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GLA 304

On the 13th and 14th of July 2021, enormous water amounts of rain fell over the western part of Germany. Much of the precipitation fell within 15 to 18 hours of 100 to 150 mm rain. The two federal states of North Rhine were particularly affected, Westphalia and Rhineland-Palatinate. In the studio course our focus areae was Ahr valley in the state of Rhineland-Palatinate

Our area of study reaches from Schuld in the east to the city of Bad Neuenahr-Ahrweiler, and the area focused in this report is Walporzheim. The district of Walporzheim lies between Ahrweiler and Marienthal on the left bank of the Ahr in the transition from the lower to the middle part of the Ahr valley. The landscape is characterized by steep rock formations. In Walporzheim approximatly 700 people live there and tourism, wine growing and trading are economical most improtant in Walporzhrim.

As mentioned earlier there were enormous amounts of rainfall in a short time over Ahr valley and Walporzheim. From a meteorological point of view, various factors led to the extremely high precipitations of the area. The heavily indented terrain of the affected river valleys cut deeply increased surface runoff, and the already saturated soil also made the situation worse.

After gathering information, images, and data on what happened the days before and during the flood a timeline was made to try to reconstruct the events from 10th of July to 05.37 am 15th of July. By 9:45 am on the 15th of July 70 people were already missing.

I have also made cross-sections that are illustrating how it might have been during the flood. The level is between 2.5 m to 4.2 m, and debris of trees, propane tanks, gas tanks, and cars are scattered around like toys.

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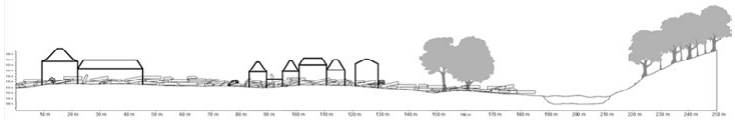

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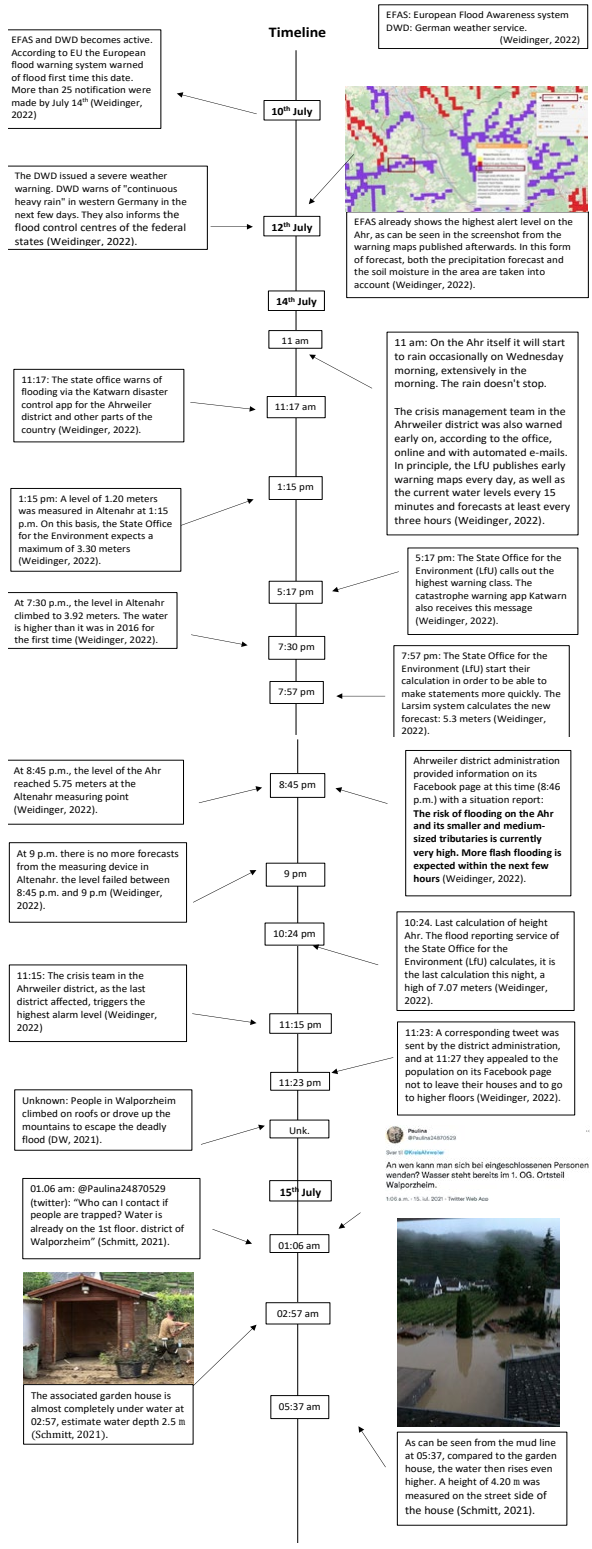

The maps on the right area showing how Walporzheim was before (2019) and after the flood (2021). The highlited area is the zone the district lined as the flood risk area.

The flood event that took place between the 14th and 15th of July is not a one-off situation in the Ahr Valley. Throughout time there have been flooding events at the valley. Descriptions of floods have been handed down since 1304 and recorded flood levels date back to 1804. In the past, there have been particular two floods events that can be compared to the one in 2021: in 1804 and 1910. In Walporzheim you can find historic marks of flood events on many of the buildings. In the picture of where the men are measuring the height we can se the flood mark of 1910 flood and 2016 flood.

The map is illustrating the impact of the flood on the 14th and 15th of July made in Walporzheim. The analysis of images, videos, and aerial photos revealed a clear pattern of the area which has been destroyed, damages on buildings, and flooding excided the flood risk zone the district had mapped out.

The red zone where we can see the destruction of buildings, sports fields, a bridge, and vegetation is closed to the river. The orange zone is the area where we can see major and minor damages on buildings. In the yellow zone, the buildings are not damaged on the outer constructions, but in most of the area, water has flooded into the basements and/or the first floor. In every zone debris of cars, timber, gas tanks, etc. could be seen.

Workshop 02: What happens?

In Workshop 02 the aim was to look at analyses and documentation of ongoing planing, designing and building action in Ahr valley. The different towns hav different approaches in the valley. Walporzheim is one of the town where the are taking actions by their own hands, istead of waiting on what the district have decided to do. The “flood plain” has become a construction site with heavy machines and building materials. The people of Walporzheim have already started to build the houses and the infrastructure.

Since the federal road, B 267, and the railway are on the other side of the flood there were no severe damages on the major infrastructure. The railway has been running hourly from Walporzheim to Bonn since December, and the B267 has been in use since the day after the flood.

Since there are a lot of work been done in Walporzheim they need to move across the river. The arch bridge got destroyed by the flood, and a temporary bridge were built on the river. Because of the water level on Ahr river has been risen slightley a canal has been dug by a contractor company to direct the water past the temporary bridge. There was a danger that the bridge would be flooded. In consultation with the district administration and the Technical Relief Organization (THW), the solution was a precisely measured canal dug in front of the bridge, which directs the water past the bridge in order to relieve the main bridge. The canal is dead straight because they wanted to ensure that the water is guided past at a high flow rate. A curved channel may cause a backwater due to the lower flow rate.

After following the devlopent of the bridge over a 2 month period the observation is illustrating that the “temporary” bridge is becoming more and more of a permenant solution.

Workshop 03: What should happen?

The analysis from workshop 2 and the history of Walporzheim after a flood event indicate that the people of Walporzheim will most likely not move, but stay.

Since the flooding in Walporzheim and Ahr valley is fluvial flood, my design approach has been to try to implementing mitigating strategies based on what's happening in Walporzheim now. I have focused on giving space to the river, finding an approach for the bridges, human settlement, and to drain and delay precipitation.

My approach is to work with what the people of Walporzheim are doing now. The ideal idea would have been to move the people out of the floodplain area, but as history and the analysis from workshop 02 is showing is that is a unlikely approach.

The intermittently dry area is the "space" that is given to the river. The balance between giving the space to the river and human settlement determined the "flood plain". The zone will also give the river space to braid and from itself.

In the whole valley most of the bridges got damged or destroyed, and Walporzheim is not an exception. As we have seen the bridges were important connectors for humans to move over the river.

I am proposing to go away from the historic arch bridges to thruss bridges. If the people of Walporzheim who are deciding to stay have to be willing to sacrifice some of the history to stay in the future. Thruss bridges can be built without supports or with supports. The bridge will not have the same effect as arch bridges had with clogging up debris, increasing the velocity and the water level of the river. The bridge is also moved a little bit further to use the height of the terreing to give the river space vertically when the next flood comes.

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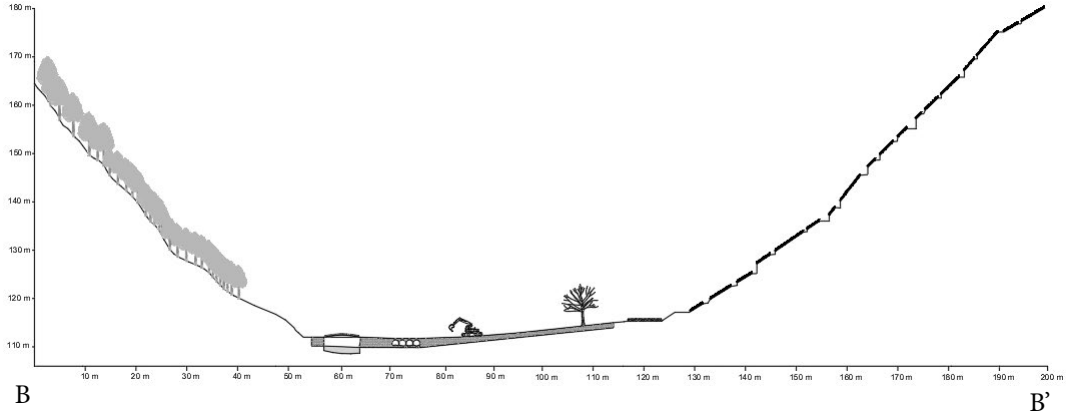
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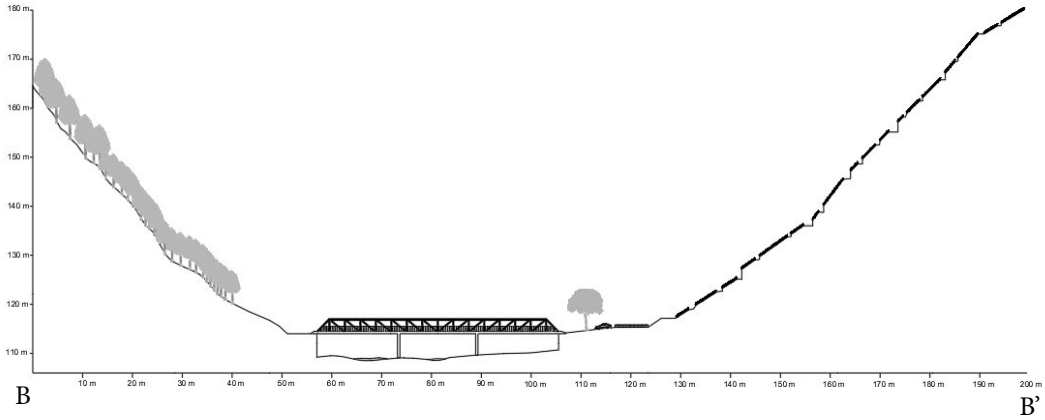
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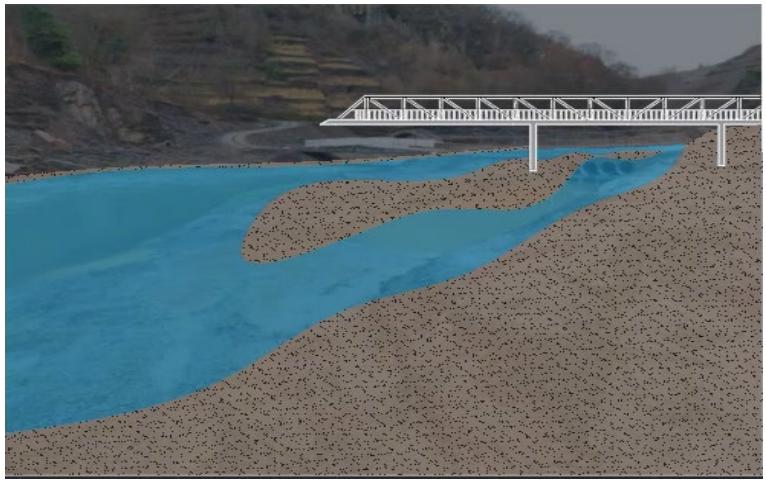
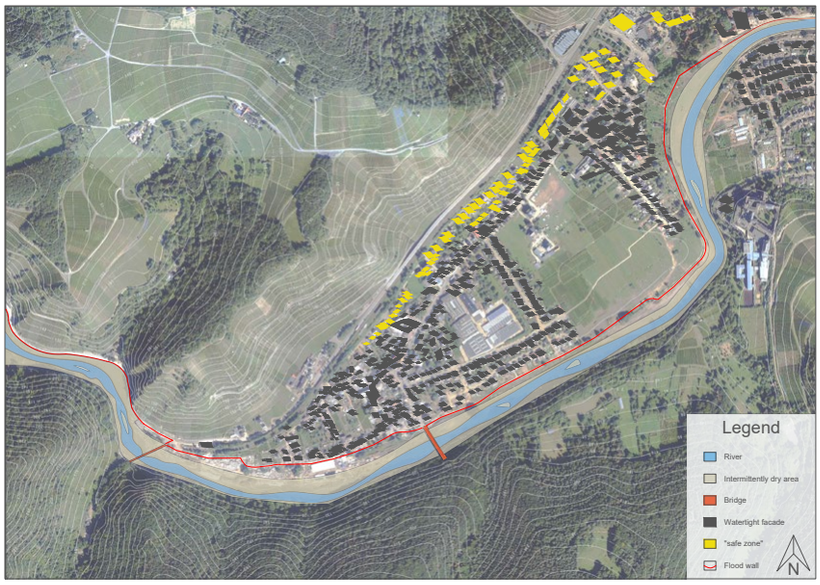
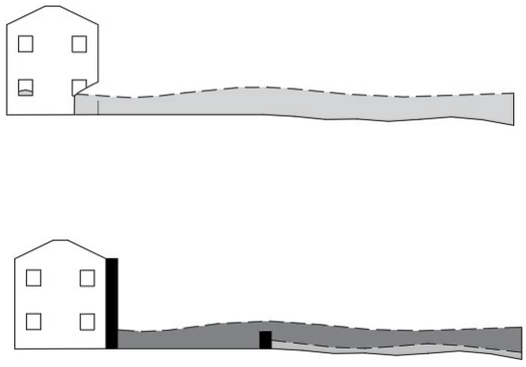


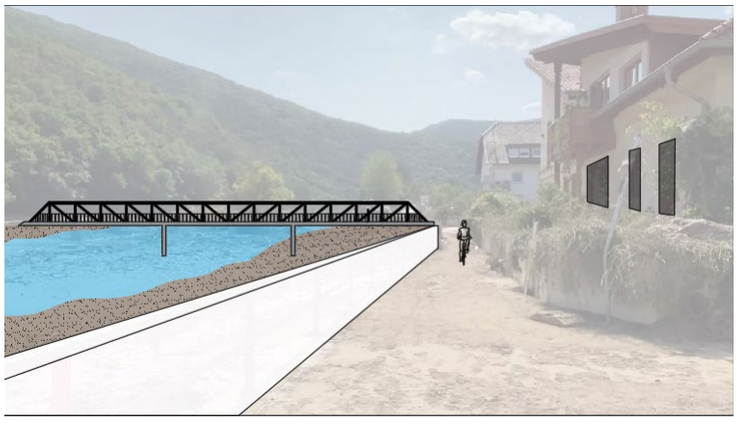
Since the inhabitants are indicating that they are staying and building houses, one of my approaches is to have damage mitigating solution on to the existing buildings and build a flood wall.

The flood wall goes throgh the whole town. The idea with the flood wall is to have a low wall that can give a mitigating effect on low water level floods. The flood wall will be approximitaly 1 m high. An example of that can be found in Bad Kreuznach on the River Nahe

Basing on what is happening now , adding building facades flood-resistant is a way of improving flood protection when other measures are difficult to implement due to lack of space. In Kampen on the River IJssel this was achieved by watertight pointing of the masonry and the installation of windows with special safety glass, while the doors are protected with mobile flood protection elements.

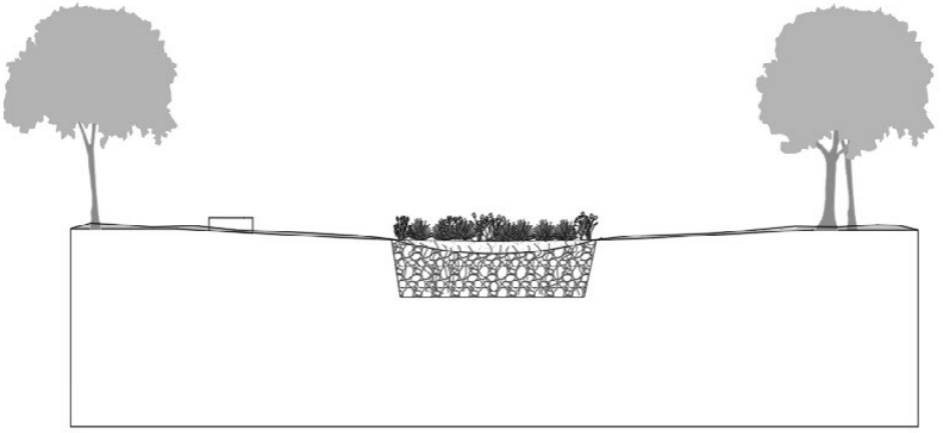
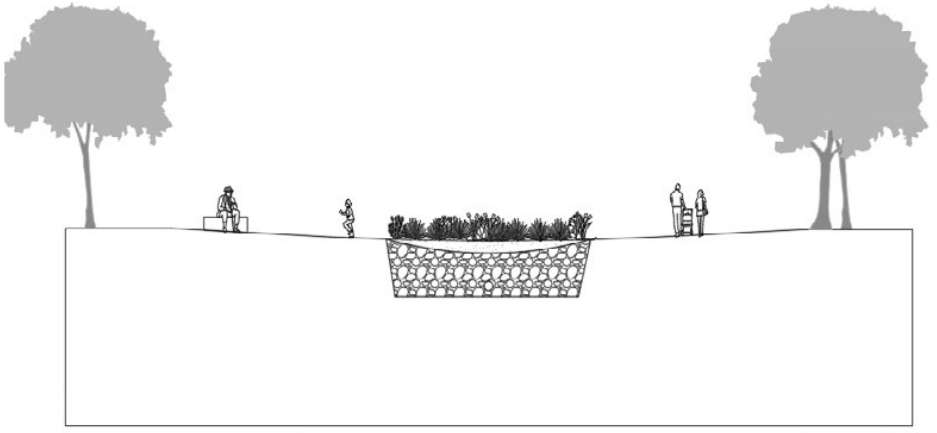






The high percipitation was one of the main causes for the flood. There are not many green area to give to drain or delay rain water. I have mapped out areas that can potetial act as rain catchment areas.

The light green areas is areas that can function as raint catchment areas and as parks /recreational area for the inhabitants.

The dark green area are vegetational areas that can act as rain catchment area. The area that goes along the flood plain is riperian meadow.

The green areas reffered as “potential area” are areas that are agricultural land. The question about land properties makes it difficult to use these as rain catchment areas.