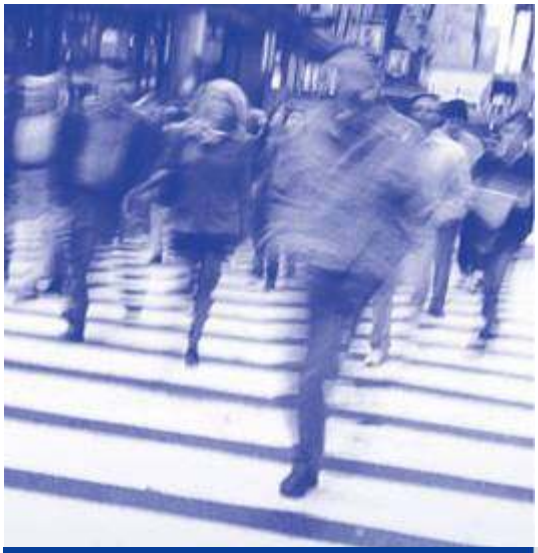

CiViTAS
Cleaner and better transport in cities

ÚSTÍ NAD LABEM

Ústí nad Labem

T25.1 New Parking Scheme in Ústí nad Labem

February 2012

THE CIVITAS INITIATIVE
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1 Introduction

1.1 Background CIVITAS

CIVITAS - cleaner and better transport in cities - stands for CIty-VITAlity-Sustainability. With the CIVITAS Initiative, the EC aims to generate a decisive breakthrough by supporting and evaluating the implementation of ambitious integrated sustainable urban transport strategies that should make a real difference for the welfare of the European citizen.

CIVITAS I started in early 2002 (within the 5th Framework Research Programme);
CIVITAS II started in early 2005 (within the 6th Framework Research Programme) and
CIVITAS PLUS started in late 2008 (within the 7th Framework Research Programme).

The objective of CIVITAS-Plus is to test and increase the understanding of the frameworks, processes and packaging required to successfully introduce bold, integrated and innovative strategies for clean and sustainable urban transport that address concerns related to energy-efficiency, transport policy and road safety, alternative fuels and the environment.

Within CIVITAS I (2002-2006) there were 19 cities clustered in 4 demonstration projects, within CIVITAS II (2005-2009) 17 cities in 4 demonstration projects, whilst within CIVITAS PLUS (2008-2012) 25 cities in 5 demonstration projects are taking part. These demonstration cities all over Europe are funded by the European Commission.

Objectives:

- to promote and implement sustainable, clean and (energy) efficient urban transport measures
- to implement integrated packages of technology and policy measures in the field of energy and transport in 8 categories of measures
- to build up critical mass and markets for innovation

Horizontal projects support the CIVITAS demonstration projects & cities by:

- Cross-site evaluation and Europe wide dissemination in co-operation with the demonstration projects
- The organisation of the annual meeting of CIVITAS Forum members
- Providing the Secretariat for the Political Advisory Committee (PAC)
- Development of policy recommendations for a long-term multiplier effect of CIVITAS

Key elements of CIVITAS:

- CIVITAS is coordinated by cities: it is a programme “of cities for cities”
- Cities are in the heart of local public private partnerships
- Political commitment is a basic requirement
- Cities are living ‘Laboratories' for learning and evaluating

1.2 Background ARCHIMEDES

ARCHIMEDES is an integrating project, bringing together 6 European cities to address problems and opportunities for creating environmentally sustainable, safe and energy efficient transport systems in medium sized urban areas.

The objective of ARCHIMEDES is to introduce innovative, integrated and ambitious strategies for clean, energy-efficient, sustainable urban transport to achieve significant impacts in the policy fields of energy, transport, and environmental sustainability. An ambitious blend of policy tools and measures will increase energy-efficiency in transport, provide safer and more convenient travel for all, using a higher share of clean engine technology and fuels, resulting in an enhanced urban environment (including reduced noise and air pollution). Visible and measurable impacts will result from significantly sized measures in specific innovation areas. Demonstrations of innovative transport technologies, policy measures and partnership working, combined with targeted research, will verify the best frameworks, processes and packaging required to successfully transfer the strategies to other cities.

1.3 Participant Cities

The ARCHIMEDES project focuses on activities in specific innovation areas of each city, known as the ARCHIMEDES corridor or zone (depending on shape and geography). These innovation areas extend to the peri-urban fringe and the administrative boundaries of regional authorities and neighbouring administrations.

The two Learning cities, to which experience and best-practice will be transferred, are Monza (Italy) and Ústí nad Labem (Czech Republic). The strategy for the project is to ensure that the tools and measures developed have the widest application throughout Europe, tested via the Learning Cities' activities and interaction with the Lead City partners.

1.3.1 Leading City Innovation Areas

The four Leading cities in the ARCHIMEDES project are:

- Aalborg (Denmark);
- Brighton & Hove (UK);
- Donostia-San Sebastián (Spain); and
- Iasi (Romania).

Together the Lead Cities in ARCHIMEDES cover different geographic parts of Europe. They have the full support of the relevant political representatives for the project, and are well able to implement the innovative range of demonstration activities.

The Lead Cities are joined in their local projects by a small number of key partners that show a high level of commitment to the project objectives of energy-efficient urban transportation. In all cases the public transport (PT) company features as a partner in the proposed project.

2 Ústí nad Labem

Ústí nad Labem is situated in the north of the Czech Republic, about 20 km from the German border. Thanks to its location in the beautiful valley of the largest Czech river Labe (Elbe) and the surrounding Central Bohemian Massive, it is sometimes called 'the Gateway to Bohemia'. Ústí is an industrial, business and cultural centre of the Ústí region.

Ústí nad Labem is an important industrial centre of north-west Bohemia. The city's population is 93859 living in an area of 93.95 km^2. The city is also home to the Jan Evangelista Purkyně University with eight faculties and large student population. The city used to be a base for a large range of heavy industry, causing damage to the natural environment. This is now a major focus for improvement and care.

The Transport Master Plan, initiated in 2007, will be the basic transport document for the development of a new urban plan in 2011. This document will characterise the development of transport in the city for the next 15 years. Therefore, the opportunity to integrate Sustainable Urban Transport Planning best practices into the Master Plan of Ústí nad Labem within the project represents an ideal match between city policy framework and the ARCHIMEDES project.

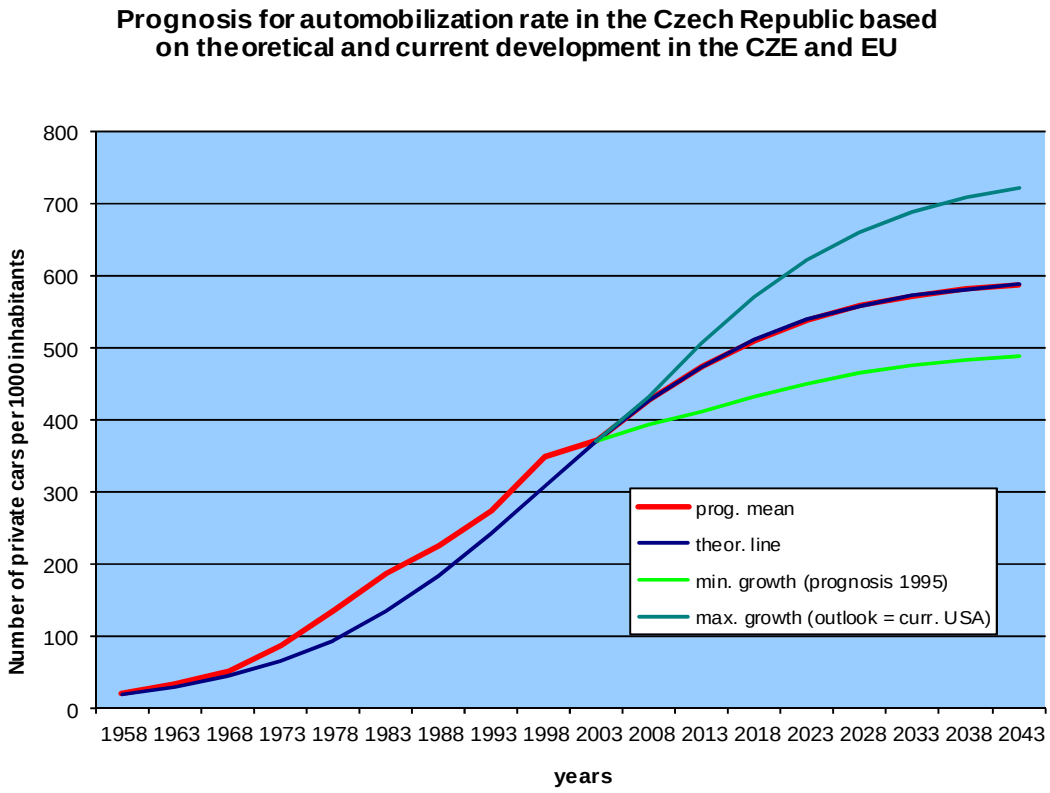
The project's main objective is to propose transport organisation of the city, depending on the urban form, transport intensity, development of public transport, and access needs.

3 Background to the Deliverable

The sole objective of transport policy in the past was to provide a road network; sufficient parking facilities were not considered, nor anticipated as a fairly low level of car ownership was predicted. However, as roadways for vehicles are improved via the transport policy, so the adverse impact of parking on the environment and the residential function of the area increases. More importantly, the non-systematic solution to the parking results in uncontrolled parking occupying space, which is of a poor aesthetic standard, particularly in the historical parts of the municipality.

After 1989, the number of private cars grew dramatically and the modal split changed – individual automobile transport (IAT) outnumbered public transport. Parking facilities have become insufficient to cover the increasing number of private cars, especially those of residents, and they have expanded to places restricted to leisure uses by residents.

Figure 1 – Development of automobilization in the Czech Republic



(Source: CityPlan, spol. s.r.o.)

The current European trend is quite contradictory; many city centres have restricted zones where construction of car parks and multi-storey garages is forbidden, parking time is limited

in areas close to the centre and parking policy prefers public transport (PT) to IAT.. This trend is a real burden on public budgets in locations where PT is subsidised.

3.1 Summary Description of the Task

The city of Ústí nad Labem is facing critical parking conditions, primarily in the city centre. Ústí nad Labem has a target to enhance and expand its parking system by introducing differentiated parking charges in specific city zones. Within the CIVITAS ARCHIMEDES task 3.7, Short Term Parking Scheme, the city analysed measures suitable for implementation to improve its parking conditions, such as paid parking zones and the Park and Ride (P&R) system.

This task involved a traffic survey conducted in the city centre to map parking of vehicles and their parking patterns. The study noted whether the parking places are charged or not. The survey results also revealed serious parking problems in the city centre. This work describes specific proposals for the parking scheme (“parking policy”) and provides general analysis of suitable regulatory tools.

The task further included implementation of 6 sample paid parking lots in the city centre, production of information parking brochures and distribution of parking clocks for companies located in the city centre. This demonstration task was based on results of the research study of the task 11.3.3, Parking Strategy Research and the task 11.2.3, P&R Feasibility Study.

4 Short Term Parking Scheme

4.1 Basic Terminology and Requirements

The parking scheme refers to all stationary vehicles deliberately parked by drivers and not those stationary due to queuing in congested traffic congestion or technical defects.

Figure 2 – Parking in the city

Parking has become quite a sensitive issue in larger cities in the Czech Republic, as well as in other developed European countries. The problem of insufficient parking facilities grew slowly; however, its scale and seriousness is significant nowadays. Its origins date back to the residential development when future car numbers were hugely underestimated. In the Czech Republic the trend of living in newly built houses on the outskirts of large cities began in the 1990s. However, such areas have poorer public transport services, so local residents have to travel by private car for work, culture, health care, etc., which results in road congestion and demand for parking in city centres.

The parking scheme distinguishes the following:

- short-term parking (up to 2 hours)
- long-term parking (2-24 hours)
- permanent parking (over 24 hours).

Parking facilities have been built near all potential transport resources and destinations. These comprise mostly residential, manufacturing, administration and shopping facilities, and schools. Options for parking facility solutions consist of:

- Parking lanes – along the side of roads with longitudinal places for parking (cars parked in a line parallel to the road)
- Parking strips – along the road with diagonal and perpendicular parking places

- Parking bay – a parking lane/strip which is not continuous along the full length between crossroads
- Parking areas – car parks – designated areas for parking of several vehicles, these have to be connected to the road network and can include structures built with the sole purpose of vehicle parking, usually built in areas with a shortage of free areas and large demand for parking, and usually multi-level. They can be either under or above ground
- Row of garages – in residential areas, industrial sites, etc
- Automatic parking systems – parking garages where vehicles are stacked mechanically using crane platforms, which saves space on access roads and handling areas, and consequently allows most of the area to be used for vehicle parking.

In terms of users, parking can be divided into:

- Residents
- Employers
- Employees
- Visitors..

In terms of accessibility, we distinguish the following parking facilities:

- Public – open to all, usually with restrictions only on maximum vehicle weight and dimensions, parking fee may be charged
- Non-public – with access permitted only to a particular group of people, for example, employees.

Public parking facilities can be operated by:

- The City (via a road authority)
- Private entity on private land
- Private entity under contract to either of the above.

The parking scheme must not worsen parking conditions on the outskirts of the municipality. It is obvious that parking solutions in the inner city will affect the situation in adjacent areas, so the parking scheme must deal with both the centre and its adjacent areas.. This is particularly important in a long-term solution.

In developing the parking policy, public opinion on the prepared changes, must be taken into consideration. The authorities have to present comprehensible reasons for the executed changes, particularly when introducing unpopular parking fees. At the same time, an information campaign on the prepared changes has to be organised to allow enough time for people to get used to the new conditions.

4.2 Transport Policy

4.2.1 Transport Policy Relations

The parking scheme (parking policy) should be coordinated with the planning of all non-transport schemes. Transport is a far reaching area and has a number of limiting and influencing factors. Consequently, it is coordination and planning together with other schemes that provide an effective instrument to enhance the parking scheme and environment in the city. Figure 3.shows the interactions within the transport policy.

Total reduction of demand for transport means that the need to use motorised vehicles is reduced. This implies an appropriate allocation of residential facilities, work opportunities, services, educational and health care facilities around the whole city area, so that they are accessible and the need for long journeys eliminated. Ideally, residents should have adequate job and shopping facilities within walking distance of home, and the same applies in relation to children and schools/health care facilities. This would eliminate a lot of travel by motorised vehicles, the road infrastructure would not need to be adapted to high traffic volumes and the need for short-term parking would not escalate.

However, the reality is different as most cities have been built according to different designs: in the inner city we find job opportunities, cultural facilities and services, while residential facilities are on the outskirts. As a result residents travel between the centre and their place of abode. It is impossible to restrict such movements in existing cities; we can only change the modal split from IAT to PT and non-motorised transport.

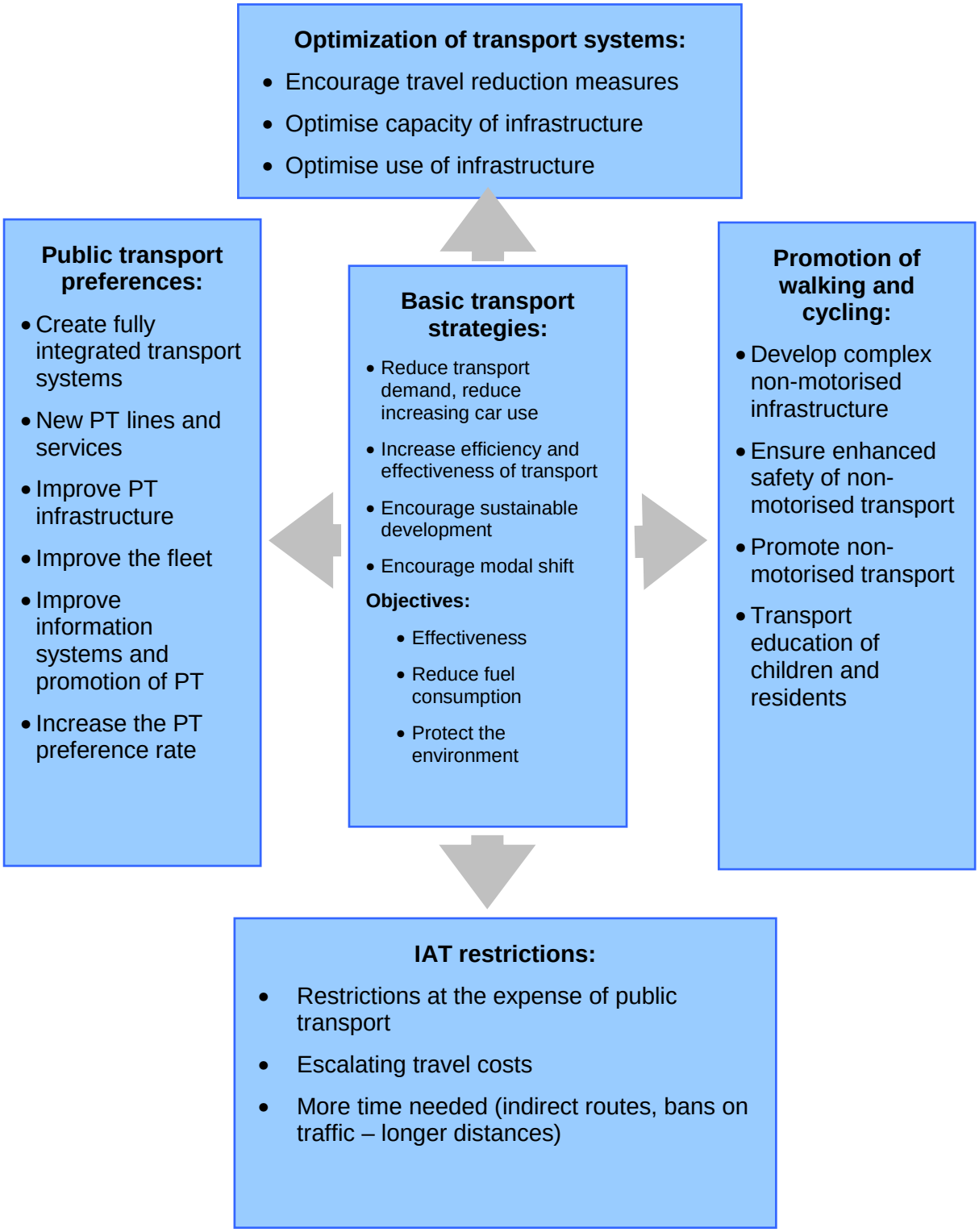
Parking has become an integral and important part of the transport system. A typical vehicle is parked for 23 hours every day and uses several parking places every week [5].

Parking is distinguished as a problem in most cases when the number of parking places is perceived as insufficient and there is a common tendency to resolve the issue by higher supply, i.e. building new parking spaces.

Parking problems not only occur in supply (shortage of parking places and demand for more), but also in management (supply of parking is not used efficiently). Transport management solutions offer a better approach compared to constant expansion of supply, as they pursue more strategic planning objectives [5]:

- Reduce developers' costs and increase affordability of parking
- More compact, multi-modal community planning ("smart growth")
- Encourage the use of alternative modes and reduce the use of cars (i.e. reduce congestion, accident rates and emissions)
- Improve transport users' options and quality of services, partially for non-drivers
- Improve design flexibility, developing more functional and attractive communities
- Accommodate new users and respond to new requirements
- Reduce areas with impermeable surfaces with the associated environmental and aesthetic benefits.

Figure 3 – Interactions within transport policy



4.2.2 Parking Scheme Management Principles

Todd Litman defined ten principles of parking management that help plan individual measures to deal with parking issues. These 10 best practices can help manage planning decisions to support parking management. Litman also defined parking management benefits.

Parking management principles [5]:

1. *User choice.* People should have affordable parking and mobility options.
2. *User information.* Motorists should have information on their parking and mobility options.
3. *Sharing.* Parking spaces should be used by different users and at different destinations.
4. *Efficient use.* Parking spaces should be sized and managed to allow efficient use.
5. *Flexibility.* Parking plans should be able to cope with irregularities and changes.
6. *Prioritization.* The most popular parking spaces should be managed to satisfy users with the highest priority.
7. *Pricing.* Users should pay directly for the parking spaces they use as far as possible.
8. *Peak hour management.* Special attention should be paid to satisfying demand in peak hours.
9. *Quality versus quantity.* The quality of parking spaces should be given the same importance as the quantity, including aesthetics, safety, accessibility and user information.
10. *Complex analysis.* All significant costs and benefits should be taken into consideration when parking planning.

Parking management benefits [5]:

1. *Reduced construction costs.* Reduced costs for administration authorities, employers, developers and consumers.
2. *Increased quality of services.* Different policies increase the quality of services for users by providing better information, increasing options for users, reducing congestion and creating more attractive spaces/facilities.
3. *More flexible locations and design.* Parking management provides architects, designers and planners with more ways to address requirements for parking.
4. *Revenue creation.* Some management policies create revenue that can support parking spaces/facilities, transport or other important projects.

5. *Reduced space use.* Parking management can reduce requirements for space and consequently protect green areas and other valuable, environmentally friendly, historical and cultural resources.
6. *Support for mobility management.* Parking management is an important component in encouraging more efficient transport examples that help reduce problems like traffic congestion, costs for road construction, emissions, fuel consumption and traffic accidents.
7. *Support of "smart growth".* Parking management helps create more accessible and efficient examples of land use and also supports other planning objectives of land use.
8. *Better walkability.* By encouraging more combined development located closer to footpaths and roads, parking management helps create communities that give more consideration to walking.
9. *Support for public transport.* Parking management encourages development focused on PT and its use.
10. *Reduced costs for management of rainstorms, water pollution and urban heat island effect.* Parking management can reduce the total area of hard surfaces and implement design components such as landscaping and shading, which reduce rainstorm water flow, water pollution and solar heat accumulation.
11. *Support for equality objectives.* Management policies can reduce the need for subsidies, improve the mobility options of non-drivers, provide financial savings to low-budget families and increase affordability of housing.
12. *Friendlier communities.* Parking management creates a more attractive and more efficient municipal environment by reducing the total area of hard surfaces, allowing more flexible building design, increasing walkability and improving parking space design.

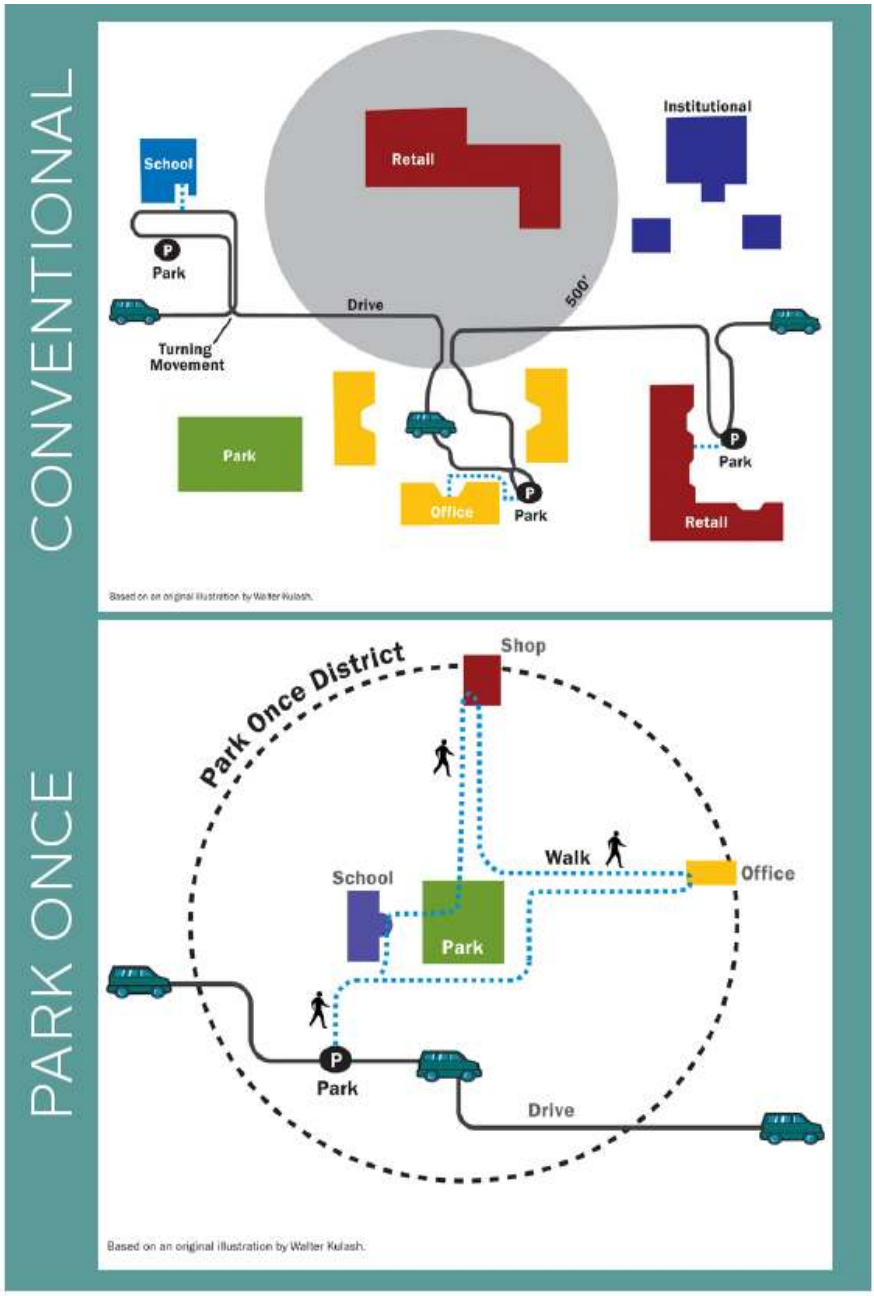
4.2.3 Parking Scheme Management Policies

Urbanism, functional land use and planning

Proper functional land use in the form of a precise urban design is the best supply management – both in transport and parking. The disadvantage is that it cannot be applied ex post, i.e. when the functional use of spaces has already been decided and it is impossible to change it radically.

The method of land use is the best instrument in supply regulation. Maximization of accessibility through destination proximity reduces the number of journeys and the need for parking. For example, in settled areas with adequate density and mixed use where residents can satisfy daily shopping needs just by walking or employees can walk to lunch or arrange day-to-day things, the number of car trips which would otherwise be necessary are minimised. In such compact locations with mixed use it is often more efficient to introduce the so-called "park once" system, which allows a large number of users to share the same choice of parking area rather than allocating exclusive enclosed parking places for different travel purposes.

Figure 4 - Structure of a territory, its functional use and parking policies – the conventional example and the optimised example "park once"

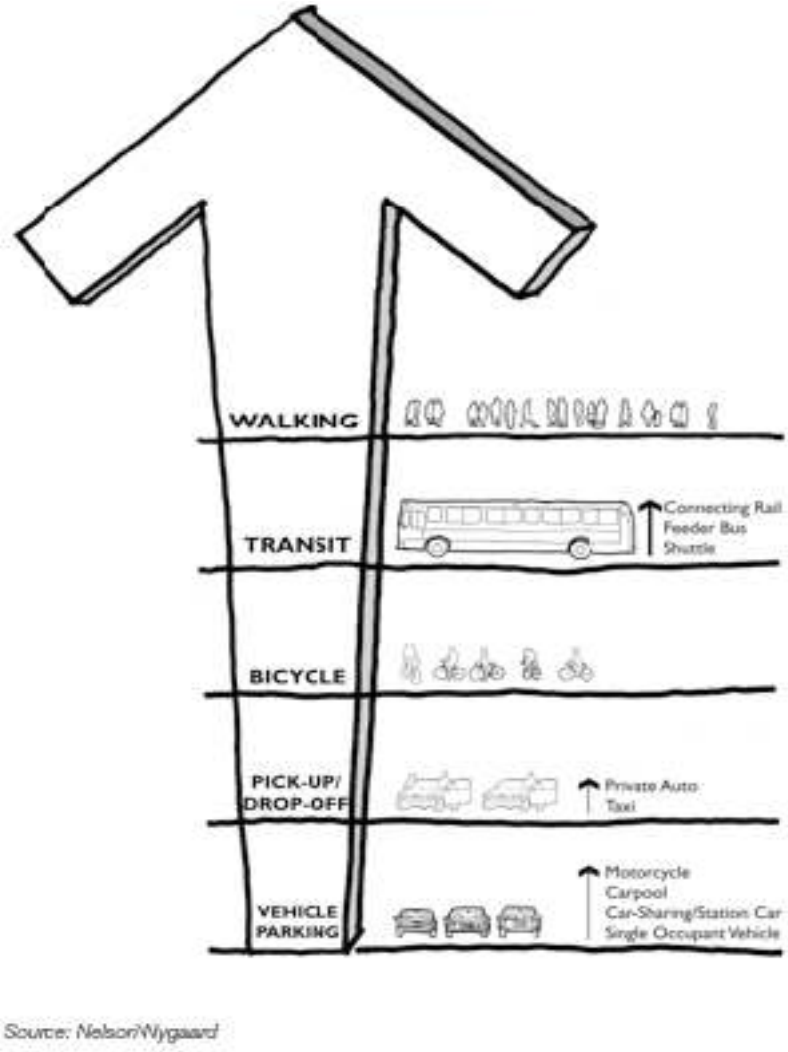


(Source: [1])

Accessibility of destinations is a strong determinant of the choice of transport mode, and also the resulting transport situation and attractiveness of the environment in the specific locality. Demand for the number of parking places can be reduced by preferring different transport modes rather than individual automobile transport, which can be illustrated, for example, by the example of the San Francisco Bay Area Rapid Transit (BART). The first in the hierarchy of access modes is walking, followed by public transport (transit) with cycling coming third,

passenger drop off /pick-up (i.e. short-term parking, Kiss & Ride, taxi) coming fourth and last, private car parking, which is distinguished by motorcycles, carpooling, car sharing and single occupant cars.

Figure 5 - Access mode hierarchy, example of the San Francisco BART



(Source: [1])

4.2.4 Policies and Their Effectiveness

Different publications deal with a number of possible parking management policies; below we present policies according to Todd Litman (see Figure 7). This describes different policies and typical reduction in the demand for parking once the policy has been used, as well as identifying whether any decrease in traffic intensity can be expected.

Figure 6 - Parking management policies according to [5]

Policy	Description	Typical reduction	Traffic reduction
Shared parking	Each parking place is used for more users and destinations	10-30%	
Parking regulation	Regulations that satisfy important users - service vehicles, distribution, customers, fast deliveries and individuals with specific needs	10-30%	
More prices and flexible standards	Setting standards for parking to obtain better response to the demand in individual situations	10-30%	
Parking maximums	Introducing standards for parking maximums	10-30%	
Remote parking	Providing parking spaces outside destinations or on the city outskirts	10-30%	
Smart growth	Encouraging more compact, mixed and multi-modal development to facilitate greater sharing of parking spaces and using alternative transport modes	10-30%	√
Enhancing walking and cycling	Improving conditions for walking and cycling to extend the radius of destinations with available parking spaces	5-15%	√
Increasing capacity of existing spaces	Increasing the supply of parking by the use of otherwise “waste” space, smaller bays, vehicle stackers and cell parking	5-15%	
Mobility management	Encouraging more efficient mobility patterns including changes to modes, timing, destinations and frequency of car travel	10-30%	√
Parking fees	Direct and effective selection of fees from motorists for the use of parking spaces/facilities	10-30%	√
Enhancing parking fee methods	Using better parking fee methods making payment more convenient and cost effective	NA	√
Financial incentives	Providing financial incentives to promote shifts to a different mode	10-30%	√
Parking separation	Rent or sale of parking spaces separately from buildings	10-30%	√
Parking rate reform	Introducing fees/taxes for parking spaces and their use	5-15%	√
Cycling facilities	Providing parking and transfer points	5-15%	√
Improving user information and marketing	Providing suitable and accurate information on parking options and prices, use of maps, signs, brochures and electronic communication	5-15%	√
Better surveillance	Providing effective, careful and fair surveillance in compliance with parking regulations	NA	
Transport management association	Setting up an association controlled by its members, which provides services of transport and parking management in a specific locality	NA	√
Parking plans for peak demands	Developing plans to manage intervals with peak demands	NA	
Addressing the issue of overcrowding	Using management, surveillance and parking fees to address overcrowding problems (capacity problems), such as undesirable use of neighbouring parking spaces	NA	
Design and operation of parking spaces	Enhanced design and operation of parking spaces and facilities as an aid in dealing with the problems and achieving the objectives of parking management	NA	

4.2.5 Change of Paradigms

A paradigm is a group of conditions on which a theory or framework is based. During the change of a paradigm, perception of a problem is changed and offered solutions are assessed.

As Litman says in his work [5], the current paradigm in many developed countries is based on the idea “the bigger the parking supply, the better". This is reflected in planning and predictions (transport prognosis), in which past trends are extrapolated to predict future demand which planners try to satisfy. This often creates “self-fulfilling prophecies” since a great parking supply increases the use of vehicles and suburbanization (i.e. dispersed urbanization). This in turn increases the demand for parking and supply of parking, and so on (see Figure 9 the “vicious circle” below).

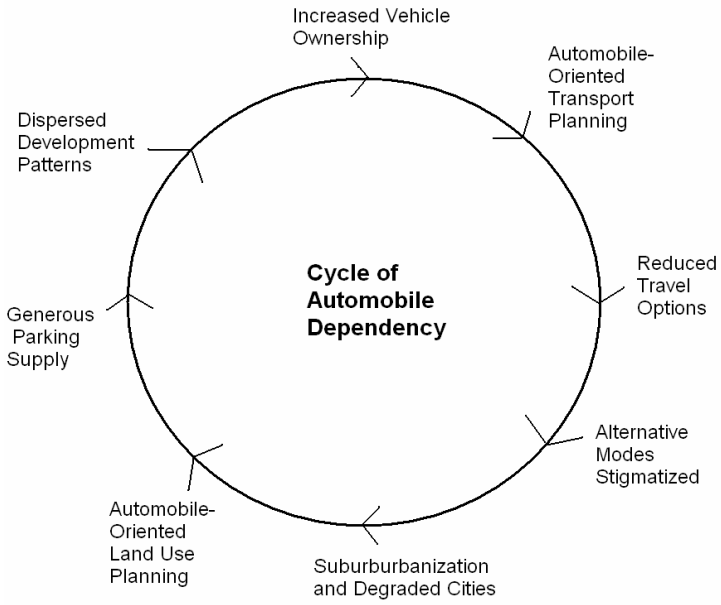
Introducing parking management brings the need for paradigms used by interested individuals (experts and planners as well as users). A change in paradigm is necessary in order to increase acceptance of the proposed measures and motivation of users to comply with them. Measures that are not understood by users are often ignored or evaded. Litman identifies the following paradigms in his work:

Figure 7 – Change of a paradigm according to [5]

Old parking paradigms	New parking paradigms
“Parking problem” means inadequate supply of parking.	“Parking problem” can mean inadequate supply, ineffective management, inadequate information and other problems connected with parking spaces/facilities and activities
More parking is better.	Too great a capacity is as adverse as too little
Parking should generally be provided free of charge. Wherever possible, parking spaces/facilities should be subsidised indirectly through building rents or taxes.	Users should pay for parking directly and the more the better
Parking should be available on the principle “first come, first served”.	Parking should be regulated to satisfy users with higher priority and in order to encourage efficiency
Requirements for parking should be applied consistently without any exceptions or variants.	Requirements for parking should reflect each individual situation and should be applied in a flexible manner
Traditional solutions should be encouraged. New approaches should not be encouraged, unless they are well established and have poor acceptance.	Innovative solutions should be encouraged as even unsuccessful experiments can often provide useful information
Parking management should be applied as the last option, if increasing capacities would be too costly	Parking management programmes should be widely applied to prevent parking problems
"Transfers mean driving“. Scattering of destinations (suburbanization) is acceptable or even required.	Vehicular transport is only one part of the transport system. Dispersed land use patterns dependent on cars should not be desirable.

In case of incorrect, one-sided transport planning focused on private cars, a city falls into the cycle of automobile dependency as presented in Figure 8. Transport alternatives between a source and a destination become reduced, alternative transport modes are stigmatised, cities suburbanize and degrade, automobile-oriented planning grows, the number of parking places dramatically grows, dispersed development extends, car ownership increases, which in turn strengthens tendencies to transport planning oriented towards private cars.

Figure 9 – Cycle of automobile dependency



(Source: [1])

4.2.6 Benefits of Free Parking

Free parking is often perceived as an instrument to encourage local businesses. However, as Stienstra states (see [7]), the discussion on free parking is usually based on emotions, not facts. Other authors (e.g. Knoflacher) also point out the favourable economic effects of introducing pedestrian zones (i.e. introducing a ban on traffic, or entry regulation) on businesses.

The primary role of paid parking is to limit the parking time and thus facilitate short-term parking for users who would not get to the concerned parking places otherwise, as they would be occupied by those parking long-term. Public support for introducing fees is greater if drivers notice better parking opportunities once paid parking has been introduced. Public support will be low if the paid parking system has been introduced solely to generate revenues. Such a measure can decrease the attractiveness of the concerned area for customers, or partial changes to shopping habits can occur (moving to a different place for shopping). This can affect the economic decline of retailers and other service providers in the specific locality.

Will paid parking change people´s habits and transport behaviour?

Siestra notes that a study by Goudappel Coffeng/Intromart, (2004) concluded parking was rarely identified as a reason for visiting a shopping zone. On the other hand, parking was often stated as a weak point of many shopping locations. The study's conclusions confirm that "parking itself is not used as an argument for the attractiveness of a shopping location, but it should contrariwise be understood as a limiting factor. Unless a critical limit is exceeded by the restrictions, parking has no influence on the visitor turnout".

Other studies show that parking fees play only a small role in deciding where to park. Key factors are location and accessibility.. Drivers are willing to pay for more comfortable parking. Reducing walking distance by 100 m corresponds to approx. € 0.50. Avoiding time limits is another factor.

A Dutch study showed that a shortage of parking places is more important than the rate of parking fees, and paid parking does not discourage people from visiting the city centre. First of all, users expect adequate parking areas as part of shopping location accessibility. **Free parking does not add any extra attractiveness to any location** [7].

According to Siestra, many Dutch studies have shown that customers choose their shopping destinations mainly based on different criteria than parking prices. Quality of the supply and the environment are most important. The order of criteria was:

1) Cleanliness (environment)
2) Safety (environment)
3) Services (supply)
4) Supply of articles (supply)
5) Atmosphere (environment);
6) Parking
7) Walking routes (environment).

4.2.7 Parking Fees

A number of references mention that parking is still the subject of strong emotions. There are various reasons, of which especially the following can be named:

- Shortage of parking places
- Continuous growth of parking rates
- Insufficient transparency regarding determination of parking charges (purpose and objective of the rate policy; in car owners and municipalities).

Cities approach the issue of pricing with different motivations, such as to:

- Cover cost (neutral approach)
- Contribute to the mobility support fund
- Obtain money for different purposes
- Cover the required saturation rate
- Indirectly support alternative transport modes
- Reduce traffic volumes and associated phenomena (congestion, emissions);
- Exploit practices of other cities.

The primary question is what is the optimum fee and supply of parking places. A Dutch study [8] highlighted a method of rate calculation based on "optimum social profit" taking into account two principles:

1) Get the right people to the right car park - people with a greater need to park in the specific location should find a free parking place, whereas others have the option to find a different place or travel using an alternative transport mode;
2) Prices should reflect the location value (demand and readiness to pay the specified parking fee differs in specific locations).

An optimized rate is derived from the following equation:

$$T_{area} = \alpha * B * K\ (1+A)*i_t$$ where:

α = 0.23 – invariable defined according to "average business street" (Meent, Rotterdam)

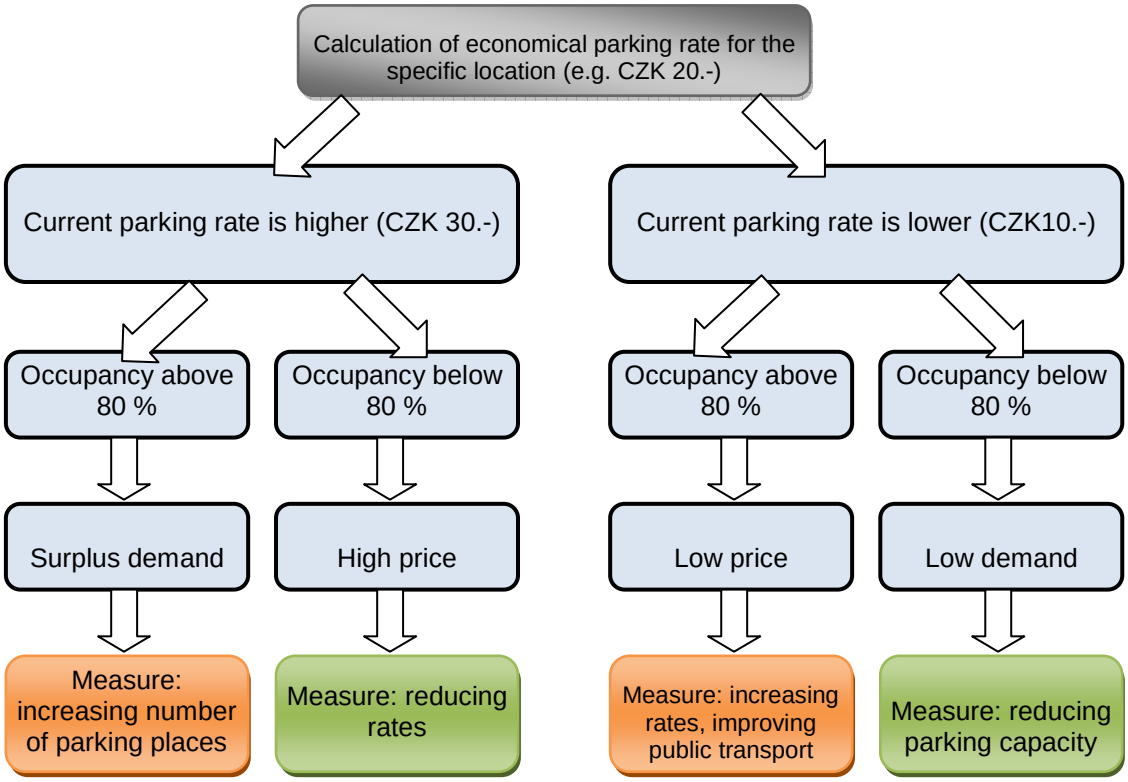
B = occupancy rate

K = value of people´s time

A = attractiveness of the location

i_t = inflation correction

Figure 10 – Specifics of parking fees (Source: [8], adapted)



4.2.8 Psychological Aspects of Unauthorised Parking

Paid parking brings the problem of drivers parking illegally without payment. Principally, there are two possible approaches and their combination to solve the problem:

1. Prevention, education and information

   Fees are more accepted if users know or are explained the purpose and objective of the decision. The feeling of doing the right thing in favour of the community or city is an effective motivator.

2. Restrictions in the form of fines, and/or vehicles being towed away.

   Fines for unauthorised parking must be adequately set to achieve the "educational effect" and to discourage drivers from unauthorised parking. Surveillance of regulation compliance must be sufficiently frequent so that occasional payment of fines is not perceived as easier than regular payment of parking fees.

A study [6] dealt with psychological aspects of unpermitted parking based on the study of two German cities, and presented the following results:

- Higher authority does not guarantee better behaviour
- Knowledge and understanding of parking regulations and instructions are not a guarantee of better behaviour
- Fines should have an educational and warning effect (“Heads Up” or a “Call for Attention”)
- It is necessary to break unsuitable routines and bad social habits
- Unauthorised parking will decrease if people know how important it is to observe regulations and to be part of the community.

The mentioned study also shows the following solutions:

- People should remember that they are part of the community and how important it is that all of them abide by social regulations, since it is also for their own good
- Improve civil culture: "I am part of this city“ / "I want to do things correctly“
- Use educational events including interactive instruments, humour, art and creativity. Regulations for better social behaviour will be welcomed.
- Redefine the meaning of the word “fine”
- Use instruments such as self-regulation and social regulation more than enforcement by institutions. Restrictions are the last resort after "soft” measures.

4.2.9 Specifics of City Centres

The issue of transit traffic is crucial in city centres. There are several reasons, beginning with the previous trend to route transit traffic through municipal centres, often directly via the central square, or in close proximity to the centre, along dense historical development with narrow streets. Such development usually does not allow wider, higher capacity roads to be built or to distribute traffic loads to alternative, parallel roads, because street spaces are usually rather constrained.

Constraint is also reflected in the limited number of parking places. Thus traffic load should be regulated first and subsequently parking alternatives, should be addressed, along with the number of necessary and implemented parking spaces.

Central parts of cities, in which cultural and historical sights, cultural entertainment, etc. are usually located, are visited by many tourists. It is desirable therefore to mitigate traffic in these parts by adequate regulation, organisation and traffic control. Tourists arriving in a city in their own cars mean parking places are in high demand. The demand fluctuates - with the peaks mainly in tourist seasons and dependent on the weather. The parking places are not used over the rest of the year (except in municipalities with all-year-round tourism, e.g. spas).

Another limiting condition in city centres is historical development. Apart from the already named problem of narrow streets, there is usually insufficient space to establish the

necessary number of parking spaces. There is also an urban-aesthetic factor. Large squares should be a quiet place for people to move around, with green areas. They should not be used as a capacity car park. The number of places for parking should be limited to those necessary for deliveries, or for residents, provided there is no chance for them to park their vehicles in other places (building yards, adjacent streets). High pedestrian concentration should not be forgotten, with the relative width of pavements and roads being appropriate to the demand and observed flows.

Vehicles usually park in city centres for a short time (tourists, visit to offices, etc.); people who commute to the inner centre by car need long-term parking, especially during the day. Outside company offices there are many company vehicles parked. The number of residents is lower, their vehicles are usually parked for a longer time and journeys are irregular (on holidays, big shopping, etc.). Vehicle turnover in parking places is rather high and it is not homogenous; it depends on the specific location, whether there are residents (lower turnaround) or subscribers, employees or visitors. So on squares and locations attractive for tourists the vehicle turnaround is high, unlike in housing estates, where it is much lower.

Figure 11 – Parking in the centre of Ústí nad Labem

The total number of necessary parking places is specified according to ČSN 73 6110 – Design of local roadways. The number of necessary parking spaces depends on the following:

- Area development
- Level of car ownership and its development
- Number of apartments
- Population of the area
- Transit traffic volumes
- Attractiveness of the area for tourists (number of tourist destinations, possibility for visitors to enter and park in the centre)
- Number and size of shops, offices, cultural and health care facilities
- PT quality and price.

4.2.10 Specifics of Residential Areas

In neighbourhoods like this residents do not use their cars every day, but only for certain trips (going on holiday, weekly shopping, moving large objects, etc.), and for the rest of the time

the vehicle is parked. Turnaround of parking places is therefore low. The number of parking places should be adequate for the number of households and level of car ownership.

Neighbourhoods with low development density usually have sufficient parking spaces. There are areas with villas or single-family houses, which provide sufficient length of local roads, where vehicles can be parked or they can be parked on the grounds or garages of houses. A different situation is found in a dense development with a high concentration of residents – typically tower block neighbourhoods. Such locations usually have a great shortage of parking spaces and there is only very limited space suitable for new parking places.

Figure 12 – Parking in a residential area of Ústí nad Labem - a street with low development

4.3 Parking Scheme Solutions

The parking scheme can be organised in two ways. They differ in the implementation cost of measures, the scope of the measures and their efficiency.

A short-term solution deals with instantaneous problems using simple adjustments. It is not very costly. However, its effectiveness is very low; in suitable conditions it accommodates current traffic loads, but in the future it will be necessary to respond to changes in the transport process. The objective of the adjustments is to use the current infrastructure as effectively as possible in terms of the number of supplied parking places.

A long-term solution is more costly, but efficient for a considerably longer time period. It involves introducing the described parking management. However, transport issues have to be dealt with comprehensively at first: the principle of this solution are traffic load forecasts in the area, and forecasting the number of private cars[1] and development urbanization. The solution involves measures in the area of the parking scheme as well as mitigating traffic.

[1] Number of residents in the specific territorial unit per one private car

The latter means particularly organisation of activities in the urban space [2] which leads to a decreasing demand for transit.

4.3.1 Short-Term Solution

This deals with the current shortage of parking capacity, but does not consider potential development in the future. A small number of parking places is provided by adding new spaces by more efficient use of the current infrastructure. Construction adjustments are of a smaller scale. Hence its short-term effect, which is suitable in a situation where:

- the estimate of future mobility relationships and distribution of labour is very unclear (unapproved ground plan, planning of an extensive development, etc.)
- there is an acute shortage of parking capacity.

Possible ways of increasing parking capacity:

- To introduce one-way streets and create parking places on both sides of the road, and to improve the information system directing drivers to free parking facilities. There is often a space for laying down a restricted cycle lane.
- To narrow traffic lanes and to add a parking lane/ strip
- To change parallel parking to diagonal or perpendicular by narrowing traffic lanes
- At the expense of footpaths or green areas – this is an unsuitable solution particularly in inner cities because of the many pedestrians.

A short-term solution to insufficient parking spaces in housing estates is difficult and is usually possible only at the expense of greenery. The deficit in parking spaces is much higher than the parking spaces that could theoretically be created in all free spaces of a housing estate.

4.3.2 Long-Term Solution

The long-term solution to the parking scheme represents a complex solution to mobility in a municipality. However, it must be based on effective and efficient organisation of traffic to also meet future traffic loads. It is advisable to develop models simulating future volumes. Traffic should be divided into that necessary for correct functioning of the area (supplies and

[2] Extract from the lecture **"**Influence of urban structure on traffic demands of the area and relationship of land planning to solutions of transport sustainability" (Ing. Arnošt Bělohlávek, Ing. Peter Súkenník CMDTUR Žilina 2006)

"Continuous growth of transport still does not meet the idea of "sustainable development". The organization of an urban area crucially affects the demand for transporting people and goods. The demand often induces traffic in an unmanageable scope . In designs of new urbanization it is desirable to deal with the distribution of activities and residential zones together with an analysis of demands for transit induced by such a layout. Satisfying the mobility need is impossible as it belongs to basic human rights. The demand for mobility induces traffic, which cannot be limited for the same reason, it can only be better organised by shortening transit and, consequently, transit distances, resulting in reducing the traffic performance".

deliveries, PT, TAXI, fire brigade vehicles and ambulances, residents' automobiles) and transit traffic, which does not bring any benefit to the area; on the contrary, it loads roadways undesirably and reduces the space in the area. Unnecessary traffic can be broken down into three categories:

- **1st degree unnecessary traffic**: It has no departure point or destination in the concerned area, it is transit traffic which burdens the roadway capacity and therefore is highly undesirable in developed areas, especially in city centres or in their proximity
- **2nd degree unnecessary traffic**: The departure point or destination are located in the area concerned, however, located unsuitably (e.g. an industrial site in the city centre, a shopping facility without any capacity connection to a suitable infrastructure). This results in unfavourable traffic relationships loading the road network and its surroundings usually with high demand for haulage as well as individual automobile transport.
- **3rd degree unnecessary traffic**: The area has a correctly located point of departure or destination, or departure point and destination of mobility relationships, however, these are reached using unsuitable modes. A typical example is loading roadway capacities (mostly highways) by IAT (although the potential of railway transport) is not fully used, or by transits in the city centres using IAT and not using PT.

Unnecessary traffic results in high mobility demand, considerably reduces the roadway capacity, especially in peak hours (the time when the traffic load is the heaviest, on workdays between approximately 8 am – 10 am and 4 pm – 7 pm depending on local conditions). The growing traffic load increases the risk of accidents,, has an increasingly adverse influence on the environment (noise, vibrations, dust, exhaust gas emissions), increases the communication barrier effect, and unfavourably influences the flow and reliability of PT services, which are not segregated from other traffic. Heavy traffic load also poses demands on land use (such as the necessity for two traffic lanes in one direction), which could otherwise be devoted to parking, non-motorised transport (footpaths, cycle paths) or greenery.

Instruments to reduce unfavourable traffic can be divided into the following groups:

- **Transport regulation**: An instrument which is the most costly, time demanding and which requires extensive human resources. It changes mobility habits in the area using suitable construction measures such as:
    - construction of city bypass roads
    - introduction of payments for entering the city centre
    - reduction of parking spaces - fees, residential zones
    - uncomfortable roadway: narrowing traffic lanes, delays in road junctions with traffic lights, complexity (a great number of road junctions).
- **Transport organisation**: To accommodate the roadway network in cities to current mobility requirements, efforts to use the current infrastructure most efficiently. It uses the following options:
    - a system of one-way roads and cul-de-sacs (complicated, long and slow journey) with only one way out, offering more parking spaces
    - entry prohibition / restriction

  - turning prohibition at crossroads (most preferably in the direction of the biggest number of collision points – i.e. on the left)
  - residential zones, "Tempo 30“ zones (moderate traffic speed).

  The disadvantage of the solutions is often that they make trips longer and consequently have an impact on the environment.

- **Transport management**: Direct influence on mobility in a specific place and optimised for specific conditions, e.g.:
  - traffic lights
  - vertical and horizontal road marking
  - intelligent transport systems (ITS).

The best effect – reduction of traffic load on roadways in central and residential parts of a municipality – can be achieved by building and opening highway / motorway bypasses and diverting transit traffic from developed areas. This will meet the most important condition for the development of non-motorised transport – quiet, relatively safe and wide enough streets. This solution is considerably cost and time demanding; however, it is generally unbeatable when it comes to its efficiency.

The number of parking or permanent parking places must meet the features of the area (number of apartments, job opportunities, number and size of shops, presence of cultural, health care facilities, authorities, etc.) and the quality of PT. Logically, the more people that use a private car for their trips, the greater the demand for parking places, unlike the situation where residents prefer PT for their trips or they cycle or walk. Consequently, attention should be paid to creating suitable conditions and promoting PT and non-motorised modes. Such consideration only applies to specific locations, e.g. inner cities. The number of parking places is derived from the number of cars, the features of the area and the adopted parking scheme policy, not the directly used capacity.

Solutions to eliminate (unnecessary) transit traffic involve applying a parking scheme policy, creating the necessary number of parking places, using instruments to deal with the parking scheme and applying supportive measures.

4.4 Instruments for Parking Restrictions

Solutions for the parking scheme management consider specific transport engineering and urban conditions of the location concerned. The measures and necessary conditions to organise parking vehicles efficiently can be summarised in the following paragraphs.

4.4.1 Reducing Transit Traffic and IAT

The most advantageous way to reduce unfavourable traffic load is to build a city bypass road (in Ústí nad Labem transit traffic will be diverted once the D8 motorway has been completed). The size of the city with its current and forecasted traffic volumes plays an important role in deciding whether the bypass should be a motorway of higher capacity, or a highway, which is cheaper. Bypass roads improve transport connections of the area to the current roadway network around the municipality via radial roads (roads connecting the municipality with the bypass road), as well as serviceability of the area from the periphery.

Vehicles would not travel through the whole centre, they would use the bypass road and radial road. Consequently, trips into the city centre are minimised. This would require mitigating traffic in the centre itself by suitable measures – mainly by restricting transit, or by making transit complicated and time demanding, so that drivers would prefer travelling via a bypass road.

It is desirable to create a mitigated zone in the inner city – a pedestrian precinct, where automobiles are prohibited, or only some vehicles have permission to enter (usually delivery/supply, PT, ambulances and fire brigade vehicles) at a specific time, typically when fewer people are around.

Such measures will be reflected in a minimum drop in demand for parking, and traffic will not represent such a great spatial demand. For example: to lead transit traffic, a four-lane roadway is necessary to meet the traffic load. There are still queues of vehicles at peak hours causing irregularities of PT. Once the bypass road has been opened, the roadway will mostly be used to service the area, i.e. traffic having their departure point or destination in the area. The traffic load can be expected to be considerably lower with only a two-circle roadway being able to satisfy the capacity. The space saved from the original traffic lanes can be used as parking lanes / strips, restricted to a cycle lane, a cycle path, or for planting greenery.

4.4.2 Encouraging PT versus IAT

Another measure to reduce the numbers of private cars driving into the centre and parking there is PT preference. It should convince people to make trips by PT when they commute, go to school, culture, authorities, etc. without using their own car every day. The instruments of PT versus IAT preference are:

- direct:
  - IAT banned from entering the centre, imposing entry fees, parking fees
  - PT preference - restricted traffic lanes, segregated routes, driving in pedestrian precincts, preference at traffic lights
- indirect:
  - PT offering higher quality and affordable rates
  - integrating more carriers and more transport modes, facilitating mutual transfer, transfer rate
  - top quality information systems
  - P&R, K&R, B&R parking facilities
  - suitable prices
  - motivating campaigns.

Increasing the quality of PT services should motivate people to use PT more frequently. The following considerations apply:

- reliability and regularity of services
- high-quality fleet: modern, environmentally-friendly, low-floor, clean vehicles
- high-quality infrastructure: good barrier-free access to bus-stops, providing bus-stops with seats and roofs, ticket machines
- lines servicing the most requested routes, bus-stops conveniently positioned at important destinations
- favourable intervals of bus lines and trains
- services to easily accessible and more remote areas around the city (integrated system)
- suitably set fares and transparent rate system
- information available to passengers (clear timetables, information on closures, etc.)
- promotion (leaflets, web sites, information on new services, etc.).

City visitors should have a high-quality information system available, according to which they can easily find information about PT lines, proximity of significant tourist destinations and PT rates at bus stops.

Traffic load in city centres can also be reduced by decreasing the number of parking places. If drivers commuting to work by car have no place to park, they will have to use PT instead. Therefore, park and ride schemes should be established to increase the demand for parking places on the periphery of the municipality and near bus-stops, bus stations or train stations.

4.4.3 Park and Ride Facilities

The park and ride scheme is a very efficient way to satisfy the need for parking:

P+R (park & ride) **facilities** are usually located in close proximity to terminal stops on the periphery of a municipality. They serve mainly people from the region or close surroundings of the municipality (so-called "satellites“), who commute to the municipality and have poor PT services to the destination.. They drive from home to the car park and continue to the specific destination by PT. Parking prices must be low and the parking ticket is often also used as a ticket on PT.

PT commuters have the advantage of fuel and time savings, because PT is usually much faster in central areas of municipalities (it should be, otherwise the transport policy of the municipality is inefficient or it does not respect current trends of transport mitigation). Drivers who leave their vehicles at a P+R facility are not stressed by dense traffic or jams either.

B+R (bike & ride) **facilities** have a similar function as P+R, but are used by cyclists to have their bikes securely parked. They are often built as part of a P+R facility.

Such a facility is beneficial for cyclists who have no opportunity to park their bike near their workplace, or near their destination, or they do not want to cycle on heavily used roadways.

K+R (kiss & ride) **facilities** are located near PT stops, close to heavily used roadways. These are short-term stops to allow passengers to get in or out (approximately 5 minutes) who then travel to their destination by PT- mostly to the city centre, while the driver returns driving outside the city centre.

P+G (park & go) **facilities are** a system of high-capacity car parks on the outskirts of a city centre where drivers can park their vehicle. Such facilities may be located within walking distance of their destinations or they can use PT; the difference to the P+R system is that there are usually more lines in the centre – they cross or go in parallel – which makes the intervals shorter.

The proper functioning of park and ride schemes depends on many factors and it is obviously necessary to consider specific conditions in the city. Influencing factors include:

- Number of job opportunities in the centre, cultural, health care and educational facilities and, consequently, the volume of traffic
- Quality of PT (see the points above)
- Current roadway infrastructure
- Size of the town – the time the driver needs to reach the centre even in unfavourable traffic conditions.

Trips by PT to the centre using a park and ride facility should not take much longer than a trip by car; otherwise, drivers would not be motivated to use the P+R system.

4.4.4 Paid Entrance to the City Centre

A very efficient instrument to reduce traffic load in the centre is to introduce charges for driving into central parts of cities. However this has a short-term effect [3]. It depends on the specific conditions of the town, whether the entry is charged at peak hours or all the time. Permits for delivery trucks are different, as deliveries are usually allowed in the morning. Residents pay a small fraction of the amount compared to visitors. Households pay charges increasing in increments for a second vehicle and each following one. There are various methods of collecting the charges, from paying directly at parking meters, advance payments using an electronic card until the deposited amount is spent, paying via the GSM network and mobile phone, or paying an invoice retrospectively, where entering a paid zone is monitored according to a vehicle's number plate and an invoice is sent to the driver (after a certain period or when reaching a specific amount). Charges imposed on driving into the centre require an accessible bypass, the capacity of which will satisfy traffic loads even in the future.

Such a solution must have a high-quality system of park and ride facilities (with sufficient capacity) available near all access roadways to the city and a high-quality, dense PT network with short intervals.

4.5 Parking Scheme in a City Centre

Basically, there are administration and technical solutions. Parking charges reduce the demand for parking. This is often followed by reducing traffic load in the area, because drivers try to save money and leave their cars parked in areas where parking is free and then they change to a different transport mode (ideally PT). Parking charges increase municipal budget revenues[4] (e.g. they can cover the operating costs of the parking facility), reduce exhaust gas emissions and the negative impacts of motorised transport (noise, vibrations, accident rates, etc.) and contribute to the safety of transport and the development of non-motorised transport (walking, cycling).

It is reasonable to introduce a higher price at peak demands for parking. A good motivating instrument is a parking charge discount for vehicles with more occupants. Basically, there are two solutions to paid parking: paid car parks and paid parking zones.

4.5.1 Paid Parking Places

These are parking places near attractive destinations, often on town squares and in open spaces. The negative side is the increased demand for parking in the proximity of the paid parking places where parking of vehicles is free. Consequently, it is advisable to combine

[3] Based on the London congestion charging zone

[4] Which often results in an inappropriate pricing policy. In the worst case, system operators try to maximize their profits (as has been noted in Prague)

paid parking facilities with waiting prohibition zones or parking zones only for residents. Payment can be:

- Direct
- Pre-paid.

Options for paying charges for parking / permanent parking are:

- Street coin machines
- Payment terminals
- Contactless technology (similar to toll gates on Czech motorways)
- Payment using mobile phones (GSM network)
- Payments to a patrol officer.

It is recommended to secure paid parking places with a bar which will ensure more efficient collection of parking fees.

4.5.2 Paid Parking Zones

Paid parking is located in all parking spaces in the specific area open to the public, i.e. all car parks and parking lanes and strips, etc. Parking charges are different for residents and subscribers or visitors. In some types of zones only residents and subscribers can park, in others only short-term parking for visitors is permitted. It is essential that the information and road marking be clear and easy to understand for drivers. Charges are usually prepaid, or instant permits can be provided (e.g. for 2 hours) – for example, for tradesmen, allowing them to park in residents´ parking places.

Options for paying charges for parking / permanent parking are the same as in section 4.5.1

Such zones have a similar effect as reducing the number of parking places - no places to park or drivers do not want to pay for parking and are motivated to use a different transport mode, especially PT. Residents from different municipalities can find park and ride facilities near PT stops very attractive.

4.5.3 Restricting the Number of Parking Places

Demand for parking can be reduced by withdrawing places for parking or changing them to places for residents. Without the opportunity to park, drivers will have to leave their vehicles and use PT.. However, parking of vehicles must be possible in high-capacity car parks specified for such a purpose to avoid an influx of cars being parked in neighbouring areas.

4.5.4 Underground Garages

This solution is very costly. Parking garages must be built underground due to constraints on development and no suitable space being available, as well as to satisfy aesthetic requirements in city centres. It can be considered provided the increased parking capacity does not bring a new traffic load into the area. Parking / permanent parking of vehicles is paid. Should the desired effect be achieved, the parking charges will not bring fast returns. Therefore it would require co-funding from the public budget.

4.5.5 Car Parks / Parking Garages on the Outskirts

An interesting option is to build car parks / parking garages outside the centre near busy roadways, where people park their vehicles and walk to the centre (a P+G facility) or take PT. Such a parking facility must be at a really favourable price (much cheaper than parking in zones with paid parking in the centre) to motivate people to use it. The system is only suitable for small municipalities and towns, as the walking distance in bigger cities could exceed the acceptable limit. Such towns do not have conditions to operate the P+R system efficiently due to less dense PT lines with longer intervals so drivers would not use them sufficiently.

4.6 Parking Scheme in Residential Areas

In residential areas, it is reasonable to implement construction and engineering solutions. The problem of insufficient places for parking occurs in housing estates rather than in single-family house areas. In the latter case, it is convenient to mitigate roadway traffic and establish enough parking places taking safety into consideration.

The problem of a large shortage of parking facilities in densely populated areas, usually housing estates, is quite frequent in the Czech Republic (as well as in other European cities). Residents must be able to park their own vehicle at their place of abode irrespective of how much they actually use their vehicle, meaning that resolving this problem is not necessarily linked to reducing IAT. The only solution is to increase the number of permanent parking places. This can be done through:

- Changing the parking mode
- Parking areas
- Parking houses
- Introducing charges for long-term parking and permanent parking.

4.7 Information Transfer

To make the parking system functional and beneficial to the city it is necessary to make sure drivers respect and observe it. Therefore, users should be informed of the introduced conditions and regulations considering parking. Drivers are divided into:

- City residents or individuals working in the city who know the parking facilities and usually know their routes by heart
- Visitors who do not know the situation in the city, and are guided by traffic signs and information alongside roadways.

The provided information must respect both groups of drivers and should be satisfactory, comprehensible and explicit, so that drivers can understand the parking system and are directed to the right parking facility.

Vertical and horizontal road markings are a typical information instrument. At the moment, with drivers facing excessive information and taking into account the complexity of parking systems, this method of informing drivers is not sufficient. It is important to publish the information on the parking system in the area. It must be exhaustive and clear. It is usually located at parking meters and signboards near car parks, which is accessible.

The information should also be available for visitors in advance, published on Internet sites and distributed on leaflets, for example (e.g. at petrol stations in the city surroundings). The information should also be available in information centres, offices, etc.

Intelligent transport system components can also be used successfully. Such systems can monitor occupancy in car parks and inform on free capacity. This will prevent vehicles arriving at car parks and turning away if they are full. Information can also be presented for specific car parks individually, or systematically – coordinated for all car parks connected to the system (for example, P+R facilities). If one car park is full, ITS devices can navigate drivers to the nearest free car park. Portable traffic signs and traffic information facilities are used.

Figure 13 – Devices for traffic information

(Source: www.dopravni-znaceni.eu)

(Source: praha.eu)

ITS systems applied in the parking scheme can provide input information for the traffic control room and can be used to help regulate the traffic in the city. The outputs can also be used for web applications – displaying occupancy of car parks / parking garages to Internet users (also possible via mobile phones).

4.8 Examples from Other Cities in the Czech Republic

Most Czech and foreign cities battle the problem of parking. Solutions are similar; cities often use well-established practices from other municipalities. Basically, the aim is to restrict traffic in the centre and introduce parking charges in the inner city. Each city has different specific conditions for application that must be complied with. The section below describes the

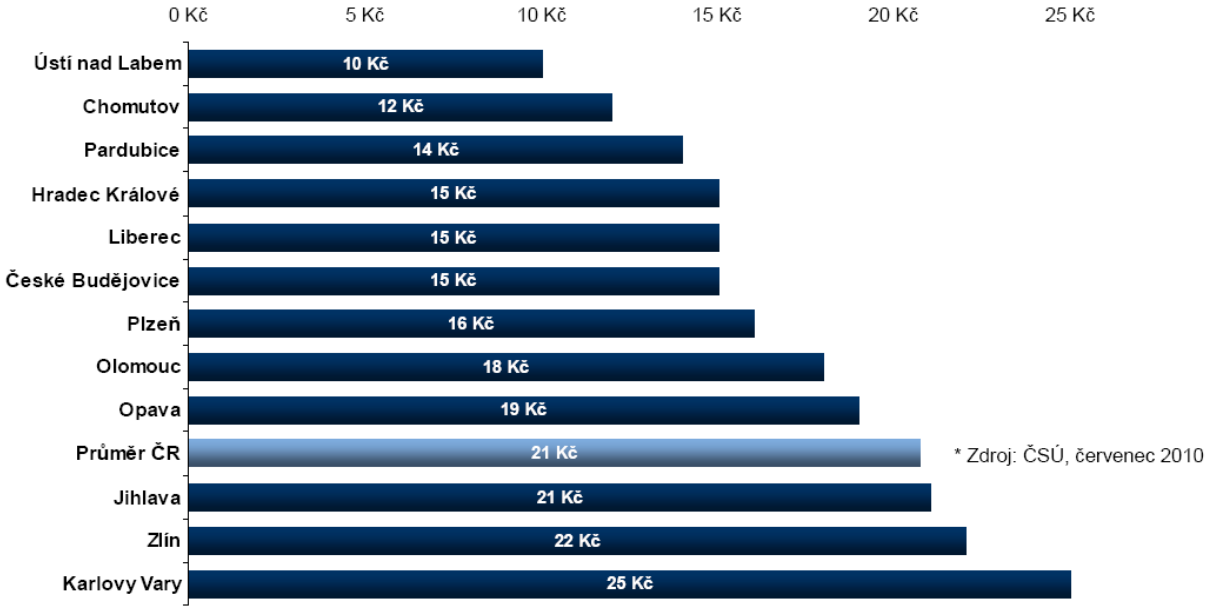
situation of parking schemes and adopted measures in several Czech cities. It also provides a comparison of parking prices.

4.8.1 Average Parking Prices in the Czech Republic

In autumn 2010, Empirica s.r.o., an independent company, published findings on the conditions of parking systems in medium-sized cities of the Czech Republic. The survey did not evaluate introduced parking systems in large cities, such as Prague, Brno and Ostrava.

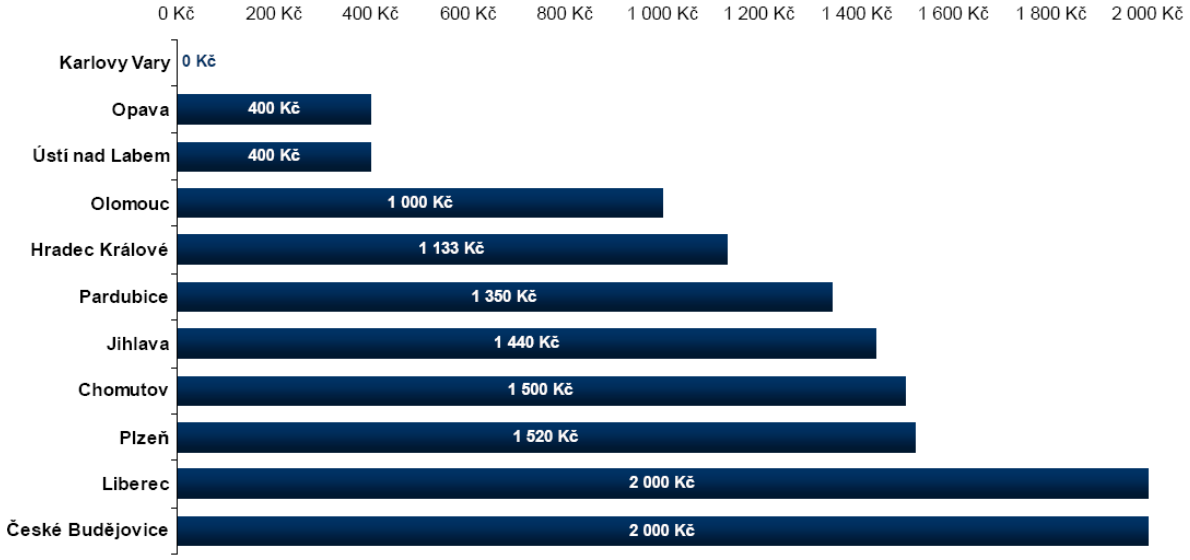
According to Empirica, parking prices were the lowest in Ústí nad Labem (CZK 10) in 2010, compared to the average parking price of CZK 21 nationwide. Ústí nad Labem is therefore a regional town with the lowest parking fees in facilities with parking meters. As for residential parking cards, Ústí nad Labem is one of the cheapest regional towns.

Figure 4 - Average price for the first parking hour on premises with parking meters – regional cities except the three largest ones



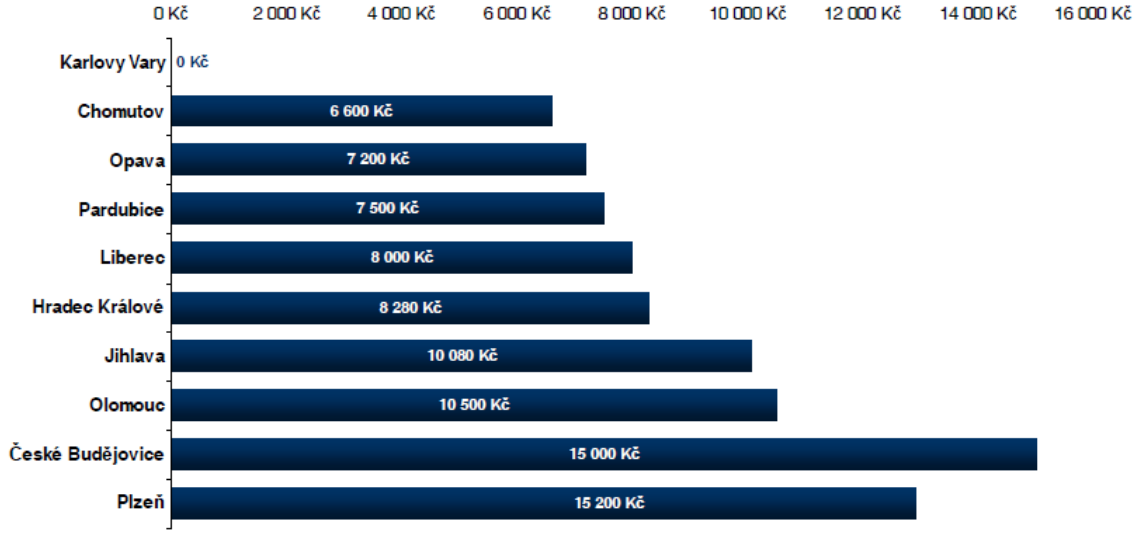
(Source: Empirica, 2010)

Figure 5 - Average price for a residential parking card for the first vehicle valid for 12 months



(Source: Empirica, 2010)

Figure 16 - Average price for subscription parking card for the first vehicle valid for 12 months



(Source: Empirica, 2010)

4.8.2 Prague

Regulation of trips into the centre is provided by limiting parking places in paid zones. The shortage of parking places in the centre and proximity of Prague is resolved by zones of paid parking facilities. Each municipal district deals with paid parking zones individually, however, taking into account the parking solutions in neighbouring districts. Parking is usually provided on parking strips and bays. Three types of zone are distinguished:

- **Blue zone** – Designated for residents and subscribers for long-term parking who are issued parking cards stuck onto the windshield of the car. Paid parking is for all day or week. Stopping without a valid parking card over the day is possible for a maximum of 3 minutes. Charges:
    - Basic price: CZK 36,000 per vehicle annually (1st price zone), CZK 30,000 annually (2nd price zone), CZK 24,000 annually (3rd price zone). Also available are six-monthly, quarterly, monthly and weekly parking cards.
    - Residents:
        - 1st vehicle: CZK 700 annually (resident over 65 years: 1st vehicle: CZK 350 annually)
        - 2nd vehicle: CZK 7,000 annually
        - 3rd and other: CZK 14,000 annually

      Six-monthly parking cards are also available.
    - Vehicles owned by an entity operated as a business car, where the entity has premises in the area concerned, vehicles of a property owner in the area concerned:
        - 1st vehicle: CZK 12,000 annually
        - Each following vehicle according to standard rates listed previously.

      Six-monthly parking cards are also available.
    - Entity generally conducting business beneficial to the community in the specified area: CZK 1,000 annually

      A quarterly card is available.
    - Instant rub-off parking cards are used particularly for delivery vehicles and providing services, valid in paid zones in all municipal districts:
        - for 2 hours: CZK 120
        - for 10 hours (8 am – 6 pm): CZK 400.

  Green zone – Designated for visitors for medium-length parking of maximum 6 hours. Parking meters are installed in such zones and the parking ticket must be visibly placed behind the windshield of the vehicle. Parking is paid on weekdays between 8am and 6pm, and in some streets also at holidays and weekends - specified on a supplementary sign of vertical road marking. Charges:
    - CZK 15 hourly (1st rate zone)
    - CZK 30 hourly (2nd rate zone).

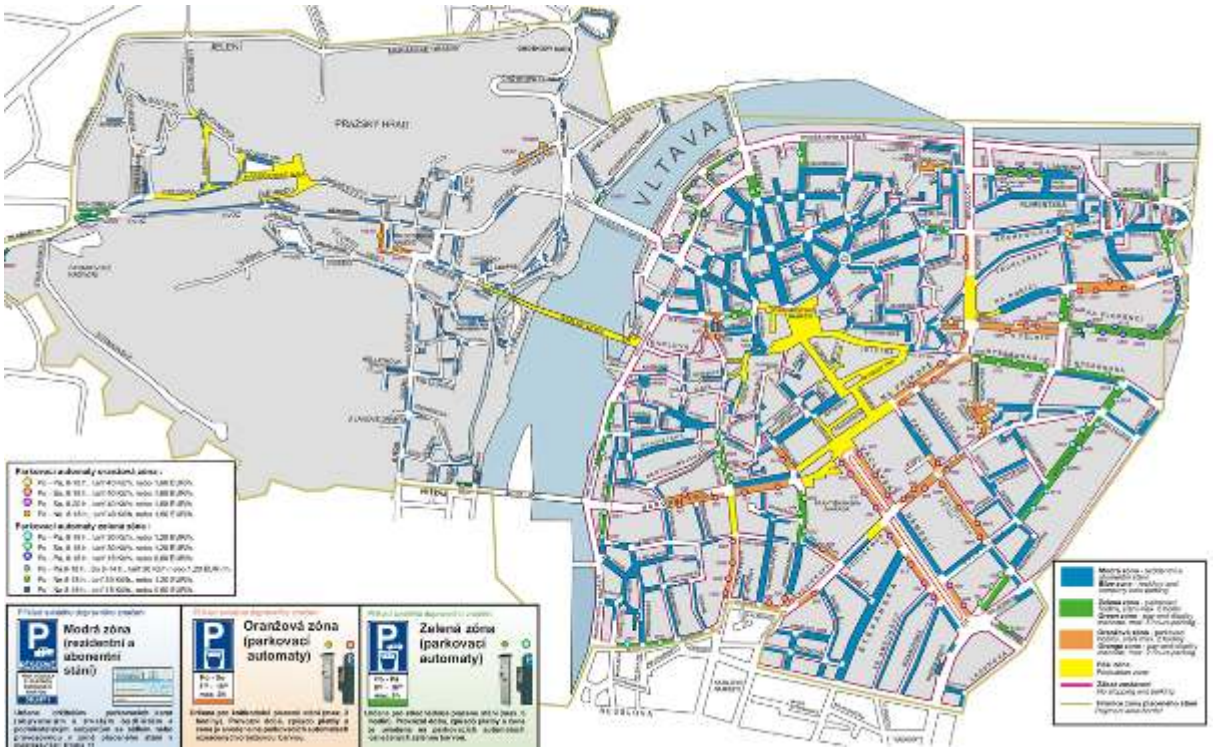
- **Orange zone** - Designated for visitors for short-term parking of maximum 2 hours. Parking meters are installed in such zones and the parking ticket must be visibly placed behind the windshield of the vehicle. Parking is paid on weekdays between 8am and 6 pm, and some streets also at holidays and weekends - specified on a supplementary sign of vertical road marking. Charges:
    - CZK 10 hourly (1st rate zone)
    - CZK 20 hourly (2nd rate zone)
    - CZK 40 hourly (3rd rate zone).

- Mopeds, motorbikes and cycle cars do not pay.

Paid parking zones have been introduced in the following municipal districts (also see the following images):

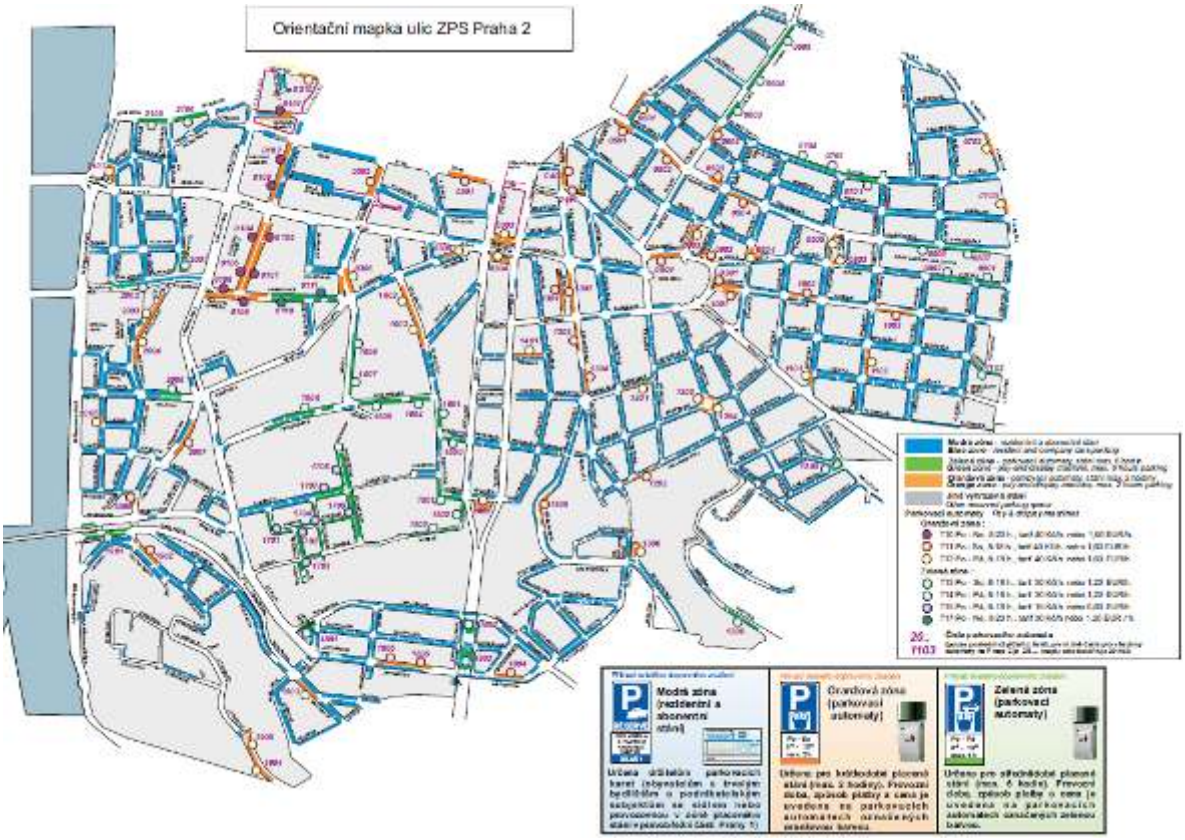
- Prague 1 - Paid parking zones are located throughout the municipal district. 1st price band.
- Prague 2 - Paid parking zones are located throughout the municipal district. 1st and 2nd price band.
- Prague 3 - Paid parking zones are located throughout the municipal district. 2nd and 3rd price band.
- Prague 7 - Paid parking zones are located in Letná and Holešovice. 2nd price band.
- Prague 10 – has introduced the option of purchasing a residential and abonent parking card for residents living in streets neighbouring the Prague 2 and 3 municipal districts. Although Prague 10 has not introduced parking zones, residents from bordering areas have the opportunity to park in neighbouring streets which are part of another municipal district.

Figure 17 - Parking zones in the municipal district Prague 1



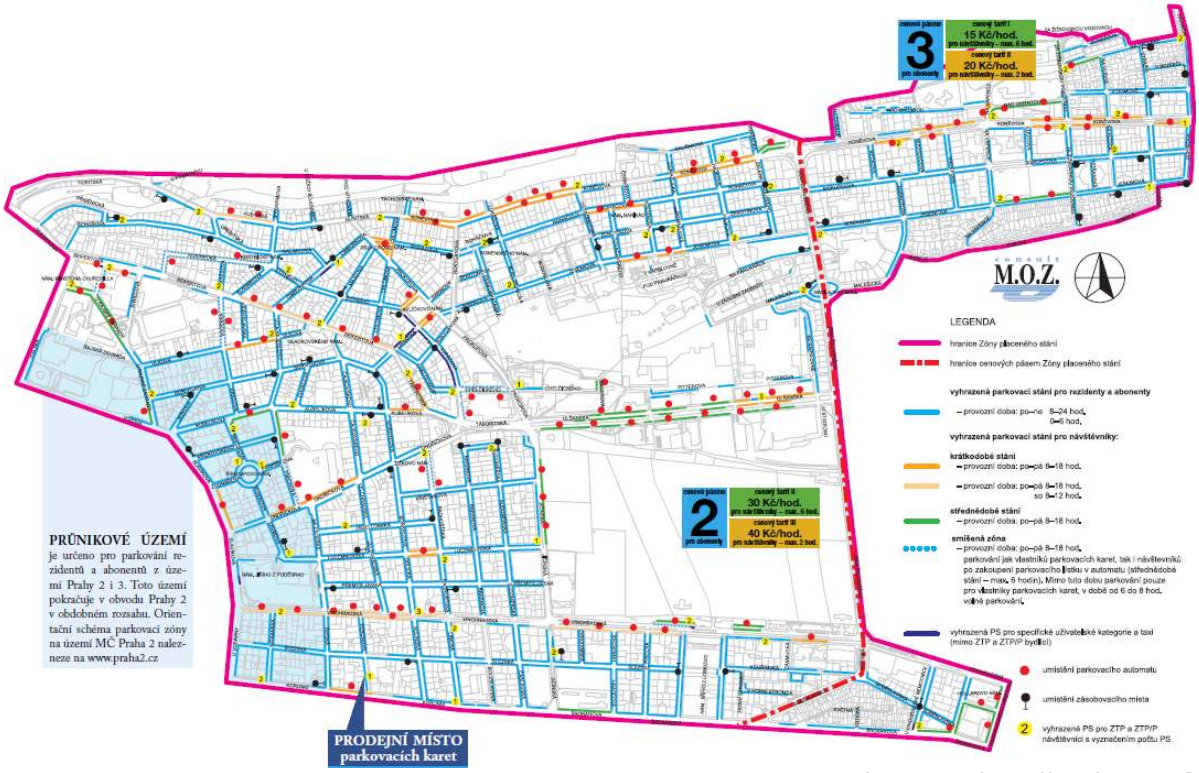
(Source: http://praha1.cz/)

Figure 18 - Parking zones in the municipal district Prague 2



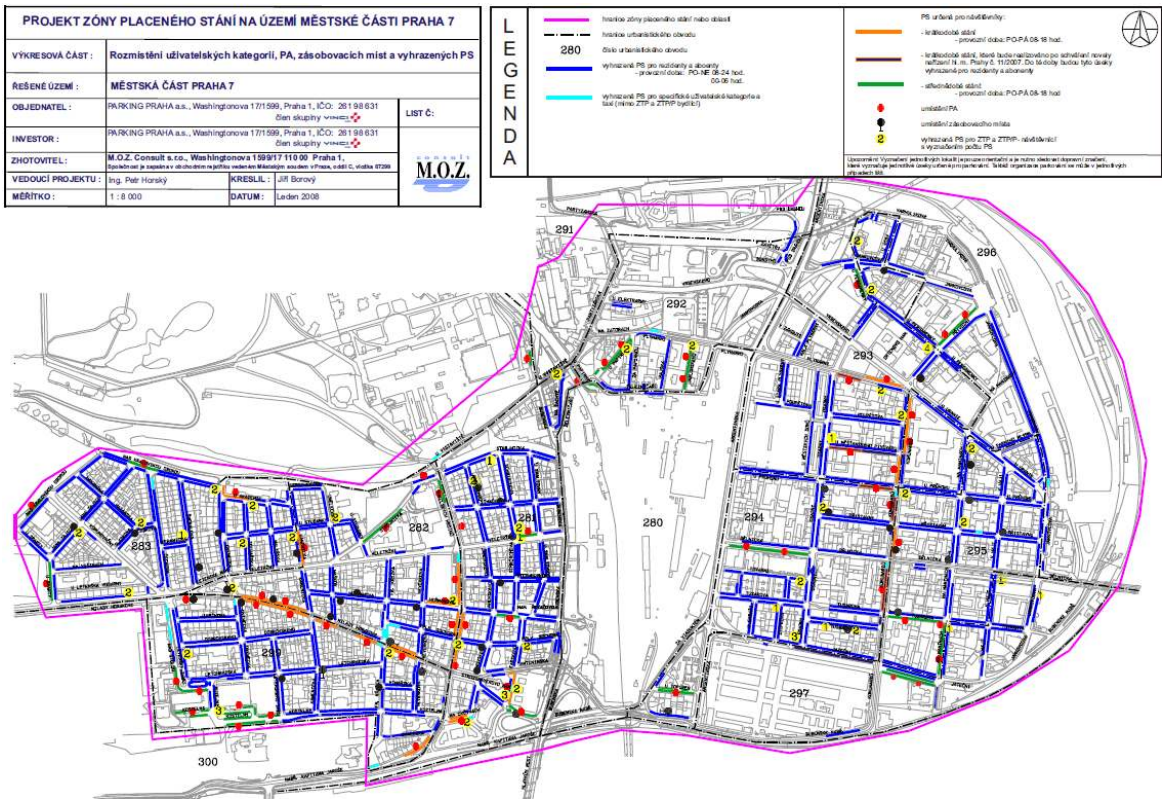
(Source: http://praha2.cz/)

Figure 19 - Parking zones in the municipal district Prague 3



(Source: http://praha3.cz/)

Figure 20 - Parking zones in the municipal district Prague 3



(Source: http://praha3.cz/)

The city has 18 P+R car parks situated near underground stations. The car parks also offer B&R services – i.e. bikes can safely be parked here. The PT network (underground, trams, buses, ferries) is quite dense and also serves a large area in Central Bohemia in cooperation with the integrated transport system (Prague Integrated Transport). The city is considering introducing charges for driving into the centre; however, highway bypass roads – the Prague bypass (SOKP) and the municipal bypass - have to be completed first. In the central part there are a number of pedestrian precincts where delivery vehicles have permission to drive in with a valid card, unauthorised entries are physically hindered.

4.8.3 Plzeň

Parking charges have been introduced in some streets in the centre of Plzeň. The town is divided into five rate zones, A, B, C, F, and Petrohrad.

Charges:

- Residential parking cards: CZK 3,500 annually (A zone), CZK 2,000 annually (B), CZK 700 annually (C, F, Petrohrad)
- Subscription parking cards:
  - CZK 35,000 annually, CZK 3,500 monthly (A zone),
  - CZK 20,000 annually, CZK 2,000 monthly (B)
  - CZK 700 annually, CZK 700 monthly (C, F, Petrohrad).

Six-monthly, quarterly and monthly parking cards are also available.

The parking scheme involves 2 car parks and the Rychtářka parking building:

- Car park in Pětatřicátníků park CZK 20 hourly
- Car park near Peklo house of culture CZK 10 hourly and free after 6 pm
- Rychtářka parking house – functions:
  - For visitors (Park & Go):
    CZK 10 hourly (10 am – 7 pm), CZK 5 hourly (7 pm – 11pm, 5 am – 10 am)
  - For residents and subscribers:
    - Day subscription fee (6 am – 8 pm): CZK 13,500 yearly, CZK 1,200 monthly
    - Night subscription fee (6 pm – 8 am) : CZK 9,000 yearly, CZK 800 monthly
    - Daily subscription fee: CZK 30,000 yearly, CZK 3,000 monthly.

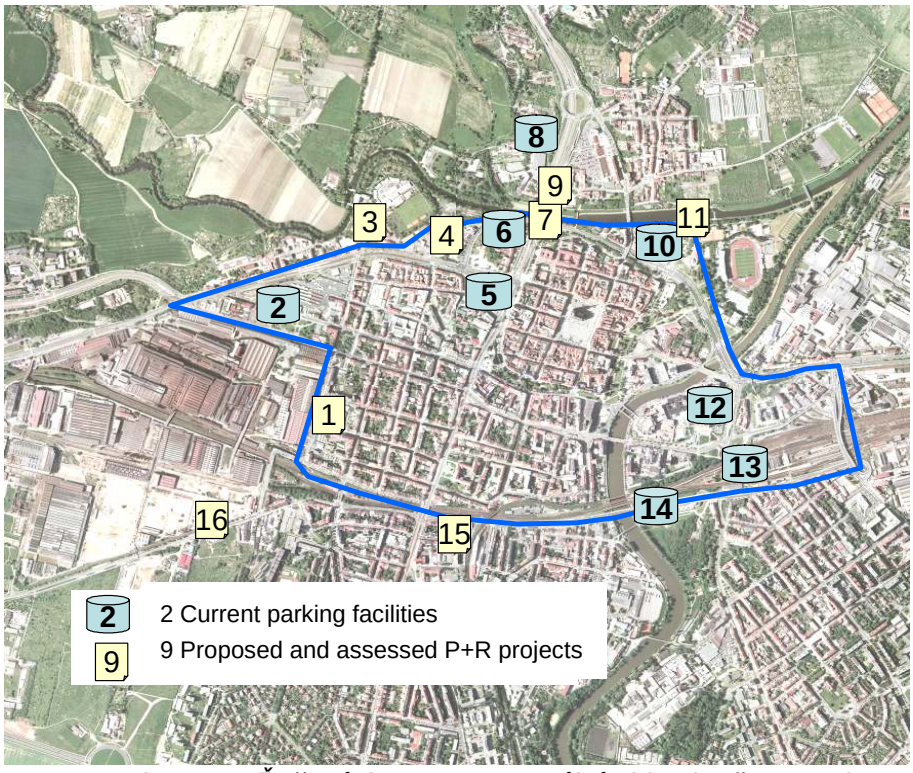
Figure 21 - Rychtářka parking house

(Source: www.parkingplzen.cz)

The Rychtářka parking house is a unique project successfully combining private sector and public needs. The shortfall in funds in the city budget was covered by a private investor with whom the city entered into an agreement. The private investor financed the construction of the parking building with 447 places for parking and several commercial premises (the costs amounted to CZK 230 mil.). The investor will operate and maintain it. The city will pay the private investor an annual fee for operating the parking building, i.e. CZK 18.3 mil annually for 19 years. This has helped the city alleviate the shortage of parking facilities despite the lack of municipal funds. The private investor should also make a profit according to the project calculation.

Plzeň has parking spaces showing the character of Park & GO facilities considering their location. They are shown in Figure 22 The car parks have designated owners and operators.

Figure 22 – P & Go parking areas



(Source: Řešení dopravy v centrální oblasti města, Activ Parking, 2006)

The city has a motorway bypass, the D5 motorway, so there is minimum transit traffic in the city. The PT network (trams, trolleybuses, buses) covers the whole area of the city and also serves the closest surroundings. There are no charges for city centre entry.

4.8.4 České Budějovice

Paid car parks are situated in the central part, especially on the squares. These are divided into two zones of charges:

- A zone: CZK 30 for the first hour and then CZK 60 for each commenced hour
- B zone: CZK 10 for each commenced hour.

Approximately 14 streets in the central, historical part of the city parking are restricted only to residents and abonents, who pay CZK 2,000.- annually for a parking card. Entry to the central, historical parts is restricted for vehicles with a weight over 3.5 t. The PT network (trolleybus, bus) covers the centre and the adjacent city surroundings. PT preferences and park and ride facilities are being introduced. Most of the transit traffic will be diverted from the municipality once the D3 motorway section has been completed.

Figure 23 - Zones in České Budějovice

(Source: www.vincipark.cz)

4.8.5 Hradec Králové

The parking scheme administration was assigned by the city to a private company for 30 years. Subject to the agreement the private company shall invest in the parking scheme infrastructure – build parking buildings, establish new parking spaces and invest in the

operation and repairs of facilities. Parking charges and parking regulations are approved by the city.

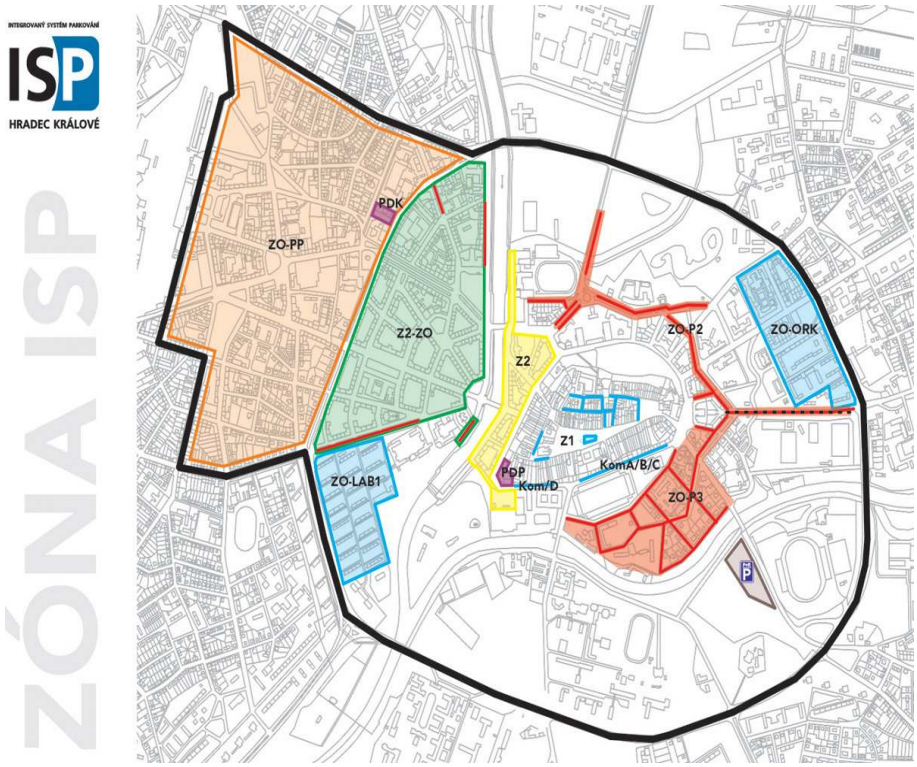
In the central part of the city there is an integrated parking system. Parking is charged, residents and subscribers are issued parking cards. Parking prices in streets differ in individual locations and are as follows:

- Residents:
  - 1st vehicle: CZK 1,000–1,200 annually, 2nd and next vehicle: CZK 2,500-3,000 annually
  - The centre (Velké Square / Komenského): 1st vehicle CZK 6,000-4,000 annually, 2nd and following vehicle: CZK 9,000 / 6,000
- Subscribers:
  - 1st vehicle: CZK 7,000–9,000 annually, 2nd and next vehicle: CZK 9,000-15,000 annually
  - The centre (Velké Square / Komenského): 1st vehicle CZK 20,000 - 12,000 annually, 2nd and following vehicle: CZK 30,000 / 15,000
- Advance reservation of spaces, 8 am – 6 pm: 1st vehicle: CZK 15,000 annually, 2nd and following vehicle: CZK 18,000 annually
- Place reservation, 24 hours: 1st vehicle: CZK 20,000 annually, 2nd and following vehicle: CZK 25,000 annually
- Parking meters: CZK 5 – 20 (in the very centre 50) hourly with a progressive rate.

Parking buildings are an integral part of the system:

- PD RegioCentrum
  - Resident: 1st vehicle: CZK 3,600 annually, 2nd and following vehicle: CZK 5,000 annually
  - Abonent: 1st vehicle: CZK 12,000 annually, 2nd and following vehicle: CZK 15,000 annually
  - CZK 15 hourly (8 am – 6 pm), CZK 10 lump sum (6 pm – 8 am)
- PD Katschnerka
  - Resident: 1st vehicle: CZK 2,400 annually, 2nd and following vehicle: CZK 2,400 annually
  - Abonent: 1st vehicle: CZK 6,000 annually, 2nd and following vehicle: CZK 6,000 annually.

Figure 24 – Parking zones in Hradec Králové



(Source: www.hradeckralove.org)

The system also has three P+R facilities, with free parking.

There is also a bypass road around the historical centre and transit traffic is diverted by the E67 international thoroughfare outside the developed area. The PT (trolleybus, bus) is synchronised with the PT in Pardubice, a Jaroměř carrier and regional railway links.

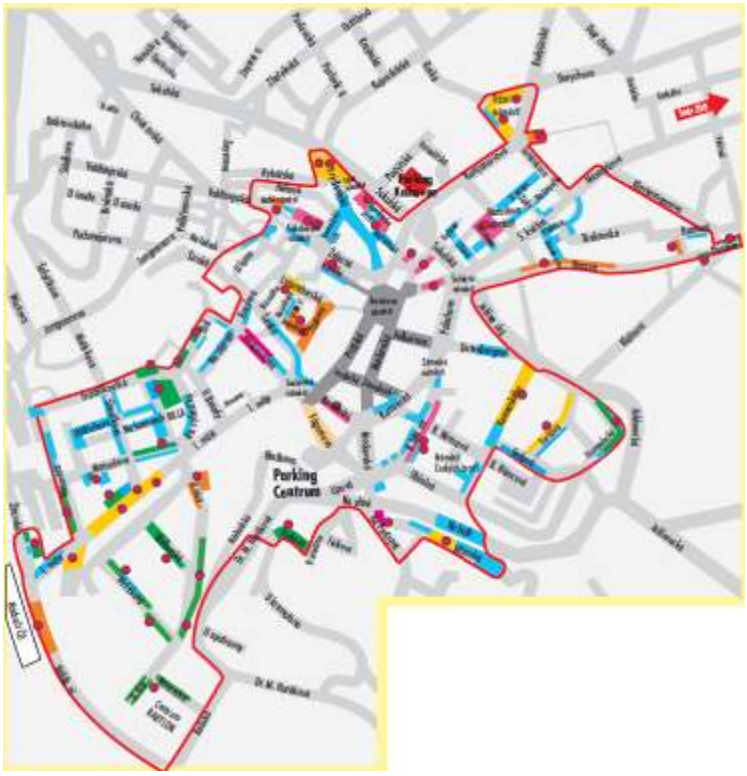
4.8.6 Liberec

Liberec has introduced a parking and permanent parking system of vehicles which differentiates residents / abonents from visitors. Information on parking places is always provided on a supplementary board at the vertical road marking. So far they have introduced:

- Resident – abonent parking: specified exclusively for:
  - Residents: 1st vehicle CZK 2,000 annually, 2nd vehicle CZK 6,000 annually, following vehicle: CZK 12,000 annually
  - Abonents: CZK 12,000 annually
- Parking for visitors: charges paid from Mo – Fri: 7 am – 6 pm, Sat: 8 am – 1 pm, outside the Zoo Mo – Sun: 8 am – 6 pm, parking fee CZK 15 – 30 hourly according to the location, free at other times.

The PT has bus and trolleybus lines.

Figure 25 – Parking zones in Liberec



4.9 European cities

Parking in the centres of European cities is usually always paid, often with zones introduced with different rates.

German cities have introduced an interesting way of restrictions on motorised transport in cities to improve the environment (Berlin was the first, Koln am Rhein and Hannover, and there are other cities quickly joining the project). They have established environmentally-friendly zones called “Umwelt ZONE” in which only vehicles producing a specified maximum volume of emissions are permitted to enter. Vehicles must be equipped with a label to simplify checks.

P+R facilities are not as common in large European cities as we would expect. There are various reasons – mostly disagreements about the whole concept or a failure of political will to introduce them. Such facilities are lacking, for example, in the following cities: Brussels, Copenhagen, Lisbon, Madrid and Zagreb. Another complication is that many countries do not use well-established and comprehensible P+R marking.

The insufficiently unified conditions for P+R facilities is the reason for the differing popularity of the system; parking is free in some car parks (e.g. Luxembourg, Berlin, Koln am Rhein, Hamburg), on the contrary, parking in Geneva, probably the most expensive of all, would cost EUR 30. for 12 hours. The common price for 24-hour parking in European cities usually ranges between EUR 1 and 7

Most cities usually face the problem of finding a free space in the P+R facility. For example, there are only over 200 places in Ljubljana, unlike Rome, having 31 P+R facilities with 13,000 parking places. Prague, for example, has a high-quality information system on the number of free parking places in individual car parks on the Internet.

Many cities (e.g. Copenhagen, Bremen) withdraw several parking places in the centres every year in favour of walking and cycling. Particularly in Amsterdam, they have introduced parking regulation by reducing the parking capacity in the centre by 30% using metal bars, which has improved conditions for walking and cycling (vehicles do not park on footpaths and cycle paths). They have also introduced parking spaces for residents, local companies and short-term parking with rather high charges in the remaining places. Munich has introduced parking prohibition on one side of the street, which has reduced the supply of parking places. In turn this has reduced long-term parking and permanent parking of vehicles, which has reduced traffic.

Nuremberg came up with a different policy - they have introduced maximum parking prices. Gothenburg has combined both of the above options to regulate its parking scheme – they have reduced the number of parking places (i.e. from 21 thousand to 14 thousand) and increased the price of short-term parking by 100%.

4.10 Summary

On the whole, cities deal with transport problems according to the following principle. They try to divert transit traffic outside the city, usually on a bypass road, or introduce measures to make the centre unattractive for IAT. Parking in the centre is paid; residents are offered a considerable discount. The scope of the territory where parking / permanent parking is paid differs according to the character of the city. It is usually not very large, only in streets suffering from the problem of parking. Parking in the streets of peripheral districts is not paid (scarce guarded car parks and parking garages are the only exceptions). There is a tendency to change the modal split – i.e. to shift the traffic load from IAT to PT and non-motorised transport by generating integrated transport systems including railways (e.g. German S-Bahn suburban trains), and conditions for walking and cycling.

5 Parking Policy and Its Implementation in Ústí nad Labem

The problem of historical cities and spaces urbanised under socialist designs is the discrepancy between the need for parking places and their capacity. This problem is particularly sensitive in city centres and housing estates in the Czech Republic, including the city of Ústí nad Labem.

Housing estates

The shortage of parking places in housing estates can only be resolved by increasing the capacity. The reason is clear – this is where residents live. It is also essential to note that the numbers of resident vehicles are not final. According to prognoses and "old" EU countries´ experiences, numbers of resident private cars will grow by 36%. Such increase in a free country cannot be restricted administratively or by political proclamations. The 36% growth is disputable, however, it should be noted that it is not the volume of the growth we should consider but the time over which this will happen.

The only thing which can and must be prevented is the parking of vans and trucks. It is also advisable to introduce parking bans on smaller business vehicles of entrepreneurs whose business premises are not located in the concerned housing estate.

Single-family house developments / areas with less dense settlement

Vehicles can be parked in the grounds of houses and the population density in proportion to the length of roadways is not so big. Thus there are enough parallel parking spaces on the side of the roadway within acceptable walking distance and these areas have no serious parking problems.

City centres

City centres have a more complicated situation. They provide job opportunities for wider areas, regional authorities, hospitals and other activities to which residents living outside the city commute. Satisfying the mobility needs of citizens (also using IAT!) is one of their civil rights. People travelling from the surrounding areas (even remote ones) is a problem particularly in regional cities including Ústí nad Labem. The solutions cannot be limited to the city centre. They must cover the whole of the city as well as the region.

5.1 Ústí Region

As already suggested parking policy cannot be considered in isolation. The problem is much wider. To reduce or, at least, limit the increasing number of private cars driving into the city from surrounding areas, it is necessary to encourage high-quality public transport. An ideal solution is the integrated transport system. To clarify the problem, these are the main attributes of ITS:

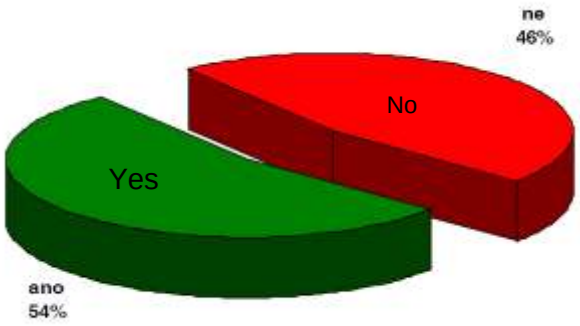
- one ticket applicable for all carriers integrated into the ITS regardless of the transport mode (the step before is mutually recognised tickets).

- equal fares between two places regardless of which carrier operates the transport.
- equal transport regulations and conditions for all carriers and equal relationship of carriers to customers.
- common timetable with a uniform format for all carriers.
- uniform information system.
- sale points with equal parameters and equal approach to customers regardless of who organises the sales
- individual connections are linked also between specific transport modes
- all vehicles providing integrated transport of passengers are clearly and unambiguously marked.

The system is beneficial for residents in the area in which it is operated**.** This also means fair) fares at suitable rates, which do not discriminate against any group of travellers

A survey was conducted within the CIVITAS ARCHIMEDES project, task 11.4.5, to map citizens' satisfaction with and awareness of PT. The results showed that 54% of respondents wanted to have an integrated public transport system, while 46% would not use the benefits of the ITS.

Figure 26 - Public response to the question "Would you use uniform fares for all transport modes (integrated transport system)?"



(Source: CIVITAS Archimedes survey December 2009 – February 2010)

The ITS system requires cooperation between the region and the city.

5.2 Districts of Ústí nad Labem outside the City Centre

Measures introduced in the region can eliminate trips of private cars into the centre only partially. These must be followed by measures enforced within the city territory outside the centre. The crucial measure is to establish park and ride facilities (e.g. P+R system). A park

and ride facility that is working cannot be just any free space and car parks cannot be operated commercially. Now we will look in more detail at both problems:

- **Car park location:** A car park must be easily accessible from the main direction of traffic. A car park must be situated within short walking distance of the PT station. An ideal place is the PT transfer point.
- **Pricing policy:** Parking charges must not demotivate people from using the car park. Generally, there are two approaches. It is common practice abroad that park and ride facilities are free of charge; however, they do not provide any other advantages or services. We believe that the "original Prague model" is a different and better solution. The model works like this: the parking price in P+R facilities is valid on the day the service was provided until the end of the daily operation of the parking facility and amounted to CZK 10.-. The price of the transfer return ticket connected with parking at the P+R facilities amounted to CZK 40.- (just for drivers). The price of two (both directions) tickets was CZK 52.-. The motivating saving for the driver is CZK 2.- + the saving of money for relatively cheap parking. However, in summer 2011, the payment for parking in the P+R facilities was changed – the daily parking fee is now CZK 20.-, and benefits for individual fares (tickets) have not been introduced. The applied rate is that of the Prague integrated transport standard rate.

5.3 Centre of Ústí nad Labem

It is possible to impose restrictions on transit traffic entering and parking in the centre. There are several solutions which can be combined; however, not all are based on current legislation. Individual measures also differ by cost. All measures require intensive cooperation between the Czech police and municipal police. Possible solutions are:

- To introduce a toll for centre entry (London model). This solution is not suitable as the system is very costly. What is more, it has no backing in legislation.
- Ban on traffic driving into the centre without a permit. The permit should be issued (at a symbolic price) only to residents, delivery vehicles, vehicles providing services and vehicles operated by companies having their business premises in the centre. Some permits should be reserved for the city council and regional authority. Observation of the prohibition must be permanently supervised by the police,.The cost of introducing the measure is minimal. Parking areas near shopping centres should be excluded from the zone with the restricted entry. To include them In the case of the Ústí nad Labem centre it would be complicated or impossible considering their number and location around the whole centre.
- To limit parking space and introduce charges (current situation). The system should be introduced in the whole centre. The parking capacity around the charged zone should be carefully considered to avoid shifting the whole problem of parking to other districts. This risk is linked to charges. Expensive charges can be counterproductive. Charges paid by residents can only be symbolic (this only applies to the first car of the family).

It is recommended to combine the two last systems for the city of Ústí nad Labem. Issuing permits poses the risk of potential corruption.

It should be noted that a solution to the parking scheme is not something that would “fill the municipal coffers”. The choice of the right option is a political decision. With nearly all families having a private car, the wrong decision could have a grave impact on elections. Prohibiting people from using their cars, if they already own one, would not be perceived well. Basically, ownership of a car which you do not use generates cost without any benefits.

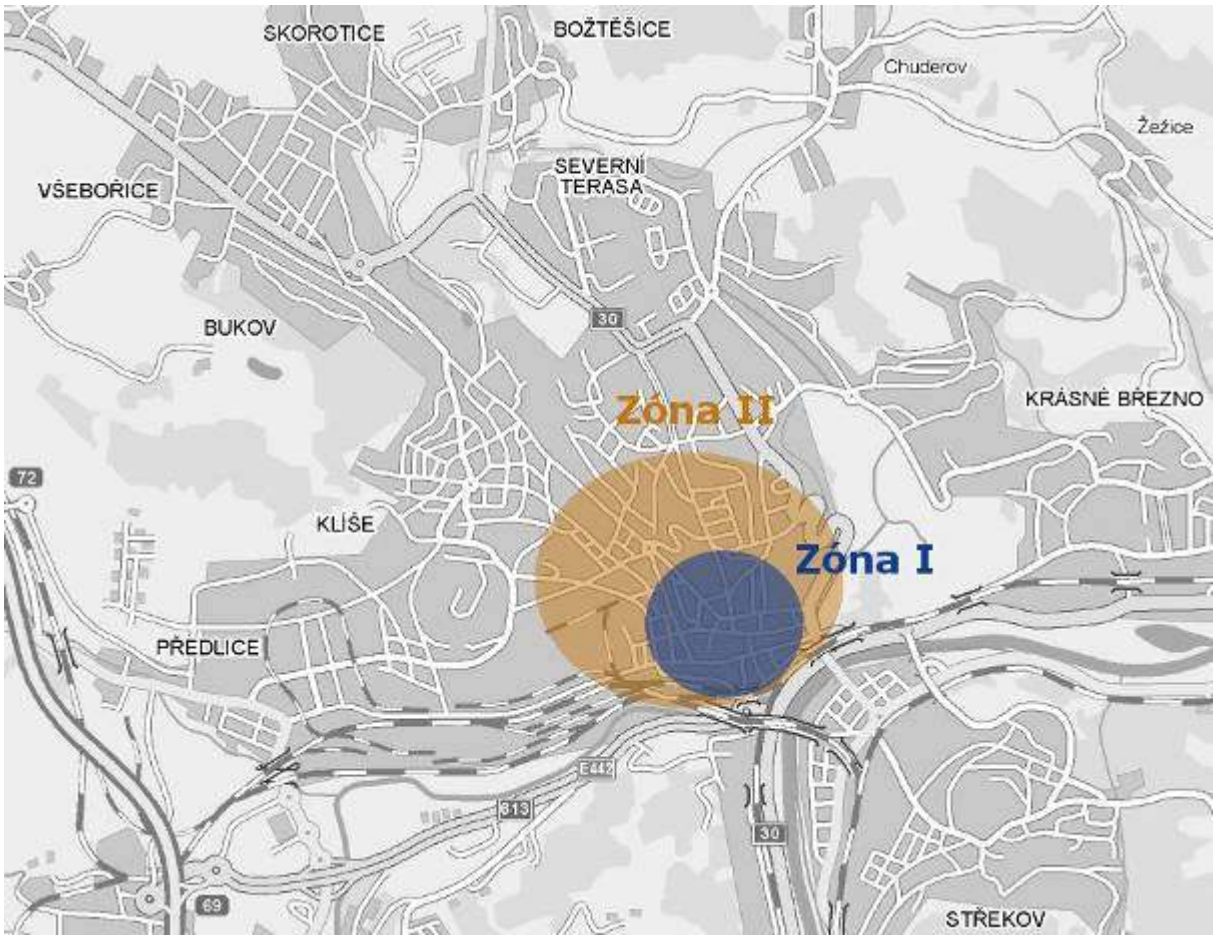
5.4 Paid Parking in the City

Solutions to parking in the centre of Ústí nad Labem mean establishing optimum organisation of vehicle parking. In the centre there are numerous shops, authorities and similar facilities with a demand for short-term parking, as well as residential blocks of flats whose residents must have the possibility to park their vehicles permanently.

To reduce the demand for parking it is necessary to reduce transit traffic and the number of short-term parking options. This can be achieved by introducing paid parking; some motorists will not accept the amount they will have to pay and will shift to another transport mode or park their vehicle in a different part of the city. The parking scheme policy must select an area which will prevent shifting of the parking problem from the centre and drivers being led there intuitively. Ústí nad Labem has introduced a paid parking system; however, it does not satisfy the current requirements and demand any more.

Parking for residents cannot be restricted and a sufficient number of parking spaces need to be established to meet the needs of the population. A reasonable solution to introduce is the so-called "resident parking” solely restricted to residents´ vehicles with a valid permit. The observance must be checked by the police and illegal parking should be punished (on the spot fines, vehicle towing away, etc.).

Figure 27 – Proposed scheme of paid parking zones in Ústí nad Labem



(Source: http://mapy.cz)

An efficient system comprises time rates charged for parking in all streets and car parks. The first two or three hours should be charged moderately and the fee for the following time period should increase exponentially. In introducing the measures it is necessary to take the local conditions into consideration, specifically in Ústí nad Labem the location of the shopping malls. People must have the opportunity to take their shopping away by car from the malls. Such shopping malls should have a parking facility with sufficient capacity for customers. Those who are not customers are discouraged by high parking fees, customers do not need to pay them. The technical solution depends on the proportions of individual car parks and shopping malls – a well-established practice shows the most efficient system as having (for example) the first three hours of parking in the shopping mall car parks free and then parking is charged every hour at a relatively high rate.

Once the paid parking zones in the centre (zone I) have been introduced, the demand for parking can be expected to shift to neighbouring locations. It is therefore necessary to implement the parking scheme also in the neighbouring locations, the character of which is suitable for parking of vehicles (zone II). The parking price would be lower than in the centre. Residents should pay a symbolic price for parking or park free.

Paid parking zones must be established to make drivers park vehicles outside the centre or, possibly in P+R facilities built in peripheral parts of the city. The best solution is to enable regular trips by city residents to the centre using PT links. Paid parking zones must also allow local residents to undertake necessary business in the centre by car (e.g. moving furniture, etc.).

5.5 Preconditions for Efficient Parking Policy

An efficient parking policy must propose a suitable regulation of vehicle parking, a transport model with a forecast of mobility relationships and demand for parking, and properly implemented measures in the streets of the municipality.

To ensure proper functioning of the implemented elements of the parking policy, it is necessary to inform not only the local population but also visitors. The information should be provided in a simple, lucid, comprehensible and comprehensive manner. Drivers should be confident about the information systems which should help them find directions in an unknown environment. A high-quality information system considerably increases the efficiency of parking solutions. The main supportive activity is to display information on parking options on the Internet sites of the municipality, and to display and distribute leaflets. The information system itself comprises both vertical and horizontal marking showing the type of place (e.g. whether the parking is paid), directions to potential park and ride facilities (P+R type), portable signboards informing about the free capacity of the car park and, if need be, directions to the nearest car park, if this one is full. There should also be enough payment machines in the streets. The form of the information should be motivating for motorists and also inform on alternative transport modes to the centre, i.e. PT, the location of bus-stops and PT rates, and/or it should show directions and possibly distances, and how to get to the centre on foot. It is also essential to have a uniform graphic style of the information for easy identification and finding directions.

Parking areas outside the city centre should be built near PT stops, or the stops should be moved to the vicinity of car parks to allow drivers a different transport alternative to the centre. Unless such systems are integrated, the charging system is established or park and ride facilities are completed, short-term parking will not work in the city.

Surveillance of the parking scheme by the police plays an important role in sustainable parking. Checks must be frequent and consistent. They must focus on observing the traffic regulations on roadways as specified by Act No. 361/2000 Coll. (within the scope of authority of the municipal police) and observing parking regulations i.e. if drivers have properly paid the parking charge.

With no fine drivers will not observe parking regulations and even the best parking system will not work efficiently. The police control should also allow journeys by ambulances and fire brigade vehicles.

6 Current Parking Situation in Ústí nad Labem

6.1 Assessment of Current Conditions

A detailed analysis of the current parking situation in the centre of Ústí nad Labem can identify the requirements, specifics, deficiencies and problems of the existing situation. A deep knowledge is necessary to identify possible measures so that these can be efficient and beneficial.

Applied background:

- parking scheme master plan (see section 6.3)
- data from MSÚL, allowance organisation (see section 6.2)
- information published by the city and other organisations
    - city regulation
        - 3/2003 - On restrictions on local roadways in the cadastral area of the city of Ústí nad Labem to parking charges of motor vehicles
        - 2/2010 - Which specifies maximum prices for enforced vehicle towing away
    - parking charges for motor vehicles (from 1 September 2008 still applicable)
- information published on web sites:
    - www.usti-nad-labem.cz
    - www.msul.cz
- information on traffic loads on roadways.

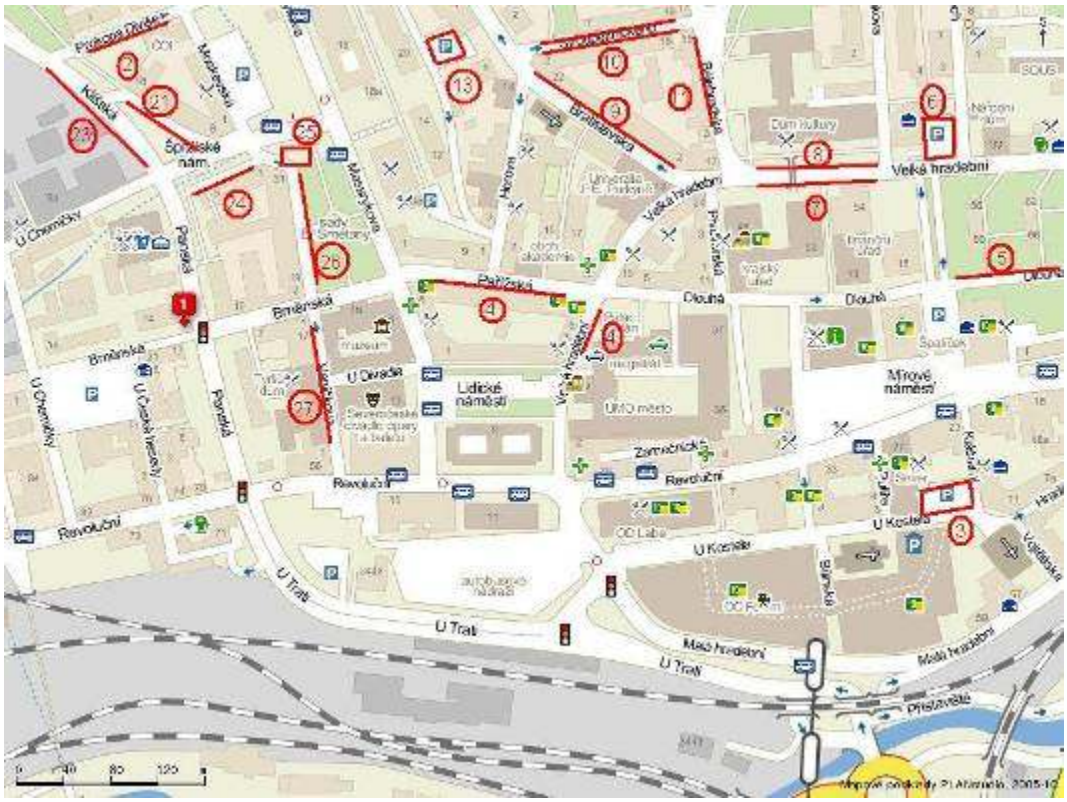
The essential part of the analysis of the current situation was a transport survey, which is the subject of a separate section (section 6.6). Other background information was used to be able to assess potential conflicts and collisions between the reality and publically presented information. After that, the transport survey findings were analysed and established facts were identified

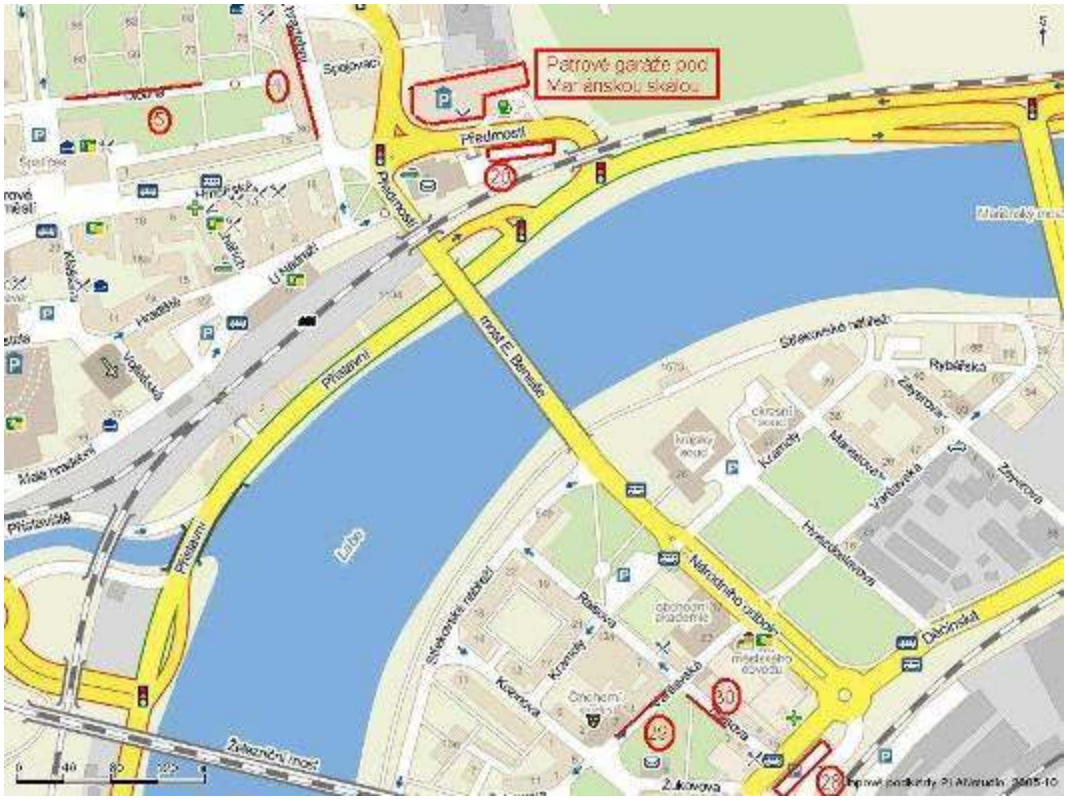
6.2 Background Data from the Administrator of Local Parking Facilities (MSÚL)

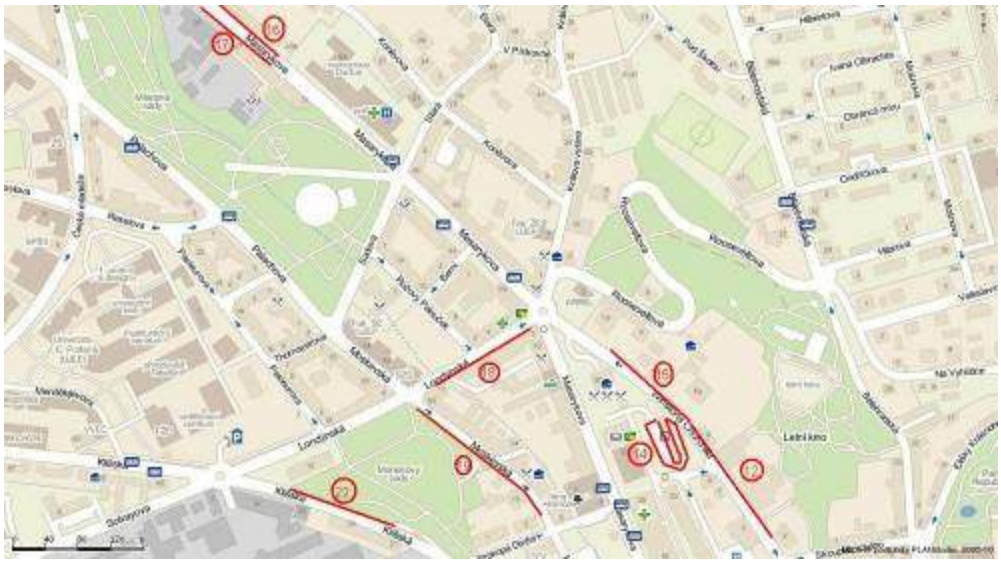
The city of Ústí nad Labem charged Municipal Services of Ústí nad Labem, allowance organisation (MSÚL) with the administration of roadways, the system of paid parking facilities in the centre and the parking garages owned by the city. This organisation provided the requested background:

- Mapping places where parking / permanent parking of vehicles is charged
- List of places with paid parking, introduced rates and capacity (including the parking garages operated by MSÚL)

Figure 28 - Paid parking in the city centre







(Source: MSÚL)

Figure 29 - Parking scheme in the city, capacity and rates at individual localities

No of park.	Name	No. of places	Rate	No of park.	Name	No. of places	Rate
1	Velká hradební (Uhlozbyt)	32	**A**	**19**	Moskevská upper part	55	**A**
2	Prokopa Diviše oper.2.5. 2008	20	**A**		Předmostí operation from 16.5.2008	32	**A**
3	Klášterní opposite ČNB	35	**B**	**21**	Špitalské Square	24	**A**
4	Pařížská	18	**A**	**22**	Klíšská	32	**A**
5	Dlouhá behind IH Bohemia	47	**C**	**23**	Klíšská - Panská	22	**A**
6	Velká hradební (Union banka)	18	**A**	**24**	Špitálské Square (elektra Unima)	17	**A**
7	Velká hradební (Pozemní stavby)	26	**A**	**25**	Špitálské Square (near the park)	14	**A**
8	Velká hradební (House of culture)	16	**A**	**26**	Vaníčkova behind the Smetana park	31	**A**
9	Bratislavská	34	**A**	**27**	Vaníčkova behind the City Theatre	30	**A**
10	Stroupežnického	46	**A**	**28**	Žukovova (U Lípy) oper.from 12/2007	45	**A**
11	Bělehradská	12	**A**	**29**	Varšavská (Činoherní studio) operation from December 2007	14	**A**
12	W.Churchilla I. (Grand Hall)	21	**A**	**30**	Raisova operation from 12/07	13	**A**
13	Masarykova (rear part)	15	**A**				
14	W.Churchilla near the Vladimír hotel	72	**D**		Parking meter Mariánské garages (Parking fees)	426	*
15	W.Churchilla II.(House of Children and Youth)	33	**A**		CORSO car park	82	**
16	Masarykova Str. Direction Ice stadium	30	**A**				
17	Masarykova Str. Direction the city	25	**A**				
18	Londýnská	37	**A**				
	Total	**537**			**Total**	**755**	
	TOTAL PAID PLACES IN ÚSTÍ NAD LABEM					**1 292**	

grey characters – parking places are not located in the city centre A B C D * ** – for rate zones, see the following table

(Source: MSÚL)

Figure 30 - Parking charges in Ústí nad Labem

Basic rate (code A)	
each commenced hour CZK 10.- ……24-hour parking CZK 70.-	
Higher rate (code B)	
each commenced hour CZK 20.- ……24-hour parking CZK 100.-	
Higher rate with progressive rate (code C)	
first commenced hour CZK 20.- ……each subsequent commenced hour CZK 50.-	
24-hour parking ……CZK 200.-	
Lower rate (code D)	
each commenced hour CZK 5.- ……24-hour parking CZK 30.-	
SMS parking rate	
CZK 15.- incl. VAT for the SMS……1 SMS = parking hour	
Mariánské parking garages rate (*)	
1st day	• first three hours free • each subsequent commenced hour CZK 5.- Kč • max. CZK 100.- Kč / 1 day
1 week	• CZK 250.-
2 weeks	• CZK 420.-
1 month	• CZK 630 -
5 % discount for advance payments for a minimum of 3 months	
10 % discount for advance payments for a minimum of 6 months	
15 % discount for advance payments for a minimum of 1 year	
CORSO car park rates	
1st day	• first commenced hour CZK 15.- • each subsequent commenced hour CZK 10.- • max. CZK 150.- 1 day
1 week	• CZK 252.-
2 weeks	• CZK 420.-
1 month	• CZK 630.-

(Source: MSÚL)

6.3 Urban Parking Plan

Ústí nad Labem assigned the Budínský design studio with the task to develop the Urban Parking Plan between 2001 and 2006. The work describes the shortcomings of the parking scheme in individual municipal districts. The text below summarises the most problematic points that were outlined by the parking scheme master plan.

For the needs of this master plan, the necessary parking capacity was calculated using two methods, subject to:

- decree of the capital city of Prague No. 26/1999 Coll. - on general technical requirements for construction in the capital city of Prague, dated 19 October 1999. The decree specifies the number of parking places according to purpose.
- subject to ČSN 73 6110 - Design of local roadways.

The "Prague decree“ calculated the necessary places according to the number of apartments, ČSN 73 6110 according to the population (subject to the applicable wording of ČSN 73 6110, the capacity of the necessary parking spaces is currently derived from the number of apartments).

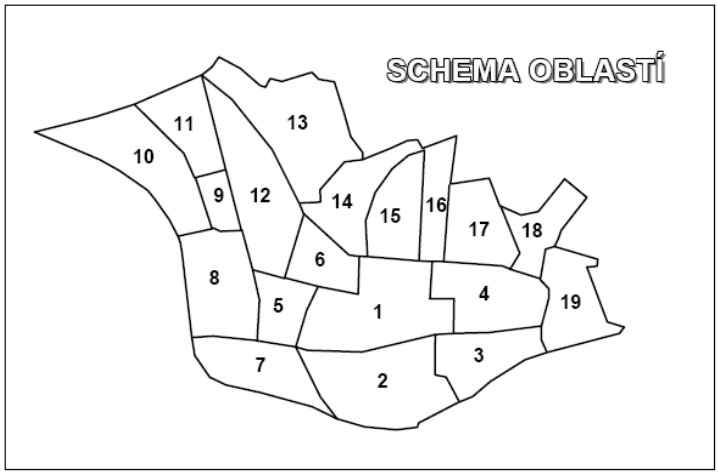
For the needs of the Urban Parking Plan, the municipal districts were divided into individual locations.

City centre of Ústí nad Labem

The city centre has insufficient parking capacity. There are still unused reserves within walking distance of amenities, but these do not have sufficient capacity and will be exhausted in the near future. Considering the dense development, it will be very difficult to find some space to build new parking / permanent parking (parking garages). There are 3,300 parking places in the area (including internal blocks and private land of shops and residential houses).

The survey’s findings from 19 areas, into which the location of the centre was divided, cannot be generalised, as they differ with the type of structures that are situated in them (shops, residential houses, park greenery, etc.)

Figure 31 – Scheme of parking areas in the centre of Ústí nad Labem



Source: Ing. Vladimír Budínský, January 2001

Areas 1 and 2 mainly have amenities which are very busy. On weekdays these parking places are used to their maximum despite additional capacity parking spaces being available. The situation is a little better at weekends.

Most of the remaining areas do not provide large parking spaces, with the exception of No. 19. In some areas (15, 18) parking is concentrated in streets, yards or rows of garages.

Figure 32 – Total number of parking places

TOTAL	
Type of parking	
Parking indicated on the ground	1792
Parking in row garages	201
Parking in parking garages	678
Parking alongside roads (not indicated)	343
Parking in yards and other areas	261
TOTAL	**3275**

Source: Ing. Vladimír Budínský, January 2001

6.4 Traffic Load in the City

Figure 33 – Traffic intensity on the city road network

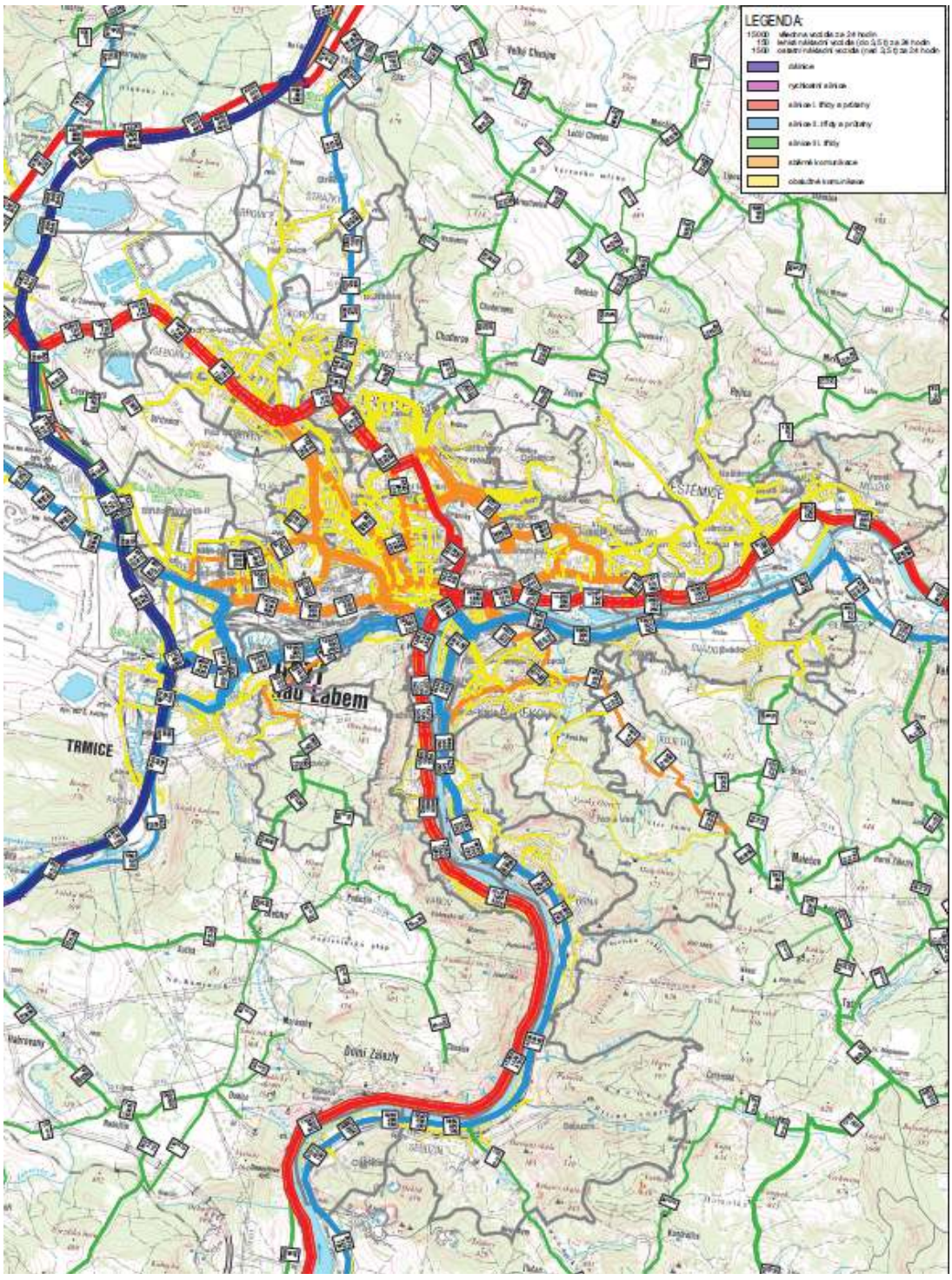
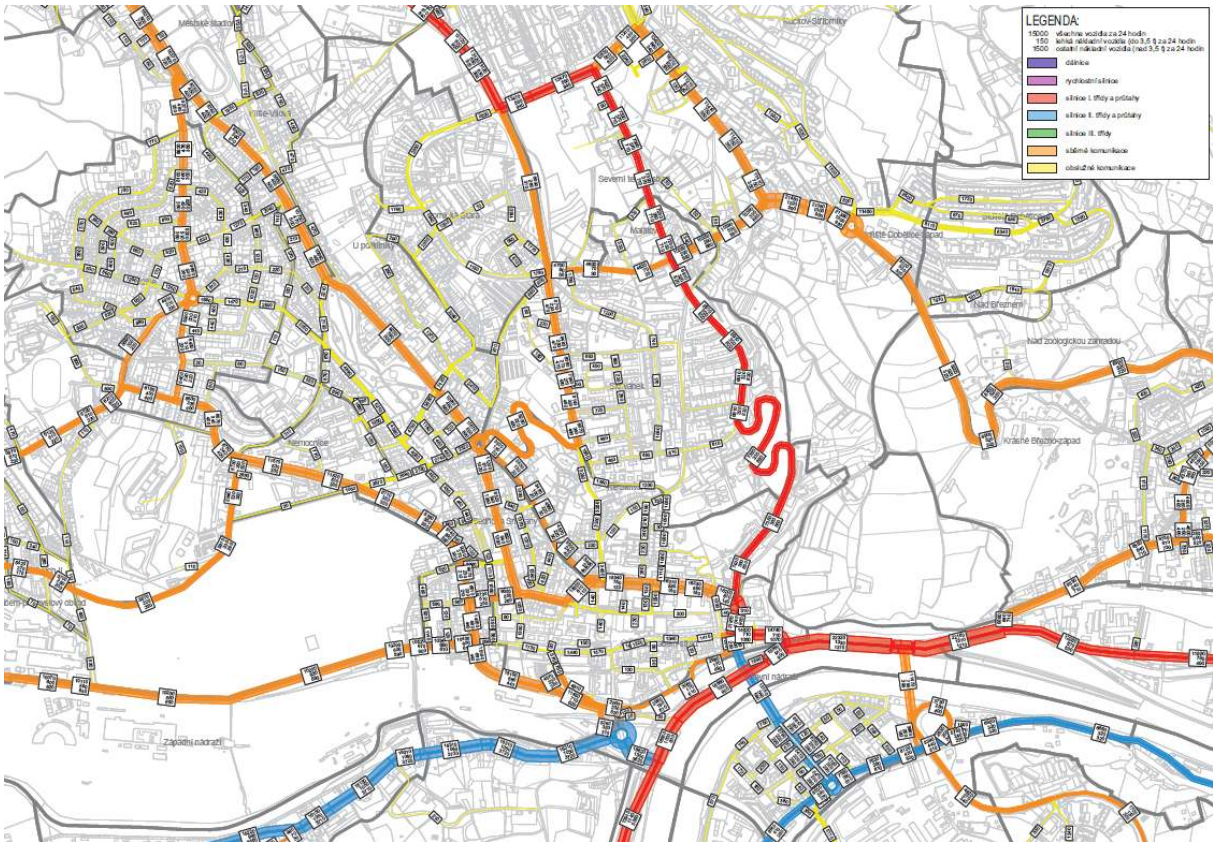


Figure 34 – Traffic intensity in the centre of Ústí nad Labem



The road network in the city is relatively heavily affected by motor traffic even in the centre. The problem results from the D8 motorway, which has not been completed yet. So the bypass route runs through the city of Ústí nad Labem and there is no highway bypass around the city. The table below shows a list of fifteen roadways in the city with the heaviest traffic.

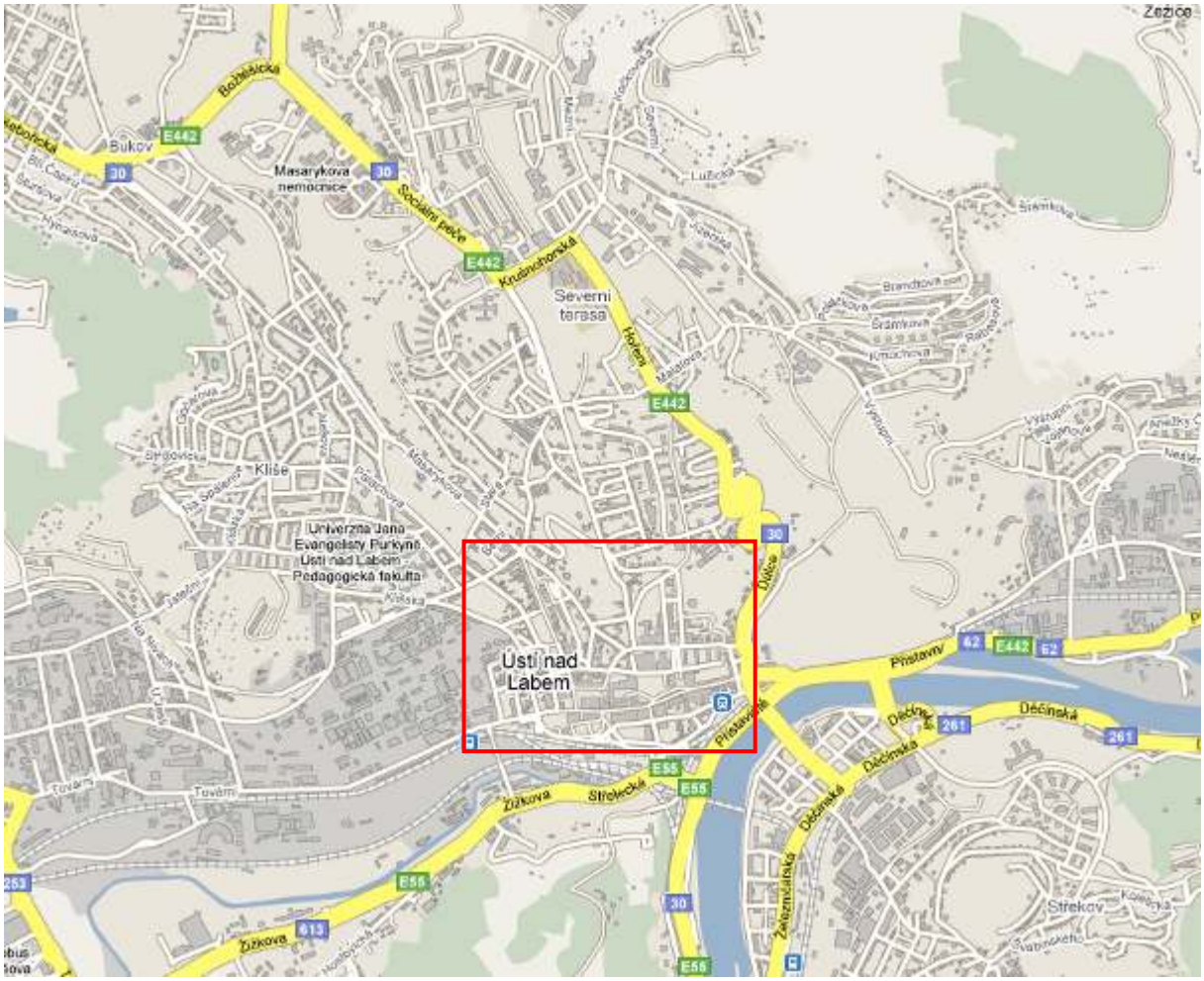
Figure 35 – Streets in Ústí nad Labem with the highest traffic load (2011)

pořadí	ulice	úsek		RPDI	
		začátek	konec	voz./24 h.	
1	**Přístavní**	Předmostí	Mariánský most		22 290
2	**Přístavní**	Mariánský most	Drážďanská		22 120
3	**Důlce**	Předmostí	Velká hradební	22 010	22 070
4	Na Návsi	Stříbrnická	Šrámkova	21 370	21 470
5	Žižkova	U Trati	Přístavní		18 540
6	Sociální péče	Mezní	Petrovická	16 600	17 740
7	Velká hradební	Bratislavská	Důlce	15 390	17 020
8	Všebořická	Havířská	Boženčická	13 980	16 970
9	Přístavní	Žižkova	Předmostí	15 510	16 800
10	Opletalova	Podmokelská	Opletalova (Neštěmice)		16 360
11	Masarykova	Boženčická	Štefánikova	15 000	16 280
12	Stříbrnická	Krušnohorská	Na Návsi	11 410	16 240
13	Žižkova	U Trati	Tyršova	14 940	16 070
14	Boženčická	Petrovická	Masarykova	14 930	15 570
15	U Trati	Žižkova	Revoluční	11 500	15 170

6.5 Identifying the Territory

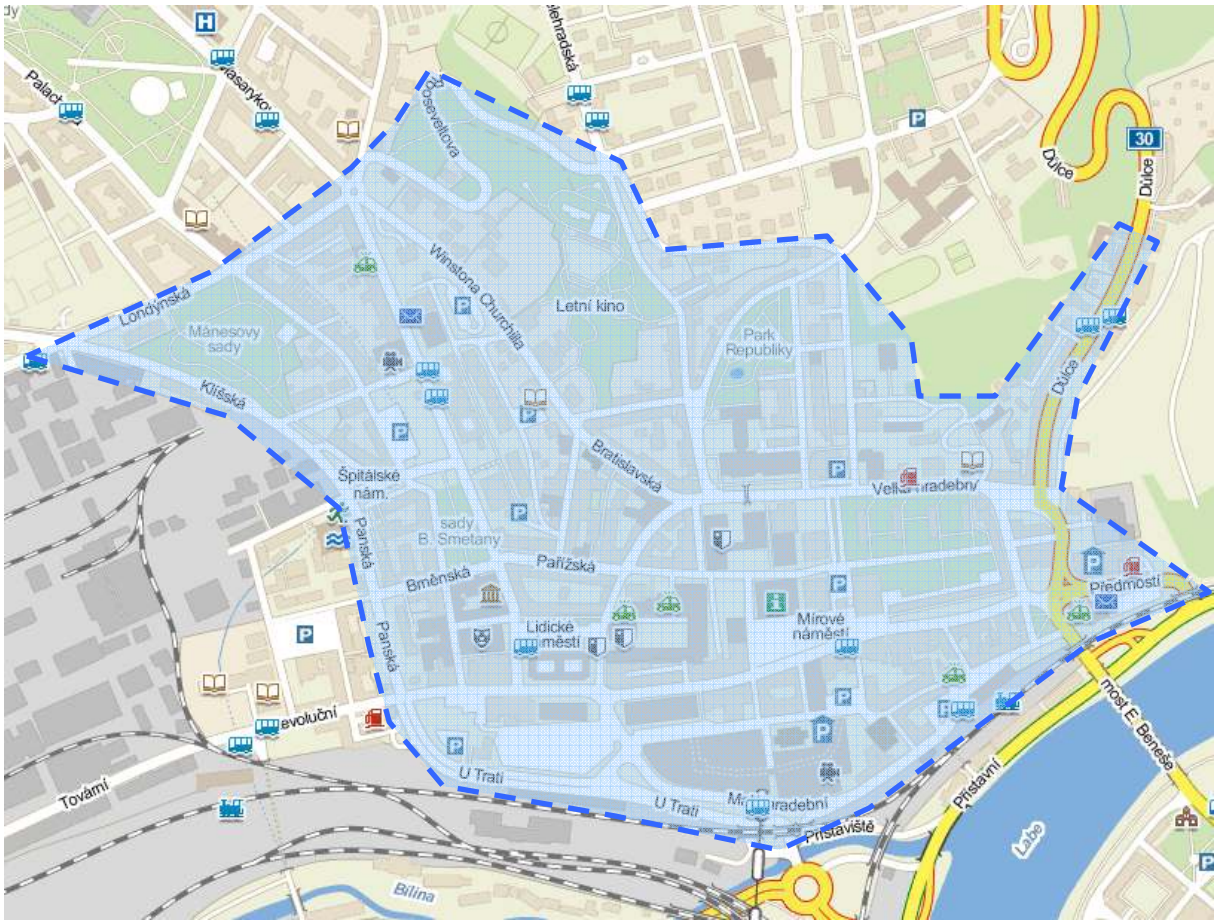
A transport survey was conducted focusing on the parking scheme situation in the central area of the city of Ústí nad Labem and adjacent locations. This area is very densely populated and it also has a dense network of local roadways. The development features tall houses as well as tower blocks. There are many shops, services, authorities and health care and cultural facilities in the area. The area was demarcated by the location of the city centre, i.e. by Klíšská, Panská, U trati, Malá Hradební, Důlce, Na Vyhlídce, Rooseveltova streets. The area is displayed in the following picture.

Figure 36 – Scheme of the territory where transport survey was conducted



(Source: http://maps.google.cz)

Figure 37 – Detail of the area where the transport survey was conducted



(Source: mapy.cz)

6.6 Conducting the Parking Survey

The survey was conducted on Tuesday 26 October 2010, between 9 am and 6 pm, in the middle of the working week to avoid misrepresentation of the outcomes. The demand for parking was high throughout the day, which was reflected in the continuous occupancy of parking places.

The weather on the day of the survey was changeable, with a moderate shower around midday, and temperatures quite typical for the season. As for cultural or social events, life in the city was like any other day.

Generally, the conditions during the transport survey can be characterised as usual, not affecting the survey's findings.

Figure 38 – GPS record of most of the routes of the transport survey (Google Earth application)

The transport survey mapped the parking situation in the streets of the city centre. The objectives were to:

- Identify the parking capacity (number of places in streets, car parks and parking garages)
- Identify the parking mode
- Identify comprehensibility of the parking mode for drivers
- Verify and check the conformity of the information provided to the public by the cities and Municipal Services, allowance organisation with the situation on the roadways.

Originally, the survey's intention was also to specify the demand for parking, i.e. to establish the number of parking vehicles. This proved to be impossible, since demand was so excessive that nearly all places were full with vehicles also parked in places where it was impossible to park a vehicle and still respect the traffic regulations or traffic signs. When the level of parking reaches this level the balance of supply and demand is distorted and the results cannot be relied upon as true demand is suppressed.

Figure 39 - Parking scheme survey

The survey was conducted by a team of transport engineers who walked along the streets and checked the area concerned. The monitored criteria were recorded in prepared forms and photographs of the parking situation were taken. The detailed procedure of conducting and evaluating the transport research was as follows:

1) Monitored criteria:
   a) Type of parking (parking lanes, strips, areas or parking garages)
   b) Capacity of parking spaces (onsite established only if the parking places were marked by horizontal markings, otherwise, calculated according to dimensions)
   c) Quality of marking
   d) Comprehensibility of the system
   e) Photographs (characteristic parking in the sections, typical offences of drivers, etc.)
2) The city centre of Ústí nad Labem was considered as one monitored unit given that walking distances within any part of the concerned area are suitable (i.e. not excessive).
3) Processing of collected data:
   a) Identifying deficiencies and problems
   b) Identifying parking capacity
   c) Description of the marked parking.
4) The survey was followed by evaluation of the data. First, it is necessary to specify the required parking capacity for the locations subject to ČSN 76 6110 (demand). After that, the actual number of parking / permanent parking places in the location must be specified from the transport survey (supply). This calculation must respect the size of parking and the area for manoeuvring specified by ČSN 73 6056 for 02 category vehicles. The required capacity shall be compared with the demand for parking.

6.7 Current State of Parking in Ústí nad Labem

The existing parking scheme in the streets in the centre of the city of Ústí nad Labem is described according to the transport survey. The findings show the current status and situation perceived by individual users of local roadways in the area, mainly drivers.

The information presented by the city and the provider of the parking facilities was used as additional background for the analysis of the existing parking scheme. We wanted to find out if the current system and the indicated road marking functioned properly and if they were understandable for drivers.

6.7.1 Parking Capacity in the City Centre

The city centre of Ústí nad Labem offers parking places on roadways (parallel, perpendicular, diagonal), car parks and parking garages. Parking places can be divided into facilities open to the public and private facilities (on private land, in gardens, individual garages, etc.). In addition, in parking areas open to the public we distinguish between paid and unpaid facilities.

The total of the established number of individual parking places is shown in the following table:

Figure 40 – Parking capacity identified by the survey

		paid	unpaid	reserved
parking on roadways	parallel	271	198	53
	diagonal	179	57	15
	perpendicular	146	77	61
car parks		270	42	428
parking garages		893*	0	768*
Total		1759	374	1325
		2133		
individual	yards, gardens	281		
	garages	225		
total		506		
Total parking places		3964		

*) public parking garages:

- below the Mariánská Rock (426),
- under the City Council (176),
- under the Mírové Square (145),
- behind the railway station (106),
- public automatic parking system in Pivovarská Street (40)
- at the Forum shopping mall (640) – primarily for customers
- at the Labour Office (2)
- at the Regional Office of the Ústí Region - Dlouhá Street (87)
- at the Bohemia Hotel (13)
- at the Regional Office of the Ústí Region - Stroupežnického Street (26).

The figure shows that most public parking places in the central area are charged. The parking scheme is shown on the map of paid parking.

6.7.2 Existing Parking System

The terms of the parking scheme in the city centre are governed by:

- The Ordinance of the Corporate city of Ústí nad Labem No. 3/2003 - On restrictions on local roadways in the cadastral area of the city of Ústí nad Labem to parking charges of motor vehicles
- Parking charges for motor vehicles (as of 1 September 2008)
- Parking prices are also specified by the Transport service pricelist, Municipal Services of Ústí nad Labem, applicable as of 15 September 2011.

The parking scheme is regulated by paid parking in the streets and public parking garages (the parking building below the Mariánská Rock). This is a common method in cities in the Czech Republic and abroad. The paid parking system is operated by the MSÚL.

Figure 41 - The most common traffic sign marking paid parking in the centre of Ústí nad Labem

Paid parking has been introduced in individual streets marked by specific traffic signs (please see Figure 1). There is no zone of paid parking marked in the area of the centre. The streets where parking is charged are shown in the following table:

Figure 42 - Streets with paid parking

No. of the parking place	Location (street, local name)	rate
1	Velká hradební (u Uhlozbytu)	A
2	Prokopa Diviše	A
3	Klášterní opposite ČNB	B
4	Pařížská	A
5	Dlouhá behind the Bohemia Hotel	C
6	Velká hradební (at Union bank)	A
7	Velká hradební (near Pozemní stavby)	A
8	Velká hradební (near the House of Culture)	A
9	Bratislavská	A
10	Stroupežnického	A
11	Bělehradská	A
12	W.Churchilla (near the Grand Hall)	A
13	Masarykova (rear part)	A
14	W.Churchilla (near the Vladimír Hotel)	D
15	W.Churchilla	A
16	Masarykova Str. (direction to the Ice Stadium)	A
17	Masarykova Str. (direction to the city)	A
18	Londýnská	A
19	Moskevská upper part	A
20	Bridge head operation	A
21	Špitálské Square	A
22	Klíšská	A
23	Klíšská – Panská	A
24	Špitálské Square (at the Unima shop)	A
25	Špitálské Square (near the park)	A
26	Vaníčkova behind Smetana Park	A
27	Vaníčkova behind the City Theatre	A
28	Žukovova (U Lípy) in operation since December 2007	A
29	Varšavská (Drama Theatre) in operation since December 2007	A
30	Raisova in operation since December 2007	A

The lines marked in grey in the table show the roadway sections with paid parking which are beyond the considered area of the city centre and they are not shown on the detailed map (figure 43).

Figure 43 - Map of paid parking in the centre

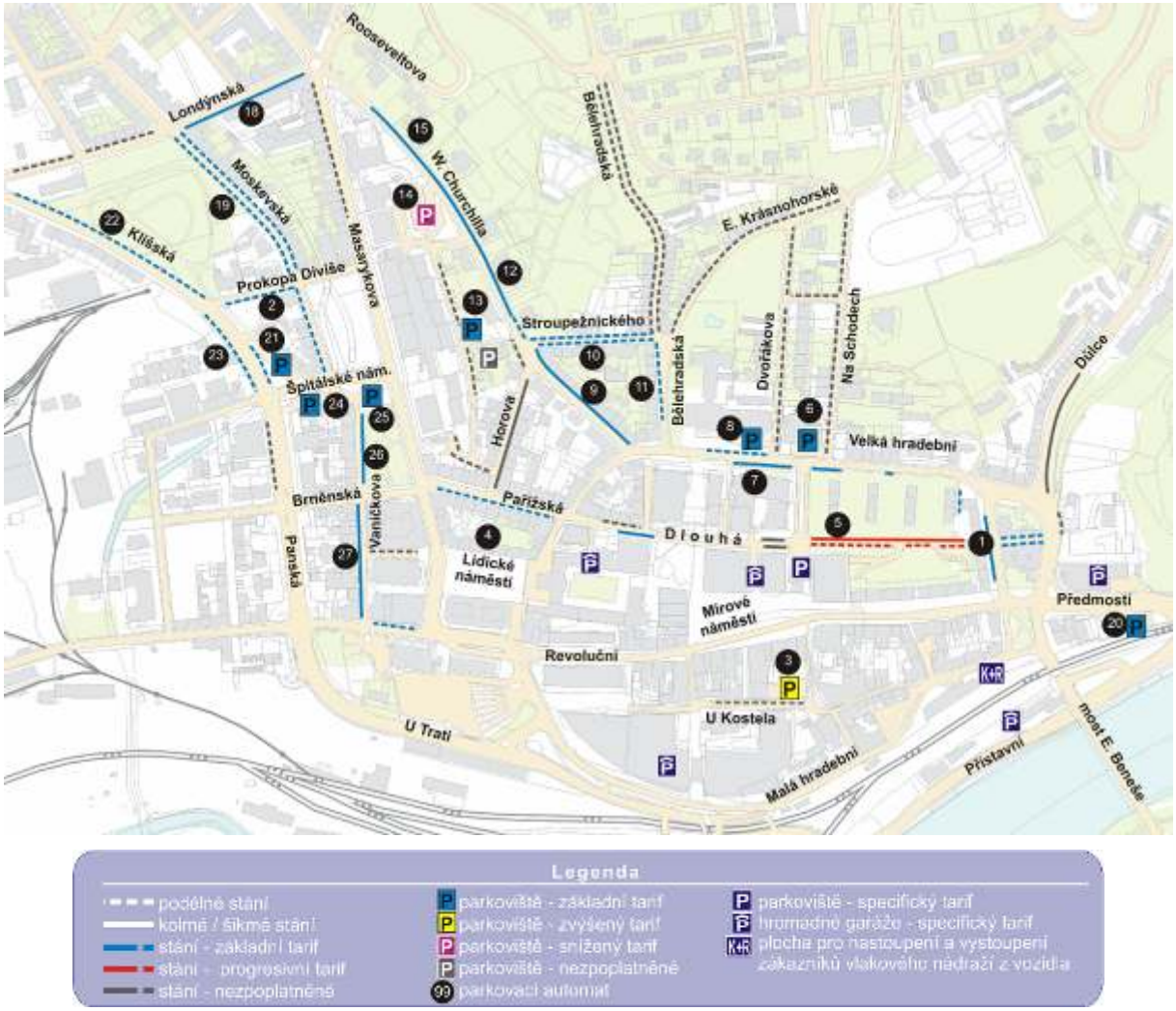
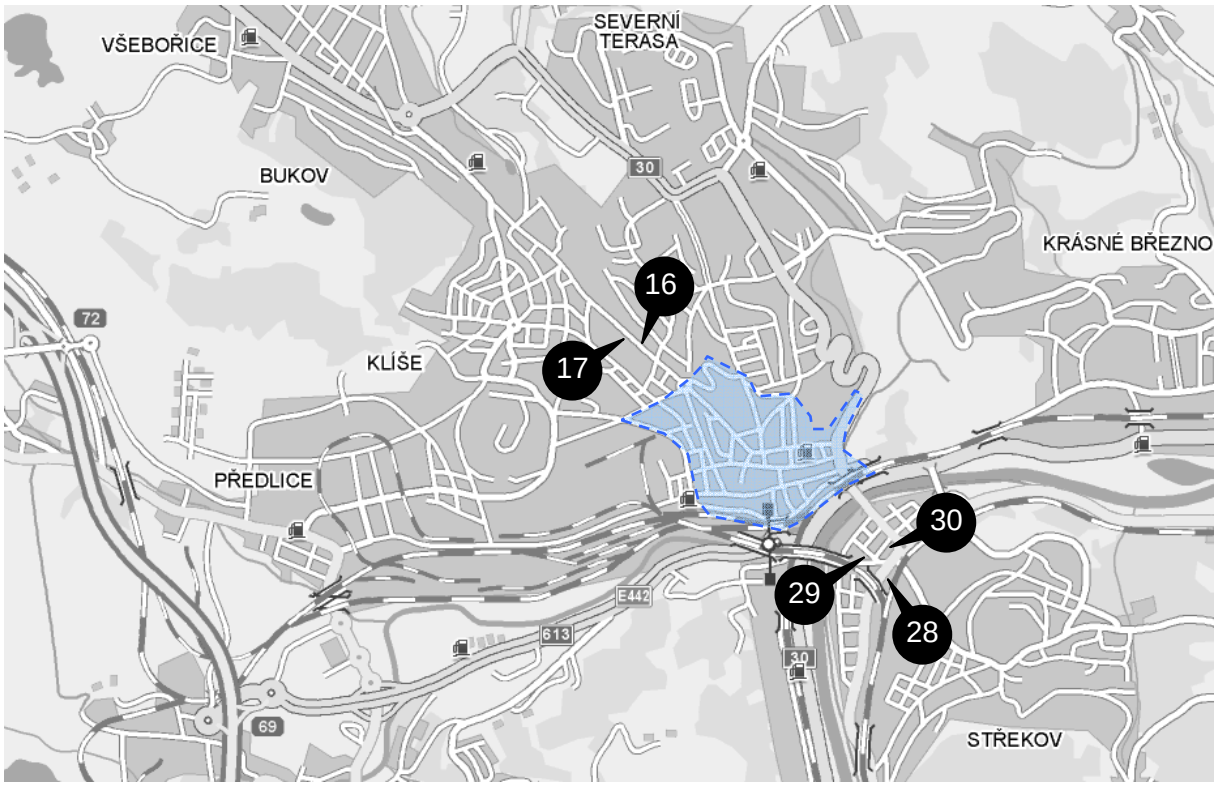


Figure 44 - Map of paid parking outside the considered area in the city centre



(Source: http://mapy.cz)

The prices for parking in the streets and car parks are provided at four rates. The specific parking garages have their own price terms. The parking price in the streets is derived from the attractiveness of the street considering the demand for parking of vehicles and walking distance to attractive destinations. In the most attractive places, streets, the rate is more expensive than in those relatively more distant.

Parking can be paid at parking meters located near each paid parking facility or car park. The minimum charged unit is half an hour. A special form of payment is via SMS sent by mobile phone (the service was introduced in 2008). The SMS has a specified format. 1 SMS can always pay one hour of parking, it is impossible to pay a shorter period of time. The fee is the same for all places..

Exemptions from paying parking charges are given to:

- motorbikes
- vehicles carrying a severely impaired person or a person severely impaired in movement (designation O1 subject to S.67 of Act No. 361/2000 Coll., on roadway traffic) or impaired in hearing (designation O2) are exempted from paying for 2 hours of parking in the restricted places.

Parking in the streets is charged at the following times:

- Monday to Friday: 7:00 am – 6:00 pm
- Saturday: 8:00 am – 1:00 pm

Figure 45 – Instant parking prices in the city centre

Rate		*1st hour*	*Next hour*	*24-hour parking*
A	*basic*	*CZK 10*	*CZK 10*	*CZK 70*
B	*higher*	*CZK 20*	*CZK 20*	*CZK 100*
C	*progressive*	*CZK 20*	*CZK 50*	*CZK 200*
D	*lower*	*CZK 5*	*CZK 5*	*CZK 30*
SMS parking		*CZK 15 /h, 1 SMS = 1 hour of parking*		

Instant fees for parking have been the same since 1 January 2005 (the rate will probably be changed in 2012).

Parking cards are issued for residents and a range of subscriptions. The MSÚL issues the cards. The types of card are:

- **Resident card** – for residents permanently living in the place directly adjacent to the specific part of the local roadway where paid parking is in place, who own a vehicle of maximum 3.5 t or use a company car. The cards are only applicable for the specified section of the roadway. The issue is recorded according to individual households.Prices:
  - 1st vehicle per household: CZK 120 quarterly, CZK 400 annually (basic price)
  - 2nd vehicle per household: 5 times the basic price
  - 3rd and following vehicle per household: 10 times the basic price
- **Full-area card** – effective for all municipal roadways with restricted paid parking and the parking below the Mariánská Rock. Prices:
  - For natural entities: CZK 7,200 annually
  - For legal entities: CZK 8,160 annually
- **Full-area card with restrictions** – effective for all municipal roadways with restricted paid parking and the parking below the Mariánská Rock except the car park on Mírové Square. Prices:
  - For natural entities: CZK 7,200 annually
  - For legal entities: CZK 8,160.annually
- **Full-area card with local specification** - effective for all municipal roadways and parking below the Mariánská Rock except the car park on Mírové Square and the car park in Bílinská Street outside the church. Prices:
  - For natural entities: CZK 4,800 annually
  - For legal entities: CZK 5,520 annually
- **TAXI card** – only for vehicles with an assigned registration number of a taxi vehicle issued by the Transport Department of the City Council of Ústí nad Labem. This is only applicable for specially designated sections of local roadways with paid parking. Price: CZK 2,760 annually
- **Business card** - the full-area cards for business vehicles of the City Council of Ústí nad Labem, municipal districts and allowance organisations established by the city, are available at only a handling charge.

The parking cards marked in grey are specified in the “Price terms for paid parking of motor vehicles of the Corporate city of Ústí nad Labem”. They are not shown in the current pricelist of the MSÚL, probably because their purpose has already ceased. The parking facility on Mírové Square has been withdrawn during reconstruction work and the area can only be driven through by vehicles providing transport services.

Other parking capacity in the centre is in parking garages, underground or above-ground. The list of parking garages in the city centre of Ústí nad Labem available to the public:

- Parking building below the Mariánská Rock – access from Předmostí Street (short-term parking card taken from the entry turnstile)
  - first 3 hours of parking free
  - each commenced hour CZK 5 hourly (max. CZK 100 per day)
  - each following day is charged as the first day
- Privilege rates for 1 parking place (suitable for parking longer than 1 day)
  - 1 week CZK 250
  - 2 weeks CZK 420
  - 1 month CZK 630
  - smart card CZK 300 each
- Quantity discounts have been introduced as well:
  - 5% for 3-month advance payments
  - 10% for 6-month advance payments
  - 15% for 1-year advance payments
  - for parking of 5 and more vehicles and advance payments
- Underground garages under the City Council access from Dlouhá Street
  - 1st hour CZK 20
  - Each commenced hour CZK 25 hourly (max. CZK 209 /day)
  - Month CZK 2,267
  - Option of long-term place rental
- Underground garages under Mírové Square – access from Dlouhá Street
  - Between 6 am – 8 pm: CZK 20 hourly
  - Between 8 pm – 6 am: CZK 10 hourly
  - Option of long-term place rental
- Parking garages behind the railway station – access from Přístavní Street
  - Between 8 am – 4 pm:
    - First 2 hours: CZK 5
    - 3rd hour: CZK 50
    - Each following hour: CZK 100
  - At other times CZK 5 hourly
- Parking garages at the Forum shopping mall – access from Malá hradební and U Trati Streets (the parking garages are primarily designated for customers of the mall, however because of its high capacity and attractive location they are shown in the list)
  - Up to 1.5 hours free
  - Up to 2 hours CZK 10
  - Up to 2.5 hours CZK 20
  - Up to 3 hours CZK 30
  - Up to 3.5 hours CZK 50
  - Up to 4 hours CZK 70
  - Each following hour CZK 40 hourly.

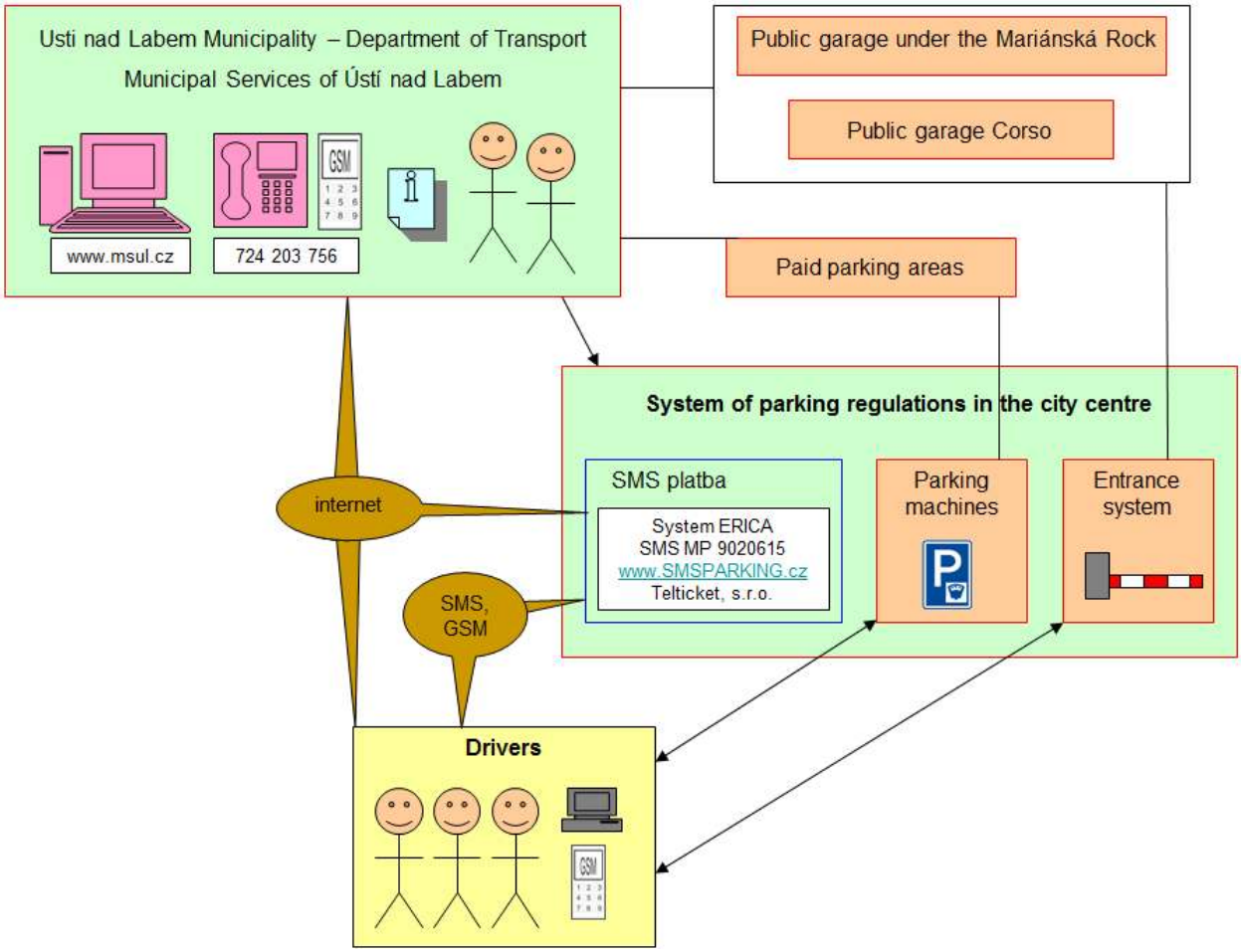
Figure 46 - Parking garages under Mírové Square

The public can also park vehicles on the private land, the owners of which operate public parking facilities. One is situated outside the Bohemia Hotel with access from Dlouhá Street. Prices are specified by the operator, paid parking is from Monday to Friday from 7 am to 5 pm. The price is CZK 20 hourly.

In addition, an automated parking system is situated in Pivovarská Street. Prices and operational terms are specified by the operator.

Figure 47 - Automated parking system in Pivovarská Street

Figure 48 – Physical architecture of parking in the city



The Municipal Police of Ústí nad Labem supervises the observance of parking regulations. They also have the technology available to check if the driver paid the parking fee by SMS.

Figure 49 – Incorrect parking in the city

Towing of illegally parked vehicles hindering the flow of traffic or impeding transport safety is provided by the Transport Company of Ústí nad Labem, a. s. Prices of towing vehicles are specified by the Regulation of the Corporate City No. 2 / 2010 as follows:

- Maximum price for complete towing: CZK 2,500
- Maximum price for incomplete towing: CZK 1,950 (if the driver arrives while the car is being stacked onto the towing vehicle and it is put back, without the vehicle being towed away)
- Price for towing vehicles when the streets are cleaned and their return: CZK 4,000 (a discount of CZK 1,000 for instant payments)

In 2011, approximately 2,500 vehicles were towed away.

The car park of towed vehicles is guarded 24 hours a day and is situated in Jateční Street. It is operated by the Transport Company of Ústí nad Labem, a. s.

6.7.3 Parking Possibilities in the City

The southern side of the city centre is close to the River Elbe. Parking is possible in the streets on the right river bank. Walking distance to the centre is about 1 km across the bridges, which is rather long.

To the east of the centre there is an industrial park with most parking places reserved for local businesses. A few places can be found in U Chemičky Street and Brněnská Street (behind the road junction of the streets Brněnská x Panská) and in U České besedy Street, although here it is nearly impossible to find a parking place.

North west of the centre are residential neighbourhoods. Parking is not regulated in the streets but the demand of the residents for parking is rather high and the parking capacity available does not meet local needs.

North of the centre is a residential neighbourhood with single-family houses and tower blocks. The parking capacity does not fully meet the needs of residents.

The Mariánská Rock (an important landscape object) is situated east of the centre and it does not offer any capacity for parking or traffic.

Parking options in the close vicinity are considerably limited as there are no sufficient parking places even for residents living here. Parking further from the city centre and travelling to the centre by PT is possible. However, it is rather complicated to find a parking place in more remote locations because they are usually densely populated and the parking deficit is critical – see Task 11.3.3 – Parking strategy research, parking in residential areas (the housing estate of Dobětice was dealt with within the task).

6.8 Identified Deficits

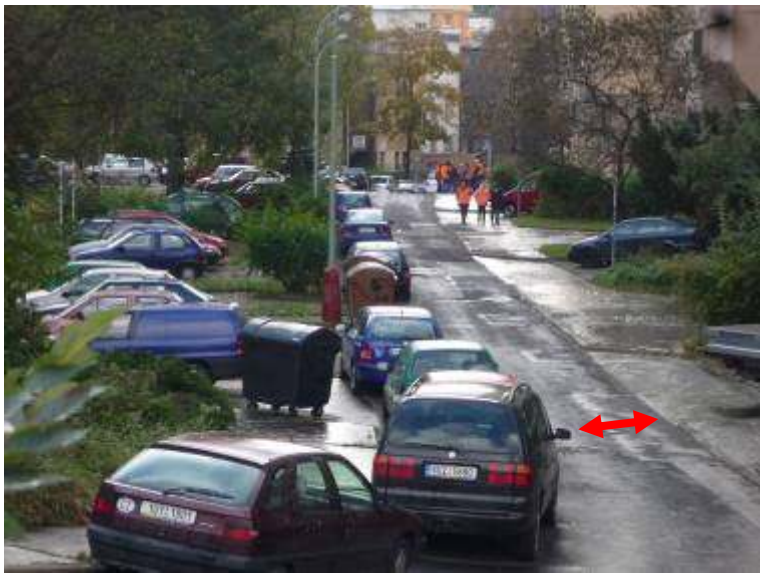
The inspection of the parking scheme identified different deficiencies differently influencing traffic safety. Some deficiencies result from the poor discipline of drivers. Others, however, show the deficiencies of the existing parking scheme.

6.8.1 Parking in Conflict with Regulations

Drivers often park vehicles in places that are unsuitable or even forbidden by the traffic marking. This usually happens if there are not enough parking places in the specific location:

- **Parking vehicles restrict the horizontal clearance -** Vehicles are parked along the traffic lane / strip. However, it is not wide enough to allow other vehicles to pass safely, particularly lorries, which represents a potential problem for the movement of fire brigade vehicles.

Figure 50 – Parking in the street Masarykova



- **Ignoring vertical or horizontal marking** - Drivers do not obey the B 28 “Clearway”, or B 29 “Waiting Prohibited” vertical marking, or the V 12c “Waiting prohibited” horizontal marking and they park their vehicles in places marked by these signs.

Figure 51 – Masarykova street

Figure 52 – Moskevská street

- **Parking near road junctions or close to road junctions** - Drivers often park vehicles at large areas near road junctions, which increases the risk to drivers and particularly to pedestrians.

Figure 53 – Masarykova street

Figure 54 - Londýnská street

- **Parking on sidewalks** - The inspection found that drivers even park their vehicles on pavements, which directly hinders or poses a risk to pedestrians. The situation on the pavement at the road junction of the streets Panská x Brněnská with illegal parking on the pavement is particularly serious.

Figure 55 - Masarykova street

Figure 56 - Panská x Brněnská street

- **Parking close to pedestrian crossings** – As stipulated by Act No. 361/2000 Coll. drivers must stop or park their vehicle at a distance of a minimum 5 m from crossings. Unfortunately, this provision is not very often complied with, which significantly impedes the scope of vision and poses a risk to the pedestrians using the crossing.

Figure 57 – Moskevská street

6.8.2 Insufficient Parking Capacity

The inspection identified insufficient parking capacity and higher demand for parking, compared with the existing number of legal parking places in the streets. The criterion for evaluation in the transport survey was the occupancy in individual places and the rate of disobedience of traffic regulations in the area.

The deficit is obvious particularly in the following parts of the centre:

- Considerable deficit:
  - The area of the rear block of Masarykova Street at the tower block development (area 12*)
  - The area of the streets Stroupežnická, Bělehradská and Elišky Krásnohorské – blocks of flats (area 14)
  - The area of the streets Vaníčkova, U Divadla and Panská (area 8*)
- Deficit:
  - The area of Dlouhá Street in the east, outside the tower blocks (area 4*)
  - The area of the streets Londýnská, Moskevská – blocks of flats (area 11*)

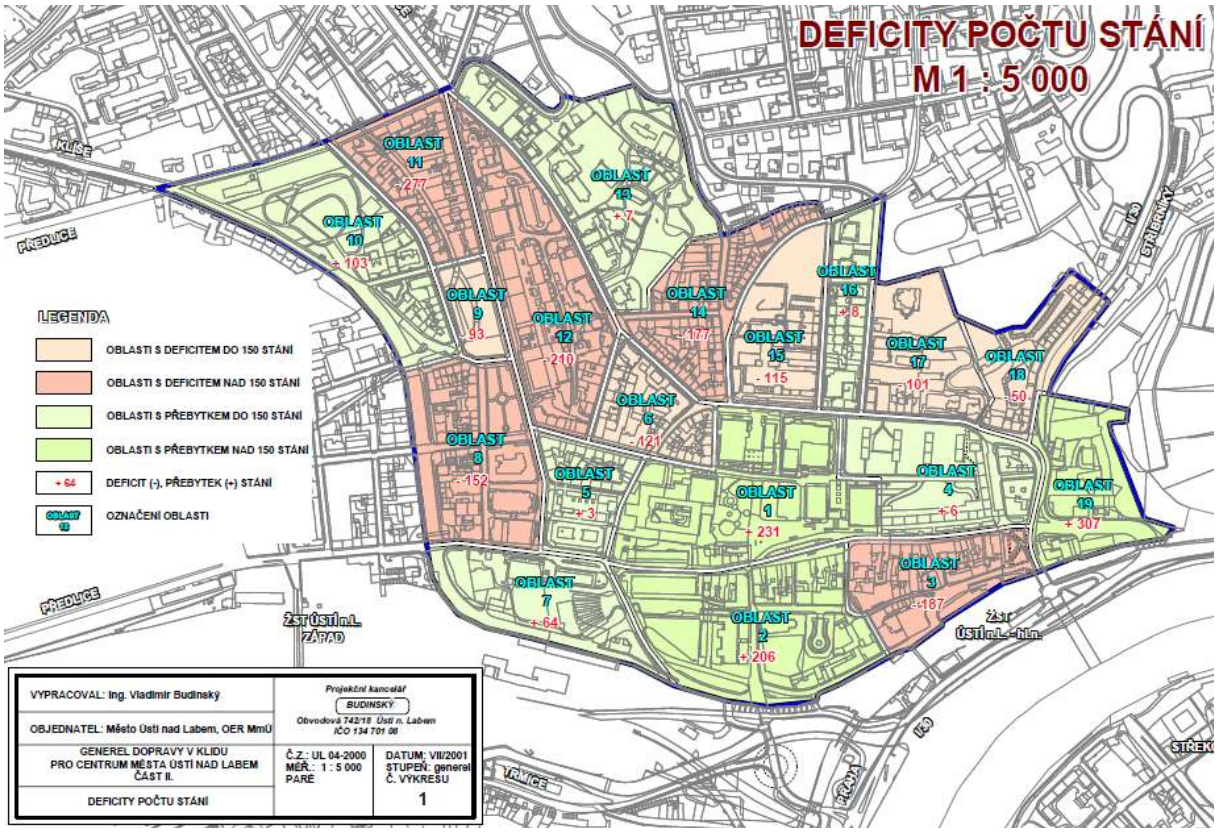
- The area of the streets Hradiště, Klášterní, U Kostela – historical blocks of flats (area 3*)
- The area of Důlce Street – historical houses (areas 17, 18*).

*) the number of the area used in the Parking scheme master plan, see figures 44 & 45.

The findings also confirmed the conclusions of the completed parking scheme master plan. In area 2, specified by the master plan, the parking garages at the Forum shopping mall were built in 2009 (designated for customers). These satisfy the demand of the mall, so this structure has not significantly affected the parking scheme. The parking scheme master plan reviews the possible alternatives and insufficient capacity. The conducted transport survey has confirmed these results, see figures 44 & 45.

It is rather surprising that the capacity of the parking garages below the Mariánská Rockis is not fully used although the prices are very advantageous. On the contrary, the capacity of the parking garages under the City Council and Mírové Square is already fully exhausted every day by early morning. This probably results from the longer walking distance from the parking garages under the Mariánská Rock, which is, however, only about 350 m to Mírové Square and approximately 4 minutes walk and can hardly be perceived as critical.

Figure 58 - Deficits in parking capacity according to the parking scheme of master plan



(Source: Budínský design studio)

6.8.3 Traffic Signs for Parking in the City

The road marking identifying the section with paid parking is provided in most sections by the IP 13c “Car park with parking meter” vertical marking and the supplementary plate E 12 “Text”, reading:

Mo – Fri	7am – 6pm
Saturday	8am – 1pm

Alternatively a similar text is used restricting the time of paid parking.

Some sections of municipal roadways, particularly those recently reconstructed, display the vertical marking IP 25a “Zone with traffic restrictions” / IP 25b “End of zone with traffic restrictions” with the sign IP 13c “Car park with parking meter” and the text “Mo – Fri 7am – 6 pm, Sat 8 am – 1 pm” (see Figure 59). This marking has been provided in the following streets:

- Moskevská
- Prokopa Diviše
- Stroupežnického

Designating the zone is completely equal to the designation of a zone according to the rate. Unfortunately, it is only applied for sections of streets so the benefits are lost – it should apply for the whole area, not only from the sign to the end of the first following road junction, as is the case with the IP 13c vertical marking.

Figure 59 – Traffic signs marking paid parking in the city

Figure 60 – Vertical traffic sign marking a zone with traffic restrictions

Horizontal marking, if indicated, does not distinguish charged and free places in most sections. Parking lanes / strips are often not indicated at all. Paid parking is only painted in blue on newly reconstructed sections of roadways by the horizontal marking (V 10g “Parking time restricted”). This applies to the streets W. Churchilla, Londýnská and Vaníčkova.

Figure 61 - Paid parking lanes with missing horizontal marking (photos from the steets Bělehradská and Londýnská)

Figure 62 - Parking strip notifying paid parking (blue horizontal marking)

Outside the railway station an area has been established to facilitate a short drop off /pick up area for customers of Czech Railways. It is designated by the B 1 “Ban on traffic for all vehicles (in both directions)” vertical marking with a supplementary plate E 12 “Text” – reading “EXCEPT CR CUSTOMERS” and B 29 “Waiting prohibited”. According to the indicated road marking drivers can stop here for the necessary time to unload or load things and to drop off or pick up customers of Czech Railways. However, a vertical marking IP 13e “K + R parking facility” is more suitable for this situation, which designates the option of short-term parking and waiting at the PT terminals. It is specified for picking up or dropping off passengers when drivers are carrying another person to or from the PT stop by car.

Figure 64 - Complicated traffic signs at the railway station

Figure 65 - Vertical traffic sign IP13e "K+R parking facility""

The IP 11g "Car park (partial parallel parking on pavement)" vertical marking specifies the method of parking. It is a one-way street with a relatively wide traffic strip. The pavement is not wider than the traffic strip. There is no point parking vehicles on the pavement because vehicles parked on the carriageway do not hinder the traffic. In fact, drivers park their vehicles on the carriageway rather than the pavement, which is in conflict with the indicated vertical marking, but still, there are no problems with the clearance of the section.

Figure 66 - Unnecessary indication of partial parking on the pavement of the street Propokopa Diviše

6.8.4 ITS Elements

The parking scheme in the city does not use any elements of intelligent traffic control to regulate parking. This would direct drivers looking for a parking place to the available facility and reduce the number of vehicles circulating in the centre looking for a parking place.

6.8.5 Presented Information

Information presented to the public on the parking system, parking charges and prices is not easily available. This is an issue mainly for drivers who do not often park in the centre, i.e. particularly for visitors to the city. Information is only available on the website of the provider – Municipal Services. – www.msul.cz . section “Parking”. It shows the list of streets with paid parking, rates and information on alternatives. A map of paid parking is not available.

Figure 67 - Website of the paid parking provider (www.msul.cz)

The information on the paid parking system is presented on the official website of the city (www.usti-nl.cz, www.usti-nad-labem.cz) only via publicising the following documents:

- Ordinance of the city 3/2003 - on restrictions on local roadways in the cadastral area of the city of Ústí nad Labem to parking charges of motor vehicles
- Ordinance of the city 2/2010 - which specifies maximum prices for enforced vehicle towing
- Parking charges for motor vehicles (as of 1 September 2008, still applicable).

This information on parking is not always presented in a user-friendly form and the above-stated documents are rather difficult to find.

Further information on the paid parking system is not publicised or such documents are rather difficult to find. Another complication is that the information publicised by the city and MSÚL differs in some provisions. The city ordinance shows the list of the streets with paid parking, with the names of streets where parking has been eliminated or where parking is not currently charged as a result of new construction, redevelopment or other reasons:

Mírové Square	U Nádraží
Pivovarská	Revoluční
U Kostela	Bílinská
Malá hradební	Kramoly
Na Schodech	Kozinova
Dvořákova	Panská
Horova	Hviezdoslavova
Masarykova	

The MSÚL's information does not specify the names of the streets. It features the streets with paid parking (verified by the transport survey).

The paid parking system is therefore not sufficiently promoted and the benefits of paid parking are not being explained consistently. There are no promotional information leaflets available which are beneficial particularly for visitors to the city.

The information provided on the paid parking system in Ústí nad Labem compared to other Czech cities is not sufficient or easy to access. The form of its publicising is outdated.

6.9 Assessment of the Implemented Parking Scheme

Parking in the city centre is regulated by existing paid parking in the streets. Parking is paid in specific selected streets and it is indicated using standard traffic marking. Paid parking has been introduced in streets located near common destinations, i.e. in streets where the demand for parking is the highest. In some streets in the centre paid parking has not been introduced. Vertical marking of the paid parking zone is only used in a few places, the most common being the IP 13c vertical marking. Horizontal marking indicating paid parking (lines painted in blue) has been introduced only on several newly reconstructed sections of road. Consequently, it is sometimes a problem to say if a parking place is charged or if it is part of an area where parking is not regulated. The centre also has large parking garages – underground facilities and the parking building. The parking garages have a specific rate system

The parking fee can be paid at parking meters located near each paid facility via SMS. Payments via SMS are perceived positively and applied by users. The existing rates are adequate and make long-term parking disadvantageous in the most attractive locations. Residents with a permanent place of residence can buy a card at a very favourable price which allows them to park there. Generally, such a measure is quite common in cities of the Czech Republic and it is comprehensible for drivers. Residents quite favour paid parking in the centres.

Unfortunately, not even the regulation using the paid parking scheme was able to balance the demand for parking and the supplied number of parking places. Most of the centre area shows a shortage of parking places. This is apparent since all parking places are occupied and vehicles park in the most inconvenient places (parking at road junctions, near pedestrian crossings, etc.). Some streets, especially those neighbouring the streets Vaníčkova, Dlouhá and Stroupežnického, are overcrowded. The capacity of the underground garages near the City Council and under Mírové Square is fully used, unlike the parking building below the Mariánská Rock, the capacity of which is hardly used. Parking in the centre is very often in conflict with legislation (parking at road junctions, close to pedestrian crossings, hindering horizontal clearance, etc.)

Consequently, the paid parking system fails to meet its purpose, i.e. to regulate parking in order to reduce the demand for parking and to make sure the supplied capacity is sufficient. The current situation is far from that, and has the most adverse impact on residents wanting to park their car near the place of their residence. There is a huge risk that commuters will park their vehicles in the streets close to the centre. This increases the problem of insufficient parking capacity, as well as the risk of reduced traffic safety which can extend even to the neighbouring areas (as is already happening near the Městské sady park). There is a lack of motivation to use the parking facilities situated in the more remote edges of the centre which

are still within acceptable walking distance of the centre. The standard of PT serviceability is also relatively high.

ITS elements and dynamic guidance regarding free parking capacity are not available to direct those looking for a parking place. The way in which information on parking options is provided was found to be significantly deficient. This is a problem for drivers who do not often travel to the centre.. The current situation where parking in one street is paid and in another one it is not can be confusing.

7 Proposal for the New Parking Scheme in the City

7.1 Parking Needs of Ústí nad Labem

The completed analysis of the current parking scheme shows that some regulation has been introduced; however, the situation is still not good. The conditions for residents, those regularly commuting and visitors must be improved. The needs of individual users must be taken into consideration in proposing the measures:

- Residents and tenants - request long-term / permanent parking of vehicles in the place of abode without having to look for a free place for a long time.
- Commuters – request a free place quickly available near their workplace, or a PT stop, if they switch to PT to continue their trip. Ideally, they should be able to park vehicles in the same places
- Businessmen, tradesmen – request parking in the place of business / business premises / office to be able to do their business.
- Irregular commuters (random users) – travel by car to get to services, shops, culture, healthcare, etc. They usually need short-term parking near the destination of their trip.
- Visitors of residents – short-term parking near the visited place, exceptionally long-term parking
- Visitors to the city (tourists) – short-term parking in the city centre, easy to find (good navigation using road marking and directing panels).

7.2 Proposed Measures

7.2.1 Proposal for Paid Parking Scheme

The proposed parking system complies with Task 11.3.5 – City centre access control, (Regulace přístupu do centra).

It is necessary to identify the objective of how to eliminate the deficit in the current parking and permanent parking capacity. Basically, there are two options:

- Increase the parking capacity by building new parking garages in the indicated area. They can be built underground taking into consideration the dense development.
- Change the target group – designate parking places for short-term parking, to avoid parking for the whole day or the working hours of the drivers. The parking places would then be designated only for the time necessary to arrange necessary shopping, services, to deal with the authorities and similar short-term needs for trips to the city centre of Ústí nad Labem.

7.2.2 Paid Parking Zones

The optimal solution of how to increase the parking capacity in the city centre of Ústí nad Labem is to build underground garages since there is no sufficient space in the centre for new parking facilities and it is impossible to change the mode in the streets from parallel to diagonal parking due to their lack of width. As a result of these limitations it is necessary to implement the second option - i.e. to change the mode to short-term parking. This option involves eliminating vehicles left by drivers for long-term parking in the streets. Parking, in the streets would be designated for residents and short-term parking of both residents and visitors. Short-term parking would be encouraged by progressive parking rates.

The number of parking places would not be reduced; however, the conditions under which the places could be used would be more stringent. Some drivers would accept the increased parking prices and continue parking in the centre as they do now, but some drivers would find the charges unacceptable and would start looking for a different solution - parking in a different area or a different transport mode. Considering the intention is to reduce the traffic in the city centre of Ústí nad Labem, the ideal solution would be to encourage people to use PT rather than IAT. Generally, high parking prices can reduce traffic load on roadways in the specified area.

However, many drivers would probably look for parking places in neighbouring areas due to the high price of parking in the city. These areas also currently face insufficient parking capacity and they would not be able to satisfy the new demand for parking. Drivers who commute to work by car and usually park their vehicles longer than 8 hours would have the highest requirement for parking, i.e. those for whom parking in the specified area would be the most expensive.

The solution to the spill over of demand for parking is to implement a second parking zone in areas where the spill over is anticipated. Such a zone would preferentially be reserved for residents and other parking places would be paid at a lower rate than those in the central area.

Unambiguous traffic marking should be provided, for example, to indicate paid parking places with blue horizontal marking. This is how paid parking zones are designated in Prague, for example, and this method has also been used in Ústí nad Labem on newly reconstructed roadways.

ZONE I

A paid parking zone with progressive rates (rapidly increasing with time) indicated as ZONE I should be introduced throughout the area identified as the city centre. The zone is designated for parking of residents and short-term parking of non-residents. Zone I is proposed within the area bordered by the following streets: Malá hradební, U Trati Panská, Klíšská, Londýnská, Rooseveltova, Veleslavínova, Hoření (these two streets are not part of ZONE I, as shown in figure 76), Důlce Předmostí, and U Nádraží.

Parking and permanent parking of residents´ vehicles would remain unchanged, which means they would be issued resident cards for households in the area where the paid parking zone is indicated. The parking places in the streets could be indicated as places reserved only for holders of resident cards. This measure would be advisable in places with a high concentration of apartments, i.e. outside tower blocks near Winstona Churchilla and Dlouhá streets. Paid parking would be introduced only on weekdays and on Saturday mornings (similar to the current status).

The road marking could use IP 25a Zone vertical marking with traffic restrictions and depicting IP 13c Car park with parking meter and a supplementary table specifying the rate. To mitigate traffic in the centre, the vertical marking could also indicate sign B 20a. The highest permitted speed (30 km/h) would create a mitigated zone TEMPO 30. The horizontal marking should be in blue .

Within ZONE I it is certainly convenient to keep newly established places for delivery vehicles, see section 8.2.

Figure 68 - Proposed vertical marking for the identified area of the centre (Zone I paid parking)

Figure 69 - Proposed vertical marking for exclusively resident parking in ZONE I

ZONE II

A transitional paid parking zone is proposed at the boundary line between ZONE I and the streets in which parking of vehicles is not paid. The second parking zone - Zone II – is proposed in a relatively large area north of the identified area of the centre along Masarykova Street. Near the chemicals company it is bordered by Zone I and Klíšská, Beethovenova, Koněvova and U Chemičky streets. The premises of the chemicals company do not offer any parking places as this is an industrial business not open to the public (see figure 76).

Resident parking could be permitted in this zone and non-residents would only have a few designated places in each street with a lower rate compared to ZONE I.

Alternatively, ZONE II could have places reserved for residents so as to prevent turning the area into a park and ride facility for drivers commuting to the centre by car (to work or those pursuing a different purpose). It would be designated to satisfy the needs of citizens who have their permanent residence here and to offer residents a parking place, but, at the same time, where non-residents could also park (with a lower rate than in the centre). Paid parking would be introduced only on weekdays and on Saturday mornings (similarly as the current status).

For the traffic marking, the IP 25a vertical marking "Zone with traffic restrictions" depicting IP 13c "Car park with parking meter" and a supplementary plate specifying the rate could be used, or for each section use the IP 13c vertical marking "Car park with parking meter" and a supplementary plate specifying the rate. The horizontal marking should be in blue.

Figure 70 - Proposed vertical marking for the identified area of ZONE II paid parking

Figure 71 - Optional proposal for vertical marking for the identified area of ZONE II paid parking

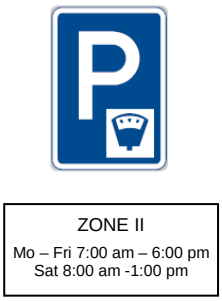


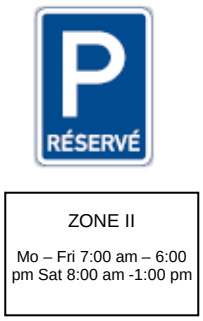
Figure 72 - Proposed vertical marking for exclusively resident parking in ZONE II

Alternatively, should only resident parking be introduced in ZONE II, the IP 25a vertical marking "Zone with traffic restrictions" displaying IP 12 "Restricted parking", or only the IP 12 vertical marking "Restricted parking", both with a supplementary specifying table could be used. The validity of the restricted parking would be specified only for the period of increased demand for parking. It is also necessary to designate places for visitors - IP 13c vertical marking "Car park with parking meter".

Figure 73 - Proposed vertical marking for exclusively resident parking in ZONE II

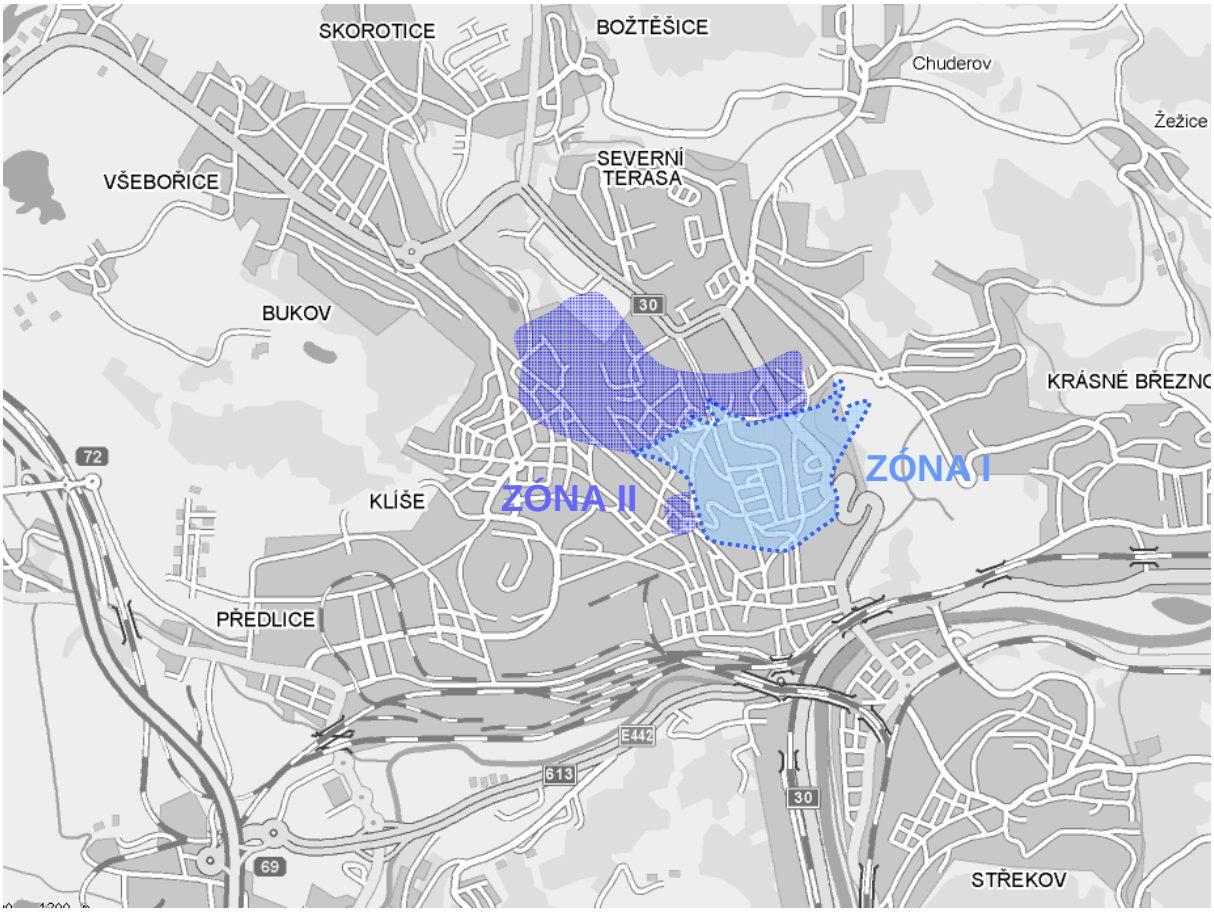
Figure 74 - Optional proposal for vertical marking for exclusively resident parking in ZONE II

Figure 75 - Proposed vertical marking for exclusively resident parking in ZONE II



The proposed location of paid parking zones is shown in the following scheme.

Figure 76 - Map of the proposed parking zones



(Source: www.mapy.cz)

7.2.3 Outskirts P+G facilities

As the report on Task 11.2.3 – Park & Ride Feasibility Study shows, a P+R facility is not a suitable solution for a city of the size of Ústí nad Labem. This is because of the loss of time necessary for travelling by PT from the P+R facility on the outskirts of the city to the centre compared to a trip by private car (including the time necessary to find a place for parking). Nevertheless, how can the shortage of parking places for those commuting to the city centre be resolved?

The answer is to build parking facilities along the circumference of the identified area which would be used as outskirts parking facilities for vehicles of drivers travelling to the city centre of Ústí nad Labem. Drivers would continue from there to reach their destination on foot or by PT. The centre of Ústí nad Labem covers a small area and the location of the proposed outskirts facilities is in close proximity to the centre, so any destination within the identified area is within easy walking distance. For greater distances beyond the physical ability of

individuals, in bad weather or if time is short, drivers can travel by PT. The advantage of this system compared to a P+R scheme, is that all PT lines cross in the central area, so the frequency of services (both bus/trolleybus lines and railway connections) is favourable and the journey to the centre is short. Hence, no time losses occur as with the P+R scheme. With drivers having the opportunity to park their vehicles in the outskirts parking facility and walk to their destination, this system is sometimes called P+G, i.e. from the English Park and Go.

The parking facilities that would be integrated into the P+G system in Ústí nad Labem would either be the current underground garages and parking buildings, or convenient areas for establishing similar, new facilities:

- Current parking facilities:
  - Underground car park near the City Council (176 places)
  - Underground car park below Mírové Square (145 places)
  - Parking building below the Mariánská Rock (426 places)
  - Car park near the Vladimír hotel (63 places, the plan envisages a potential increase in capacity by parking garages)
  - Parking building behind the railway station (106 places)
- Newly proposed parking garages:
  - Underground garage below Lidické Square (anticipated 270 places, current status: building permission issued)
  - Parking building in U Chemičky Street near Tovární Street (anticipated 600 places)*
  - Parking building in U Chemičky Street opposite Špitálské Square (anticipated 870 places)*
  - Parking building at the corner of Revoluční x U Trati Streets (anticipated 290 places)*

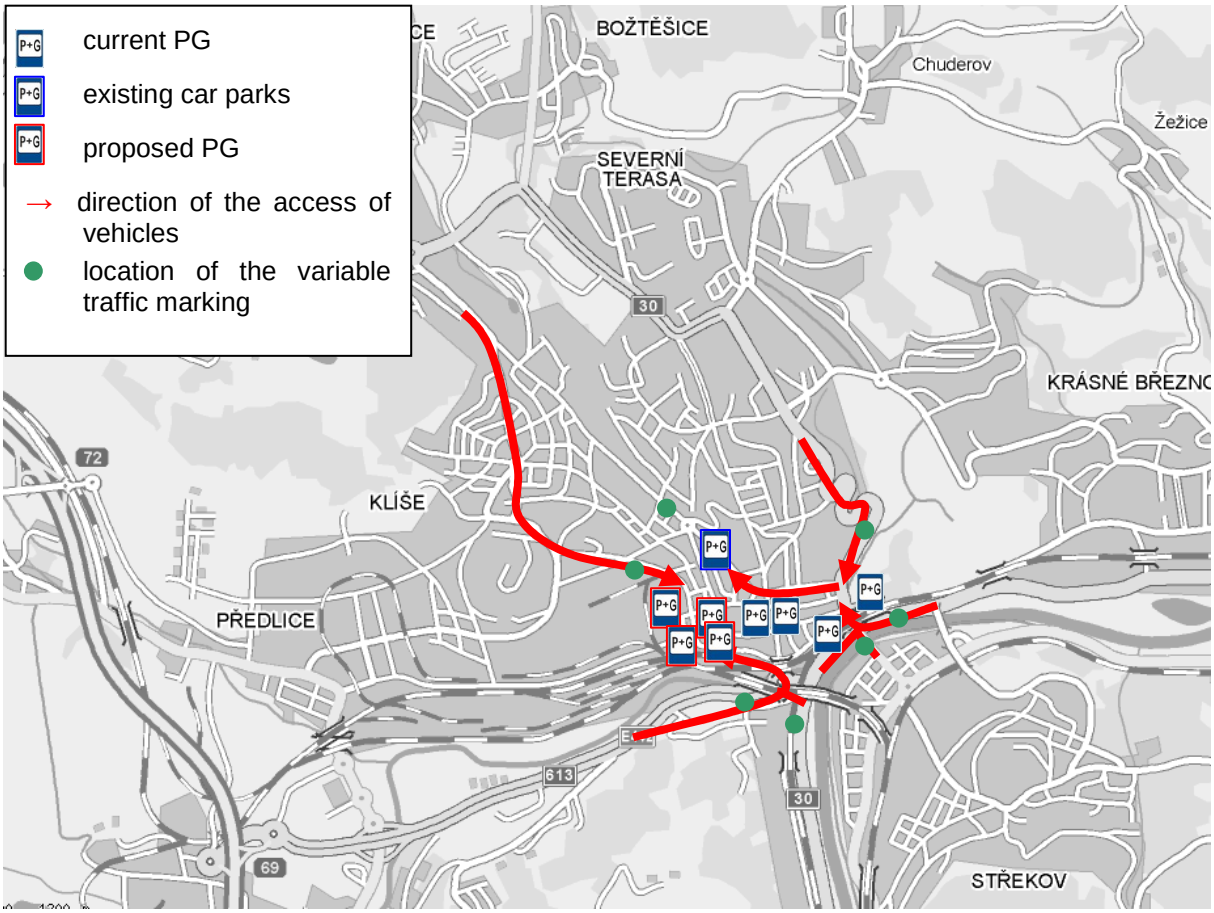
*) These parking garages have been proposed in development areas as specified by the Development Plan, and the structures would not have just one function.. The use of the structures will be multifunctional, e.g. premises for small shops and services. The parking building behind the railway station is directly connected to the station and could be used to park vehicles and continue by train (P+R). The capacity of the proposed parking garages is provisional only.

Access to the parking facilities and parking garages is routed on roadways along the circumference of the identified area, and does not add any extra traffic to the area. The following image shows a schematic drawing displaying the location of the parking garages and other facilities specified for long-term parking.

To make the system work, it is necessary to present it to the public in a proper and comprehensible way. The road marking must be lucid even for visitors to allow them to quickly find directions. What can make the function of P+G facilities on the outskirts of the centre more efficient is variable traffic marking. It would be located on all access roads to the centre and would display the number of free spaces at the nearest P+G facility, or other P+G facilities easily accessible from the point concerned. The variable marking must also display information on the direction to the outskirts parking facilities. Should the capacity of the nearest parking facility be used up, the marking will navigate drivers to the next nearest free P+G facility. The variable marking must be controlled centrally, ideally from a traffic centre that interacts with the occupancy of the parking facilities.

Figure 77 - Proposed vertical marking for identified parking facilities on the outskirts of the centre

Figure 78 – Scheme of P&G parking areas in Ústí nad Labem



(Source: http://mapy.cz)

7.2.4 Summary of Parking Scheme Proposals

To resolve insufficient permanent parking capacity in the city centre of Ústí nad Labem, the system of outskirts parking facilities along the circumference of the identified area of the centre appears to be suitable. Its advantage is that drivers can park their vehicles and all the

destinations in the central area are within walking distance (hence it is sometimes called the "P+G scheme"), or drivers can travel by PT. The benefit of travelling by PT in this system as opposed to the option with P+R facilities is that nearly all bus and trolleybus lines cross in the central area, so the frequency of transport services is very favourable, making the journey to the destination very short. However, to make the system efficient, sufficient parking capacity must be offered, i.e. a number of new collective garages must be built.

P+G facilities are designed for long-term parking of vehicles of drivers who commute to work, people who need to arrange things that require some time and visitors to the city. The system is less comfortable for drivers than parking in close proximity to their destination. However, the vehicles would not block the streets and drivers would not ride through the streets looking for a free place, which would improve the environment in the whole city centre of Ústí nad Labem.

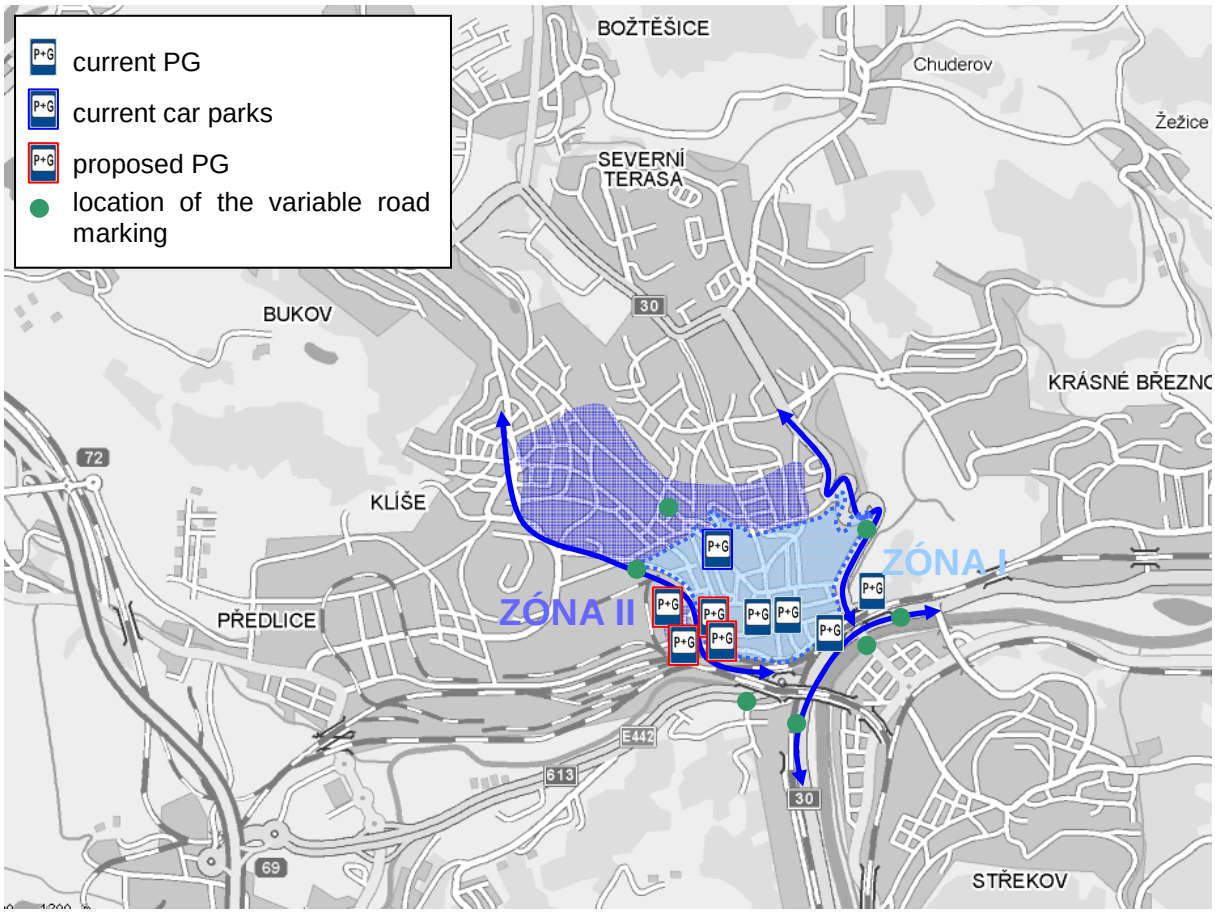
However, to encourage the P+G scheme around the circumference of the city centre it is necessary to introduce paid parking zones. With respect to the considerable deficit of parking places in the streets such places should be reserved mostly for residents and places for short-term parking only. Long-term parking would be shifted to the parking facilities on the centre's outskirts (car parks and parking garages). To prevent spill over of parking vehicles from the centre to the neighbouring areas a parking zone must be introduced in these as well, mostly reserved for residents.

Prices must be set up so that parking in the streets of the inner centre is only advantageous for a short time (e.g. 2-3 hours), as opposed to the long-term parking charges in outskirts car parks and garages which would be considerably more favourable. Price and operating conditions would be unified for both the P+G facilities and parking zones to make access to information easier for the public (one source of information where you can get everything you need).

A system of paid parking of vehicles in the streets is proposed in the identified area. Parking in the streets is now designated for residents and for short-term parking. Therefore, we propose a rate with progressive increments, i.e. the fee does not increase linearly with time but rather exponentially. Paid parking places in the identified area (i.e. all places along roadways and in car parks) should be marked in such a manner so that even an infrequent user would understand that the parking place is paid. Such places should accordingly be marked horizontally in blue, and equipped with parking meters located at such distances and places to ensure they are noticed..

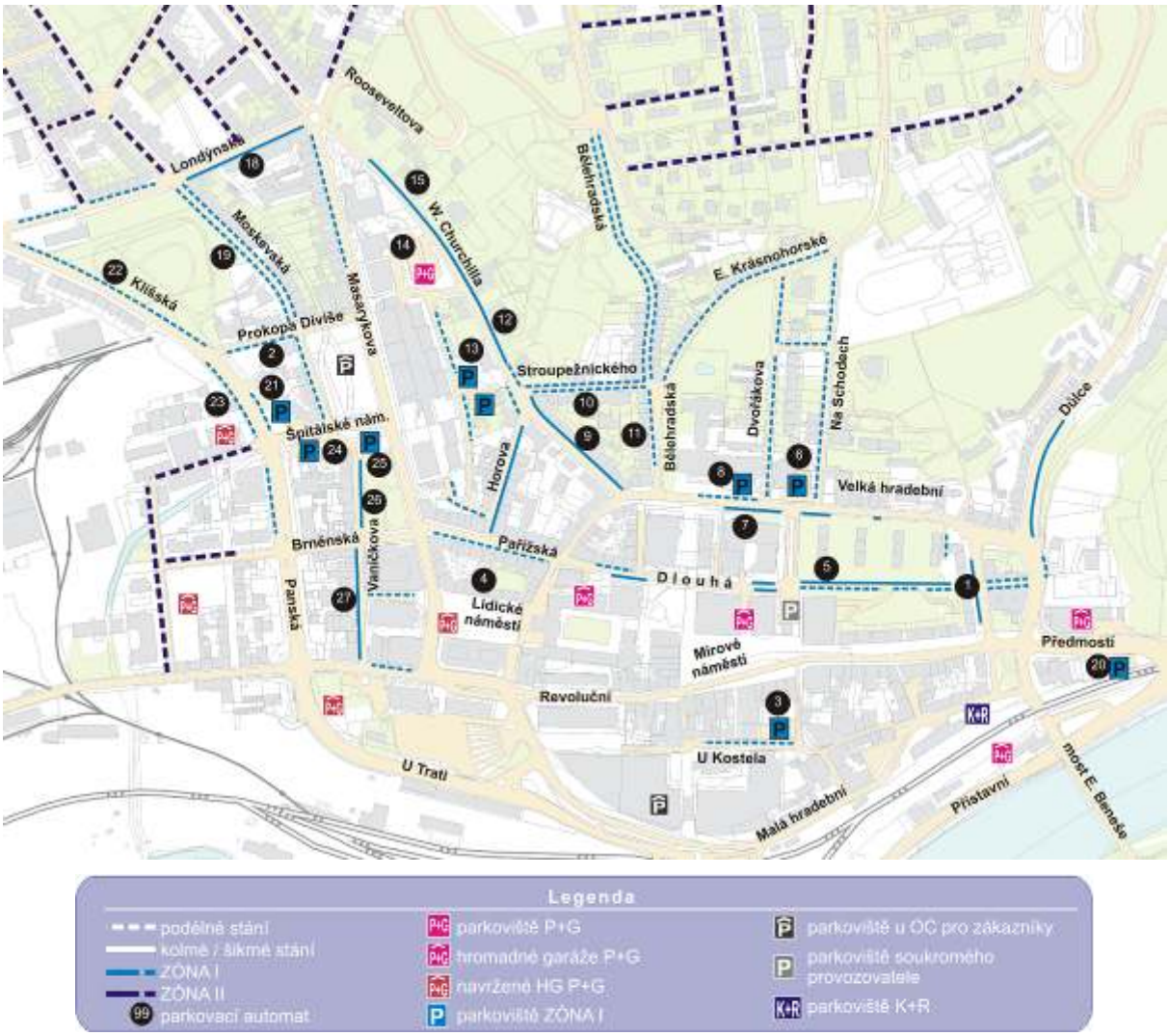
At the same time, we have proposed the so-called P+G outskirts parking facilities (from the English Park and Go) for visitors or commuters (e.g. to work). They are represented by existing public parking garages and car parks, but we have also proposed new structures, since the capacity of the current ones is not sufficient even today. Once the charges for parking in the streets have been modified, increased demand for parking in these outskirts parking facilities can be expected.

Figure 79 - Map of paid parking zones and outskirts P+G facilities



(Source: http://mapy.cz)

Figure 80 - Map of proposed zone system of paid and outskirts P+G facilities



7.2.5 Rates and Payment Methods

To pay the parking fee, drivers would use the existing and newly built parking meters and SMS (mobile phones). Residents and others who are eligible from ZONE I and ZONE II (taxis, company cars, etc.) would be issued parking cards effective for a specified area or the whole area. Paid parking would not have to be introduced for a continuous period of time, parking could be free at weekends, bank holidays and at night – similar to present arrangements. The municipal police would inspect and supervise how parking arrangements are observed. Vehicles parked in conflict with the regulations (parking in illegal /inconvenient places, failure to pay parking fee, etc.) would be towed away, or they would be mechanically prevented from leaving the place (TPZOV - a mechanical device designed to prevent vehicles from departing, the so-called "wheel boot“).

Short-term parking in ZONE I should be encouraged by introducing progressive parking rates, which means that the charged fee for the first two hours would be acceptable for most

of the population, but every subsequent hour would be considerably more expensive. This should encourage drivers to use these places only for short-term parking. Should they want to park their vehicles for longer and more cheaply, they would have to use a different facility.

The progressive rate (in ZONE I) could be as follows (valid from Mo – Fri: 7:00 am – 6:00 pm, Sat: 8:00 am - 1:00 pm):

- 1st hour CZK 20
- 2st hour CZK 25
- Each subsequent hour CZK 50
- (maximum CZK 505 daily).

Taking into account that parking in the streets of the centre is paid and construction and operation of parking garages are very costly, parking in such facilities must be paid. P+G facilities are designated for long-term parking (e.g. during the working hours of drivers), so this should be reflected in the charged fee. It must be financially attractive and favourable for citizens compared to the fee for parking in the streets of the identified area, so that they are motivated to use P+G facilities. The parking prices in the P+G facilities should offer the option of prepaid parking, e.g. a 3-monthly and a 12-monthly card. They would be compatible with all P+G facilities in Ústí nad Labem.

The proposed basic rate for parking in parking garages and P+G facilities (validity: Mon - Sun) is:

- Each commenced hour CZK 5
- All-day parking (24 h) CZK 100
- Weekly prepaid ticket CZK 300
- Monthly prepaid ticket CZK 800
- 6-monthly prepaid ticket CZK 3,500
- 12-monthly prepaid ticket CZK 6,600.

The parking rate in the second zone of paid parking (ZONE II) must be considerably higher than the rate in ZONE I; its validity is also limited to the period from Mon – Sun:

- Each commenced hour CZK 10
- All-day parking (24 h) CZK 100.

The prices of resident parking cards could reflect the current price level. The prices above have been identified upon the current rates, which are well perceived by the public.

The expected effect of the proposed changes to the parking conditions is a reduction in the numbers of vehicles parked in the streets of the city. The vehicles of commuting people will be parked in designated parking garages and P+G facilities situated mostly along the circumference of the inner centre. Navigation of drivers to these parking facilities will be supported by variable road marking that will provide information on the available parking capacity or will direct drivers to another free parking facility on the edge of the city centre. Consequently, the number of vehicles parked in the streets (short-term parking and resident parking) can be expected to fall, but more importantly, trips by vehicles looking for a suitable place for parking and then leaving the central area will be reduced as well.

8 Implemented Tools

8.1 Leaflet on Parking in the City Centre

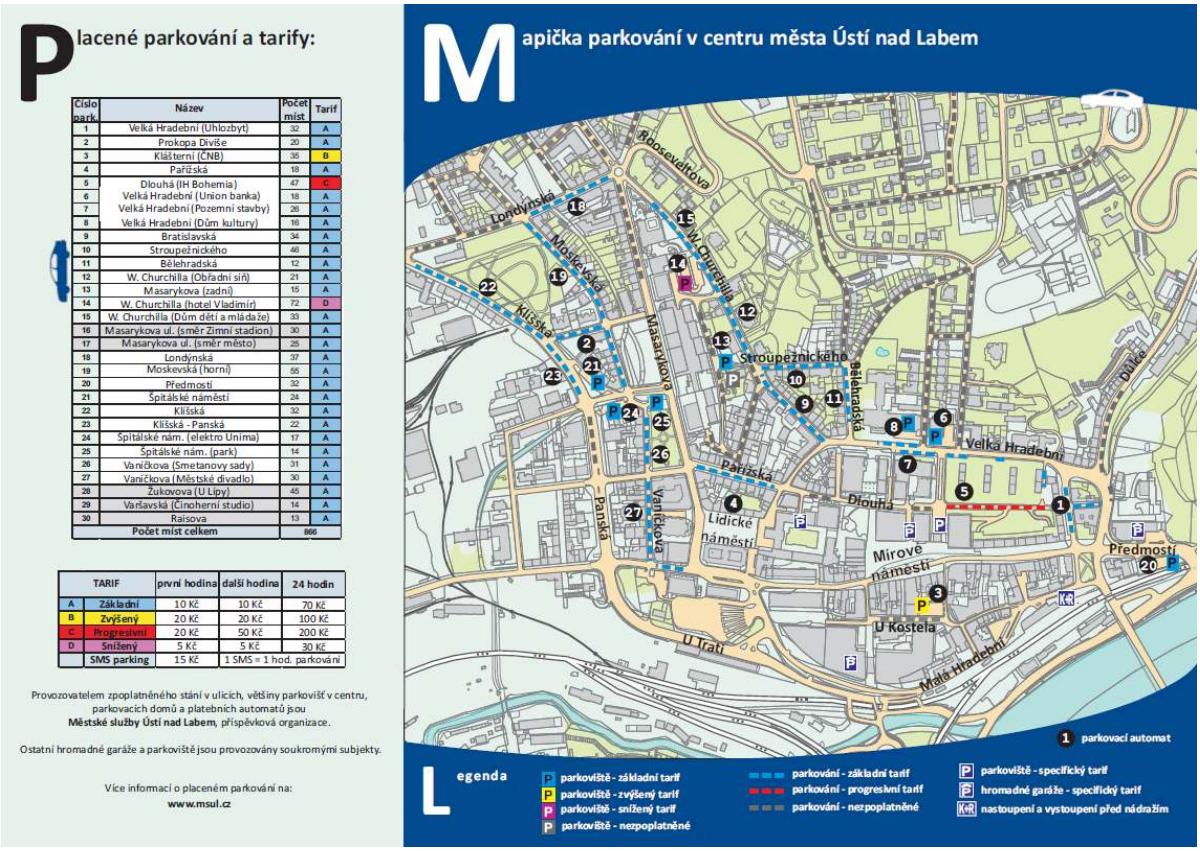
A leaflet within the CIVITAS ARCHIMEDES project was created to give information on parking alternatives. Its objective was to improve the awareness of the public of the current paid parking scheme and also to help visitors to the city. Although the leaflet publicises the existing scheme (not the proposed new scheme), it helps to address the current deficiencies in provision of public information on parking arrangements. This leaflet could be adapted in future in order to publicise the proposed new scheme.

The leaflet contains the following information:

- names of the streets with paid parking
- list of the parking garages
- table of current rates in the streets and the parking garages,
- payment method of the parking fee (parking meter, SMS payment),
- information on towing of illegally parked vehicles,
- map of parking in the centre displaying sections of paid parking and current rates.

The leaflet is being distributed to the public at promotional events and it is available in the city information centre as well as in other official public places.

Figure 81 - Information leaflet on how to park in the city centre



Placené parkování a tarify:

Číslo park.	Název	Počet míst	Tarif
1	Velká Hradební (Uhlozbyt)	32	A
2	Prokopa Diviše	20	A
3	Klášterní (ČNB)	36	B
4	Pařížská	18	A
5	Dlouhá (IH Bohemia)	47	C
6	Velká Hradební (Union banka)	18	A
7	Velká Hradební (Pozemní stavby)	28	A
8	Velká Hradební (Dům kultury)	16	A
9	Bratislavská	34	A
10	Stroupežnického	46	A
11	Bělehradská	12	A
12	W. Churchilla (Obřadní síň)	21	A
13	Masarykova (zadní)	15	A
14	W. Churchilla (hotel Vladimír)	72	D
15	W. Churchilla (Dům dětí a mládaže)	33	A
16	Masarykova ul. (směr Zimní stadion)	30	A
17	Masarykova ul. (směr město)	25	A
18	Londýnská	37	A
19	Moskevská (horní)	55	A
20	Předmostí	32	A
21	Špitálské náměstí	24	A
22	Klíšská	32	A
23	Klíšská - Panská	22	A
24	Špitálské nám. (elektro Unima)	17	A
25	Špitálské nám. (park)	14	A
26	Vaníčkova (Smetanovy sady)	31	A
27	Vaníčkova (Městské divadlo)	30	A
28	Žukovova (U Lípy)	45	A
29	Varšavská (Činoherní studio)	14	A
30	Raisova	13	A
	Počet míst celkem	866	

	TARIF	první hodina	další hodina	24 hodin
A	Základní	10 Kč	10 Kč	70 Kč
B	Zvýšený	20 Kč	20 Kč	100 Kč
C	Progresivní	20 Kč	50 Kč	200 Kč
D	Snížený	5 Kč	5 Kč	30 Kč
	SMS parking	15 Kč	1 SMS = 1 hod. parkování	

Provozovatelem zpoplatněného stání v ulicích, většiny parkovišť v centru, parkovacích domů a platebních automatů jsou **Městské služby Ústí nad Labem**, příspěvková organizace.

Ostatní hromadné garáže a parkoviště jsou provozovány soukromými subjekty.

Více informací o placeném parkování na:
www.msul.cz

Mapička parkování v centru města Ústí nad Labem

8.2 Parking Places for Supply Vehicles

The Transport Department of the City Council of Ústí nad Labem is the administration authority of local roadways. In cooperation with the Police of the Czech Republic it has been implementing measures to introduce order in supplying businesses situated in the city centre. At the moment, places which should be used for delivery vehicles are occupied by private cars, so deliveries can only be provided from "the second row", which negatively affects the flow and safety of traffic. Places for delivery vehicles have already been introduced near the Forum mall and in the area of Mírové Square.

Thanks to the CIVITAS ARCHIMEDES project, 6 more places for direct delivery in individual streets have been introduced. They allow time restricted parking of vehicles to a maximum of 30 minutes. The ARCHIMEDES CIVITAS project funded the cost of establishing the parking places.

The parking places have been designed in streets with many shops. These places have been indicated using both horizontal and vertical traffic marking. Delivery vehicles must be equipped with a parking disc. Considering the local conditions and the anticipated use of the parking designated for delivery vehicles, the places have been designed to suit the size of 1 – 2 vehicles of N1 category, i.e. a small lorry.

Owners or operators of the adjacent shops were distributed with clock discs. The driver of a delivery vehicle must place the clock disc on display behind the front windscreen and indicate the time of arrival.

Delivery parking places have been established in the following locations:

Figure 82 - Parking places for supply vehicles - Masarykova Str. (near the road junction with Londýnská Str.)

Figure 83 - Parking places for supply vehicles Masarykova Str. (near the Police of the Czech Republic)

Figure 84 - Parking places for supply vehicles Masarykova (near the theatre)

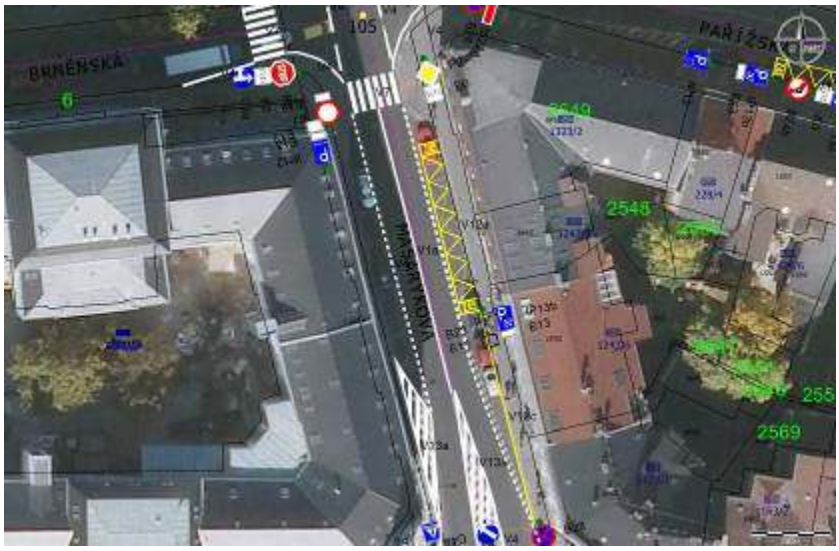
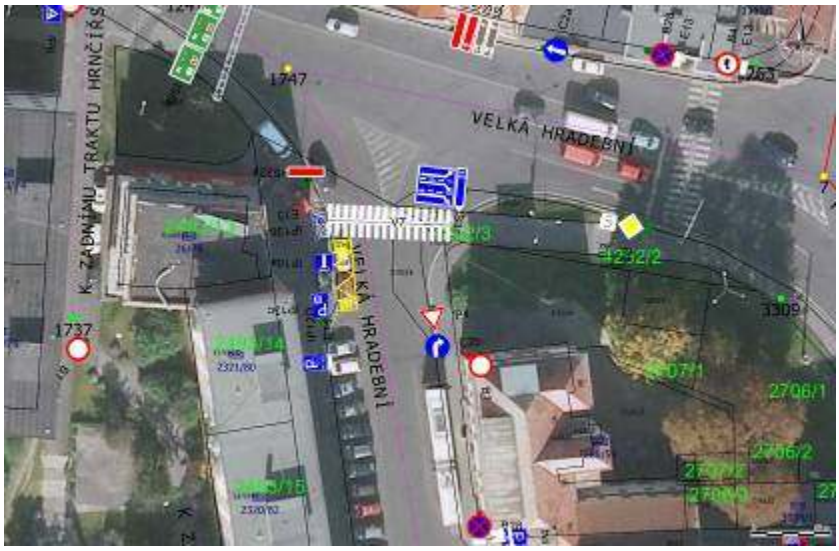


Figure 85 - Parking places for supply vehicles (Pařížská x Masarykova street)

Figure 86 – Parking places for supply vehicles (Pařížská x Velká hradební)

Figure 87 – Parking places for supply vehicles (Velká hradební x Předmostí)



9 Conclusion

The parking scheme issue is quite extensive and the solution is not easy. There are numerous existing parking methods in other locations. Each is beneficial in some way, but also has disadvantages. Only a few are suitable for the situation in Ústí nad Labem. The process of determining the parking strategy in Ústí nad Labem means looking for optimum instruments via compromises between the parking scheme, traffic, PT and public opinion. It also involves devising a technical solution and conveying information to the public including organising a massive advertising information campaign. Even the best system will not work efficiently without good promotion and thus it would not be as beneficial as the city expected. The city must also cooperate with the Police of the Czech Republic and the Municipal Police of the Corporate City of Ústí nad Labem. Inspections and penalties can eliminate parking of vehicles in illegal places. Vehicles parked in such places impede vision, posing a risk to traffic safety and hinder the flow of traffic.

We have conducted an analysis of the parking scheme in the centre of other Czech cities within this task. We have also conducted a detailed transport survey to understand the shortcomings and problems of parking in the central area. Based on the findings we have proposed a possible solution to the parking scheme in the city centre. It involves establishing zones of paid parking and a system of high-capacity parking garages to allow parking for regularly commuting people.

The solution to the parking scheme in the city centre requires that the following conditions be met:

- High-quality public transport
- Awareness of the population
- To ensure parking for those commuting to the centre (proposed P+G scheme),
- To increase parking capacity by building new parking garages.

Only after that will it be possible to introduce paid parking zones. They must be designated unambiguously and comprehensibly.. The measures implemented in the centre must be accompanied with measures in its close neighbourhoods to prevent undesirable spill over of parking vehicles to these neighbourhoods. It is also necessary to allow activities of citizens in the centre that require travelling by car, so it is not possible to ban vehicles from the centre completely; there must be some parking facilities in the centre.

There were two practical outputs of this task. Firstly, information leaflets have been prepared and published that explain the current system of paid parking in the city centre. They provide basic information on the method of payment and rates and they contain a lucid map displaying the parking facilities. The leaflet is being distributed to the public and is beneficial for both tourists and local people, especially irregularly commuting drivers.

Secondly, places for delivery vehicles have been established. The places are identified using vertical and horizontal marking and are designated only for vehicles supplying shops. Shopkeepers have been instructed on the regulations and they should convey the information to their suppliers.

To improve the parking scheme in the city centre, Ústí nad Labem must necessarily invest an essential amount of money to increase the number of parking places. With respect to the

limited free space in this developed area, the only possible way is to build parking garages. Unfortunately, without investing in such facilities the situation cannot improve; ,nor can the city consider the efficiency of the measures in the near future.

10 References

[1] ČSN 73 6110 - Design of local roadways.

[2] ČSN 73 6056 Permanent parking and parking areas for vehicles

[3] Act No. 361/2000 Coll., Road traffic

[4] Alameda county transportation commission: “Traffic demand management”, chapter 10;

[5] Litman Todd, Victoria Transport Policy Institute: “Parking management: strategies, evaluation and planning”, 4/2006;

[6] Wacker – Pastor: “Psychological aspects of illegal parking”, 2005;

[7] Stienstra Sjoerd: “Who benefits from free parking?”, 12/2005;

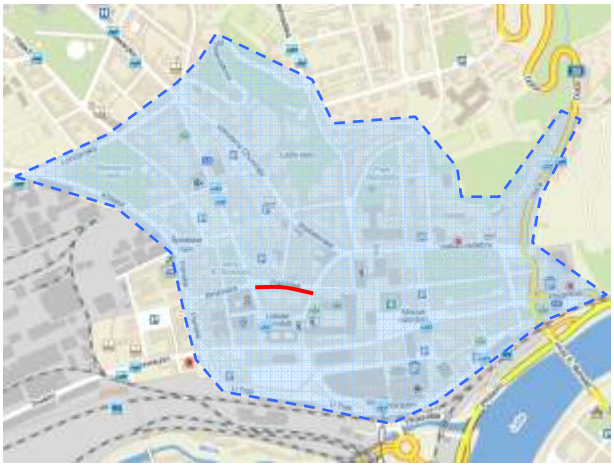
[8] Martens (ECORYS) – Luipen (KpVV): “To a better future with a motivated parking tariff”, 6/2009.

Annex 1) Parking Survey at Individual Streets in the Centre of Ústí nad Labem

Characteristic roadway profiles – streets are considered individually in the area covered.

Pařížská Street

Figure 1 – Pařížská Street



(Source: mapy.cz)

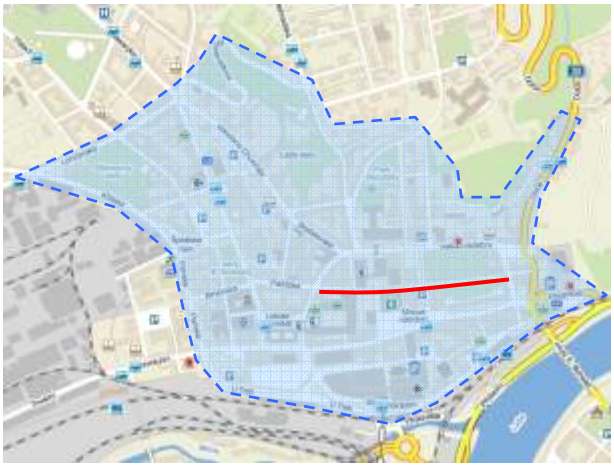
Pařížská Street is an important two-way and two-lane roadway. Together with Velká hradební Street it represents a transit thoroughfare through the city centre. The adjacent road junction of Pařížská x Masarykova x Brněnská Streets has no traffic lights. The road is very busy and there are also many pedestrians. It is situated in the core of the centre – in close proximity to services, authorities and apartments in an older development.

The street has parallel parking on the southern side in the marked parking lane (vertical and horizontal marking). The situation is well-arranged considering the parking scheme.

Figure 2 and 3 – Situation in Pařížská Street

Dlouhá Street

Figure 4 - Pařížská Street



(Source: mapy.cz)

The section from Pařížská Street towards the Bohemia hotel is a one-way drive through street. In the section between the road junctions with Pařížská and Pivovarská Streets, the street features parallel parking on the northern side (of which 8 places are restricted for delivery vehicles), on the southern side the parking is perpendicular in the parking bay (2 places restricted for disabled people and 5 places restricted for the Czech Police). There is vertical and horizontal marking, but rather timeworn. The street features an entry to the parking garages under the City Council.

Outside the ZDAR shopping mall there are 8 restricted places for supplies and deliveries to the mall on the footpath on the southern side of the street. There is vertical marking and a mechanical bar preventing undesired parking. In the lane between the Regional Office of the Ústí Region and the Revenue Authority, there are 3 places restricted for the Revenue Authority, designated by vertical marking.

Before the road junction of Dlouhá Street and the connecting road to Velká Hradební Street (near the Bohemia hotel), there are parking bays for perpendicular spaces on both sides. On the northern side the parking places are only for permits issued by the Regional Office. These places are also designated by vertical marking. Horizontal marking is rather timeworn or hardly visible. From this street there is access to the parking garages underneath Mírové Square.

Figure 5 – traffic situation in Dlouhá Street (section Pařížská Str. – Zdar shopping mall)

Figure 6, 7, 8 and 9 – situation in Dlouhá Street (section from Zdar SM to the Bohemia hotel)

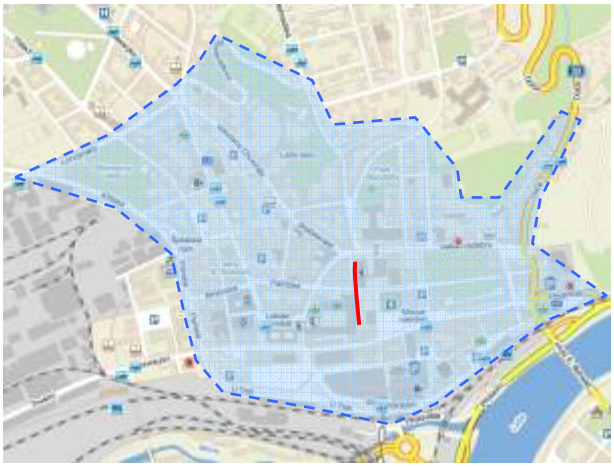
This two-way street cannot be driven along in the section from the connecting road to Velká hradební Street towards the blocks of flats. On the southern side parking is parallel; on the northern side there is a parking strip for perpendicular parking (only vertical marking). The parallel parking makes the roadway narrower but this section is of a low transport importance so the limited parallel parking is acceptable. Ambulances or fire brigade vehicles can drive

through. A public car park has been established at the Bohemia hotel, operated by a private entity.

Figure 10 – situation in Dlouhá Street (section from the Bohemia hotel towards the interior block)

Pivovarská Street

Figure 11 – Pivovarská Street



(Source: mapy.cz)

The street has limited transport importance, vehicles cannot drive down the street from either side, there is parking on both sides and it is used to provide transport services to the adjacent buildings. In the northern part parking is permitted for local organisations (vertical marking and rather timeworn horizontal marking); in the rear part there is a gate and parking is only allowed for vehicles with city permits (vertical marking). In the southern part of the street there is a mitigated zone offering spaces for the Department of Social Affairs (vertical

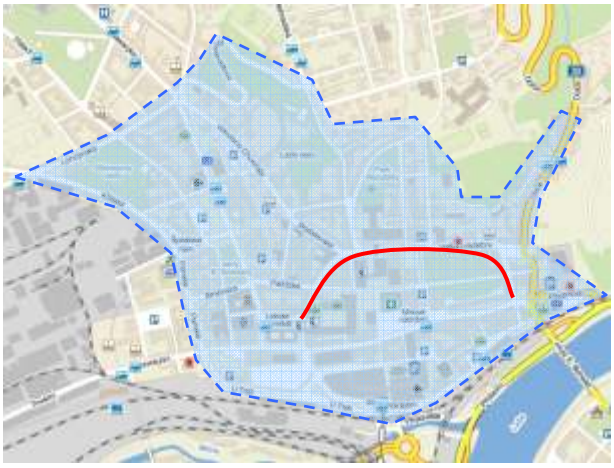
marking) and the gate of an automatic parking system operated by a private entity for the public.

In the southern part of the street vehicles often park in places not designated for parking – no vertical marking or horizontal marking is indicated there. Two-way traffic is impossible here due to the width of the street. Parked vehicles do not represent a bottleneck for traffic since the importance of the street is low.

Figure 12 and 13 – Pivovarská Street

Ulice Velká hadební

Figure 14 – Velká hradební Street



(Map resource: mapy.cz)

Velká hradební Street is a two-way, double-lane road. It is very important, except for the section between Hrnčířská - Důlce Streets (together with Pařížská Street it is the radial road running through the city centre). The roadway has been repaired recently and has been

provided with a pedestrian crossing and a traffic island. The street is very busy with pedestrians.

The section of the streets Hrnčířská – Důlce is relatively quiet. It is a two-way road, with a parking bay for perpendicular parking on its western side. One vehicle can be parked in parallel on the eastern side and back-up trolleybuses and buses of the Transport Company of Ústí nad Labem a. s. are parked here as well.

Figure 15 – Velká hradební Street in the section Hrnčířská - Důlce

Several small parking bays for perpendicular parking are situated in the section of Velká hradební Street between the road junctions with Důlce and Dvořákova Streets. Two car parks are located on the opposite side, with one being reserved for the National House and the second one having 50% of the parking area reserved for a private organisation and the remaining 50% being available to the public. The painted marking is both horizontal and vertical.

Figure 16 and 17 – Velká hradební Street in the section Důlce – Dvořákova

On the northern side of the street near the House of Culture there is a parking bay for perpendicular parking and parallel parking near the pedestrian crossing. On the southern side there is a parking strip for perpendicular parking. The painted marking is both horizontal and vertical. A parking facility is situated directly outside the House of Culture.

Figure 18 and 19 – Velká hradební Street in the section near the House of Culture


Figure 20 and 21 – Velká hradební Street – car park near the House of Culture

There is a residential zone between Pařížská and Revoluční Streets; entry is only permitted for transport services. The residential zone offers several perpendicular parking places restricted only to permits issued by the City Council. The road marking is vertical. A great problem is that the demand for parking in this section exceeds the supply and drivers often leave their cars in the area not designated for parking – see, for example Figure 24,

Figure 22 and 23 – Velká hradební Street - section at the City Council

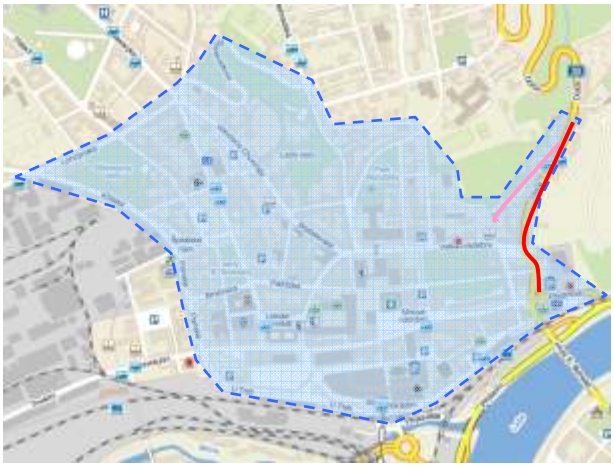

Figure 24 – Velká hradební Street – section at the City Council (illegal parking)

A parking facility is situated at the end of Velká hradební Street near the road junction with Revoluční Street. All parking places are designated solely for the transport company, the Police and other organisations in this car park.

Figure 25 – Velká hradební Street – car park near Revoluční Street

Důlce Street

Figure 26 – Důlce Street



(Source: mapy.cz)

This is an important urban arterial road running along the centre circumference. The residential buildings on the western side are brick structures, the eastern side features wild greenery and some small technology and commercial structures.

Four parallel parking places are situated on the left near the road junction of Důlce x Velká hradební Streets. There is no horizontal marking. The parking places are located at a busy road junction controlled by traffic lights. There are also building entries. However, parked vehicles do not hinder the range of vision of the traffic at the road junction. There are also parking places in the section from the road junction towards the north on the eastern side. The parking is perpendicular in a parking strip. The surface of the strip is not compacted and parking is not marked. Vertical marking indicating parking places reserved for local organisations is situated on the same side.

Figure 27 – Důlce Street– parking at the Důlce x Velká hradební road junction

Figure 28 – Důlce Street – parking in the northern part of the concerned section

There is the option of parking / permanent parking in some yards of the adjacent houses upon the approval of the property owners. Behind the houses there is a tertiary roadway, which is not a through road and is only used as an access road to the row of garages and parking places in the interior block. This capacity is devoted to residents living in the adjacent buildings.

Figure 29 and 30 – Důlce Street – parking in the interior block

Dobětická Street

Figure 31 – Dobětická Street

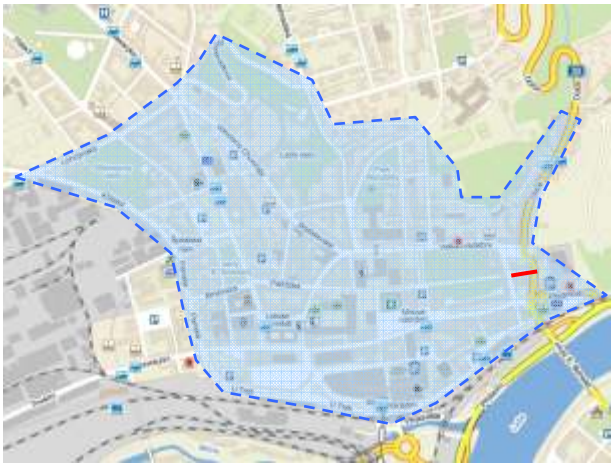
(Source: mapy.cz)

Dobětická Street is not a through road (the restriction on entry was imposed due to an important landscape object). It is a narrow, two-way tertiary road. The street is only used to provide transport services in the location. A parking facility with an unpaved surface is situated by the road, only designated for the residents living nearby.

Figure 32 – Dobětická Street

Spojovací Street

Figure 33 – Spojovací Street



(Source: mapy.cz)

Spojovací Street is a two-way road but is not a through road. Parallel parking is indicated on both sides using vertical and horizontal marking – on the southern side the parking places are partially on the footpath, on the northern side there is footpath parking only. All places are designated for permits issued by the financial authority. Parked vehicles considerably limit the horizontal clearance of the street, but in any case, the clearance for ambulances or fire brigade vehicles is not affected.

Figure 34 – Spojovací Street

Předmostí Street

Figure 35 – Předmostí Street

(Source: mapy.cz)

Předmostí Street is an important arterial road connecting the city centre with the I/30 and I/62 roads. It is also important for transport in the city since it is an access road to the bridges across the River Elbe. It is a two-way road with designated traffic lanes near the road junctions.

The most important parking facilities are the parking garages below the Mariánská Rock (near the petrol station). This is an above-ground multi-storey structure operated by Municipal Services. The structure is situated on the northern side of the road. A public car park with a paved surface is situated opposite, across the street. A private structure is situated nearby offering parking for approximately 20 small lorries.

Next to the post office there is a small paved area used by vehicles servicing the ramp. In any case, this area and the adjacent footpath are used for parking vehicles – see *Figure 38*. Parking is illegal here as the standing vehicles hinder pedestrians. They do not block traffic.

Figure 36 – parking garages below the Mariánská Rock

Figure 37 – car park opposite the parking garages

Figure 38 – illegal parking near the post office

Hrnčířská Street and Mírové Square

Figure 39 – Hrnčířska Street

(Source: mapy.cz)

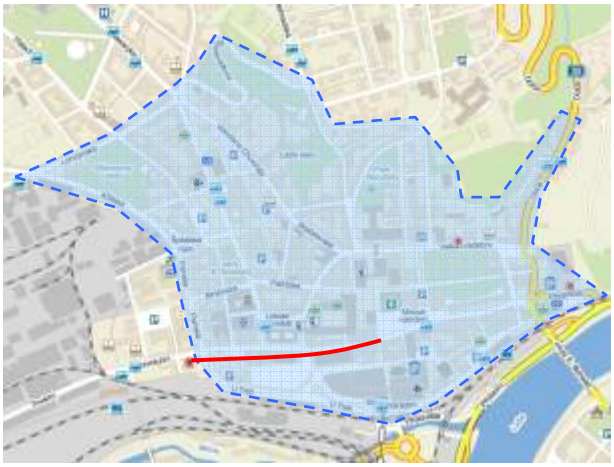
Hrnčířská Street directly connects to Mírové Square, which is the core city centre with a very high density of pedestrians. The profile of the roadway is identical in both Hrnčířská Street and on Mírové Square. It is a two-way road with two lanes and entry is permitted only to vehicles providing transport services. The roadway has recently been reconstructed. Many PT lines are routed here with central change points, which makes this part of the road the most important PT corridor.

There are no parking places in this section. 5 parking places have been established only for taxi vehicles on the northern side on Mírové Square.

Figure 40 – Hrnčířská Street

Revoluční Street

Figure 41 – Revoluční Street



(Source: mapy.cz)

Revoluční Street is the direct continuation of Hrnčířská Street and is situated in the very city centre. It is a two-circle, two-way roadway without centre lines. A number of PT lines are routed along the street with a central interchange point.

The section from Mírové Square to the road junction of Revoluční x Malá hradební Streets has the same profile as the roadway in Hrnčířská Street. Entry is also permitted only for transport services. No parking places have been established in this section.

Figure 42 – Revoluční Street– the section between Malá hradební Street – Mírové Square

The next section near the bus station (between the road junctions of Malá hradební Street and Masarykova Street) has introduced entry only for transport services. This is a two-lane roadway with traffic islands for pedestrians at the zebra crossings, and traffic lanes with marked directions. This part features a bus stop in the bay on the northern kerb of the roadway and a bus stop in the traffic lane on the southern kerb. The lane is wide enough to allow vehicles to drive round standing trolleybuses/buses. Parallel behind the traffic island runs the second half of the roadway featuring PT stops next to the adjacent bus station and

places for permanent parking of PT vehicles. This is a very important part with most PT lines in the city crossing. There is also a heavy flow of pedestrians.

No parking facility has been established here. The bay designated for bus stops on the northern side of the roadway is used by drivers for parking (up to 5) since this stop is only used for PT in some seasons. Parked vehicles impede the visibility in the section and make it difficult for people not knowing the local situation and trying to find directions.

Figure 43 – Revoluční Street – section near the bus station

Figure 44 – Revoluční Street – parking in the bus stop bay

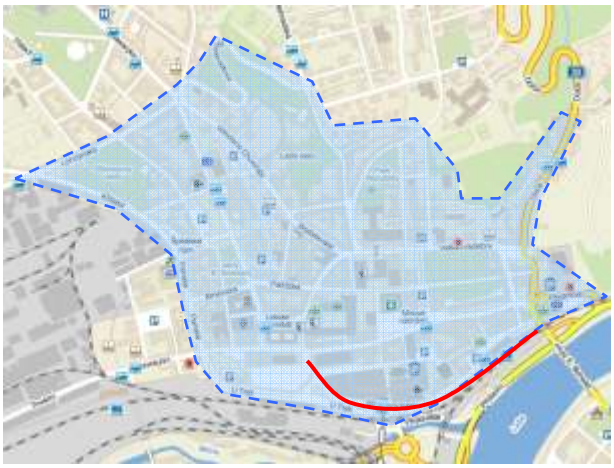
Revoluční Street is a two-way roadway with two lanes. Entry is not restricted in the section between Masarykova – Panská Streets. Entry is not permitted for trucks except delivery / supply vehicles. The northern side of the roadway features parallel parking places. Perpendicular parking places are marked on the southern side outside the ČSSZ (Czech Social Security Administration). They are situated on private land. Permits are issued for specific vehicles upon the owner´s decision. Next to the Czech Social Security Administration (ČSSZ) there is a car park (vertical and horizontal marking) entirely for the needs of the ČSSZ and the company Četrans a. s..

Figure 45 a 46 – Revoluční Street– Masarykova - Panská Streets section

Figure 47 – Revoluční Street – car park near the ČSSZ

Malá hradební and U Nádraží Streets

Figure 48 – Malá hradební and U Nádraží Streets



(Source: mapy.cz)

The section next to the Forum shopping mall is a two-way road with two lanes without any restrictions on entry, and it also features a bus-stop bay for PT. The roadway has recently been completely reconstructed. Parking is only provided in the parking garages in the shopping mall. This facility is designated for mall customers.

Figure 49 – Malá hradební Street

U Nádraží Street links to Malá hradební Street. This is a one-way road with two lanes and the PT stops outside the railway station, the engineering design having a preference for PT vehicles. Outside the railway station the flows of pedestrians are very heavy. The street crossing is controlled by traffic lights. A parking facility, with entry permitted only for vehicles of the Czech Railways, is situated on the northern side opposite the PT stops (horizontal and vertical marking) and there is a small car park near the road junction of U Nádraží Street x Hradiště Street, with vertical marking indicating 2 places reserved for 2 vehicles of the Czech Police. Other parking places using horizontal marking have not been indicated, although there is space to allow approximately 5 parking places.

Directly outside the railway station next to the entry to the fenced area of the station, there is a space used for parking. The vertical marking prohibits entry (B 1 vertical marking) "except for customers of Czech Railways" (E 12 vertical marking),. There is also Waiting Prohibited marking (B 29 vertical marking). Actually, the area has a similar function as a P+K facility (designated for dropping passengers off or picking them up). Unfortunately, vehicles park here much longer than the time necessary for waiting or unloading / loading the vehicle and picking passengers up / dropping them off.

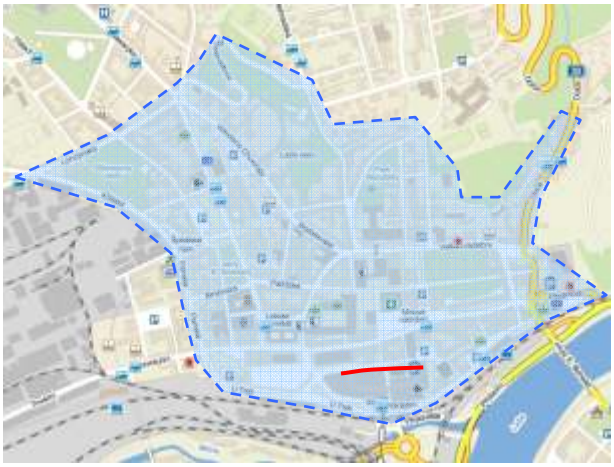
Figure 50 – U Nádraží Street – car park reserved for Czech Railways

Figure 51 – U Nádraží Street – car park near the road junction with Hradiště Str.

Figure 52 – U Nádraží Street – improvised P+K facility

U Kostela Street

Figure 53 – U Kostela Street



(Source: mapy.cz)

The street has been considerably changed in terms of traffic with the construction of the nearby shopping mall. In the section of Malá hradební – Bílinská Streets traffic is mitigated to allow the flow of pedestrians. Traffic is allowed in the remaining part of the street in two ways. The transport importance of the roadway is low (the section near the church permits entry only to transport services). It is used to supply local shops and access to the public car park. Both vertical and horizontal marking is clear and well-arranged.

U kostela Street has reserved perpendicular parking places for the vicarage and a parking strip for perpendicular parking on the opposite side.

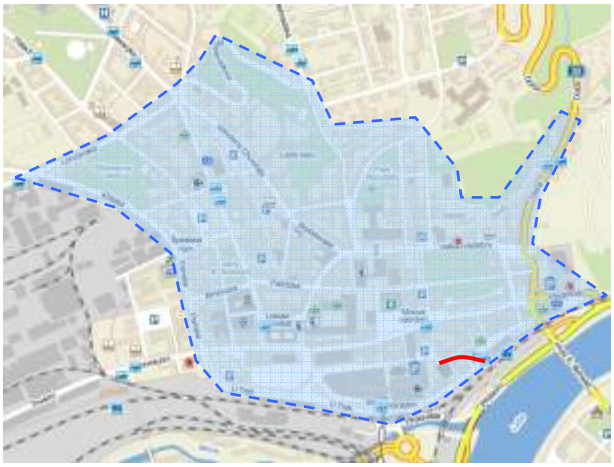
Figure 54 a 55 – U Kostela Street – seaction outside the church

In the remaining part of the street between the road junctions of F. Pulíře and Klášterní Streets there is a larger car park (vertical marking) and a parking lane with parallel parking spaces (horizontal marking).

Figure 56 a 57 – U Kostela Street – section between the road junction of F. Pulíře and Klášterní Streets

Hradiště Street

Figure 58 – Hradiště Street

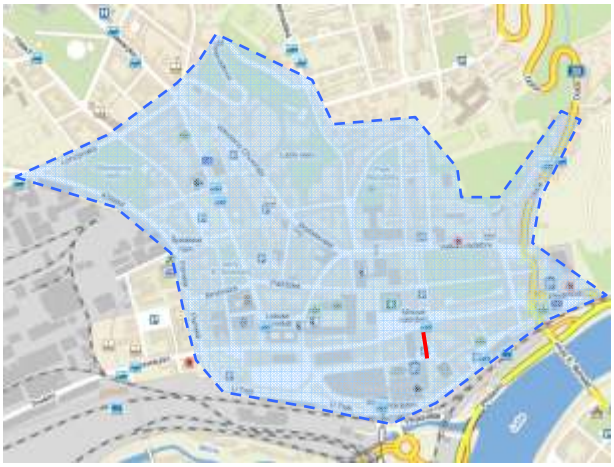


(Source: mapy.cz)

This is a one-way street, without limited transport importance, only used for the transport services of the location. There are no parking places for the public. Parking is possible outside some buildings, usually for residents´ vehicles and in private grounds – in yards.

Klášterní Street

Figure 59 – Klášterní Street

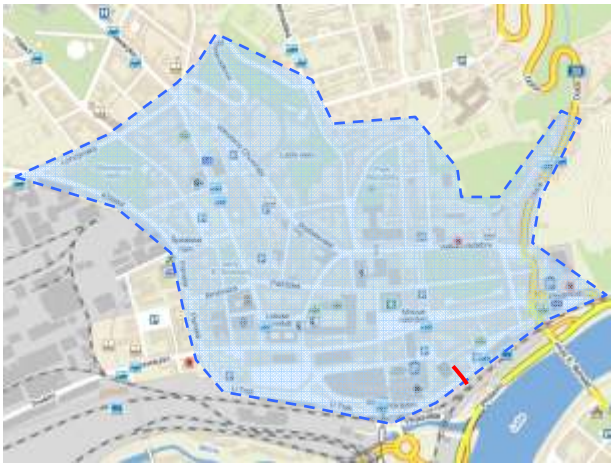


(Source: mapy.cz)

The street has a low transport importance, used only to serve and supply the location. Parking is available in private grounds and is restricted; the public is not permitted.

Vojtěšská Street

Figure 60 – Vojtěšská Street



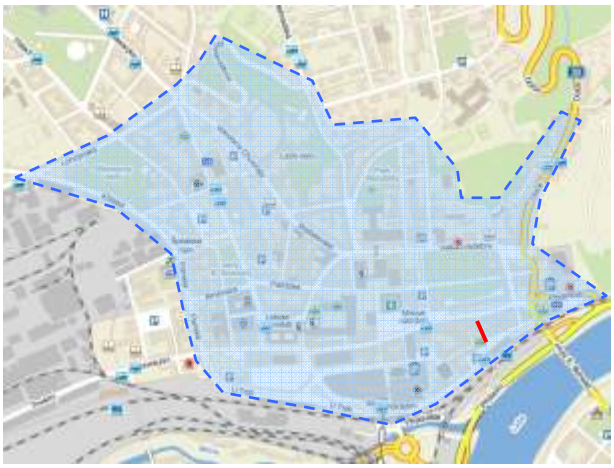
(Source: mapy.cz)

Vojtěšská Street is a two-way street. Entry is not prohibited. It is important only as a roadway to supply and serve the location. Parking places are only situated in private grounds, so they are not available for the public.

Figure 61 – private parking in Vojtěšská Street

V Jirchářích Street

Figure 62 – V Jirchářích Street



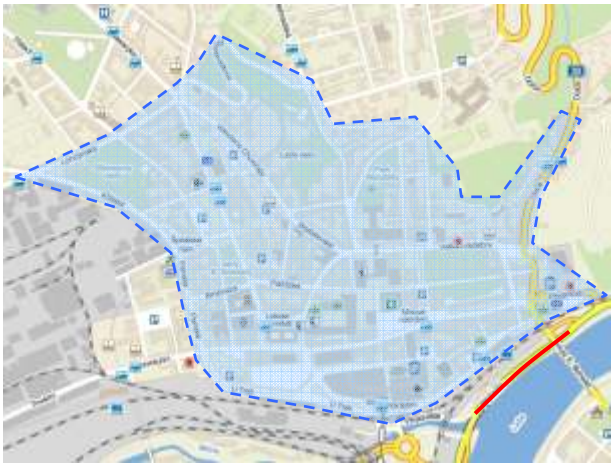
(Map resource: mapy.cz)

This is a two-way street. Entry is only permitted for transport services. Parking has not been established here. The free area is only used by local residents due to the entry restriction.

Figure 63 – V Jirchářích Street

Přístavní Street

Figure 64 – Přístavní Street



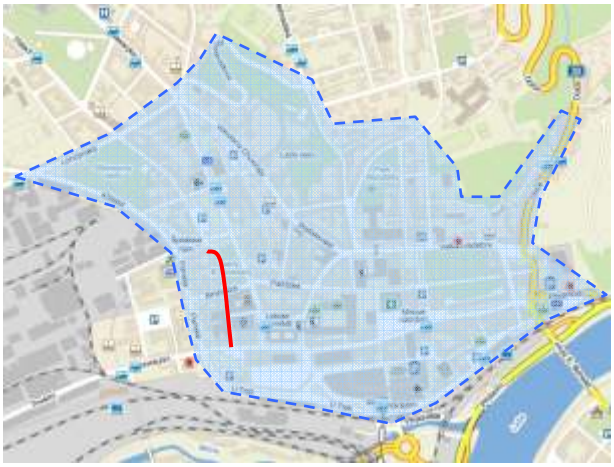
(Map resource: mapy.cz)

An important part of the I/30 arterial road runs along Přístavní Street. It is a two-way road, with four lanes along most of its length, which has been considerably reconstructed. Driving on the roadway is not restricted. Parking is provided in the parking garages behind the railway station, opened to the public in spring 2011.

Figure 65 – Přístavní Street with a view of the parking garages

Vaníčkova Street

Figure 66 – Vaníčkova Street



(Map resource: mapy.cz)

It is a one-way street without any restrictions on entry. A car park (with high-quality vertical and horizontal marking) is situated in the northern part between Vaníčkova and Masarykova streets. The section between Špitálské Square and Brněnská Street features a parking bay for diagonal parking with both vertical and horizontal painted marking.

Figure 67 – Vaníčkova Street – northern part

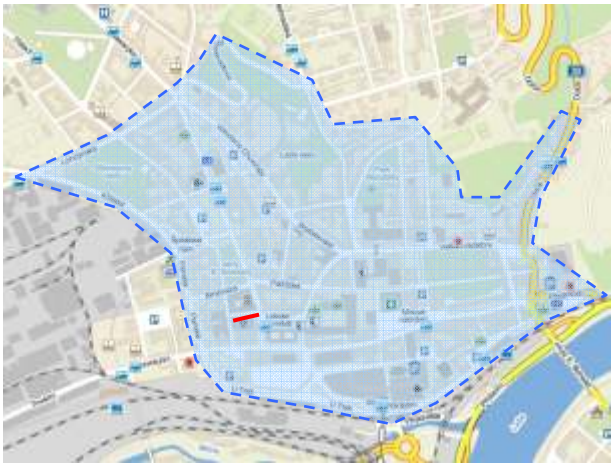
The section of Brněnská – Revoluční Streets has diagonal parking on one side. The vertical and horizontal marking is not indicated along the whole section. Parking places have also been established outside the theatre, permitted only for theatre vehicles. The clearway sign only allows supply vehicles next to the road junction of Vaníčkova x Revoluční Streets, which is not accepted by drivers – vehicles are parked diagonally up to the road junction. The parked vehicles do not impede the traffic flow because the section links to the permitted diagonal parking in the front part of the street. They just make it difficult for supply vehicles serving the local commercial outlets.

Figure 68 – Vaníčkova Street – section Brněnská - Revoluční

Figure 69 – Vaníčkova Street – unpermitted parking despite the vertical marking 28 Clearway (except for delivery vehicles)

U Divadla Street

Figure 70 – U Divadla Street



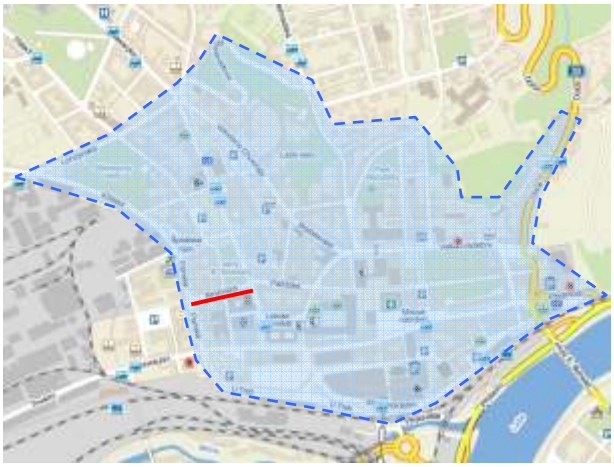
(Source: mapy.cz)

This is a short, two-way section which cannot be driven through. There is not enough space at the end of the section to allow the turning of vehicles. Vehicles park diagonally on one side. There is vertical marking prohibiting parking on the opposite side, which is not respected by drivers; vehicles are parked even on the footpath.

Figure 71 – U Divadla Street

Brněnská Street

Figure 72 – Brněnská Street



(Source: mapy.cz)

It is two-way through street with two lanes and lanes with marked directions at the road junctions. The traffic lanes are wide enough.It is an important roadway busy with vehicular traffic which links to the arterial road formed by Pařížská and Velká hradební streets.

No parking places are marked in the street. A B 29 traffic sign – Waiting Prohibited - is situated here. In spite of that, parking of vehicles - even long-term - can be seen here. The traffic lanes are wide enough, so the parked vehicles do not impede the traffic flow or safety – unless they are parked close to the road junctions, when they hinder vision.

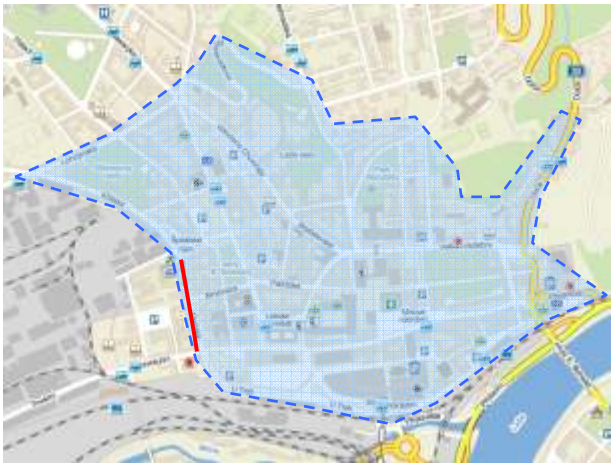
Illegal parking spontaneously occurs on the footpath on the south-eastern side of the road junction of Brněnská x Panská Streets. The footpath surface is a large bituminous area. Parked vehicles hinder pedestrians. They can pose a risk to people walking past (particularly in parking manoeuvres, hindering the view of the footpath). They also damage the footpath surface.

Figure 73 – Brněnská Street

Figure 74 – spontaneous illegal parking at the section of Brněnská x Panská Streets

Panská Street

Figure 75 – Panská Street

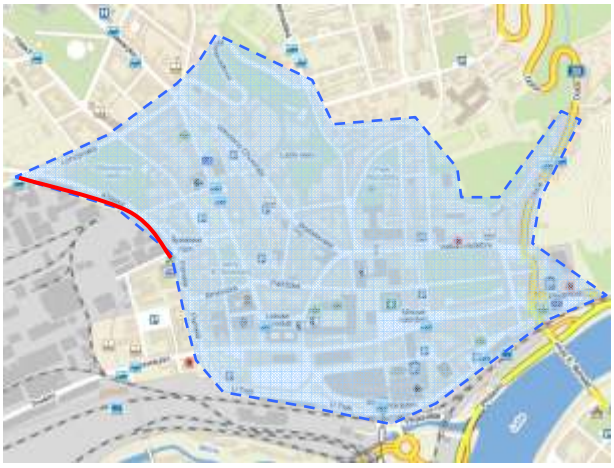


(Source: mapy.cz)

Panská Street together with Klíšská and U Trati streets represent an important transport artery. It is a two-way road with four traffic lanes, the road junctions are controlled by traffic lights. PT lines run along the street. Parking is indicated by vertical and horizontal marking in the section between Brněnská Street and Špitálské Square. It is situated in a lane with parallel places on the western side of the road. There are parking places on the opposite side on private grounds and in yards to satisfy the needs of owners and tenants.

Klíšská Street

Figure 76 – Klíšská Street



(Source: mapy.cz)

The street links to the roadway in Panská and Klíšská Streets and together form an important transport artery. It is a roadway with two lanes, and a two-way street with guiding strips near the road junctions. PT lines run along the street. Parallel parking has been established on both sides near Špitálské Square, indicated by vertical marking, and there is a car park (vertical marking) as well. Long-term parking occurs in the car park even in the area where the Waiting Prohibited traffic sign prohibits it (V 12d). Vehicles are parked illegally here in conflict with the traffic regulations. However, they do not impede or hinder the traffic flow. On the eastern side there is a parking lane for parallel parking in the section near the Mánesovy sady park.

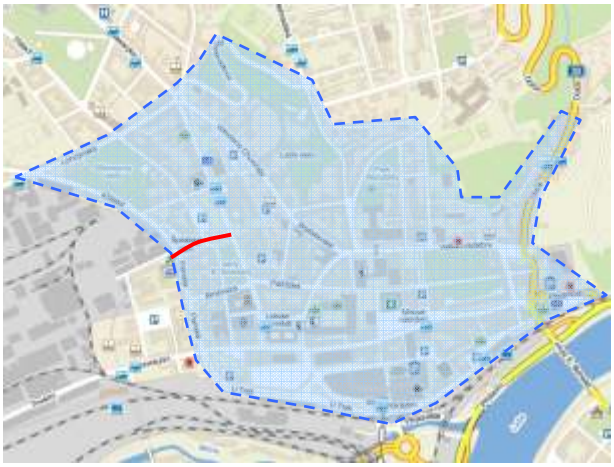
Figure 77 – Klíšská Street – parallel parking on both sides near Špitálské Sq..

Figure 78 – Klíšská Street – car park on Špitálské Sq.

Figure 79 – Klíšská Street – parallel parking near the Mánesovy sady park

Špitálské Square

Figure 80 – Špitálské Square



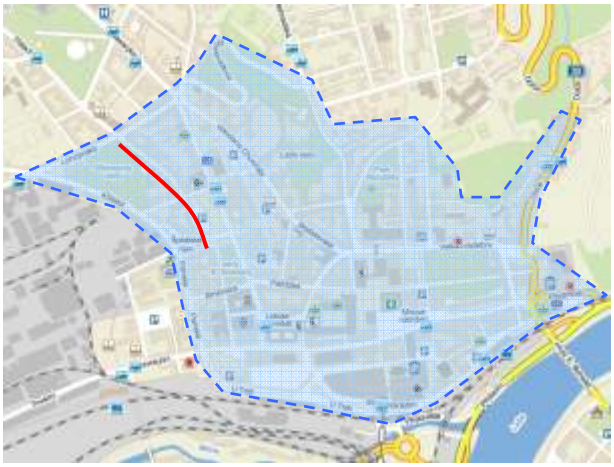
(Source: mapy.cz)

No parking is permitted in Špitálské Square Street. It is a two-way road connecting Klíšská and Panská Streets and Masarykova Street with PT lines routed along it. The car park situated near the road junction of Klíšská x Panská x Špitálské Square Streets can be entered from here.

Figure 81 – Klíšská x Panská x Špitálské Square Streets

Moskevská Street

Figure 82 – Ulice Moskevská



(Source: mapy.cz)

It is a one-way street with one lane in the section of the streets Londýnská – Prokopa Diviše, and a two-way section situated between Prokopa Diviše St. – Špitálské Square; this part is important for supply/delivery vehicles that service the location. Parallel parking is indicated in the parking lane by horizontal marking. However, the horizontal marking has not been indicated correctly – the parking lane indicates V 12d – Waiting Prohibited - which is rather confusing and in conflict with reality (see *Figure 84*). Drivers do not respect the vertical marking B 28 - Clearway.

Figure 83 – Moskevská Street (section Londýnská – Prokopa Diviše)

Figure 84 – parking not respecting the vertical marking

In the two-way section between Prokopa Diviše St. and Špitálské Square there are parallel parking places on both sides of the roadway.

Figure 85 – confusing HM V 12d

Figure 86 – Moskevská Str. (section Prokopa Diviše – Špitálské Sq.)

Prokopa Diviše Street

It is a two-way street which cannot be driven through to Masarykova Street. Parking is parallel on the southern side of the roadway. According to the vertical marking, parking is partially provided on the footpath. However, it is rather narrow and the carriageway is wide enough, so drivers park only on the carriageway along the kerb.

Figure 87 – Prokopa Diviše Street

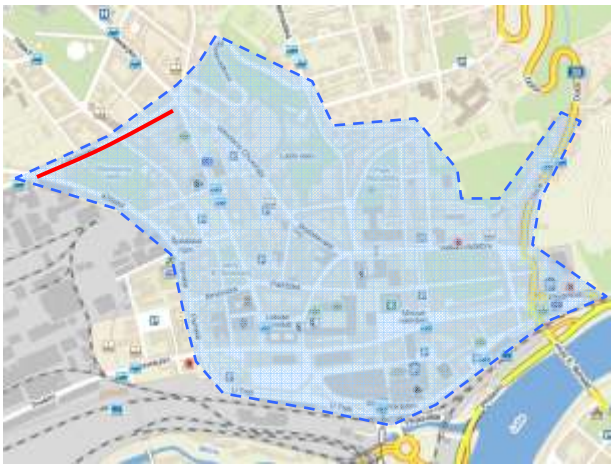
(Map source: mapy.cz)

Figure 88 – confusing horizontal marking V 12d

Londýnská Street

Londýnská Street permits one-way traffic in the section between Masarykova x Londýnská x W. Churchilla streets and Londýnská x Moskevská streets in a single lane. The remaining section permits two-way traffic in two lanes. Diagonal parking has been established in the parking strip (vertical and horizontal marking) at the front part of the street. Entries to private yards and garages are situated from this part of the street. Parking is parallel along the northern side in the two-way section of the street.

Figure 89 – Londýnská Street



(Source: mapy.cz)

Figure 90 – Londýnská Street - one-way section

Figure 91 – Londýnská Street - two-way section

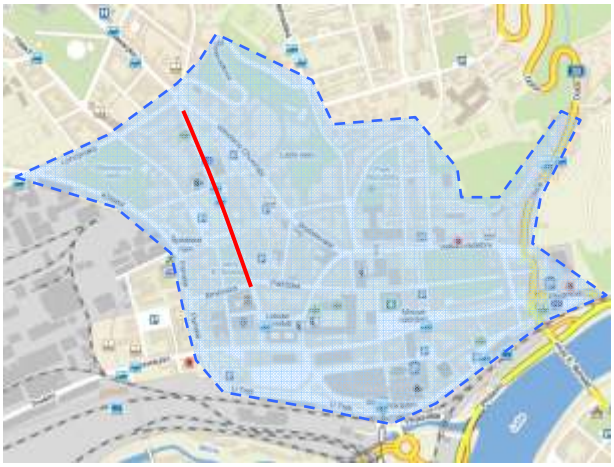
Masarykova Street

It is an important two-way and two-circle roadway along which most of the PT lines are routed. It is an important arterial road in the section of Masarykova x Londýnská x Rooseveltova streets and Masarykova x Brněnská x Pařížská streets. The part in the remaining section towards Revoluční Street is not a through road. Entry is only permitted for transport services.

Parallel parking is situated in the parking lane along the western side of the roadway, with indicated horizontal and vertical markings in the section between the stated street and Prokopa Diviše Street. A parking lane has been established on the eastern side in the section between Masarykova x Brněnská x Pařížská streets. This is reserved for supply / delivery vehicles with limited time for parking (vertical and horizontal marking). Illegal long-

term parking of vehicles unfortunately occurs here. On the opposite side outside the theatre is a parking lane marked as parallel parking (for vehicles of the Czech Police, the theatre, with permits).

Figure 92 – Masarykova Street



(Source: mapy.cz)

Figure 93 – Masarykova Street – parallel parking at the kerb

Figure 94 a 95 - Masarykova Street – parking in the section outside the theatre


The rear part of Masarykova Street – an interior block between W. Churchilla and Masarykova streets, is one-way. In this street there are parallel parking facilities on the northern side and small parking areas have been established here. In fact, vehicles park in any possible place in this section, at road junctions and at widened structure entries. These vehicles are parked in conflict with legislation. They hinder the view in the section and probably hinder the potential passage of ambulances or fire brigade vehicles.

Figure 96 a 97 - Rear block between Masarykova and W. Churchilla streets


Winstona Churchilla and Bratislavská Streets

Both streets represent one through unit, with one-way traffic running along a single lane. This part of the street ascends in the direction of the traffic flow. Bratislavská Street features a parking strip for diagonal parking indicated by both vertical and horizontal marking, with the exception of parallel places reserved for vehicles of disabled persons. This parking strip is situated on the right side of the traffic flow. At the road junction of W. Churchilla x Bratislavská x Stroupežnického streets are perpendicular parking places opposite Stroupežnického Street. Further down W. Churchilla Street there are diagonal parking places

indicated by vertical and horizontal marking on the north-eastern side of the street. A large public car park is situated outside the Vladimír hotel.

Figure 98 – Winstona Churchilla Street

(Source: mapy.cz)

Figure 99 – Bratislavská Street

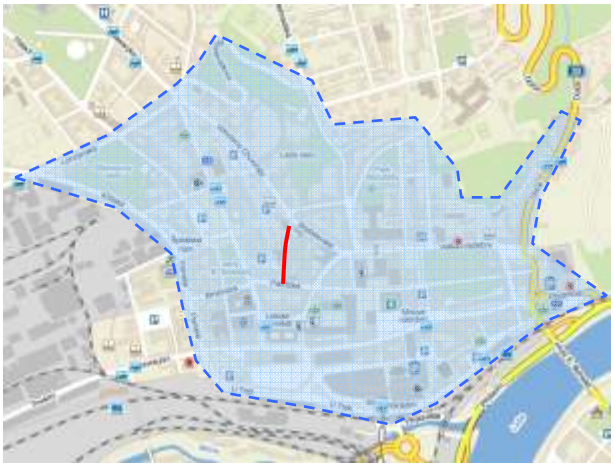
Figure 100 – Winstona Churchilla Street

Figure 101 – Winstona Churchilla Street – car park

Horova Street

|This is a one-way street which descends considerably. Diagonal parking is indicated by vertical and horizontal marking on the eastern side.

Figure 102 – Horova Street



(Source: mapy.cz)

Figure 103 – Horova Street

Stroupežnického Street

A one-way street with a single lane which is only important for transport services of the location. Parallel parking is provided on both sides of the street (without horizontal marking).

Figure 104 – Stroupežnického Street

(Source: mapy.cz)

Figure 105 – Stroupežnického Street– parallel parking on both sides

Bělehradská Street

This is a one-way roadway with one lane, considerably descending in the section between the road junction of Velká hradební and Stroupežnického streets. It is a two-way street with two lanes.

The one-way part features parallel parking in the northern part along the eastern side of the roadway, followed by parallel parking on both sides of the street. The places are indicated by contrasting horizontal and vertical marking. There are some individual parking places in garages. The two-way section has vertical marking indicating parallel parking along the western kerb of the street.

Figure 106 – Bělehradská Street

(Source: mapy.cz)

Figure 107 and 108 – Bělehradská Street– one-way section

Figure 109 and 110 – Bělehradská Street– two-way section

Elišky Krásnohorské Street

It is a one-way ascending street with one lane, important for transport services. Parking is parallel on the left of the traffic flow and is indicated by vertical marking.

Figure 111 – Elišky Krásnohorské Street

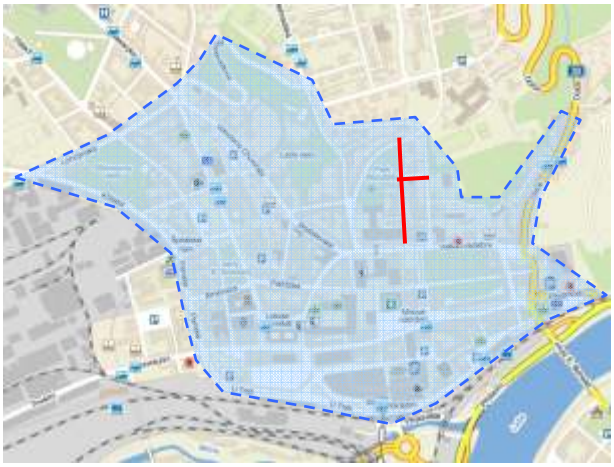
(Source: mapy.cz)

Figure 112 – profile of Elišky Krásnohorské Street

Dvořákova Street

This is a two-way street important for vehicles providing transport services to the location. Parallel parking on the eastern side of the street is found in the northern half on one side only. The second half features parallel parking opposite. Parking is not indicated by vertical or horizontal marking.

Figure 113 – Dvořákova Street



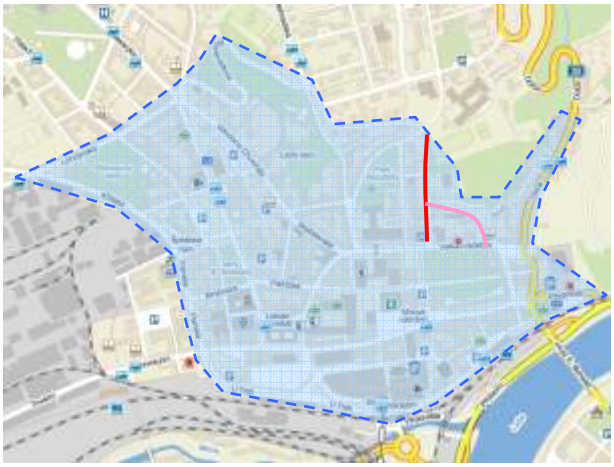
(Source: mapy.cz)

Figure 114 – profile of Dvořákova Street

Na Schodech Street

It is a roadway, considerably ascending to the north, important for transport serviceability of the location. In the section between Velká hradební street and the connecting road of Na Schodech and Dvořákova streets, it is a one-way, turning to two-way in its remaining part. Parking is parallel on the western part of the street. The tertiary road along the Czech Broadcasting building features entries to parking facilities in private grounds.

Figure 115 – Na Schodech Street



(Source: mapy.cz)

Figure 116 – profile of Na Schodech Street

Figure 117 and 118 – Na Schodech Street – tertiary road along the Czech Broadcasting building

Annex 2) Roadway Network Load in the City Centre (Year 2011)