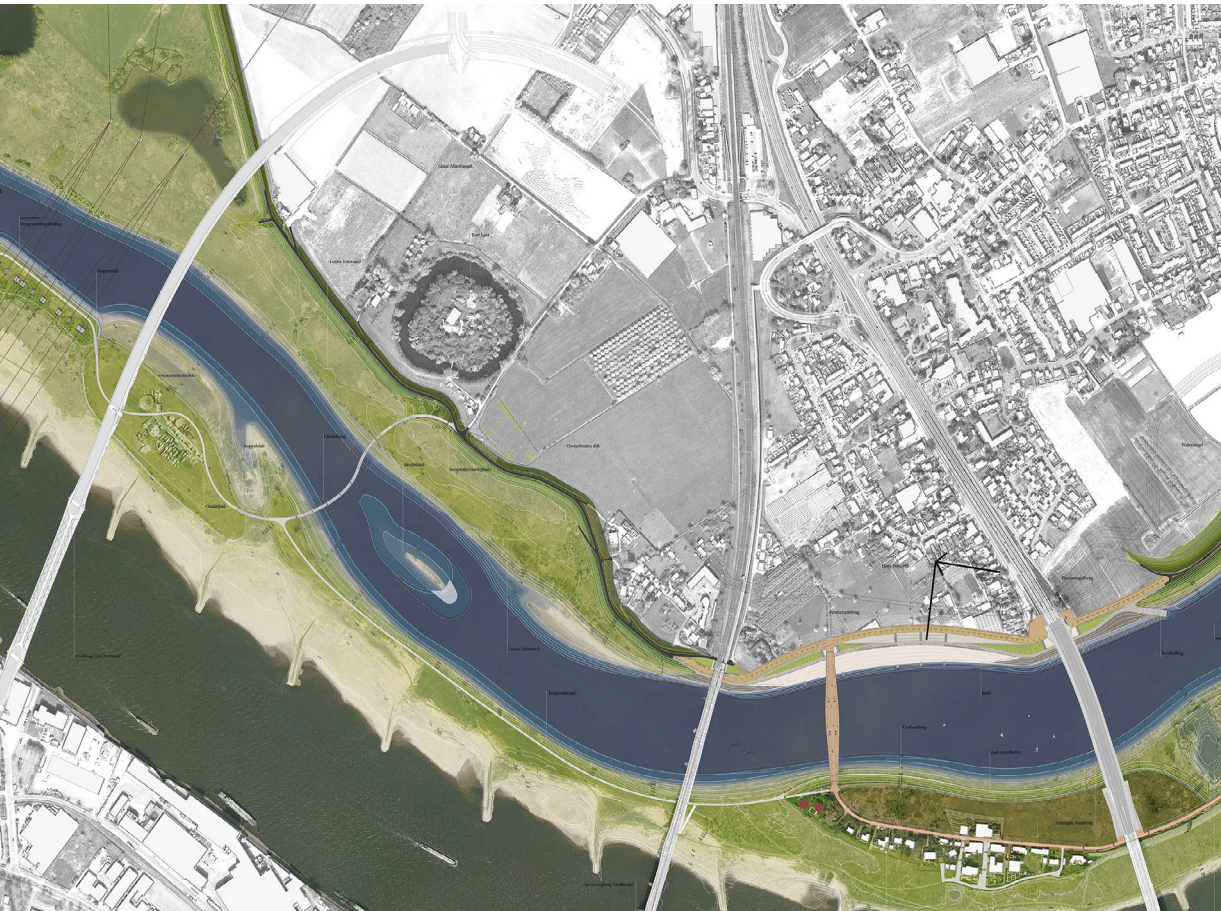




Three bridge project in Nijmegen, Netherlands

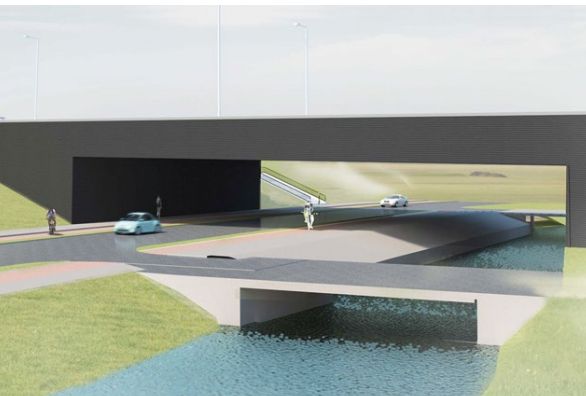
Allplan in practice

ISLAND BUILDING

The Dutch in Nijmegen reveal just how sustainable and pioneering flood protection can be with an impressive project. Just across the border from Germany in the Lower Rhine, Europe's largest flood protection project is under construction.

It is called "Ruimte voor de Waal" – literally "more room for the Waal" – and is intended to create more space for the biggest river in the Netherlands, the Waal. Behind the right bank of the Waal, a second four-kilometer-long riverbed is being dug, which will be just as wide as the first. This means that part of the suburb of Lent will become an island between two arms of the Waal and will be connected to both banks of the river by three bridges. For the town planners, it's primarily about better flood protection: changing the course of the river by building a side arm to reduce future

high-water peaks by 34 cm. All the same, they have managed to turn this necessary task into an attractive project and an opportunity to further develop the city. Not only will water meadows of ecological importance be created along the 2.5-kilometer island in the river, but recreational and leisure facilities and homes will be erected on the plateaus. Extensive reworking of the city infrastructure is needed to make the project a reality. The current Waal bridge will be extended by several hundred meters in order to span the 200-meter wide arm of the river. Additionally two



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new bridges will also be built: The Citadel Bridge will connect the mainland to the western part of the island – where the new district of Citadel will emerge. The Promenade Bridge will connect the mainland with the center of the island. Attractive promenades are planned for this area, as well as a small marina, and residential and business premises.

For the engineers in charge at Witteveen + Bos, bridge building on this scale is an enormous challenge, especially as the timetable has been tight from the start. Initial plans got underway in 2011 and the three massive bridges are expected to be ready by 2015. Planning such a major project without errors in such an incredibly short time is only possible – and the Dutch engineers were in full agreement – with hard work and the latest equipment. With Building Information Modeling (BIM) as an efficient planning method, and with Allplan Engineering as the right tool for the job.

The BIM system for three dimensional formwork and reinforcement planning enables integrated working between the team of 10 designers and 10 engineers on the virtual support structure model. In conjunction with the workgroup manager, the project team can partly work simultaneously on a building model and accurately coordinate the various planning steps. "We have to create hundreds of plans for every structure in the shortest possible time," explains Marcel Linderman, project

"Numerous plans within the shortest possible time – we can only achieve this because we work with Allplan Engineering effectively and without errors from the start."

Marcel Linderman, Witteveen + Bos

manager at Witteveen + Bos. "We can only achieve this because we can work effectively with Allplan from the start. Thanks to integrated planning, we are able to deliver on time and, what's more, without any errors."

Because all the structures are designed in the building model from the start, the planning partners can understand all the structural entities in detail – including unusual shapes, such as those for the extension of the Waal Bridge. The bridge mainly has round structures where the dimensions and position of steel bars are complex.

Thanks to Allplan, even these structural entities can be reinforced quickly and accurately. The formwork edges are transferred automatically from the model and form the reference point for the spatial arrangement of the reinforcement.



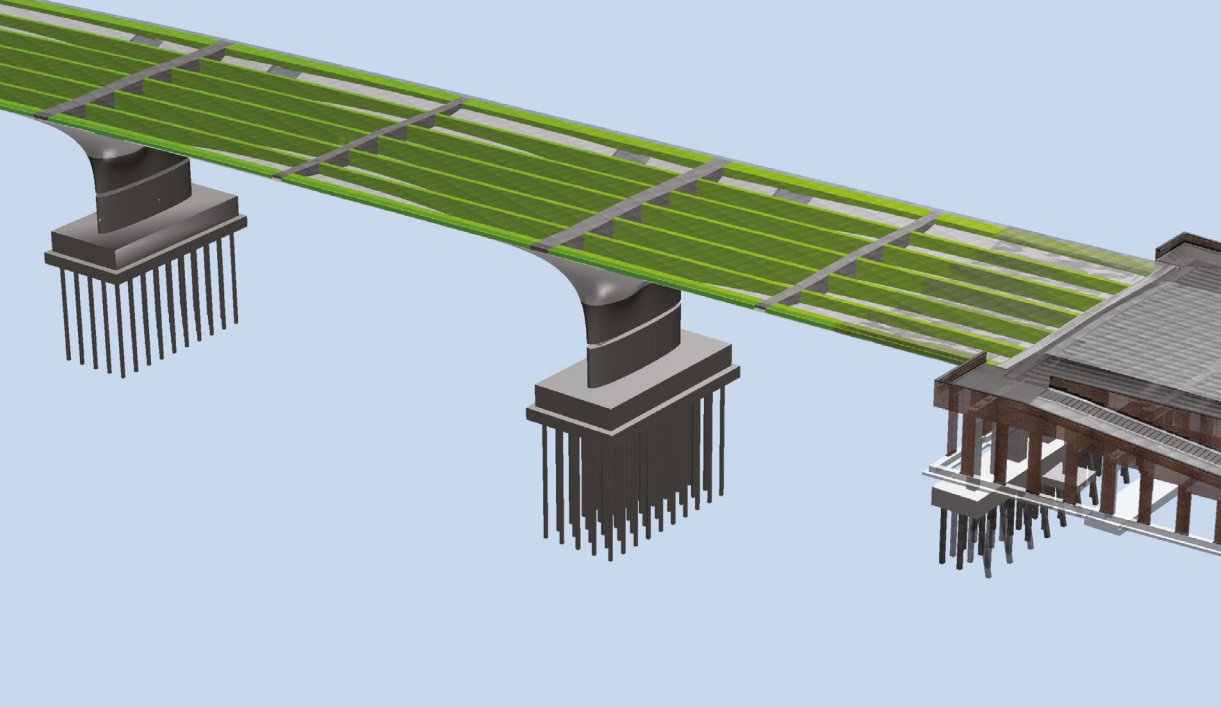
Thanks to Allplan, even these structural entities can be reinforced quickly and accurately. The formwork edges are transferred automatically from the model and form the reference point for the spatial arrangement of the reinforcement.

The BIM model is therefore extremely beneficial because all the necessary information can be derived directly and coherently. Not only does this include formwork and reinforcement plans with floor plans, views and sections, but also reports such as steel and bending schedules, or volumes of ready-mixed concrete, which can also be generated automatically through quantity takeoff. This approach is particularly successful for quantity takeoff of concrete volumes or formwork surfaces. Ultimately it is a question of incorporating large rebar diameters in complex formwork geometry.

Allplan Engineering also enables round-trip engineering for planners from the building model to static calculation with Scia Engineer and back again. Component objects are transferred from Allplan to the calculating system, optimized in several passes, and then returned to Allplan. This allows the engineers to calculate even extremely thin concrete shells easily and safely. Because the static system always remains coupled with the corresponding Allplan components, the consistency of the data on both sides also remains secure.

PROJECT INFORMATION AT A GLANCE

- > **Focus:** Engineering
 - > **Software used:** Allplan Engineering
Allplan Workgroup Manager
Allplan Bridge Building Modeler
Scia Engineer
 - > **Project data:**
 - > **Client:** Rijkswaterstaat Nederland with the City of Nijmegen
In cooperation with general contractor I-Lent
 - > **Start of planning:** 2011
 - > **Start of construction:** 2012
 - > **Completion:** 2015
-



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WITTEVEEN + BOS

The engineering firm Witteveen + Bos has a long tradition and was established in Deventer, Netherlands in 1946. Today they have over 900 employees on staff. The projects undertaken by Witteveen + Bos cover all areas and aspects of construction engineering.

ABOUT ALLPLAN

ALLPLAN is a global provider of BIM design software for the AEC industry. True to our "Design to Build" claim, we cover the entire process from the first concept to final detailed design for the construction site and for prefabrication. Allplan users create deliverables of the highest quality and level of detail thanks to lean workflows. ALLPLAN offers powerful integrated cloud technology to

support interdisciplinary collaboration on building and civil engineering projects. Around the world over 500 dedicated employees continue to write the ALLPLAN success story. Headquartered in Munich, Germany, ALLPLAN is part of the Nemetschek Group which is a pioneer for digital transformation in the construction sector.

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