SPRÁVA ŽELEZNIC

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Brno New Main Train Station

Brief

International Urban Transport Architectural Two-Phase
Restricted Project Competition

P01

International urban-transport-architectural two-phase restricted project competition for the

Brno New Main Train Station

Contracting Authorities

Správa železnic (Railway Administration) and Statutární město Brno (Statutory City of Brno)

Organiser of the Competition and the processor of the Competition Conditions:

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Contents

For a hardly believable period of ninety-four years, Brno has been deciding on the location of its main train station. The construction of the new station almost began several times, but historical events such as the Great Depression in 1929, World War II and the post-war reconstruction, or the occupation in 1968 always postponed it.

The design of the new main train station and public spaces in the forecourt and in the area behind the station will fundamentally affect the development of Brno – one of the most modern train stations in Europe will be created, surrounded by a whole new city district. The impact the new train station and the new district created around it is comparable in the city's history only with the removal of the city walls in the second half of the 19th century.

List of acronyms used:

Bpv	Baltic system of altitudes after adjustment
BUS	bus
EPS	Fire Alarm System
EZS	Electronic Security System
HPP	gross floor area
IAD	Individual car transport
IDS JMK	Integrated Transport System of the Southern Moravia Region
K+R	short-term parking area of the "kiss and ride" type
MHD	Public transport
P+R	long-term parking area of the "park and ride" type
SJKD	North-South Railway Diameter
VHD	Public transport
VZT	heating, ventilation and air-conditioning

1 Brief

Design the building of the new **main train station,** including the roofing and the appearance of the platforms, the layout of the interior spaces, the location of the main dispatch hall, the appearance of the facades of the railway buildings, the appearance of the railway body and the design of bridge structures. Prepare the designs on the basis of the Feasibility Study of the Brno Railway Junction (P18), i.e. on an elevated railway bridge body with the track level at a height of 206,750 m Bpv (Baltic system of altitudes after adjustment) and a usable underpass height of 4.8 m for tram and city bus and 4.5 m for long-distance bus and other public communication services.

Also design the optimal location and appearance of the **bus station, public transport transfer terminal**, parking lots, taxi service stations and bicycle storage. The design must take into account both their connection to the urban transport network and their interconnections, especially with regard to the quality of pedestrian movement and pedestrian access through the railway body; the solution must be a comprehensive multimodal transit node.

Design **public spaces** on the north and south sides of the solved area (station forecourt and the area behind the station). Design the new Central Station building, including the bridge body and the area under the station, to help create these adjoining new high-quality public spaces.

Design **new buildings** in the station forecourt and the area behind the station according to the building programme. These buildings must complement the public spaces and be in line with the new main train station building.

FAILURE TO COMPLY WITH THE REQUIREMENTS REFERRED TO IN PARAGRAPH **2.2.1** OF THE CONTEST CONDITIONS CONSTITUES A **REASON TO EXCLUDE** A PROPOSAL FROM THE ASSESSMENT AND TO EXCLUDE THE PARTICIPANT FROM THE CONTEST.

The Contracting Authority recommends respecting the requirements described in more detail in Chapters 1.1 to 1.9. Failure to comply with them is not a reason to exclude the proposal from the assessment nor to exclude a participant from the contest. The quality and complexity of incorporating these requirements into the contest proposal is one of the evaluation criteria of the contest and it will be a subject the jury's evaluation.

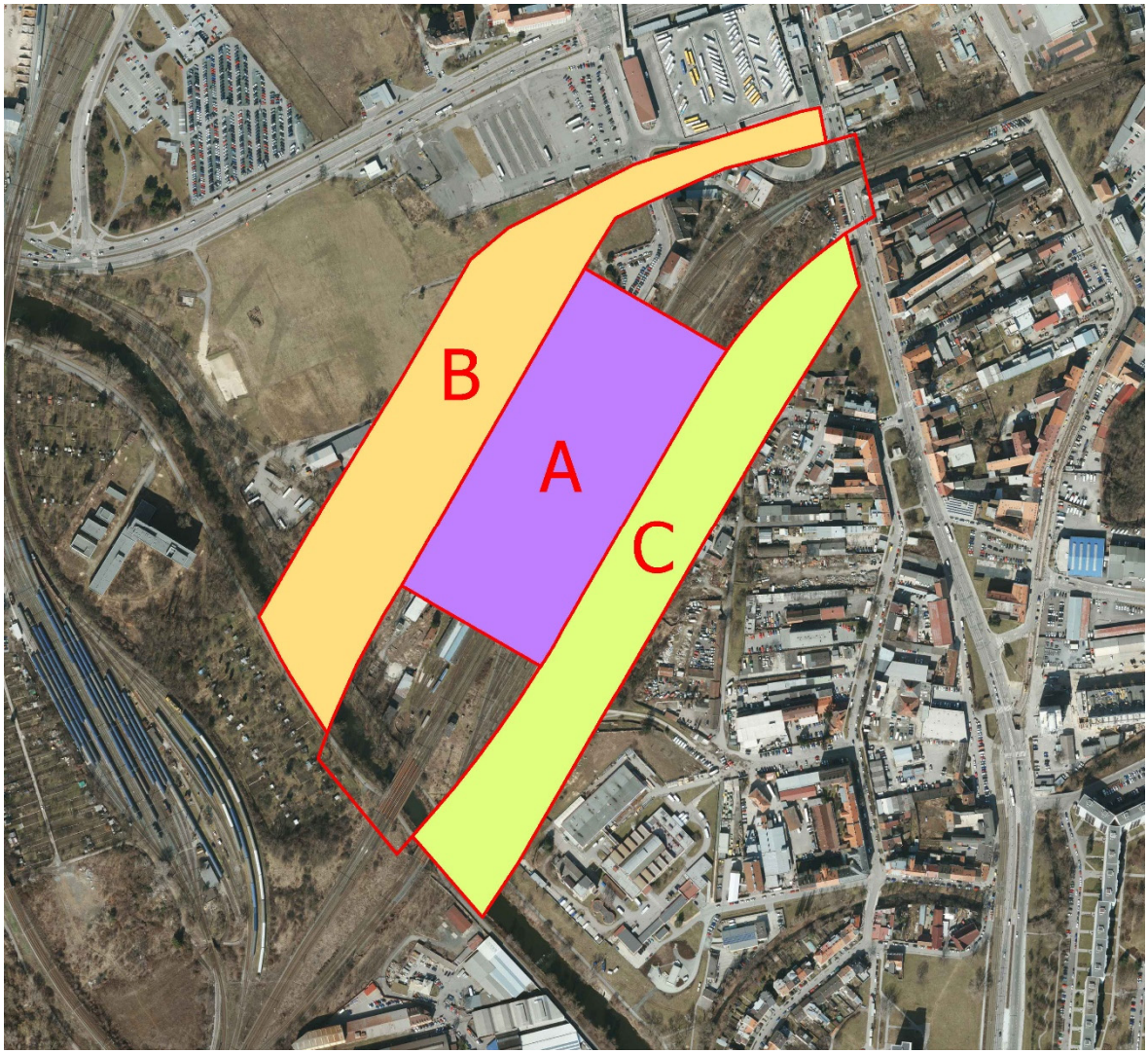
1.1 Solved area

The solved area is located in the cadastral area of Komárov, Štýřice and Trnitá. The area is divided into three parts: the railway body itself and the adjacent station forecourt and the area behind the station.

The railway body is defined by the binding supporting document of the Railway Administration (see paragraph 2.2.1 of the Contest Conditions) and it includes the trackage partly on the embankment and partly on bridges with the track level a height of 206.750 m Bpv (Baltic system of altitudes after adjustment) (see supporting document P18). The scope of this part is defined by bridges over the Svratka River and over Plotní Street, which are part of the area and the subject of the design. Under the body in the space under the bridge structure of the station is defined the "sub-station" area, which is designed primarily for the public areas intended for passengers and non-public areas intended for the proper operation of railway transport.

The northern part – the station forecourt area includes public spaces and areas for construction on the north side of the railway body delimited by the Svratka River, the boundary of the new construction areas according to the valid land-use plan and Plotní Street.

The southern part – the area behind the station includes public spaces and areas for construction on the south side of the railway body delimited by the Svratka River, the boundary of the new construction areas according to the valid land-use plan and Plotní Street.



A – main train station, sub-station area, **B** – station forecourt, **C** – area behind the station

The contest proposal will be placed in the solved area and the table of balances will be filled in only in the scope of the solved area.

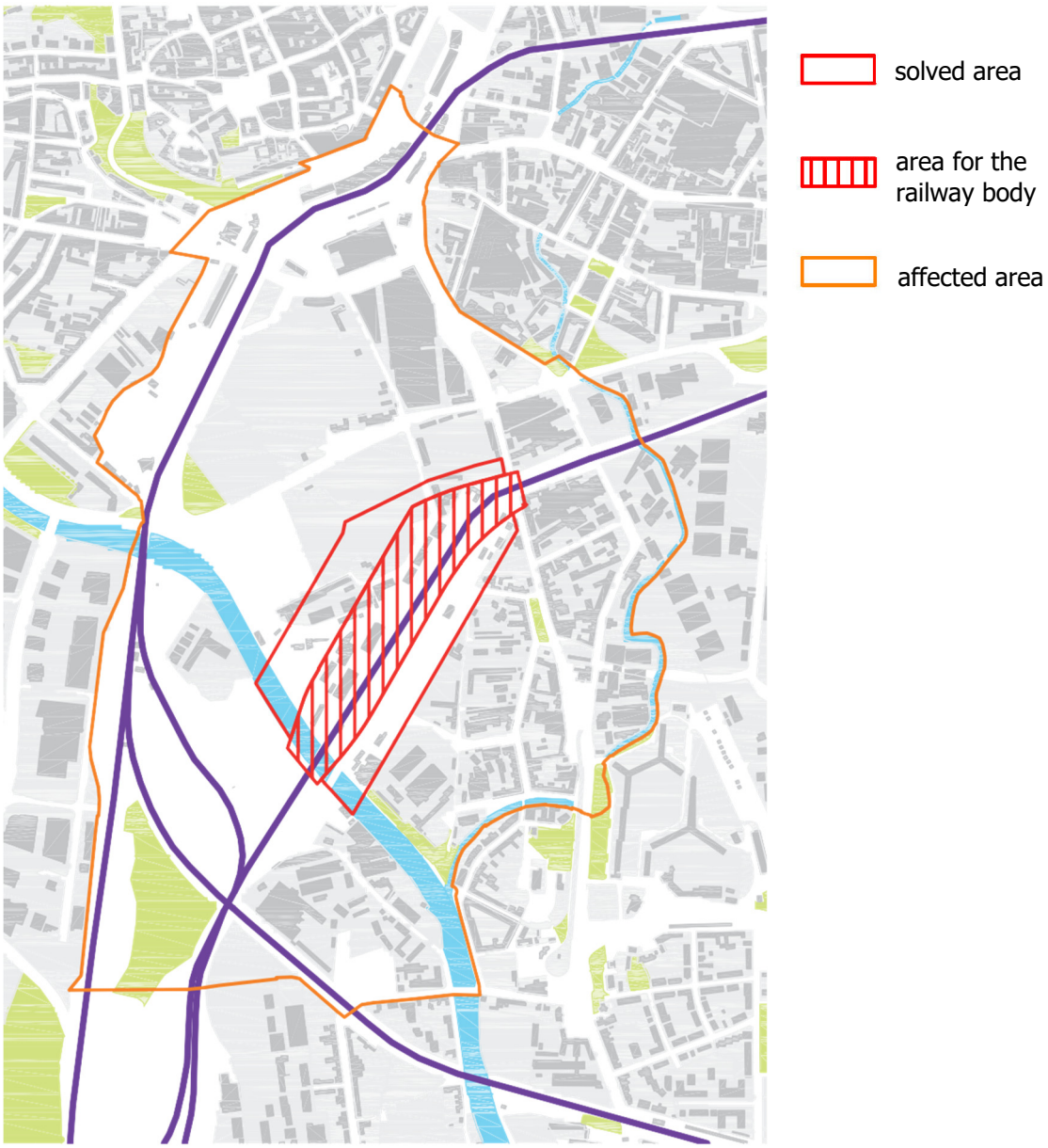
1.1.1 Area of the solved area:

Northern part (station forecourt)	62,061 m_2	6.21 ha
Southern part (area behind the station)	56,311 m_2	5.63 ha
Railway body	117,397 m_2	11.74 ha
of which the "sub-station" area	56,588 m^2	5.66 ha
Total	**235,769 m_2**	**23.58 ha**

To indicate mutual ties and relations in the vicinity, the affected area is further defined, which includes the entire development site south of the historic centre of Brno (the Trnitá site). The areas of the affected area are not the subject of a contest proposal.

1.1.2 Area of the affected area:

Total **1,579,988 m2** **158.00 ha**



1.2 Requirements for the urbanist solution

Design a solution that takes into account the following requirements, i.e. which:

- respects the structure of the new district and takes into account the requirements of the Jižní čtvrť (Southern district of the City) **territorial study** (see P19);
- solves the form of interconnection of the street **Plotní** by the railway body;
- incorporates the building in the urban structure of the city as much as possible and keeps the area **permeable** and minimises the effect of the railway body as a barrier in the area;

- designs the station building as a **dominant feature** of the new district, as an important landmark;
- appropriately integrates the Brno railway junction and the related buildings into the city **skyline**;
- composes the building and public spaces in relation to the new boulevard, the axis of which is terminated on one side by the new train station and on the other by the Cathedral of St. Peter and Paul; addresses the concord between the new station and the historic centre (the effect of the historic centre on the station and vice versa);
- solves the interconnection of the Svratka riverbed and the adjoining banks below the railway body on the basis of the Jižní čtvrť (Southern district of the City) **territorial study** (see P19);
- respects the **anti-flood** measures proposed in the Documentation for the land-use decision Railway Junction Brno and takes into account Study of nature friendly flood control measures (see P20);
- addresses public **spaces** in a multifunctional manner not only as traffic and dispersion areas, but in connection with the surrounding urban functions as important local centres;
- addresses the northern and southern parts of the territory as a public space allowing the free movement of pedestrians and cyclists, safely connected to public transport, and creates places of **residence** with a clear hierarchy and a human scale;
- shapes the northern and southern parts of the area in such a way as to ensure the maximum **safety** of passengers, especially in the event of fire or the risk of terrorist attacks;
- takes into account new **intentions** in the territory (see Chapter 4 Intentions);
- solves the whole solved area in a barrier-free manner.

In the areas north and south of the station building (station forecourt and the area behind the station), it is not necessary to respect the valid land-use plan. With regard to the existing and proposed development of the affected area, design the **new built-up area and new functions** (including parking capacities) according to the building programme. **This built-up area must not conflict with the primary function of the transport hub and it must not restrict its operation.** The number of long-term parking spaces needs to be increased accordingly (see 1.6 Requirements for transport infrastructure solutions).

Legal proprietary relationships in the territory do not have to be taken into account in the design.

1.3 Requirements for the architectural solution

Design a new main train station area, including related buildings and transport infrastructure elements, that will take into account the following requirements, i.e. which will:

- address the construction of the new train station, including related buildings and platform roofing, and related areas with an emphasis on **functionality, clarity, human scale, a pleasant indoor environment, economy, sustainability and minimal impact on the environment**;
- address the construction of the new train station, including the related buildings and platform roofing, and the related areas, adequately to their importance, the expected number of users and the location, **taking into account the planned development of the affected area**;
- address the design of the new train station, including related buildings and platform roofing, **including the** bus station, public transport terminal and taxi service stations;
- solve the **bridge** structures of the railway body in connection with the solution of the building of the new train station and the roofing of platforms and individual structural elements as elements of the interior and which will examine the possibility of illuminating the spaces under the bridges with daylight;

- solve the **bridging of the Svratka river** (bridge in the forecourt – public transport and road connection of the station area – BUS, TAXI, Personal car transport (IAD)); the space under the bridge structures will be adapted for the possible migration of animals moving in the biological corridor along the Svratka River.
- examine the possibility of **illuminating** the areas under the railway bridge over the Svratka River with daylight;
- solve the **interiors** the main assembly and communication areas of the station building – passages, the main passenger hall and platforms and their roofing as an integral and significant part of the space of the new station;
- address the appearance of the railway body, including any noise walls or other measures;
- address the **roofing** of public transport stations (tram, bus, trolleybus), bus station (terminal) and taxi service stations in the northern and southern part as part of the roofing of the whole building or separately, but in a way that corresponds to the overall character of the train station building and which is adequate to the transport importance of the area;
- address the appearance of public spaces and all publicly accessible areas of the trackage;
- design the station building and roofing so as to eliminate the impact of the **noise load of the** rail traffic on current and future buildings in the area.
- Any noise barriers and roofing of public transport sites should be designed to prevent injuries and death of birds in the event of impacts on these areas, so as to protect the birds.

1.4 Requirements for layout solution

A detailed building programme form Annex P21 – Building Programme.

1.4.1 Train station building (sub-station area)

The operation of the new train station building will be divided into a public and a non-public part. Design the layout of the station building so that there are no collisions between the operation of the public and non-public part of the building. More detailed requirements of the Railway Administration for the layout solution are provided in supporting document P21.

Public part

Most of the areas and services offered within the check-in hall will serve passengers and carriers. The expected extent of retail space is based on a market analysis, which was prepared for the needs of the contest. The Railway Administration assumes that it will not be a direct provider of the above services, but that the premises will be leased to the companies that will provide the services.

Non-public part

These are areas intended for the administration of the main train station and for traffic control, but also for areas intended for the administration and management of the operation of a bus terminal with the potential for long-distance transport and public transport.

1.4.2 Platforms

The technical solution of the trackage and platforms, including their arrangement, is obligatorily determined by the supporting document P18 in accordance with paragraph 2.2.1(a) of the

Competition Conditions. On platforms, design grade separated connections (stairs, escalators) so as to ensure smooth and functional passenger management and to allow for easy orientation in the area of the station building. Furthermore, the platforms will be properly equipped with furniture (seating, waste bins, etc.) and an information and orientation system.

1.4.3 Areas in front of the station (forecourt) and behind the station

In the areas in front of and behind the main station building, design new buildings that will supplement the missing functions in the area, while not restricting the operation of the station building (see Article 1.2). Within these areas, use a mix of functions (retail services, offices, hotels, student housing, aparthotels and city logistics services) that will support the potential of the site and create the heart of the new urban structure.

The gross floor area values of individual functions listed in the supporting document P21 – Building Programme are based on a detailed market analysis, which determined the area requirements of individual functions for the use of the site potential.

At the same time, consider locating the new seat of the Regional Directorate of the Railway Administration in the main train station site. More detailed requirements for the layout solution are provided in P21 – Building Programme.

Design a long-term parking area (P + R and employees of the Railway Administration) and a short-term parking area (taxi, K + R) according to the required capacities listed in chap. 1.6.3. Road transport.

Examine the site options and design a parking facility or parking facilities for long-term parking in the sub-station, forecourt and/or the area behind the station.

1.5 Requirements for blue-green infrastructure solution

The blue-green infrastructure solution should be an integral part of the urban, architectural and technical design.

Design an architectural-landscape and water management solution that will take into account the following requirements, i.e. which will:

- coordinate the design of landscaping with water management solutions according to the principles and values of blue-green infrastructure systems;
- address the connection to the existing system of residential greenery, especially the banks of the Svratka River;
- address the landscaping in relation to existing spatial land-use planning documents (P19 – Jižní čtvrť (Southern district of the City) territorial study);
- incorporate the design of blue-green infrastructure into the overall urban and architectural solution so that the individual elements do not form a barrier in places with increased movement of persons;
- present the concept of water management solution with emphasis on rainwater management, which will work not only with the location of the necessary retention volumes, but will also use measures to reduce the runoff of rainwater from the area and will contribute to improving the quality of runoff rainwater into the adjacent watercourse. The design should include a balance of rainwater runoff and calculation of retention volumes;
- apply, in the design of drainage of public spaces, particularly nature-friendly measures that mitigate the effects of climate change and contribute to the improvement of the local microclimate through decentralised facilities that retain rainwater, seep it, evaporate it or clean it near the place of its impact on the earth's surface;

- respects the **anti-flood** measures proposed in the Documentation for the land-use decision Railway Junction Brno and takes into account Study of nature friendly flood control measures (see P20).

1.6 Requirements for the transport infrastructure solution

As part of the transport terminal solution, design a solution for individual modes of transport based on the following requirements:

1.6.1 Bus transport

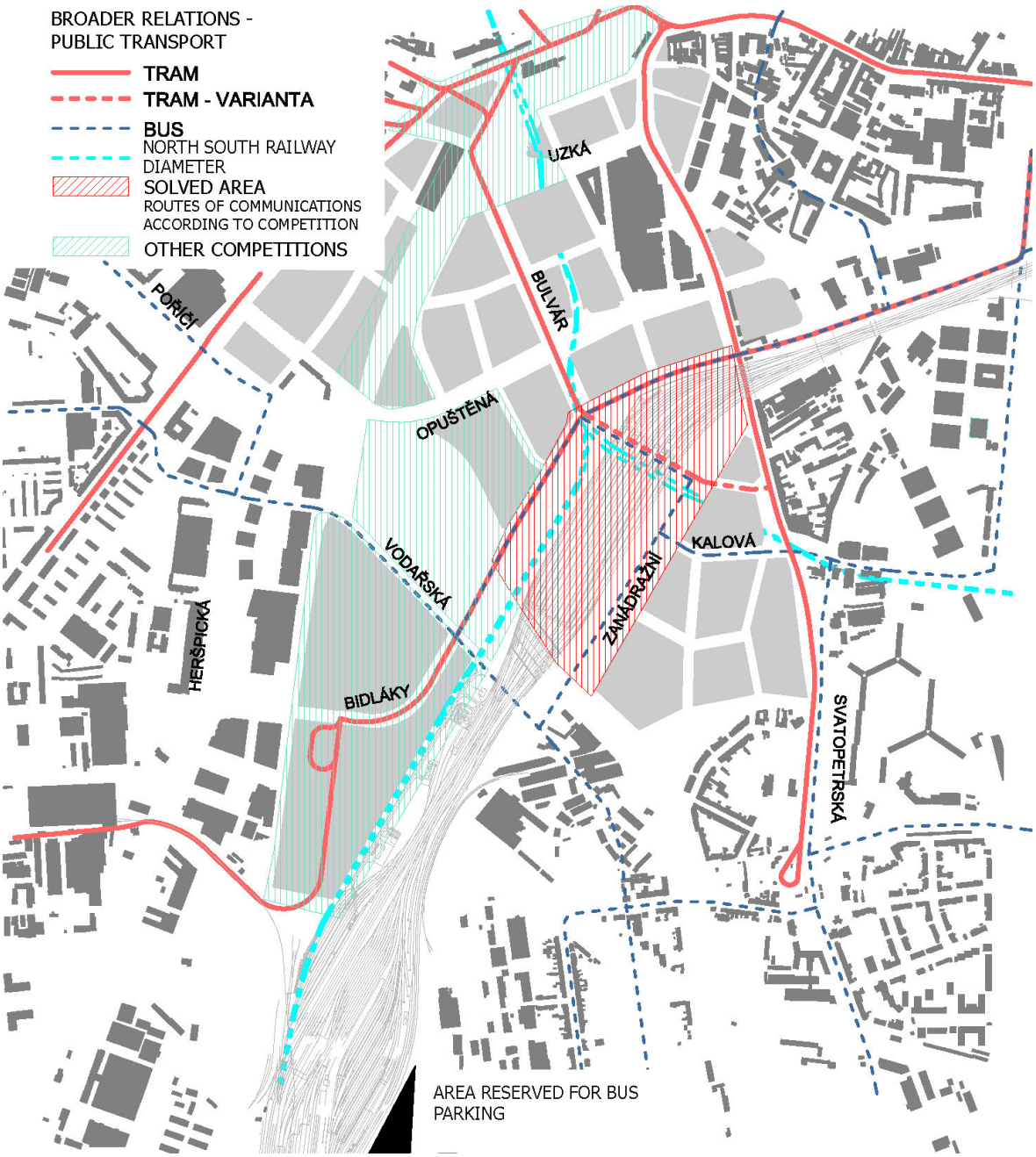
The new main train station will also be a bus station (terminal) replacing the existing Zvonařka and Benešov stations and it will serve mainly for international, long-distance, tour and backbone regional lines – other regional lines according to the already established concept of the Integrated Transport System of the South Moravian Region are or will be terminated at local transit nodes with connections to rail or tram transport.

- Place 40 15-metres-long bus stops. The required dimensions for the arrangement of stops are provided in Annex P26 – Scheme of Bus Stops:
- The bus station (terminal) will be used only for the departure and boarding of passengers, or for balancing the time between arrival and departure up to about 30 minutes (according to the time of day). Parking of buses, including operational treatment, will be carried out outside the area, probably near the railway parking station in Horní Heršpice.
- The bus station (terminal) will also be used by substitute bus transport for the railway; this is reflected in the required number of stops. However, it is appropriate to design backup stops (with limited comfort) for the case of large closures with a capacity of twelve 15-metre buses (type 1 or 2 pursuant to Annex P26).
- Design a way to protect passengers from rain and sun (roofing), while respecting the importance of this bus station (terminal).

1.6.2 Public transport

Two new tram lines will lead to the train station, the first via the future Boulevard from the existing Nové Sady and Hybešova stops and the second via Košťálová Street (it is called Nová Rosická in the Documentation for the land-use decision Brno Railway Junction) from Plotní Street, where the tram line from Dornych Street is now being transferred. In the future, other tram lines are also planned (see the BROADER RELATIONS – Public Transport diagram) and for the time being, transport in these directions will be provided for by non-rail transport and the North-South Railway Diameter.

- Buses in Brno often provide planned and operative replacement of trams (reconstructions, accidents, breakdowns, etc.) and fully provide transport in the nighttime, therefore it is required to allow non-rail public transport vehicles to travel on the tram tracks.
- There is also trolleybus transport in Brno, but so far it is not certain whether the lines serving the new main station will be bus, classic trolleybus or battery-operated trolleybus, so in the following text, all non-rail public transport vehicles will be collectively referred to as the "city bus".



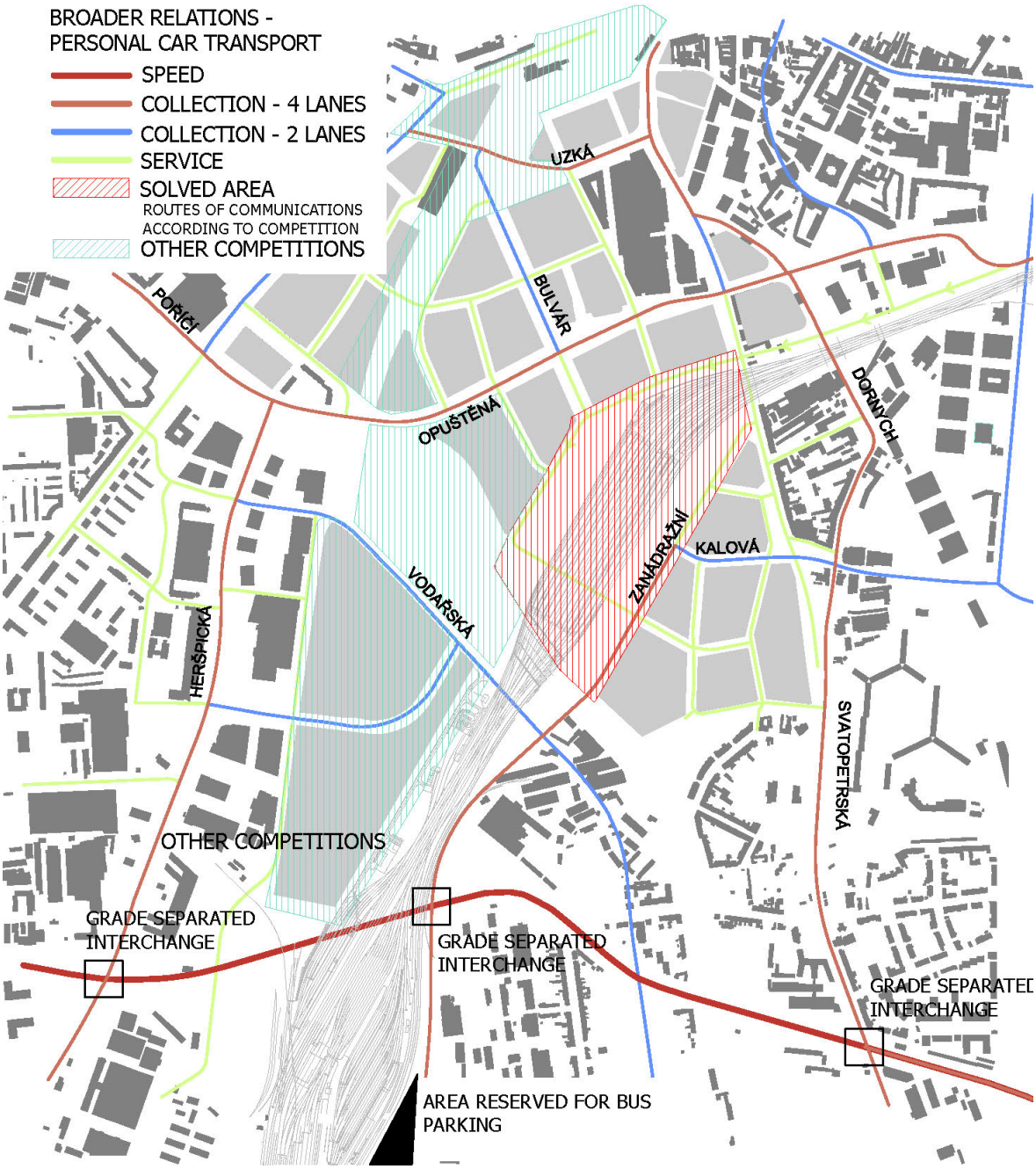
- The transport lines has changed over the years for many reasons (network expansion, closures, change of transport links, increase or decrease of the budget, etc.), so the contracting authority prefers a flexible arrangement of the transit node, i.e. without a link to a specific line.
- It is suitable to allow the turn-around of trams in the vicinity of the new main train station and it is necessary to allow the turn-around of city buses. The smallest radius of the tramline axis is required to be 25 metres.
- At least 4 usable platform edges 80 metre long (for 2 tram trains with a length of 40 m) are required, which will also be used by city buses. Furthermore, 4 usable platform edges 40 metre long (or 2 80 metre long ones enabling overtaking of standing buses) are required for city buses. It is advisable that all transport link travelling in the same direction stop at the same usable platform edge. At the same

time, the required capacity will enable a possible transfer of the night connection, the departure to the new Main Train Station (i.e. the simultaneous congregation of all night buses for mutual transfer).

- A suitable platform width is 6 to 8 metres for one-sided platform and 10 to 12 metres for two-sided platform. The width of the platforms may be narrower in the case more usable platform edges are designed (i.e. separating the passengers into more stops).
- Design a way to protect passengers from rain and sun (roofing), while respecting the importance transit node.
- For operational needs, it is suitable to allow for a tram to be parked (length 40 m) and it is necessary to allow for parking of 3 city buses with a length of 20 m.

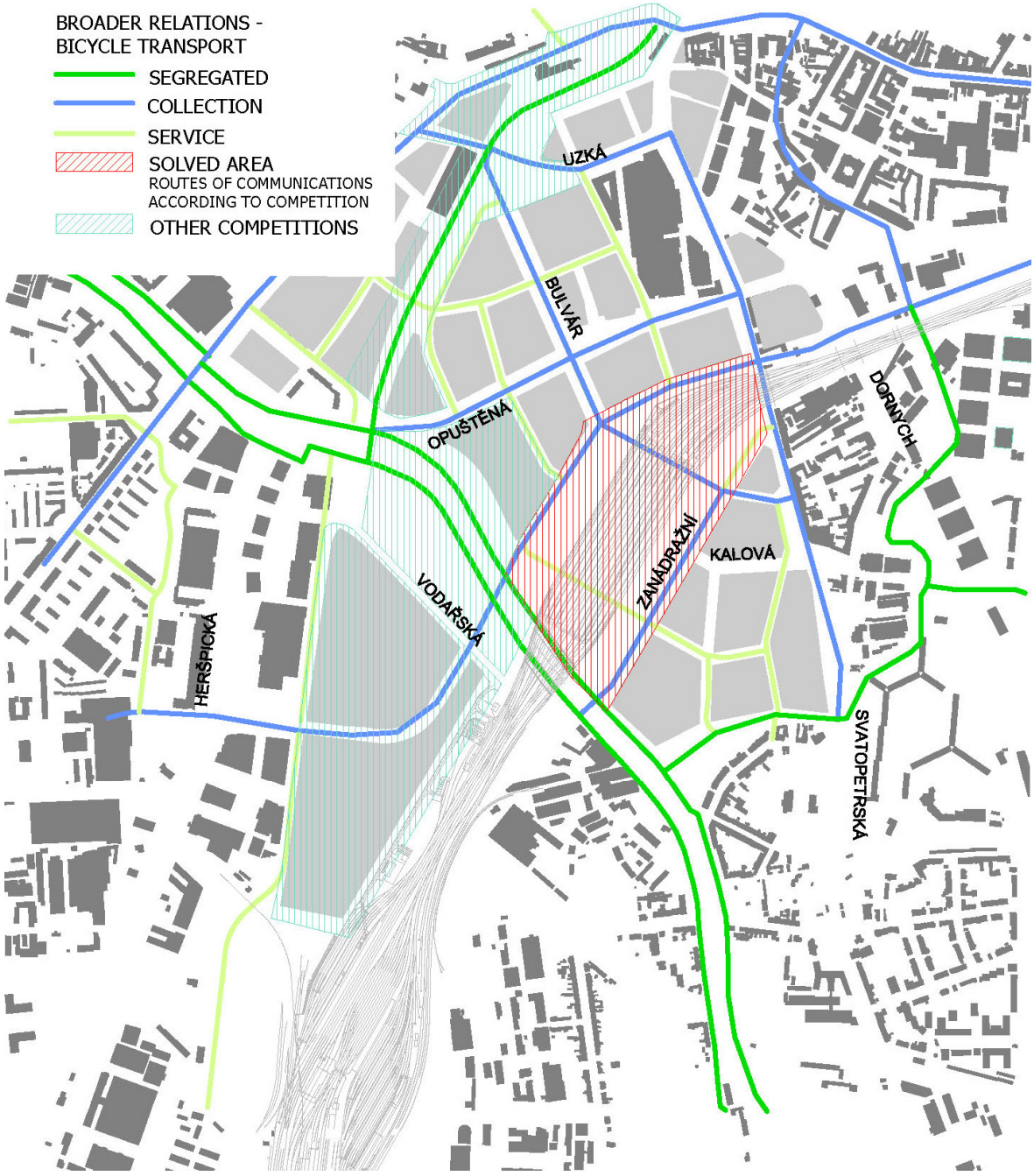
1.6.3 Road transport.

- The main arrival of cars and long-distance buses is expected from the large city ring road ("city highway" around the inner city) from the area of the future junction southwest of the station (see the BROADER RELATIONS – IAD diagram).
- Two types of parking area are required in the area of the new main train station – a short-term parking area for the needs of taxis and K + R (drop-off and pick-up of passengers) and a long-term parking area for the needs of P + R (parking facility for long-distance train passengers) and employees.
- The short-term parking area will be used for taxi service vehicles and for vehicles of persons who have brought or are picking up a person (relative, colleague, etc.) travelling by train or bus (K + R). In addition to a simple stop and departure/boarding, the possibility of short-term (up to half an hour) waiting should be considered. Given the expected increase in various forms of vehicle sharing and alternative taxi services, an increase in this mode of transport may be expected. A total of 40 parking spaces are required for this purpose. The spaces may be spread over several places in the area of the new main train station, but the main parking area should be easily identifiable so that passengers from trains and buses can easily find their vehicle. At the same time, it is advisable to assume that there will be a higher proportion of people with reduced mobility among passengers with a pick-up service from or to the station. Design a way to protect passengers from rain and sun (roofing), while respecting the importance transit node.
- The long-term parking area will be used for vehicles of persons continuing by long-distance and interstate transport (P + R), as well as for station personnel. Therefore, the usual parking time is one day. At least 1,000 parking spaces are required with a reserve for another 1,000 spaces. The long-term parking may be facilitated in a parking house(s), or another solution may be designed.
- With regard to the newly designed built-up area in the station forecourt and in the area behind the station, the capacity of parking areas must be increased accordingly, or solved within individual objects. The required number of parking spaces must be designed in accordance with the regulations in force. It is recommended to include in the calculation for the minimum number of parking spaces the coefficient of influence of automation ka = 0.75 and the coefficient of reduction of the number of parking spaces kp = 0.25.


BROADER RELATIONS -
PERSONAL CAR TRANSPORT
SPEED
COLLECTION - 4 LANES
COLLECTION - 2 LANES
SERVICE
SOLVED AREA
ROUTES OF COMMUNICATIONS ACCORDING TO COMPETITION
OTHER COMPETITIONS
UZKÁ
POŘÍČÍ
BULVÁR
OPUŠTĚNÁ
DORNYCH
ZANÁDRAŽNÍ
KALOVÁ
VODAŘSKÁ
HERŠPICKÁ
SVATOPETRSKÁ
OTHER COMPETITIONS
GRADE SEPARATED INTERCHANGE
GRADE SEPARATED INTERCHANGE
GRADE SEPARATED INTERCHANGE
AREA RESERVED FOR BUS PARKING

1.6.4 Bicycle transport

- In the design, include in the adjacent areas north and south of the station building the planned bicycle routes (see the BROADER RELATIONS – BICYCLE TRANSPORT diagram), which pass through the area and which, among other things, ensure the connection of the new main station to bicycle transport, especially to the Svratka bicycle route.
- Design an unattended bicycle storage room with a capacity of 1000 bicycles at a suitable place(s), some of which will be private and some part of bikesharing services.



1.6.5 Mutual transit links

The basic indicator for evaluating the proposal from the point of view of future users is the quality of the multimodal transit node (various types of public, non-motorised and automobile transport), i.e. the quality of transit between modes of transport (from train to tram, from tram to bus, from train to taxi, etc.) or even within one mode of transport (from one train to another, from one tram to another, etc.). The quality of the transit is characterised by the following parameters:

- The length of the transit between the point of departure and boarding, also with regard to persons with reduced mobility (elderly, etc.) and also ensuring adequate times for transit links (horizontal and vertical transit).
- Collision-free operation – passing of passengers across bus lanes, tram tracks and bicycle paths is only possible to a limited extent. Of course, there should be sufficient visibility between the pedestrian and the driver. Transit links requiring crossing lanes for car traffic are unsuitable, all the more so as more vehicles pass through them. The human nature to follow the shortest route must be taken into account, not the officially marked arrival path.
- Clarity – finding a connecting transport should be as easy and as intuitive as possible.
- Comfort – a protection of transiting passengers from rain is suitable.

The basis for the design of transit links and the design of individual sub-terminals (buses, public transport), including the determination of the significance of individual modes, forms Annex P22 along with the forecasted number of transiting persons.

1.6.6 Technical solution of the train station

- The train station has a track level at a height of 206.75 m Bpv (Baltic system of altitudes after adjustment). It is important to choose such a construction of the bridge structure, so that the space under the railway structures can be used for bus transport in all directions. The appearance of the bridge structure is part of the design (see Requirements for the architectural solution).
- There are 14 main tracks with a usable platform edge, 2 main tracks without a usable platform edge (mainly for freight trains) and 2 shorter tracks with a usable platform edge (mainly for short parking of ending trains). This arrangement was verified in great detail both in terms of transport technology (number of trains, etc.) and in terms of geometry (switches and crossings, etc.). The number of tracks and their length as well as the number of platforms and their length may not be changed, and the change of the proposed solution is unacceptable and is in conflict with the binding condition specified in paragraph 2.2.1 of the Contest Conditions. The drawing of the binding arrangement of the trackage and the maximum extent of the bridge structure forms Annex P18. The entire above trackage will be built in as a part of a single construction, i.e. long-term phasing (construction of part of the platforms now and part in the future) is not considered.
- Arrivals to platforms (stairs, escalators, lifts) should be arranged so as to logically create quality transit links to other modes of transport. Their capacity will be verified in the next stage of project documentation by microsimulations. It is advisable for the transit between trains stopping at different usable platform edges to be possible without a long walk to the nearest arrival point, i.e. the distance between arrival points should not exceed 100 metres, or 150 metres at the south-western end.
- At least one arrival on each platform must be designed to be easy to use for the rescue services, i.e. the lower part of the arrival must be easy access of firefighting vehicles and ambulances and subsequent transfer of rescuers to a platform or a train.
- It is not necessary to consider the roofing of the entire platform area. It is advisable that the centre the platforms (i.e. the place with the highest concentration of passengers, usually in the middle third of the stopping train, also with regard to the divided platform edges), the station should be roofed

over with regard to protection against rain, sun and wind (see 1.3 Requirements for the architectural solution).

- A possible noise protection of the platform area against passing freight trains may be formed by a low noise wall or soundproofing of the railway superstructure.
- Other stages of project documentation may result in the need for noise walls for the protection of surrounding buildings – the design should include a variant with noise walls.
- During the construction after the commissioning of the station, the function of freight through route for transit freight transport in the axis Brno-Maloměřice – Modřice must be maintained. It is not possible to run these trains through the existing main station, so it is necessary to consider a temporary relocation of the freight through route in the area. We draw your attention to this condition, because it will have to be respected in the subsequent stages of preparation.

1.6.7 North-South Railway Diameter

- In the future, the construction of the North-South Railway Diameter (SJKD) is expected as an important underground route of urban and suburban transport. In the past, more variants were monitored, the connection to the railway line to Chrlice was preferred, but the option of connecting to Modřice/Střelice was also processed. The feasibility study, which will be the basis for the selection of the SJKD variant, will be prepared in 2020 and 2021. Based on this result, the SJKD station (or the reserve for it) must be designed in the subsequent stages of the solution of the new train station.
- The SJKD station for the direction to Chrlice will be located underground perpendicular to the railway tracks (see P27). The building of the new main train station must be designed to allow additional construction of the SJKD underground station for the direction to Chrlice (mandatory requirement pursuant to paragraph 2.2.1 of the Contest Conditions), or it must allow meaningful existence of the SJKD station in both time horizons, i.e. immediately after the construction of a new main train station (without the existence / operation of SJKD) and after the construction of SJKD (i.e. with the operation of SJKD, i.e. e.g. including transit links between SJKD and other modes of transport). The current proposals envisage the construction of a temporary walls and ceiling during the construction of the main train station, under the protection of which the SJKD station would be built in the future (see P27).
- The SJKD station for the direction of Modřice and Střelice will be located in the station forecourt area, i.e. north of the trackage. Any proposed buildings in this area will have to be designed so that in the next stage of the project documentation they either do or do not have, according to the result of the SJKD feasibility study, an underground part adapted for the (future) route of the SJKD branch.

1.7 Requirements for the technical infrastructure solution

The connection to the technical infrastructure, which is an integral part of the design, will be designed based on the following requirements:

- The design must take into account the equipment necessary for the operation of the station and make the space within the station building adequately sized for the equipment (security equipment for rail traffic control, communication equipment for rail transport, transformer stations, electronic security system (EZS), fire alarm system (EPS), information systems, telephones, industrial television, air conditioning (VZT engine room)).
- For the purposes of the contest proposal, consider that the building of the new main train station will be heated by central heating connected to a hot water pipeline.
- New buildings (the building of the new main station and the new buildings in the forecourt and the area behind the station) should be designed with regard to the sustainability of the buildings.
- Examine the possibility of using renewable resources in the overall concept of technical solutions for buildings (photovoltaics, solar collectors, etc.).

- Flat roofs of the designed buildings (with the exception of the roofing of the building of the new main station) should be solved as green roofs (with extensive greenery).
- Design the concept of drainage of rainwater from the solved area, which will comply with the valid legislation, the General Drainage of the City of Brno and the conclusions of the Jižní čtvrť (Southern district of the City) territorial study.
- When designing the drainage of the station building and adjacent public spaces, emphasise the economical use of rainwater and prefer nature-friendly measures that lead to maintaining the nature water balance in the area.
- Respect the minimum space requirements and limits resulting from the design of the blue-green infrastructure elements.
- Treat the existing management of engineering networks economically in order to avoid unnecessary induced investments.

1.8 Requirements for the possibility of phasing the construction

Due to the involvement of several investors in the process of design and realisation of the construction, it is necessary to be able to divide / phase the project according to individual investors.

For the trouble-free construction of the new main train station building itself, all structures related to its operation (see chapter 1.4 Requirements for the layout solution and P21 – Building Programme) must be realised within one phase. Further construction in the solved area will be designed in such a way that it can be realised independently in separate phases.

Include in the design a possible way of phasing the implementation of construction in the area.

1.9 Demonstrating the compliance with the requirements of the contracting authority

Each proposal shall be accompanied by completed tables describing the balances – see the supporting document P05 – Model Table of Balances and Basic Areas.

2 Location

2.1 Characteristics of the location

It is a location that is unparalleled in the Czech Republic in terms of its potential for development in the immediate vicinity of the historic city centre. The current appearance of the area bears the marks of 160 years of uncoordinated development of railway transport and construction of temporary storage, production and residential facilities connected to the railway, as well as of the redevelopment of the Brno Railway Junction, all of which is reflected in the uncertainty of property owners and potential investors in the area. Due to the above, this part of the city is perceived as "outskirts in the inner city".

Despite the fact that the area is currently stagnant in terms of construction, its location near the city centre and the adjacent area around the Svratka River makes it a place with great potential for the development of housing, trade, services and leisure. It is a place with exceptional access to the city centre and at the same time a connection to a large city ring road.

Aerial view from the south

2.2 History of the area

The original settlement Trnitá stood in the area south of the city walls – it was built in the 14th century and there were vegetable gardens that supplied the city with fresh vegetables. Trnitá had been burned down in 1645 in preparation for the second Swedish siege of the city, but it was rebuilt later. The gardens were there until the 19th century, when the industrial revolution began and Trnitá together with Křídlovice, Novosady and Dornych formed the fruit and vegetable backbone of the town.

In the past, there were three independently governed village suburbs in the original cadastre of Trnitá: Trnitá, Petrovská Ulice and Dornych. In 1850, the entire original became one with the town of Brno.

In the years 1854–1856, the Rosické train station was built at the southern end of Trnitá Street, from which a connection to the main train station was built in the years 1868–1870. With the construction of the train station, the importance of the Trnitá area increased. In 1864, the Vaňkovka machine plant was established between this connection and Trnitá Street by a factory owner Bedřich Wannieck.

In the years 1883-1886, the Vlárská railway line was constructed. The construction of the above railway corridors meant the end of the Trnitá Street's development, as it made it a dead end street. The Brno train station played an even bigger role than the construction of the railway link, which created an insurmountable obstacle to the metropolitan urbanisation of this strategically located area.

Until the First World War, a monumental school building was built west of Zvonařka, the Trnitá village-style buildings were replaced by smaller suburban apartment buildings, but all development ended there. On the contrary, the industry's importance increased in the area due to the expansion of the industrial production of the Vaňkovka machine shop. In the years 1900-1902, it became part of the first Brno engineering company.

The industrial part of the Trnitá area was significantly affected in the years 1944 to 1945 during the bombing of Brno and later marked by the communist era. In the 1980s, a city ring road was built along Zvonařka, and a Central Bus Station with the same name Zvonařka was built opposite to Vaňkovka.

The residential development of the district is currently concentrated mainly in the vicinity of Křenová and Mlýnská streets. The western part of the district is so far neglected and the development there is almost non-existent. It is this area that currently forms Brno's main development zone, in which a new city district is to be built in connection with the construction of the future new Brno main train station.

After the year 2000, the originally industrial southern part of Brno (between Úzká, Plotní, Trnitá and Dornych streets) is experiencing a resurgence of business, industry, services and culture in the form of the establishment of the Vaňkovka shopping gallery. Together with Fait Gallery, it brought life back to a previously abandoned and unattractive location. The construction boom was completed in 2009 by the multifunctional building Trinity, and in 2016 and 2017, the DORN and Vlněna office buildings completed the area.

Solved area on the basis of an orthophotomap from 2019

2.2.1 Brno Railway Junction

The history of the Brno railway junction dates back to 1839, with the beginning of a train connection from Břeclav to Vienna. The railway was terminated in the area of today's train station and to this day a large part of the viaduct over the Svratka River has been preserved. In 1851, the newly brought line from Česká Třebová enabled the connection of Brno with Prague. In the following years of the nineteenth century, the line was connected to Střelice (1856, ending at the "lower train station"), from Přerov (1869), a connection between the "lower train station" was built in 1870, from Tišnov (1885), from Veselí nad Moravou (1888), etc. In the second half of the nineteenth century, the southern part of the town experienced a development on an industrial character, supported by the construction of a railway with an extensive storage yard situated in the area of the Svratka River. The construction of sidings to industrial enterprises in the 19th and 20th centuries negatively affected the already complicated situation of the railway junction.

After World War II, the construction of the marshalling yard in Maloměřice continued with the construction of a new line from Tišnov (1953), the construction of a double-track line through the town (1970) and the construction of a container transhipment depot in Horní Heršpice (1975).

The chaotic construction of the railway junction caused a problem with the construction of the railway's own equipment, but also with the use and interconnection of the city area that surrounded the line. The construction of the train station in the 1930s on the southern edge of the city meant that a modern southern wall of the city was created without taking into account the strategic development of the area. The current location of the station has thus become not only a barrier to the expansion of the city, but also to the development of railway transport itself.

Moving the station to the south became a topic at the beginning of the 20th century. The main reasons were the insufficient capacity of the main train station and its passenger buildings, the branching of the lines in the city, the small capacity of the storage yard and the cramped station forecourt area. The defined shortcomings were the reason for announcing the first urban contest for the solution of the railway junction in the city of Brno (1924). The winning design "Centre of the Republic" by architects Max Urban and Alois Kubíček first proposed the relocation of Brno's main train station to the south, thus conditioning the development of the city Centre by resolving its railway issue.

The idea of a new, relocated position of the train station south of Opuštěná Street or, in a variant, in the area of the lower train station, continues to appear in all land-use plans from 1956, 1970 and 1982. From this moment on, heated debates, evaluations and research have been taking place. In 1978, a new bus station Zvonařka was built, as the first building of the southern train station.

In 1994, a new, hitherto valid land-use plan was created, which envisages the location of the construction of a new train station by the river. Over the next 25 years, discussions and analyses addressing the location of the new train station had been conducted in regular cycles.

In 2018, the government of the Czech Republic finally decided that the Brno train station would be built in the Řeka (River) variant, thus supporting the opinion of the Central Commission of the Ministry of Transport and following up on its earlier decision to relocate the train station in 2002.

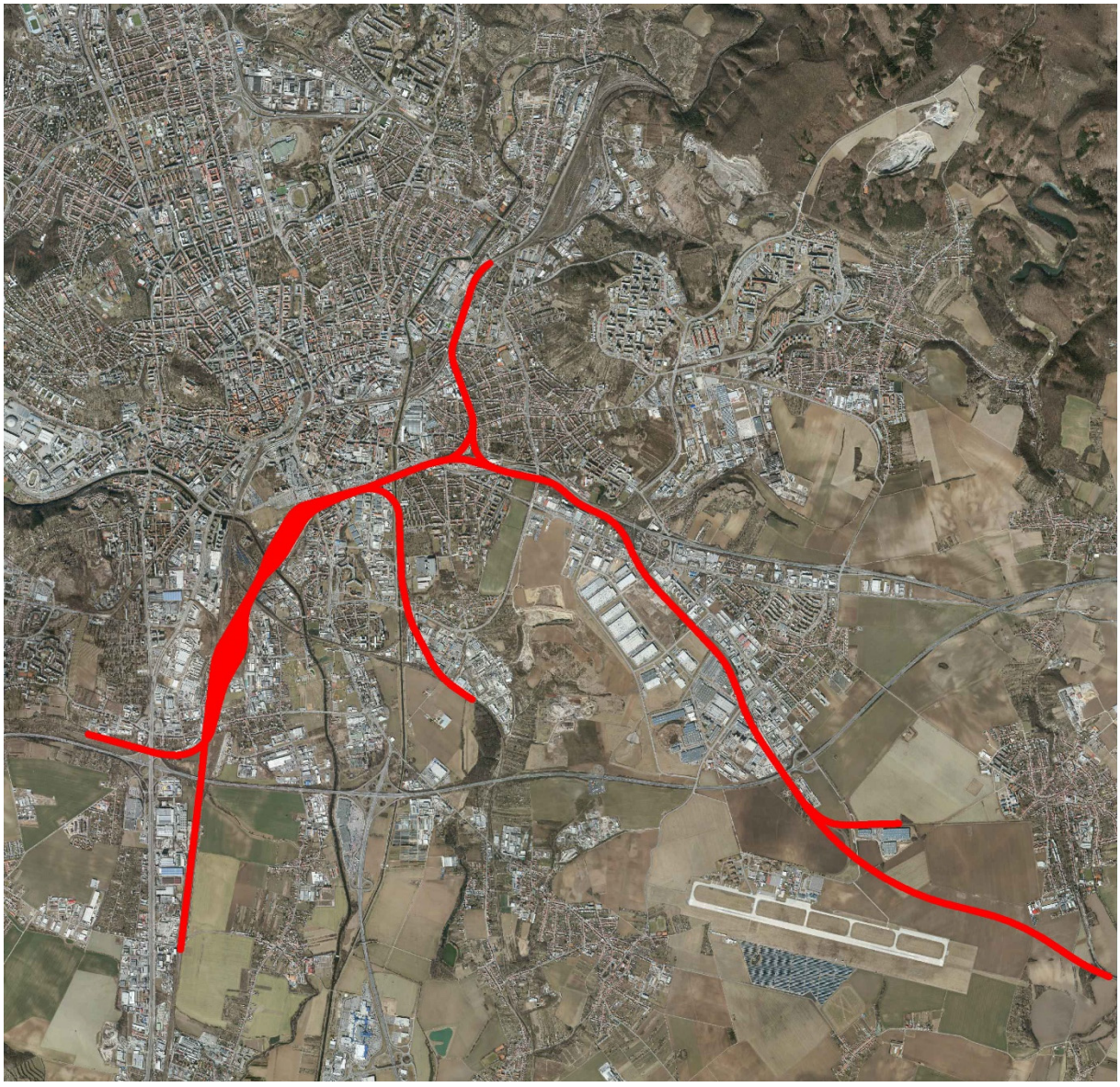


Diagram of the Brno Railway Junction

2.3 Property rights relations

The locality includes lands owned by State, Region, City and private landowners. As part of the planned construction, some plots of land were purchased by the city as a basis for the future creation of urban infrastructure in the new district, boulevard, public transport and areas for public spaces adjacent to the newly built Brno train station.

In the solved area, the plots are mostly owned by České dráhy, Povodí Moravy, Brněnské komunikace, the Statutory City of Brno and other private entities.

The above statement is for information only and does not set out any requirements for the contest proposal.

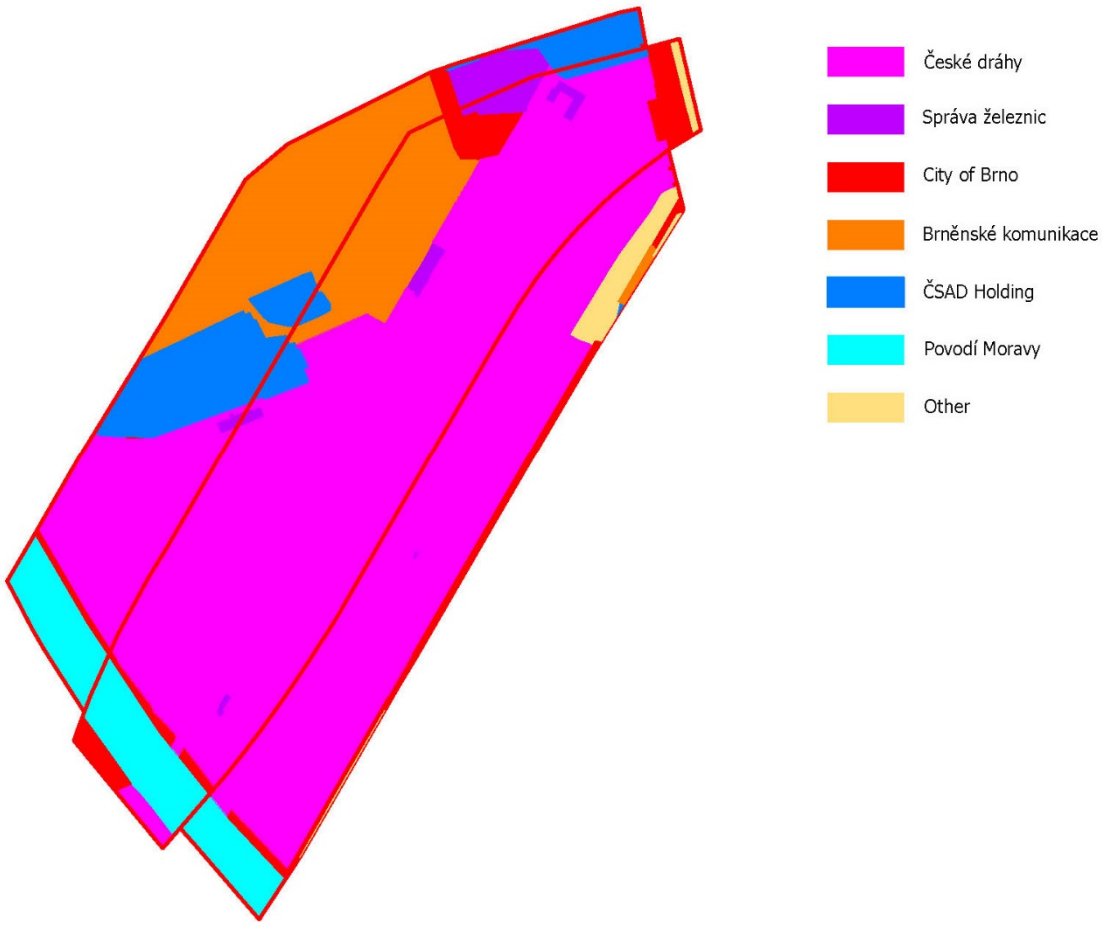


Diagram of ownership relations in the territory

2.4 Natural conditions

2.4.1 Climate

The Czech Republic lies in a temperate climate zone with a typical alternation of four seasons. The western direction of air flow prevails here.

The average annual temperature in Brno is 13 °C. The coldest month of the year is January, when the average temperature reaches 1 °C. On the contrary, July is the warmest month of the year with an average temperature of 24 °C and at the same time it is the month with the highest amount of precipitation, on average 75 mm. The average annual amount of precipitation in Brno is 624 mm (for the years 1855-2018).

There are regular deviations from the average values, when the weather is affected by the occasional penetration of the oceanic western influence and the continental influence from the east.

2.4.2 Geology and morphology

Brno has developed in a strategically important area. The rugged topography of the city is spread between the watercourses of the Svratka and Svitava rivers, and at the same time Brno lies at the point where Bohemian Massif and the Western Carpathians meet.

There is a contrast between the rugged landscape formed on the one hand by a relief on the rocks with forest complexes, and on the other, there is a flat area of plains around the rivers. In addition to the steep slopes above the Svratka valley, and partly also the Svitava and Ponávka valley, the terrain relief of the Brno area is characterised by a basically isolated group of three ridges – Kraví hora with Žlutý kopec, Špilberk and Petrov. The altitude of the solved area is between 198 and 201 m above sea level.

The solved area is located in the valley floodplain above the confluence of the Svratka and Svitava rivers, where a significant part of the soil profile is formed by the foundation soil of the river alluvium in the form of sandy gravels and flooding sandy clays deposited in the upper bed.

Directly in the area of the existing lower station, the surface is levelled with made-up grounds, which consist of clay, construction waste, coal dust and ash, with a variable thickness of up to 6 meters. The geological profile under the made-up grounds is formed by flood clays in thicknesses usually from 2 to 4 metres. Below them, fluvial loamy sands are irregularly developed. Further in the depth there are quaternary sandy gravels deposited, 4 to 6 metres thick (citation: Directive to the Contest for the New Passenger Station in Brno).

2.4.3 Groundwater

In general, the level of the affected groundwater level corresponds to the interface of flood clays and sandy gravels, i.e. the range of about 2.5 to 4.0 metres below terrain. Flooded horizon, depending on the frequency of lithological heterogeneities, with a filtration coefficient in the orders of n.10-3 – n.10-5 m.s-1, represents a very variable phenomenon in terms of the special foundation of buildings, the nature and scope of the planned construction, both directly relating to the construction and with regard to the future.

The unaffected groundwater level in the area of interest has a slope of around 2.8 ‰. If an obstacle is built, the groundwater level will increase on the inlet side and the groundwater level will decrease on the outflow side. The erosion base in the area of interest is the Svratka River, which partially drains the quaternary structure.

It follows from the above that the construction of more than one underground floor will affect the level and direction of groundwater flow. It is necessary to take into account the risks of changes in runoff conditions when considering constructions. From this point of view, the shape of the underground structure and its orientation is important. (AQUA ENVIRO s.r.o. Study for Determination of Hydrogeological Regulations for Construction in the Locality Brno – Jižní centrum (Brno – South Centre), 2008).

2.4.4 Flood control

The main barriers to the construction development of the locality are the floodplains of the Svratka and Svitava rivers. Therefore, a comprehensive system of protection against floods was proposed for the area in question within the General Drainage of the City of Brno (2009), which was subsequently specified by the Study of Nature-Friendly Flood Protection Measures (2015).

The basic principle of the proposed solution is the construction of offset flood banks or walls, the use of floodplain space for other nature-friendly flood control measures and the overall improvement of the morphology of the stream and floodplain. The solved area is mainly affected by the sections SO 09 Štýřice, SO 10 Vodařská and SO 11 Trnitá, the construction of which is one of the main priorities of the city's flood protection.

2.5 Amenities

2.5.1 Current state

The predominantly industrial and commercial character of the locality and the minimal settlement affect the overall level of community amenities of the area and limit it to a minimum of services and public institutions.

The existing significant transport structures (Opuštěná, Úzká and Dornych streets) passing through the area suppress the urban character. The solved area is connected with the historical centre by an imaginary belt of solitary mono-functional buildings of mostly commercial character (Tesco, Vaňkovka, Fait Gallery, Trinity, cadastral office Brno-venkov, Šlapanice municipal authority).

The area south of the solved area is mainly characterised by the absence of any major community amenity object. The area is a remnant of the industrial past with a number of industrial premises with small businesses.

To the west of the area there is an important administrative district Spielberg Office Centre and administrative buildings along Pražákova Street (which currently includes the tallest building in the Czech Republic – AZ Tower), the justice complex, the building of the Labour Office and the Post Office. Another important administrative centre is located near the already mentioned Vaňkovka (Trinity, Dorn, Vlněna).

There are no cultural institutions in the solved or affected area, with the exception of the Fait Gallery. Most are located in the historic city centre, which is thus heavily congested in terms of transport.

The existing building of the main train station is located less than a kilometre north of the area. The Zvonařka bus station provides domestic and international regular bus transport.

Residential development is currently concentrated northeast of the area, especially in the vicinity of Křenová and Mlýnská streets, west of the area in Štýřice and Staré Brno and south of the area in the Brno-jih (Komárov) district.

2.5.2 Future

The construction of the new main train station is also related to the development of the entire area south of the historic city centre (within the scope of the affected area).

It is assumed that the planned construction of the new Trnitá district will create a new living functional part of the city with a balanced ratio of functions (housing, work, amenities), which will organically connect to the existing surrounding buildings.

At present, there are construction plans in the affected area in various stages of project preparation.

3 Transport

According to the survey, the share of transport modes among the inhabitants of the city of Brno is stated as follows: public transport 43%, individual car transport 38%, walking 18% and cycling 1%; for the inhabitants of the suburban region it is as follows: public transport 21%, individual car transport 61%, walking 17% and cycling 1%). According to the approved sustainable transport policy, the city is interested in maintaining a high share of public transport and reducing the share of individual car transport by increasing the share of non-motorised traffic.

3.1 Railway transport

3.1.1 State

Gradual connection of lines of various companies created a junction in Brno formed by two railway lines – a northern one, for passenger transport, on which the existing main train station is located, and the southern one, where the Lower Train Station is located.

The Lower Train Station has been used only for freight transport since 1870 and as a light repair shop for hauled stock – due to the repairs of the existing main train station (necessity to extend its service life until the complete reconstruction of the junction), it also now serves for passenger transport after temporary modifications.

3.1.2 Future

The Brno Railway Junction will be fundamentally modernised, in particular the passenger through route will leave and the existing freight through route will be expanded, which will bring all rail transport in the city into one route with all the related advantages and disadvantages. This is directly related to the change in the position of the main train station, which will move to the position of today's Lower Train Station. The new arrangement of the junction is to ensure sufficient capacity for the growth of suburban and long-distance traffic and the corresponding technical parameters; the new arrangement of the junction is also to eliminate the existing barriers of the area and open new areas for the development of the city in close proximity to its historic centre.

The new train station will be raised compared to the existing lower station so as to allow a transverse passage as well as a passage under the bridge structure of the trackage. In the future, an underground railway is to pass under the main train station perpendicular to the railway tracks, i.e. the North-South Railway Diameter. As part of the reconstruction of the Brno Railway Junction, several new smaller stations will be built, but more than half of passengers are forecast to use the new main train station, including passengers switching between individual trains – Brno main train station is to be a transit node of supra-regional importance.

3.2 Bus transport

3.2.1 State

The existing Central Bus Station Zvonařka was gradually established in the years 1978 to 1988 as a replacement for several bigger and smaller stations scattered around Brno – however, one of them, the Benešov bus station was reopened in the 1990s. The operation of the Central Bus Station Zvonařka was gradually reduced after the year 2000 with the emergence of integrated transport and the creation of backbone railway lines, which connect with suburban bus lines at various stations, or by the terminations of some suburban buses on the outskirts of the city with a transit to tram.

The Central Bus Station Zvonařka was privatised in the 1990s, the Benešov bus station belongs to the city. Benešov is mainly used by large carriers operating in long-distance transport, Zvonařka is used by the remaining suburban lines preserved after the establishment of integrated transport and by

smaller carriers in long-distance transport. Even so, this bus station is still one of the largest in the Czech Republic.

In recent years, there have been many changes in long-distance and interstate bus transport, both the disruption of traditional lines and the introduction of new connections.

3.2.2 Future

According to the city's long-term plans, both Zvonařka and Benešov are to be replaced by a new bus terminal, which will be part of the new main train station. Buses of irregular (tour) transport from the stations in front of the Janáček Theater and from Heršpická Street will also be able to be diverted to the new main train station.

For information about arrival of long-distance buses at the main train station, see 3.4 Car transport.

3.3 Public transport

3.3.1 State

The backbone system of Brno's public transport is the tram, although its conversion into a high-speed tram was carried out only partially. The vision of complete physical segregation of trams (including underground sections) is no longer pursued, the effort is aimed at implementing preference at intersections and other such features. The limiting element in terms of capacity is the central part of the tram network, to which all tram lines run, and the centre is already congested. Public transport is complemented by bus and trolleybus lines. Suburban railway and bus lines of all carriers are fully integrated with public transport in terms of transport and tariffs within the IDS JMK (Integrated Transport System of the Southern Moravia Region).

Transport in the nighttime is provided exclusively by buses, which all depart at the hub, which has long been at the existing main train station.

The actual location of lower train station is not connected to the tram, the nearest line was led along Dornych Street and is currently being transferred to Plotní Street. There are several public bus lines near the lower train station.

3.3.2 Future

The change in the importance of the lower train station which will turn into the new main train station means an immediate need for a significant change in public transport in the area. The long-term intention is to supplement the two existing tram transport nodes (Main Train Station, Česká Street + Moravské Square) with a third node at the new main train station.

To this end, it is necessary to build two tram lines to the new train station, from the existing stops Nové Sady + Hybešova by the new boulevard from Plotní Street in the route of Koštálová Street. In the future, it is necessary to monitor the possible connection by tangential lines around the AZ Tower to the Celní + Vsetínská stops and via the Masná stop to the Tkalcovská stop.

Most of the bus lines that pass through the locality will be diverted to the new Main Train Station. Some of them may be replaced by trolleybuses. It cannot be ruled out that the night transport hub will be moved to the new Main Train Station as well.

3.4 Road transport

3.4.1 State

In the vicinity of the locality, a common route II. and III. (i.e. the middle route and the outer route) of the city ring road runs north on Opuštěná Street, and an important city radial runs east along

Dornych Street. The load on both is over 40,000 vehicles per day, which is reflected, among other things, in frequent traffic jams.

3.4.2 Future

The construction of the southern segment of the Great City Ring Road will alleviate the load on Opuštěná and Dornych streets. However, a more significant alleviation of the load on the above streets would be achieved only by a significant change in the traffic behaviour of residents and companies.

The Great City Ring Road is a road that is being built in the long-term with at least two lanes for each direction of travel, without at-grade junctions, pedestrian crossings, etc.; less than a third of its length around Brno has been completed so far, mainly in the northern part.

The goal of the Great City Ring Road is to divert intra-city inter-regional and suburban traffic from the city's streets, seeing as many routes around the city now lead through the city centre, even though the driver does not need to and does not want to enter the city centre at all.

The first stage of the southern segment of the Great City Ring Road should be built together with the Brno Railway Junction, otherwise the new storage yard of the Brno Railway Junction would have to be dug up again for the construction of the road underpass. It is in the city's interest that the new main train station, due to its city-wide and regional importance, be directly connected to the large city ring road – the new main train station is supposed to be a multimodal transport hub and therefore easily accessible to those who use a car for any reason and in any form (P + R, K + R, taxi, rental, etc.); the parking capacity will also be adequate to its importance.

3.5 Bicycle transport

3.5.1 State

An important and popular route not only for cyclists, but also for pedestrians and in-line skaters is the route around the banks of the Svratka River, now on both banks. The busy Svratecká bicycle route in the south connects to the Brno – Vienna route and in the north to the Brno Reservoir area.

3.5.2 Future

By Brno standards, the new Main Train Station will be exceptionally connected to the backbone bicycle routes – these are the paths along the banks of the Svratka River, the route along the railway body to the Svitava River, along which the backbone cycle route runs, and the routes in the new Trnitá district.

4 Intentions

4.1 Land-use planning documentation

The land-use plan of the City of Brno of 3 November 1994 (complete wording as of 31 January 2020) created the conditions for the location of the new train station by the river, including the basic principles of development of the adjoining area and basic transport services.

4.2 Intentions in the area

Although the construction development in the area north of the solved area is currently stagnating, there are a number of construction plans in the affected area in various phases of project preparation. The implementation of flood control measures is absolutely key for the further development of the area (see chap. 2. 4 Natural conditions).

The whole locality was examined in more detail by the Jižní čtvrť (Southern district of the City) territorial study (Arch. Design, s.r.o., 2013), which was updated in 2019 by the Brno City's Architect Office. The territorial study defines in more detail the new city class and street network, the nature of development and functional use, it further confirms the new location of the new main train station and the location of the north-south railway diameter, the underground line of urban and suburban transport.

4.2.1 An overview of the main intentions in the area

- Flood control
- Set of buildings Tram Plotní
- North-South Railway Diameter

5 Summary

The Railway Administration and the Statutory City of Brno are the contracting authorities of the international urban-transport-architectural two-phase restricted project competition.

Brno City's Architect Office is the organiser of the contest and the processor of the contest conditions.

This is a competition that will fundamentally **affect the development of the** city of Brno.

The brief of the competition is the design of a new main train station, including the roofing of platforms and trackage and the design of bridge structures. Furthermore, an urban-transport-architectural solution of public spaces and buildings in the station forecourt and the area behind the station.

In the areas in front of the station (forecourt), behind the station and under the station, it is necessary to solve **non-railway transport** (public transport terminal, bus station, parking, pedestrian connections and more).

The design must respect the technical solution of the trackage from the **Feasibility Study** of the Brno Railway Junction.

The aim of the contest is to obtain a comprehensive design that will be **functional and feasible**.

The Railway Administration and the City of Brno intend to conclude a contract with the winning team of the contest for the **preparation of an architectural study, including author's supervision and follow-up activities**.

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