

➤ Energy transition as an economic factor

It is no secret that the construction industry is experiencing ongoing difficulties. Insufficient investment and a difficult economic environment with an increasing number of regulations and bureaucratic hurdles are causing many projects to be halted and "construction paused".

In this respect, we consider ourselves fortunate that the energy transition holds a number of tasks and challenges in store for us as a geotechnical consulting company. We are currently working on the construction of new liquefied natural gas terminals in Wilhelmshaven and Brunsbüttel. In addition to the "usual" tasks associated with foundations in soft soils close to the coast, there are special issues to be addressed, such as preventing soil liquefaction.

The phase-out of fossil fuels such as oil, coal and gas requires extensive restructuring of existing plants. We are active in this area with our expertise at numerous power plant sites in Berlin. The expansion of renewable energies and the associated fluctuations in the electricity supply are placing a considerable strain on the electricity grid. In order to make this more efficient and thus fit for the future, numerous transformer stations and grid nodes are currently being built or existing ones are upgraded in addition to new power lines. We are working for our client Stromnetz Berlin GmbH with foundation expertise and specialised geotechnical planning.

We are also a sought-after service provider for power generation plants. For example, we are supporting the development of a wind farm in the Taunus region with geotechnical reports. We have also planned the complex foundation of wind energy plants in former open-cast lignite mines in Upper Lusatia. Last but not least, we provide intensive support to the offshore wind industry with expert opinions, planning and inspections.



The energy transition also offers opportunities for geotechnics.

➤ Berlin power plants on course for the future

As part of the coal phase-out, BEW Berliner Energie und Wärme AG plans to decommission all coal-fired power plants and most of the old gas-fired power plants by 2030. Large

heat pumps and biomass heating plants are planned as replacements. At individual locations power-to-heat and new gas plants are being built to fill open capacities and cover peak loads.

We support BEW as geotechnical experts and specialist designers during extensive new construction and conversion measures at the following sites: Reuter, Reuter West, Charlottenburg, Klingenberg, Mitte and Moabit. Depending on the project and location, we have investigated the subsoil with over one hundred exploratory drillings to a depth of around 30 metres and a large number of indirect explorations such as dynamic probing and cone penetration testing (CPT). We have also prepared the geotechnical preliminary and main investigation reports as well as geotechnical statements. We mainly use spatial subsurface models, including for use in integrated planning using the BIM method.



The Reuter power plant in Berlin is being extensively upgraded.

AI in geotechnics

Dear readers,

Artificial intelligence is one of the major topics of the future and will have a major impact on many areas of life. A study from the USA was published in November 2024 in which doctors were presented with various medical histories based on real cases. The participants had to make diagnoses and suggest further steps. At the same time, the cases with the same task were also "presented" to the chatbot of the AI software ChatGPT. The answers were anonymised and evaluated by a jury of experts for their medical accuracy. The result was sobering for the human participants: while they achieved a score of 74%, ChatGPT achieved a score of 85% on possible points and in a fraction of the time.

Umbruchfehler:
un·rea·son·able

So will doctors and geotechnics be replaced by ChatGPT in the future? Certainly not. But it would be **unreasonable** not to utilise the potential that the AI tools already available today have for our work. Perhaps the use of AI in everyday working life will be as commonplace in a few years as the creation of CAD drawings and the use of structural analysis software is today. Of course, the final say and responsibility for the results should always remain with humans.

On behalf of the companies in the GuD – Group of Companies, I would like to thank all of our customers and project partners for the good cooperation and joint successes in 2024. I wish you an equally successful 2025.



Dr. techn.
Bert Schädlich
Authorised signatory
GuD Consult

Infrastructure projects in Frankfurt am Main

In 2024, the Frankfurt GuD branch office was once again involved in major infrastructure projects in the region.

As part of the general refurbishment of the 'Riedbahn', GuD Frankfurt predicted and evaluated the vibration effects of the pile installation on a nearby ethylene pipeline. For the extension of the railway line to Westerland (Sylt), the Frankfurt team analysed the dynamic stability of the existing and new line on soft layers in the Niebüll-Klanxbüll section. GuD Frankfurt also continues to support the construction of the 'Bergsammler' sewer channel in Frankfurt's city centre with geotechnical investigations and hydrological calculations. As part of the general refurbishment of the Kinzigtal high-speed railway corridor, GuD Frankfurt carried out subsoil examinations in the Gelnhausen-Fulda section.

GuD Frankfurt carried out the geotechnical investigations as part of the renovation of the Reicholzheim tunnel. The Frankfurt GuD team is also involved in the subsoil investigation and foundation recommendations for the new and extended Karlsruhe-Basel railway line.



Subsoil investigations on the banks of the river Main in Frankfurt.

Anniversaries at GuD Consult and BBI in 2024

GuD Berlin

- 10 YEARS Dr. techn. Bert Schädlich
Dipl.-Geol. Nicole Dumet
Dr.-Ing. Silke Appel
Dr. techn. Alexander Tributsch
- 20 YEARS Dr.-Ing. Fabian Kirsch
- 25 YEARS Dipl.-Ing. Hilmar Leonhardt
- 30 YEARS Dipl.-Ing. Kerstin Deterding

BBI

- 25 YEARS Beate Smolka

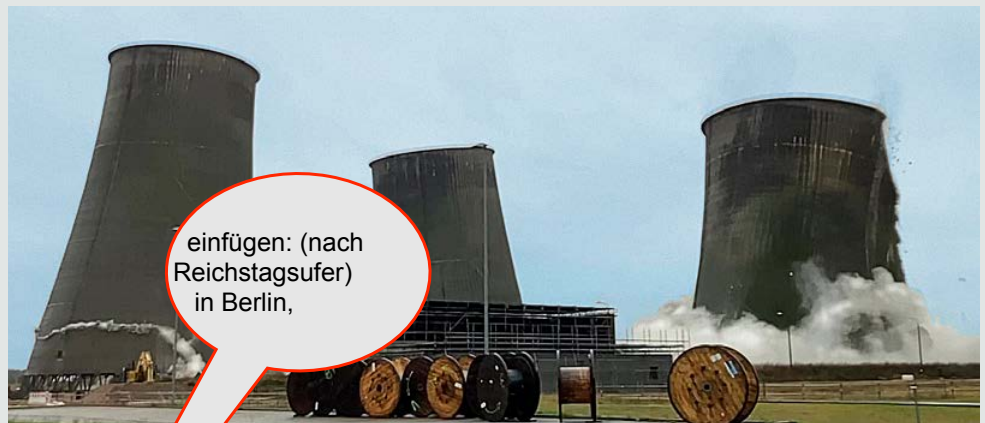
Energy transition in Upper Lusatia

On 6 December 2024 at 11:03 a.m., the last three cooling towers of the old Boxberg power plant in the Oberlausitz (Saxony) were blown up in a controlled manner. This is another symbolic milestone in the energy transition in eastern Germany.

The 113 metre high towers were part of Plant II of what was once Europe's largest lignite-fired power plant. The battery storage units of the "Gigawattfactory" are to be built on this site in the future. This wind power and photovoltaic centre of Lausitz Energie AG (LEAG) is planned for the subsequent

use of open-cast mining areas in the region. By 2030, it is intended to generate renewable energy with a capacity of 7 gigawatts.

For the blasting of the cooling towers, GuD prepared a forecast of the expected vibrations in order to ensure the safe operation of the neighbouring parts of the power plant that were still in operation during and after the blasting. During the blasting, the vibrations in the neighbouring structures and the ground vibrations in the area surrounding the blasting were monitored by the GuD team using advanced measurement technology.



The last three cooling towers of the old Boxberg power plant were demolished in December 2024.

Refurbishment of the Robert Koch Forum

In a prominent location between Wilhelmstrasse, Dorotheenstrasse and Reichstagsufer, the historic Robert Koch Forum is currently being refurbished and extended for Berliner Immobilienmanagement GmbH.

The historic building was constructed between 1873 and 1883 for the scientific and medical institutes of the Friedrich-Wilhelm-University. The Nobel Prize winners Robert Koch and Walther Nernst made outstanding achievements in research and teaching in these new institutes of the German Empire.

For future use, the existing energy supply is to be protected in the form of a medium-voltage power line and the new parts of the building are to be founded using bored piles. GuD Consult was commissioned with the construction supervision of the bored piles, including quality control, site supervision and keeping track of construction dates. The impact of the drilling work on the existing exterior façade were to be assessed on the basis of the accompanying vibration monitoring.

The drilling work proved to be very difficult due to the existing foundations in the form of old masonry foundations and wooden driven piles. As the previous building had

been damaged by extensive dewatering measures in the 1930s, the existing foundation was reinforced with steel beams, which further hindered the drilling work. The construction of the foundation piles began in August 2023 and was completed in May 2024.



Old wooden piles complicated the drilling work.

➤ Foundation of Germany's longest motorway bridge



Test load for the new A26 motorway.

DEGES Deutsche Einheit Fernstraßenplanungs- und -bau GmbH is planning the construction of the new A26 motorway in Hamburg. In the course of the harbour passage, the route crosses the Süderelbe with a cable-tensioned high bridge. In conjunction with the adjoining elevated road over the port area and the foreland bridges, this approximately 4 km-long section will form Germany's longest motorway bridge in the future.

Due to the challenging subsoil conditions, the foundations for this section are planned with more than 2,000 bored piles, most of which are to be designed with base expansion. When designing the pile groups under the numerous pier axes, the correct assessment of pile group effects is of particular importance due to the large number of piles involved. Using simplified approaches is not

an option here due to the complex boundary conditions. Instead, in addition to numerous individual pile load tests, two load tests are also carried out on groups of large-diameter bored piles with base expansion.

The first load test on a group of bored piles took place in December 2024. The redundant determination of the distribution of pile skin friction and pile base resistance - point-by-point via sister bars and continuously using high-resolution fibre-optic sensors - minimised the error for interpretation. Pile group effects are determined experimentally by analysing the load transfer of corner and inner piles as well as comparable single piles. The results of the load transfer behaviour are currently being evaluated and compared with the load-bearing behaviour of 18 statically and dynamically tested single piles.

➤ New construction of the Hotel Alstertwiete

The legendary luxury Atlantic Hotel directly on Hamburg's Außenalster Lake is to be extended with a new building. The new building will cover an area of 3,000 square metres and extend for around 100 metres along the Alstertwiete road.

The existing 5 to 8-storey buildings with basements on the new construction site will be completely demolished. For this project, BBI prepared the geotechnical report and a pollutant cadastre for the existing buildings to be demolished. The BBI team was also commissioned with the planning and tendering of the demolition of the existing building and the excavation pit, whereby separate tender procedures were used.

To secure the 3 m to 7 m deep excavation pit, underpinnings will be constructed along the neighbouring buildings using the jet grouting method and soldier pile walls will be built along the adjacent public ground. The underpinnings and the shoring walls are back-anchored. Temporary groundwater drainage by means of gravity wells is planned to ensure sufficient safety against buoyancy. Above-ground demolition is currently underway. This work is expected to be completed by the end of April 2025. This will be immediately followed by the construction of the excavation pit.



The planned expansion of the Hotel Atlantic.

© Visualisation: GHP Architects

➤ Mound reinforcements on Hallig Hooge

Due to their exposed location, the Halligen in the North Frisian Wadden Sea are exposed to the predicted sea level rise and increasing extreme weather events. Targeted measures are therefore necessary to protect the mounds against storm surges in the long term.

The municipality of Hallig Hooge has commissioned Ramboll to plan the reinforcement of the endangered dwelling. To this end, BBI carried out comprehensive geotechnical investigations for the Lorenzwarft/Mitteltritt, Volkertswarft and Ockelützwarft in August 2024.



Soil exploration on the Hallig Hooge.

The focus here was on the settlement-sensitive marine sediments, which place particular demands on the foundation consultancy. As part of the investigations, almost 100 subsoil explorations were carried out, including small and large diameter boreholes. The latter were used to obtain undisturbed samples, which were used for oedometer tests to enable precise settlement calculations. The complex interlocking of fossil and recent marine deposits posed a challenge when creating a subsoil model as a basis for reliable settlement forecasts. BBI will continue to work on bringing the mounds to a height which is safe for the future.

➤ Refurbishment of the Komische Oper Berlin

In a prominent location at Unter den Linden, the Komische Oper Berlin is to be renovated, modernised and extended.

The historic 1892 building is being transformed into a modern, future-orientated opera house according to plans by kadawittfeldarchitektur. Partial demolition is planned in various parts for the conversion of the existing building. The extension includes the complete demolition of the western extension and a new building. The eastern side wing is also to be replaced by a new building after demolition. GuD Consult was commissioned by kadawittfeldarchitektur on behalf of the Senate Department for Urban Development, Building and Housing with the design and site supervision of the decontamination



The listed opera house is extended

and demolition work with designing the preliminary exploration

Dr Patrick Arnold in einer Zeile (kein Umbruch zwischen Dr und Patrick)

➤ New measuring method for test columns

For the construction of a new apartment block in Berlin's Regattastrasse, GuD is using its own innovative method for measuring jet grout test columns, which simplifies the work process on the construction site and thus saves time and money.

The construction of a watertight excavation pit is planned for the basement car park. The excavation is to be sealed horizontally against the groundwater using a jet grouting slab. To ensure the sealing function, a seamless and watertight base is required, which is achieved by overlapping the individual jet grouting columns. GuD Consult was commissioned to carry out measuring tests on two hardened test columns for quality control purposes in order to verify whether the planned column diameter can be achieved with the chosen installation parameters.

The 'down-hole profile recording' method developed by GuD is used for this measure-

ment. In this process, the diameter of the neighbouring, already cured column is recorded during the installation of an excitation column and visualised over the entire column height.



Jet grouting on the construction site in Regattastrasse.

➤ GuD sporting events 2024

The GuD employees were once again sporty this year and took part in numerous events.



Group photo at the BBI/GuD Badminton Cup.

Our volleyball group trained every week in the summer and organised the GuD Beach Volleyball Cup in June together with other Berlin engineering firms. In November, the colleagues from BBI organised the 3rd BBI/GuD Badminton Cup and brought the trophy back to Hamburg. The running enthusiasts at GuD took part in both the Berlin team race and the B2 Run with a finish at the Olympic Stadium. More than 20 colleagues competed for our coveted trophy at the GuD table tennis tournament. We also took part in the Mammutmarsch in November, a hike from Berlin-Mitte to Spandau (and back) with distances of up to 55 kilometres.

GuD at the 38th Baugrundtagung

At this year's Baugrundtagung conference in Bremen, our 'Young Geotechnical Engineers' Sigrid Wilhelm (GuD), Lucas Olschewski (GuD) and Phillip Lenz (BBI) were able to give an insight into their work in the special session 'Forum for Young Geotechnics Engineers'. Sigrid Wilhelm received the prize for the second-best presentation. Congratulations for this great achievement!

Other presentations at the main event were given by Dr Bert Schädlich (GuD) on the foundation of the RIN_01 railway bridge in Berlin, Dr Olaf Stahlhut (BBI) on the large-diameter bored piles for the A26 motorway and Dr Patrick Arnold (GuD) on the design philosophy of the new EC 7.



M.Sc. Sigrid Wilhelm, GuD

New exhibition stand of the GuD – Group of Companies

The 2024 Baugrundtagung conference in Bremen was the ideal occasion for the premiere of the GuD – Group of Companies' completely revamped exhibition stand. With its modern, open concept, it was not only a real eye-catcher in the trade exhibition, but also offered an excellent platform for maintaining old contacts and making new ones. The new exhibition stand has a modular structure and can therefore also be used by our partners BBI and GSP or on a smaller scale.



Premiere of the exhibition stand at the Baugrundtagung.

GuD publications 2024

You can find the latest publications from GuD's experts at gudconsult.de.

➤ Foundation reinforcement in confined spaces

A public building on the Puschkinallee in Berlin-Köpenick is to be extensively remodelled and Bundesanstalt für Immobilienaufgaben (BImA).

The construction project will be realised as a PPP project with the partner and general contractor HOCHTIEF until 2028. GuD Consult has been commissioned with the design of the geotechnical works and their technical supervision. Two larger watertight excavation pits with up to two basement levels and two smaller 'open' excavation pits as well as trenches running around the entire building complex are planned for a later media installation.



„and“ soll weg
stattdessen:
for our client

To reinforce the foundations for a later extension, almost 4,000 jet grouting columns have to be installed in the existing underground car park in confined spaces. Particular attention is being paid to groundwater and nature conservation due to the extensive groundwater protection measures between important areas in the proximity of the Berlin-Brandenburg Airport. The project includes, among other things, extensive groundwater modelling and purification as well as defence measures via groundwater wells.

Geotechnical engineering works in the cramped existing underground car park.

➤ Riverbank restoration in Berlin Niederschöneweide

A new residential building is constructed along the southern bank of the Spree in the Berlin district of Niederschöneweide by the project developer BUWOG. This project will begin with the renovation of an approximately 250 metre long section of the river-

bank before the structural and landscaping works continue. GuD Consult has been commissioned with the design, the preparation of the tender and the site supervision for this renovation measure.



Renovation work on the riverbank wall.

After clearing vegetation and dismantling existing structures along the riverbank, the construction of a new reinforced concrete beam and railing is planned as part of the riverbank renovation. The work will be carried out from a pontoon in the water and, in addition to sheet pile walls and grouted anchors, will also include the repair of age-related defects in the existing 100-year-old riverbank wall by means of diving operations. In doing so, it is important to always observe and implement the requirements of the waterways authorities.

➤ Bi-directional load tests of highly loaded large-diameter bored piles

Bored piles with large diameters are being used more and more frequently to safely transfer very high loads in the subsoil. This applies in particular to infrastructure projects or inner-city high-rise foundations.

Static and dynamic load tests are carried out to determine the load capacity of the piles. For high test loads, bi-directional static test loading with load cells installed in the pile is also an efficient method. In the course of planning the closing segment of the A14 motorway near Stendal, pile foundations are being planned for the construction of

a new bridge. As a member of the GuD group of companies, GSP was able to successfully carry out the bi-directional static axial load tests on 3 test piles for this project together with the American company GRL Engineers Inc. Two of these tests were designed as multi-level tests with 2 cell levels each.



GRL-Cell installation within the steel reinforcement and cable management

Nikolaus Schneider takes his leave in retirement

After almost 30 years at GuD, our colleague and partner, Dipl.-Ing. Univ. Nikolaus Schneider, will be leaving the operational management team on 31 December 2024.



Dipl.-Ing. Univ. Nikolaus Schneider

Since 1995, as co-founder of what was then GuD Ingenieurbüro für Spezialtiefbau GmbH, he has developed and established construction site supervision as a core competence of the GuD Group. As a dedicated engineer, he has always succeeded in bringing together the

theory and practice of geotechnical engineering with an interdisciplinary team. His successes are evidenced by a number of patents and the development of several methods for monitoring the execution quality of jet grouting, diaphragm walls and bored piles.

We are delighted that Nikolaus Schneider will continue to support us with his vast experience in projects and product developments.

Dear Nikolaus, the entire GuD team wishes you good luck, the best of health and more time for your family and all the things you love.

Climate protection through underground Residual wood deposits

Germany is planning to remove millions of tonnes of CO₂ from the atmosphere every year in order to become climate-neutral in the near future.

The start-up Carbonsate is developing technologies to store unused biomass permanently and locally underground.

In the summer, GuD Consult organised a workshop together with Carbonsate to discuss the administrative, geological and technical conditions as well as suitable construction technologies. It became clear that the underground storage of biomass, e.g. for excavations, earth dams or landfills, requires careful geotechnical planning. However, the storage of wood from the point of view of the Recycling Management Act and waste recycling also leaves plenty of scope for engineering. Both sides agree to continue the fruitful co-operation.

➤ New building in Europacity

In Heidestrasse in Berlin, the investor JTRE is developing the Nordhafen Living & Office project with apartments, offices, retail and an underground car park on a 6,000 m² site.

GuD Consult planned the subsoil exploration and prepared the Geotechnical report for this new project in Berlin's Europacity. The GuD team was also responsible for designing the excavation pit and the water permit application. The geological situation and the ratio of the excavation pit area to the excavation depth led to an excavation pit concept with groundwater lowering. At the client's request, GuD took on the role of site supervision for the excavation pit, earthworks and groundwater management. Due to construction delays caused by a change of investor, the injection anchors were in use for longer

than intended and were subject to extended monitoring. The excavation pit was handed over to the building construction company in 2024 and the groundwater lowering can be switched off as planned in 2025.



The excavation pit was handed over to the construction company in 2024.

➤ Refurbishment of the Pergamon Museum

Since May 2024, preparatory work has been underway at the Pergamonmuseum for the



Jet injections from the water.

renovation of building section B. After extensive pipework has been laid between the Pergamon Museum and the Neues Museum in a very confined space, the way is being paved for the new underground connecting structure. Although this structure only bridges a distance of 7 metres, the requirements are all the greater. There are historical fillings up to 17 metres below ground level. Old temporary support structures and building foundations also present obstacles for the planned bored pile foundation.

Prior to these operations, stabilisation work will be carried out on the west façade from the water using jet grouting. Sheet pile walls secure the injection work and the drilling rig is placed on a pontoon.

➤ Offshore wind industry picks up speed again

GuD Consult in 2024 made significant progress in advising the offshore wind industry. The GuD team planned and carried out the main geotechnical investigation for the North Sea Cluster B offshore wind farm. In addition to the offshore investigations, this includes both standard and cyclic laboratory tests. These detailed investigations ensure that the foundations can withstand the particular challenges of the offshore environment.

For the two transformer stations for the Gennaker wind farm in the Baltic Sea, we can directly apply our expertise from the ProBucket research project funded by the Federal Republic of Germany. This is because the foundations are being built on so-called suction buckets. We are also continuing our commitment in Poland by participating in public tenders and numerous conferences on

the topic of offshore wind. Outside Europe, we prepared a comprehensive geotechnical desktop study and a preliminary foundation design for three wind farm projects in the Philippines and supervised the geophysical campaign.



The GuD Polska team at the Offshore Wind Conference.

New employees in 2024

„the companies in“
weglassen

In 2024, we once again welcomed numerous new employees to the companies in the GuD – Group of Companies. We wish them a good start and successful work in our well-established teams.

Berlin



M.Sc. Clara Sieling



M.Sc. Ahmed Kadry



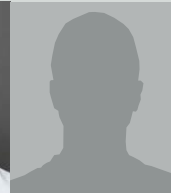
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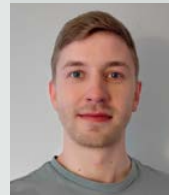


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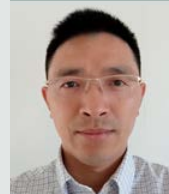


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