



EUROPEAN UNION
EUROPEAN REGIONAL
DEVELOPMENT FUND



Central Europe Project 1CE037P3 LABEL



PILSEN REGION



EVALUATION OF CONDITIONS REGARDING WATER TOURISM IN THE PILSEN REGION

Planning study according to § 30 of the Czech Building Act
SUMMARY



DHV CR, spol. s r.o.
Sokolovská 100/94, 186 00 Praha 8

2010 - 2011

Full version of the Planning study Evaluation of Conditions Regarding Water Tourism in the Pilsner Region is available at the procurer and on internet pages of the Pilsen Region: www.plzensky-kraj.cz.

SUBMITTER



Pilsen Region

Škroupova 18

306 13 Plzeň

PROCURER

Regional Authority of Pilsen Region

Regional Development Department

Spatial Planning Section

Škroupova 18

306 13 Plzeň

Responsible person of the procurer

RNDr. Václav Tremel

Head of the Spatial Planning Section

tel.: 377 195 420

e-mail: vaclav.tremel@plzensky-kraj.cz

DESIGNER



DHV CR, spol. s r. o.

Sokolovská 100/94

186 00 Praha 8

Team leader | urban design

Ing. arch. Veronika Šindlerová

tel.: 236 080 562

mobil: 602 442 651

e-mail: veronika.sindlerova@dhv.com

Responsible designer | supervision

Ing. arch. Mgr. Monika Boháčová

Authorized architect of Czech Chamber of Architects

Certificate of the authorization Nr. 03 709

Water regime | flood protection

Ing. Petr Hrdlička (AMI, s.r.o.)

Authorized engineer of Czech Chamber of Authorised
Engineers and Technicians

Certificate of the authorization Nr. 0401000

Social geography | tourism

Mgr. Vladimíra Khajlová

Nature and landscape protection

Ing. Boleslav Jelínek

GIS

Mgr. Karolina Lejsková

Mgr. Radka Neudertová

Bc. Markéta Koropečká

Technical support

Bc. Veronika Klečková

Miroslav Drožen

PROJECT LABEL

Floods are one of the greatest natural risk factors in the Central Europe and Labe river-basin (Elbe in German). They are a repeated cause of catastrophies and danger to humus, nature itself or country economy. Primar cause of floods are varied: from changing drainage of landscape, climate changes, limited information and knowledge regarding flood risks, high interest to utilise flooding areas for development and ecomonic activities, river canalisation and other.

Each of these causes plays a certain par in a system of management of flooding risks. Nevertheless solution of a single problem cannot deal with the whole situation in complex. Flooding risks can only be decreased by complex and integrated solution methods and attitudes.

Planning study as part of international project LABEL

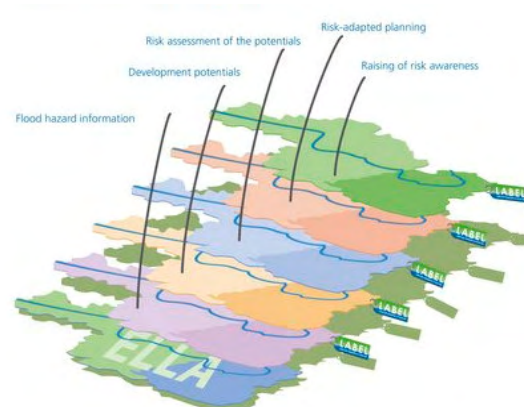
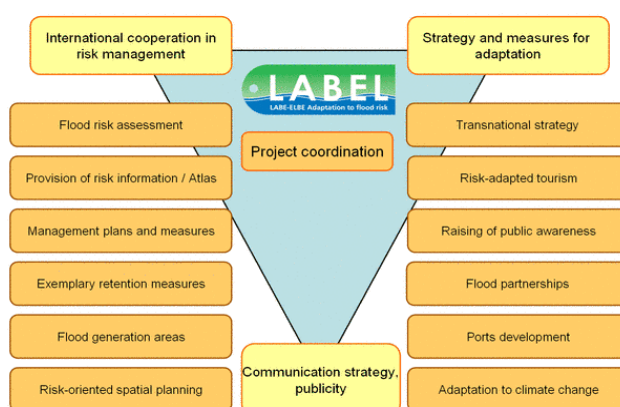
Planning study Evaluation of Conditions Regarding Water Tourism in the Pilsen Region was elaborated in the framework of the intenational project **LABEL – Adaptation to flooding risks in Labe river-basin**, INTERREG IV B, CENTRAL EUROPE, regulation 3.2. Reduction of risks caused by nature and human factor and their impact. The Pilsen Region is of twenty partnership regions involved in the LABEL project. The project is co-financed from the European Regional Developement Fund (ERDF) – Operational program International Cooperation in the Central Europe - Objective 3 – European Planning Cooperation. The submitter and head partner of the project is the Saxony Ministry of Internal Affairs. Project realization is due in period 1 September 2008 – 28 February 2012.

For the area of in the Pilsen Region there are elaborated studies evaluating retention abilities of the area and conditions for improvement of water tourism.

Link to project internet pages: <http://www.label-eu.eu/>

Planning study Evaluation of Conditions Regarding Water Tourism in the Pilsen Region according to requirements of the international project LABEL should contribute to solution of the following issues:

- Identification of infrastructure for water tourism in the Pilsen Region
- Evaluation of potential for water tourism in the Pilsen Region
- Evaluation of infrastructure for water tourism in relation to nature flood protection – regulation draft
- Identification of problems of utilisation of water courses for water tourism in the Pilsen Region
- Recommendations for regulations to improve conditions for water tourism in the Pilsen Region
- Utilisation possibilities of suggested flood protection to improve conditions for water tourism



Project LABEL – scheme of working units and the level of project solution (source: www.label-eu.eu, downloaded on 24 April 2011)



SUBJECT AND OBJECTIVES OF THE PLANNING STUDY

The subject of the planning study Evaluation of Conditions Regarding Water Tourism in the Pilsen Region is to identify existing infrastructure for water tourism in relation to Berounka and Otava rivers in the Pilsen Region, to evaluate existing issues and development potentials and following draft of modifications or enhancements. The planning study follows existing relations of infrastructure for water tourism in the area, their utilisation, accessibility, complexity and quality of equipment and mainly the conflicts with flooding areas and possibilities of flood protection.

General content of the planning study | Phases of planning study elaboration

Planning study Evaluation of Conditions Regarding Water Tourism in the Pilsen Region is done in two phases.

Outcome of the **1st phase | Evaluation of materials and data and area analysis** is to define infrastructure issues regarding water tourism, their possible development potentials and evaluation of conflicts with flooding areas, that is possible suggested flood protection and other limits of area utilisation.

Outcome of the **2nd phase | Design** is suggestions for elimination of defined issues of infrastructure for water tourism and regulations leading towards elimination of identified conflicts, mainly the flooding areas and active zone of flooding area conflicts. For concrete examples of water tourism infrastructure aiming at camping and car camping sites, possibilities of future planning development are researched while preserving the flood protection conditions.

Objectives of the planning study

The objectives of the planning study is to revise area conditions in relation to Otava river in the locality of Čeňkova Pila - Horažďovice and Berounka river in locality of Plzeň - Zvíkovec for water tourism in direct relation to flooding risks and mainly to the following:

- Evaluation of existing infrastructure for water tourism in researched area;
Planning relations, extent, quality, intensity and ways of utilisation, conflicts with set flooding areas and active zone of flooding area, conflicts with other protected interestes (for example nature and landscape protection and others);
- Design of infrastructure for water tourism modifications;
Adding, modification and enhancements, transfers to other areas, cancellations etc.;
- Accomodation of suggested changes in the area set by flooding area, active zone of flooding area and requirements for flood protection.

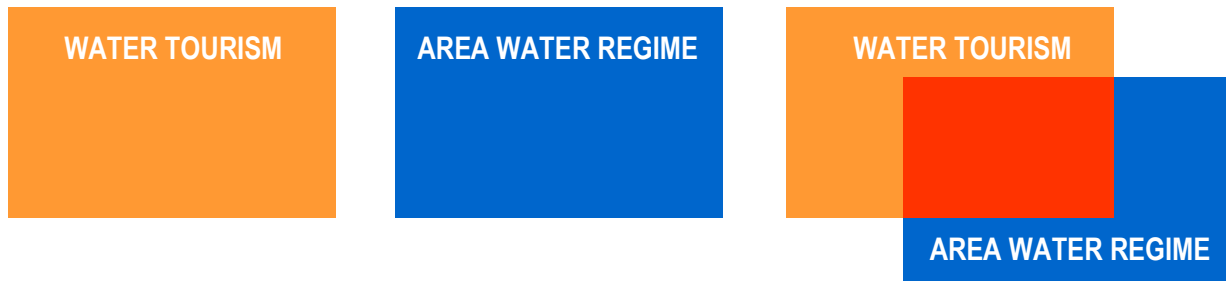
Topical areas of the planning study

The planning study follows following topical areas:

WATER TOURISM	AREA WATER REGIME
INFRASTRUCTURE	FLOODING AREAS
ATTRACTIONS	FLOOD PROTECTION
REQUIREMENTS	WATER COURSE NAVIGABILITY
POTENTIALS & DEFICITS	

Both topical areas are in the framework of the planning study solved in two ways:

- **autonomously**, that is each area is solved independently
- **in mutual conflicts**, that is the study identifies and resolves mutual conflicts between both topical area.



Water tourism and its components

The planning study understands water tourism as a **form of travel tourism that is directly or indirectly related to the water course area**; for this particular planning study concretely in the area of monitored water courses of Otava and Berounka rivers in the area of Pilsen Region, the water course can be:

- direct place for spending free time
- key attractivity of tourism (touristic attractivity).

The planning study defines following activities and actions as part of water tourism where it monitors only those that are really realised or those that can be potentially realised in the framework of the resolved area

Water stream as a place for actions and activities

- water sports (canoeing and rafting) = flowing down water courses using various types of floats (canoe, kayak or raft)
- swimming
- fishing

Water stream as an attractivity for actions and activities

- walking tourism in relations to water course
- biking tourism in relation to water course
- horse tourism in relation to water course
- mountain tourism in relation to water course
- spending time at the stream in relation to children games or adult sport activities



Otava – swimming in Nové Městečko, fishing in Sušice, waterman's camp in Sušice (photo: Veronika Šindlerová, 2010)

MONITORED AREA

The planning study Evaluation of Conditions Regarding Water Tourism in the Pilsen Region deals specifically with water courses of Otava and Berounka and a nearby areas in the Pilsen Region. It is the area where currently exists or potentially can be build an infrastructure for water tourism and attractions of tourism in relation to the river Otava in area of Čeňkova Pila – Horažďovice and the river Berounka in area of Plzeň - Zvíkovec.

Specifics of monitored area

Otava

Otava is the river with mutinous rapids in the midst of thick Šumava forest and also the river running through romantic valleys and open landscape with many historical monuments. The upper stream of Otava being a part of the Šumava National Park and protected landscape area Šumava, that is the area between Čeňkova Pila and Sušice, is specific due to its mountain character, the river is very wild with plenty of rapids. Down from Sušice the river flows into a relatively wide valley of Šumava foothills with a alluvial plain.

Settlement along the monitored area is closely related to the water course. Most municipalities are found directly in the alluvial plain directly at the river. The character of the settlement has a very favourable influence at services in the area as well as traffic availability and general civil equipment.

The river Otava is appreciated for its unusually clean waters favourable not only for bathing and fishing but also it becomes more attractive for general leisure time activities. Upper Otava is today considered one of the most attractive locations of the South-west Bohemia.



Otava near Rejštejn, near Rabí and near Malé Hydčice (photo: Veronika Šindlerová, 2010)

Berounka

Berounka in the upper river course flows through forest valley steeps and in place through large meadows. Such unique sceneries are intensified by views of ancient ruins of castles and old mills making Berounka even more attractive to watermen and other tourists. Along the whole river course Berounka is a slow and calm river with a placid slope and long stretches with slow stream. Berounka is nicknamed by watermen as the „idle river“.

Settlement along the monitored area is situated mainly on table land above the valley. The river valley itself is very narrow and with only few exemptions (Liblín and Kalinova Ves u Zvíkovce) directly at the river there are merely cottage settlements and other recreational areas. Most villages are located several kilometers away from the river which makes services and general civil facilities less available.



Berounka near Krašov, near Robčice and near Chlum (photo: Veronika Šindlerová, 2010)

Water tourism in the monitored area

Water tourism and recreation at the river belongs to traditional forms of tourism in the Czech Republic with a number of local specifics. A large number of water courses favourable for water tourism where locally related infrastructure for water tourism and attractions of tourism participate in line disposition of tourism. Water tourism and recreation is further influenced by climatic conditions in the Czech Republic and is therefore time-related exclusively to summer season with possible overlaps into spring and autumn period.

Within the monitored area water tourism and recreation is related to the rivers Otava and Berounka that belong to the most populated and utilized rivers among watermen in the Czech Republic. Flowing down rivers in canoes, kayaks or rafts represents the most frequent form of water tourism in the monitored area.

Infrastructure for water tourism flooding danger in the monitored area

Basically all camping sites and car camps in relation to the Otava and Berounka rivers in the monitored area are endangered by flooding of various intensity; most of them is at least partially located in active zone of flooding area. Naturally all waterman camping sites or car camps are historically located directly in the alluvial plain of the river directly related to the water course. Yet most camps are located in the inner river meander that is away from the river streamline during the flooding period. The negative effect of water is then less intense on the inner side of the meander yet the flooding still effects the area.

Otava

The upper stream of the Otava river between Čerňkova Pila – Sušice is created by a very steep and narrow valley where the river has a mountain stream character. Areas designed for flood effusion are very limited but due to the upper stream location, the intensity and depth of flooding are usually low. Section between Sušice and Horažďovice is quite specific by relatively wide alluvial plain with a large area of active flooding zone and own flooding areas that along the whole river course amount to several hundreds of metres from the river banks. Most camping sites and car camps at the Otava river are endangered by flooding of various intensity and a number of them is located directly in the active zone of flooding area.

Berounka

The Berounka river along the monitored area between Pilsen and Zvíkovec has a character of deeply cut meander canyon valley with a specifically limited areas for flooding effusion (mainly in places of steep meanders). Flooding areas and active zone of flooding area are usually along the whole width of the valley; in the meanders where alluvia of the river is cumulated the alluvial plain partially raises above the level of flooding areas of at least above the level of active zone of flooding area. Most camping sites and car camps at the Berounka river are endangered by flooding of various intensity and a number of them is located directly in the active zone of flooding area.

PROBLEM AREA 1

WATER TOURISM

The first problem area defined in the design part of the planning study is the tourism issue focusing on water tourism. The whole society development, economic development and increasing people's standard of life is reflected by changing preference of touristic forms and customers' - tourists' - demands on spectrum and quality of services.

Also water tourism in relation to the Otava and Berounka rivers as a traditional form of tourism in the Czech Republic, inevitably has to react to the existing and expected development trends in tourism.

Issue definition

Existing forms of water tourism in the monitored area

Water tourism in the defined area in a long-term has a traditional form of watermen sports, that is flowing down rivers or its particular parts on canoes, kayaks or rafts.

In view of complex infrastructure and service offer for water tourism and general tourism the existing situation in the defined part of the Otava river is significantly better than in the Berounka area. Watermen sports are a traditional form of tourism in the monitored area of the Otava river only in the middle part of the river between Sušice and Horažďovice. On the contrary going down the upper course of the Otava river between Čejkova Pila and Sušice is only limited therefore water tourism prevails in form of car camping or stays in hotels, pensions or private accommodation facilities. The attractiveness of the Otava river for the mentioned water tourism form is enhanced by the attractive location of the upper course in the National Park Šumava and Protected Landscape Area Šumava.

The traditional form of water tourism - waterman sports – definitely dominates in the monitored area of the Berounka river. In the surroundings except a couple of pensioned and sporting facilities, there is no adequate infrastructure offer for other forms of water tourism. Berounka surroundings in the monitored area is characteristic apart from waterman sports by individual recreation in form of cottage and bungalow settlements.

Existing clientele and its requirements

In case of the monitored area of the Berounka river the traditional and prevailing touristic clientele are **watermen**. They form a specific group of tourists, whose infrastructure requirements for water tourism, its extent and service quality, remain without changes in a long term and are characteristic for example by comfort quality and accommodation service standards for water tourism, by its close relation directly to the water course and followingly limited operability in the area and specific traffic requirements in the area.

Clientele with higher demands on tourism service quality including foreign clients uses mainly infrastructure for tourism in relation to upper stream of the Otava river in the National Park, the Protected Landscape Area Šumava, where apart from traditional camping sites and car camps there are also pensions, hotels or private accommodation facilities. Traditional tourism centres in relation to the Otava river are Srní, Čejkova Pila, Hartmanice, Rejštejn or the town of Sušice.

Tourism infrastructure offer or water tourism offer for more demanding clientele in relation to the monitored area of the Berounka river is in comparison to the Otava river quite limited.

Proposal of solution of improvement of water tourism conditions in the monitored area

Target tourist groups and their requirements

The planning study defines potential target groups of tourists and their characteristic requirements and demands for water tourism infrastructure with focus on new forms of water tourism implemented in the monitored area:

- young families with children
- tourist with higher standards for service quality
- active sportsmen
- eco-tourism / bio-tourism
- handicapped tourists and tourists of advanced age groups
- school children groups (thematic / educational stays).

Elimination of negative influence of seasonality

The objective of the tourism development and mainly infrastructure for the new forms of water tourism in the monitored area ought to be focused on elimination of negative influence of seasonality. While the area in relation to resolved area of the Otava river, and mainly the area of Čeňkova Pila or Sušice, is currently a favourite touristic destination also in winter (winter cross-country tracks, proximity of winter centres Srní, Kašperské Hory and others), the area around Berounka is currently only focused on summer tourism (domination of watersports and hiking tourism).

Therefore the Berounka river in the monitored area will require seeking specific touristic forms, or water tourism forms, that will prolong the touristic season in the area at least from spring to autumn season.

Integration and interconnectivity of infrastructure for individual forms of water tourism

The objective of tourism and infrastructure development for new forms of water tourism in the monitored area ought to aim at integration of individual facilities or infrastructure for various forms of water tourism (new facilities and activities in relation to existing infrastructure for water tourism, combination of more facilities in one area etc.) and further aim at mutual interconnectivity and cooperation with other attractive tourism sites.

Creating such interconnected systems in the area and offering required services can together increase an overall touristic attractiveness of the area.

Suggested new forms of water tourism

The planning study identifies such forms of water tourism that could be further developed in relation to the areas near Otava and Berounka rivers, or that could be appropriately newly implemented aiming at fulfilling touristic potential, increasing overall area attractiveness and enhancing complexity of offered touristic services.

The planning study characterises individual newly suggested forms of water tourism; it identifies their needs and specific requirements and refers to existing facilities in the defined area.

- horse tourism
- geocaching
- eco tourism / eco agro tourism / bio tourism
- educational tourism aiming at local history and traditions
- outdoor and adrenalin activities
- tourism aimed at clientele with higher requirements on service quality.

PROBLEM AREA 2

WATER TOURISM INFRASTRUCTURE

The second problem area defined to solution in the design part of the planning study is the issue of infrastructure for water tourism aiming at infrastructure for watermen sports, deficit solution, car availability, availability of touristic atractivities in relation to water course for watermen and also checking the development potentials of camping sites and car camps. All that with no regard to flooding risks, that are studied in the following part - Problem area 3.

Issue definition

Infrastructure availability for water tourism

The first of identified issues for watermen sport tourism is the availability with respect to bad traffic infrastructure of larger area in relation to the defined part of Berounka river and also availability of some existing accommodation facilities localised in direct relation to the water course for personal vehicles.

While the monitored area of the Otava river has a good service and traffic availability for water sport tourism, mainly with respect to the railroad between Sušice and Horažďovice parallel to the Otava river, an optimal service and traffic availability for the Berounka river had certain deficits. The reason for the disbalance is the terrain configuration and landscape character in relation to the settlement location away from the water course area, that is on the plateaux above the river valley usually several kilometres away from the river.

The reason for the difficult accessibility of the camping sites located nearby the river course in the monitored area for the cars are roads which are often limited only to forest and field paths connected to the local communications or railroads, a bad technical conditions and parameters of which deteriorate their practical utilization.



Access road towards the camping site Nadryby (Berounka) and insufficient parking in Čenkova Pila (photo: Veronika Šindlerová, 2010)

Availability of tourism attractivities for watermen

In the monitored area in relation to the parts of the Otava and Berounka rivers there are plenty of touristic attractive cultural and historical sites as well as natural sites the accessibility of which is unfortunately often very limited for watermen. The reason for the deterioration is usually insufficient or completely missing appropriate landing places for boats near the sites, or inappropriate or non-existing communications for hikers leading towards the site or even missing tourist signs pointing towards the site at the river bank.

Infrastructure development for water tourism

Based on data evaluation and area location analysis and terrain research locations for possible water tourism infrastructure development were identified, that is locations of new camps and car camps, for enhancement of the existing camps, enlargements nearby the water course, setting up new boarding places at the river or for example availability of the area by the public transport.

Design of infrastructure for water tourism

The solution of the problem area 2 aims at the general draft of regulations towards elimination of defined issues of the existing infrastructure for water tourism, that is the draft of the new infrastructure without respect to conflict with possible flooding risks dealt with the problem area 3.

Infrastructure for water tourism availability

In the defined area of the Berounka river from the point of traffic services and availability it is essential to aim mainly at the enlargement and quality enhancement of the connectivity of the area to the road network, improving the accessibility of the bus traffic from the main settlement centres and for example including seasonal bus lines such as cyclo buses or special lines for watermen servicing the boarding locations at the river.

From the point of car accessibility of camping sites and other facilities for water tourism it is essential to currently improve technical parameters of certain insufficient access communications, mainly ensure a stable surface of the roadways, normal width parameters of communications minimally for one way traffic with turnouts and improve traffic signs of the access roadways from the general road network.

Touristic attractive sites availability for watermen

To reach an optimal availability of touristic attractive site in relation to water course or its surroundings for watermen it is essential to provide a whole complex of regulations starting with information on the location of the tourism attractivity to its real physical availability.

- Awareness on the presence of the tourism attractivity related to the water course or its surroundings
- Touristic signs of the attractivity for watermen flowing down the river
- Possibility of docking the boat in the respective river bank at the entry point of the path towards the tourism attractivity
- Solution of the entry communication towards the tourism attractivity from the river bank (including the respective tourist signs, instructive path etc.).

Development of infrastructure for water tourism

Based on the results of the analytical part of the planning study, which identifies the potential possibilities of the infrastructure development for water tourism and after evaluation of the existing capacity of the water tourism infrastructure and mainly the accommodation facilities in relation to the river (camping sites and car camps) in the framework of the defined area, a list of needs and requirements was formed to create new or enhance the existing infrastructure.

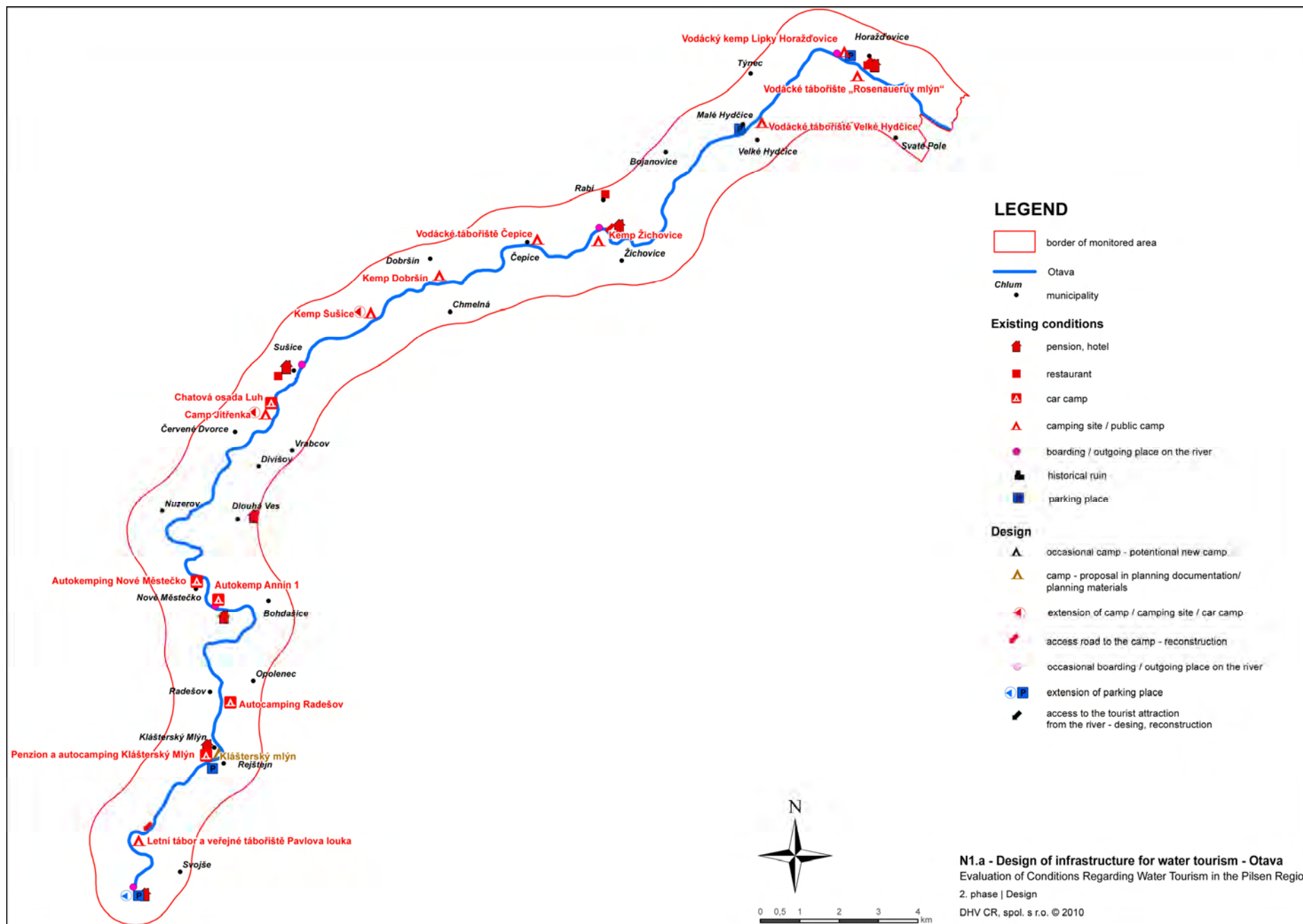
At the moment accommodation facilities in relation to the defined part of the **Otava** river is with respect to the relatively thick network of camping sites and car camps equally located and distributed along the river in optimal distances; their capacity was evaluated as sufficient covering existing and future requirements for water tourism. Some of the suggestions provided in the planning study include an enlargement of the currently insufficient capacity of parking place for tourists in Čeňkova Pila or enhancing the capacity of utilised boarding place in Sušice Kemp site.

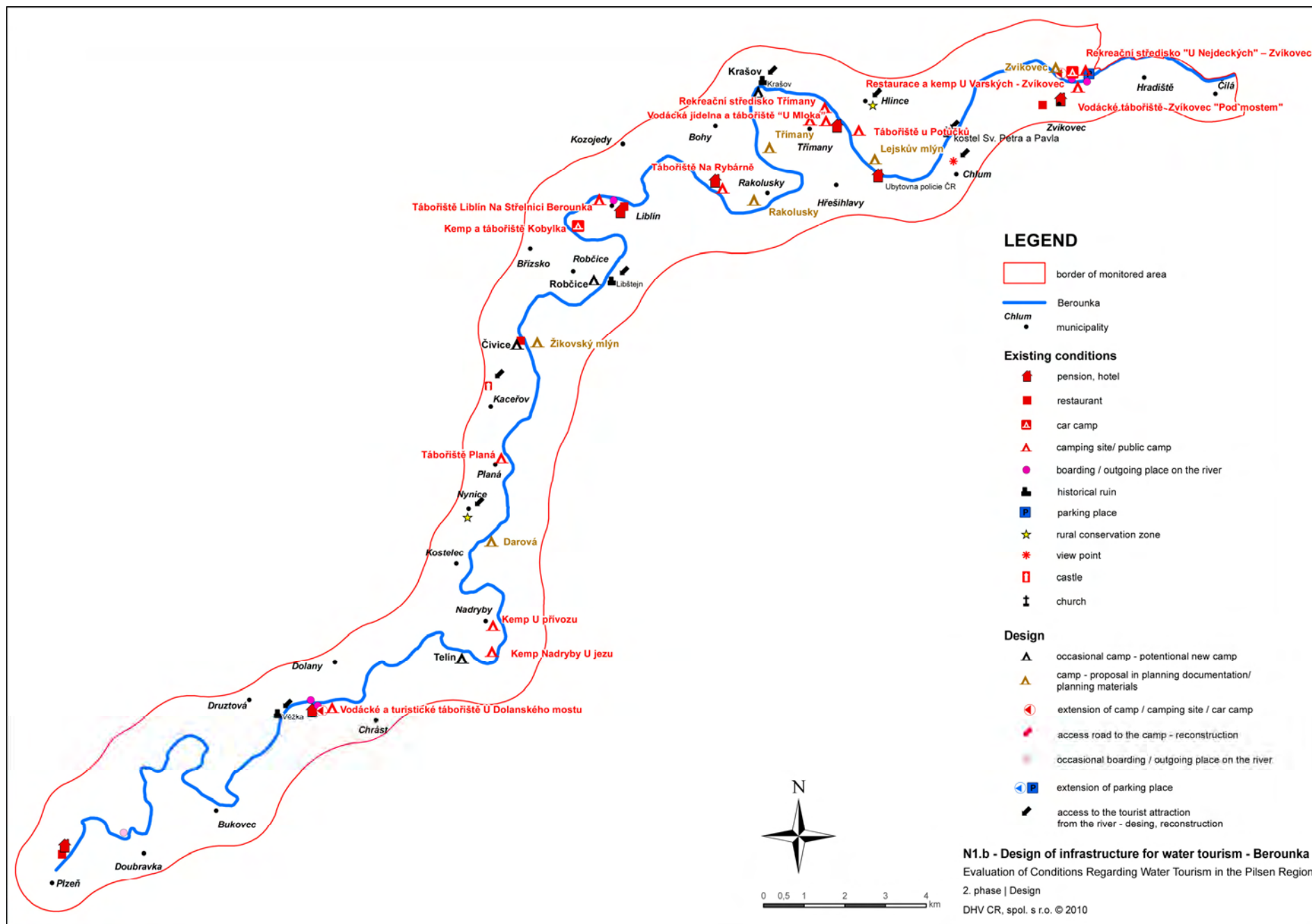
The existing capacity of accommodation facilities in relation to the defined part of the **Berounka** river was also evaluated as essentially sufficient to existing needs and requirements; nevertheless with respect to the longlasting favourability of the Berounka river for watermen, increasing interest in recreation at the river course and also with respect to several long sections of the water course with no water camping site (Nadryby – Planá, Planá – Liblín and Liblín - Rakolusky – Třimany), the planning study suggest several locations as possible new sites of camping. Another suggestion is to investigate more into new entry/boarding place at the river in Pilsen at the St. George's church.

Design of infrastructure draft for water tourism is described in two schemes:

N1.a – Design of infrastructure for water tourism – Otava

N1.b – Design of infrastructure for water tourism – Berounka





PROBLEM AREA 3

CONFLICT OF INFRASTRUCTURE FOR WATER TOURISM WITH LIMITS OF WATER COURSE IN THE MONITORED AREA

The subject of the resolved problem area 3 is to evaluate conditions for development of existing and potential localities for camping or car camps in relation to defined areas of the Otava and Berounka rivers, with respect to flooding risks and conditions of flood protection. In respect to the traditional infrastructure position for water tourism directly on the river bank practically all infrastructure is more or less in danger of flooding, while the location in the flooding areas and the active zone of flooding area make its potential future development or establishment of new facilities difficult or even impossible to achieve.

Issue definition

Based on the results of the study analysis all followed existing and potential locations for camping sites and car camps are in direct conflict with flooding areas of various flooding intensity; most of them had the lowest monitored flooding intensity Q_5 , and also active zone of flooding area. Not only the open camping sites are endangered but also building sites in the camp facilities for cars, sports equipment and even access roadways.

Infrastructure for water tourism is traditionally located directly at the river banks at the minimum distance to the river course. Considering a demanding manipulation with the boats (canoes, kayaks or rafts) a long-distance transportation away from the river is not possible; furthermore tourists – watermen themselves require close contact with the river, and staying at the riverside is the prior and basic prerequisite of water tourism.

Placing basically all monitored locations of the camping sites and car camps in the flooding areas or active zone of flooding area is with respect to the limitations of nature and landscape protection the basic limitation of their areal development. Possibilities of a preventive flood protection of remaining and suggested location are therefore also very limited. The alluvial plains of both rivers are relatively narrow and any interference with the flow profile can cause its constriction and have a negative effect on possible flooding progression. Area scope of active zone of flooding area in framework of which it is not possible to locate any new constructions and buildings including camping sites and temporary accommodation facilities, is marked in both river sections and in many parts of both rivers it includes the whole of alluvial plain.

Suggested principles of preventive flood protection of infrastructure for water tourism applicable in the monitored area

Preventive flood protection for water tourism, if the particular location provides for it, has to take into account the specific requirements and characteristics of the monitored area and differentiate between areas of landscape and natural value, areas with an extensive utilisation and last but not least also the areas primarily defined for flooding debouchment. Within the monitored area in direct relation to the Otava and Berounka rivers only such preventive flood protection that will fully respect all area values without any interference with the water regime and the overall character of the natural environment in respect of water tourism can be used.

Specific characteristics of the monitored area and following requirements for preventive flood protection of the water tourism infrastructure

The monitored area shows a whole complex of specific characteristics that need to be respected regarding the flood protection infrastructure for water tourism (mainly camping sites and car camps), and the requirements of flood protection have below listed specific requirements:

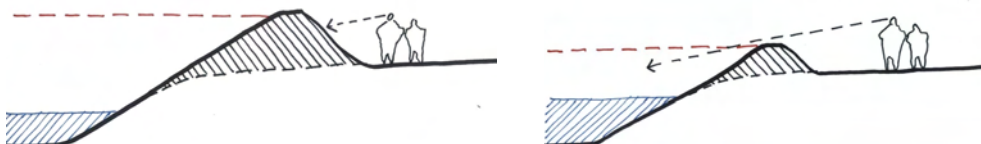
- landscape highly valued natural area
- area appropriate for flooding debouchment in nature / floodplain
- area of a low intensity of utilisation / area often with no relations to constructed ground.

Fundamentals of designing of preventive flood protection of infrastructure for water tourism

Regarding the specific character of the monitored area an application of preventive flood protection of infrastructure for water tourism in the framework of the area is very limited. It is not possible to approach the flood protection of camping sites and car camps same as the protection of urbanized, intensively developed and utilised areas.

The planning study sets the following principles of preventive flood protection of infrastructure for water tourism with respect to specific characteristics of the monitored area and following specific requirements of preventive flood protection:

- **Modification of suggested flood protection for the needs of water tourism**
- **Preservation of direct optical and physical contact of the protected area with the river**



- **Water tourism infrastructure preservation for „common“ flooding intensity (Q_5 , Q_{20})**
- **Economic severity of preventive flood protection adequate to its benefits**
- **Primar protection of the building objects and not only free area for camping**
- **Minimisation of negative influence of area retention and possible flooding development**
- **Preference of natural solutions to technically highly demanding solutions**
- **Suggested building and technical regulations drafted as multi-functional (integrated)**



Principles of preventive flood protection of infrastructure for water tourism

Regarding the specific character of the monitored area an eventual application of the preventive flood protection of infrastructure for water tourism within the monitored area is significantly limited and not all possible protections are suitable. Objective of the planning study is to define such ways of preventive flood protection of infrastructure of camping sites and car camps an implementation of which can be recommended in the area and to eliminate those that are not suitable in the area. All ways of preventive flood protection is further evaluated in view of its benefits (+) or negative influence (-) according to the following:

- economic costingness of investment into antiflood protection (for example costs of m^2 camp area)
- flood protection influence terrain relief
- flood protection influence to landscape character and nature
- flood protection influence to water regime in the area and possible flooding development
- flood protection influence to user area quality (for example barrier effect)
- possibilities of multi-functional flood protection utilisation.

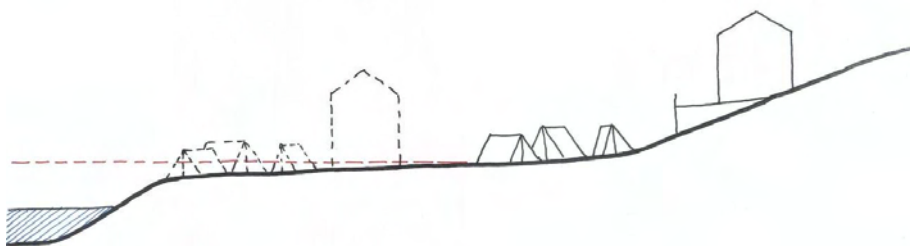
In view of each preventive flood protection of infrastructure for water tourism it is necessary to take into account also the location of the area and the water course (convex / concave / direct section of the river) and the real level of flooding against which the area is to be protected in respect of the level of current terrain.

The planning study deals exclusively with preventive flood protection directly in monitored locations; it does not draft preventive flood protection in form of increasing the retention ability of landscape, that is for example by drafting dry polders, modification of river-basin or water course line, changes of vegetation surfacing or modification of landscape farming.

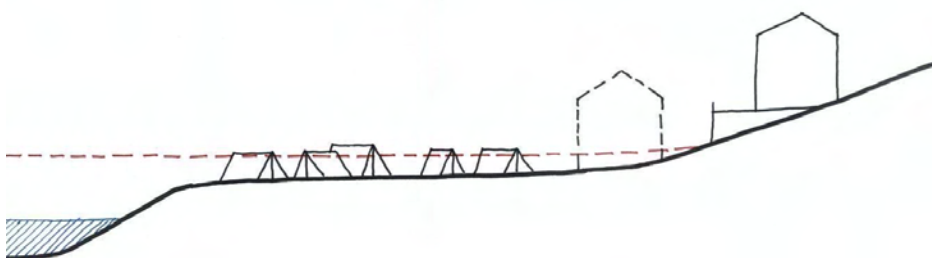
Following there is a list of principle ways of preventive flood protection of camping sites and car camps that can be suggested and recommended in the monitored area.

Note: red dashed line represents the level of flooding against which the area is to be protected

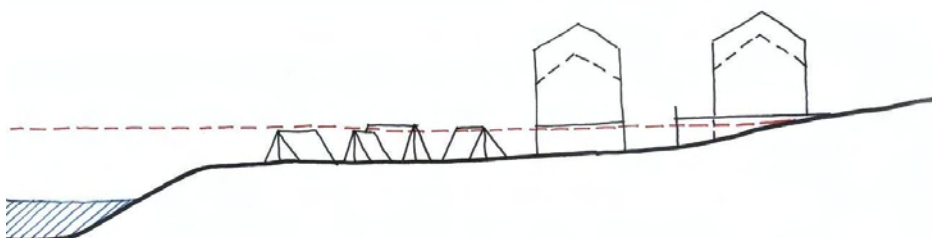
- **Relocation of a complex camping site into a new location outside the area in danger of flooding**



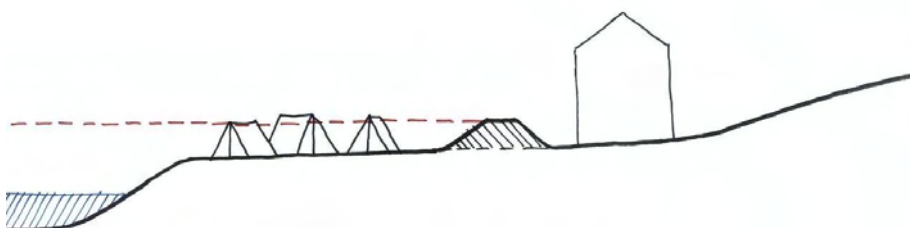
- **Relocation of building objects of the camping site background into a new location outside the area in danger of flooding**



- **Facility building objects on piles above the flooding level**



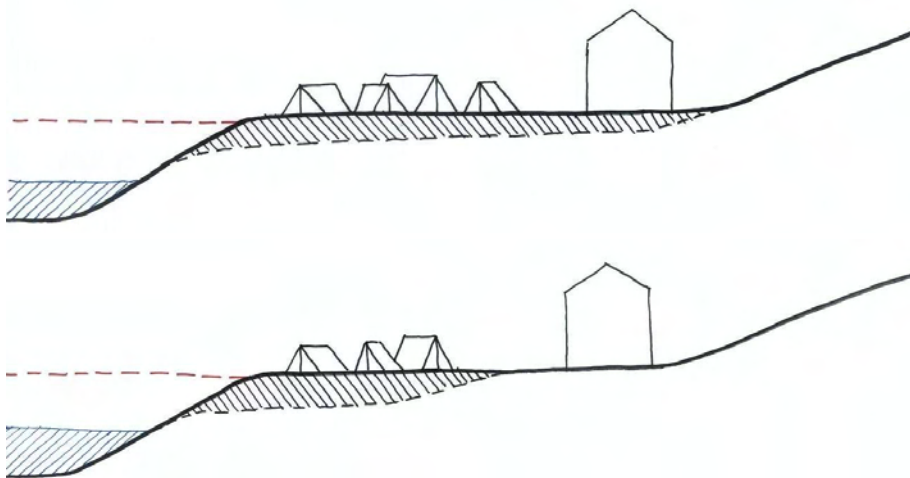
- **Protection of building objects of the camping site facilities by stabile building and technical equipment**



- **Protection of a complex camping site by stabile building and technical equipment**



- **Increase (filling) the total area / part of the camping site area above the level of flooding**



Cards of camps / camping sites / car camps

All relevant data regarding the current infrastructure condition aimed at camping sites and car camping conditions, defined problems and deficits of their equipment, quality of offered services and accessibility, of defined conflicts of individual locations with flooding areas or active flooding zones and last but not least the draft of regulations to enhance infrastructure for water tourism and possible preventive flood protection of current and suggested locations included complexly in the framework of CARDS OF CAMPS / CAMPING SITES / CAR CAMPS.

In the locations of current and suggested campins sites or car camps the principles of preventive flood protection of water tourism infrastructure are check out in detail infrastruktury that could potentially be applied in the monitored area. The draft of flood protection of each concrete location representes a principle approach (in certain cases even a variant) to potentially possible solution of preventive flood protection while respecting individual location character, eliminating negative influences of water regime in the area, landscape character and other protected interests of nature and landscape, and ultimately preserving custom quality of the area.

The objective is to provide a complex summary of possible ways and approaches towards flood protection of water tourism infrastructure localised in the framework of the monitored area in direct relation to water stream and to suggest the locations that can be preserved and define the conditions under which that could be processed; further to identify the locations protection of which against flooding is not necessary at all or it is not desirable or even eliminated in view of a possible negative influence to water course and the progression of possible flooding.

Example of one CARD OF CAMPS / CAMPING SITES / CAR CAMPS is on the following pages:

municipality	river	river km	location	river bank
Rejštejn	Otava	106,2	•)	R

camp / camping site / car camp name

AUTOKEMPING RADEŠOV

code

04

accommodation types

car camping, camp, cottages

capacity

camp

car camping

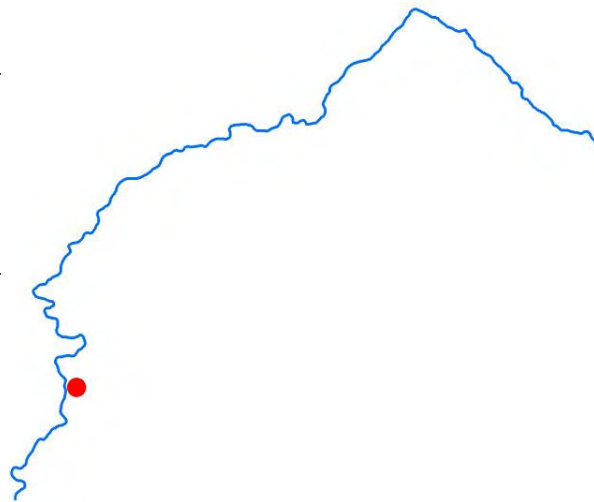
2 quadruple bed cottages

2 double bed cottages

1 single bed cottage

facilities

drinking water, hot water, WC, shower, electricity connection, bufet or kiosk, restaurant, parking place, children playground, no-barrier access, tarmac area for ball games, special separated areas for fire places



INFRASTRUCTURE FOR WATER TOURISM

current state – failures of infrastructure for water tourism

- Not identified

design – infrastructure for water tourism modifications

- Not designed

FLOOD PROTECTION

existing conditions – flooding danger

- The whole camp area including access communications and building facilities are located in the flooding zone Q100
- Over a half of free area for camping is located in the flooding area Q5 and Q20 (buildings are found outside the flooding area Q5 and Q20)
- Active zone of flooding area copies inner servicing communication within the camp very close to the river bank line
- Risk of flooding comes also from the Opolenecký potok (right Otava inflow), yet there are no flooding zones set for this water course

design of flood protection

Option A

- Increasing servicing communication along the Otava river in form of filling mound in level of flooding Q20, which does not eliminate the risks of backwater from the Opolenecký stream on the Northern and Eastern side of the camping site
- It is essential to create a detailed hydrotechnical research of the Opolenecký stream

Option B

- Filling part of the camping site by inner service communication to flooding level Q20 → „island“ defined by the current service communication above the levels Q20 and active zone of flooding area
- All building objects in the facility that is accommodation cottages need to be transported outside active zone of flooding area and with consent of an appropriate water right office and administrator eventually elevated above the flooding level Q100

CONCLUSION

- Location with the possibility of flood protection (providing there is a contest of both the appropriate river-basin administrator and water right office)
- Location appropriate for further development of building objects within the existing camping site are providing all nature and landscape protection conditions are met (Landscape Protected Area Šumava)

municipality

Rejštejn

river

Otava

river km

106,2

location

•)

river bank

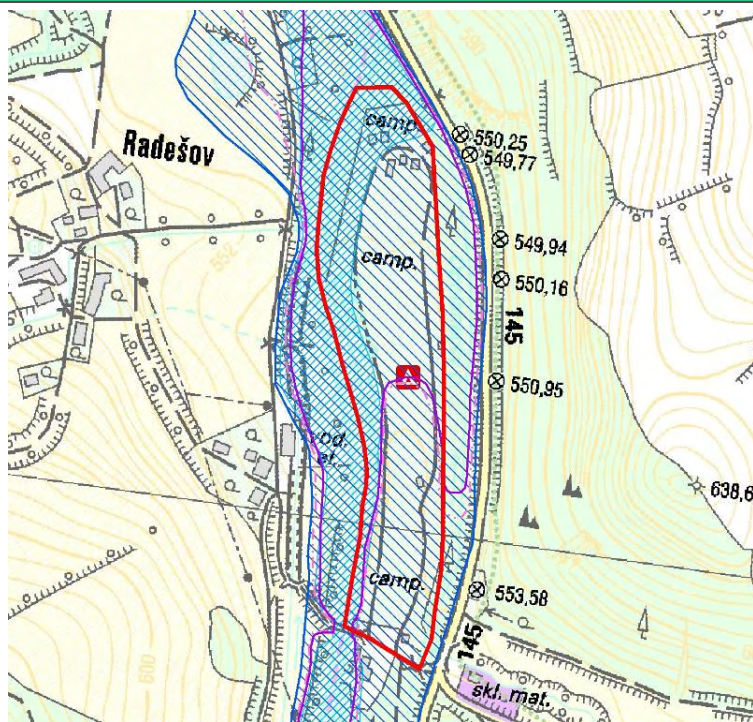
R

camp / camping site / car camp name

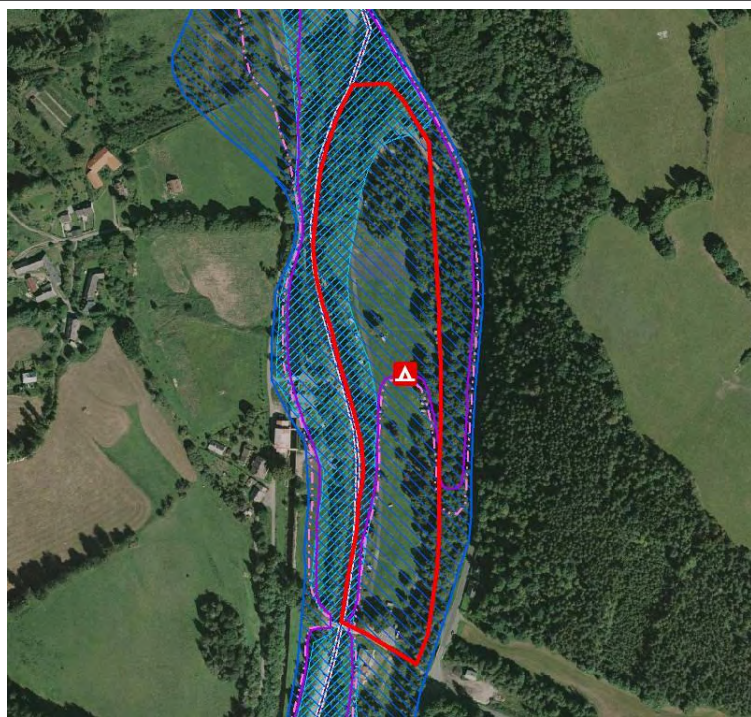
AUTOKEMPING RADEŠOV

code

04



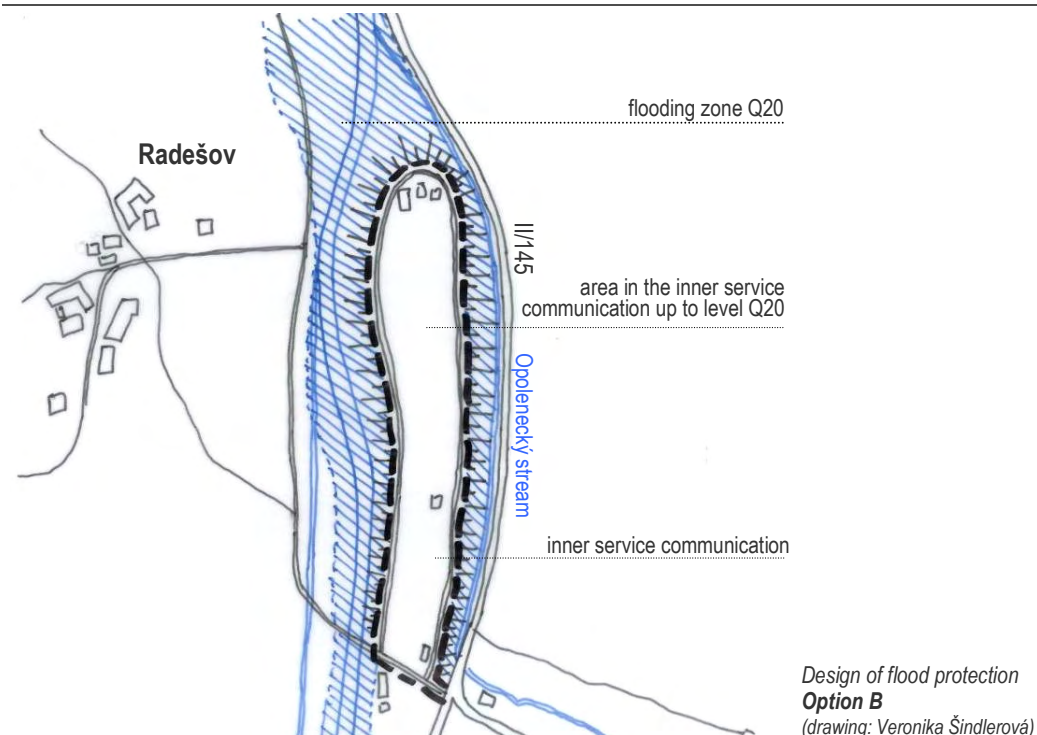
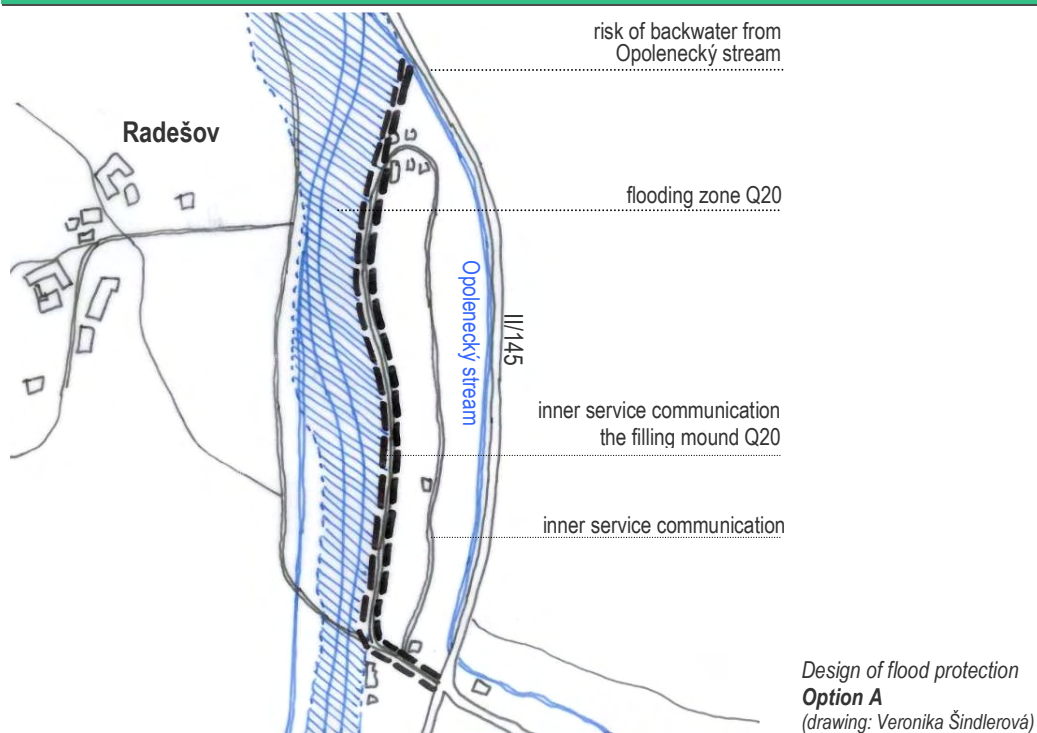
Basic map derived 1:10 000 - cutout



Orthophoto map of Pilsen region 2008
GEODIS Brno spol. s r.o.
GEOREAL Plzeň spol. s r.o.

municipality	river	river km	location	river bank
Rejštejn	Otava	106,2	•)	R

camp / camping site / car camp name	code
AUTOKEMPING RADEŠOV	04



Complete evaluation of conditions of water tourism infrastructure development

Water tourism infrastructure development and mainly in respect of accommodation facilities such as camps, camping sites and car camps, are most significantly determined by the location of facilities in direct relation to the water course in the alluvial plain in the framework of flooding areas or active zone of flooding area. Any interference with the alluvial plain of the water stream is a significant intervention into the natural value and followingly it influences the water regime in the location, mainly the development of possible flooding or an area defined for the debouchment. On the other hand it is possible to move the camping sites and car camps outside the flooding areas that is in further distance from the water course, which decreases the utility value of the accommodation facility the essential prerequisite of which is optical and also physical contact with the water course as a key attractivity of the water tourism.

Criteria of condition evaluation for development of individual camps, camping sites and car camps

Development conditions for individual camps, camping places and car camps in the current locations and other locations defined as possible new future facilities, were individually evaluated based on following criteria:

- Level of flooding danger in the location
- Necessity of preventive flood protection in the location
- Location conditions for preventive flood protection
- Location conditions for other area development

Categorisation of camps, camping sites and car camps locations in view of their development

All evaluate locations of the camps, camping sites and car camps were evaluated based on development conditions and sorted in five categories depending on the level of flooding and conditions for possible preventive flood protection. Followingly it is clear which locations are suitable for other areal development or intensifying of the use or which locations are suitable for placing new camps or car camps and priority attention should be paid to their possible development. Further the evaluation states that some locations are with respect to its positioning in the flooding areas or active zone of flooding area completely insufficient for further development or it is not at all possible to place new facilities in the area.

Note: regarding specific conditions for preventive flood protection, that is specific conditions for development some locations could not be exactly placed in one of the five categories and therefore are placed between two category ranges.

location category	definition / location category
A	No / minimum flooding danger No need for flood protection Possibility of development of free space for camping and building objects of the facilities
B	Flooding danger of a section or complete location Possibility of flood protection of building objects or free area for camping Possibility of development of building objects or free area for camping
C	Danger of flooding of almost complete or the complete location Possibility of flood protection is significantly limited (for example only of the building objects of the facilities) or impossible Possibility of development is significantly limited (for example only of the building objects of the facilities)
D	Significant exposure of the complete location by flooding (for example by positioning of large part of area within the active zone of flooding area) Impossibility of any flood protection Possibility of keeping current equipment and camping range in accordance with the valid final building approval
E	Significant exposure of the complete location by flooding (for example by positioning of large part of area within the active zone of flooding area) Impossibility of any flood protection The location is completely unsuitable for placing a camping site or car camp

Categorization of locations in light of development conditions

<i>location code</i>	<i>location name</i>	<i>river km</i>	<i>position against stream</i>	<i>left (L) bank</i> <i>right (R) bank</i>	<i>location evaluation</i>
Otava					
O1	Letní tábor a veřejné tábořiště Pavlova Louka	111,1	.)	R	A
O2	Penzion a autokemping Klášterský Mlýn	107,9	.)	L	A
O3N	Klásterský mlýn	cca 107,5	.)	L	E
O4	Autokemp Radešov	106,2	.)	R	B
O5	Autokemp Annín 1.	101,8	.)	R	C D
O6	Autokemping Nové Městečko	101,0	.)	L	C D
O7	Camp Jitřenka	93,6	.)	L	A B
O8	Chatová osada Luh	93,6	.)	L	D
O9	Kemp Sušice	89,7	.)	L	B C
O10	Kemp Dobruška	87,6	.)	L	D
O11	Vodácké tábořiště Čepice	84,4	.)	L	C D
O12	Kemp Žichovice	82,9	.)	R	D
O13	Vodácké tábořiště Velké Hydčice	75,5	.)	R	B C
O14	Vodácký kemp Lipky Horažďovice	73,2	.)	L	B
O15	Vodácké tábořiště „Rosenauerův mlýn“	73,1	.)	R	C

Berounka

B1	Vodácké a turistické tábořiště U Dolanského mostu	124,6	.)	R	A
B2N	Telín	cca 120,0	.)	R	E
B3	Kemp Nadryby U jezu	119,0	.)	L	C D
B4	Kemp U přivozu	118,0	.)	L	D E
B5N	Darová	cca 114,6	.)	R	A
B6	Tábořiště Planá	112,4	.)	L	C
B7N	Čivice	cca 109,0	.)	L	C
B8N	Žitovský mlýn	cca 109,0	.)	R	E
B9N	Robčice	cca 105,9	.)	L	E
B10	Kemp a tábořiště Kobylka	103,5	.)	R	C
B11	Tábořiště Liblín Na Střelnici Berounka	101,7	.)	R	D
B12	Tábořiště Na Rybárně	97,8	.)	L	A
B13N	Rakolusky	cca 95,8	.)	L	C D
B14aN	Třímány	cca 93,6	.)	R	C
B14bN	Krašov	cca 92,3	.)	R	E

location code	location name	river km	position against stream	left (L) bank right (R) bank	location evaluation	
B15	Tábořiště a rekreační středisko Třímány	90,5	- |	R	C	
B16	Vodácká jídelna a tábořiště "U Mloka"	90,5	- |	R	C	
B17	Tábořiště u Potůčků	89,3	) .	L	C	D
B18N	Lejskův mlýn	cca 88,3	) .	L	C	D
B19	Restaurace a kemp U Varských - Zvíkovec	81,7	) .	L	C	D
B20N	Restaurace a kemp U Varských – Zvíkovec - rozšíření	cca 82,0	- |	L	E	
B21	Vodácké tábořiště Zvíkovec "Pod mostem"	81,5	) .	R	B	

Notes to table:

Positioning against water course

Positioning inside river meander) .
Positioning outside river meander) .
Positioning in direct river section	- |

Current / potential location

	Current camp / camping site / car camp location
	Location for potential positioning of a new camp / camping site / car camp (current occasional camping intention from planning documentation / planning materials)

Evaluation of conditions for development of individual camps / camping sites / car camps locations in view of elimination of conflicts with the limits of water regime in the area

Evaluation of conditions for development of individual camping site / car camps locations in view of elimination of conflicts with the limits of water regime in the area is described in schemes:

N3.a – Evaluation of the locations – Otava

N3.b – Evaluation of the locations – Berounka

