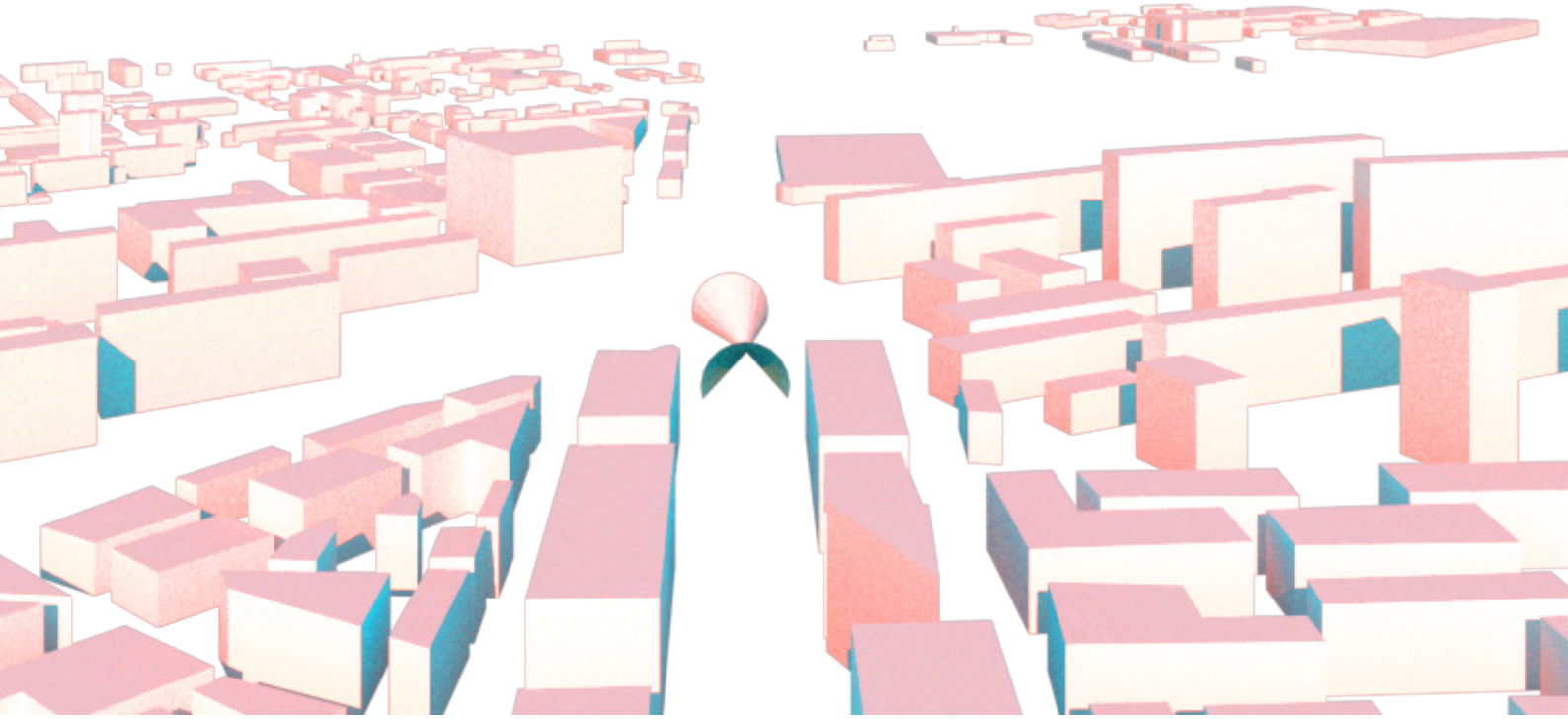


A conceptual masterplan for Rybníčky, Prague 10

Kameliya Staneva
2nd Year Undergraduate
(United Kingdom)

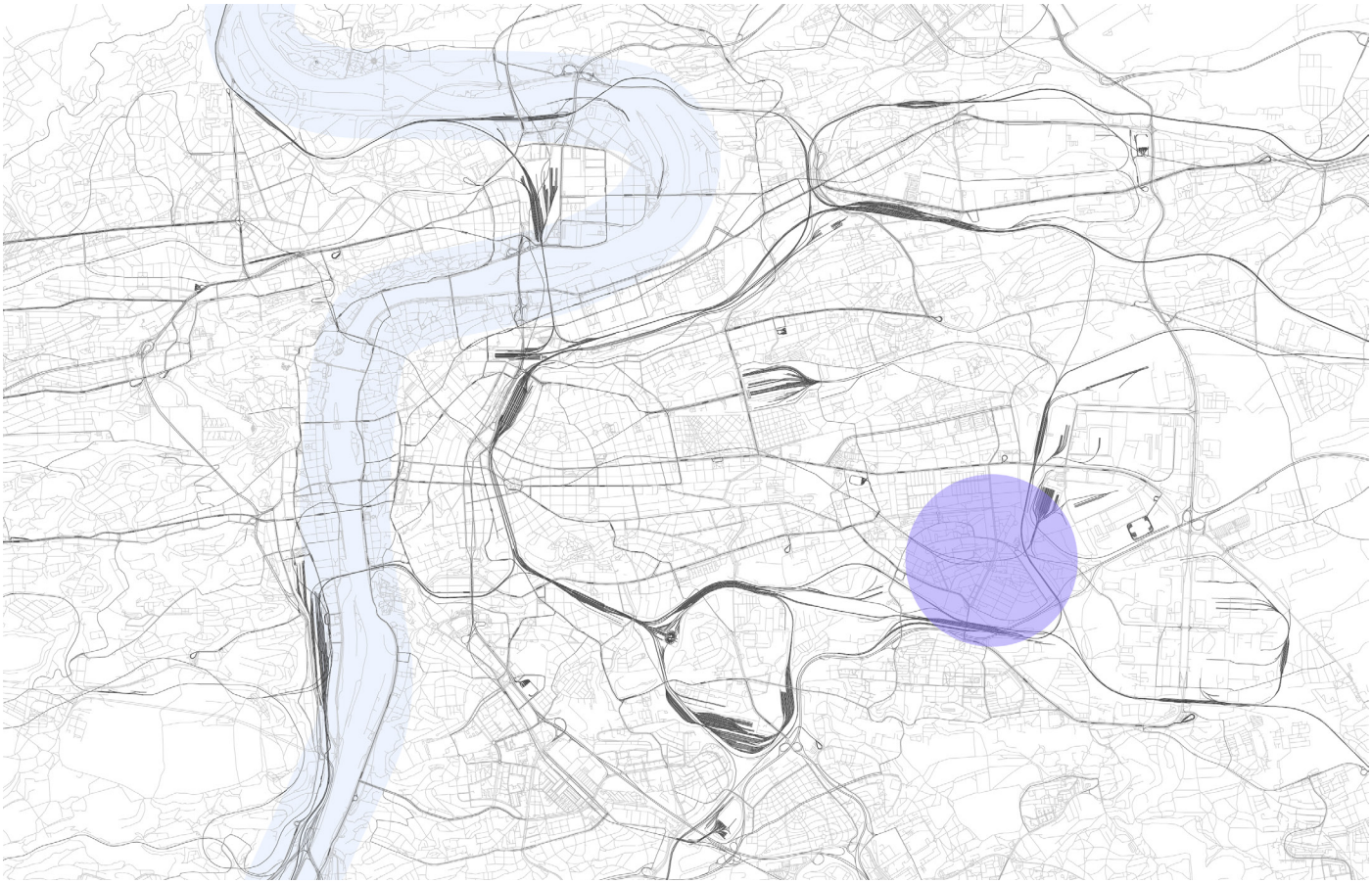
Atelier Achten-Pavlíček-Nováková, summer semester 2019-2020
Faculty of Architecture
Czech Technical University in Prague

The goal of this Design studio is to research cutting-edge technology and principles which are suitable for delivering a future where there is a limited amount of cars. This being said, the ideal car would be autonomous and electrical, often shared and always trying to be better utilised. Drones, AI and other technologies can be used to improve the human experience in the highly urbanising environment.

Aiming to minimize the usage of personal cars using harmful fuels, there has to be a change in how our cities and neighbourhoods are structured. Currently, developments are usually in favour of cars, neglecting pedestrian movement, micro-mobility and public transportation. Cars take up a lot of space: commercial and personal parking lots, roads, gas stations, car repair services. These are often more frequently found in the suburbs of cities, where land is abundant and cheaper.

Suburban residents often find themselves in need to use the car. There is unreliable public transport, not enough desired services nearby. That is why we need to tackle the urban fabric to deal with excess cars, to achieve a future with no cars. Endorsing public transportation and local micro-mobility, the transit-oriented development will help Rybníčky neighbourhood and Skalka station with achieving centralization and densification. This will result in an upsurge in pedestrians and people using micro-mobility means for transportation, employment due to opening of new services, less space used for vehicles, more space for people.

This conceptual masterplan could serve as the basis for many developments around transportation hubs around major metro stations in Prague, in collaboration with other projects with wider projects aimed at reducing car usage.

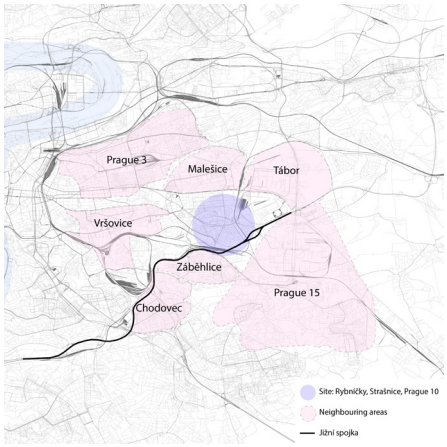


In the city outskirts, people are more dependant on their cars due to the spread-out structure of the suburban city fabric. This causes congestion, environmental and health issues to those who drive and those who passively suffer air contamination and poor infrastructure due to car-centric design. To fight this, this project challenges the current state of Rybníčky, a neighbourhood in the semi-suburban area, and offers an updated masterplan for it. A centre point of the neighbourhood is Skalka metro station which is regarded here as the main entrance/exit point into/from the neighbourhood, where transportation modes could be switched in benefit of car-free movement.

Rybníčky is the neighbourhood surrounding Skalka metro station and is located within Strašnice in Prague 10. This is a point between Prague's core and the suburbs, where public transit begins with Tram and Metro depots in close proximity. Therefore, Rybníčky plays the role of a mediator, it is a transition area between suburbia and the dense city centre.
Rybníčky is surrounded by some key areas. For example, Chodovec, a major commercial and business district, well-connected both physically and economically to other parts of the city. Prague 15 has many industrial sites and is home to Nature Park Hostivař-Záběhlice, a large recreational ground. On the west, Prague 3 is Rybníčky's connection to the Old Town centre.
Major infrastructure link is Jižní spojka, the highway which transports people from east Prague and further villages coming into Prague's centre, for an average of 120,000 vehicles in 24 hours. Rybníčky is entered from the south via Jižní spojka or north via Rabakovská and then through Na Padesátém.
This project's area of interest is concentrated around Skalka station as a focal point. It extends to Depo Hostivař to the north and Jižní spojka to the south.
The existing building morphology can be described as rather scattered. It is comprised of smaller dwellings such as 1-2 family houses or smaller house-like apartment blocks and long ridges of modern housing blocks. The latter is protected by Prague Council to conserve the modernist character of the neighbourhood.
Rybníčky is well-linked through public transport. Metro line A crosses the neighbourhood with its stop at Skalka station. Trams No: 6, 8, 14, 15, 16, 22, 25, 97, 99 are running on the north and south end.
Rybníčky has potential for well connected green spaces, provided by the abundance of public residential park/playground green strips and three bigger parks, a greenfield between Nedvězská street and Žernovská street, an area close to Skalka station on the northwest, and currently a forest-like terrain, allowed to be built on for recreational purposes.

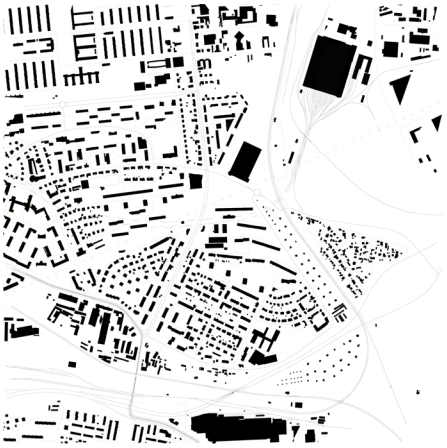
The theoretical concept behind this project is called 'Transit Oriented Development' and it is an approach to areas which have a large public transport station in the middle. It is about making neighbourhoods compact, walkable, pedestrian-oriented and adding mixed-use buildings that ultimately results in lowering car-dependence and thus reduces environmental impacts of human activity and allows residents to have better quality services near their homes[1].

Location



Immediate neighbouring areas

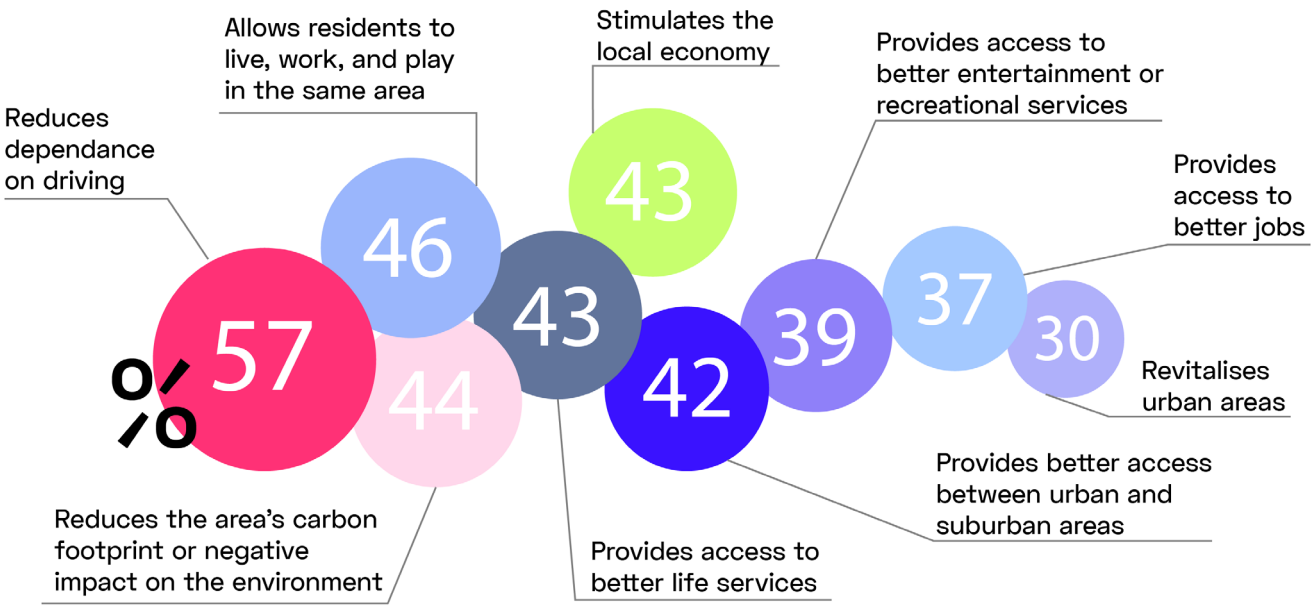
Area of interest



Existing building morphology and street pattern

Transport infrastructure

Green Infrastructure



% of people who believe in the different benefits of TOD (2016 HNTB Companies)

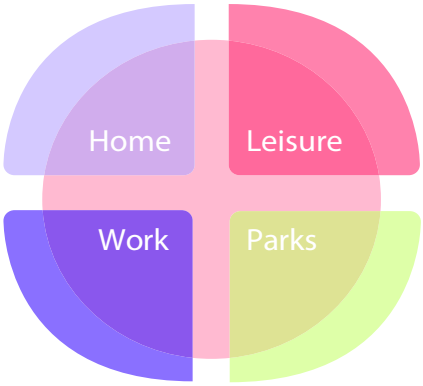
To achieve a future without cars, we must first reduce cars from the streets of Prague. Taking full advantage of the areas close to metro stations would be of great benefit to the pedestrian. A good range of building programs and spaces like residential, leisure, commercial, office and recreational spaces has to be well-mixed together in order to provide a variety of activities available to residents and commuters. Connectedness to major roads and other modes of public transport are important as they would make for a seamless journey. Trams, buses, micro-mobility and autonomous electrical vehicles are an extension to the main mode of transit - the metro network. By creating a district oriented around a metro station, the station becomes more attractive and will be used more.

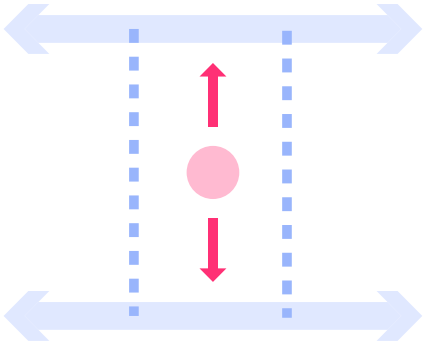
The design concept is to create a walkable and connected neighbourhood, where everything is at arm's reach to reduce the use of cars and to facilitate for more environmentally- and socially-friendly ways of moving around.

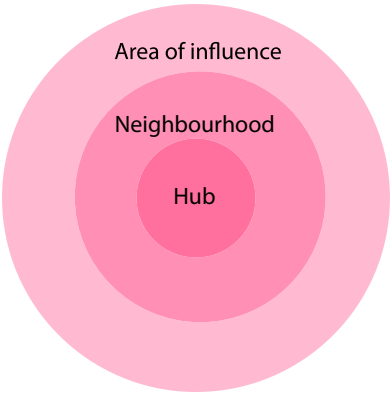
The metro station being at the centre of the design, it will be connected to the two major entry points of Na Padesátém - the north and south node. They will be linked by an underground tunnel for the flow of cars just passing by Rybníčky. At these two nodes, there are multiple connections to bus and tram and parking for commuter's cars. At the south node, there will be a highway Hub which would allow for change to an AEV car to Skalka station. Parking will be with space for 10000 and managed by smart meter systems with artificial intelligence in the reach of 10 min walking.

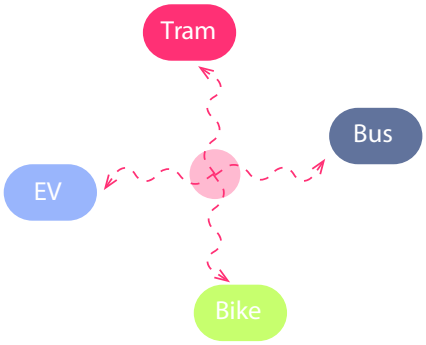
Building morphology around Skalka will be transformed into higher density, mixed-use development with a maximum 15 minute walking time from the centre to the periphery. Shops, services, offices and retail units will be concentrated around Skalka for easiest access to both residents and commuters.

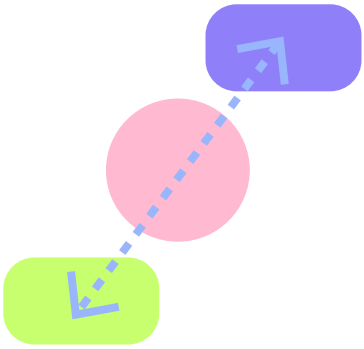
On ground level, Na Padesátém will be transformed into a pedestrian public space with access for micro-mobility such as bikes and scooters. Mixed-use developments will be on both sides of the street, housing shops, services, entertainment facilities.



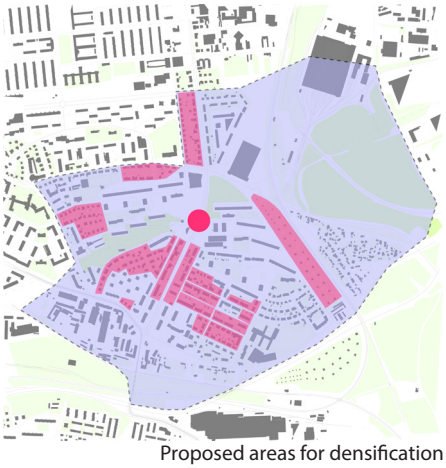






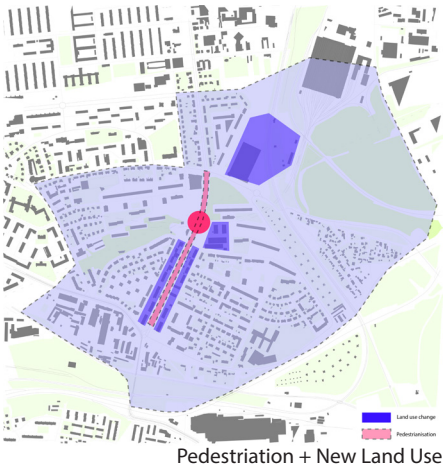


Connection to major roads and transition hubs



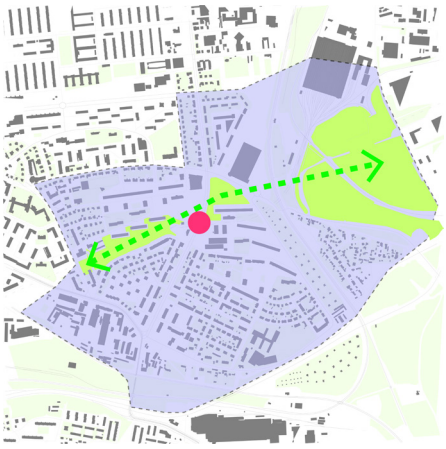
Proposed areas for densification

Infrastructure changes for outsiders



Pedestriation + New Land Use

EV road network

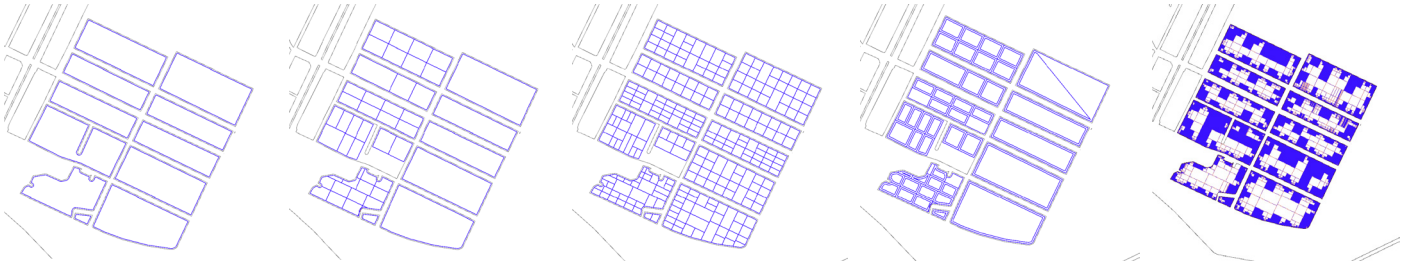


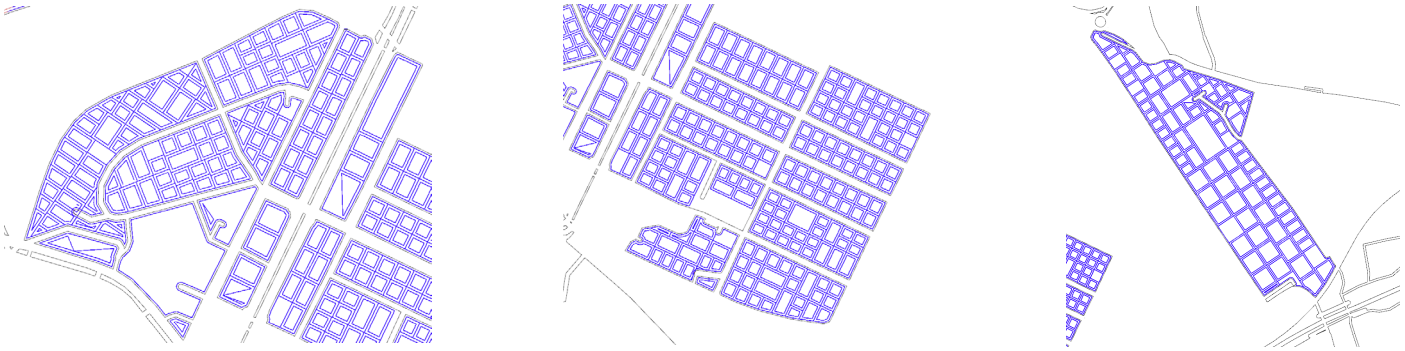
Green network connection

The building morphology on the east grid of Na Padesátém is comprised of low-density smaller one or two-family houses. The area could be further densified in order to achieve maximum capacity. This is to ensure the most amount of people are housed within walking distance to Skalka metro station.

Blocks with a width of 25 meters were chosen as a building unit. Its position in the grid will be kept but will be transformed into larger blocks by combining them.

Using the DeCoding Spaces toolbox for Grasshopper, different parcel layouts were prototyped for the further concept design of the city blocks.





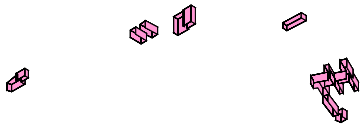
Land use changes are going to impact the neighbourhood centre and the surroundings. Most commercial units and services are going to be located on Na Padesátém, including retail units, medium-grade supermarkets with the ability for grocery pick-up, restaurants, coffee shops, postal services, pharmacies, cinemas, community centres and kindergarten. This would ensure residents have every kind of service in a less than a 15 min walk from every corner of the neighbourhood.

Mixed-use developments are promoting good connections between homeplace, work-place, leisure and services.

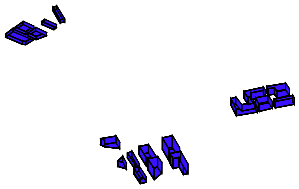
As the modernist look of Skalka must be kept, almost all of the 20th-century residential blocks remain for their cultural heritage.

Office clusters are ensuring residents have available jobs nearby. This also promotes the district as business quarters are coming together.

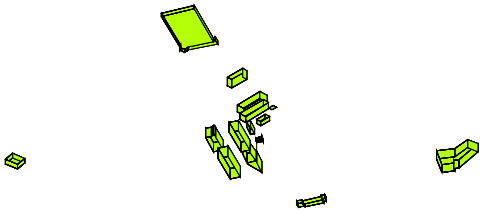
Public buildings keep build and maintain a sense of local social inclusion with admin, library and education functions for the community.



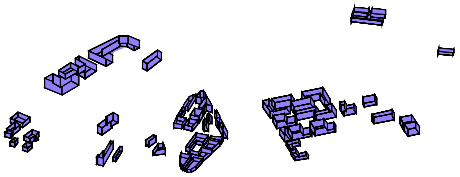
Public Buildings
library, administration, hospital and education



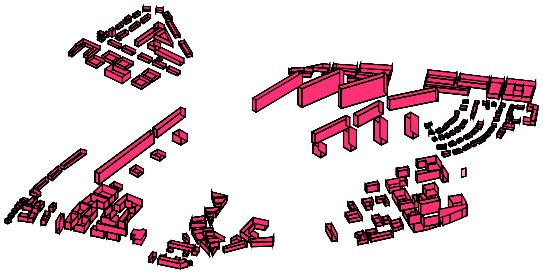
Office quadrants
mini business quarters benefiting from close proximity and density



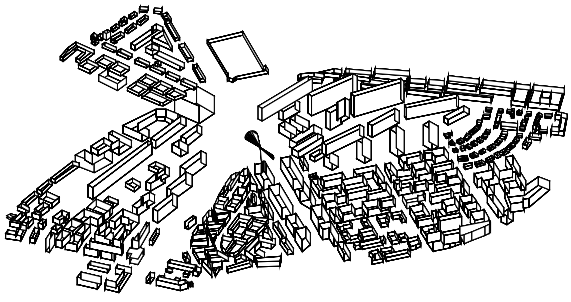
Commercial + Office
places to work and to shop



Commercial + Residential
combining everyday functions with home units



Residential
modernist tower blocks new development com-plexes



Na Padesátém is a four lane boulevard, which is a central road to Rybníčky. Despite its location, it is not utilised by pedestrians, because it is heavily used by motor vehicles and generates traffic.

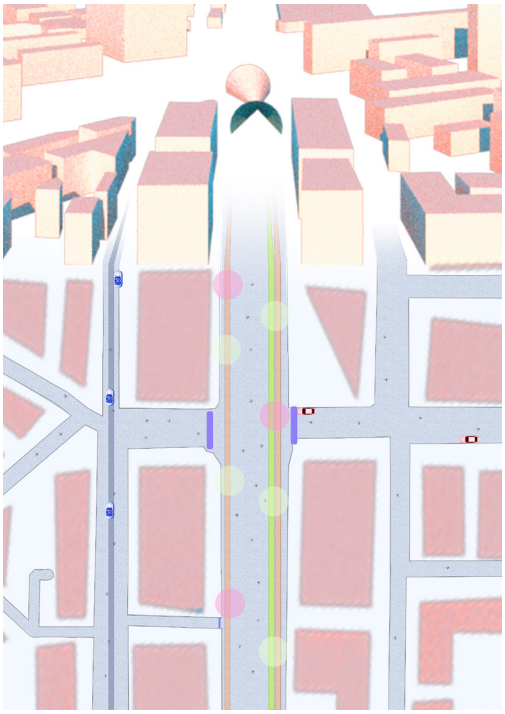
Pedestrianisation of this boulevard will promote higher pedestrian flow, better resident health and better environment setting. It will generate more income for local businesses situated on the street.

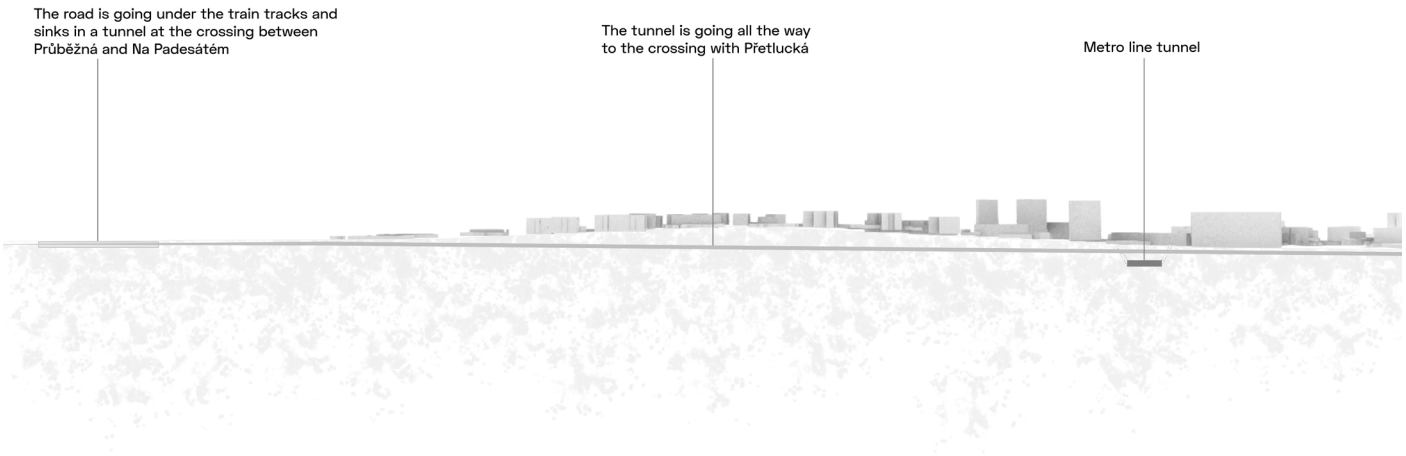
Thus, Na Padesátém is going to become the centre point of Rybníčky in itself, a public space for people to gather and to experience the neighbourhood. Active frontages, landscaped areas and welcoming shopfronts will guide people to Skalka station or two of the closest parks.

In order not to compromise Na Padesatem's through route function, a tunnel under it will be built to ensure vehicle traffic transitting through the area is accommodated.

The pedestrianisation of Na Padesátém is going to create an immediate connection between the west and east green plots.

With planning proposal for the east green plot to be used as recreational ground, the green infrastructure network will become cohesive and integrated with the urban fabric.




The road is going under the train tracks and sinks in a tunnel at the crossing between Průběžná and Na Padesátém
The tunnel is going all the way to the crossing with Přetlucká
Metro line tunnel

A fleet of shared autonomous electrical cars will be available for residents to move around Rybníčky. On the level of automation 2 cruise control and lane-centering are automated and the driver must still be ready to take control of the vehicle, but can have his hands and feet free[2]. This level will ensure the safety of passengers while allowing for the comfort for social interactions.

Based on a Space Syntax model for this area, the new AEV network route was determined. The 'loop'[3] (Na Padesátém and Přetlucká) has high usage intensity and is a central road. Further advantage is the high pedestrian usage of the area inside the loop's boundaries. Therefore, the route chosen is following the busy road layout, but is avoiding the crowded boulevard.

The small scale of this network avoids the shift away from human-centric design and focuses on providing the most comfort for residents who require a car to move around their neighbourhood[4].

Utilising Artificial Intelligence technology, AEVs could be ordered to pick-up points around the route. These points are going to be situated at a maximum of 300m from one another, ensuring residents can get to them in less than 5 minutes.

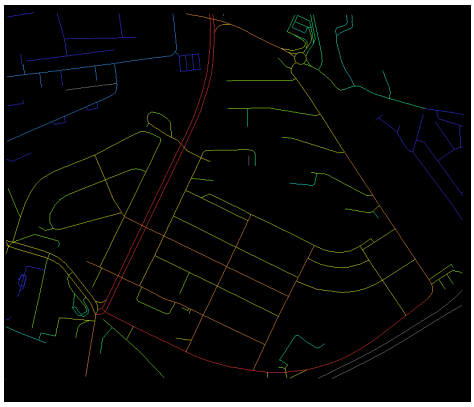
The whole loop will take up to 15 minutes to drive through, but constantly circulating cars will ensure prompt car arrival on every pick-up point.

Main entry points to Skalka station are the north and south side of Na Padesatem. On both sides, there will be a "Mobility Hub" where people can park their cars and switch to public transportation to continue into the city of Prague.

Residents in the area are approximately 15,000 and if we assume 70% of them own a car, that would be 10,500 cars in the area, which parking houses or on-street parking will have to accommodate.

With potential car reduction in the neighbourhood, pedestrian zones can be established, pushing cars outside Rybnicky into the surrounding parking houses.

Road usage intensity



Road centrality

Pedestrian road use

New AEV Network route and pick-up points

References:
1 http://www.tod.org
2 https://www.techrepublic.com/article/autonomous-driving-levels-0-to-5-understanding-the-differences/
3 https://www.dezeen.com/2017/07/19/edg-loop-nyc-driverless-car-proposal-offers-manhattan-green-space-architecture-infrastructure-new-york-city/
4 https://www.citylab.com/transportation/2017/07/will-autonomous-vehicles-lead-to-a-resurgence-of-auto-centric-infrastructure/534804/