Construction of two dual-carriageway sections as continuation of the A5 North motorway

General information

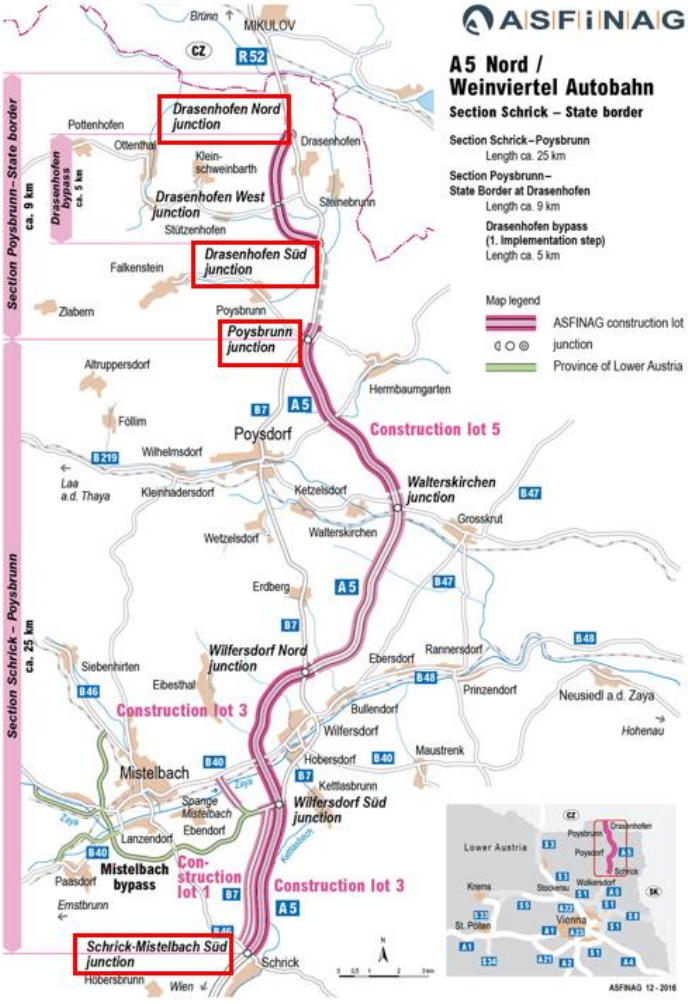
The project concerns the construction of two dual-carriageway sections as a continuation of the A5 North motorway. The two sections involved are **Schrick-Poysbrunn** and **Poysbrunn-state border with Czech Republic** (including the **bypass of Drasenhofen**). The total length of the two sections is 33 km.

The A5 North motorway is a road axis crossing the North-Eastern territory of Austria. It is connected with the expressway R52 in the territory of the Czech Republic. This link is of great significance for the economic integration of the two countries and for the enhancement of the interregional connection. The implementation of the project would ensure a high-quality accessibility to Vienna and become the main route between Vienna and Brno.

As regards the **relevance of the project**, the construction of the A5 North motorway is also identified as a priority transport project in the General Transport Plan up to 2025.

The involved road sections are part of two Core Network Corridors, namely the Baltic-Adriatic and the Orient-East/Med. In spite of its relevance, the A5 North can be considered a **missing link** on the two abovementioned CNCs. Figure 2-1 shows the localisation of the project.

Figure 2-1: Localisation and design of A5 motorway



Source: ASFINAG (2017)

Moreover, the completion of the A5 North motorway is expected to divert most of the traffic from the B7 (i.e., the Brünnerstrasse), which crosses several towns along the alignment. Indeed, the **traffic diversion** from B7 to A5 will prevent small villages from intense truck traffic flows, thus reducing polluting emissions, congestions, noise and road accidents.

Being part of the motorway network of Austria, the A5 is a tolled road. A time-based tolling system (i.e., vignette[1]) is applied for vehicles up to 3,5 tonnes. A distance-based tolling system is applied for trucks and buses, with surcharges calculated depending on the pollutant emissions (i.e., according to engine EURO class) and noise (i.e., day and night time periods).

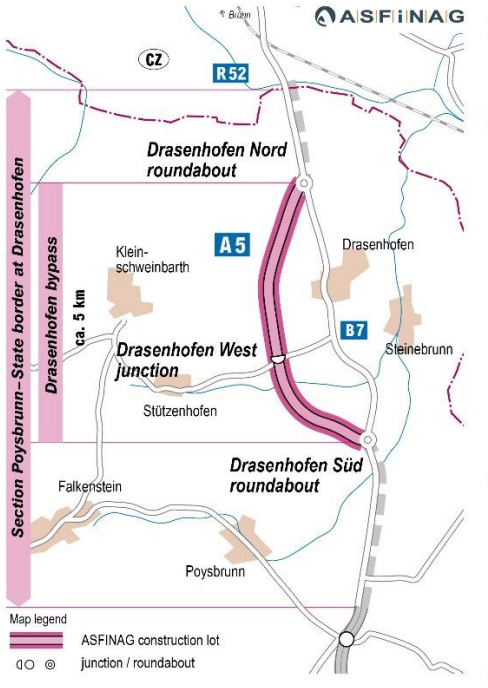
The project promoter is **ASFINAG**, the fully public-owned concessionaire in charge of motorway network management of Austria.

Technical description

The completion of the A5 North motorway consists of two sections for a total length of approximately 33 km: the Schrick-Poysbrunn section (i.e., 24,73 km) and the Poysbrunn-state border section (i.e., 8,74 km - of which 4,90 km to bypass the Drasenhofen).

The transversal section of the new motorway assembles two dual-carriageways, a central separation and emergency lanes. The project is a mix of greenfield and brownfield sections. The motorway will be built ex- novo except for the short sections between Poysbrunn and Drasenhofen South and from Drasenhofen North to the state border. The brownfield part refers to those sections of the road B7 that will be widened and adapted to designed motorway standards (see Figure 2-2).

Figure 2-2: Brownfield and greenfield sections of A5 motorway



Source: ASFINAG (2017)

[1] Three types of vignette are available for road users with duration of 10 days, 2 months and one year, respectively.

Regarding the civil works, the construction of **56 bridges is envisaged,** of which 48 on the section Schrick-Poysbrunn and 8 on the section Poysbrunn-state border.

From the available documents, it is not possible to depict a detailed description of the entire projects in terms of technical characteristics. The only available information concerns the last lot and the traffic control section of the section Schrick-Poysbrunn. The **total estimated investment costs** amount to **€ 444 million** (see Table 2-1). Information is not provided regarding costs breakdown or incidence of the civil structures (i.e., bridges) for this project.

Table 2-1: Estimated construction costs of the sections of the A5 motorway

Section	Total estimated cost [€ million]	Cost per km [€ million]
Schrick-Poysbrunn	304	12,29
Poysbrunn-state border	140	16,02
Total	**444**	**13,27**

Source: EC (2014a)

Project implementation

As regards the **project implementation schedule**, the section from Schrick to Poysbrunn will be constructed in phases developing 4 large lots. The section from Poysbrunn to the state border near Drasenhofen will be constructed in two phases.

For the construction of the A5 section **Schrick-Poysbrunn**, the works are expected to be finished by the end of 2017. In the middle of 2015, the main installations were completed. Only minor changes are being dealt in the course of the remaining construction measures[2].

As regards the section **Poysbrunn-state border**, the construction works have been divided into two phases. The first phase concerns the construction of the two-lane Drasenhofen bypass. The second phase regards the widening of the road B7 to a four-lane motorway configuration, namely two lanes for each direction with hard shoulders. Table 2-2 shows the construction works **timeline of all the sections**.

Table 2-2: Construction timeline of the A5 motorway

Section	Construction start year	Construction end year
Schrick-Poysbrunn	2015	2017
Drasenhofen bypass	2017	2018
Poysbrunn-state border	2025	2027

Source: ASFINAG (2016), EC (2014a), EC (2014c)

Transport demand

The estimation of transport demand is based on the findings of traffic surveys[3]. Table 2-3 shows the data summarised in ASFINAG (2016) for the traffic of year 2010 and forecasted values of year 2025, with respect to the sections under consideration.

[2] The construction works started in April 2015 with the laying of the Brünnerstrasse (i.e., the B7) and the erection of the Mistelbach clasp (i.e., first lot). This was followed by the construction of the Schrick to Wilfersdorf Nord section (i.e., second lot), where it has been located the new traffic control centre. The third lot goes from Wilfersdorf Nord to Walterskirchen and includes the construction of 14 out of the 48 bridges planned to be built on the section Schrick–Poysbrunn. The last and fourth lot stretches from Walterskirchen to Poysbrunn. The special feature of this lot is that it will be driven downhill for many kilometres due to the characteristics of the terrain.

[3] Information can be found in the technical contribution concerning traffic as part of the documents submitted for the EIA (see ArealConsult, 2015).

The figures of 2010 are the starting point and consider the traffic volume of the road B7. The values of 2025 are provided with respect to the B7 (i.e., the scenario without the project) and assuming the completion of the works planned for the A5 (i.e., the scenario with the project). Information is not provided on how the forecast has been elaborated.

Table 2-3: Traffic figures of do-nothing and project scenarios [number of vehicles per day] of A5 motorway

Road section	Scenario	2010	2025	Annual growth rate [%]
Schrick-Poysbrunn	via B7 (do-nothing)	13.000	17.000-21.000	2,05-4,10
	via A5 (project)	-	20.000-35.000	3,59-11,28
Poysbrunn-state border	via B7 (do-nothing)	7.500	15.000	6,67
	via A5 (project)	-	17.000	8,44
Drasenhofen bypass	via B7 (scenario)	5.600-6.000	14.400-15.400	9,33-10,44
	via A5 (project)	-	14.400-19.700	9,33-15,22

Source: TRT elaboration on ASFINAG (2016)

It is worth observing the annual growth rates of the traffic volumes, as significant variations are expected. Comparing with respect to the projected annual growth rate of the GDP for Austria for the period 2010-2025 (i.e., 1,67%), according to projections of EC Reference scenario 2016 (Capros et al., 2016), the trends obtained are markedly higher. This outcome might be due to the expected share of diverted traffic (and possibly generated) from the B7 to the new sections.

Moreover, regarding the socio-economic drivers and the assumed interval of traffic growth annual rates, there is no available information on the consulted documents.

Financial analysis

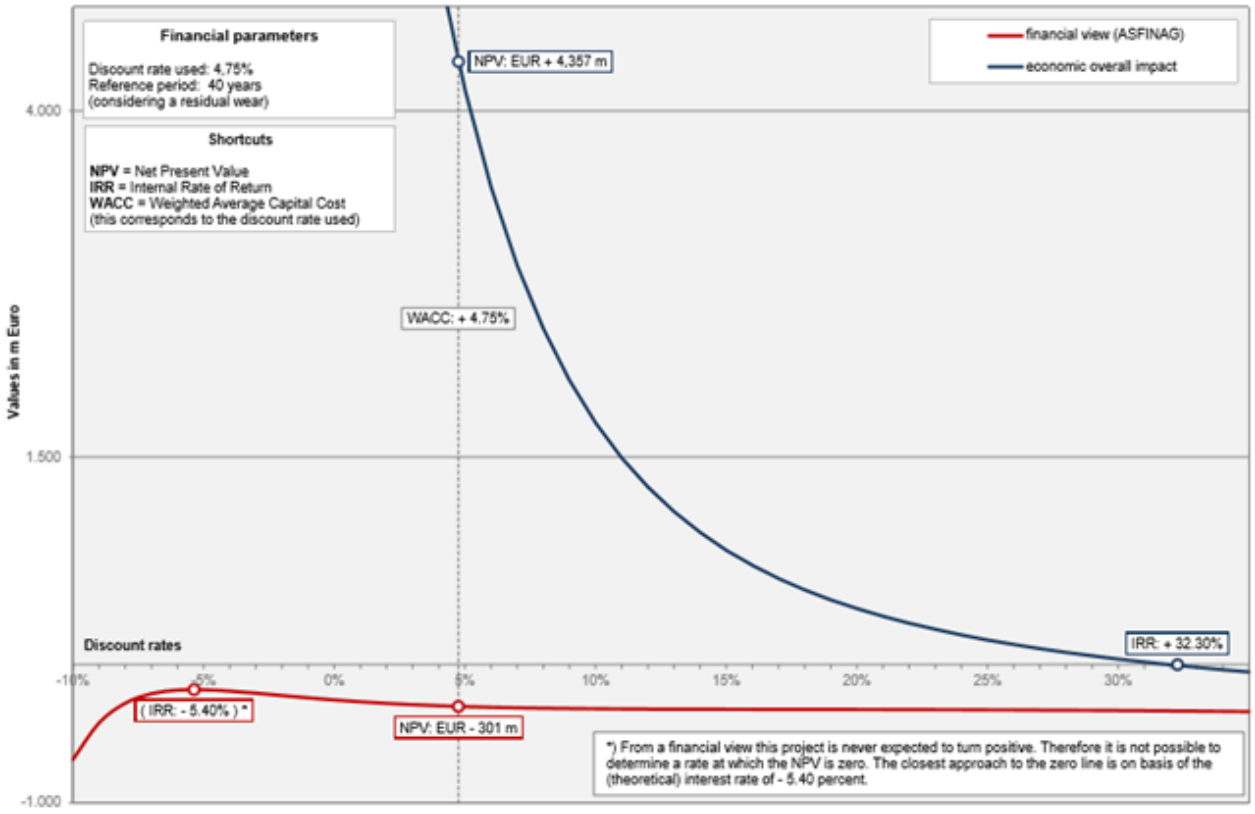
The construction of the A5 North Motorway from Schrick to the state border near Drasenhofen has been evaluated in terms of financial profitability for ASFINAG. The estimated project costs were split according to the timeline for implementation. The evaluation period extends until the year 2050.

According to this scheme, cost items included expenditures for investment, renovation works and operating maintenance. With respect to the revenues: (i) additional income has been considered from induced trucks (i.e., vehicles with weight higher than 3,5 tonnes are subject to distance-based tolls), while (ii) no additional income from cars was taken into consideration, since it has not been assumed that the realisation of this project would lead to additional sales of vignette (i.e., cars are subject to time-based tolls).

Figure 2-3 shows the results of the financial profitability analysis assuming a time frame from 2010 to 2050. The financial profitability analysis resulted in a **negative FNPV of approximately € 300 million, when a discount rate equal to 5% is assumed**. Besides, the financial performance of the project is never expected to turn positive and hence it is not possible to determine a FIRR.

The documents made available do not provide with information regarding the financial sustainability analysis.

Figure 2-3: Financial and economic analysis of A5 motorway



Source: arealConsult (2015)

As far as the sources of financing are concerned, for the section Schrick-Poysbrunn, € 21 million come from CEF grant (i.e., 7%). With respect to the section Poysbrunn-state border, where almost € 50 million are allocated for the construction of the Drasenhofen bypass, the contribution of the region of Lower Austria is equal to € 4,5 million.

Economic analysis

The project has been evaluated relying on the methodology of (i) Austrian directives RVS 02.01.22 and 02.01.23 and (ii) the guideline from ASFINAG concerning the use of cost-benefit analysis for national road projects. Besides, this evaluation has been carried out in accordance with the CEF requirements.

The **appraisal period** of the economic analysis covers 41 years in total (i.e., from 2010 to 2050), including planning and construction phases. The following **scenarios** were developed:

- Do-nothing - no construction of the A5 North motorway in the northern section;
- Investment scenario:
  → expansion stage I: construction of the Schrick-Poysbrunn section and the Drasenhofen bypass;
  → expansion stage II: construction of the complete A5 North motorway from Schrick to the border near Drasenhofen.

The expansion stages I and II are sequential and not alternatives to be compared with each other. The calculated ENPV estimates the total costs and benefits of the step-by-step expansion of the A5 North motorway in comparison with the do-nothing scenario, in which no action is undertaken and the status quo is kept unchanged up to the year 2050.

The **costs** reported in arealConsult (2015) are in aggregate form for both the investment and the operating costs of the infrastructure. The total amounts to approximately € 500,3 million. Indication is not provided regarding the application of conversion factors from financial to economic inputs.

As regards the **travel time costs variation,** significant savings would result from project implementation generating a benefit of approximately € 2.759,4 million, over the appraisal period.

The calculation of the **vehicle operating costs** is based on the results of the traffic surveys. The monetisation of the mileage is estimated in relation to fuel consumption. In the investment scenario, vehicle operating costs are approximately € 1.090 million lower than in the do-nothing scenario.

The evaluation of external costs of road **accident costs** shows a benefit of € 914,7 million.

The monetary evaluation of **traffic noise** is based on the energy equivalent of the noise emission levels and the number of people affected by the emissions. In this respect, a benefit of € 13,8 million is estimated.

The local **pollutants costs** were calculated for the do-nothing scenario and the construction scenario for every year of the appraisal period, ending with an economic benefit of € 3,5 million. With respect to CO_2 the emissions of methane (i.e., CH_4) and Nitrous Oxide (i.e., N_2O), the planned section of the A5 from Schrick to the national border near Drasenhofen is expected to generate additional environmental costs of approximately € 14,5 million.

Regarding the **consumer surplus,** the construction of the Schrick-Poysbrunn and Poysbrunn-state border sections will result in a decrease of the perceived users' costs and will give raise to induced traffic. This induced traffic brings about a benefit of € 90,4 million.

Table 2-4 summarises with regard to the costs and benefits reported above.

Table 2-4: Summary of estimated cost and benefits and economic performance indicators of A5 motorway

Item	Benefits [€ million]	Costs [€ million]
Infrastructure	-	500,3
Travel time	2.759,4	-
Vehicle operating	1.090,0	-
Accident	914,7	-
Noise	13,8	-
Air pollution	3,5	-
Climate	-	14,5
Consumer surplus (induced traffic)	90,4	-
Total	**4.871,8**	**514,8**
Benefit-cost ratio (B/C)		9,46
ENPV (5%)		4.357

Source: arealConsult (2015)

The ENPV accounts for € 4.357 million and the EIRR is 32,30% (see also Figure 2-3). Even in the event of substantive increments in the construction costs, the sensitivity analysis demonstrates that the benefit-cost ratio will remain positive to 7,03, thus remarking the economic viability of the project. The interval of variation assumed for the sensitivity analysis is not provided in the documents.

Environmental analysis

The EIA has been completed for both sections covered by the project. For the construction of the A5 sections Schrick-Poysbrunn, the EIA was completed in 2006. For the section Poysbrunn-state border an amendment to the initial document approved in 2009 was necessary. The revised EIA was thus approved in 2013. After the municipality consultations, the EIA decision was adopted in 2015.

An investment of more than € 3 million per km is expected for mitigation measures, involving the following sectors.

- **Noise and vibrations**. To limit noise emissions and vibration, it will be employed alternatively a low-noise wash concrete, an asphalt concrete flooring or a mastic asphalt pavement. Constructors will ensure that in construction sites low-noise equipment is used and that the directly affected population will be previously informed of particularly noisy construction activities.
- **Agriculture, soil and waste management**. Agricultural areas adjacent to the construction sites will be protected by appropriate interventions, and the land temporarily used by construction activity will be re-cultivated. The dust on non-asphalted roadways used for construction operations will be minimised. The functioning of existing drains, water drains and any other existing subterranean facilities will be restored before the completion of the construction phase.
- **Air quality**. During the construction works, protective facilities will be installed where possible on the side of the motorway which is near residential and recreation areas, in order to minimise dust emissions.
- **Pollutant emissions**. Measurements of pollutant emissions (i.e., NO_2, PM_{10}) will be carried out during the construction period and for at least 5 years at selected points. If measurements will exceed the legal threshold, mitigation measures such as speed restrictions will be deployed for residential areas.
- **Forestry**. Before the beginning of the works, all adjacent forestry areas will be isolated from the construction areas with physical barriers. Impairments to the adjacent forestry areas resulting from the construction works will be remedied through re-cultivation after the damage occurred.

Safety levels

There is no other specific information related to safety levels and black spots on the concerned road section. The socio-economic analysis highlights some significant benefits from safety improvements.

In order to address safety issues, in view of reduction of accidents caused by wrongly loaded, overloaded or badly equipped trucks, a **traffic control centre** in the section Schrick-Poysbrunn has been planned for construction.