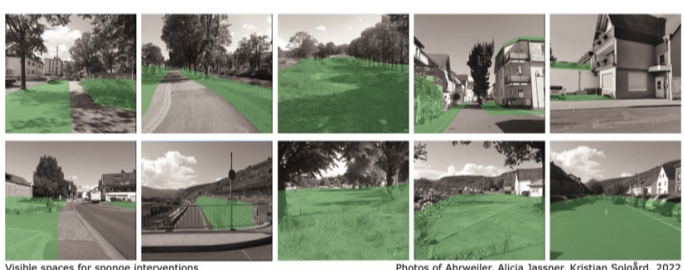


**Sponge City**

One of the first impressions of Bad-Neuenahr Ahrweiler has been, that most surfaces are impermeable and green spaces are limited. Instead of infiltrating into the soil, rain water gets directed fairly quickly into the river Ahr.

As the settlement makes up only a very small percentage of landuse in the catchment area, it is no surprise, that the bulk of the flood waters came from upstream areas. Retaining all rain water falling on Bad-Neuenahr Ahrweiler would only reduce the HQ 100 event by 3.5%. This clearly wouldn't be enough to prevent the next disaster. However, in a river valley, such as this one, spaces for intervention are limited and every drop counts. From this perspective, converting Bad-Neuenahr Ahrweiler, into a fully functioning urban sponge, is well worth the effort and investment.

Additionally to flood prevention, sponge measures can aid in climate resiliency by storing water for droughts, improve aesthetic value and highlight the cultural aspects of the spa town or provide habitat for endemic flora and fauna.



Visible spaces for sponge interventions Photos of Ahrweiler, Alicia Jassner, Kristian Solgård, 2022



Small-scale interventions eg. Parking Lot Large-scale interventions eg. Ahr



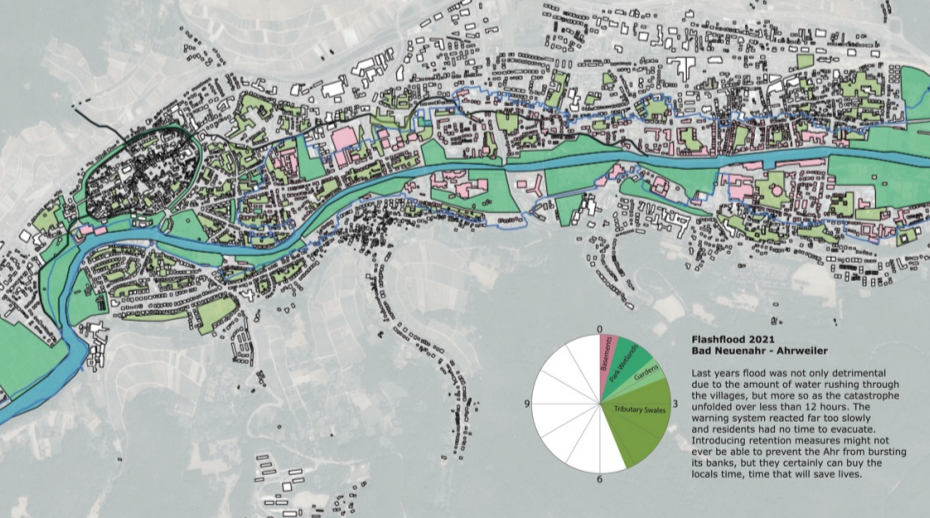
**Sponge Measures in the Old Town of Ahrweiler**

The sponge city concept only works if thousands of big and small retention and infiltration opportunities are offered throughout the urban area. The map is showing a myriad of those possibilities within the public realm of Ahrweiler. These can be seen as functional infrastructure, teaching the residents the diversity, beauty and value of sponge city, and hopefully inspiring them to incorporate appropriate measures within their own homes.

Despite the harsh lesson of the flood, individual flood prevention measures aren't understood yet. The city can lead by example, to change the planning mentality of the whole valley.

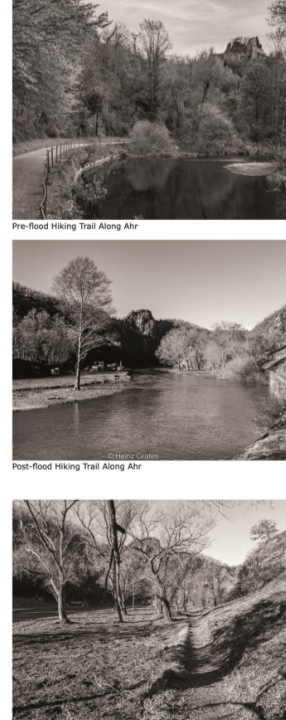


Vertical Green A myriad of systems can enhance walls and facades with greenery, even moss (Green Studios, 2015) Green Roof Can be Secum Mats to whole parks with trees on rooftops (Groundwork Sheffield, 2018) Permeable Paving Can include grasses or herbs or planting plants with no grass (Taller Venturolo, 2013) Bioswales Whole parks along the river can be converted to store more water during floods (Dierke, van Steenbeek, 2013) Rain garden Popular in combination with parking lots or impermeable sidewalks (Wolke, 2012) Underground Retention Basins or cisterns can store large amounts of water without disrupting the above infrastructure (Gronwald, 2022)



**Flashflood 2021 Bad Neuenahr - Ahrweiler**  
Last years flood was not only detrimental due to the amount of water rushing through the villages, but more so as the catastrophe unfolded over less than 12 hours. The warning system reacted far too slowly and residents had no time to evacuate. Introducing retention measures might not ever be able to prevent the Ahr from bursting its banks, but they certainly can buy the locals time, time that will save lives.

**Overview of the Langfigtal**



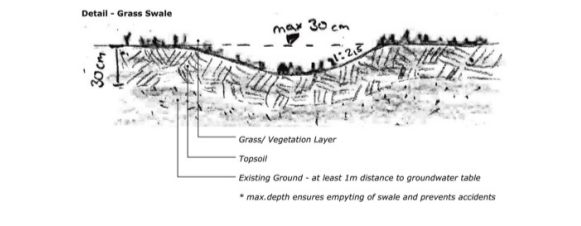
Pre-flood Hiking Trail Along Ahr Post-flood Hiking Trail Along Ahr Flat riverbank and rocky hillsides

**Retaining Water in the valley - Langfigtal**

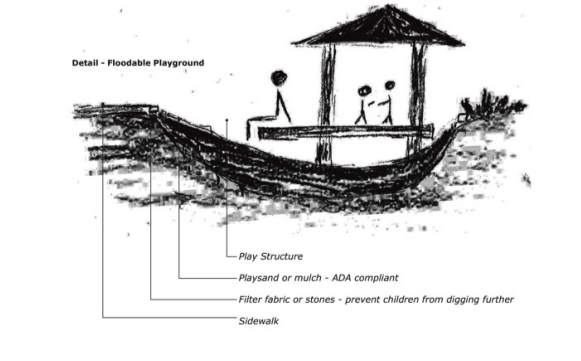
The river bend in Altenahr is a designated nature reserve, boasting a great variety of habitat types common along the Ahr - such as steep rock cliffs, dry walls from former vineyards, forests, floodplain meadows and more. Water management strategies implemented here, can be exemplary for flood interventions along the whole watershed.

The rocky landscape and steep slopes pose the greatest difficulty for retaining water. However, it is possible to construct detention systems along hiking trails, the flood plains and terraces.

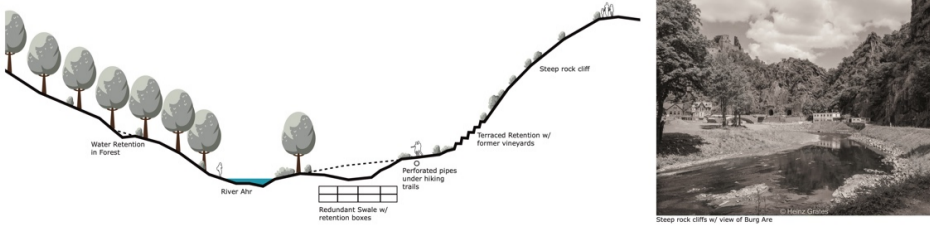
The biotopes in the Langfigtal are protected and provide homes to many endangered species. Many of whom benefit from the dry stone walls, dry forests and seasonal meadows. Holding back water shouldn't change the species make up of the area, but rather strengthen their resilience in the face of climate change.



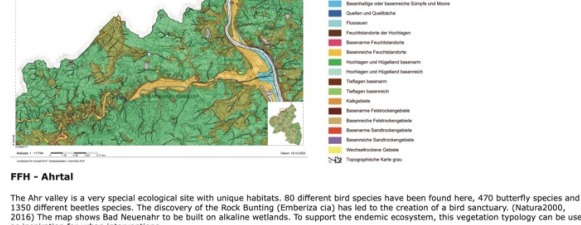
Detail - Grass Swale max 30 cm Existing Ground - at least 1m distance to groundwater table \* max.depth ensures emptying of swale and prevents accidents



Detail - Floodable Playground Play Structure Filter fabric or stones - prevent children from digging further Sidewalk



Water Retention in Forest Perforated pipes under hiking trails Redundant Swale w/ retention boxes Steep rock cliff Steep rock cliffs w/ view of Burg Ahr



**FFH - Ahrtal**  
The Ahr valley is a very special ecological site with unique habitats. 60 different bird species have been found here, 470 butterfly species and 1350 different beetles species. The discovery of the Rock Bunting (Emberiza cia) has led to the creation of a bird sanctuary. (Natur2000, 2016) The map shows Bad Neuenahr to be built on alkaline wetlands. To support the endemic ecosystem, this vegetation typology can be used as inspiration for urban interventions.