101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA

STUDY ON WATER RETENTION IN THE LANDSCAPE AND PROJECT OF SPRING AREA REVITALIZATION
ACCOMPANYING REPORT

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101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy— LIFE-2021-SAP-CLIMA

LIFE ADAPT BRDY

NATURA 2000

Ministerstvo životního prostředí

November 2023
Order No.: 5552/006

CONTENT

1. IDENTIFICATION

The project was designed on the basis of a work contract dated March 13, 2023

Contract Number of the Commissioning Authority 2023-654

Contract Number of the Contractor 06-o-5552-13624/23

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2. INTRODUCTION

2.1. Terms of Reference

The multi-criteria analytical study of the water regime in the Brdy Highland. The study will cover the area of the former Brdy military area of approximately 22,600 ha, which is managed by VLS ČR, s.p., Hořovice Division.

The study will involve a survey of the entire area of interest, focusing on hydrology, water management, river and landscape ecology and river morphology. The available data on the territory will be evaluated and a field survey will be carried out with the aim of identifying sites suitable for revitalization – selected spring areas. The parts of the study relating to analyses and solutions will be addressed with the use of a GIS system.

The present study regards a “spring area” as a site (small and large) with a water discharge or with a waterlogged or saturated soil profile (wetland and marshland character), with and in some cases without typical vegetation bound to waterlogged areas with the soil profile only being saturated and possibly with coatings of chemical precipitates. The character of the spring area is both with and without runoff, small and large scale – the spring areas of the Brdy streams, minor peat loops in the forest stand and spring (wetland) alder forest, waterlogged and bog spruce stands, birch mire forests, waterlogged riparian vegetation along watercourses, waterlogged meadows, raised bogs, etc.

The aim of the study is to determine the condition of the hydrological regime of the hydrophilic communities and to assess the possibility of restoring its natural character in the area concerned.

analysis of runoff routing

- mapping of water channels – use of data from the LIDAR system and field verification
- mapping of forest drainage routes and other drainage structures
- distribution of the current water network using the Central Register of Watercourses (in Czech referred to as the "CEVT") and potentially other databases and documents
- anthropogenic influences (e.g. road network, freshwater abstraction for public supply, etc.)
- research into the historical water conditions in the area – analysis based on available data (former marshlands and wetlands, waterlogged forests, original size of water bodies, existence of former water reservoirs, original natural routes of watercourses, technical measures for water transfer, etc.)

analysis of the area concerned from a biological point of view

- map of habitats bound to waterlogged, wetland, bog and spring sites – based on forestry maps and natural habitats
- map of areas suitable for extension of natural aquatic habitats
- selection of watercourses or their parts without anthropogenic influence (part of a watercourse without noticeable deepening, dredging, realignment or channelling carried out in the past)
- identification of former natural stream channels (visible original stream channels in areas where watercourses have been regulated and straightened)
- classification of habitats (the Czech detailed classification system refers to types of habitats as the "biotopes") and streams with the potential to enhance the hydrological regime and prioritization
- verification of priority biotopes and watercourses in the field

analysis of territorial limitations

- analysis of territorial limitations (land maintenance, territorial protection, management of forests and the open landscape, etc.)
- identification of spring areas
- location and demarcation – point and spatial, non-runoff and runoff, historical and contemporary
- vegetation identifier for spring areas – botanical survey of spring areas (current composition of vegetation, no vegetation, characteristic indicator species, etc.)
- description of the level of damage to spring areas (extent of drainage, damage by roads, land reclamation, depth, size, etc.) – classification in terms of the degree of disturbance by drainage – methodology for assessing damage to spring areas

2.1.1. References

1. Hyklová J., Karlík P.: Lesní biotopy ohrožené změnami hydrologického režimu v CHKO Brdy, Bohemia centralis, 2020, vol. 36, no. 2020, pp. 281-297. ISSN: 0231-5807
2. SWECO Hydroprojekt a.s., Studie zvýšení retenční schopnosti pramenné oblasti CHKO Brdy - I. ETAPA KLABAVA, 2/2017
3. Stehlík M., Lubas M. & Guziur J. (2018): Možnosti zvýšení retence vody v povodí horní Klabavy (CHKO Brdy). – Bohemia centralis, Prague, 34: 97–115.
4. AOPK (2015): Plán péče o CHKO Brdy na období 2016–2025. – Ms., 45 p. [depon. in: AOPK ČR, Prague].
5. Chytrý M., Kučera T., Kočí M., Grulich V. & Lustyk P. [eds.] (2010): Katalog biotopů České republiky. Ed. 2. – AOPK ČR, Prague.
6. Just T. (2003): Revitalizace vodního prostředí – AOPK ČR, Prague.
7. AOPK (2022): Standardy péče o krajinu – obnova vodního režimu rašelinišť a pramenišť SPPK B02 002: 2022. AOPK ČR, Prague.
8. Dohnal Z. a kol. (1965): Československá rašeliniště a slatiniště. – Nakl. ČSAV, Prague
9. Biotope Mapping in the Czech Republic, Nature Conservation Agency, online WMS
10. Forest Typology Map, FMI, online WMS
11. Digital Relief Model of 5th Generation, COSMC
12. Register of Boreholes, Geofond
13. Cadastre of Real Estate – remote access
14. Terrain survey

3. ANALYTICAL PART

3.1. Demarcation of territory

The area of interest can be defined as the area of the Brdy Protected Landscape Area situated in the former military zone. The size of the area concerned is 263 km^2, i.e., 76% of the total area of the PLA.

It was necessary to identify target forest types and habitats within the area. The total area of 28 km^2 of target forest types have been identified.

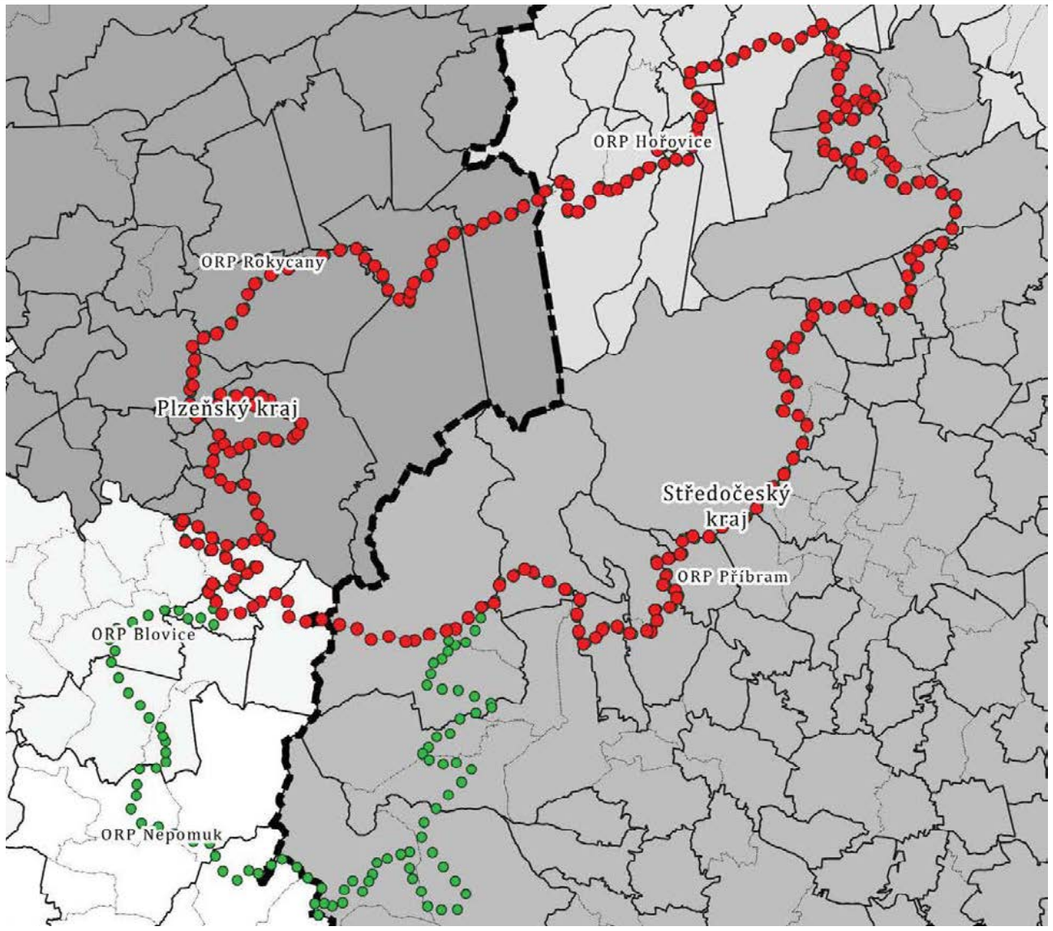


Fig. 1 Area concerned – administrative zoning

The area is located within 2 regions, namely the Pilsen Region (33%) and Central Bohemian Region (67%). The following 4 municipalities with extended competence are concerned: Blovice (3%), Rokycany (31%), Hořovice (16%) and Příbram (51%). Total 33 municipalities and 64 cadastral areas are concerned.

3.2. Territorial limitations

3.2.1. Territorial protection

Protection pursuant to Act No. 114/1992 Coll.

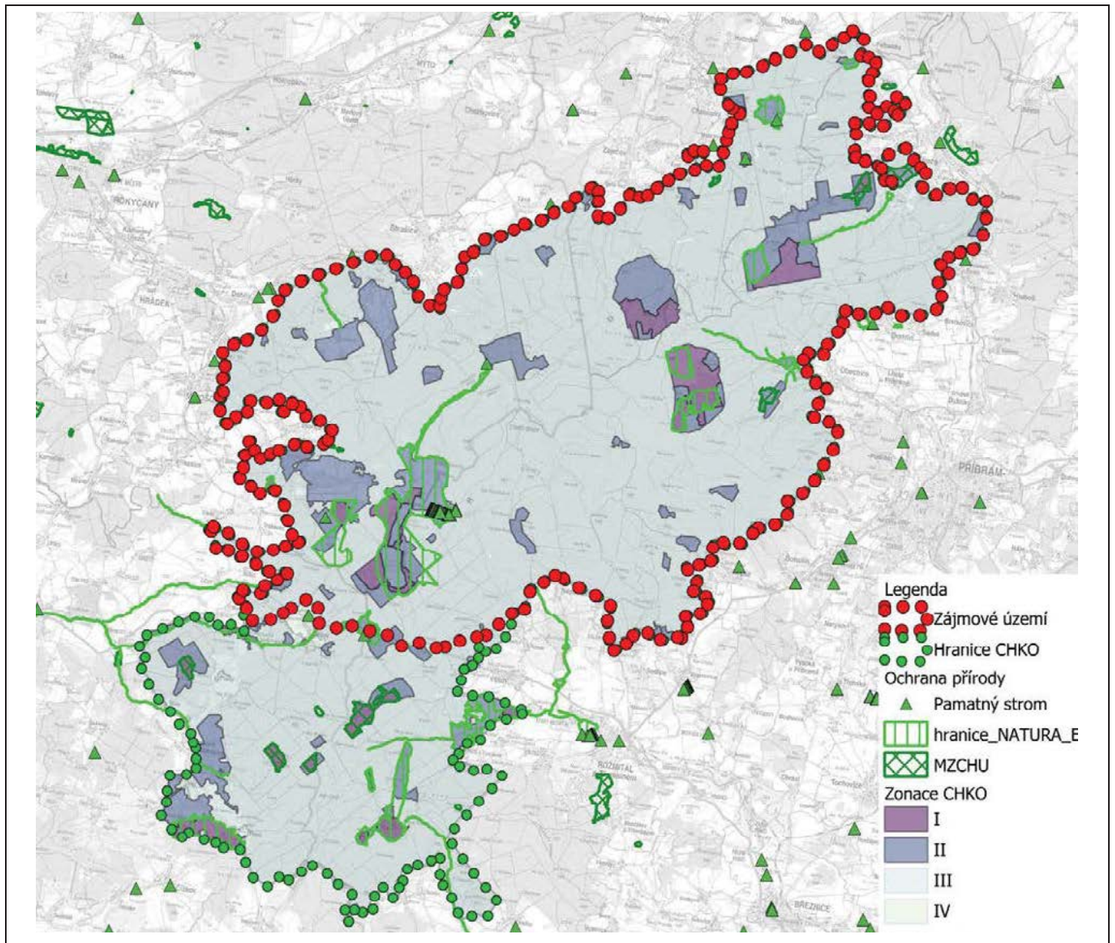


Fig. 2 Area of interest – territorial protection pursuant to Act No. 114/1992 Coll.

Tab. 1 List of Natura 2000 sites in Brdy PLA

Site code	Site name	Site code	Site name
CZ0213783	Felbabka	CZ0210056	Trokavecké louky
CZ0213787	Hrachoviště	CZ0210047	Třemšín a Hřebence
CZ0214047	Brda	CZ0214041	Niva Kotelského potoka
CZ0213818	Octárna	CZ0320005	V Úličkách
CZ0213050	Ohrazenický potok	CZ0213814	Ledný potok
CZ0214042	Padrťsko	CZ0210054	Tok
CZ0210062	Teslíny	CZ0313140	Závišínský potok

Protection pursuant to other legislation

Protected Areas of Natural Accumulation of Water (PANWA) are defined in Section 28 of Act No. 254/2001 Coll. on Water and on Amendments to Certain Acts (Water Act) as areas which, by virtue of their natural conditions, constitute significant natural accumulation of water. To the extent specified by Government Decree, Act No. 254/2001 Coll. prohibits: (a) reducing the extent of forest land, (b) draining forest land, (c) draining agricultural land, (d) extracting peat, (e) extracting minerals by means of opencast mining or carrying out other earthwork which would lead to the exposure of continuous groundwater levels, (f) extracting and processing radioactive raw materials, (g) depositing radioactive waste. The boundaries of these areas are defined in Government Decrees No. 40/1978 Coll., No. 10/1979 Coll., and No. 85/1981 Coll. The records involve territorial identification, a description of the boundaries and the name of the protected area.

Protected zones of water resources and water reservoirs

- Water reservoirs – Láz, Pilská, Obecnice
- Water resources –

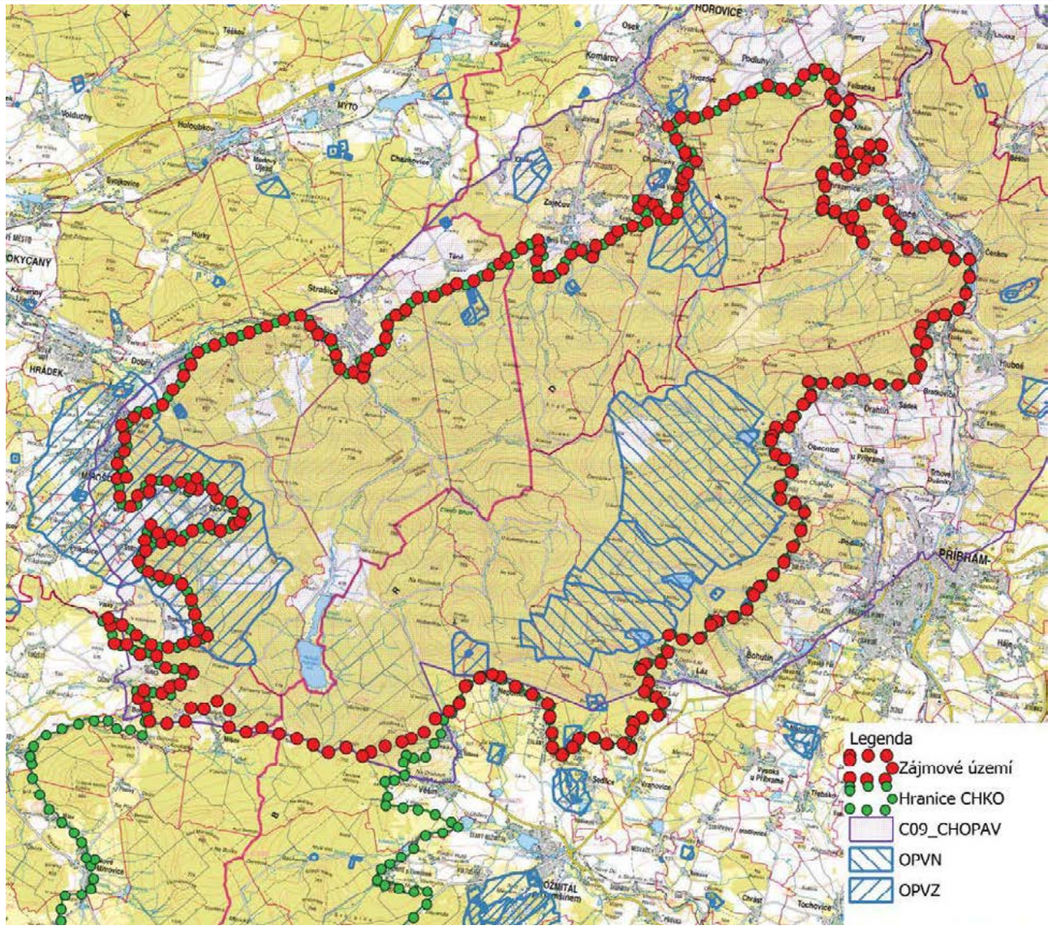


Fig. 3 Area of interest – protection pursuant to Act No. 254/2001 Coll.

Protected deposit areas

Undermined area

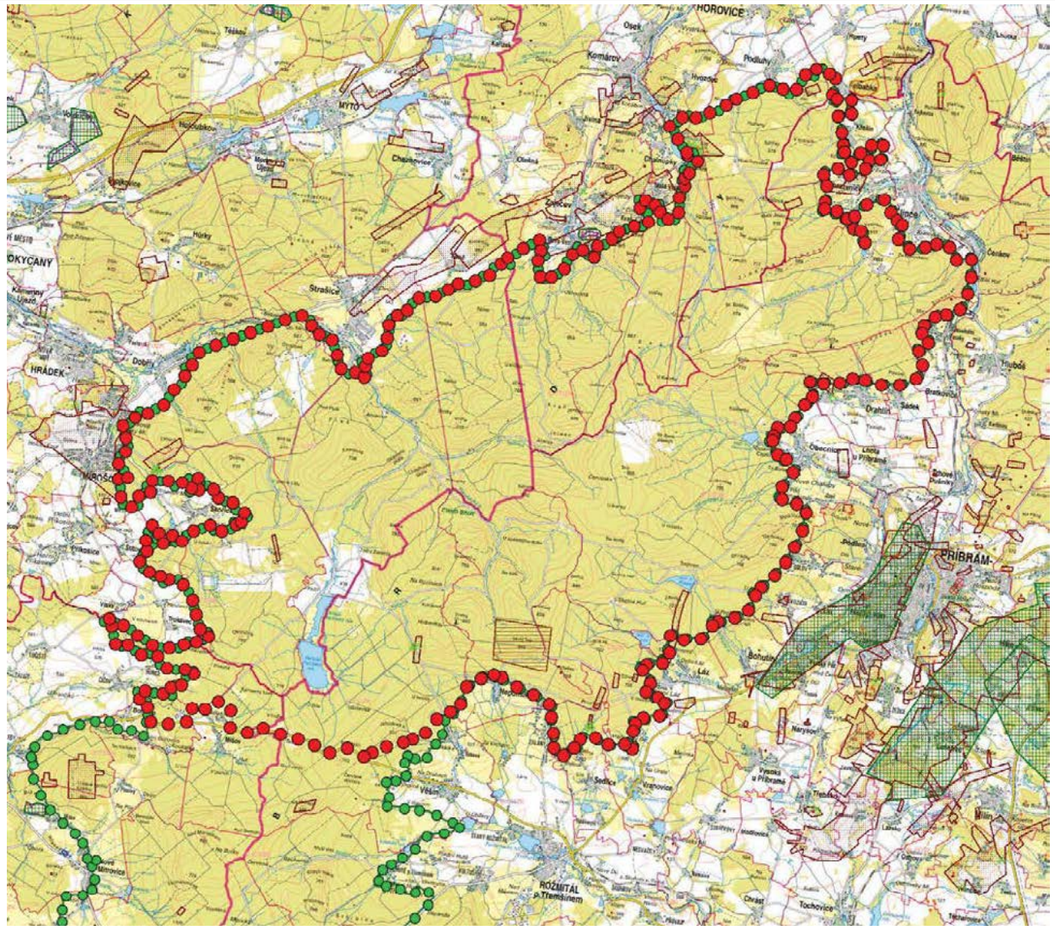


Fig. 4 Area of interest – protection pursuant to other legislation

3.2.2. Transport and technical infrastructure networks

The area of interest lies outside the built-up area with minimum technical infrastructure networks. There are installations of data cables operated by the Army of the Czech Republic. The information on the location of the networks is subject to a special security regime. Therefore, it is recommended that such information be requested only at the time of preparation of the individual sites within the project. A survey shall be carried out prior to the commencement of construction works. Anticipated location along roads. The detailed layout is not considered public information.

There are water resources and related technical infrastructure in the area. Water resources of regional significance are water reservoirs (Láz, Pilská, Obecnice) on the eastern border of the area, as well as smaller local resources supplying water for municipalities outside the area.

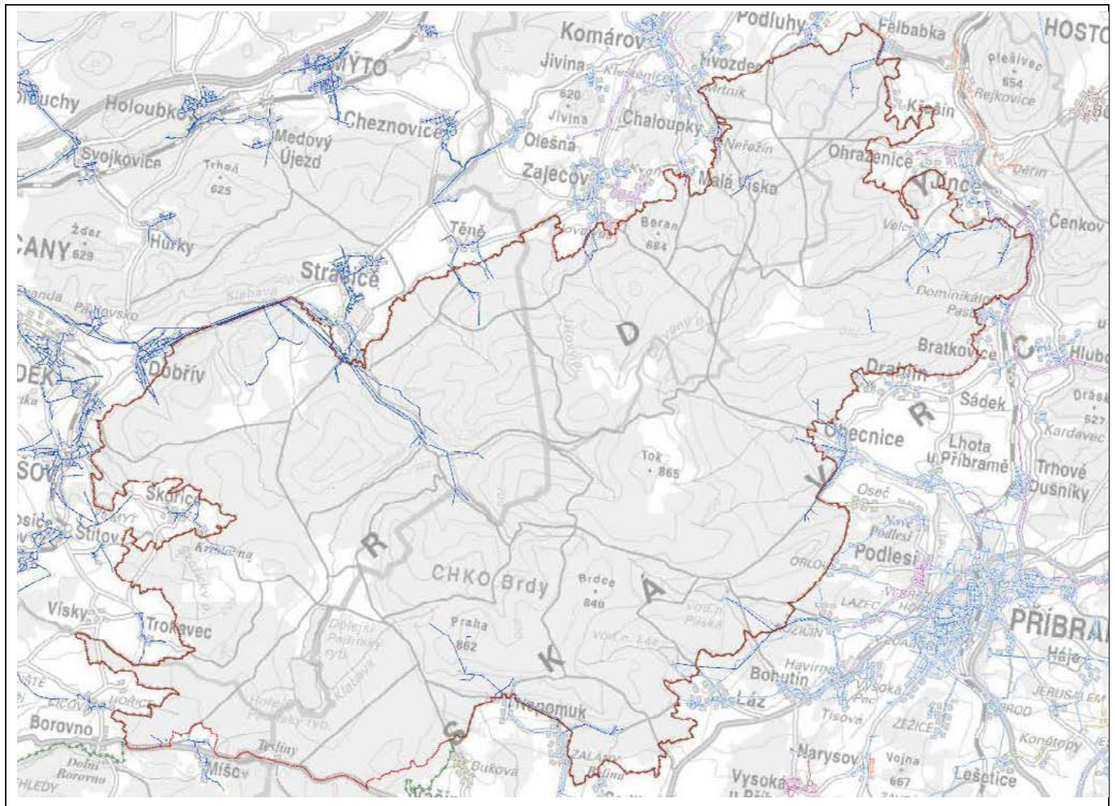


Fig. 5 Area of interest – water resources, water supply and sewerage systems (source: development plans of the water supply and sewerage system)

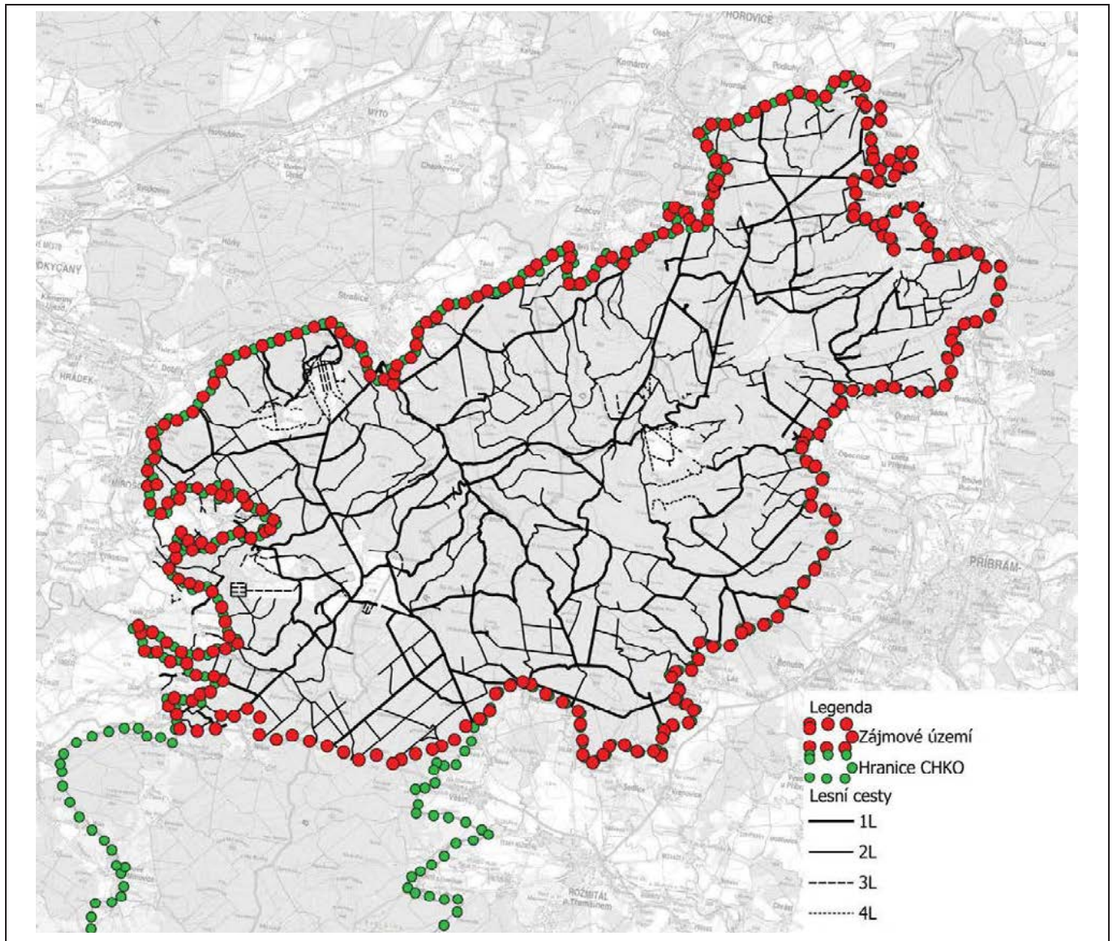


Fig. 6 Area of interest – road network

Road network

There are no public roads in the area of interest pursuant to Act No. 13/1997 Coll. on Roads. The road network consists of forest roads of classes 1–4 as defined in Act No. 289/1995 Coll. on Forests.

Tab. 2 Forest roads by categories

Category	Length (m)
1L	248,066
2L	309,696
3L	26,598
4L	21,172
Total	605,532

3.2.3. Land ownership

The land ownership in the area of interest is determined by the original demarcation of the military area. The land is mostly state-owned with management rights held by the state enterprise VLS. There are smaller state-owned areas with the management right held by the Ministry of Defence.

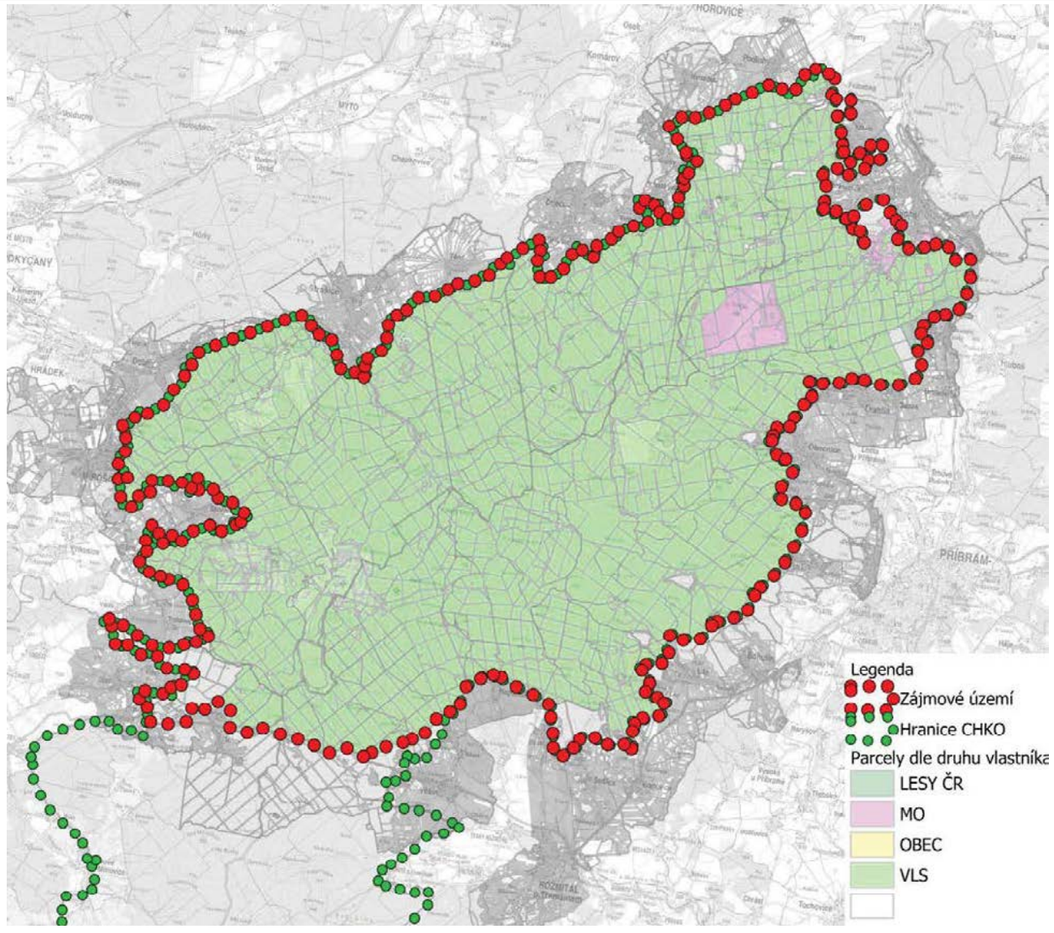


Fig. 7 Area of interest – land ownership

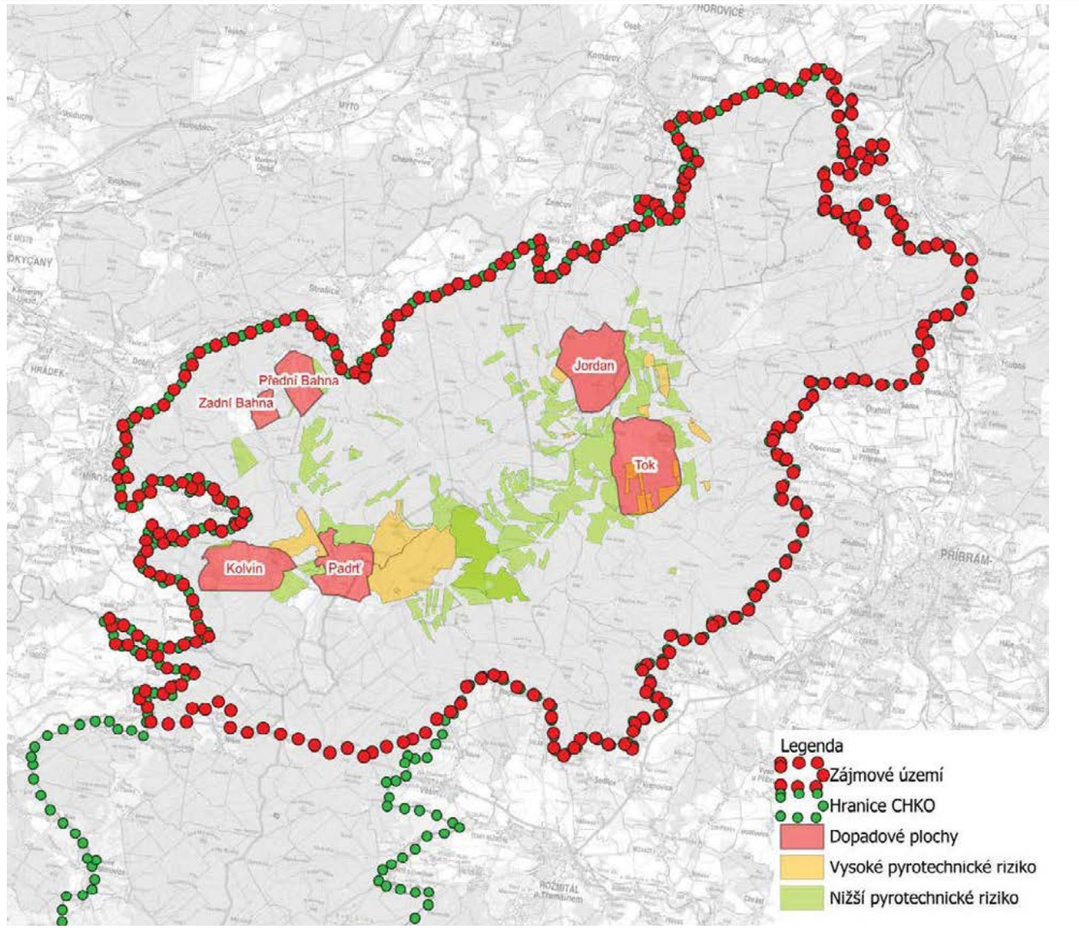


Fig. 8 Area of interest – UXO hazard

3.2.4. UXO hazard

The area is both former and still active military area. This implies restrictions on activities due to explosive hazards. The priorities for the selected locations shall take this into account since the implementation of the measures relies on an unexploded ordnance (UXO) survey. The UXO survey beyond the clearance plan of the former military area may be reflected in increased implementation costs of the construction.

3.3. Natural conditions in the area of interest

3.3.1. Geomorphology

The area concerned, which represents the central and northern part of the Brdy Highland north of the Spálené Poříčí – Rožmitál pod Třemšínem line, falls within the geomorphological districts of the Třemšínská vrchovina, Třemošenská vrchovina and Strašická vrchovina highlands. Within the higher geomorphological units, these districts fall within the sub-unit VA-5A Brdy, unit VA-5 Brdy Highland, area VA Brdy area, sub-province V Berounka system and province Bohemian Massif.

The highland is rugged with a mean altitude of 600.6 m and a mean slope of 5°24' The western part is predominant with Proterozoic shales with numerous interbeds of lydite and spilite. The eastern part is characterised by Cambrian sandstone and quartzite conglomerates. The relief is structurally denuded with remnants of a flattened surface where wide structural ridges separate shallow valleys of numerous spring streams. The Litavka River deeply incises the north-eastern promontory. (Demek et al., 1987).

The highest peak is Tok, reaching 865 metres above sea level.

Raised bogs are an important geomorphological formation in the Brdy Highland. These are peat areas formed by the accumulation of plant debris and peat. They are often characterized by wetlands, bog lakes and specific vegetation. Raised bogs have a significant ecological value and contribute to preserving biodiversity.

3.3.2. Geological conditions

This is an area with highly diverse geology, formed by limestone, shale, sandstone and basalt.

During the Paleozoic the Brdy area was covered by the sea, so there were sediments of different types of rocks, particularly limestone, shale and sandstone.

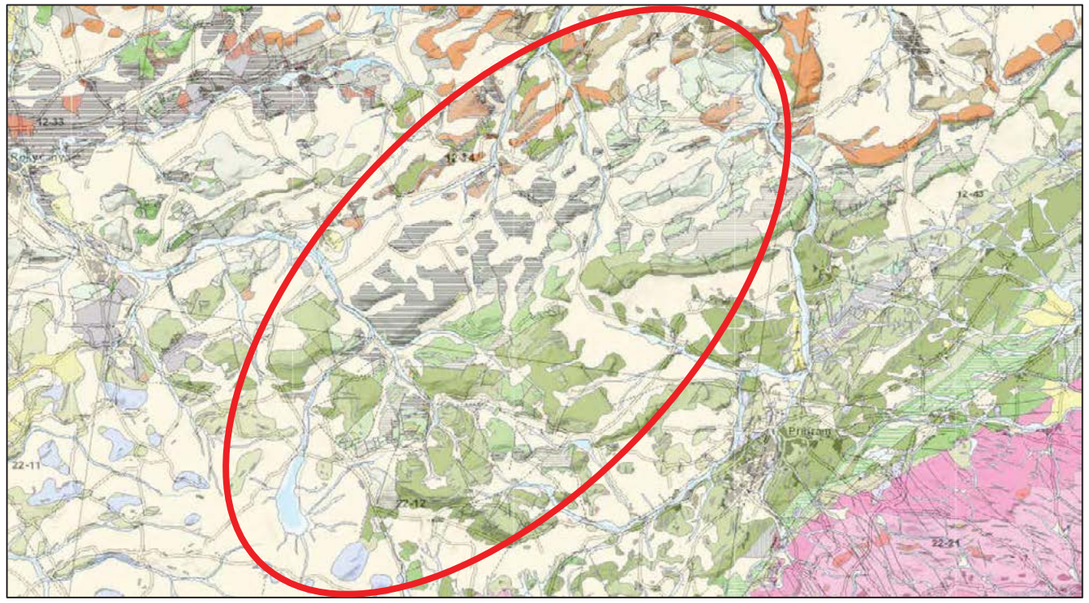
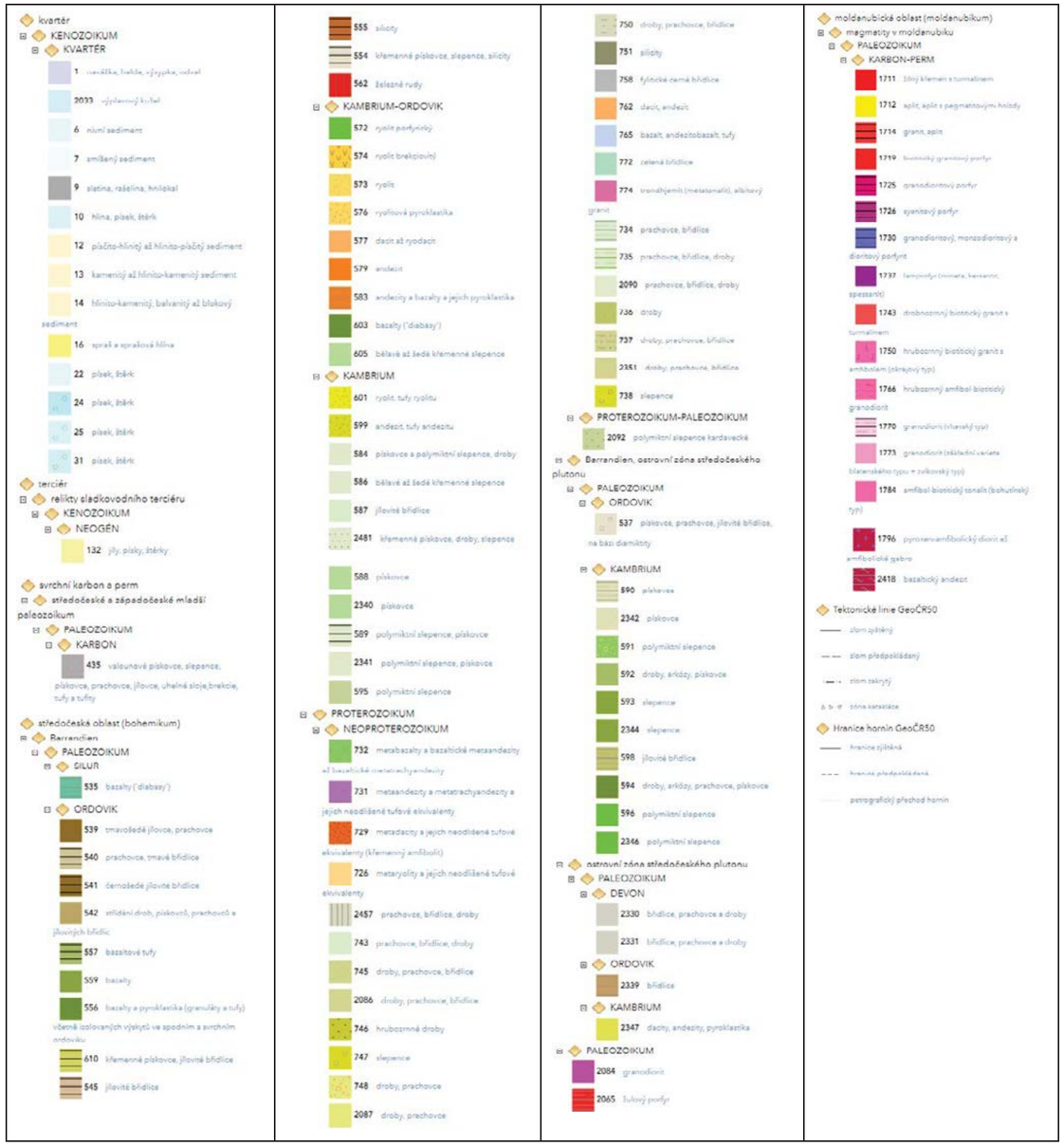


Fig. 9 Geological map 1: 50 000 https://mapy.geology.cz/geocr50/



Barrandian Upper Proterozoic

In the Brdy Highland, the Proterozoic rocks cover the belt between Příbram and Dobříš and form the southern and south-western part of the mountain range. Clay shales, siltstone, graywacke and volcanic rocks occur variably in the two main groups of the Barrandian Proterozoic sediments (Kralupy–Zbraslav and Štěchovice groups). Parts of the layer sequences got striated during the Cadomian orogeny. The sedimentary sequence shows alternation of fine-grained clastic siltstone, shales and graywacke.

In the southern part of the area, we can find basalts, basaltic andesite and tuffs in the area between Mirošov and Rožmitál pod Třemšínem.

Barrandian Paleozoic

Palaeozoic rocks occur throughout the entire area of interest and form the predominant bedrock here.

The occurring sedimentary rocks are conglomerates, graywacke, sandstones, quartzose sandstones, siltstones, clayey shales and tuffs.

Among igneous rocks, there are andesite, basalt, rhyolite and their pyroclastics.

Quaternary and tertiary deposits

Tertiary sediments are very rare in the given area, occurring in the originally highly eroded surface (e.g., in the surroundings of Strašice and Kamenný újezd). They are mostly of fluvial to fluvio-lacustrine origin, predominantly composed of clay, sand and gravel sediments. These sediments can be up to 8 m thick (https://mapy.geology.cz/vrtna_prozkoumanost/; 2023).

The valley lines of the local streams are filled with accumulations of fluvial and colluvial-fluvial sediments, mainly of Holocene sediments of sandy loam, clayey sand and clayey stone. The thickness of the valley line deposits can reach up to 20 m in certain parts (the valley of the Červený potok Brook). In the upper parts of small stream basins, the thickness varies between 0.5 and 5 m (https://mapy.geology.cz/vrtna_prozkoumanost/; 2023).

Colluvial (delluvial) sediments form most of the cover in the given area. The character of the colluvium is consistent with the original rock - in the case of shales and graywacke, the colluvial sediments are most likely of a clay to claystone character. The colluvial sediments of sandstones and conglomerates will mainly show a sandy and gravelly character, while the colluvial sediments of igneous rocks will mainly be heavy clay to stony clay. The thickness of the colluvial sediments varies greatly ranging from decimetres around bedrock outcrops to a number of metres at the bases of slopes https://mapy.geology.cz/vrtna_prozkoumanost/; 2023).

Eolithic sediments are rare within the study area. The sites with such occurrence are namely in the surroundings of Hořovice, adjacent to the northern part of the area of interest, and also north of the city of Příbram.

Mineral extraction took place in the area in the past, which resulted in considerable anthropogenic deposits – spoil tips (e.g. in the vicinity of Ejpovice and Břasy).

3.3.3. Hydrogeology

In terms of hydrogeological zoning, the area lies in region No. 6230 Basement, Proterozoic and Palaeozoic in the Berounka River basin.

The area is characterised by relatively simple groundwater conditions. The groundwater flow is limited to the system of fissures and is linked to the near-surface layer of disconnected rocks. Locally more important are the aquifers of the Cambrian conglomerates in the Brdy Highland. Hydrochemically significant are the Upper Proterozoic pyrite shales, and the Ordovician sediments also show higher mineralization. The deep zones may have significant fault belts acting as drainage aquifers.

The main aquification occurs in disconnected rocks near surface, where a shallow non-uniform aquifer is formed with a free surface that conforms to the morphology of the terrain. The water is drained in the form of spring seeps or hidden seeps into valley alluvium and surface streams. Only some groundwater flows deeper down along fissure zones and tectonic lines.

According to the hydrogeological map 1:50 000 (Source: https://mapy.geology.cz/hydro_rajony/; 2023), the above-mentioned alternating locations of Cambrian conglomerates and greywackes within the area can be found between the towns of Rokycany, Rožmitál pod Třemšínem and the village of Felbabka. According to the HG map, these locations show a low degree of transmissivity and a transmissivity coefficient $<1*10^{-4}$ m^2*s^{-1}.

Between the municipalities of Spálené poříčí, Rokycany and Rožmitál pod Třemšínem, there occur Proterozoic shales, siltstones, greywackes, and phyllites with a prevailingly low degree of transmissivity and a transmissivity coefficient $<1*10^{-4}$ m^2*s^{-1}. In the surroundings of the Úslava River basin and its tributaries there are locally more transmissive locations with a medium degree of transmissivity and a transmissivity index in the range of $1*10^{-4}$-$1*10^{-3}$ m^2*s^{-1}.

Between Rokycany, Hořovice and the village of Strašice, we can find a highly tectonically disturbed belt formed by a rich mixture of Ordovician shales and siltstones,, greywackes and shales, quartzites and quartzose sandstones with thickness >100 m, paleovolcanics – mainly matabasites, spilites of diabases and their tuffs, porphyrites and adesites with a mostly low degree of transmissivity and a transmissivity coefficient $<1*10^{-4}$ m^2*s^{-1}. In the area southwest of Hořovice and in the area between the municipalities of Březina and Lhota pod Radcem, there are Ordovician quartzites and quartzose sandstones with thickness >100 m, a medium degree of transmissivity and a transmissivity index in the range of $1*10^{-4}$-$1*10^{-3}$ m^2*s^{-1}.

3.3.4. Natural habitats

Habitat mapping was carried out in the Czech Republic under the auspices of the AOPK ČR in 2000–2005, followed by an update. The mapped segments of biotopes were classified according to CHYTRÝ, M.; KUČERA, T.; KOČÍ, M. (eds.) (2001). Habitat Catalogue of the Czech Republic.

Tab. 3 List of habitats (in the detailed Czech classification system, types of habitats are referred to as "biotopes") in the area of interest

Groups of habitats		Area (m^2)	% of the total area of interest
-	not identified	159,093,981	60.5%
K	Scrub	247,323	0.1%
L	Forests	15,808,981	6.0%
M	Wetlands and riverine vegetation	353,568	0.1%
moz.	Mosaic	66,605,665	25.3%
R	Springs and mires	380,325	0.1%
S	Cliffs and boulder screes	155,183	0.1%
T	Secondary grasslands and heathlands	7,037,321	2.7%
V	Streams and water bodies	1,211,199	0.5%
X	Habitats strongly influenced or created by man	11,977,720	4.6%

More than 60% of the area of interest has no habitat identified. The most common in the mapped area is a mosaic with multiple habitat types. The mapped habitats of pure forests cover approximately 6% of the given area.

The area of interest was analysed based on the occurrence of habitats. Those significantly linked to water were selected as target habitats. Their response to the restoration of the natural hydrological regime will be largely positive. The restoration potential is a significant indicator of efficient measures proposed.

The most represented habitats (biotopes) are the following forest biotopes: waterlogged spruce forests (L9.2B), ash-alder alluvial forests (L2.2), bog spruce forests (L9.2A), birch mire forests (L10.1) and wet acidophilous oak forests (L7.2). Frequently occurring are also mire and wetland biotopes: transitional mires (R2.3), reed beds of eutrophic still waters (M1.1) and tall-sedge beds (M1.7).

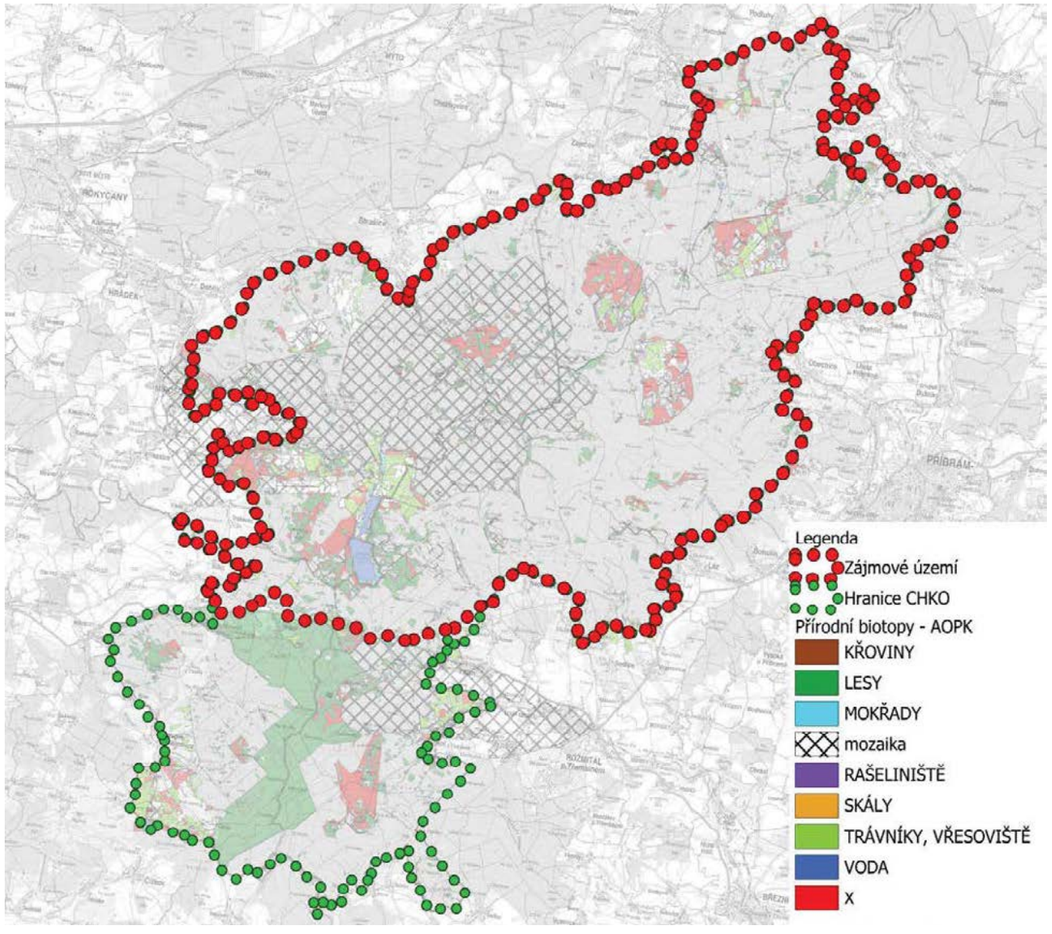


Fig. 10 Area of interest – occurrence of groups of habitats according to mapping carried out by the Nature Conservation Agency

L1 Alder carrs

Alder carrs are biotopes occurring in the Brdy Highland rarely and mostly in small-scale areas. Quite frequent are stands in transition to unit L2.2 (already mapped as this unit). Most of the stands are of associations of *Carici elongatae-Alnetum glutinosae* (cf. Sofron 1998). This association can be found on gleyed heavy soils and humolite. Alder carrs occurring on humolite are often in contact with associations of *Equiseto-Piceetum* and *Mastigobryo-Piceetum* (L9.2B). As to the composition of the herbaceous undergrowth, the alder growths (except L1 and L2.2) in Brdy are among forest stands of highest plant diversity. Some herb-rich beech forests may possibly show comparable diversity. Nevertheless, there are mostly common species. The alder carrs are home to such threatened species as the marsh valerian (*Valeriana dioica*) and *Epilobium obscurum* (Karlík & Hlaváček 2013).

L2.2 Ash-alder alluvial forests

Alder growths are one of the most frequently mapped natural habitats in the Brdy Highland. They may be found throughout the territory, being absent only in the top parts of the Central Brdy, where peat bogging occurs and where they are replaced by bog and waterlogged spruce forests.

In the more strongly incised floodplains (which are quite rare in the Brdy Highland), there are associations of *Arunco sylvestris-Alnetum glutinosae*. The relatively flatter areas with slow water movement and the rather broader floodplains at higher altitudes are home to associations of *Piceo-Alnetum*. Spring areas in and outside the floodplain with dominating alder and less frequently ash are occupied by associations of *Carici remotae-Fraxinetum*. They are frequently in contact with R1.4 where the tree layer is not much closed.

The grey alder (*Alnus incana*), which is allochthonous in the Brdy Highland and represents an element of cultural degradation, occurs locally in the tree canopy. Where the water regime is disturbed, stands are developing with predominating *Carex brizoides*, *Deschampsia cespitosa* and *Rubus fruticosus agg.* in the herbaceous layer.

As mentioned in the case of the previous biotope, alder forests (L2.2 including L1) form the most diverse habitats of the Brdy Highland. These are centres of vascular plant diversity in often extensive monotonous stands of coniferous cultural cenoses. Alder forests are associated with numerous rare plant species, such as *Carex umbrosa*, *Trollius altissimus* and *Soldanella montana*, which is very important in terms of phytogeography (Karlík & Hlaváček 2013).

L7.2 Wet acidophilous oak forests

Oak forests on more humid sites represent a considerable classification issue. They occur on relatively productive plateaus or gentle slopes and are therefore well accessible to forest management. Most of these areas (not only in the Brdy Highland) have been transformed into cultural spruce forests. Beech is typically disadvantaged on such sites (frost, humidity) but oak and fir thrive here. Occurrence of typical *Molinia* oak forests of associations of *Molinio-Quercetum*, also falling within biotope L7.2, is not presumed in Brdy. In some stands, these are obviously forested *Molinia* meadows indicating occurrence of *Trollius altissimus* or *Carex umbrosa*. Stands of unit L7.2 are mostly associated with the borders of the given area (Karlík & Hlaváček 2013).

L9.2 Bog and waterlogged spruce forests

Bog and waterlogged spruce forests represent a climax biotope bound to specific edaphic conditions and are highly significant for the Brdy region in terms of phytogeography and conservation (Sofron 1998, Karlík 2001, Sofron et al. 2005). Their occurrence in the Brdy Highland is essential in terms of nature conservation in Central Bohemia and even in the entire interior of the country. The maps distinguish two sub-units – L9.2A and L9.2B.

L9.2A Bog spruce forests

The forest associations of this sub-unit fall within the association of *Sphagno-Piceetum*. They are open forest stands of smaller dwarfed spruce trees with a massive moss layer (*Sphagnum* sp. div. and bulty *Polytrichum commune*).

Occurrence of L9.2A is associated exclusively to central part of the mountain range (including the eastern banks of the Padrťské rybníky ponds).

L9.2B Waterlogged spruce forests

This sub-unit comprises two associations – as. *Mastigobryo-Piceetum*, as. *Equiseto-Piceetum* (cf. Sofron 1998, Husová et al. 2002), with rather indistinct discrimination in the given area. Sub-unit L9.2B occurs both in the centre and the periphery of the mountain range. It is most abundant along the eastern banks of the Padrťské rybníky ponds (less frequently occurring on the deep humolite on the western banks). Waterlogged spruce stands further occur on the valley slopes and in the valley of the Kormundka Brook, in the valleys of the Reserva and Třítrubecký potok brooks, and other locations.

High quality representative waterlogged spruce stands are rare, being recorded mainly on several locations on the eastern banks of the Padrťské rybníky ponds. At the stage of clear-cuts, the planted seedlings are considerably accompanied by natural seeding of spruce. The resulting stands thus show age diversity.

The considerable peat bogging related to the formation of shallow homolite may often have a secondary character and is a result of evotranspiration after clearcutting and subsequent waterlogging. Excessive waterlogging linked to peat bogging may slow down the growth of young trees and give rise to temporarily blocked stages with dwarfing spruce and massive development of E0. Therefore, forest managers feel the need to carry out drainage; such measures are sometimes very effective and have negative impacts on the entire habitat. On the other hand, they are sometimes completely ineffective in flat terrain (Karlík & Hlaváček 2013).

L10.1 Birch mire forests

Typically developed birch mire forests of the *Betuletum pubescentis* association have been preserved only on the eastern bank of the Hořejší Padrťský rybník pond and in small scale on one site above Chynín. *Betula pubescens* occurs in the tree canopy and always on peloid soils with high content of organic matter. The habitat occurs in Central Bohemia mainly in the Brdy Highland and is significant in terms of phytogeography and conservation (Karlík & Hlaváček 2013).

Some other wetland biotopes have also been mapped on a small scale within the wetland forests. These are namely R1.4 – forest springs without tufa formation, M1.5 – reed vegetation of brooks, R2.3 – transitional mires, and marginally possibly also R3.1 – open raised bogs and R2.2 – acidic moss-rich fens. The mentioned biotopes are discussed in more detail in the study by Karlík and Hlaváček (Karlík & Hlaváček 2013).

Draining represents the main threat to wetland forests (Kučera et al. 2008). The use of heavy machinery allows for easy deep ditching. The drainage measures jeopardize mainly small-scale wetland forests, typically alder carrs, not only by altering the water regime but also by actual destruction of a considerable part of their size (Karlík & Hlaváček 2013). Unsuitable species composition in planting represents another threat (Beneš & Pokorný 2001).

Tab. 4 Target natural habitats according to the Habitat Catalogue

FSB	Code of biotope	Name of biotope	Code of habitat	Name of habitat	Formation group
K	**K1**	**Willow carrs**	**-**		**Scrub**
K	K2.1	Willow scrub of loamy and sandy river banks	-		Scrub
L	**L1**	**Alder carrs**	**-**		**Forests**
L	**L10.1**	**Birch mire forests**	**91D0**	**Bog woodland**	**Forests**
L	**L10.2**	**Pine mire forests with Vaccinium**	**91D0**	**Bog woodland**	**Forests**
L	**L10.3**	**Pine forests of continental mires with Eriophorum**	**91D0**	**Bog woodland**	**Forests**
L	L10.4	Pinus rotundata bog forests	91D0	Bog woodland	Forests
L	L2.1	Montane grey alder galleries	91E1	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)	Forests
L	**L2.2**	**Ash-alder alluvial forests**	**91E1**	**Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)**	**Forests**
L	L2.3	Hardwood forests of lowland rivers	91F0	Riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers (*Ulmenion minoris*)	Forests
L	L2.4	Softwood forests of lowland rivers	91E1	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)	Forests
L	**L7.2**	**Wet acidophilous oak forests**	**9190**	**Old acidophilous oak woods with *Quercus robur* on sandy plains**	**Forests**
L	**L9.2A**	**Bog spruce forests**	**91D0**	**Bog woodland**	**Forests**
L	**L9.2B**	**Waterlogged spruce forests**	**9410**	**Acidophilous Picea forests of the montane to alpine levels (*Vaccinio-Piceetea*)**	**Forests**
M	**M1.1**	**Reed beds of eutrophic still waters**	**-**		**Wetlands and riverine vegetation**
M	M1.2	Halophilous reed and sedge beds	-		Wetlands and riverine vegetation
M	**M1.3**	**Eutrophic vegetation of muddy substrata**	**-**		**Wetlands and riverine vegetation**
M	M1.4	Riverine reed vegetation	-		Wetlands and riverine vegetation
M	**M1.5**	**Reed vegetation of brooks**	**-**		**Wetlands and riverine vegetation**
M	M1.6	Mesotrophic vegetation of muddy substrata	7140	Transition mires and quaking bogs	Wetlands and riverine vegetation
M	**M1.7**	**Tall-sedge beds**	**-**		**Wetlands and riverine vegetation**
M	M1.8	Calcareous fens with Cladium mariscus	7210	Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	Wetlands and riverine vegetation
M	M2.1	Vegetation of exposed fishpond bottoms	3130	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/ or *Isoëto-Nanojuncetea*	Wetlands and riverine vegetation
M	M2.2	Annual vegetation on wet sand	3130	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/ or *Isoëto-Nanojuncetea*	Wetlands and riverine vegetation
M	M2.3	Vegetation of exposed bottoms in warm areas	3130	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/ or *Isoëto-Nanojuncetea*	Wetlands and riverine vegetation
M	M2.4	Vegetation of annual halophilous grasses	-		Wetlands and riverine vegetation
M	**M3**	**Vegetation of perennial amphibious herbs**	**3130**	**Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/ or *Isoëto-Nanojuncetea***	**Wetlands and riverine vegetation**
M	**M4.1**	**Unvegetated river gravel banks**	**-**		**Wetlands and riverine vegetation**
M	M4.2	River gravel banks with Myricaria germanica	3230	Alpine rivers and their ligneous vegetation with *Myricaria germanica*	Wetlands and riverine vegetation
M	M4.3	River gravel banks with Calamagrostis pseudophragmites	3220	Alpine rivers and the herbaceous vegetation along their banks	Wetlands and riverine vegetation
M	M5	Petasites fringes of montane brooks	6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	Wetlands and riverine vegetation
M	M6	Muddy river banks	3270	Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation	Wetlands and riverine vegetation
M	M7	Herbaceous fringes of lowland rivers	6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	Wetlands and riverine vegetation
R	R1.1	Meadow springs with tufa formation	7220	Petrifying springs with tufa formation (*Cratoneurion*)	Springs and mires
R	R1.2	Meadow springs without tufa formation	-		Springs and mires
R	R1.3	Forest springs with tufa formation	7220	Petrifying springs with tufa formation (*Cratoneurion*)	Springs and mires
R	**R1.4**	**Forest springs without tufa formation**	**-**		**Springs and mires**

FSB	Code of biotope	Name of biotope	Code of habitat	Name of habitat	Formation group
R	R1.5	Subalpine springs	-		Springs and mires
R	R2.1	Calcareous fens	7230	Alkaline fens	Springs and mires
R	**R2.2**	**Acidic moss-rich fens**	**7140**	**Transition mires and quaking bogs**	**Springs and mires**
R	**R2.3**	**Transitional mires**	**7140**	**Transition mires and quaking bogs**	**Springs and mires**
R	R2.4	Peatsoils with Rhynchospora alba	7150	Depressions on peat substrates of the *Rhynchosporion*	Springs and mires
R	**R3.1**	**Open raised bogs**	**7110**	**Active raised bogs**	**Springs and mires**
R	R3.2	Raised bogs with Pinus mugo	91D0	Bog woodland	Springs and mires
R	R3.3	Bog hollows	7110	Active raised bogs	Springs and mires
R	R3.4	Degraded raised bogs	7120	Degraded raised bogs still capable of natural regeneration	Springs and mires
T	**T1.10**	**Vegetation of wet disturbed soils**	**-**		**Secondary grasslands and heathlands**
T	T1.4	Alluvial Alopecurus meadows	-		Secondary grasslands and heathlands
T	**T1.5**	**Wet Cirsium meadows**	**-**		**Secondary grasslands and heathlands**
T	**T1.6**	**Wet Filipendula grasslands**	**6430**	**Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels**	**Secondary grasslands and heathlands**
T	T1.7	Continental inundated meadows	6440	Alluvial meadows of river valleys of the *Cnidion dubii*	Secondary grasslands and heathlands
T	**T1.9**	**Intermittently wet Molinia meadows**	**6410**	***Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)**	**Secondary grasslands and heathlands**
T	T7	Inland salt marshes	1340	Inland salt meadows	Secondary grasslands and heathlands
V	V1A	Macrophyte vegetation of naturally eutrophic and mesotrophic still waters with Hydrocharis morsusranae	3150	Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation	Streams and water bodies
V	V1B	Macrophyte vegetation of naturally eutrophic and mesotrophic still waters with Stratiotes aloides	3150	Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation	Streams and water bodies
V	**V1C**	**Macrophyte vegetation of naturally eutrophic and mesotrophic still waters with Utricularia australis or U. vulgaris**	**3150**	**Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation**	**Streams and water bodies**
V	V1D	Macrophyte vegetation of naturally eutrophic and mesotrophic still waters with Salvinia natans	3150	Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation	Streams and water bodies
V	V1E	Macrophyte vegetation of naturally eutrophic and mesotrophic still waters with Aldrovanda vesiculosa	3150	Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation	Streams and water bodies
V	**V1F**	**Macrophyte vegetation of naturally eutrophic and mesotrophic still waters (without species specific to V1A - V1E)**	**3150**	**Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation**	**Streams and water bodies**
V	**V1G**	**Macrophyte vegetation of naturally eutrophic and mesotrophic still waters without macrophyte species valuable for nature conservation**	**-**		**Streams and water bodies**
V	V2A	Macrophyte vegetation of shallow still waters with dominant Batrachium spp.	-		Streams and water bodies
V	V2B	Macrophyte vegetation of shallow still waters with dominant Hottonia palustris	-		Streams and water bodies
V	**V2C**	**Macrophyte vegetation of shallow still waters, other stands**	**-**		**Streams and water bodies**
V	**V3**	**Macrophyte vegetation of oligotrophic lakes and pools**	**3160**	**Natural dystrophic lakes and ponds**	**Streams and water bodies**
V	**V4A**	**Macrophyte vegetation of water streams with currently present aquatic macrophytes**	**3260**	**Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation**	**Streams and water bodies**

FSB	Code of biotope	Name of biotope	Code of habitat	Name of habitat	Formation group
V	**V4B**	**Macrophyte vegetation of water streams with potential occurrence of aquatic macrophytes or with natural or seminatural bed**	**-**		**Streams and water bodies**
V	V5	Charophyceae vegetation	3140	Hard oligo-mesotrophic waters with benthic vegetation of *Chara spp*.	Streams and water bodies
V	V6	Isoëtes vegetation	3130	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/ or *Isoëto-Nanojuncetea*	Streams and water bodies

The habitats in bold are those identified in the habitat mapping and occurring in the area of interest.

3.3.5. Forest types

The area of interest was further analysed based on forest typology. Decree No. 298/2018 Coll., on elaborating regional plans of forest development and on specification of management groups – Annex 4 determines the forest type groups. As in the case of natural habitats, target forest types (see Tab. 5) bound to water have been identified. The potential measures to restore the hydrological regime will have a significant effect.

The basic classification units are the following:

Forest vegetation zones (LVS, also referred to as the "vegetation tier"), which express the vertical (altitudinal) variation in the growth conditions of the main forest tree species depending on altitude and climatic conditions (Baláš & Kuneš 2014, Plíva 1987).

Ecological series, which is characterized by resembling habitat conditions, i.e. soil properties, soil water regime, or geomorphology. Total eight ecological series are distinguished – extreme, acid, nutrient-rich, maple, ash, stagnic, wet, and peat (Decree 298/2018 Coll.).

Edaphic categories represent subunits of ecological series and focus on economically significant soil conditions: content of nutrients, water regime, skeleton proportion, depth of soil, presence of stones, slope gradient, etc. (Baláš & Kuneš 2014). **The edaphic categories relating to the study** are the following: alluvial (L – *alluvialis*), soils of ravines and gulleys (U – *vallidosa*), moist to wet (V – *humida*), nutrient-medium stagnic soils (O – *variohumida mesotrophica*), acidic stagnic soils (P – *variohumida acidophila*), nutrient-poor Gleysols (T – *paludosa oligotrophica*), nutrient-medium Gleysols (G – *paludosa mesotrophica*), peats (R – *turfosa*).

Based on the combination of the forest vegetation zone and the edaphic category, forest type groups are identified. The first digit defines the LVS, the following letter defines the edaphic category (Kašpar & Marušák 2016). Forest type (LT) represents the basic typological unit where the figure in the third position in the total three-digit code indicates the more detailed permanent characteristics of the forest environment.

This division into forest type groups (SLT) and forest types (LT) gives an appropriate description of the habitat conditions for the individual forest segments. Nevertheless, in terms of practical forest management, it appears to be too detailed and difficult to comprehend or implement. A simplified classification has therefore been developed for the purpose of management planning, defining target management groups (CHS) and management groups (HS). Related SLTs are aggregated into target management groups, which are determined based on natural conditions and the functional purpose of the forest. The CHSs consist of two digits, where the first number indicates the vegetation zone (LVS) and the second number the ecological series. The definition of CHSs and the related terminology used in this article are given in accordance with the new Decree No. 298/2018 Coll.

Nature forest areas (PLO) are defined as regional geographical units with similar conditions for forest growth. There are total 41 PLOs in the territory of the Czech Republic. The entire area of the study is part of the nature forest area 7 – Brdská vrchovina

In practice, this division is used, for example, to set rules for the transfer of reproductive material (Poleno & Vacek 2011).

Based on the functional orientation of the forest also related to natural conditions, the forests are categorised into protection forests, special-purpose forests and economic forests. This is laid down in the Forest Act (Act No. 289/1995 Coll., as amended). Wetland forests may fall within any of the three mentioned categories. The data on forest categories are part of the HSs and CHSs and are significant in terms of the functional mission of forests when applying state administration and forest policy.

The area of interest is located in vegetation zones 4-8. Vegetation zone 3 (oak-beech) is also marginally present, namely in the northern part near Podluhy. The most extensive contiguous areas of target habitats can be found in the vicinity of Padrťské rybníky ponds and further to the north near Skořice. These areas mostly fall within the vegetation zone 5 (fir-beech) and 6 (spruce-beech).

The most frequent edaphic categories are stagnic categories O (*variohumida mesotrophica*) and P (*variohumida acidophila*) These form three main contiguous areas in the territory of interest. Other target categories occur rather in mosaics. Peat categories occur sporadically but are significant for the study and its objectives.

The determined target forest types cover 43% of the area of interest.

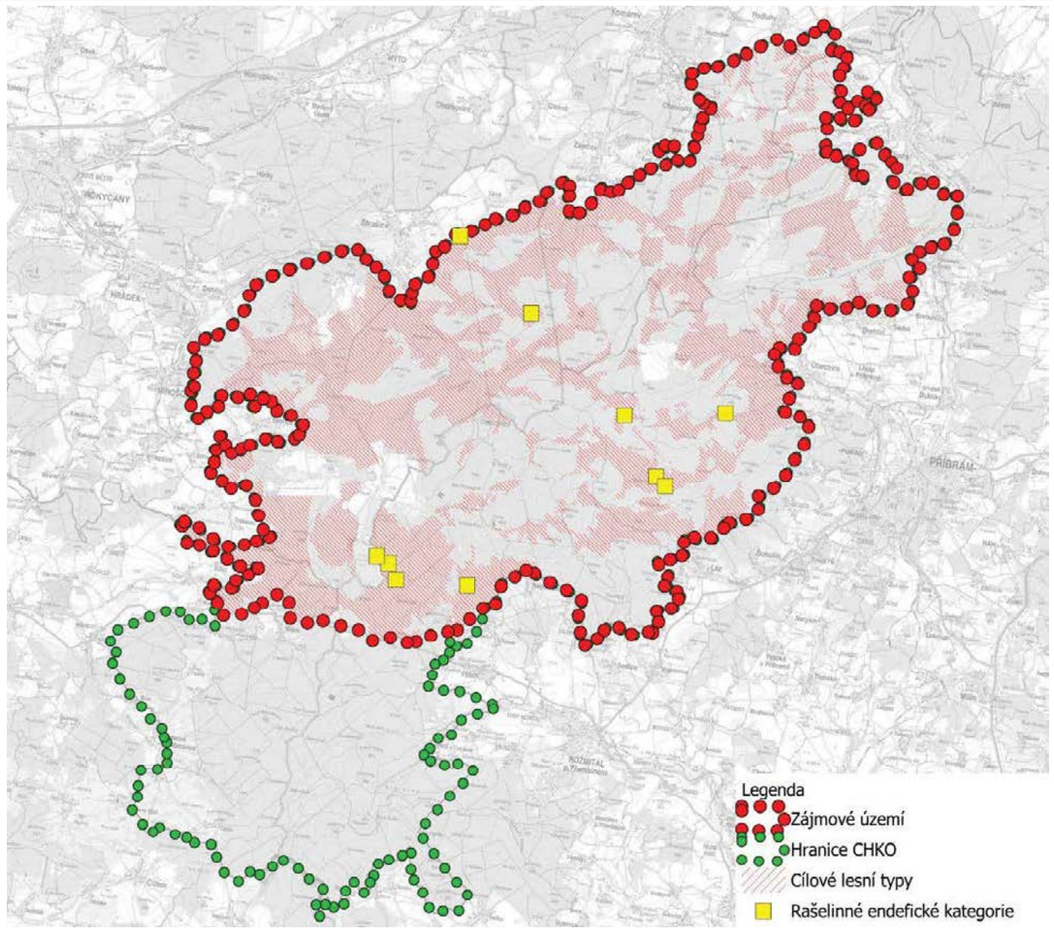


Fig. 11 Area of interest – target forest types

Tab. 5 Selected forest types with indication of target types for this study

Forest vegetation zone	Ecological series	NUTRIENT-RICH						MAPLE			ASH			STAGNIC			PALUDOSA MESOTROPHIPCA		PEAT
	Edaphic category	oligo-mesotrophica	lapidosa mesotrophica	subxerothermica	mesotrophica	calcaria	illimerosa mesotrophica	deluvia	acerosa lapidosa	acerosa saxatile	alluvialis	vallidosa	humida	variohumida mesotrophica	variohumida acidophila	variohumida oligotrophica	paludosa mesotrophipca	paludosa oligotrophica	turfosa
		S	**F**	**C**	**B**	**W**	**H**	**D**	**A**	**J**	**L**	**U**	**V**	**O**	**P**	**Q**	**G**	**T**	**R**
10	Alpine																		
9	Dwarf pine																		RAISED BOG
8	Spruce	Piceetum mesotrophicum	(Piceetum lapidosum mesotrophicum										**Acereto-Piceetum humidum**	**Piceetum variohumidum trophicum**	**Piceetum variohumidum acidophilum**	**Piceetum variohumidum oligotrophicum**	**Piceetum paludosum mesotrophicum**	**Piceetum paludosum oligotrophicum (humilis)**	**Piceetum turfosum montanum**
7	Beech-spruce	Fageto-Piceetum mesotrophicum	Fageto-Piceetum lapidosum mesotrophicum						Aceri-Fageto-Piceetum lapidosum		**Piceetum alluviale**		**Fageto-Piceetum acerosum humidum**	**Abieto-Piceetum variohumidimtrophicum**	**Abieto-Piceetum variohumidum acidophilum**	**Abieto-Piceetum variohumidum oligotrophicum**	**Abieto-Piceetum paludosum mesotrophicum**	**Abieto-Piceetum paludosum oligotrophicum**	**Piceetum turfosum acidophilum**
6	Spruce-beech	Piceeto-Fagetum mesotrophicum	Piceeto-Fagetum lapidosum mesotrophicum		Piceeto-Fagetum trophicum		Piceeto-Fagetum illimerosum trophicum	Piceeto-Fagetum acerosum deluvium	Aceri-Piceeto-Fagetum lapidosum	Ulmi-Piceeto-Aceretum saxatile	**Alnetum incanae**		**Piceeto-Fagetum fraxinosum humidum**	**Piceeto-Abietum variohumidum trophicum**	**Piceeto-Abietum variohumidum acidophilum**	**Piceeto-Abietum variohumidum oligotrophicum**	**Piceeto-Abietum paludosum mesotrophicum**	**Piceeto-Abietum paludosum oligotrophicum**	**Piceetum turfosum mesotrophicum**
5	Fir-beech	Abieto-Fagetum mesotrophicum	Abieto-Fagetum lapidosum mesotrophicum	Abieto-Fagetum subxerothermicum	Abieto-Fagetum trophicum	Abieto-Fagetum calcarium	Abieto-Fagetum illimerosum trophicum	Abieto-Fageum acerosum deluvium	Acereto-Fagetum lapidosum	Ulmi-Fraxineto-Aceretum saxatile	**Fraxineto-Alnetum montanum**		**Abieto-Fagetum fraxinosum humidum**	**(Fageto-)Abietum variohumidum trophicum**	**Abietum piceosum variohumidum acidophilum**	**Abietum piceosum variohumidum oligotrophicum**	**Abietum quercino-piceosum paludosum mesotrophicum**	**Abietum quercino-piceosum paludosum oligotrophicum**	**Pineto-Piceetum turfosum acidophilum**
4	Beech	Fagetum mesotrophicum	Fagetum lapidosum mesotrophicum	Fagetum subxerothermicum	Fagetum trophicum	Fagetum calcarium	Fagetum illimerosum trophicum	Fagetum acerosum deluvium	Tilieto-Fagetum acerosum lapidosum		Submontanum alluviale		Fagetum fraxinosum humidum	Querceto-Abietum variohumidum trophicum	Querceto-Abietum variohumidum acidophilum	(Querceto-Abietum variohumidum oligotrophicum	Querceto-Abietum piceosum paludosum mesotrophicum	Querceto-Abietum piceosum paludosum oligotrophicum	Piceetum relictum turfosum mesotrophicum
3	Oak-beech	Querceto-Fagetum mesotrophicum	Querceto-Fagetum lapidosum mesotrophicum	Querceto-Fagetum subxerothermicum	Querceto-Fagetum trophicum	Querceto-Fagetum calcarium	Querceto-Fagetum illimerosum trophicum	Querceto-Fagetum acerosum deluvium	Tilii-Querceto-Fagetum acerosum lapidosum	Tilieto-Aceretum saxatile	Fraxineto-Alnetum alluviale		Querceto-Fagetum fraxinosum humidum	Abieti-Querceto-Fagetum variohumidum trophicum	Abieto-Quercetum variohumidum acidophilum	Abieto-Quercetum variohumidum oligotrophicum	Abieto-Quercetum piceosum paludosum mesotrophicum	Abieto-Quercetum piceosum paludosum oligotrophicum	Piceetum relictum turfosum acidophilum
2	Beech-oak	Fageto-Quercetum mesotrophicum	Fageto-Quercetum lapidosum mesotrophicum	Fageto-Quercetum subxerothermicum	Fageto-Quercetum trophicum	Fageto-Quercetum calcarium	Fageto-Quercetum illimerosum trophicum	Fageto-Quercetum acerosum deluvium	Aceri-Fageto-Quercetum lapidosum		Fraxineto-Quercetum alluviale		Fageto-Quercetum fraxinosum humidum	Abieto-Fagi-Quercetum variohumidum trophicum	Quercetum abietinum variohumidum acidophilum	Quercetum abietinum variohumidum oligotrophicum	Quercetum abietinum paludosum mesotrophicum	Abieto-Quercetum paludosum oligotrophicum	
1	Oak	(Carpineto-)Quercetum mesotrophicum	Carpineto-Quercetum lapidosum mesotrophicum	Carpineto-Quercetum subxerothermicum	Carpineto-Quercetum trophicum		Carpineto-Quercetum illimerosum trophicum	Carpineto-Quercetum acerosum deluvium	Aceri-Carpineto-Quercetum lapidosum	Carpineto-Aceretum saxatile	Ulmeto-Quercetum alluviale		Carpineto Quercetum fraxinosum humidum	Tilieto-Quercetum variohumidum trophicum	Betuleto-Quercetum veriohumidum acidophilum	(Betuleto-Quercetum variohumidum oligotrophicum	Saliceto-Alnetum	Betuleto-Alnetum (paludosum oligotrophicum)	Alnetum torfosum

0	Pine associations and associations with a naturally high share of pine			Pinetum serpentinicum										Pinetum quercino-abietinum variohumidum trophicum	Pinetum quercino-abietinum variohumidum acidophilum	Pinetum quercino-abietinum variohumidum oligotrophicum	Piceeto-Pinetum paludosum (mesotrophicum)	Betuleto-Pinetum (paludosum oligotrophicum)	Pinetum turfosum

3.4. Runoff conditions and morphology

3.4.1. Runoff conditions

The area of interest spreads over four catchment areas of the third order.

Tab. 6 Catchment area of the third order

Hydrological Order No.	Name of catchment area of the third order	Area (m^2)	% of the total area of interest
1-08-04	Lomnice and Otava from Lomnice to estuary	13 147 231	5%
1-10-05	Úslava	6 975 649	3%
1-11-01	Berounka from Úslava to Střela	118 469 540	45%
1-11-04	Litavka and Berounka from Litavka to Loděnice	124 278 847	47%

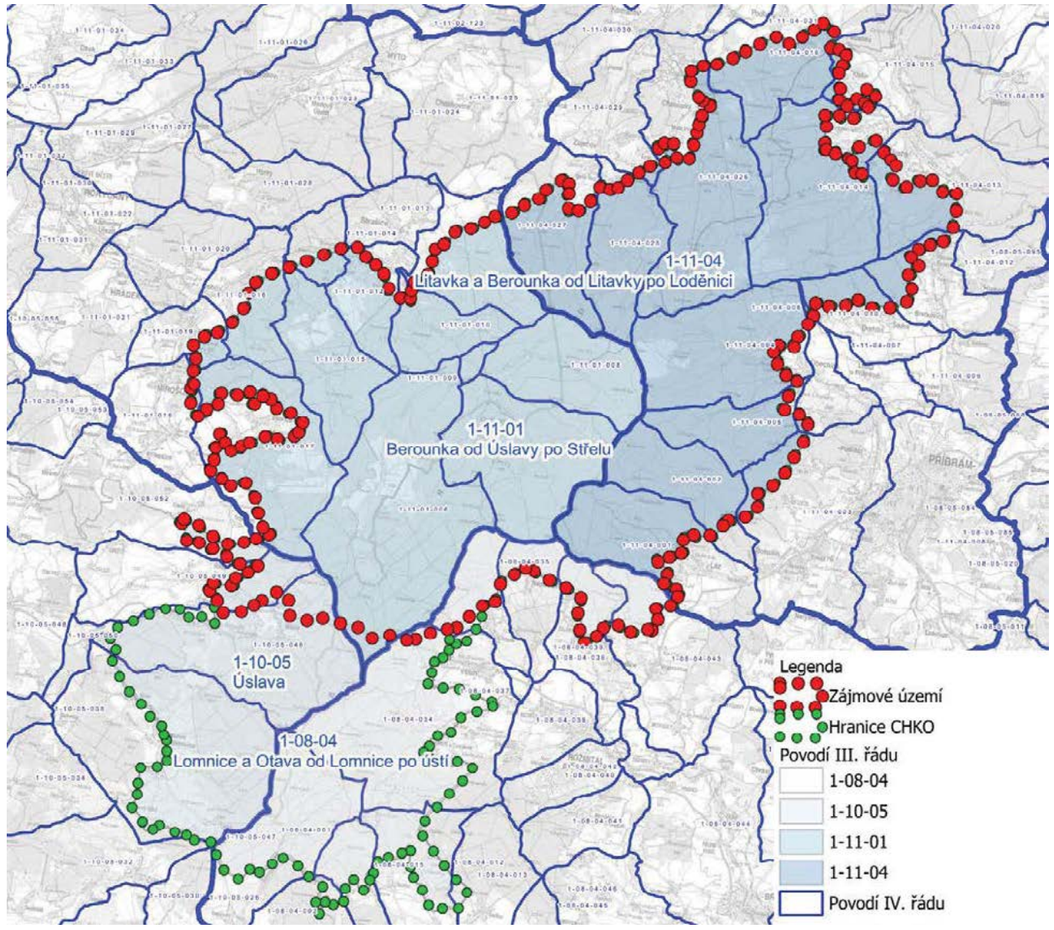


Fig. 12 Area of interest – runoff conditions

Runoff analysis

Considering the large extent of the area, a simplified procedure was adopted instead of the detailed and time demanding creation of the DTM by interpolation from the TIN generated from the point cloud.

The open-source QGIS software was used to generate the digital elevation model and the slope relief. This provided the basis for the generation of the catchment areas and river network. The processing operations were run successively over several days on a supercomputer.

The generation process is depicted in the following description and in a small section of the area.

Fig. 13 Base map and orthophoto with the marked watercourse base layer (light blue - existing, dark blue dashed - historical routing)

First, a 1x1 m grid containing the lowest elevation of the nearest points was created using the freely available DMR5G point cloud provided by the COSMC (Czech Office for Surveying, Mapping and Cadastre). QGIS filter tool.

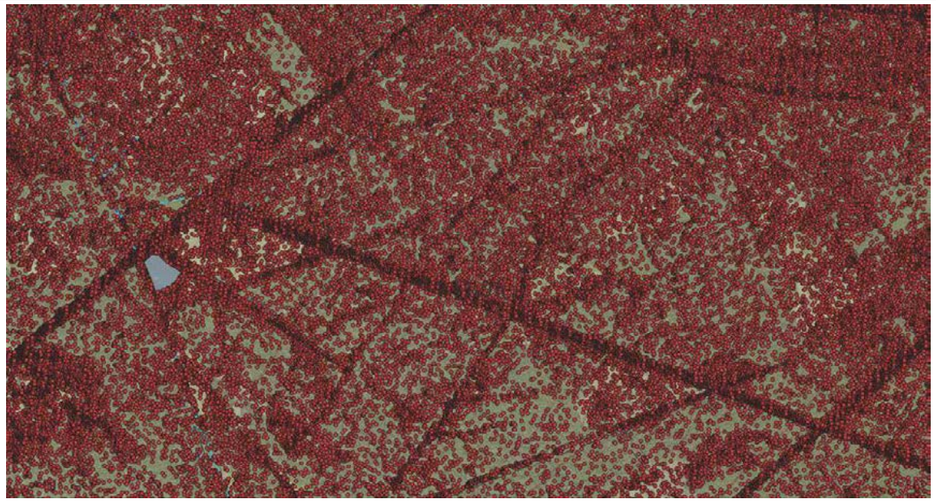


Fig. 14 DMR5G point cloud

The Rasterize tool was used to create a grid from the point cloud with a resolution of 1 m.

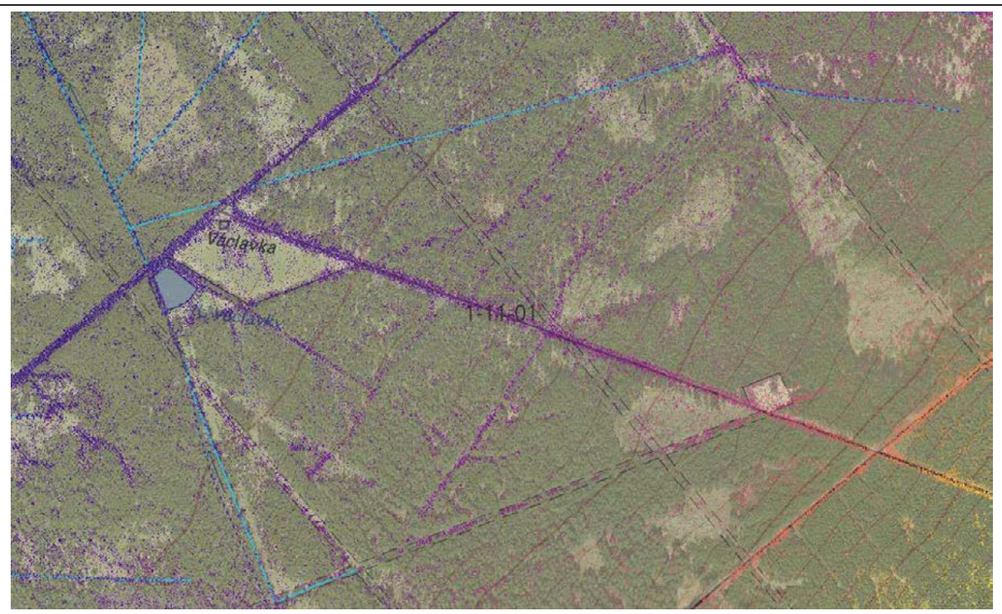


Fig. 15 The first elevation grid according to the availability of points (the rest NoData)

Figure 3 clearly indicates the paths, which have many more available elevation points than in the vegetation. The missing values were interpolated to fill the incomplete grid.

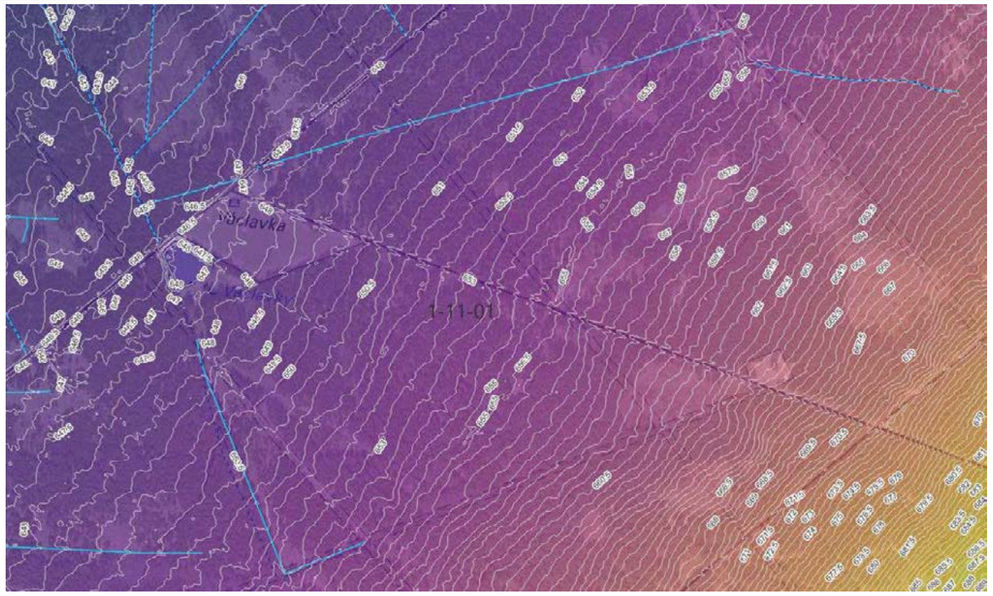


Fig. 16 Grid with interpolated data and contours at half metre intervals

The complete grid was further refined using the Gaussian filter tool. The task is subsequently divided into two procedures. In the first case, the sites that show less than 20 meters when mapping the outflow from the higher to the lower site were artificially broken. In the second case, a tool was chosen to fill in the terrain depressions. The created grids do not differ much from the figure above and thus do not need to be shown here. Nevertheless, the follow-up processes are distinct. The first was carried out only for the variant 1 and depicts accumulation of the sheet runoff.

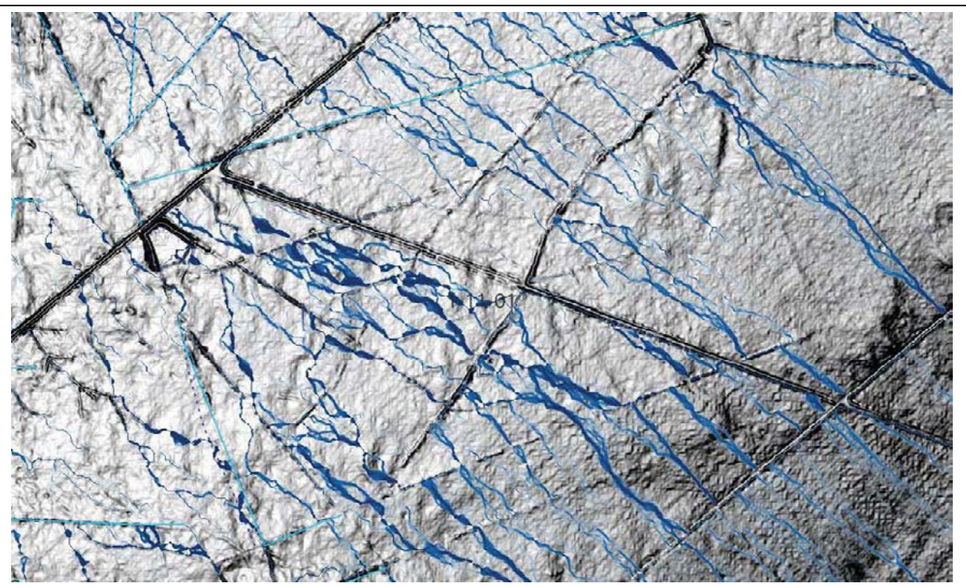


Fig. 17 Grid of runoff concentrations in the terrain model and a slope model

This runoff already shows the deficiencies of the terrain model in terms of improperly identified drainage ditches. The water flows only partly along the roads and frequently only crosses these. This does not correspond to water drainage in ditches along the roads. The improper generation is attributed to presence of vegetation that prevented the survey of the lowest elevations and artificially raised the ground level. The mean error of DMR 5G is 0.3 m in forested terrain. In order to generate runoff reflecting the reality, it would be necessary to survey all ditches and culverts, with their geometry modelled into the terrain model. On the other hand, it shall be noted that the functionality of ditches and culverts, as well as the channels in open terrain, depends on their condition and maintenance. The runoff system may have changed in the clear-cut areas due to the movement of machinery. The same will apply in the case of silting of ditches or blockage of culverts. The outputs of the drainage lines are shown here for comparison. Neither of these may be considered as correct or corresponding the reality. A field survey would have to be carried out for verification, which is not implementable in the extent of the entire area.

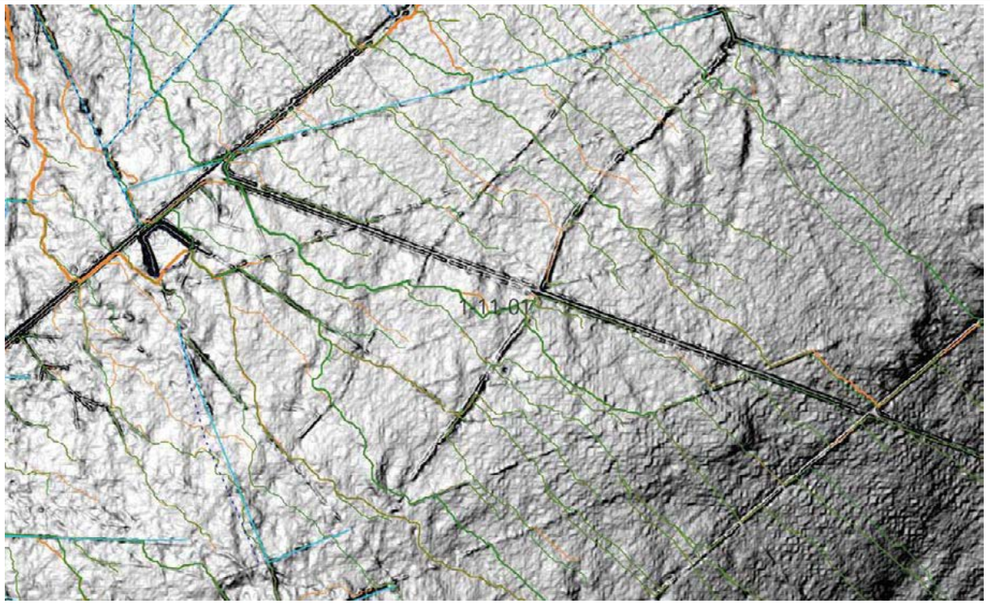


Fig. 18 Drainage lines according to the Strahler method

A local comparison of DTM and the map server of the COSMC (ags.cuzk.cz) was conducted for process verification. The following figures show a very good correlation. The slope model we have developed provides much better representation of the surface. This is given by its higher resolution compared to the COSMC (1 m against 2 m).

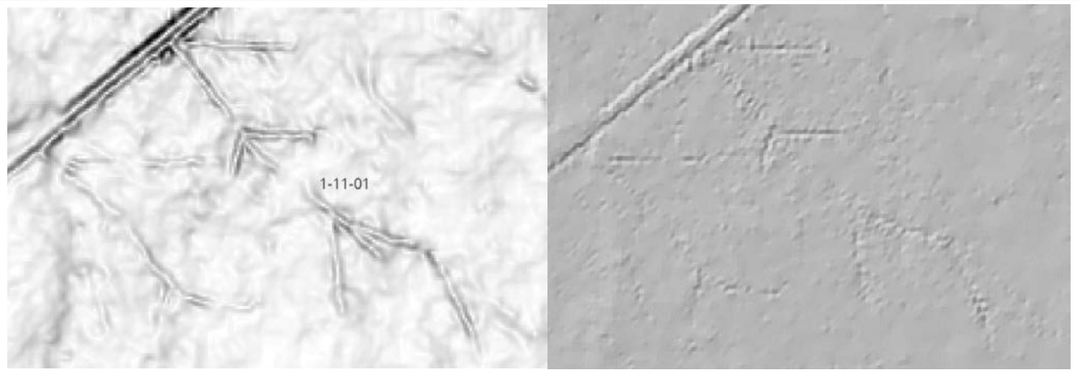


Fig. 19 Comparison of the COSMC model and the created slope model

The last comparison deals with the boundaries of the water divide of the catchment area of the fourth order and the runoff model. A slight local variation was observed. This is also given by more detailed processing of the elevation model and the derived runoff. However, a completely new delimitation of water divides is anticipated based on the DMR 5G (originally most probably DMR 4G). Therefore, a higher conformity can be expected.

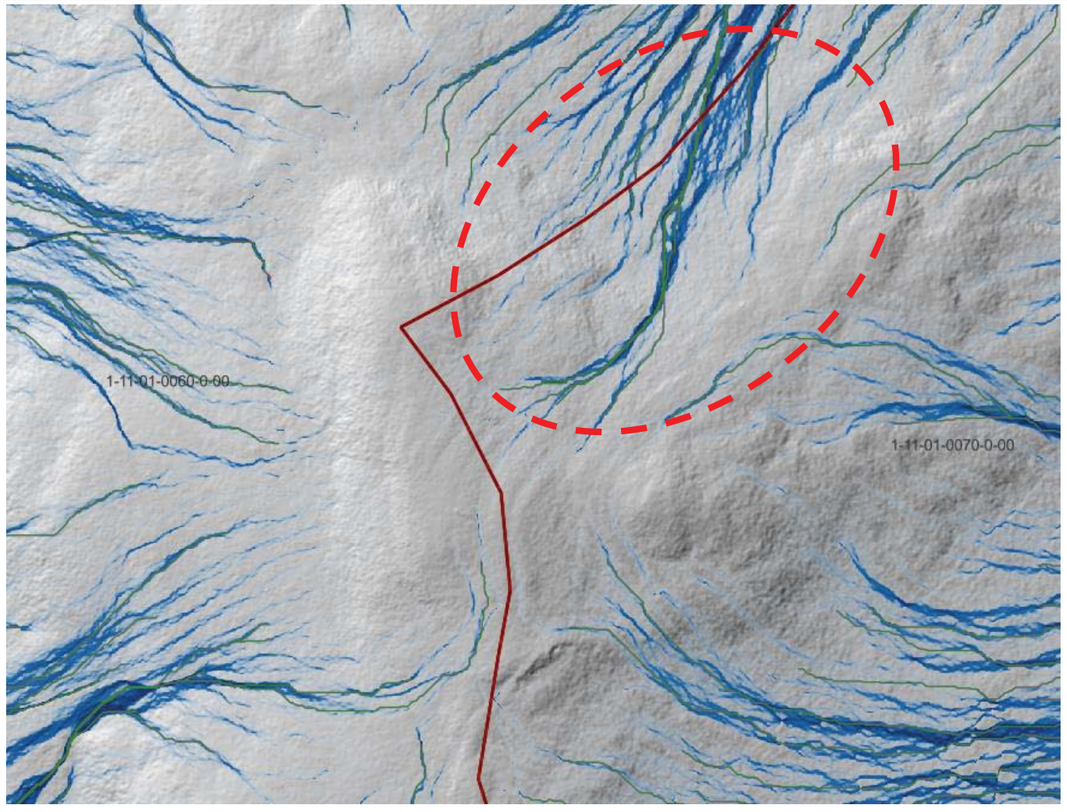


Fig. 20 COSMC water divides compared to the runoff model

The runoff lines determined in this way are subsequently used to determine the original flow routes and to estimate the nature of runoff in the study locations. For the highest priority sites, these facts will be verified by a field survey.

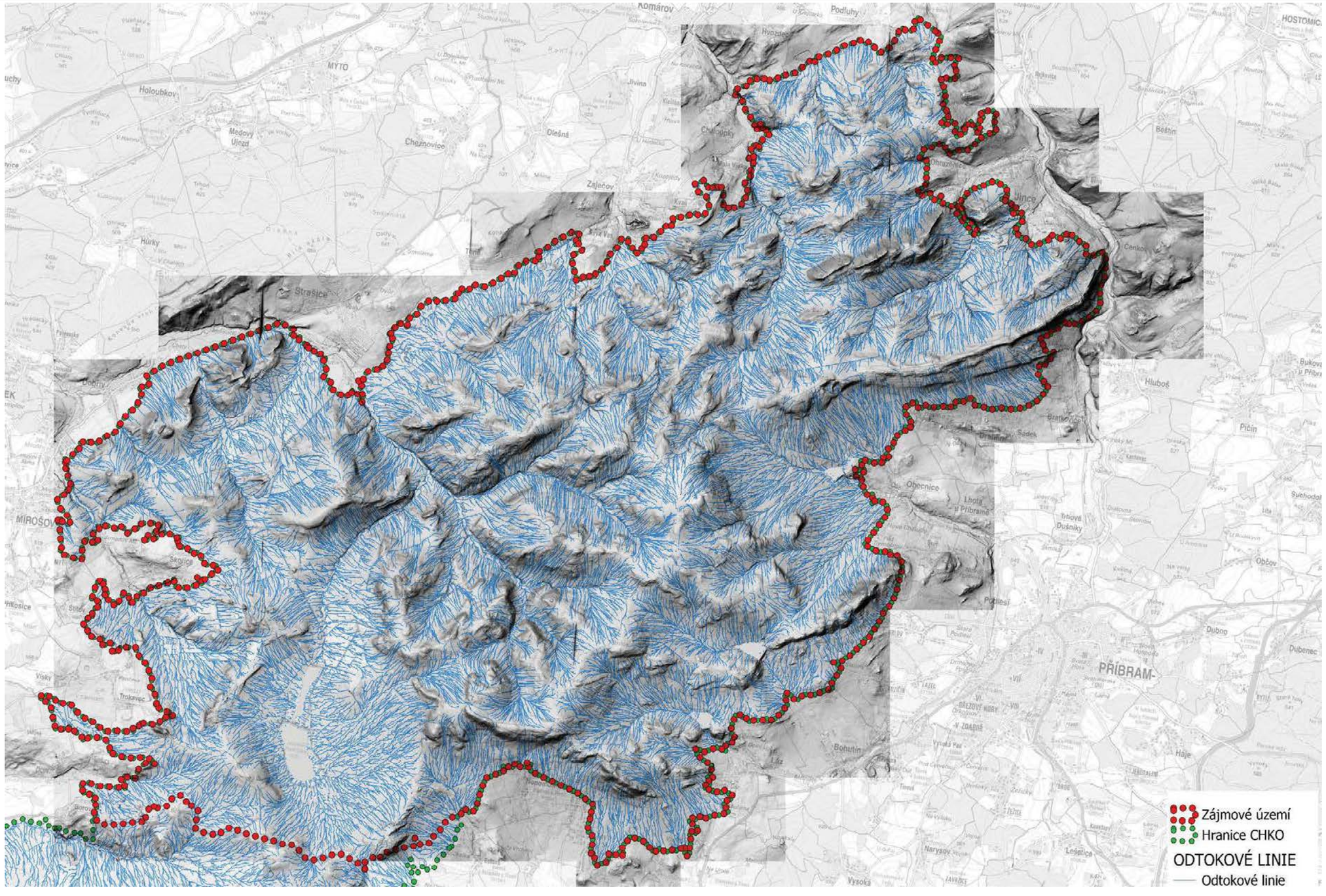


Fig. 21 Runoff lines not affected

3.4.2. Watercourses

The Central Register of Watercourses (CEVT) records total 299 km of watercourses and 15 km of other water lines in the area of interest. Minor watercourses in this area are mostly managed by VLS ČR, s.p. Major (significant) watercourses are managed by Povodí Vltavy, s.p., which also manages the catchment area.

Tab. 7 List of main recipients (catchment area of fourth order)

Watercourse	Major watercourse pursuant to Decree No. 178/2012 Coll.	Demarcation of a section of watercourse in the category "significant"	Watercourse manager
Albrechtický potok	NO		Vojenské lesy a statky ČR, s.p.
Bojovka	NO		Vojenské lesy a statky ČR, s.p.
Bradava	YES		Povodí Vltavy, státní podnik
Buková	NO		Vojenské lesy a statky ČR, s.p.
Červený potok	YES	to the boundary of the Brdy military area	Povodí Vltavy, státní podnik
Červený potok	NO		Vojenské lesy a statky ČR, s.p.
Hoděmyšlský potok	NO		Vojenské lesy a statky ČR, s.p.
Jalový potok	NO		Vojenské lesy a statky ČR, s.p.
Klabava	YES		Povodí Vltavy, státní podnik
Kornatický potok	NO		Vojenské lesy a statky ČR, s.p.
Ledný potok	NO		Vojenské lesy a statky ČR, s.p.
Litavka	YES		Povodí Vltavy, státní podnik
Mourový potok	NO		Vojenské lesy a statky ČR, s.p.
Nesvačilský potok	NO		Vojenské lesy a statky ČR, s.p.
Nový potok	NO		Vojenské lesy a statky ČR, s.p.
Obecnický potok	YES		Povodí Vltavy, státní podnik
Ohrazenický potok	YES		Povodí Vltavy, státní podnik
Pilský potok	YES		Povodí Vltavy, státní podnik
Podlužský potok	NO		Vojenské lesy a statky ČR, s.p.
Reserva	NO		Vojenské lesy a statky ČR, s.p.
Skořický potok	NO		Vojenské lesy a statky ČR, s.p.
Tisý potok	NO		Vojenské lesy a statky ČR, s.p.
Třítrubecký potok	NO		Vojenské lesy a statky ČR, s.p.
Veský potok	NO		Vojenské lesy a statky ČR, s.p.

No flood zones have been declared in the area of interest. The flood zone of the Klabava near Strašice is marginally concerned.

A total of 412 streams and other water lines with a total length of 31.4 km are registered in the area of interest in the CEVT.

3.5. Photographs

Photo 1 Drainage ditch at site 5 U žida

Photo 2 Drainage ditch at site 4 Václavka

Photo 3 Drainage ditch at site 23 Trokavec

Photo 4 Drainage ditch at site 1 Voložný potok Brook

Photo 5 Manifestations of drought on vegetation at site 1 Voložný potok Brook

Photo 6 Drained spring area at site 20 Spring area above Obecnice

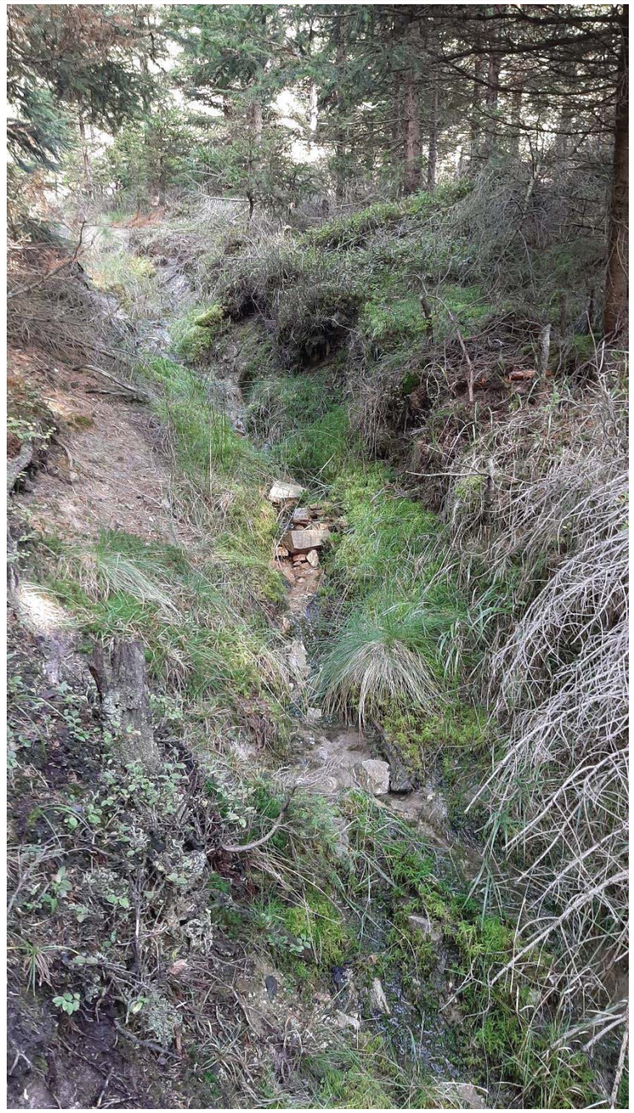


Photo 7 Depth erosion in the riverbed of a regulated small stream at site 3 Spring area of the Třítrubecký potok Brook

Photo 8 Ditch along the road without culverts at site 6 Water divide Hlava – Jordán

Photo 10 Division of the catchment area by a drained road at site 10 Spring area of the Litavka River

Photo 9 View of site 23 Trokavec

Photo 11 Example of unsuitable drainage of the road – site 3 Spring area of the Třítrubecký potok Brook

Photo 12 Demonstration of the road ditch relief at site 1 Voložný potok Brook

Photo 14 Drainage at site 1 Voložný potok Brook

Photo 13 Voložský potok Brook in the final profile

Photo 15 Photo Deepened small watercourse at site 20 U pěti zlodějů

Photo 16 Drainage ditch at site 5 U pěti zlodějů

Photo 17 Drainage ditch at site 5 U pěti zlodějů

4. PROPOSAL

4.1. Definition of basic objectives

The aim of the study is delimitation of wetland habitats in the territory of Brdy PLA, assessment of their state and evaluation of the potential restoration of the natural hydrological conditions. The concept of technical solutions will be proposed to reduce anthropogenic impacts degrading the water regime in the defined sites. Stabilization of the water regime of wetlands leads to the restoration of active water reserves in the landscape and their reasonable regulation capacity. In functional wetland habitats, there is not only the process of water accumulation, but also natural carbon accumulation.

The Standard of the NCA CR (SPPK B02 002:2022) defines the selected anthropogenic negative impacts on the water regime as follows:

Surface and subsurface drainage is the most prevalent type of drainage in mires and causes the most severe degradation (due to erosion and bank scouring). Severe damage is caused by furrows as deep as to the mineral bedrock and by furrows of large proportions, which are most difficult to lock as there is a high risk of retrogressive erosion at the bottom. Pipe drainage has been used mainly in commercially mined mires and on agricultural land, locally degrading the water regime of spring areas and minerotrophic non-forest bogs of fen type. The drain pipes can be made of such hazardous material as asbestos. This fact shall be taken into consideration when defining the revitalization procedures.

Regulation of minor watercourses. Mires often occur in a mosaic with other wetland habitats or are hydrologically associated with other water elements (spring areas, watercourses, still waters). The revitalization project shall take into account that minor watercourses play an essential role in the water regime in the area.

The unsuitable road network and its drainage in bog wetlands causes severe linear drainage along the road, which destabilizes the water regime in the area. The steeper the terrain, the more severe the effect. In many locations, addressing drainage along roads is essential for revitalizing the water regime.

Precipitation is the main source of water in the area of interest. Subsurface water is bound to the fissure system of the bedrock. However, the mentioned system weakens the fissures and does not generate significant springs. The aim is therefore to make maximum use of the retention capacity of the near-surface soil and rock layers.

The runoff line shall be defined as a basis for the proposal of measures.

Tab. 8 Types of runoff lines

TYPE	Description	
P	drainage ditch	drainage ditch
S	drainage of the road	ditches, culverts linked to the road network.
T	regulated watercourse	deepened, straightened or otherwise modified watercourse.
C	road	unpaved road, harvesting line forming a preferred route for runoff.
PT	original route of the stream, streambed	remains of the original small watercourse route.

For the concept proposal for lower priority sites, the type of measure for a given drainage line is therefore defined in the map outputs. Considering the extent of the mapped runoff lines, it was not possible to propose measures in detail of individual check dams, etc.

Tab. 9 Runoff line solution concept

PROPOSAL	Description	
Z	damming	damming with different types of check dams to the target level for the site target habitat.
V	fill	filling channels with soil, sheaves of vegetation, etc.
R	opening, revitalization	opening of the modified channels to trigger renaturation of the modified streambeds or revitalization in a new route.
M	shallowing	shallowing of deeper channels with embedded check dams to the designed level to prevent deep erosion, reduce the channel capacity and connect the channel to the floodplain.
0	original route	original route of a small watercourse without modifications only with connection to natural drainage routes
C	route, culverts, swales, drainage	measures of type I, J, K, and L linked to road drainage.

4.2. Solution concept

4.2.1. Surface and subsurface drainage

The proposed measure aims to prevent runoff from improperly drained areas. Both the open surface ditch system and subsurface pipe drainage need to be addressed. At this stage, the subsurface drainage system has not been found in the defined locations of the area of interest. However, it has be taken into account at the next stages of preparation of plans.

The ditches will be blocked using various types of check dams. The selection of such check dams depends on the morphology, terrain, character of the streambed, and the habitat of the given site.

4.2.2. Regulation of minor watercourses.

Restoration of the natural hydrological network is an integral part of the solution. Inappropriate modifications of channels such as their deepening and straightening accelerate the surface runoff from the site and decrease the possibility of infiltration. Such channels can rarely be distinguished from drainage ditches.

The natural morphology of the channel of a small watercourse is characterised by its diversity, both laterally and longitudinally. The natural channel is a sequence of opposed curves. In the longitudinal direction, there is an

alternation of flowing (shallow fords) and quiescent (deeper) sections. The natural streambed (channel) is not a stable phenomenon. It undergoes further development, especially in terms of directional erosion (outer parts of the bends). Deep erosion is minimal and is compensated by the early sedimentation of the carried material.

At the same time, the channel has a low capacity and there are frequent overflows. This natural connectivity with the floodplain is also a desirable aim of this study. The spilling out of the watercourse channel slows down the runoff and changes it from a fast and concentrated to a slower sheet flow.

The aim of the measures on modified watercourses is to revitalize the natural morphology of the stream. The key objective is to restore the original extended route and to select the appropriate design capacity of the channel. The channel modelling is detailed in the description of measure type G.

4.2.3. Road network and its drainage

The relatively dense road network, which also includes a drainage system, is an important phenomenon affecting the hydrological regime in the area of interest. The road network and its drainage concentrate, accelerate and redirect the surface runoff. Such concentrated runoff causes erosion at the inlet to the stream or under culverts. This subsequently implies the need for stabilization of these profiles. The previously conducted study (SWECO, 2017) identified the impact of road network on runoff conditions as significant. This study has generally defined measures that disrupt the concentrated runoff on forest roads, such as cross-drains and swales. These measures help divert water into the surrounding vegetation. Among other things, this reduces the degradation of unpaved roads with impervious surfaces. In addition, measures on road ditches such as diverting the ditch route into adjacent vegetation are also included. The principle of this measure is similar to that of relief swales, which serve to relieve some flow into the surrounding area. The present study also addresses the use of culverts under forest roads. Culverts as part of the road network are associated with investment but also with operating costs. Thus, their number has to be optimized. In higher priority sites, the system of culverts should be adjusted to prevent the mentioned undesirable concentration of surface runoff.

Access routes for harvesting also have an impact of the water runoff regime. Logging is carried out using heavy machinery, which creates preferential routes for concentrated water runoff. These may trigger erosion stages on steeper slopes.

This group of measures deals with drainage of roads, which causes undesirable disruption of the natural runoff, e.g., when culverts are installed outside the main valley line. In such cases, installation of culverts is recommended in places of crossing the natural valley line. In the case of roads of lower categories, reinforced swales may be built to transfer the valley line on the road surface. There are cases of oversized ditches that concentrate water into the channel or out of the original catchment area. Relief swales should ideally be built to transfer water in sheet or in more places. Runoff concentration into a single place causes deep erosion.

The mentioned measures may also be implemented within standard maintenance or repairs of the road network.

4.2.4. Monitoring

The measures should also be accompanied by monitoring to help evaluate their effects. The main parameters of monitoring are the groundwater level and surface runoff. Water balance can be compiled when comparing these with precipitation, which is measured using a relatively dense network of stations managed by the Czech Hydrometeorological Institute.

The groundwater level will be monitored using drilled groundwater boreholes in which a level probe will be installed and the measured values recorded by so-called dataloggers. Given the location of the sites, manual data collection is the most appropriate approach. The given site will be visited approximately once a month and the data will be downloaded onto a data carrier.

Surface runoff will be measured by a gauged spillway located in the channel near the final profile of the catchment area in question. A hydraulically determinable profile such as Thomson's, Bazin's spillway or Parshall flume will be placed in the gauge profile. The type will be selected according to the slope, discharge characteristics, streambed geometry, etc. A level probe and data logger will again be placed above the gauge profile for data collection.

This monitoring should ideally be complemented with botanical monitoring. Botanical indicators show if the natural development of the area has been triggered.

The relevance of the results depends on the length of monitoring. It is appropriate to start monitoring well in advance of the implementation of the measures. The length of the subsequent monitoring depends on a number of factors, such as financial resources, use of data, etc.

4.3. Types of measures

The general principle of mire restoration is to reduce the drainage of these areas by installing appropriate structures in the drainage channels. The type and design of the check dams, their location and optimum number on a given site is determined by the intensity of drainage, the technical parameters of the drainage ditches (depth, width), and habitat conditions such as slope, soil type, etc. In places where segments of the original mires have been preserved, we can identify the type of mire (based on the vegetation present) and the groundwater level (the "target level") to be reached in the section affected by the drainage ditch.

The target level varies according to the type of habitat on the given site. For example, the groundwater level for raised bogs is recommended approx. 5 cm below ground. In bog spruce forests, this value is 15–20 cm below ground.

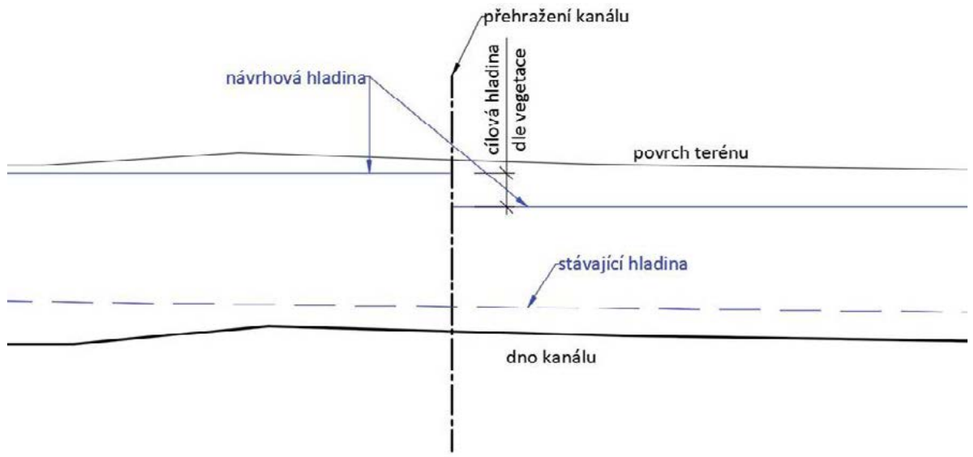


Fig. 22 "Target level" principle

The proposed level of measures, their frequency, etc., is determined by this indicative target level for each type of habitat. However, the resulting proposal must individually reflect the local conditions of the site, such as slopes, surrounding land use, road network, etc.

Tab. 10 Indicative target levels by habitat

Target habitat	Target level below ground	Note.
Meadow mires	10–20 cm	
Waterlogged spruce forests	20–40 cm	(depending on the slope and nature of the site)
Spring areas	up to 5 cm	
Spring systems	5–10 cm	
Transitional mires	10 cm	
Bog spruce forests	10–15 cm	
Steep slopes	30–40 cm	(by site)
Succession birch forests on slopes	15–20 cm	
Wet meadows	15–35 cm	
Raised bog	5 cm	

The concept of target level, as a general principle, defines the frequency (ground distance) of dams with respect to the longitudinal slope of the channel and the target habitat. This determines the maximum range of how far the water level can be buried below the terrain after damming.

The use of check dams represents a step change in the water level in the channel (see figure "target level"). In less sensitive habitats, this difference can be larger, i.e. fewer dams and at greater distances.

The following are the basic types of measures suitable for the territory under consideration. The proposed specific measures must be based on the results of surveys of the site and will be a combination of several types.

The resulting proposal reflects the experience acquired in the preparation and implementation of similar measures particularly in the Šumava National Park and the German side of the Krušné hory Mountains (Naturpark "Erzgebirge/Vogtland") .

The following model types of measures have been specified in the proposal for measures in the details of this study.

Tab. 11 List of model measures

Type of measure		Brief description
A	Check dam type A	Massive double check dam
B	Check dam type B	Massive simple check dam
C	Check dam type C	Wooden dams made of vertically driven planks
D	Measure D	Partial filling of deep channels of modified streams (shallowing) using buried check dams – safety dams buried in the bed of the shallowed streams
E	Measure E	Filling of dammed channels with soil or sheaves of vegetation
F	Measure F	Filling shallow dry channels
G	Measure G	Restoration of original channels and small tributaries
H	Measure H	Opening the existing channels
I	Measure I	Disruption of concentrated runoff on forest roads – cross-drains
J	Measure J	Disruption of concentrated runoff on forest roads – swale (reinforcement by road category)
K	Measure K	Relief of road ditches
L	Measure L	Culvert

In addition to these main types of measures, it is recommended to address other complementary measures. These are measures of a non-construction nature that lead to an improvement in the conditions in the revitalized areas. They include, for example, felling of unsuitable tree species, removal of biomass from areas affected by input of nutrients, restoration of microrelief, etc.

4.3.1. Check dam type A

Description: This type of check dam is proposed in places where an increased demand on the stability of the structure is expected, i.e. in places where channels meet or cross, in main drainage channels, in channels with a high longitudinal slope, etc.

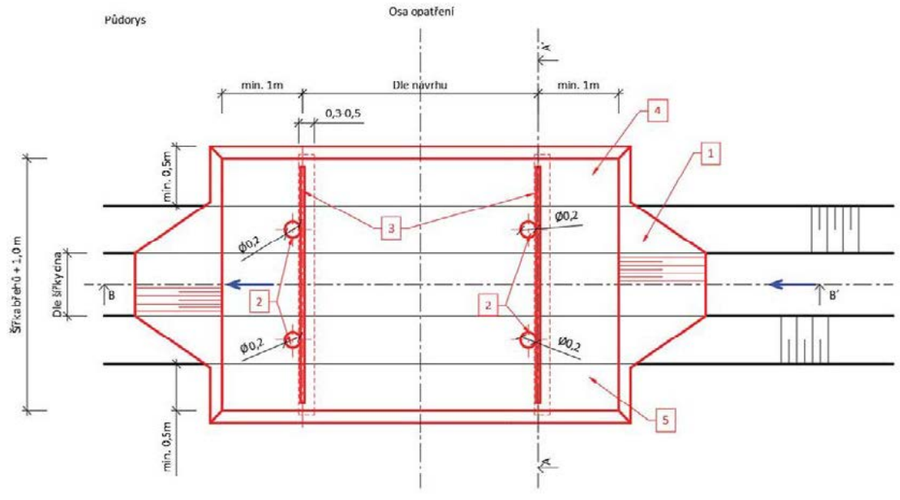
This is an earth dam combined with two reinforcing wooden dams. The soil for backfill will be extracted in the vicinity of the construction site from bank mounds or small depressions. The earth body is stabilized at the top and bottom by a wall made of planks and embedded in the soil backfill. These walls are anchored into the banks and bottoms of the channels.

The wooden walls/dams are installed horizontally across the channel. The check dams are constructed of edged or unedged planks or half-logs. The planks are placed horizontally in two layers overlapping the gaps. The width of planks or the half-logs must be minimum 15 cm, the thickness of the planks minimum 2 cm. In channels over 1.5 m deep, geotextile must be laid between the layers of planks/half-logs. The geotextile shall be made of degradable natural material (tow), which shall be inert and tested as harmless to the natural environment.

When the dams are built of horizontal planks, sufficiently deep notches must be dug in the banks and in the bottom of the trench to meet the requirements for overlapping and anchoring (minimum 0.5 m to the sides – up to 0.8 m or more for large channels, and minimum 0.5 m to the bottom). The notches for installing the check dam shall be up to 0.3–0.5 m to ensure good sealing. The dams are assembled in the prepared notches and sealed with compacted earth. In the lower part of the dam (near the bottom), the geotextile overlaps and is laid on the bottom above the upstream face of the dam, where it is then covered with soil. At the downstream face, the dam shall be reinforced with a minimum of two cross-notched log stakes. The number of log stakes rises with the width of the dam. For earth dams of type A, the wooden dams shall be completely backfilled with soil and no spillway shall be constructed. The dams are commonly constructed of two layers of planks, but in channels deeper than 1.5 m, it is necessary to construct the bulkheads of three layers of planks (with a single layer of geotextile) and a larger number of stakes are used for reinforcement at the downstream face. The dam shall be perpendicular to the channel, with a horizontal top edge and smoothly embedded in the banks. The outer face shall be embanked to a minimum depth of 1 m and up to 2 m or more for large channels over 1.2 m deep.

The vegetation and the turf layer will be removed from the bottom of the channels prior to the installation of the dams and backfilling with soil. The vegetation and turf will be reused for the topsoil. Wetland vegetation will prefer moist sites. The earth mass will be compacted to the maximum degree consistent with the category of material used.

Model solution:



Legend:

1 - Compacted backfill with soil, backfill slope max 1:1

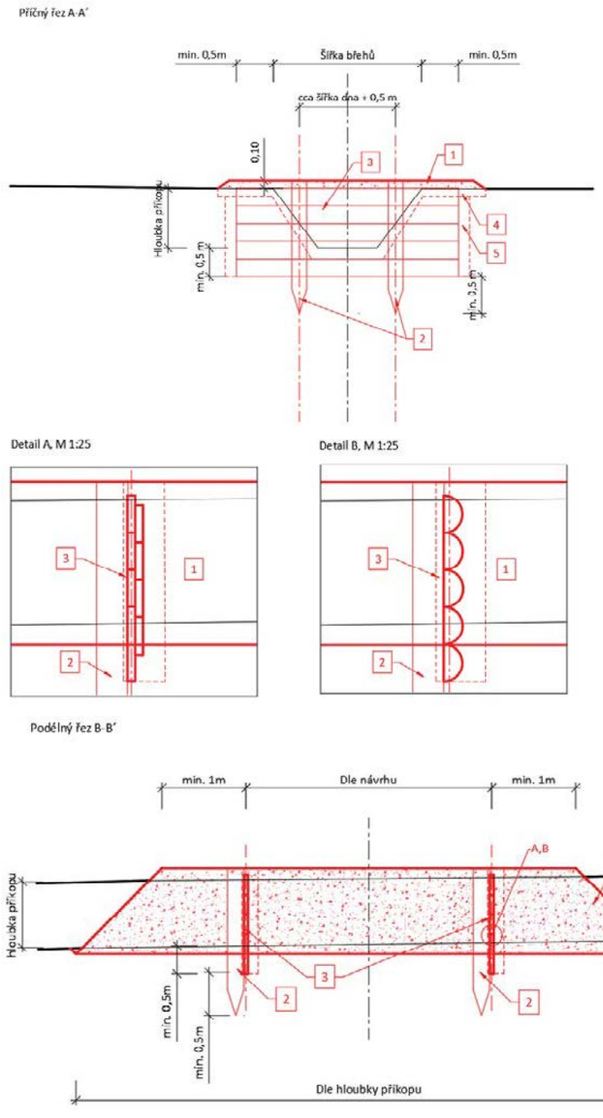
2 - Logs with a diameter of min. 0.15 m embedded at least 0.5 m into the soil layer

3 - Wall of two layers of edged or unedged planks of minimum 20 mm thick; the minimum thickness of the entire construction is 150 mm

or half-logs minimum 150 mm thick (= planks embedded min. 0.5 m to the banks and the bottom)

4 - In the area of the dam turf layer of 0.2 m will be removed and later reused for the topsoil of the embankment

5 - The trench for the foundation of the wooden wall; once installed, it will be filled with compacted original material.



Legend:
1 - Compacted backfill with soil, backfill slope max 1:1
2 - Logs with a diameter of min. 0.15 m embedded at least 0.5 m into the soil layer
3 - Wall of two layers of edged or unedged planks of minimum 20 mm thick; the minimum thickness of the entire construction is 150 mm
or half-logs minimum 150 mm thick (= planks embedded min. 0.5 m to the banks and the bottom)
4 - In the area of the dam turf layer of 0.2 m will be removed and later reused for the topsoil of the embankment

5 - The trench for the foundation of the wooden wall; once installed, it will be filled with compacted original material.

Notes:

4.3.2. Check dam type B

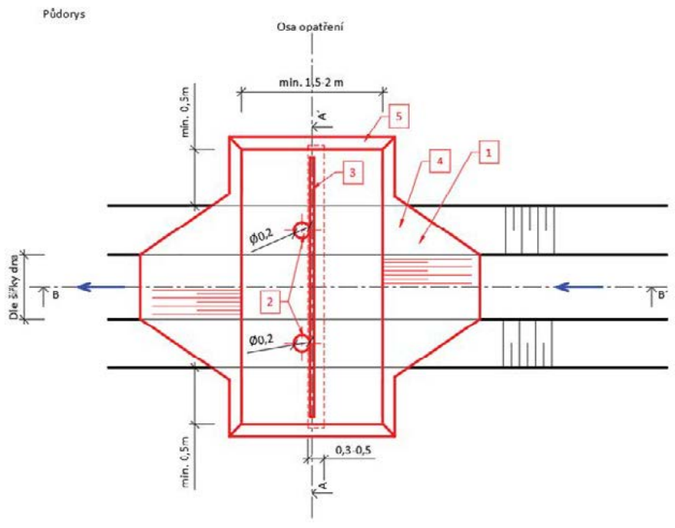
Description: An earth dam combined with a single reinforcing wooden dam. The soil for the backfill will be obtained in the vicinity of the construction site from bank mounds or small depressions. The earth body is stabilized in the centre with a wall of planks. This wall is embedded in the banks and the channel bottom.

The wooden walls/dams are installed horizontally across the channel. The dams are constructed of edged or unedged planks or half-logs; the planks are laid horizontally in two layers overlapping the gaps. The width of planks or the half-logs must be minimum 15 cm, the thickness of the planks minimum 2 cm. Geotextile is installed between the layers of planks/half-logs. The geotextile shall be made of degradable natural material (tow), which shall be inert and tested as harmless to the natural environment.

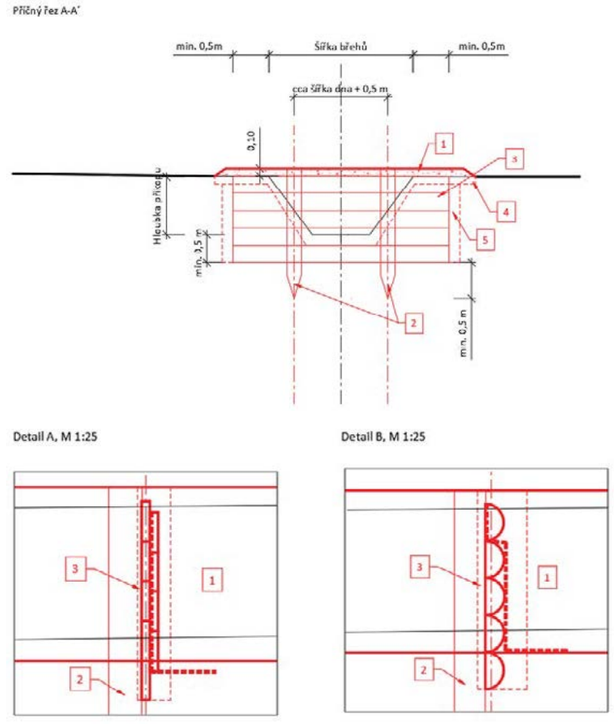
When the dams are built of horizontal planks, sufficiently deep notches must be dug in the banks and in the bottom of the trench to meet the requirements for overlapping and anchoring (minimum 0.5 m to the sides and to the bottom, up to 0.8 m or more for large channels). The notches for installing the check dam shall be up to 0.3–0.5 m wide to ensure good sealing. The dams are assembled in the prepared notches and sealed with compacted earth. In the lower part of the dam (near the bottom), the geotextile overlaps minimum 40 cm and is laid on the bottom above the upstream face of the dam, where it is then covered with soil. At the downstream face, the dam shall be reinforced with a minimum of two cross-notched log stakes. The number of log stakes rises with the width of the dam. For earth dams of type B, the wooden dams shall be completely backfilled with soil and no spillway shall be constructed. The upstream and downstream faces of the bulkhead shall be backfilled minimum 1.5–2 m. In case of insufficient soil in smaller channels, backfill of at least 0.8 m on both sides shall be used and a spillway (approx. 20 cm wide, 2 cm deep) shall be built in the bulkhead. The dams are commonly constructed of two layers of planks; in channels deeper than 1.5 m, it is necessary to construct the bulkheads of three layers of planks (with a single layer of geotextile) and a larger number of stakes are used for reinforcement at the downstream face. The dam shall be perpendicular to the channel, with a horizontal top edge and smoothly embedded in the banks.

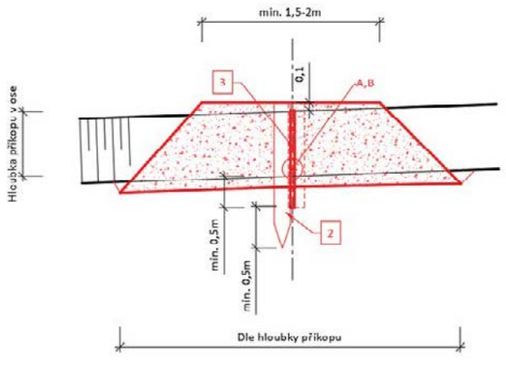
The vegetation and the turf layer will be removed from the bottom of the channels prior to the installation of the dams and backfilling with soil. The vegetation and turf will be reused for the topsoil. Wetland vegetation will prefer moist sites. The earth mass will be compacted to the maximum degree consistent with the category of material used.

Model solution:



Legend:
1 - Compacted backfill with soil, backfill slope max 1:1
2 - Logs with a diameter of min. 0.15 m embedded at least 0.5 m into the soil layer
3 - Wall of two layers of edged or unedged planks of minimum 20 mm thick; the minimum thickness of the entire construction is 150 mm
or half-logs minimum 150 mm thick (= planks embedded min. 0.5 m to the banks and the bottom)
4 - In the area of the dam turf layer of 0.2 m will be removed and later reused for the topsoil of the embankment
5 - The trench for the foundation of the wooden wall; once installed, it will be filled with compacted original material.





Legend:
1 - Compacted backfill with soil, backfill slope max 1:1
2 - Logs with a diameter of min. 0.15 m embedded at least 0.5 m into the soil layer
3 - Wall of two layers of edged or unedged planks of minimum 20 mm thick; the minimum thickness of the entire construction is 150 mm

or half-logs minimum 150 mm thick (= planks embedded min. 0.5 m to the banks and the bottom)
4 - In the area of the dam turf layer of 0.2 m will be removed and later reused for the topsoil of the embankment
5 - The trench for the foundation of the wooden wall; once installed, it will be filled with compacted original material.

Notes:

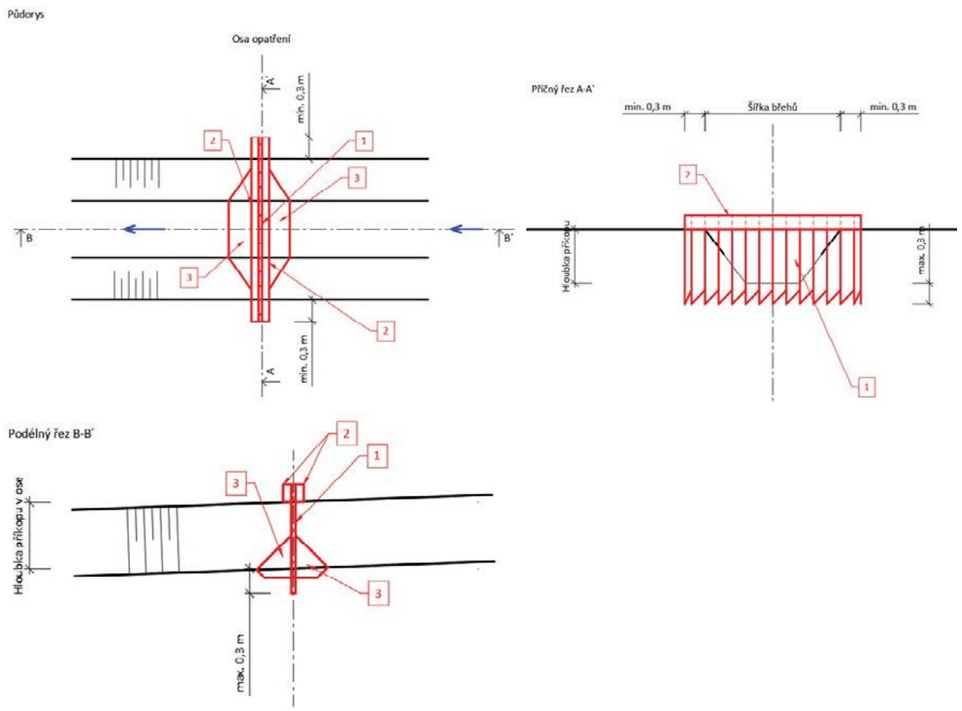
4.3.3. Check dam Type C – wooden dams of vertically notched planks

Description: The dam is made by driving individual planks vertically into the bottom of the trench. The planks are prepared for tongue-and-groove joining in advance and cut on site as required. They are laterally reinforced with ties. Minimum overlaps of the dam in peat are 50 cm at the bottom and 60 cm at the walls of the channel - the thickness must be verified on site. This is an environmentally sound technology ideal for particularly vulnerable raised bogs.

The planks are tongue-and-groove joined and laterally reinforced with ties. Dimensions of planks: width: 20 cm, thickness: 6 cm, the length must be adjusted to the depth of the trench. Standard lengths are 1.5 m, 2 m and 2.5 m, which are then cut on the site as required.

The dimensions of tongues and grooves on planks: thickness 2 cm, length 2 cm. Dimensions of ties: width 15 cm, thickness 5 cm, length must be adjusted to the width of the trench. The planks are notched vertically into the trench bottom one by one and joint simultaneously. The dam is thus created gradually on the spot from the planks that are pre-processed in the workshop. When preparing the planks, precision is essential; especially when making the tongue and groove, the specified dimensions must be observed. The reinforcing ties must always be placed beneath the overflow. The dams must be backfilled in the minimum length of 1-2 m above the downstream and upstream face and more in the case of larger channels.

Model solution:



Legend:

1 - Edged plank thickness 50mm

2 - Tie - beam 100x200

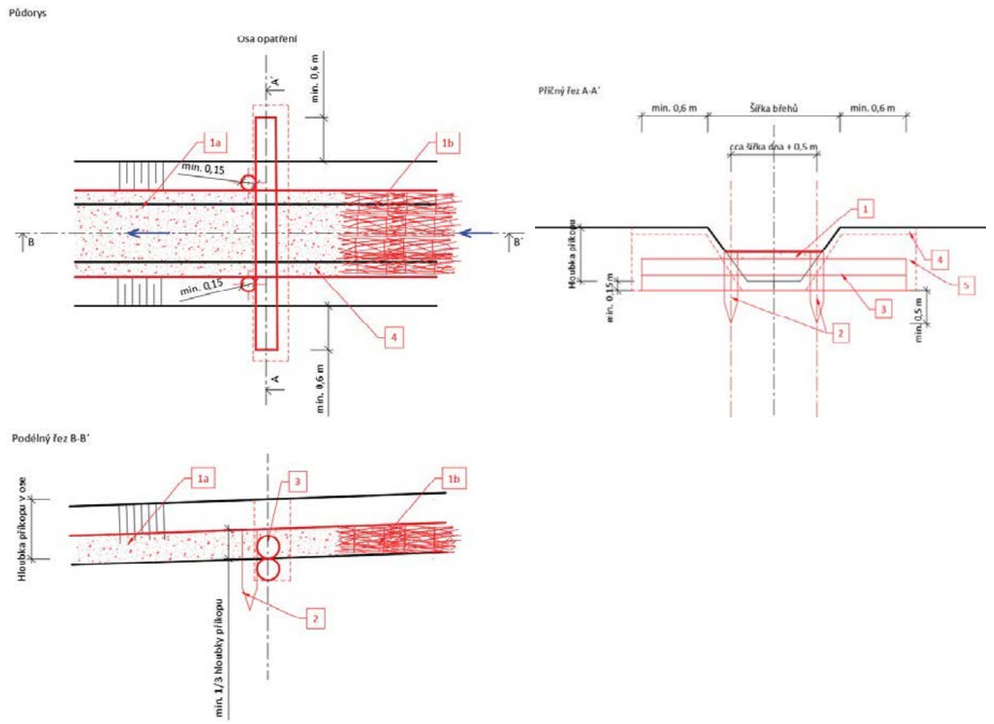
3 - Backfill with earth obtained within dam construction

Notes:

4.3.4. Measure D: Partial filling of deep channels of modified streams (shallowing) using backfilled dams - buried safety dams at the bottom of shallowed streams

Description: The aim of this measure is to raise the streambed of modified, i.e. extensively deepened streams (includes natural streams heavily deepened due to accumulation of water from a large number of drainage channels) where the original natural stream route cannot be restored. The entire channel bottom will be partially backfilled with soil or gravel (aggregate); the backfill will include fully embedded cross timber bulkheads notched in the bottom and banks so as to stabilize the backfill and prevent material from being washed away. The bulkheads construction corresponds type B but are low and completely backfilled. They only have a safety function, are part of the bottom with no projection. The bottom will be raised approx. up to 1/3 of the channel depth (exceptionally higher), most often by 30-40 cm in height.

Model solution:



Legend:

1a - Compacted soil backfill

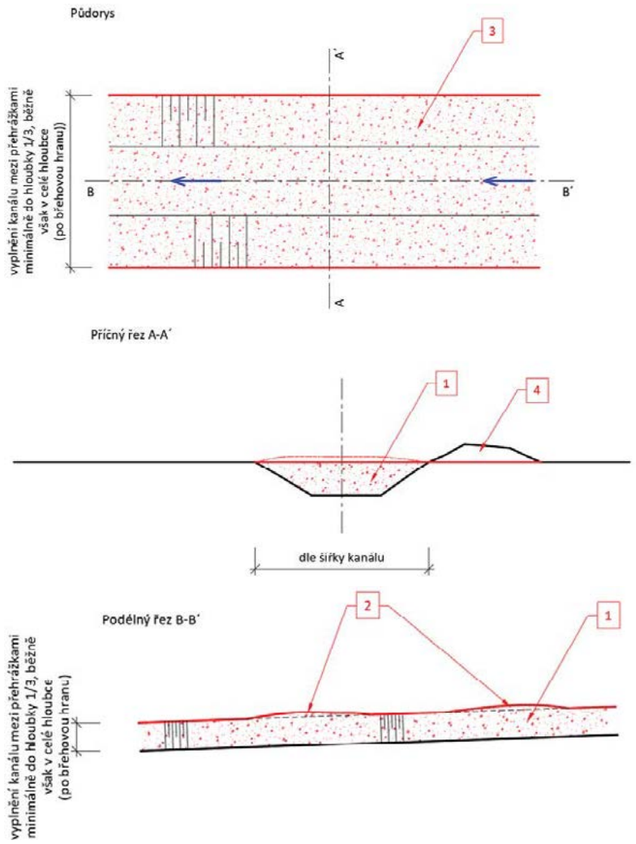
1b – In case of lack of soil, filling with sheaves of branches

2 - The pole with a diameter of min. 0.15 m driven at least 0.5 m into the soil layer

3 - Wall of logs with a diameter of min. 0.15 m, embedded min. 0.6 m in the banks

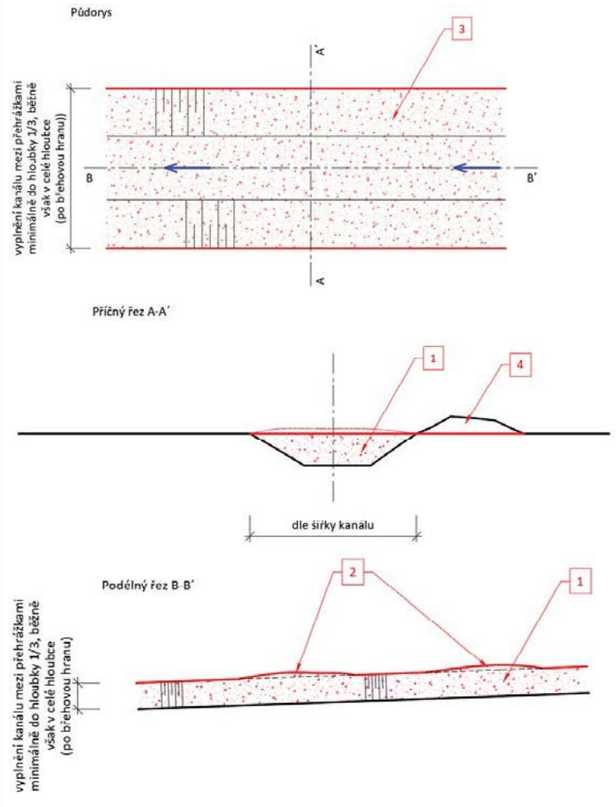
4 - Sod layer 0.2 m thick will be removed in the area and reused for the topsoil of the embankment 5 - The trench for the foundation of the wooden wall; once installed, it will be filled with compacted original material.
Notes:

4.3.5. Measure E: Filling of dammed channels with soil or sheaves of vegetation

Description: The blocked/dammed channels shall, to the maximum extent possible (but not less than 1/3), be filled with earth from adjacent bank mounds, remaining deposits or small depressions formed in the vicinity. In wetland areas, more open space up to 25% of the channel length may be left between dikes for water accumulation. In case of lack of material, the spaces between the damming will be filled with sheaves made of branches from pruned trees. Branches up to 2 cm in diameter, tied tightly together using thin, uncoated wire. The size of sheaves approx. 0.7 m in length and up to 0.5 m in width so that they can be carried by hand. Pieces of trunks from pruning and thinning can also be used (placed tightly lengthwise).
Model solution:    Legend: 1a - Compacted earth backfill

2 - Raising the embankment by approx. 10 cm, erosion prevention measures in case of embankment subsidence 3 - Sod layer 0.2 m thick will be removed in the area and reused for the topsoil of the embankment 4 - Removal of bank mounds.
Notes:

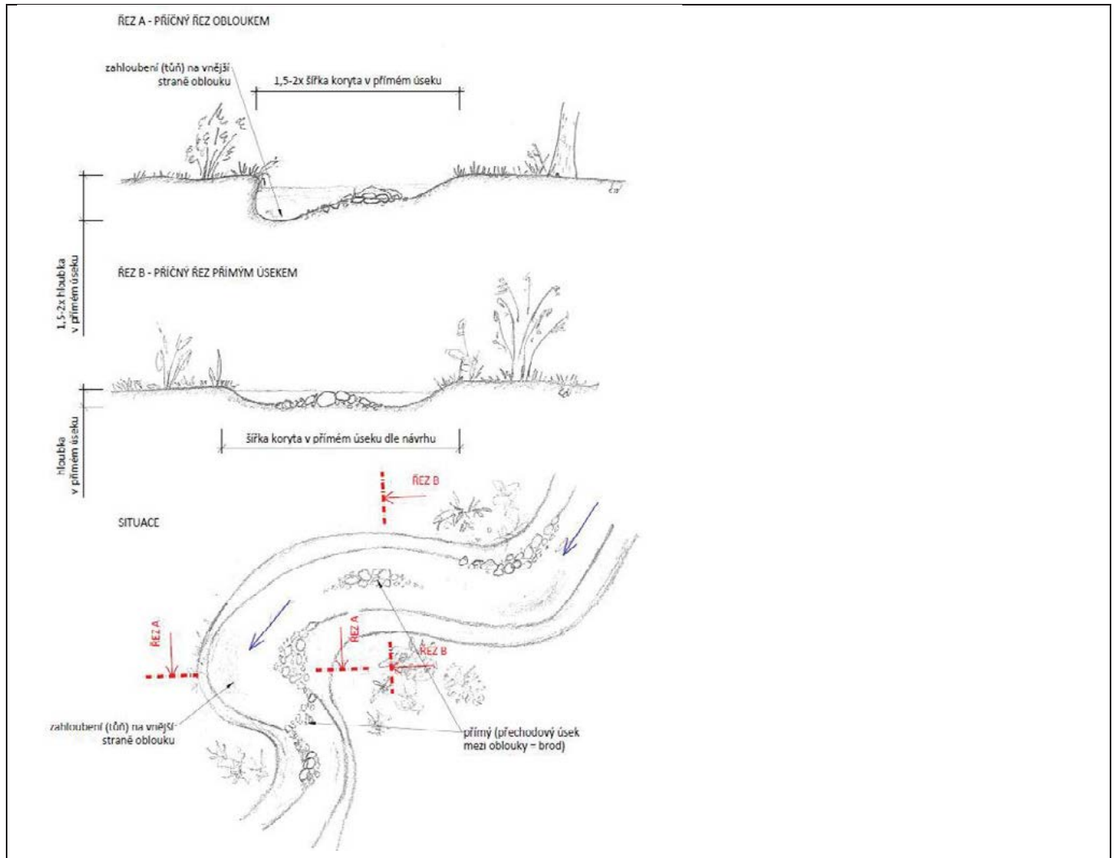
4.3.6. Measure F: filling shallow dry channels

Description: The blocked/dammed channels shall, to the maximum extent possible (but not less than 1/3), be filled with earth from adjacent bank mounds, remaining deposits or small depressions formed in the vicinity. In wetland areas, more open space up to 25% of the channel length may be left between dikes for water accumulation. In case of lack of material, the spaces between the damming will be filled with sheaves made of branches from pruned trees. Branches up to 2 cm in diameter, tied tightly together using thin, uncoated wire. The size of sheaves approx. 0.7 m in length and up to 0.5 m in width so that they can be carried by hand. Pieces of trunks from pruning and thinning can also be used (placed tightly lengthwise).
Model solution:    Legend:

1a - Compacted earth backfill 2 - Raising the embankment by approx. 10 cm, erosion prevention measures in case of embankment subsidence 3 - Sod layer 0.2 m thick will be removed in the area and reused for the topsoil of the embankment 4 - Removal of bank mounds.
Notes: In case of soil shortage, earth can be replaced locally

4.3.7. Measure G - Restoration of original channels and small tributaries

Description: In this case, new low-capacity channels will be built with alternating opposed bends (reflecting the slope of the terrain). This way modelled channel has a character of the initial stage of the natural stream flow. Care must therefore be taken to ensure that the channel is both laterally and longitudinally diverse. The width of the small drains will be maximum 0.4–0.5 m, the depth generally up to 0.2 m, maximum 0.3 m in the lower sections of higher capacity. A slightly deeper (by approx. 10 cm) section should be created on the impact bank of the bend. On less steep slopes, current and quiescent sections alternate regularly, i.e. deeper parts (outer part of the bend) with shallower parts (fords in the transitional straight sections). This measure is proposed in the routes of original channels selected within the field survey. The natural morphology of the hydrological network of the area also required the restoration of the defunct small tributaries that channel surface runoff water from the spring areas into the already developed stream channels. These restored smallest tributaries are similar in character to the natural watercourses but have a smaller capacity.
Model solution:

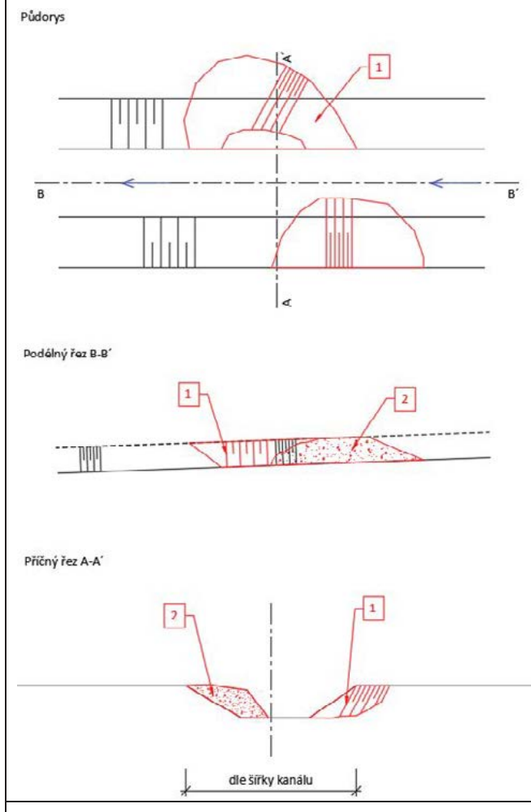


Notes:

4.3.8. Measure H: Opening of existing channels

Description: Opening of selected streams is proposed, which consists in ripping a part of the bank in the shape of a shallow crescent and moving this mass to the opposite bank. Description: Opening of selected streams is proposed, which consists in ripping a part of the bank in the shape of a shallow crescent and moving this mass to the opposite bank. The disturbed (impact) part of the created bend should have a steep bank with a slightly deeper depression to guide the water current. The moved mass forms the sediment bank with a gentle gradient towards the stream. This section shall be compacted to the maximum extent possible in the places of connection while retaining the vegetation and sod on the surface. These sections of moved mass alter regularly on the right and left bank to slow down the flow. The length of the ripped part is always approx. 3-4 m depending on the size and capacity of the channel; the depth of the ripped bank maximum 2 m. The aim is to trigger the renaturation process and create more diverse morphology of the stream.

Model solution:



Legend:

1 - Excavation of soil from the bank edge

2 - Placing earth on the opposite bank slightly upstream so that the flow is directed into the excavation.

Notes: This establishes an initiation phase leading to the natural development of the channel morphology.

Complementary measures to all types of measures involve filling the space between the dam elements. This will reduce the volume of free water that puts load on the dam structures. In addition to water, the pressure of ice represents a significant negative effect on the structures. When the water level is reduced, the process of overgrowth accelerates, which thus the filling of blocked channels. Based on practical experience gained during the revitalization of the Šumava National Park, it is advisable to place clusters of peat moss in suitable places after the completion of the construction work.

This method is recommended to be used at a maximum extent as these constructions prove to be more durable and better tied to the terrain. Use of machinery is not recommended only in places where rare habitats occur and moving machinery could cause severe damage.

4.3.9. Measure I: Disruption of concentrated runoff on forest roads - cross-drains

Description: The subject of the measure is installation of cross-drains (transverse drainage) in forest roads. Apart from protecting the road surface from erosion, the aim of this measure is to disrupt the accelerated and concentrated runoff of surface water over the road surface and to divert it off the road into the retention area in the forest. The surface water runoff should ideally be diverted into adjacent stands with the potential

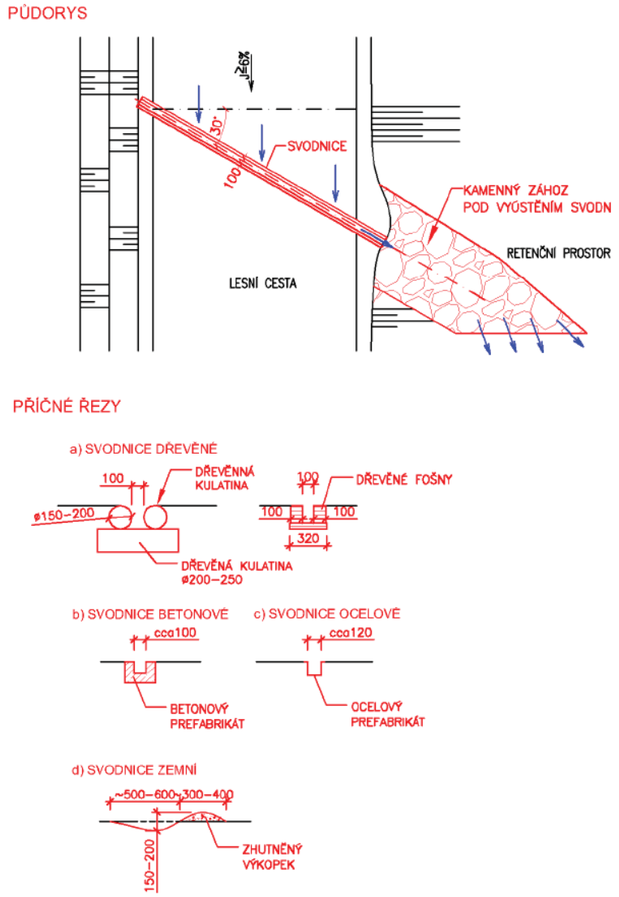
to infiltrate into the forest soils. If not possible, it should be alternatively diverted into sheet flow where the roughness of the forest soil surface will efficiently slow down the flow. The surface water runoff should ideally be diverted into adjacent stands with the potential Cross-drains are proposed particularly for roads with a high longitudinal slope and suitable (retention) space along the road, or with suitable terrain morphology.

Different materials are used for the construction of the cross-drains, such as wood (planks or logs), stone (stonework), concrete or steel. The cross-drain may also be modelled as an earth structure ('traversable cross swale' - see separate list of measures).

Wooden cross-drains are less costly, but their disadvantage is less strength and lower durability. They are therefore suitable for lower class roads or temporary roads. Concrete or steel U-shaped cross-drains are more expensive but longer durability. They may ideally be used in higher class roads with heavier traffic load.

The construction of the cross-drain forms a drainage channel with a transverse U-shaped profile with dimensions of min. 10x10 cm. The cross-drains are installed in spacing depending on the longitudinal slope, the amount of precipitation or the type of road surface (different materials can resist different water flow rates).

Model solution:



Legend:

1 - Excavation of soil from the bank edge

2 - Placing earth on the opposite bank slightly upstream so that the flow is directed into the excavation.

Adapted from SWECO (2017)

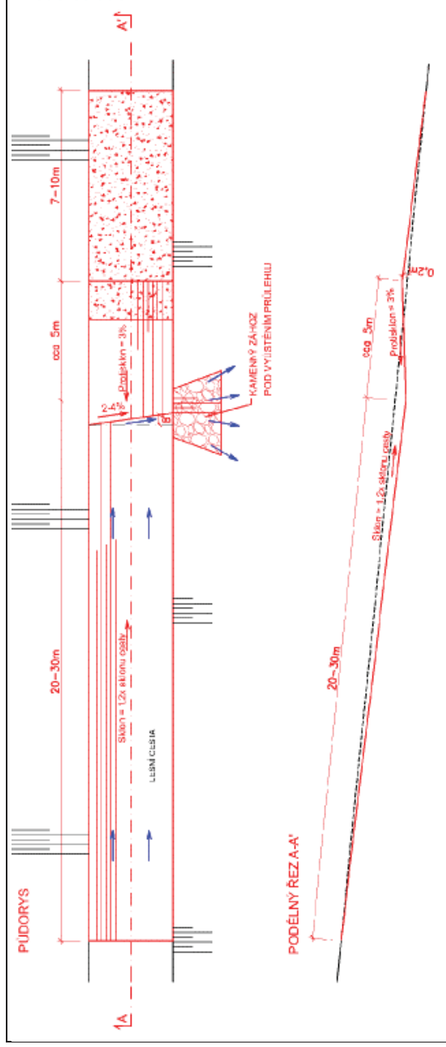
4.3.10. Measure J: Disruption of concentrated runoff on forest roads – swale

Description: The measure involves the construction of swales in the road profile, which is one of the possible methods of cross drainage on forest roads.

The aim is to disrupt the concentrated surface water runoff along the road crown and divert it to the embankment slope or to the forest retention areas. With regard to water retention in the landscape, the main objective of the measure is primarily to prevent the fast runoff of water from the paved surface of the road, which becomes one of the major runoff paths during rainfall. In terms of technical solution, it also protects the road against water erosion. Cross swales are proposed mainly for roads with a great longitudinal slope and suitable (retention) space along the road or suitable terrain morphology. The measure is more suitable for gravel roads.

Swales in the road surface represent a measure with minimal costs, built directly in the road profile without the use of additional materials and with no additional investment. They are mostly designed as part of the forest road project but may also be installed additionally where they are reasonable and the terrain morphology allows it. The surface of the road is modelled when constructing the swale; the proportions of the swale may vary while the ease of passing should be taken into account. In this particular case, a gradual type of a swale with a triangular transverse profile (type 1) is proposed for approximately 40 m of the road length.

Model solution:

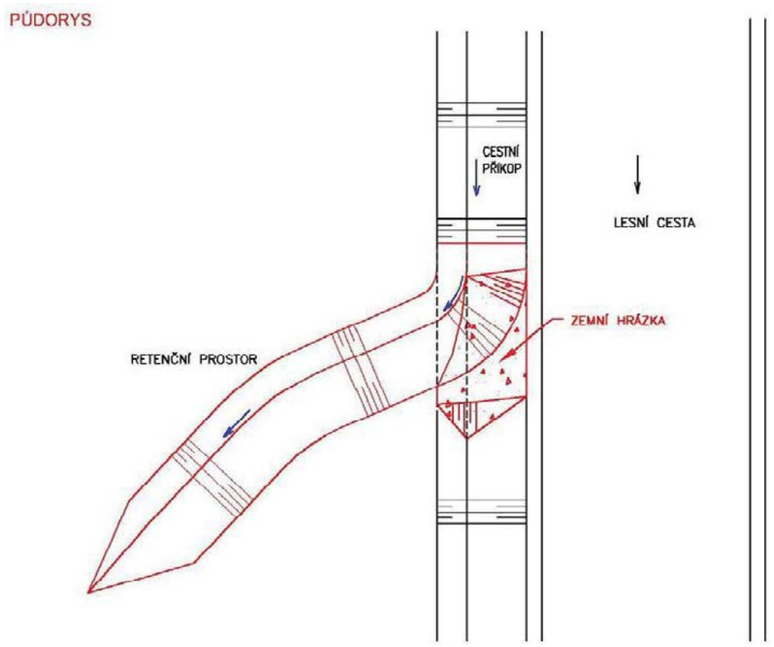


Adapted from SWECO (2017)

4.3.11. Measure K: relief of road ditches

Description: The aim of this measure is to disrupt the concentrated and accelerated runoff in road ditches by diverting it into the forest area where it will convert to sheet flow and will be slowed by the roughness of the forest land surface. It is also assumed that, in particular in lower intensity rainfall events, it will partly infiltrate into the forest soil and thus promote water retention in the landscape. The measure is suitable for new roads as well as the existing road network. When the route of the ditch is diverted to a suitable location near a rod, the water remains on the same side of the road. When this measure is implemented, the road ditch line will always be broken/blocked. Under such modifications the road ditch can continue. Diversion of the route of the road ditch should be designed in locations suitable for this purpose, thus minimizing the costs and earthworks. Some excavated material from the new route, (the proposed route should respect the existing vegetation), will be used to blind the ditch, i.e. to create an earth embankment in the profile of the ditch. The slope of the bottom of the ditch diverted along the contour will always be smaller than the slope in the road ditch. The water runoff will be reduced to a rate that causes no damage. The ditch termination should not be in a concentrated runoff route but should allow for water dispersal in the forest stands.

Model solution:



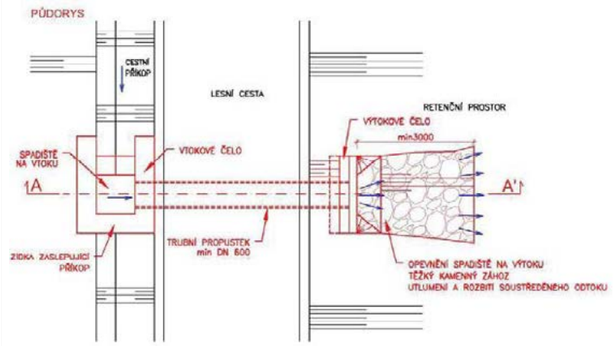
Adapted from SWECO (2017)

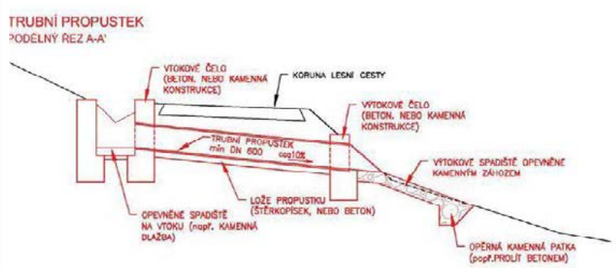
4.3.12. Measure L: Culvert

Description: The aim of this measure is to disrupt the concentrated and accelerated runoff in road ditches by diverting it into the forest area as sheet flow slowed down by the roughness of the forest land surface. It is also assumed that, in particular in lower intensity rainfall events, it will partly infiltrate into the forest soil and thus promote water retention in the landscape. The measure is suitable for new roads as well as the existing road network. Conveying water under the road through a pipe culvert is appropriate if the area for water infiltration or retention is on the opposite side of the road. When implementing this measure, the road ditch will always be disrupted (diverted) - blocked. Under such modifications the road ditch will continue.

Pipe culverts will be designed to convey water harmlessly under the road from the blinded (filled) road ditch to the retention area on the other side of the road. As this is a challenging and costly construction, the use of pipe culverts will only be proposed in locations with a significant final effect, i.e. the potential for retaining larger volumes of surface water in the forest or dispersing the flow in the forest stand. The inside diameter and slope of the culvert will be determined based on hydrotechnical calculations that take into consideration the maximum flow rate. Nevertheless, for reasons of easy maintenance, culverts should be designed with a minimum inside diameter of DN 600. The most common type of pipe culvert is the circular culvert, built of prefabricated pipes - concrete, reinforced concrete, steel or plastic. The inlet and outlet of the culvert will have head walls - concrete or stone construction. (A culvert without head walls is a more cost-effective option, where the protruding ends of the pipes are only lined with dry stone walls in the slope profile). A wall or earth embankment will be perpendicular to the inlet head to blind the road ditch. An inlet (sedimentation) tank may be constructed at the inlet, or the bottom of the inlet spillway may only be reinforced. On the outlet side, the channel must be reinforced with a stone backfill. Such a rough surface will reduce the kinetic energy and the water flow velocity. It is recommended to install the stone fortification in a fan-shaped pattern to disperse the runoff into the downstream area. The outlet should never be directed into the route of the concentrated runoff to prevent potential water erosion. As an option, a water infiltration component (e.g., a pit filled with aggregate) or a retention pool should be constructed at the outlet of the culvert to retain water from less intense rainfall. This complementary measure would significantly enhance retention of water in the landscape.

Model solution:





Adapted from SWECO (2017)

4.3.13. Complementary measures

The revitalization of the defined area is a comprehensive set of structural and non-structural measures. In addition to the above technical measures aimed at raising the groundwater level, the complementary measures have a significant overall effect on the site. This effect may be observed in faster restoration of natural habitats, improvement of microclimate indicators, water quality, etc.

Felling and interventions in vegetation

As all the sites are subject to varying degrees of forest management, the occurrence of non-native species has been recorded. Intensive drainage of the areas has also had an impact on the species composition, particularly of the forest stands. This has promoted the growth of undesirable species that hinder restoration of the target habitats.

The non-native species can be removed from the area by a single intervention, including the removal of branches (possible seed sources). Before the proposed measures are implemented, undesirable species can be eliminated by waterlogging of the areas again and possibly removing trees that may represent seed sources.

As stated above, an increase in the groundwater level will have an impact on the living trees and the species composition. The main indicators will be the rate of such increase of the groundwater level (GWL) and the age of the stand. Older trees are less tolerant to the changes in the GWL.

This chapter can include implementation of the conclusions and recommendations from the forestry part of the LIFE Adapt Brdy project, which addresses, among other things, close-to-nature forest management.

Biomass removal

Target oligotrophic habitats are characterized by low levels of nutrients, which allows the development of vegetation with a typical species composition. Areas with growing common reed (*Phragmites australis*), lesser reed (*Lemna minor*) and three-spotted reed (*Lemna trisulca*) and similar species in eutrophic and mesotrophic standing waters are a clear indicator of nutrient availability.

Removal of biomass from areas affected by nutrient inputs, e.g. by cutting reed, including removal from the site, reduces nitrogen and phosphorus loads. The greatest effect can be expected in areas with historical loads (fertilization of forests and meadows), where there is no additional nutrient input from agricultural land, surface inflow from sewage systems and waste water treatment plants, etc.

Restoration of the microrelief and ground shaping

The areas excavated especially by machinery are characterised by a morphologically unstructured surface. Natural areas of mires and raised bogs are characterized by the alternation of shallow depressions (hollows) and uplands (hummocks), which form diverse microhabitats of typical plant and animal species. The accumulation of precipitation water, the slowing down of surface runoff and the effect on the local microclimate are further effects. Temperatures as high as 70 °C have been recorded on the surface of the exposed 'black' peat. When combined with mulching, the development of vegetation will be accelerated in these areas. The detailed procedures are based on the so-called Canadian method (Rochefort, 2003).

Technically, this involves modelling of shallow depressions with uneven banks and varying depths up to a maximum of 0.75 m. The material obtained in this way can be used to block or fill the drainage channels, as there is frequently a shortage of suitable material for the construction of earth dams. When damming channels, it is advisable to adjust the outflow from the space between the barriers. A shallow swale will allow accumulated water to flow in the desired direction. In the case of eutrophicated waters, it is advisable to divert these out of nutrient-sensitive areas. The channels are commonly surrounded by mounds of excavated material. This prevents the natural periodic spill into adjacent areas. Additional ground works may include removal of these mounds and deposition of the material in the adjacent channel.

4.4. Reference constructions

Revitalization of mires in the Krušné hory Mountains

Revitalization of the Cínovec mire

Sites already revitalized in 2009–2012 – association Beleco (formerly civic association Daphne CR – Institute of Applied Ecology). The general partner of the project is NET4GAS, s.r.o. (formerly RWE Transgas Net, s.r.o.).

Fig. 23 Cínovec Ridge

Fig. 24 Cínovec U jezera

Fig. 25 Double sealed log dam

Fig. 26 Constructed check dams

Links to articles and posts:

http://www.daphne.cz/projekty/revitalizace-raselinist-v-krusnych-horach

https://vesmir.cz/cz/casopis/archiv-casopisu/2011/cislo-7/raseliniste-zachraneno-cinovecky-hrbet.html

http://www.rozhlas.cz/priroda/zivotniprostredi/_zprava/revitalizace-krusnohorskych-raselinist-1-cast--1319377

http://www.rozhlas.cz/priroda/zivotniprostredi/_zprava/1319379

http://ekolist.cz/cz/zpravodajstvi/zpravy/PR-raseliniste-skryvaji-biotopy-z-doby-ledove

Revitalization of the Mothäuser Heide mire

The Mothäuser Heide is located in the German state of Saxony near the Czech border in the vicinity of the village of Hora sv. Šebestiána. In 2012, the realization of Stengelhaide (part of the site), which was partly industrially mined, started. The project preparation, construction and follow-up monitoring are carried out by Naturpark "Erzgebirge/Vogtland".

Fig. 27 Mothäuser Heide

Fig. 28 Sub-site Stengelhaide

Fig. 29 Damming the main drainage channel

Fig. 30 Constructed check dams

Links to articles and posts:

https://moorevital.sachsen.de/index2.asp

Revitalization of mires in the Jizerské hory Mountains

NR Klečové louky

Project "Restoration of visitor infrastructure and revitalization of mires in PLA Jizerské hory Mountains III" from 2012 involved reconstruction of tourist trails in the Sedlo Holubníku Seddle, near NM Vlčí louka and to the top of Mt. Jizera. This involved the renewal of the wooden decked footpaths, the cross drains of stone steps, the drainage gutters, the information boards and a wooden shelter. Three fenced plots have been installed. Furthermore, revitalization of the mires in NR Klečové louky – namely Jelení louka and Smrčková louka was carried out.

Fig. 31 Check dams constructed in NR Klečové louky

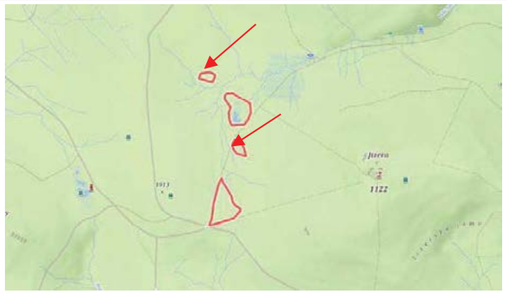


Fig. 32 Revitalized locations – NR Klečové louky

Klugeho louka and NNR Rašeliniště Jizery

In 2010 and 2011, with the help of volunteers, the Jizera-Ještěd Mountain Association (JJHS) dammed drainage channels on sites Klugeho louka and NNR Rašeliniště Jizery.

For the protection zone of NNR Raseliniště Jizery, maximum water level drops were determined in the range of 5–15 cm, 15–30 cm and 30–50 cm. This depended on the particular trench, as each differs in length, slope, width, depth, profile, etc.

Once the required number of dams, their spacing and location are determined, the actual construction takes place. There are various types of check dams used in the Czech Republic and around the world (in the Krušné hory Mountains made of logs, in Germany massive plank dams, in Switzerland regulating dams with an adjustable overflow rim, board dams, etc.). In the conditions of the Jizerské hory Mountains and based on the experience from Šumava, two basic types of check dams are distinguished: horizontal and vertical. Horizontal are designed to dam smaller trenches. Vertical dams are used for draining ditches which are generally larger and where a higher volume of retained water is expected.

The horizontal dam consists of cut planks 32 mm thick and 200 mm wide, while the width may vary depending on the availability of material. The length of each plank depends on the diameter of the specific trench. The planks are laid in two layers across so that the joints overlap each other. The two layers are filled with geotextile fabric, which overlaps approximately 30 cm at the bottom above the upstream face of the dam and is then backfilled with locally sourced material. The dam is reinforced with two half log stakes placed at the downstream face.

The vertical check dam is constructed using 45 mm thick, 200 mm wide, tongue-and-groove, machined planks that are driven vertically into the bottom. The so-called ties are fitted at the top of the dam, consisting of planks hammered horizontally on both sides. Both types of dams are also fitted with a spillway to concentrate the outflow of water and a chute to absorb the kinetic energy of the overflowing water. The lengths of the chutes are adapted to the difference in the water levels in the dams and their slope is minimum 45 degrees. The upper rim of the dam must always be horizontal to prevent water from draining elsewhere than at the spillway and washing out of the bank at the edge of the dam.

Another important step is to sufficiently anchor the dam to the banks and bottom of the drainage trench. This again depends on the slope and the expected volume of water to be retained. The minimum anchorage is 1 m into the banks and 0.5 m into the bottom; for larger trenches and steeper terrain, anchorage of more than 0.5 m into the bottom and 1.5 m into the banks is assumed. (JJHS Yearbook 2011).

Fig. 33 Constructed check dams at Klugeho louka

http://horskyspolek.cz/aktuality/64-revitalizace-raseliniste/

Further experience from the Jizerské hory Mountains

The team of Martin Šanda from the CTU (Faculty of Civil Engineering, Department of Hydrometeorology and Landscape Engineering) monitors the water regime of drained mires in the Jizerské hory Mountains PLA in the meadows of Uhlířská and Velká jizerská louka. The areas have undergone degradation of *Sphagnum* growth and other changes in vegetation. The measurements seek to describe the water regime under the current conditions, i.e. use of drainage forest ditches, and after the planned revitalization involving the damming of these ditches. In addition to the meteorological variables, surface runoff and groundwater levels, the monitoring in the catchment areas involves measuring soil suction pressures and soil moisture, and the natural isotope content in the water. Peat samples are also taken in the catchment areas for laboratory determination of retention curves. Numerical modelling of the water regime of a variably saturated environment on peat is carried out.

Revitalization of mires in NP Šumava

Several projects have been implemented or are being prepared in the Šumava National Park supported by the Programme of Revitalization of Šumava Wetlands and Mires.

http://www.npsumava.cz/cz/1502/1638/clanek/

Constructions implemented in relation to mires and wetlands on the territory of NP Šumava:

- Modravské slatě: Kamerální slať, Černohorský močál, Vrchové slatě, Novohoťské močály, Cikánské slatě, Blatenská slať, Luzenské údolí, Ptačí nádrž, Nad Rybárnou, Schachtenfilz, Na Ztraceném, Zhůží-Hadí vrch, Rokytenské slatě
- Borovoladsko: Šindlov
- Vltavský luh: Soumarský Most, Malý luh, Hučina, Žlebský potok, Jedlový potok

Revitalization of the Černohorský močál marsh

For the preparation and evaluation of the project, monitoring of the site was carried out in 2000–2002. Part of the area was revitalized in 2001. In 2013-2014, 1.8 km of drain ditches were blocked over an area of 80 ha and a small watercourse of 0.6 km was restored.

Fig. 34 Situation immediately after implementation

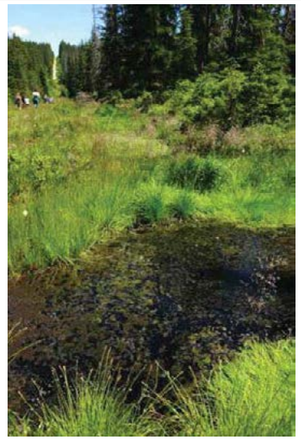


Figure. 35 Two years after implementation

Restoration of an industrially mined mire – Soumarský Most

Between 1999 and 2006, the drainage channels were dammed and filled (wooden and peat dams). Simultaneously, surface modifications were carried out, involving the creation of shallow depressions and covering the exposed peat with mulch from the surrounding sedge meadows. The mulch was used for topsoil in order to reduce the evaporation and to prevent overheating of the peat surface. The valley raised bog forest on a total area of 70 ha was restored this way.

The revitalization method is based on the so-called "American school" (François Quinty, Line Rochefort – 90's of the 20th century). The method consists of the following measures:

- Preparation of the mire surface – depressions
- Collection and introduction of peat-forming vegetation – initiation of the peat-forming process, 10 cm, carpet, application ratio 1:10
- Mulching
- Waterlogging – blocking channels
- To start as soon as possible after mining!

Revitalization of Zhůří

Revitalization was carried out in 2014–2015 and involved work on drainage channels on the left bank of the Křemelá River. The associations mainly involve wet meadows. The groundwater level has been monitored in the area since 2009, which allows its comparison before and after implementation.

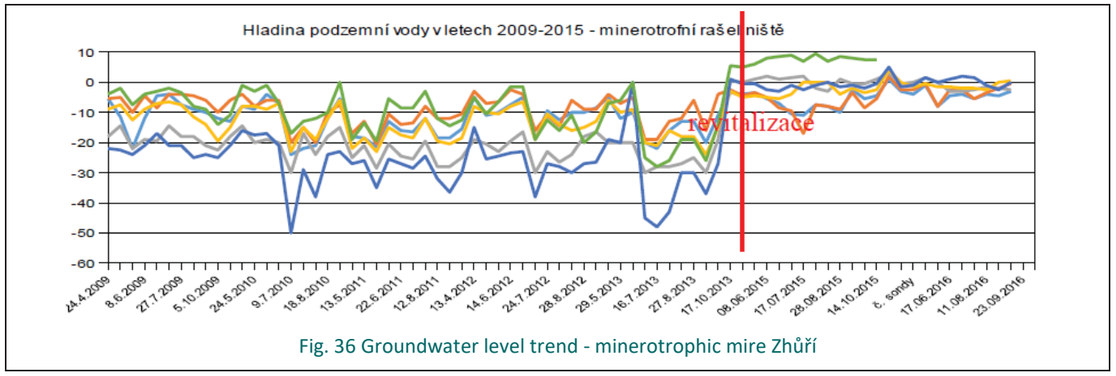


Fig. 36 Groundwater level trend - minerotrophic mire Zhůří

Further experience from revitalization projects

This chapter summarizes the experience based on monitoring in revitalized mires. The outputs and summary were prepared by Iva Bufková from the Šumava National Park.

The following parameters are being observed as part of the monitoring designed to assess the degradation changes in the drained mires and the success of revitalization:

- groundwater level
- runoff conditions
- water chemistry
- precipitations
- microclimate (air humidity and temperature)
- vegetation

The hydrological response of drained mires to revitalization varies according to the type of mire. Monitoring of the groundwater level found the following:

For raised bogs:

- quick immediate response
- increase in groundwater level
- reduction in the amplitude of fluctuation

Bog spruce forests:

- less response to extreme drought
- groundwater levels higher in extremely dry year 2015 than before revitalization

Minerotrophic (sedge) mires:

- the groundwater level increased after revitalization – see Fig. 36
- the maximum groundwater level recorded in the dry year 2015

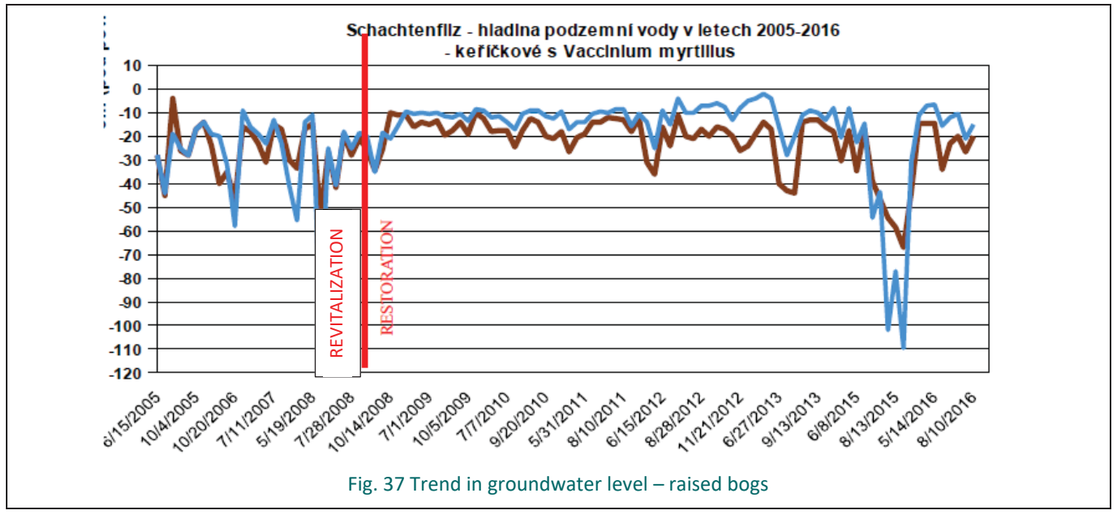


Fig. 37 Trend in groundwater level – raised bogs

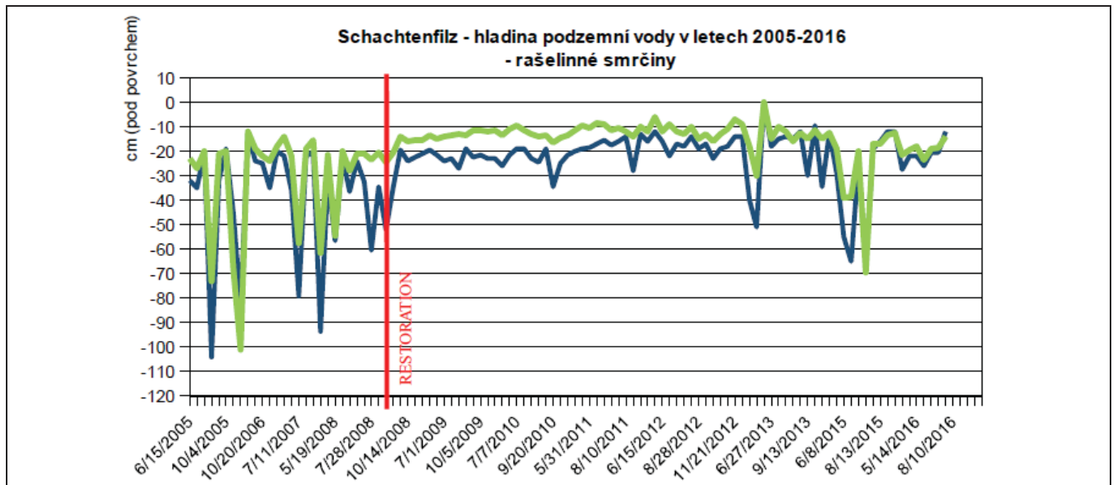


Fig. 38 Trend in groundwater level – bog spruce forests

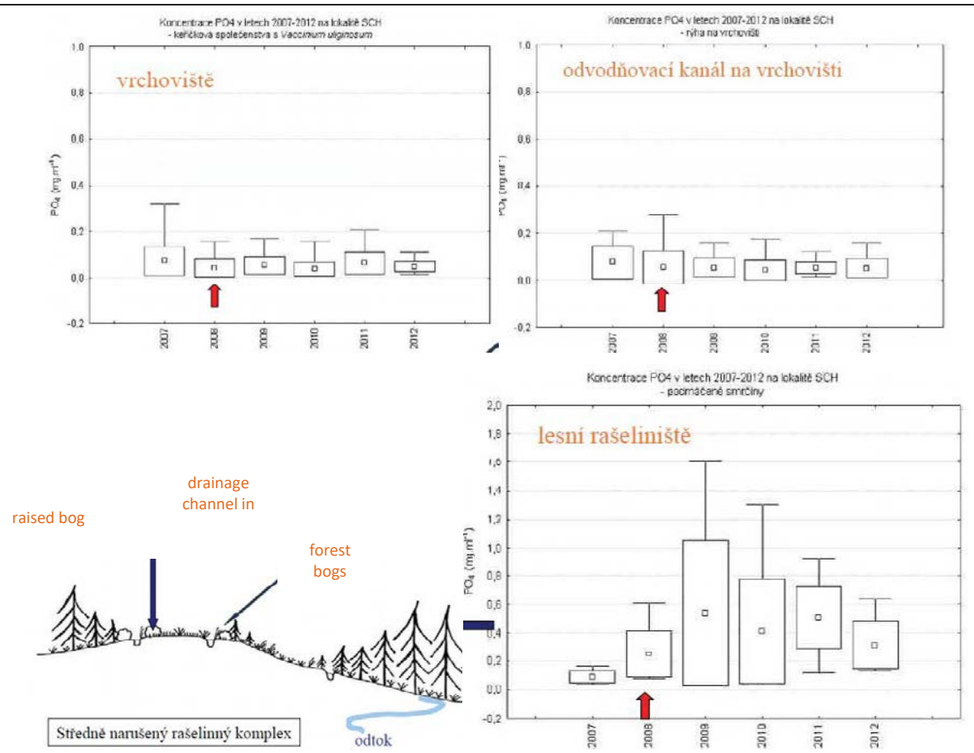


Fig. 39 Trend in phosphate concentrations (PO_4) for different types of mires

Summary of knowledge and experience from NP Šumava:

- concept of the target water level – suitable for the revitalization of mires and wetlands in steep montane terrain
- no channel filling in combination with damming results impossible (erosion)
- success rate (technical) around 78%
- positive hydrological response – still reflecting extremely dry periods
- indispensable overall restoration of water movement in the wetland
- hydrochemical reaction varies in different types of peat – temporary effect on water quality in the catchment area
- response of minerotrophic mires more pronounced
- immediate and long-term response differs
- use of machinery to the maximum extent possible will ensure better quality of the work performed and higher stability of the constructions.

Revitalization in other locations

Projects aimed at restoring the natural hydrological regime were also implemented in areas with a lower degree of protection.

Enhancing the water regime of the SCI Kapličky – CZ-SK SOUTH LIFE – ConNat ATC45-B

The preparation process for the project in the South Bohemian Region is similar to that of the present project. Within the LIFE programme, Studies for the Restoration of the Hydrological Regime in Selected Natura 2000 Sites were prepared. The implementation of the second stage in the SCI Kapličky is currently in progress.

Fig. 40 Unfinished check dam in raised bog

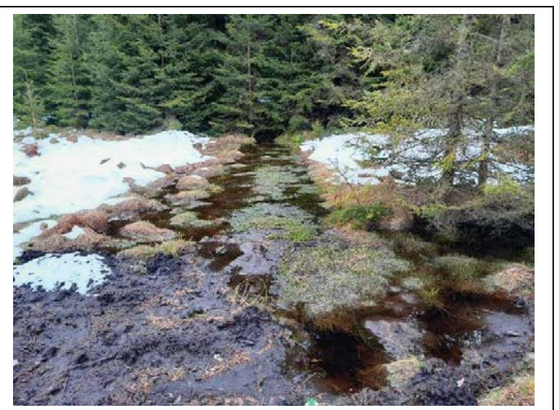


Fig. 41 Blocked ditch at the boundary between forest and meadow

4.5. Delimitation of sites

The sites to be addressed were selected as part of the analysis of the area of interest and the subsequent field survey. The indicator for the selection was whether the site was located in the target forest type and habitat. Additionally, an assessment was made as to whether there is drainage, stream regulation or whether the area is affected by a road network.

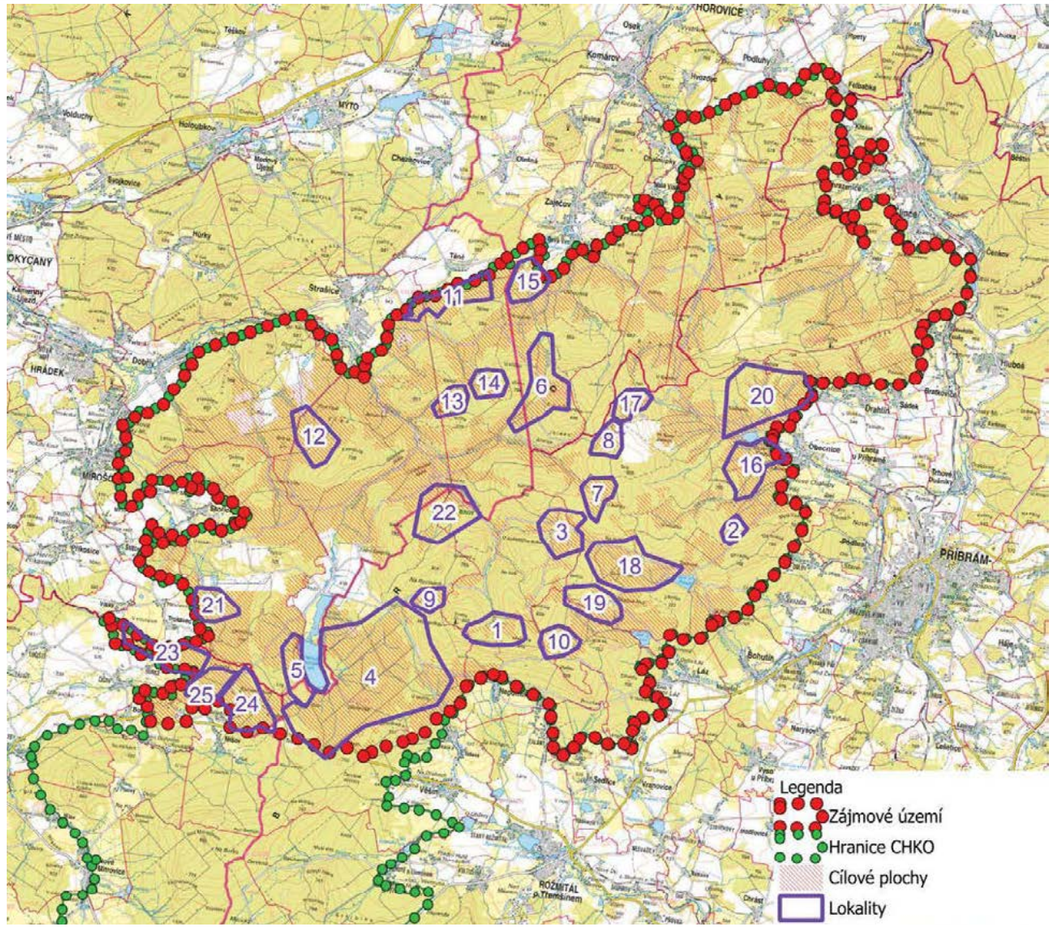


Fig. 42 Delimitation of sites

Tab. 12 Overview of determined sites

ID	Site	Area (ha)	Priority
1	Spring area of the Voložný potok Brook	130	**A**
2	Spring area above Obecnice	37	B
3	Spring area of the Třítrubecký potok Brook	161	B
4	Václavka	1 216	B
5	U žida (Hořejší Padrťský pond)	109	B
6	Water divide Hlava – Jordán	316	C
7	Carvánka	80	C
8	Kozlovice	70	D
9	Spring area of the Klabava	49	D
10	Spring area of the Litavka	80	B
11	Teně	138	C
12	Bahna - Vlčí potok Brook	142	D
13	Dolíky	64	C
14	Spring area Hlava	73	C
15	Suchá seč and Jalový potok Brook	105	C
16	Pod Kloboučkem	179	C
17	Spring area of the Obecnický potok Brook	66	D
18	Pilský potok Brook	278	B
19	Skelná huť	128	C
20	U pěti zlodějů	596	**A**
21	Kolvín	96	C
22	Tři trubky	223	C
23	Trokavec	151	**A**
24	Spring area of the Bradava	181	C
25	Spring area of the Bojovka	80	C

4.6. Proposal for measures in selected locations

The following part of the study provides a proposal for measures in detail according to the priorities identified. In the locations of priority A, the proposal gives the details at the level of individual measures. In priorities B, C, D it provides the solution concept.

4.8. Estimated costs

The cost estimate is divided into investment costs and project preparation.

The investment costs of the proposed measures (for details see Proposal for Measures) in individual sites are estimated on the basis of the types of measures (for priority A locations) proposed in this study and mostly estimated by the Guideline Prices of Construction Works (ÚRS Prague), or the costs of the common measures of the Ministry of Environment. Unit prices based on the contractor's experience with similar type of constructions have also been used. For sites of lower priority (B, C, D), aggregated items related to the length of the lines according to the design concept are used.

The costs of project preparation include the costs of elaboration of single-stage project documentation and the costs of engineering activities related to the construction permit. The item does not comprise the costs of providing supporting documents beyond those specified in the UNIKA Tariff. The pricing corresponds to the current (11/2023) applicable legislation.

The costs do not include the costs associated with the influence of the territory, induced investments, etc., which cannot be estimated in current detail.

Tab. 13 Estimated costs

ID	Site	Priority	DESIGN COSTS	INVESTMENT COSTS	Total costs
1	Spring area of the Voložný potok Brook	A	300,000	470,000	**770,000**
2	Spring area above Obecnice	B	350,000	600,000	**950,000**
3	Spring area of the Třítrubecký potok Brook	B	500,000	1,280,000	**1,780,000**
4	Václavka	B	500,000	9,510,000	**10,010,000**
5	U žida (Hořejší Padrťský pond)	B	500,000	1,530,000	**2,030,000**
6	Water divide Hlava – Jordán	C	500,000	2,030,000	**2,530,000**
7	Carvánka	C	450,000	950,000	**1,400,000**
8	Kozlovice	D	300,000	560,000	**860,000**
9	Spring area of the Kablava	D	300,000	350,000	**650,000**
10	Spring area of the Litavka	B	300,000	370,000	**670,000**
11	Teně	C	500,000	1,440,000	**1,940,000**
12	Bahna - Vlčí potok Brook	D	350,000	620,000	**970,000**
13	Dolíky	C	350,000	600,000	**950,000**
14	Spring area Hlava	C	300,000	290,000	**590,000**
15	Suchá seč and Jalový potok Brook	C	350,000	690,000	**1,040,000**
16	Pod Kloboučkem	C	500,000	1,080,000	**1,580,000**
17	Spring area of the Obecnický potok Brook	D	500,000	1,160,000	**1,660,000**
18	Pilský potok Brook	B	500,000	3,760,000	**4,260,000**
19	Skelná huť	C	500,000	1,230,000	**1,730,000**
20	U pěti zlodějů	A	500,000	1,380,000	**1,880,000**
21	Kolvín	C	450,000	950,000	**1,400,000**
22	Tři trubky	C	300,000	230,000	**530,000**
23	Trokavec	A	500,000	1,160,000	**1,660,000**
24	Spring area of the Bradava	C	500,000	1,150,000	**1,650,000**
25	Spring area of the Bojovka	C	400,000	760,000	**1,160,000**
Total			**10,500,000**	**34,150,000**	**44,650,000**

5. CONCLUSION

Based on the analysis of the territory, the presented study identifies locations with the potential to improve water retention in the area lying within the watershed. This primarily involves rainwater and spring water management. The system of measures proposed in these locations aims at restoring the natural hydrological regime. The natural hydrological regime is also associated with the natural development of the habitats in such locations. The proposed measures aim at retaining water in the soil horizon, slowing down the surface runoff and increasing infiltration into the bedrock environment. At present, we can observe manifestations of climate change, such as prolonged periods of drought and more frequent occurrence of extreme precipitation events.

Water retained in the soil is accessible to local vegetation and significantly less susceptible to the effects of climate change such as periods of drought and their impact on forest and non-forest communities. Slowing down surface and subsurface runoff means enhanced water infiltration potential in the area of interest, which is a source of water of local and regional importance. Slowing down surface runoff is an important factor when facing flash floods occurring in events of extreme rainfall. This is particularly important for the municipalities situated at the foothills of the Brdy Highland.

This study is followed by the preparation of a project and the implementation of measures in the selected location. Site 1 – Spring area of the Voložný potok Brook has been selected for implementation. This site is a coherent source part of the catchment area where a rapid response to the interventions can be anticipated. This will allow for the evaluation of the effect of measures already within the duration of the project 101074426 - LIFE21-CCA-CZ-LIFE Adapt Brdy - LIFE-2021-SAP-CLIMA. The evaluation will be carried out based on the monitoring of hydrological and biological indicators before and after the implementation of the measures.

The study has identified additional sites of higher priority for further preparation. This was done on the basis of the presentation of the study to selected institutions that can assist in the next stages of preparation. One of these institutions is the Regional Authority of the Pilsen Region and its Healthy Landscape Programme (www.zdravakrajinapk.cz), which represents a potential source of funding.

Another institution to which the study was presented is the Brdy Protected Landscape Area Administration. The outputs of this study will be provided to the above-mentioned organizations for coordination with their intents.

101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA

STUDY ON WATER RETENTION IN THE LANDSCAPE AND SPRING AREA REVITALIZATION PROJECT PROPOSAL FOR MEASURES

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 4
150 56 Prague 5, Czech Republic

VOJENSKÉ LESY A STATKY ČR, s.p.

101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy— LIFE-2021-SAP-CLIMA

Ministerstvo životního prostředí

November 2023
Contract No: 5552/006

CONTENT

1. IDENTIFICATION

The project was designed on the basis of a work contract dated March 13, 2023

Contract Number of the Commissioning Authority 2023-654

Contract Number of the Contractor 06-o-5552-13624/23

CONTRACTING AUTHORITY:

VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Prague 6 – Dejvice, Czech Republic
Division Hořovice
Slavíkova 106, 262 23 Jince, Czech Republic
Representatives of the Contracting Authority: Zbyněk Nejman, zbynek.nejman@vls.cz, +420 605 206 726

CONTRACTOR:

VODOHOSPODÁŘSKÝ ROZVOJ A VÝSTAVBA, a.s.
Division 06
Nábřežní 4
150 56 Prague 5, Czech Republic
Management team of the Contractor: Vendula Koterová, koterova@vrv.cz, +420 605 257 585
Filip Urban, urban@vrv.cz, +420 605 210 951
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Vítězslav Dvořák, dvorakv@vrv.cz, +420 724 846 143
Tomáš Staněk, stanek@vrv.cz, +420 721 069 165

Approved by: Pavel Menhard, Director of Division 06

2. DELIMITATION OF SITES

The sites to be addressed were selected as part of the analysis of the area of interest and the subsequent field survey. The indicator for the selection was whether the site was located in the target forest type and habitat. Additionally, an assessment was made as to whether there is drainage, stream regulation or whether the area is affected by a road network.

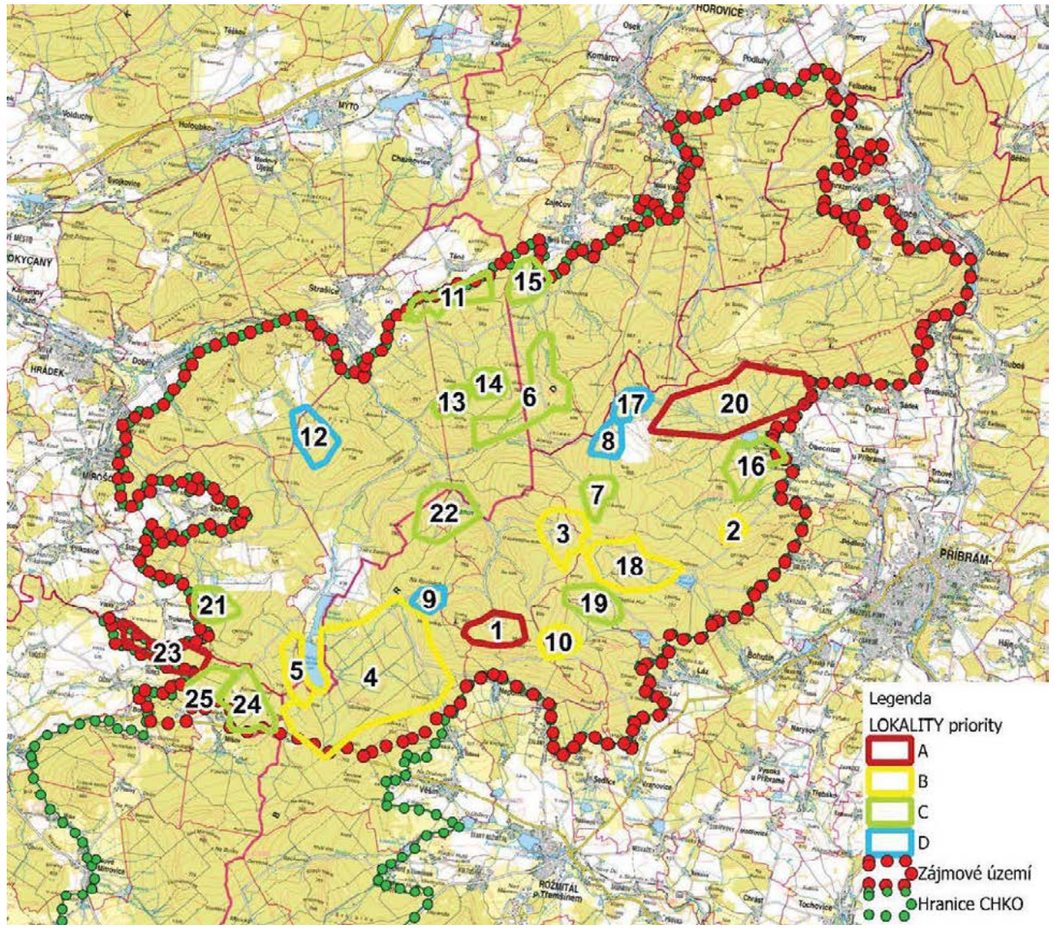

Fig. 1 Delimitation of sites

Tab. 1 Overview of determined sites

ID	Site	Area (ha)	Priority
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4	Václavka	1,216	B
5	U žida (Hořejší Padrťský pond)	109	B
6	Water divide Hlava – Jordán	316	C
7	Carvánka	80	C
8	Kozlovice	70	D
9	Spring area of the Klabava	49	D
10	Spring area of the Litavka	80	B
11	Teně	138	C
12	Bahna - Vlčí potok Brook	142	D
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21	Kolvín	96	C
22	Tři trubky	223	C
23	Trokavec	151	A
24	Spring area of the Bradava	181	C
25	Spring area of the Bojovka	80	C

3. PROPOSAL FOR MEASURES IN SELECTED SITES

3.1. Proposal for measures in sites of priority A

3.1.1. Site 1 – Spring area of the Voložný potok Brook

Site	**Spring area of the Voložný potok Brook**	Order No.	1
Region	Central Bohemian	Municipality with extended competence	Příbram
Municipality	Nepomuk	Cadastral area	Nepomuk in Brdy
Catchment area of IV. order	Třítrubecký potok Brook	Hydrological Order No.	1-11-01-007

Current state:

Site 1 is part of the cadastral area of Nepomuk in Brdy, which is part of the village of Nepomuk. The village of Nepomuk falls under the municipality of Příbram (municipality with extended competence) in the Central Bohemian Region. The area is located in the III. protection zone of Brdy PLA.

The given site is in the southern part of the area of interest, between the peaks Praha and Malý Tok. It is the spring area of the Voložný potok Brook, which is a left tributary of the Třítrubecký potok Brook. The Třítrubecký potok Brook flows into the Klabava River, which leaves the area of interest in Strašice. The Voložný potok Brook is managed by VLS.

The site is situated on a northern slope at an elevation of 760–825 m above sea level. As for the runoff characteristics, it is a spring fan of minor watercourses, which are, however, severely affected by past land reclamation interventions and drainage ditches. The shallow soil horizon is drained by ditches and the surface runoff is affected by the road network and skidding lines.

At the time of the study, the major part of the site is not covered by forest. As to habitat occurrence, this is a mosaic of prevailing forest plantations of allochtonous coniferous trees (X9A) with a significant proportion of bog spruce forests (L9.2A) and occurrence of waterlogged spruce forests (L9.2B).

In forest typology, the site is classified in vegetation zones 6 (spruce-beech) and 7 (beech-spruce) with the occurrence of edaphic categories P, R, K, Q, G and T. The target ecological series are stagnic, wet and peat, such as *Piceeto-Abietum variohumidum acidophilum* and *Piceetum turfosum mesotrophicum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff, which will increase local infiltration. A further effect of the measures will be the reduction of deep erosion affecting small watercourses.

This mainly consists of blocking drainage ditches and channels in their non-natural routes, shallowing and opening up of the modified streambed of the Voložný potok Brook. These key measures will be complemented by measures relating to the road network, adjustment of the morphology of the terrain in the areas of transport lines with a connection to the natural stream valley or the original stream course.

Basic parameters of the proposal:

Total site area	130	ha
Total number of lines concerned	26	pcs
Total length of lines concerned	9,200	m
of which drainage of roads and roads	4,277	m
of which drainage ditches to be blocked	2,309	m
of which natural streams with no intervention	1,156	m
of which streambeds to be shallowed	693	m
of which streams to be revitalized or opened	764	m
Total number of measures	40	pcs
of which type B	24	pcs
of which type D	5	pcs
of this type I	2	pcs
of which type J	6	pcs
of which type L	3	pcs

Phasing:

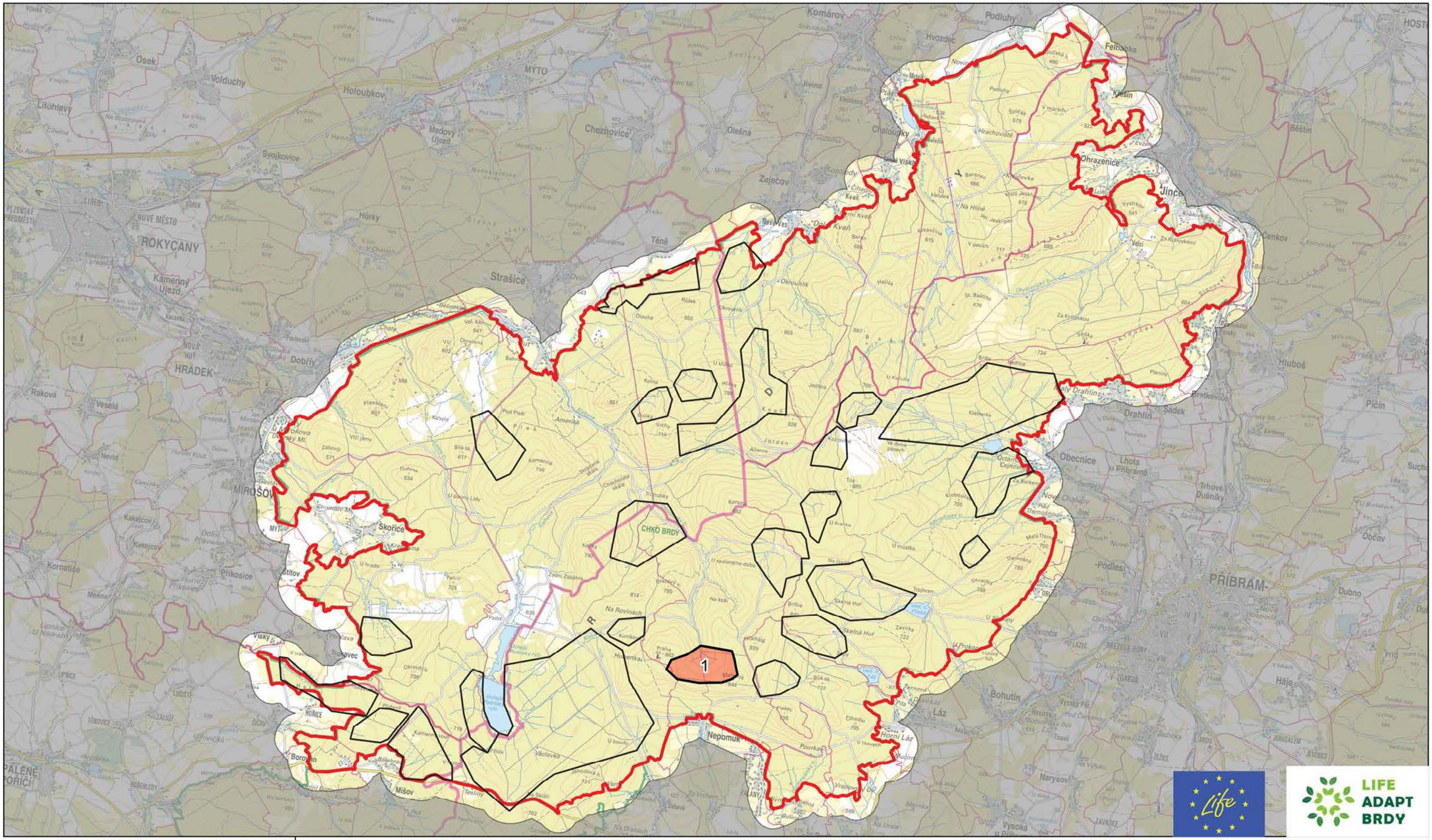
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:8 000
3.	Cadastral overview with the type of drainage lines	1:8 000
4.	Terrain morphology and the proposal concept	1:8 000
5.	Proposal for measures	1:8 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

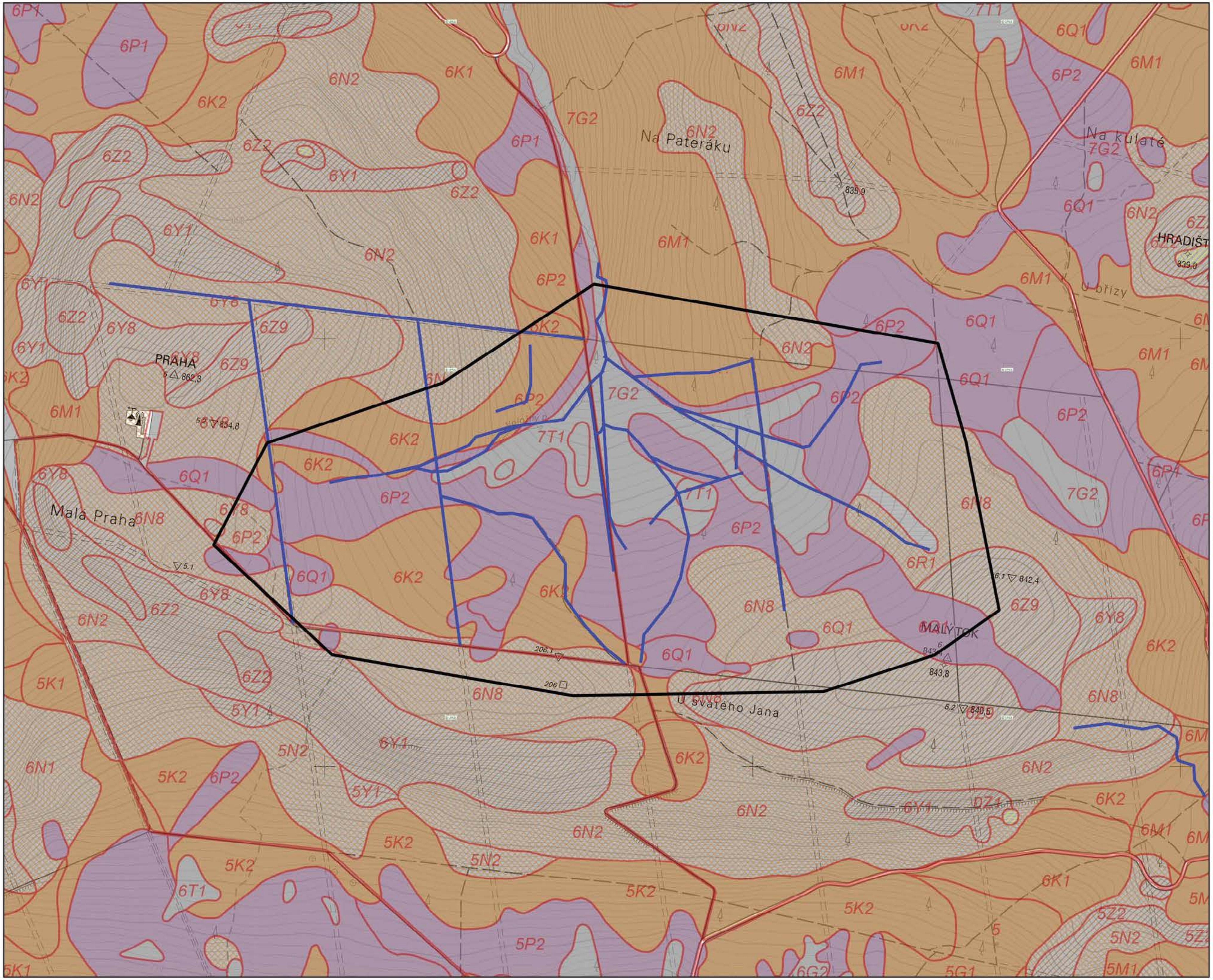
Zadavatel:

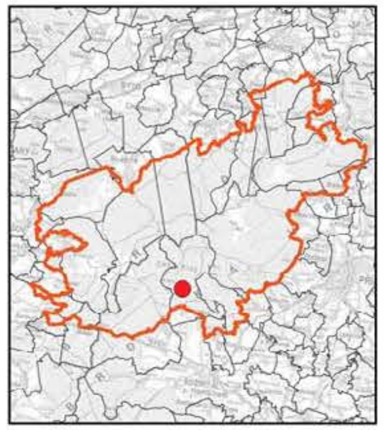
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 1

Prameniště Voložného potoka





Lokalita 1

Prameniště Voložného potoka

Priorita **A**

Řešená lokalita

Odtokové linie

Zájmové území

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Balt po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracovaváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

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2. Situace lesních typů

Lokalita 1

Prameniště Voložného potoka

Priorita **A**

Středočeský kraj

ORP:
Příbram - 539911

Obce:
Věšín
Nepomuk

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:8 000
1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

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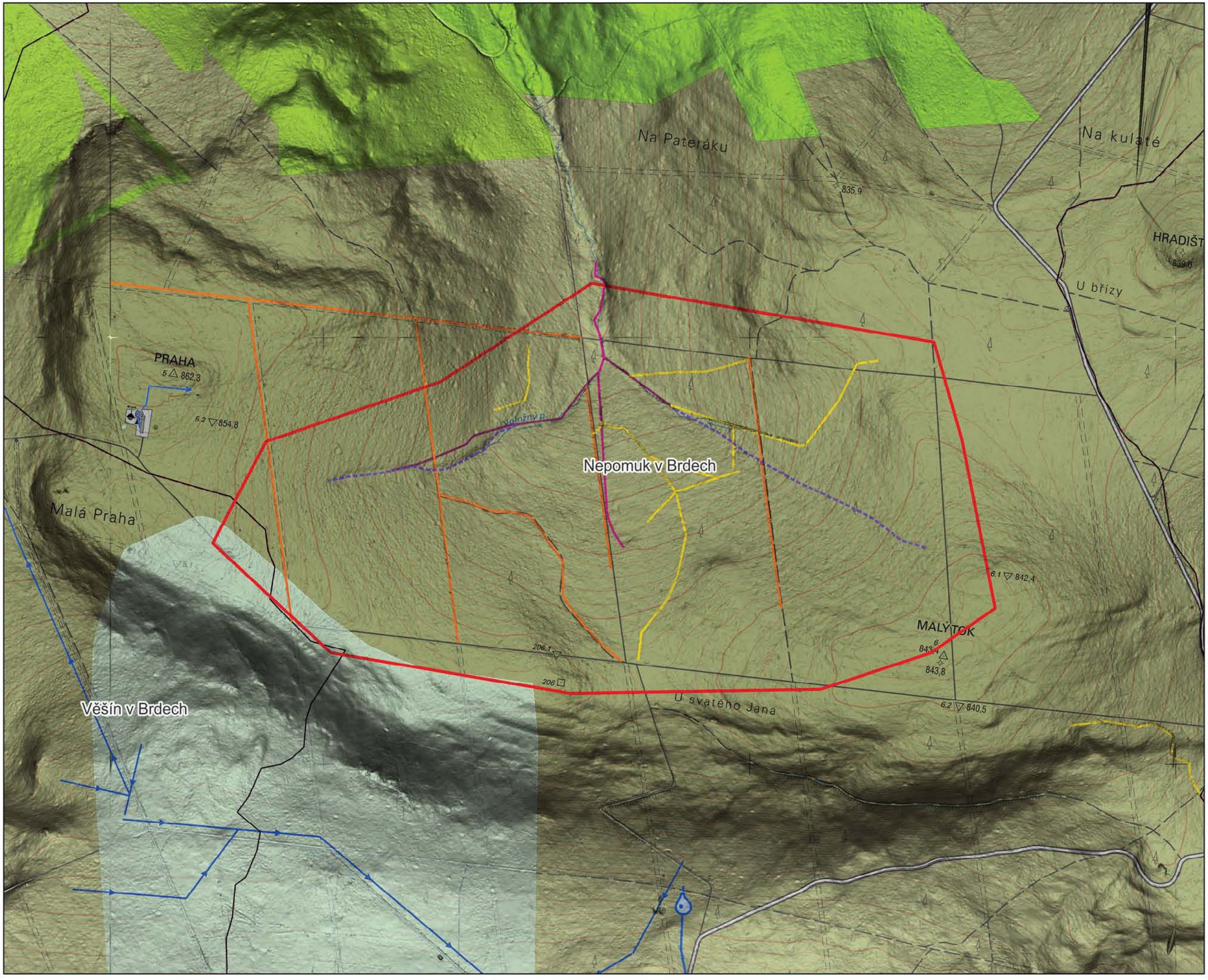
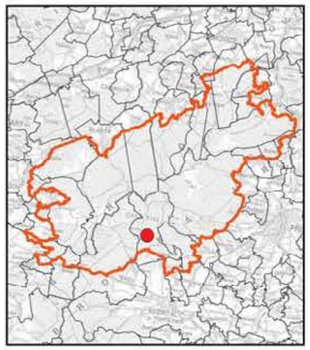
LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace





Lokalita 1

Prameniště Voložného potoka

Priorita **A**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:8 000

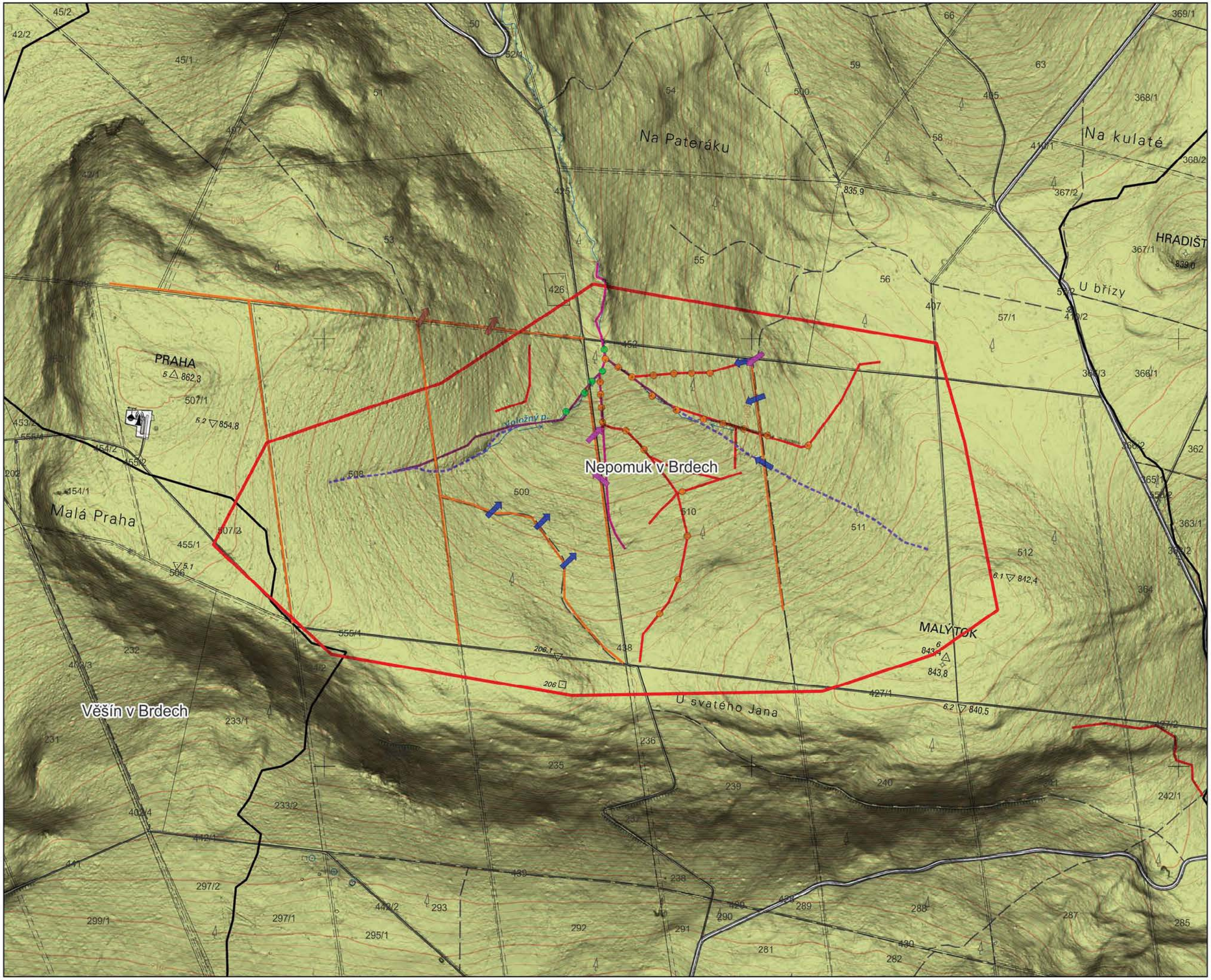
1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

Zpracováváno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území prameniště

4. Morfologie terénu s konceptem návrhu



Lokalita 1

Prameniště Voložného potoka

Středočeský kraj

ORP:

Příbram - 539911

Obce:

Věšín

Nepomuk

Řešená lokalita

Typ opatření

- Masivní jednoduchá přehrážka
- Částečné vyplnění hlubokých koryt
- Přerušení soustředěného odtoku na lesních cestách - svodnice
- Přerušení soustředěného odtoku na lesních cestách - průleh
- Propustek

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

- Zájmové území
- Katastrální území
- Hranice parcel

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováváno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

5. Návrh opatření - Lokalita priority A

3.1.2. Site 20 – U pěti zlodějů

Site	U pěti zlodějů	Order No.	20
Region	Central Bohemian	Municipality with extended competence	Příbram
Municipality	Obecnice	Cadastral area	Obecnice in Brdy
Catchment area of IV. order	Obecnický potok Brook	Hydrological Order No.	1-11-04-004

Current state:

Site 20 is part of the cadastral area of Obecnice in Brdy, which is part of the village of Obecnice. In terms of administration, the village of Obecnice falls under the municipality of Příbram (municipality with extended competence) in the Central Bohemian Region. The area is located in the third protection zone of Brdy PLA and partly in the protection zone of the Obecnice water reservoir. The area between the Planinská and Pětizlodějská roads is where water resources supplying water for the municipality of Obecnice are situated.

The western boundary of the site adjoins the impact area Jordán and adjacent areas with a higher explosive ordnance hazard.

The site is located in the eastern part of the area of interest on the slopes of above the Obecnice water reservoir. It is a spring area of the Obecnický potok Brook and its left tributary. Under Decree No. 178/2021 Coll., the Obecnický potok Brook is a significant watercourse managed by state enterprise Povodí Vltavy (Vltava River basin administration). The nameless left tributary of the Obecnický potok Brook and other registered watercourses are administered by VLS.

The site extends on the eastern slopes at an elevation of 570–745 m above sea level. In terms of runoff characteristics, these are two spring areas of watercourses altered by previous land reclamation interventions. The surface runoff is also affected by the road network and the system of skidding lines.

At the time of the study, the site is forested with older cover consisting mainly of spruce. The stands show absence of shrub and moss layer. In combination with drought, these are therefore species-poor communities sensitive to climate change. The habitat mapping identified only small disconnected patches of bog spruce forests (L9.2A), waterlogged spruce forests (L9.2B), acidophilous beech forest (L5.4), etc.

In terms of forest typology, the site is in vegetation zones 5 (fir-beech) and 4 (beech). The local target ecological series are stagnic and wet, such as *Abietum piceosum variohumidum acidophilum* and *Abietum quercino-piceosum paludosum mesotrophicum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses and land. The aim is to make use of the retention potential of the soil horizon in the spring area, and slow down the surface runoff, which will increase infiltration at the site. A further effect of the measures will be the reduction of deep erosion affecting small watercourses.

This primarily involves blocking of drainage ditches and channels in their non-original routes, shallowing of the modified tributary channel of the Obecnický potok Brook and other watercourses. These key measures will be complemented by measures relating to the road network, adjustment of the morphology of the terrain in the areas of transport lines with a connection to the natural stream valley or the original stream course.

Basic parameters of the proposal:

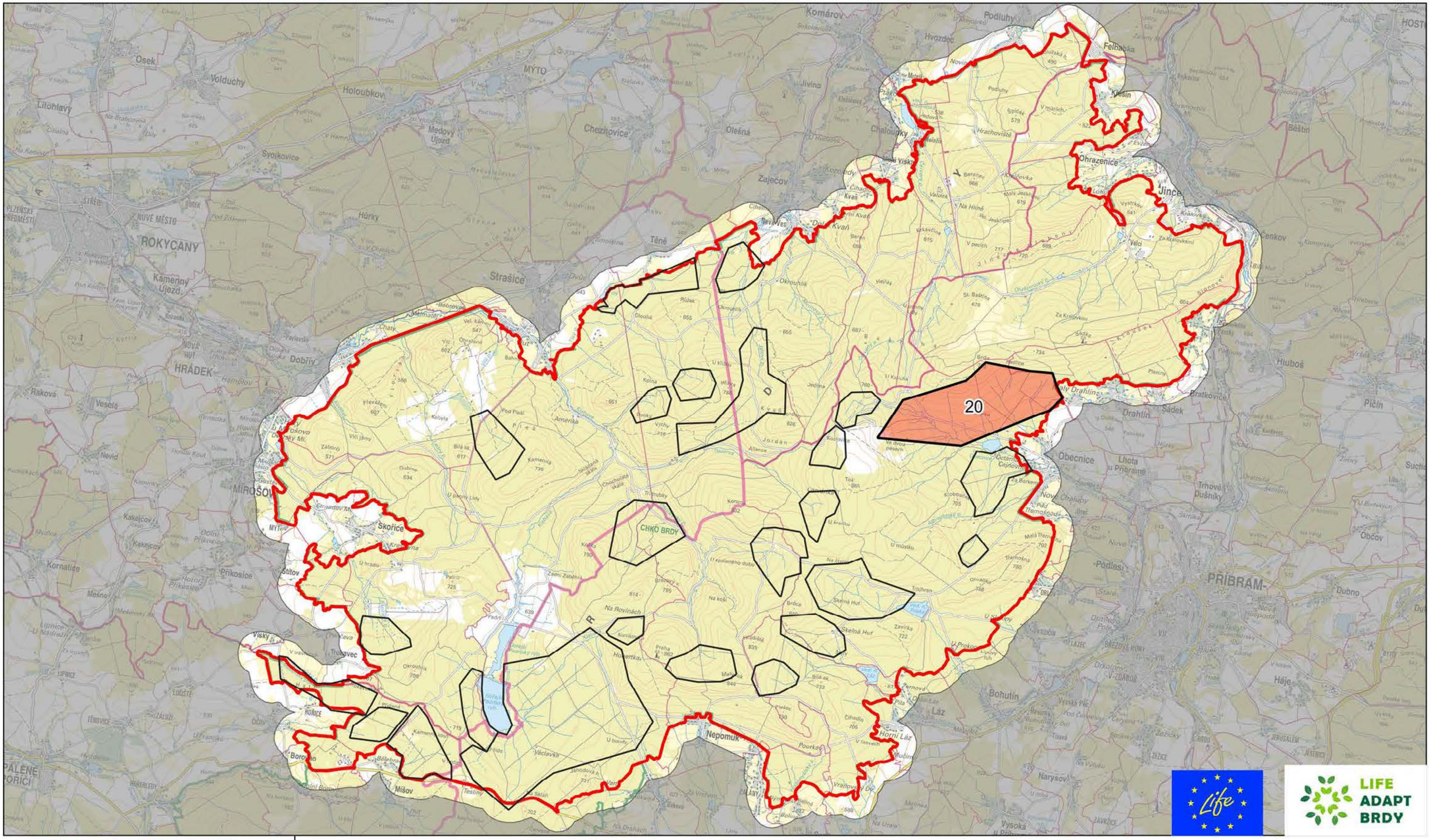
Total site area	596	ha
Total number of lines concerned	49	pcs
Total length of lines concerned	15,505	m
of which drainage of roads and roads	2,886	m
of which drainage ditches to be blocked	8,726	m
of which natural streams with no intervention	2,382	m
of which streambeds to be shallowed	856	m
of which streams to be revitalized or opened	654	m
Total number of measures	179	pcs
of which type B	154	pcs
of which type D	3	pcs
of which type J	19	pcs
of which type K	2	pcs
of which type L	1	pcs

Phasing:

Given the size and consistency of the site, we propose to address the site in three phases. Phases I and II relate to the upper parts of the catchment area. Phase III addresses the remaining central part of the catchment area. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:15 000
3.	Cadastral overview with the type of drainage lines	1:15 000
4.	Terrain morphology and the proposal concept	1:15 000
5.	Proposal for measures	1:15 000



STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)

LIFE
ADAPT
BRDY

Zhotovitel:

VRV

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

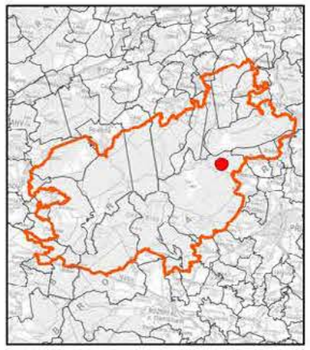
Zadavatel:

VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 20

U pěti zlodějů



Lokalita 20

U pěti zlodějů

Priorita **A**

Řešená lokalita

Odtokové linie

Zájmové území

1:15 000

1 cm = 150 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

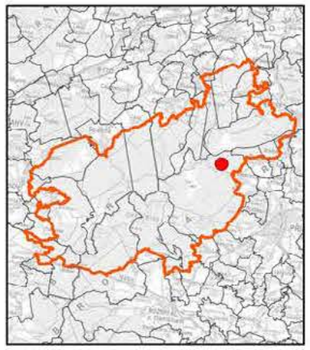
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 20

U pěti zlodějů

Priorita **A**

Středočeský kraj

ORP:
Příbram - 539911

Obce:
Drahlín
Obecnice

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:15 000
1 cm = 150 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

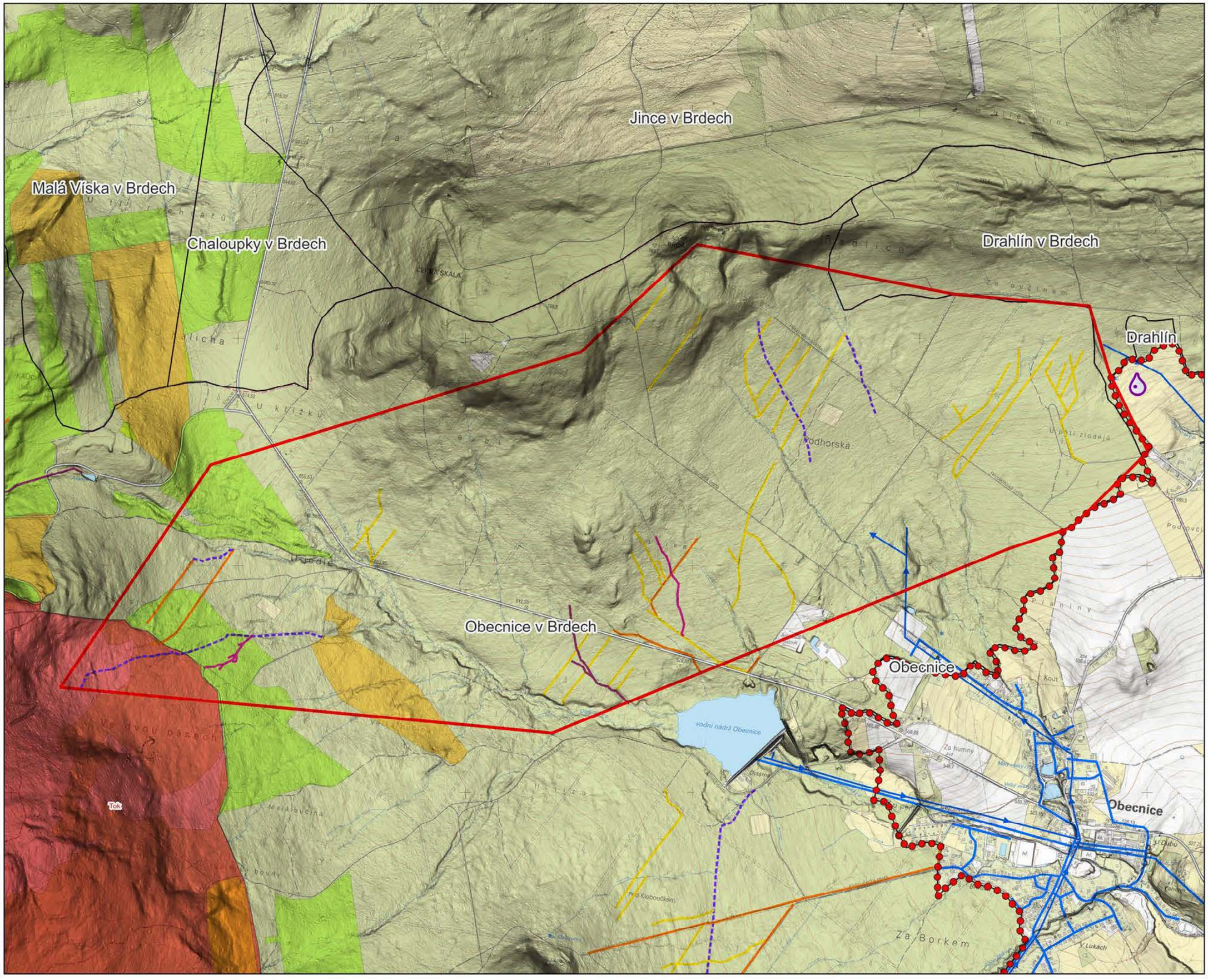
Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

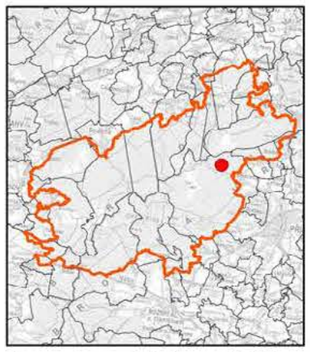
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace





Lokalita 20

U pěti zlodějů

Priorita **A**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:15 000

1 cm = 150 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

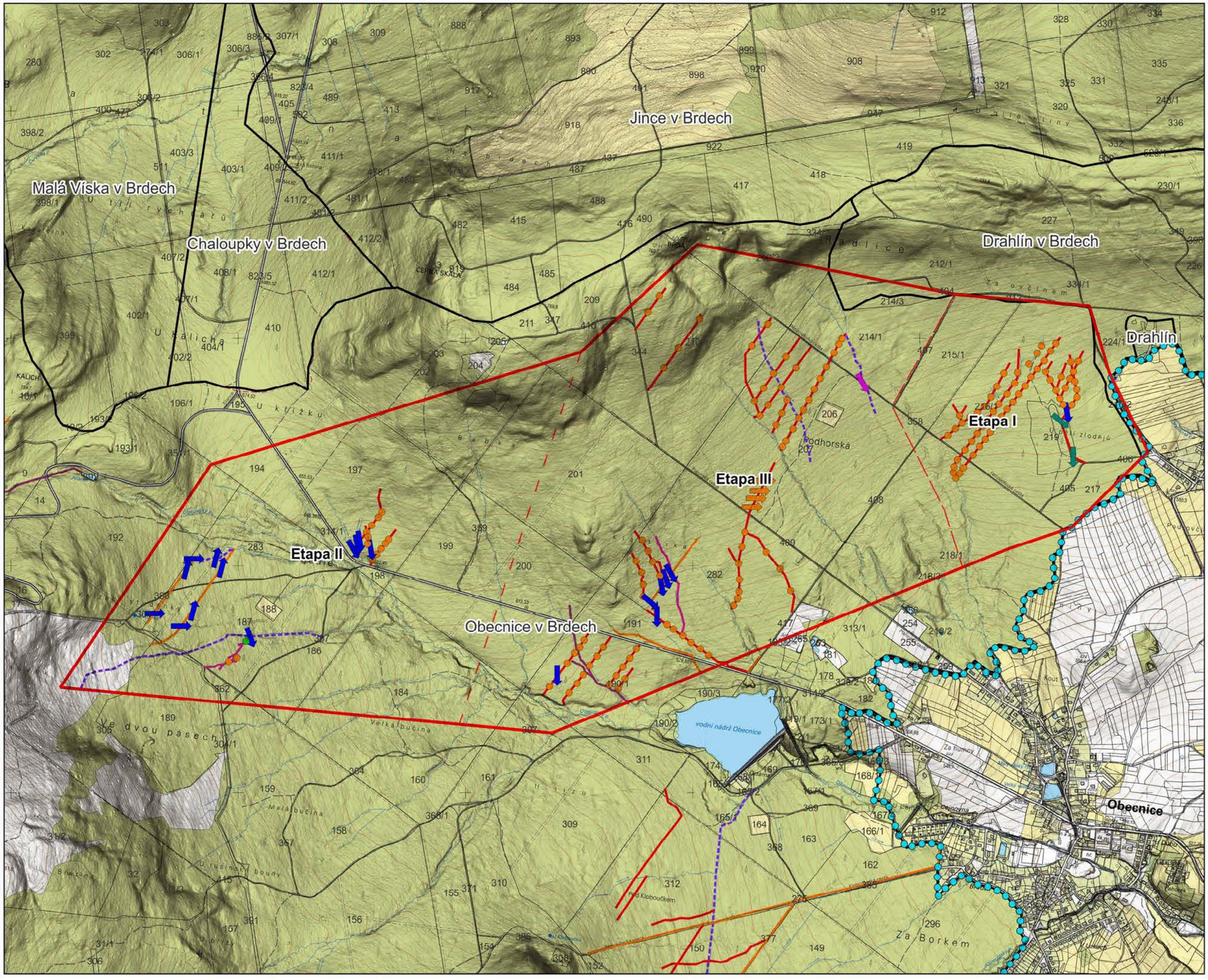
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

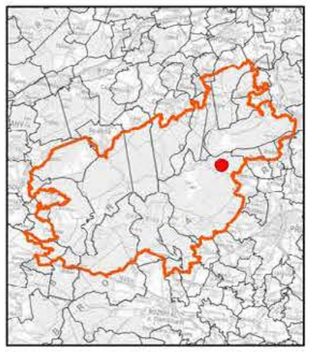
VRV

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu





Lokalita 20

U pěti zlodějů

Středočeský kraj
ORP:
Příbram - 539911

Obce:
Drahlín
Obecnice

Řešená lokalita
Etapy realizace

Typ opatření
- Masivní jednoduchá přehrážka
- Masivní jednoduchá přehrážka
- Částečné vyplnění hlubokých koryt
- Přerušení soustředěného odtoku na lesních cestách - průleh
- Odlehčení cestních příkopů
- Propustek

Odtokové linie - Návrh
- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Zájmové území
Katastrální území
Hranice parcel

1:15 000
1 cm = 150 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramenitě

LIFE ADAPT BRDY

5. Návrh opatření - Lokalita priority A

3.1.3. Site 23 – Trokavec

Site	Trokavec	Order No.	23
Region	Pilsen	Municipality with extended competence	Blovice
Municipality	Spálené Poříčí	Cadastral area	Číčov in Brdy
Catchment area of IV. order	Kornatický (Mešenský) potok Brook	Hydrological Order No.	1-10-05-052

Current state:

Site 23 is part of the cadastral area of Číčov in Brdy, which is part of the municipality of Spálené Poříčí. In terms of administration, the village of Spálené Poříčí falls under the municipality of Blovice (municipality with extended competence) in the Pilsen Region. The area is located in the III. protection zone of Brdy PLA. There is a source of water for the village of Trokavec in the site.

The site lies in the south-western tip of the area concerned between the settlement of Hořice and the village of Trokavec. It is a forest enclave between blocks of meadows and arable land. The Kornatický (Mešenský) potok Brook flows from the area in this location. The Kornatický (Mešenský) potok Brook in managed by VLS.

The site is situated on a moderate western slope at an elevation of 538–670 m above sea level. As to runoff, this is an approximately 3 km long spring section of a small watercourse, into which drainage ditches are connected. The channel of the smallest tributary leading through the centre of the site was straightened and deepened in the past. This drainage line is not documented as a watercourse. From the left side it empties into the Kornatický (Mešenský) potok Brook, which forms the northern boundary of the site. Its channel has also been straightened and deepened, forming pronounced bank mounds. The watercourse serves as a recipient of the of subsurface pipe drained water on the adjacent meadows.

At the time of the study, the site is covered mainly by spruce forest. More contiguous areas of deciduous forest stands are in the western half of the site. The central area is characterized by distinctive clear-cuts. The habitat mapping identified only minor non-contiguous areas with habitats of ash-alder alluvial forests (L2.2) and acidophilous beech forests (L5.4).

In terms of forest typology, the site is in vegetation zones 5 (fir-beech) and 4 (beech). The local target ecological series are stagnic and wet, such as *Abietum quercino-piceosum paludosum mesotrophicum* and *Querceto-Abietum variohumidum trophicum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential in the spring area and slow down the surface runoff, which will increase infiltration in the vicinity of the water resource. A further effect of the measures will be the reduction of deep erosion affecting small watercourses.

This primarily involves blocking of drainage ditches and channels in their non-original routes, shallowing of the modified channel of the tributary and restoration of the original route of the small watercourse. These key measures will be complemented by measures relating to the road network, road improvements involving the creation of fords connected to the natural stream valley or the original stream channel.

Basic parameters of the proposal:

Total site area	151	ha
Total number of lines concerned	45	pcs
Total length of lines concerned	13,531	m
of which drainage of roads and roads	2,561	m
of which drainage ditches to be blocked	6,823	m
of which natural streams with no intervention	478	m
of which streambeds to be shallowed	773	m
of which streams to be revitalized or opened	2,897	m
Total number of measures	100	pcs
of which type A	4	pcs
of which type B	64	pcs
of which type D	24	pcs
of which type J	8	pcs

Phasing:

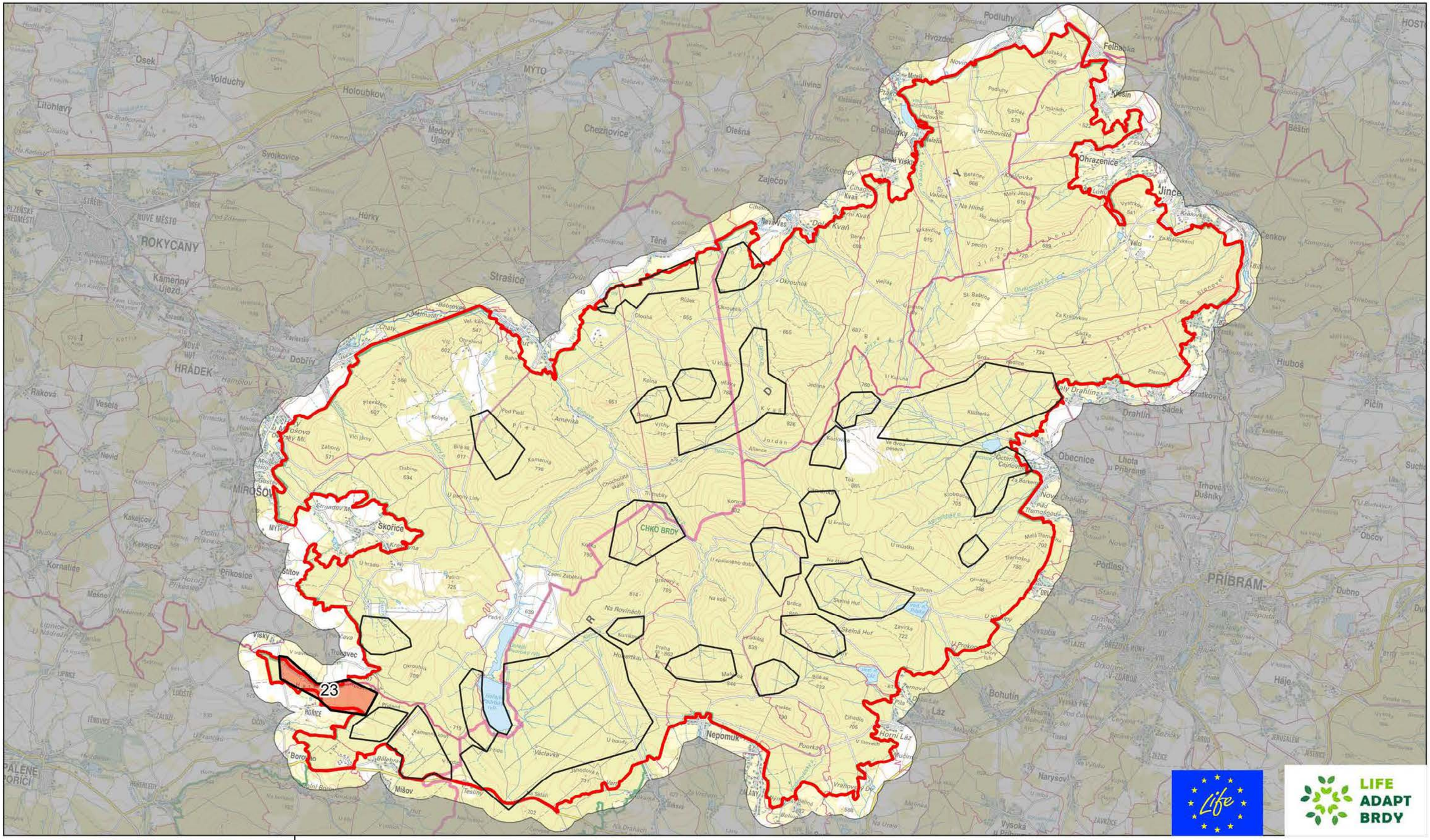
Given the size and consistency of the site, we propose to address the site in two phases. Phase I addresses the upper part of the catchment area. Phase II addresses the remaining central part of the catchment area. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:8 000
3.	Cadastral overview with the type of drainage lines	1:8 000
4.	Terrain morphology and the proposal concept	1:8 000
5.	Proposal for measures	1:8 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

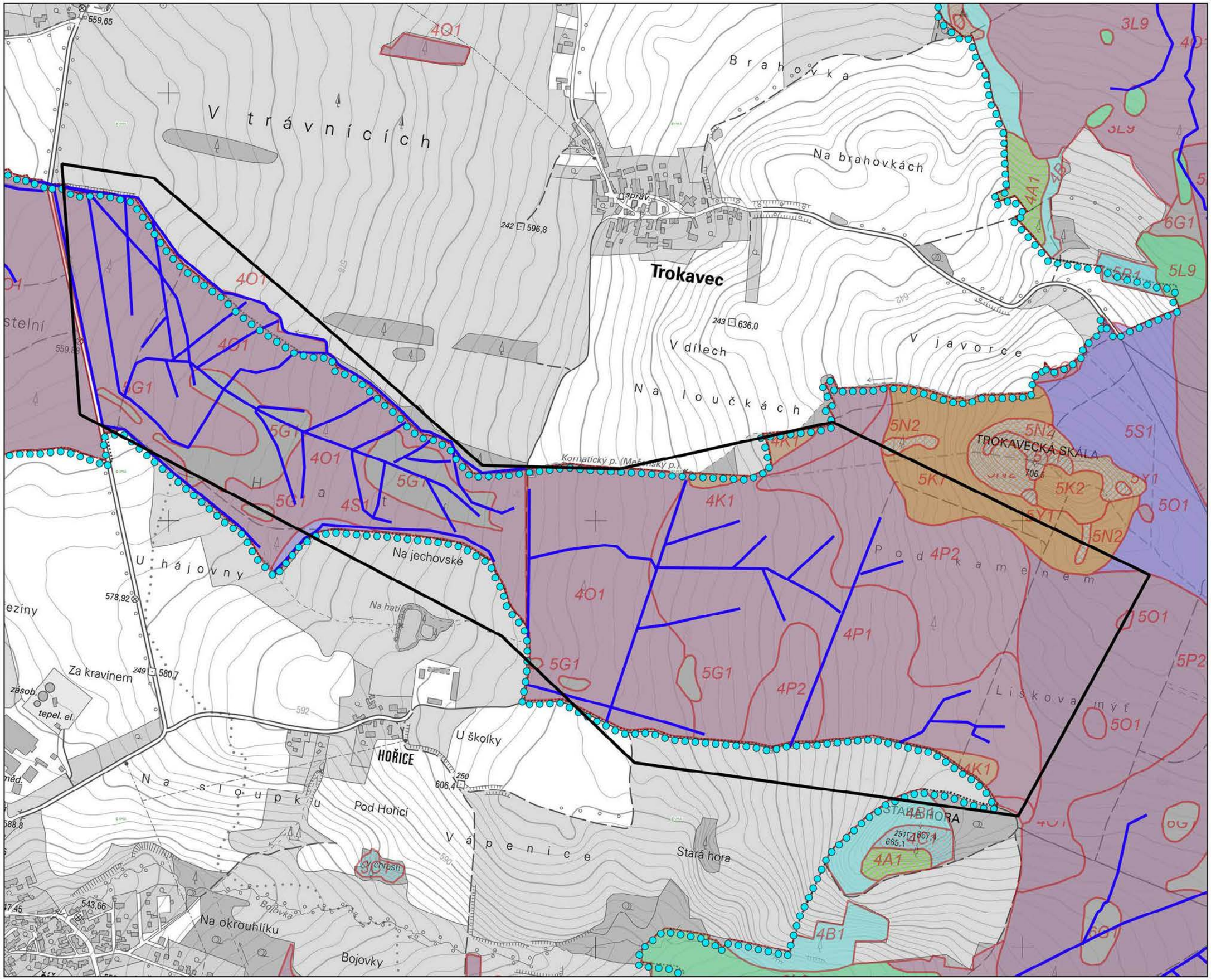
Zadavatel:

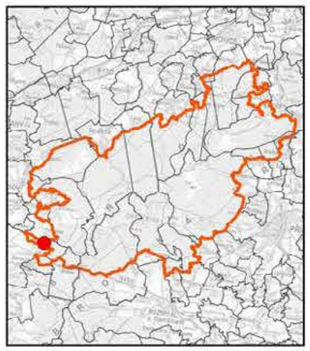
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 23

Trokavec





Lokalita 23

Trokavec

Priorita **A**

Řešená lokalita

Odtokové linie

Zájmové území

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

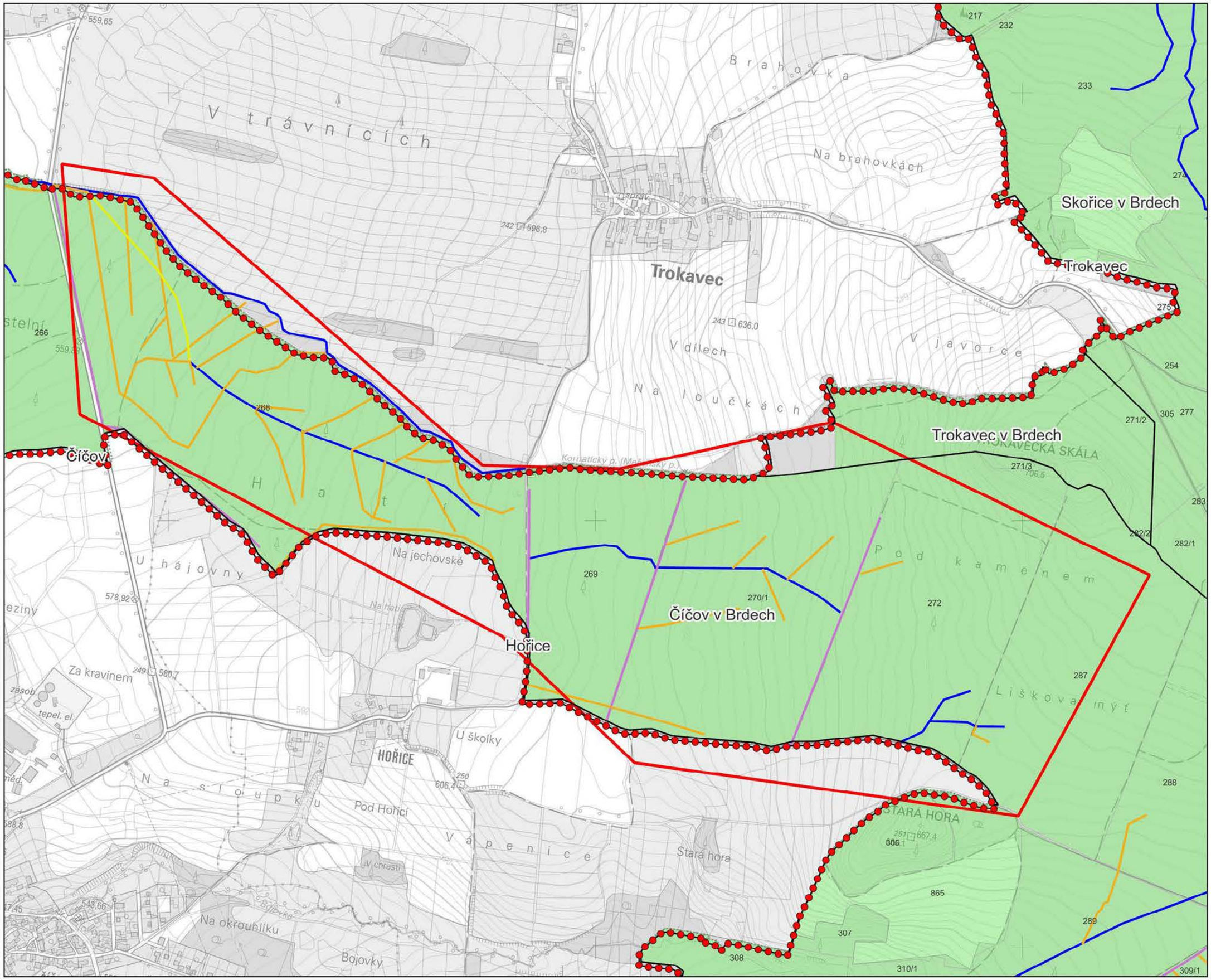
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

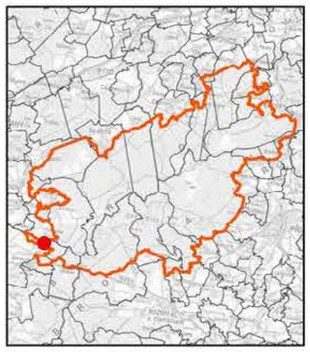
VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramenišť

LIFE ADAPT BRDY

2. Situace lesních typů





Lokalita 23

Trokavec

Priorita **A**

Plzeňský kraj

ORP:
Blovice - 557587
Rokycany - 559717

Obce:
Spálené Poříčí
Trokavec

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:8 000
1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

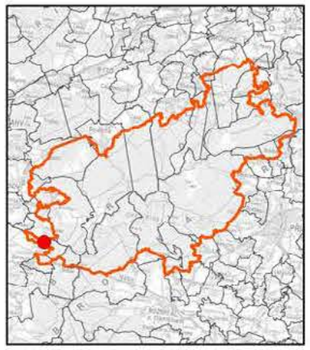
Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace



Lokalita 23

Trokavec

Priorita **A**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

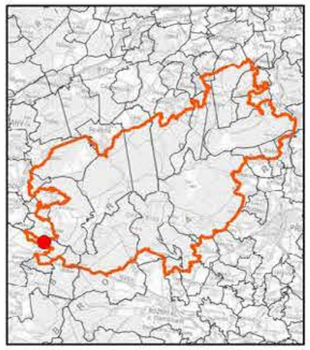
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracovaváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramenišť

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu



Lokalita 23

Trokavec

Plzeňský kraj
ORP:
Blovice - 557587
Rokycany - 559717
Obce:
Spálené Poříčí
Trokavec

Řešená lokalita
Etapy realizace

Typ opatření
- Masivní dvojitá přehrážka
- Masivní jednoduchá přehrážka
- Částečné vyplnění hlubokých koryt
- Přerušení soustředěnného odtoku na lesních cestách - průleh

Odtokové linie - Návrh
- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Zájmové území
Katastrální území
Hranice parcel

1:8 000
1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramoniště

LIFE ADAPT BRDY

5. Návrh opatření - Lokalita priority A

3.2. Proposal for measures in sites of priority B

3.2.1. Site 2 – Spring area above Obecnice

Site	Spring area above Obecnice	Order No.	2
Region	Central Bohemian	Municipality with extended competence	Příbram
Municipality	Obecnice	Cadastral area	Obecnice in Brdy
Catchment area of IV. order	Albrechtický potok Brook	Hydrological Order No.	1-11-04-005

Current state:

Site 2 is part of the cadastral area of Obecnice in Brdy, which is part of the village of Obecnice. In terms of administration, the village of Obecnice falls under the municipality of Příbram (municipality with extended competence) in the Central Bohemian Region. The area is located in the third protection zone of Brdy PLA and the protection zone of the Obecnice water reservoir.

The site extends in the eastern part of the area concerned beneath the peak Ohrádka. It is a spring area of the right tributary of the Albrechtický potok Brook, which is the right tributary of the Obecnický potok Brook. The Albrechtický potok Brook leaves the area concerned in Obecnice. The Albrechtický potok Brook is managed by VLS.

The site is situated on a northern slope at an elevation of 765–795 m above sea level. As for the runoff characteristics, it is a spring fan of minor watercourses, which are, however, severely affected by past land reclamation interventions.

At the time of the study, the site is forested with older cover consisting mainly of spruce. The habitat mapping identified only small non-contiguous patches of forest plantations of allochtonous coniferous trees (X9A) with a proportion of bog spruce forests (L9.2A) and the occurrence of forest springs without tufa formation (R1.4) and ash-alder alluvial forests (L2.2).

In terms of forest typology, the site is in vegetation zones 6 (spruce-beech) and 5 (fir-beech). The local target ecological series are stagnic and wet, such as *Abietum quercino-piceosum paludosum mesotrophicum* and *Fraxineto-Alnetum montanum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses and spring areas in the site. The aim is to make use of the retention potential of the soil horizon in the spring area and slow down the surface runoff, which will result in saturation of the local soil environment. The restoration of original habitats in the spring areas and their surroundings will be a further effect of the measures.

These mainly involve blocking of the drainage ditches, deepened channels, primarily blocking the deep ditches passing through the centre of the spring areas. The notches in the spring areas will be filled with local soil to achieve the target water level at the ground level.

Basic parameters of the proposal:

Total site area	37	ha
Total number of lines concerned	8	pcs
Total length of lines concerned	2,437	m
of which drainage ditches to be blocked	68	m
of which streambeds to be shallowed	2,369	m

Phasing:

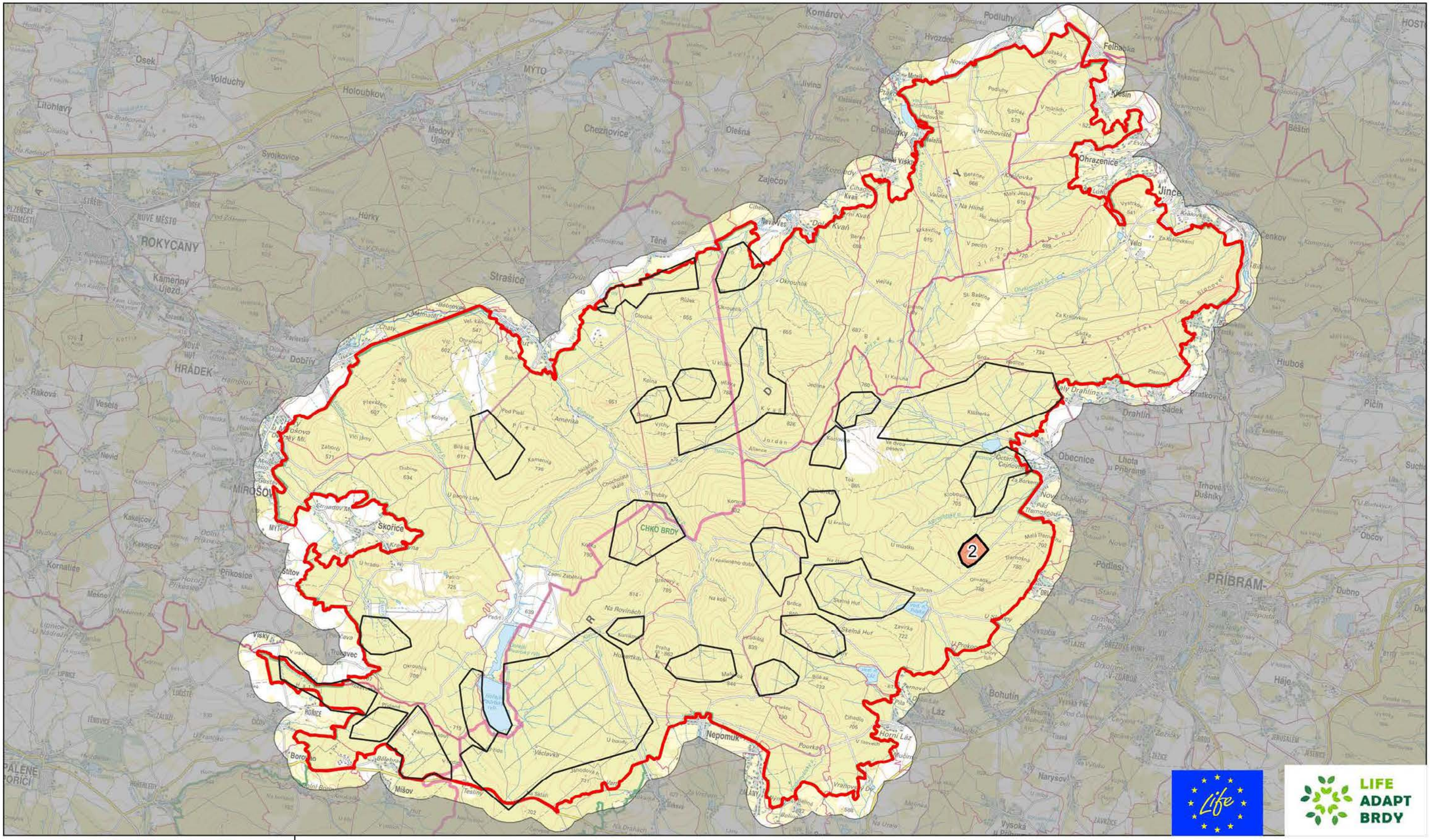
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:5 000
3.	Cadastral overview with the type of drainage lines	1:5 000
4.	Terrain morphology and the proposal concept	1:5 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

Zadavatel:

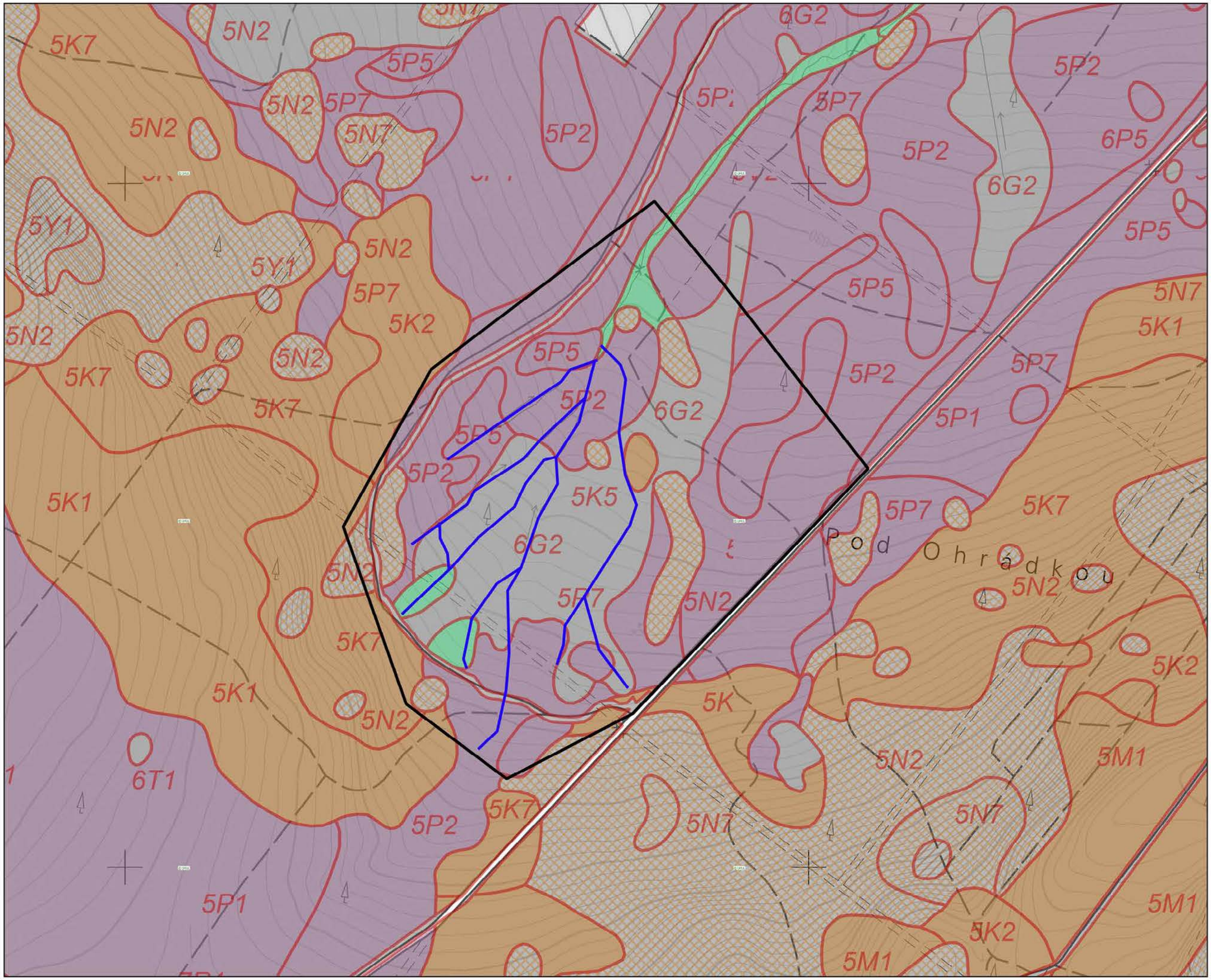
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

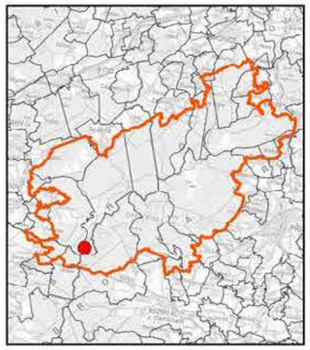
Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 2

Prameniště nad Obecnicí

LIFE ADAPT BRDY





Lokalita 2

Prameniště nad Obecnicí

Priorita **B**

Řešená lokalita

Odtokové linie

Zájmové území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území prameniště

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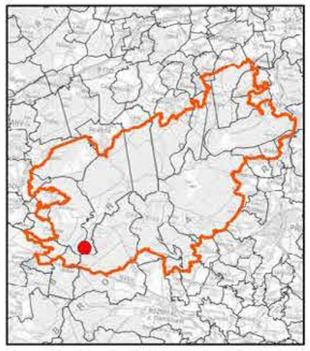
LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 2

Prameniště nad Obecnicí

Priorita **B**

Středočeský kraj

ORP:
Příbram - 539911

Obce:
Obecnice

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:5 000
1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

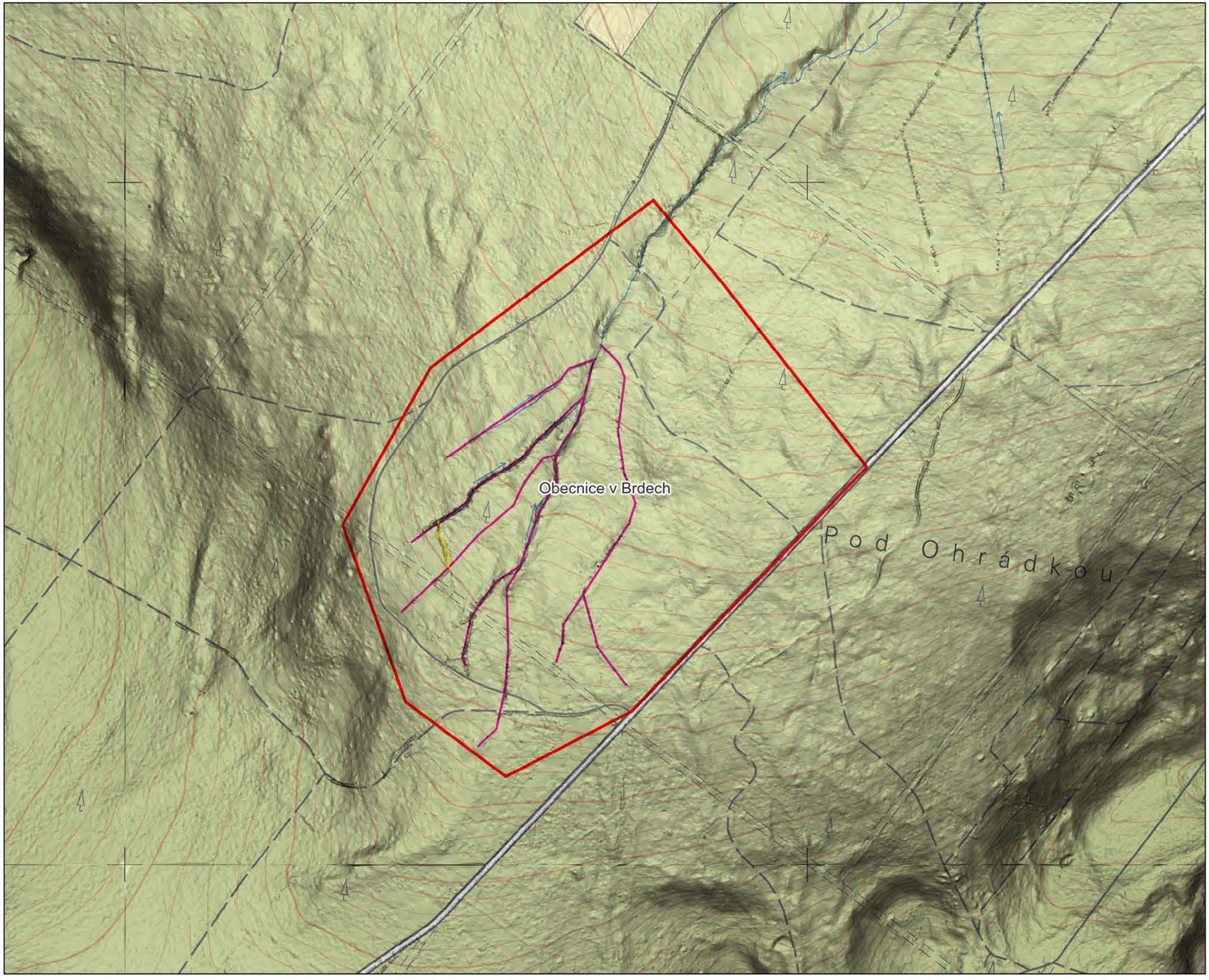
Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

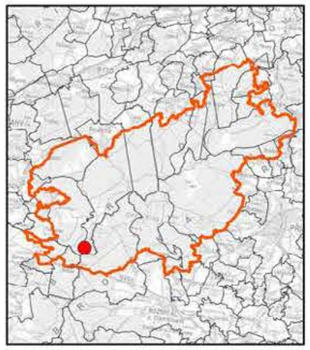
3. Typ odtokové linie na katastrální situace

Obecnice v Brdech

Pod Ohrádkou

143/2 276 143/1 375/3 143/3 278 144/1 137 144/2 136 375/2 145/1 135 132 352/1 424 376 130 129 380 128 134/1 374/1





Lokalita 2

Prameniště nad Obecnicí

Priorita **B**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.2.2. Site 3 – Spring area of the Třítrubecký potok Brook

Site	Spring area of the Třítrubecký potok Brook	Order No.	3
Region	Central Bohemian	Municipality with extended competence	Příbram
Municipality	Nepomuk	Cadastral area	Nepomuk in Brdy
Catchment area of IV. order	Třítrubecký potok Brook	Hydrological Order No.	1-11-01-007

Current state:

Site 3 is part of the cadastral area of Nepomuk in Brdy, which is part of the village of Nepomuk. The village of Nepomuk falls under the municipality of Příbram (municipality with extended competence) in the Central Bohemian Region. The area is located in the III. protection zone of Brdy PLA. The meadows in the central part extend over the II. protection zone of Brdy PLA.

The peripheral parts are areas of an increased explosive ordnance hazard.

The site lies in the central part of the area of interest between the peaks Brdce and Koruna. It is the spring area of the Třítrubecký potok Brook. The Třítrubecký potok Brook flows into the Klabava River, which leaves the area of interest in Strašice. The Třítrubecký potok Brook and other registered nameless watercourses are managed by VLS.

The site extends on slopes at an elevation of 705–800 m above sea level. As for the runoff characteristics, it is a spring fan of minor watercourses, which are, however, affected by past land reclamation interventions. There are drainage ditches, deepened smallest tributaries, which are characterized by the impact of further deepening caused by water erosion.

At the time of the study, the site is forested with local clear-cuts and younger stands. The habitat mapping identified only small non-contiguous patches of forest plantations of allochtonous coniferous trees (X9A), waterlogged spruce forests (L9.2B). Minor patches of transitional mires (R2.3) were identified along the Třítrubecký potok Brook and in the vicinity of the water body.

In terms of forest typology, the site is mainly in vegetation zone 6 – spruce-beech. The local target ecological series are stagnic and wet, such as *Piceeto-Abietum variohumidum acidophilum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the area and slow down the surface runoff, which will increase local infiltration. A further effect of the measure will be the mitigation of deep erosion affecting the deepened small watercourses.

This mainly consists of blocking drainage ditches and channels in their non-natural routes, shallowing and opening up of the modified streambed. The connecting drainage ditches will be blocked by means of wooden check dams backfilled and filled with soil. These key measures will be complemented by measures relating to the road network, adjustment of the morphology of the terrain in the areas of transport lines with a connection to the natural stream valley or the original stream course.

Basic parameters of the proposal:

Total site area	161	ha
Total number of lines concerned	50	pcs
Total length of lines concerned	8,353	m
of which drainage of roads and roads	954	m
of which drainage ditches to be blocked	5,619	m
of which streambeds to be shallowed	147	m
of which streams to be revitalized or opened	1,633	m

Phasing:

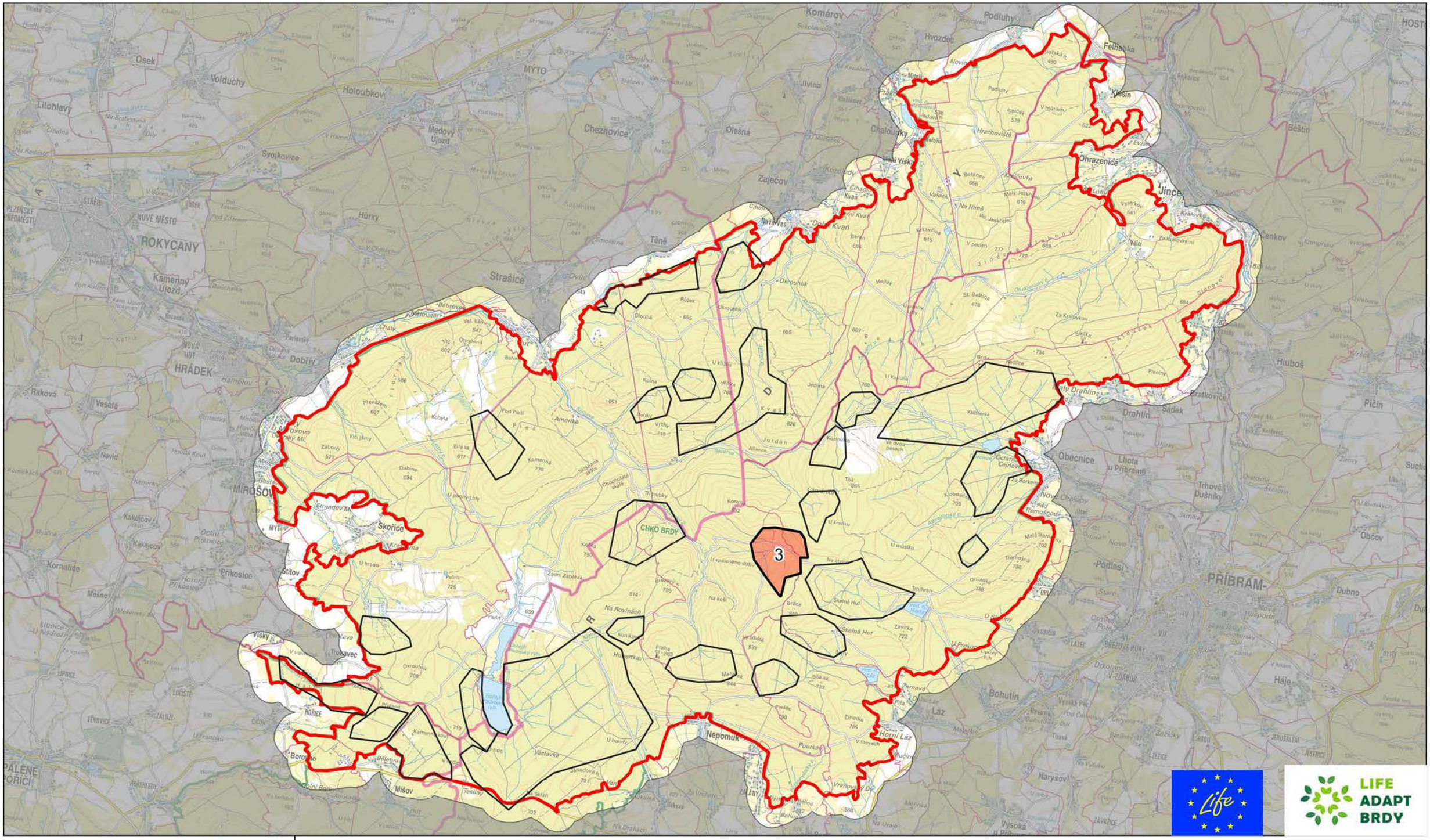
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:8 000
3.	Cadastral overview with the type of drainage lines	1:8 000
4.	Terrain morphology and the proposal concept	1:8 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

Zadavatel:

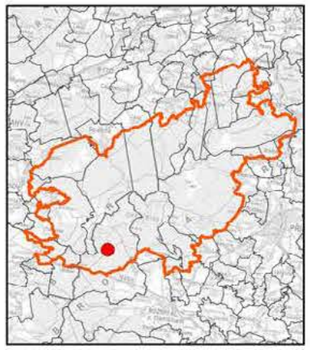
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 3

Prameniště Třítrubeckého potoka

LIFE ADAPT BRDY



Lokalita 3

Prameniště Třítrubeckého potoka

Priorita **B**

Řešená lokalita

Odtokové linie

Zájmové území

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramniště

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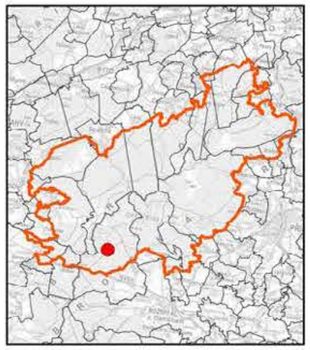
LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 3

Prameniště Třítrubeckého potoka

Priorita **B**

Středočeský kraj

ORP:
Příbram - 539911

Obce:
Obecnice
Nepomuk

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:8 000
1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

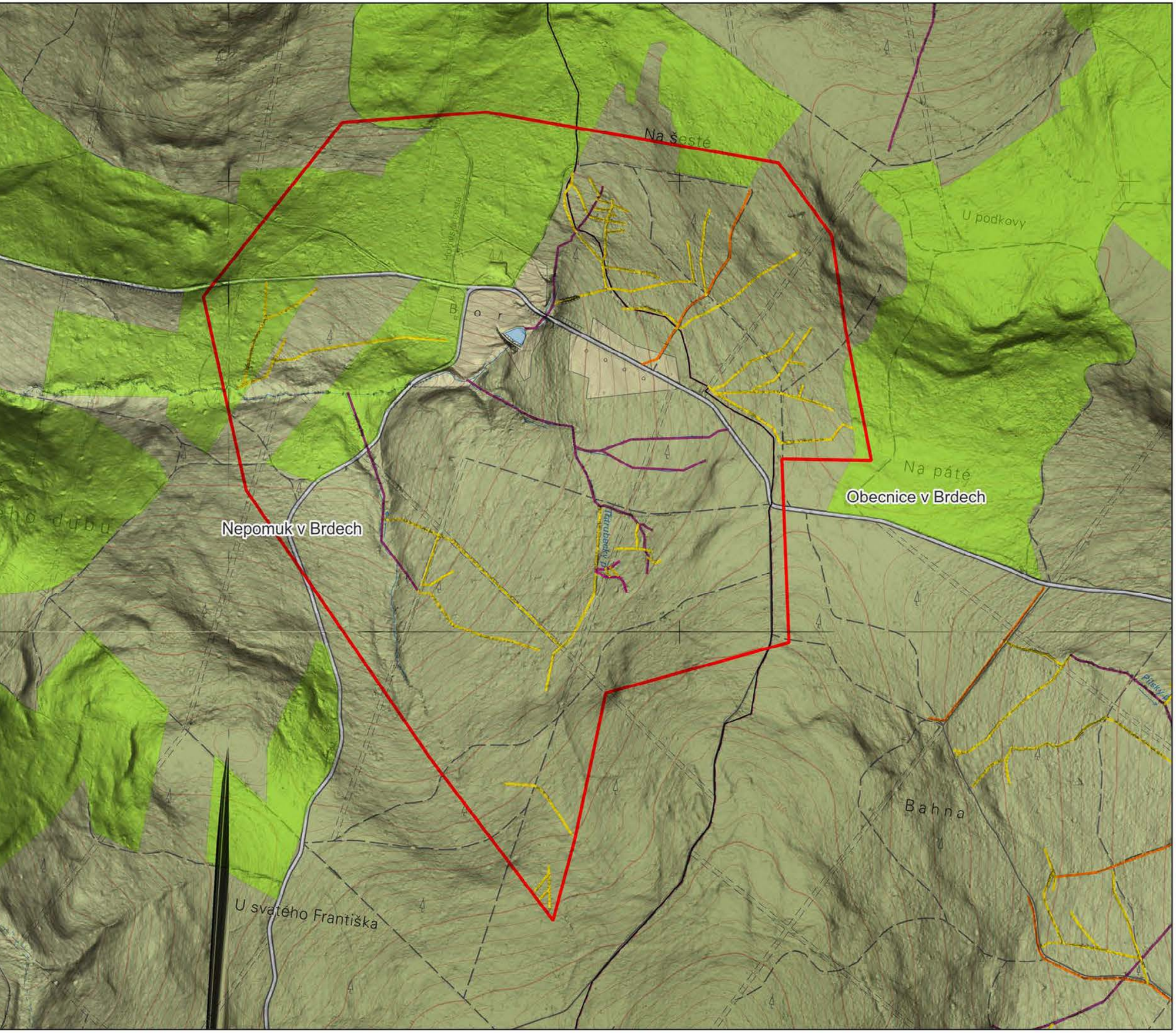
Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

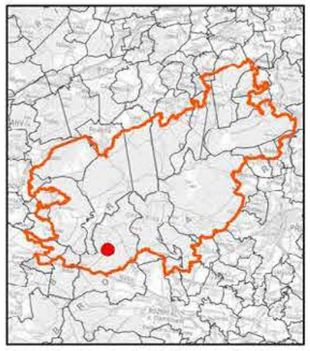
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace





Lokalita 3

Prameniště Třítrubeckého potoka

Priorita **B**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracovaváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.2.3. Site 4 – Václavka

Site	Václavka	Order No.	4
Region	Central Bohemian	Municipality with extended competence	Příbram
Municipality	Věšín	Cadastral area	Věšín in Brdy
Catchment area of IV. order	Klabava, Buková	Hydrological Order No.	1-11-01-006, 1-08-04-035

Current state:

Site 4 is part of the cadastral area of Věšín in Brdy, which is part of the village of Věšín. In terms of administration, the village of Věšín falls under the municipality of Příbram (municipality with extended competence) in the Central Bohemian Region. The area is located in the III. protection zone of Brdy PLA. The riparian areas of Hořejší Padrťský pond are within the I. and II. protection zones of Brdy PLA.

The site is located in the southern part of the area of interest near Padrťské ponds. It is an area between the ponds and the water divide formed by Jahodová hora and Praha hills. It is the Zlatý potok Brook and its tributaries and other left tributaries of the Klabava River leaving the area of interest in Strašice. Under Decree No. 178/2021 Coll., the Klabava River is a significant watercourse managed by state enterprise Povodí Vltavy (Vltava River basin administration). Other registered nameless watercourses are managed by VLS.

In the eastern part of the site, there is the historical water channel named Gangloff's Channel, which was used to transfer water between the Klabava and Buková rivers. In its vicinity we can also find a former mine for the extraction of iron and gold-bearing ores and the still active Červený lom quarry.

The site extends on slopes at an elevation of 635–700 m above sea level. As to runoff characteristics, it is a flat area adjacent to the littoral zone of the Hořejší Padrťský pond, which was altered by land reclamation in the past. These are more mutually overlapping systems of drainage ditches, deepened and straightened small tributaries, drainage of roads and skidding lines.

At the time of the study, the site is forested with local clear-cuts and younger stands. The habitat mapping identified only non-contiguous patches of forest with occurrence of waterlogged spruce forests (L9.2B), ash-alder alluvial forests (L2.2), and minor patches of transitional mires (R2.3) in the vicinity of the Klabava River. This mosaic is complemented by forest habitats severely affected by man with occurring non-native tree species.

In terms of forest typology, the site is mainly in vegetation zones from 5 (fir-beech) to 7 (beech-spruce). The local target ecological series are ash, stagnic and wet, such as *Piceeto-Abietum variohumidum acidophilum*, *Piceetum turfosum mesotrophicum*, *Piceeto-Fagetum fraxinosum humidum*, and similar.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the drained soil horizon in the area and slow down the surface runoff, which will increase local infiltration. Given the size of the site, there is a diverse mosaic of habitats ranging from transitional mires, meadows, and waterlogged spruce forests to anthropogenic vegetation. The detailed proposal for measures shall respect these characteristics and determine the target water levels with a high degree of consideration.

This mainly involves blocking of drainage ditches and channels in their non-original routes, shallowing and opening the modified streambeds. These key measures will be complemented by measures relating to the road network, removal of redundant transport lines, adjustment of terrain morphology where the lines connect to the natural stream valley or the original stream course. The next step of the proposal consists of revitalizing the Klabava River, which flows through the bypass channel along the right bank of Padrťské ponds. The adjusted channel is separated from the adjacent bogs by bank mounds. The proposal recommends connecting the channel with the floodplain by lowering the mounds and restoring the natural character of the stream.

Basic parameters of the proposal:

Total site area	1,216	ha
Total number of lines concerned	230	pcs
Total length of lines concerned	58,542	m
of which drainage of roads and roads	12,867	m
of which drainage ditches to be blocked	35,286	m
of which natural streams with no intervention	3,876	m
of which streambeds to be shallowed	445	m
of which streams to be revitalized or opened	6,068	m

Phasing:

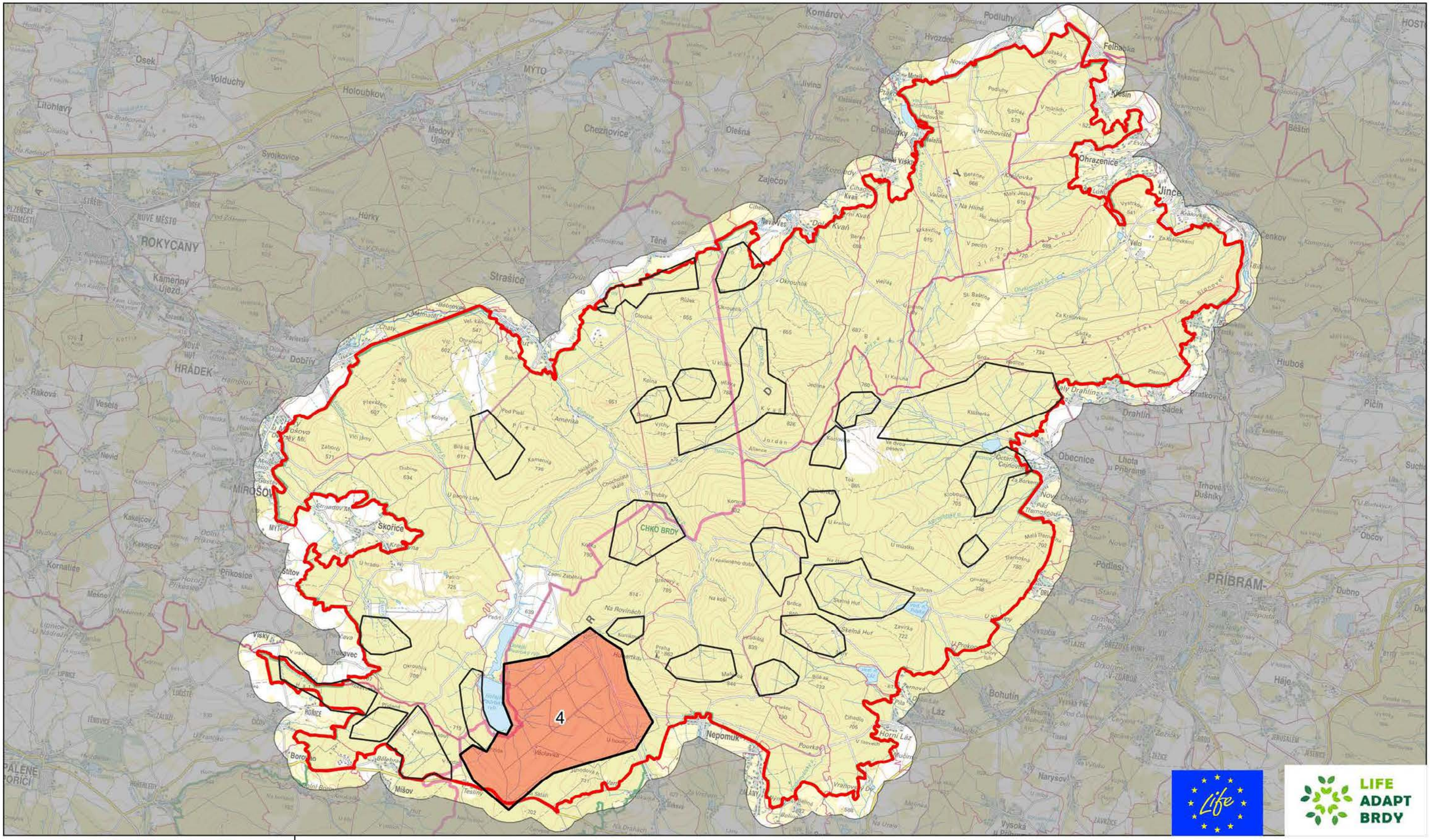
Given the size and consistency of the site, we propose to address the site in more phases. Considering the solution concept, the works on the site can be divided into 5 phases, which will be implemented both in terms of financing and their gradual effect. The gradual effect is also important in view of the gradual response of the vegetation to the modified hydrological conditions. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:18 000
3.	Cadastral overview with the type of drainage lines	1:18 000
4.	Terrain morphology and the proposal concept	1:18 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

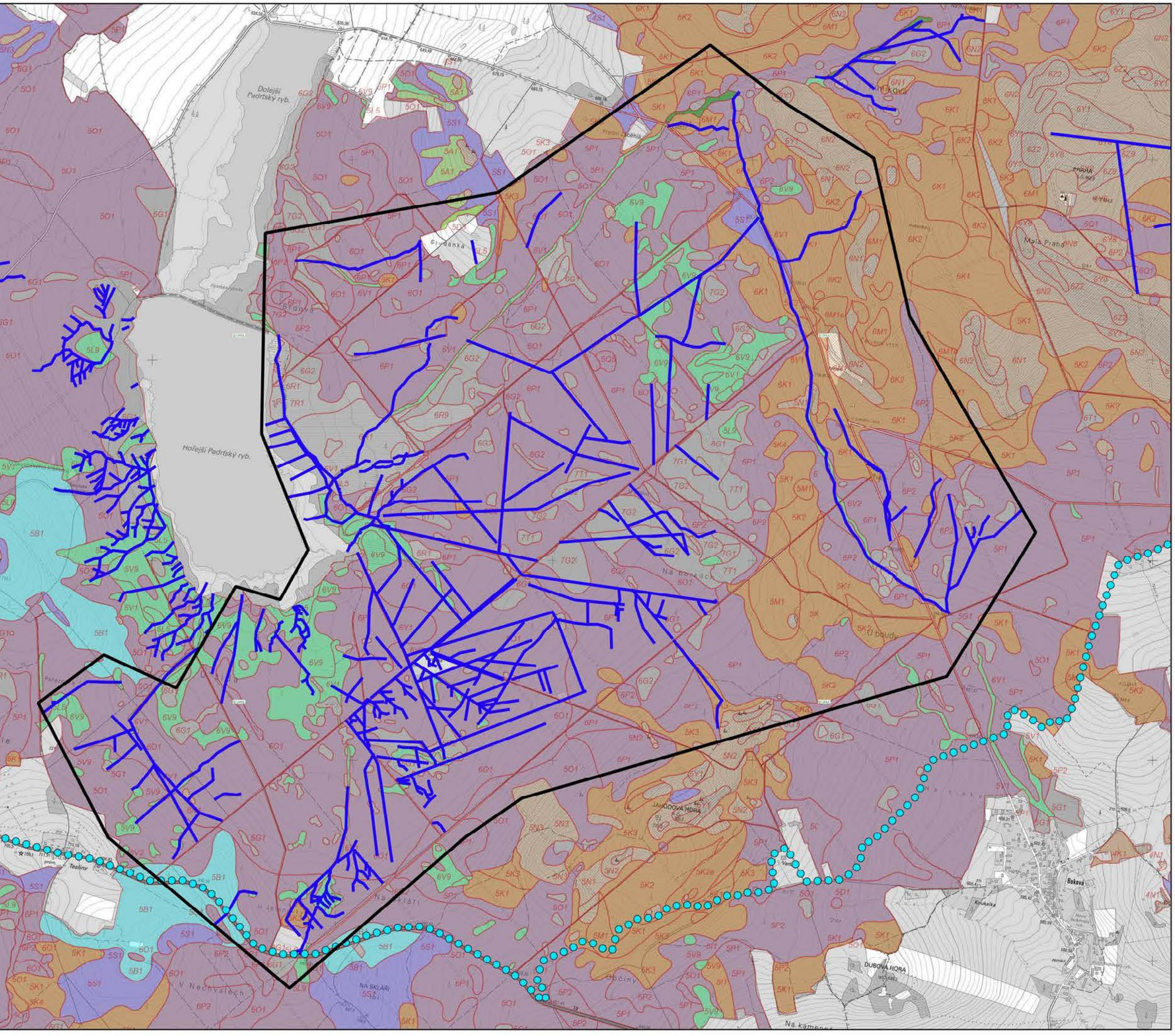
Zadavatel:

VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 4

Václavka



Lokalita 4

Václavka

Priorita **B**

Řešená lokalita

Odtokové linie

Zájmové území

1:18 000

1 cm = 180 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramenitě

LIFE ADAPT BRDY

2. Situace lesních typů

Lokalita 4

Václavka

Priorita **B**

Středočeský kraj
Plzeňský kraj

ORP:
Příbram - 539911
Blovice - 557587
Rokycany - 559717

Obce:
Věšín
Míšov
Strašice

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:18 000
1 cm = 180 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

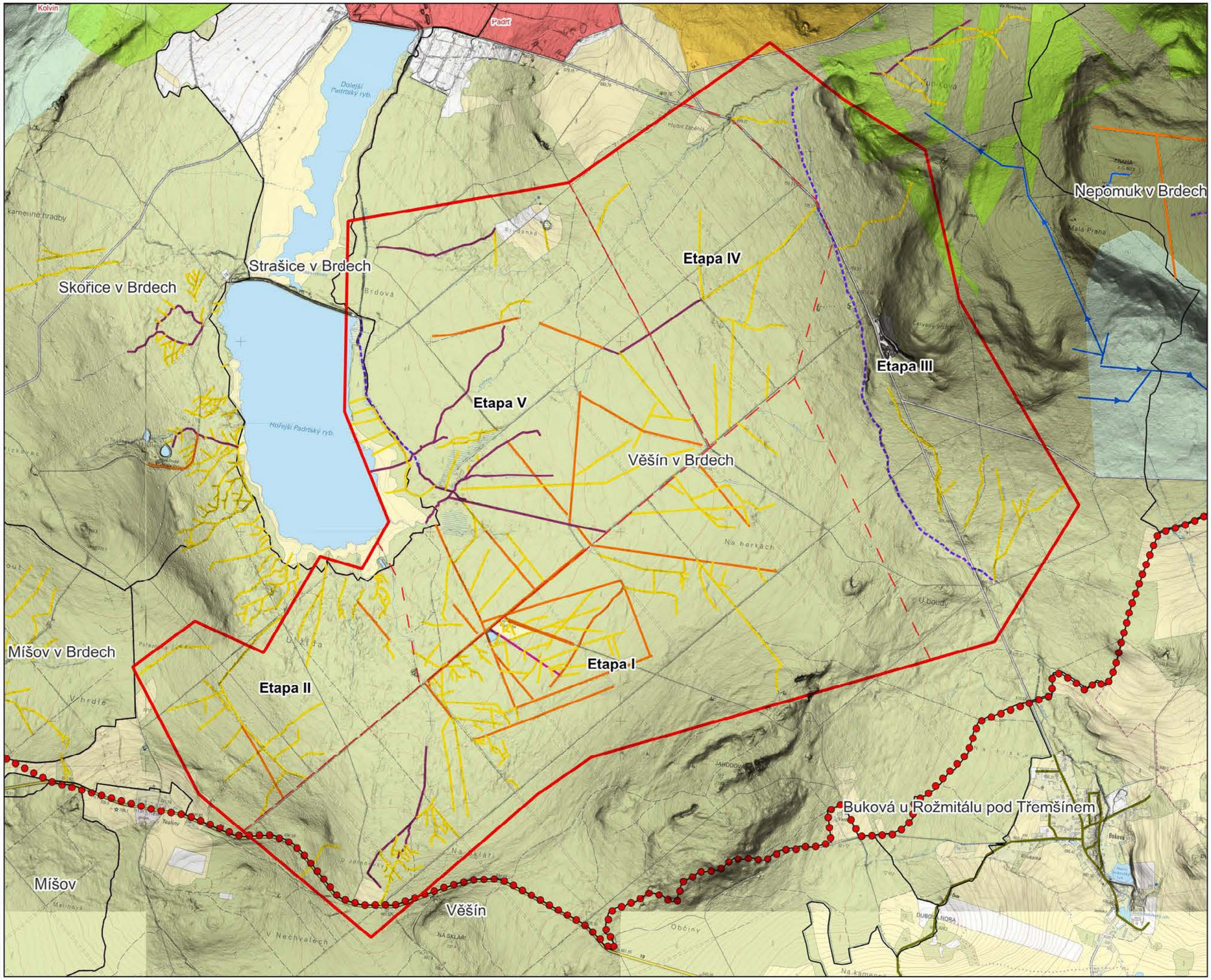
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramoniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace

Skořice v Brdech
Věšín v Brdech
Míšov v Brdech
Míšov
Věšín
Buková u Rožmitálu pod Třemšínem



Lokalita 4

Václavka

Priorita **B**

Etapy realizace

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:18 000

1 cm = 180 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.2.4. Site 5 - U žida (Hořejší Padrťský pond)

Site	U žida (Hořejší Padrťský pond)	Order No.	5
Region	Pilsen	Municipality with extended competence	Rokycany
Municipality	Strašice, Skořice, Věšín	Cadastral area	Strašice in Brdy, Skořice in Brdy, Věšín in Brdy
Catchment area of IV. order	Klabava	Hydrological Order No.	1-11-01-006

Current state:

Site 5 is part of the cadastral areas of Strašice in Brdy, Skořice in Brdy, and Věšín in Brdy, which are part of the villages of Strašice, Skořice, and Věšín. In terms of administration, the village of Věšín falls under the municipality of Rokycany (municipality with extended competence) in the Pilsen Region. A significant part of the site is located in the I. and II. protection zones of Brdy PLA.

The site extends in the southern part of the area of interest on the left slope of the Hořejší Padrťský pond. Under Decree No. 178/2021 Coll., the Klabava River is a significant watercourse managed by state enterprise Povodí Vltavy (Vltava River basin administration). Other registered nameless watercourses are managed by VLS. According to the Central Register of Watercourses (CEVT), the Zlatý potok Brook leads through the centre of the ponds and springs in Site 4.

The site extends on slopes at an elevation of 635–670 m above sea level. As to runoff characteristics, it is a sloping area adjacent to the littoral zone of the Hořejší Padrťský pond, which was altered by land reclamation in the past. There are short ditches, deepened and straightened small tributaries, and a paved road leading across the area fitted with a small number of culverts.

At the time of the study, the site is forested with local clear-cuts and younger stands. The species composition of the stands, especially in the lower part, is relatively diverse with a high share of native species. The habitat mapping identified only non-contiguous patches of forest with occurrence of waterlogged spruce forests (L9.2B) and ash-alder alluvial forests (L2.2). This mosaic is complemented by forest habitats severely affected by man with occurring non-native tree species.

In terms of forest typology, the site is mainly in vegetation zone 5 (fir-beech). The local target ecological series are ash, stagnic and wet, such as *Fraxineto-Alnetum montanum, (Fageto-)Abietum variohumidum trophicum*, *Abietum quercino-piceosum paludosum mesotrophicum*, etc.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions on the site, where a quite dense network of drainage ditches has been built on the slopes with alluvial vegetation. This resulted in a decline in the groundwater level and weakening of the local stands, which is undesirable, especially in the I. and II. protection zones of the PLA. The aim is to make use of the retention potential of the soil horizon in the area and slow down the surface runoff, which will increase local infiltration and mitigate further deep erosion affecting the ditches.

This mainly involves blocking of drainage ditches and channels in their non-original routes, shallowing and opening the modified streambeds. These key measures will be complemented with measures relating to the road network, i.e. a review of existing culverts and possibly their additional installation to reduce the load on the road ditches.

Basic parameters of the proposal:

Total site area	109	ha
Total number of lines concerned	104	pcs
Total length of lines concerned	11,977	m
of which drainage of roads and roads	391	m
of which drainage ditches to be blocked	10,298	m
of which streams to be revitalized or opened	1,288	m

Phasing:

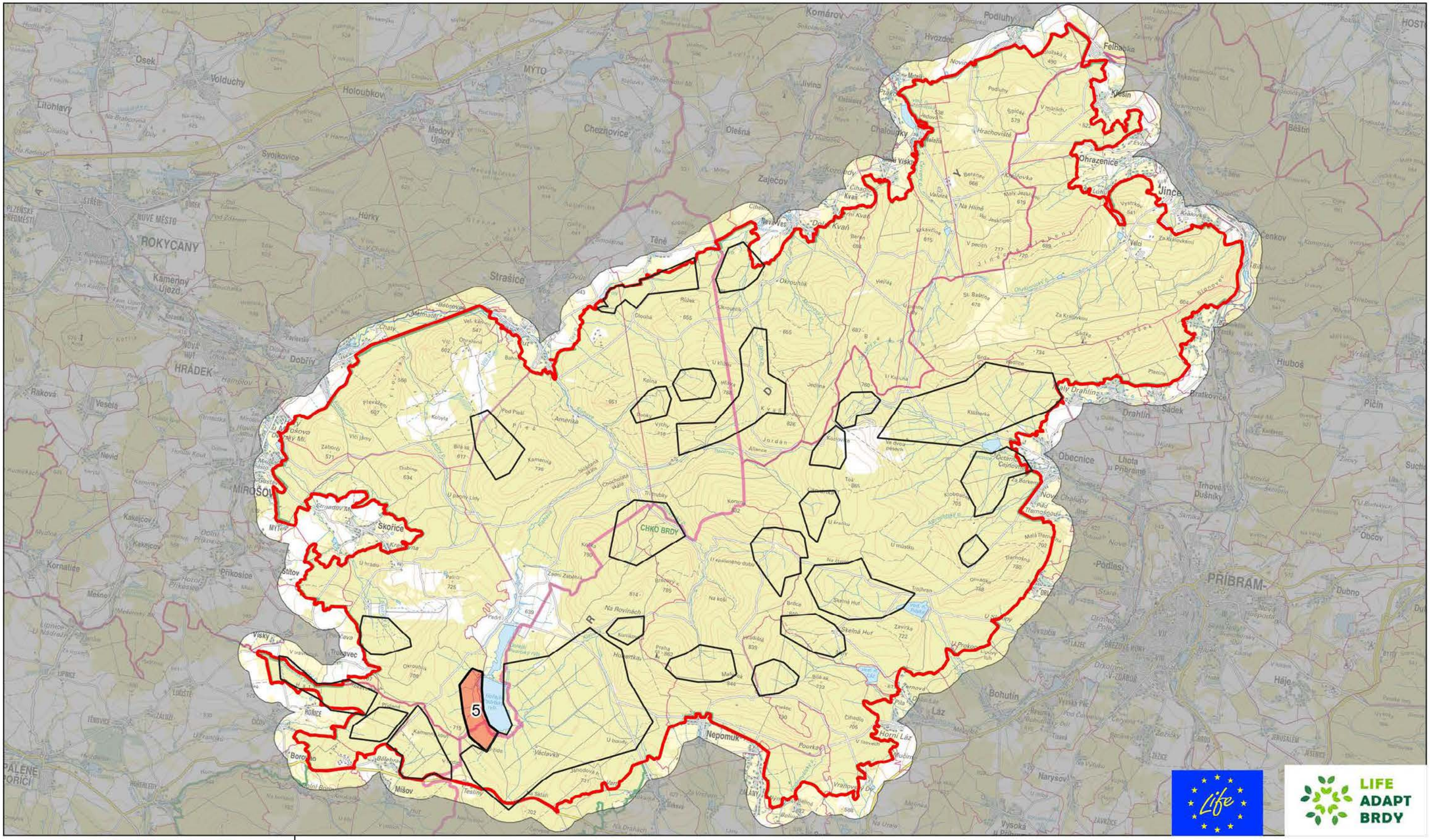
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:8 000
3.	Cadastral overview with the type of drainage lines	1:8 000
4.	Terrain morphology and the proposal concept	1:8 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

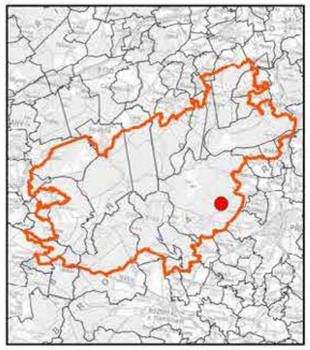
Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

Zadavatel:

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 5

U žida (Hořejší Padrťský rybník)



Lokalita 5

U žida (Hořejší Padrťský rybník)

Priorita **B**

Řešená lokalita

Odtokové linie

Zájmové území

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

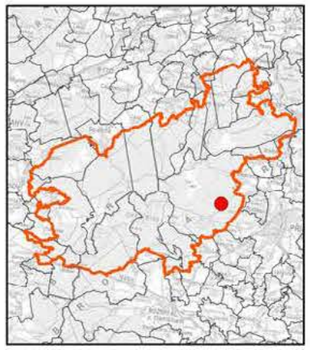
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 5

U žida (Hořejší Padrťský rybník)

Priorita **B**

Středočeský kraj
Plzeňský kraj
ORP:
Příbram - 539911
Rokycany - 559717

Obce:
Skořice
Věšín
Strašice

🟥 Řešená lokalita

Stávající odtokové linie

- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:

- 🟩 ČR - Vojenské lesy
- 🟩 ČR - Lesy České republiky
- ▨ ČR - Ministerstvo obrany
- ▨ Obec
- ☐ Soukromý subjekt

● Zájmové území
☐ Katastrální území

1:8 000
1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Balt po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracovanáno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

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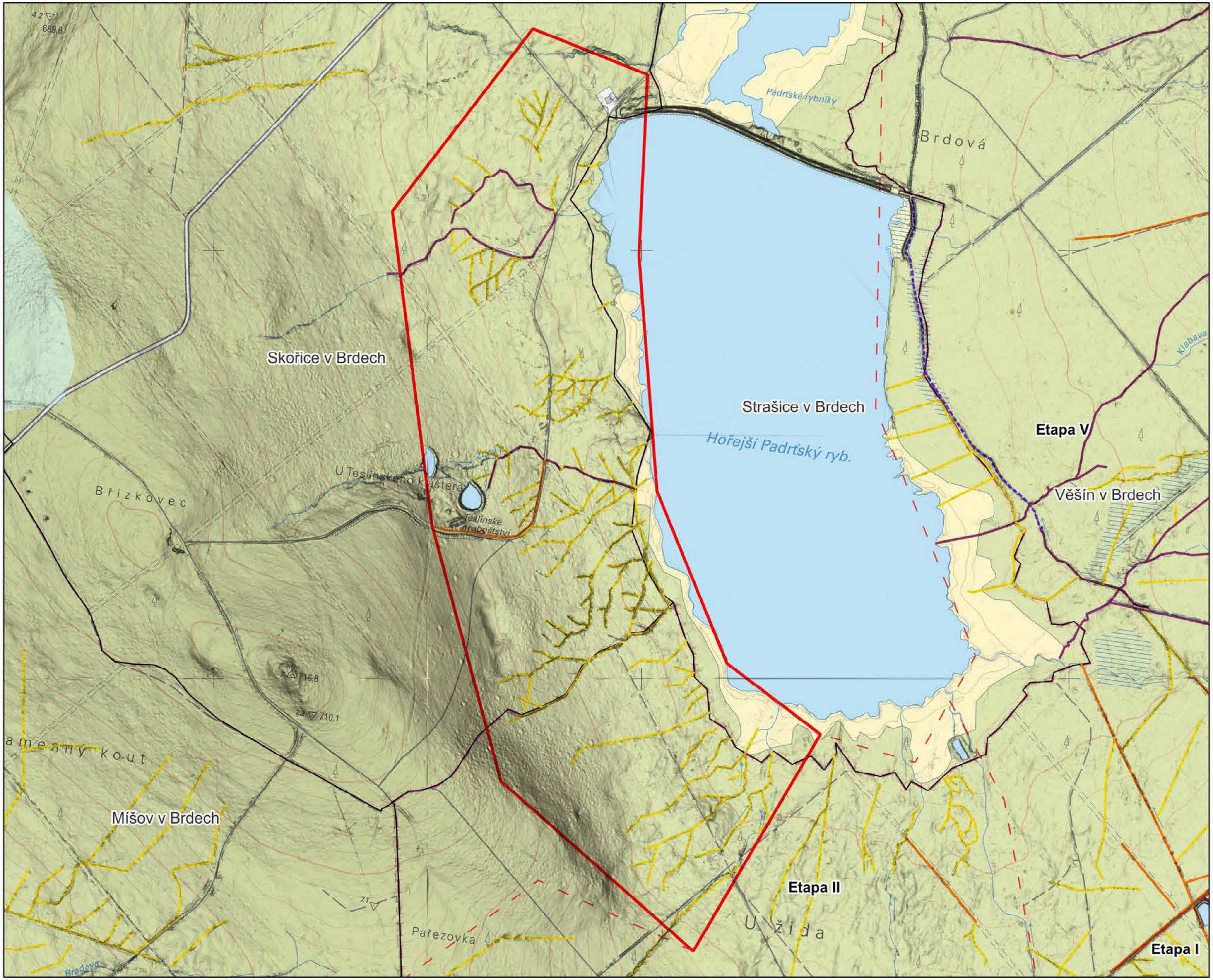
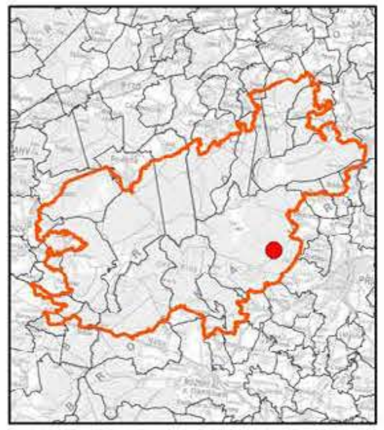
3. Typ odtokové linie na katastrální situace





Lokalita 5

U žida (Hořejší Padrťský rybník)

Priorita **B**

- Etapy realizace
- Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy
- OPVZ
- Zájmové území
- Katastrální území

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Balt po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracovanáno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

4. Morfologie terénu s konceptem návrhu

3.2.5. Site 10 - Spring area of the Litavka

Site	Spring area of the Litavka	Order No.	10
Region	Central Bohemian	Municipality with extended competence	Příbram
Municipality	Nepomuk, Vranovice	Cadastral area	Nepomuk in Brdy, Vranovice in Brdy
Catchment area of IV. order	Litavka	Hydrological Order No.	1-11-04-001

Current state:

Site 10 is part of the cadastral area of Nepomuk in Brdy and Vranovice in Brdy, which are part of the villages of Nepomuk and Vranovice. In terms of administration, the villages of Nepomuk and Vranovice falls under the municipality of Příbram (municipality with extended competence) in the Central Region. The area is located in the III. protection zone of Brdy PLA and the protection zone of the Láz water reservoir.

The site is in the south-eastern part of the area of interest between the peaks Malý Tok and Bílá skála (Kormundka). Under Decree No. 178/2021 Coll., the Litavka River is a significant watercourse managed by state enterprise Povodí Vltavy. Other registered nameless watercourses are managed by VLS.

The site extends on slopes at an elevation of 715–780 m above sea level. As to runoff characteristics, it is a spring area of the Litavka River, which was altered by land reclamation in the past. These are drainage ditches, modified watercourses, and a paved road across the area with a small number of culverts.

At the time of the study, the site is continuously forested mainly with spruce monocultures of different ages. The shrub and moss layer is also present in the vegetation. The habitat mapping identified only minor non-contiguous patches of forest with occurrence of waterlogged spruce forests (L9.2B) close to the Litavka River.

In terms of forest typology, the site is mainly in vegetation zone 6 (spruce-beech). The local target ecological series are stagnic and wet. Along the watercourses there is *Piceeto-Abietum paludosum mesotrophicum* transitioning into *Piceeto-Abietum variohumidum acidophilum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the spring sections in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff, which will increase infiltration in the area above the water reservoir.

It mainly involves blocking of the drainage ditches and trenches and revitalization of the Litavka River channel. These key measures will be complemented with measures relating to the road network, i.e. a review of existing culverts and possibly their additional installation to reduce the load on the road ditches.

Basic parameters of the proposal:

Total site area	80	ha
Total number of lines concerned	12	pcs
Total length of lines concerned	2,421	m
of which drainage ditches to be blocked	1,788	m
of which streams to be revitalized or opened	633	m

Phasing:

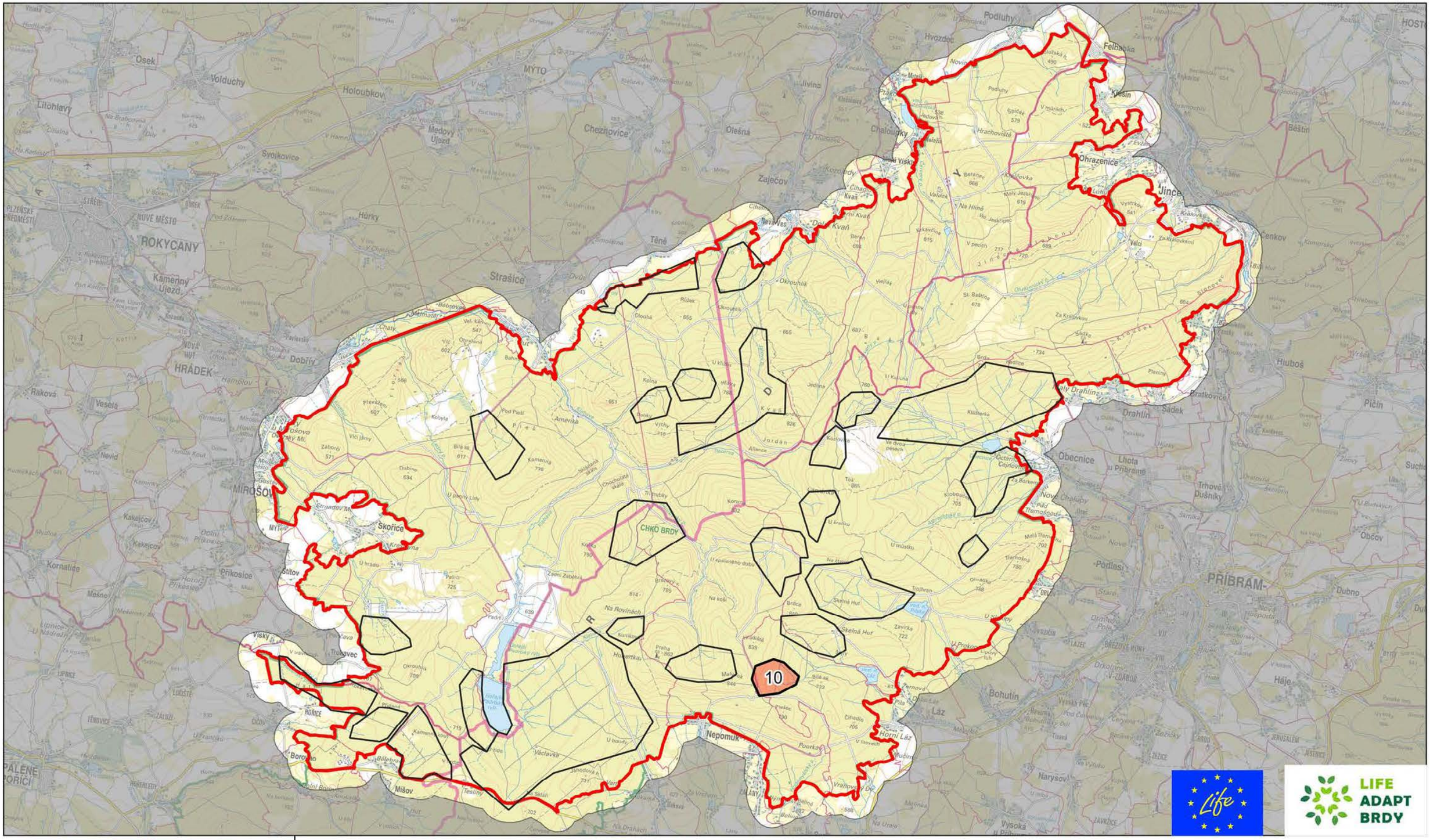
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:5 000
3.	Cadastral overview with the type of drainage lines	1:5 000
4.	Terrain morphology and the proposal concept	1:5 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

Zadavatel:

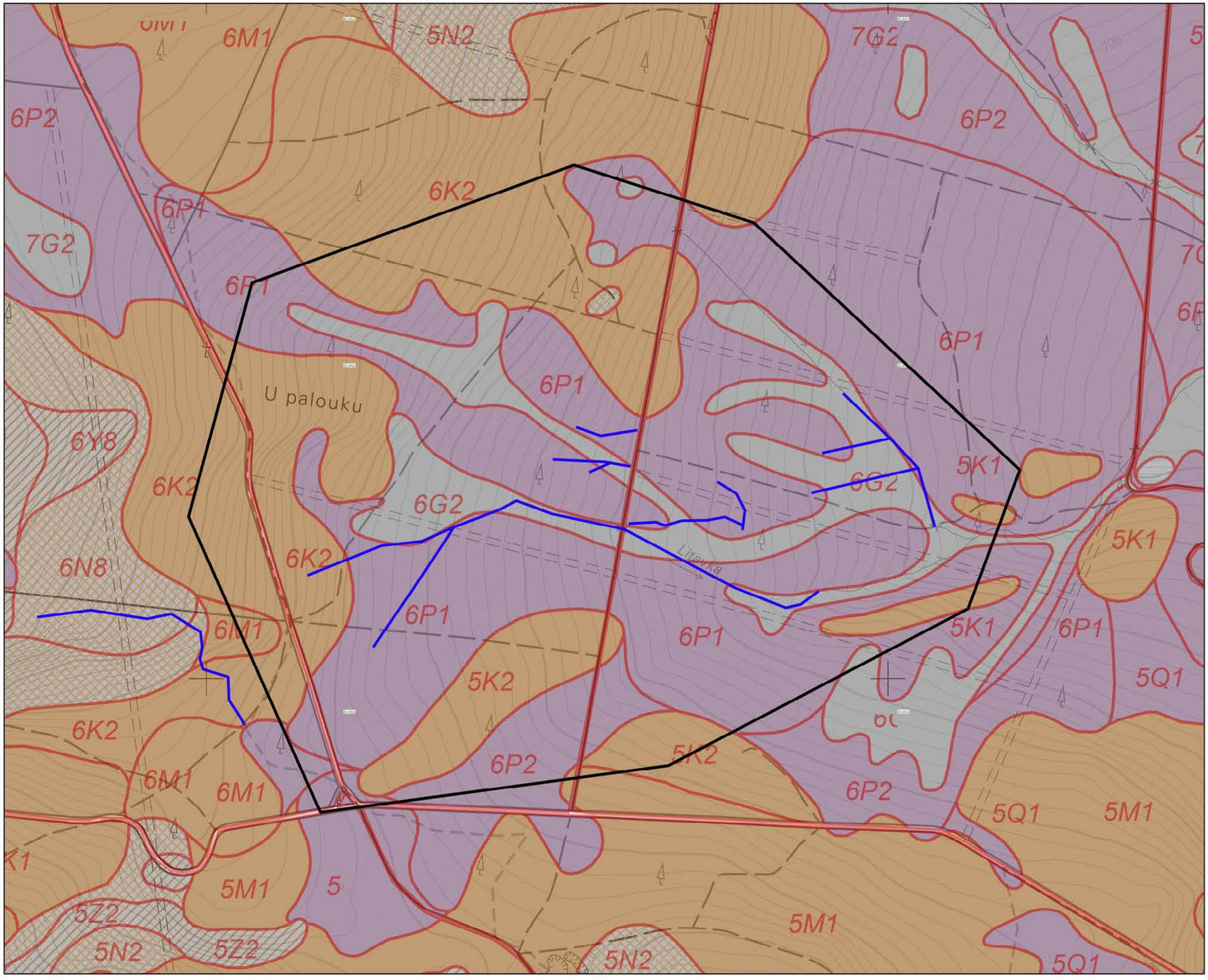
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

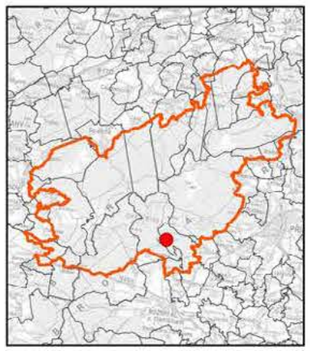
Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 10

Prameniště Litavky

LIFE ADAPT BRDY





Lokalita 10

Prameniště Litavky

Priorita **B**

Řešená lokalita

Odtokové linie

Zájmové území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

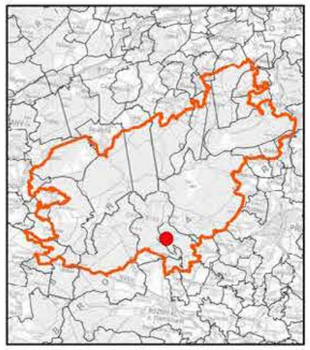
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramenišť

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 10

Prameniště Litavky

Priorita **B**

Středočeský kraj

ORP:
Příbram - 539911

Obce:
Vranovice
Nepomuk

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:5 000
1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace

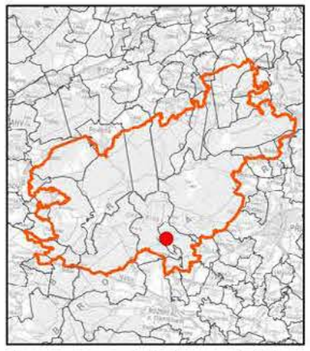
U palouku

Vranovice v Brdech

Nepomuk v Brdech

Litavka

410/2 57/1 366/3 452 366/1 361 358 558/1 362 366/2 365/2 365/1 410/8 558/2 363/2 512 364 363/1 435 514/1 355 357 410/7 356 353 427/1 410/6 244 241 242/1 242/2 410/5 245 246 410/4 243 428 286/2 540/1 286/1 268/7 540/4 287 285 268/1 540/5 540/6 268/6 268/3 268/2



Lokalita 10

Prameniště Litavky

Priorita **B**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy
- OPVZ

- Zájmové území
- Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.2.6. Site 18 - Pilský potok Brook

Site	Pilský potok Brook	Order No.	18
Region	Central Bohemian	Municipality with extended competence	Příbram
Municipality	Obecnice	Cadastral area	Obecnice in Brdy
Catchment area of IV. order	Pilský potok Brook	Hydrological Order No.	1-11-04-002

Current state:

Site 18 is part of the cadastral area of Obecnice in Brdy, which is part of the village of Obecnice. In terms of administration, the village of Obecnice falls under the municipality of Příbram (municipality with extended competence) in the Central Bohemian Region. The site is located in the III. protection zone of Brdy PLA and the protection zone of the Pilská water reservoir.

The site is in the eastern part of the area of interest and the Pilská water reservoir. Under Decree No. 178/2021 Coll., the Pilský potok Brook is a significant watercourse managed by state enterprise Povodí Vltavy. Other registered nameless watercourses are managed by VLS.

The site extends on slopes at an elevation of 675–780 m above sea level. As to runoff characteristics, it is a spring area of the Pilský potok Brook, which was altered by land reclamation in the past. These are drainage ditches, a modified channel of the Pilský potok Brook, roads and skidding lines.

At the time of the study, the site is continuously forested mainly with spruce monocultures of different ages and present clear-cut areas. The stands show absence of shrub and moss layer. In combination with drought, these are therefore species-poor communities sensitive to climate change. The habitat mapping identified more significant areas of waterlogged spruce forests (L9.2B)

In terms of forest typology, the site is mainly in vegetation zone 6 (spruce-beech). The local target ecological series are stagnic and wet, as well as peat, such as *Piceeto-Abietum variohumidum acidophilum* and *Piceetum turfosum acidophilum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the drained soil horizon in the area above the water reservoir and slow down the surface runoff, which will increase local infiltration. Mitigating erosion in the drainage lines will also reduce sedimentation in the reservoir located below.

This mainly involves blocking of drainage ditches and channels in their non-original routes, shallowing and opening the modified streambeds. These key measures will be complemented by measures relating to the road network, removal of redundant transport lines, adjustment of terrain morphology where the lines connect to the natural stream valley or the original stream course. It is necessary to review the existing culverts and possibly install new ones.

Basic parameters of the proposal:

Total site area	278	ha
Total number of lines concerned	78	pcs
Total length of lines concerned	18,037	m
of which drainage of roads and roads	5,361	m
of which drainage ditches to be blocked	8,059	m
of which streambeds to be shallowed	818	m
of which streams to be revitalized or opened	3,799	m

Phasing:

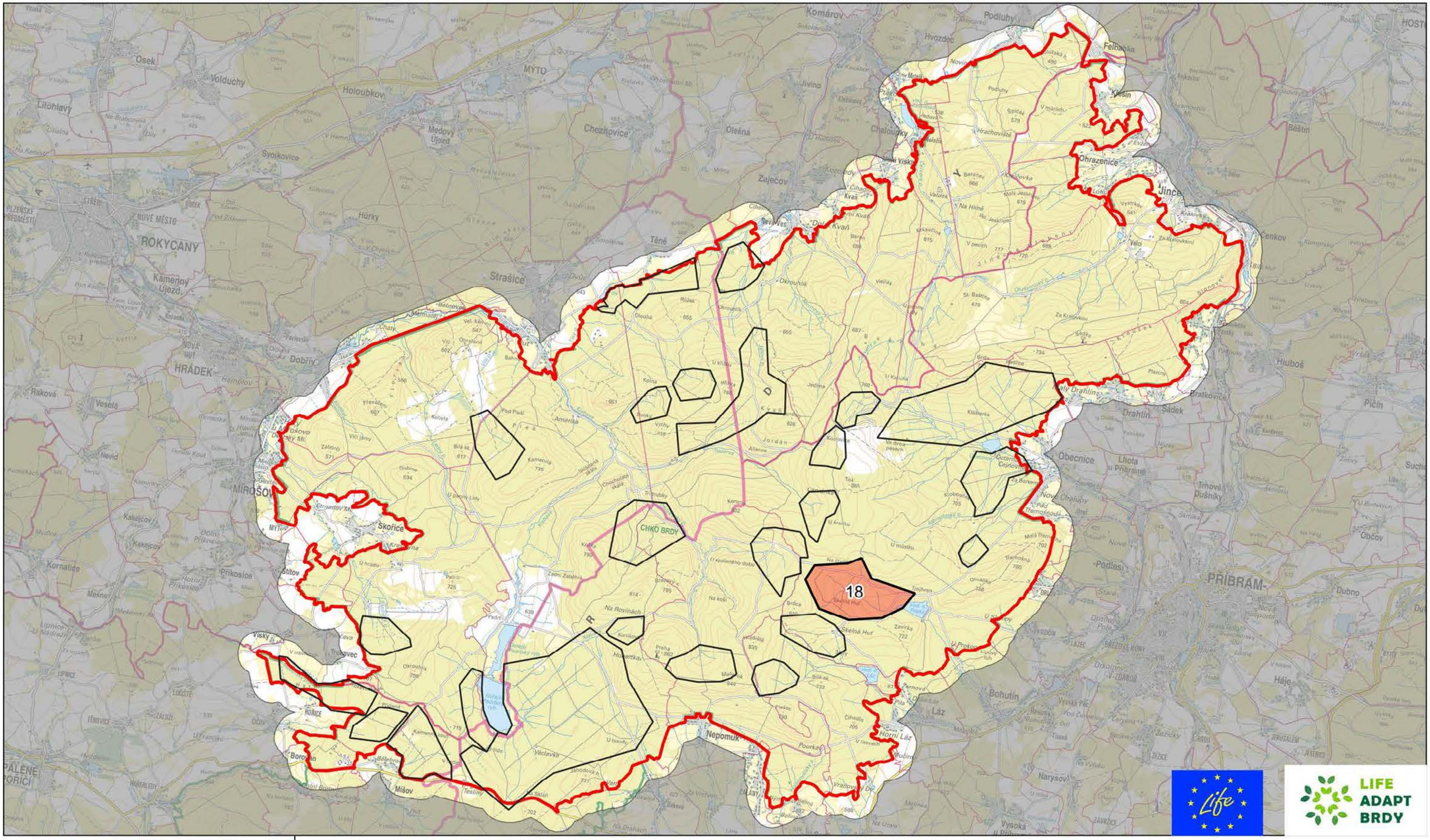
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:9 000
3.	Cadastral overview with the type of drainage lines	1:9 000
4.	Terrain morphology and the proposal concept	1:9 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

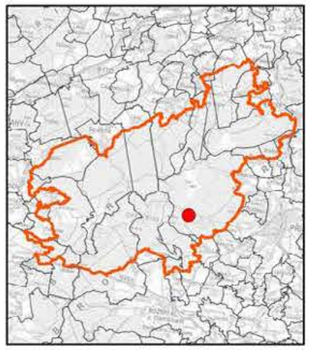
Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

Zadavatel:

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 18

Pilský potok



Lokalita 18

Pilský potok

Priorita **B**

Řešená lokalita

Odtokové linie

Zájmové území

1:9 000

1 cm = 90 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

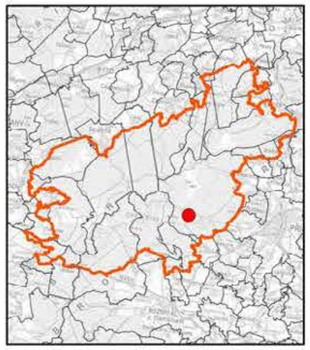
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramenišť

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 18

Pilský potok

Priorita **B**

Středočeský kraj

ORP:
Příbram - 539911

Obce:
Obecnice

Řešená lokalita

Stávající odtokové linie

- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:

- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území

Katastrální území

1:9 000

1 cm = 90 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

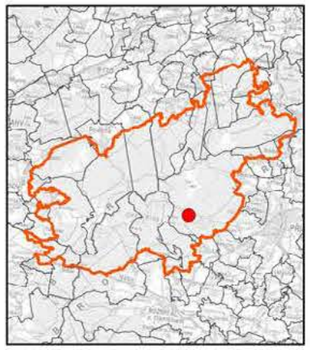
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramenitě

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace



Lokalita 18

Pilský potok

Priorita **B**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:9 000

1 cm = 90 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramoniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.3. Proposal for measures in sites of priority C

3.3.1. Site 6 - Divide Hlava – Jordán

Site	Divide Hlava – Jordán	Order No.	6
Region	Central Bohemia, Pilsen	Municipality with extended competence	Hořovice, Rokycany
Municipality	Zaječov, Teně	Cadastral area	Zaječov in Brdy, Teně in Brdy
Catchment area of IV. order	Jalový potok Brook, Reserva	Hydrological Order No.	1-11-04-027, 1-11-01-008

Current state:

Site 6 is part of the cadastral area of Zaječov in Brdy, Teně in Brdy, which are part of the villages of Zaječov a Teně. In term of administration, the villages of Zaječov and Teně fall under the municipalities of Hořovice in the Central Bohemian Region and Rokycany in the Pilsen Region (municipalities with extended competence) respectively. In the basin of the Reserva stream beneath the site addressed, there are water resources Tři trubky, supplying water to the village of Strašice.

The site delineation overlaps with partial areas of lower explosive ordnance hazard.

The site is located in the central part of the area of interest between the peaks Hlava and Jordán. The Jalový potok Brook, the Reserva and other streams registered as nameless watercourses are managed by VLS.

The site extends on slopes at an elevation of 600–760 m above sea level. As to runoff characteristics, it is a divide of the Jalový potok Brook and a nameless right tributary of the Reserva. The watercourses and their basins are altered by reclamation interventions from the past. These interventions include drainage ditches, regulated streams, draining related to roads, etc.

At the time of the study, the site is continuously forested mainly with spruce monocultures of different ages. The habitat mapping identified areas with prevailing forest plantations of allochtonous coniferous trees (X9A) and smaller patches of waterlogged spruce forests (L9.2B), acidophilous beech forests (L5.4), and similar habitats.

In terms of forest typology, the site is mainly in vegetation zones 5 (fir-beech) and 6 (spruce-beech). The local target ecological series are stagnic and wet, such as *Piceeto-Abietum variohumidum acidophilum* or *Piceeto-Abietum variohumidum oligotrophicum*, etc.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff, which will increase local infiltration. A further effect of the measures will be the reduction of deep erosion affecting small watercourses.

This mainly consists of blocking drainage ditches and channels in their non-natural routes, shallowing and opening up of the modified streambed of the tributaries of the Jalový potok Brook and the Reserva stream. These key measures will be complemented by measures relating to the road network, adjustment of the morphology of the terrain in the areas of transport lines with a connection to the natural stream valley or the original stream course.

Basic parameters of the proposal:

Total site area	316	ha
Total number of lines concerned	76	pcs
Total length of lines concerned	13,571	m
of which drainage of roads and roads	1,320	m
of which drainage ditches to be blocked	10,167	m
of which streambeds to be shallowed	146	m
of which streams to be revitalized or opened	1,938	m

Phasing:

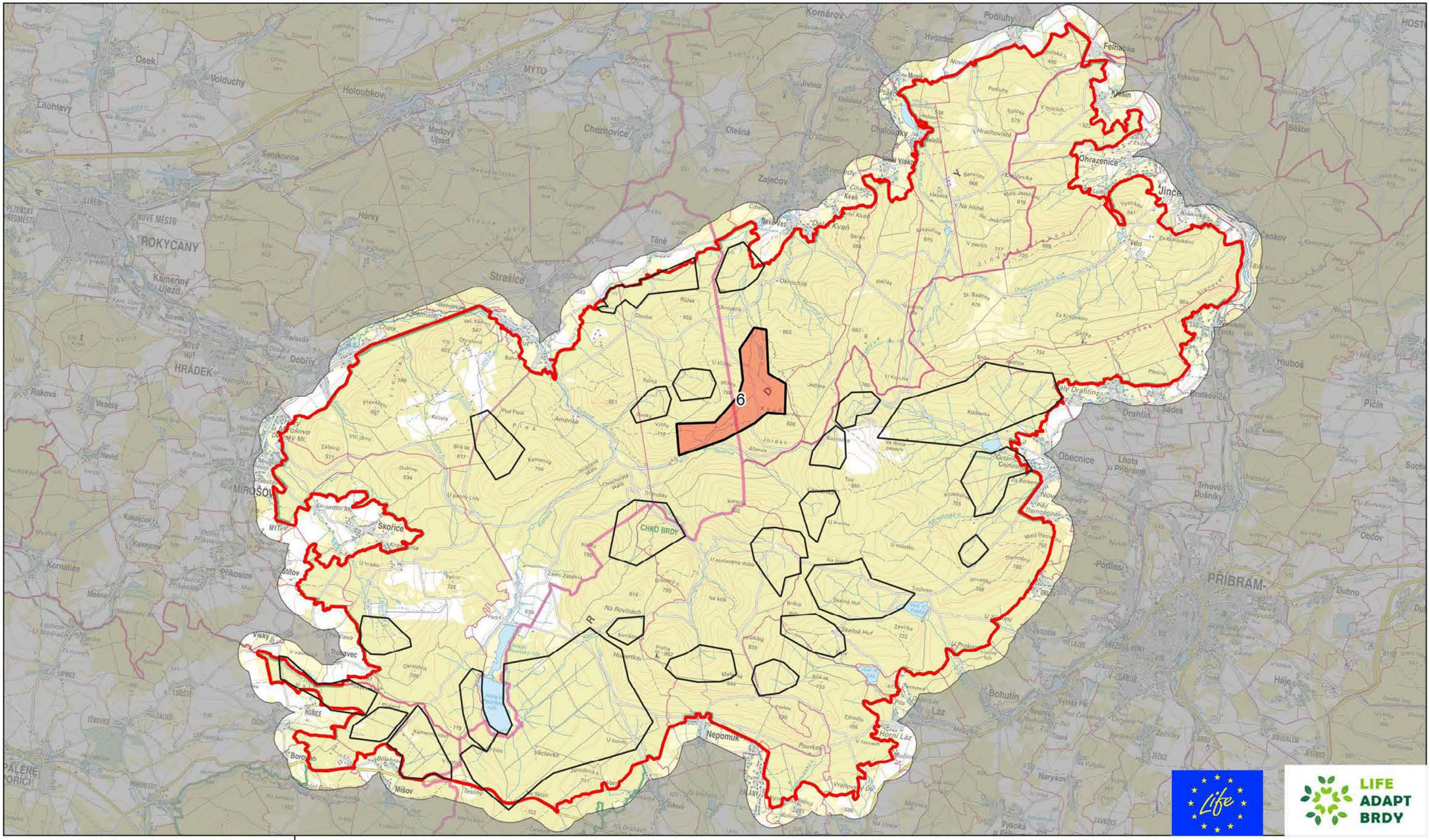
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:12 000
3.	Cadastral overview with the type of drainage lines	1:12 000
4.	Terrain morphology and the proposal concept	1:12 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

Zadavatel:

VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 6

Rozvodí Hlava - Jordán

LIFE ADAPT BRDY

Lokalita 6

Rozvodí Hlava - Jordán

Priorita **C**

Řešená lokalita

Odtokové linie

Zájmové území

1:12 000

1 cm = 120 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracovánáno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramenitě

LIFE ADAPT BRDY

2. Situace lesních typů

Lokalita 6

Rozvodí Hlava - Jordán

Priorita **C**

Středočeský kraj
Plzeňský kraj
ORP:
Hořovice - 531189
Rokycany - 559717

Obce:
Zaječov
Těně

Řešená lokalita

Stávající odtokové linie

- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:

- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:12 000
1 cm = 120 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

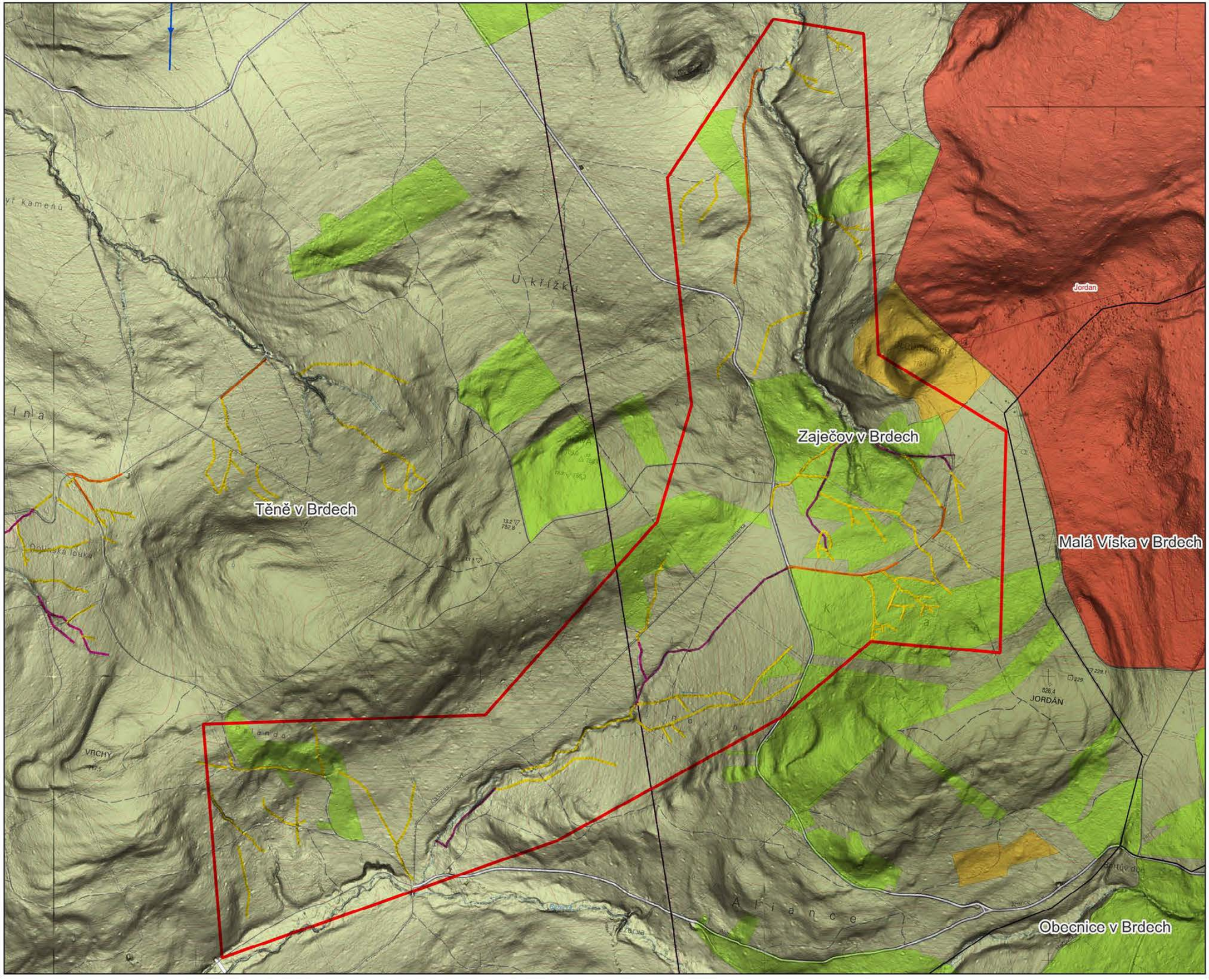
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace



Lokalita 6

Rozvodí Hlava - Jordán

Priorita **C**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:12 000

1 cm = 120 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.3.2. Site 7 – Carvánka

Site	Carvánka	Order No.	7
Region	Central Bohemian	Municipality with extended competence	Příbram
Municipality	Obecnice	Cadastral area	Obecnice in Brdy
Catchment area of IV. order	Reserva	Hydrological Order No.	1-11-01-008

Current state:

Site 7 is part of the cadastral area of Obecnice in Brdy, which is part of the village of Obecnice. In terms of administration, the village of Obecnice falls under the municipality of Příbram (municipality with extended competence) in the Central Bohemian Region. The area is located in the III. protection zone of Brdy PLA.

The site overlaps with areas of lower explosive ordnance hazard.

It lies in the central part of the area of interest beneath the Carvánka hunting lodge. The Reserva stream and other registered nameless streams are managed by VLS.

The site extends on slopes at an elevation of 760–830 m above sea level. As to runoff characteristics, it is a spring area of the Reserva stream. The land reclamation interventions into watercourses are not particularly significant. They mainly affect the runoff conditions on roads and skidding lines.

At the time of the study, the site is continuously forested mainly with spruce monocultures of different ages. The habitat mapping identified non-contiguous areas of forest plantations of allochtonous coniferous trees (X9A) and smaller patches of bog spruce forests (L9.2A), and similar habitats.

In terms of forest typology, the site is mainly in vegetation zones 6 (spruce-beech) and 7 (beech-spruce). The local target ecological series are stagnic and wet, such as *Piceeto-Abietum variohumidum acidophilum* and *Abieto-Piceetum variohumidum oligotrophicum*, etc.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff, which will increase local infiltration. A further effect of the measures will be the reduction of deep erosion affecting small watercourses.

This mainly involves blocking drainage ditches, shallowing and opening up streambeds. These key measures will be complemented by measures relating to the road network, adjustment of the morphology of the terrain in the areas of transport lines with a connection to the natural valley line or the original stream course, and removal of redundant lines.

Basic parameters of the proposal:

Total site area	80	ha
Total number of lines concerned	9	pcs
Total length of lines concerned	3,624	m
of which drainage of roads and roads	1,618	m
of which drainage ditches to be blocked	661	m
of which streams to be revitalized or opened	1,345	m

Phasing:

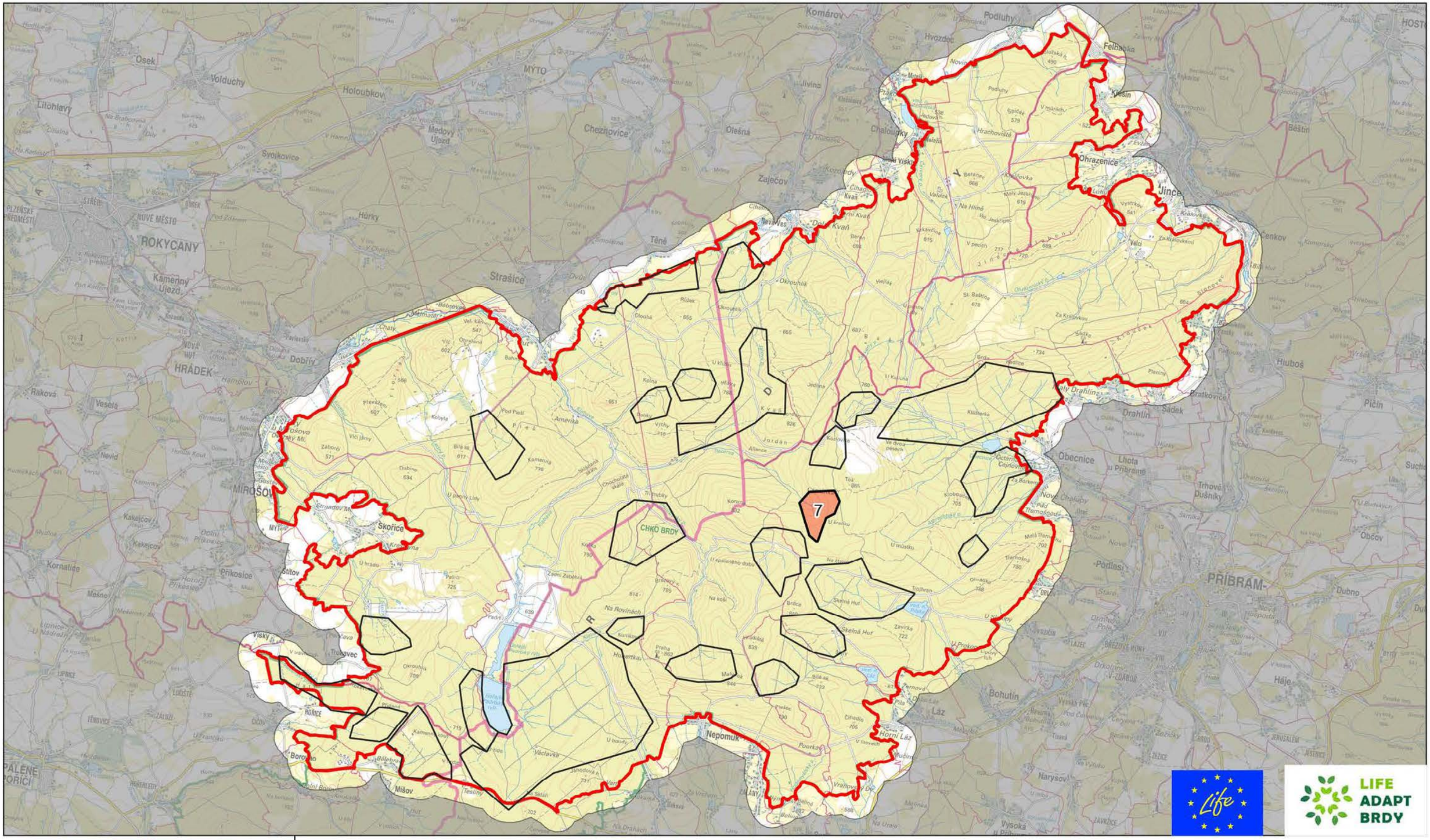
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:5 000
3.	Cadastral overview with the type of drainage lines	1:5 000
4.	Terrain morphology and the proposal concept	1:5 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

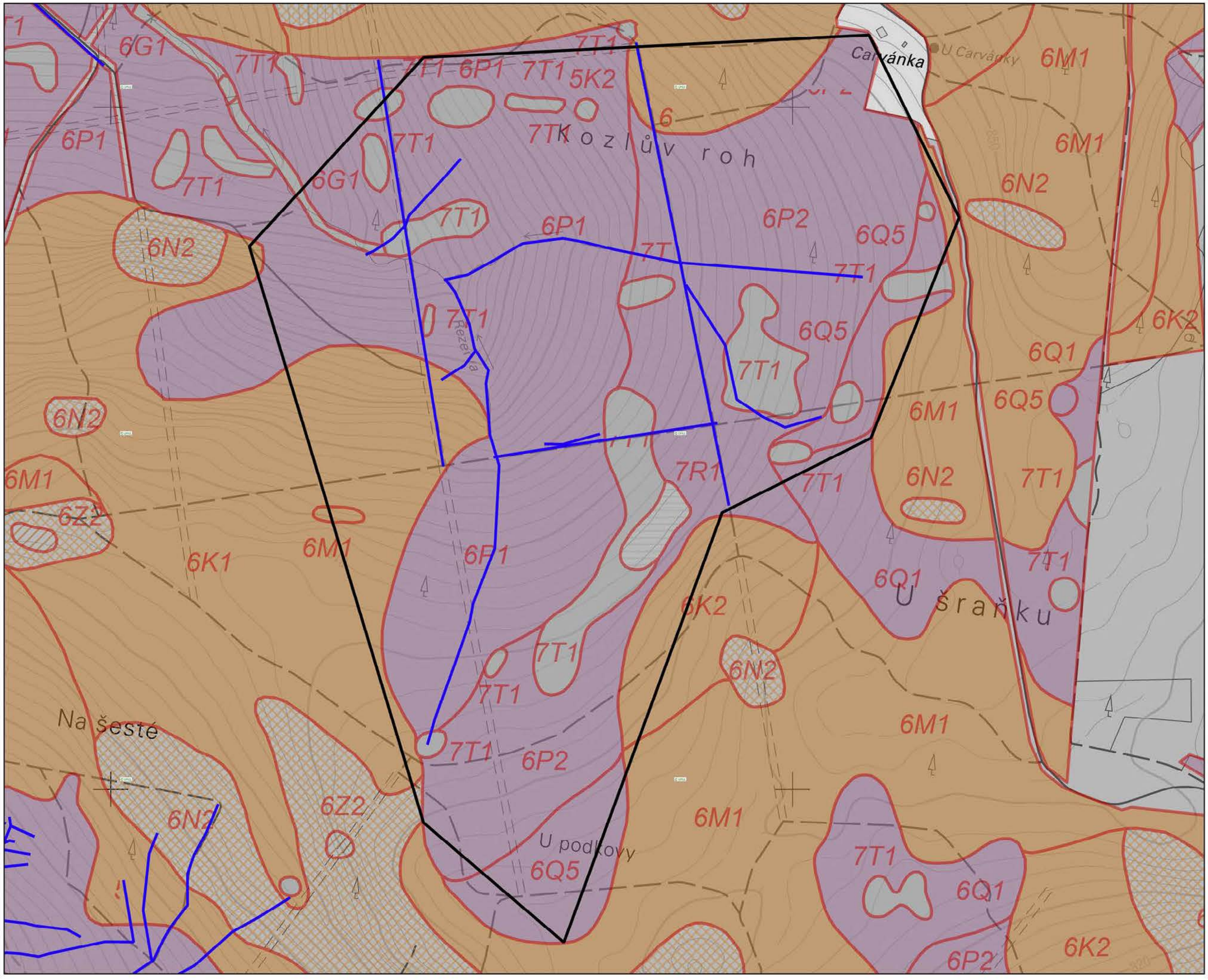
Zadavatel:

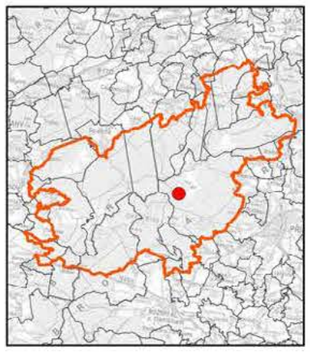
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 7

Carvánka





Lokalita 7

Carvánka

Priorita **C**

Řešená lokalita

Odtokové linie

Zájmové území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

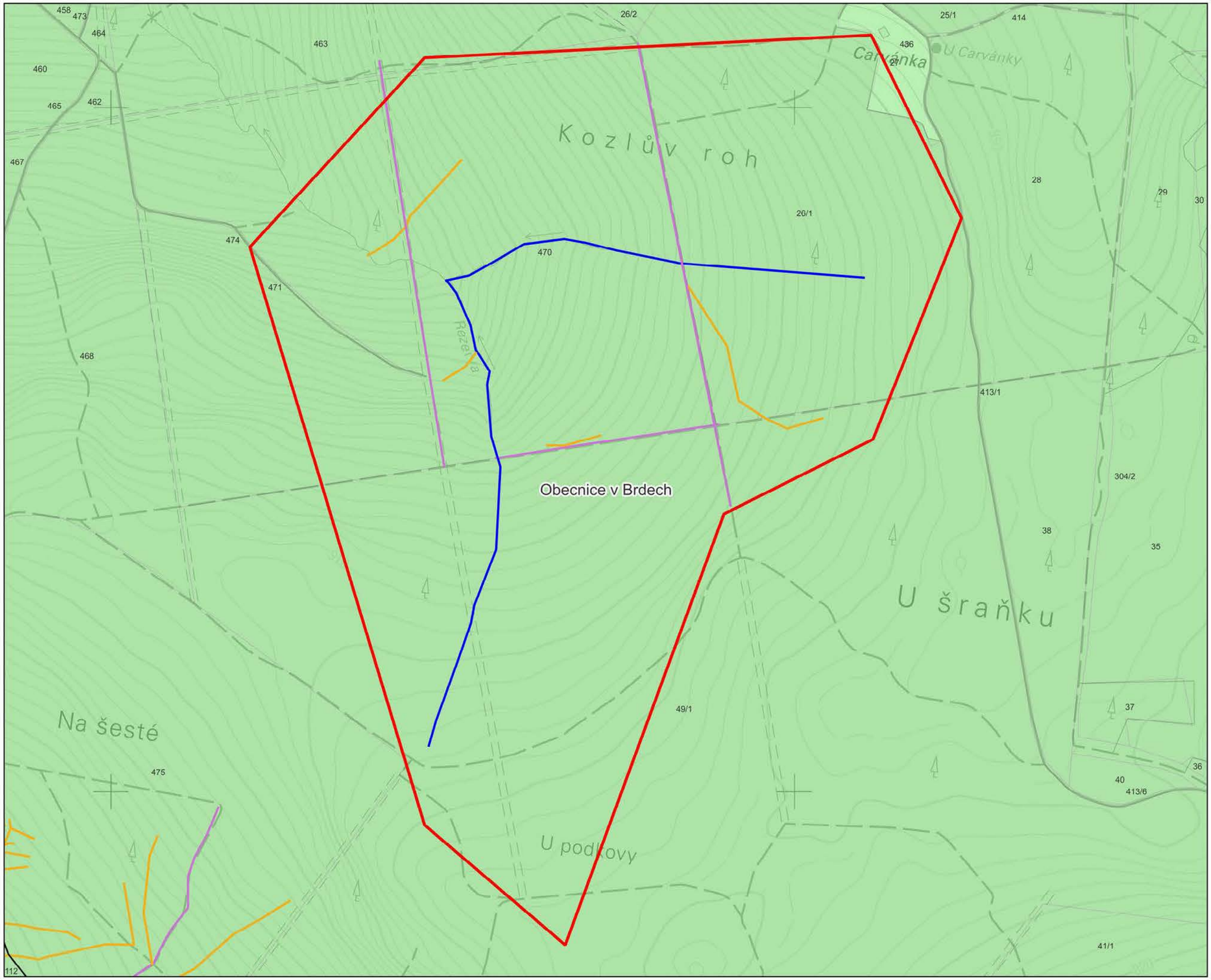
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

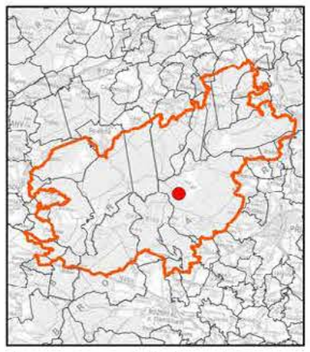
VRV

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramenišť

LIFE ADAPT BRDY

2. Situace lesních typů





Lokalita 7

Carvánka

Priorita **C**

Středočeský kraj

ORP:
Příbram - 539911

Obce:
Obecnice

Řešená lokalita

Stávající odtokové linie

- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:

- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území

Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

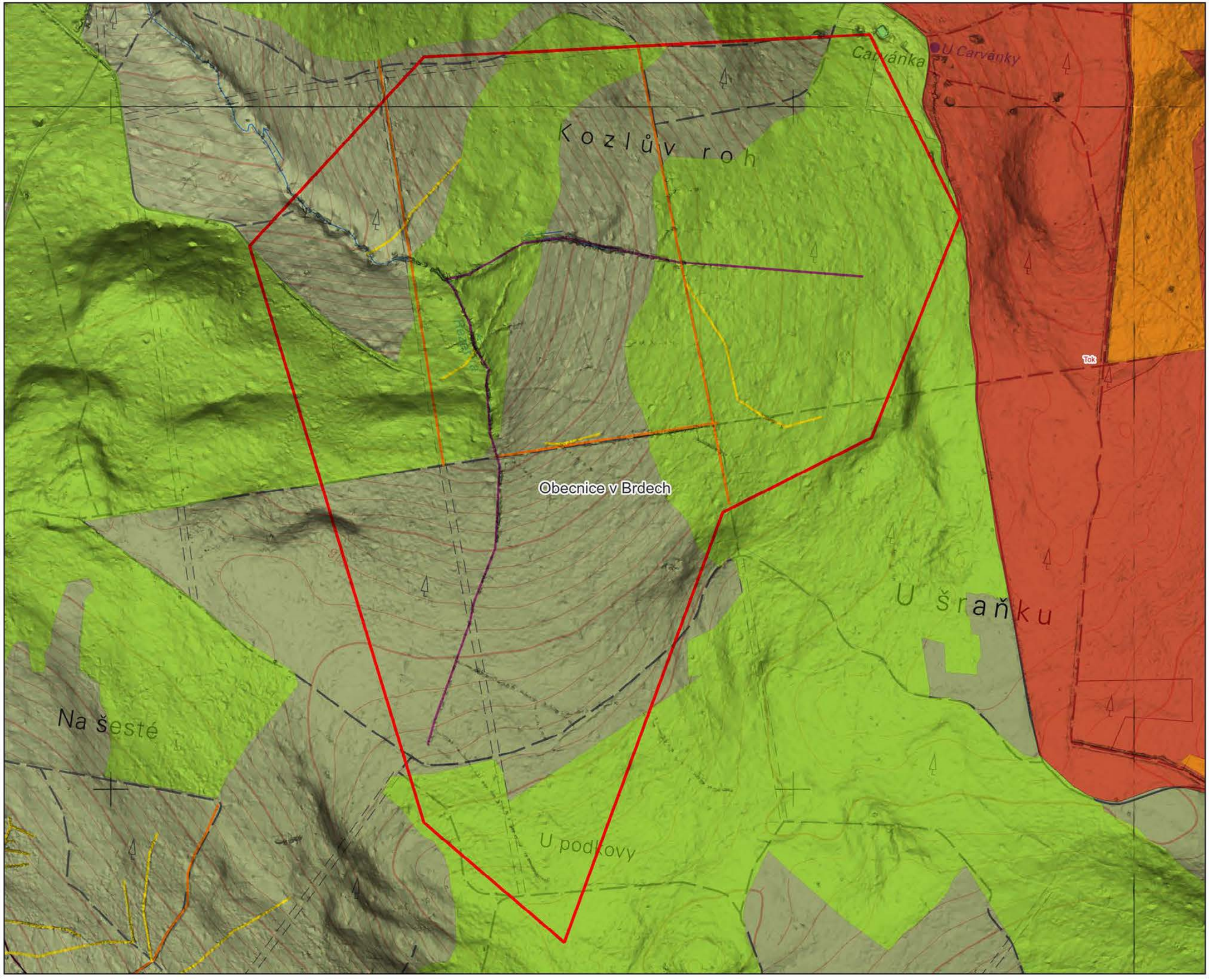
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

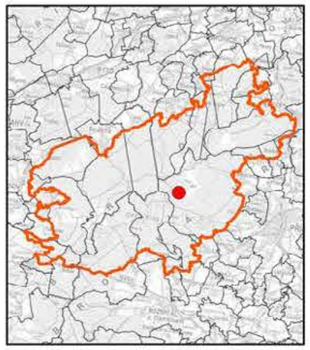
VRV

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace





Lokalita 7

Carvánka

Priorita **C**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

4. Morfologie terénu s konceptem návrhu

3.3.3. Site 11 – Teně

Site	Teně	Order No.	11
Region	Pilsen	Municipality with extended competence	Rokycany
Municipality	Teně, Strašice	Cadastral area	Teně in Brdy, Strašice in Brdy
Catchment area of IV. order	Tisý potok Brook	Hydrological Order No.	1-11-01-011

Current state:

Site 11 is part of the cadastral area of Teně in Brdy and Strašice in Brdy, which are part of the villages of Teně a Strašice. In terms of administration, the villages of Teně and Strašice fall under the municipality of Rokycany (municipality with extended competence) in the Pilsen Region. The area is located in the II. and III. protection zone of Brdy PLA. Within the site, there are water resources supplying water to the village of Teně including their protection zone.

The site lies on the north-western boundary of the area of interest above the village of Teně. The Tisý potok Brook and other registered nameless watercourses are managed by VLS.

The site extends at an elevation of 515–560 m above sea level. As to runoff characteristics, it is an alluvial plain of the Tisý potok Brook and the surroundings. The land reclamation interventions were carried out within the modifications of channels as well as in the wider area of the basin. These interventions mainly affect the runoff conditions in drainage ditches, on roads and skidding lines.

At the time of the study, the site is continuously forested mainly with spruce monocultures of different ages and significant occurrence of clear-cut areas. The habitat mapping identified an area with occurring bog spruce forests (L9.2A). The area overlaps the borders of the II. protection zone of the PLA.

In terms of forest typology, the site is in vegetation zones 4 (beech) and 5 (fir-beech). The local target ecological series are stagnic and wet. The prevailing part of the area is home to *Querceto-Abietum variohumidum acidophilum*, while in the II. protection zone of the PLA we may find *Piceetum relictum turfosum mesotrophicum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff, which will increase infiltration near water resources. A further effect of the measures will be the reduction of deep erosion affecting small watercourses.

This mainly involves blocking drainage ditches and shallowing streambeds in the bog of the Tisý pond. In the remaining part, this also means blocking drainage ditches and shallowing or possibly opening up the regulated watercourses. At the next phase of the project preparation, we recommend to conduct an assessment of the impact of the measures on the quality and volume of underground water in water resources. The proposed measures shall not have any negative impact in this respect.

Basic parameters of the proposal:

Total site area	138	ha
Total number of lines concerned	37	pcs
Total length of lines concerned	8,919	m
of which drainage of roads and roads	1,387	m
of which drainage ditches to be blocked	5,898	m
of which streambeds to be shallowed	1,126	m
of which streams to be revitalized or opened	508	m

Phasing:

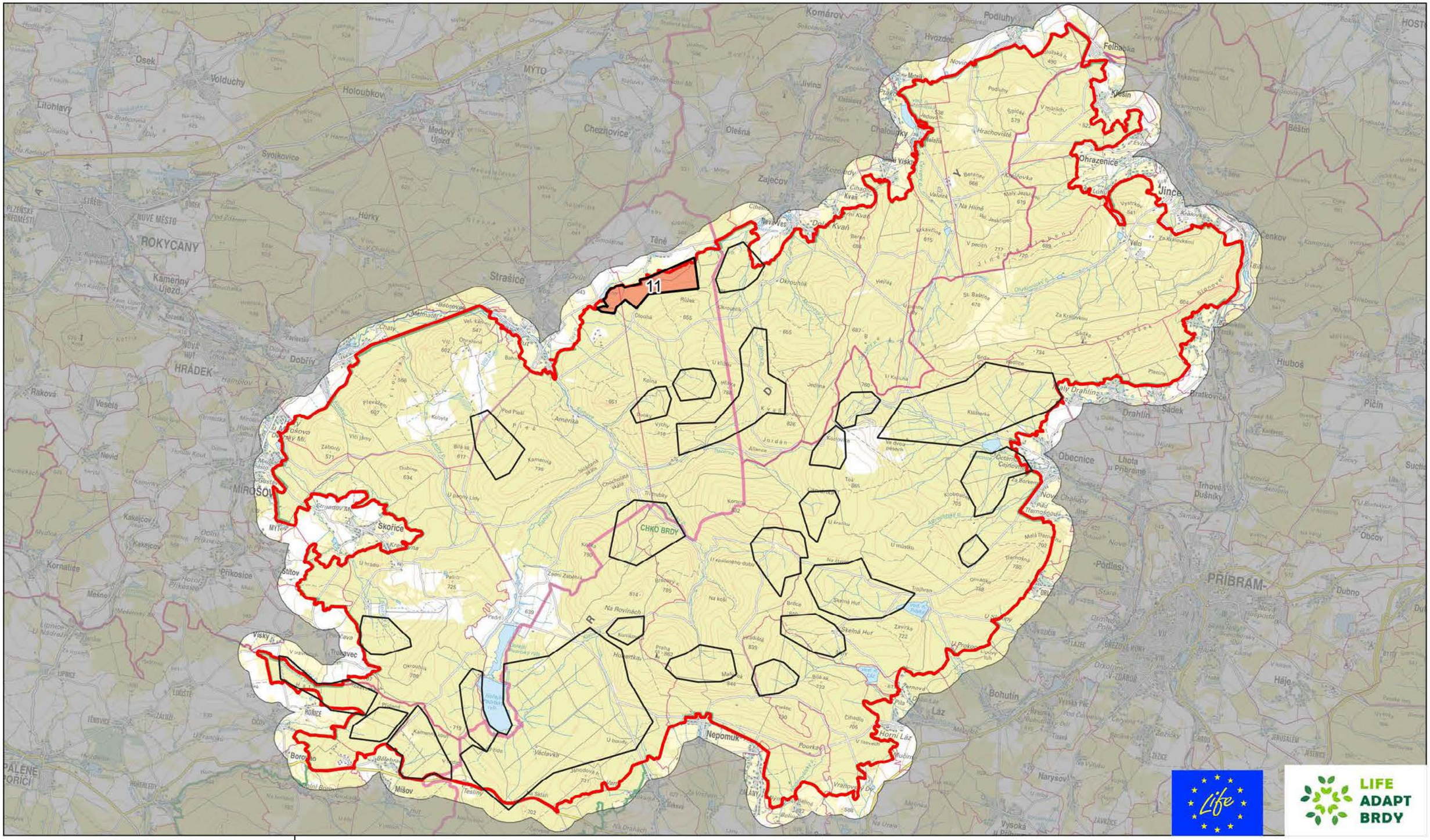
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:8 000
3.	Cadastral overview with the type of drainage lines	1:8 000
4.	Terrain morphology and the proposal concept	1:8 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

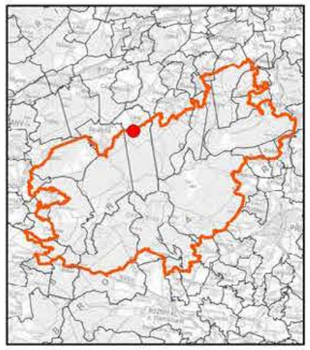
Zadavatel:

VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 11

Teně



Lokalita 11

Teně

Priorita **C**

Řešená lokalita

Odtokové linie

Zájmové území

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

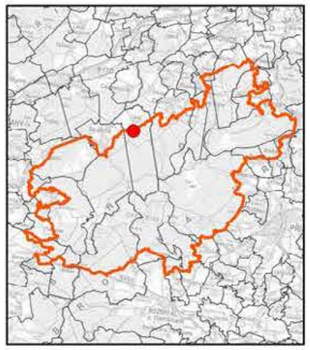
VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramenišť

Mapové výstupy jsou zpracovány na podkladu: Výškopisných dat DMR 5G, copyright © ČÚZK, MO ČR, MZe ČR, ZABAGED® copyright © ČÚZK, Základní mapy ČR 1:10 000 copyright © ČÚZK

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 11

Teně

Priorita **C**

Plzeňský kraj

ORP:
Rokycany - 559717

Obce:
Těně
Strašice

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:8 000
1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

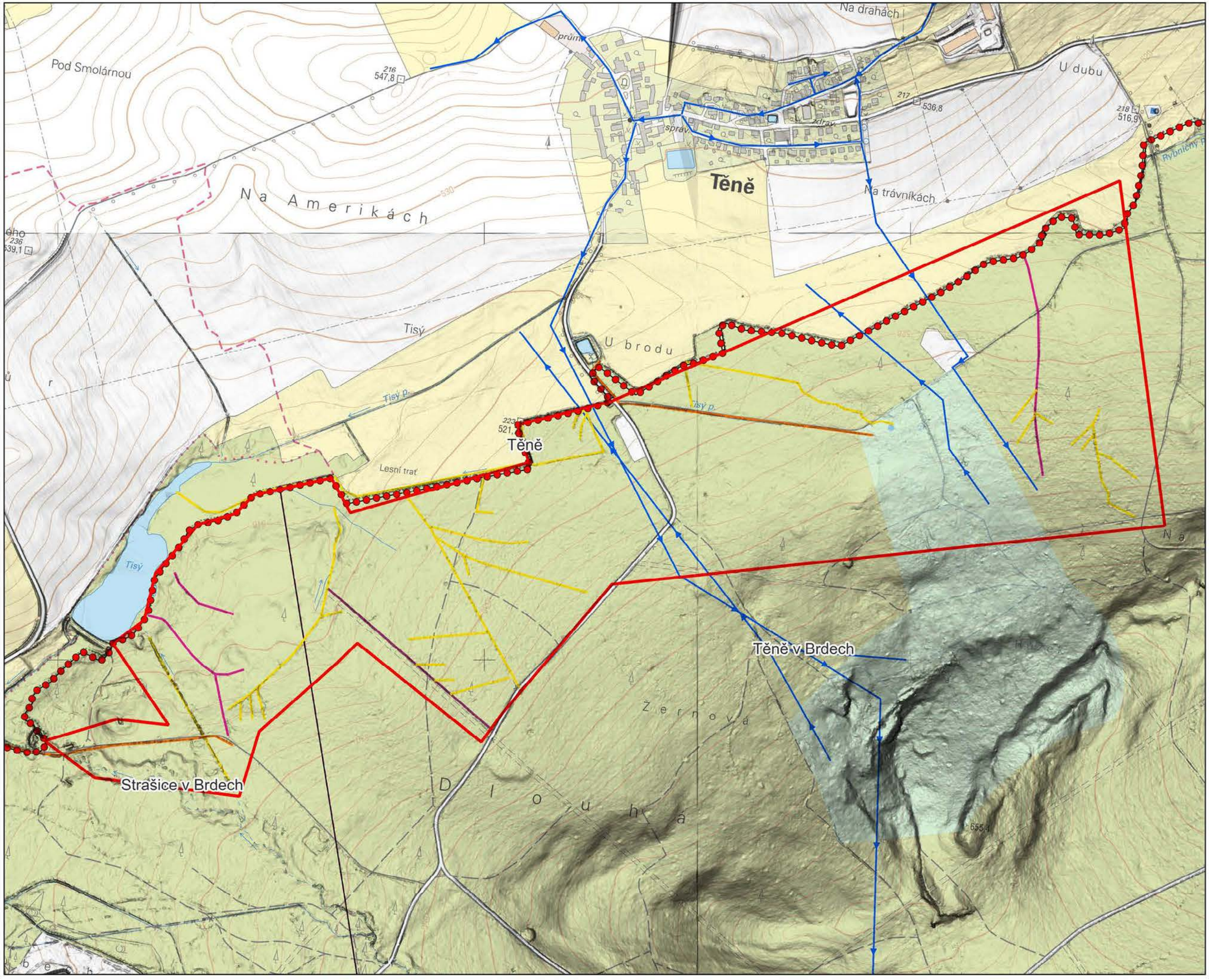
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

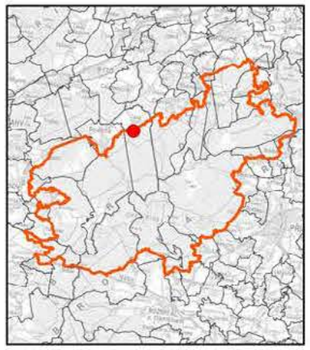
VRV

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace





Lokalita 11

Teně

Priorita **C**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramenitě

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.3.4. Site 13 – Dolíky

Site	Dolíky	Order No.	13
Region	Pilsen	Municipality with extended competence	Rokycany
Municipality	Teně, Strašice	Cadastral area	Teně in Brdy, Strašice in Brdy
Catchment area of IV. order	Klabava	Hydrological Order No.	1-11-01-010

Current state:

Site 13 is part of the cadastral area of Teně in Brdy and Strašice in Brdy, which are part of the villages of Teně a Strašice. In terms of administration, the villages of Teně and Strašice fall under the municipality of Rokycany (municipality with extended competence) in the Pilsen Region. The area is located in the II. and III. protection zone of Brdy PLA.

The site is located in the central part of the area of interest above the village of Strašice. It is a spring area of the right tributary of the Klabava River, which, along with other registered watercourses in the site, is managed by VLS.

The site extends on the western slope at an elevation of 605–690 m above sea level. As to runoff characteristics, it is a spring area of a small watercourse. The land reclamation interventions were carried out within the regulation of small tributaries, which involved their deepening and straightening. There are further effects on the runoff conditions on the roads and skidding lines.

At the time of the study, the site is forested with a relatively diverse species and age composition and presence of clear-cut areas. The habitat mapping identified areas of acidophilous beech forests (L5.4) and forest plantations of allochtonous coniferous trees (X9A).

In terms of forest typology, the site is mainly in vegetation zones 5 (fir-beech) and 6 (spruce-beech). The local target ecological series are stagnic and wet. Most of the area is covered by *Abietum piceosum variohumidum acidophilum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff, which will increase local infiltration. A further effect of the measures will be the reduction of deep erosion affecting small watercourses.

This mainly involves blocking of drainage ditches and channels in their non-original routes, and shallowing and opening the deepened streambed. These key measures will be complemented by measures relating to the road network, adjustment of the morphology of the terrain in the areas of transport lines with a connection to the natural stream valley or the original stream course.

Basic parameters of the proposal:

Total site area	64	ha
Total number of lines concerned	23	pcs
Total length of lines concerned	3,344	m
of which drainage of roads and roads	777	m
of which drainage ditches to be blocked	1,850	m
of which streambeds to be shallowed	717	m

Phasing:

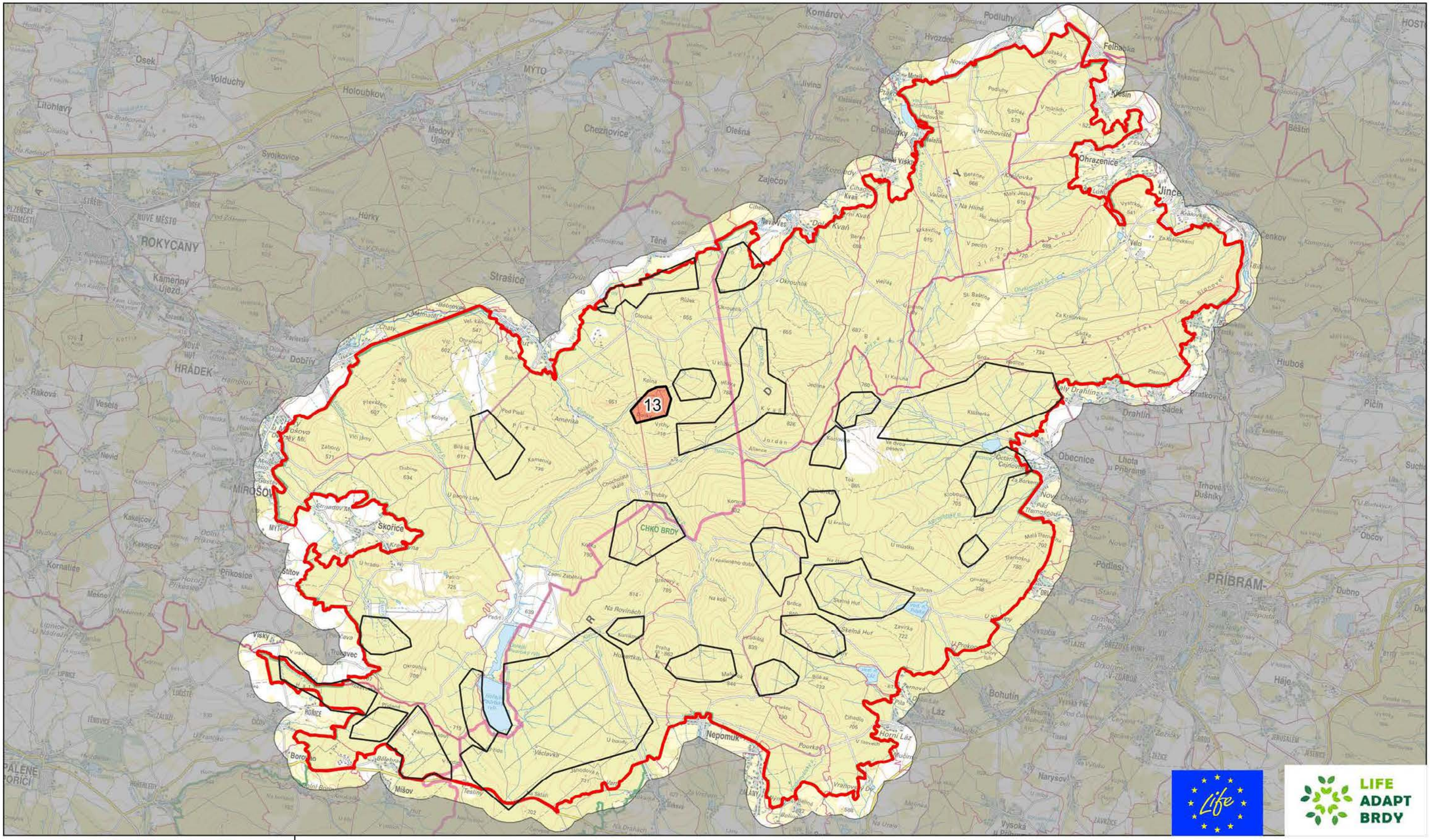
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:5 000
3.	Cadastral overview with the type of drainage lines	1:5 000
4.	Terrain morphology and the proposal concept	1:5 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



LIFE ADAPT BRDY

Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

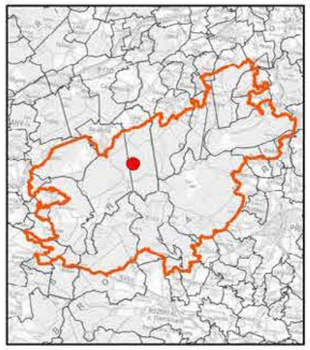
Zadavatel:

VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 13

Dolíky



Lokalita 13

Dolíky

Priorita **C**

Řešená lokalita

Odtokové linie

Zájmové území

1:5 000

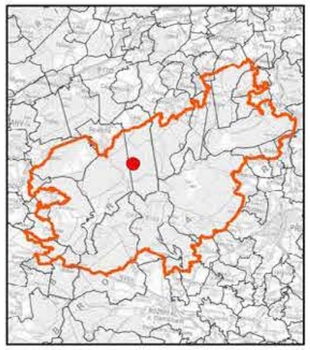
1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území prameniště

2. Situace lesních typů



Lokalita 13

Dolíky

Priorita **C**

Plzeňský kraj

ORP:
Rokycany - 559717

Obce:
Těně
Strašice

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:5 000
1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

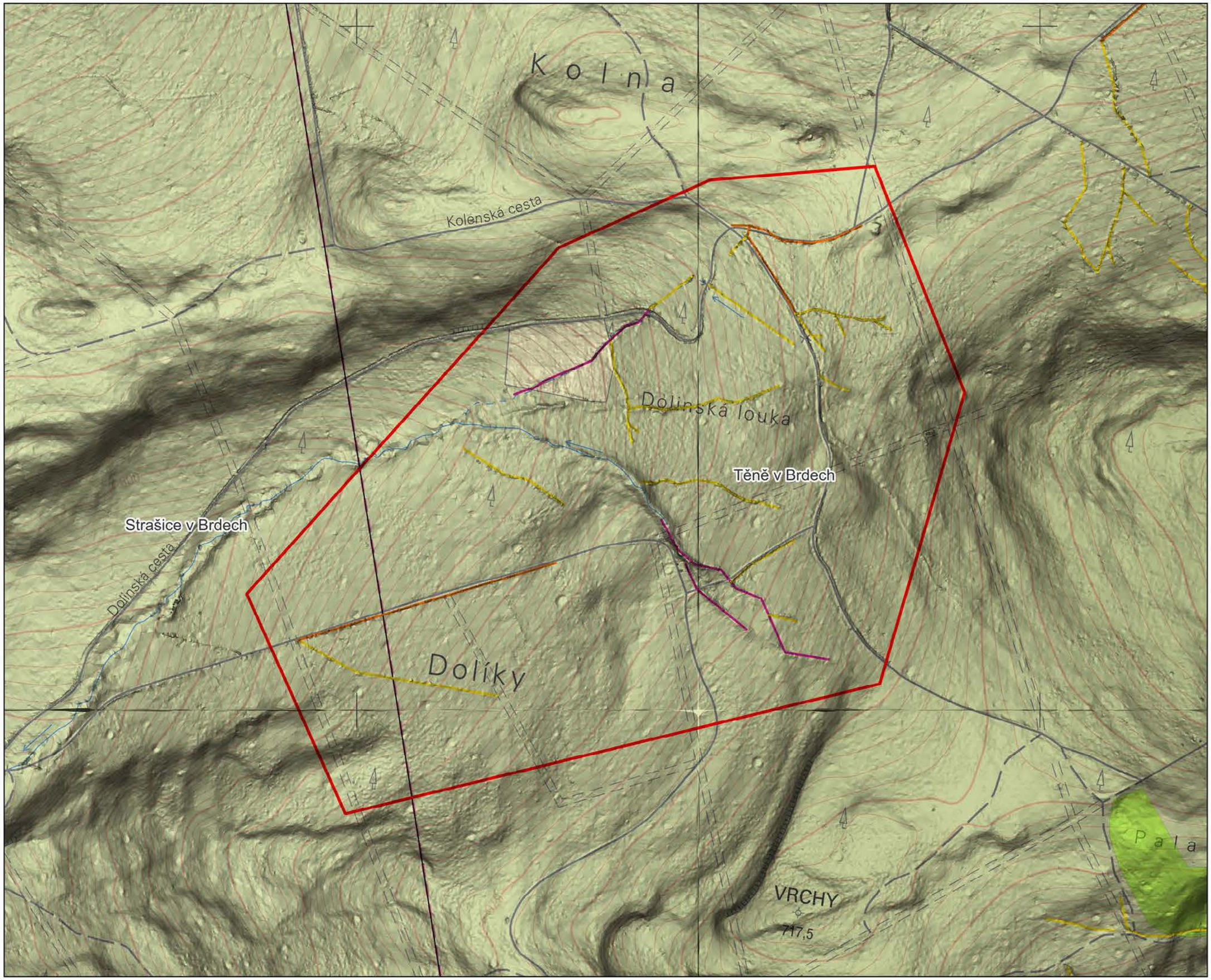
Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

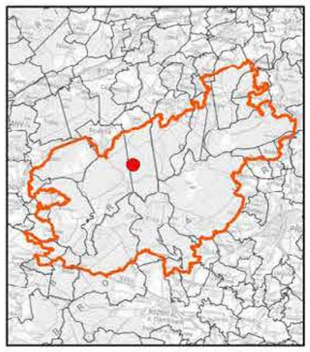
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramenitě

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace





Lokalita 13

Dolíky

Priorita **C**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.3.5. Site 14 - Spring area Hlava

Site	Spring area Hlava	Order No.	14
Region	Pilsen	Municipality with extended competence	Rokycany
Municipality	Teně	Cadastral area	Teně in Brdy
Catchment area of IV. order	Tisý potok Brook	Hydrological Order No.	1-11-01-011

Current state:

Site 14 is part of the cadastral area of Teně in Brdy, which is part of the village of Teně. In terms of administration, the village of Teně falls under the municipality of Rokycany (municipality with extended competence) in the Pilsen Region. The area is located in the III. protection zone of Brdy PLA.

The site is located in the central part of the area of interest above the village of Teně. It is a spring area of the left tributary of the Tisý potok Brook, which, along with other registered watercourses in the site, is managed by VLS.

The site extends on the western slope at an elevation of 655–740 m above sea level. As to runoff characteristics, it is a spring area of a small watercourse. The land reclamation interventions were carried out within the regulation of the channels, i.e. their deepening and straightening, as well as in the wider area of the basin. There are further effects on the runoff conditions on the roads and skidding lines.

At the time of the study, the site is forested mainly with spruce monocultures with significant presence of clear-cut areas. The habitat mapping identified mosaics of forest plantations of allochtonous coniferous trees (X9A), bog spruce forests (L9.2A), and waterlogged spruce forests (L9.2B).

In terms of forest typology, the site is mainly in vegetation zones 5 (fir-beech) and 6 (spruce-beech). The local target ecological series are stagnic and wet. Most of the area is covered by *Abietum piceosum variohumidum acidophilum*. *Abieto-Fagetum fraxinosum humidum* is determined along the valley line.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff, which will increase local infiltration. A further effect of the measures will be the reduction of deep erosion affecting small watercourses.

This mainly involves blocking drainage ditches, shallowing and opening up the modified streambed of the brook. These key measures will be complemented by measures relating to the road network, adjustment of the morphology of the terrain in the areas of transport lines with a connection to the natural stream valley or the original stream course. It is also recommended to review culverts and possibly install new ones where they cross the valley lines.

Basic parameters of the proposal:

Total site area	73	ha
Total number of lines concerned	17	pcs
Total length of lines concerned	2,450	m
of which drainage of roads and roads	206	m
of which drainage ditches to be blocked	2,245	m

Phasing:

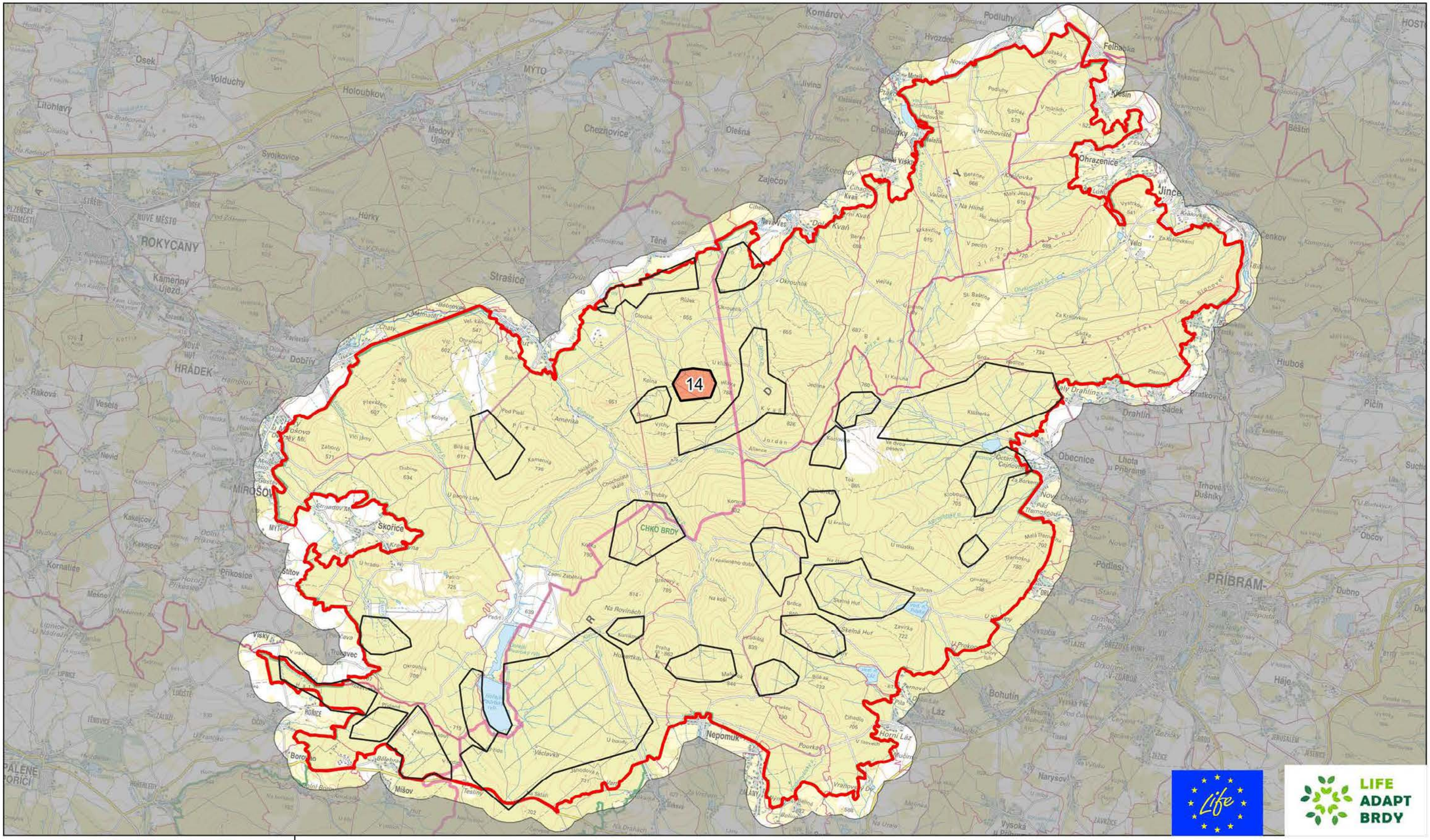
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:5 000
3.	Cadastral overview with the type of drainage lines	1:5 000
4.	Terrain morphology and the proposal concept	1:5 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

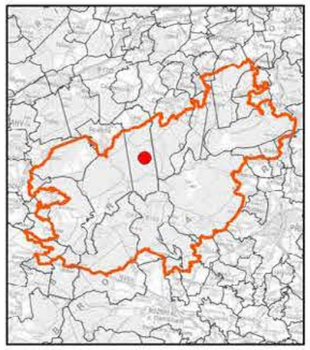
Zadavatel:

VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 14

Prameniště Hlava



Lokalita 14

Prameniště Hlava

Priorita **C**

Řešená lokalita

Odtokové linie

Zájmové území

1:5 000

1 cm = 50 m

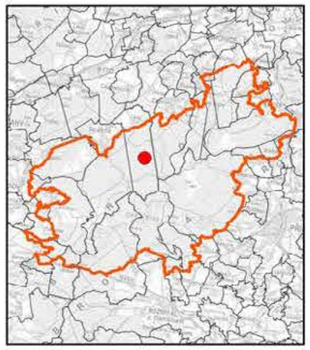
souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramenišť

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 14

Prameniště Hlava

Priorita **C**

Plzeňský kraj

ORP:
Rokycany - 559717

Obce:
Těně

Řešená lokalita

Stávající odtokové linie

- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:

- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území

Katastrální území

1:5 000

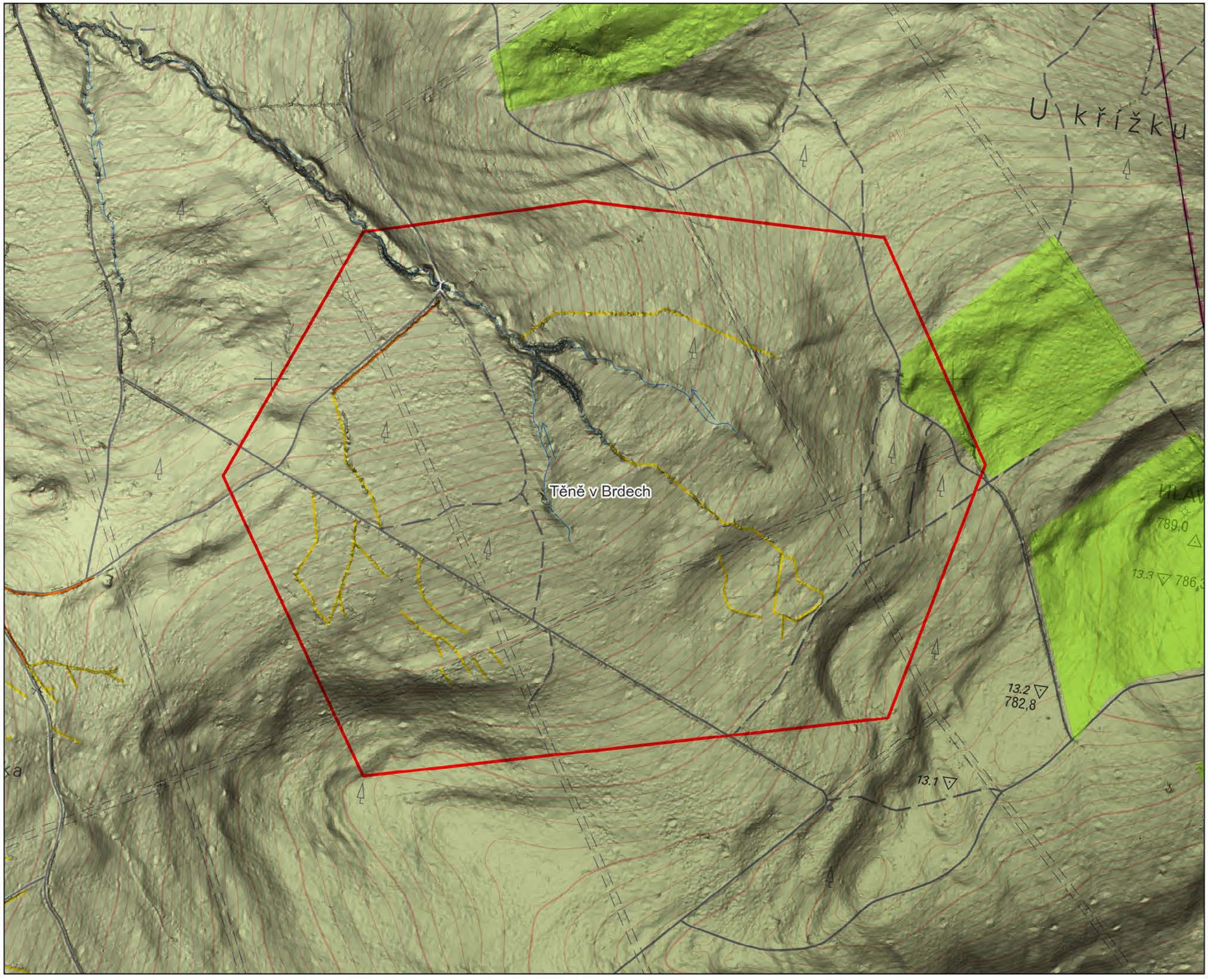
1 cm = 50 m

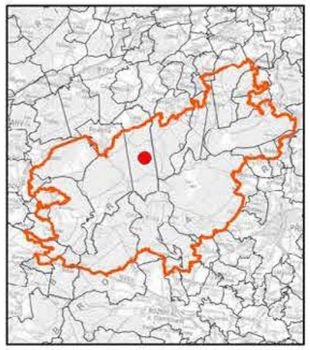
souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

3. Typ odtokové linie na katastrální situace





Lokalita 14

Prameniště Hlava

Priorita **C**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.3.6. Site 15 - Suchá seč and Jalový potok Brook

Site	Suchá seč and Jalový potok Brook	Order No.	15
Region	Central Bohemian	Municipality with extended competence	Hořovice
Municipality	Zaječov	Cadastral area	Zaječov in Brdy
Catchment area of IV. order	Jalový potok Brook	Hydrological Order No.	1-11-04-027

Current state:

Site 15 is part of the cadastral area of Zaječov in Brdy, which is part of the village of Zaječov. In terms of administration, the village of Zaječov falls under the municipality of Hořovice (municipality with extended competence) in the Central Bohemian Region. The area is located in the II. and III. protection zone of Brdy PLA.

The site is located on the northern boundary of the area of interest above the settlement of Nová Ves. It is a valley of the Jalový potok Brook and its left tributary, which, along with other registered watercourses in the site, is managed by VLS.

The site extends over a relatively flat area at an elevation of 495–550 m above sea level. As to runoff characteristics, it is an alluvial plain and areas with small watercourses. The land reclamation interventions were carried out within the regulation of small tributaries, i.e. their deepening and straightening, as well as within the alluvial plain of the Jalový potok Brook. There are further effects on the runoff conditions on the roads and skidding lines.

At the time of the study, the site is forested mainly with spruce monocultures with significant presence of clear-cut areas. The habitat mapping did not identify any significant areas here.

In terms of forest typology, the site is in vegetation zones 4 (beech) and 5 (fir-beech). The local target ecological series are stagnic and wet, such as *Querceto-Abietum variohumidum trophicum*, *Querceto-Abietum variohumidum acidophilum*, and *Querceto-Abietum variohumidum oligotrophicum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in watercourses in the site. The aim is to make use of the retention potential of the soil horizon in the spring area and floodplain of the Jalový potok Brook, and slow down the surface runoff, which will increase local infiltration. A further effect of the measures will be the reduction of deep erosion affecting small watercourses.

This mainly consists of blocking drainage ditches and channels in their non-natural routes, shallowing and opening up of the modified streambed of the brook. These key measures will be complemented by measures relating to the road network, adjustment of the morphology of the terrain in the areas of transport lines with a connection to the natural stream valley or the original stream course. It is also recommended to review culverts and possibly install new ones where they cross the valley lines to reduce the load on ditches along the road.

Basic parameters of the proposal:

Total site area	105	ha
Total number of lines concerned	30	pcs
Total length of lines concerned	4,844	m
of which drainage of roads and roads	1,020	m
of which drainage ditches to be blocked	3,824	m

Phasing:

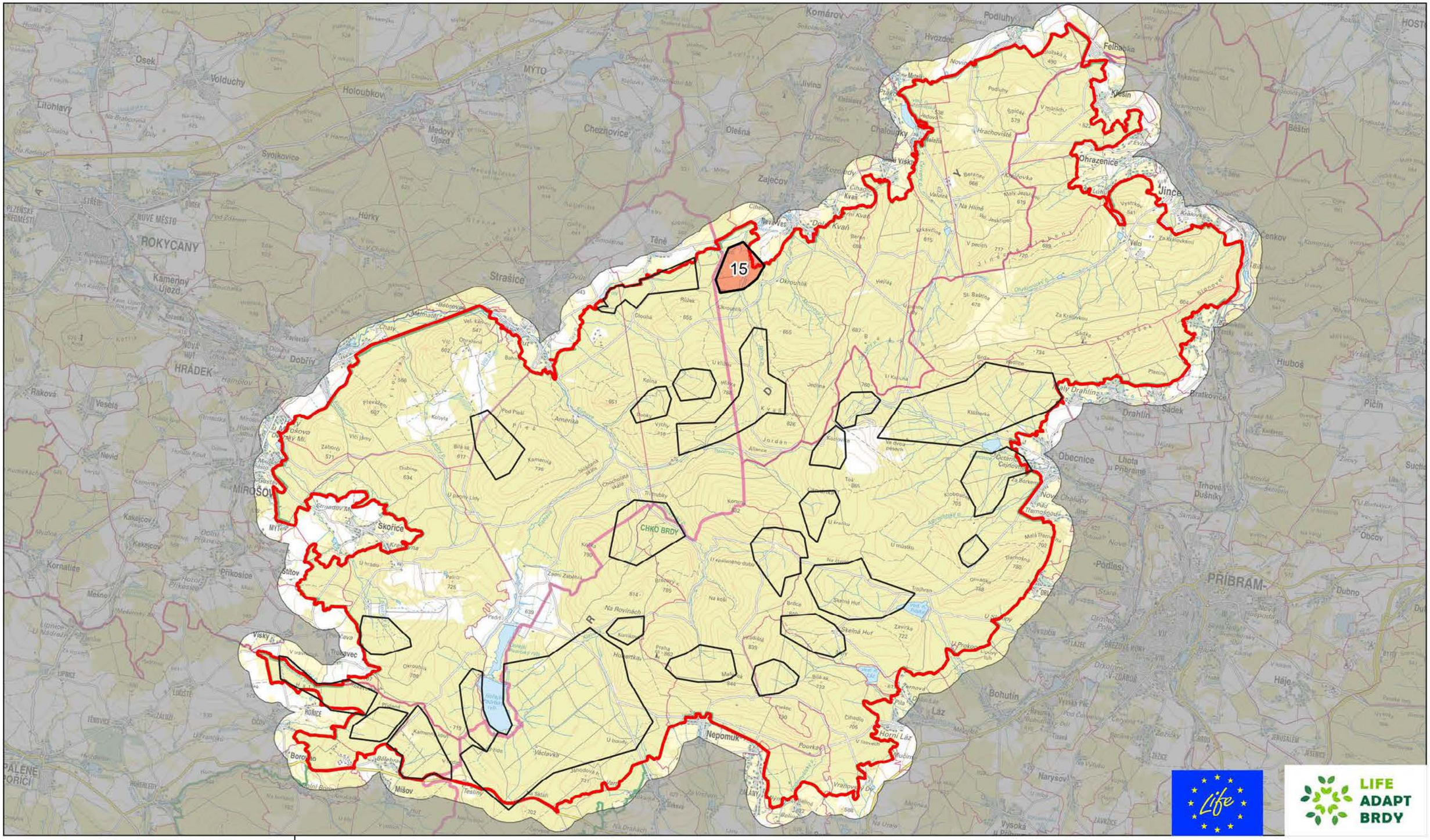
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:5 000
3.	Cadastral overview with the type of drainage lines	1:5 000
4.	Terrain morphology and the proposal concept	1:5 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

Zadavatel:

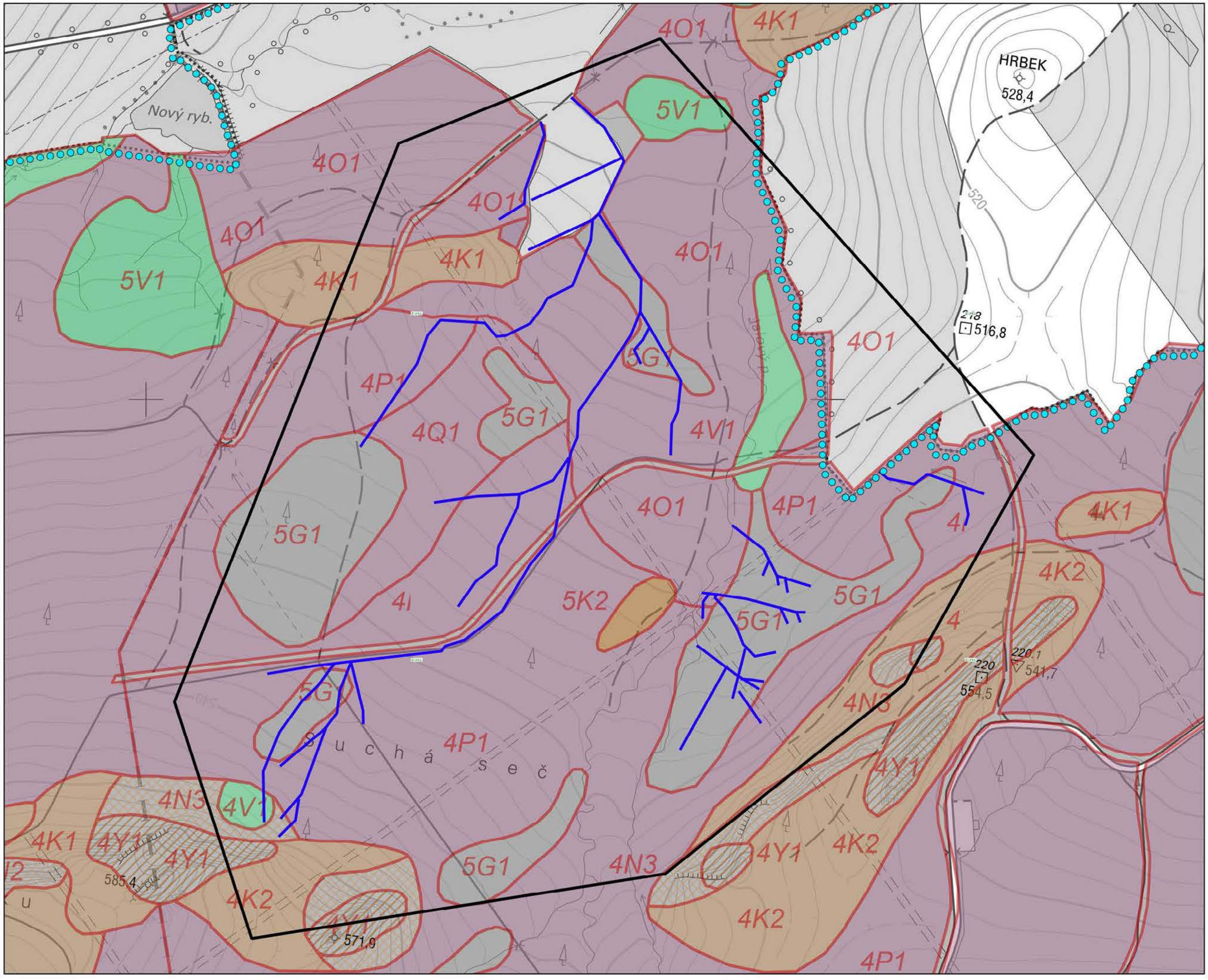
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

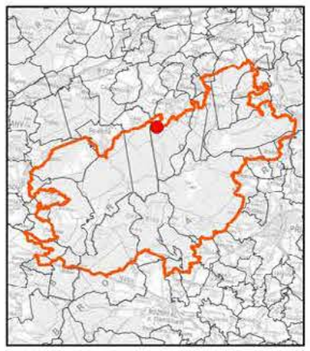
Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 15

Suchá seč a Jalový potok

LIFE ADAPT BRDY





Lokalita 15

Suchá seč a Jalový potok

Priorita **C**

Řešená lokalita

Odtokové linie

Zájmové území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

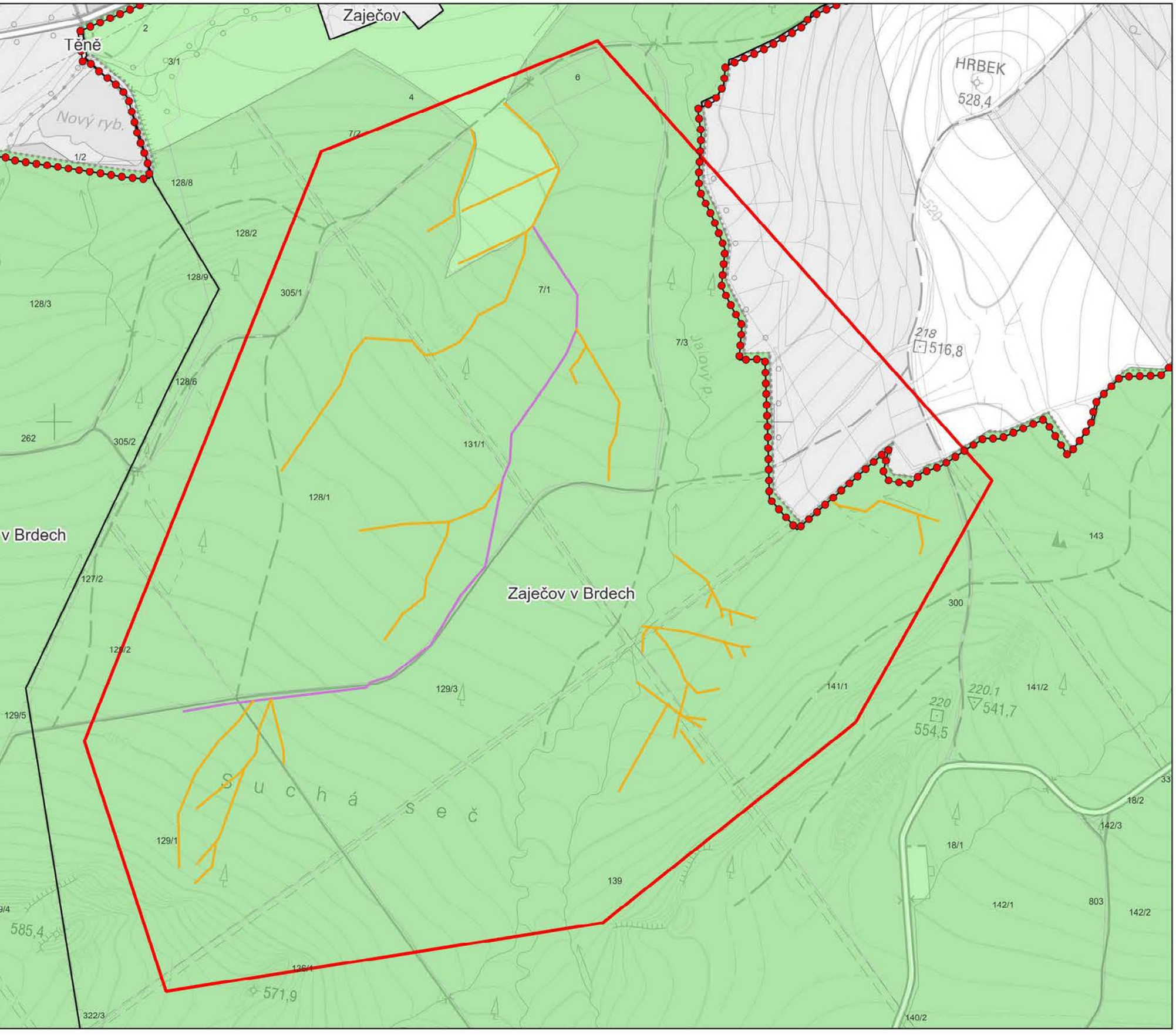
Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

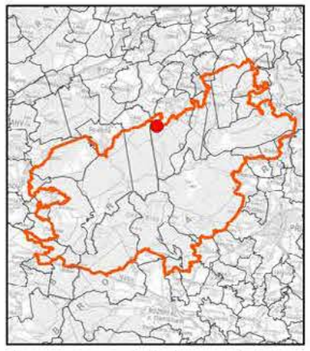
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramenišť

LIFE ADAPT BRDY

2. Situace lesních typů





Lokalita 15

Suchá seč a Jalový potok

Priorita **C**

Středočeský kraj

ORP:
Hořovice - 531189

Obce:
Zaječov

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:5 000
1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

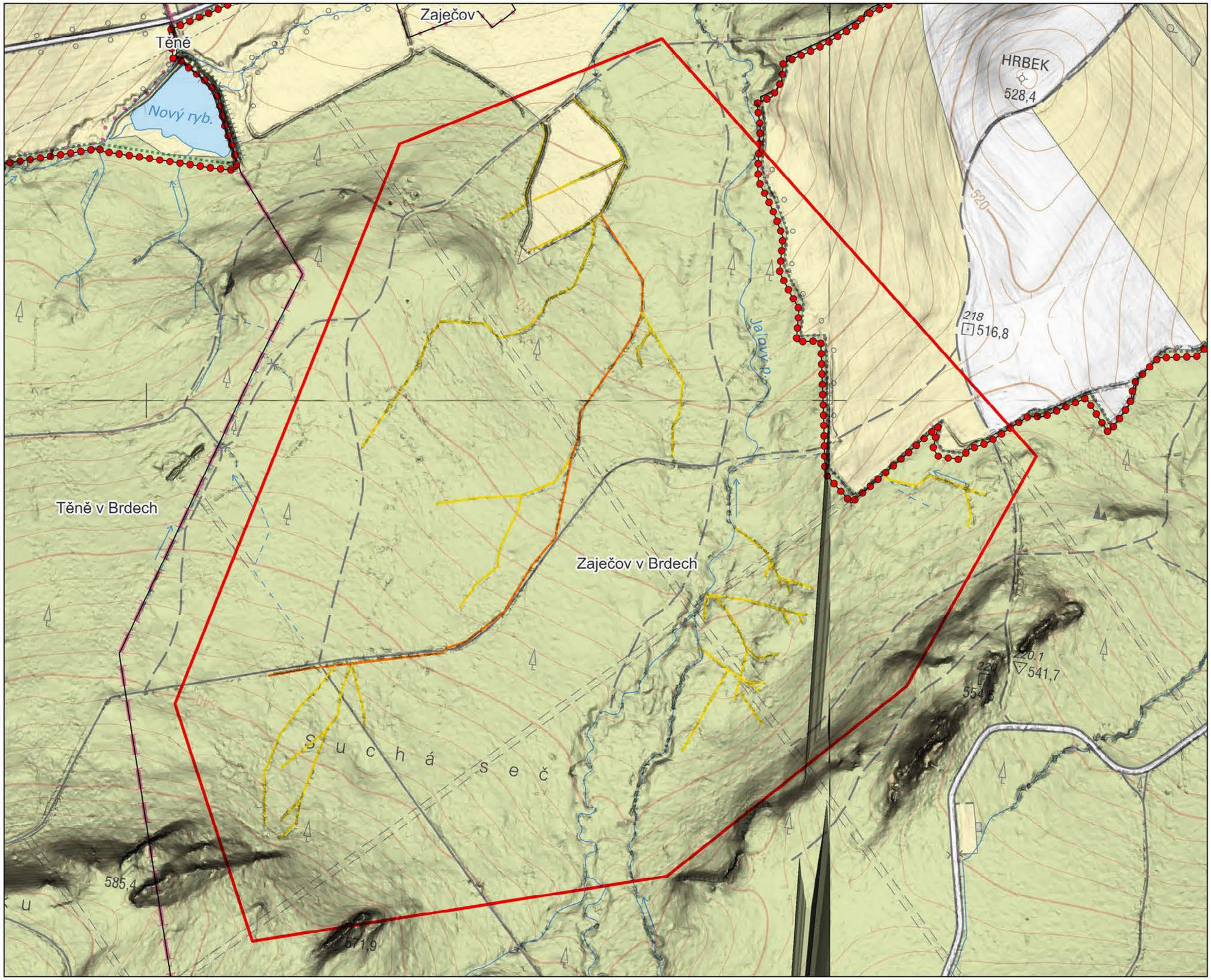
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

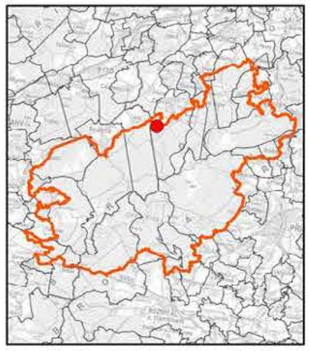
VRV

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace





Lokalita 15

Suchá seč a Jalový potok

Priorita **C**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramoniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.3.7. Site 16 - Pod Kloboučkem

Site	Pod Kloboučkem	Order No.	16
Region	Central Bohemian	Municipality with extended competence	Příbram
Municipality	Obecnice	Cadastral area	Obecnice in Brdy
Catchment area of IV. order	Obecnický potok Brook	Hydrological Order No.	1-11-04-004

Current state:

Site 16 is part of the cadastral area of Obecnice in Brdy, which is part of the village of Obecnice. In terms of administration, the village of Obecnice falls under the municipality of Příbram (municipality with extended competence) in the Central Bohemian Region. The area is located in the II. and III. protection zone of Brdy PLA and in the protection zone of the Obecnice water reservoir.

The site is on the eastern boundary of the area of interest above the village of Obecnice. Here, small watercourses managed by VLS will be subject to the proposed measures. The site is crossed by a historical artificial water channel that conveys water between the Albrechtický potok and Obecnický potok brooks, which is managed by Povodí Vltavy (Vltava River basin administration).

The site extends over a relatively flat area at an elevation of 560–605 m above sea level. As to runoff characteristics, these are moderate slopes with small watercourses and springs, with the occurrence of tourist attractive spring wells. The reclamation interventions in the watercourses are not substantial. Nevertheless, the runoff conditions are also affected by roads and skidding lines in the site.

At the time of the study, the site is forested mainly with spruce monocultures with significant presence of clear-cut areas. The habitat mapping did not identify any significant areas here. Forest springs without tufa formation (R1.4) have been identified in the upper part of the site.

In terms of forest typology, the site is in vegetation zones 4 (beech) and 5 (fir-beech). The local target ecological series are stagnic and wet, such as *Querceto-Abietum variohumidum acidophilum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff, which will increase local infiltration. A further effect of the measures will be the reduction of deep erosion affecting small watercourses.

The measures will mainly involve blocking of the drainage ditches. These key measures will be complemented by measures relating to the road network, adjustment of the morphology of the terrain in the areas of transport lines with a connection to the natural stream valley or the original stream course. It is also recommended to review culverts and possibly install new ones where they cross the valley lines to reduce the load on ditches along the roads.

Possible installation of structures for water control along the channel is subject to the discussion with the respective administrative body. These would include, for example, controllable gated structures to tackle the periods of drought.

Basic parameters of the proposal:

Total site area	179	ha
Total number of lines concerned	6,869	pcs
Total length of lines concerned	12	m
of which drainage of roads and roads	2,371	m
of which drainage ditches to be blocked	2,919	m
of which natural streams with no intervention	1,579	m

Phasing:

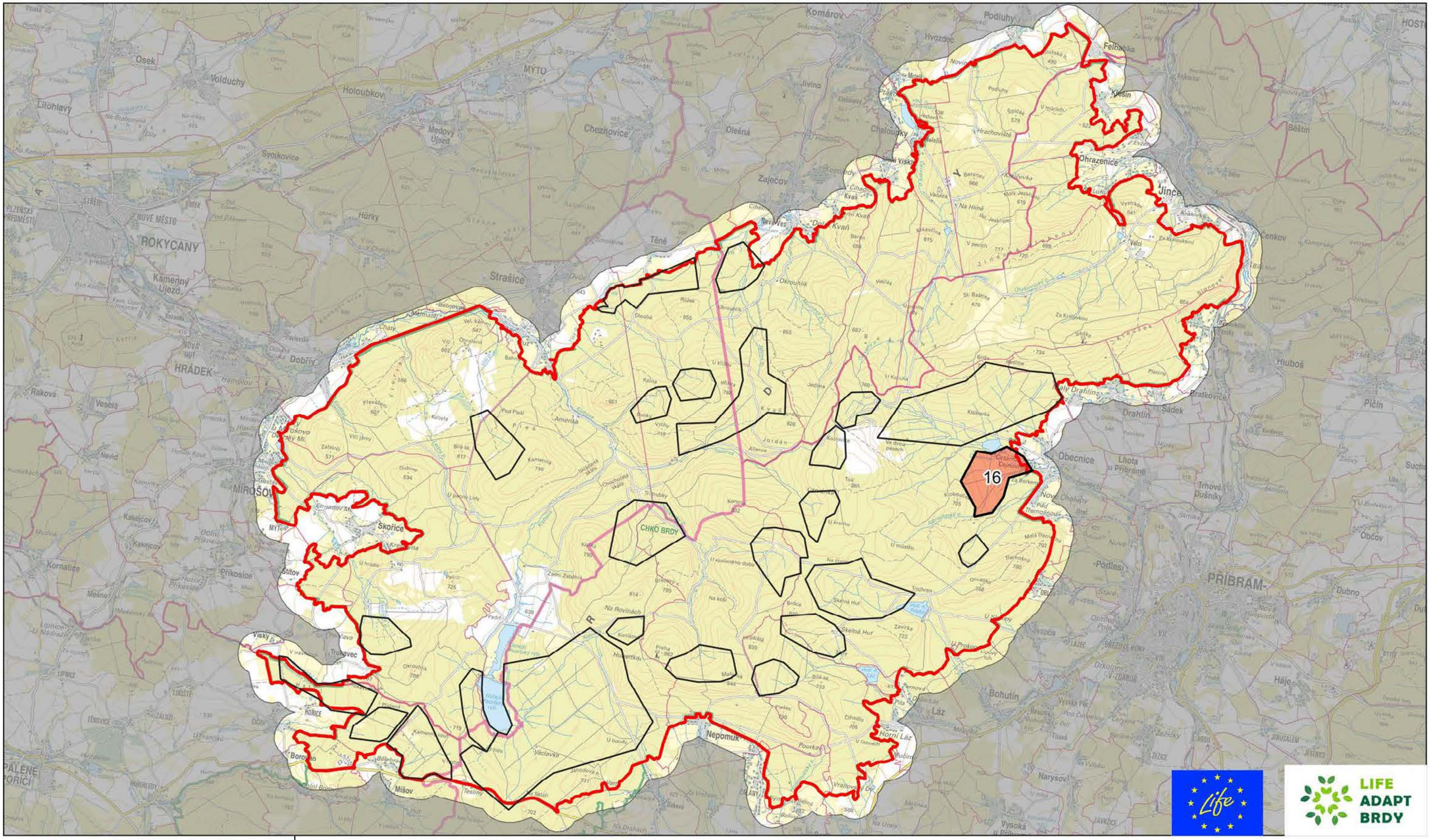
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:7 000
3.	Cadastral overview with the type of drainage lines	1:7 000
4.	Terrain morphology and the proposal concept	1:7 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

Zadavatel:

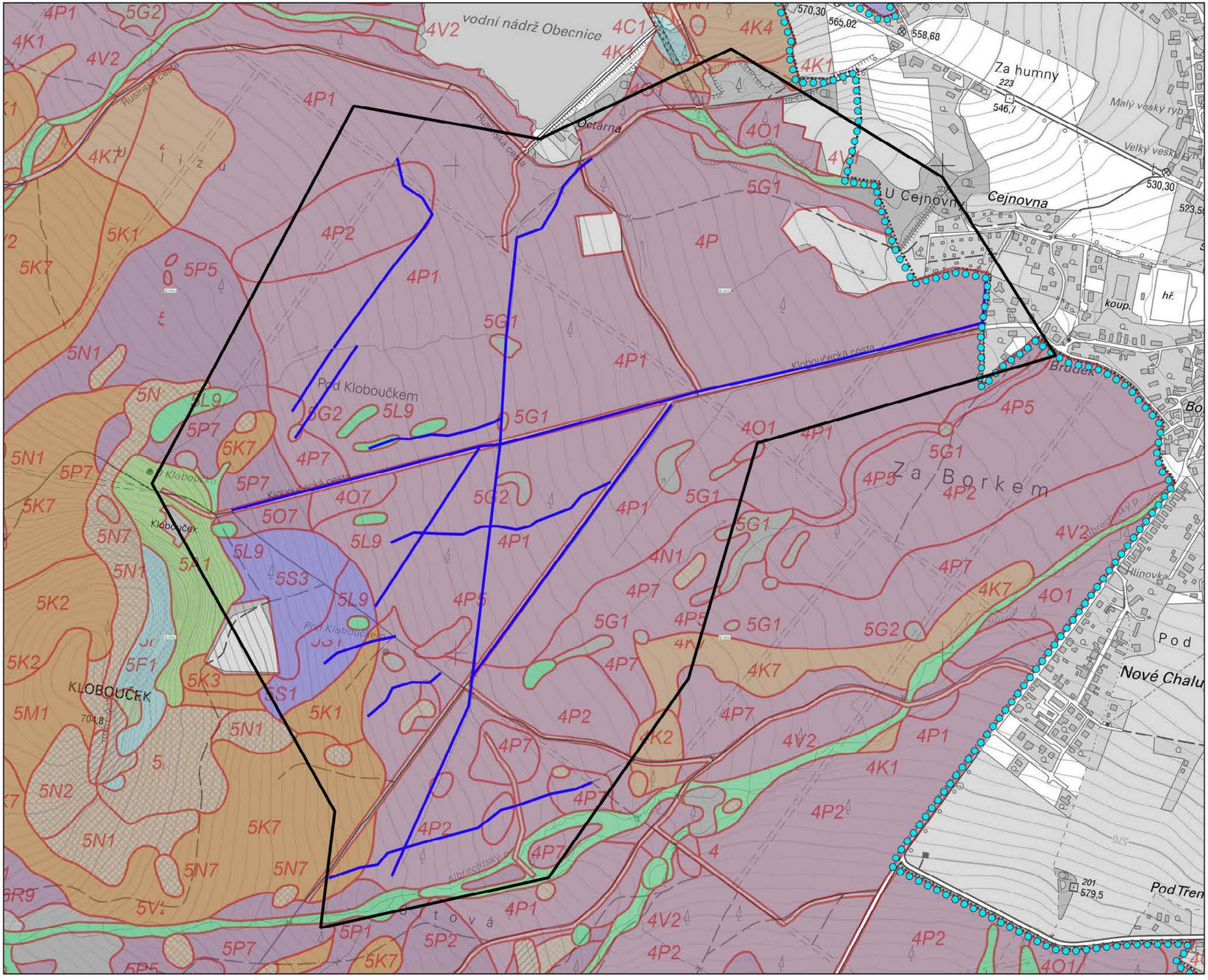
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

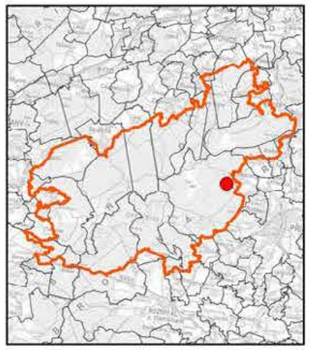
Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 16

Pod Kloboučkem

LIFE ADAPT BRDY





Lokalita 16

Pod Kloboučkem

Priorita **C**

- Řešená lokalita
- Odtokové linie
- Zájmové území

1:7 000

1 cm = 70 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

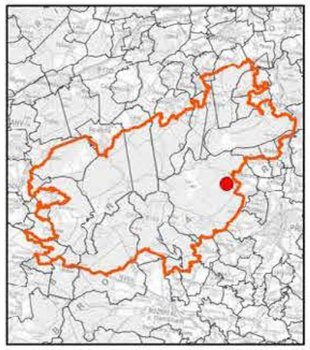
Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramenišť

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 16

Pod Kloboučkem

Priorita **C**

Středočeský kraj

ORP:
Příbram - 539911

Obce:
Obecnice

Řešená lokalita

Stávající odtokové linie

- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:

- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území

Katastrální území

1:7 000

1 cm = 70 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

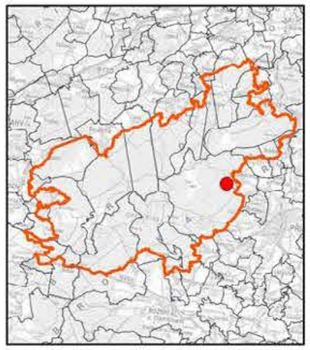
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramenitě

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace



Lokalita 16

Pod Kloboučkem

Priorita **C**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:7 000

1 cm = 70 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

4. Morfologie terénu s konceptem návrhu

3.3.8. Site 19 - Skelná huť

Site	Skelná huť	Order No.	19
Region	Central Bohemian	Municipality with extended competence	Příbram
Municipality	Obecnice	Cadastral area	Obecnice in Brdy
Catchment area of IV. order	Litavka	Hydrological Order No.	1-11-04-001

Current state:

Site 19 is part of the cadastral area of Obecnice in Brdy, which is part of the village of Obecnice. In terms of administration, the village of Obecnice falls under the municipality of Příbram (municipality with extended competence) in the Central Bohemian Region. The area is located in the II. and III. protection zone of Brdy PLA and in the protection zone of the Láz water reservoir.

The site is on the eastern boundary of the area of interest above the village of Obecnice. Here, small watercourses and left tributaries of the Litavka River managed by VLS will be subject to the proposed measures.

The site extends over a relatively flat area at an elevation of 670–790 m above sea level. As to runoff characteristics, these are southern slopes with small watercourses. The land reclamation interventions were carried out mainly as part of the regulation of small tributaries, which involved their deepening and straightening. There are further effects on the runoff conditions on the roads and skidding lines.

At the time of the study, the site is mainly covered by younger forest stands and a meadow enclave around the Skelná Hut junction. In the non-forest area, the habitat mapping has identified Intermittently wet *Molinia* meadows (T1.9), Wet *Cirsium* meadows (T1.5) and other meadow biotopes. No continuous mapping has been carried out in the forest areas. Only partial areas of Waterlogged spruce forests (L9.2B) have been determined.

In terms of forest typology, the site is mainly in vegetation zones from 5 (fir-beech) to 7 (beech-spruce). The local target ecological series are stagnic and wet, as well as ash, such as *Abietum piceosum variohumidum acidophilum*, *Abieto-Fagetum fraxinosum humidum*, etc.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the area and slow down the surface runoff, which will increase local infiltration. A further effect of the measures will be the reduction of deep erosion affecting small watercourses.

This mainly consists of blocking drainage ditches and channels in their non-natural routes and revitalizing the modified streambed of the brook. It is also recommended to review culverts and possibly install new ones where they cross the valley lines to reduce the load on ditches along the road.

Basic parameters of the proposal:

Total site area	128	ha
Total number of lines concerned	36	pcs
Total length of lines concerned	6,688	m
of which drainage of roads and roads	475	m
of which drainage ditches to be blocked	3,873	m
of which streams to be revitalized or opened	2,339	m

Phasing:

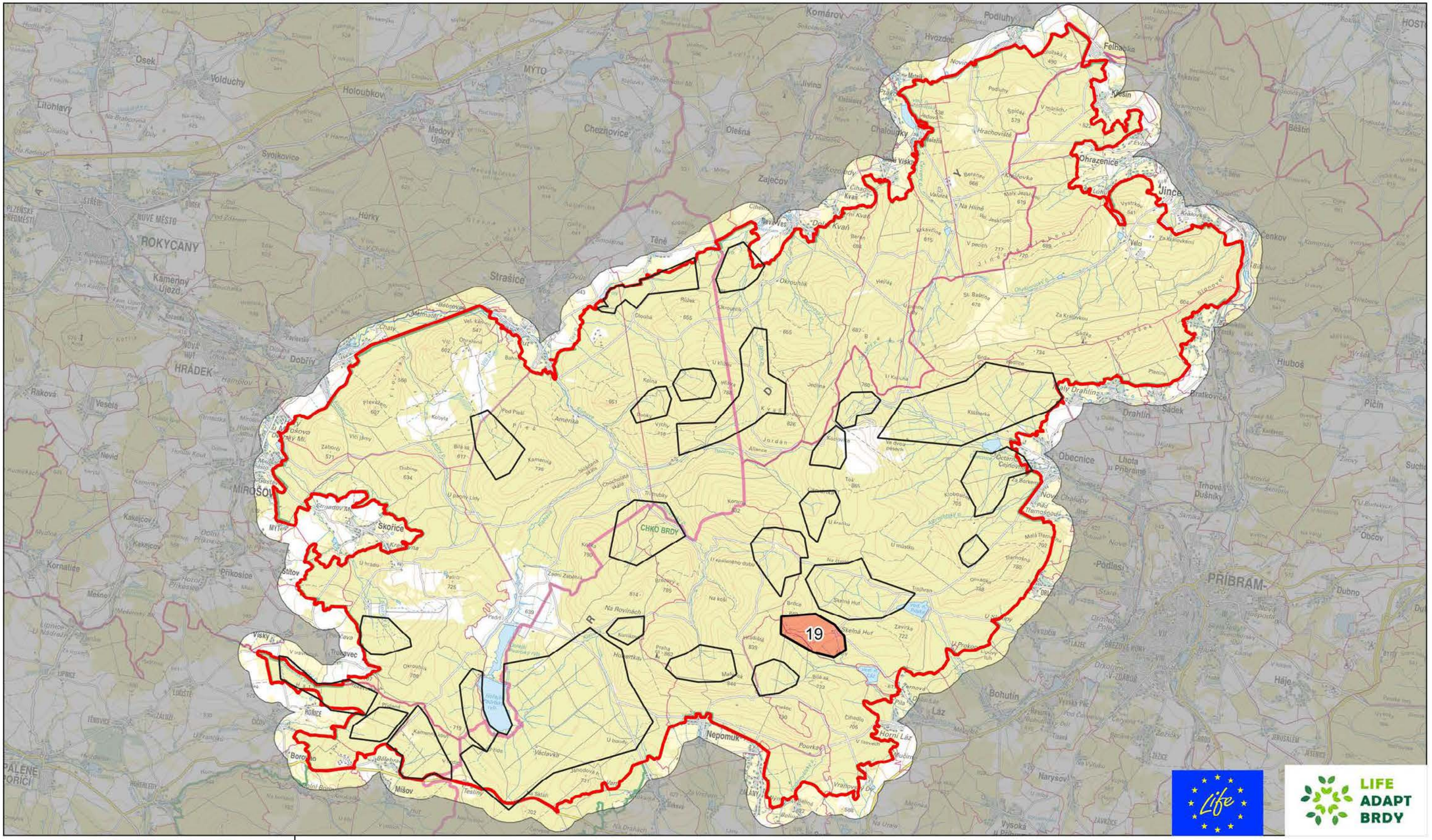
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:5 000
3.	Cadastral overview with the type of drainage lines	1:5 000
4.	Terrain morphology and the proposal concept	1:5 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

Zadavatel:

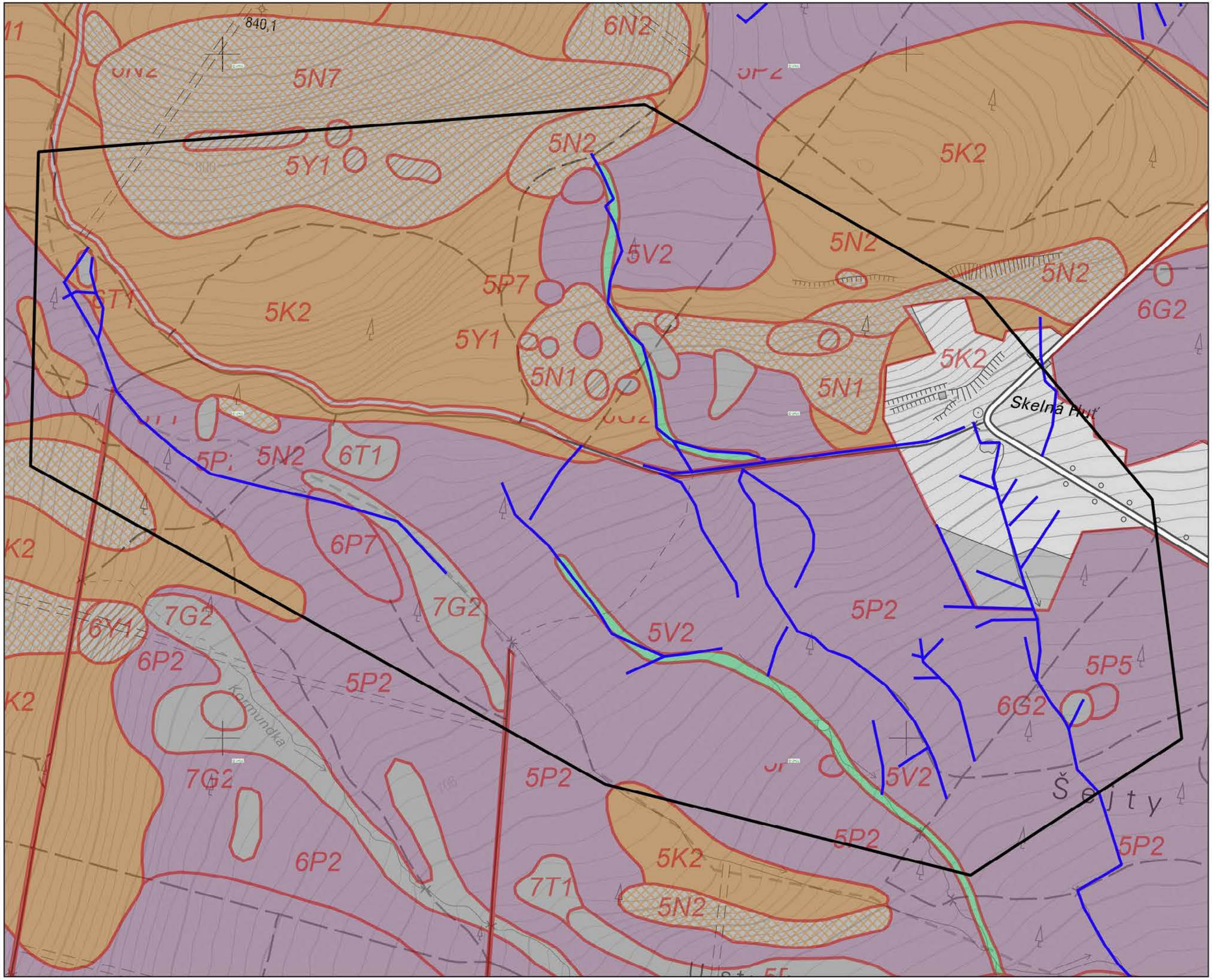
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

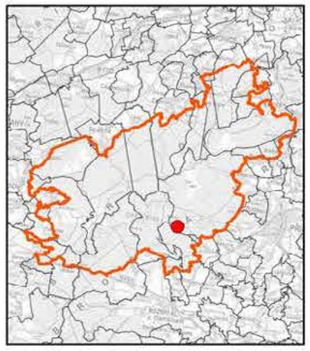
Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 19

Skelná huť

LIFE ADAPT BRDY





Lokalita 19

Skelná huť

Priorita **C**

Řešená lokalita

Odtokové linie

Zájmové území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

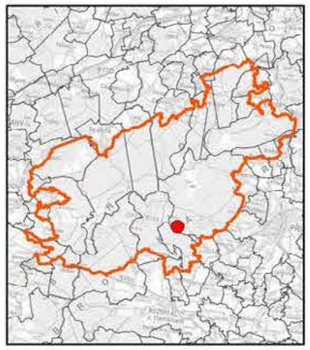
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 19

Skelná huť

Priorita **C**

Středočeský kraj

ORP:
Příbram - 539911

Obce:
Obecnice
Vranovice
Nepomuk

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:5 000
1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace

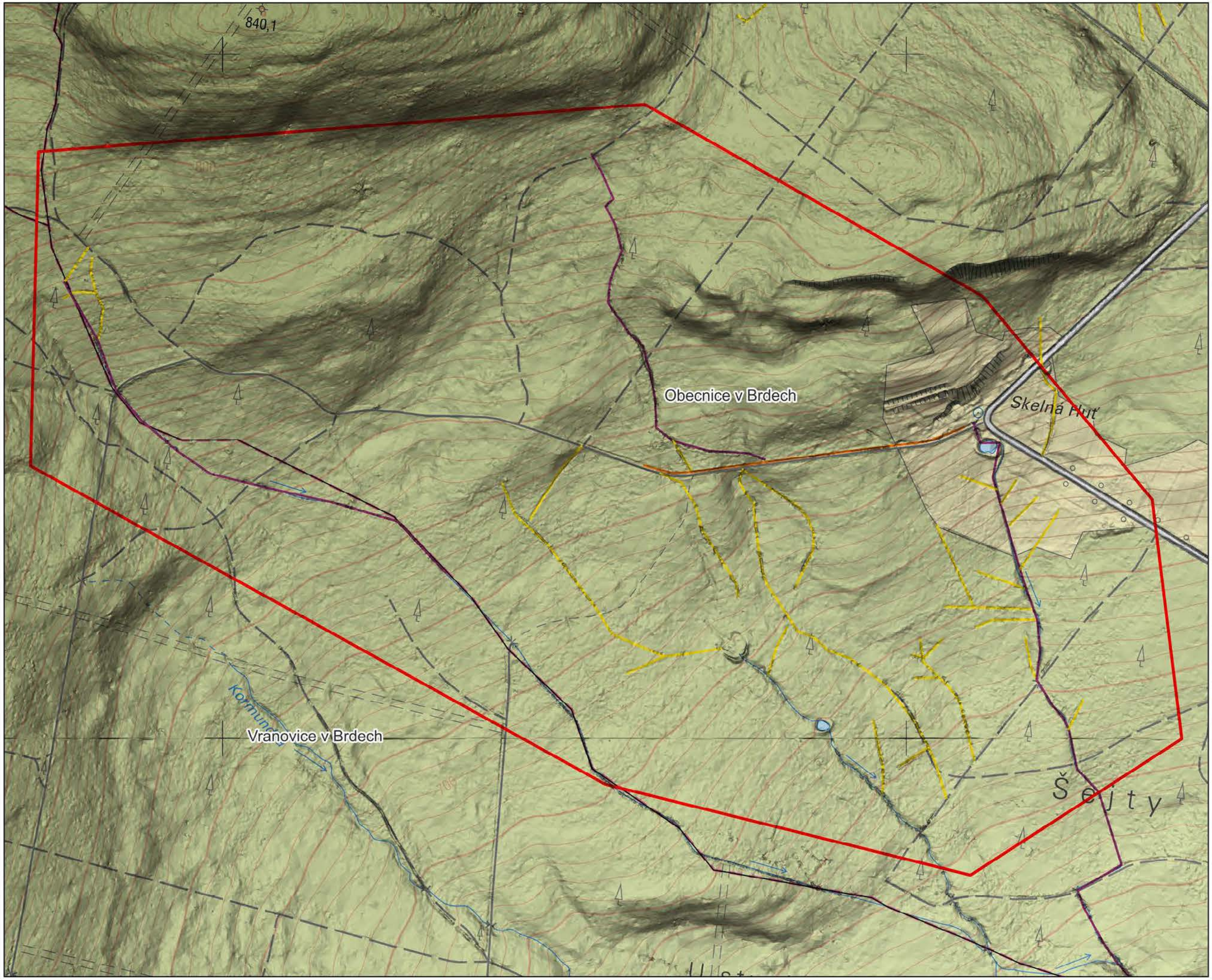
Obecnice v Brdech

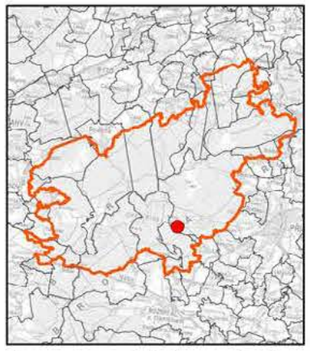
Vranovice v Brdech

Skelná Huť

Šejty

840,1





Lokalita 19

Skelná huť

Priorita **C**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.3.9. Site 21 – Kolvín

Site	Kolvín	Order No.	21
Region	Pilsen	Municipality with extended competence	Rokycany
Municipality	Skořice	Cadastral area	Skořice in Brdy
Catchment area of IV. order	Skořický potok Brook	Hydrological Order No.	1-11-01-017

Current state:

Site 21 is part of the cadastral area of Skořice in Brdy, which is part of the village of Skořice. In terms of administration, the village of Skořice falls under the municipality of Rokycany (municipality with extended competence) in the Pilsen Region. The area is located in the II. and III. protection zone of Brdy PLA and in the protection zone of the Janov water reservoir.

The site is located on the western boundary of the area of interest near the Kolvín shooting range. Heavily modified small watercourses under VLS management are found in the site.

The site extends over a relatively flat area at an elevation of 575–620 m above sea level. As to runoff characteristics, these are northern slopes with small watercourses. The land reclamation interventions were carried out mainly as part of the regulation of small tributaries, which involved their deepening and straightening. There are further effects on the runoff conditions on the roads and skidding lines.

At the time of the study, the site is forested by mixed forests of varied age and covered by meadow enclaves. In the non-forest area, the habitat mapping has identified Intermittently wet *Molinia* meadows (T1.9), Wet *Cirsium* meadows (T1.5) and other meadow biotopes. No continuous mapping has been carried out in the forest areas. Only partial areas of Ash-alder alluvial forests (L2.2) have been determined.

In terms of forest typology, the site is in the vegetation zones from 3 (oak-beech) to 5 (fir-beech). The local target ecological series are stagnic and wet, as well as ash, such as *Fraxineto-Alnetum alluviale*, *Querceto-Abietum variohumidum trophicum*, etc.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the soil horizon in the area and slow down the surface runoff, which will increase local infiltration. A further effect of the measures will be the connection of the channels of the streams with the adjacent floodplain and the restoration of conditions for the development of alluvial habitats.

This mainly involves blocking of drainage ditches and channels in their non-original routes, shallowing and opening the modified streambeds of small watercourses.

Basic parameters of the proposal:

Total site area		ha
Total number of lines concerned	18	pcs
Total length of lines concerned	3,932	m
of which drainage ditches to be blocked	1,050	m
of which streambeds to be shallowed	349	m
of which streams to be revitalized or opened	2,533	m

Phasing:

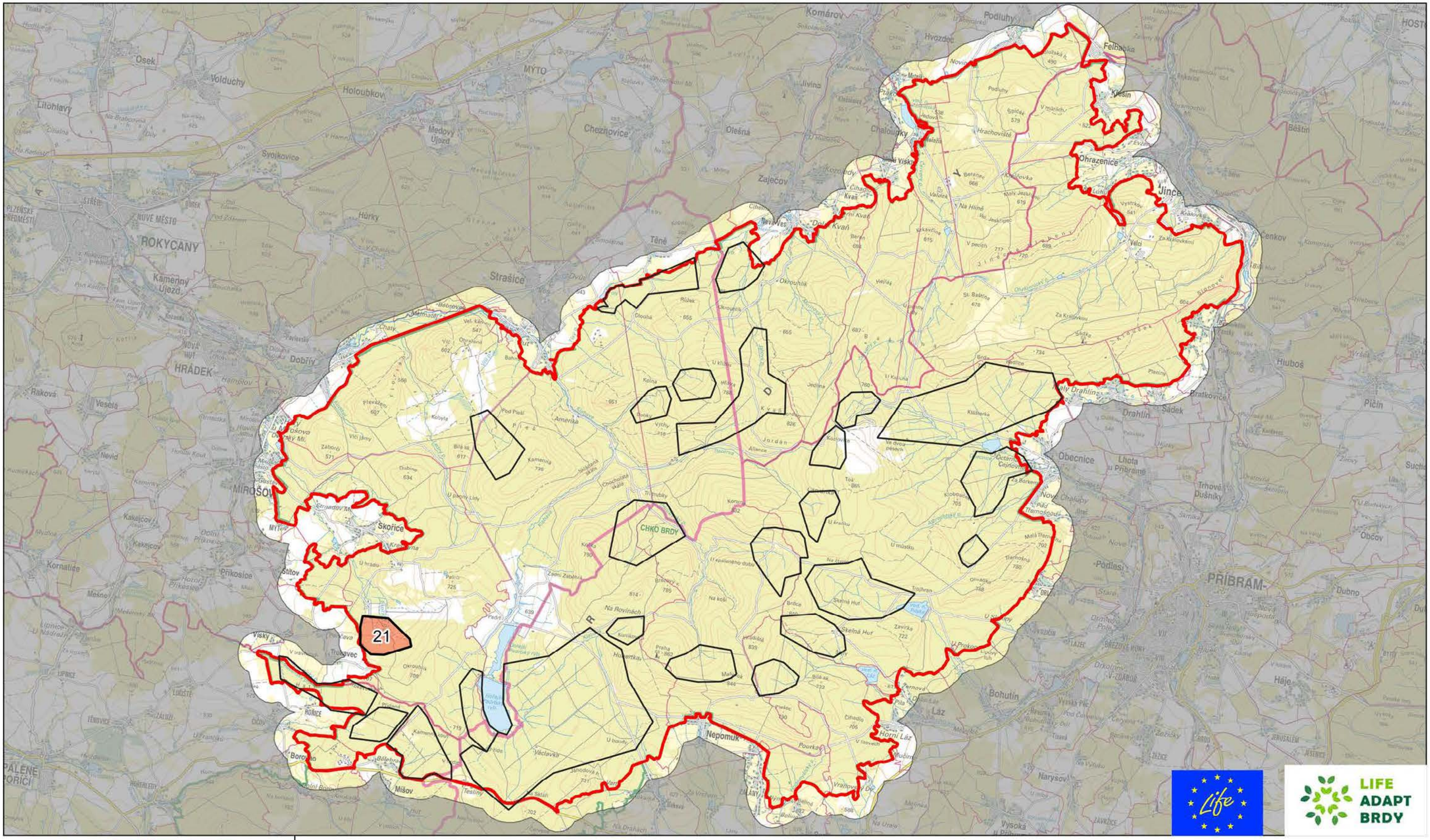
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:5 000
3.	Cadastral overview with the type of drainage lines	1:5 000
4.	Terrain morphology and the proposal concept	1:5 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

Zadavatel:

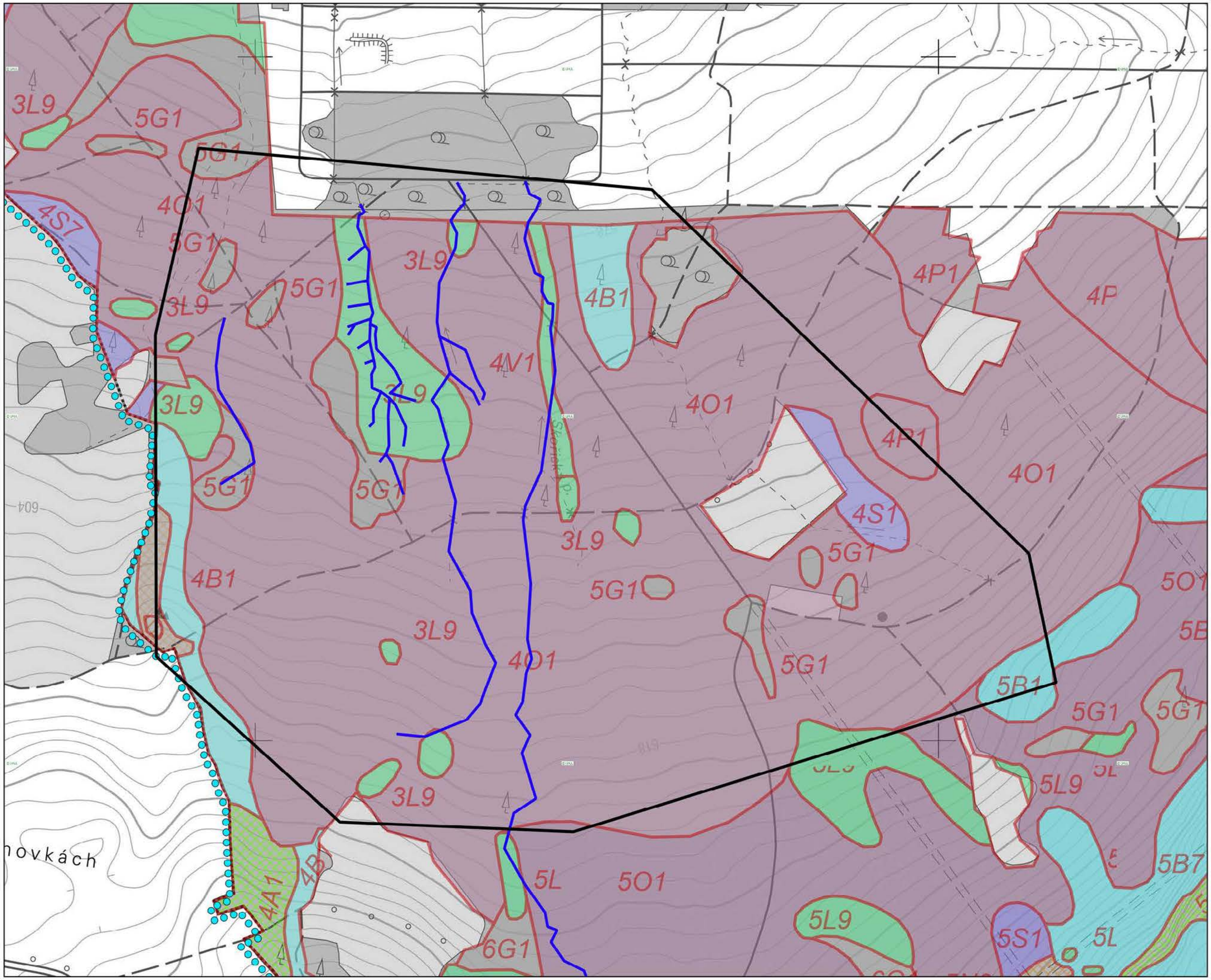
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

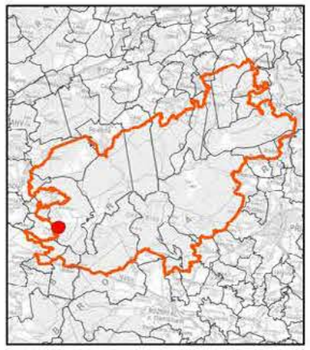
Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 21

Kolvín

LIFE ADAPT BRDY





Lokalita 21

Kolvín

Priorita **C**

Řešená lokalita

Odtokové linie

Zájmové území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramenitě

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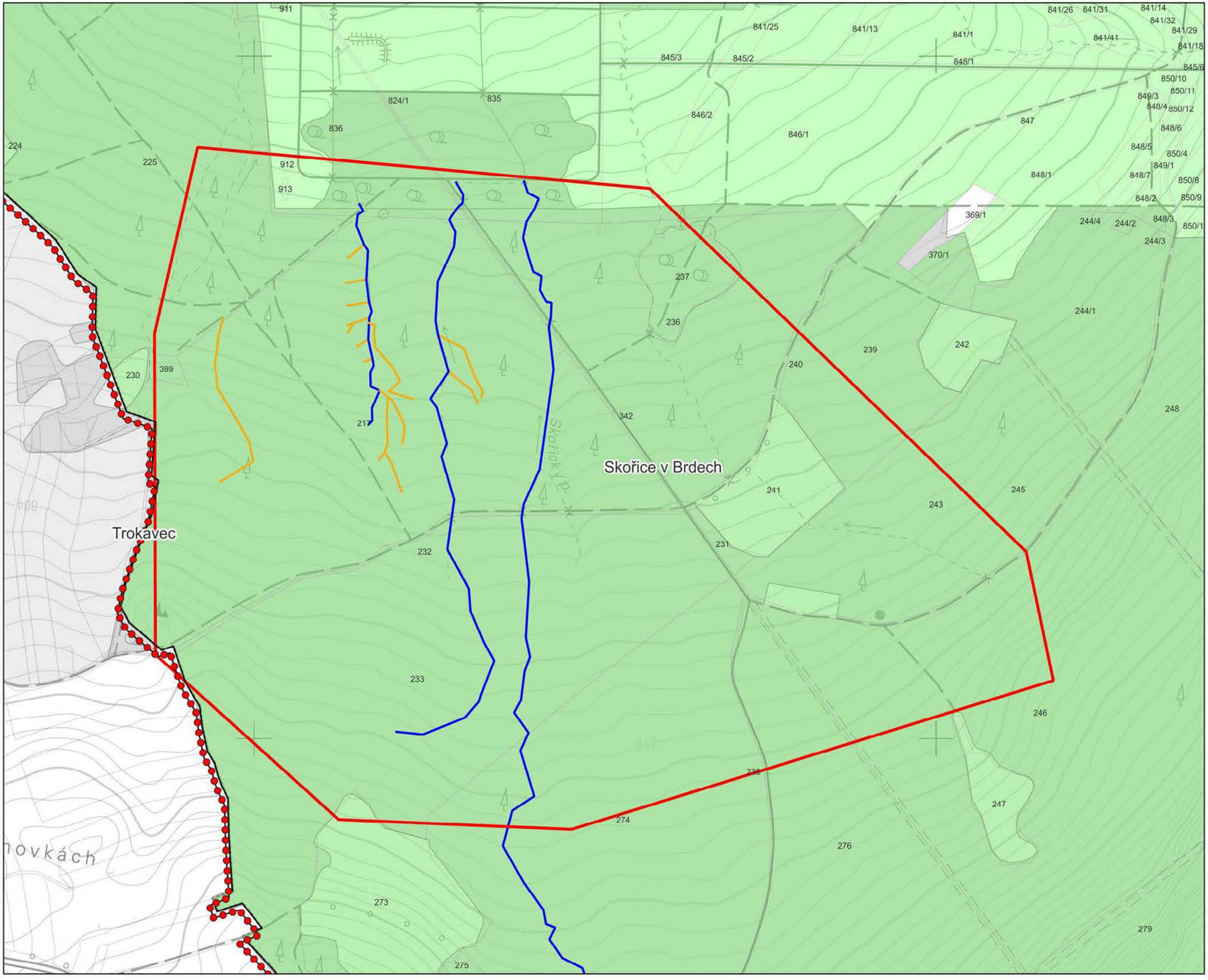
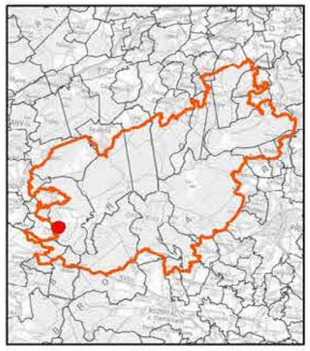
LIFE ADAPT BRDY

2. Situace lesních typů





Lokalita 21

Kolvín

Priorita **C**

Plzeňský kraj

ORP:
Rokycany - 559717

Obce:
Skořice
Trokavec

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:5 000
1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

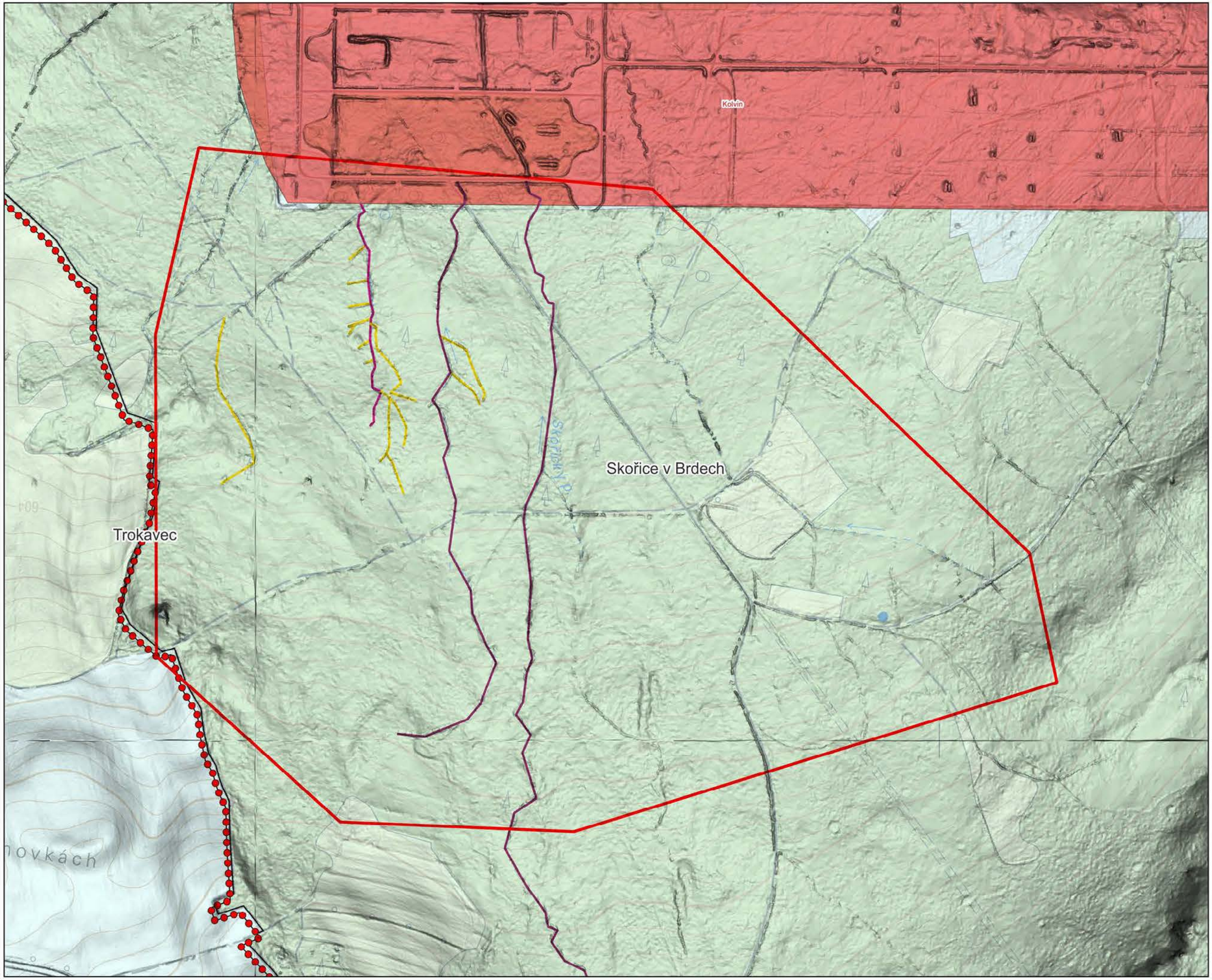
Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

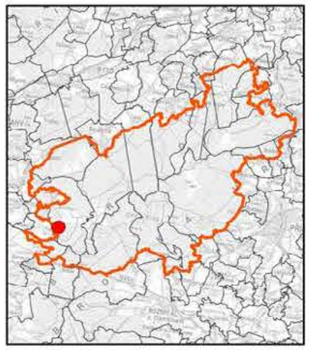
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace





Lokalita 21

Kolvín

Priorita **C**

Řešená lokalita

Odtokové linie - Návrh

Vymělčení

Rozvolnění, revitalizace

Bez zásahů, připojení na přirozený odtok

Opatření vázaná na cestní síť

Zablokování

Pyrotechnické ohrožení

Nižší riziko

Vysoké riziko

Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramoniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.3.10. Site 22 - Tři trubky

Site	Tři trubky	Order No.	22
Region	Central Bohemia, Pilsen	Municipality with extended competence	Příbram, Rokycany
Municipality	Nepomuk, Věšín, Strašice	Cadastral area	Nepomuk in Brdy, Věšín in Brdy, Strašice in Brdy
Catchment area of IV. order	Třítrubecký potok Brook	Hydrological Order No.	1-11-01-007

Current state:

Site 22 is part of the cadastral areas of Nepomuk in Brdy, Věšín in Brdy, Strašice in Brdy., which are part of the villages of Nepomuk, Věšín, Strašice. In terms of administration, the villages of Nepomuk and Věšín fall under the municipality of Příbram (municipality with extended competence) in the Central Bohemian Region; the village of Strašice falls under the municipality of Rokycany (municipality with extended competence) in the Pilsen Region. The area is located in the III. protection zone of Brdy PLA. There is a source of water for the village of Strašice in the site.

Nearly all the site lies within an area of lower or high explosive ordnance hazard.

The site is delineated by the basin of the left tributary of the Třítrubecký potok Brook below the peaks Kočka, Paterák and Březový vrch. There are small watercourses within the site that are managed by VLS.

The site extends on the northern slope at an elevation of 580–690 m above sea level. As to runoff characteristics, these are in some parts very steep slopes, while on moderate slopes there are small watercourses and a floodplain in the lower section. The reclamation interventions are not predominant. Nevertheless, gully erosion occurs in sloping valley lines. There are further effects on the runoff conditions on the roads and skidding lines. All the above mentioned may have impact on the water resources in the vicinity.

The site and its surroundings are severely affected by bark beetle infestation and subsequent felling, which is reflected in the character of the stands. There are mainly contiguous clear-cuts with new plantations. The habitat mapping identified mainly forest plantations of allochtonous coniferous trees (X9A) and locally waterlogged spruce forests (L9.2B).

In terms of forest typology, the site is mainly in vegetation zones 5 (fir-beech) and 6 (spruce-beech). The local target ecological series are stagnic and wet, as well as peat, predominantly on gentler parts of slopes and near watercourses. These are mainly *Piceeto-Abietum variohumidum acidophilum* with occurring *Piceetum turfosum acidophilum* and *Piceeto-Fagetum fraxinosum humidum*, etc.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the soil horizon in the spring area and slow down the surface runoff, which will increase infiltration in the area of water resources.

The measures will mainly involve blocking of the drainage ditches. The drainage system of the road network will also be reviewed and measures taken to reduce the load on the ditches leading to the catchment area. At the next phase of the project preparation, we recommend to conduct an assessment of the impact of the measures on the quality and volume of underground water in water resources. The proposed measures shall not have any negative impact in this respect.

Basic parameters of the proposal:

Total site area	96	ha
Total number of lines concerned	9	pcs
Total length of lines concerned	2,308	m
of which drainage ditches to be blocked	2,308	m

Phasing:

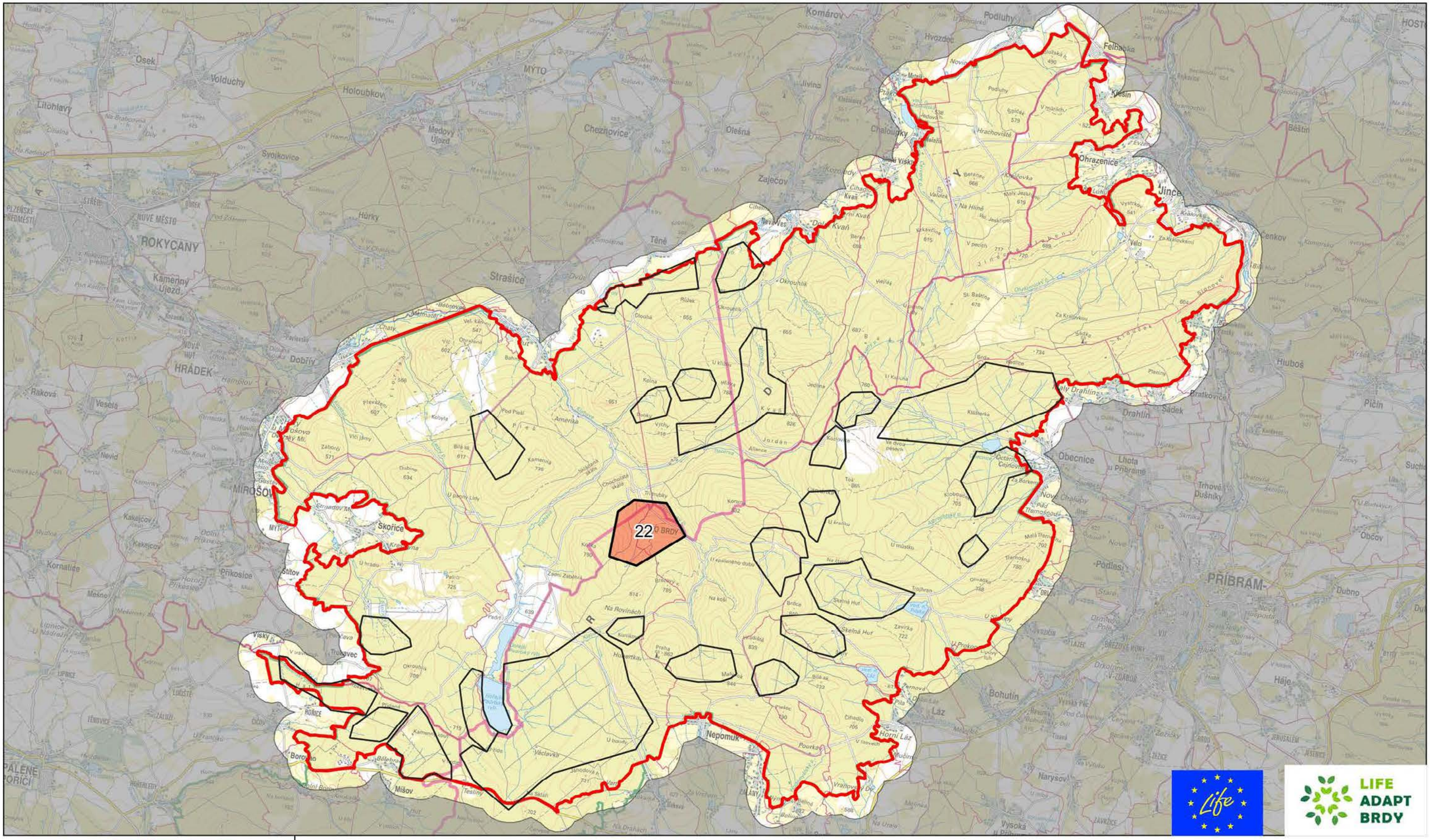
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:8 000
3.	Cadastral overview with the type of drainage lines	1:8 000
4.	Terrain morphology and the proposal concept	1:8 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

Zadavatel:

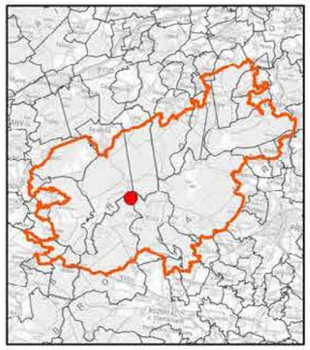
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 22

Tři trubky

LIFE ADAPT BRDY



Lokalita 22

Tři trubky

Priorita **C**

Řešená lokalita

Odtokové linie

Zájmové území

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

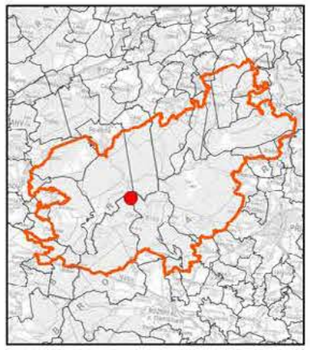
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramenišť

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 22

Tři trubky

Priorita **C**

Středočeský kraj
Plzeňský kraj
ORP:
Příbram - 539911
Rokycany - 559717

Obce:
Věšín
Těně
Strašice
Nepomuk

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:8 000
1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

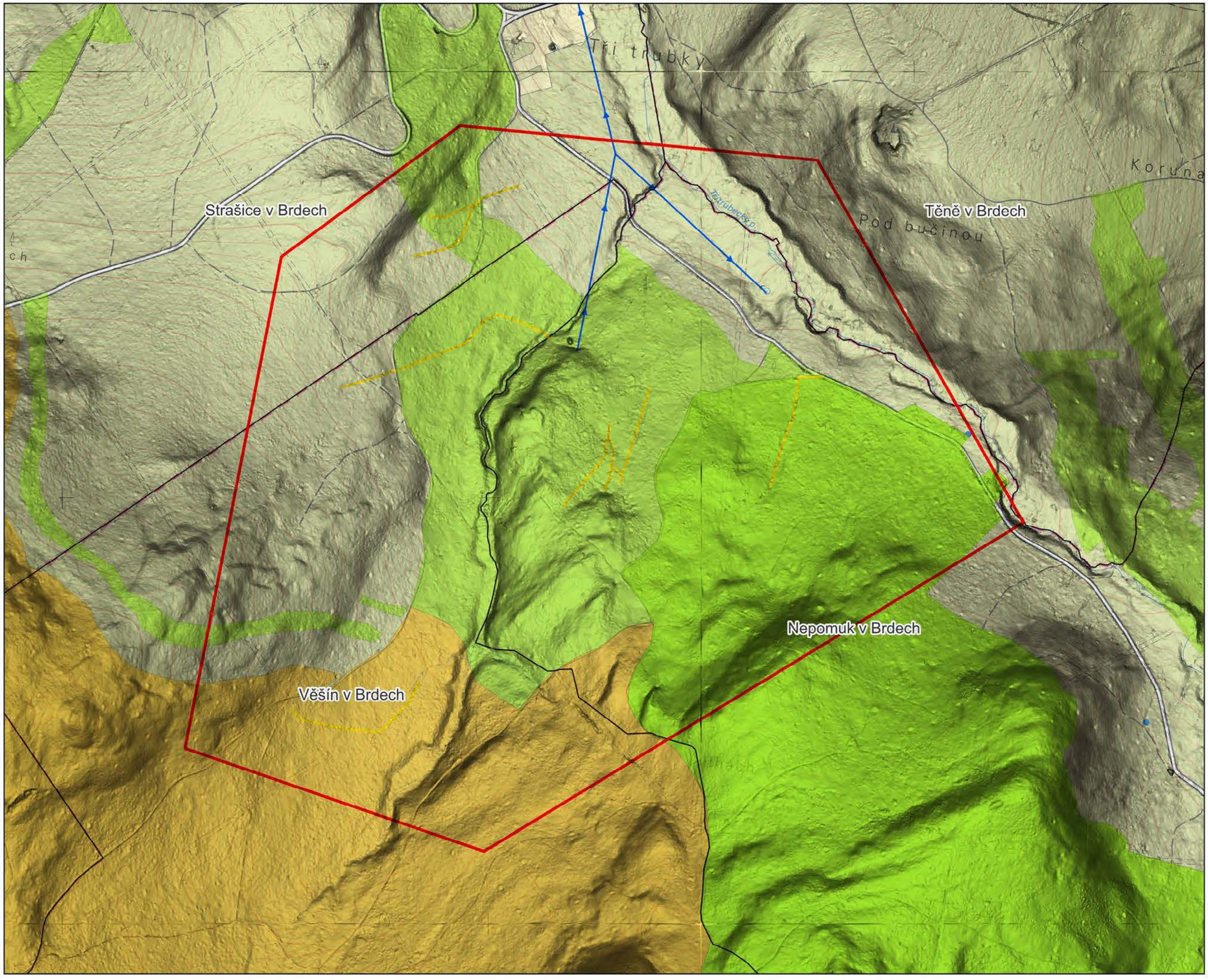
Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

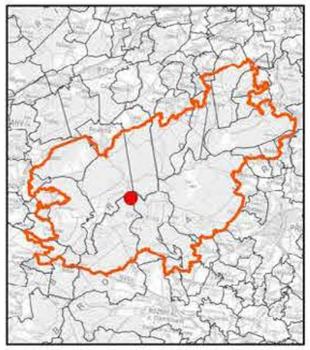
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramoniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace





Lokalita 22

Tři trubky

Priorita **C**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramenitě

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.3.11. Site 24 - Spring area of the Bradava

Site	Spring area of the Bradava	Order No.	24
Region	Pilsen	Municipality with extended competence	Blovice
Municipality	Míšov	Cadastral area	Míšov in Brdy
Catchment area of IV. order	Bradava	Hydrological Order No.	1-10-05-046

Current state:

Site 24 is part of the cadastral area of Míšov in Brdy, which is part of the village of Míšov. In terms of administration, the village of Míšov falls under the municipality of Blovice (municipality with extended competence) in the Pilsen Region. The area is located in the II. and III. protection zone of Brdy PLA.

The site is a spring area of the Bradava River and its tributaries. There are largely modified watercourses within the site that are managed by VLS.

The site extends on the south-western slope above Míšov at an elevation of 635–700 m above sea level. As to runoff characteristics, it is a spring slope with modified watercourses and small tributaries. The reclamation interventions, mainly straightening and deepening, are quite extensive. There are further effects on the runoff conditions on the roads and skidding lines.

At the time of the study, the site is forested mainly with spruce monocultures with significant clear-cut areas with non-forest enclave Kuťkovská mýť (II. protection zone of the PLA). In the non-forest area, the habitat mapping has identified Intermittently wet *Molinia* meadows (T1.9), Wet *Cirsium* meadows (T1.5) and other meadow biotopes. No comprehensive mapping has been carried out in the forest areas. Only partial ash-alder alluvial forests (L2.2) have been identified.

In terms of forest typology, the site is mainly in vegetation zones 5 (fir-beech) and 6 (spruce-beech). The local target ecological series are stagnic and wet, as well as ash. They are prevailingly *(Fageto-)Abietum variohumidum trophicum* and *Piceeto-Abietum paludosum mesotrophicum* with random occurrence of alluvial types.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff. A further effect of the measures will be the connection of the channels of the streams with the adjacent floodplain and the restoration of conditions for the development of alluvial habitats.

This mainly consists of blocking drainage ditches and channels in their non-natural routes, shallowing and opening up of the modified streambed of the brook. These key measures will be complemented with measures relating to the road network, which involve a review of culverts and possible removal of redundant transport lines that form preferential routes of surface runoff.

Basic parameters of the proposal:

Total site area	223	ha
Total number of lines concerned	44	pcs
Total length of lines concerned	10,072	m
of which drainage ditches to be blocked	9,213	m
of which streambeds to be shallowed	477	m
of which streams to be revitalized or opened	381	m

Phasing:

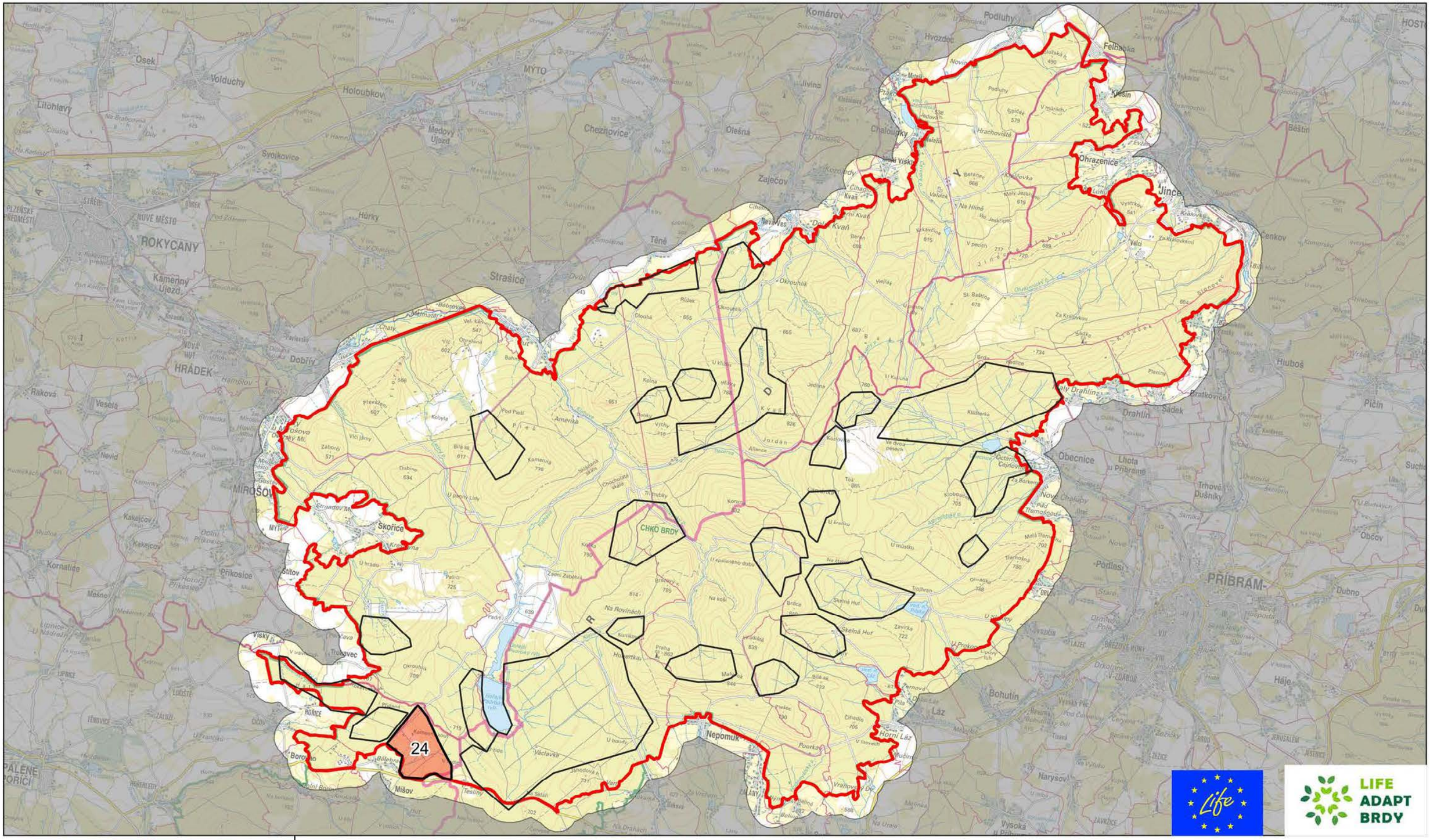
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:8 000
3.	Cadastral overview with the type of drainage lines	1:8 000
4.	Terrain morphology and the proposal concept	1:8 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

Zadavatel:

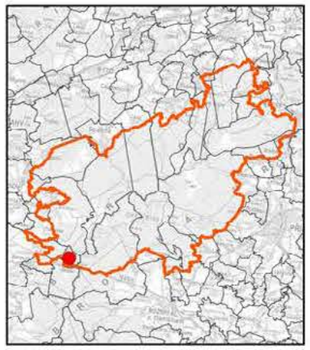
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 24

Prameniště Bradavy

LIFE ADAPT BRDY



Lokalita 24

Prameniště Bradavy

Priorita **C**

Řešená lokalita

Odtokové linie

Zájmové území

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území prameniště

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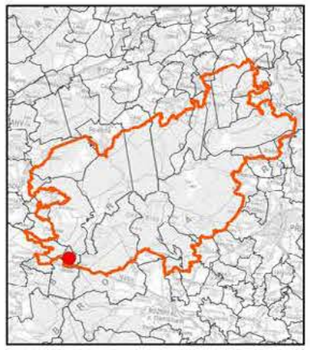
LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 24

Prameniště Bradavy

Priorita **C**

Středočeský kraj
Plzeňský kraj
ORP:
Příbram - 539911
Blovice - 557587

Obce:
Věšín
Míšov
Spálené Poříčí

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:8 000
1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

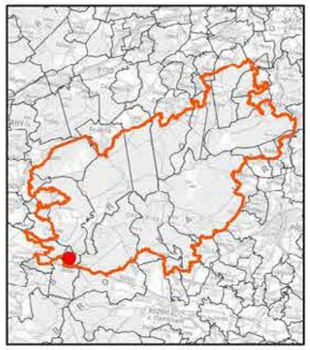
Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace



Lokalita 24

Prameniště Bradavy

Priorita **C**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

Etapa II

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

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LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.3.12. Site 25 - Spring area of the Bojovka

Site	Spring area of the Bojovka	Order No.	25
Region	Pilsen	Municipality with extended competence	Blovice
Municipality	Spálené Poříčí	Cadastral area	Číčov in Brdy
Catchment area of IV. order	Bojovka	Hydrological Order No.	1-10-05-049

Current state:

Site 25 is part of the cadastral area of Číčov in Brdy, which is part of the municipality of Spálené Poříčí. In terms of administration, the village of Spálené Poříčí falls under the municipality of Blovice (municipality with extended competence) in the Pilsen Region. The area is located in the II. and III. protection zone of Brdy PLA.

The site is a spring area of the Bradava River and its tributaries. There are largely modified watercourses within the site that are managed by VLS.

The site extends on the south-western slope above Číčov at an elevation of 610–675 m above sea level. As to runoff characteristics, it is a spring slope with modified watercourses and small tributaries. The reclamation interventions, mainly straightening and deepening, are quite extensive. There are further effects on the runoff conditions on the roads and skidding lines.

At the time of the study, the site is forested with species and age diverse stands, but still with predominant spruce monocultures and clear-cut areas. In the non-forest area, the habitat mapping has identified Intermittently wet *Molinia* meadows (T1.9) and other meadow biotopes. No comprehensive mapping has been carried out in the forest areas. Only partial ash-alder alluvial forests (L2.2) have been identified.

In terms of forest typology, the site is mainly in vegetation zones 5 (fir-beech) and 6 (spruce-beech). The local target ecological series are stagnic and wet, as well as ash. They are prevailingly *(Fageto-)Abietum variohumidum trophicum*, *Alnetum incanae*, etc.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff. A further effect of the measures will be the connection of the channels of the streams with the adjacent floodplain and the restoration of conditions for the development of alluvial habitats.

This mainly involves blocking drainage ditches, shallowing and opening up the modified streambed of the brook. These key measures will be complemented with measures relating to the road network, which involve a review of culverts and possible removal of redundant transport lines that form preferential routes of surface runoff.

Basic parameters of the proposal:

Total site area	80	ha
Total number of lines concerned	10	pcs
Total length of lines concerned	3,593	m
of which drainage of roads and roads	1,098	m
of which drainage ditches to be blocked	1,583	m
of which streams to be revitalized or opened	912	m

Phasing:

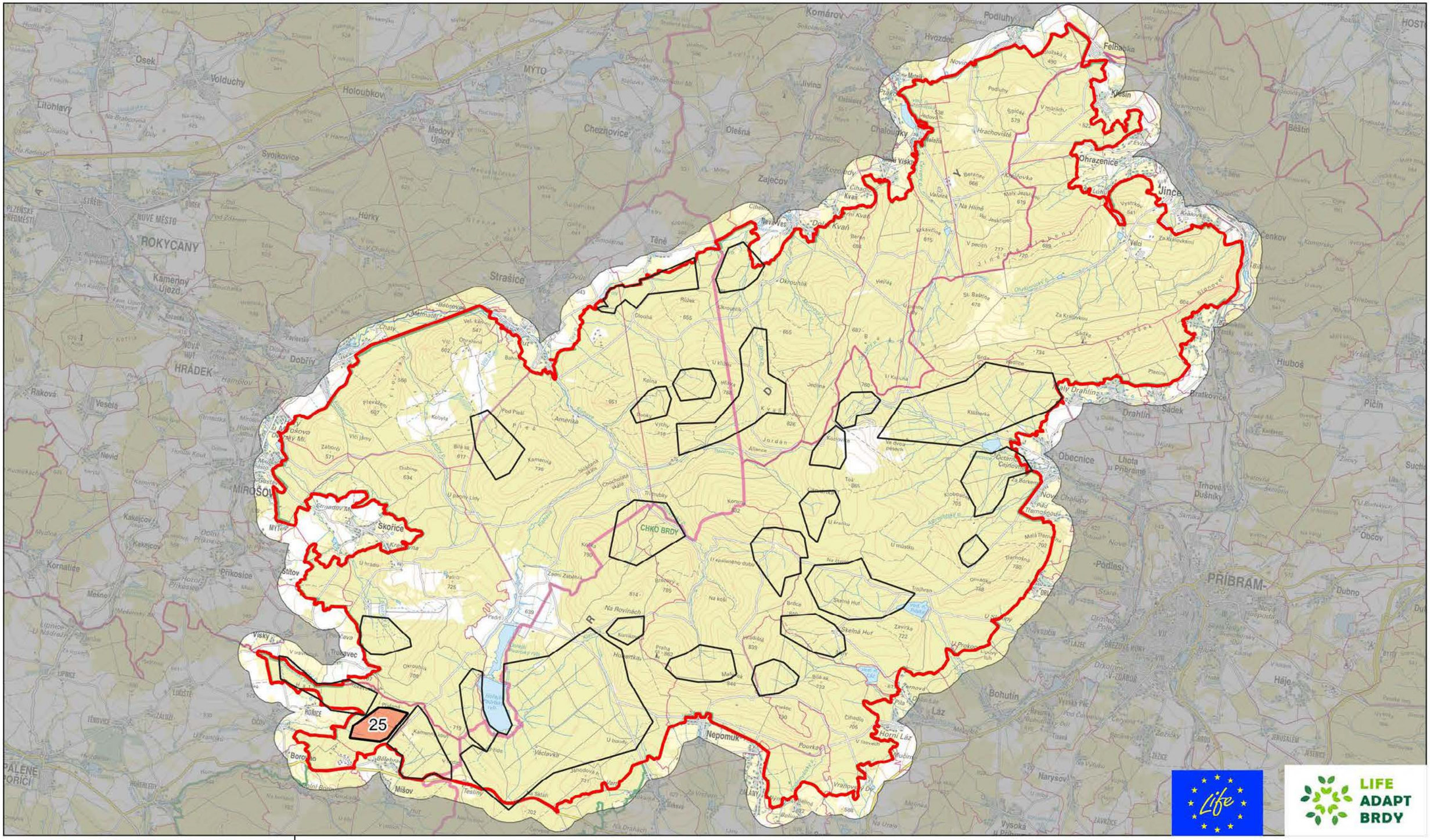
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:5 000
3.	Cadastral overview with the type of drainage lines	1:5 000
4.	Terrain morphology and the proposal concept	1:5 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

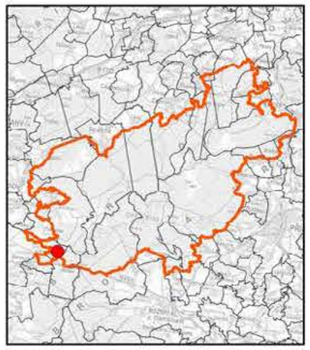
Zadavatel:

VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 25

Prameniště Bojovky



Lokalita 25

Prameniště Bojovky

Priorita **C**

Řešená lokalita

Odtokové linie

Zájmové území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

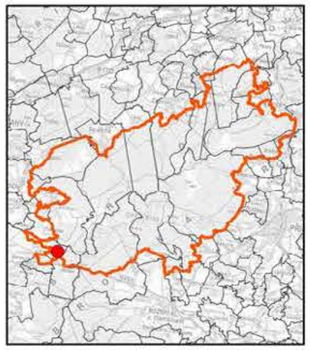
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramenišť

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 25

Prameniště Bojovky

Priorita **C**

Plzeňský kraj

ORP:
Blovice - 557587

Obce:
Spálené Poříčí

Řešená lokalita

Stávající odtokové linie

- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:

- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obce
- Soukromý subjekt

Zájmové území

Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

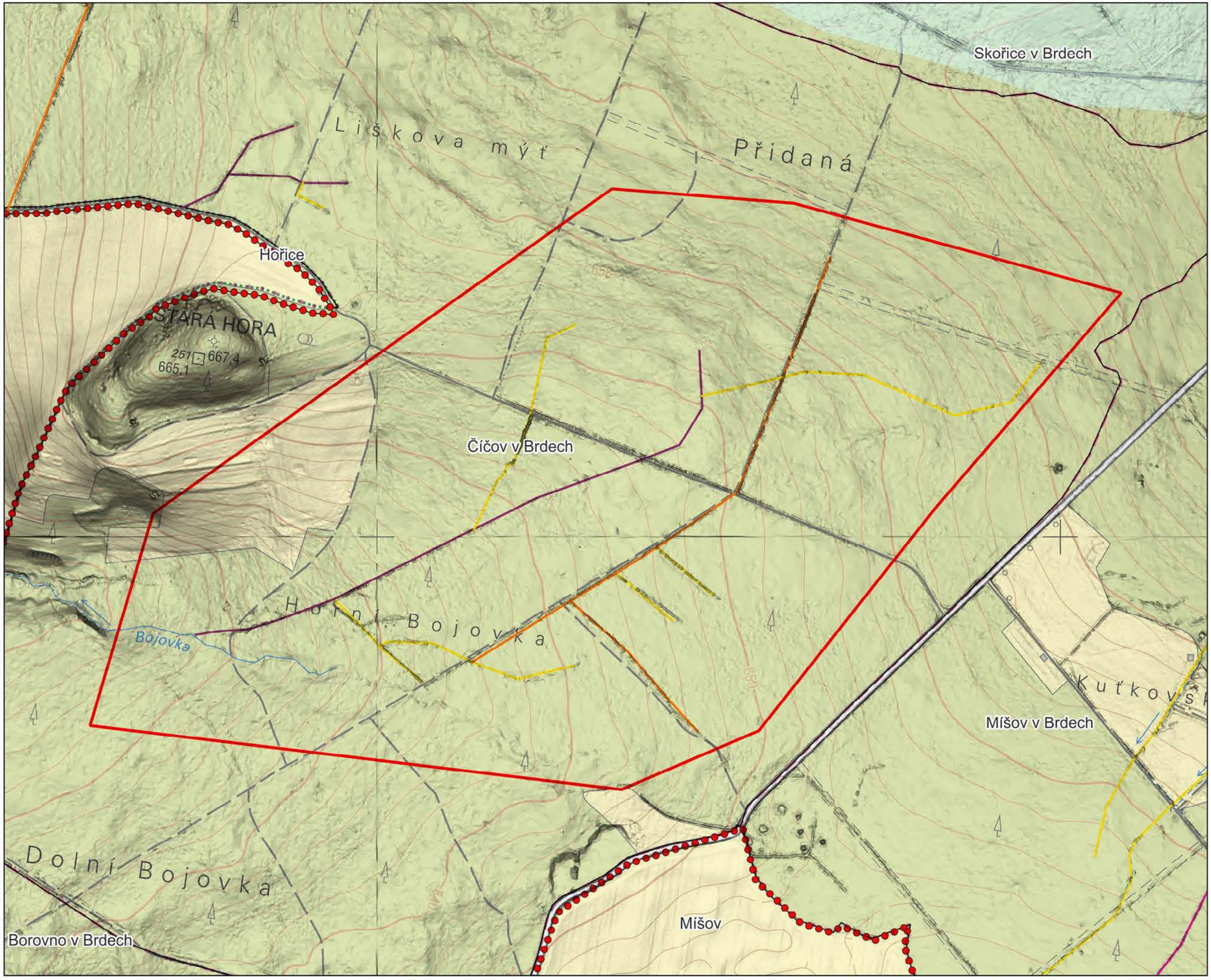
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

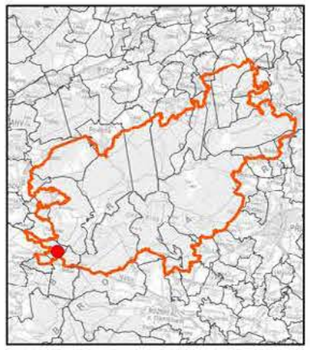
VRV

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace





Lokalita 25

Pramenitě Bojovky

Priorita **C**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramenitě

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.4. Proposal for measures in sites of priority D

3.4.1. Site 8 – Kozlovice

Site	Kozlovice	Order No.	8
Region	Central Bohemian	Municipality with extended competence	Příbram
Municipality	Obecnice	Cadastral area	Obecnice in Brdy
Catchment area of IV. order	Reserva	Hydrological Order No.	1-11-01-008

Current state:

Site 8 is part of the cadastral area of Obecnice in Brdy, which is part of the village of Obecnice. In terms of administration, the village of Obecnice falls under the municipality of Příbram (municipality with extended competence) in the Central Bohemian Region. The area is located in the III. protection zone of Brdy PLA.

The site overlaps with areas of lower explosive ordnance hazard and an adjacent impact area named Tok.

The site is located in the central part of the area of interest west of the impact area. The registered nameless watercourse is managed by VLS.

The site extends on the western slope at an elevation of 780–850 m above sea level. As to runoff characteristics, it is a spring slope with small tributaries. The reclamation interventions are not pronounced, mainly affecting the runoff conditions on roads and skidding lines.

At the time of the study, the site is forested mainly with spruce monocultures of diverse age with presence of clear-cut areas. The habitat mapping identified only non-contiguous areas of forest plantations of allochtonous coniferous trees (X9A), smaller patches of bog spruce forests (L9.2A), and waterlogged spruce forests (L9.2B).

In terms of forest typology, the site is mainly in vegetation zones 6 (spruce-beech) and 7 (beech-spruce). The local target ecological series are stagnic, such as *Piceeto-Abietum variohumidum oligotrophicum* and *Abietum piceosum variohumidum oligotrophicum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff. A further effect of the measures will be the connection of the channels of the streams with the adjacent floodplain and the restoration of conditions for the development of target forest habitats.

This mainly involves blocking drainage ditches and shallowing the modified streambed of the brook. These key measures will be complemented with measures relating to the road network, which involve a review of culverts and possible removal of redundant transport lines that form preferential routes of surface runoff.

Basic parameters of the proposal:

Total site area	70	ha
Total number of lines concerned	13	pcs
Total length of lines concerned	2,320	m
of which drainage of roads and roads	1,527	m
of which drainage ditches to be blocked	652	m
of which streambeds to be shallowed	141	m

Phasing:

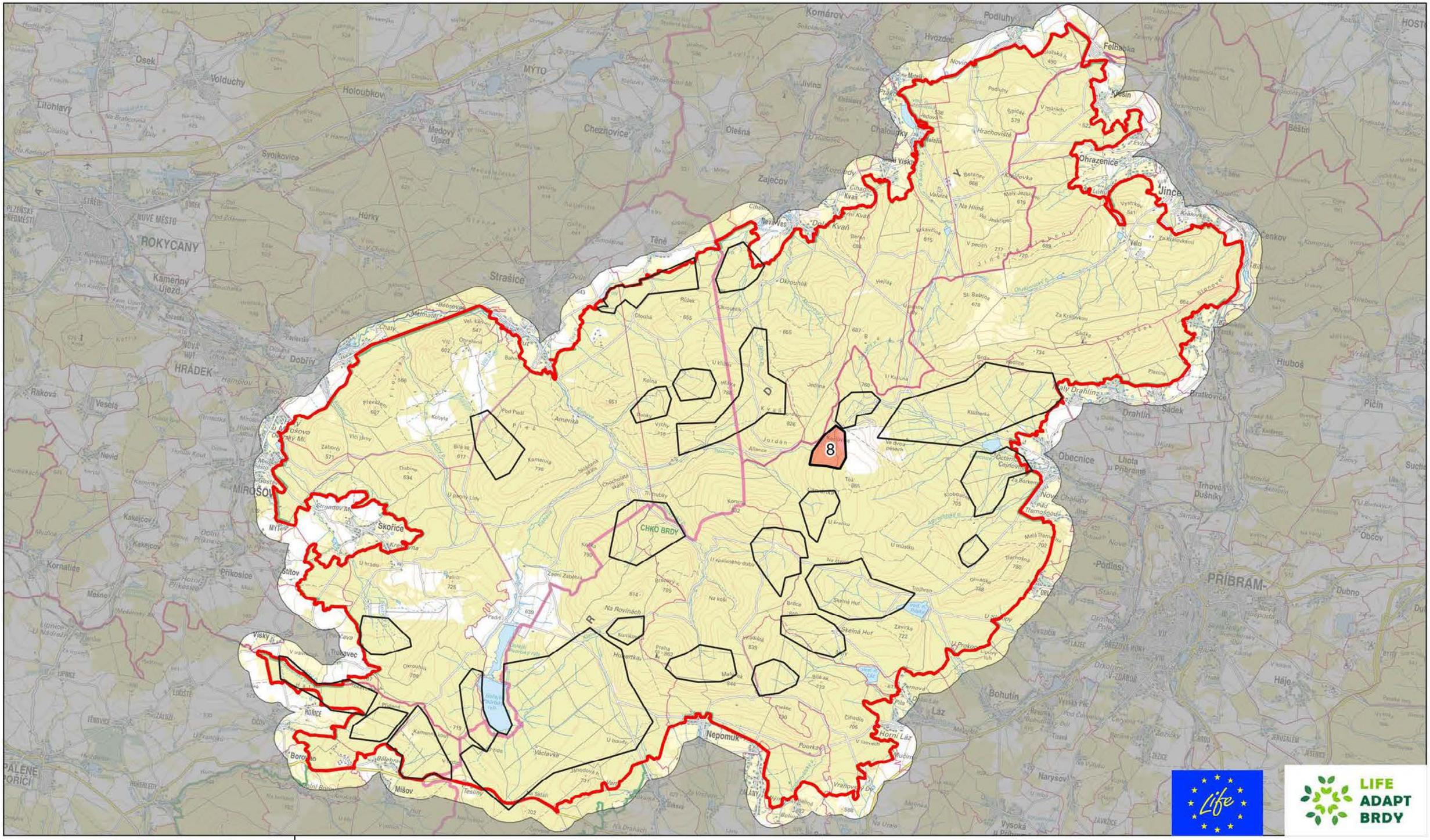
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:5 000
3.	Cadastral overview with the type of drainage lines	1:5 000
4.	Terrain morphology and the proposal concept	1:5 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

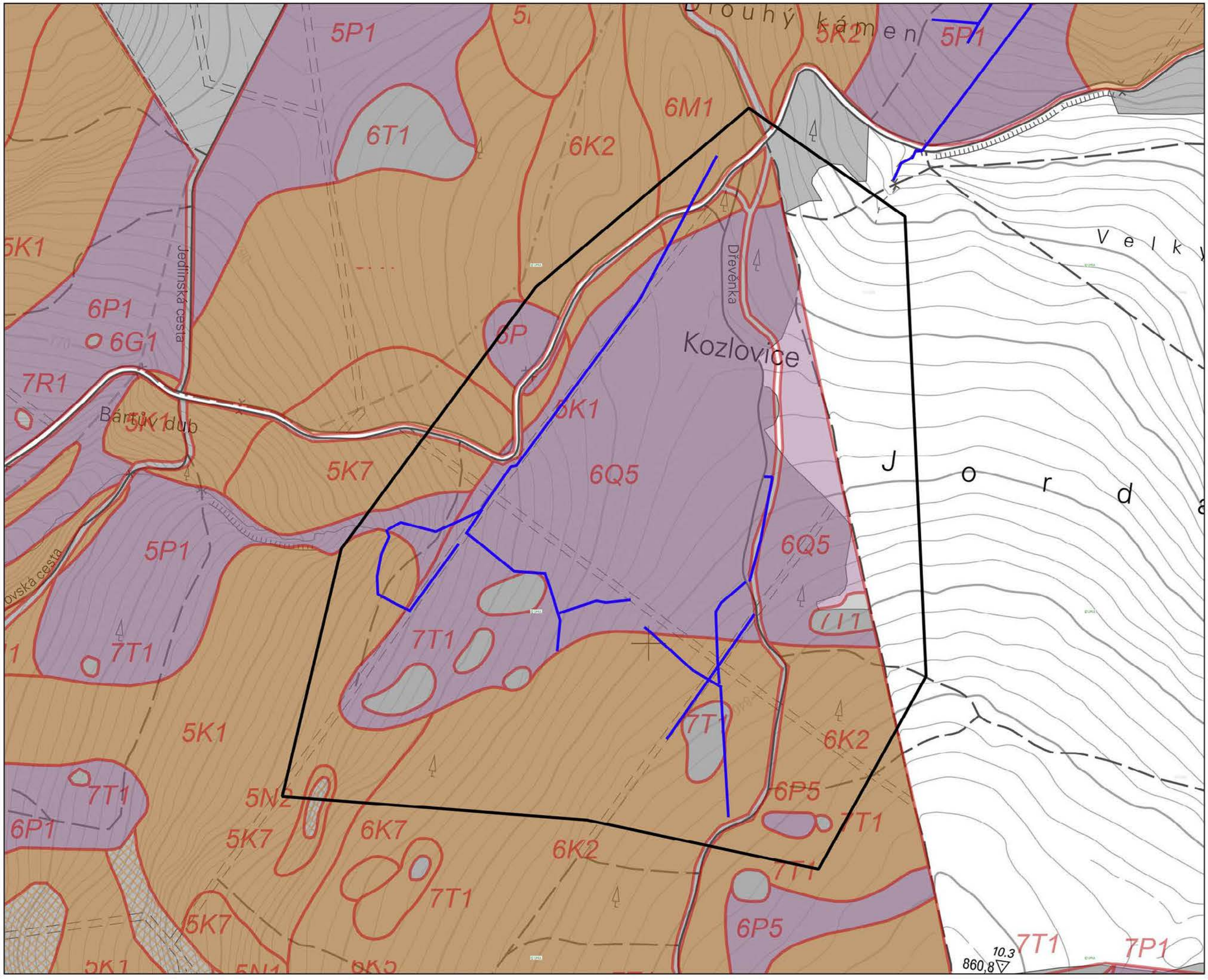
Zadavatel:

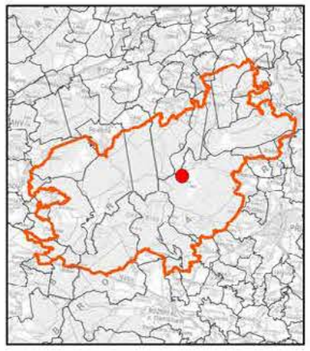
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 8

Kozlovice





Lokalita 8

Kozlovice

Priorita **D**

Řešená lokalita

Odtokové linie

Zájmové území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

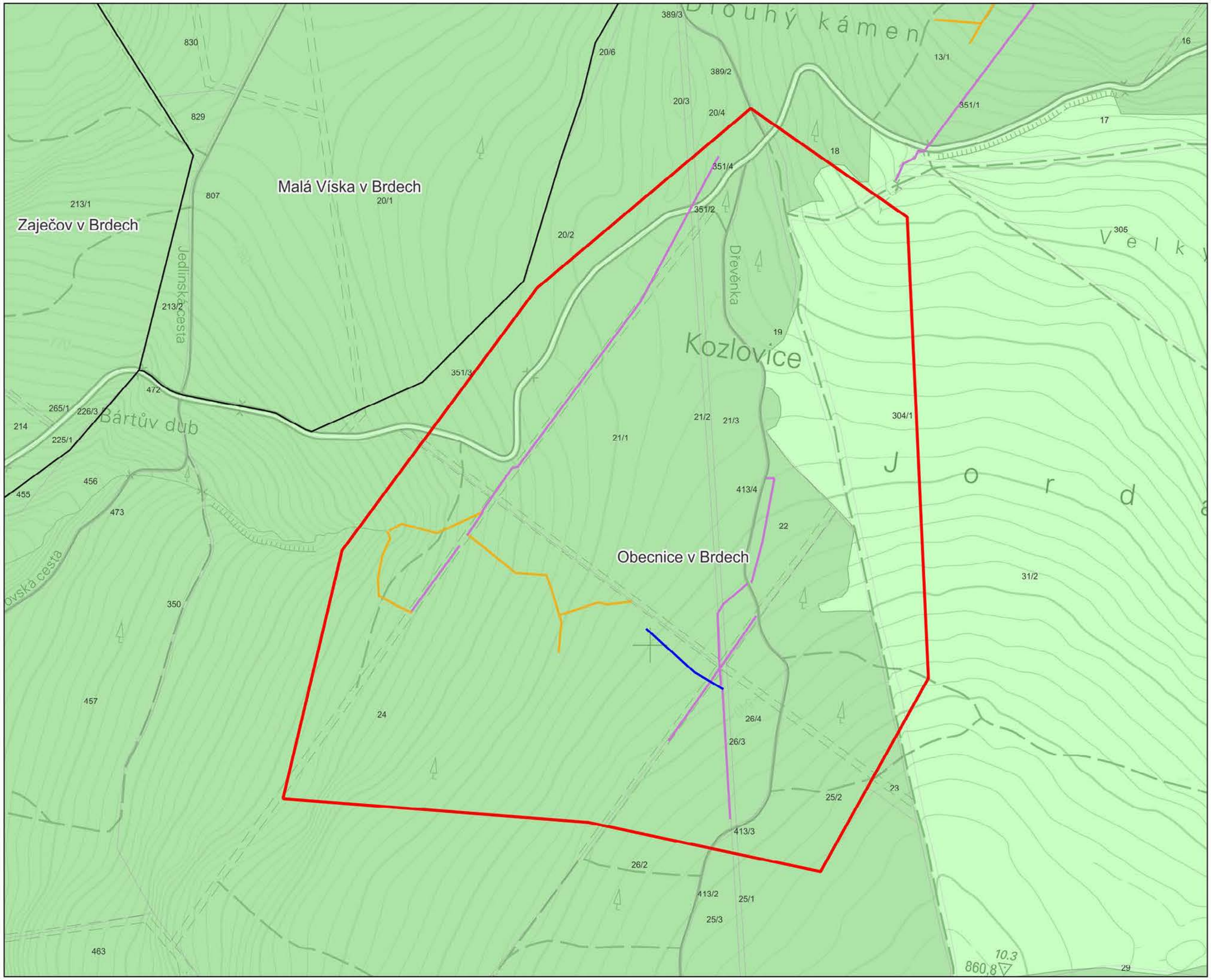
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramenišť

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 8

Kozlovice

Priorita **D**

Středočeský kraj

ORP:
Příbram - 539911

Obce:
Obecnice

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:5 000
1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

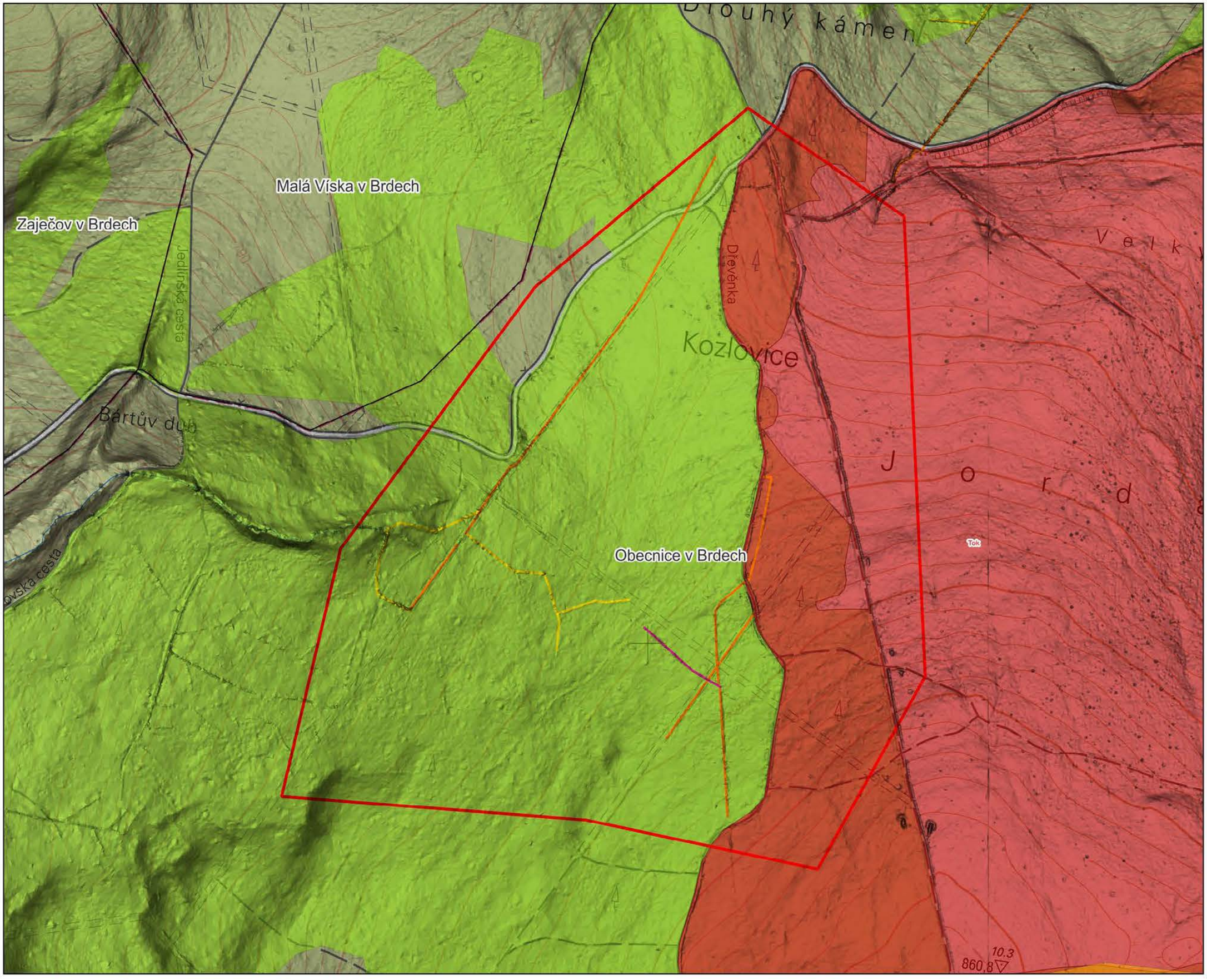
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

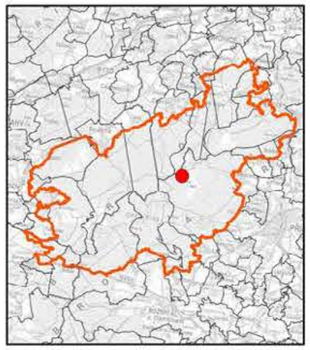
VRV

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace





Lokalita 8

Kozlovice

Priorita **D**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramoniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.4.2. Site 9 - Spring area of the Klabava

Site	Spring area of the Klabava	Order No.	9
Region	Central Bohemian	Municipality with extended competence	Příbram
Municipality	Věšín	Cadastral area	Věšín in Brdy
Catchment area of IV. order	Klabava	Hydrological Order No.	1-11-01-006

Current state:

Site 9 is in the cadastral area of Věšín in Brdy, which is part of the village of Věšín. In terms of administration, the village of Věšín falls under the municipality of Příbram (municipality with extended competence) in the Central Bohemian Region. The area is located in the III. protection zone of Brdy PLA. There are water resources within the site.

The site overlaps with areas of lower explosive ordnance hazard.

The site is located in the central part of the area of interest west of the impact area. Under Decree No. 178/2021 Coll., the Klabava River is a significant watercourse managed by state enterprise Povodí Vltavy. Other registered nameless watercourses are managed by VLS.

The site extends on the western slope at an elevation of 620–780 m above sea level. As for the runoff characteristics, it is a spring area of minor watercourses, which are, however, severely affected by past land reclamation interventions and drainage ditches. The shallow soil horizon is drained by ditches and the surface runoff is affected by the road network and skidding lines.

The site and its surroundings are severely affected by bark beetle infestation and subsequent felling, which is reflected in the character of the stands. There are mainly contiguous clear-cuts with new plantations. The habitat mapping identified scattered patches of waterlogged spruce forests (L9.2B) and bog spruce forests (L9.2A).

In terms of forest typology, the site is mainly in vegetation zones 6 (spruce-beech) and 7 (beech-spruce). The local target ecological series are stagnic and wet, as well as ash, such as *Piceeto-Abietum variohumidum acidophilum*, etc.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff, which will increase local infiltration and enhance water resources. A further effect of the measures will be the connection of the channels of the streams with the adjacent floodplain and the restoration of conditions for the development of target forest habitats.

This mainly consists of blocking drainage ditches and channels in their non-natural routes, shallowing and opening up of the modified streambed of the brook. These key measures will be complemented with measures relating to the road network, which involve a review of culverts and possible removal of redundant transport lines that form preferential routes of surface runoff.

At the next phase of the project preparation, we recommend to conduct an assessment of the impact of the measures on the quality and volume of underground water in water resources. The proposed measures shall not have any negative impact in this respect.

Basic parameters of the proposal:

Total site area	49	ha
Total number of lines concerned	7	pcs
Total length of lines concerned	2,309	m
of which drainage ditches to be blocked	1,697	m
of which streams to be revitalized or opened	612	m

Phasing:

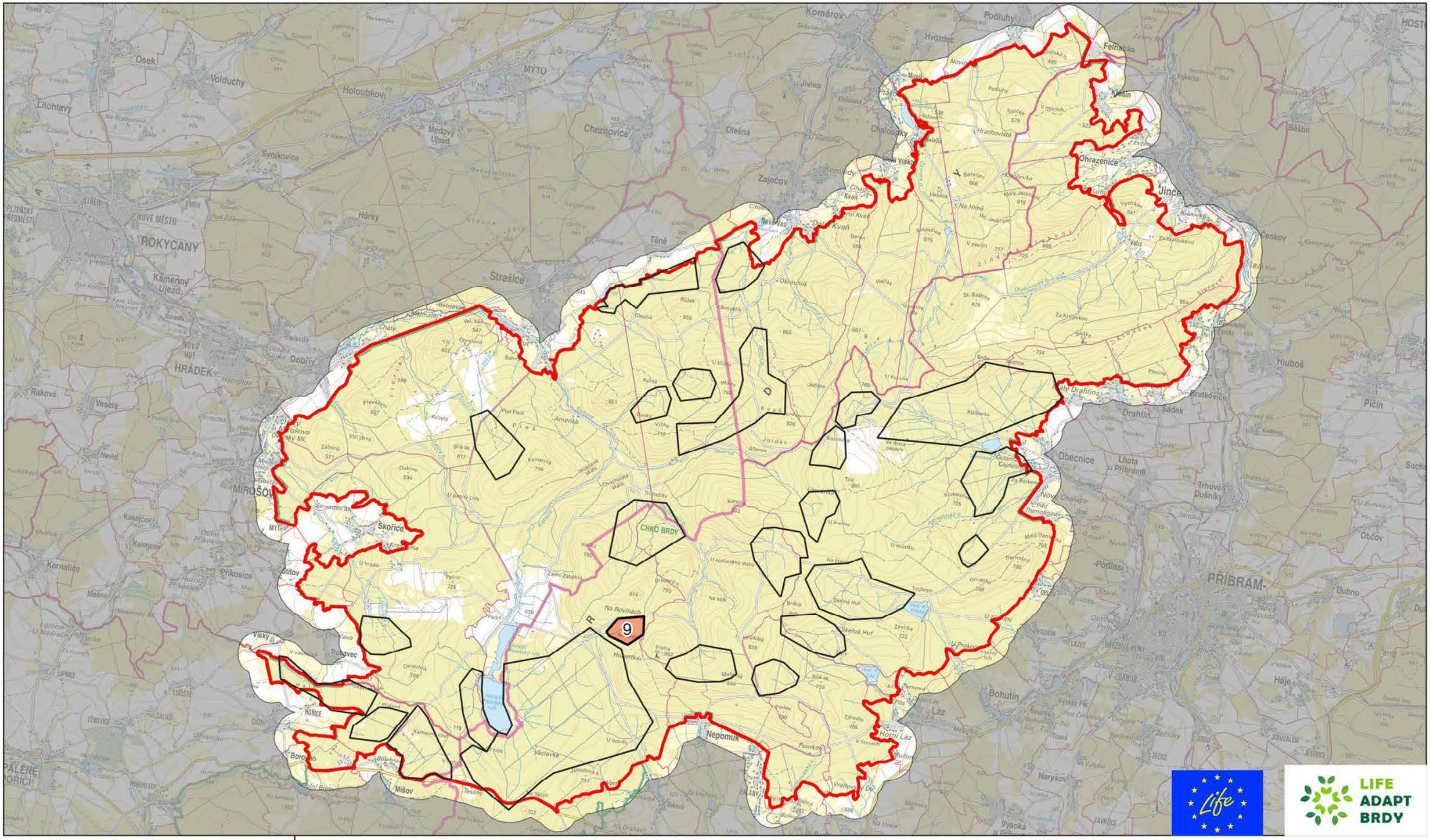
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:5 000
3.	Cadastral overview with the type of drainage lines	1:5 000
4.	Terrain morphology and the proposal concept	1:5 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

Zadavatel:

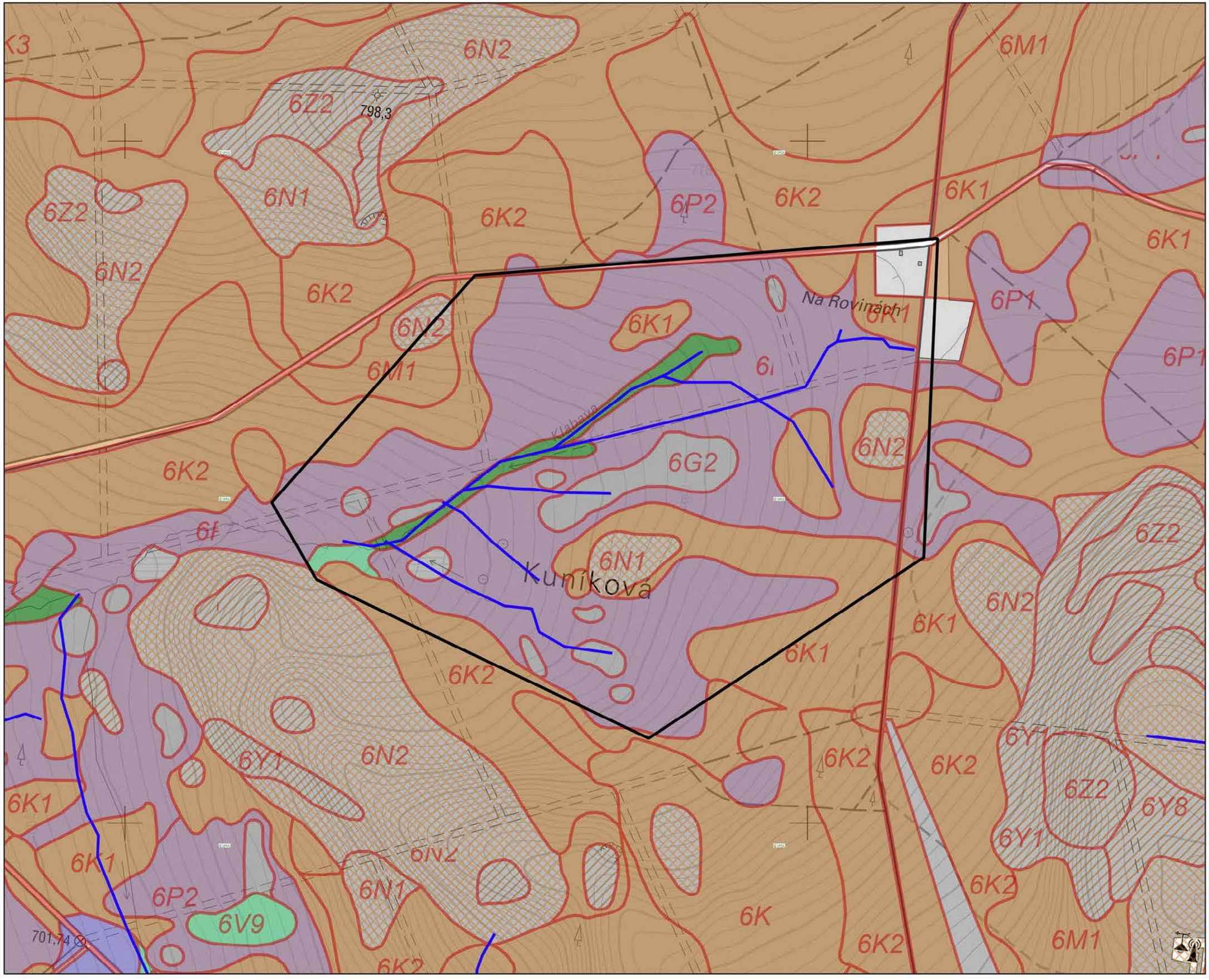
VLS
VOJENSKÉ LESY A STATKY ČR, s.p.

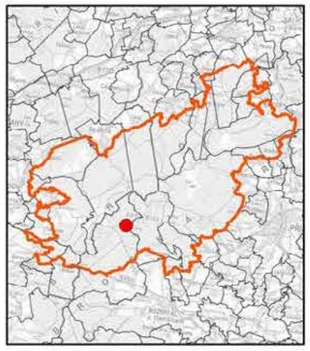
Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 9

Prameniště Klabavy

LIFE ADAPT BRDY





Lokalita 9

Prameniště Klabavy

Priorita **D**

Řešená lokalita

Odtokové linie

Zájmové území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

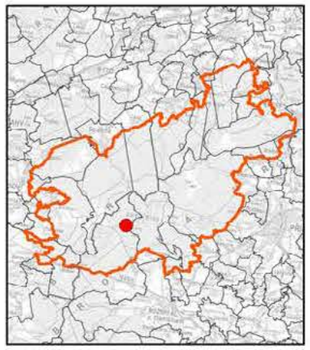
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 9

Pramenitě Klabavy

Priorita **D**

Středočeský kraj

ORP:
Příbram - 539911

Obce:
Věšín
Nepomuk

Řešená lokalita

Stávající odtokové linie

- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:

- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:5 000
1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

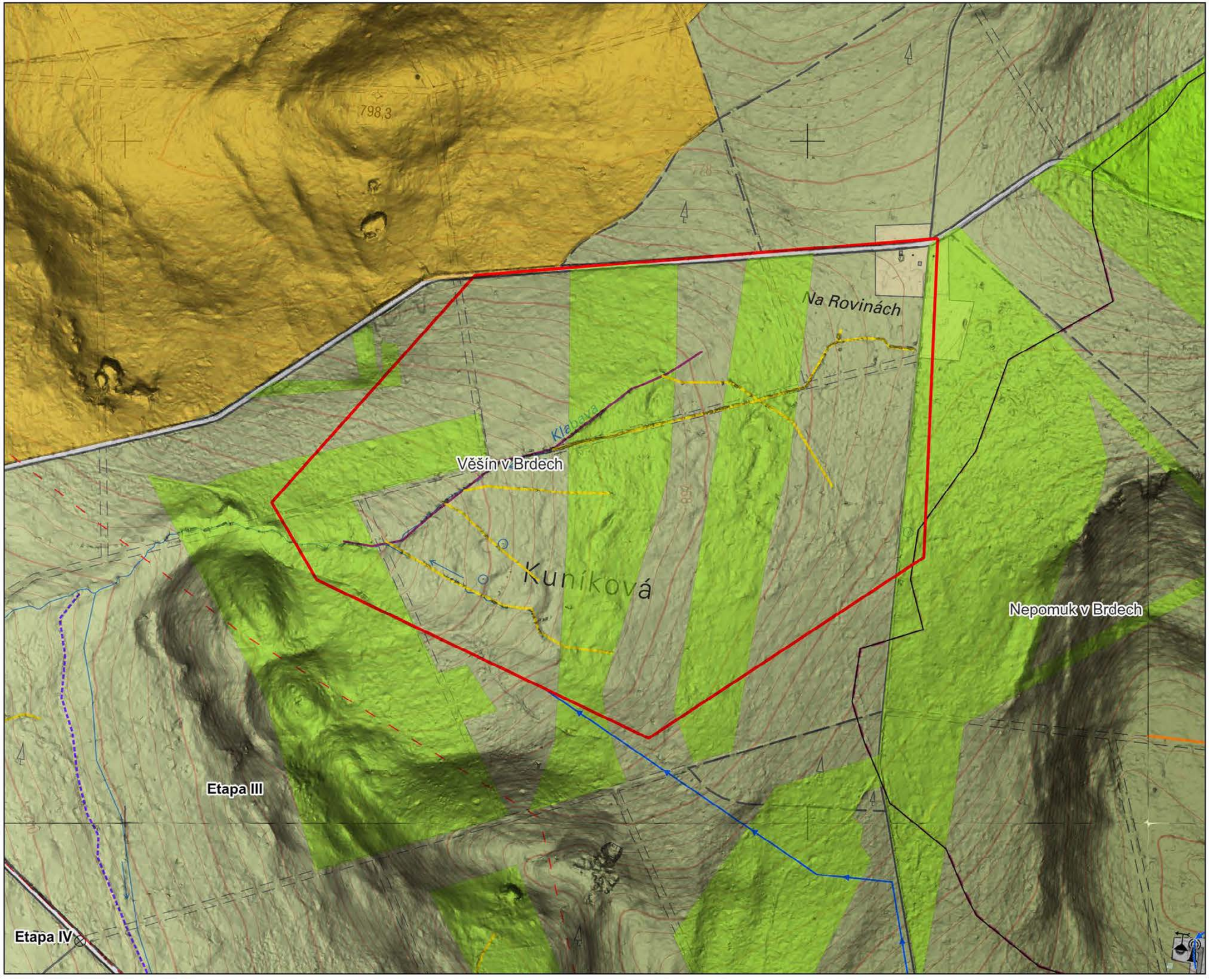
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

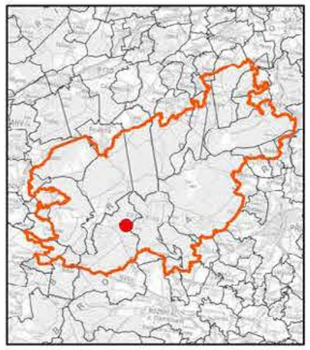
Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramenitě

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace

Na Rovinách
Klabava
Věšín v Brdech
Kuníková
Nepomuk v Brdech
798,3
701,74





Lokalita 9

Prameniště Klabavy

Priorita **D**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

4. Morfologie terénu s konceptem návrhu

3.4.3. Site 12 - Bahna - Vlčí potok Brook

Site	Bahna - Vlčí potok Brook	Order No.	12
Region	Pilsen	Municipality with extended competence	Rokycany
Municipality	Strašice	Cadastral area	Strašice in Brdy
Catchment area of IV. order	Vlčí potok, Ledný potok	Hydrological Order No.	1-11-01-012, 1-11-01-015

Current state:

Site 12 is in the cadastral area of Strašice in Brdy, which is part of the village of Strašice. In terms of administration, the village of Strašice falls under the municipality of Rokycany (municipality with extended competence) in the Pilsen Region. The area is located in the II. and III. protection zone of Brdy PLA.

The site overlaps with areas of lower explosive ordnance hazard and is adjacent to an impact area named Přední Bahna.

The site is located in the central part of the area of interest, south of the impact area. The Vlčí potok and Ledný potok brooks are managed by VLS.

The site extends on the north-western slope at an elevation of 560–640 m above sea level. As for the runoff characteristics, it is a spring area with small tributaries, which are, however, severely affected by past land reclamation interventions and drainage ditches. The surface runoff is also affected by the road network, a system of skidding lines and terrain modifications associated with military activities.

At the time of the study, the site is continuously forested mainly with spruce monocultures of different ages. The habitat mapping identified areas with prevailing forest plantations of allochtonous coniferous trees (X9A), and smaller patches of ash-alder alluvial forests (L2.2).

In terms of forest typology, the site is in the vegetation zones 4 (beech) and 5 (fir-beech). The occurring target ecological series is mainly stagnic, such as *Abietum piceosum variohumidum acidophilum* and *Querceto-Abietum variohumidum acidophilum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff, which will increase local infiltration and enhance water resources. A further effect of the measures will be the connection of the channels of the streams with the adjacent floodplain and the restoration of conditions for the development of alluvial and meadow habitats.

This mainly consists of blocking drainage ditches and channels in their non-natural routes, shallowing and opening up of the modified streambed of the brook. These key measures will be complemented with measures relating to the road network, This involves a review of culverts and possible installation of new ones in valley lines.

Basic parameters of the proposal:

Total site area	142	ha
Total number of lines concerned	12	pcs
Total length of lines concerned	4,036	m
of which drainage ditches to be blocked	2,572	m
of which streambeds to be shallowed	1,464	m

Phasing:

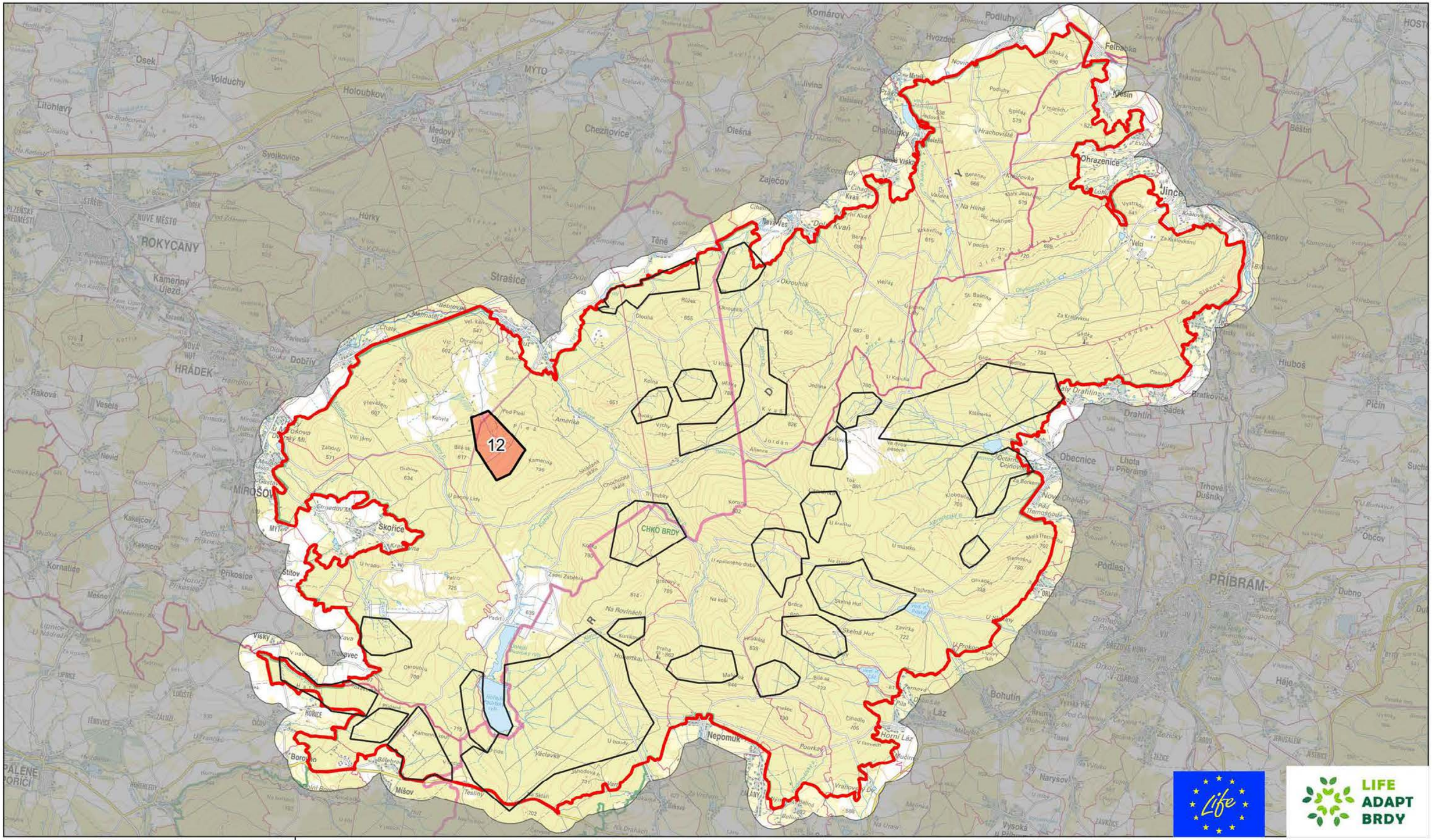
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:8 000
3.	Cadastral overview with the type of drainage lines	1:8 000
4.	Terrain morphology and the proposal concept	1:8 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



LIFE ADAPT BRDY

Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

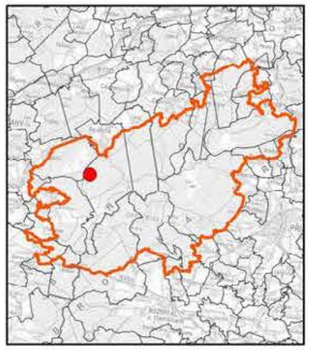
Zadavatel:

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 12

Bahna - Vlčí potok



Lokalita 12

Bahna - Vlčí potok

Priorita **D**

Řešená lokalita

Odtokové linie

Zájmové území

1:8 000

1 cm = 80 m

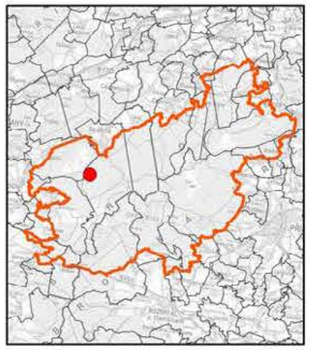
souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

Zpracováno v rámci projektu
Studie retence vody v krajině a projekt revitalizace území pramenišť

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 12

Bahna - Vlčí potok

Priorita **D**

Plzeňský kraj

ORP:
Rokycany - 559717

Obce:
Dobřív
Strašice

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:8 000
1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

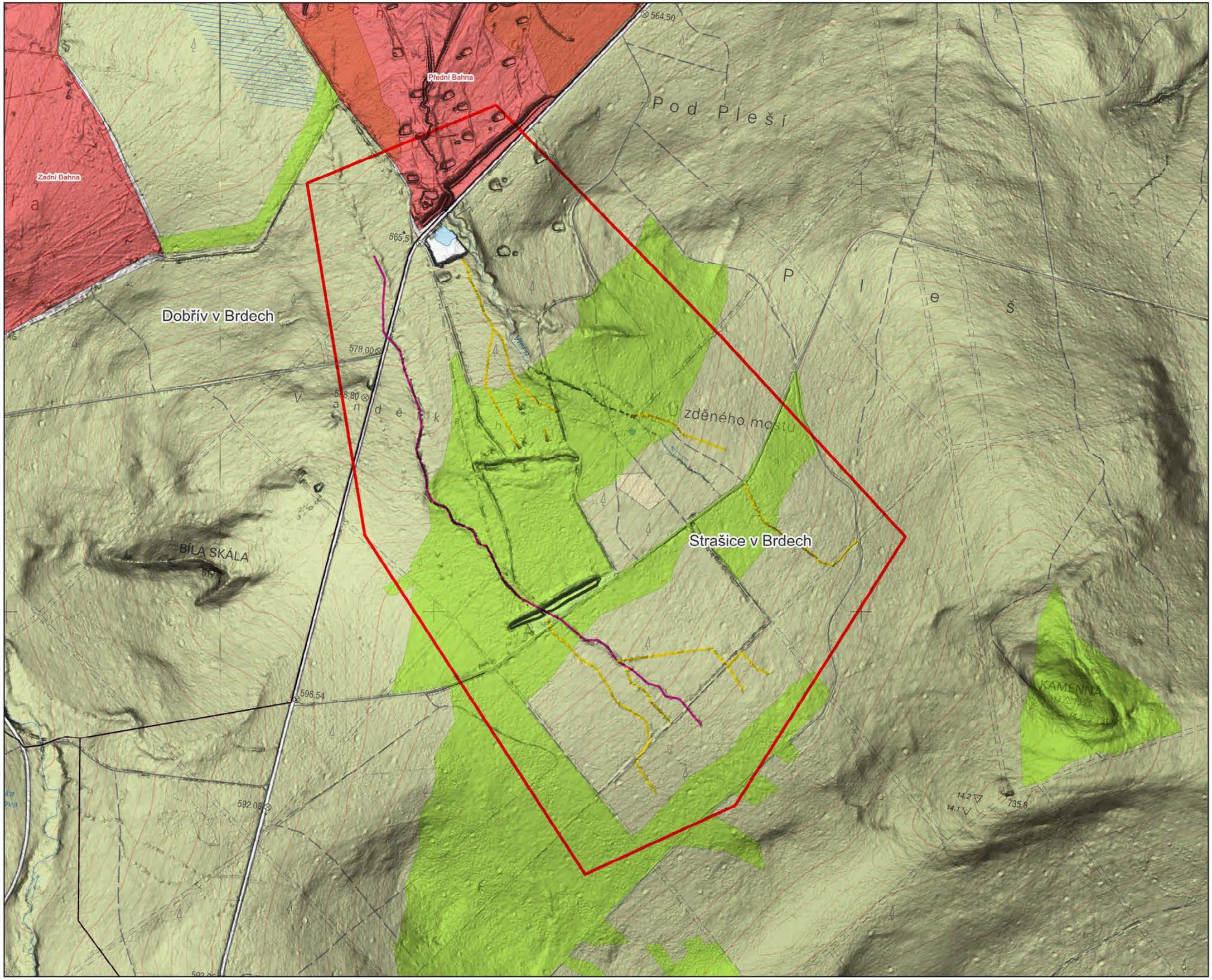
Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

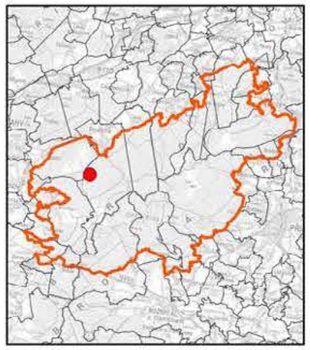
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace





Lokalita 12

Bahna - Vlčí potok

Priorita **D**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:8 000

1 cm = 80 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováváno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramoniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu

3.4.4. Site 17 - Spring area of the Obecnický potok Brook

Site	Spring area of the Obecnický potok Brook	Order No.	17
Region	Central Bohemian	Municipality with extended competence	Příbram
Municipality	Obecnice	Cadastral area	Obecnice in Brdy
Catchment area of IV. order	Třítrubecký potok Brook	Hydrological Order No.	1-11-01-007

Current state:

Site 17 is part of the cadastral area of Obecnice in Brdy, which is part of the village of Obecnice. In terms of administration, the village of Obecnice falls under the municipality of Příbram (municipality with extended competence) in the Central Bohemian Region. The area is located in the third protection zone of Brdy PLA and the protection zone of the Obecnice water reservoir.

The site overlaps with areas of lower explosive ordnance hazard and is adjacent impact areas Tok and Jordán.

The site is located in the central part of the area of interest, between impact areas. Under Decree No. 178/2021 Coll., the Obecnický potok Brook is a significant watercourse managed by state enterprise Povodí Vltavy. Other registered nameless watercourses are managed by VLS.

The site extends on the north-eastern slope at an elevation of 710–800 m above sea level. As for the runoff characteristics, it is a spring area of minor watercourses, which are severely affected by past land reclamation interventions. the surface runoff is also affected by drainage ditches, road networks and systems of skidding lines.

At the time of the study, the site is continuously forested mainly with spruce monocultures; there are clear-cut areas that are being gradually forested. The habitat mapping identified areas with prevailing waterlogged spruce forests (L9.2B) and bog spruce forests (L9.2A), and similar habitats.

In terms of forest typology, the site is mainly in vegetation zone 5 (fir-beech). The local target ecological series are stagnic and ash, such as *Abietum piceosum variohumidum acidophilum* and *Fraxineto-Alnetum montanum*.

Proposal:

Target state:

The target state is the restored natural water regime and the elimination of inappropriate interventions in the small watercourses in the site. The aim is to make use of the retention potential of the shallow soil horizon in the spring area and slow down the surface runoff, which will increase local infiltration and enhance water resources. A further effect of the measures will be the connection of the channels of the streams with the adjacent floodplain and the restoration of conditions for the development of target forest habitats.

This mainly consists of blocking drainage ditches and channels in their non-natural routes, shallowing and opening up of the modified streambed of the brook. These key measures will be complemented with measures relating to the road network, which involve a review of culverts and possible removal of redundant transport lines that form preferential routes of surface runoff.

Basic parameters of the proposal:

Total site area	66	ha
Total number of lines concerned	27	pcs
Total length of lines concerned	5,008	m
of which drainage of roads and roads	2,652	m
of which drainage ditches to be blocked	1,693	m
of which streams to be revitalized or opened	662	m

Phasing:

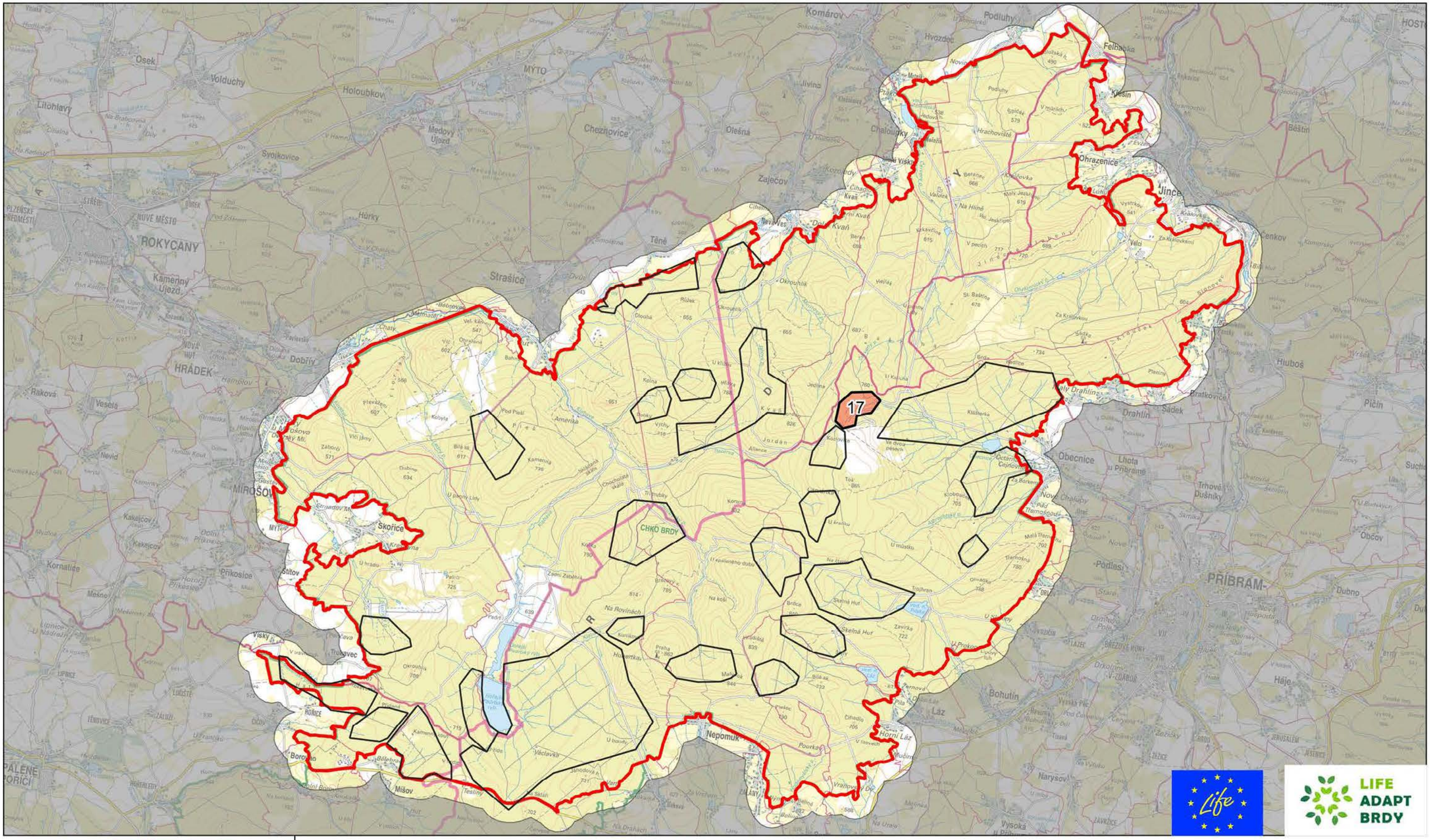
Given the size and consistency of the site, we propose to address the site in a single phase. The works shall proceed with respect to the water run-off from the site so that the raised groundwater level does not hinder subsequent construction activities.

Annexes:

1.	Overview of the current situation	1:100 000
2.	General overview of forest types	1:5 000
3.	Cadastral overview with the type of drainage lines	1:5 000
4.	Terrain morphology and the proposal concept	1:5 000

STUDIE RETENCE VODY V KRAJINĚ A PROJEKT REVITALIZACE ÚZEMÍ PRAMENIŠTĚ

(101074426 — LIFE21-CCA-CZ-LIFE Adapt Brdy — LIFE-2021-SAP-CLIMA)



Zhotovitel:

Vodohospodářský rozvoj a výstavba a.s.
Nábřežní 90/4
150 00 Praha 5

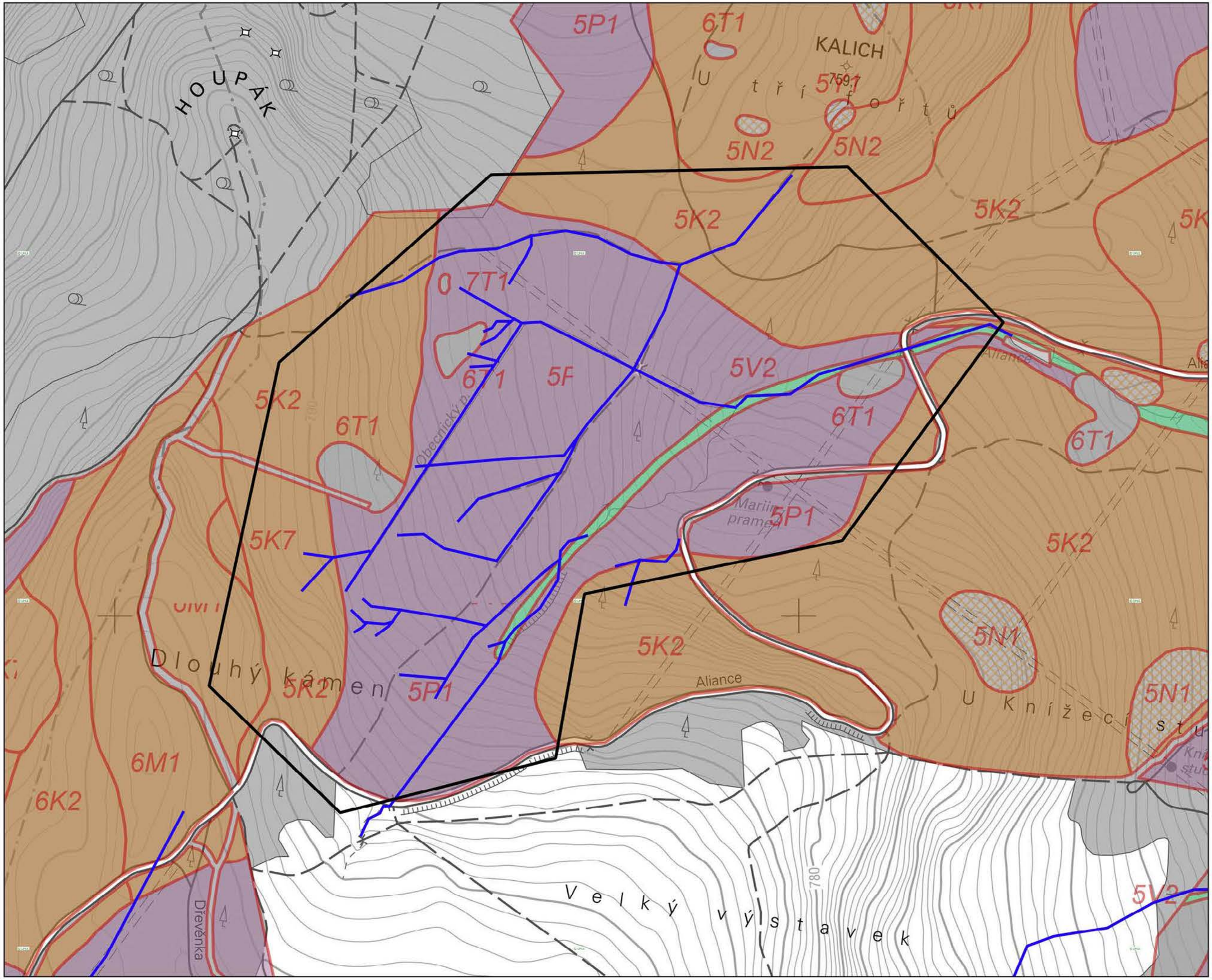
Zadavatel:

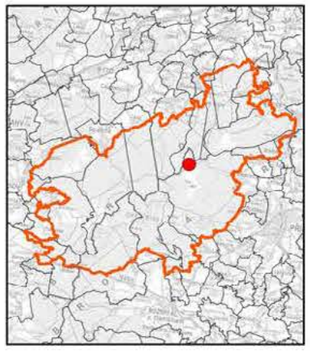
VOJENSKÉ LESY A STATKY ČR, s.p.

Vojenské lesy a statky ČR, s.p.
Pod Juliskou 1621/5
160 00 Praha 6 - Dejvice

Lokalita 17

Prameniště Obecnického potoka





Lokalita 17

Prameniště Obecnického potoka

Priorita **D**

Řešená lokalita

Odtokové linie

Zájmové území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

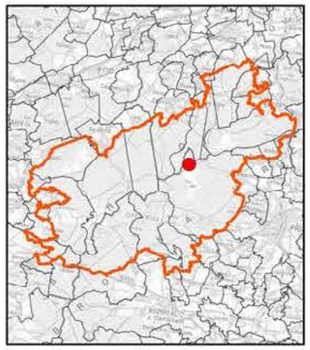
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území pramenišť

LIFE ADAPT BRDY

2. Situace lesních typů



Lokalita 17

Prameniště Obecnického potoka

Priorita **D**

Středočeský kraj

ORP:
Příbram - 539911

Obce:
Obecnice

Řešená lokalita

Stávající odtokové linie
- Cesta
- Odvodnění cest
- Příkop
- Upravený vodní tok
- Přirozený vodní tok

Pozemky dle vlastníků:
- ČR - Vojenské lesy
- ČR - Lesy České republiky
- ČR - Ministerstvo obrany
- Obec
- Soukromý subjekt

Zájmové území
Katastrální území

1:5 000
1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

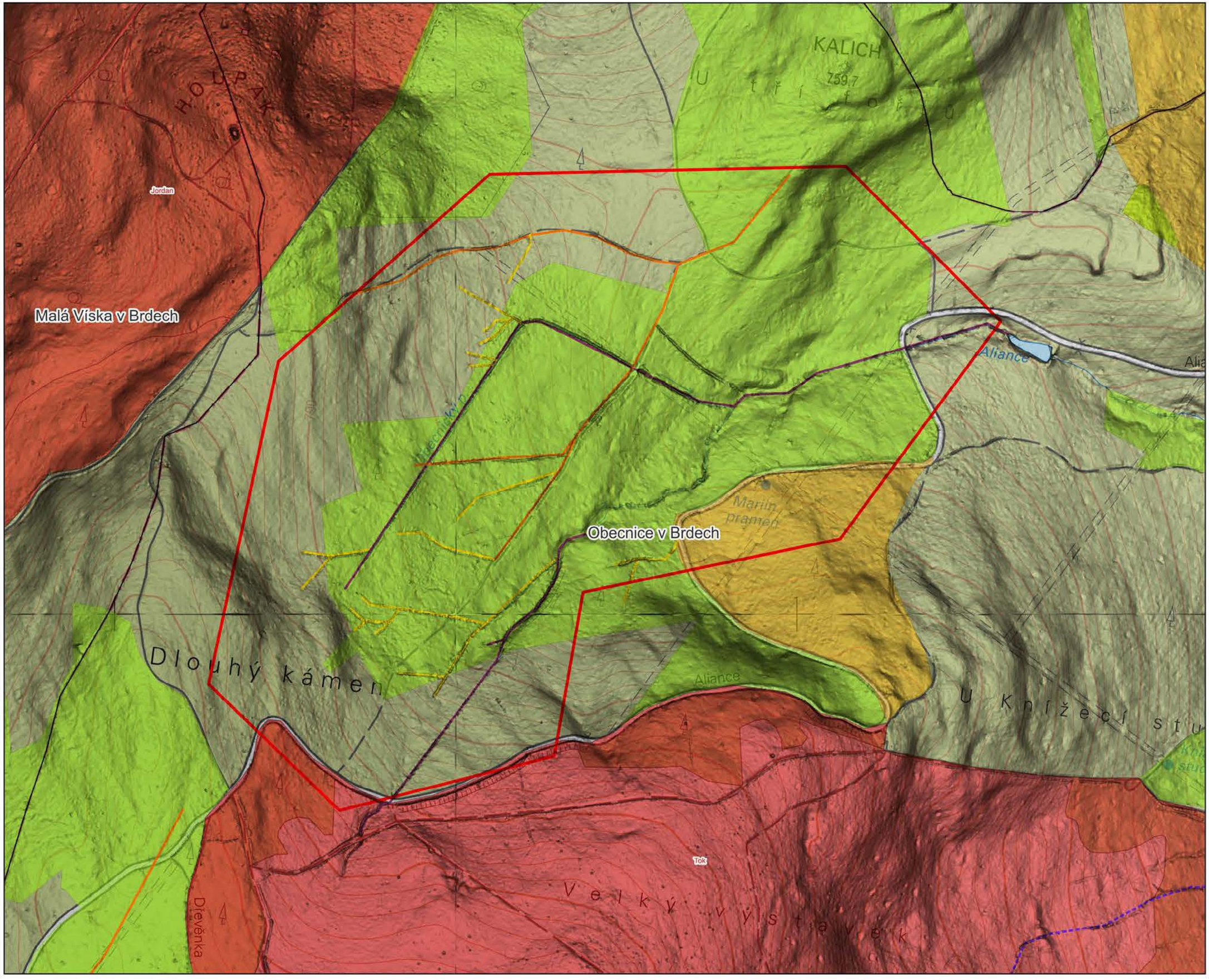
VLS VOJENSKÉ LESY A STATKY ČR, s.p.

Zpracováno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

3. Typ odtokové linie na katastrální situace

Malá Víska v Brdech
Obecnice v Brdech
KALICH 759,7
U tří fořtů
HOUPÁK
Dlouhý kámen
U Knížecí stu
Velký výstavek
Aliance
Mariin pramen
Obecnický p.
Dřevěnka



Lokalita 17

Prameniště Obecnického potoka

Priorita **D**

Řešená lokalita

Odtokové linie - Návrh

- Vymělčení
- Rozvolnění, revitalizace
- Bez zásahů, připojení na přirozený odtok
- Opatření vázaná na cestní síť
- Zablokování

Pyrotechnické ohrožení

- Nižší riziko
- Vysoké riziko
- Dopadové plochy

OPVZ

Zájmové území

Katastrální území

1:5 000

1 cm = 50 m

souřadnicový referenční systém S-JTSK
výškový referenční systém Bpv po vyrovnání

Zadavatel: VOJENSKÉ LESY A STATKY ČR, s.p.
Zhotovitel: Vodohospodářský rozvoj a výstavba a.s.

VLS VOJENSKÉ LESY A STATKY ČR, s.p.

VRV

Zpracovánno v rámci projektu:
Studie retence vody v krajině a projekt revitalizace území prameniště

LIFE ADAPT BRDY

4. Morfologie terénu s konceptem návrhu