

PROLINE-CE

WORKPACKAGE T1, ACTIVITY T1.2

REVIEW OF BEST MANAGEMENT PRACTICES FOR DRINKING WATER SUPPLY ISSUES

D.T1.2.1 Country-specific best management practice reports

SLOVENIA

February, 2017





Contributors, name and surname	Institution
Banovec Primož	University of Ljubljana, FGG (PP4)
Bračič Železnik Branka	Public Water Utility JP VO-KA (PP5)
Brenčič Mihael	University of Ljubljana, NTF (PP4)
Cilenšek Ajda	University of Ljubljana, FGG (PP4)
Čenčur Curk Barbara	University of Ljubljana, NTF (PP4)
Torkar Anja	University of Ljubljana, NTF (PP4)
Verbovšek Timotej	University of Ljubljana, NTF (PP4)

Lead Institution:	University of Ljubljana
Lead Author/s	Barbara Čenčur Curk
Contributors	PP4, PP5
Date of last release	April 2017





Contents

1. Introduction	5
2. Mountain sites.....	6
2.1 Forest	6
2.1.1. BP MF1 Protective forests.....	6
3. Plain sites	7
3.1 Agriculture	7
3.1.1. BP PA1 Implementation of Agricultural Advisory Service	7
3.1.2. BP PA2 Organic farming in DWPZs	7
3.1.3. BP PA3 Restriction of fertilisers and manure use in DWPZs.....	7
3.1.4. BP PA4 Fertilization plan and diary	7
3.1.5. BP PA5 Storage facilities for manure	8
3.2 Grassland	9
3.2.1. BP PG1 Restriction of fertilisers and manure use in DWPZs	9
3.3 Wetland.....	9
3.3.1. BP PW1 Preservation and revitalization of wetlands on floodplains - Creation and maintenance of riparian wetlands.....	9
3.3.2. BP PW2 Establishment of constructed wetlands for water treatment	10
3.4 Forest	11
3.4.1. BP PF1 Protective forests	11
3.5 Urban areas	11
3.5.1. BP PU1 Establishment of Constructed wetlands for water treatment	11
4. Special sites	12
4.1 Riparian strips	12
1.1.1. BP SRF1 Protective forests.....	12





5. General Best practices	13
5.1 Flood measures.....	13
5.2 Measures for drinking water quality and quantity	14
5.3 Prohibitions, restrictions and protective measures for drinking water protection zones depending on the protection level in DWPZ I (VVO I), DWPZ II (VVO II) or DWPZ III (VVO III)	14
5.3.1 Urban areas.....	14
5.3.2 Industrial areas	20
5.3.3 Transport.....	21
5.3.4 Agriculture area	22
5.3.5. Forest.....	24





1. Introduction

The aim of this concept is to provide the review of best practices regarding different types of land use (agriculture, grassland, forestry) respectively vegetation cover (wetland), aiming at water protection and mitigating floods, resulting from several studies lined out in former projects. The Best Practice Catalogue is partially derived from the SEE project CC-WARE and further projects respectively studies.

Best management practices are divided into the three clusters according to WP T2 (Pilots) and contain a general description, advantages and challenges of the respective measure. Each measure is evaluated due to its respective water protection functionality, costs, duration of implementation and time interval of sustainability.

The name of best practice measure is created by the first letters of the respective cluster and its subcategories (for example BP MF1 - Best practice for mountain region, subcategory forest). If the relevant measure also fits to another cluster the respective additional valid cluster is added with brackets.





2. Mountain sites

2.1 Forest

2.1.1. BP MF1 Protective forests

Description of the measure

Establishing of protective forests for protection of land from landslides and rock crumbling. These are forests on steep slopes or banks of waters, forests, exposed to strong winds, forests in torrential areas withhold excessive discharge of water and thus protect the land from erosion. Protective forests also form forest belts, which protect forests and land from wind, water, snowfall and avalanches.

Table 1. Mountain sites: Forest - Best practices

	Water protection functionality	Cost of the measure	Duration of implementation	Time interval of sustainability
BP MF1	High	Middle	Short	High



3. Plain sites

3.1 Agriculture

3.1.1. BP PA1 Implementation of Agricultural Advisory Service

Description of the measure

The task of the Agricultural Advisory Service is to inform farmers about their duties in case they receive different subsidies. If farmers receive subsidies, they are required to comply with the requirements. Agricultural Advisory Services provide aid to farmers in technology, design fertilization plan, organise trainings for the use of pesticides (plant protection products). Trainings for pesticide use are compulsory every 5 years. Agricultural Advisory Services cooperate with farmers through personalized advice and lectures in the winter, which are mandatory each 5 years.

3.1.2. BP PA2 Organic farming in DWPZs

Description of the measure

Agricultural Advisory Services encourage farmers to organic farming without pesticides and fertilizers in the DWPZs.

3.1.3. BP PA3 Restriction of fertilisers and manure use in DWPZs

Description of the measure

In the 1st DWPZ (adjacent to the capture area) is forbidden: fertilization with mineral fertilizers containing nitrogen, fertilization with manure and slurry, ploughing of permanent grassland, irrigation with water with added plant nutrients. Farmers get money compensations because of smaller harvest.

3.1.4. BP PA4 Fertilization plan and diary

Description of the measure

Fertilization plan is made on the basis of soil analysis and type of crop. Measured parameters for soil analyses are: pH, P and K content, content of organic matter and depth of soil sample. Fertilization plan includes the amount of manure/fertilizer that can be applied in a single parcel, which type of crop will be cultivated and which plant nutrient will be applied. 170 kg N/ha is allowed.





Basic fertilization is carried out in the autumn (N-P-K fertilizers and livestock manure). During the growing season it is additionally fertilized (for vegetables is added N), which is prohibited in farming in DWPZ.

Fertilization diary is conducted for each parcel. The farmer must keep a diary of fertilization in which it can be seen when it fertilizers were applied and how many plant nutrients have been applied per parcel.

3.1.5. BP PA5 Storage facilities for manure

Description of the measure

Storage facility must be large enough to store manure and slurry for six months. The farmer has to keep a record of slurry amount and have a plan for manure spreading. 170 kg N/ha is allowed. The farmer has to have manuring diary with information about time, locations and amounts of manure spreading. All these data are not checked and are based upon honesty.

In 2006 subsidies were granted for the arrangements of storage facilities for livestock manure. The control was carried out by the Inspectorate of the RS for agriculture, forestry, hunting and fisheries, who only inspected schemes and building project, but not implementation in the space.

Table 2. Plain sites: Agriculture - Best practices

	Water protection functionality	Cost of the measure	Duration of implementation	Time interval of sustainability
BP PA1	High	Middle	Short	High
BP PA2	High	Low	Short	High
BP PA3	High	Middle	Short	High
BP PA4	High	Low	Short	High
BP PA5	High	Middle	Short	High





3.2 Grassland

3.2.1. BP PG1 Restriction of fertilisers and manure use in DWPZs

Description of the measure

In the 1st DWPZ (adjacent to the capture area) is forbidden: fertilization with mineral fertilizers containing nitrogen, fertilization with manure and slurry, ploughing of permanent grassland, irrigation with water with added plant nutrients. Farmers get money compensations because of smaller harvest.

Table 3. Plain sites: Grassland - Best practices

	Water protection functionality	Cost of the measure	Duration of implementation	Time interval of sustainability
BP PG1	High	Middle	Short	High

3.3 Wetland

3.3.1. BP PW1 Preservation and revitalization of wetlands on floodplains - Creation and maintenance of riparian wetlands

Description of the measure

Floodplains are areas immediately adjacent to the stream and are periodically inundated with water. They present a vital part of the river ecosystem. The main function of these areas is carrying excess waters in time of flood events and consequently reducing the flood water's potential energy. Besides, the functions of these areas are improving water quality, reducing runoff and erosion, providing an environment for a diversity of plant and animal life and helping to sustain base flow of adjacent streams and rivers during drought conditions. Floodplains reduce the inputs of nutrients is important to retain and maintain the floodplain land in a state close to 'natural' due to its function as a buffer zone between agricultural or urban land and the stream. Floodplains can successfully reduce nitrates (nitrogen and phosphorus) from the drainage water from agricultural lands flowing through these areas towards the stream (Peacock, 2013). Often, the agricultural lands are extended very close to the stream and the buffer zones between fields and stream is very narrow (less than 0.25 m). Nitrate removal of the buffer zone was found to be effective up to 16 m width, while after does not seem to increase. In general phosphate is removed efficiently from surface runoff and the greatest removal is closest to the source as for example 60 % within 8 m and 95 % within 16 m on an experimental grass buffer area (Vought et al. 1994). Drained floodplains and change to agricultural areas lead to remove the fluctuating water levels which are important for the sustained system, because



riparian ecosystems are adapted to water level variation, leading to varying degrees of soil oxidation, which in turn are critical to nutrient retention (Peacock, 2013). For ensuring the function of floodplains as the buffer zone, the vegetation cover is crucial. There is uncertainty about the relative roles of different vegetation types. The grass and herbaceous vegetation may be more efficient at trapping particulates from storm flow and forest vegetation more efficient at removing pollutants from groundwater (Peacock, 2013). Several researches investigated the importance and extend of different vegetation types (Haycock & Pinnay, 1993; Leonardson et al., 1994; Lowrance, 1996; and others) that are described in more details within the measure description of 'Creation and maintenance of riparian wetlands'.

3.3.2. BP PW2 Establishment of constructed wetlands for water treatment

Description of the measure

The natural ability of wetlands to retain the nutrients and sediment can be successfully used in plant treatment plants for the purification of communal and industrial waste water before discharging to the river. Water flows through wetlands slow down and the suspended solids trapped by vegetation and therefore significantly reduce from the water. Besides also the content of other pollutants in the water reduce due to transforming into led soluble forms taken up by plants or become inactive (EPA, 2004).

The constructed wetlands are treatment systems that have been designed and constructed to utilize the natural processes involving wetland vegetation, soils, and their associated microbial assemblages to improve water quality (Shutes, 2001; EPA, 2004; Vymazal, 2010).

Constructed wetlands are recognised as useful solution for:

- reducing nutrients and suspended particles from water from arable land (agriculture, livestock) e.g. in local depressions inside arable land to retain of excess water instead runoff through channels,
- purification of municipal waste water (individual houses, settlements, tourist resorts etc.) e.g. instead of direct discharge by canal systems to streams or as filtering fields for wastewater before entering the environment,
- purification of industrial waters (process waters and leachate; factories wastes, mine drainage, rafinery process waters),
- reducing the stormwater runoff (residential, public buildings etc.),
- treatment of wastewater with possibility of water reuse (watering, fire fighting).



Table 4. Plain sites: Wetland - Best practices

	Water protection functionality	Cost of the measure	Duration of implementation	Time interval of sustainability
BP PW1	High	Middle	Middle	High
BP PW2	High	Middle	Middle	High

3.4 Forest

3.4.1. BP PF1 Protective forests

Description of the measure

Establishing protective forests - forests at banks of waters preventing agricultural pollution to waters and flooding.

Table 5. Plain sites: Forest - Best practices

	Water protection functionality	Cost of the measure	Duration of implementation	Time interval of sustainability
BP MF1	High	Middle	Short	High

3.5 Urban areas

3.5.1. BP PU1 Establishment of Constructed wetlands for water treatment

Description of the measure

Dispersed settlements present the risk for drinking water resources due to waste water from sewages systems and septic tanks that influence on the water quality. Besides increased number of population and consequently greater water consumption can cause also deficiency of drinking water. Therefore some additional measures are needed: improvement of water distribution network (reduction of water loses), installation of water saving devices in buildings, rainwater harvesting for garden irrigation, toilet and washing machines use, and reuse of grey-water as water for irrigation and toilet washing (Bogardi et al, 2012). Various types of constructed wetlands differ in their main design characteristics as well as in the processes which are



responsible for pollution removal. The constructed wetland for wastewater treatment may be classified according to the wetland hydrology (free water surface and subsurface systems) and subsurface flow constructed wetlands could be further classified according to the flow direction (horizontal and vertical) (Vymazal, 2008, 2010).

4. Special sites

4.1 Riparian strips

4.1.1 BP SRF1 Protective forests

Description of the measure

Establishing protective forests - forests at banks of waters preventing agricultural pollution to waters and flooding.

Table 6. Special sites: Riparian strips - Best practices

	Water protection functionality	Cost of the measure	Duration of implementation	Time interval of sustainability
BP MF1	High	Middle	Short	High

5. General Best practices

In this section we describe best practise regardless to the different types of land use and are applicable to all. General best practises are divided into two main groups; flood measures and measures for drinking water quality and quantity.

5.1 Flood measures

1. Identification of flood hazard zones and consideration of their limitations;
2. Identification, development and protection of flood retention volumes;
3. Adaptation of land use on watershed level;
4. Performance of hydrological and meteorological monitoring;
5. Management archives and registries in the field of flood management;
6. Education and awareness rising on flood risk and flood management;
7. Planning, design and construction of flood management structures;
8. Development of individual flood protection measures (flood-proofing);
9. Regular control of the existing constructive flood protection measures;
10. Regular maintenance of the watercourses, hydraulic works and river banks;
11. Regular supervision of river network status;
12. Adequate management of hydraulic structures;
13. Stable financing of flood management services;
14. Development of emergency plans and response mechanisms for the flooding scenarios;
15. Flood forecasting systems;
16. Flood warning systems;
17. Emergency and response measures in the case of floods;
18. Flood damage assessment protocols and mitigation/reconstruction works after the flood events;
19. Documentation and analysis of past flood events;
20. Applied measures addressing legal, financial and system framework.

5.2 Measures for drinking water quality and quantity

1. Determination of limit values for drinking water;
2. Defined yearly monitoring for drinking water (sampling sites, frequency of sampling, samplers and laboratories that perform testing of samples);
3. Criteria for determining the external and internal boundaries of water protection areas;
4. Determination of the drinking water protection zones (DWPZ): border of capture area (fenced); the narrowest area with the most rigorous protection regime (I); narrow area with rigorous protection regime (II); and, wider area (the whole recharge area) with moderate protection regime (III);
5. Defined drinking water protection zones for karst, porous and fissured aquifers and for surface waters;
6. Defined prohibitions, restrictions and protective measures for drinking water protection zones depending on the protection level in DWPZ I, DWPZ II or DWPZ III.

5.3 Prohibitions, restrictions and protective measures for drinking water protection zones depending on the protection level in DWPZ I (VVO I), DWPZ II (VVO II) or DWPZ III (VVO III)

5.3.1 Urban areas

Table 7. Protection level in urban areas

I	RESIDENTIAL BUILDINGS	VVO I	VVO II	VVO III
1	Dwelling buildings	–	pd	+
2	Multi-dwelling building	–	pd	+
3	Residential building for special purposes	–	pd	+

II	NON-RESIDENTIAL BUILDINGS	VVO I	VVO II	VVO III
1	Hospitality buildings	–	pd	+
2	Administrative and office buildings	–	pd	+
3	Commercial buildings	–	pd	+
4	Fair halls, exhibition spaces	–	pp	+
5	Gas stations	–	–	pp
6	Buildings for other service activities	–	pd	+
7	stations, terminals, building for the implementation of the electronic communications and related	–	pp	pp



	buildings			
8	Garage buildings	-	pp	pd
9	Industrial buildings	-	pp	pp
10	Reservoirs, silos and warehouses, except tanks for natural gas, silos and warehouses of dangerous substances	-	-	-
10a	silos and warehouses of hazardous substances	-	pp	pp
10b	Reservoirs for natural gas	-	-	pd
11	Buildings for culture and entertainment	-	pd	+
12	Museums and libraries	-	pd	+
13	Buildings for education and scientific research	-	pd	+
14	Health care buildings	-	pp	pd
15	Sports halls	-	pd	+
16	Buildings for crop production, including greenhouses, which are not classified as simple structures	-	pp	pd
17	Buildings for breeding animals (up to 5 livestock units)	-	pd	pd
17a	Buildings for breeding animals (more than 5 livestock units)	-	pp	pp
18	Buildings for harvesting	-	pd	+
19	Other non-residential agricultural buildings	-	pd	+
20	Buildings for religious services	-	pd	+
21	Cemetery buildings and supporting facilities	-	pd	pd
22	Cultural monuments	+	+	+
23	Other non-residential buildings not elsewhere classified	-	pd	+

IV	PIPELINES, COMMUNICATION AND POWER LINES	VVO I	VVO II	VVO III
1	Oil and portable (transport) pipelines, except natural gas	-	-	pip
1a	Portable gas pipelines for natural gas	-	pip	pp
2	Portable water supply	pp	pd	p
3	Facilities for pumping, filtering and capture water	pd	pd	p
4	Portable communications networks	-	pd	+
5	Portable electricity lines	-	pd	+
6	Distribution pipelines, except natural gas	-	pip	pip
6a	Distribution pipelines for natural gas	-	pd	pd





7	Distribution pipes for potable and process water	pd	+	+
8	Distribution pipes for hot water, steam and compressed air	–	pd	+
9	Water towers, fountains and hydrants	pd	pd	pd
10	Pipelines for waste vodo ²⁰	–	pd	pd
10a	Outflow or outflow facility of the discharge of industrial waste water to the surface of the soil or the infiltration into the soil, except for the discharge of waste water from the hardened, paved or with other material coated surface to the surface of the soil or the infiltration into the ground	–	–	pd
10b	Outflow or outflow facility of the discharge of municipal waste water to the surface of the soil or the infiltration into the soil, except for the discharge of waste water from the hardened, paved or with other material coated surface to the surface of the soil or the infiltration into the ground	–	pd	pd
10c	Outflow or outflow facility for discharge of waste water from paved, paved or covered with other material surfaces on the surface of the soil or infiltration into the ground over the oil trap	–	pd	pd
10d	Outflow or outflow facility discharges wastewater directly into surface water	–	pd	pd
10e	Outflow or outflow facility for draining rainwater from roof surfaces on the surface of the soil or infiltration into the ground	–	pd	+
14	Wastewater treatment plant	–	pip	pip
15	The distribution electricity lines and distribution communication networks	pp	pd	+
16	Facilities for artificial recharge or augmentation of groundwater from one aquifer to another	pp	pp	pp

IV	OTHER CIVIL ENGINEERING FACILITIES ^{1,3}	VVO I	VVO II	VVO III
1	Sports grounds	–	pp	pd
2	Other civil engineering constructions for sport, recreation and leisure, with the exception of the golf course	–	pp	pd
	Golf course	–	pp	pp
3	Military facilities	–	–	pp
4	Facilities for the protection against harmful effects of water in deprived areas		pp	pd





5	Landfill of hazardous waste other than landfill for non-hazardous or inert waste	-	-	-
5a	Landfills for non-hazardous or inert waste	-	-	pp
5b	Facilities for the collection or treatment of hazardous waste with the exception of facilities for the collection and processing of non-hazardous	-	-	pp
5c	Facilities for the collection and processing of non-hazardous waste	-	pp	pp
6	Cemetery	-	pd	pp
7	Parking	-	pp	pd
8	Other civil engineering facilities not elsewhere classified	-	pp	pd

	UNPRETENTIOUS FACILITIES* ^{1,3}	VVO I	VVO II	VVO III
1	Facilities for personal needs:			
	Woodshed, single floor storey shed, arbor	+	+	+
	Garage, glasshouse, swimming pool, hardened driveway	pd	+	+
	Closed septic tank	-	-	-
	Flow septic tank	-	-	-
2	Fences	+	+	+
3	Scarp and retaining walls	+	+	+
4	Auxiliary infrastructure:			
	Sidewalk, bike trail, stop place, base stations intended for public telecommunications services, aerial drug, area of telecommunications equipment in the container, auxiliary facilities for environmental monitoring, auxiliary facilities of water infrastructure	pd	+	+
	Small municipal wastewater treatment plant with a capacity of less than 50 population units	-	pp	pd
5	Auxiliary agroforestry facilities:			
	hayrack, barn, barn, farm shed, forest road, constructed forest track, the Polish route, a concrete trough	+	+	+
	silos, water reservoir dug into the soil, greenhouse, game breeding	-	pd	+
	cesspit, cesspool, tank liquid manure	-	pd	+
6	Temporary structures, designed for seasonal tourist attractions and events:			





	kiosk type container pier	pd	+	+
7	The memorial	pd	+	+
8	Facilities for advertising	-	+	+
9	Application	pd	+	+
10	Facilities for telecommunications equipment	pd	+	+

	SIMPLE FACILITIES* ^{1,3}	VVO I	VVO II	VVO III
1	Facilities for personal needs:			
	roof, rainwater tank, paved courtyard	+	+	+
	single-story ground floor	-	-	+
	capture, borehole or a well for their own drinking water supply	pd	pd	pd
	tank for liquefied petroleum gas or oil with a connection to the facility	-	pd	pd
	small municipal wastewater treatment plant with a capacity of less than 50 population units	-	-	-
2	Auxiliary infrastructure:			
	auxiliary road facilities, except the drainage of roads; auxiliary railway facilities other than facilities except the drainage of railway tracks; airport auxiliary buildings; auxiliary port facilities except facilities for drainage port platforms; auxiliary energy facilities of telecommunication antennas and transmitters where the signal does not cover more than 100 m zone around the transmitting point; auxiliary municipal facilities, with the exception of model or prefabricated septic tanks and small sewage treatment plants with a capacity of less than 50 population units and collection points of separate municipal waste fractions; auxiliary facilities at border crossings; auxiliary facilities for monitoring the state of the environment	pd	+	+
	borehole or a well needed for research	pd	pd	pd
	retail drainage of roads, drainage facility for railway tracks, building drainage port platforms	-	pd	+
	type or prefabricated septic tanks, small urban waste water treatment plants with a capacity of less than 50 population units	-	-	-
	Collection centres of separate fractions of municipal waste	-	pd	pd
3	Auxiliary defence facilities	pd	+	+





4	Auxiliary agroforestry facilities:			
	beehive, wooded nature trail, granary, hayrack, barn, fencing for grazing livestock, built forest track, field road forest road	pd	+	+
	farmyard release	-	pd	pd
	greenhouse, pond, feeding stations, milking parlour, borehole or a well for irrigation of agricultural land	-	pd	+
5	Temporary facilities:			
	open a seasonal outdoor seating, indoor space with an inflatable structure or assembly tent, the stage with a roof, a temporary grandstand for spectators in the open	pd	+	+
	indoor event space with sanitary facilities, a circus	-	pd	+
5a	Temporary facilities intended for storage	-	pd	+
6	The training facilities intended for sports and outdoor recreation:			
	bike trail, hiking trail, walking trail and trim trail, airfield, golf sports	pd	+	+
	ski resort	-	pp	pd
	sports shooting place	-	pd	+
7	The training facilities intended for defence exercises and exercises for protection, rescue and assistance	-	pd	+
8	The memorial	-	+	+
9	Urban equipment			
	overhung waiting room, public bicycle, public telephone, transparent, sculpture, fountain or decorative pool, padlocks, playground	+	+	+
	prefabricated sanitary unit	-	-	-

	MAINTENANCE OF FACILITIES*1,3	VVO I	VVO II	VVO III
1	Investment maintenance:			
	installation of wind turbines for electricity production, installation of air conditioners, construction of internal installations, construction of ramps for access to the facility, organization yards, installation of roof windows, installation of TV antennas pet	+	+	+
	installation of generator to produce electricity, installation of heating equipment, installation of solar collectors or solar panels, installation of heat pumps	pd	pd	+





	implementation wells geoprobes	-	pd	+
	REGULAR MAINTAINENECE			
	Regular maintenance	+	+	+

5.3.2 Industrial areas

Table 8. Protection level in industrial areas

V	COMPLEX INDUSTRIAL FACILITIES ^{1,3}	VVO I	VVO II	VVO III
1	Mining facilities (including gravel pits)	-	-	pip
2	Energy facilities	-	pip	pip
3	Facilities of the chemical industry, except for those from 3 a and 3 b	-	-	
3a	Devices that can cause large scale pollution in accordance with regulations governing the protection of the environment, other than those referred to in CC.Si 24203 from 5, 5a, 5b and 5c	-	pp	pp
3b	Facilities which represent a source of risk to the environment due to major accidents involving dangerous chemicals in accordance with the regulations governing environmental protection	-	pp	pp
6	Other complex industrial facilities, not elsewhere classified, except for those from 3 a and 3 b	-	-	pip

	THE IMPLEMENTATION OF CONSTRUCTION WORK ^{1,3}	VVO I	VVO II	VVO III
1	Construction site in accordance with the regulations governing the construction of buildings on land with an area of more than 1 ha	-	pp	pd
2	Parking on construction site for machinery and appliances (excluding maintenance vehicles and machinery)	-	pd	+
3	Space for the maintenance of vehicles and machines and temporary storage of fuels and lubricants or special chemical agents	-	pd	+
4	Toilets on construction site	-	-	-
5	Temporary storage at the construction site for concrete elements	-	pd	+
6	Supply of machinery and equipment with fuel on site (streaming fuels)	-	pp	+





7	Excavations on the construction site	pd	pd	–
8	Use and cleaning of the equipment for the manufacture of concrete, etc., used for geotechnical drilling and milling tools on construction site	–	pd	+
9	Application of shotcrete	–	pp	+
10	The use of waste building materials	–	pp	+
11	Use of construction materials made from waste from the processing of waste, the construction of buildings	–	pp	+
12	The use of building materials, from which they can secrete substances harmful to water	–	–	–
13	Cleaning and surface treatment facilities and construction material, provided it is produced wastewater (eg. washing the facade)	–	+	+
14	Changing the morphology of the landfills or removing soil	–	pp	pd
15a	Construction of sealing curtain to protect the water source	pp	pp	pd
15b	Construction sealing curtains for the remaining	–	pp	pp
16	Injection	–	pd	+
17	Installation of concrete and wooden piles to dry drilling, excavation or hammering	–	pd	pd
18	Installation of pilot drilling with flush	–	pp	pd
19	Installation of pilot with hardening in the hole	–	pp	+
20	Drilling of wells and execution for other purposes (irrigation, potable water supply, the use of geothermal energy etc.)	–	pd	pd
21	Drilling for drinking water supply	+	+	+

5.3.3 Transport

Table 9. Protection level in transport infrastructure

III	TRANSPORT INFRASTRUCTURE	VVO I	VVO II	VVO III
1	Motorways, expressways, main roads and regional roads	–	pip	pip
2	Local roads and public routes, unclassified roads and forest roads	–	pd	+
4	Main and regional railway	–	pip	pip
5	City railways	–	pip	pip
6	Airport roads and platforms except the airport	–	–	pip





	helicopter above ground on the part of the building			
6a	Heliport above ground at the building	-	pp	pp
7	Air navigation facilities	pp	+	+
8	Bridges and viaducts	-	pd	pd
9	Tunnels and subways	-	pp	pd
10	Ports and waterways	-	pd	pd
11	Dams	pp	pd	pd
12	Inlet and outlet ducts and drainage systems, except irrigation systems	-	pp	+
12a	Irrigation systems	-	pp	pp

5.3.4 Agriculture area

Table 10. Protection level in agricultural area

I	FERTILIZATION OF AGRICULTURAL LAND	VVO I	VVO II	VVO III
1	Fertilization without fertilization plan	-	-	-
2	Fertilization with mineral fertilizers containing nitrogen	-	+	+
3	Fertilization with manure and slurry	-	+	+
4	Fertilization with seasoned manure	+	+	+
5	Ploughing of permanent grassland	-	+	+
6	Irrigation with water with added plant nutrients	-	+	+
7	Temporary storage of organic fertilizers, determined in accordance with regulations governing the protection of waters against pollution caused by nitrates from agricultural sources	-	-	-
8	The use of sewage sludge, determined in accordance with the regulations governing the use of sludge from sewage treatment plants in agriculture	-	-	-
9	Fertilization with the remains of cesspools, small wastewater treatment plants or water treatment plants			
10	Fertilization with sludge produced on the holding and is a mixture of urban waste water, slurry and manure, irrespective of the time of its storage	-	-	-
11	Temporary storage of compost or digestate sludge of 1 or 2 environmental quality, as determined to the regulations governing the treatment of biodegradable waste	-	-	-





12	The use of compost and digestate sludge of 1 environmental quality, as determined to the regulations governing the treatment of biodegradable waste	-	-	+
13	The use of compost and digestate sludge of 2 environmental quality, as determined to the regulations governing the treatment of biodegradable waste	-	-	-
14	Temporary storage of sewage sludge, determined in accordance with the regulations governing the use of sludge from sewage treatment plants in agriculture	-	-	-

II	FERTILIZATION OF NON-AGRICULTURAL LAND	VVO I	VVO II	VVO III
1	Fertilization with manure and slurry	-	-	+
2	Fertilization with seasoned manure and compost from crop residues	+	+	+
3	Fertilization with mineral fertilizers containing nitrogen	-	+	+
4	Irrigation with water, which had the added plant nutrients	-	+	+
5	Fertilization with sludge produced on the holding and is a mixture of urban waste water, slurry and manure, irrespective of the time of its storage	-	-	-
6	Temporary storage of organic fertilizers, determined in accordance with regulations governing the protection of waters against pollution caused by nitrates from agricultural sources	-	-	-
7	Temporary storage of compost or digestate sludge of 1 or 2 environmental quality, as determined to the regulations governing the treatment of biodegradable waste	-	-	-
8	The use of compost and digestate sludge of 1 environmental quality, as determined to the regulations governing the treatment of biodegradable waste	-	+	+
9	The use of compost and digestate sludge of 2 environmental quality, as determined to the regulations governing the treatment of biodegradable waste	-	-	-
10	Temporary storage of sewage sludge, determined in accordance with the regulations governing the use of sludge from sewage treatment plants in agriculture	-	-	-





11	Fertilization with the remains of cesspools, small wastewater treatment plants or water treatment plants	-	-	-
12	Fertilization with the remains of cesspools, small wastewater treatment plants or water treatment plants	-	-	-

III	USE OF PLANT PROTECTION PRODUCTS ON AGRICULTURAL LAND	VVO I	VVO II	VVO III
1	Use of unauthorized plant protection products in accordance with the regulations on plant protection products	-	-	-
2	The use of plant protection products in accordance with the regulations on plant protection products on agricultural land			

IV	USE OF PLANT PROTECTION PRODUCTS ON NON-AGRICULTURAL LAND	VVO I	VVO II	VVO III
1	The use of plant protection products in accordance with the regulations on plant protection products in parks, cemeteries, green areas and sports grounds	-	-	-
2	The use of plant protection products in accordance with the regulations on plant protection products on the objects of transport infrastructure	-	-	-

5.3.5. Forest

Table 11. Protection level in forest areas

V	HANDLING IN FOREST AND FOREST LAND	VVO I	VVO II	VVO III
1	Afforestation	+	+	+
2	Fertilization with manure, liquid manure and slurry in the woods	-	-	-
3	Temporary storage of compost or digestate sludge of 1 or 2 environmental quality or sewage sludge	-	-	-
4	Fertilization with the remains of cesspools, small wastewater treatment plants or water treatment plants	-	-	-
5	The use of compost and digestate sludge of 1 environmental quality, as determined to the regulations governing the treatment of biodegradable waste	-	+	+





6	The use of compost and digestate sludge of 2 environmental quality, as determined to the regulations governing the treatment of biodegradable waste	-	-	-
7	Mobilisation for the control tree pests	-	+	+
8	Supply of machinery and equipment with fuel in the forest	-	+	+

* Unpretentious and simple objects/facilities are objects in accordance with the regulations governing the types of objects depending on the complexity.

VVO I = DWPZ I: Means the narrowest water protection zone.

VVO II = DWPZ II: Means the narrow water protection zone.

VVO III = DWOZ III: Means the wider water protection zone.

+ Means that the intervention in the environment is permitted.

- Means that the intervention in the environment is prohibited.

pd: Means that the procedure for issuing water consent for the construction of facilities and implementation of the construction works examined the effects on the water regime and the status of water bodies and water consent is issued.

pp: Means that it is exceptionally allowed the construction of facilities and implementation of construction works and water consent can be issued; (1) if to project solutions from the project for obtaining a building permit in the process of obtaining the consent of water an risk analysis of contamination is performed and the results of this analysis shows the risk of contamination from this work is acceptable and (2) if due to impact on the water regime and the status of the water body protective action is taken, where the risk analysis of contamination results that the risk of contamination from this practice is acceptable.

pip: Means that it is exceptionally permitted the construction of buildings and implementation of construction works when (1) the intervention is in accordance with the national spatial plan or detailed municipal spatial plan, which is adopted in accordance with the regulations governing spatial planning and the regulations governing placement of spatial arrangements of national significance in the area, and (2) when a comprehensive environmental impact assessment has carried out and obtained the consent in accordance with regulations governing the protection of the environment. Acceptability of impacts on the water regime and the status of water bodies and the effects of the protection measures to minimize the risk of pollution are verified by the ministry on the basis of the risk analysis of contamination in the process of issuing an opinion to the national spatial plan or detailed local plan.

