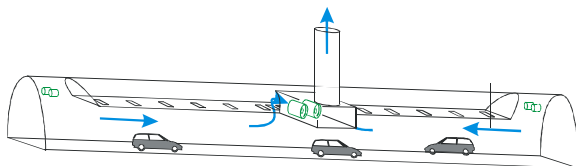




Surrounding area of northern tunnel portal



2012 annual mean of PM10-concentration at the northern tunnel portal without (above) and with (below) air extraction; MISKAM simulation



Tunnel ventilation during normal operation: longitudinal ventilation with central air extraction

Description

Today, the city of Starnberg suffers from heavy traffic passing the city centre. The bypass-tunnel will provide an alternative route to Munich along the federal road B2. The tunnel is single tube for two-way traffic.

To provide an adequate level of safety during emergencies, the 1'878 m long tunnel will be equipped with a local smoke extraction using remote controlled smoke dampers. The longitudinal air flow will be controlled by means of jet fans.

The air dispersion study led to the conclusion that portal discharge of polluted air should be minimised in order to improve air quality in the vicinity of the tunnel portals. Therefore, the ventilation system for normal operation is of longitudinal type with central air extraction. Fresh air is introduced at both tunnel portals. Exhaust air is extracted in the central section of the tunnel and discharged through an exhaust stack. This allows an effective dilution of pollutants.

Services

HBI Haerter Consulting Engineers was responsible for the air dispersion study and for the ventilation concept design of the bypass-tunnel.

- Calculation of vehicle emissions applying data from the German Umweltbundesamt
- Modelling and air dispersion calculation in the vicinity of the tunnel portals using MISKAM, a CFD-type dispersion model
- Modelling and air dispersion calculation for exhaust air from the stack using a Gaussian model
- Ventilation concept design following the German design code RABT-2006
- Ventilation design for normal operation (tunnel air quality and reduction of portal air discharge) as well as emergency operation
- Technical advice on objections during project approval
- Technical advice during community consultation meetings as part of project approval