



PROGRESS: 100% - COMPLETED
SWITZERLAND

EUROPAPLATZ REDESIGNED

City quarter Europaallee Zurich Main Station

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In the centre of Zurich, around the main railway station, PORR has been heavily involved in creating the city's new quarter, "Europaallee".

PORR contributed significantly to the rejuvenation of the area through the projects "Exit to Europaallee", "Dismantling the Postbrücke installation platform" and "New bicycle garage". All three projects had to be completed without disruption to ongoing rail operations.

Background

The new Europaallee quarter is being built in central Zurich, near the main railway station, as part of an urban site development project undertaken by SBB Immobilien.

The project is divided into eight stages (A to H), with completion scheduled for 2020.

In the process of extending the main railway station to become Löwenstrasse/Zurich HB Main Station, the new cross-city route (In German Durchmesserlinie, or DML) project was linked to the SBB rail network with four tracks on the second underground level, which is now a through station for the DML line.

The DML and Europaallee major projects make Zurich's city centre considerably easier to reach. Rail links have also been established to other important transport hubs such as Zurich

Project data

Employer	Schweizerische Bundesbahnen (Swiss Railways), SBB AG
Contractor	PORR SUISSE AG
Order type	Public buildings
Project scope	Exit to Europaallee, dismantling the Postbrücke installation platform, building a bicycle garage
Order volume	approx. CHF 25 million (22 million euros)
Construction start	03/2015
Construction end	03/2018

airport; at the same time, a new residential area has been created in the city centre.

PORR established the link between these two major projects.

Overview

As part of the urban development project "Europaallee", PORR handled the structural work for three separate projects at Zurich's main railway station: "Exit to Europaallee", "Dismantling the Postbrücke installation platform" and "Building a bicycle garage".

Work began with the exit to Europaallee, which provides a quick, accessible route for travellers from the Sihlquai underground passage directly to the Europaplatz.

At almost the same time, work started on the Europaplatz bicycle garage, creating parking space for 1600 bicycles beneath the Europaplatz. Finally, in December 2017, work began on dismantling the installation platform. The work was completed in just three months.



WE CARRIED OUT ALL THE BUILDING WORK WITHOUT DISRUPTION TO ONGOING RAIL OPERATIONS.

Helmut-Hans Bertiller
Project Head, PORR SUISSE

The projects in detail

Part 1: Exit to Europaallee

Extending the Sihlquai underground passage, the new exit onto Europaallee forms the last jigsaw piece of an extensive system of passages beneath Zurich’s main station. The existing exit was widened from 10 to 34 metres; it opens onto the 6,000m² Europaplatz.

Although PORR built the stairway, the roof over it was not included in of the order. All building work had to be carried out without interrupting rail operations, which created logistical challenges for the project. For example, a temporary stairway had to be provided for around 150,000 passengers daily. It was frequently necessary to close off a section, put up temporary bridges or walkways, and divide the work into separate stages.

Lots of work was also carried out during off-peak hours and we aimed to keep noise, vibration and dust to a minimum.

Finally, access to all construction areas had to be ensured for emergency vehicles throughout the construction period from March 2015 to September 2017.



The new exit onto Europaallee. Source: PORR

Foundation and underground structural elements

A combined pile and raft foundation was chosen for the underground level. The foundation is subjected to the biggest loads by a ten-storey building in construction area B. Piles with a diameter of 1.20m and a length of 20m were installed in this area; elsewhere, piles with a diameter of 90cm and a length of 15m were used.

The underground structural elements were fabricated from reinforced concrete. The base slab and external walls were protected against humidity with plastic membranes (“white tank”+, or “yellow tank”). Ceilings were sealed with bituminous membranes (polymer bitumen membranes, PBD) and fitted with drainage mats.

Support structure and bracing

The support structure consists essentially of a solid transition slab. Loads are transferred through individual columns and two cores into the foundation.

The passage itself is directly subjected to horizontal load on the southern side due to earth pressure. This area has been braced with reinforced concrete walling and the connection to the station.

The building standing on construction area B also transfers horizontal loads due to wind and earth movements to the transition slab over the underground level.

Technical data

Exit to Europaallee



6,000m²

Area of the Europaplatz

Extension with solid steel columns	50t each
Bored piles	56
Features	Building stands entirely in groundwater
Excavated soil	approx. 1,500m ³



APART FROM THE RAMPS AND EXTERNAL STEPS, ALL THE COMPONENTS FOR THE BICYCLE GARAGE WERE MANUFACTURED FROM RECYCLED CONCRETE.

Helmut-Hans Bertiller
Project Head, PORR SUISSE

Part 2: The bicycle garage

During a construction period from April 2015 to September 2016, the bicycle garage was built entirely underground as a pure reinforced concrete structure.

A bored soldier pile wall was used as a retaining wall for the temporary construction pit system, supported in the construction pit by horizontal girders anchored with diagonal braces.

Although no water pressure was anticipated during construction, we built a structural retention system to protect against water ingress. All newly built underground components, such as the external walls and base slab, were fabricated from waterproof concrete as “white tank” structures.



The 45cm thick ceiling of the bicycle garage is supported by 25cm thick external walls and a regular grid of supporting columns.
Source: PORR

Since 40t vehicles pass over the roof of the bicycle garage, a 45cm thick ceiling was installed, supported by 25cm thick external walls and supporting columns.

The columns were installed in a regular 5.55x5.7m grid on a shallow foundation with reinforcements beneath the columns. All concrete surfaces, such as walls and ceilings, were made from exposed concrete.



Entrance and exit to the bicycle garage. Source: PORR

Technical data

Bicycle garage



approx. 1,800m³

Concrete used

Floor area	2,685m ²
Length	86.5m
Width on the Sihl side	35.6m
Width towards Lagerstrasse	15.7m
Ceiling height	3.15m
Ceiling	thickness = 45cm
Foundation	thickness = 30cm
Excavated soil	approx. 15,000m ³



PORR PLAYED A SIGNIFICANT PART IN THE EUROPAALLEE DEVELOPMENT.

Helmut-Hans Bertiller
Project Head, PORR SUISSE

Part 3: Dismantling the Postbrücke installation platform

To wind up the project, PORR removed the installation platform. This included the removal of four concreted central columns and the abutment structures at each end of the bridge.

Fish passes and public supply pipelines also had to be removed. Due to regulations from the fisheries authority, all work had to be carried out during the winter months.

This made it easier to work in the river bed due to the lower water level in the Sihl, but also avoided disturbing the common nase, a rare local fish species (and other fish species) during the spring spawning season.

Before work began on dismantling the structure, probes were taken at various locations. The results were used to determine effective component dimensions, calculate the expected material quantities and check for the presence of contaminated material or pollutants.

Logistics and embankments

Since the work was taking place in central Zurich, we had to implement a wide range of safety and protective measures to ensure noise and pollutant emissions were kept to a minimum. In addition, traffic could not be disrupted.

In order to allow the dismantling process to be carried out seamlessly, embankments were created to expose the riverbed beneath individual spans; these were designed so that they could be flooded, and would wash away with a flow rate of 10 to 20m³/sec. Embankments that were not washed away were subsequently levelled using machinery.

PORR built special ramps for the dismantling work in the Sihl river bed; these were used to transport away the dismantled material by lorry. All construction machinery was taken out of the river bed at the end of each working day and stored nearby.



In order to allow the dismantling process to be carried out seamlessly, floodable embankments were created to expose the riverbed beneath individual spans. Source: PORR

Technical data

Dismantling the Postbrücke installation platform



approx. 3,600m³

Sent to landfill

Reinforced concrete removed approx. 3,600m³

Weight of steel removed approx. 380t

Plant building and carriageway slabs

A former sand-lime brick plant was located on the bridge, with a volume of around 650m³.

This structure was demolished using an excavator in the standard way. The 20-50cm thick carriageway slabs were then removed in segments corresponding to the exposed spans. In total, 450m³ of concrete and around 380t of steel were removed.



Around 380t of steel was removed when the old Postbrücke was dismantled. Source: PORR

Bridge support structures and sealing slabs

The concrete slabs used to seal the river bed were bolted laterally onto the existing supports using shear anchors, or anchored to the sheet-pile wall supports using welded stud shear connectors. Intermediate supports were fabricated from reinforced concrete wall panels.

The bridge support structure and sealing slabs for the river bed beneath the bridge were dismantled as the bed of each span was exposed. The support structure was dismantled from above. The bridge carriageway slabs were used as a working platform for the dismantling machinery.

Lateral supports and finishing work

The lateral bridge supports comprised sheet-pile planks and concreted bridge supports, plus driftwood deflectors and a flood gate structure. The driftwood deflectors were upstream of the bridge supports. The sheet-pile walls were panelled with steel plates. Cross girders had also been installed to provide horizontal bracing. There were also sloping bars fitted on the sides of the platform.

All sheet-pile walls had to be removed in order to meet official requirements; this involved removing around 1,300m² of sheet-pile walls by surface area.

Once dismantling work was completed, a renaturing and rejuvenation process was initiated, during which new guardrails were installed on the remaining parts of the Postbrücke and surfacing work was carried out.

Summary

PORR has made a significant contribution to the sustainable development of the city of Zurich in the course of these three projects developing the Europaallee quarter and its links to the main railway station.

Why is this sustainable development? Because the city-centre quarter combines living and working facilities, because the projects create links between public transport and cycling, and because the renaturing activities around the Postbrücke have created habitats for native species.

All our projects were completed on schedule and to the full satisfaction of the principal and designing architects.