

**Assessment of the impact of the planned “Rail Baltica”
railway line section “Kabli – Estonia–Latvia border” and its
related infrastructure on the Natura 2000 site – nature
reserve “Mērnietku dumbrāji”**

Summary

2025, September

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1. Impact assessment approach

This assessment provides information on the specially protected Natura 2000 site, the nature reserve “Mērnīeku dumbrāji,” located near the planned section of the “Rail Baltica” railway line — “Kabli to the Estonian–Latvian border” and its associated infrastructure.

To outline the objectives behind the establishment of this Natura 2000 site, the following sources were consulted:

- The annex to the Law on Specially Protected Nature Territories – listing Natura 2000 sites of European importance in Latvia;
- The National Protection and Management Program for Natura 2000 Territories (2018–2030);
- Project LIFE11 NAT/LV/000371 – “NAT-PROGRAMME”, 2017;
- The Standard Data Form available through the European Nature Information System (EUNIS) database.

The assessment of impacts on the Natura 2000 site was carried out in accordance with the Cabinet of Ministers Regulations No. 300 of 19 April 2011, “*Procedure for the Assessment of Impacts on Sites of European Importance (Natura 2000)*”.

2. Current situation

Location, area, and code of the Natura 2000 site - the nature reserve “Mērnīeku dumbrāji” (code LV0522000) is located in Ainaži parish, Limbaži municipality (see Figure 1.). According to the most recent cartographic data, the total area of the site is 61 hectares. The reserve does not have designated functional zones; however, it falls within the landscape protection zone of the North Vidzeme Biosphere Reserve.

Objectives of establishment and protection of the Natura 2000 site - the reserve is classified as a Type B Natura 2000 site — designated for the protection of specially protected species, excluding birds, and specially protected habitats. The main natural values of the reserve are considered to be the relatively undisturbed wet forest habitats and rare plant species. Several species listed in annex I of the EU Birds Directive are also present within the reserve, which is regarded as a potential habitat for the flying squirrel. However, since the flying squirrel is considered extinct in Latvia according to the latest assessments based on IUCN criteria¹, this aspect is not further addressed within this assessment.

According to annex 1 of the Law on Specially Protected Nature Territories,² the area was designated for the conservation of the species and habitats listed in Table 1.

¹ <https://sarkanagramata.lu.lv/par-projektu/materiali/> - “Species Assessed in the Project and Their Assigned Categories”

² 02.03.1993. “Likuma par īpaši aizsargājamām dabas teritorijām”

Table 1. Species and habitats for which the nature reserve “Mērnīeku dumbrāji” was established

Habitats	Species	Latin name
9010* <i>Western Taiga</i>	White-backed Woodpecker	<i>Dendrocopos leucotos</i>
9080* <i>Fennoscandian deciduous swamp woods</i>	Black Stork	<i>Ciconia nigra</i>
9020* <i>Fennoscandian hemiboreal natural old broad-leaved deciduous forests</i>	Black Woodpecker	<i>Dryocopus martius</i>
	Hazel Grouse	<i>Bonasa bonasia</i>
	Drooping Wood-reed	<i>Cinna latifolia</i>
	Eurasian three-toed woodpecker	<i>Picoides tridactylus</i>

Within the nature reserve, there are several micro-reserves established for the protection of habitats or specially protected species:

- ML 185783, established for the protection of other deciduous forest habitat.
- ML 185789, established for the protection of wet black alder forest habitat.
- ML 183803, established for the protection of other deciduous forest habitat.
- ML 185793, established for the protection of spruce and mixed wet spruce forest habitats, partially located within the “Mērnīeku dumbrāji” nature reserve.

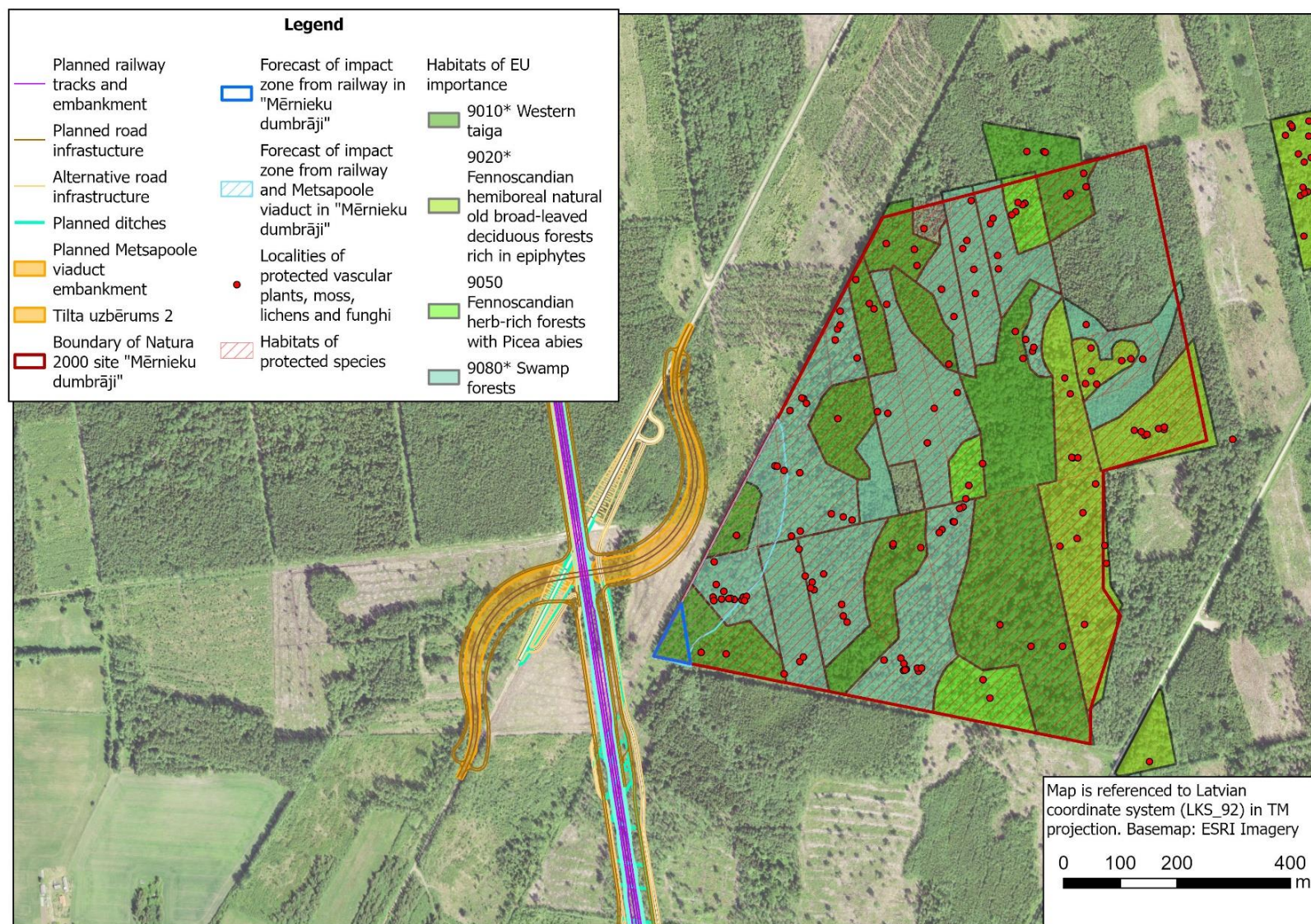


Figure 1. Location of the Proposed Activity in Relation to the Specially Protected Nature Area – Nature Reserve "Mērnīeku dumbrāji"

Natural values identified during expert surveys - as part of the Environmental Impact Assessment (EIA) process, the “Mērnīeku dumbrāji” nature reserve and an approximately 150-meter-wide buffer zone on the Estonian side were surveyed. These surveys were conducted on May 12 and 20, 2025, by certified species and habitat experts Anete Pošiva-Bunkovska (Certificate No. 116) and Gune Mīlgrāve (Certificate No. 208).

During the assessment, previously unregistered forest habitats of European Union importance as well as specially protected species were identified (see Tables 2 and 3).

In addition, fieldwork to assess the impact on bird species was carried out between March 29 and June 7, 2025, by ornithological experts Jānis Ukass (Expert Certificate No. 249) and Pēteris Daknis (Expert Certificate No. 221). The bird species identified during this period are listed in Table 5.

Abbreviations used in the tables: **SAP** – Specially Protected Species (SAP), **MIK** – Micro-reserve Species, **SG** – Red Data Book Species, **WHK IS** – Species Specific to woodland key habitat (Indicator Species), **WHK SS** – specialists’ species of woodland key habitat.

Table 2. Identified and registered specially protected species in the study area (see Fig. 1)

Name	Species Group, Protection Category	IUCN ³ status
<i>Arthonia leucopellaea</i>	Lichen: SAP I	NT
<i>Arthonia spadicea</i>	Lichen: SAP I, WHK IS	LC
<i>Arthonia vinosa</i>	Lichen: SAP I, WHK IS	NT
<i>Bazzania trilobata</i>	Moss: SAP I, SG II, MIK, WHK SS	NT
<i>Carex disperma</i>	Vascular plant: SAP I, SG III, MIK, WHK SS	EN
<i>Dactylorhiza fuchsii</i>	Vascular plant: SAP I, SG IV	LC
<i>Frullania tamarisci</i>	Moss: SAP I, SG II, MIK, WHK SS	NT
<i>Huperzia selago</i>	Vascular plant: SAP II, SG IV	LC
<i>Lejeunea cavifolia</i>	Moss: SAP I, SG II, MIK, WHK IS	LC
<i>Leptoporus mollis</i>	Fungus: DMB SS	
<i>Jungermannia leiantha</i> (<i>Liochlaena lanceolata</i>)	Moss: SAP I, MIK	NT
<i>Lobaria pulmonaria</i>	Lichen: SAP I, SG II, WHK SS	NT
<i>Lycopodium annotium</i>	Vascular plant: SAP II, SG IV	LC
<i>Menegazzia terebrata</i>	Lichen: SAP I, MIK, SG III, WHK SS	NT
<i>Mycoblastus sanguinarius</i>	Lichen: SAP I, SG III, MIK, WHK SS	NT
<i>Neckera complanata</i>	Moss: SAP I, SG II, WHK IS	LC
<i>Odontoschisma denudatum</i>	Moss: SAP I, MIK, WHK IS	LC
<i>Oxyporus corticola</i>	Fungus: WHK IS	
<i>Platanthera bifolia</i>	Vascular plant: SAP I, SG IV	
<i>Riccardia palmata</i>	Moss: SAP I, SG III	VU

³ **Evaluation According to IUCN (International Union for Conservation of Nature) Criteria**
Based on materials from the project “LIFE FOR SPECIES”: <https://sarkanagramata.lu.lv/par-projektu/materiali/>. **LC** – **Least Concern** – species of least concern (secure); **NT** – **Near Threatened** – species nearly threatened; **VU** – **Vulnerable** – vulnerable species; **EN** – **Endangered** – endangered species; **CR** – **Critically Endangered** – critically endangered species

Name	Species Group, Protection Category	IUCN ³ status
<i>Thelotrema lepadinum</i>	Lichen: SAP I, SG III, MIK, WHK SS	NT
<i>Viola uliginosa</i>	Vascular plant: SG III	VU

Table 3. Protected Habitats of EU Importance identified during surveys in the study area (see Fig. 1)

EU Habitat code	Variant	Quality	Area (ha)	Quality Determining Factors
9010* <i>Western Taiga</i>	1	medium	3.9	Longevity, microclimate
	2	medium	1.9	
		good	13.1	
		excellent	1.0	
9020* <i>Fennoscandian hemiboreal natural old broad-leaved deciduous forests</i>	2	excellent	4.8	Longevity, microclimate
		good	2.8	
9050 <i>Fennoscandian herb-rich forests with Picea abies</i>	1	good	1.6	Longevity, microclimate
	2	excellent	1.3	Longevity, microclimate, hydrological regime
9080* <i>Fennoscandian deciduous swamp woods</i>	1	good	9.2	Longevity, microclimate, hydrological regime
		medium	3.3	
		excellent	12.5	
Total area			55.5	

Table 4. Specially protected habitats: degree of protection and conservation, restoration potential, area, and national protection status assessment

EU Habitat code	Area in Nature Reserve, ha	Conservation status assessment in Nature Reserve	Area in Latvia, ha	Conservation status assessment in Latvia ⁴
9010* <i>Western Taiga</i>	19.9	FV	49600- 75000	U2
9020* <i>Fennoscandian hemiboreal natural old broad-leaved deciduous forests</i>	7.6	FV	11100 - 14500	U2
9050 <i>Fennoscandian herb-rich forests with Picea abies</i>	2.9	FV	11400 - 11600	U2
9080* <i>Fennoscandian deciduous swamp woods</i>	25	FV	22300 - 25000	U2

FV - favourable, **U2** - unfavourable – inadequate

⁴ Report to the European Commission on the Conservation Status of Habitats and Species of European Importance in Latvia: Assessment for the Period 2013–2018

Table 5. Specially protected bird species identified in the study area and potentially inhabiting the Nature Reserve

Name	Protection Category	IUCN ⁵ Status
Hazel grouse <i>Bonasa bonasia</i>	SAP II, Birds Directive Annex I	EN
Whooper swan <i>Cygnus cygnus</i>	SAP I, MIK, Birds Directive Annex I	NT
Black stork <i>Ciconia nigra</i>	SAP I, MIK, Birds Directive Annex I	CR
Crane <i>Grus grus</i>	SAP I, Birds Directive Annex I	LC
Eurasian Eagle-owl <i>Bubo bubo</i>	SAP I, MIK, Birds Directive Annex I	CR
Ural owl <i>Strix uralensis</i>	SAP I, Birds Directive Annex I	LC
Pygmy owl <i>Glaucidium passerinum</i>	SAP I, MIK, Birds Directive Annex I	VU
Lesser spotted eagle <i>Clanga pomarina</i>	SAP I, MIK, Birds Directive Annex I	LC
Northern goshawk <i>Accipiter gentilis</i>	MIK, Birds Directive Annex I	CR
Common buzzard <i>Buteo buteo</i>		EN
Three-toed woodpecker <i>Picoides tridactylus</i>	SAP I, MIK, Birds Directive Annex I	EN
White-backed woodpecker <i>Dendrocopos leucotos</i>	SAP I, MIK, Birds Directive Annex I	LC
Middle Spotted woodpecker <i>Dendrocopos medius</i>	SAP I, MIK, Birds Directive Annex I	LC
Lesser Spotted woodpecker <i>Dryobates minor</i>		VU
Black woodpecker <i>Dryocopus martius</i>	SAP I, Birds Directive Annex I	LC
Grey-headed woodpecker <i>Picus canus</i>	SAP I, Birds Directive Annex I	LC
Stock dove <i>Columba oenas</i>	SAP I, MIK	LC
Red-breasted flycatcher <i>Ficedula parva</i>	SAP I, MIK, Birds Directive Annex I	NT

Relationships and interactions determining the existence of natural values within the Natura 2000 site - the biodiversity of the area is determined by regulated, limited forestry activities prescribed by legislation, which have promoted the long-term development of forest stands. Additionally, the site's location within a forest massif characterized by distinctive microrelief ensures a suitable microclimate for the persistence of habitats for rare species.

The natural values present within the nature reserve are associated with long-undisturbed forest stands, a stable microclimate, and an undisturbed hydrological regime. Many of the forest habitats and specially protected species found in the area require a consistently or seasonally elevated groundwater level, and in some cases, periodic flooding of certain areas.

Factors negatively affecting the natural values within the Natura 2000 site or the potentially affected area prior to the implementation of the planned activity - significant factors

⁵ Evaluation According to IUCN (International Union for Conservation of Nature) Criteria Based on materials from the project "LIFE FOR SPECIES": <https://sarkanagramata.lu.lv/par-projektu/materiali/>. **LC** – **Least Concern** – species of least concern (secure); **NT** – **Near Threatened** – species nearly threatened; **VU** – **Vulnerable** – vulnerable species; **EN** – **Endangered** – endangered species; **CR** – **Critically Endangered** – critically endangered species

contributing to the decline of biodiversity include the restoration of drainage systems and forest roads in the adjacent area, posing a risk of deteriorating the hydrological regime in the wet forest habitats within the nature reserve. The forest habitats identified during the surveys are located within the nature reserve, where economic activities are restricted. Consequently, these habitats and species' living sites are not directly threatened by logging or drainage, which have strongly affected the surrounding areas. However, such activities may indirectly affect the quality of habitats and species' living sites within the reserve, for example, through edge effects or drainage carried out in adjacent territories.

No such impacts were observed during the survey, however, there is a possibility that effects from road reconstruction and ditch installation conducted to the east (the road is located 50–90 meters from the reserve boundary) may become evident in the coming years. Similar impacts could also arise if drainage systems are installed or restored in other adjacent areas. On the Estonian side, the nearest road with side ditches is located more than 200 meters from the reserve boundary, but it cannot be ruled out that drainage systems may be established or restored closer to the reserve.

In recent years, forest fragmentation has increased in the areas adjacent to the reserve, with edge effects now observable from forest areas cleared on the Estonian side. The standard data form lists waste dumping in the forest, land reclamation, and drainage as low-risk factors for the decline of natural values in the area.

The significance of the site for the coherence of the Natura 2000 network at the national and biogeographical region levels - the nature reserve is an important site for the protection of habitat types 9080* *Fennoscandian deciduous swamp woods* and 9010* *Western Taiga*, as these habitats are preserved there in good and excellent condition.

Description of protection and management - no nature protection plan has been developed for the nature reserve, its protection requirements are defined by the Cabinet of Ministers Regulation No. 264 of 16 March 2010, "General Protection and Use Rules for Specially Protected Nature Areas." These regulations prohibit the drainage of forest stands on wet mineral soils and wet peat soils within the reserve, as well as forestry operations from 15 March to 31 July, clear-cutting and reconstructive cutting of trees, and, with exceptions, thinning operations. Other restrictions also apply.

The North Vidzeme Biosphere Reserve is governed by the Cabinet of Ministers Regulations No. 303 of 19 April 2011, "Individual Protection and Use Regulations of the North Vidzeme Biosphere Reserve." Current legislation does not impose restrictions on forestry activities or land reclamation within this area.

To date, no management activities have been undertaken. According to the "National Protection and Management Programme for Natura 2000 Sites 2018–2030," appropriate management measures for old forests found in the area include non-intervention in natural processes, ensuring undisturbed conditions for habitats of protected species that are dependent on microclimate and hydrological changes in these forest habitats.

It is necessary to promote the reduction of forest habitat fragmentation and prevent any impacts on the microclimate and hydrological regime of this area. The mentioned document also recommends habitat mapping according to the latest methodology, which has already been carried out within the framework of the project “Preconditions for better biodiversity preservation and ecosystem protection in Latvia”/ “*Nature Census*”⁶ and during the preparation of expert assessments.

3. Description of the planned activity and all possible alternatives

The planned activity involves the construction of a new, high-speed, modern, electrified double-track railway line with the European standard track gauge of 1435 mm (designed speed – 249 km/h) along the route Tallinn–Pärnu–Riga–Kaunas–Lithuania/Poland border.

The assessment was conducted for a 12.7 km section of the “Rail Baltica” from Kabli to the Estonia–Latvia border, which is subject to a cross-border EIA procedure, including an assessment of impacts on Natura 2000 sites. The EIA is carried out as part of the design process, with the aim of minimizing the environmental impact of the railway construction and operation.

A strategic environmental impact assessment was carried out in 2016 for all planning documents of the Estonian section of “Rail Baltica.” The planning documents define a 350 m wide corridor within which the exact alignment of the Rail Baltica railway tracks and associated infrastructure will be determined during the detailed design phase. During the EIA stage, the Rail Baltica tracks, and related infrastructure will be located within the previously established 350-meter corridor.

The alignment of the railway is also determined by the border crossing point, which was selected in 2016 as the connection between the Estonian and Latvian Rail Baltica sections. Relocating this crossing point is not possible, as it would affect the Rail Baltica route alignment in Latvia, where technical design and preparatory construction works are already underway.

In the Environmental Impact Assessment (EIA), including the Natura 2000 impact assessment, two main Rail Baltica route alternatives are evaluated:

1. Alternative (Preliminary Project Solution) and
2. Alternative (Value Engineering Solution).

The track alignment in both alternatives is the same. However, in certain sections, they differ in track elevation, crossing solutions, and access solutions to real estate properties. Along the stretch near the nature reserve “Mērnīeku dumbrāji,” the track alignment and side ditch solutions are the same for both alternatives. Within the context of the Natura 2000 impact assessment, no differences have been identified between the two main alternatives that could result in varying impacts on the “Mērnīeku dumbrāji” nature reserve.

⁶ <https://www.daba.gov.lv/en/projects/nature-census>

In the section before the Estonian–Latvian border, a road overpass across the railway (Metsapoole viaduct) is planned. The nature reserve “Mērnīeku dumbrāji” is located 40 meters or more to the east (at the nearest access point) from the planned Metsapoole viaduct, for which two location alternatives are assessed within the Natura 2000 evaluation (see Figure 2):

- **Metsapoole viaduct Alternative 1:** The viaduct is planned in the location of the existing road, maintaining its current alignment or modifying it so that the overpass would cross the railway embankment at a 90° angle. The road used to be a narrow-gauge railway, of which only the embankment remains today. The planned road surface height above the crossing is 25.17 m.
- **Metsapoole viaduct Alternative 2:** The crossing is planned approximately 1 km north of the Metsapoole road.

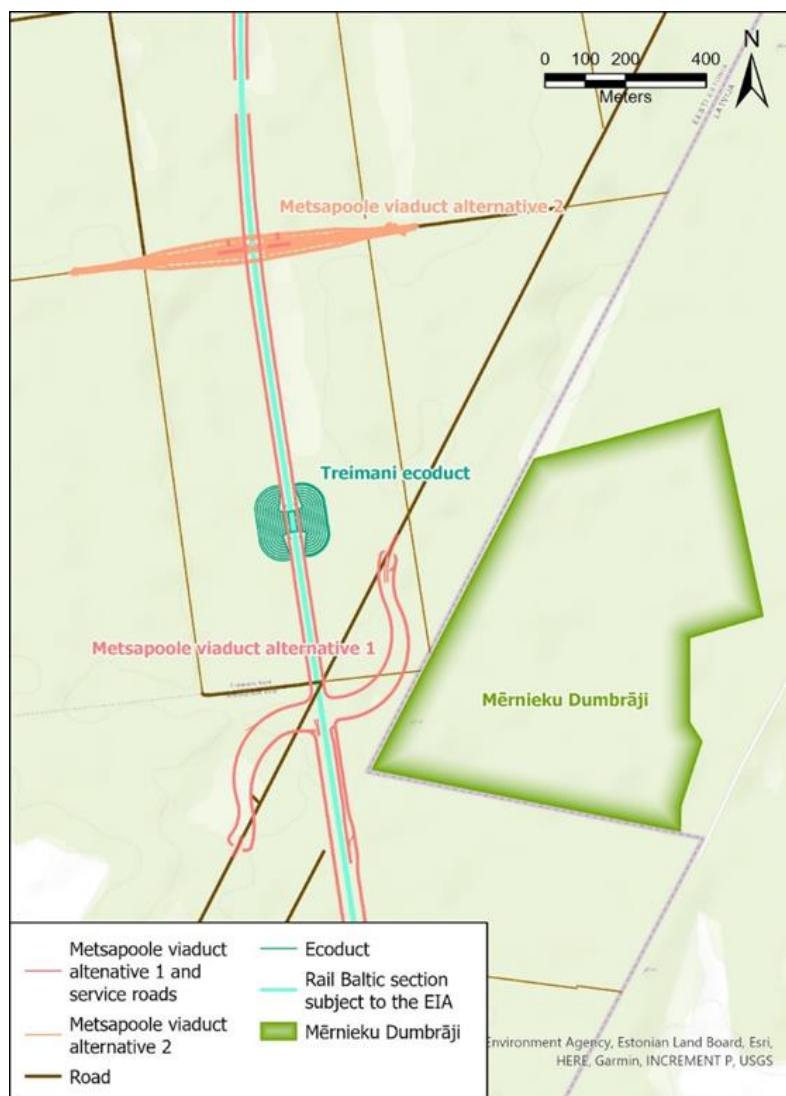


Figure 2. Location alternatives of Metsapoole viaduct

The railway tracks will be placed on an embankment constructed from suitable layered materials, with a height of approximately 2 to 3.5 meters. The crossing road is planned as a gravel surface, with construction materials sourced from local quarries (sand, gravel, crushed stone). To ensure surface water drainage from the railway embankment, drainage ditches will be constructed on both sides of the embankment.

4. Potential direct, indirect, and secondary impacts on the Natura 2000 site

The use of natural resources will mainly be required during the construction phase, while during the operational phase the developed infrastructure maintenance plan must be followed to ensure optimal, justified, and environmentally friendly use of materials. During the construction and operation of Rail Baltica, no activities related to material extraction or changes in land use within the Natura 2000 site “Mērnīeku dumbrāji” will be carried out.

No significant impacts from waste, noise, light, vibration, electromagnetic radiation, or odour emissions on the Natura 2000 site are anticipated.

During the construction and operation of the railway, no trees will be felled, and no structures will be built within the nature reserve.

Along the section adjacent to the Natura 2000 site “Mērnīeku dumbrāji”, railway side ditches are planned on both sides of the embankment. In the construction of the viaduct, considering the moisture regime of the surrounding land, it is also anticipated that drainage ditches along the viaduct embankment will be constructed. Forest drainage ditches provide water outflow from the site up to 150 m from the ditch edge. It is assumed in the assessment that the railway side ditches will affect the hydrological regime at a similar distance.

- For the main railway line construction, it is projected that the hydrological conditions in the nature reserve “Mērnīeku dumbrāji” will be affected over an area of 0.33 ha, impacting the microclimate of habitat type 9010* *Western taiga*;
- For the Metsapoole viaduct alternative 1 construction, it is projected that the hydrological conditions in the nature reserve “Mērnīeku dumbrāji” will be affected over at least 3.45 ha (5.7% of the total area of “Mērnīeku dumbrāji”, and 6.2% of the total habitat area within it);
- Metsapoole viaduct alternative 2 construction located more than 1 km from the Natura 2000 site “Mērnīeku dumbrāji”, will not affect its hydrological regime.

5. Significance assessment of impacts to the Natura 2000 Site

The main natural values of the reserve are considered to be minimally disturbed wet forest habitats and rare plant species. The habitats for which the nature reserve “Mērnīeku dumbrāji” was established are: 9010* *Western Taiga*, 9080* *Fennoscandian deciduous swamp woods* and 9020* *Fennoscandian hemiboreal natural old broad-leaved deciduous forests*.

The impact assessment concluded that implementation of Metsapoole viaduct alternative 1 would affect the quality of habitat 9010* *Western Taiga*, 9080* *Fennoscandian deciduous swamp woods* over an area of 3.45 ha, whereas implementation of Metsapoole viaduct alternative 2

would affect the quality of habitat 9010* *Western Taiga* over an area of 0.33 ha, thereby influencing the favourable conservation status of habitats of specially protected species.

Given the spatial relationship between Natura 2000 sites and other similar natural values in relation to the “Mērnīeku dumbrāji” nature reserve, an increase in isolation is not anticipated.

Within the nature reserve, high-quality forest habitats inhabited by birds have been identified. The greatest risk is the degradation or destruction of these habitats due to the drainage works planned during the construction process, therefore, it is important to preserve the hydrogeological and hydrological conditions in order to maintain the existing habitats, which also serve as bird nesting sites.

Other potential threats, such as noise, light, air pollution, and vibration, are expected to have an insignificant impact on the ecological functions of the Natura 2000 site in both Metsapoole viaduct alternative 1 and 2.

If the planned construction of the railway line and viaduct proceeds without implementing mitigation measures, Metsapoole viaduct alternative 1 is expected to cause a significantly adverse impact on habitat 9080* *Fennoscandian deciduous swamp woods* over an area of 2.1 ha, and a minor adverse impact on habitat 9010* *Western Taiga* within the Natura 2000 site. Therefore, a considerable impact is anticipated:

- on the objectives of establishing and protecting the Natura 2000 site;
- on factors that have already affected the site prior to the planned activity;
- on the importance of the site for the coherence of the Natura 2000 network at both the national and biogeographical region levels.

In the case of Metsapoole viaduct alternative 2, where the viaduct construction is planned approximately 1 km north of the nature reserve, the permanent impact of the planned railway infrastructure on forest habitats is predicted to be a minor adverse effect on the microclimate of habitat 9010* *Western Taiga*. No significant impact on the objectives of establishing and protecting the Natura 2000 site is expected, however, it is advisable to implement measures to limit impacts on the hydrological regime and, accordingly, the habitat microclimate. Likewise, if the project developer decides to abandon the construction of the Metsapoole viaduct, the impact on the Natura 2000 site “Mērnīeku dumbrāji” will be equivalent to that of Metsapoole viaduct Alternative 2, and **such alternative is not assessed separately in the evaluation.**

The anticipated impact on the “Mērnīeku dumbrāji” nature reserve is outlined in Table 6.

Summarizing the impact assessment on the Natura 2000 site, it can be concluded that to maintain the favourable conservation status of specially protected species and habitats, specific mitigation measures targeting impacts on Natura 2000 sites are necessary. These measures are compiled in Table 7.

If the recommended mitigation measures are implemented, the drainage impacts on the EU-priority protected habitats and associated rare and protected vascular plants, fungi, lichens, and moss species within the Natura 2000 site ‘Mērnīeku dumbrāji’ can be fully avoided. Regarding bird species, the proposed measures will entirely prevent impacts on the quality of habitats within

the nature reserve. It is not possible to eliminate the negative effects of railway line-induced fragmentation on the Hazel grouse *Bonasa bonasia*; however, the fragmentation will not affect habitats within the Natura 2000 site, thus the impact is considered indirect and insignificant concerning the Natura 2000 site.

5.1. Impact on the Natura 2000 Site, Its Ecological Functions, Integrity, and Conservation and Management Objectives

The assessment concluded that the planned railway construction will not have a significantly negative impact on the integrity of the “Mērnīeku dumbbrāji” Natura 2000 site (nature reserve). Although minor impacts on the site’s hydrological conditions (up to 3.45 ha under Metsapoole viaduct Alternative 1 and 0.33 ha under Metsapoole viaduct Alternative 2) and on the associated microclimatic conditions are possible, these changes will be insignificant if mitigation measures are applied, such as:

- Modifying the configuration of the Metsapoole viaduct to eliminate potential drainage impacts;
- Relocating the Metsapoole viaduct at least 150 m from the border of nature reserve “Mērnīeku dumbbrāji” (the assessment assumed that the railway’s and viaduct’s side ditches would affect the hydrological regime at a similar distance as forest drainage ditches);
- Abandoning the Metsapoole viaduct or selecting Metsapoole viaduct Alternative 2, which involves constructing the viaduct 1 km further away.

Significant habitat loss or fragmentation within the site is not expected, and most species, including qualifying bird species, will not be adversely affected. Hazel grouse (*Bonasa bonasia*) may experience some additional disturbance and fragmentation; however, suitable habitats exist outside the Natura 2000 site, and population-level effects are not anticipated. The site’s structure, ecological functions, and connectivity within the wider Natura 2000 network will be maintained.

Table 6. Impact Assessment on the Natura 2000 Site in accordance with the Cabinet of Ministers Regulations No. 300 of 19 April 2011, "Procedure for the Assessment of Impacts on Sites of European Importance (Natura 2000)".

No.	Criteria	Quantitative indicator or identified trend (e.g., decreasing, stable, increasing)	Assessment
1	Area of a specially protected habitat or species habitat	Changes in the area (ha) of the habitat or species habitat and the percentage ratio (%) in relation to: - the area of the habitat or species habitat within the specific Natura 2000 site; - the area of the habitat or species habitat within all Natura 2000 sites in Latvia; - the area of the habitat or species habitat within the entire country; - the area of the habitat or species habitat within the Natura 2000 network across the European Union.	No direct changes in the area of the Natura 2000 site are expected, since the development project (railway line and viaduct) does not directly cross this territory. Consequently, no changes are foreseen in the habitat or species habitat area within the specific Natura 2000 site, nor in the Natura 2000 network in Latvia and the European Union. Likewise, no changes are expected in the extent of habitats or species habitats in the country as a whole. The habitat area of bird species changes when alterations occur in the territory where the species lives and obtains the necessary resources. No direct change is expected in the habitat areas of birds within the Natura 2000 site. No negative impact on the areas of species (plants and birds) and habitats within the Natura 2000 site is anticipated, since the planned activity does not directly affect these territories. Accordingly, no changes are expected in the Natura 2000 network in Latvia and the European Union.
2	Population density of a specially protected species	Changes in population density	The population density of a species may change either as a result of variation in the number of individuals within a given territory or due to alterations in the size of the territory itself. Changes in the density of plant species may also be associated with modifications in habitat quality, for example, as a consequence of alterations in the hydrological regime. One of the species for the protection of which the nature reserve was designated is the broad-leaved woodreed (<i>Cinna latifolia</i>). In the Natura 2000 Standard Data Form for the site, Lithuanian manna grass (<i>Glyceria lithuanica</i>) is also listed as occurring within the territory. During field surveys, neither of these species was recorded. However, in spring and early summer their identification is challenging or even impossible, as the leaves resemble those of the widespread <i>Millium effusum</i>, and without inflorescences reliable species determination cannot be ensured. Therefore, the presence of <i>Cinna latifolia</i> and <i>Glyceria lithuanica</i> within the site cannot be excluded.

No.	Criteria	Quantitative indicator or identified trend (e.g., decreasing, stable, increasing)	Assessment
			The habitat requirements of these species are comparable to those of other rare and protected species found in the area – mature forest stands with a stable, elevated moisture regime. Accordingly, it may be concluded that, even if these plant species were present within the site, their population density would remain unchanged, provided that the hydrological regime is preserved. The population density of bird species within the Natura 2000 site may be affected by the construction of the railway track, which, with a 30–50 m wide safety zone on both sides in forested areas, contributes to additional forest fragmentation. As a result, birds may forage and move outside the Natura 2000 territory. Nevertheless, experts have concluded that if recommendations for maintaining the hydrological regime in the nature reserve are implemented, and if groundwater levels are not altered, the construction of the railway and its associated infrastructure will not have a significant negative impact on breeding birds within the reserve. The exception applies to certain forest species that forage in the undergrowth and are particularly sensitive to forest fragmentation, such as the hazel grouse (<i>Bonasa bonasia</i>). However, this effect is considered relevant to the entire railway route as a whole, not only the Natura 2000 site. The population density of hazel grouse may decrease. However, experts have noted that to the east, outside the Natura 2000 site, there are numerous clear-cuts and young forest stands, which provide suitable foraging habitats for the species. It is predicted that the population density of other bird species will remain unchanged, provided that mitigation measures are implemented. Noise pollution and collision risks with trains are expected to have only negligible impacts on bird populations, particularly in connection with the construction of the viaduct under Metsapoole alternative 1. In conclusion, it can be stated that, provided the proposed mitigation measures are implemented, no significant changes in species population density are expected. Therefore, no negative impact on the population density of plant and bird species within the Natura 2000 site is anticipated.
3	Fragmentation of habitats or a specially protected species habitat	Degree of fragmentation, continuity or permanence, in relation to the original state	Fragmentation of habitats or species' living areas occurs when a continuous and coherent habitat block is divided into smaller, isolated patches, thereby reducing ecological connectivity. As a result, species are also adversely affected. No significant fragmentation impact on protected plant species or protected habitats within the Natura 2000 site is expected under either Metsapoole viaduct Alternative 1 or 2, since the planned activity will not directly divide habitats within the Natura 2000 territory into smaller, isolated patches.

No.	Criteria	Quantitative indicator or identified trend (e.g., decreasing, stable, increasing)	Assessment
			The fragmentation of hazel grouse (<i>Bonasa bonasia</i>) habitats is, however, likely to increase due to the establishment of a physical barrier (the railway) under both Metsapoole viaduct Alternatives. It should be emphasised that suitable habitats for hazel grouse exist outside the Natura 2000 site. Observations indicate that, on the Estonian side, forestry activities have been more intensive, resulting in significantly more fragmented forest areas. By contrast, on the Latvian side, to the east of the Natura 2000 site, forest habitats are more suitable for hazel grouse. The suitability of hazel grouse habitats is illustrated in Figure 6. It is therefore not expected that habitats within the Natura 2000 site itself will be fragmented. Although an increase in fragmentation of hazel grouse (<i>Bonasa bonasia</i>) habitats is anticipated, this is not considered to constitute a significant negative impact, as suitable habitats are available for the species outside the Natura 2000 site (see Figure 6 in the Assessment report LV).
4	Disturbance to specially protected species	Duration or permanence, distance from the area	Disturbance means any activity, event, or factor that negatively affects the living conditions, behavior, reproduction, or survival of these species. Plant species' living conditions may be affected by changes in the hydrological regime; however, the impact will be insignificant if environmental mitigation measures for maintaining the hydrological regime are observed. Bird species may experience disturbance from both railway noise and the fence built along both sides of the railway. The noise caused by the railway is neither constant nor long-lasting, and it is predicted that it will not cause significant disturbance to either nesting or birds of prey. Railway infrastructure could create risks for game bird populations, particularly during hunting, when birds may use various supports as observation points. This applies to the entire railway line as a whole, rather than as individual restrictive measures for the nature reserve. The risk of bird species colliding with trains is not high, but a lasting disturbing impact on bird species may result from the deterioration of habitat quality. The risk of bird species colliding with railway infrastructure—such as fences, wires, poles, gates, and similar elements—is assessed as low. However, the solution foresees a transparent wire fence, which, as a preventive measure, should preferably be marked with colors and technologies that highlight its outlines and make it largely non-transparent.

No.	Criteria	Quantitative indicator or identified trend (e.g., decreasing, stable, increasing)	Assessment
			It is predicted that hazel grouse (<i>Bonasa bonasia</i>) populations will nevertheless face increased disturbance due to forest fragmentation under both main alternatives due to building of railway track. However, these impacts will not be significantly negative, since suitable habitats for hazel grouse exist outside the Natura 2000 area. It has been observed that on the Estonian side, forestry activity has been more intensive, resulting in considerably more fragmented forests. Meanwhile, on the Latvian side, east of the Natura 2000 area, forests are more suitable for hazel grouse. The suitability of hazel grouse habitats is shown in Figure 6. The expected disturbance to Natura 2000 qualifying bird species is not considered significant if all environmental mitigation measures are followed. Disturbance to plant species within the Natura 2000 area will also be insignificant, provided that environmental mitigation ensures the preservation of the area's hydrological regime and microclimate.
5	Isolation (separation) of a specially protected habitat or species habitat from other similar habitats or species habitats	Degree of isolation (separation)	The isolation (separation) of habitats or habitats of specially protected species refers to the degree to which a particular habitat or habitat fragment is detached from other habitats of the same type. The main natural values of the nature reserve "Mērnīeku dumbrāji" are long-standing wet broad-leaved forests and the associated specially protected species. The nearest Natura 2000 site is located in Estonia, 900 m to the north – the nature reserve "Kivikupitsa", whose key conservation values are the habitats 9010* Western taiga, 9020 Old broad-leaved forests (with elevated moisture conditions identified from topographic maps), and 9060 Coniferous forests. A further Natura 2000 site, "Laulaste", is situated 4.22 km to the north, where the key conservation values are habitats 9010* Western taiga, 9080* Fennoscandian deciduous swamp woods, and 3260 Water courses. On the western side of the planned railway, birch stands dominate, and according to the Estonian forest register, the largest share of forest types are suitable for wet forest habitats. The nearest Natura 2000 site designated specifically for the protection of bird species is Põhja-Liivimaa, located 900 m to the north. It harbours 26 specially protected bird species, including species for which the "Mērnīeku dumbrāji" nature reserve was also established – the white-backed woodpecker (<i>Dendrocopos leucotos</i>), the three-toed woodpecker (<i>Picoides tridactylus</i>), and the hazel grouse (<i>Bonasa bonasia</i>). Considering the distances between the respective habitats of these species, the degree of isolation from habitats of these specially protected birds will not increase.

No.	Criteria	Quantitative indicator or identified trend (e.g., decreasing, stable, increasing)	Assessment
			The nearest EU priority habitats of type 9080* Fennoscandian deciduous swamp woods are located at a distance of 150 m, while within a 5 km radius in Latvian territory, swamp forest habitats occur approximately 1 km apart. Taking into account the distances between habitats, isolation from equivalent natural values will not increase. It can therefore be concluded that the isolation (separation) of habitats or habitats of specially protected species from other habitats of the same type will not be intensified.
6	Changes in the quality of a specially protected habitat or species habitat (in its characteristic structures and functions)	Relative changes in the hydrological regime, relative changes in key chemical parameters in water, changes in flood regime or volume, changes in the amount of deadwood in forests, changes in natural species relationships (e.g., species balance in plant communities), changes in tree and shrub cover, changes in the composition of characteristic habitat species, and other changes	Changes in the quality of habitats or habitats of specially protected species (i.e. their characteristic structures and functions) may occur when ecological processes essential for the persistence of these habitats are disturbed or altered. As a result of the construction of transport infrastructure, changes in the hydrological regime of the nature reserve are possible. It has been calculated that, in the case of Metsapoole viaduct alternative 1, an area of 3.45 ha (5.6% of the Natura 2000 site) could be affected if mitigation measures aimed at maintaining the hydrological regime are not implemented. Under both main alternatives, 0.33 ha of the nature reserve will be directly affected by the construction of the railway embankment and tracks. Within the 0.33 ha affected area, the habitat type 9010* Western taiga has been identified. Overall, the quality of the habitat and the habitats of the specially protected species present are not directly dependent on elevated groundwater levels. However, if groundwater levels were to decrease as a result of the construction, a minor impact on the microclimate may occur, since areas with seasonally elevated moisture would disappear completely (impact area at least 0.8 ha in the case of the Metsapoole viaduct, and at least 0.33 ha in the case of the main line only). A slight adverse effect on the microclimate of the habitat and the habitats of protected species is therefore possible. Mitigation measures should be implemented to minimise impacts on the hydrological regime and, consequently, the microclimate within the habitat. With regard to birds, no significant deterioration in habitat quality is anticipated. In conclusion, provided that mitigation measures are implemented, no significant negative impact on the quality of habitats and habitats of specially protected species within the Natura 2000 site is expected.
7	Changes in patterns and interactions	The degree of fragmentation, continuity, or permanence in relation to the original state;	Compared to the initial condition, the construction of the Metsapoole viaduct alternative 1 could affect the hydrological regime of the nature reserve over an area of approximately 3.45 ha within the Natura 2000 site. In contrast, if only the main railway line were constructed, as well as in case of

No.	Criteria	Quantitative indicator or identified trend (e.g., decreasing, stable, increasing)	Assessment
	that determine the structure and function of the area	relative changes in the hydrological regime; variations in key chemical parameters in water; alterations in flood dynamics or volume; and other relevant changes.	Metsapoole viaduct Alternative 2, the impact could affect about 0.33 ha of the Natura 2000 site (in the case of both main Alternatives 1 and 2). It should be noted that within the potential impact zone lies the habitat type 9010* Western taiga (polygon No. 25AP116_2), the quality of which, as well as the quality of the habitats of specially protected species within it, is not directly dependent on elevated groundwater levels. However, if groundwater levels were to decrease as a result of the infrastructure development, a minor impact on the microclimate could occur, as areas with seasonally elevated moisture conditions may disappear. The expected impact on hazel grouse (<i>Bonasa bonasia</i>) is expressed through additional fragmentation of its occupied range. However, taking into account the actual situation in the field, it can be concluded that outside the Natura 2000 site, hazel grouse are more likely to use forests to the east rather than to the west, where the railway construction is planned, since the western side is currently dominated by clear-cuts and young stands, which are less suitable for the species. Provided that mitigation measures are implemented, no significant changes are anticipated in the ecological relationships and interactions that determine the structure and functions of the Natura 2000 site. The planned activity will not substantially alter the hydrological or geological conditions of the site, nor will it have a significant impact on species migration corridors.

Table 7. Measures to mitigate the negative impact of the planned activity

No.	Name of the Mitigation Measure	Will this measure negatively affect the integrity of the Natura 2000 site?	How the measure will reduce the negative impact on the Natura 2000 site integrity	Implementer and Implementation Method	How the measure will ensure the planned outcome	Schedule aligned with the planned activity	Monitoring process and contingency measures if the outcome is not achieved
1.	No construction of the Metsapoole viaduct (viaduct alternative 3)	Will not cause significant negative impact	Reduces impact and will not cause a significantly adverse effect on habitat 9080* <i>Fennoscandian deciduous swamp woods</i> and only a minor adverse effect on habitat 9010* <i>Western taiga</i>	Implementation requirements will be included in the design project	Any potential drainage impact on moisture-dependent habitats and species' habitats is entirely prevented	Design stage	The client must ensure the implementation of the appropriate mitigation measures
2.	Implement Metsapoole viaduct alternative 2 (plan the viaduct 1 km further away)	Will not cause significant negative impact	Reduces impact and will not cause a significantly adverse effect on habitat 9080* <i>Fennoscandian deciduous swamp woods</i> and only a minor adverse effect on habitat 9010* <i>Western taiga</i>	Implementation requirements will be included in the construction project	Any potential drainage impact on moisture-dependent habitats and species' habitats is entirely prevented	Design stage	The client must ensure the implementation of the appropriate mitigation measures
3.	If Measures No. 1 or 2 are not implemented, the configuration of the Metsapoole viaduct should be modified to eliminate any potential drainage impact	Will not cause significant negative impact	Reduces impact and will not cause a significantly adverse effect on habitat 9080* <i>Fennoscandian deciduous swamp woods</i> and only a minor adverse effect on habitat 9010* <i>Western taiga</i>	Implementation requirements will be included in the construction project	Any potential drainage impact on moisture-dependent habitats and species' habitats is entirely prevented	Design stage	The client must ensure the implementation of the appropriate mitigation measures
4.	Ensure that the impact of drainage does not extend	Will not cause significant negative impact	Reduces impact and will not cause a significantly adverse effect on habitat 9080* <i>Fennoscandian</i>	Implementation requirements will be included in the	Any potential drainage impact on moisture-dependent	Design stage	The client must ensure the implementation of

No.	Name of the Mitigation Measure	Will this measure negatively affect the integrity of the Natura 2000 site?	How the measure will reduce the negative impact on the Natura 2000 site integrity	Implementer and Implementation Method	How the measure will ensure the planned outcome	Schedule aligned with the planned activity	Monitoring process and contingency measures if the outcome is not achieved
	beyond 150 meters from the railway edge		<i>deciduous swamp woods</i> and only a minor adverse effect on habitat 9010* <i>Western taiga</i>	construction project	habitats and species' habitats is entirely prevented		the appropriate mitigation measures
5.	The impact of drainage must be reduced to avoid affecting Natura 2000	Will not cause negative impact	Reduces impact and will not cause a significantly adverse effect on habitat 9080* <i>Fennoscandian deciduous swamp woods</i> and a minor adverse effect on habitat 9010* <i>Western taiga</i>	Implementation requirements will be included in the construction project	The potential impact of drainage impact is eliminated	Design stage	The client must ensure the implementation of the appropriate mitigation measures
6.	Carry out construction works outside the bird nesting season	Will not cause significant negative impact on birds qualifying N2000 site	Reduce potential negative impacts on bird populations	Implementation requirements will be included in the construction project	Potential negative impacts on bird populations are minimized	During construction	The client must ensure the implementation of the appropriate mitigation measures
7.	In the case of constructing a transparent wire fence on both sides of the railway tracks, it is recommended as a preventive measure to mark the fence with colors and technologies that highlight its contours and make it largely non-transparent	Will not cause significant negative impact qualifying N2000 site	Reduce potential negative impacts on bird populations	Implementation requirements will be included in the design project	Potential negative impacts on bird populations are minimized	During construction	The client must ensure the implementation of the appropriate mitigation measures