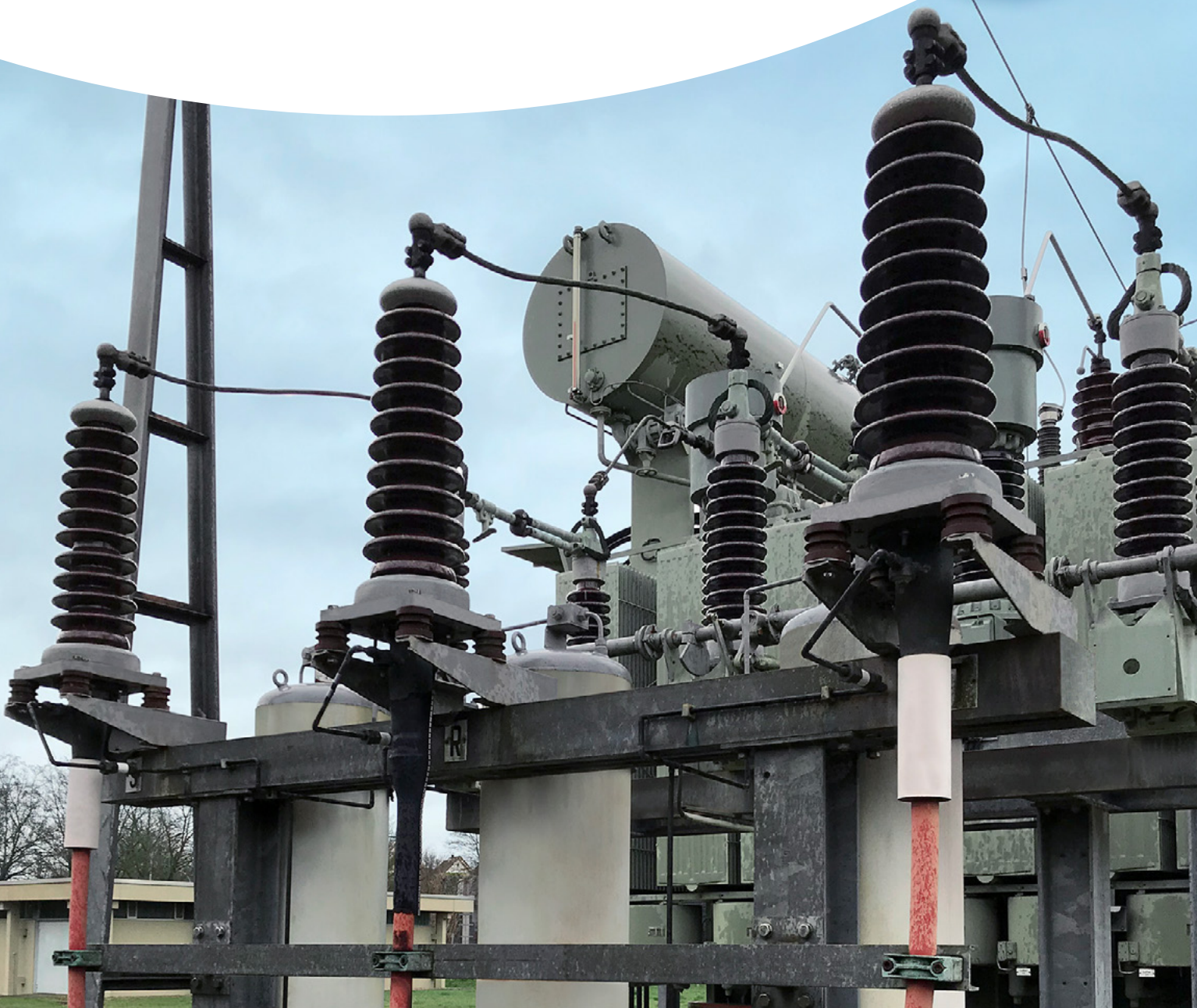


# Technically complex project 'under the River Neckar'

**Case study turnkey project cable system**  
High-voltage cables and accessories





**What made this project special was the fact that the oil-filled cable had to be partially dismantled and that routing was challenging.**



#### Customer feedback

“ This was a project that not only involved exceptional challenges, but also where we could count on Brugg Cables’ excellent support. ”

Achim Roth, Project Planning/  
Construction Coordination



#### Company and project

NHF Netzgesellschaft Heilbronn-Franken mbH is the distribution grid operator for the electricity grid in the region of the municipalities of Heilbronn, Lauffen am Neckar, Kirchheim am Neckar and Neckarwestheim in Baden-Württemberg. With a 100% efficiency score in electricity distribution, the company regularly sets records in the German Federal Network Agency’s benchmark procedure.

In the supply area, there was a 60 kV line that supplied the upstream high-voltage grid for the supply areas of Lauffen, Kirchheim and Neckarwestheim via the Lauffen-West and Lauffen-Städtle substations. This line – an old oil-filled cable dating back to 1979 – had reached the end of its life, both in terms of its power capacity and its age and design.

A new substation was built in Lauffen-West together with Netze BW GmbH to enable switching to the 110 kV voltage level throughout the entire supply area. In this context, the 60 kV cable was replaced by a new 110 kV XLPE cable system with a system length of 3,600 m between the two substations.

#### Challenge

The project implemented in the south-west of Germany is impressive, due to two special challenges it faced:

- The partial dismantling, recovery and disposal of the old 60 kV oil-filled cable
- Planning and construction of the new XLPE cable system: its route running through urban areas and under the River Neckar, not to mention an island that is home to protected biotopes

Since the work was carried out near bodies of water and biotopes, special certification under the German Water Resources Act was a must for carrying out the work.

#### The Brugg Cables solution

Engineers from the company headquarters in Brugg and the Brugg Cables Project Execution Team were involved in the project planning and implementation process. The route was already planned by the distribution grid operator. The Brugg experts then derived a cable design for the power requirement and the route. The system plan with a system length comprising 3,600 m of 110 kV cable was implemented with three socket pits.

The new XLPE cable was already laid in 2019 as part of a very challenging process due to the crossing under the River Neckar and routing in the urban area through the historic old town. In the urban area, plastic empty conduits were installed for the new line by a specialised civil engineering company. Under the River Neckar, Teflon-coated empty conduits were driven through the ground at a depth of 16 – 17 metres using the flush drilling method.

The socket pits are all located in urban areas – sometimes in hard-to-reach locations – and were dug by a civil engineering company. Due to the crossing under the River Neckar and the limited tensile forces caused by the cable cross-section, the cable lengths and the number of socket pits had to be

adapted accordingly. The cable pulley itself was challenging due to the route and the tensile forces limited by the cable cross-section – but nevertheless it was successfully implemented. In the socket pits, Brugg fitters connected the cables using transit joints. Afterwards, the pits were backfilled.

Once the new XLPE cable was laid, NHF restored the existing substation, built a new one, and constructed new GIS facilities there. It was only once these construction measures were completed that the new XLPE cable could be connected via terminations. Brugg Cables only had a tight time frame to do all of this.

Once the new XLPE cable had been commissioned, partial dismantling of the oil-filled cable could be started. The experts from Brugg Germany were called in for this work. Brugg Germany is certified as a specialist company under the German Water Resources Act. The certification process, which was carried out by TÜV and was a prerequisite for this work near bodies of water and biotopes, includes work on installations with water-polluting liquids. Most of the oil was blown out of the cable, while the parts were dismantled in sections and disposed of properly. The rest of the oil-filled cable system was reconnected as part of a pressure-controlled procedure.

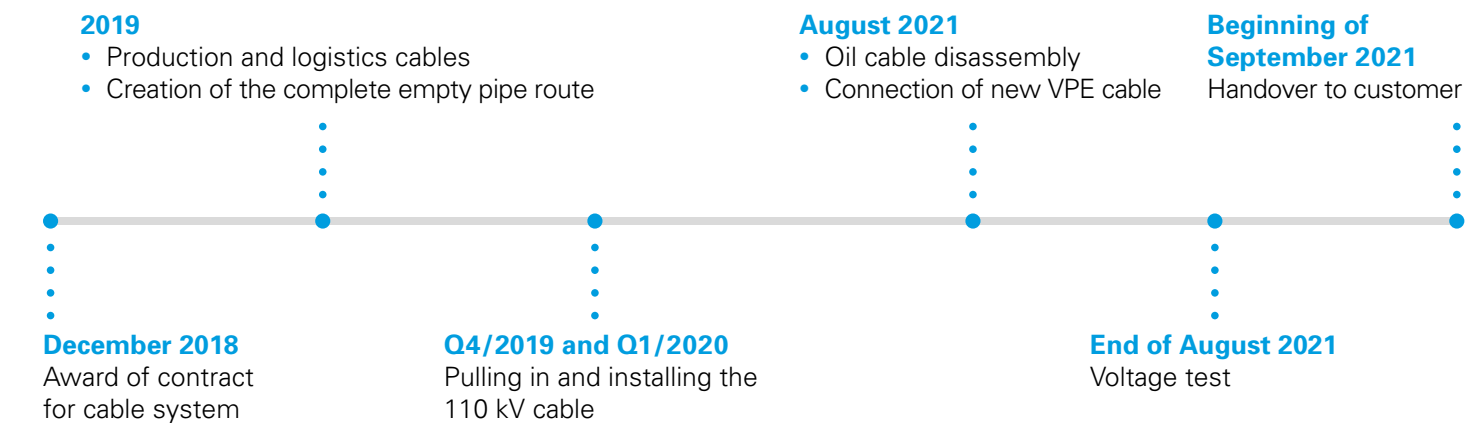
#### Hardware and Equipment

The cable system consists of a three-core 110 kV XLPE cable with a system length of 3,600 m and has individual lengths between 800 and 1,000 m due to the structural route. The customer opted for the tried-and-tested MPFH transit joints to connect the sections of cable. Appropriate equipment was used on site to dismantle and dispose of the oil-filled cable.

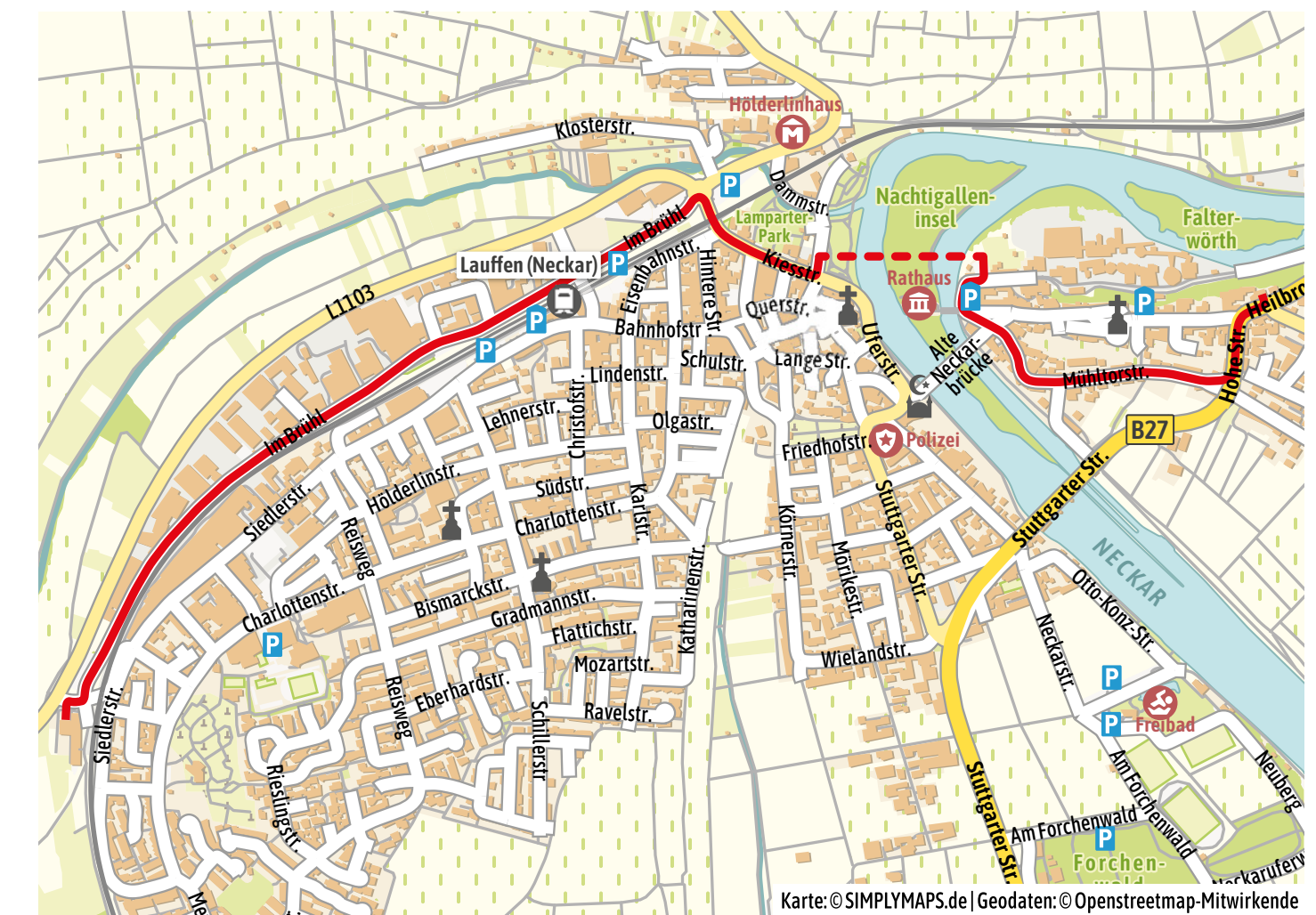
#### Technical data and project scope

- Supplying 10,950 m of 110 kV XLPE cable (type N2XS(F)LJ2Y 1 x 400 mm<sup>2</sup> 64/110 kV (123 kV))
- Installing cables with a system length of 3,600 m and individual sections between 800 and 1,000 m earthed on both sides
- Supplying and installing nine connecting sleeves for the three sleeve pits
- Supplying and installing three terminations each in the two substations

#### Project history



#### Challenging routing



## Brugg Cables

Brugg Cables is an innovative cable manufacturer from Switzerland that offers an extensive range of power transmission and distribution services. Established by Gottlieb Suhner more than 120 years ago, Brugg Cables is now one of the world's leading cable manufacturers. Throughout our history, our defining characteristics have been our strong customer focus and a highly skilled and professional workforce. Our emphasis has been on innovation and outstanding Swiss quality – since 1896.

### Cable projects

Brugg Cables is the high-performance partner for high-voltage cable projects. From planning, production and logistics to installation and commissioning. As a general contractor, we coordinate all trades, monitor all phases and, with our experts, are the central point of contact for the customer on site.

### Asset Management & Services

Our Asset Management & Services package is specifically designed for the demands of energy suppliers, transmission system operators and electricity customers in the high and extra-high voltage sector. This encompasses diverse services to ensure that the planning, construction, operation and maintenance of high-voltage cable systems is safe, efficient and cost-effective.

