

## Widening of A8 motorway South of Munich to the German-Austrian border

### General information

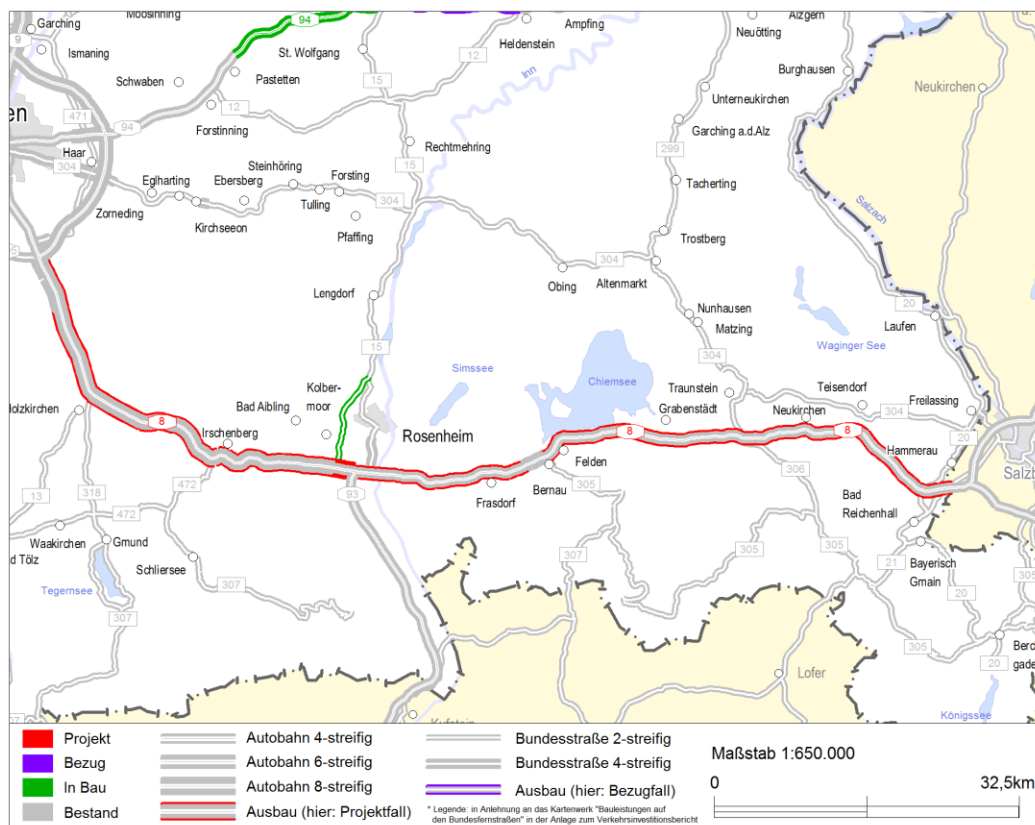
This project regards the **widening of the transversal section to 6/8 lanes of the motorway A8 from the South of Munich to the German-Austrian border** via Bad Reichenhall, for a total length of 116 km.

The A8 motorway is a major German road axis which crosses the South-Eastern part of the Free State of Bavaria<sup>1</sup>. It is part of the TEN-T Core Network, specifically the Rhine-Danube CNC and connects Germany with Austria, linking Munich to Salzburg.

As regards the **relevance of the project**, the widening of A8 motorway from Munich to the state-border with Austria has been identified as a priority project in the 2030 Federal Transport Infrastructure Plan of Germany.

Figure 1-1 provides with the geographical localisation. According to the Federal Ministry of Transport and Digital Infrastructure<sup>2</sup>, this section is considered a **bottleneck of the Rhine-Danube CNC**, leading to congestions and undermining the mobility across a major road infrastructure of Bavaria. The project has been divided in 4 sections, one of which is cross-border (see Table 1-1). With respect to the total length, 17,3 km are considered a bottleneck.

**Figure 1-1: Alignment of A8 motorway and widening project design (in red)**



Source: BVWP (2016)

<sup>1</sup> Definition assumed according to the consulted stakeholders.

<sup>2</sup> <http://www.bvwp-projekte.de/strasse/A008-G010-BY/A008-G010-BY.html>

The project is meant to improve the characteristics of the A8 in terms of traffic safety, of the quality of transport and to alleviate some environmental issues (e.g., dewatering<sup>3</sup> and noise).

Being part of the motorway network of Germany, the A8 is a tolled road only for trucks of weight above 7,5 tonnes. Distance based rates are charged for the use of the infrastructure and an amount is calculated for the pollutant emissions caused by the vehicle. For users of motorcycles, cars and vehicles up to 7,5 tons and buses, the passage of motorway sections in Germany is free.

The **project promoters** are the Ministry of Transport and the Free State of Bavaria.

**Table 1-1: Sections, length, number of lanes and bottlenecks of A8 motorway**

N.	Section	Length [km]	Extension to n. lanes	Bottleneck [km]
1	Munich-Holzkirchen	15,8	8	5,9
2	Holzkirchen-Inntal	29,8	8	3,9
3	Inntal-Traunstein/Siegsdorf	44,9	6/8	7,5
4	Traunstein/Siegsdorf-border AT	25,5	6	0
<b>Total (Munich-border AT)</b>		<b>116,0</b>	<b>6/8</b>	<b>17,3</b>

Source: BVWP (2016)

### Technical description

The widening project of the A8 would allow to achieve technical compliance with the current standards for motorways. The A8 motorway is one of the oldest in Germany. It was built between 1934 and 1939 and shows the typical features of a **pre-war motorway**.

This 4-lane infrastructure is in **poor conditions** and, in some cases, has serious damages. The width is below standards, the existing radii sequences and alignment elements do not meet current requirements in terms of position and height. Lateral lanes are missing and this is dangerous in the case of accidents or vehicle defects. The central separation of the carriageways is too narrow. The existing route is without clothoids<sup>4</sup>, with excessive long longitudinal inclinations, small radii and transverse inclinations. The acceleration lanes are too short and lead to obstructions of the traffic flow and to an increase in the risk of accidents. Drainage is not assured by the poor quality of the pavement and, generally, there is no noise protection barriers. The reference source does not provide with specific information about major civil structures of this project.

Table 1-2 summarises with respect to the **estimated investment<sup>5</sup> and maintenance or replacement costs** of the entire project and per each section. The total estimated investment cost accounts for approximately €1,4 billion. The investment cost per km varies in the interval €6-16 million/km.

**Table 1-2: Estimated investment costs per section and per km of construction [€ million] of A8 motorway**

N.	Section	Length [km]	Total investment cost [€ million]	Unit investment cost [€ million/km]	Total maintenance costs [€ million]
1	Munich-Holzkirchen	15,8	98,8	6,3	98,8
2	Holzkirchen-Inntal	29,8	181,5	6,1	181,5
3	Inntal-Traunstein/Siegsdorf	44,9	425,3	15,7	425,0
4	Traunstein/Siegsdorf-border AT	25,5	376,5	14,8	376,5
<b>Total (Munich-border AT)</b>		<b>116,0</b>	<b>1.360,1</b>	<b>11,7</b>	<b>917,4</b>

Source: TRT elaboration on BVWP (2016)

<sup>3</sup> Recovering of contaminated water.

<sup>4</sup> Transition curves placed between a straight section and a turn with constant radius of curvature.

<sup>5</sup> Without planning costs.

There is not information available regarding construction **costs breakdown by category**.

## Project implementation

As regards the implementation schedule, the construction phase is expected to last 61 months (i.e., approximately 5 years), but there is no complete information available with respect to the start/end date of the project as a whole. The only timing available refers to the sections Rosenheim-Achenmühle (i.e., 2016-2021) and Achenmühle-Bernau (i.e., 2017-2023)<sup>6</sup>.

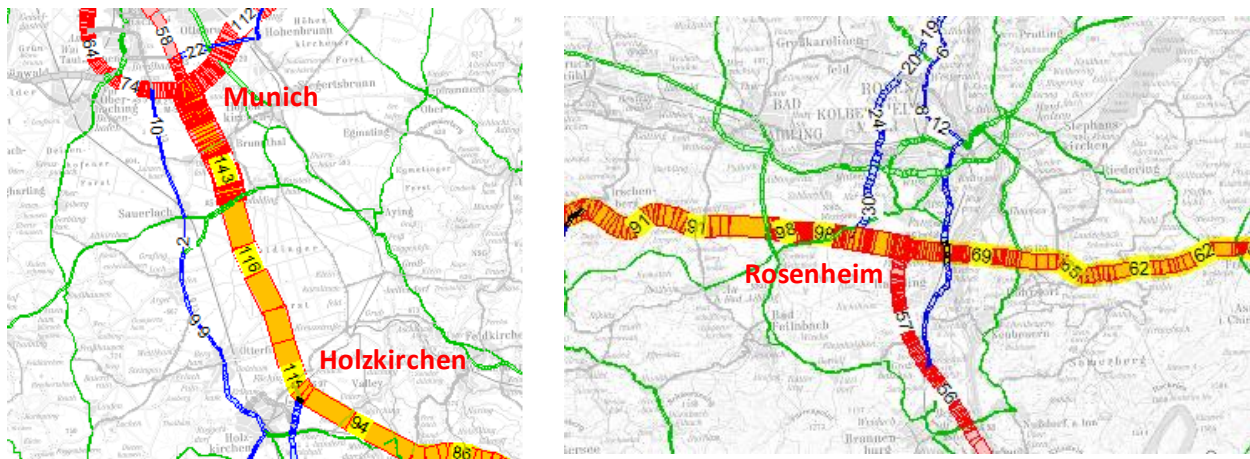
## Transport demand

Information on the transport demand is available for the threshold year of 2030, with respect to both reference and project scenarios. Modelling exercises have been carried out to obtain the traffic volumes. There is not information on assumptions for the key driver parameters to elaborate on the trends. There are not specific indications regarding the composition of the demand in terms of segments (i.e., short or long distance).

The share of trucks remains unchanged across the scenarios, being equal to 18% in both reference and project scenarios. The following figures illustrate on the distribution of the traffic volumes along the motorway sections.

The section showing the highest volume is between South of Munich and Holzkirchen, where the daily traffic reaches 144 thousand vehicles per day (see Figure 1-2). Approaching Holzkirchen, traffic drops to 115-94 thousand vehicles per day. Then it raises around the city of Rosenheim to 98 thousand vehicles, in correspondence to the motorway junction with motorway A93 and then drops to 62 thousand vehicles between Rosenheim and Traunstein/Siegsdorf. The less loaded section is between Traunstein/Siegsdorf and the border with Austria with around 46-43 thousand vehicles per day (see Figure 1-3)<sup>7</sup>.

**Figure 1-2: Traffic figures of the sections Munich-Holzkirchen (left) and around Rosenheim (right) in the 2030 for reference scenario [thousand vehicles/day] of A8 motorway**

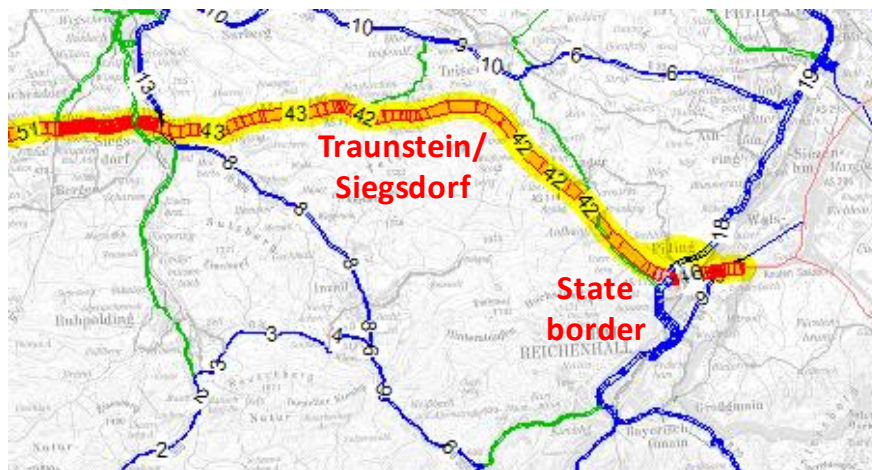


Source: BWVP (2016)

<sup>6</sup> European Commission, 2014.

<sup>7</sup> This value does not include the variant of Piding, which would catch the entire traffic that used to pass in the reference section closer to the city.

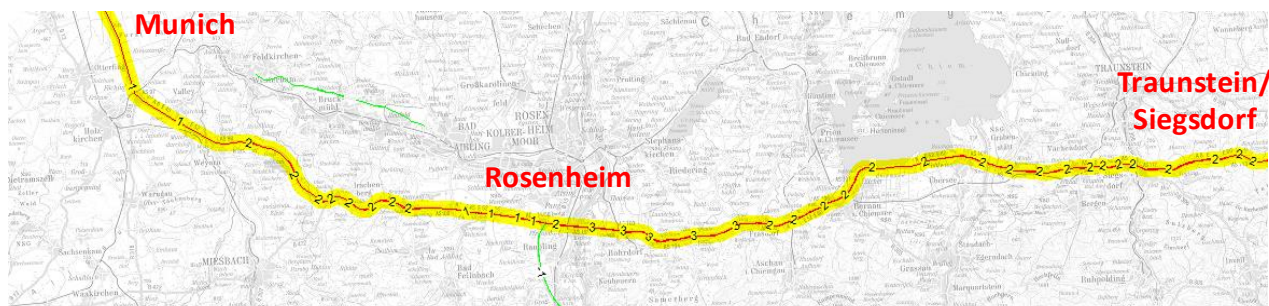
**Figure 1-3: Traffic figures of the section Traunstein/Siegsdorf-state border in the 2030 reference scenario [thousand vehicles/day] of A8 motorway**



Source: BVWP (2016)

The forecasts of the project scenario at 2030 do not envisage a significant variation of daily traffic volumes. Indeed, the average volume from Munich to the state border with Austria is approximately 70 thousand vehicles per day in the reference scenario and 72 thousand in the investment scenario, respectively (i.e., a difference of 2,6%). As shown in Figure 1-4, the section which displays the most significant traffic growth due to the investment is on the east side of Rosenheim, where volume is expected to increase by 3 thousand vehicles per day.

**Figure 1-4: Difference in traffic flows between the investment and reference scenario [thousand vehicles/day] of A8 motorway**



Source: BVWP (2016)

## Financial analysis

The financial analysis has not been carried out. It is worth remarking that the motorway network of Germany is tolled for trucks of weight above 7,5 tonnes. Details are not provided for the financing mechanism.

## Economic analysis

The economic analysis has been carried out drawing on the Methodology for the Federal Transport Master Plan (PTV GROUP et al., 2016)<sup>8</sup>. According to the consulted documents, information exists with respect to the total present variations of the main items, as summarised in Table 1-3 and Table 1-4.

<sup>8</sup> [http://www.bmvi.de/SharedDocs/DE/Anlage/VerkehrUndMobilitaet/BVWP/bvwp-methodenhandbuch.pdf?\\_\\_blob=publicationFile](http://www.bmvi.de/SharedDocs/DE/Anlage/VerkehrUndMobilitaet/BVWP/bvwp-methodenhandbuch.pdf?__blob=publicationFile).

There are no indications neither regarding conversion factors from financial to economic inputs, nor for assumptions on the residual value of the investment.

The appraisal period assumes 5 years for the construction phase plus 32 years for the operating phase. The bulk of the benefits is expected from travel time savings of cars and this is followed by reduction of vehicles operating costs and safety. On the other hand, external effects are expected to negatively impact on social welfare.

The economic performance indicator shows that the project is viable, as the benefit/cost ratio is equal to 1,2. The ENPV and the EIRR are not calculated. There are not indications on a sensitivity analysis of the economic appraisal.

**Table 1-3: Estimated benefits of the project of A8 motorway**

Item variation	Annual benefit [€ million]	Total present value [€ million]
Vehicle operating costs for passengers and freight transport	11,438	214,018
Maintenance and operating costs of the infrastructure	-0,699	-13,084
Safety	10,904	204,030
Travel time of passenger transport	38,111	713,117
Travel time of goods transport	1,916	35,852
Greenhouse gases emissions	-1,230	-23,010
Noise emissions	-0,046	-0,864
Local polluting emissions of which:	-5,243	-98,106
<i>Nitrogen oxide emissions (NO<sub>x</sub>)</i>	-0,965	-18,061
<i>Carbon monoxide emissions (CO)</i>	-0,049	-0,915
<i>Carbon dioxide emissions (CO<sub>2</sub>)</i>	-4,015	-75,120
<i>Hydrocarbon emissions (HC)</i>	-0,011	-0,207
<i>Particulate matter emissions (PM)</i>	-0,201	-3,756
<i>Sulphur dioxide emissions (SO<sub>2</sub>)</i>	-0,003	-0,047
Other monetised effects <sup>9</sup>	1,071	20,039
<b>Total estimated benefits</b>	<b>56,222</b>	<b>1.051,996</b>

Source: BVWP (2016)

**Table 1-4: Estimated cost of the project of A8 motorway**

Item	Cost [€ million]	Present value of costs [€ million]
Planning activities	150,17	-
Construction works	952,13	-
<b>Total estimated investment costs</b>	<b>1.075,29</b>	<b>903,95</b>

Source: BVWP (2016)

## Environmental analysis

An environmental assessment has been carried out with respect to the four sections of the project. The analysis concluded that impacts are in the low/medium range and localised in specific points. The information available reports on the main issues encountered by the alignment of the motorway and the protected areas crossed. Graphical information is available in form of charts showing the protected areas crossed. The information available are summarised in Table 1-5.

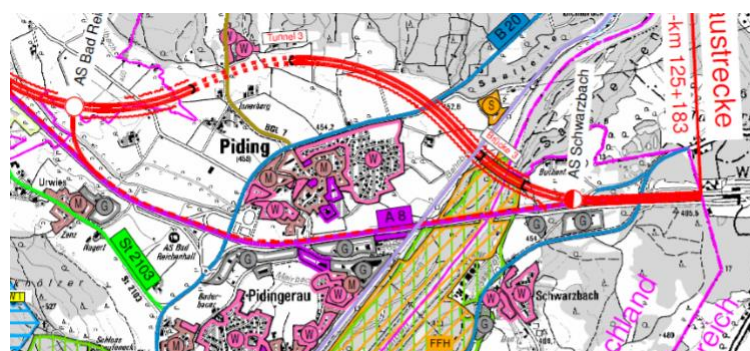
<sup>9</sup> Not specified.

**Table 1-5: Description of the environmental effects of the project of A8 motorway**

Section	Estimated level of the impact <sup>10</sup>	Type of expected impact
Munich-Holzkirchen	Low	The excavations are carried out moving terrain between Brunenthal and Sauerlach, mainly through forest areas (Hofoldingner Forst). Natura 2000 sites are not affected.
Holzkirchen-Inntal	Medium	The project runs through territory of the counties of Rosenheim and Miesbach over strongly moved terrain with forest and agricultural areas. Two flora and fauna habitats (i.e., FFH) are crossed by bridges. Two further FFHs are clearly located in the active zone. Impairments are possible for these FFH areas. A further FFH area is located in the edge of the active zone, but impairments are excluded.
Inntal-Traunstein/Siegsdorf	Medium	The project runs from the Inn valley to Traunstein/Siegsdorf. It is located in a hilly landscape with grassland and wooded areas. Two overlaying FFH and bird protection areas on the Chiemsee lake are intersected. Significant impairments cannot be excluded. Two additional FFH and bird protection areas are south of the project on the Chiemsee, also here considerable impairments cannot be excluded. In order to improve ecological continuity, five new underpasses will be constructed.
Traunstein/Siegsdorf -border AT	Medium	To address environmental issues, a different alignment of the project has been developed in the municipality of Piding. As alternative, a northern bypass has been considered (see <b>Napaka! Vira sklicevanja ni bilo mogoče najti.</b> ). This variant is more cost-effective for nature protection and is less demanding in terms of surface requirement. Developing northern bypass, there is also the possibility of the integration of the Piding and Mauthausen areas hitherto separated by the A8. The cost of both variants is comparable. Both variants cross the FFH area of Marzoller Au and lead to considerable impairments.

Source: BVWP (2016)

**Figure 1-5: Localisation of the variant at Piding**



Source: BVWP (2016)

Widening the A8 motorway, modern **noise protection systems** will be necessary to limit disturbance in the residential areas. The new noise protection facilities will be installed during project implementation according to the noise protection legislation. New active measures (e.g., noise barriers and walls) will be accompanied by strict speed limits in the vicinity of the populated areas.

<sup>10</sup> With respect to a qualitative scale of assessment, namely: low medium and high. The reference source does not provide explanation regarding the basis of the qualitative scale of assessment.

## **Safety levels**

There is **no specific information on safety issues and black spots**, before and after project implementation. However, the socio-economic analysis highlights a significant amount of benefits derived from safety.