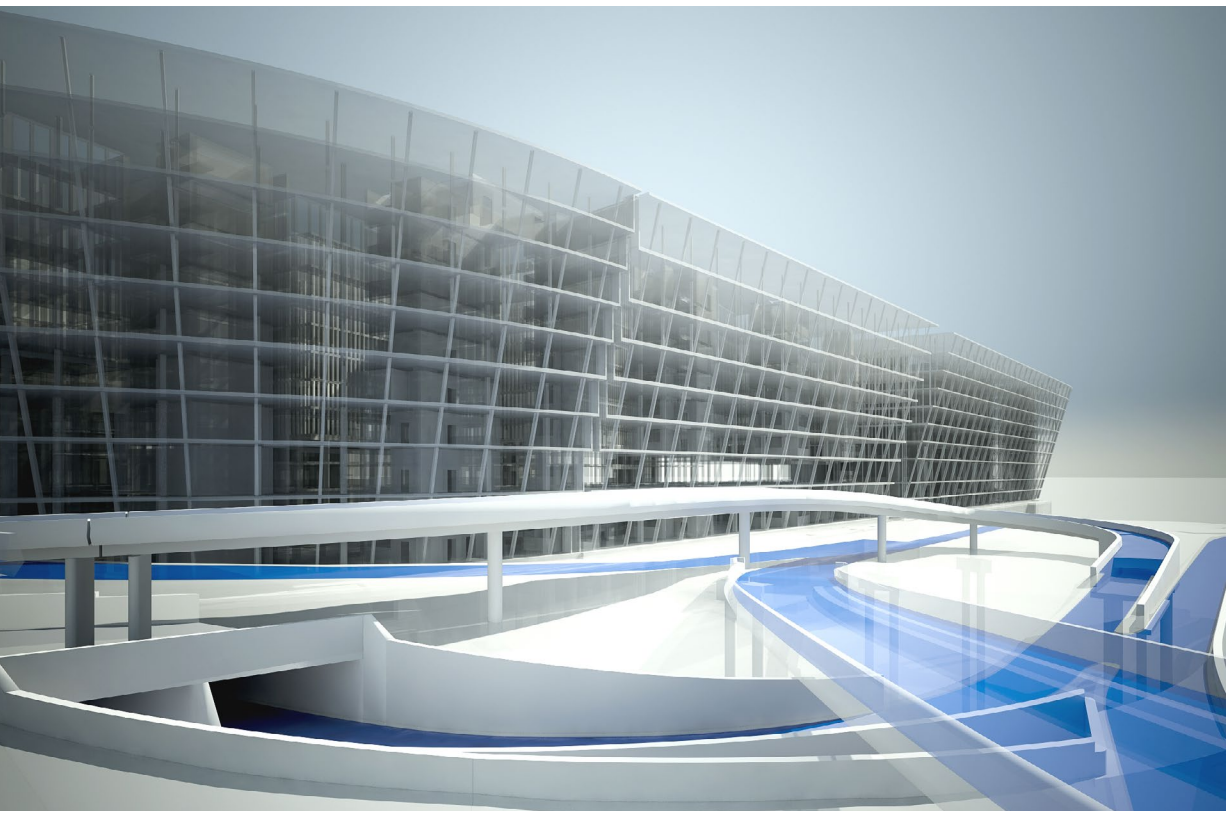


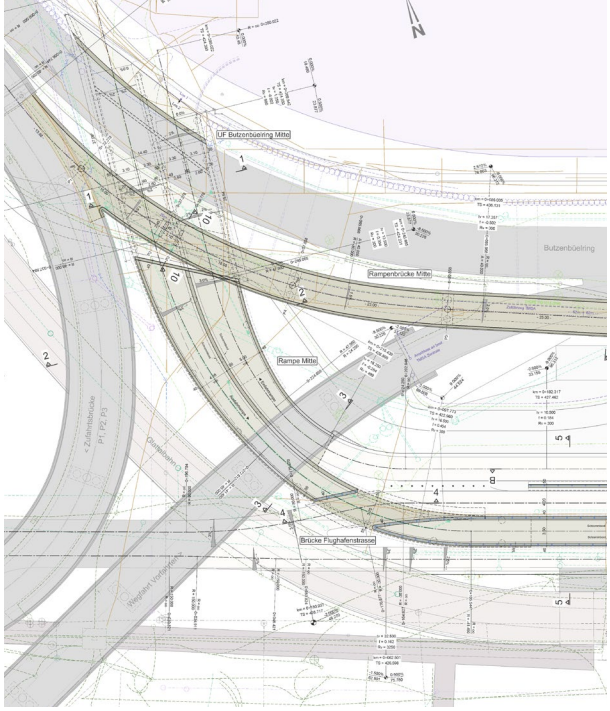
Access Structures,
The Circle,
Zurich Airport,
Switzerland

Allplan in practice

CHALLENGING ACCESS

After six years of intense preparation, the end of April 2015 marked the official green light for the implementation of the major project "The Circle".

With a total investment cost of around CHF 1 billion, at the foot of the Butzenbüel hill and within walking distance of the terminal, a high-quality superstructure for services is emerging that will provide a usable area of 180,000 square meters. The first and second stages are expected to be completed at the end of 2018 and in 2019 respectively. The winner of the three-stage, public architecture competition was announced in February 2010. The "Divers(c)ity" project by the 70-year-old Japanese star architect Riken Yamamoto from Yokohama prevailed against more than 90 applications from 12 countries. The design contains a light-flooded, partially overhanging facade, which completely encloses the foot of the Butzenbüelring. Behind this facade, various cubic structures with a high glass content are arranged facing the hill. The new service center is expected to be brought to life by two hotels, a convention center, a medical center by the University Hospital of Zurich, shops, restaurants, as well as art, cultural, entertainment and educational offerings, to name but a few examples. The legal building permit was granted in April 2012 and, at the end of 2013, it was announced that Swiss Life would be involved asa co-investor with a 49% share in the newly-established co-ownership, of which Flughafen Zürich AG will hold 51%. In December 2014, the investors made the definitive decision for the project's implementation after the funding was secured and over half of the usable area was leased.

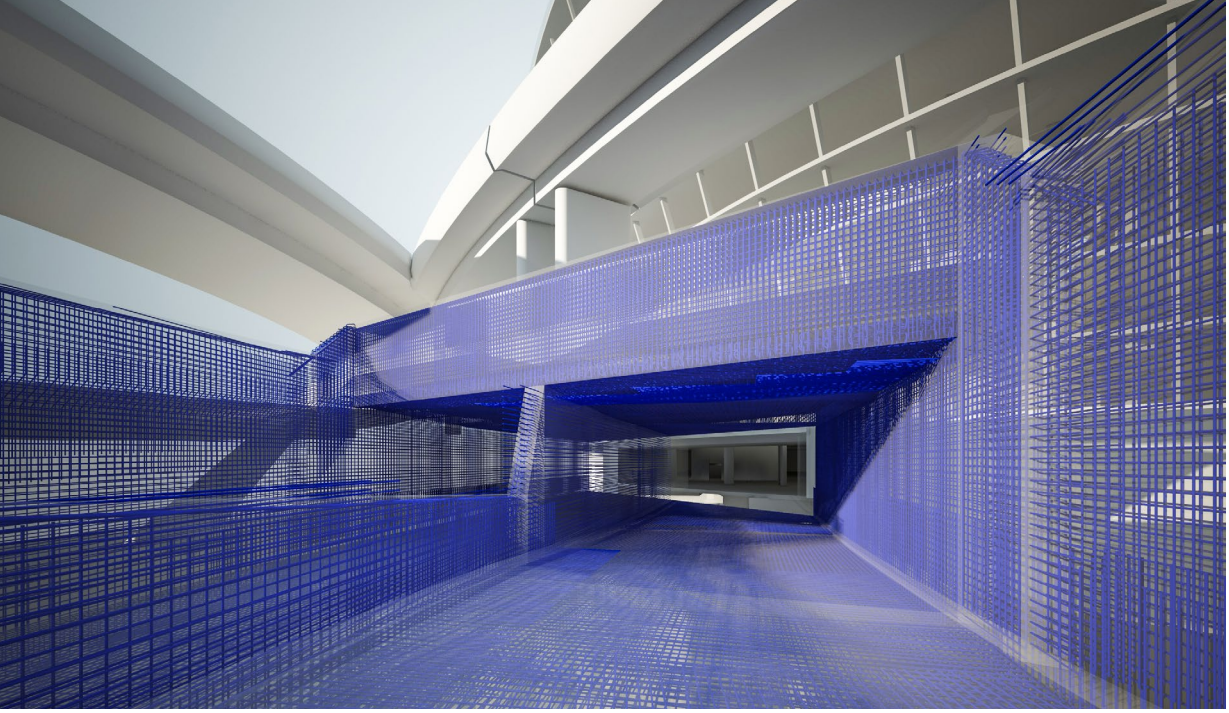


As soon as January 2015, the preparatory and civil engineering work was started for the implementation of the major project. Four buildings, including the P5 and P40 parking garages, were demolished by the spring. At the same time, construction of the necessary structures for accessing "The Circle" were started. The main drainage pipe from the town of Kloten, which ran though the new development site for historical reasons, also had to be moved. The new building, with its crescent-shaped floor area measuring 37,000 square meters, is accessed via the Flughafenstrasse and the Butzenbüelring. A ramp bridge from the parking garage (P1, P2, P3) access bridge, which eventually leads into the underground parking garage via the Butzenbüelring underpass, serves as the entrance to the underground garage with 520 spaces. The exit from the parking garage is via a separate ramp and leads into the Flughafenstrasse. These entrances and exits are entirely free of intersections, and therefore help to improve traffic safety and ensure that regional bus services operate smoothly. An underpass with its own ramp is under construction in the northern part of "The Circle" between the exit ramp from the parking garage P6 and the Flughafenstrasse as an exit from the delivery center. The delivery entrance is in the southern part of the building complex and is also used to access the planned Hyatt Regency Hotel.

A MULTITUDE OF NEW ACCESS STRUCTURES

In lot 2, the firm dsp Ingenieure & Planer AG in the engineering team with B+S AG is responsible for the civil engineering works for the new building "The Circle", and is working on the following:

- **Central ramp bridge as an actual entrance to the parking level:** a pre-stressed, five-span bridge 108 meters long, and a two-span forking bridge 29 meters long
- **Central ramp:** Open tub structure in ground water, built in stages and in the presence of traffic in close proximity to the Glattalbahn railway
- **Central Butzenbüel underpass:** Closed framework built in stages in the presence of traffic due to lake sediment sensitive to settlement founded on bored piles
- **Flughafenstrasse bridge:** Framework embedded in the subsoil
- **Northern Butzenbüel underpass:** Framework with bored piles (vertical elements) and in-situ concrete slabs (transoms) with a span of 9 meters in cut-and-cover method



With the exception of the central ramp bridge, which is expected to be built in 2018, the construction work on these access structures is either in progress or already completed. "The major challenge is building these structures during normal operation, which is only possible in stages and by performing individual activities overnight," explains Oliver Müller from dsp Ingenieure & Planer. Mr Müller is sub-project manager of civil engineering works for the all the access facilities and the responsible Divisional Head of Bridge Construction at dsp. "Planning the excavation pit for the central ramp, which is right next to the Glattalbahn route, was technically demanding," he continues. Centering for the construction of the central ramp bridge was a major challenge during spatial positioning. According to the current state of planning, this ramp bridge is located in close proximity to a planned protection platform over the Butzenbüelring, which will be necessary to construct the building's partly overhanging facade. The central ramp bridge also crosses over one point of the current exit from the airport drop-off area at a very oblique angle.

STRUCTURES MODELED IN 3D WITH ALLPLAN ENGINEERING

Hüseyin Sancak is the senior design engineer responsible for editing the access structures for "The Circle". The smooth import of 3D data for the existing structures and the planned building complex meant that he had an ideal starting point to integrate the new access structures into these

"THE CIRCLE" FACTS AND FIGURES

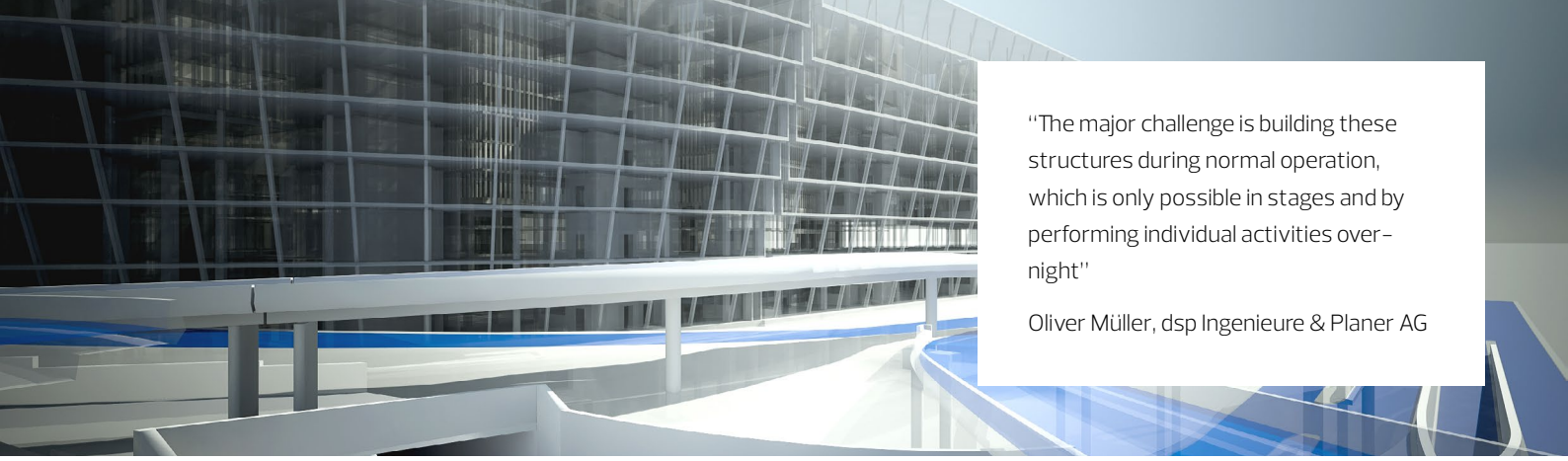
- **Plot area:** 37,000 m²
- **Usable area:** 180,000 m²
- **Parking spaces:** 520
- **Investment:** CHF 1 billion
- **Completion:**
  First stage expected to be complete at the end of 2018
  Second stage expected to be complete in 2019

INVOLVED IN THE PROJECT

- **Owner / developer:** Flughafen Zürich AG
- **Co-investor:** Swiss Life AG
- **Architect:** Riken Yamamoto & Field Shop, Yokohama, Japan

NEW BUILDING ACCESS PROJECTS

- **Building costs:** CHF 20 million
  (Share of civil engineering works approx. 12 million)
- **Project management:** Flughafen Zürich AG Airfield Maintenance
- **Planner:** B+S AG planning association based in Zurich, dsp Ingenieure & Planer AG based in Greifensee
- **Construction:** ARGE Circle
  Marti AG, Eberhard Bau AG, Stutz AG



"The major challenge is building these structures during normal operation, which is only possible in stages and by performing individual activities overnight"

Oliver Müller, dsp Ingenieure & Planer AG

layouts. Although both this data and the digital terrain model were partially developed using software from other providers, the data was exchanged without any problems. Development in the 3D model was particularly useful to ensure that the central ramp bridge was ideally placed and, thanks to the system's visualization feature, various components could also be optimized in terms of their esthetic design. And these are not the only advantages of editing in the 3D model, as Hüseyin Sanca explains: "I can quickly and easily check that the layout is complete during both formwork and reinforcement processes and, in particular, solve geometrically complex details efficiently." At ALLPLAN Switzerland, the central ramp bridge is also seen as a reference structure for the "Section Along Curve" function. "This function opened new opportunities up to us and showed us how to develop a layout in an extremely efficient manner," comments the senior design engineer.

THE CUSTOMER

dsp Ingenieure & Planer AG, based in Greifensee, near Zurich, currently employs more than 90 members of staff. The company has achieved success throughout Switzerland since 1985 in its capacity as an independent engineering and planning company operating in the construction industry, and also operates on an international scale in the fields of its core competencies. ALLPLAN Switzerland helps the company to edit projects in building construction, bridge construction and civil engineering. Because it continuously trains its employees, today more than half of the company's draftsmen and design engineers have the expertise required to build projects as 3D models.

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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