European Infrastructure and Environment Funds | **Republic of Poland** | PKP POLISH RAILWAY LINES S.A. | **European Union** Cohesion Fund

"This project contributes to reducing social and economic disparities between citizens of the European Union"

Procuring

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Name of the project:

"Working on an alternative transport route Bydgoszcz – Tricity, stage I"

Title of study:

Report on the environmental impact of the project

Area of study:

Railway line No 201 from km 136 + 096 to km 205 + 200
Railway line 214 from km – 0.229 to km 8+ 150
Railway line No. 229 from km 31 + 000 to km 42+ 100
together with newly designed joints

Industry: ENVIRONMENT

Date: 20.08.2018

Version number of the study: Revision 01

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1. INTRODUCTION

1.1. Subject matter and purpose of the study

The subject of this study is a report on the environmental impact of the project for Investment entitled: **"Working on an alternative transport route Bydgoszcz – Tricity, stage I"**.

The following traffic is foreseen on the lines concerned:

- line No 201 on the section Kościerzyna – Gdynia Główna – passenger and freight traffic,
- line No 214 Somonino- Kartuzy – freight and passenger traffic,
- line No 229 on p.g. Glincz Kartuzy – passenger and freight traffic.

Lines administered and operated by PKP Polskie Linie Kolejowe S.A. Railway Lines Plant in Gdynia.

The purpose of the analyses carried out as part of the submitted study is to determine the impact of the planned project on individual components of the environment both at the stage of implementation, operation and possible decommissioning, and to identify solutions or measures to minimise potential negative impacts.

Documentation is necessary to obtain an environmental permit.

1.2. Legal basis, formal qualification of the undertaking

The project in question has been classified as **projects likely to have a significant impact on the environment.** The legal basis for this qualification is **§ 3 para. 2(1) in conjunction with Paragraph 2(1). 1 point 29 of the** Regulation of the Council of Ministers of 9 November 2010 on projects likely to have significant effects on the environment (consolidated text Journal of Laws 2017, item. 1405 as amended) – railway lines forming part of the trans-European rail system, within the meaning of the Rail Transport Act of 28 March 2003 (Journal of Laws 2017, item. 2117, as amended).

The applicant for a decision on environmental conditions is PKP Polskie Linie Kolejowe S.A.

The decision of the Regional Director of Environmental Protection in Gdańsk of 27 June 2018 was issued for this investment (ref.: RDOŚ – Gd-WOO.420.76.2018.JG.JP.7) on the need to carry out an environmental impact assessment and to draw up a report on the impact of a project on the environment of a scope consistent with the provisions of Article 66 of the EIA Act, with particular regard to impact assessment under Article 6.3 of Council Directive 92/43/EEC, including:

1. Nature characteristics of the project site and of the area within the scope of the investment, including plant species, fungi of animals protected under the provisions of the Act of 16 April 2004 on Nature Protection (uniform text Journal of Laws of 2018 item. 142 as amended), natural habitats in Annex I and species and habitats of species in Annex II to Council Directive 92/43/EEC and species and habitats of species in Annex I to Directive 2009/147/EC, together with the presentation of issues in graphical and cartographic form;
2. Assessment of the impact of direct and indirect investments and the technologies used therein on the state and behaviour, during implementation and operation:
   a) Natural habitats from Annex I and species and habitats of species from Annex II of Council Directive 92/43/EEC, which are subject to protection in the Natura 2000 site Uroczyska Polakzierza Kaszubskiego PLH 220095 and Jar Rzeki Raduni PLH220011;
   b) Habitats of species and species protected under the Nature Conservation Act, occurring at the site of the investment and within the scope of its impact
3. An indication of the area of natural habitats and habitats of species that are subject to protection in the above-mentioned Natura 2000 sites and protected species that will be destroyed in connection with the implementation of the intention;
4. An assessment of the impact of the investment after application of all possible measures to mitigate negative impacts, together with an assessment of the materiality of the impacts for individual protected objects in Natura 2000 sites;
5. Analysis of the impact of the project on the protection of the Tri-City Landscape Park and the Kashubian Landscape Park;
6. Analyses of the impact of the project on the protection of the Kartuski Landscape Protected Area and the "Jar Rzeki Raduni" and "Kacze Łęga" nature reserves;
7. A detailed analysis of the scope of planned demolition of residential buildings;
8. A description of proposals for solutions to minimise possible environmental impacts and alternative solutions to eliminate impacts;
9. Analysis of the impact of the project on landscapes. The analysis should include, inter alia: defining the boundaries of landscape zones constituting in particular the foreground of the exhibition, viewing axes, viewpoints and built-up areas with a distinctive local architectural form (cultural landscape);
10. Analyses of the impact of the project on ecological corridors occurring in the direct and indirect impact of the project;
11. Estimates of cumulative effects with other projected, implemented and operated located in the vicinity of

the project, the cumulative impact of the planned project with other planned and existing projects within the same noise source (roads, railways) should be presented at points, specifying the noise level from the project in question, the noise level from planned and existing other projects and the noise level from all projects. Assess the indirect impact of the planned project as a change in the existing acoustic conditions in areas where indirect effects may be relevant;

12. An analysis of the acoustic impact and an indication of effective methods of protecting areas requiring protection against the negative impact of the project on the acoustic climate, specifying the parameters (e.g. in the case of acoustic barriers, height and length and type of technology);
13. Analysis of the extent and effects of vibration, taking into account the impact of vibrations on the nearest building;
14. Identify proposals for solutions to minimise possible impacts on the environment and alternative solutions to eliminate impacts;
15. Analyses of the impact of the planned project on the climate and its changes (mitigation, i.e. mitigation by a project of climate change) and the impact of climate and its changes on the project (adaptation of the project to climate change);
16. Analysis of social conflicts related to the planned project;
17. Make proposals for post-implementation monitoring.

1.3. Authority competent to take the decision

The project is located partly in closed areas, among others, on the following plots (dz. 82 (compartment 103 village of Kartuzy) dz. 31 (somonino area, town of Somonino) no. 32 (compartment of Somonino, town of Somonino), dz. No. 746/2 (Zhukowo district, town of Żukowo), dz. 151/1 (district of Kościerzyna 1, Kościerzyna village), No 200/9 (Rub. Kościerzyna 4, village Kościerzyna) in connection with the above pursuant to Article 75 para. 1 point 1 point b of the Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and environmental impact assessments (consolidated text: Dz. U. 2017 item. 1405 as amended), the competent authority to issue an environmental permit decision is the Regional Director of Environmental Protection. Since the project is located in the Pomeranian Voivodeship, the **Regional Director of Environmental Protection in Gdańsk** is the competent authority to issue an environmental permit decision.

1.4. Parties to the proceedings

The number of parties to the procedure for issuing an environmental permit exceeds 20. Map Annex 2 to the proposal provides a map on a scale ensuring the legibility of the data submitted, indicating the projected site on which the project will be carried out and the projected area on which the project will be affected.

1.5. Strategy papers

The planned investment is part of a number of strategic documents and objectives, at European, national, regional and local level, for the development of rail transport. The most important strategic documents are discussed below.

The **"Strategy for smart, sustainable and inclusive growth – Europe 2020" is the document defining the place of transport investment in the European Union's development planning.**

The Europe 2020 strategy sets three interlinked priorities:

- smart development (based on knowledge and innovation);
- sustainable development (supporting an economy that uses resources efficiently, is more environmentally friendly and more competitive);
- inclusive development (strengthening an economy with a high level of employment, ensuring economic, social and territorial cohesion).

The European Union's policy is largely based on sustainable regional development and inclusiveness. Equal access to the highest quality of transport is essential for economic development, which would allow equal living standards for citizens of poor and rich regions. Transport systems determine the economic and social accessibility of the region, helping the mobility of residents and their economic and professional activity. The region covered by the project fits into Union policies based on equalisation of accessibility to transport, which will result in a level playing field for economic development.

Another strategic document is the **"European Spatial Development Perspective" which takes into account in its scope the implementation of this project.** This document points to the need for sustainable and polycentric development and sets out three key directions for the EU's spatial policy:

- polycentric urban development and a new city-rural relationship,
- equal access to infrastructure and knowledge,
- prudent management of natural resources and cultural heritage.

It should be noted that the implementation of the policy objectives of the European Union outlined in this document will lead to an increase in demand for transport services, in particular for transport infrastructure enabling policy implementation in designated directions. The planned investments on railway line 201 are therefore justified in the light of the policy pursued by the European Union. In addition, the planned investment can contribute to the territorial development priorities set out in the "Territorial Agenda of the European Union 2020". They include, among others:

- promoting polycentric and balanced territorial development;
- making cities a driving force for smart and sustainable growth, applying an integrated and multi-level approach to urban development and rehabilitation policies, developing urban regions through urban cooperation and connecting cities, expanding cities beyond administrative boundaries and focusing on functional regions, including peri-urban areas;
- improving territorial links for citizens, communities and businesses;
- increasing mobility, access to public services, information and knowledge, transport road, rail, waterborne and aviation, further development of trans-European networks (TEN-T), intermodal transport, other infrastructure elements including broadband internet and trans-European energy networks, as well as the generation of low-carbon renewable energy.

Another document for the Member States of the European Union is the **"European Union Strategy for the Baltic Sea Region".** Sue RMB is an EU macro-regional strategy of an intra-EU nature. It is implemented on the basis of funds under existing EU financial instruments, from national budgets and from international financial institutions. The implementation of SUE RMB is based on the Action Plan, which includes thematic areas and Horizontal Actions. The Action Plan is based on three main objectives (Save the Sea, Connect the Region, Increase Prosperity). One of the Thematic Areas of Connect the Region is Transport, the implementation of which is intended to complement the TEN-T core and comprehensive network in the EU Member States bordering the Baltic Sea with connections to Belarus and Russia. Given that railway line 201 is fully listed as part of the TEN-T comprehensive network, the planned project is in line with the objectives of SUE RMB.

Documents at national level are:

Long-term Country Development Strategy, Third Wave 2030 (DSRK)

The aim of this document is to define the basic directions and to characterise and analyse the conditions necessary for the development of Poland against the background of the European Union in key areas. This document characterises and analyses the economic processes taking place in the world. based on the analysis and characteristics of the DSRK, the DSRK formulates challenges and translates them into proposals for actions and tools within the framework of strategic public policy intervention.

The main objective of the activities set out in the DSRK is to improve the quality of life of Poles. The achievement of this objective is measured by the increase in gross domestic product (GDP) per capita, the increase of social cohesion and the reduction of territorial imbalances, as well as the scale of the civilizational leap of society and the innovativeness of the economy vis-à-vis other countries.

The planned investment is in line with the implementation of the objectives set by the DSRK.

Investments on railway lines 201, 229, 214 are fully in line with the objective of strengthening territorial balancing mechanisms for developing and fully exploiting regional potential. This objective is to be achieved, inter alia, through the following intervention lines consistent with the scope of the planned investment:

- development of a transport system guaranteeing the accessibility of rural areas, inter alia, by expanding and modernising local road and rail infrastructure and improving transport links with the nearest urban centres;
- construction of efficient transport systems, including connections with the nearest surroundings of the city.

In addition, the planned investment supports the objective of increasing the territorial accessibility of Poland by creating a sustainable, coherent and user-friendly transport system. The planned project is part of the implementation of the intervention "Easy modernisation, extension and construction of an integrated transport system", which assumes, among other things, improving the quality of services provided in the field of rail transport by:

- modernisation, rehabilitation, construction, reconstruction and extension of railway lines and infrastructure (including stations);
- comprehensive modernisation and/or replacement of rolling stock;
- improvement of the organisation and management system in the railway sector.

The Country Development Strategy for 2020

The Mid-Term Country Development Strategy 2020 (SSRK) is an element of the new country's development management system. It is the most important medium-term strategic document in Poland overarching the integrated strategies, which include: Transport Development Strategy or National Regional Development Strategy. The SSRK creates an essential framework for structural intervention in Poland, undertaken within the framework of individual European policies in the next programming period 2014-2020. Taking into account the Polish specificities and conditions that will contribute to the achievement of the national development objectives, it also indicates how the objectives of the Europe 2020 strategy will be achieved.

The main objective of the SSRK is to strengthen and exploit the economic, social and institutional potentials that ensure faster and sustainable development of the country and improve the quality of life of the population. The SSRK selects three strategic areas (Effective and Efficient State, Competitive Economy, Social and Territorial Cohesion), within these areas it sets individual objectives and priority directions of intervention.

The planned investment supports the achievement of the objectives of the "Competitive economy" and "territorial and social cohesion" areas. In the area of "Competitive economy", it contributes significantly to the objective of increasing transport efficiency. As part of this objective, the SSRK underlines the importance of expanding the infrastructure links between urban centres located in peripheral areas with the metropolitan network. In addition to the investment priority of connections of national importance, the SSRK envisages support for transport investments constituting additional connections between localities and complementary national and voivodeship transport systems. within the railway infrastructure, the SSRK refers to the implementation of projects consisting of the modernisation of the main lines and complementary infrastructure in this rolling stock.

It should be noted here that railway line No 201 is an important connection of not only provincial but also interregional importance and thus complements the national transport system.

Concept of Spatial Development of the Country until 2030

The "Concept of Spatial Development of the Country 2030" is the most important strategic document concerning the spatial development of Poland. The vision of the country's spatial development in the perspective of 2030 was presented in the KPZK 2030. It is to be implemented by the objectives and directions of the spatial development policy set out in the document.

The above-mentioned vision for the development of the country by 2030 refers to various elements and spheres of development. in relation to rail transport, Poland's vision for 2030 is shown in the figure below. It can be seen that railway line No. 201 has been designated as a conventional line with speeds from 100 to 120 km/h.

The strategic objective outlined by the KPZK 2030 is to effectively use the country's space and its diverse development potentials to achieve competitiveness, increase employment and improve state efficiency and social, economic and spatial cohesion in the long term. Its implementation is to be pursued by closely interconnected and mutually complementary objectives:

1. Increasing the competitiveness of Poland's main urban centres in the European space through their functional integration while maintaining the polycentric structure of the settlement system conducive to cohesion.
2. Improving the internal and territorial cohesion of the country's development by promoting functional integration, creating conditions for the spread of development factors, multifunctional rural development and exploiting the internal potential of all territories.
3. Improving the territorial accessibility of the country at various spatial scales by developing transport and telecommunications infrastructure.
4. Shaping spatial structures supporting the achievement and maintenance of high quality natural environment and landscape values of Poland.
5. Increasing the resilience of the spatial structure to natural hazards and loss of energy security and shaping spatial structures supporting the defence capabilities of the state.

6. Restoration and consolidation of spatial order.

With regard to the planned investment on the alternative transport route Bydgoszcz – Tricity, it should be stated that it fits in with the above objectives. This can be seen in particular with regard to Objectives 1 to 3, for which the development of the transport network is crucial. According to the provisions of the KPZK, these objectives cannot be treated separately, so the implementation of one of them cannot be carried out in isolation from the others. Therefore, the planned investment must be carried out in accordance with all the mentioned objectives.

In accordance with the provisions of the KPZK relating to the transport network, there should be support for the development of transport links between the most important urban centres located in the area of Eastern Poland, Central Pomerania and Western Poland. in the present era, building central links with the most important Polish cities. in this respect railway line No. 201 is very important in creating a transport connection between the most important centers of Central Pomerania and the most important urban centers of Central Poland.

National Regional Development Strategy 2010-2020: Regions – cities – rural areas

The NSRF is a comprehensive medium-term strategic document relating to the implementation of the socio-economic development policy of the country in the voivodship perspective. It is one of nine integrated strategies detailing the Country Development Strategy until 2020. It sets out the strategic objective of regional policy, which is: "Effectively exploiting specific regional and other territorial development potentials to achieve the country's development goals – growth, employment and cohesion over the long-term horizon". The implementation of this goal is largely related to the planned investment on an alternative transport route Bydgoszcz – Tricity. The railway lines falling within the scope of the project will largely support the possibility of effectively exploiting the potential of the Pomeranian and Kujawsko-Pomorskie regions. Passenger transport on the described section increases the possibilities of commuting the population to work in cities along this line, in particular to the developed labour market of Tricity and Bydgoszcz. It also promotes the improvement of the region's internal territorial cohesion and interregional cohesion.

Moreover, in addition to the main objective of regional policy, the NSRF defines three objectives of this policy:

1. Boosting the competitiveness of the regions ('competitiveness'),
2. Building territorial cohesion and countering the marginalisation of problem areas ('cohesion'),
3. Creating the conditions for effective, effective and peer-to-peer implementation of activities.

The planned project is in line with these objectives. The planned investment can also improve the transport accessibility of rural areas, contributing to a level playing field between urban and rural populations.

In addition, the NSRFprovides for measures to strengthen the functions of the regional metropolitan centres and the integration of their functional areas and strengthen the interconnectedness between these centres. The planned project supports the achievement of these objectives.

State Transport Policy 2006-2025

"State Transport Policy 2006-2025" is a document defining Poland's transport policy until 2025 at the national level. The main objective of this policy is to significantly improve the quality of the transport system and to expand it in accordance with the principles of sustainable development. This objective was motivated, resulting from observation and research, by the relationship between the state of the transport system and the living conditions of the inhabitants and the economic development of the country and regions. The main objective of transport policy is to be achieved through six specific objectives. These objectives include:

- improving transport accessibility and quality as a factor in improving living conditions and removing barriers to economic development;
- supporting the competitiveness of the Polish economy as a key instrument for economic development;
- improving the efficiency of the transport system;
- integration of the transport system – in the branch and territorial system;
- improving safety, leading to a radical reduction of accidents and reduction of accidents the consequences (killed, injured) and, in the social sense, of improving the personal safety of transport users and the protection of cargoes;
- reducing the negative impact of transport on the environment and living conditions.

The planned investment largely supports the achievement of the above objectives. Its implementation will contribute to improving transport accessibility and increase the potential of the economy on a regional and interregional scale. As a competitive mode of transport for road transport, it can contribute to increasing the efficiency of the transport system in the region and improve the quality of the potential for the creation of inter-branch transport networks. In addition, this investment will have a positive impact on the level of safety in transport and its implementation in accordance with the principles of sustainable development. Taking over some of the passengers and goods transported by road will reduce the negative impact of transport on the environment.

Transport Development Strategy to 2020

The Transport Development Strategy (SRT) is a medium-term planning document, which is an integral part of a coherent management system for national strategic documents. The essence of SRT is to identify the objectives and outline the directions of transport development so that by 2030 it will be possible to achieve the objectives set out in the Long-term Country Development Strategy (DSRK) and the Mid-Term Country Development Strategy (SSRK 2020).

The main objective of the national transport policy outlined by the SRT is to increase territorial accessibility and improve the safety of road users and the efficiency of the transport sector by creating a coherent, sustainable and user-friendly transport system at national (local), European and global level.

- SRT sets two main strategic objectives for transport in Poland:
- creating an integrated transport system through investment in infrastructure transport;
- creating the conditions for the smooth functioning of transport markets and development efficient transport systems.

The planned investment largely supports the implementation of Specific Objective 1 "creating a modern and coherent transport infrastructure network".

The main intervention directions envisaged in the SRT for this objective for rail are:

1. the consistent modernisation and rehabilitation of the existing railway network;
2. modernisation and construction of terminals adapted to be operated by intermodal railways container transport;
3. by 2020, taking a decision on the possible construction of a high-speed rail system complemented by the so-called High-Speed Rail System. 'Y';
4. developing the infrastructure of systems to improve the management of passenger and freight services;
5. progressive deployment (ERTMS) on key railway routes;
6. modernisation of the infrastructure of railway stations and stops;
7. replacement of locomotives and wagons for modern rolling stock;
8. in functional areas of cities – rehabilitation and extension of railway lines;
9. take measures to improve the integration of rail and wheel transport.

On the basis of the analysis of the above document, it can be concluded that the planned investment is in line with the strategic objectives set. The implementation of the planned project can be used to implement most of the most important interventions envisaged in the SRT.

Strategic planning of transport development in Poland takes into account the directions of activities and guidelines contained in the European transport policy. One of its key elements is the TEN-T Trans-European Transport Network. The planned investment in railway line 201 is part of the TEN-T comprehensive network.

Implementation document for the Transport Development Strategy to 2020 (with a 2030 perspective)

The document contains a list of operational objectives to be achieved in the rail transport sector, which covers, inter alia, the following issues: reducing the average travel time for passenger transport; enabling long trains with axle loads of 221 kN; improving capacity; modernisation of basic transport routes.

In the Implementation Document to the Transport Development Strategy up to 2020 (with a perspective up to 2030) on the list of railway projects of national importance, presenting priority investments to be implemented from EU funds for transport in the years 2014-2020, elements of the investment were marked as a project pipeline for maritime projects.

Master Plan for Rail Transport in Poland until 2030

This document presents the concept of development of rail transport in Poland until 2030. The main strategic objectives of the Master Plan for rail transport in Poland over the period to 2030 include:

- ensuring the competitiveness of railways in relation to other modes of transport in the most developing segments of the market;
- sustainability of the industry transport structure and reduction of environmental damage resulting from increased demand for transport, including the rapid development of road transport;
- ensuring the conditions for improving the quality of customer service by railway undertakings;
- ensuring stable funding for railway infrastructure;
- operational and allocation efficiency of rail transport resources;
- effective use of human resources and optimisation of employment.

Implementation of the above-mentioned strategic objectives of the Master Plan are to serve operational priorities. The planned investment on railway lines 201, 229 and 214 is part of the priorities. These priorities include in particular:

- improving transport accessibility for both passenger and freight services;
- enabling the widest possible use of existing railway infrastructure;
- facilitating mobility through different modes of transport, including in particular for passengers with reduced mobility;
- creating the conditions for efficient operation of both passenger and freight traffic;
- achieving railway competitiveness in relation to car and air transport.

National Railway Programme until 2023

The National Railway Programme (NCP) is a document containing a multi-annual programme (until 2023) for the modernisation, rehabilitation and construction of railway lines in Poland. It defines, among others, the diagnosis of the existing network, the directions and priorities of the investment, the size and sources of their financing and the expected results after the implementation of the projects.

The main objective is to strengthen the role of rail transport in the country's integrated transport system by creating a coherent and modern rail network. The following specific objectives are complementary to it:

- strengthening the efficiency of rail transport;
- improving the safety of rail transport;
- improving the quality of passenger and freight transport.

The implementation of this project will contribute to achieving significant results in all the objectives mentioned.

Strategy for Responsible Development

SOR is the most up-to-date strategic document to reflect the country's desired and implemented development agenda.

Under the "Transport" chapter, the following lines of intervention of the Strategy are mentioned:

1. Building an integrated, interconnected transport network for a competitive economy;
2. Changes in individual and collective mobility;
3. Improving the efficiency of the use of public funds for transport projects.

The following actions to be implemented by 2020 are related to rail transport:

- Preparation of a long-term and comprehensive transport development policy, including an integrated and environmentally compatible development plan for all modes of transport;
- Implementation of a new transport infrastructure development planning system – taking into account the needs of different modes of transport (road, rail, inland waterways, maritime, air) and changing patterns of social mobility and economic needs in this area;
- Promoting sustainable mobility patterns in Polish society, including the use of public transport (especially rail transport);

- Improving the state of rolling stock of road and rail passenger transport used for public transport services;
- Improving the technical characteristics of linear road and rail transport infrastructure and modernising railway stations and stops to uniform standards – adapting the transport network to improve the quality of public transport services as well as the needs of people with reduced mobility (age, disability).
- Actions improving safety in road, rail and other modes of transport, implementation of traffic management systems, including ITS, ERTMS, air navigation system (SESAR), continuation of the River Information Systems (RIS) implementation programme;
- Promotion of intermodal and combined transport as alternatives to land transport – exploiting the potential of both public entities as well as enterprises and socio-economic partners;
- The possibility for railway undertakings to prepare an attractive offer of rail freight services increasing the share of rail transport in this segment of services (by improving the parameters of railway infrastructure, point infrastructure and equipment used in freight transport), taking into account the cost requirements of maintaining modern rolling stock and railway infrastructure;

Preparing an analysis of the possibility of implementing high-speed railways and deciding whether to build it in the years 2020-2030.

By 2030, the following actions are planned:

- Linking Poland to TEN-T Core Network Corridors: Baltic – Adriatic and North Sea – Baltic. Investments will concern all modes of transport (road, rail, inland waterways, maritime, air) in particular: completion of the motorway and expressway system; modernisation of the railway network, including traction and level crossings; restoration of the transport capacity of waterways (parameters IV of navigability class) – on selected economically and ecologically justified sections;
- Development of regional and local transport infrastructure (especially in the area of road and rail transport and limited inland waterways), including areas with poor accessibility (including rural, border and peripheral areas) in economic and development processes;
- Linking local and regional centres with agglomerations, major cities and their functional area using road and rail transport;
- Implementation of IT and telecommunications systems (transport telematics) in all modes of transport, taking into account costs and potential profits (different for different modes of transport). Smart Transport Systems (ITS) in cities and their functional areas; River Information System (RIS) in the Lower Oder area; The European Rail Traffic Management System (ERTMS) on the main routes;
- Development of infrastructure supporting intermodal transport, in particular by: linking sea ports and inland waterways to the land transport network (road and rail); further development of the potential of Polish logistics centres – support for the modernisation of the offered services.

<u>The implementation of this project will contribute to achieving results in these activities, in line with the implementation of the Strategy for Responsible Development.</u>

Strategic documents at regional level are:

<u>Strategy for the development of the Pomeranian Voivodeship 2020</u>

The Strategy defines the challenges and development objectives facing the voivodeship and indicated to be achieved by 2020. One of the challenges identified in the Strategy is transport accessibility to ensure efficient transport links with economic centres of Poland and Europe, integration of the collective transport system in order to increase the internal cohesion of the voivodship and mobility of residents, including improving the accessibility of railway areas with the lowest accessibility in the region.

The strategy identifies 3 strategic objectives, which are of a general nature and identify the desired target states in terms of problems. They are defined by 10 operational objectives and 35 lines of action.

The project is part of strategic objective 3 "attractive space", one of the operational objectives of which is an efficient transport system, which is characterised, among others, by high quality of services provided (e.g. by improving the state of infrastructure) and a strong competitive position in relation to individual car transport. Within the framework of the objective, actions will be taken to support PKP PLK S.A. in the preparation and implementation of a rehabilitation project and modernisation of railway lines serving intra-regional links.

Regional strategy for the development of transport in the Pomeranian Voivodeship for the years 2007-2020

The strategic objective of the development of rail transport in the Pomeranian Voivodeship will be to fully exploit the existing potential of clean rail transport to improve social cohesion, spatial accessibility and increase the economic competitiveness of the region as well as increase the share of rail transport in public transport.

Achieving the objective of strategic development of rail transport will be achieved, inter alia, by:

1. linking the elements of the State's Transport Policy to activities within the voivodship transport development strategy with particular emphasis on:
   - modernisation of bus and primary railway lines (adapting them to increased speed and handling of port loads)
   - implementation of measures leading to an increase in the share (up to 60 %) of rail transport in the handling of port general cargo, in particular containers;
2. increasing the share of rail transport in improving accessibility to the Tri-City metropolitan area and improving its rail links with the region;
3. strengthening the basic transport infrastructure of areas with lower development potential through the rehabilitation of railway lines affecting the activation of local communities;
4. reducing the negative impact of transport on the environment by making fuller use of the potential of clean rail transport and thus

increasing the share of rail in the transport of passengers and cargo (particularly port).

This project is inscribed in all the above defined lines of action. In addition, the strategy explicitly indicates the actions necessary to make better use of railway infrastructure in the Pomeranian Voivodeship, among which indicated, among others, the need to rehabilitate sections of railway lines No.: 201 Kościerzyna – Gdynia, 229 Stara Piła – Glincz (connection with line no. 201) – Kartuzy, 234 Stara Piła – Kokoszki, 211 and 212 Kościerzyna – Lipusz – Bytów.

Regional Transport Strategic Programme "Move Pomerania"

The Regional Strategic Programme for Transport is one of the six key tools for the implementation of the Pomorskie Voivodeship Development Strategy 2020. The programme plays a leading role in the concreteisation and implementation of activities resulting from the provisions of the Strategy of the Pomeranian Regional Government in such thematic areas as collective transport, accessibility of peripheral parts of the region and key multimodal hubs. The Regional Strategic Programme for Transport identifies 3 specific objectives for the above-mentioned thematic areas. This project fits into the first specific objective, i.e. striving for a developed and efficient public transport system.

The Regional Strategic Programme clearly identifies the existing shortcomings in the transport system, including the low degree of integration and coordination of carriers, the relatively low level of safety and low quality of the services offered, as well as the mismatch of the offer to the real needs of the inhabitants. Striving to eliminate these defects is one of the main transport objectives. The implementation of the project fits into these objectives.

1.6. List of abbreviations

The**EU –** the European Union.
Kip – Project Information Sheet.
PKP PLK S.A. – PKP Polskie Linie Kolejowe S.A.
St – railway station.
P.O. – a passenger stop.
L.P.O. – public cargo hold and passenger stop.
Podg – branch station.
Ten – T – Trans-European Transport Network.
SRK – Rail traffic control system.
LPN – Line of non-tractive needs.
LCS – Local Control Center.
ISOK – Information Technology System of the Country.
JCWP – Uniform Water Parts
The surface.
JCWPd – Uniform Parts of Underground Waters.
GZWP – Main Underground Water Tanks.
RZGW – Regional Water Management Board.
MPZP – Local Spatial Development Plan.
WZZ – Provincial Register of Monuments.
WIOŚ – Provincial Inspectorate of Environmental Protection.
The**EU –** the European Union.
PGE – Polish Energy Group.
EZT – Electric Tractor Unit.
OChK – Areas of Protected Landscape.
Lion – Sound power level.
WFD – Water Framework Directive.
PT – Traction substation.
KS – Sectional Cabin.

2. DESCRIPTION OF THE PLANNED PROJECT

2.1. Location of the project

Sections of the railway lines concerned are located within the boundaries of the Pomeranian Voivodeship, within the following municipalities:

- Line 201 odc. Kościerzyna – Gdynia Main: the town of Kościerzyna, rural gmina Kościerzyna, rural commune of Stężyca, rural commune of Somonino, urban-rural commune of Kartuzy, urban-rural commune Żukowo, city of Gdańsk, city of Gdynia,
- Line 214 Somonino – Kartuzy: rural commune of Somonino, municipality of Kartuzy,
- Line 229 Glincz – Kartuzy: urban-rural commune Żukowo, urban-rural commune of Kartuzy,
- Link between line 214 and line 229 – municipality of Kartuzy,
- Link between line 201 and line 229 – urban-rural commune Żukowo.

Railway line No 201 on the section in question runs through the following localities: Kościerzyna, Skorzewo, Gołubie Kaszubskie, Little Krzeszna, Stara Krzeszna, Szymbark, Kolano, Wieżyca, Dębowo, Sławki, Somonino, Kiełpino, Rutki, Glincz, Borkowo, Żukowo, Pępowo, Rębiechowo, BARNIEWICE, Nowy Świat, Gdańsk, Gdynia.

The other railway lines analysed connect line No. 201 with the town of Kartuzy (via Leszno Kartuskie and Dzierżążno).

The planned link between line 214 and line 229 is located within the municipality of Kartuzy, east of Kartuzy. The planned link between line 201 and line 229 is located in Żukowo commune, south of Borkowo.

The table below shows the length of the railway line in individual municipalities and counties.

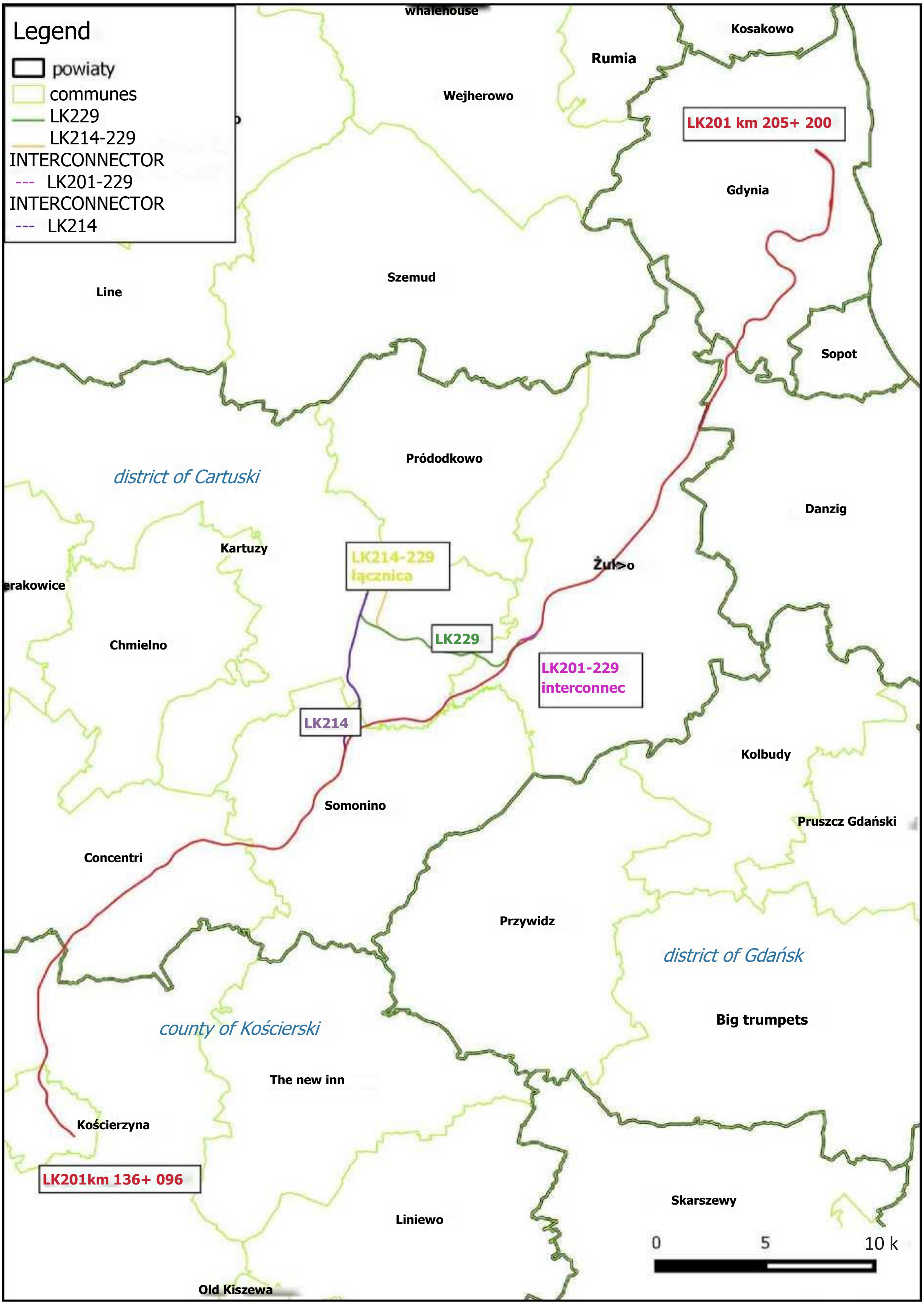
Tab. 1 Length of railway lines in individual municipalities and counties.

Territorial unit		Railway line number	mileage	Length of section [km]
counties	**Municipality/City**			
skeleton	City of Kościerzyna	LK201	From 136+ 096 to 139+ 986	3,89
	Municipality of	LK201	From 139+ 986 to 145+ 850	5,86
Carthusian	Municipality of	LK201	From 145+ 850 to 156+ 372	10,52
	Municipality of Somonino	LK201	From 156+ 372 to 164+ 849	8,42
		LK214	From -0 + 229 to 3+ 006	3,23
	Municipality of Kartuzy	LK201	From 164 + 849 to 169 + 259	4,41
		LK214	From 3+ 006 to 8+ 150	5,13
		LK229	From 34+ 965 to 42+ 100	7,12
		Switch LK214 and LK229	From 8+ 150 to 11+ 400	3,25
	Municipality of Żukowo	LK201	From 169 + 259 to 186 + 927	17,64
		LK229	From 31 + 000 to 34 + 965	3,96
		Connector LK201 and LK229	From 0 + 000 to 0 + 877	0,88
Danzig	City of Gdańsk	LK201	From 186+ 927 to 191+ 024	4,09
Gdynia	City of Gdynia	LK201	From 191 + 024 to 205+ 200	14,17

Source: own development

The indicative location of the investment in question is presented in Fig. 1.

Fig. 1 Indicative location of the investment in question



Source: Own development

2.2. Description of the existing state

The railway line No 201 Nowa Wieś Wielka – Gdynia on the section Kościerzyna – Somonino-Gdańsk Osowa-

Gdynia Główna (km 136+ 096 to km 205+ 200) is a line of state importance belonging to the TEN-T network. From km 136+ 096 to km 186+ 530 it is a single track line, while from km 186+ 530 to km 205+ 200 double track. Not electrified from km 136+ 096 to km 204+ 529, electrified from km 204+ 529 to km 205+ 200.

Railway line 214 Somonino – Kartuzy from km -0 + 229 to km 8+ 150 with a newly built link with line 229 from km 8+ 150 to 11+ 400. Line 214 is a secondary line, outside the TEN-T network, single track, non-electrified. The newly designed link will form part of railway line 214 and will allow trains on the Glincz-Somonino section to pass through Kartuza station without the need to change direction.

Railway line No. 229 Pruszcz Gdański – Łeba on the section Glincz – Kartuzy from km 31 + 000 to km 42+ 100 with a newly built link section of line 201 with line 229 in km from 0 + 000 to km 0 + 877. Line 229 is a line of local significance, outside the TEN-T network, single track, non-electrified. The new section of the line 201 link to line 229 will allow for a collision-free and directional connection of these lines.

The immediate surroundings of the analysed line are very diverse and characterised by the occurrence of various forms of land development. The dominant type of development is the so-called natural-cultural type, which is characterised by the presence of forest areas, fields and meadows with groups of natural trees and agricultural areas. There is also a cultural type of land development. The investment area is also adjacent to the residential, multi-family, residential and service areas.

2.3. Project options considered

In connection with the implementation of the planned project, the following options were analysed:

- W0 – non-investment option with maximum permissible speed at existing level,
- W1 – investment option – assuming the traffic design speed for a given railway line at the level of:
  - for railway line No 201: design speed from 100 to 140 km/h;
  - for railway line 214: from 100 km/h to 120 km/h;
  - for railway line 229: from 80 km/h to 100 km/h.
- W2 – alternative – assuming design speed for individual railway lines:
  - forlinesrailwayNo. 201: from 100 up to 140km/h;
  - forlinesrailwayNo. 214: up to 100 km/h;
  - forlinesrailwayNo. 229: up to 100 km/h.

Option 0 – non-investment option

If the project is not undertaken, the investment site will remain in the existing state and thus there will be no interference with the environment.

The non-investment option assumes maintaining the current state of the infrastructure. This means that there are no planned repairs in order to increase the technical parameters of the lines concerned. The changes that may occur in this option will concern ad hoc work to maintain traffic continuity and prevent further degradation of infrastructure.

When analysing the non-investment option, both its impact on the direct surroundings of the railway line but also the impact on the whole region should be taken into account. Failure to implement the investment in subsequent years may contribute to increasing the negative impact on the environment through emissions of pollutants into the air or noise emissions.

Investment option (W1) selected for implementation

This option includes the following work:

reconstruction and modernisation of railway line No. 201 on the section Kościerzyna – Gdańsk Osowa – the addition of a second track of the railway line with the adaptation of the technical infrastructure to the speed of Vmax=140 km/h.
reconstruction and modernisation of railway line No. 201 on the section Gdańsk Osowa – Gdynia Główna with the addition of a third track, on the section from km approx.187 + 000 to km 205+ 200, with the adaptation of the technical infrastructure to the speed of Vmax=100 km/h.
construction of two switching links between railway line 201 and railway line No 202 – approx. km 202 + 800, correction of track tracks of railway line No 202 over a distance of 1 km.
electrification of the entire modernised section of railway line No. 201, No 214 and 229 with newly designed linkages,

construction of non-tractive needs on the modernised section of railway lines 201, 214 and 229 – reducing the risk of power outages,
reconstruction and modernisation of the station on line 201 – Kościerzyna, Gołubie Kaszubskie, Somonino, Żukowo Wschodnie – demolition and construction of a new track system of the station together with the necessary railway infrastructure.
reconstruction and modernisation of the station on line 201 – Gdańsk Osowa and Gdynia Wielki Kack to the extent necessary, resulting from the construction of the third track.
reconstruction and modernisation of line 214 with the adaptation of the technical infrastructure to the speed of Vmax=120 km/h. demolition and construction of a new track system of the station with the necessary railway infrastructure,
construction of a new section of line 214 as a link with line 229, enabling the Somonino-Kartuzy-Glincz train to travel without changing the direction of travel – with the adaptation of the technical infrastructure to the speed of Vmax=100 km/h,
reconstruction and modernisation of the Kartuzy station – demolition and construction of a new track system of the station with the necessary railway infrastructure,
adaptation of the technical infrastructure of line 229 to the speed of Vmax=100 km/h.
construction in the vicinity of Podg Glincz of a new section of the link line No 201 with line 229, enabling collision-free and directional connection of these lines – with the adaptation of the technical infrastructure to the speed of Vmax=100 km/h,
construction of the Dzierżyżno mijanka in the place of the existing passenger stop Dzierżyżno together with the reconstruction of the existing platform.
construction of new passenger stops on line 201,
construction of new control rooms and building LCS Kościerzyna,
carrying out a comprehensive reconstruction of the existing drainage and construction of a new one in places where it is necessary,
decommissioning and reconstruction of existing platforms, including correction of platform edge position and construction of new platforms with access and accompanying infrastructure, including persons with reduced mobility, demolition of unnecessary infrastructure,
reconstruction of railway and road crossings with sections of access roads,
elimination of railway and road crossings and construction of parallel roads,
construction or reconstruction of selected roads at intersections with railway tracks and parallel roads in connection with the addition of a second track, change of track geometry, change of railway-road crossing position, change of location of embankments and railway excavations, change of vertical and horizontal structure of engineering structures or construction of drainage.
elimination of railway and road crossings and construction of two-level junctions, reconstruction of roads in the area of existing and planned two-level junctions, construction of parking spaces and access roads in the area of railway control rooms and buildings and equipment for the operation and operation of railway traffic,
construction and reconstruction of parking spaces, including for persons with reduced mobility, in the area of platforms with access,
construction of public cargo stations in the area of railway stations with access, reconstruction of existing parallel roads on collision sections with the planned track system,
construction, reconstruction of pavements, pedestrian and cycle paths on road sections within railway and road crossings, two-level junctions, rebuilt public roads and in the area of platforms and passenger services, renovation/construction/destruction of engineering facilities,
construction of fiber optic and copper cable lines,
reconstruction and installation of traffic protection devices on railway and road crossings and rail level crossings,
reconstruction and construction of TVU equipment at level crossings, for monitoring railway facilities and areas,
installation of sq. equipment at traffic stations and in control rooms/containers buildings, reconstruction and installation of automatic linear locking devices,
modernisation of the lighting of platforms and switches at stations and passenger stops, reconstruction/construction of electric heating switches.
reconstruction of existing or demolition and construction of new engineering facilities in new locations (railway overpasses, road viaducts, railway bridges and culverts).

Alternative option (W2)

This option includes the following work:

the addition of a second track on the Kościerzyn section to include the PKM line in line 201 – as a consequence, on the section from Kościerzyna to Gdynia, line 201 would be entirely two-track;
reconstruction of track systems at existing stations (branch postings) consisting of:

- adapting them to increased train speeds up to 120 – 140 km/h between Kościerzyna and Gdańsk Osowa (construction of new turnouts with better parameters; adjustment of track geometry),
- adapting them to the operation of double-track traffic on the trail,
- adaptation to increased transport through the construction of new tracks, the construction of a link enabling a collision-free exit from the newly designed route No. 2 of line 201 to line 229, the elimination of unnecessary side tracks at Kościerzyna station, the construction of a loading square in a new location at Kościerzyna station, the comprehensive construction and reconstruction of track drainage on the route and stations, the construction of new tracks and the reconstruction of existing rail and road crossings at rail level (including by adapting to a larger number of tracks, building the SSP, changing the position, changing categories, etc.); decommissioning of identified existing rail-road crossings;

reconstruction of selected local roads related to the addition of a second track, change of track geometry, change of location of railway and road crossings or construction of drainage;
the construction of new platforms (e.g. in connection with the addition of a new route track) and the liquidation of selected existing platforms and their transfer to a new location, the construction of new control rooms and the building of the Local Control Centre, the modernisation of individual engineering facilities, aimed at increasing technical and operational parameters in line with current standards, electrification of lines and switches;
construction of new and reconstruction of existing rail-road crossings at the level of rails (e.g. by replacing surfaces, adapting to more tracks, building SSP, repositioning, changing and raising categories, etc.), decommissioning existing rail-road crossings;
construction of a cargo square in a new location at Kościerzyna station,
reconstruction of selected local roads related to the addition of a second track, change of track geometry, change of location of railway and road crossings or construction of drainage, reconstruction of railway and road crossings with sections of access roads,

the elimination of railway and road crossings and the construction of parallel roads, the elimination of railway-road crossings and the construction of two-level junctions, the reconstruction of roads in the area of existing and planned two-level junctions, the construction of parking spaces and access roads in the area of railway control and traffic control and equipment, the construction and reconstruction of parking spaces, including for persons with reduced mobility, in the area of platforms, including accesses, construction of public hold squares in the area of railway stations with accesses, reconstruction of existing parallel roads on collision sections with the planned track system, construction, reconstruction of pavements, pedestrian-bike tracks and cycle paths on road sections within railway-road crossings, two-level crossings, rebuilt public roads and in the area of platforms and passenger services, reconstruction of railway and road crossings with access road sections, removal of rail-road crossings and construction of parallel roads, elimination of rail-road crossings and construction of two-level junctions, reconstruction of roads in the area of existing and planned two-level junctions, construction of parking spaces and access roads in the area of railway control, buildings and equipment for the operation and operation of railway traffic, construction and reconstruction of parking spaces, including for persons with reduced mobility, in the area of platforms and accesses, construction of public cargo spaces in the area of railway stations, including accesses, reconstruction of existing parallel roads on collision sections with the planned track system, construction, reconstruction of pavements, pedestrian-bike tracks and cycle paths on road sections within rail-road crossings, two-level crossings, reconstruction of public roads and in the area of platforms and passenger services, modernisation of line 214;
correction of track geometry on line 214 (minimum changes not extending beyond the railway area) and replacement of track surface to raise train speed to 100 km/h, reconstruction of the track system at Kartuzy station, comprehensive construction or reconstruction of drainage on the Kartuzy trail and station, reconstruction of existing platforms with a height of 76 cm above the rail head, construction of the connecting station Kartuza with line 229,
replacement of surfaces at rail-road crossings at rail level (in the indicated cases, raising the category and assembly of SSP),
comprehensive main repair (refurbishment) of individual engineering facilities aimed at achieving the original technical and operational parameters, replacing surfaces on rail-road crossings at rail level (change and raising the category, SSP construction), electrification of line 229.

The following table presents the most important differentiating information between the options described above.

Tab.2 Differences between the options analysed.

Work element	Investment option (W1)	Alternative option (W2)
Line No. 201		
Track works (track 1)	YES km 136,096 – 205,200	YES km 136,096 – 205,200
Construction of the second track	YES From Kościerzyna to Gdańsk Osów	YES From Kościerzyna to Gdańsk Osów
Construction of the third track	Yes Km 189,250-202,300 on the section Gdańsk OSOWA Gdynia Main	NO
Construction of the junction between LK 201 and LK 229	So a new section of the link line 201 with line 229 from km 0 + 000 to 0 + 877.	So a new section of the link line 201 with line 229 from km 0 + 000 to 0 + 877.

Work element	Investment option (W1)	Alternative option (W2)
Construction of two-level intersections	YES	NO
Maximum speed on lk 201	From 100 km/h to 140 km/h	From 100 km/h to 140 km/h
Maximum speed on the junction	100 km/h	100 km/h
Electrification of lk 201 and switch	YES	YES
Construction of Nontractive Needs Lines	YES	NO
Number of crossings at rail level after implementation investments (potential hazardous places)	3 (22 to be decommissioned)	25
Line 214		
Track works	YES —0 + 229 to km 8+ 150	YES km -0 + 229 – 8+ 150
Construction of the second track	NO	NO
Electrification	Yes (connector)	Yes (connector)
Construction of the junction between LK 229 and 214	YES construction of the line 214 link with line 229, as an extension of line 214 – kilometre 8 + 150 – 11 + 400.	YES construction of line 214 with line 229, 0 + 000 – 3 + 206.
Speed on lk 214	From 100 to 120 km/h	100 km/h
Speed on the junction	100 km/h	90 km/h
Construction of Nontractive Needs Lines	Yes (between Somonin and Leszno Kartuski)	NO
Number of crossings at rail level after implementation investments (potential hazardous places)	5 (3 to be decommissioned)	8
LK 229		
Track works	Yes from km 31+ 000 to km 42+ 100,	NO
Construction of the second track	NO	NO
Construction of two-level intersections	NO	NO
Construction of the mijanka	Yes in km from 36+ 120 to km 36+ 968 mijanka Dzierżyżno	NO
Speed	100 km/h	100 km/h
Electrification lk 229	YES	YES
Construction of Nontractive Needs Lines	YES	NO
Number of crossings at rail level after implementation investments (potential hazardous places)	10	10

Source: own development

The **investment option (W1) is recommended by the applicant.**

The main difference between the investment option (W1) and the alternative option (W2) – in favour of option W1 – is the addition of a third track between Gdańsk Osowa Station and Gdynia Główna Station, the construction of which, as demonstrated by the traffic analysis prepared at the Performance Study Results stage, is necessary to transfer the traffic load from the transport corridor C-E 65, especially freight trains between

Gdynia Port – Kościerzyna and further to Central Poland. The track geometry in the investment variant has been adapted to the speed of 140 km/h on the entire section between Kościerzyna and Gdańsk Osowa, with local limitations of up to 120 km/h, when the alternative variant can achieve the maximum speed on a smaller section of the line.

Another factor in favour of the investment option (W1) is the reduction in the number of road and railway crossings in one level. Although active protection of crossings with corners is a safer solution than passively guarded crossings – warning signs, e.g. in the case of failure of crossing signalling devices, the safest is a collisionless – two-level crossing. In the investment option, only 7 of the currently operating 25 crossings and crossings for pedestrians at rail level will remain on the 201 railway line alone. Some of them will be replaced by road viaducts above the railway line, the part will be removed with the provision of parallel/access roads to the nearest junction with the railway line. An additional advantage of this solution is the fact that the new collision-free intersections have been designed in the areas of passenger service points and implemented as part of separate integration nodes projects, e.g. Integration Node Somonino, Integration Node in Żuków. The two-level intersection, allowing safe communication of areas cut through the railway line, for both vehicles and pedestrians, has been combined with the possibility of collision-free entry of passengers to any platform (passenger stops, stations), through pavements, stairs and elevators on designed road and rail overpasses, thus eliminating potential hazardous places.

The investment option also provides autonomous power supply to non-tractive needs, i.e. all railway infrastructure equipment not related to traction power supply – e.g. crossing signalling, platform lighting, etc., as an alternative power supply for these components to power from the professional power industry. Thanks to this solution, railway equipment is more reliable and independent of external energy supplies.

The investment option designed a flyover on line 229 on MPO Dzierżyżno, in order to improve the capacity on a single-track line, a line 214 link with line 229 with a more advantageous track geometry was designed, allowing the train speed not to reach 90 km/h, as in the alternative variant and 100 km/h, as on line 229, in which the connecting link switches on.

2.4. Characteristics of the project

The railway line No 201 Nowa Wieś Wielka – Gdynia on the section Kościerzyna – Somonino-Gdańsk Osowa-Gdynia Główna (km 136+ 096 to km 205+ 200) is a line of state importance belonging to the TEN-T network. From km 136+ 096 to km 186+ 530 it is a single track line, while from km 186+ 530 to km 205+ 200 double track. Not electrified from km 136+ 096 to km 204+ 529, electrified from km 204+ 529 to km 205+ 200.

Railway line 214 Somonino – Kartuzy from km -0 + 229 to km 8+ 150 with a newly built link with line 229 from km 8+ 150 to 11+ 400. Line 214 is a secondary line, outside the TEN-T network, single track, non-electrified. The newly designed link will form part of railway line 214 and will allow trains on the Glincz-Somonino section to pass through Kartuza station without the need to change direction.

Railway line No. 229 Pruszcz Gdański – Łeba on the section Glincz – Kartuzy from km 31 + 000 to km 42+ 100 with a newly built link section of line 201 with line 229 in km from 0 + 000 to km 0 + 877. Line 229 is a line of local significance, outside the TEN-T network, single track, non-electrified. The new section of the line 201 link to line 229 will allow for a collision-free and directional connection of these lines.

2.4.1. Subject matter and purpose of the project

The subject of the project is works on railway lines:

- No. 201 from km 136+ 096 to km 205+ 200,
- No. 214 from km —0 + 229 to km 8+ 150,
- No. 229 from km 31 + 000 to km 42+ 100,
- No. 214 and No. 229 – Construction of a new section of line 214 as a link to line 229 of km 8+ 150 to km 11+ 400,
- No 201 and No 229 – new section of the link line 201 with line 229 from km 0 + 000 to 0 + 877.

The scope of the planned work is described in section 2.4.2.

Objective of the project

The implementation of the project will achieve the following general objectives:

- reducing the running time of passenger and freight trains on the railway sections covered by the project;

- creating conditions for high-speed passenger and freight transport by increasing the average speed of trains and eliminating speed limits;
- the introduction of genuine competition and the interlinking of the various modes of transport, and above all the revitalisation of rail transport;
- removal of bottlenecks on sections, Glincz – Gdańsk Osowa and Gdynia Wielki Kack – Gdynia Main by, among others, construction of the third track on lk 201 on the section Gdańsk Osowa – Gdynia Główna, and construction of a flux on lk 229 between Kartuzy and Glincze
- creating conditions for the development of multimodal transport;
- increasing the competitiveness of rail, increasing safety, rationalising the operating costs of infrastructure and rolling stock, intermodality for passengers and improving the comfort of public services;
- subscribe in terms of infrastructure and technical standards to the standards of the pan-European transport network (TEN-T);
- ensuring rail interoperability and allowing non-discriminatory access to Polish railway infrastructure for operators from other countries;
- increasing the capacity of the above-mentioned railway lines at the same time as frequency improvements; increased connectivity with passenger trains and intercity bus and urban transport, while increasing punctuality;
- increasing the reliability of rail transport, improving traffic safety at intersections with car and pedestrian traffic through the construction of intersections and collision-free passageways or the installation of modern signalling on crossings, improving the safety of trains,
- increasing the safety of transport of dangerous goods,
- reducing the negative impact on the environment by:
- taking over passenger and freight traffic by rail from road transport as less environmentally friendly;
- electrification of sections of lines not yet covered;
- rationalising the operating and maintenance costs of managed infrastructure and reducing the devastation of railway infrastructure on the lines concerned;
- reducing the burden on road transport, which entails increased capacity and road safety,
- create the conditions for increasing the attractiveness and competitiveness of the region, which will promote socio-economic development.

The main specific objective of this project is to create an alternative transport route between the port of Gdynia and the south of the country. Currently observed difficulties in the movement of trains at the Tri-City diameter make the modernisation of railway line No. 201 a strategic investment on the Polish scale, which will enable the further development of the port of Gdynia and indirectly the port of Gdańsk, by relieving the railway network within the access to the port of Gdańsk. In the absence of investment, in the coming years the capacity will be completely exhausted in the context of access and departure by rail from the port of Gdynia, and thus a large part of the transport of goods by water will not be carried out in Gdynia, but in other ports, largely outside the country.

These objectives will be achieved in particular by:

- rationalisation of the use of railway infrastructure, including by improving and modernising the technical condition of the line,
- increasing the reliability of railway infrastructure;
- improving rail transport accessibility and conditions;
- increasing the number of passengers travelling by rail and improving the transport accessibility of selected towns in the Pomeranian Voivodeship;
- improved freight transport;
- improving the quality of customer service, the comfort of the journey and reducing its costs;
- implementation of the regional rail system integrated with the public transport system of the Tri-City Metropolis;
- enhancing the integration of the Pomeranian region;
- stimulating socio-economic development at agglomeration and regional level, in particular by ensuring better handling of transport in their territory; and
- ensuring greater mobility of the population;
- shifting part of road transport to rail, which will increase capacity and road safety;
- maximising the reduction of negative impacts on the environment by increasing the use of the most environmentally friendly mode of public transport such as rail;

- improving the accessibility and competitiveness of the agglomerations of Gdańsk and Gdynia and the region and creating opportunities for socio-economic development.

2.4.2. Scope of planned work

Of<u>the projected investment in the railway industry includes the following works:</u>

reconstruction and modernisation of railway line No. 201 on Kościerzyna – Gdańsk Osowa section to the standard of double track line with adaptation of technical infrastructure to Vmax=140 km/h.
reconstruction and modernisation of railway line No 201 on the section Gdańsk Osowa – Gdynia Główna with the addition of a third track with the adaptation of the technical infrastructure to the speed of Vmax=100 km/h. Maksymiliana, which consists of the construction of switching links between line 201 and line 202, and shifting the tracks in such a way as to position two new platforms at railway line 201.
electrification of the entire modernised section of railway line No. 201, 214 and 229 with newly designed connections.
reconstruction and modernisation of the station on line 201 – Kościerzyna, Gołubie Kaszubskie, Somonino, Żukowo Wschodnie – demolition and construction of a new track system of the station together with the necessary railway infrastructure.
reconstruction and modernisation of the station on line 201 – Gdańsk Osowa and Gdynia Wielki Kack to the extent necessary, resulting from the construction of the third track.
reconstruction and modernisation of line 214 with adaptation of technical infrastructure to Vmax=120 km/h.
construction of a new section of line 214 as a link with line 229, enabling the Somonino Kartuzy-Glincz train to travel without changing direction – with the adaptation of the technical infrastructure to the speed of Vmax=100 km/h.
reconstruction and modernisation of the Kartuzy station – demolition and construction of a new track system of the station with the necessary railway infrastructure.
adaptation of the technical infrastructure of line 229 to the speed of Vmax=100 km/h.
construction in the vicinity of Podg Glincz of a new section of the link line No 201 with line 229, enabling collision-free and directional connection of these lines – with the adaptation of the technical infrastructure to the speed of Vmax=100 km/h.

- construction of the Dzierżyżno mijanka in the place of the existing passenger stop Dzierżyżno together with the reconstruction of the existing platform.
- construction of a new passenger stop on line 201.
- construction of a control room in new locations, and the Local Control Centre in Kościerzyn.
- carrying out a comprehensive reconstruction of the existing drainage and construction of a new one in places where it is necessary.
- decommissioning and reconstruction of existing platforms, including correction of the position of platform edges and construction of new platforms with accesses and accompanying infrastructure, including persons with reduced mobility.
- dismantling of Babi Dół stop.
- demolition of unnecessary infrastructure.
- reconstruction of existing or demolition and construction of new engineering facilities in new locations (railway overpasses, road viaducts, railway bridges and culverts).
- construction of non-tractive needs line on the modernised section of railway lines 201, 214 and 229.

Achieving the above-mentioned speeds also requires <u>shifting the track beyond the existing railway lane,</u> thus adding embankments or widening existing trenches.

<u>The scope of the projected investment in the road industry includes the following works:</u>

- reconstruction of railway and road crossings with sections of access roads;
- decommissioning of rail and road crossings and construction of parallel roads;
- elimination of rail and road crossings and construction of two-tier intersections;
- reconstruction of roads in the area of existing and planned two-level junctions;
- construction of parking spaces and access roads in the area of railway control rooms and buildings and equipment for the operation and operation of railway traffic;
- construction and reconstruction of parking spaces, including for persons with reduced mobility, in the area of platforms and commuting;
- construction of public cargo spaces in the area of railway stations and accesses;

- construction or reconstruction of selected roads, including parallel roads, at intersections and in collision areas with the planned track system in connection with the addition of a second track track, change of track geometry, change of railway-road crossing position, change of location of embankments and railway excavations, change of vertical and horizontal structure of engineering facilities or construction of drainage.
- construction, reconstruction of pavements, pedestrian-bike tracks and cycle paths on road sections within rail-road crossings, two-level junctions, rebuilt public roads and in the area of platforms and passenger service places;
- construction of road energy-intensive barriers, located along the edges of existing and designed roads.

Detailed breakdowns of the rebuilt rail-road crossings and roads for the project are set out in point 2.4.2.6.

2.4.2.1. Track industry

Investment option

Lk201

<u>Technical parameters</u>

<u>Characteristic design parameters</u>

Due to the construction of the second track on the Kościerzyn – Gdańsk Osowa section and the third track on the section Gdańsk Osowa – Gdynia, a new railway pavement of the planned railway line will be built.

Over the entire length of the planned railway line No 201 for main and road tracks and intersections, a pavement has been designed:

- new 60E1 profile rails in quality as for 160 km/h steel grade 260 or 350 HT steel
- new strunoconcrete sleepers at a spacing of 0.60 m;
- new crushing ballast, Class I, grade 1 min. thickness 0.35 m;
- elastic attachments of rails to sleepers;

For the main additional tracks and intersection inserts, the following surface has been designed:

- new rails with a profile of 49E1, in quality as for 120 km/h of steel grade 260 or 350 HT steel);
- new strunoconcrete sleepers at a spacing of 0.60 m;
- new crushing ballast, Class I, grade 1 min. thickness 0.30-0.35 m;
- elastic attachments of rails to sleepers;

in the case of additional track lengths on the main tracks, the new 60E1 rails are designed exceptionally in the performance quality as for the speed of 160 km/h.

For lateral tracks, a surface is designed:

- ancient rails of 49E1 profile;
- ancient strunoconcrete primers – at a spacing of 0.60 m;
- new crushing ballast, class I, grade 1 min. thickness 0.25-0.30 m.

On rail and road crossings, the track surface is designed as for road tracks and main tracks.

All turnouts are planned to be constructed as new ones, constructed of rail sections corresponding to rails with a profile of 60E1 or 49E1 of the variety welded on strunoconcrete cross-sections, equipped with underneath rollers.

<u>Characteristic operating parameters</u>

The newly designed line No. 201 will be on the Kościerzyna – Gdańsk double track section.

For railway line No 201 on this section, it is foreseen:

- maximum speed for passenger trains up to 140 km/h;
- maximum speed on freight trains up to 100 km/h.

Gdańsk Osowa – Gdynia St. John's Hill Maximilian – three-track.

For railway line No 201 on this section, it is foreseen:

- maximum speed for passenger trains up to 100 km/h;
- maximum speed for freight trains up to 80 km/h.

Railway stations and stops

The scope of works at passenger stops, railway stations is presented below:

St. Kościerzyna

The station consists of 3 main main tracks 1, 2, 3 and additional main tracks and a communication, side and cargo track.

Two island platforms with a length of at least 200 m and a height of 0.76 m with an exit to platforms (stairs and lifts) are provided for passenger service. The access of travellers to the platforms will take place by tunnel from the front of the platform (investment carried out by the City of Kościerzyna as part of the project"Construction of the integration node Kościerzynie warz with the revitalisation and adaptation of the railway station and the creation of public transport in Powiecie Kościerskie), or in case of problems with the implementation of the tunnel by the self-government unit, access at the level of rails.

After Skorzewo

At the Skorzewo passenger stop, it is assumed to extend the existing platform and build a new single-edge platform located in an alternating system on the external sides of the tracks. Access to the platforms was foreseen at one level.

St Gołubie Kashubian

At Gołubie Kaszubskie station, 2 main tracks No. 1 and No. 2 were designed, which are an extension of the tracks of railway line No. 201 and the main additional tracks and side tracks together with the planned public hold.

Two platforms are provided for passenger service: platform No. 1 – a modernised two-edge island platform and a newly built platform No. 2 – a single-edge located at the additional main track. The access of travelers to the platforms takes place from the underground passage.

It is planned to demolish the station building in which the existing control room is located.

After the chair

At the Krzeszna passenger stop, it is planned to move the existing platform with elongation and the construction of the second – single-edge Perona is located in a system opposite the outer sides of the tracks – the existing No. 1 and the newly designed No. 2. Access to the platforms was foreseen in two levels.

After the Tower

At the tower passenger stop, it is planned to move the existing platform with elongation and build a second – one-edged platform. Platforms will be located in a system opposite the outer sides of the tracks – the existing No. 1 and the newly designed No. 2. Access to the platforms was foreseen in two levels.

After the hallmarks

At the Sławki passenger stop, two single-edge platforms with a height of 0.76 m were provided, located in the system opposite the outer sides of the tracks – modernised No. 2 and newly designed No. 1. Access to the platforms was foreseen from the road-rail trip. It is possible to move the existing platform by several hundred meters.

In addition, in order to ensure the passage of trains with a exceeded gauge (so-called oversized transport), at the Sławki passenger stop, a field reserve has been foreseen for the planned development of the track plexus within track No 1.

St Somonino

At Somonino station, 3 main main tracks were designed, additional main tracks and side tracks along with a planned public hold.

Two platforms are provided for passenger service: modernised platform No. 1 – an island two-edge with a height of 0.76 m, located at tracks 1 and 2, which will be extended and expanded and platform No. 2 – a single-edge. with a height of 0.76 m. The access of travellers to platforms will take place from the underground passage.

By Kiełpino Kartuskie

At the Kiełpino Kartuskie passenger stop, it is planned to rebuild and extend the existing platform and build a second single-edge platform with a height of 0.76 m. Perons are located in a system opposite the outer sides of the tracks – existing No. 1 and newly designed No. 2. Reaching platforms at ground level.

After Babi Bottom

At Babi Dół's passenger stop, it is planned to demolish the existing platform. Stop intended for liquidation.

By Glincz

At the Glincz branch station, it is planned to rebuild the connection between railway line No 201 and railway line 229, as well as the development of a trapezoidal switches allowing for a two-sided change of track on line 201.

After Borkowo

At the Borkowo passenger stop, it is planned to move the existing platform to a new location, extension to 150 m, additionally the construction of a single-edge platform with a height of 0.76 m. Perons are located in a system opposite the outer sides of the tracks – the existing No. 1 and the newly designed No. 2. Access to the platforms was provided on a two-tier basis (through the existing pedestrian tunnel).

After Żukowo

At the Żukowo passenger stop, it is assumed that the existing platform will be extended to 150 m and the construction of a new single-edge platform with a height of 0.76 m, located in the system opposite the outer sides of the tracks. Access to the platforms was foreseen from the level of the terrain, and the connection with the footbridge of both platforms.

St Żukowo Eastern

At Żukowo Wschodnie station, 2 main main tracks and 2 main additional tracks were designed with protective ribs.

The demolition of low platforms 1 and 2 and the construction of platforms in a new location were designed. Two platforms are provided for passenger service: platform No. 1 – an island two-edge with a height of 0.76 m, located between tracks 1 and 3, and platform No 2 – an island two-edge with a height of 0.76 m, located between tracks 2 and 4. The access of travellers to the platforms will take place from the underground passage.

By Pępowo Kartuskie

At the Pępowo Kartuskie passenger stop, it is assumed to leave the existing platform with an extension of up to 150 m and the construction of a new single-edge platform located in the system opposite the outer sides of the tracks. The access to the platforms was envisaged as two-level.

By Handbone

At the Rębiechowo passenger stop, it is assumed to move the existing platform to a new location, extension to 150 m, additionally the construction of a single-edge platform. Designed platforms, located in a system opposite the outer sides of the trail tracks. The access to the platforms was envisaged as two-level.

St Gdańsk Osowa

At Gdańsk Osowa station, the shift of existing turnout connections from Kościerzyna was designed, and the turnout head from Gdynia was expanded to bring out the third – the planned track from the station.

At the Gdańsk Osowa station, two two-edge platforms remain in the existing state.

St Gdynia Wielki Kack

At Gdynia Wielki Kack station, the reconstruction of both warheads was designed to introduce and bring the third – the planned track from the station. A new additional main track has been designed.

After Gdynia Karwiny

At the Gdynia Karwiny passenger stop, it is assumed to expand the existing single-edge platform to the two-edge platform by adding a new platform edge to the third track of railway line No. 201.

After Gdynia Stadium

At the Gdynia Stadion passenger stop, it is assumed to expand the existing single-edge platform to the two-edge platform by adding a new platform edge to the third track of railway line No. 201, and correcting the track system at the height of the passenger stop.

After St. John's Hill. Maximilian

At the personal stop of St. John's Hill. Maksymiliana, it is assumed to build two new single-edge platforms, located in the system opposite the outer sides of the tracks. The access to the platforms was foreseen as two-level, through the existing pedestrian tunnel.

After Gdynia Main

It is planned to link to the existing track system.

Lk214

Technical parameters

Characteristic design parameters

Due to the modernisation of the line, a new railway pavement will be built.

Over the entire length of the planned railway line No 214, a surface consisting of:

- new rails with a profile of 49E1, in performance quality as for speed ≥ 120 km/h;
- new strunoconcrete sleepers at a spacing of 0.60 m;
- new crushing ballast,

For the main additional tracks, the surface is designed:

- new rails with a profile of 49E1, in quality as for 120 km/h of steel grade 260 or 350 HT steel);
- new strunoconcrete sleepers at a spacing of 0.60 m;
- new crushing ballast, Class I, grade 1 min. thickness 0.35 m;
- in the case of additional track lengths on the main tracks, the new 60E1 rails are designed exceptionally in the performance quality as for the speed of 160 km/h.

For lateral tracks, a surface is designed:

- ancient rails of 49E1 profile;
- ancient strunoconcrete primers – at a spacing of 0.60 m;
- new crushing ballast, class I, grade 1 min. thickness 0.25-0.30 m.

Characteristic operating parameters

For railway line No 214, the section in question provides for:

- maximum speed for passenger trains up to 120 km/h;
- maximum speed on freight trains up to 100 km/h.

Railway stations and stops

The scope of works at passenger stops, railway stations is presented below:

St Kartuzy

Two main main tracks were designed at Kartuzy station, the main additional tracks and the side tracks.

The newly designed link will form part of railway line 214 and will allow trains on the Glincz-Somonino section to pass through Kartuza station without the need to change direction.

Two platforms are provided for passenger service: platform No. 1 – an existing two-edge island extended to a minimum of 200 m, located at tracks 1 and 2 and platform No. 2 – a single-edge with a length of at least 200 m located at track no. 4. The access of travellers to the platforms will take place at the level of the rails.

By Leszno Kartuskie

It is assumed to move the passenger stop Leszno Kartuskie towards the Somonino station, construction of a new one-edge platform. Access to the platforms was foreseen at one level.

Lk229

Characteristic design parameters

The possibility of comprehensive replacement of the railway surface at traffic stations and in places of increasing the operating parameters of the line is envisaged.

On railway line 229 on the main and road tracks and connections in the vicinity of Kartuza and p.odg. Glincz shall be designed on the pavement and intersection inserts:

- new rails with a profile 49E1, in the quality of workmanship as for speeds of 120 km/h
- new strunoconcrete sleepers at a spacing of 0.60 m;
- new crushing ballast, Class I, grade 1 min. thickness 0.30-0.35 m;
- elastic attachments of rails to sleepers;

For the main additional tracks, the surface is designed:

- new rails with a profile of 49E1, in quality as for 120 km/h of steel grade 260 or 350 HT steel);
- new strunoconcrete sleepers at a spacing of 0.60 m;
- new crushing ballast, Class I, grade 1 min. thickness 0.30-0.35 m;
- elastic attachments of rails to sleepers;

In the case of additional track lengths on the main tracks, the new 60E1 rails are designed exceptionally in the performance quality as for the speed of 160 km/h.

Characteristic operating parameters

For railway line No 229, the section in question provides for:

- maximum speed for passenger trains up to 100 km/h;
- maximum speed for freight trains up to 80 km/h.

Railway stations and stops

MPO Dzierżyżno

It is planned to rebuild the passenger stop Dzierżyżno, into a mijanka and a passenger stop. It is assumed to correct the position of the existing platform (No 1) and add to the existing single-edge platform of the second edge with a length of 150 m and a height of 0.76 m.

Alternative option(W2)

Lk201

Technical parameters

Characteristic design parameters

As part of the alternative option (W2), it is planned to build a second track from Kościerzyna station to the point of including PKM line 201 in km 137 + 772 – 186 + 546 (over a total length of about 48 774 m including switches at intermediate stations).

Planned comprehensive pavement replacement for about 52 km (road track no. 1 from about 136.7 km to about 203.0 km) and about 7 km (road track no. 2 from about km 190,0 to about km 202.2).

The geometry in the plan will be redesigned to achieve a maximum speed of 120 km/h – 140 km/h over longer stretches. The changes consist of the use of horizontal deflection curves with large radii, which will allow the transition curves to be extended. Achieving the above-mentioned speeds also required shifting the track beyond the existing railway lane, thus adding embankments or widening existing trenches.

Characteristic operating parameters

- For the 201 line, a design speed of 120 to 140 km/h is assumed.

Railway stations and stops

The alternative option foresees the following works at stations and stops:

- demolition of track surface – part of the track will remain built againW new location,
- liquidation of some tracks, new buildings tracks andcorrectiongeometrysome tracks,
- construction of a new track surface,
- construction of inserts between switches,
- liquidation of some turnouts and construction of new sets of switches, transfer of some turnouts to a new location,
- adaptation to the construction of the second track,
- comprehensive modernisation/reconstruction of drainage,
- decommissioning and reconstruction of existing platforms with accompanying infrastructure, including correction of the platform edge position,
- construction of new single-edge platforms with access and passage in the level of rails, taking into account the disabled,
- equipping platforms with roofing, small architecture, fencing, barriers, installation of a passenger information system, adaptation to the needs of persons with reduced mobility in the area of blind and wheelchair users,

provision of appropriate dimensions for the obstacle-free zone and the danger zone, the position of the cable installation for the dynamic passenger information system (SDIP) and the publicity system,

- construction of a loading square in a new location (Station Kościeżyna),
- consideration of extension of station systems at Gołubie Kaszubskie station with prospective tracks.

Lk214

Technical parameters

Characteristic design parameters

As part of the modernisation of the line – it was assumed to raise the class of the track through the construction of the track in a higher construction standard.

It is envisaged that the track surface will be rebuilt, the set of new switches will be built and, as part of the construction of the switch, turnout No 200 on line 229, the elimination of selected tracks and inserts between switches, the removal of selected sets of existing switches, the construction of a new public hold in the vicinity of the planned track No. 9 (in return for depriving the cargo bay on the other side of the station) together with the access road from Węglowa Street, changing the location of platform No 1 and building as a one-stopper.

In addition, a link between railway line 229 and railway line 214 is planned. As part of its construction, it is planned to make about 3.2 km of track with a completely new mileage, which will allow trains on the Glincz – Somonino section to pass through Kartuza station without having to change direction.

Minor adjustments may be made to the geometry of the track in the plan (including tilts) to achieve a maximum speed of 100 km/h over the entire length of railway line No. 214. Corrections will take place within the railway area.

Characteristic operating parameters

- For line 214, a design speed of up to 100 km/h is assumed.
- The newly designed rail link No. 214 with line 229 is designed to allow trains to travel at a maximum speed of 90 km/h.

Railway stations and stops

This option assumes modernisation of existing platforms at Kartuzy station and Leszno Kartuskie passenger stop. Works will include the reconstruction of platforms, including relocation, platform equipment with roofing, small architecture, information boards, showcases, megaphones, clocks; adapting to the needs of persons with reduced mobility for blind and wheelchair users; ensuring appropriate dimensions for the obstacle-free zone and the danger zone, drainage work, the position of the cable installation for the dynamic passenger information system and the publicity system, etc.

LK 229

As part of the works planned for line 229, only electrification is foreseen. A design speed of up to 100 km/h is assumed.

Railway stations and stops

Works within the Kartuzy station, the line 229 link with line 214 and the link at the Glincz branch station, which include parts of line 229, were included in the scope of works of lines 214 and 201 respectively.

2.4.2.2. Teletechnics

Investment option (W1)

With regard to the modernisation of telecommunications equipment, it is envisaged to rebuild the technological communication equipment for wired and radio communications resulting from the need for reconstruction and modernisation of track systems and routes, including infrastructure at station facilities, branch stations, passenger stops and railway stations, and enabling the introduction of remote control of stations and traffic stations.

In the field of telecommunications, the following scope of work is foreseen:

- construction of telecom cables for optical fibre and copper;
- installation of technological wired communication devices with teletransmission devices – in the case of the construction of a control room with on-call service;

- installation of radio communication remote control devices. The equipment will be able to control with LCS Kościerzyna;
- installation of multi-hole cable sewer for the needs of the travel information system and video monitoring system;
- construction of telecommunications containers;
- installation of an intrusion and robbery signalling system (SSWiN) signalling intrusion detection and access control (KD) in rooms related to rail traffic management;
- construction of fire alarm and fire extinguishing systems;
- reconstruction and construction of TV equipment at level crossings;
- reconstruction and construction of TV equipment for monitoring railway facilities and areas;
- reconstruction of a collision of telecommunications cables which are not part of the railway line, owned by public and foreign operators.

- **Alternative option (W2)**

In connection with the planned project, work on cable lines is planned, including:

- construction of fiber optic cable line,
- reconstruction of the cable sewerage system and the cable network,
- installation of broadcast devices, clock devices, dynamic travel information and monitoring on platforms,
- dismantling from the overhead line PKP Maintenance from km 194,937 to the Kościerzyna station of all steel wire circuits and leaving on the poles of the overhead line TK TELEKOM,
- execution of telephone, clock, burglary and fire installation in renovated rooms,
- construction of cable pipelines on both sides with fiber optic cable from Somonina to Kartuz,
- installation of fixed fire-extinguishing devices in railway traffic control rooms (srk) where computer and other equipment will be installed.

Within the building of the LCS Kościerzyna – the installation of a cable switch for designed optical fibre cables, a cable switch for designed copper cables, a control panel of the railway communication system (SŁK) with teletransmission and telecommunications installations, central radio communication and remote control of train and road radios along the route with antenna and lightning installation, a visual information centre with equipment (all stations and passenger stops of the entire area managed from the LCS building) is foreseen, monitoring centre (all stations, passenger stops, all journeys of category A and GSM-R facilities), clock control (all stations and passenger stops), installation of a broadcast device with an automatic announcement server for the entire area managed from the LCS building and others.

2.4.2.3. SRK equipment

Investment option (W1)

In the field of the srk industry, it is planned to convert to modern srk devices based on computer technology in the scope resulting from the new track system. As part of the investment, the construction of external devices at traffic stations and internal devices located in the buildings of control rooms/containers will be carried out. The new srk devices will be adapted for remote control and for cooperation with ERTMS/ETCS level 2.

The scope of works envisaged as part of the project includes the construction of the new LCS Kościerzyna:

- station srk equipment at stations and branch stations;
- self-locking devices;
- cross-section equipment;
- remote control devices;
- dSAT equipment;
- the new cable network.

The scope of works envisaged as part of the design works for the existing LCS Gdynia Ossowa reconstruction or extension:

- station srk equipment at stations and branch stations;
- self-locking devices;
- cross-section equipment;

- remote control devices;
- dSAT equipment;
- the existing cable network.

The scope of works envisaged as part of the project includes on tangent routes (according to the existing mileage):

- reconstruction of self-locking devices on the Gdynia Orłowo – Gdynia Główna route (from Gdynia Main station to Gdynia Orłowo station);
- execution of accompanying works in the srk industry related to the construction of new warning shields, indicators and cable network:
  - Kościerzyna station, direction station Bąk to about 134.450 km on LK201;
  - Kościerzyna station, direction station Lipusz to about 67.250 km on LK211;
  - Kartuzy station, direction station Lębork to about 43.650 km on LK229;
  - branch station Glincz, direction Stara Piła station to about 29.800 km on LK229.

Alternative option (W2)

The alternative option foresees the following scope of work:

- replacing obsolete SRK systems with computer systems with adaptation to the changed track system and centralisation of control in LCS Kościerzyna,
- construction of the LCS Kościerzyna remote control system together with the necessary infrastructure, among others, the installation of computer SRK devices, the installation of light signals and electric switch drives, the installation of track failure control devices, etc.,
- changing the categories of certain level crossings,
- installation of a self-propelled crossing signalling device with road signals and audible signals and switchable sensors,
- installation of electric switch drives and track occupancy control devices.

2.4.2.4. Unattractive power generation

Investment option (W1)

LK 201,214,229 with connectors

As part of the works in the field of non-attractive electricity, it is planned to build infrastructure related to the construction of the second track on the section ST Kościerzyna – ST Gdańsk Osowa and the construction of the third track on the section ST Gdańsk Osowa – OP Wzgórze Św. Maximilian. The main components of the infrastructure will be: cable networks, lighting poles with luminaires, heaters for electric heating switches with separation transformers and power supply cabinets for lighting and electrical heating of switches.

In addition, due to the electrification of the line and its entire length of the line, LPN is expected to supply all existing and designed LPN receivers via pole or container transformer stations. Existing connections from the power industry will be used as a backup power supply for SRK equipment and other facilities requiring backup power. Unnecessary connections from the commercial energy sector will be subject to dismantling.

Collisions or non-normative approximations of energy networks identified during the works in the form of:

- overhead lines nn, SN, WN
- cable lines,
- existing lighting
- existing electrical heating of switches,
- they will be removed by rebuilding or covering the conflicting infrastructure.

In the reconstruction of existing lighting and electric heating switches, materials and systems will be used as for the construction of new devices.

Below are examples of collisions:

LK 201 hp 167+ 860 – low voltage overhead line

In km 167+ 860 railway line number 201 crosses with the overhead line of the low voltage property of Energa Operator S.A..

Due to the electrification of the railway line, the above mentioned intersection should be rebuilt. This reconstruction will be carried out in accordance with the conditions obtained from the network gesturer.

Crossing bay poles will be replaced by end poles. From the poles will be made a cable descent, and then the passage under the railway tracks using a controlled drilling.

LK 201 hp 168+ 040 – medium voltage overhead line

In km 168+ 040 railway line number 201 crosses with the overhead line of the medium voltage property of Energa Operator S.A.

Due to the collision of the planned track system with the column of the SN line, the above-mentioned intersection should be rebuilt. This reconstruction will be carried out in accordance with the conditions obtained from the network gesturer.

Crossing bay poles will be replaced by end poles. The poles will be made a cable descent, and then the passage under the railway tracks by means of a controlled drilling. Depending on the conditions issued by the network Gestor, disconnectors will be installed on one or both ends of the cable line.

LK 201 hp 178+ 270 – low voltage cable line

In km 178+ 270 railway line number 201 crosses with the cable line of the low voltage property of Energa Operator S.A..

Due to the lowering of the level of the designed track relative to the existing state, the above-mentioned intersection should be rebuilt. This reconstruction will be carried out in accordance with the conditions obtained from the network gesturer.

Under the designed tracks, a cable insert will be made using a controlled drill. The existing cable section (collided) will be dismantled and the designed cable section will be connected to the existing line using cable muffs.

LK 229 hp 8+ 680 – lighting DW 224

In km 8+ 680 of railway line number 229, a railway bridge over the existing voivodeship road number 224 is being designed. This road is illuminated by lighting poles with luminaires having LED light source. Luminaires are powered by cable.

Due to the collision of the planned railway bridge with the existing lighting of the voivodeship road, the reconstruction of lighting poles located in a collision with the above mentioned investment is being designed to ensure continuity of lighting.

LK 201 hp 165+ 500 – high voltage overhead line – 110 kV

In km 165+ 500 railway line number 201 crosses with the overhead line of high voltage property of Energa Operator S.A..

The above-mentioned intersection is planned to be rebuilt. This reconstruction will be carried out in accordance with the conditions obtained from the network gesturer.

LK 201 hp 180+ 800 – overhead line of the highest voltage – 2x400kV

In km 180+ 800 railway line number 201 crosses with the overhead line of the highest voltage properties of PSE S.A.

The above-mentioned intersection is planned to be rebuilt. This reconstruction will be carried out in accordance with the conditions obtained from the network gesturer.

Alternative option (W2)

In connection with the electrification of the railway line and the addition of a new track, it is planned to:

- reconstruction of existing electricity infrastructure intersecting with the track system,
- reconstruction of existing power equipment up to 1 kV in places of planned works on platforms and crossings.

Works in the field of lighting of railway areas (for the needs of level crossing lighting, reaching platforms, platforms), electric heating of switches, power supply of SRK and teletechnical equipment, removal of collisions between low and medium voltage intersections with the track system are envisaged.

2.4.2.5. LPN line and transformer stations lines 201, 214 and 229

Investment option (W1)

As part of the work on non-tractive needs lines, it is planned to:

- construction of overhead lines,
- construction of cable lines,
- construction of container transformer stations,
- construction of pole transformer stations.

Alternative option (W2)

This option does not plan to build a line of unattractive needs.

2.4.2.6. Journeys

Investment option (W1)

The table below summarises the scope of works for rail-road crossings located on the sections of railway lines No 201, 214 and 229 covered by the study.

Tab.3 Scope of work for rail and road crossings LK 201

LK 201			
LP	**km is a railway line**	**category of travel**	**Scope of work**
1	136,354 LK 201	A	Dismantling of the cat. A (crossing all the station tracks of Kościerzyna station) Construction of the Passage Cat. D (enables access to the newly designed public cargo bay, running through 1 side track of Kościerzyna station)
2	136,950 LK 201	F	dismantling of the cat. F
3	137,365 LK 201	E (A)	dismantling of pedestrian crossing cat. E (A)
4	142,645 LK 201	–	construction of pedestrian crossing cat. E (B)
5	143,948 LK 201	F	dismantling of the cat. F
6	144,551 LK 201	D	elimination of the cat D crossing, construction of a two-level junction, reconstruction, construction of the road system
7	149,524 LK 201	A	dismantling of the cat. A, construction of a two-level junction, reconstruction, construction of the road system
8	149,874 LK 201	F	dismantling of the cat. F, construction of parallel roads
9	150,215 LK 201	F	dismantling of the cat. F, construction of parallel roads
10	150,909 LK 201	D	dismantling of the cat. D, construction of parallel roads
11	153,751 LK 201	E	dismantling of pedestrian crossing cat. E, construction of parallel roads
12	153,756 LK 201	F	dismantling of the cat. F, construction of parallel roads
13	155,621 LK 201	C	dismantling of the cat. C, reconstruction, construction of parallel roads
14	156,405 LK 201	C	dismantling of the cat. C, construction of a two-level junction in km about 156,100, reconstruction, construction of the road system
15	157,325 LK 201	D	dismantling of the cat. D, reconstruction, construction of parallel roads

LK 201			
LP	**km is a railway line**	**category of travel**	**Scope of work**
16	160,840 LK 201	C	elimination of cat C crossing, construction of two-level junction, reconstruction, construction of road system
17	161,246 LK 201	D	dismantling of the cat. D, construction of parallel roads
18	161,926 LK 201	A	dismantling of the cat. A, construction of a two-level junction in km about 162,820, reconstruction, construction of the road system
19	162,819 LK 201	E(A)	dismantling of pedestrian crossing cat. E(A)
20	163,169 LK 201	A	dismantling of the cat. A, construction/reconstruction of parallel roads
21	166,250 LK201	D	elimination of the cat D crossing, construction of a two-level junction, reconstruction, construction of the road system
22	166,601 LK201	D	dismantling of the cat. D, construction of parallel roads
23	167,541 LK201	C	elimination of cat C crossing, construction of two-level junction, reconstruction, construction of road system
24	179,622 LK201	A	dismantling of the cat. A, construction/reconstruction of parallel roads
25	188,163 LK201	B	Kat. B – unchanged (no road works)

Source: Develop your own.

Tab.4 Scope of work for rail and road crossings LK 214

LK 214			
LP	**km is a railway line**	**category of travel**	**Scope of work**
1	1,218 LK214	D	elimination of the cat D crossing, construction of a two-level junction, reconstruction, construction of the road system
2	3.568 LK214	D	elimination of the cat D crossing, construction of a two-level junction, reconstruction, construction of the road system
3	3,758 LK214	D	Decommissioning, Redevelopment and demolition of access road sections
4	4,272 LK214	D	conversion of the crossing, change of cat. to F
5	5,965 LK214	D	conversion of the crossing, change of cat. to F
6	6.534 LK214	D	conversion of the crossing, change of cat. to C or B
7	7.170 LK214	A	refurbishment of the passage, cat. A – no change
8	7.565 LK 214	E	conversion of pedestrian crossing, change of cat. to E (A,B)

Source: Develop your own.

Tab.5 Scope of work for rail and road crossings LK 229

LK 229			
LP	**km is a railway line**	**category of travel**	**Scope of work**
1	31,679	C	Kat. C – unchanged (no road works)
2	32,412	F	Kat. F – unchanged (no road works)
3	34,038	C	Kat. C – unchanged (no road works)
4	35,238	B	Kat. B – unchanged (no road works)
5	36,034	C	Kat. C – unchanged (no road works)
6	36,244	C	conversion of the crossing, change of cat. to B
7	37,816	C	Kat. C – unchanged (no road works)
8	39,146	F	Kat. F – unchanged (no road works)
9	40,492	E (B)	reconstruction of pedestrian crossing, cat. E (B) – unchanged
10	40,952	A	Kat. A – no changes (no road works)

Source: Develop your own.

Alternative option (W2)

The alternative option envisages raising the category of selected rail-road crossings at rail level and construction of a new crossing in 136+ 300 km – construction of a new crossing providing access to the newly designed public cargo bay.

In addition, the ride in km 163,165 is planned to be shifted in km 163,189. Trips in km 149+ 874, 150+ 215 and 157+ 325 are planned to be moved to a new location due to changes in the geometric layout of the tracks.

In the alternative option on line 214, it is planned to build a new level crossing (in km 0.555 – link kilometre) and to change the category of several existing crossings.

In the alternative option on line 229, no works are planned within the existing rail-road level crossings.

2.4.2.7. Road

Investment option (W1)

The investment foresees the construction and reconstruction of roads and car parks, as well as the construction of public cargo spaces. The following tables describe the scope of work.

Tab.6. List of roads and related elements planned for construction/reconstruction – LK 201

LK 201				
LP	**Name of road and related elements for construction/reconstruction**	**Side of the railway line (L, P)**	**Approximate location (section, km of existing line)**	**Scope of work**
1	public cargo hold square	P	okay, okay. 136,1 – 136.4 LK 201	construction of a public hold square in Kościerzyna Station with construction, reconstruction of access road

LK 201				
LP	**Name of road and related elements for construction/reconstruction**	**Side of the railway line (L, P)**	**Approximate location (section, km of existing line)**	**Scope of work**
2	access to the control room	P	okay, okay. 137.4 LK 201	construction of the exit from the public road to the "Kc" control room of Kościerzyna Station
3	parallel road	L	okay, okay. 137,800 – 139,000	reconstruction of the existing parallel road – ul. Stone
5	access road to the property and to the fields	L,P	okay, okay. 142,2 – 142.5 LK 201	reconstruction of the existing parallel road, access to the property
6	reconstruction of the access road to the viaduct	L,P	Viaduct in km 142,245	reconstruction of the access road to the viaduct
7	access to parking spaces, pavements	L	okay, okay. 142.6 – 142.7 LK201	construction of parking spaces in the area of Skorzewo platform, including access
8	access to the crossing or to the two-level junction	L,P	Transfer in km 144,551	reconstruction of the road system in connection with the construction of a two-level junction
9	road in the area of the two-level junction	L,P	okay, okay. 148.3 LK 201	reconstruction of the road in connection with the reconstruction of the railway viaduct
10	public cargo hold square	L	okay, okay. 149.0 – 149.4 LK 201	construction of the public cargo bay of Gołubie Kashubian Station
11	access to the public hold and the station building Gołubie Kaszubskie, pavements	L	okay, okay. 149.3 – 149.5 LK 201	reconstruction of the municipal road in connection with the construction of a two-level
12	road under the railway viaduct (two-level intersection in km approx. 149.4 LK 201) with commuting	L,P	okay, okay. 149.0 – 149.6 LK 201	reconstruction of the municipal road in connection with the construction of a two-level junction
13	parking with access	L	okay, okay. 149.3 – 149.5 LK 201	reconstruction of the car park with access
14	parallel road, access to fields and real estate "cut off" after the liquidation of rides	L	okay, okay. 149.4 – 151.0 LK 201	construction of a parallel road in connection with the decommissioning of level crossings
15	parallel road to and within the road viaduct, parking	L,P	okay, okay. 153.0 – 153.4 LK201	reconstruction of the municipal road in the area of the rebuilt road overpass, construction of a car park in the area of the Acting
16	parallel road	L	okay, okay. 153.3 – 153.8 LK201	construction of a parallel road in connection with the decommissioning of the crossing
17	access to buildings	P	okay, okay. 153.3 – 153.6 LK201	reconstruction of existing access to buildings in Krzeszna
18	parallel road (selected sections)	L	okay, okay. 155.5 – 157.4 LK 201	reconstruction of parallel roads in connection with the elimination of crossings into horizontal rails and construction of a two-level intersection in approx. 156.1 LK 201
19	access road to and within the two-level junction	L,P	okay, okay. 156.1 LK201	reconstruction of the public road at communes and within the two-level junction
20	parallel road	P	okay, okay. 156.4 – 157.4 LK201	construction of a parallel road in connection with the decommissioning of the level
21	parallel road	L	okay, okay. 156.1 – 156.3	Construction of a parallel road

LK 201				
LP	**Name of road and related elements for construction/reconstruction**	**Side of the railway line (L, P)**	**Approximate location (section, km of existing line)**	**Scope of work**
22	parallel road	P	okay, okay. 160,0 – 160.5 LK201	reconstruction of parallel road, access road to real estate and fields
23	access road	L	okay, okay. 160,8 – 161.3 LK201	construction of an access road (parallel) in connection with the decommissioning of the level crossing of rails
24	access to the crossing or to the two-level junction and access to platforms	L,P	Transfer in km 160,840	reconstruction of the road system in connection with the construction of a two-level junction and construction to reach platforms
25	public cargo bay square, access	P	okay, okay. 161.9 – 162.4 LK201	construction of the public cargo bay of Somonino Station with access
26	district road (within the two-level junction with accesses)	L,P	okay, okay. 161.8 – 163.1 LK201	reconstruction of the district road and communal roads linked to the construction of a two-level junction in approx. 162.9 LK 201
27	access to the station building, parking	P	okay, okay. 162.7 – 162.9 LK201	reconstruction of communal roads in the area of the two-level junction, construction of a parking lot in the area of the building of the Somonino Station
28	parallel road – access to adjacent properties	L	okay, okay. 162.8 – 163.2 LK201	reconstruction of the parallel road in connection with the decommissioning of the level
29	parking with access	L	okay, okay. 166.2 – 166.3 LK 201	construction of a car park in the area of Kiełpino Kartuskie with access
30	access to the crossing or to the two-level junction	L,P	Transfer in km 166,250	reconstruction of the road system in connection with the construction of a two-level junction
31	parallel road – access to fields and residential building	P	okay, okay. 166.2 – 166.7 LK 201	construction of a parallel road in connection with the decommissioning of the level
32	parallel road	L	okay, okay. 167.3 – 168.0 LK 201	reconstruction of the parallel road as access to the property
33	access to the crossing or to the two-level junction	L,P	Transfer in km 167,541	reconstruction of the road system in connection with the construction of a two-level junction
34	road section in the area of the road viaduct	L,P	okay, okay. 173.9 – 174.2 LK 201	reconstruction of roads in the area of the rebuilt road viaduct
35	access to the "Gl" control room	L	okay, okay. 174.4 – 174.6 LK 201	construction of parking spaces and access to the control room in the area of the branch station Glincz
36	section of the road within the two-level junction	L,P	okay, okay. 175.6 – 175.7 LK 201	reconstruction of the road in connection with the reconstruction of the railway viaduct
37	construction of parking spaces	L	okay, okay. 175.3 – 175,4 LK 201	construction of parking spaces
38	parking with access in the area of acting Żukowo	L	okay, okay. 177.8 – 178.1 LK 201	reconstruction of the parallel road with the construction of parking spaces in the area of acting Żukowo

LK 201				
LP	**Name of road and related elements for construction/reconstruction**	**Side of the railway line (L, P)**	**Approximate location (section, km of existing line)**	**Scope of work**
39	parallel road	P	okay, okay. 178.2 – 178.6 LK 201	reconstruction of the municipal road – ul. The field in connection with the reconstruction of the LK
40	access to the "ŻW" control room and construction of parking spaces	L	okay, okay. 178.4 – 178.6 LK 201	reconstruction of access to the Zhukowo-Eastern setting and construction of parking spaces
41	parking, communication infrastructure	L, P	okay, okay. 178.9 – 179.1 LK 201	construction of a car park with access in the area of Żukowo Wschodnie
42	parallel road	P	okay, okay. 179,5 – 180,0 LK 201	construction of a parallel road in connection with the decommissioning of the level
43	access to the rebuilt two-level junction	L,P	okay, okay. 180,2 LK 201	reconstruction of roads in the area of the railway viaduct
44	road in the area of the two-level junction	L,P	okay, okay. 181.4 – 181.6 LK 201	reconstruction of roads in the area of road viaduct
45	construction of parking spaces and access to platforms	L,P	okay, okay. 181.4 LK 201	construction of parking spaces and access to platforms
46	parking with access, sidewalks	L,P	okay, okay. 184.1 – 184.3 LK 201	construction of a car park with access, in the area of p.o. Rębiechowo
47	access road to fields	L	okay, okay. 184.8 – 188.5 LK 201	reconstruction of parallel road
48	public cargo hold square	P	okay, okay. 136,1 – 136.4 LK 201	construction of a public hold square in Kościerzyna Station with construction, reconstruction of access road

Source: Develop your own.

In addition, the construction or reconstruction of selected roads, including parallel roads, in collision areas and at intersections with the railway track not included in the above set-up, due to the addition of a second track, changes in track geometry, changes in the location of embankments and railway excavations, changes in vertical and horizontal engineering sites, or the construction of drainage is envisaged.

Tab.7 List of roads and related elements planned for construction/reconstruction – LK 214

LK 214				
LP	**Name of road and related elements for construction/reconstruction**	**Side of the railway line (L, P)**	**Approximate location (section, km of existing line)**	**Scope of work**
1	parking with access	P	okay, okay. 2,0 – 2.2 LK	construction of a car park with access
2	access roads to the crossing or to the two-level junction	L,P	1,218	reconstruction of the road system in connection with the construction of a two-level junction
3	access roads to the crossing or to the two-level junction	L,P	3,568	reconstruction of the road system in connection with the construction of a two-level junction
4	access roads to pass	L,P	3,758	Reconstruction and demolition of access road sections for passage
5	access roads to pass	L,P	4,272	reconstruction of access roads to pass

LK 214				
LP	**Name of road and related elements for construction/reconstruction**	**Side of the railway line (L, P)**	**Approximate location (section, km of existing line)**	**Scope of work**
6	access roads to pass	L,P	5,965	reconstruction of access roads to pass
7	access roads to pass	L,P	6,534	reconstruction of access roads to pass
8	access roads to pass	L,P	7,170	reconstruction of access roads to pass
9	Two-level junction line 214 from 229 with DW224, road viaduct	L,P	8.680 (continuation of mileage LK214)	restoration of DW224 in the existing trace in connection with the construction of a road viaduct at the junction with the planned connection of line 214 with line 229
10	Two-level junction line 214 from 229 with DW211, road viaduct	L,P	10,605 (continuation of km LK214)	restoration of DW211 in the existing trace in connection with the construction of a road viaduct at the junction with the planned connection of line 214 with line 229

Source: Develop your own.

In addition, the construction or reconstruction of selected roads at intersections with railway tracks and parallel roads not included in the above list is envisaged, due to changes in track geometry, changes in the location of embankments and railway excavations, changes in the vertical and horizontal structure of engineering facilities or the construction of drainage.

Tab.8. List of roads and related elements planned for construction/reconstruction – LK 229

LK 229				
LP	**Name of road and related elements for construction/reconstruction**	**Side of the railway line (L, P)**	**Approximate location (section, km of existing line)**	**Scope of work**
1	parking with access	P	okay, okay. 36.2 – 36.3 LK229	construction of a car park with access in the area of platforms of m.p.o. Dzierżyżno
2	access roads to pass	L,P	36,244	reconstruction of access roads to pass
3	access to the property	P	okay, okay. 36.3 – 36.5 LK229	reconstruction of parallel road
4	public cargo yard with access roads	P	okay, okay. 41.7 – 42.0 LK 229	construction of the public cargo bay of Kartuza Station with access

Source: Develop your own.

Alternative option (W2)

Tab.9. List of roads planned for reconstruction – lk 201.

LK 201				
LP	**Name of the road to be rebuilt**	**Side of the railway line (L, P)**	**Approximate location (section, km of existing line)**	**Comments**
1	Access road to the control room	L	From about km 136.3 to about km 136.5	
2	Commuting to the passage of cat. F in km 136,950	L	From about km 136,9 to about km 137,0	
3	Municipal road on plot no. 200/6 ul. Stone, Kościerzyna	L	From about km 138.1 to about km 138,4	

LK 201				
LP	**Name of the road to be rebuilt**	**Side of the railway line (L, P)**	**Approximate location (section, km of existing line)**	**Comments**
4	Municipal road ul. Stone, Kościerzyna and junction with ul. Solar	L	From about 138.8 to about km 139,0	Change of course of ul. Stone
5	Municipal road	P	From approximately 140.8 km to about 141.0 km	
6	Municipal road	L	From about 141.7 km to about km 141,8	
7	Municipal road	P	From about km 142.2 to about km 142,6	
8	Municipal road	L	From approximately 143.2 to approximately 143.5 km	
9	Access road	L	From about 144.5 km to about km 144,6	
10	Exits to the field and access to the journey in km 149,874	L and P	From about km 149.8 to about km 149,9	
11	Communal road access to the passage in km 150,909	P	From about 150.8 km to about 151.0 km	
12	Municipal road	L	From about km 153.1 to about km 153,3	
13	Access road to the property	P	From about 153.3 km to about 153.6 km	
14	Municipal road	L	From about 156.4 km to about km 156,7	
15	Municipal road	L	From about 156.7 km to about km 156,8	
16	Municipal road	P	From about km 156.9 to about km 157,4	Postponement of the existing road due to the new route of line 201
17	Municipal road	P	From about 158.6 km to about km 159,2	You will move the road due to the new course of the designed ditches along line 201
18	Municipal road	P	From about 160.3 km to about km 160,5	
19	Transfer of the location of the existing crossing in km 161,928	L and P	From approximately 161.8 km to approximately 162.0 km	
20	Municipal road	L	From approximately 162.3 to approximately 162.4 km	
21	Municipal road	P	From about 162.3 km to about 162.5 km	
22	Municipal road	L and P	Accesses for the new railway crossing in km 163,189 with the correction of the mileage of the existing ul. Gardeners	
23	Municipal road, ul. Raduńska	L	From about 167.5 km to about km 167,9	
24	Municipal road	L	From about km 173.1 to about km 173,3	
25	Municipal road Ul. Colonial	P	From about km 174.0 to about km 174,2	
26	Municipal road ul. Nowowiejska	L	From about 175.6 km to about km 175,7	

LK 201				
LP	**Name of the road to be rebuilt**	**Side of the railway line (L, P)**	**Approximate location (section, km of existing line)**	**Comments**
27	Access road	P	From about 175.6 km to about km 175,9	
28	Access road	P	From approximately 178.1 to approximately 178.6 km	ul. Field
29	Access road	P	From about km 179.5 to about km 179,6	
30	Access road	L	From about km 183.2 to about km 183,5	
31	Access road	L	From about km 184.8 to about km 185,5	

Source: Develop your own.

No reconstruction, construction of roads on lk 214, lk 229 and linkages are foreseen.

2.4.2.8. Overhead contact line

Investment option (W1)

As regards overhead contact line 201, 214, 229 and planned interconnectors, full electrification is foreseen and the scope of work is as follows:

- construction of new supporting structures with accessories,
- installation of a new overhead contact line,
- the installation of new disconnectors and disconnectors and the integration of their control into the remote control system,
- assembly of group sewing,
- adaptation of existing traction substations to the necessary extent, the construction of new traction substations with power lines for these substations and return lines, section cabs and non-tractive needs line with transformer stations and power equipment up to 1 kV.

The power supply range of the overhead contact line will be implemented as part of PKP Energetyka's work. It is planned to power the overhead contact line from:

- Traction substation Gdynia Redłowo located at the railway line no. 250,
- from the newly built power facilities, which will be located along railway line No. 201.

Traction power will be realised through the construction and modernisation of existing traction substations. The following traction substations and section cabins shall be constructed:

Tab.10. List of traction substations and section cabins – investment option (W1).

LP.	Object name	approximate km of location	Comments
1	PT Kościerzyna	137 + 322	designed
2	KS Gołubie Kashubia	149 + 354	designed
3	PT Somonino	162 + 500	designed
4	KS Kiełpino Kartuskie	168 + 000	designed
5	PT Glincz	173 + 550	designed
6	PT Gdańsk Osowa	188 + 200	designed
7	KS Gdynia Wielki Kack	194 + 500	designed
8	PT Gdynia Redłowo	PT Existing	modernisation

Source: Own development

The power supply of newly designed PTs will be realised from nearby GPZs.

Alternative option (W2)

Electrification of the railway lines under the project will work as a single supply and distribution system.

It is planned to build an electric traction network powered by a voltage of 3 kV DC.

Traction power will be realised through the construction and modernisation of existing traction substations. The designed traction substations will be powered bilaterally from a grid with a voltage of 15 kV. Power supply to the traction substation is possible from one GPZ, but the main and backup power circuits must be carried out from two different sections of the GPZ. I anticipate the supply of modernised and designed traction substations from the following GPZs:

- GPZ Kościerzyna (PT Kościerzyna);
- GPZ Kiełpino (PT Somonino);
- GPZ High/Airport (PT Gdańsk Osowa);
- GPZ Rutki (PT Glincz);
- GPZ Redłowo (PT Gdynia Redłowo);
- GPZ University/Zaspa (PT Gdańsk Wrzeszcz).

The construction or modernisation of the traction substations shown in the table below is envisaged.

Tab.11. List of traction substations and section cabins – alternative option (W2).

Power supply to the railway line	City	Modernisation/Building
201	PT Gdynia Redłowo	Modernisation
PKM, 201	PT Gdańsk Osowa	Construction
PKM	PT Gdańsk Wrzeszcz	Modernisation
201, 214, 229	PT Glincz	Construction
201, 214, 229	PT Somonino	Construction
201	PT Kościerzyna	Construction

Source: Develop your own.

2.4.2.9. Cubature facilities

Investment option (W1)

The investment foresees the construction of control rooms at stations in: Gołubiu Kashubianski, Somonin, Glińcz, Żuków Eastern. railway line no. 201. In addition, the building of the Local Control Centre in Kościerzyn is planned.

In addition to the construction of the cubature facilities themselves, the scope of building works includes:

- execution of connections: energy, telecommunications, sewage, water supply, gas and heat according to conditions obtained from network gestures;
- construction of walkways, communes, parking spaces near buildings;
- construction of a social building in the area of the existing control room in Gdańsk Osów,
- reconstruction of access roads;
- demolition of existing unnecessary cubature facilities at railway stations and stations;
- the internal equipment of the facilities and the development of the area around;
- equipment of facilities.

<u>Demolitions</u>

The investment provides for the following buildings to be demolished:

- Setting building "Kc-1" Kościerzyna and adjacent building in km 136,527 – dz. no. 167/30.
- Setting building "GK" Gołubie Kashubia in km 149,400 – dz. no. 160/27.
- The building of the closed transit guard in Gołubi Kaszubski – dz. no. 195/1, 195/14, 175.
- Setting building "So1" Somonino in km 162,070 – dz. no. 362.
- Setting building "ŻW" Żukowo Wschodnie in km 179,511 – dz. no. 648/15.

- Technical and economic building in Somonino station in km 162,850 – dz. no. 174/11.

Alternative option (W2)

As part of the alternative option, it is planned to build a new Local Control Centre in Kościerzyn, new settings in Gołubia Kashubian, Somonin and Zhuków Eastern and additionally a container for the location of: Glinch Station. It is planned to demolish buildings located in the following location:

- Approx. km 201149 + 600 LK 201 buildings located on plots with registration number: 175; 201/2; 166/13; 219/9; 219/12 within Gołuba, municipality of Stężyca;
- Approx. km 36 + 500 LK 229 – 2 buildings located on a plot with registration number 326/12 area Dzierżyżno, municipality of Kartuzy
- Approx. km 142 + 700 LK 201 – building located on a plot with registration number 364/20 area Skorzewo, municipality Kościerzyna.
- Approx. km 141 + 400 LK 201 – building located on a plot with registration number 364/14, area Skorzewo, gmina Kościerzyna,
- Approx. km 142 + 250 LK 201 – building located on a plot with registration number 1126, area Skorzewo, gmina Kościerzyna.

2.4.2.10. Facilities for Travellers

Investment option (W1)

In the area of travel facilities, the following scope of work is envisaged:

- demolition of conflicting platforms;
- relocation of existing platforms to another location;
- extension of existing platforms;
- construction of new platforms;
- replacement of platform plates, platform surface.

Tab.12 List of facilities for service – Railway line no. 201

LP.	name	platform	robots	type	access
LK201					
1	St Kościerzyna 137,344	1	extension (expansion) plus reserve to extend to 300 m	two-edged	Decommissioning of existing access at the level of rails; construction of two-level access, stairs plus elevator
		2	liquidation	two-edged	liquidation is.
			construction	two-edged	construction two-level access, staircase plus elevator
2	After Skorzewo 142,563	1	extension (25 m elongation)	single-edged	Construction of access at the level of rails, secured by means of passing devices, as for cat. B
		2	construction	single-edged	–
3	St. Gołubie Kashubia	1	demolition and construction in a new location	two-edged	Decommissioning of existing access at the level of rails;

LP.	name	platform	robots	type	access
	149,367				construction two-level access, staircase plus elevator
		2	construction	two-edged	construction two-level access, staircase plus elevator
4	After Chair 153,662	1	relocation and extension (25 m elongation)	single-edged	Decommissioning of existing access at the level of rails; construction of two-level access, stairs plus elevator
		2	construction	single-edged	construction two-level access, staircase plus elevator
5	After the Tower 156,200	1	relocation and extension (25 m elongation)	single-edged	Decommissioning of existing access at the level of rails; construction of two-level access, stairs plus elevator
		2	construction	single-edged	construction two-level access, staircase plus elevator
6	After Sławki 160,906	1	extension (25 m elongation)	single-edged	Construction of access at the level of rails, secured by means of passing devices, as for cat. B
		2	construction	single-edged	–
7	St. Somonino 162,817	1	extension (25 m extension and extension) plus a reserve to extend to 250 m.	two-edged	Decommissioning of existing access at the level of rails; construction of two-level access, stairs plus elevator
		2	construction	single-edged	construction two-level access, staircase plus elevator
8	Po Kiełpino Kartuskie 166,340	1	the demolition is.	single-edged	liquidation is.
		2	construction in a new location	single-edged	in the level of the terrain, the pavement is a road – railway crossing
		3	construction	single-edged	in the level of the terrain, the pavement is a road – railway crossing
9	After Babi Down 170,583	1	the demolition is.	single-edged	liquidation is.
10	After Borkowo 175,518	1	demolition istn	single-edged	liquidation is.
			construction	single-edged	two-level (through the existing pedestrian tunnel), construction of an additional pavement
		2	construction	single-edged	two-level (through the existing pedestrian tunnel), construction of an additional pavement
11	Po Żukowo 177,922	1	extension (25 m elongation), platform plate replacement, platform pavement	single-edged	in the level of terrain, there is a projection slipway for pedestrians, stairs, elevator
		2	construction	single-edged	in the level of the terrain, the design of the pavement, the projection ramp. footbridge,

LP.	name	platfor m	robots	type	access
					stairs, elevator
12	St. Żukowo Eastern 178,823	1	the demolition is.	single-edged	liquidation is.
			construction (in a new location)	two-edged	design passage under the tracks, stairs, elevator
		2	the demolition is.	single-edged	liquidation is.
			construction (in a new location)	two-edged	design passage under the tracks, stairs, elevator
13	Po Pępowo Kartuskie 181,568	1	construction	single-edged	in the level of terrain, pavement, road viaduct
		2	extension (25 m elongation)replacement of platforms and platform surfaces	single-edged	in the level of terrain, pavement, road viaduct
14	Rębiechowo 184,324	1	the demolition is.	single-edged	liquidation is.
			construction (in a new location)	single-edged	in the level of terrain, pavement, or railway viaduct
		2	construction (in a new location)	single-edged	in the level of terrain, pavement, or railway viaduct
15	St. Gdańsk Osowa 188,529	1	No work	two-edged	there is a passage under the tracks, elevators, stairs
		2	No work	two-edged	there is a passage under the tracks, elevators, stairs
16	St. Gdynia Wielki Kack 194,215	–	–	lack of platform	–
17	After Gdynia Karwiny 195,583	1	Addition of the second platform edge to a single-edge platform	two-edged	road viaduct, stairs, elevator
		2	no work	single-edged	road viaduct, stairs, elevator
18	After Gdynia Stadium 201,745	1	platform Edge Correction	single-edged	road viaduct, stairs, elevator
		2	Addition of the second platform edge to a single-edge platform	two-edged	road viaduct, stairs, elevator
19	After the Mount of St. Maximilian ana 202,300	1	construction	single-edged	reconstruction of underground passage, construction, stairs, elevators
		2	construction	single-edged	reconstruction of the underground passage, demolition of stairs, construction, stairs in a new
LK214					
1	After Leszno Kartuskie 3,450	1	the demolition is.	single-edged	liquidation is.
			construction	single-edged	
LK 229					
1	St. Cards 7.578(lk214) 41,365 LK229	1	extension (50 m elongation)	two-edged	adapting to the platform
		2	demolition	two-edged	liquidation
			construction	single-edged	access to the level of rails
2	MPO Knife 36,529	1	relocation and extension (one edge)	two-edged	coming from the journey

Source: Own development

Alternative option (W2)

The scope of work includes:

- decommissioning and reconstruction of existing platforms with accompanying infrastructure, including correction of the platform edge position,

- construction of new single-edge platforms with access and passage in the level of rails, taking into account the disabled,
- equipment of platforms with roofing, small architecture, fencing, barriers, installation of a passenger information system, adaptation to the needs of persons with reduced mobility in the field of blind and wheelchair users, provision of appropriate dimensions for the obstacle-free zone and the danger zone, the position of cable installation for the dynamic passenger information system (SDIP) and the publicity system,
- construction of a loading square in a new location (Station Kościeżyna),
- modernisation of existing platforms at Kartuzy station and Leszno Kartuskie passenger stop.

2.4.2.11. Engineering facilities

Investment option (W1)

The following types of engineering facilities are present on the railway lines covered by the planned project: viaducts, culverts and bridges.

A summary of the engineering facilities and the scope of the planned works are presented below in the table:

Tab.13. Engineering facilities

LP.	railway line	Km of line	Type of Object	Investment option
1	LK 201	136,316	culvert	dismantling the existing culvert, construction of a new culvert
2	LK 201	137,788	culvert	dismantling the existing culvert, construction of a new culvert
3	LK 201	138,713	culvert	dismantling the existing culvert, construction of a new culvert
4	LK 201	139,058	railway viaduct over railway line 201 in Kościerzyn	demolition of the old viaduct, construction of a new railway overpass
5	LK 201	139,294	culvert	dismantling the existing culvert, construction of a new culvert
6	LK 201	140,148	culvert	dismantling the existing culvert, construction of a new culvert
7	LK 201	140,784	culvert	dismantling the existing culvert, construction of a new culvert
8	LK 201	141,773	culvert	dismantling the existing culvert, construction of a new culvert
9	LK 201	142,164	culvert	dismantling the existing culvert, construction of a new culvert
10	LK 201	142,245	railway viaduct over the ground road, Skorzewo	demolition of the old facility, construction of a new facility
11	LK 201	143,438	railway viaduct over the ground road, Skorzewo	demolition of the old facility, construction of a new facility

LP.	railway line	Km of line	Type of Object	Investment option
12	LK 201	143,439	culvert	dismantling the existing culvert, construction of a new culvert
13	LK 201	143,828	culvert	dismantling the existing culvert, construction of a new culvert
14	LK 201	145,405	culvert	dismantling the existing culvert, construction of a new culvert
15	LK 201	145,626	railway viaduct over the ground road, Stara Sikorska Huta	demolition of the old facility, construction of a new facility
16	LK 201	145,869	culvert	dismantling the existing culvert, construction of a new culvert
17	LK 201	147,195	culvert	dismantling the existing culvert, construction of a new culvert
18	LK 201	147,486	culvert	dismantling the existing culvert, construction of a new culvert
19	LK 201	148,296	railway overpass over the asphalt road, Gołubie Kashubian	construction of a new railway viaduct
20	LK 201	148,334	railway overpass over the asphalt road, Gołubie Kashubian	dismantling the old viaduct with its footholds
21	LK 201	148,335	culvert	dismantling the existing culvert, construction of a new culvert
22	LK 201	148,765	culvert	dismantling the existing culvert, construction of a new culvert
23	LK 201	149,425	railway viaduct	construction of a new railway viaduct with access to platforms at Gołubie Kaszubskie station
24	LK 201	149,714	culvert	dismantling the existing culvert, construction of a new culvert
25	LK 201	149,993	culvert	dismantling the existing culvert, construction of a new culvert
26	LK 201	150,307	culvert	dismantling the existing culvert, construction of a new culvert
27	LK 201	150,896	culvert	dismantling the existing culvert, construction of a new culvert
28	LK 201	151,341	railway viaduct over the ground road, Gołubie Kashubian	demolition of the old viaduct, construction of a new railway overpass
29	LK 201	151,577	culvert	dismantling the existing culvert, construction of a new culvert

LP.	railway line	Km of line	Type of Object	Investment option
30	LK 201	151,713	culvert	dismantling the existing culvert, construction of a new culvert
31	LK 201	151,940	culvert	dismantling the existing culvert, construction of a new culvert
32	LK 201	152,085	culvert	dismantling the existing culvert, construction of a new culvert
33	LK 201	152,152	railway viaduct over the ground road, Little Krzeszna	demolition of the old viaduct, construction of a new railway overpass
34	LK 201	152,581	railway overpass over the road, Krzeszna	demolition of the old viaduct, construction of a new railway overpass
35	LK 201	152,905	culvert	dismantling the existing culvert, construction of a new culvert
36	LK 201	153,190	culvert	dismantling the existing culvert, construction of a new culvert
37	LK 201	153,289	road viaduct in Old Krzeszna	demolition of the road viaduct, construction of a new viaduct with access to platforms at the Krzeszna passenger stop
38	LK 201	153,810	culvert	dismantling the existing culvert, construction of a new culvert
39	LK 201	154,122	culvert	dismantling the existing culvert, construction of a new culvert
40	LK 201	154,421	culvert	dismantling the existing culvert, construction of a new culvert
41	LK 201	154,619	culvert	dismantling the existing culvert, construction of a new culvert
42	LK 201	154,781	railway viaduct over district road no. 1922G, Wieżyca-Ostrzyce	demolition of an existing facility, construction of a new building with two bridges
43	LK 201	155,221	culvert	dismantling the existing culvert, construction of a new culvert
44	LK 201	155,902	culvert	dismantling the existing culvert, construction of a new culvert
45	LK 201	156,085	railway viaduct	construction of a new railway viaduct with access to platforms at the Wieżyca station
46	LK 201	156,338	culvert	dismantling the existing culvert, construction of a new culvert
47	LK 201	156,711	culvert	dismantling the existing culvert, construction of a new culvert
48	LK 201	157,070	culvert	dismantling an existing culvert, building a new one

LP.	railway line	Km of line	Type of Object	Investment option
				culvert
49	LK 201	157,764	culvert	dismantling the existing culvert, construction of a new culvert
50	LK 201	158,649	culvert	dismantling the existing culvert, construction of a new culvert
51	LK 201	159,123	railway overpass over the road between Dębowo and Rąty	demolition of an existing facility, construction of a new building with two bridges
52	LK 201	159,124	culvert	dismantling the existing culvert, construction of a new culvert
53	LK 201	159,450	retaining wall	construction of a retaining wall from km 159.300 to km 159.600
54	LK 201	159,746	culvert	dismantling the existing culvert, construction of a new culvert
55	LK 201	160,069	culvert	dismantling the existing culvert, construction of a new culvert
56	LK 201	160,138	culvert	dismantling the existing culvert, construction of a new culvert
57	LK 201	160,282	culvert	dismantling the existing culvert, construction of a new culvert
58	LK 201	160,764	culvert	dismantling the existing culvert, construction of a new culvert
59	LK 201	161,040	culvert	dismantling the existing culvert, construction of a new culvert
60	LK 201	161,240	railway bridge over the watercourse, in Sławki	demolition of the old bridge, construction of a new railway bridge
61	LK 201	161,369	culvert	dismantling the existing culvert, construction of a new culvert
62	LK 201	161,879	culvert	dismantling the existing culvert, construction of a new culvert
63	LK 201	162,440	culvert	dismantling the existing culvert, construction of a new culvert
64	LK 201	162,875	railway viaduct	construction of a new railway viaduct with access to platforms at Somonino station
65	LK 201	163,556	railway overpass over the asphalt road, Somonino	demolition of an existing facility, construction of a new building with two bridges
66	LK 201	163,577	railway bridge over the Radunia River, Somonino	demolition of an existing facility, construction of a new building with two bridges
67	LK 201	163,844	railway overpass over the road, Somonino	demolition of an existing facility, construction of a new building with two bridges

LP.	railway line	Km of line	Type of Object	Investment option
68	LK 201	164,850	culvert	dismantling the existing culvert, construction of a new culvert
69	LK 201	165,383	railway overpass over the road, Somonino	demolition of an existing facility, construction of a new building with two bridges
70	LK 201	165,384	culvert	dismantling the existing culvert, construction of a new culvert
71	LK 201	165,817	culvert	dismantling the existing culvert, construction of a new culvert
72	LK 201	166,513	culvert	dismantling the existing culvert, construction of a new culvert
73	LK 201	167,317	culvert	dismantling the existing culvert, construction of a new culvert
74	LK 201	167,959	culvert	dismantling the existing culvert, construction of a new culvert
75	LK 201	168,320	culvert	dismantling the existing culvert, construction of a new culvert
76	LK 201	168,849	railway viaduct over the ground road, Kiełpino	demolition of the old viaduct, construction of a new railway overpass
77	LK 201	169,163	railway viaduct over the ground road, Mezowo	demolition of an existing facility, construction of a new building with two bridges
78	LK 201	169,243	culvert	dismantling the existing culvert, construction of a new culvert
79	LK 201	171,451	culvert	dismantling the existing culvert, construction of a new culvert
80	LK 201	171,953	railway viaduct over the ground road, Babi Dół	demolition of an existing facility, construction of a new building with two bridges
81	LK 201	172,354	culvert	dismantling the existing culvert, construction of a new culvert
82	LK 201	173,060	culvert	dismantling the existing culvert, construction of a new culvert
83	LK 201	173,175	retaining wall	construction of a retaining wall from km 173.100 to km 173.250
84	LK 201	174,181	road viaduct in Borkowo	demolition of the road viaduct, construction of a new viaduct
85	LK 201	175,349	culvert	dismantling the existing culvert, construction of a new culvert
86	LK 201	175,424	railway viaduct over voivodeship road no. 211, ul. Kartuska, Borkowo	demolition of an existing facility, construction of a new building with two bridges
87	LK 201	175,701	railway overpass over the road from	demolition of an existing object, construction of a new one

LP.	railway line	Km of line	Type of Object	Investment option
			stone nave, Borkowo	two bridges
88	LK 201	175,702	culvert	dismantling the existing culvert, construction of a new culvert
89	LK 201	176,059	railway overpass over the road, Borkowo	demolition of an existing facility, construction of a new building with two bridges
90	LK 201	176,594	road viaduct in Żukowo	demolition of the road viaduct, construction of a new viaduct
91	LK 201	177,261	railway bridge by the river Słupina, Zhukowo	dismantling the existing bridge, adding two bridges on existing supports
92	LK 201	177,992	footbridge	construction of footbridge connecting platforms on PO Żukowo
93	LK 201	178,225	retaining wall	construction of a retaining wall from km 178.150 to km 178.300
94	LK 201	178,356	culvert	dismantling the existing culvert, construction of a new culvert
95	LK 201	179,000	culvert	dismantling the existing culvert, construction of a new culvert
96	LK 201	179,075	tunnel for pedestrians	pedestrian tunnel with access to platforms at Zhukowo-Eastern station
97	LK 201	180,197	railway viaduct over the ground road, Żukowo	demolition of the old viaduct, construction of a new railway overpass
98	LK 201	180,871	culvert	dismantling the existing culvert, construction of a new culvert
99	LK 201	181,028	railway viaduct over the ground road, Pępowo	demolition of an existing facility, construction of a new building with two bridges
100	LK 201	181,387	culvert	dismantling the existing culvert, construction of a new culvert
101	LK 201	181,463	road viaduct in m. Pępowo Kartuskie	demolition of the road viaduct, construction of a new viaduct
102	LK 201	182,812	culvert	dismantling the existing culvert, construction of a new culvert
103	LK 201	183,531	culvert	dismantling the existing culvert, construction of a new culvert
104	LK 201	183,897	railway bridge over the watercourse, Rębiechowo	demolition of an existing facility, construction of an object with two bridges
105	LK 201	184,243	railway viaduct over district road no. 1901G, Rębiechowo	demolition of the old viaduct, construction of a new railway overpass
106	LK 201	184,483	railway bridge over the stream Strzelniczka, Rębiechowo	demolition of an existing facility, construction of an object with two bridges

LP.	railway line	Km of line	Type of Object	Investment option
107	LK 201	184,620	culvert	dismantling the existing culvert, construction of a new culvert
108	LK 201	184,835	road viaduct in m. Rębiechowo	demolition of the road viaduct, construction of a new viaduct
109	LK 201	185,271	culvert	no works on the facility
110	LK 201	185,478	railway viaduct over district road no. 1902G, Rębiechowo	demolition of the old viaduct, construction of a new railway overpass
111	LK 201	185,800	railway viaduct	construction of a new railway viaduct
112	LK 201	185,705	culvert	no works on the facility
113	LK 201	185,870	retaining wall	construction of a retaining wall from km 185.850 to km 185.890
114	LK 201	185,900	railway overpass over railway line 253	construction of a new railway viaduct
115	LK 201	185,945	retaining wall	construction of a retaining wall from km 185.850 to km 186.040
116	LK 201	186,100	railway viaduct	construction of a new railway viaduct
117	LK 201	186,556	railway viaduct over district road no. 1902G, BARNIEWICE	no works on the facility
118	LK 201	186,904	culvert	no works on the facility
119	LK 201	189,501	railway overpass over the asphalt road, Gdańsk Osowa	demolition of the old viaduct, construction of a new railway overpass
120	LK 201	190,411	railway bridge over the watercourse, Gdańsk Osowa	Demolition of the bridge, construction of a new facility
121	LK 201	191,615	culvert	dismantling the existing culvert, construction of a new culvert
122	LK 201	192,123	culvert	dismantling the existing culvert, construction of a new culvert
123	LK 201	192,720	railway overpass over the road, Gdynia-Wlk. Kack	demolition of the old viaduct, construction of a new railway overpass
124	LK 201	192,840	culvert	dismantling the existing culvert, construction of a new culvert
125	LK 201	193,295	culvert	dismantling the existing culvert, construction of a new culvert
126	LK 201	193,410	railway overpass over the road, Gdynia-Wlk. Kack	demolition of the old viaduct, construction of a new railway overpass
127	LK 201	193,591	road overpass over the road, Gdynia-Wlk. Kack	demolition of the road viaduct, construction of a new viaduct
128	LK 201	194,045	culvert	no works on the facility

LP.	railway line	Km of line	Type of Object	Investment option
129	LK 201	194,081	railway overpass over the road, Gdynia-Wlk. Kack	demolition of the old viaduct, construction of a new railway overpass
130	LK 201	194,207	culvert	dismantling the existing culvert, construction of a new culvert
131	LK 201	194,272	culvert	no works on the facility
132	LK 201	195,342	culvert	dismantling the existing culvert, construction of a new culvert
133	LK 201	195,343	culvert	dismantling the existing culvert, construction of a new culvert
134	LK 201	195,750	retaining wall	construction of a retaining wall from km 195.400 to km 196.100
135	LK 201	196,395	culvert	dismantling the existing culvert, construction of a new culvert
136	LK 201	196,555	railway bridge over the stream of Maria, Gdynia-Karwiny	demolition of the old bridge, construction of a new railway bridge
137	LK 201	197,076	culvert	dismantling the existing culvert, construction of a new culvert
138	LK 201	197,286	culvert	dismantling the existing culvert, construction of a new culvert
139	LK 201	197,690	culvert	dismantling the existing culvert, construction of a new culvert
140	LK 201	198,100	railway bridge over the Kacza stream, Kacze Łęgi Reserve, Gdynia-Mały Kack	Demolition of the bridge, construction of a new facility
141	LK 201	198,380	railway overpass over the road, Gdynia-Mały Kack	demolition of the old viaduct, construction of a new railway overpass
142	LK 201	199,011	railway overpass over the road, Gdynia-Mały Kack	demolition of the old viaduct, construction of a new railway overpass
143	LK 201	199,012	culvert	demolition of the old viaduct, construction of a new railway overpass
144	LK 201	199,530	railway overpass over the road, Gdynia-Mały Kack	demolition of the old viaduct, construction of a new railway overpass
145	LK 201	199,531	culvert	dismantling the existing culvert, construction of a new culvert
146	LK 201	199,800	culvert	dismantling the existing culvert, construction of a new culvert
147	LK 201	199,938	culvert	dismantling the existing culvert, construction of a new culvert
148	LK 201	200,228	culvert	dismantling the existing culvert, construction of a new culvert

LP.	railway line	Km of line	Type of Object	Investment option
149	LK 201	200,598	culvert	dismantling the existing culvert, construction of a new culvert
150	LK 201	200,635	railway viaduct over the road, Gdynia- Mały Kack	demolition of the old viaduct, construction of a new railway overpass
151	LK 201	201,335	railway viaduct over district road no. 1633G, Gdynia- Mały Kack	demolition of the old viaduct, construction of a new railway overpass
152	LK 201	201,680	retaining wall	construction of a retaining wall from km 201.530 to km 201.830
153	LK 201	201,861	railway viaduct over the asphalt road, Gdynia Redłowo	demolition of the existing viaduct construction of a new railway viaduct
154	LK 201	201,861	railway viaduct over the asphalt road, Gdynia Redłowo	Construction of a new railway viaduct
155	LK 201	201,950	retaining wall	construction of a retaining wall from km 201.850 to km 202.050 (Western side)
156	LK 201	201,950	retaining wall	construction of a retaining wall from km 201.850 to km 202.050 (Eastern side)
157	LK 201	202,109	railway viaduct over the Gdynia Road, Gdynia Redłowo	demolition of two viaducts, construction of new three viaducts
158	LK 201	202,193	railway viaduct	no works on the facility
159	LK 201	202,193	railway viaduct above railway line 202, St. John's hill. Maksymiliana, Gdynia Redłowo	construction of a new railway viaduct
160	LK 201	202,674	culvert	dismantling the existing culvert, construction of a new culvert
161	LK 214	0,814	railway bridge on the river Radunia, Somonino	railway bridge repair, ballast trough extension
162	LK 214	1,358	culvert	dismantling the existing culvert, construction of a new culvert
163	LK 214	1,779	culvert	dismantling the existing culvert, construction of a new culvert
164	LK 214	2,586	culvert	dismantling the existing culvert, construction of a new culvert
165	LK 214	3,080	culvert	dismantling the existing culvert, construction of a new culvert
166	LK 214	3,561	culvert	dismantling the existing culvert, construction of a new culvert
167	LK 214	4,212	railway bridge over the watercourse	dismantling an old bridge, building a new bridge

LP.	railway line	Km of line	Type of Object	Investment option
			water	rail
168	LK 214	4,505	culvert	dismantling the existing culvert, construction of a new culvert
169	LK 214	4,814	culvert	dismantling the existing culvert, construction of a new culvert
170	LK 214	5,131	culvert	dismantling the existing culvert, construction of a new culvert
171	LK 214	5,400	culvert	dismantling the existing culvert, construction of a new culvert
172	LK 214	5,617	culvert	dismantling the existing culvert, construction of a new culvert
173	LK 214	5,909	culvert	dismantling the existing culvert, construction of a new culvert
174	LK 214	6,082	culvert	dismantling the existing culvert, construction of a new culvert
175	LK 214	6,402	culvert	dismantling the existing culvert, construction of a new culvert
176	LK 214	6,526	culvert	repair of the culvert
177	LK 214	6,731	culvert	repair of the culvert
178	LK 214	6,915	culvert	repair of the culvert
179	LK 214	7,072	culvert	repair of the culvert
180	LK 214	8,177	road viaduct in Kartuzy	demolition of the road viaduct, construction of a new viaduct
181	LK 214	8,697	railway overpass over road DW224	construction of a new road viaduct
182	LK 214	10,614	railway overpass over road DW211	construction of a new road viaduct

Source: Develop your own.

Alternative option (W2)

A summary of the engineering facilities and the scope of the planned works are presented below in the table:

Tab.14. Engineering facilities – alternative option (W2)

LP.	railway line	Km of line	Type of Object	Alternative option (W2)
1	LK 201	136,316	culvert	renovation
2	LK 201	137,788	culvert	renovation
3	LK 201	138,713	culvert	renovation
4	LK 201	139,294	culvert	renovation
5	LK 201	140,148	culvert	renovation
6	LK 201	140,784	culvert	renovation
7	LK 201	141,773	culvert	renovation
8	LK 201	142,164	culvert	renovation
9	LK 201	143,439	culvert	renovation

LP.	railway line	Km of line	Type of Object	Alternative option (W2)
10	LK 201	143,828	culvert	renovation
11	LK 201	145,405	culvert	renovation
12	LK 201	145,869	culvert	renovation
13	LK 201	147,195	culvert	renovation
14	LK 201	147,486	culvert	renovation
15	LK 201	148,335	culvert	renovation
16	LK 201	148,765	culvert	renovation
17	LK 201	149,714	culvert	dismantling the existing culvert, construction of a new culvert
18	LK 201	149,993	culvert	dismantling the existing culvert, construction of a new culvert
19	LK 201	150,307	culvert	dismantling the existing culvert, construction of a new culvert
20	LK 201	150,896	culvert	dismantling the existing culvert, construction of a new culvert
21	LK 201	151,577	culvert	dismantling the existing culvert, construction of a new culvert
22	LK 201	151,713	culvert	dismantling the existing culvert, construction of a new culvert
23	LK 201	151,940	culvert	dismantling the existing culvert, construction of a new culvert
24	LK 201	152,085	culvert	dismantling the existing culvert, construction of a new culvert
25	LK 201	152,905	culvert	renovation
26	LK 201	153,190	culvert	dismantling the existing culvert, construction of a new culvert
27	LK 201	153,810	culvert	dismantling the existing culvert, construction of a new culvert
28	LK 201	154,122	culvert	renovation
29	LK 201	154,421	culvert	renovation
30	LK 201	154,619	culvert	dismantling the existing culvert, construction of a new culvert
31	LK 201	155,221	culvert	renovation
32	LK 201	155,902	culvert	renovation
33	LK 201	156,338	culvert	renovation
34	LK 201	156,711	culvert	renovation
35	LK 201	157,070	culvert	renovation
36	LK 201	157,764	culvert	renovation
37	LK 201	158,649	culvert	dismantling the existing culvert, construction of a new culvert
38	LK 201	159,124	culvert	renovation
39	LK 201	159,746	culvert	dismantling the existing culvert, construction of a new culvert
40	LK 201	160,069	culvert	renovation
41	LK 201	160,138	culvert	dismantling the existing culvert, construction of a new culvert
42	LK 201	160,282	culvert	renovation
43	LK 201	160,764	culvert	dismantling the existing culvert, construction of a new culvert
44	LK 201	161,040	culvert	dismantling the existing culvert, construction of a new culvert
45	LK 201	161,240	emptiness	renovation

LP.	railway line	Km of line	Type of Object	Alternative option (W2)
46	LK 201	161,369	culvert	dismantling the existing culvert, construction of a new culvert
47	LK 201	161,879	culvert	dismantling the existing culvert, construction of a new culvert
48	LK 201	162,440	culvert	dismantling the existing culvert, construction of a new culvert
49	LK 201	164,850	culvert	renovation
50	LK 201	165,384	culvert	renovation
51	LK 201	165,817	culvert	renovation
52	LK 201	166,513	culvert	renovation
53	LK 201	167,317	culvert	renovation
54	LK 201	167,957	culvert	renovation
55	LK 201	168,320	culvert	renovation
56	LK 201	169,243	culvert	renovation
57	LK 201	171,451	culvert	renovation
58	LK 201	172,354	culvert	renovation
59	LK 201	173,060	culvert	renovation
60	LK 201	175,349	culvert	renovation
61	LK 201	175,702	culvert	renovation
62	LK 201	178,356	culvert	renovation
63	LK 201	179,000	culvert	renovation
64	LK 201	180,871	culvert	renovation
65	LK 201	181,387	culvert	renovation
66	LK 201	182,812	culvert	renovation
67	LK 201	183,531	culvert	renovation
68	LK 201	185,271	culvert	renovation
69	LK 201	186,904	culvert	renovation
70	LK 201	191,615	culvert	renovation
71	LK 201	192,123	culvert	renovation
72	LK 201	192,840	culvert	renovation
73	LK 201	193,377	culvert	renovation
74	LK 201	194,045	culvert	renovation
75	LK 201	194,207	culvert	renovation
76	LK 201	194,272	culvert	renovation
77	LK 201	195,343	culvert	renovation
78	LK 201	195,342	culvert	renovation
79	LK 201	196,395	culvert	renovation
80	LK 201	197,076	culvert	renovation
81	LK 201	197,286	culvert	renovation
82	LK 201	197,690	culvert	renovation
83	LK 201	199,012	culvert	renovation
84	LK 201	199,531	culvert	renovation
85	LK 201	199,800	culvert	renovation
86	LK 201	199,938	culvert	renovation
87	LK 201	200,228	culvert	renovation
88	LK 201	200,598	culvert	renovation
89	LK 201	202,674	culvert	renovation
90	LK 201	142,245	viaduct	Comprehensive repair
91	LK 201	143,438	viaduct	renovation

LP.	railway line	Km of line	Type of Object	Alternative option (W2)
92	LK 201	145,626	viaduct	Comprehensive repair
93	LK 201	148,334	viaduct	Comprehensive repair
94	LK 201	151,341	viaduct	total demolition and construction of a new facility
95	LK 201	152,152	viaduct	total demolition and construction of a new facility
96	LK 201	152,581	viaduct	total demolition and construction of a new facility
97	LK 201	154,781	viaduct	Comprehensive repair
98	LK 201	159,123	viaduct	renovation
99	LK 201	161,240	the Small Bridge	total demolition and construction of a new facility
100	LK 201	163,556	viaduct	Comprehensive repair
101	LK 201	163,652	the Big Bridge	Comprehensive repair
102	LK 201	163,844	viaduct	Comprehensive repair
103	LK 201	165,383	viaduct	renovation
104	LK 201	168,849	viaduct	renovation
105	LK 201	169,163	viaduct	renovation
106	LK 201	171,953	viaduct	renovation
107	LK 201	175,424	viaduct	Comprehensive repair
108	LK 201	175,701	viaduct	Comprehensive repair
109	LK 201	176,059	viaduct	Comprehensive repair
110	LK 201	177,364	the Big Bridge	renovation
111	LK 201	180,197	viaduct	Comprehensive repair
112	LK 201	181,028	viaduct	Comprehensive repair
113	LK 201	183,897	large culvert	renovation
114	LK 201	184,243	viaduct	renovation
115	LK 201	184,483	the Big Bridge	renovation
116	LK 201	185,478	viaduct	renovation
117	LK 201	185,821	large culvert	renovation
118	LK 201	186,556	viaduct	renovation
119	LK 201	189,501	viaduct	Comprehensive repair
120	LK 201	190,411	large culvert	renovation
121	LK 201	192,720	viaduct	Comprehensive repair
122	LK 201	193,410	viaduct	Comprehensive repair
123	LK 201	194,081	viaduct	Comprehensive repair
124	LK 201	196,660	bridge	Comprehensive repair
125	LK 201	198,235	large culvert	renovation
126	LK 201	198,380	viaduct	Comprehensive repair
127	LK 201	199,011	viaduct	Comprehensive repair
128	LK 201	199,530	viaduct	Comprehensive repair
129	LK 201	200,635	viaduct	Comprehensive repair
130	LK 201	201,335	viaduct	Comprehensive repair
131	LK 201	201,861	viaduct	the building was thoroughly modernised (replacement of the system and supports) in 2000
132	LK 201	202,109	2 single track viaducts	no work on the facility
133	LK 201	202,193	viaduct	comprehensive repair
134	LK 214	1 + 358	culvert	renovation
135	LK 214	1 + 779	culvert	renovation
136	LK 214	2 + 258	culvert	renovation
137	LK 214	3 + 080	culvert	renovation
138	LK 214	3 + 561	culvert	renovation
139	LK 214	4 + 212	culvert	renovation

LP.	railway line	Km of line	Type of Object	Alternative option (W2)
140	LK 214	4 + 505	culvert	renovation
141	LK 214	4 + 814	culvert	renovation
142	LK 214	5 + 131	culvert	renovation
143	LK 214	5 + 400	culvert	renovation
144	LK 214	5 + 617	culvert	renovation
145	LK 214	5 + 909	culvert	renovation
146	LK 214	6 + 082	culvert	renovation
147	LK 214	6 + 402	culvert	renovation
148	LK 214	6 + 526	culvert	renovation
149	LK 214	6 + 731	culvert	renovation
150	LK 214	6 + 915	culvert	renovation
151	LK 214	7,072	culvert	renovation
152	Lk214	0 + 814	Railway bridge over the Radunia River	comprehensive repair

Source: Develop your own.

2.4.2.12. Dehydration

Investment option (W1)

Dehydration of the railway system

The drainage of the railway track is provided through drainage ditches or deep drainage in the form of drainage and drain collectors.

The designed system of drainage of the railway system will guarantee the adoption of the resulting rainwater and melting waters.

Dehydration of platforms

For the capture of water from the surface of platforms, the following shall be assumed:

- dehydration by transverse fall outside the platform into adjacent terrain or towards a trench or shallow concrete tray – single-edge platforms;
- dehydration by descending towards the platform axis and linear dehydration – an island two-edge platform.

Dewatering of rail and road crossings

Dewatering of rail and road crossings will be carried out surfacely, using longitudinal and cross-road slopes. Rainwater and melting water will be drained into road ditches, rail side ditches or rainwater drainage of the road.

In addition, a drainage tie drainage and in the case of inclination of the access road towards the railway track will be carried out for all redesigned crossings at the level of the road surface. The drainage water from tie and line drainage will be drained into the drainage system of the railway line or road, depending on the local situation.

Dehydration of roads

The designed roads, depending on the local situation, will be dehydrated surfacely through longitudinal and transverse drops to road side ditches, a common railway-road ditch or through rainwater sewerage.

Alternative option (W2)

- The drainage of the track is foreseen on the section Gdańsk Osowa – Gdynia Główna (excluding the station).
- A new drainage system will be introduced on the sections where a comprehensive replacement of the pavement or new building will be carried out.
- On the Kościerzyna – Gdańsk Osowa section, it is planned to rebuild the existing one or to build a new drainage.

2.4.2.13. Infrastructure WOD-KAN, GAZ, CO (collisions)

Investment option (W1)

In the area of the planned investment there are collisions of designed solutions with existing main water supply networks. There are perpendicular collisions (e.g. a collision of the DN400 water main in km 201+ 868 with a modernised track), as well as longitudinal collisions when the water main runs parallel to the designed solutions, at a distance that poses a risk of damage to the conductor during operations (e.g. DN350 water bus in km 201 + 867-202 + 083 along the modernised track). In the case of the above-mentioned collisions, it is necessary to rebuild or secure the water main on the section where it interferes with the planned solutions.

As part of the investment, there is also a need to rebuild the following networks:

- reconstruction or protection of high-pressure gas networks that run in collision to the designed solutions. The gas transmission networks in question – DN300 and DN500 – run around km 181 + 720 of the existing railway line, in Pępowo.
- reconstruction of existing district heating networks, interfering with design solutions. Examples of such collisions are: a collision of an underground conductor 2xDN600 in km 196+ 440 of an existing line, or a longitudinal collision with an overhead conductor 2xDN500 at km 201+ 250-201+ 800.

There are also numerous collisions of design solutions with existing sanitary and rainwater sewer networks and with existing low and medium pressure gas networks. Identified collisions involve securing or remodeling conflicting sections.

In connection with the reconstruction of the district heating network, the report was accompanied by a cost-benefit analysis. (Annex 2.4.2-1) referred to in Article 10a(a) 1 of the Act of 10 April 1997 – Energy Law (Dz. U. of 2017, item 220,791 as amended).

Alternative option (W2)

The alternative option assumes that works will be carried out in the field of reconstruction of the water, sewage and district heating networks to the extent that it will be necessary to carry out the planned project.

It will be necessary to rebuild the existing MV and NN power infrastructure intersecting with the track system. The work will consist of filing power lines.

2.4.2.14. Occupancy of the site

In connection with the implementation of the investment, it is envisaged to go beyond the railway area. Exits from the railway area will take place due to:

- reconstruction of intersections in the level of rails at two-level intersections (viaducts, tunnels),
- correction of the track system in the plan and profile which will result in the need for reconstruction earth structures (movement of embankment excavations), in order to achieve speed on the 140 km/h line, the construction of the second track on the Kościerzyna – Gdańsk Osowa section and the third track on the section Gdańsk Osowa – Gdynia Główna,
- construction of the second track on the Kościerzyna – Gdańsk Osowa section and the third track on the section Gdańsk Osowa – Gdynia Główna,
- electrification of railway lines,
- construction of new parallel roads due to the removal of rail and road crossings, the extension of the drainage system of the railway line, including the drainage of water to the receivers,
- reconstruction of overhead line collisions.

The estimated area of the investment area before the project is implemented in the investment option is approx. 184 ha. However, once the project is completed, it will be ok. 420 ha. The area of the area additionally occupied for the purposes of the project will be approx. 236 ha.

However, the estimated area of the investment site before the implementation of the project in the alternative option is approx. 184 ha, after completion of the investment approx. 279 ha. The area of the area additionally occupied for the purposes of the project will be approx. 95 ha.

2.4.3. Traffic forecast

The following is a traffic forecast for the following time horizons:

- year of completioninvestments,
- the first full year after the end of the investment,
- year of completioninvestment + 5 years,
- year of completioninvestment + 10 years.

Tab.15. Traffic forecast

Investment option – average daily number of trains		**Year**	**Year of completion of the investment**	**First full year of operation**	**Year of completion of the investment + 5 years**	**Year of completion of the investment + 10 years**
Episode	**Type of traffic**	**2018**	**2023**	**2024**	**2028**	**2033**
Kościerzyna – Somonino LK201	regional passenger pouch	17	17	34	34	34
	interregional passenger pouch	1	1	1	1	17
	freight poc	1	1	15	20	22
	SUM	19	19	50	55	73
Somonino – Glincz LK201	regional passenger pouch	17	17	11	11	11
	interregional passenger pouch	1	1	1	1	1
	freight poc	1	1	16	20	22
	SUM	19	19	28	32	34
Glincz – Gdańsk Osowa R1 PZS LK201	regional passenger pouch	30	30	54	54	54
	interregional passenger pouch	1	1	1	1	17
	freight poc	1	1	16	20	22
	SUM	32	32	71	75	93
Danzig Osowa R1 PZS – Gdańsk Osowa R4 PZS LK201	regional passenger pouch	4	4	–	–	–
	interregional passenger pouch	1	1	1	1	1
	freight poc	1	1	16	20	22
	SUM	6	6	17	21	23
Danzig	passenger pouch	32	32	48	48	48

Investment option – average daily number of trains		**Year**	**Year of completion of the investment**	**First full year of operation**	**Year of completion of the investment + 5 years**	**Year of completion of the investment + 10 years**
Episode	**Type of traffic**	**2018**	**2023**	**2024**	**2028**	**2033**
Osowa R4 PZS – Gdynia Main LK201	regional					
	interregional passenger pouch	1	1	1	1	1
	freight poc	1	1	16	20	22
	SUM	34	34	65	69	71
Somonino – Cards LK214	regional passenger pouch	–	–	24	24	24
	interregional passenger pouch	–	–	–	–	16
	freight poc	1	1	1	1	1
	SUM	1	1	25	25	41
Kartuzy (new junction) LK229	regional passenger pouch	–	–	24	24	24
	interregional passenger pouch	–	–	–	–	16
	freight poc	–	–	–	–	–
	SUM	–	–	24	24	40
Kartuzy (old line) LK229	regional passenger pouch	13	13	20	20	20
	interregional passenger pouch	–	–	–	–	–
	freight poc	1	1	1	1	1
	SUM	14	14	21	21	21
Glincz – Kartuzy Burkhadtwo LK229	regional passenger pouch	13	13	44	44	44
	interregional passenger pouch	–	–	–	–	16
	freight poc	1	1	1	1	1
	SUM	14	14	45	45	61

source: own development

2.4.4. Type of technology

Implementation phase

The scope of the works planned to be carried out under this task includes the reconstruction/expansion of the railway infrastructure in the scope of:

- the track industry,
- the road industry,
- construction industry and engineering facilities,
- control-command and signalling equipment,
- overhead contact line,
- telecommunications equipment and lines,
- power industry (non-attractive power generation and reconstruction of existing power infrastructure intersecting with track system),
- cubature objects and small architecture,
- and associated industries (e.g. drainage), including overhead contact line.

The works envisaged in the construction work shall include:

- construction of a new track on LK 201 and change of the geometry of the existing track,
- construction of railway link lines 214 with line 229 and line 201 with line 229,
- replacement of surfaces with reinforcement of the track and replacement of the ballast with a new one

construction of railway link lines 229 with line 214 of line 201 to line 229,
replacement of the track surface with cleansing and filling of the ballast,
profiling of the benches of the track,
construction of new turnouts with reinforcement of the platform with the replacement of oil ballast and EOR (Electric Heating of Departures),
restoration and clearing of lateral trenches and linear drainage,
reconstruction of railway and road crossings consisting of correction of width, tilts and angle of intersection of access roads, replacement of road surfaces and performance of drainage,
elimination of railway and road crossings, construction of two-level crossings and reconstruction and construction of access roads and parallel roads,
construction and reconstruction of public cargo spaces in the area of railway stations,
construction of energy-intensive road barriers along the edges of existing and designed roads,
modernisation of ssp devices (self-acting crossing signaling) on crossings,
installation of ssp devices and lighting of crossings due to increased speed on the railway line or due to lack of visibility on crossings,
repair the weak spots on the floor,
logging of trees and shrubs threatening the safety of the railway line within 15 m from the track, in places where connecting links will be built, in places of correction of arches and in additional places, e.g. where railway overpasses are planned, renovation/reconstruction/destruction/construction of engineering facilities,
works accompanying the automation industry, i.e. replacement of switch drives, replacement of trackside devices, modernisation of locking, modernisation of station equipment srk (rail traffic control), cable replacement, railway and teletechnical traffic control devices,
reconstruction/destruction and construction of platforms with passenger infrastructure, adaptation to the needs of people with disabilities,
modernisation of traffic protection devices and non-tractive energy,
construction of overhead contact line,
provision of conditions for the carriage of special cargoes.

The technology of construction works will take into account the efficient execution of works, using efficient construction and track machinery (e.g. loaders, excavators, cranes, wagons for transporting and building a ballast, trains for replacing tracks). Existing roads and railway lines will be used to transport construction equipment and materials. The work will be carried out using technologies that are least burdensome for residents, users of public transport and harmless to the environment. The robots will be performed using heavy equipment but also manually (due to the nature of the work), some of the machines will be adapted to move on the tracks, also most of the work will be done from the track – thus minimising the impact on the environment.

The transport of machinery and materials, as well as the export of debris and other waste, will be carried out by road and rail, and the materials will be stored in a paved area, outside natural valuable areas (river valleys or Natura 2000 sites).

The technology of the works provides for the use of ready-made prefabricated materials, and in the construction of monolithic elements on the construction site (gelbet) materials prepared mainly outside the site will be used, imported as ready to be built-in (cut to the size of reinforcement, concrete from the factory), not requiring processing on the back or construction site.

Dismantling and assembly of railway and road crossing surfaces will be carried out using railway cranes and dresin in the railway area with temporary occupation of the road lane. Railway cranes and draisines will also be used in the repair work of engineering facilities. In the case of works within bridges and culverts, organisational measures will be taken to ensure that the effect of water flushing is minimised and limited to the shortest possible time.

Operating phase

During operation, it will only be necessary to carry out typical maintenance works ensuring the proper functioning of railway lines, such as regular weeding of the track, lubrication of switches, maintenance of order and cleanliness on platforms and tracks, control and cleaning of drainage). Within a few years of the completion of the works, it is not foreseen to carry out works requiring the use of heavy equipment (except for emergencies).

2.4.5. Trees and shrubs to be removed

Felling of trees and shrubs

As part of the planned project, trees and shrubs will need to be removed. The section will be conditioned by maintaining safety related to the operation of the railway line, ensuring appropriate conditions for the visibility of crossings and crossings and in places where the scope of the planned works goes beyond this buffer, e.g. in the places of planned railway overpasses. The cutting will also include places where the track will be located in a new location due to correction of arches, construction of an additional track and construction of railway junctions.

The need to remove trees on land located in the vicinity of the railway line within 15 m from the extreme axis of the railway track results from the provisions of the Regulation of the Minister of Infrastructure and Development of 07 August 2008 on distance requirements and conditions permitting the location of trees and bushes, elements of acoustic protection and the execution of earthworks in the vicinity of the railway line, as well as the method of organising and maintaining snow curtains and fire-fighting belts (consolidated text Dz. U of 2014, item 1227).

Therefore, trees and shrubs that conflict with the design solutions of the project and safety considerations – trees and shrubs within 15 m on both sides of the extreme axis of the track were qualified for removal.

Investment option (W1)

Analysis of the state of the existing greenery along the analysed railway lines indicates that, in total, about 25 thousand trees may be destined for the felling. The most common species among the trees are: common maple and beech, and in a smaller number there is poplar aspen, pine, hawthorn, rab and black alder. Among the bushes are dominated by hazelnut, without black, sloe plum. The analysis carried out in a buffer of 2x15 m showed the total area of shrubs to be cut out – approx. 100 thousand $m^{2.}$

Alternative option (W2)

In total, about 24 thousand trees in the analysed strip can be used for felling. The most common species among the trees are: common clone and beech. Among the bushes are dominated by hazelnut, without black, alych plum. The analysis carried out in a buffer of 2x15 m showed the total area of shrubs to be cut out – about 85 thousand m^2. Most trees and shrubs will be removed in order to build railway links.

If it is necessary to destroy protected species before construction works begin, it is necessary to obtain a derogation from the prohibitions referred to in Articles 51 and 52 of the Act of 16 April 2004 on nature protection.

2.4.5.1. Implementation phase

During the implementation of the whole project, the consumption of a certain amount of mineral raw materials, materials, fuels and energy will be required. The amount of consumption will depend on many factors, including: from the quantity and technical condition of construction equipment, the way of performing the work, training and discipline of employees (e.g. switching off devices during breaks).

Water supply

During the implementation of the project, water intended for drinking by employees will be supplied in bottles in an amount dependent on the number of working people and weather conditions. Transport toilets, rented by the contractor, for the duration of their operation will be located within the construction site.

Consumption of raw materials and materials

The following raw materials and materials specified in the table are expected to be used.

Tab.16 Usage of raw materials and materials.

Description of works	Number of works	One of them
Rail 60E1 new – (139886 mb)	Okay, okay. 8394	Mg
Rail 49E1 new – (18948 mb)	Okay, okay. 929	Mg
Rail 60E1 or S60 ancient – (29294 mb)	Okay, okay. 1760	Mg
Rail 49E1 or S49 ancient – (4 412mb)	Okay, okay. 216	Mg
New strunoconcrete sleepers	Okay, okay. 264 721	Pcs.
Ancient strunoconcrete primers	Okay, okay. 18 705	Pcs.
Stone crushing	Okay, okay. 422 630	m^3

Geotextile (protective layer)	Okay, okay. 953 780	m^2
Unsort (protective layer)	Okay, okay. 152 080	m3
Wells	Okay, okay. 423	pcs.
Pipes	Okay, okay. 21 973	m
Elastic/classical attachments	Okay, okay. 1 133 700	pcs.
Lining pads	Okay, okay. 566 850	pcs.
Surface Mirosław Ujski (small size plates)	okay, okay. 330	pcs.
Surface CBP (large plates)	okay, okay. 4	pcs.
Platform panels and walls	okay, okay. 6 600	pcs.

Source: Develop your own.

Fuel and energy consumption

In principle, the main direction of fuel consumption at the stage of implementation of the project will be the supply of machinery and equipment at the construction site. During the implementation of the project, diesel, to a lesser extent gasoline, will be the main fuel for the propulsion of machinery and technological equipment. Fuels will be used for propulsion of commercial vehicles engines, construction machinery, generator sets and portable tools.

During the construction phase, energy will be consumed on the basis of a separate contract with an external distributor or will be generated on a construction site using aggregates. The supply of electricity for lighting, monitoring, information boards and other needs can be supplied from different sources (PGE, railway energy or on the basis of separate agreements with the distributor).

2.4.5.2. Operating phase

During the exploitation phase, the use of water, raw materials, materials, fuels and energy will be minimal and mainly related to the ongoing maintenance and maintenance of the railway line. The use of the following materials is envisaged:

- crushing,
- underlays,
- the rails.

The operation of the railway line is also related to the use of energy and fuels for the day-to-day operation of railway infrastructure, e.g. platform lighting, heating of switches, heating of buildings for the operation of trains.

3. NATURE OF THE ENVIRONMENT AND LAND USE IN THE SURROUNDINGS OF THE PLANNED PROJECT

3.1. Geographical location, site morphology and landscape

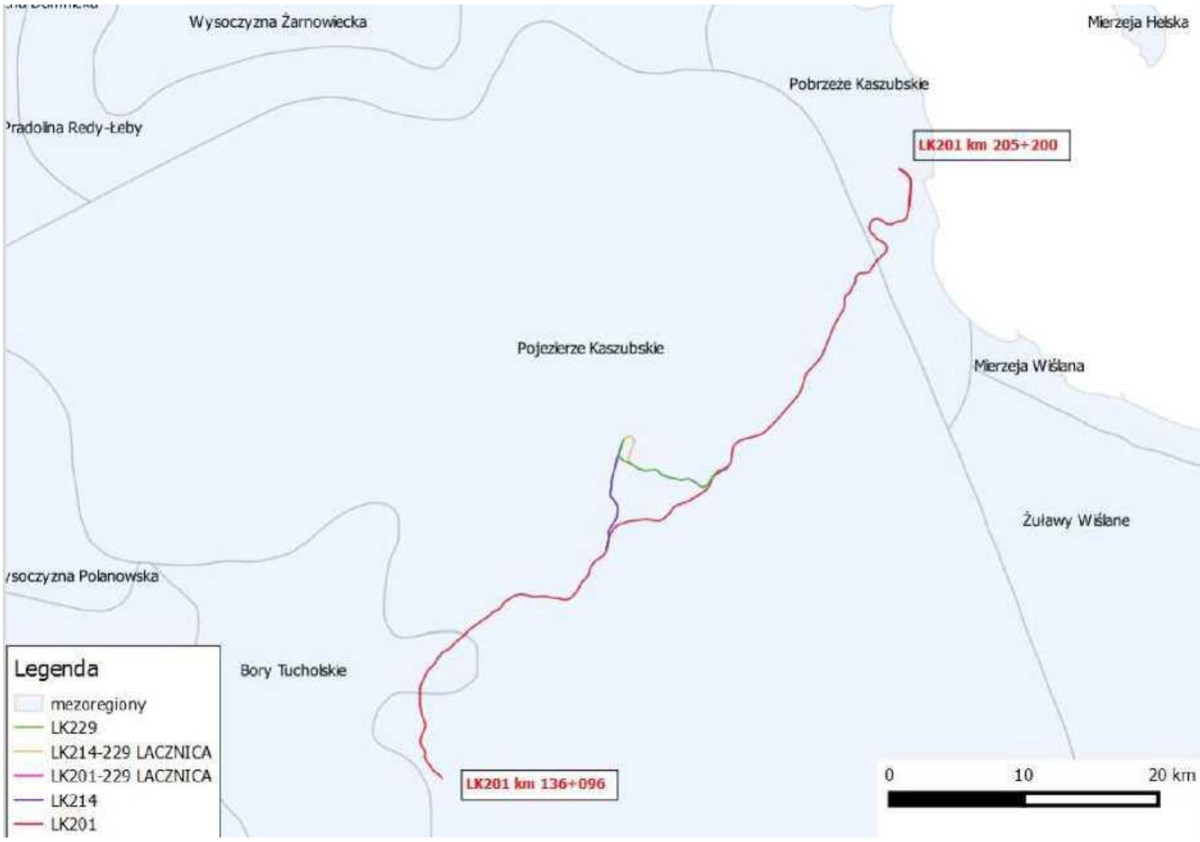
Geographical location, site morphology and landscape due to the description and analysis of areas adjacent to the investment in question are the same for both variants (W1 and W2).

According to the physico-geographical division of Poland according to Kondracki, the investment area is located within the limits of the following units:

1. province than Central European
   - The sub- province of the South Baltic Coast,
     - macroregion Pobrzeże Gdańskie,
       - mesoregion Kashubian Coast
   - South Baltic Lake District,
     - macro-region East Pomeranian Lake District,
       - Mesoregion Kashubian Lake District
   - South Baltic Lake District,
     - macro-region South Pomeranian Lake District,
       - mesoregion Bory Tucholskie

The indicative location of the analysed sections of the railway line against the background of physical and geographical mesoregions is presented in Figure 2.

Fig. 2. Location of the investment (options W1 and W2) against the background of physical and geographical mesoregions



Source: Kondracki, 2009

The shape of the surface of the area is characterised by a large geomorphological diversity. It is a lowland area, shaped by the glacier processes of the Pleistocene period and post-glacial phenomena occurring during the Holocene period.

The railway lines analysed are located within three mesoregions:

- The Kashubian Coast,
- Kashubian Lake District,
- Bory Tucholskie.

The largest section is located within the Kashubian Lake District characterised by hilly sculpture. It is an area where there are a large number of lakes, which represent the attractiveness of landscape and tourism in this part of the voivodeship. The main characteristics of this mesoregion are: corrugated and hilly moraine plains with varying levels of sculpture and variable hydrographic features with numerous lake reservoirs and swamps, with predominant agricultural land use, the slopes of the front-sea zone with variable, sometimes inclined terrain and various surface coverings (a mosaic of agricultural and forest areas) and hilly moraine lines with live and varied sculpture, covered to a large extent by forests.

The shape and coverage of the land are the factors that most affect the perception of the landscape. Below are the most important elements of the landscape in the area of the analysed railway lines.

In terms of terrain, the most varied is the middle section located within the mesoregion of the Kashubian Lake District. It is also the longest section of the analysed lines. The specific nature of the Kashubian Lake District, and in particular the large diversity of the terrain and the nature of its use (major fragmentation, including forests), cause that there is a large internal landscape display and accumulation of many local landscape interiors.

When analysing land cover, it can be concluded that the dominant form along the analysed railway lines are:

- arable land and land occupied by agriculture with a large share of natural vegetation (a total of about 30 % of the area in the buffer up to 500 m from the axis of the line),

- forest land (a total of about 28 % of the area in the buffer e.w.), • urban development loose (about 19 % of the area in the buffer e.w.).

Larger forest complexes are located on the following sections:

- Line 201: fromkilometre 141,500 to kilometer 142,000,
- Line 201: fromkilometre 146,000 to kilometer 149,000,
- Line 201: fromkilometre 150,000 to kilometer 157,000,
- Line 201: fromkilometre 168,000 to kilometer 175,000,
- Line 201: fromkilometre 191,000 to kilometer 193,000,
- Line 201: fromkilometre 196,600 to kilometer 201,000,
- Line 214: from km 4,000 to km 6,300,
- Line 229: from km 37,700 to km 40,600,
- Interconnector: all over the course.

Railway line No. 201 runs in the immediate vicinity of several lakes, which have a longitudinal shape and are an important landscape element on the course of the analysed lines. These are:

- Wysockie Lake with an area of about 33 hectares, located near the Gdańsk – Osowa stop. From km 188,100 to km 190,000. The railway line is visible from residential areas in the northern part of the lake.
- Ostrzyckie Lake with an area of 31 ha, located in the area of the village of Kolano. From km 153,500 to km 155,000. The line runs in the area of the lake in a row of trees and excavation. It is not visible in the viewing axes indicated in the planning documents. From the lake side, the line is visible during the passage of train trains.
- Patulskie Lake with an area of 9.4 hectares, located in the area of the village of Krzeszna. From km 149,700 to km 153,000. The line runs parallel to the lake. From the lake side is visible at the leafless condition of the trees, railway warehouses are visible during the crossing.
- Dąbrowskie Lake with an area of 6.4 hectares south of the Gołuba stop. From km 146,000 to km 148,500. The line runs in a row of trees, it is invisible from the lake, partly visible from the development area of Gołubie.

Taking into account the degree of urbanisation, by far the most transformed area, heavily built up, occurs in the eastern part within the Tri-City agglomeration (city of Gdynia). The other larger towns, which are located on the course of the analysed lines, are Kartuzy (the central part of the area where lines 214 and 229 are located, where the link between these lines is planned) and Kościerzyna. Most of the analysed area is dominated by rural settlements with single-family development. Commercial and service facilities occur occasionally along the line, mainly the section of line 201 within Gdynia, where on the western side of the railway line in its immediate vicinity is located, among others, the Riviera shopping centre and Gdynia Arena stadium and sports hall. In the area from Zhukov to Chwaszczyna towards Gdynia, urbanisation processes related to the settlement of suburban areas of the Tri-City are observed.

The distribution and coexistence of natural and cultural elements of the landscape structure of the region influences the degree of education of elements of visual exhibition and landscape composition. As part of the identification of the visual and exhibition features of the Pomeranian Voivodeship, two types of landscape exhibition elements were distinguished:

- active exposure including: viewpoints, viewpoints, viewing platforms,
- passive exposure, i.e. macro-interior landscapes and panoramic views of cities.

Among the elements of active and passive exposure indicated in the voivodship management plan for the Pomeranian Voivodeship, the nearest places for the analysed railway lines are:

- view point – the top of the Tower located about 1.4 km south of LK 201 at an altitude of 156.000 km, the highest hill of the Moravian Mountains of the Szymbarski Hills with a height of 328.7 m above sea level, the peak is overgrown with a forest, at the top there is a 35-meter, metal observation tower, from which you can see the view over the Kashubian Lake District. The Tower is the highest elevation of the entire European Lowland. On the top of the hill, there is a nature reserve, in which there is a 150-year-old beech forest.
- the viewpoint of Jastrzębia Góra located in the moraine band of Szymbarski Hills rises to an altitude of 227.2 m above sea level, located at the Kashubian Road, on the eastern side of the Ostrzycki Lake between Ostrzyce village and Brodnica Dolna, located about 2.5 km north of LK 201 at an altitude of 154.500 km, from the viewpoint there is a view of, among others, the Ostrzyckie Lake and the observation tower, from

the viewpoint, due to the distance and forest complexes, there is no direct observation of LK 201, the infrastructure of LK 201 is not directly observed.

- Złota Góra, located in the village of Brodnica Górna, at the confluence of the Kashubian Road and road 228, about 400 m north of LK 201 at the altitude of km 154,000, Złota Góra is an elevation, the height of which is 190 m above sea level, from the observation point located on its top there is a view of Lake Brodno Wielkie, and further behind it emerges from the right side of the Ostrzyckie Lake, due to the overshadowing of the forest and distance, from the viewpoint, is not directly observed LK 201,
- viewing road – along the route of the Kashubian Road on the section from the surroundings of the village of Piekło/Niebo, further along the eastern edge of Ostrzycki Lake, to be included in road no. 228 and further by road 228 to the village of Ręboszewa (and section of road 228 from the village of Czapielski Młyn through Brodnica Górna to Złota Góra), further on the eastern side of Lake Brodno Małe in the direction of the village Zawory – the beginning of the observation road is located north of LK 201, from the observation road LK 201 is not directly observed due to its location, overshadowing the forest and shape of the terrain.

A further distance from LK 201 is the so-called water viewing platform of Raduńskie Lake (Lower and Upper Lake). Due to the distance from Raduńskiego Górny Lake (approximately 3 500 m north-west from LK 201 at the nearest point at km 147,000), railway line 201 does not interfere with the view from the above-mentioned water platform.

Of the above-mentioned viewpoints, the 201 line is visible only from the viewpoint at the top of the Tower.

3.2. Geological conditions

For the purposes of the design documentation, geological surveys were carried out.

In terms of tectonic-structural terms, the area in question (in variants W1 and W2) is located within the Peribaltic syneclysis. It is a depressive structure, where, directly on the works of the crystalline core, there are strongly disturbed paleozoic works and a corrugated mesozoic cover. The substrate for quaternary sediments in most of the area is Neogenean, and Paleogenic mullets and quartz and quartz-glaukonite sands. Quaternary sediments are deposited over the entire surface of the test site, and their pulp is variable.

In view of the nature of the planned investment, quaternary sediments are essential in the geological construction of the site in question.

<u>Upper chalk</u>

The upper chalk in the area under consideration is represented by sediments of all floors of the upper chalk: from cenomane to mastrycht. The flesh of these works exceeds 300 m. The works of the camp are developed in the form of gray and greenish marls with glauconite and flint, pook, occasionally geese, glauconite sands and limestone. Locally in the ceiling of the upper chalk there are mastrycht marles.

<u>Paleogen – Neogen</u>

The works of the paleogen are found in the whole area, except for the southern part of it (south of Kościerzyna) and in the Kartuz area.

The Paleogenic settlements are represented by Eocene (occurring only within the Egiertowo and Dzierżno sheets) and oligocene. Eocene deposits are developed as polymicritic quartz-glaukonite sands and quartz gravels. Oligocene sediments in the form of dusty sands, differential clay sands, glauconite sands, mullets and silts with lignite inserts, sands and mullets with phosphate and gray clays.

Neogen is educated in the area under consideration in the form of Miocene quartz fine sands with dark carbide overlayings and mullets lenses, brown coal beds, dusty sands (places of glacitectonically disturbed in the ceiling part), clays and local gravels. Based on drilling, it was found that the pulp of this series of sediments may exceed 100 m, and their ceiling is varied.

<u>Quaternary</u>

Quaternary settlements occur throughout the entire area of the investment area. These are mainly order clays separated by series of conservatory and water glacier works. Their flesh is variable and exceeds a maximum of 300 m (near Szymbarka). The effect on the diverse pulp of quaternary sediment is the shaped sub-quaternary surface, which is strongly modified by preglacial erosion and exaration, and probably by tectonic movements, in the zone of pre-existing faults, and isostatic caused by the slipping and recession of the ice sheet. For the most part of the area concerned, only glaciation settlements were documented.

The strong erosion and extortion of icebergs developing during the oldest glaciation destroyed the settlements deposited at that time. A series of order clays of Narew glaciation occurs in the southern part of the area.

South Polish glaciation left the levels of order clays, whose hipsometrical position is varied, which can be explained by the vertical movements of the earth's crust – the icebox activated the fault zones in the older substrate.

Glaciation in Central Poland is represented by works of glaciation of the Oder and Warta. The series of Odra ice sludge begins with reservoirs, locally with plant detritus, deposited in calm conditions of stagnating water. On them there are water-glacial sands accumulated in the transgesive phase of the ice sheet, which are covered with order clays, and the cycle ends with water-glazing sands. Odra and Warta glaciation sediments are separated in the central part of the area by fine-grained river sands of low pulp (approx. 1 m) interglacial Lubawski. The Warta begins with water glacier sands deposited in front of the transmitting ice sheet. In the southern part of the area there are mullets and conservatory clays locally strongly disturbed by glacitectonically. The set of order clays forms a continuous layer of varying flesh, reaching up to 60 m. They are covered with silts and clay cubes, and locally sands and water-glacial gravels associated with the regression of the ice sheet.

In the central part of the investment area there are mullets and river-lake sands with a plant detritus representing the Eem interglacial.

The thickness of the northern Polish glaciation settlements reaches approx. 70 m. Vistula glaciation settlements represented three levels of order clays of herds: lower, middle and upper. The levels of clay are separated by a series of sands and gravels of water glacier and mullets and conservatory clays. In the north-eastern part of the investment area, the order clays of the central herd build a moraine highland. On the rest of the area, the highland is built from clays of the lower herd.

The Holocene settlements are found in river valleys and are built of sands and terrace gravels and river mads, sand-humus muds, humus sands, valley dens and drainless basins and sands, mullahs and river-lakes. Locally on the outskirts and in the bottoms of lakes or in lake lowers under the peat layer there is lake chalk and gytia. In the area of glacial highland, glacial sands and glacial gutters there are peat and muddy peat with a maximum pulp exceeding 5 m. In the northern part of the investment area in question, there are gravel-sandy influx cones at the edge of the moraine highland, and in the valleys of sands and deluvial clays with a flesh of more than 2 m.

The surface portion of the substrate builds the soil, and in the areas transformed by man there are embankments of anthropogenic embankments.

3.3. Soils

The origin of soils located in the area of the analysed section of the railway line (in variants W1 and W2) is closely related to the geological construction of the site. The soils present in the railway area are bulky and due to their anthropogenic nature are characterised by a lack of natural genetic levels, and the shaped caries layer is heterogeneous in terms of physicochemical properties and mineral composition.

In the area of the analysed railway lines (buffer 2x100m from the axis of the line), variants W1 and W2 mainly contain brown and brown acidic soils, which account for more than 80 % of the total analysed area.

3.4. Climatic conditions and atmospheric air condition

3.4.1. Ambient air quality status

In the Pomeranian Voivodeship, 2 zones have been designated – the Tri-City agglomeration (which includes Gdańsk, Gdynia and Sopot) and the remaining part of the voivodeship, called the Pomeranian Zone. The analysed railway lines and links are located in the Pomeranian zone, only a small part of LK 201 is located within the Tri-City zone.

The annual assessment of the air quality status in the Pomeranian Voivodeship in 2017 indicates the following results:

Tab.17 Classification of the Pomeranian and Tri-City agglomerations including criteria defined for the protection of health.

Substance	Result class symbol in a given zone	
	Zone Tricity agglomeration PL2201	Pomeranian Zone PL2202

NO_2	A	A
SO_2	A	A
PM10	A	C

Substance	Result class symbol in a given zone	
	Zone Tricity agglomeration PL2201	**Pomeranian Zone PL2202**
Lead	A	A
PM2.5	A	A
Ozone	A (D_2)	A (D_2)
Carbon monoxide	A	A
Benzene	A	A
Arsenic	A	A
Cadmium	A	A
Nickel	A	A
Benzo(a)pyrene	A	C
Summary	ozone defaults for the long-term objective (2020)	unmet levels for PM10 dust; unmet levels of benzo(a)pyrene; ozone defaults for the long-term objective (2020)

Source: own study based on "Annual Assessment of Air Quality in Pomorskie Voivodship for 2017".

where:

- A – if the concentrations of pollution on its territory did not exceed, respectively, the limit levels, targets, long-term targets,
- C – if the concentrations of impurity on its territory exceed the limit or target levels plus a margin of tolerance, where that margin is specified,
- D_2 – above long-term objective level, striving to achieve the target level long-term by 2020.

In addition, by letter WM.7016.1.141.2018.BK of 23 May 2018, the current state of atmospheric pollution in the area of the investment in question was determined. The air quality status in this area according to the above-mentioned letter is as follows:

Tab.18 Acceptable values and current air quality status (background).

L.P.	Substance	Reference values averaged over one hour D_1 [μg/m^3]	Reference values averaged over calendar year D_a [μg/m^3]	R [μg/m^3] – background (current air quality status)
1	Sulphur dioxide*	350	20	10,0
2	Nitrogen dioxide	200	40	30,0
3	Particulate matter PM10	280	40	30,0
4	Dust PM2.5	–	25/20	20,0
5	Benzene	30	5	3,0
6	Carbon monoxide	30 000	–	500,0
7	Lead	5	0,5	0,1

Source: Own study on the basis of a letter from the WIOŚ and the Regulation of the Minister of the Environment on the levels of certain substances in the air and on the reference values for certain substances in the air.

According to the above table, in the area of implementation of the investment, there are no exceedances of the permissible concentrations of average annual background quality for individual substances.

The letter setting out the air quality status is attached to this study (text annex 3.4.1-1).

3.4.2. Climatic conditions

The climate in the area of investment is temporary between the maritime and the continental climate, with a strong climate impact of the Baltic Sea and the strong impact of air masses from the Atlantic. The influence of the Baltic itself, which is a relatively small basin, is noticeable in a narrow coastal zone – it reaches inland only about 30 km from the coastline. On the other hand, the overlapping influences of the Atlantic Ocean and the Baltic Sea cause that the entire area of the voivodeship is characterised by milder winters and slightly cooler than inland summers and low amplitudes of annual temperatures. In addition, there are relatively long transition periods between summer and winter and a markedly cooler spring than autumn. Interesting and dangerous meteorological phenomena occurring over the Baltic include storms, the formation of which is influenced by a significant variation of winds and pressures. These phenomena are accompanied by high wind speeds, in gusts exceeding 35 m/s, causing storms of 10 degrees on the Beaufort scale. The period of special intensification of storm phenomena lasts from September to March. In Pomerania there is one of the lowest pressure values in Poland. This is the result of the location of the Baltic Sea voivodeship, through which the trail runs especially active in the winter of baric lowers. This system causes, so characteristic for northern Poland, high variability of weather. An important meteorological element, occurring in Pomerania, is also the size of precipitation. They are characterised by high temporal and spatial variability in the voivodeship. Intense and long-lasting rainfall usually occurs in the area of the Gulf of Gdańsk and the Vistula Lagoon.

3.5. Acoustic climate

3.5.1. Permissible environmental noise levels

According to the Environmental Protection Act, noise protection consists of ensuring the best possible acoustic condition of the environment, in particular by keeping the noise level below or at least at that level. In accordance with Article 113 of noise protection, areas intended to:

- for housing,
- for hospitals and welfare homes,
- for buildings related to the permanent or temporary residence of children and young people,
- for spa purposes,
- for recreational and leisure purposes,
- for residential and service purposes.

This applies to sites actually managed for their intended purpose – Article 113 para. 2 pt. 1. If the site can be classified in several of the above-mentioned types, it is considered that the permissible noise levels should be set as for the predominant type of site. The same article of the law authorises the minister responsible for the environment to issue a regulation setting the noise limit values in those areas.

Annex to the Regulation of the Minister for the Environment of 14 June 2007 on permissible levels of environmental noise (codified text: Dz. U.S. 2014 item 112) determines their values according to: sources, land use, and time of day.

In the case of roads and railways, the noise indicators applicable to the determination and control of the conditions of use of the environment for one day shall be:

- LAeq D – equivalent sound level A for the time of day (understood as the time interval from hour to hour) 6:00 p.m. 22:00),
- LAeq N – equivalent sound level A for night time (understood as time interval from hour to hour) 22:00 until 2 p.m. 6:00).

Tab.19. Permissible environmental noise levels caused by each group of sources, expressed by LAeq D and LAeq N indicators, which apply to the determination and control of the conditions of use of the environment, for one day.

LP.	♈ Function or purpose of the site	Permissible noise level			
		Roads or railways		Other noise facilities and activities	
	Indicator and evaluation time ♈	LAeq D dop T=16h	LAeq N dop T=8h	LAeq D dop T=8h	LAeq N dop T=1h
1	a. Protection zone "A" of the health resort. b. Hospitals outside the city.	50 dB	45 dB	45 dB	40 dB
2	a. Single-family housing areas b. Buildings related to permanent or long-term stays of children and young people[1] c. Areas of Social Welfare Homes d. Hospital areas in cities	61 dB	56 dB	50 dB	40 dB
3	a. Multi-family housing and collective housing areas b. Farmland c. Recreational and leisure areas d. Residential and service areas.	65 dB	56 dB	55 dB	45 dB
4	a. Areas in the downtown area of cities over 100 thousand inhabitants, with compact housing and concentration of administrative and commercial facilities and service[2]	68 dB	60 dB	55 dB	45 dB

[1] – If these areas are not used, in accordance with their function, at night, they shall not be subject to an acceptable level of noise at night.
[2] – The downtown area of cities over 100 thousand inhabitants is a compact residential area with the concentration of administrative, commercial and service facilities. In the case of cities with districts with the number of inhabitants of the area. 100 thousand can be designated in these districts a downtown zone if it is characterised by compact housing with the concentration of administrative, commercial and service facilities.
Source: Own study on the basis of the Regulation

In accordance with the applicable law (Article 115 of the POŚ Act), the basis for the acoustic classification of areas may be spatial planning and the actual method of development.

3.5.2. Methodology

The modelling of noise emissions for the current and forecast state was carried out on the basis of the guidelines to Directive 2002/49/EC, which recommends the calculation of noise emissions for railway lines by the Dutch calculation method SRM II published in the document in Reken-en Meetvoorschrift Railverkeers-lawaai'96. Minister Volkshuisvesting. Ruimtelijke Ordening en Milieubeheer of 20 November 1996 in accordance with EC Directive 2015/996. The calculation used the newer RMR 2002 method (corrected according to the 1996 RMR) taking into account rolling stock class, track type and traffic conditions. The data obtained enable the assessment of the acoustic climate in the surroundings of an existing or planned section of the railway line, and the results of the calculation can be directly related to the limit values for a given type of land and development.

The permissible noise levels have been adopted on the basis of the current Regulation on environmental noise limits. The indicators of the equivalent sound level for day and night time respectively (LAeqD and LAeqN) were determined in the following steps of analysis:

the Numerical Land Model (NMT) was built with accuracy in accordance with the transmitted materials, the altitude and geometric situation of the railway line was mapped,

data was applied from the topographic database (TBD) – the location of the buildings verified during the field vision, the number of floors and division due to the functions of destination, the provided traffic and speed forecast data were analysed in each category and the parameters of noise sources were introduced into the model,

acoustic calculations were performed in the 10x10 m grid at a height of 4 m above the ground level and in the receptors on the facades of protected buildings, an area where over-standard environmental noise levels are present has been established without taking into account measures to minimise noise emissions.

3.5.3. Results of field studies

In August and September 2016, noise measurements from existing railway lines were carried out. At 15 measuring points in the vicinity of this section of railway line No 201. The measurement reports are set out in the text annex to this study (3.5.3-1 Noise Test Report for LK 201).

The measurements were carried out by a laboratory-accredited methodology in accordance with the Regulation on requirements for measurement of substances or energy levels in the environment by a road, railway, tramway, airport or port operator. The methodology described in 3 of the Annex to the Regulation has been applied, in accordance with the procedure for measuring the exposure levels of sound levels, for single acoustic events enabling the determination of equivalent sound levels for daytime and night time.

The results of the measurements allow to characterise in a general way the acoustic climate prevailing at the moment in built-up areas adjacent to the analysed railway line. Below are the results of measurements for individual measuring points.

Tab.20. LAeq equivalent sound level calculated from measurements – time it's day-to-day.

Determination of the measuring point	Geographical coordinates of the measuring point		Value of equivalent sound level A, for reference time T $L_{Aeq\,T}$ [dB]	L $Aeq_{T\ value}$ after correction (due to the location of the measuring point at the facade of the building) [dB]	Measurement uncertainty U95 [dB]
	Latitude	Longitude			
P01D*	54° 29′ 10.71−N	18° 30′ 30.64′E	47,7	44,7	± 1.4
P02D*	54° 27′ 57.50−N	18° 30′ 14.83ΓE	52,0	49,0	± 1.4
P03D*	54° 25′ 55.34ΣN	18° 27′ 39.48′E	46,2	43,2	± 1.4
P04D*	54° 22′ 11.60−N	18° 24′ 23.14ΣE	43,3	40,3	± 1.4
P05D*	54° 17′ 13.91−N	18° 13′ 41.48ΣE	39,3	36,3	± 1.4
P06D*	54° 17′ 04.19−N	18° 12′ 26.31ΓE	39,1	36,1	± 1.4
P07D*	54° 16′ 03.93▲N	18° 11′ 43.39′E	45,2	42,2	± 1.4
P08D*	54° 15′ 37.53−N	18° 11′ 00.94′E	44,7	41,7	± 1.4
P09D	54° 12′ 18.41−N	18° 01′ 21.30′E	38,8	38,8	± 1.4
P10D*	54° 09′ 09.27−N	17° 59′ 04.83ΓE	42,9	39,9	± 1.4
P01R	54° 27′ 37.80′N	18° 29′ 42.25′E	50,6	50,6	± 1.4
P02R	54° 25′ 50.14−N	18° 27′ 36.39′E	55,3	55,3	± 1.4
P03R	54° 15′ 06.00−N	18° 10′ 21.73′E	45,0	45,0	± 1.4
P04R	54° 14′ 01.78−N	18° 08′ 22.66′E	50,9	50,9	± 1.4
P05R	54° 13′ 17.29−N	18° 03′ 30.68′E	42,8	42,8	± 1.4

'F'
— The results take into account the reduction due to the location of the measuring point at the façade (in accordance with the Regulation of the Minister of the Environment on the requirements for measuring levels of substances or energy in the environment by the operator of the road, railway line, tram line, airport or port).
Source: Own development

Tab.21. LAeq equivalent sound level calculated from measurements – time it's nighttime.

Determination of the measuring point	Geographical coordinates of the measuring point		Value of equivalent sound level A, for reference time T $L_{Aeq\ T}$ [dB]	L Aeq$_{T\ value}$ after correction (due to the location of the measuring point at the facade of the building) [dB]	Measurement uncertainty U95 [dB]
	Latitude	Longitude			
P01D*	54° 29′ 10.71−N	18° 30′ 30.64′E	44,8	41,8	± 1.4
P02D*	54° 27′ 57.50−N	18° 30′ 14.83ΓE	48,6	45,6	± 1.4
P03D*	54° 25′ 55.34ΣN	18° 27′ 39.48′E	45,6	42,6	± 1.4
P04D*	54° 22′ 11.60−N	18° 24′ 23.14ΣE	38,7	35,7	± 1.4
P05D*	54° 17′ 13.91−N	18° 13′ 41.48ΣE	36,2	33,2	± 1.4
P06D*	54° 17′ 04.19−N	18° 12′ 26.31ΓE	41,5	38,5	± 1.4
P07D*	54° 16′ 03.93▲N	18° 11′ 43.39′E	46,6	43,6	± 1.4
P08D*	54° 15′ 37.53−N	18° 11′ 00.94′E	40,2	37,2	± 1.4
P09D	54° 12′ 18.41−N	18° 01′ 21.30′E	44,5	44,5	± 1.4
P10D*	54° 09′ 09.27−N	17° 59′ 04.83ΓE	51,5	48,5	± 1.4
P01R	54° 27′ 37.80′N	18° 29′ 42.25′E	47,0	47,0	± 1.4
P02R	54° 25′ 50.14−N	18° 27′ 36.39′E	54,4	54,4	± 1.4
P03R	54° 15′ 06.00−N	18° 10′ 21.73′E	40,8	40,8	± 1.4
P04R	54° 14′ 01.78−N	18° 08′ 22.66′E	42,5	42,5	± 1.4
P05R	54° 13′ 17.29−N	18° 03′ 30.68′E	51,5	51,5	± 1.4

** – the results take into account the reduction due to the location of the measuring point at the façade (in accordance with the Regulation of the Minister of the Environment on the requirements for measuring levels of substances or energy in the environment by the operator of the road, railway line, tram line, airport or port).*
Source: Own development

3.5.4. Validation of the computational model

The table below summarises the number of trains of different classes in passing noise measurements.

Tab.22. List of characteristic parameters of trains.

Determination of the measuring point	Type of train	Long-distance Kat. 2		Railbuses Kat. 6		Goods Kat. 4		Technical Kat. 2	
		Day	Night	Day	Night	Day	Night	Day	Night
P01D	Traffic intensity	1	1	35	9	0	0	0	0
	Speed [km/h]	70		60		0		0	
	Number of units per train	7		2,5		0		0	
P02D	Traffic intensity	2	1	36	8	0	0	0	0
	Speed [km/h]	85		60		0		0	
	Number of units per train	7		2,5		0		0	
P03D	Traffic intensity	1	1	13	4	1	0	1	0
	Speed [km/h]	75		62		62		62	
	Number of units per train	7		2		23		1	
P04D	Traffic intensity	1	0	39	5	0	0	0	0
	Speed [km/h]	60		60		0		0	
	Number of units per train	7		2,5		0		0	
P05D	Traffic intensity	0	0	14	3	0	0	0	0
	Speed [km/h]	0		30		0		0	
	Number of units per train	0		2		0		0	
P06D	Traffic intensity	0	0	14	3	0	1	0	0

Determination of the measuring point	**Type of train**	**Long-distance**		**Railbuses**		**Goods**		**Technical**	
		Kat. 2		**Kat. 6**		**Kat. 4**		**Kat. 2**	
		Day	**Night**	**Day**	**Night**	**Day**	**Night**	**Day**	**Night**
	Speed [km/h]	0		60		40		0	
	Number of units per train	0		2		26		0	
P07D	Traffic intensity	0	0	14	3	0	1	0	0
	Speed [km/h]	0		60		30		0	
	Number of units per train	0		2		26		0	
P08D	Traffic intensity	0	0	14	3	0	0	0	0
	Speed [km/h]	0		60		0		0	
	Number of units per train	0		2		0		0	
P09D	Traffic intensity	0	0	14	2	0	1	0	0
	Speed [km/h]	0		70		61		0	
	Number of units per train	0		2		26		0	
P10D	Traffic intensity	0	0	14	2	0	1	0	0
	Speed [km/h]	0		65		65		0	
	Number of units per train	0		2		26		0	
P01R	Traffic intensity	1	1	36	8	0	0	0	0
	Speed [km/h]	82		59		0		0	
	Number of units per train	0		2,5		0		0	
P02R	Traffic intensity	1	1	13	3	1	0	1	0
	Speed [km/h]	75		60		62		62	
	Number of units per train	0		2		23		1	
P03R	Traffic intensity	0	0	14	3	0	0	0	0
	Speed [km/h]	0		70		0		0	
	Number of units per train	0		2		0		0	
P04R	Traffic intensity	0	0	12	2	1	0	1	0
	Speed [km/h]	0		85		50		50	
	Number of units per train	0		3		26		1	
P05R	Traffic intensity	0	0	14	3	0	1	0	0
	Speed [km/h]	0		65		65		0	
	Number of units per train	0		2		26		0	

Source: Own development

During daily noise measurements, mainly rail buses were registered. Other types of trains passed sporadically, usually a single day or night trip. As far as InterCity trains, freight and individual locomotives are concerned, no sufficient number of trains of a given type travelled at any point to statistically determine the measurement uncertainty. In this situation, it was considered that only the class of acoustic events involving the passage of rail buses had sufficient numbers to be used to calibrate the computational model.

The surface of the analysed section of railway line No 201 covered by noise measurements is in good condition. Non-contact connections dominate, and track structures are on strunoconcrete sleepers. Therefore, in order to map the acoustic conditions as close as possible to reality, the calculation model uses contactless connections and railway tracks using concrete primers on the backing, positions 1 and 1 in the RMR model.

Tab.23. Comparison of the results of noise measurements with the results of calculations in the computer model – the results of the measurements take into account only crossings of buses

Determination of the measuring point	Measurement results [dB]		Results of calculations [dB]		Difference [dB]	
	Day	Night	Day	Night	Day	Night
P01d	44,5	41,3	44,1	41,1	—0,4	—0.2
P01r	50,4	46,5	50,1	46,5	—0.3	0,0
P02d	48,7	44,6	46,7	43,2	—2,0	—1.4
P02r	50,1	48	47	43,6	—3.1	—4,4
P03d	37,1	35	36,7	34,6	—0,4	—0,4
P03r	45	40,8	44,1	40,4	—0.9	—0,4
P04d	40	33,1	36,9	31	—3.1	—2.1
P04r	47,3	42,5	47,5	42,7	0,2	0,2
P05d	36,3	33,3	38,6	35	2,3	1,7
P05r	42,8	37,3	42,8	39,2	0,0	1,9
P06d	36,1	32	32	28,3	—4.1	—3.7
P07d	42,2	37,7	39,6	35,9	—2,6	—1.8
P08d	41,7	37,2	39,3	35,6	—2,4	—1.6
P09d	38,8	33,3	39,9	34,5	1,1	1,2
P10d	39,9	34,4	38,3	32,8	—1.6	—1.6

Source: Own development

In conclusion, there is sufficient consistency between the measurement method (noise measurement results) and the calculation method (modeling results). The dispersion of the results was determined in accordance with Model 9 of the calculation procedure set out in Part H of Annex 3 to the Regulation:

$$\frac{1}{-1}\sum_{i=1}^{n}(L_{SUM} - and_{OH\wedge})^{1}\ 2.5\ dB$$

where:

$L_{m,i}$ – measured value of the noise indicator, in decibels [dB],
$L_{obl,i}$ – the value of the noise indicator calculated for the same conditions, in decibels [dB], n – number of comparative measurements.

The dispersion of the results is 2.0 dB, while the necessary condition is to obtain a value of less than or equal to 2.5 dB. Thus, the results determined in the calculation model can be considered to correspond with good accuracy to the results that can be obtained by measurement.

3.5.5. Assumptions

The calculation of the emissions and propagation of environmental noise for the existing state is based on the following input data:

- numerical terrain model NMT,
- location of track axis,
- type of track (contactless connections, on strunoconcrete sleepers),
- topographical data on the buildings, taking into account the purpose of the buildings and the acoustic classification of areas in the 300 m lane from the track axis,
- existing acoustic screens according to the table below,
- train movement parameters according to the table below.

Tab.24. List of existing acoustic screens included in the calculation – railway line 201.

LP.	Beginning	End	Page	Height
1	164,142	164,242	left	5,0
2	203,404	203,854	rights	3,0
3	203,419	203,667	left	3,0
4	203,667	204,049	left	2,0
5	203,901	203,945	rights	4,0
6	203,945	204,295	rights	3,0
7	204,048	204,179	left	2,5
8	204,179	204,236	left	3,0
9	204,236	204,429	left	2,0

Source: Own development

Tab.25. Traffic and speed of trains used in noise calculations Non-investment option (existing) – 2018.

Episode	Type of traffic	Type of train	Kat. RMR	number of units	day	day	night	speed
Kościerzyna – Somonino LK201	POC. Regional passenger	Railbuses	6	2	17	13,6	3,4	60
	POC. Interregional passenger	Long-distance exhaust gas (loc+weight)	2	6	1	0,8	0,2	70
	POC. Goods	Goods (local + weight)	4	19	1	0,8	0,2	60
Somonino – Glincz LK201	POC. Regional passenger	Railbuses	6	2	17	13,6	3,4	60
	POC. Interregional passenger	Long-distance exhaust gas (loc+weight)	2	6	1	0,8	0,2	70
	POC. Goods	Goods (local + weight)	4	19	1	0,8	0,2	60
Glincz – Gdańsk Osowa R1 PZS LK201	POC. Regional passenger	Railbuses	6	2	30	24	6	60
	POC. Interregional passenger	Long-distance exhaust gas (loc+weight)	2	6	1	0,8	0,2	70
	POC. Goods	Goods (local + weight)	4	19	1	0,8	0,2	60
Gdańsk Osowa R1 PZS – Gdańsk Osowa R4 PZS LK201	POC. Regional passenger	Railbuses	6	2	4	3,2	0,8	60
	POC. Interregional passenger	Long-distance exhaust gas (loc+weight)	2	6	1	0,8	0,2	70
	POC. Goods	Goods (local + weight)	4	19	1	0,8	0,2	60
Gdańsk Osowa R4 PZS – Gdynia Main LK201	POC. Regional passenger	Railbuses	6	2	32	25,6	6,4	60
	POC. Interregional passenger	Long-distance exhaust gas (loc+weight)	2	6	1	0,8	0,2	70
	POC. Goods	Goods (local + weight)	4	19	1	0,8	0,2	60
Somonino – Cards LK214	POC. Goods	Goods (local + weight)	4	19	1	0,8	0,2	60
Kartuzy (old line) LK229	POC. Regional passenger	Railbuses	6	2	13	10,4	2,6	60
	POC. Goods	Goods (local + weight)	4	19	1	0,8	0,2	60

Episode	Type of traffic	Type of train	Kat. RMR	number of units	day	day	night	speed
Glincz – Kartuzy Burkhadtwo LK229	POC. Regional passenger	Railbuses	6	2	13	10,4	2,6	70
	POC. Goods	Goods (local + weight)	4	19	1	0,8	0,2	60
LK253	POC. Regional passenger	Railbuses	6	2	26	20,8	5,2	60
LK248	POC. Regional passenger	Railbuses	6	2	28	22,4	5,6	60

Source: Own development

3.5.6. Analysis of the results obtained for the current state

Summary tables in Text Appendix Nos 3.5.6-1 and 3.5.6-2 provide a summary of the results of calculations in receptors (in the existing state and in investment variants) located in residential buildings closest to the analysed railway lines. The results do not take into account reflections from the façade (in accordance with the Regulation on requirements for measurements of the levels of substances or energy in the environment by the operator of the road, railway, tramway, airport or port).

In the existing state, the acoustic climate in the vicinity of the analysed railway lines is beneficial. This is mainly due to the very low load on freight traffic and the good technical condition of the tracks.

It should be added that in the existing state the investment described in the Noise Protection Programme for the City of Gdynia, 2013 as "Revitalisation and Moderation of SCI". "Church Rail Corridor" ODCINKA Kościerzyna – GDYNIA., i.e. the railway line No 201 in question. The Programme states that as a result of the implementation of the investment, the emissions and immissions of rail noise related to train traffic will not change substantially. The refurbishment of the line will result in a slight increase in local train speeds and line loads, but this will compensate for better insulation properties of the overhauled railway surface – the use of spring anchorages and contactless rails will generally improve environmental quality standards. It was noted that noise exceedance occurs only in the village of Somonino, where it is planned to install the acoustic screen.

3.6. Groundwater

3.6.1. Uniform Parts of Underground Waters

The area under development is located within two Uniform Parts of Underground Waters: PLGW200013 and PLGW200028.

JCWPd 13 (PLGW200013) is an important link in the Gdańsk aquifer system. It separates 7 aquifer levels of ordinary groundwater:

- groundwater level (Qg) including shallow waters found in river valleys, pradolins and sanders. These waters are associated with sandworks of holocene and Pleistocene. The aquifer occurs at a depth of 1 to 20 m p.p., reaching a thickness of up to 90 m;
- intermorean levels (upper Qm-I, middle Qm-II, lower Qm-III) are associated with sandy Pleistocene sediments. The aquifer of the upper level occurs at a depth of 1 to 80 m p.p., reaching a thickness of up to 40 m, the aquifer of the middle level occurs at a depth of 40 to 80 m p.p., reaching a thickness of up to 30 m, the aquifer of the lower level occurs at a depth of 70 to 120 m p.p.t., reaching a thickness of up to 40 m;
- the Miocene level (M) is made of fine sands. Aquifer is present at a depth of 50 to 180 m p.p., reaching a thickness of up to 40 m;
- Oligocene level (Ol) associated with fine-grained glauconite sands. Layer aquifer occurs at a depth of 70 to 250 m BC, reaching a thickness of up to 40 m;
- chalk level associated with fine-grained glauconite sands. The aquifer occurs at a depth of 150 to 340 m p.p., reaching a thickness of up to 150 m.

Quaternary levels are common in the catchment area and are most often the basis for drinking water supply. The supply of quaternary levels takes place on the way of infiltration of precipitation. The waters of deeper aquifer levels are fed from quaternary levels reaching 150 mm/year. Infiltration into the oligocene and chalk levels is limited and most often does not exceed 50 mm/year.

JCWPd 28 (PLGW200028) creates 5 aquifer levels of ordinary groundwater:

- groundwater level (Qg) including shallow waters found in river valleys, pradolins and sanders. These waters are associated with sandworks of holocene and Pleistocene. The aquifer occurs at a depth of 5 to 20 m BC, reaching a thickness of up to 25 m;
- intermorene levels (upper Qm-I, lower Qm-III) are associated with sandy Pleistocene sediments. The aquifer of the upper level occurs at a depth of 10 to 50 m p.p., reaching a thickness of up to 20 m, the aquifer of the lower level occurs at a depth of 20 to 120 m p.p., reaching a thickness of up to 40 m;
- the Miocene level (M) is made of fine sands. The aquifer occurs at a depth of 80 to 120 m p.p., reaching a thickness of up to 20 m;
- the Paleogenic and Cretaceous level is associated with marils, sandstones, and limestones. The aquifer occurs at a depth of 100 to 130 m p.p., reaching a thickness of up to 20 m.

Quaternary levels are common in the catchment area and are most often the basis for drinking water supply. The supply of quaternary levels takes place on the way of infiltration of precipitation. The waters of deeper aquifers are fed by shallow aquifer levels.

The synthetic information on the CBWPd is provided in the table below, while detailed information on the groundwater bodies in question is provided in Annex 3.6.1-1.

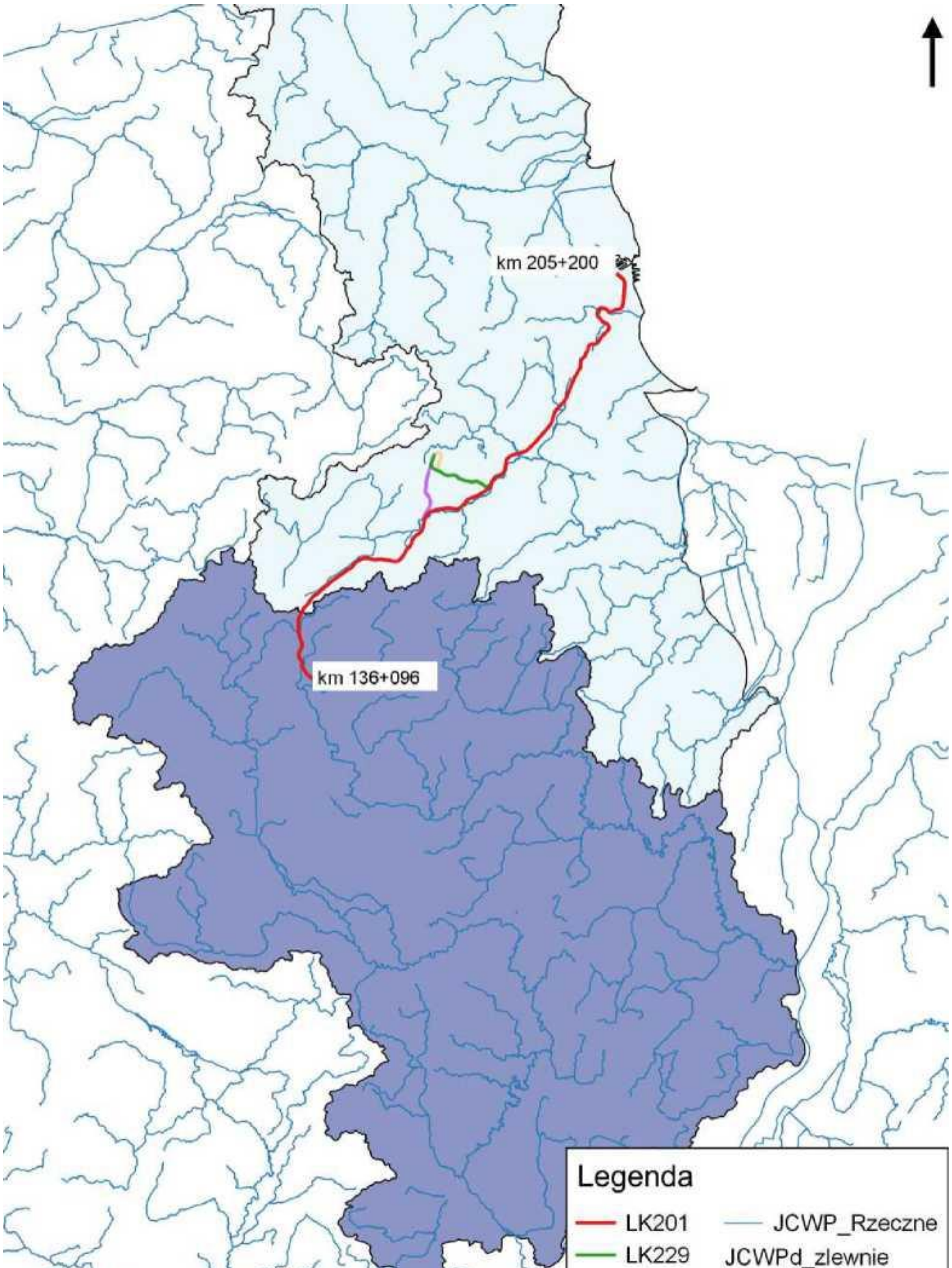
Tab.26. General characteristics of the JCWPd

JCWPd number	**PLGW200013**					**PLGW200028**
Railway line number	**201**	**214**	**229**	**L1**	**L2**	**201**
Intersection mileage investment option (W1)	144,340 – 205,200	—0.229 – 8,150	31,000 – 42,100	8,150 – 11,400	0.000 – 0.877	136,096 – 144,340
Intersection mileage alternative (W2)	144,345 – 205,200	—0.229 – 8,150	31,000 – 42,100	8,150 – 11,400	0.000 – 0.877	136,096 – 144,345

JCWPd number	PLGW200013	PLGW200028
Railway line number	**201214229 L1 L2**	**201**
JCWPd area [km^2]	2856,00	4057,40
River basin district	Vistula	Vistula
Water Region	Lower Vistula	Lower Vistula
Stratigraphy and lithology	Quaternary (holocene, Pleistocene) – sands and gravels Creed – sands	Quaternary (Holocene, Pleistocene) – sands and gravels Miocen – sands Paleogen and chalk- sands, marbles, limestone, sandstones
Type of works that build the aquifer	porous	Porous porous and slotted
Assessment of chemical status	good	good
Assessment of quantitative	good	good
Environmental objective	good chemical and quantitative status	good chemical and quantitative status
Risk assessment of non-achievement of the	not endangered	not endangered
Type of derogation	absence	absence
Type of use of water bodies	Agroforestry	Agroforestry

Explanatory notes: L1 – link between railway lines 214 and 229, L2 – link between railway lines 229 and 201
Source: Own study based on the Update of the Water Management Plan in the river basin area
Vistula and http://mjwp.gios.gov.pl/mapa/mapa,172.html

Fig. 3 Location of the investment against the background of the JCWPd catchment



Source: Own development

3.6.2. Main Underground Water Tanks

All the railway lines concerned are within the boundaries of the quaternary main groundwater reservoir GZWP111 Subniecka Gdańska

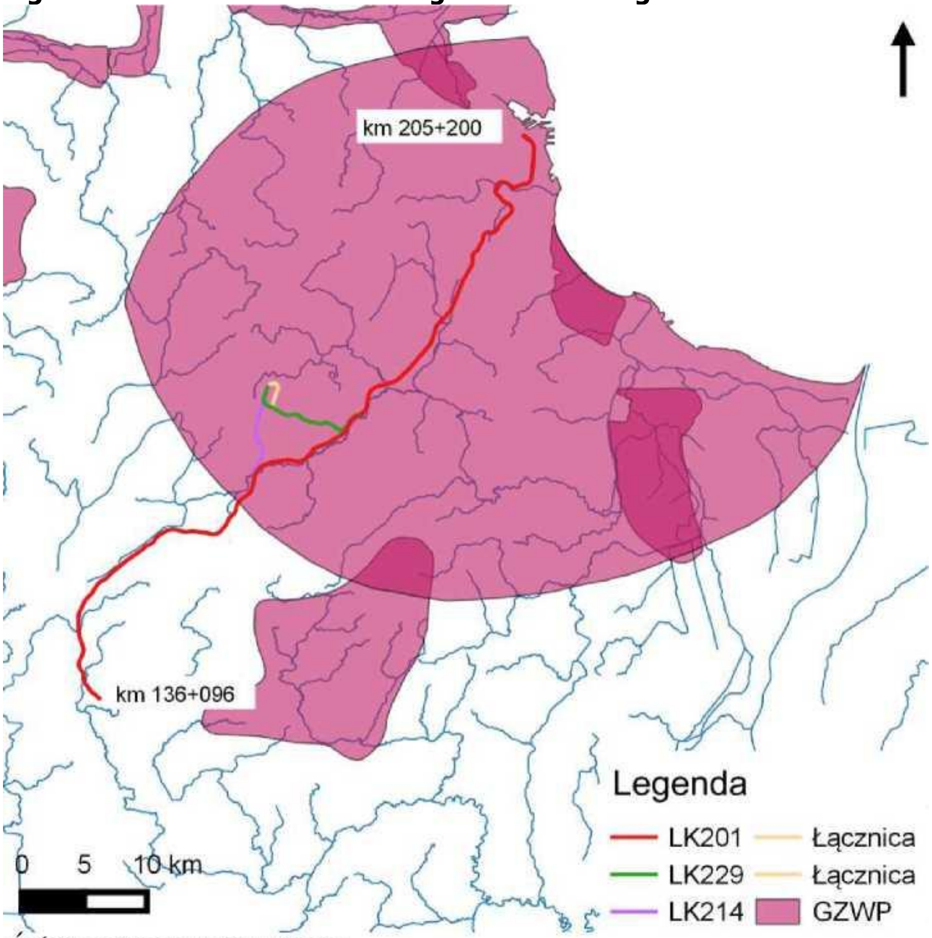
GZWP Nr 111 Subniecka Gdańska is a pore tank in chalk works. It occurs at considerable depths. It occupies the surface ok. 1 800 km 2, covering[a] large part of the Kashubian Lake District and the lowland areas of the coastal zone. Its aquifers are made of sand fraction produced from fine-grained glauconite, quartz and glauconite sands, inferiorly overlayed with brittle sandstones and sandy geese. The ceiling of the sandy aquifer lies mostly on rows from – 100 to -140 m above sea level and falls south-east. At the northern edges of its range, the pulp of the tank's aquifer is about 39 to 46 m, in the area of Gdynia about 70 m, and in the vicinity of Reda reaches 96 m. The waters of this tank are characterised by very good quality, they belong to the hydrogen carbonate-sodium type (HCO3-Na). Due to the deep location of the reservoir, the capture of its waters requires deep wells to be drilled, but this has a beneficial effect on the protection of the reservoir against pollution.

Tab.27 List of GZWP.

LP.	**Name**	**Railway line number**	**Mileage of railway lines**		**Characteristics**
			Investment option (W1)	**Alternative option (W2)**	
1	GZWP No 111 Subniecka Gdańska	201	160,765 – 205,200	160,780 – 205,200	Age of aquifers – Quaternary Tank type – porous Documentation status – documented Area – 1 800 km 2
		214	—0.229 – 8,150	—0.229 – 8,150	
		229	31,000 – 42,100	31,000 – 42,100	
		L1	8,150 – 11,400	8,150 – 11,400	
		L2	0.000 – 0.877	0.000 – 0.877	

Explanatory notes: L1 – link between railway lines 214 and 229, L2 – link between railway lines 229 and 201
Source: www.psh.gov.pl.

Fig. 4 Location of investments against the background of GZWP



Źródło: Opracowanie własne

3.6.3. Water intakes and their protection zones

According to the data received from PGW Wody Polskie RZGW Gdańsk, in a buffer of 500 meters from the analysed railway lines there are 28 active wells counted for groundwater intakes and 2 wells decommissioned. Railway line No 201 crosses 4 protection zones for indirect groundwater intakes, other railway lines and linkages do not intersect protection zones for groundwater intakes.

Table 23 provides information on the identified groundwater intakes in the 500 m buffer, while Table 24 compiles information on existing IPAs.

Tab.28 Congregation of groundwater intakes in a buffer of 500 m from the analysed railway lines.

L.P.	Name of the shot		Municipality	Water Decision No.	Date of validity of the decision		Authority issuing the decision	Owner of the shot	User of the shot	Purpose of collection	Status	Removable aquifer level	Close-up mileage [km]		Distance from line axis [m]		Side of the railway line	Railway line number
													Investment option (W1)	Alternative option (W2)	Investment option (W1)	Alternative option (W2)		
1	Gdynia	well No. 5a	Gdynia	WŚ.III.6341.18.2012.BK	2012-05-17	liquidation	Mayor of the City of Gdańsk	Gdynia Municipality Office	Board of Roads and Greenery Budget Unit of Gdynia Municipality with its registered office in Gdynia	BD	liquidation	tertiary	204,010	204,050	490	490	P	201
2	Osowa	well No. 7	Żukowo	R.6223-3/2005/ib; R.6341.15.2013.KMW	2005-03-10; 2015-03-30	2015-03-31; 2025-03-30	Mayor of Kartuski	Żukowo Municipality Office	Saur Neptun Gdańsk S.A.	municipal	active	BD	189,090	189,200	500	507	L	201
3	Osowa	well No. 3	Żukowo	R.6223-3/2005/ib; R.6341.15.2013.KMW	2005-03-10; 2015-03-30	2015-03-31; 2025-03-30	Mayor of Kartuski	Żukowo Municipality Office	Saur Neptun Gdańsk S.A.	municipal	active	BD	188,590	188,700	375	387	L	201
4	Osowa	well No. 8	Żukowo	R.6223-3/2005/ib; R.6341.15.2013.KMW	2005-03-10; 2015-03-30	2015-03-31; 2025-03-30	Mayor of Kartuski	Żukowo Municipality Office	Saur Neptun Gdańsk S.A.	municipal	active	BD	188,720	188,830	480	492	L	201
5	Osowa	well No. 1	Żukowo	R.6223-3/2005/ib; R.6341.15.2013.KMW	2005-03-10; 2015-03-30	2015-03-31; 2025-03-30	Mayor of Kartuski	Żukowo Municipality Office	Saur Neptun Gdańsk S.A.	municipal	active	chalk	190,230	190,350	400	410	L	201
6	Osowa	well No. 4a	Żukowo	R.6223-3/2005/ib; R.6341.15.2013.KMW	2005-03-10; 2015-03-30	2015-03-31; 2025-03-30	Mayor of Kartuski	Żukowo Municipality Office	Saur Neptun Gdańsk S.A.	municipal	active	Quaternary	190,220	190,340	430	440	L	201
7	Kościerzyna	well No. 8a	Kościerzyna	OŚGWLiR.I.6223-9(8)/08/09; OŚ.6223-20(5)/10; OŚ.6341.55.3.2013	2009-09-28; 2010-11-18; 2013-11-08	2014-03-20; 2033-11-07	Mayor of Kościerski	Office of the City of Kościerzyna	Water supply and sewerage company Kościerskie Sp. z o.o. in Kościerzyn; Municipal Infrastructure Company KOS-EKO Sp. z o.o. in Kościerzyn	municipal	active	Quaternary	138,600	138,610	205	205	L	201
8	Kościerzyna	well No. 4c	Kościerzyna	OŚGWLiR.I.6223-9(8)/08/09; OŚ.6223-20(5)/10; OŚ.6341.55.3.2013	2009-09-28; 2010-11-18; 2013-11-08	2014-03-20; 2033-11-07	Mayor of Kościerski	Office of the City of Kościerzyna	Water supply and sewerage company Kościerskie Sp. z o.o. in Kościerzyn; Municipal Infrastructure Company KOS-EKO Sp. z o.o. in Kościerzyn	municipal	active	Quaternary	138,290	138,300	269,5	270	L	201
9	Kościerzyna	well No. 2e	Kościerzyna	OŚGWLiR.I.6223-9(8)/08/09; OŚ.6223-20(5)/10; OŚ.6341.55.3.2013	2009-09-28; 2010-11-18; 2013-11-08	2014-03-20; 2033-11-07	Mayor of Kościerski	Office of the City of Kościerzyna	Water supply and sewerage company Kościerskie Sp. z o.o. in Kościerzyn; Municipal Infrastructure Company KOS-EKO Sp. z o.o. in Kościerzyn	municipal	active	Quaternary	138,090	138,100	355	356	L	201
10	The Great Kack	well No. 1/4a	Gdynia	UOD.RO.6223-6/08	2008-04-01	2018-03-31	President Cities of Gdynia	Water supply and sewerage company Sp. z o.o. in Gdynia; private persons	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	lower Quaternity	192,890	193,000	338	342	L	201
11	The Great Kack	well No. 2	Gdynia	UOD.RO.6223-6/08	2008-04-01	2018-03-31	President Cities of Gdynia	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	lower Quaternity	193,745	193,860	180	180	L	201
12	The Great Kack	well No. 4	Gdynia	UOD.RO.6223-6/08	2008-04-01	2018-03-31	President Cities of Gdynia	private persons; State Treasury/PKP	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	upper Quaternity	194,080	194,040	65	50	L	201
13	The Great Kack	well No. 6a	Gdynia	UOD.RO.6223-6/08	2008-04-01	2018-03-31	President Cities of Gdynia	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	upper Quaternity	193,500	193,615	390	391	L	201
14	The Great Kack	well No. T-1	Gdynia	UOD.RO.6223-6/08	2008-04-01	2018-03-31	President Cities of Gdynia	private persons; State Treasury/PKP	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	tertiary – Oligocene	193,950	194,050	60	50	L	201

L.P.	Name of the shot		Municipality	Water Decision No.	Date of validity of the decision		Authority issuing the decision	Owner of the shot	User of the shot	Purpose of collection	Status	Removable aquifer level	Close-up mileage [km]		Distance from line axis [m]		Side of the railway line	Railway line number
													Investment option (W1)	Alternative option (W2)	Investment option (W1)	Alternative option (W2)		
15	Kościerzyna	well No. 9a	Kościerzyna	OŚGWLiR.I.6223-9(8)/08/09; OŚ.6223-20(5)/10; OŚ.6341.55.3.2013	2009-09-28; 2010-11-18; 2013-11-08	2014-03-20; 2033-11-07	Mayor of Kościerski	Office of the City of Kościerzyna	Water supply and sewerage company Kościerskie Sp. z o.o. in Kościerzyn; Municipal Infrastructure Company KOS-EKO Sp. z o.o. in Kościerzyn	municipal	active	Quaternary	138,700	138,702	210	210	L	201
16	Gdynia	well No. 13a	Gdynia	WŚ.III.6341.18.2012.BK	2012-05-17	liquidation	Mayor of the City of Gdańsk	Gdynia Municipality Office	Board of Roads and Greenery Budget Unit of Gdynia Municipality with its registered office in Gdynia	BD	liquidation	Quaternary	204,210	204,250	100	100	P	201
17	Sieradzka Area I	well No. 10b	Gdynia	AXIS-IV-74411/12060/01; UOD.DM.6223-37/06	2001-06-18; 2006-12-29	BD; 2017-12-31	Voivode of Pomorski; President of the City of Gdynia	Gdynia Municipality Office; Company Water supply and sewerage Gdynia Sp. z o.o. in Gdynia	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	BD	199,645	199,770	286	290	P	201
18	Sieradzka Area I	well No. 6b	Gdynia	AXIS-IV-74411/12060/01; UOD.DM.6223-37/06	2001-06-18; 2006-12-29	BD; 2017-12-31	Voivode of Pomorski; President of the City of Gdynia	Gdynia Municipality Office; Company Water supply and sewerage Gdynia Sp. z o.o. in Gdynia	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	BD	199,740	199,865	325	330	P	201
19	Sieradzka Area I	well No. K-2	Gdynia	UOD.DM.6223-37/06	2006-12-29	2017-12-31	President Cities of Gdynia	Gdynia Municipality Office; Company Water supply and sewerage Gdynia Sp. z o.o. in Gdynia	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	chalk	199,805	199,930	320	325	P	201
20	Sieradzka Area I	well No. 4b	Gdynia	AXIS-IV-74411/12060/01; UOD.DM.6223-37/06	2001-06-18; 2006-12-29	BD; 2017-12-31	Voivode of Pomorski; President of the City of Gdynia	Gdynia Municipality Office; Company Water supply and sewerage Gdynia Sp. z o.o. in Gdynia	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	BD	199,775	199,900	395	400	P	201
21	Sieradzka Area I	well No. 3	Gdynia	AXIS-IV-74411/12060/01; UOD.DM.6223-37/06	2001-06-18; 2006-12-29	BD; 2017-12-31	Voivode of Pomorski; President of the City of Gdynia	Company Water supply and sewerage Gdynia Sp. z o.o. in Gdynia	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	BD	199,825	199,950	370	375	P	201
22	Sieradzka Area I	well No. 2b	Gdynia	AXIS-IV-74411/12060/01; UOD.DM.6223-37/06	2001-06-18; 2006-12-29	BD; 2017-12-31	Voivode of Pomorski; President of the City of Gdynia	Gdynia Municipality Office	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	BD	199,875	200,000	380	385	P	201
23	Sieradzka Area I	well No. 1a	Gdynia	AXIS-IV-74411/12060/01; UOD.DM.6223-37/06	2001-06-18; 2006-12-29	BD; 2017-12-31	Voivode of Pomorski; President of the City of Gdynia	Gdynia Municipality Office; Company Water supply and sewerage Gdynia Sp. z o.o. in Gdynia	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	BD	199,975	200,100	375	383	P	201
24	Kościerzyna	well No. 7a	Kościerzyna	OŚGWLiR.I.6223-9(8)/08/09; OŚ.6223-20(5)/10; OŚ.6341.55.3.2013	2009-09-28; 2010-11-18; 2013-11-08	2014-03-20; 2033-11-07	Mayor of Kościerski	Office of the City of Kościerzyna	Water supply and sewerage company Kościerskie Sp. z o.o. in Kościerzyn; Municipal Infrastructure Company KOS-EKO Sp. z o.o. in Kościerzyn	municipal	active	Quaternary	138,500	138,505	244	244	L	201

L.P.	Name of the shot		Municipality	Water Decision No.	Date of validity of the decision		Authority issuing the decision	Owner of the shot	User of the shot	Purpose of collection	Status	Removable aquifer level	Close-up mileage [km]		Distance from line axis [m]		Side of the railway line	Railway line number
													Investment option (W1)	Alternative option (W2)	Investment option (W1)	Alternative option (W2)		
25	Kościerzyna	well No. 7	Kościerzyna	OŚGWLiR.I.6223-9(8)/08/09; OŚ.6223-20(5)/10; OŚ.6341.55.3.2013	2009-09-28; 2010-11-18; 2013-11-08	2014-03-20; 2033-11-07	Mayor of Kościerski	Office of the City of Kościerzyna	Water supply and sewerage company Kościerskie Sp. z o.o. in Kościerzyn; Municipal Infrastructure Company KOS-EKO Sp. z o.o. in Kościerzyn	municipal	active	Quaternary	138,450	138,445	272	273	L	201
26	Sieradzka Area I	well No. 2c/5b	Gdynia	AXIS-IV-74411/12060/01; UOD.DM.6223-37/06	2001-06-18; 2006-12-29	BD; 2017-12-31	Voivode of Pomorski; President of the City of Gdynia	Gdynia Municipality Office; Company Water supply and sewerage Gdynia Sp. z o.o. in Gdynia	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	BD	199,665	199,790	375	380	P	201
27	Sieradzka Area I	well No. K-6	Gdynia	UOD.DM.6223-37/06	2006-12-29	2017-12-31	President Cities of Gdynia	Gdynia Municipality Office; Company Water supply and sewerage Gdynia Sp. z o.o. in Gdynia	Water Supply and Sewerage Company Sp. z o.o. in Gdynia	municipal	active	chalk	199,775	199,900	395	400	P	201
28	Kartuzy	well No. 1	Kartuzy	R.6341.74.2013.KMW	2013-08-28	2023-08-23	Mayor of Kartuski	Office of Kartuzy Municipality	Kartuskie Entrepreneurship Wodociągów i Kanalyzacji Sp. z o.o.	municipal	active	BD	6,600	6,600	185	185	L	214
29	Żukowo	well No. 1	Żukowo	R.6341.106.2015.IB	2015-12-14	2025-12-14	Mayor of Kartuski	Berendsen Textile Service Sp. z o.o.	Berendsen Textile Service Sp. z o.o.	technological needs and laundry, irrigation, social and living needs of company employees	active	Quaternary	178,790	178,810	207	209	P	201
30	Kielpino	well No. 1	Kartuzy	R.6341.148.2014.IB	2015-02-24	2025-02-24	Mayor of Kartuski	Renata and Clement Czapp	Renata and Clement Czapp	the Needs of a Poultry Farm	active	Quaternary	165,435	165,450	543	543	L	201

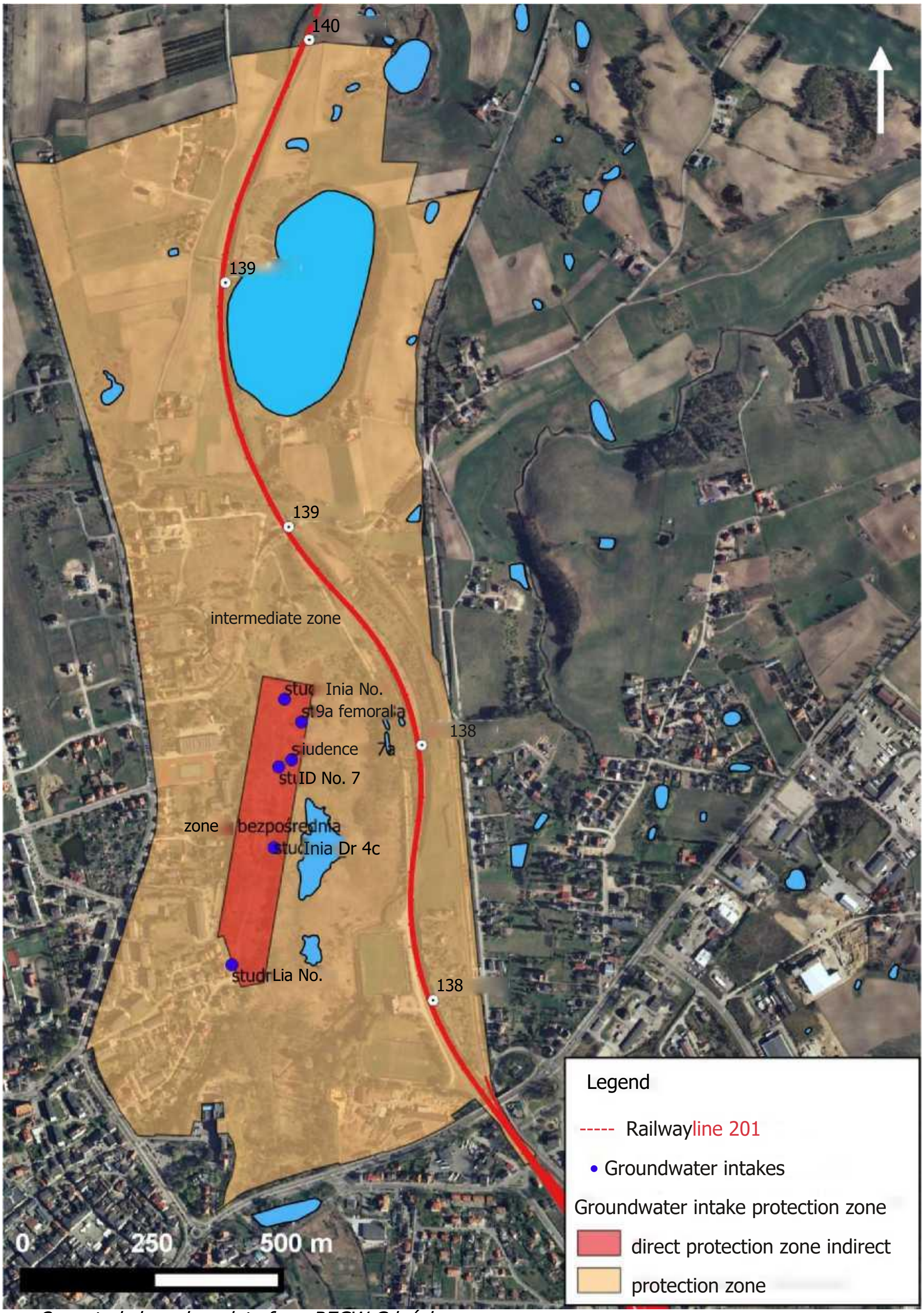
Source: Own study based on data obtained from PGW Wody Polskie RZGW in Gdańsk

Tab.29 List of intermediate protection zones for groundwater intakes.

L.P.	Name of the zone	Municipality	Regulation establishing a protection zone	Area of indirect protection zone	Close-up mileage [km]		Distance from line axis [m]		Side of the railway line	Jowa wheel-line
					Variant Investment (W1)	Alternat variant (W2)	Investment option (W1)	Alternative option(W2)		
1	Kościerzyna	Kościerzyna	Regulation No 4/2013 of the Director of the Regional Water Management Board in Gdańsk of 6 September 2013 Ordinance of the Director of the Regional Water Management Board in Gdańsk of 6 April 2017 amending Regulation No 4/2013	133,98	137,675 – 139,985	137,650 – 139,990	Intersection with the line		P, L	201
2	Osowa	Danzig	Regulation No 7/2006 of the Director of the Regional Water Management Board in Gdańsk of 8 November 2006.	64.64 ha	190,000	190,120	330	340	L	201
3	The Great Kack	Gdynia	Regulation No 7/2014 of the Director of the Regional Water Management Board in Gdańsk of 8 July 2014 Regulation of the Director of the Regional Water Management Board in Gdańsk of 10 May 2017 amending Regulation 7/2014	166,87	192,590 – 195,035	192,705 – 195,150	Intersection with the line		P, L	201
4	Sieradzka area II	Gdynia	Regulation of the Director of the Regional Water Management Board in Gdańsk of 29 August 2017 amending Regulation No 8/2013 Regulation No 6/2014 of the Director of the Regional Water Management Board in Gdańsk of 14 August 2014	202 ha	195,380 – 196,685	195,500 – 196,815	Intersection with the line		P, L	201
5	Sieradzka Area I	Gdynia	Regulation No 8/2013 of the Director of the Regional Water Management Board in Gdańsk of 19 December 2013		199,055 – 200,180	191,85 – 200,300	Intersection with the line		P, L	201

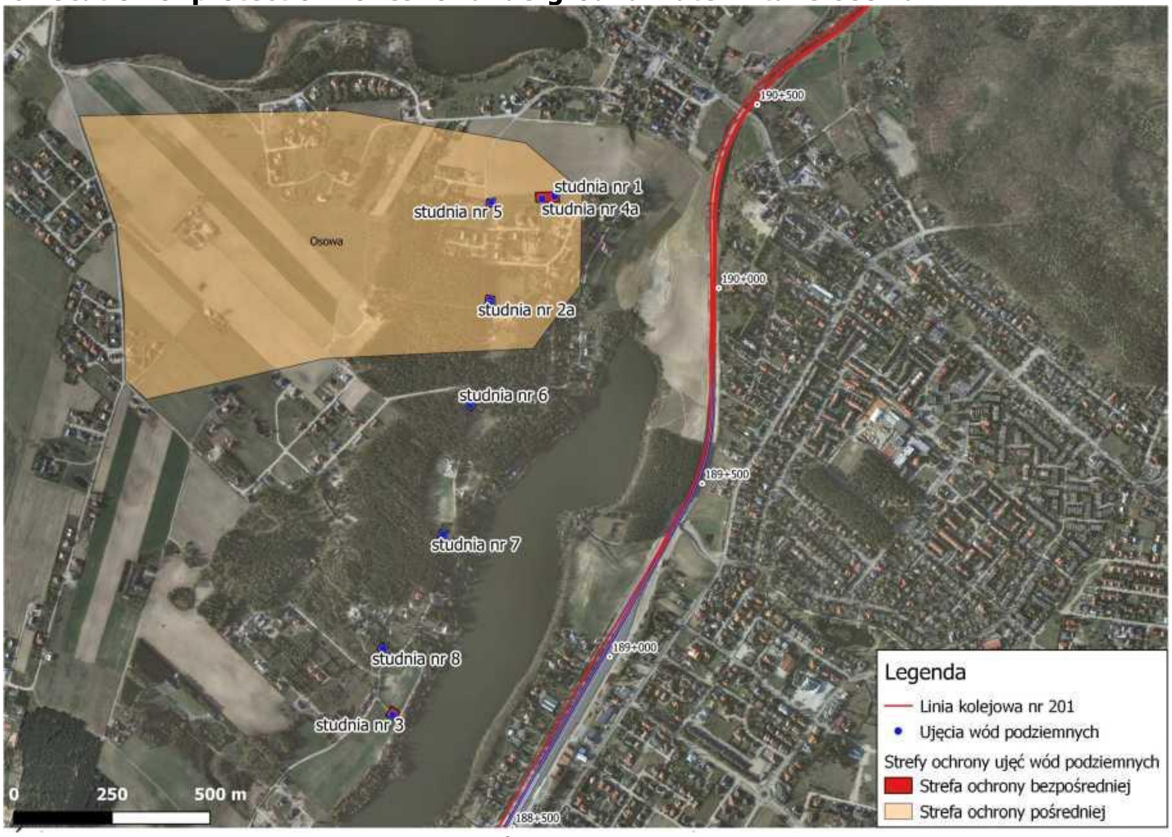
Source: Own study based on data from RZGW Gdańsk

Fig. 5 Location of protection zones for underground water intake Kościerzyna



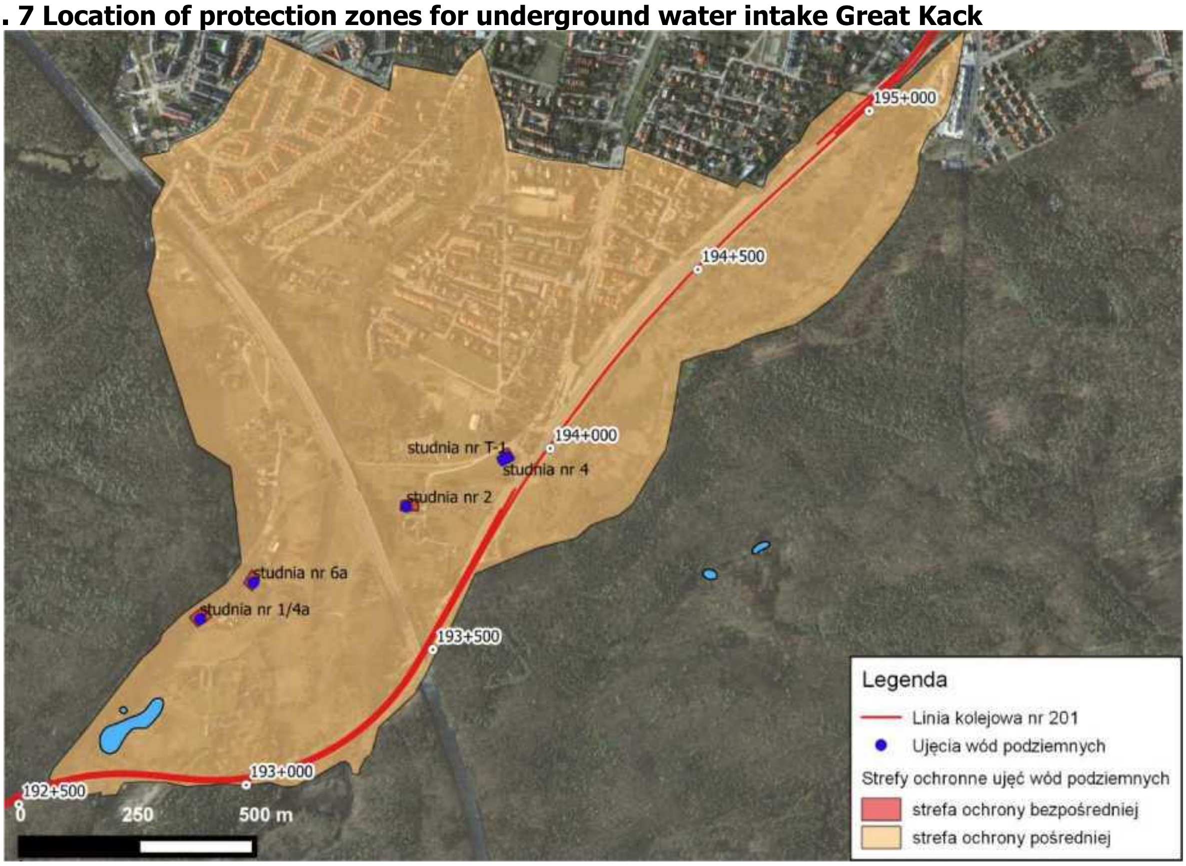
Source: Own study based on data from RZGW Gdańsk.

Fig. 6 Location of protection zones for underground water intake Osowa



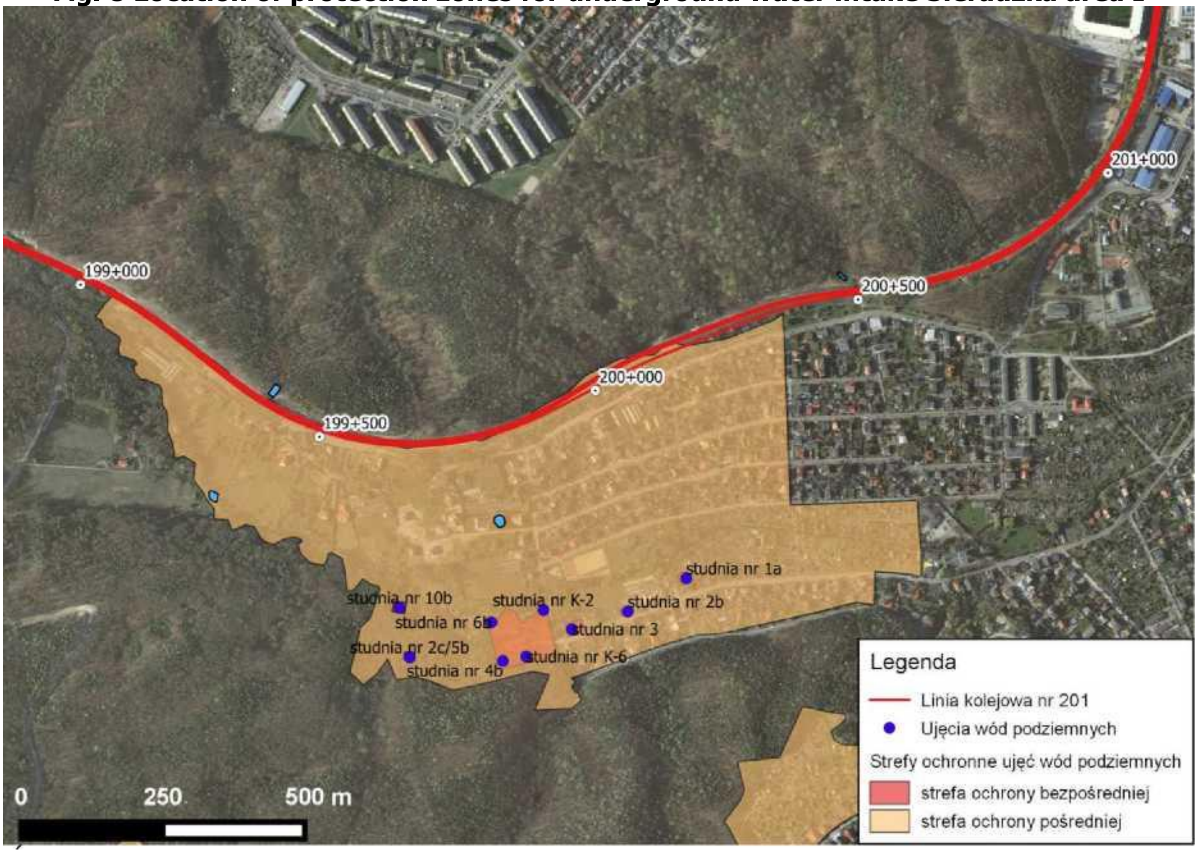
Source: Own study based on data from RZGW Gdańsk.

Fig. 7 Location of protection zones for underground water intake Great Kack



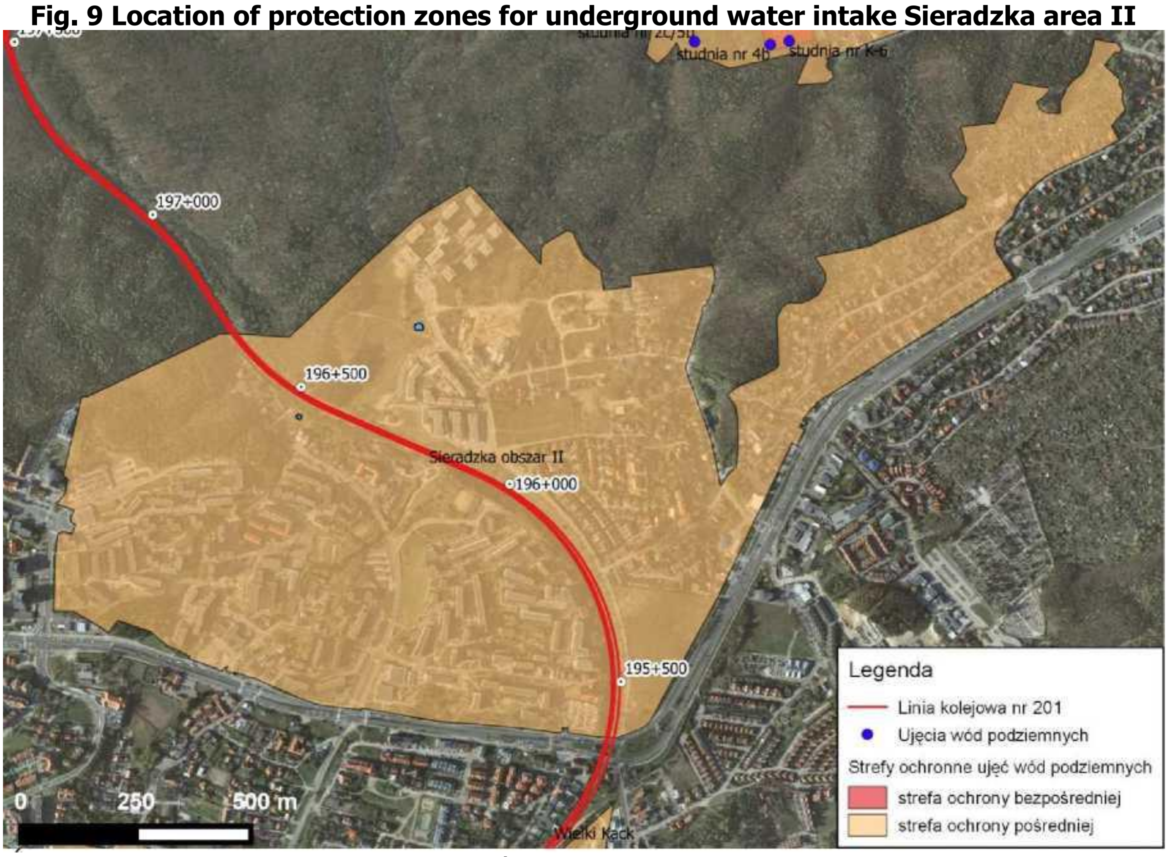
Source: Own study based on data from RZGW Gdańsk.

Fig. 8 Location of protection zones for underground water intake Sieradzka area I



Source: Own study based on data from RZGW Gdańsk.

Fig. 9 Location of protection zones for underground water intake Sieradzka area II



Source: Own study based on data from RZGW Gdańsk

Fig. 10 Location of underground water intake Kartuza – well no. 1

Source: Own study based on data from RZGW Gdańsk

Fig. 11 Location of underground water intake Kiełpino – well no. 1

Source: Own study based on data from RZGW Gdańsk

Fig. 12 Location of subterranean water intake Żukowo – well no. 1

Source: Own study based on data from RZGW Gdańsk

3.7. Surface water

Coastal areas and marine environment

The analysed section of railway line No 201, in the final run, is located about 850 m from the coastal area. From km 201,350 to km 205,200, railway section No 201 is located in the direct water catchment area TWDW1806.

Other railway lines: 214 and 229, together with connecting points, are located at a significant distance from coastal areas and from maritime areas.

Flowing waters, estuaries of rivers

The analysed railway lines 201, 214, 229 together with the planned interconnectors are located in the Vistula basin in the water region of the lower Vistula river. The most important hydrographic unit in this area is the river Radunia and Wierzyca. The railway lines in question cross 8 rivers: Kacza – river I order, A tributary from the great Kacka – river II row, Radunia and Bibrowa – river III row, Rakownica, Mała Supina, Strzelanka – river IV row and A tributary from Lake Wysocki – river V order. A summary of the watercourses constituting the JCWP and intersected by the railway lines analysed are set out in the table below.

Tab.30 Summary of watercourses constituting JCWPs intersected by the railway lines analysed.

L.P.	Name of the JCWP	Name of crossed river	JCWP code	Name of associated higher-order catchment	Government of the Watercourse	Intersection line number	Intersection mileage investment option (W1)	Intersection mileage alternative (W2)
1	Wierzyca with lakes Grabowskie and Wierzysko to the outflow from the Jez. Disembarkation	Bibrova	RW200017298173	The Basin of the Believers	III	201	137,788	137,797
2	Enters the outflow. Wdzydze	Rakownica	RW200025294379	Water catchment area	IV	201	142,164	142,160
3	Radunia from the outflow from Ostrzycki to Strzelenka	Radunia	RW20001948683	Catchment Radunia and Motławy	III	201	163,577	163,595
4	Radunia from the outflow from Ostrzycki to Strzelenka	Radunia	RW20001948683	Catchment Radunia and Motławy	III	214	0,814	0,814
6	Small Słupina with lakes Sitno, Monastery Big, White	Little Supina	RW200017486829	Catchment Radunia and Motławy	IV	201	177,261	177,297
7	Strzelenka with Lake Tuchomskie	Shooter	RW200017486849	Catchment Radunia and Motławy	IV	201	184,483	184,400
8	Strzelenka with Lake Tuchomskie	Tributary from Jez. Wysocki			V	201	185,705	185,740
9	Duck	Tributary from the Great Kack	RW20001747989	Redy and Piaśnica catchment	II	201	193,295	193,410
10					II	201	196,555	196,675
11		Duck			I	201	198,100	198,220

Source: Develop your own.

<u>Protection areas of inland water reservoirs, areas adjacent to lakes</u>

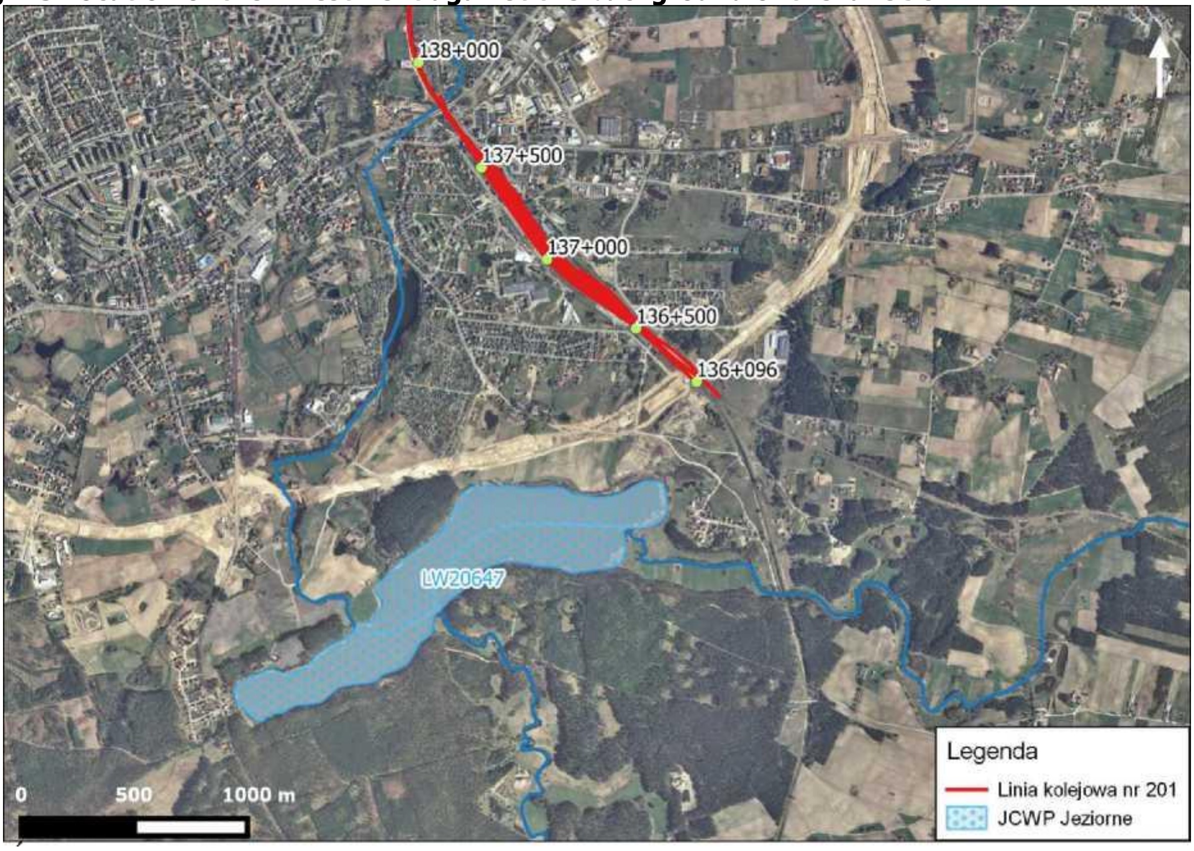
The analysed railway lines 201, 214, 229, together with the planned interconnectors do not cut through any standing waters classified as lakes. At a distance of up to 500 m from the axis of railway line No 201, there are four lakes constituting the Lake JCWP, the location of which is shown in the table below and in the following drawings.

Tab.31 List of lakes constituting JCWP lakes at a distance of up to 500 m in relation to the railway lines analysed.

Name of the lake JCWP	JCWP code	Line Page	Line number	Investment option (W1)		Alternative option (W2)	
				Distance from line axis [m]	Mileage* [km]	Distance from line axis [m]	Mileage* [km]
Ostrzyckie	LW20721	L	201	okay, okay. 33	153,900	33	153,905
Patulskie	LW20727	L	201	okay, okay. 36	152,660	36	152,663
Dąbrowskie	LW20726	L	201	okay, okay. 40	147,235	42	147,240
Wierzysko	LW20647	L	201	okay, okay. 455	136,096	465	136,096

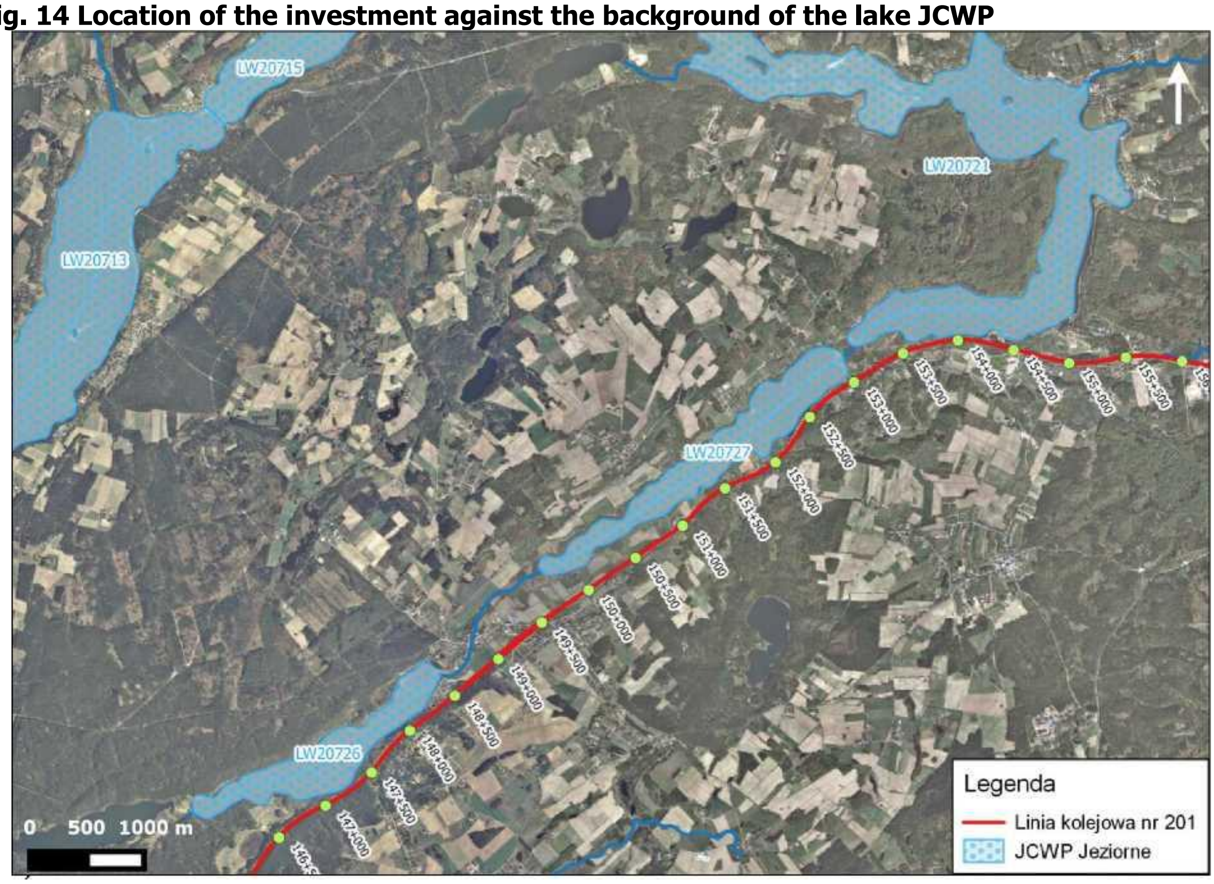
Explanatory notes: Mileage from the nearest point of the lake towards the railway line Source: Own development

Fig. 13 Location of the investment against the background of the lake JCWP



Source: Own development based on MPHP.

Fig. 14 Location of the investment against the background of the lake JCWP



Source: Own development based on MPHP.

In the 500 m buffer from the analysed railway lines, 9 lakes not distinguished as JCWP Jeziorne were found.

Tab.32 Summary of information on identified lakes up to 500 meters from the analysed railway lines.

L.P.	Tank name	Pow. [m²]	Railway line	Line page	Investment option (W1)		Alternative option (W2)	
					Distance from line axis [m]	Km of railway line	Distance from line axis [m]	Km of railway line
1	Jez. Karczemne	394465	214	L	440	6,950	440	6,950
2	Jez. Dzierżyżno	229460	229	P	320	36,055	320	36,055
3	Jez. mezowskie	394542	229	L	55	36,215	55	36,215
4	Jez. Branch	83356	201	P	10	139,425	10	139,425
5	The Great Swinebuds	185071	201	P	70	140,475	70	140,475
6	Jez. Spindle	60986	201	L	25	141,550	25	141,550
7	Jez. Long	185071	201	P	195	143,600	195	143,605
8	Jez. Rąty	53938	201	L	60	159,955	60	159,970
9	Jez. Wysockie	332278	201	L	125	188,500	135	188,615
10	Jez. Osowskie	294145	201	L	410	190,405	425	190,536

Source: Own development based on MPHP.

3.7.1. Uniform Parts of Surface Water

The area of the investment in question, according to the Map of Uniform Parts of Surface Waters made available in the Database of the National Water Management Board (as at 5.4.2018) is located within the limits of eight catchment areas of the JCWP, the characteristics of which are shown in the figure below and in the table below.

Tab.33 Characteristics of JCWPs intersected by the analysed railway lines.

Name of the JCWP		Wierzyca with lakes Grabowskie and Wierzysko to the outflow from there. banishment	Enters the outflow. Wdzydze	Radunia to the outflow from Ostrzycki	Tributary from the Rings	Radunia from the outflow from Ostrzycki to Strzelenka	Small Słupina with lakes Sitno, Monastery Big, White	Strzelenka with Lake Tuchomskie	Duck
JCWP code		**RW200017298173**	**RW200025294379**	**RW20002548681759**	**RW2000174868178**	**RW20001948683**	**RW200017486829**	**RW200017486849**	**RW20001747989**
Mileage of the intersection of the railway line in the investment option (W1)	**201**	136,096 – 140,794	140,794 – 144,340	144,340 – 155,590	155,590 – 161,270	161,270 – 175,450 177,460 – 177,810	175,450 – 177,460	177,810 – 190,755	190,755 – 205,200
	214	—	—	—	—	—0.229 – 7.020	7,020 – 8,150	—	—
	229	—	—	—	—	31,000 – 33,920 35,839 – 40,851	33,920 – 35,839 40,851 – 42,100	—	—
	L1	—	—	—	—	10,280 – 11,400	8,150 – 10,280	—	—
	L2	—	—	—	—	—	0.000 – 0.877	—	—
Railway intersection mileage in alternative variant (W2)	**201**	136,096 – 140,792	140,792 – 144,345	144,345 – 155,600	155,600 – 161,280	161,280 – 175,465 177,485 – 177,835	175,465 – 177,485	177,835 – 190,870	190,870 – 205,200
	214	—	—	—	—	—0.229 – 7.020	7,020 – 8,150	—	—
	229	—	—	—	—	31,000 – 33,920 35,839 – 40,851	33,920 – 35,839 40,851 – 42,100	—	—
	L1	—	—	—	—	10,280 – 11,400	8,150 – 10,280	—	—
	L2	—	—	—	—	—	0.000 – 0.877	—	—
Name of the relevant watercourse within the JCWP intersected by the railway line		Bibrova	Rakownica	—	—	Radunia	Little Supina	Shooter, Hez. Wysocki's tributary	Tributary from Big Kack, Duck
River basin district		Vistula River Basin District	Vistula River Basin District	Vistula River Basin District	Vistula River Basin District	Vistula River Basin District	Vistula River Basin District	Vistula River Basin District	Vistula River Basin District
Water Region		water region of Lower Vistula	water region of Lower Vistula	water region of Lower Vistula	water region of Lower Vistula	water region of Lower Vistula	water region of Lower Vistula	water region of Lower Vistula	water region of Lower Vistula
Balance sheet catchment		The Faith	Water	Radunia and Moldova	Radunia and Moldova	Radunia and Moldova	Radunia and Moldova	Radunia and Moldova	Reda Piaśnica
Type of JCWP		17	25	25	17	19	17	17	17
Water catchment area JCWP $[km^2]$		147,5	538,1	213,5	25,2	83,3	125,1	126,1	53,4
Length of JCWP $[km^2]$		50,04	121,65	57,46	6,32	31,46	48,70	41,34	22,93
Status of the JCWP		Natural	strongly modified	natural	natural	strongly modified	strongly modified	natural	strongly modified
Assessment of the status of the		Evil	Evil	good	good	good	evil	good	evil
Is the JCWP monitored		YES	YES	NO	NO	YES	YES	YES	YES
Name of the measuring and control point		Wierzyca – Sarnowy	WDA – Porębska Huta	—	—	Radunia – Lniska Radunia – Babi Dół	Small Słupina – Żukowo	Strzelenka – bridge Pępowo -Lezno	Kacza – Gdynia
Class of biological elements		I	III	—	—	II	II	II	II
Class of hydromorphological elements		II	II	—	—	II	II	II	II
Class of physicochemical elements		PPD	I	—	—	II	PPD	PPD	II
Status/Ecological Potential		moderate	moderate			good and below good	moderate	moderate	good and below good
Chemical status		—	good	—	—	good	—	—	good
Environmental objective for JCWP according to aPGW		achieving good ecological and chemical status	achieving good ecological potential and chemical status	maintaining good ecological status and achieving good chemical status	achieving good ecological and chemical status	maintaining good ecological status and achieving good chemical status	achieving good ecological potential and chemical status	maintaining good ecological status and achieving good chemical status	achieving good ecological potential and chemical status
Risk assessment of non-achievement of environmental objectives according to aPGW		threatened	threatened	not endangered	not endangered	not endangered	threatened	not endangered	threatened
Pressures/impacts and anthropogenic hazards		municipal economy	unrecognised pressure	unrecognised pressure	unrecognised pressure	unrecognised pressure	municipal economy	unrecognised pressure	unrecognised pressure
Type of derogation resulting from Article 4(1) 4 and 5 RDW		4(4)-1	4(4)-1	Absence	Absence	Absence	4(4)-1	Absence	4(4)-1
Deadline for achieving environmental objectives		2021	2021	2015	2015	2015	2021	2015	2021

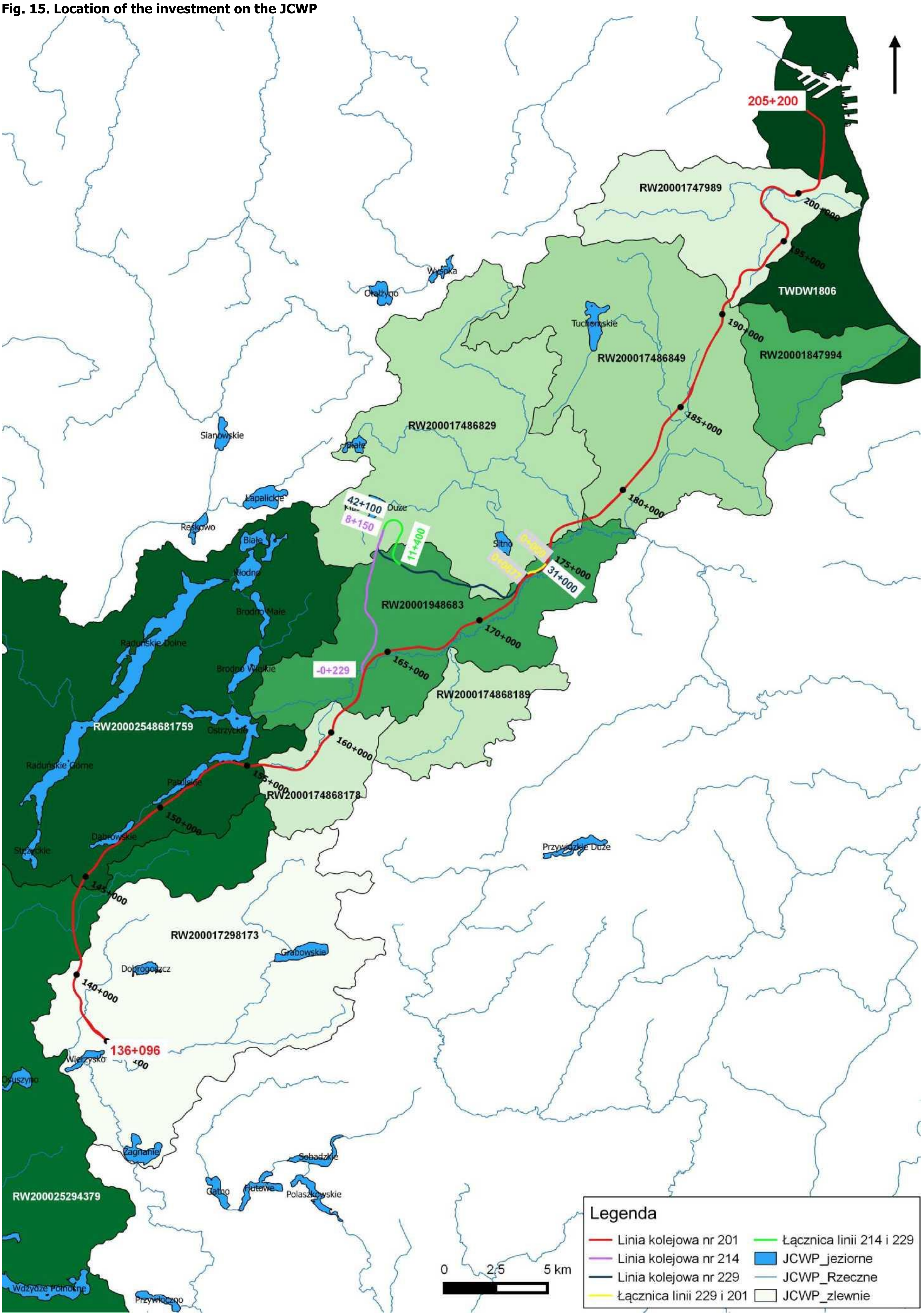
Name of the JCWP	Wierzyca with lakes Grabowskie and Wierzysko to the outflow from there. banishment	Enters the outflow. Wdzydze	Radunia to the outflow from Ostrzycki	Tributary from the Rings	Radunia from the outflow from Ostrzycki to Strzelenka	Small Słupina with lakes Sitno, Monastery Big, White	Strzelenka with Lake Tuchomskie	Duck
JCWP code	**RW200017298173**	**RW200025294379**	**RW20002548681759**	**RW2000174868178**	**RW20001948683**	**RW200017486829**	**RW200017486849**	**RW20001747989**
Justification for the derogation	Lack of technical capabilities. There is municipal pressure in the catchment area of the JCWP. The Action Programme envisages basic actions, including the ordering of wastewater management, which are sufficient to reduce this pressure to an extent sufficient to achieve good status.	Lack of technical capabilities. In the catchment of the JCWP, no pressure has been identified that may cause any exceedances of the quality indicators. It is necessary to make a detailed identification of the causes in order to correctly plan corrective actions. Identifying the reasons for failing to achieve good status will ensure the implementation of actions at national level: establishing a national database on hydromorphological changes, carrying out an in-depth analysis of pressures in terms of hydromorphological changes, developing good practices in the field of hydrotechnical works and maintenance works, setting out the rules for their implementation and developing a national programme for the restoration of surface waters.	Not applicable	Not applicable	Not applicable	Lack of technical capabilities. There is municipal pressure in the catchment area of the JCWP. The Action Programme envisages basic actions, including the ordering of wastewater management, which are sufficient to reduce this pressure to an extent sufficient to achieve good status.	Not applicable	Lack of technical capabilities. In the catchment of the JCWP, no pressure has been identified that may cause any exceedances of the quality indicators. It is necessary to make a detailed identification of the causes in order to correctly plan corrective actions. Identifying the reasons for failing to achieve good status will ensure the implementation of actions at national level: establishing a national database on hydromorphological changes, carrying out an in-depth analysis of pressures in terms of hydromorphological changes, developing good practices in the field of hydrotechnical works and maintenance works, setting out the rules for their implementation and developing a national programme for the restoration of surface waters.
The type of derogation resulting from Article 4(1). 7 RDW	absence	absence	absence	absence	absence	absence	4(7)	absence
Justification for the derogation	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Modernisation of the Strzelniczki River, Żukowo, Cartuski district, Pomeranian Voivodeship	Not applicable
Areas demarcated under Article 7 for abstraction of water intended for human consumption	NO	NO	NO	NO	NO	NO	NO	NO
Areas for the protection of aquatic species of economic interest	ABSENCE	ABSENCE	ABSENCE	ABSENCE	ABSENCE	ABSENCE	ABSENCE	ABSENCE
Bodies of water intended for recreational purposes, including areas designated as bathing sites	NO	NO	NO	NO	NO	NO	NO	NO
Water bodies designated as particularly vulnerable areas from which nitrogen flow from agricultural sources to those waters should be restricted	NO	NO	NO	NO	NO	NO	NO	NO
Water bodies designated as sensitive to pollution by nitrogen compounds from agricultural sources	NO	NO	NO	NO	NO	NO	NO	NO
Water bodies designated as nutrient sensitive areas	YES	YES	YES	YES	YES	YES	YES	YES
Areas for the conservation of habitats or species where maintenance or improvement is an important factor in their conservation	YES	YES	YES	YES	YES	YES	YES	YES

Explanatory notes: L1 – link between railway lines 214 and 229, L2 – link between railway lines 229 and 201 *Source: Own development based on data from the PGW and aPGW.*

The update for the JCWP through the catchment areas of the analysed railway lines sets out the following environmental objectives:

- for 5 CBs, the objective of achieving good ecological status/potential and achieving good chemical status,
- for 3 CBs was set as the objective of maintaining good ecological status/potential and achieving good chemical status.

Fig. 15. Location of the investment on the JCWP



Source: Own development based on data from RZGW

3.7.2. Areas at risk of flooding

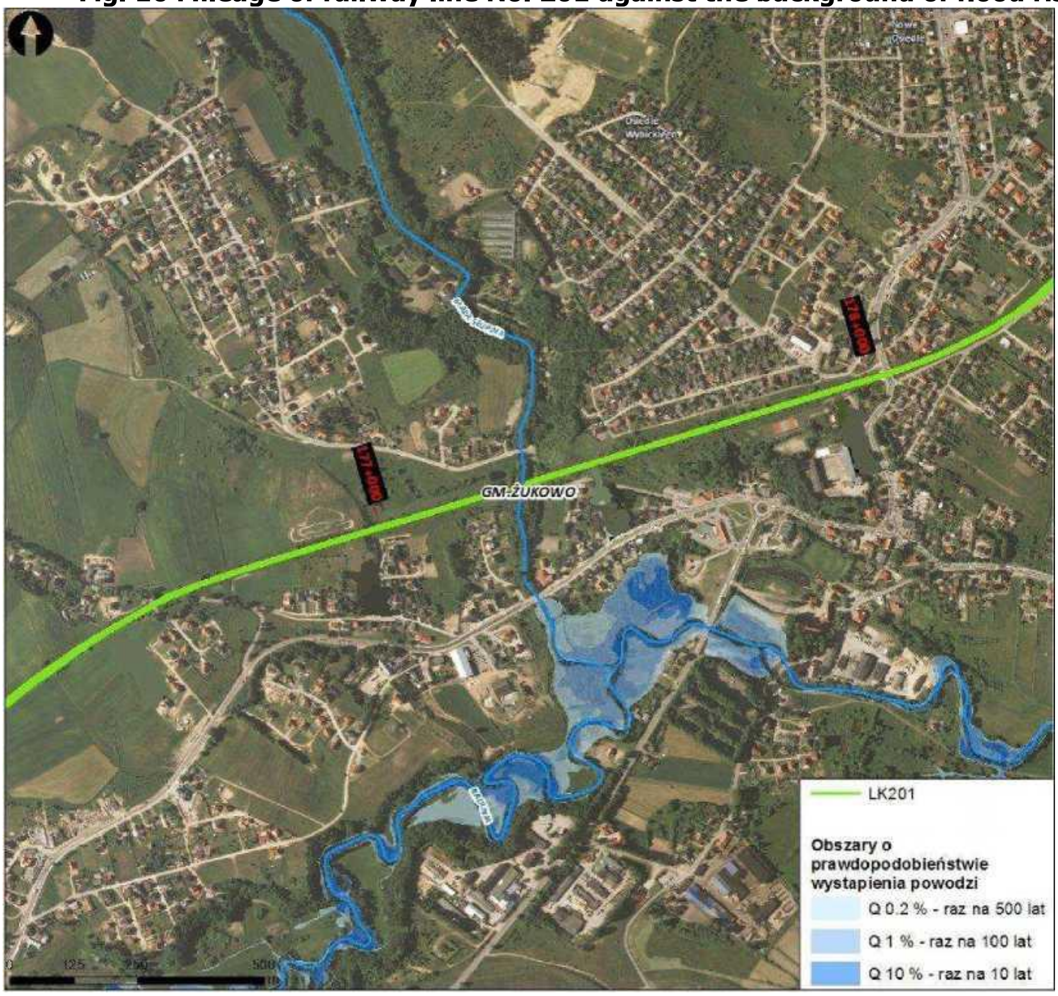
Based on data from flood hazard and flood risk maps developed as part of the Flood Risk Management Plan, it was found that the investment in question crosses 1 flood-prone area located in the area of Żukowo commune in the area of intersection by LK 201 of the Mała Słupina river.

Tab.34 List of areas at risk of flooding.

Railway line number	Estimated km of railway line – flood area Q10 %, Q1 %, Q0.2 %		Bridge objects	Intersectio n length
	Investment option (W1)	Alternative option (W2)		
201	okay, okay. 177,265 – 177,275	okay, okay. 177,295 – 177,305	Bridge over the river Mała Słupina in km 177,364	10 m

Explanatory notes:
Q0.2 % – areas where the probability of flooding is average once every 500 years;
Q1 % – areas where the probability of flooding is average and is once every 100 years;
Q10 % – areas where the probability of flooding is average and is once every 10 years; Source: http://www.isok.gov.pl/pl/, as of 05.04.2018

Fig. 16 Mileage of railway line No. 201 against the background of flood risk zones



Source: Development based on ISOK data.

3.7.3. Other areas protected by law

Water law

In Article 113, par. 4 Water Law Act lists the following protected and protective areas:

- 'unit water bodies intended for abstraction for the purpose of supplying the public with drinking water referred to in Article 49b(b). 3,
- areas intended for the protection of species of aquatic animals of economic importance,
- bodies of water intended for recreational purposes, including bathing,
- areas sensitive to eutrophication caused by pollution from municipal sources,
- areas exposed to nitrogen pollution from agricultural sources,
- areas intended for the protection of habitats or species established by the Conservation Act nature for which the maintenance or improvement of water status is an important factor in their conservation."

1. Water bodies intended for abstraction for the purpose of supplying the public with drinking water referred to in Article 49b(b). 3

Information on groundwater intakes is described in Chapter 3.6.3 of this Report.

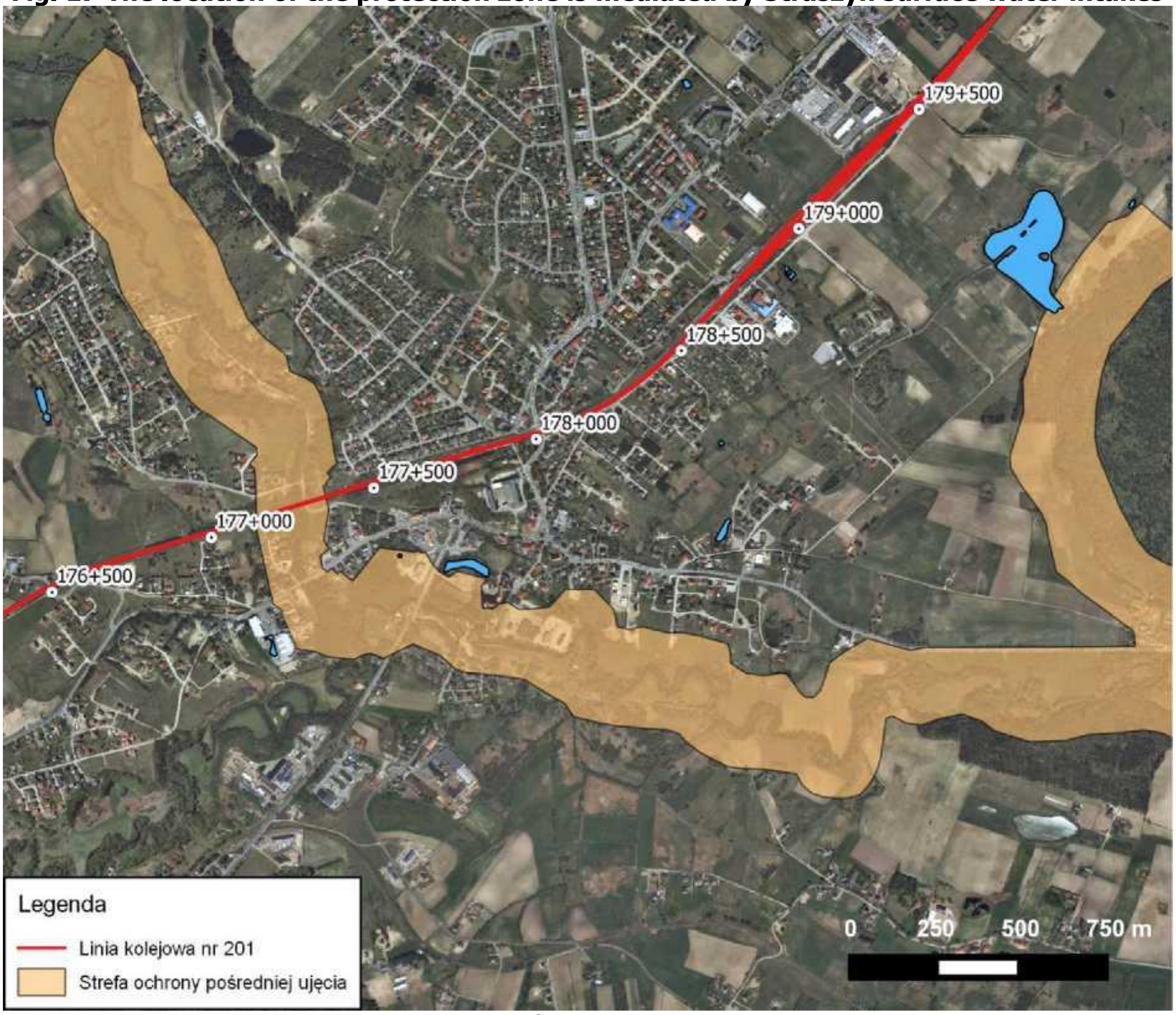
In the case of surface water intakes, only railway line 201 crosses the zone of indirect protection of Straszyn surface water intake.

Table 35 List of intermediate protection zones for intersected surface water intakes by the railway lines analysed.

L.P.	Name of the zone	Municipality	Close-up mileage [km]		Distance from line axis [m]		Line page railway-entrance	Wheel-job line
			Investment option (W1)	Alternat variant (W2)	Investment option (W1)	Alternative option (W2)		
1	Straszyn	Ljubljana Gdańsk	177,140 – 177,355	177,165 – 177,380	Intersection with the line		P, L	201

Source: Own study based on data from RZGW Gdańsk.

Fig. 17 The location of the protection zone is mediated by Straszyn surface water intakes



Source: Own study based on data from RZGW Gdańsk.

2. Areas for the protection of species of aquatic animals of economic importance

According to the provisions of the APGW, the register of protected areas in Poland did not designate areas for the protection of species of aquatic animals of economic importance, because breeding carried out outside the equipment intended for this purpose has little economic significance in Poland.

3. Bodies of surface water intended for recreational purposes, including bathing

On the basis of the list of recreational surface water bodies, including bathing areas, annexed to the APGW, it has been concluded that the railway lines under consideration do not cross the recreational areas of the JCWP, including bathing areas.

4. Areas sensitive to eutrophication caused by pollution from municipal sources

In accordance with the provisions of the Treaty of Accession of the Republic of Poland to the European Union, the entire territory of Poland has been recognised as an area sensitive to eutrophication caused by pollution from municipal sources.

5. Areas exposed to nitrogen pollution from agricultural sources

On the basis of the current list of areas particularly exposed to pollution by nitrogen compounds from agricultural sources in the Vistula river basin district annexed to the APGW, it was found that the areas located in the area of the railway lines analysed were not classified as particularly vulnerable areas.

6. Areas intended for the protection of habitats or species established by the Nature Conservation Act, for which the maintenance or improvement of water status is an

important factor in their conservation.

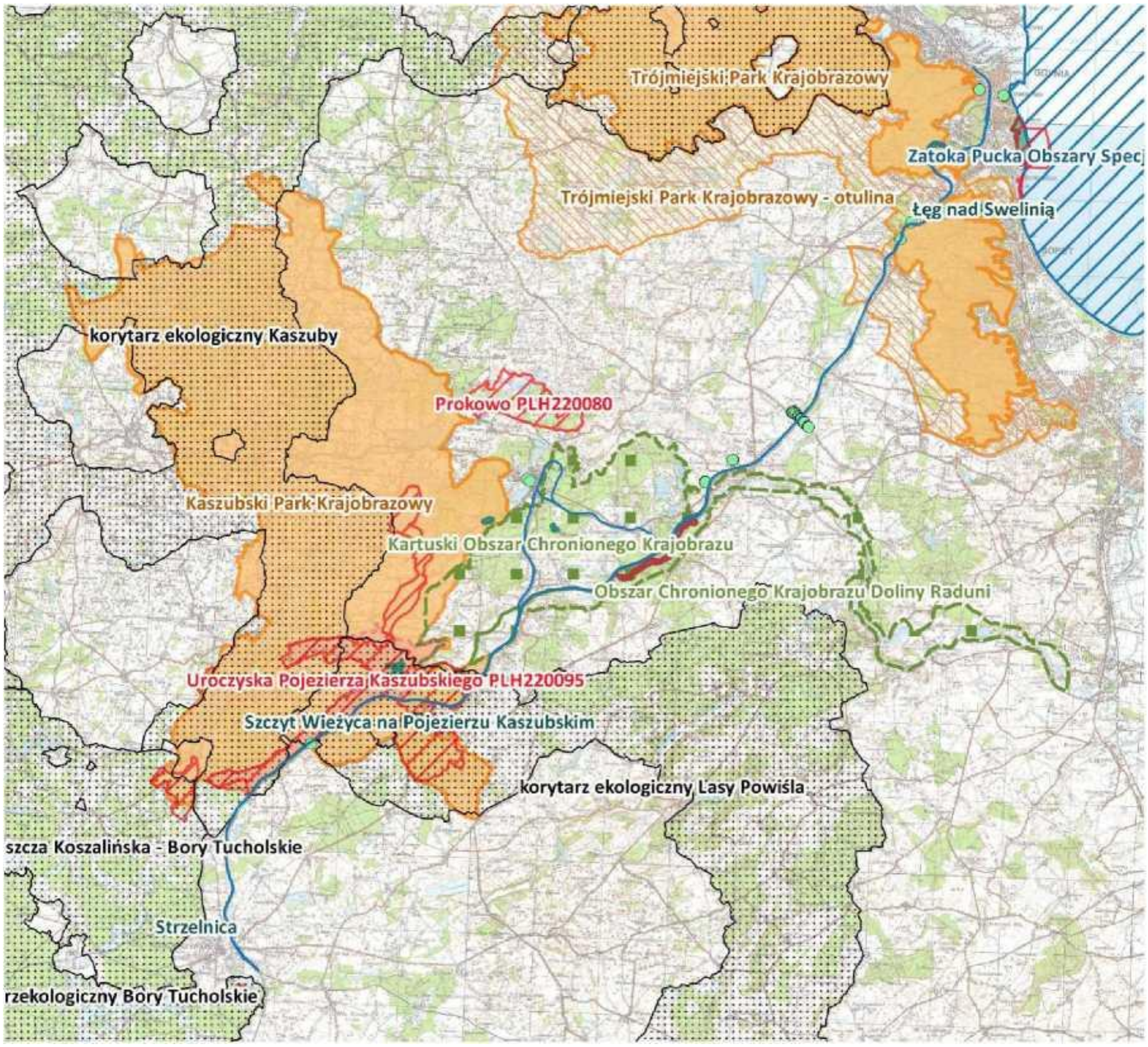
For the railway lines concerned, their location was analysed in relation to areas intended to protect habitats or species for which the maintenance or improvement of water status is an important factor in their conservation. The following chapter presents areas protected under the Nature Conservation Act, intersecting and adjacent to the analysed railway lines, for which the maintenance or improvement of waters is an important factor in their protection.

3.8. Areas and sites protected under the Nature Conservation Act

The planned investment intersects areas of natural value, including forms of nature conservation in accordance with Article 6 para. 1 of the Nature Conservation Act of 16 April 2004 (Journal of Laws 2018, item. 142 as amended). Potential impact of the investment on large-scale nature conservation: landscape parks, protected landscape areas, Natura 2000 sites and nature reserves were analysed in a buffer up to 2 km from the extreme axis of the track. Smaller forms of nature protection, i.e. natural and landscape complexes, ecological areas were analysed in buffers up to 500 m from the axis of the extreme track, while the existing natural monuments within 200 m from the extreme axis of the track. The location of the natural valuable areas along the railway lines covered by the project is shown in Map Annex No 3.8-1 Forms of Nature Protection and in the figure below.

As the investment option differs only slightly from the alternative, the location of the protected areas and facilities for both options is the same.

Fig. 18 Subject investment against the background of forms of



railways covered by the task of
natural monuments
Zzzy Natura 2000 SOO
|z/J Natura 2000 SPA
nature reserves
nature and Landscape Teams j
Protected Landscape Areas
landscape parks
surroundings of landscape parks
|:ecological corridors

Source: Develop your own.

National parks

At a distance of up to 2 km from the analysed sections LK 201, 214, 229 and two planned for the construction of the interconnectors, no national parks or their envelopes were identified. The closest is the "Bory Tucholskie" National Park, along with its surroundings, more than 37 km away from the projected investment.

Landscape parks

At a distance of up to 2 km from the analysed sections LK 201, 214, 229 and two interconnectors two landscape parks (Kaszubski Landscape Park, Tri-City Landscape Park) were located.

The *Tri-City Landscape Park (TPK)* was created in 1979. The current area of the park is 19930 hectares, while the surrounding area is 16 542 ha. The purpose of creating a landscape park is to protect and popularise natural, historical and cultural values in conditions of rational management. The whole of TPK consists of two extensive forest complexes in the area of the moraine highland of the Kashubian Lake

District and its edge zone, separated by the urbanised areas of Wielki Kacka, Małego Kacka and Gdynia Dąbrowa. The northern complex includes parts of Gdynia, Rumi, Szemud and Wejherowo, while the southern complex is twice smaller – parts of Gdynia, Sopot and Gdańsk. One of the most valuable natural qualities of the park is the unique post-glacial landscape, formed by processes related to Baltic glaciation, especially its (last) Pomeranian phase.

An estimated 850 species of vascular flora of the park identified more than 40 species subject to species protection, as well as a number of other notable species – rare, relic, mountainous. Of these, 86 species are endangered in Western Pomerania and 23 are among the endangered species in Poland. These are: single-flowered wharf, water elisma, peat violet, Swedish apple, related IF, Siberian cutter, Fuchs cuckoo, blood cuckoo, spotted cuckoo, lake lobelia, seaberry raspberry, marinade suspicion, lake raspberries, barbed sprouts, long-leaved pouches, round-leaved pouches, large-fruit lashes, floating salvnia, mud orchid, forest turf, scented turf, swamp swamp swamp and turf woolen. The greatest floral peculiarity of TPK is the site of barbed porch in the lobel lakes of the "Pełcznica" reserve, which is the last real refuge of this species south of the Baltic Sea. Within the limits of the park, 150 species of birds were found, of which 122 are breeding species. Among the latter, it is worth mentioning the rarest species of birds of prey: in the park nests, among others, our largest, coat of arms predator – eagle and ore kania. The smaller representatives of bird predators enter the nests more often: hawks, crocots, gerbils and bumblebees. Of the 11 species of amphibians and 5 reptile species observed in the park, the following are rarer and more endangered: lowland puppy, toad stripe, tree river, earth crest, common cover and zigzag viper.

The Tri-City Landscape Park does not have an approved conservation plan.

Kashubian Landscape Park covers the central ethnic area of Kashubian, located on the Kashubian Lake District. The area of the NCP is 33202 hectares, the majority of which is 16 712 ha (50.3 %), followed by forests 11 230 ha (33.8 %) and water 3 430 ha (10.3 %). The surrounding area of the park covers an area of 32494 hectares. It surrounds almost the entire park, lacking it in two places: on the section of the border of the Park with the border of Kartuzy and northwest of the Park in the municipality of Cewice. The vascular flora of the Park, as a result of the very wide variety of habitats found here, is very diverse and rich in species and communities. It is estimated to be 700-800 species (all over Western Pomerania – approx. 1600 p.m.). Relatively late deforestation, moderate anthropopression and extensive management contributed to maintaining a relatively high degree of naturalness of the area's flora. The regional and local climate of the Kashubian Lake District influences the occurrence of specific flora, distinguished by the participation of mountainous and sub-mountain species, e.g. birch tojads, ribbons, giant horsetail, round cork, lilac goat, mountain trawler, pyramidal sprinkler, grove manna, forest oblivion and glacier relics, such as: common larch, medical mildew, black pheasant, swamp, northern mushrooming, blue polygae. The list of legally protected, endangered and rare plants includes 190 species (of which 43 species are under total protection). 135 bird species were recorded in the NCP area, including 77 nesting species. One of the most valuable species are wet – nobility and nurogjah and hair owl. On peat bogs and dystrophic lakes nest: a cyan, a crane and a loner, and on the planers – mountain plix and winterfish, there is also a fleeting plush. In the park, 10 species were found, while reptiles 5 species (including increasingly rare zigzags).

Kashubian Landscape Park does not have an approved protection plan.

Tab.36 List of landscape parks located within 2 km from the extreme axis of the designed track.

Protected area	Basis for creation and operation	Subject-matter of protection	Line No	Line page	Mileage [km]	Distance from line/intersection length [m]
Kashubian Landscape Park	Ordinance No 5/94 of the Governor of Gdańsk of 8 November 1994 on the demarcation of protected landscape areas, the definition of the boundaries of landscape parks and the demarcation of envelopes around them, and the introduction of prohibitions and borders applicable therein; Ordinance No 54/06 of the Pomeranian Governor of 15 May 2006 on the Kashubian Landscape Park; Resolution No 445/XLII/17Pomeranian Voivodeship Sejm of 21 December 2017 amending the resolution of the Sejm of the Pomeranian Voivodeship on the Kashubian Landscape Park	The purpose of protection is to preserve the specificity of the terrain – moraine hills, river valleys and lake gutters and glacial meltings	201	L	The railway line is the border of the protected area, from km 145,617 to km 149,471	
				Intersection	Intersection from km 149,471 to km 156,012	6541
				L	The railway line is the border of the protected area, from km 145,617 to km 149,471	
			214	L	5,699	950
			Interconnector 214 and	L	8,150	3354
Tricity Landscape Park – Otulina	Ordinance No 5/94 of the Governor of Gdańsk of 8 November 1994 on the designation of protected landscape areas, the definition of the boundaries of landscape parks and the demarcation of envelopes around them, and the introduction of prohibitions and restrictions in force therein; Regulation No 57/06 of the Pomeranian Governor of 15 May 2006 on the Tri-City Landscape Park; Resolution No 263/XXIV/16 of the Pomeranian Voivodeship Sejm of 25 July 2016 amending the resolution of the Sejm of the Pomeranian Voivodeship on the Tri-City Landscape Park	The aim of the protection is to preserve a complex of forms of terrain of the edge zone of the moraine highland, which is a morphological unique on the European scale, lobel lakes and watercourses with a sub-mountain character	201	Intersection	Intersection from km 188,300 to km 196,680	8000
Tricity Landscape Park			201	Intersection	Intersection from km 196,680 to km 198,880	2200
				L	202,500	327

Source: own development

Nature reserves

At a distance of up to 2 km from the analysed sections LK 201, 214, 229 and two junctions in variants W1 and W2, 9 nature reserves were located. Two of them: Kacze Łęgi and Jar Rzeki Raduni are directly adjacent to the course of line 201.

TheJar Rzeki Raduni Reserve is located within the range of an inventoryed buffer of 2x150 m. It is located at a distance of 21 m from the railway axis No 201 – the closest point in km 172,906 LK 201. Located on the eastern edge of the Kashubian Lake District. It was created in 1972 on an area of 84.24 hectares. The protected area is a section of the turn of Radunia, called the Babydolski Breakthrough, through the moraine hills (the phenomenon of erosion) with overgrown slopes and overgrown slopes. There is also a vegetation of a sub-mountain nature. The purpose of nature conservation of the Jar Rzeki Raduni reserve is to preserve the unique ecosystems of the landmark section of the Raduni River, including the complex of gravel and alpine forests, rivers of a mountainous nature, lobes of extensively used meadows, one of the richest mountain sites of flora and fauna and an important refuge of saproxylbionts. It was also recognised as a Natura 2000 site. Forests occupy 80 % of the area. The tree stands are common pine, accompanied by oak, spruce, rake, poplar, black alder, gray alder.

The 2012 conservation plan is currently in force, available on the website of the Regional Directorate for Environmental Protection in Gdańsk, approved by Order No 28/2012 of the RDOŚ in Gdańsk.

According to the above-mentioned protection plan (par. 2 par. 1) The purpose of nature conservation of the Jar Rzeki Raduni reserve is to preserve the unique ecosystems of the landmark section of the Raduni River, including the complex of gravel and riparian forests, rivers of mountainous nature, lobes of extensively used meadows, one of the richest mountain sites of flora and fauna and an important refuge of saproxylbionts.

Natural and social conditions for the achievement of the objective referred to in paragraph 1. 1 above, are:

1) conservation of natural habitats listed in Annex I of the Habitats Directive: 9160 – sub-Atlantic grotto (Stellario holosteae-Carpinetum betuli), 91EO-3 – low ash and alder (Fraxino-Alnetum), 91FO-1 – typical ash lignite (Ficario Ulmetum typicum), 6510 fresh meadows extensively used;
2) preservation of sites of unique flora, mycobiotics and fauna, including 141 strictly protected species;
3) location in the Natura 2000 area Jar Rzeki Raduni PLH220011;
4) maintaining the dynamics of slope and fluvial processes (river erosion, landslides, stubbles, alluvial accumulation) of the Raduni river;
5) anthropophobia related to tourism and recreation, including canoeing;
6) presence of private land in the reserve.

According to the conservation plan, the risks to the reserve are:

- destruction and trampling of land, mechanical destruction of vegetal communities and groups of bentos of the Raduni River (including species from Annex II of the Habitats Directive – coarse-ruple collar and green flap larvae) and frightening birds during the breeding season by canoeing.
- the disappearance of fresh meadows (as a result of cessation of use) together with the sites of rare plants and animals, as a result of natural succession.
- the occurrence of pine and spruce in the stands of the reserve resulting in the degradation of mesophilic forest habitats (especially grits).
- poor forest management in the surroundings of the reserve.
- dredging the bottom of the Raduni River, modifying the banks, removing stones and dead wood lying in the bed.
- pollution of the Raduni River (wastewater).
- change in the level of water impoundment at the hydroelectric power plant in Rutek.

In a couple. 12 of this conservation plan set out the arrangements for LK 201 cit.: "the*modernisation of the Gdynia- Kościerzyna railway line adjacent to the reserve must not adversely affect the conservation objectives of the reserve; technical, technological solutions should be used* *for the project "Working on an alternative transport route Bydgoszcz – Tri-City, stage I" and organizational organisation guaranteeing protection against environmental pollution and enabling the conservation of protected ecosystems, natural habitats and species, as well as "existing cubature railway facilities (PKP Babi Dół station) and the possible introduction of additional functions within them, cannot be a reason for increasing pressure on the nature reserve*".

The*reserve Kacze Łęgi is* located within the range of an inventoryed buffer of 2x150 m. It is located about 9 m from the axis of railway line No 201 at an altitude of km 198,200 – 199,100. The forest and floristic reserve with an area of 8.97 hectares was established in 1983, located in the valley of the Kacza River in the Tri-City Landscape Park, in the area of Krykulec (part of the Mały Kack district). It includes a part of the forest valley of Kacz Potok, also known as the Duck River, which cuts the edge of the moraine highland in the vicinity of Gdynia. It protects a well-preserved bundle with a magnificent stand and a rich rune. Among the trees, black alder and ash are the leading role. 210 species of vascular plants were found in the reserve area. Noteworthy is a relatively large number of mountain-mountain plants. It grows here, among others, a red blink, a lilac goat, a mountain rollover and a grove sink. The natural value of the reserve is emphasised by the presence of 6 species on the list of dying and endangered vascular plants of Western Pomerania and Wielkopolska, these are: lizard goat, mountain trawler, grove sorrel, drip pond, forest cane and onion resin.

The reserve does not have an up-to-date security plan.

Kępa Redłowska Nature Reserve was established by the Pomeranian Voivodeship Regulation No 49/2001 of 23 March 2001 on the recognition of the area on Kępa Radłowska as a nature reserve (Dz. U. Woj. Pomeranian of 26 March 2001 No 27 item 283). The limits of the reserve, in the nearest place, are located just over 1 km from LK 201.

This Nature Reserve is located within the administrative boundaries of the city of Gdynia. It is the oldest (created in 1938) and the largest (its area is 118.16 ha) nature reserve in Gdynia. It is located between Stone Mountain and Orlov. Within this strictly protected area there is Klif Orłowski. In the reserve, beech forests are protected, especially valuable old-growth trees, as well as the position of the Swedish yoke, which is a relic from the time of the last glaciation.

The 2010 conservation plan is currently in force (Regulation No 6/2010 of the Regional Director of Environmental Protection in Gdańsk concerning the establishment of a conservation plan for the nature reserve "Kępa Redłowska" of 7 April 2010).

According to the above-mentioned protection plan (par. 2 par. 1) The purpose of nature conservation in the reserve is to preserve the natural and semi-natural seaside landscape, the glacial clump of the moraine highland, the processes taking place on the seashore, as well as the plant communities of the cliff and the moraine highland, as well as valuable species of flora, fauna and fungi, especially the Sorbus intermedia Swedish yoke.

Natural and social conditions for the achievement of the objective referred to in paragraph 1. 1 above, are:

1) preservation of the natural and semi-natural landscape of Kępa Redłowska and remains similar to natural plant communities and natural habitats: 1230 – cliffs of the Baltic coast, 9110 – sour beech, 9130 – fertile beech, 9160 – sub-Atlantic game; 2110 – initial stages of the coastal white dunes;
2) location of the reserve in the urban agglomeration of the Tri-City;
3) excessive penetration of the reservation;
4) isolation of the reserve from the natural environment;
5) the location of the reserve in the coastal zone, within the zone of the sea's impact on the natural environment of the land;
6) presence in the cliff shore reserve, including active cliffs in various forms, together with a complex of geomorphological and biological processes taking place there;
7) use of part of the reserve by the military;
8) the presence of historical objects – remains of the 11st Permanent Artillery Battery in Gdynia.

The threats to the reserve listed in the security plan do not relate to pressure from the railway.

TheŁęg nad Swelina Nature Reserve was established by the Pomeranian Voivodeship Regulation No. 11/2005 of 20 June 2005 on the recognition of Łęg nad Swelina as a nature reserve (Dz. U. Woj. Pomeranian of 7.7.2005 No 66 item 1236). The limits of the reserve, in the nearest place, are located about 1.5 km from LK 201.

The forest nature reserve with an area of 13.4 hectares is located within the boundaries of the Tri-City Landscape Park. The main conservation facility for areas with well-preserved and diverse terrain and phytocenosis communities of ash-olsz, grits and meadow and spring ecosystems. Around 200 vascular plant species have been found in the reserve, seven of which are under strict protection and five of them are partially protected.

The reserve does not have an up-to-date security plan.

TheOld Modrzewie Nature Reserve was established by the Order of the Minister of Forestry of 11 March 1954 on recognition as a nature reserve (MP No A-30poz 443). The nature reserve is located in the Kashubian Lake District with a total area of 4.85 hectares. It is located about 920 m from LK 229 (the reserve is located between LK 214 and LK229).

The main protective facility in the reserve are fragments of mixed forests with over 200-year-old Polish larchs, of which the largest of them has as much as 4.2 m perimeter.

The reserve does not have an up-to-date security plan.

Zamkowa Góra Nature Reserve was established by the Order of the Minister of Forestry of 11 March 1954 on recognition as a nature reserve (MP No. A-30 item. 446). The limits of the reserve, in the nearest place, are located about 1.6 km from LK 214.

The nature reserve is located on the outskirts of the Kashubian Landscape Park with a total area of 8.75 hectares. The main protective object are fragments of lowland beech – fertile and acidic (poor) with a large share of trees up to the age of 250 years.

The reserve does not have an up-to-date security plan.

TheOstrzycki Forest Nature Reserve is located in the Kashubian Landscape Park, on the western shore of Ostrzycki Lake, with a total area of 55.13 hectares. The limits of the reserve, in the nearest place, are located about 400 m from LK 201. It was created in 1960.

The main conservation facility are the areas forming forest communities, composed mainly of lowland beeches – fertile and acidic, and a small fragment of non-calcium beech, educated on board the lake chalk. More than 400 vascular plant species were found in the reserve.

The 2015 conservation plan is currently in force (RDOŚ Regulation 1747 RDOŚ of 14 May 2015 on the establishment of a conservation plan for the Ostrzycki Las nature reserve).

According to par. 2 par. 1 of the conservation plan, the purpose of nature conservation in the reserve is to preserve forest, peat and spring ecosystems, in particular the Kashubian humid limestone beech and the orchid population including the common Cypripedium calceolus footwear.

Natural and social conditions for the achievement of the objective referred to in paragraph 1. 1, shall be:

1) conservation of natural habitats of Annex I to the Habitats Directive (2): 9110 – Luzulo-Fagetum sour beeches, 9130 – fertile beeches Dentario glandulosae-Fagenion, Galio odorati-Fagenion, 9150-4 – Kashubian orchid beech (Fagus sylvatica-Cypripedium calceolus);
2) maintenance of the sites of the species listed in Annex II of the Habitats Directive, i.e. Footwear of common Cypripedium calceolus;
3) location of the reserve in the Natura 2000 area Uroczyska Pojezierza Kaszubskiego PLH220095;
4) location on the shore of Ostrzycki Lake, widely used recreationally;
5) presence of rare and protected species of vascular plants, lichens, fouling fungi, aphids and large-fruit fungi;
6) presence of rare and protected species of animals.

Threats to the reserve are, among others, a potential change of use on plots adjacent to the reserve.

Thetower on the Kashubian Lake District was established by the Order of the Minister of Forestry and Wood Industry of 31.1.1962 on recognition as a nature reserve (MP No. 30 item. 136). The limits of the reserve, in the nearest place, are about 625 m from LK 201.

Nature reserve located in the apricot band of the leading Szymbarski Hills on the Tower and its slopes, with a total area of 33.59 hectares. It is also a landscape reserve. It was created in 1962. The main conservation facility is a fragment of the beech forest at the top of the Tower at the age of 120 – 160 years old.

The reserve does not have an up-to-date security plan.

TheStrzelnica Nature Reserve was established by the Order of the Minister of Forestry and Wood Industry of 15.12.1980 on recognition as a nature reserve (MP No. 30 item. 171). The limits of the reserve, in the nearest place, are located almost 1.4 km from LK 201.

Nature reserve located in the Kashubian Lake District, with a total area of 3.55 hectares. The main protective facility here are old trees of a natural nature with the concentration of monumental trees. The stands also build 120-210 year old peduncle oaks and stitched oaks, as well as 180-year-old beech and pine trees.

The reserve does not have an up-to-date security plan.

Tab.37 List of reserves located within 2 km from the extreme axis of the designed track.

Protected area	Basis for creation and operation	Subject-matter of protection	Line No	Line page	Mileage [km]	Distance from line/intersection length [m]
The Jar of the Raduni River	Order of the Minister of Forestry and Wood Industry of 23 June 1972 on the recognition as nature reserves; Notice of the Pomeranian Voivodeship of 10 October 2001 on the list of nature reserves of the Pomeranian Voivodeship established before 31 December 1998; Ordinance of the Regional Director of Environmental Protection in Gdańsk of 9 April 2014 on the designation of a route made available for pedestrian traffic in the "Jar Rzeki Raduni" nature reserve	The purpose of nature conservation of the reserve is to preserve the unique ecosystems of the landmark section of the Raduni River, including the complex of gravel and alpine forests, rivers of mountainous nature, lobes of extensively used meadows, one of the richest mountain sites of flora and fauna and an important refuge of saproxylbionts	201	P	172,544	37
			201	P	172,906	21
			201	P	173,541	35
Ducks of Łęgi	Ordinance of the Minister of Forestry and Wood Industry of 22 April 1983 on the recognition as nature reserves; Notice of the Pomeranian Voivodeship of 10 October 2001 on the list of nature reserves of the Pomeranian Voivodeship established before 31 December 1998; Ordinance of the Regional Director of Environmental Protection in Gdańsk of 13 March 2015 on the designation of routes made available for pedestrian and cycling traffic and the indication of the road for vehicle traffic in the "Kacze Łęgi" nature reserve	The purpose of protection is to preserve a bundle with many monumental trees.	201	P	198,522	9
The Ostrzycki Forest	Order of the Minister of Forestry and Wood Industry of 1 February 1960 on the recognition as a nature reserve; Notice of the Pomeranian Voivodeship of 10 October 2001 on the list of nature reserves of the Pomeranian Voivodeship established before 31 December 1998; Ordinance of the Regional Director of Environmental Protection in Gdańsk of 1 July 2014 on the nature reserve "Ostrzycki Las"	The purpose of conservation in the reserve is to preserve forest, peat and spring ecosystems, in particular the Kashubian humid calcareous beech and the population of orchids, including common footwear *Cypripedium calceolus*	201	L	154,172	411

Protected area	Basis for creation and operation	Subject-matter of protection	Line No	Line page	Mileage [km]	Distance from line/intersection length [m]
Top of the Tower in the Kashubian Lake District	Order of the Minister of Forestry and Wood Industry of 31 January 1962 on recognition as a nature reserve; Ordinance of the Regional Director of Environmental Protection in Gdańsk of 9 April 2014 on the designation of the route made available for pedestrian traffic in the nature reserve "Base Wieżyca na Pojezierzu Kaszubskie"; Notice of the Pomeranian Voivodeship of 10 October 2001 on the list of nature reserves of the Pomeranian Voivodeship established before 31 December 1998	The purpose of protection is to preserve, for educational and social reasons, the fragment of the natural beech forest at the highest culmination of Pomerania	201	P	155,430	625
The Old Larches	Order of the Minister of Forestry of 11 March 1954 on recognition as a nature reserve; Notice of the Pomeranian Voivodeship of 10 October 2001 on the list of nature reserves of the Pomeranian Voivodeship established before 31 December 1998; Ordinance of the Regional Director of Environmental Protection in Gdańsk of June 6, 2014 on the designation of a route made available for pedestrian traffic in the "Stare Modrzewie" nature reserve	The purpose of conservation is to preserve, for scientific and didactic reasons, a fragment of a forest mixed with old larchs.	229	L	38,700	920
Kępa Redłowska	Ordinance of the Pomeranian Governor of 29 July 1938 on the conservation of nature creations in the area of Kępa Redłowska in Gdynia; Ordinance No 49/2001 of the Pomeranian Governor of 23 March 2001 on the recognition of the area in Kępa Redłowska in Gdynia as a nature reserve; Order No 23/2001 of the Pomeranian Governor of 7 February 2001 on the recognition of the area in Kępa Redłowska in Gdynia as a nature reserve	The purpose of conservation is to preserve the unique landscape of the cliff coast with a complex of beech forests, specific natural processes taking place at the intersection of land and sea, natural plant communities and sites of rare plant species, including the Swedish yoke (*Sorbus intermedia*) which is a relic of the Ice Age	201	P	202,117	1263
Shooting range	Notice of the Pomeranian Governor of 10 October 2001 on the list	The purpose of conservation in the reserve is to preserve the forest ecosystem	201	L	139,194	1364

Protected area	Basis for creation and operation	Subject-matter of protection	Line No	Line page	Mileage [km]	Distance from line/intersection length [m]
	nature reserves of the Pomeranian Voivodeship established before 31 December 1998; Order of the Minister of Forestry and Wood Industry of 15 December 1980 on the recognition as nature reserves; Ordinance of the Regional Director of Environmental Protection in Gdańsk of 27 December 2017 on the "Strzelnica" nature reserve;	its characteristic biocenoses and populations of valuable plant, fungi and animal species.				
Lęg over Swelina	Ordinance No 11/2005 of the Pomeranian Governor of 20 June 2005 on the recognition of "Lag nad Swelina" as a nature reserve	The purpose of the conservation of the reserve is to preserve the forests of the Swelinia stream and the sites of protected and rare species.	201	P	195,402	1504
Castle Mountain	Order of the Minister of Forestry of 11 March 1954 on recognition as a nature reserve; Notice of the Pomeranian Voivodeship of 10 October 2001 on the list of nature reserves of the Pomeranian Voivodeship established before 31 December 1998;	The reserve is created to preserve, for scientific, didactic and social reasons, a fragment of the beech forest with the characteristics of the natural complex.	214	L	5,270	1622

Source: own development

Protected Landscape Areas

The project will also cut through two protected landscape areas: Protected Landscape Area of Radunia Valley and Kartuski Protected Landscape Area. They are located up to 2 km from the analysed sections LK 201, 214, 229 and two interconnectors.

Carthusian Protected Landscape Area with a total area of 6 661 ha. This area is crossed four times by the analysed lines, once by LK 201, once by LK 214, once by LK 229 and once by the planned interconnector between LK 214 and LK 229. It is characterised by large declines in terrain and variability of forms. Most of the surface is occupied by demersal morins: hilly and wavy, slightly less – apricot frontal. There are numerous smelters occupied by large lakes or small ponds. A significant part of the area is covered by forests, mainly beech and mixed with artificially introduced pine or spruce. In the forest jams of the terrain there are borons and swamps.

The Protected Landscape of Radunia Valley is crossed four times by the analysed lines, twice by LK 201, once by LK 214 and once by LK 229. This area includes the bottom and slopes of the Raduni River valley and directly adjacent forest and agricultural areas. It was created to protect against the erosion of the steep banks of the Raduni River and to maintain and improve the purity of its water. Part of the river valley has the character of a watercourse with submountain features with numerous swimming pools and breakthroughs with a well-preserved zonal arrangement of forest communities. The total area of this area is 3 340 ha, of which 925 hectares are within the boundaries of the district of Gdańsk.

Tab.38 List of protected landscape areas located up to 2 km from the extreme axis of the projected track.

Protected area	Basis for creation and operation	Subject-matter of protection	Line No	Line page	Beginning of intersection	End of intersection [km]	Intersection length [m]
Protected Landscape of the Raduni Valley	Regulation No 66/05 of the Pomeranian Voivodeship of 24 March 2005 on protected landscape areas in the Pomeranian Voivodeship; Regulation No 23/07 of the Pomeranian Voivodeship of 6 July 2007 amending the Regulation on protected landscape areas in the Pomeranian Voivodeship; Resolution No 1161/XLVII/10 of the Pomeranian Regional Assembly of 28 April 2010 on protected landscape areas in the Pomeranian Voivodeship; Resolution No 259/XXIV/16 of the Pomeranian Voivodeship Sejm of 25 July 2016 on protected landscape areas in the Pomeranian Voivodeship	The subject of protection is the valley of the river Raduni, which is the hydrographic and landscape axis of the area with directly adjacent areas.	201	Intersection	160,822	173,818	12 996
					175,286	175,351	65
			214		0,229	0,874	645
			229		31,917	31,927	10
Carthusian Protected Landscape Area	Regulation No 66/05 of the Pomeranian Voivodeship of 24 March 2005 on protected landscape areas in the Pomeranian Voivodeship; Regulation No 23/07 of the Pomeranian Voivodeship of 6 July 2007 amending the Regulation on protected landscape areas in the Pomeranian Voivodeship; Resolution No 1161/XLVII/10 of the Pomeranian Regional Assembly of 28 April 2010 on protected landscape areas in the Pomeranian Voivodeship; Resolution No 259/XXIV/16 of the Sejm Pomorskie Voivodeship of 25 July 2016 on protected landscape areas in Pomorskie Voivodeship	The subject of protection is the distinctive landscape of the bottom and the frontal moraine with numerous lakes acting as ecological corridors	201	Intersection	163,677	173,818	10 141
			214		0,874	6,230	5 356
			229		31,925	40,519	8 594
			Switches 214 and 229		8,300	11,400	3 100

Source: own development

Natura 2000 sites

Within a radius of 2 km from the analysed sections of the railway lines, there are 6 Natura 2000 sites:

- Puck Bay Special Protection Area – PLB220005,
- SpecialLeniec nad Wierzyca Habitats Protection Area – PLH220073,
- SpecialArea of protection of settlements Uroczyska Pojezierza Kaszubskiego —PLH220095,
- SpecialHabitat Protection Area Jar Rzeki Raduni – PLH220011,
- SpecialProtection Area for Klify and Stone Reefs Orlow – PLH220105,
- SpecialProkowo Habitats Protection Area – PLH220080.

The planned investment will be crossed by the Special Area for the Protection of the Kaszubskie Lake District. In addition, within a distance of 21-37 m from the investment there is a Special Area for the Protection of Habitats Jar Rzeki Raduni.

Special Area for the Protection of Habitats Jar Rzeki Raduni – PLH220011 – railway line No. 201 is located in close proximity (21-37 m) to the area Jar Rzeki Raduni PLH220011 in three places: km 172,544, km 172,906 and km 173,541. The area includes a landmark section of the Raduni River. The river flows through the bottom of a stony spring, creating meanders. The valley and steep slopes (up to 45°) up to 40 m high, are overgrown with a deciduous forest (land, rim); there are wet meadows at the bottom of the ravine. Many mountain plants and other rare species grow here. Ostoja has a specific microclimate, with high humidity and lower temperatures compared to adjacent areas. The breakthrough of the river is divided by a vast forest complex, which is dominated by graveyard habitats. There are 7 habitat types in Annex I to Council Directive 92/43/EEC. Among them are forests of natural nature, growing slopes of the ravine. There are also three species in Annex II to Council Directive 92/43/EEC. The area is characterised by high floral qualities. 537 vascular plant species were found here, including rare and endangered and legally protected species in Poland. The Standard Data Form does not indicate the railway line as a threat to the area. The area entirely located in the Raduni Valley Protected Landscape Area (3 556.7 ha; 1994) within the limits of the nature reserve Jar of the river Raduni (84.24 ha, 1972).

According to information obtained from the Regional Directorate for Environmental Protection in Gdańsk, this area does not have a plan of conservation tasks. However, the conservation plan of the reserve approved by Regulation No 28/2012 of the RDOŚ in GdańskI.

The following tables detail the objects of the Natura 2000 site Jar Rzeki Raduni – PLH220011.

Tab. 39 Objects of protection of the Natura 2000 site Jar Rzeki Raduni – PLH220011 habitats listed in Annex I of the Habitats Directive.

Subject-matter of protection			Area assessment			
Code	**Habitat name**	**Cover [ha]**	**The Representationof Tyre ***	**Relative area ** **	**State of Behaviour *****	**Overall assessment *******
6430	mountain herbs	0,88	A	C	A	C
9160	the Sub-Atlantic Game	45,17	C	C	C	C
91E0	willow, poplar, alder and ash fields	1,49	B	C	B	B
Subject-matter of protection			**Area assessment**			

IIn accordance with Article 20(1). 5 of the Nature Conservation Act of 16 April 2004: "*Conservation plans for a national park, nature reserve or landscape park in the part overlapping with a Natura 2000 site should take into account the scope of the conservation plan for a Natura 2000 site referred to in Article 28 or the scope of the conservation plan for a Natura 2000 site referred to in Article 29*."

Code	Habitat name	Cover [ha]	The Representati onof Tyre *	Relative area **	State of Behaviour ***	Overall assessment ****
91F0	algae forests of oak, beam and ash	0,96	B	C	B	B

Markings: *Representative: A: excellent, B: all right, C: significant, D: insignificant, **Relative area: A: 100 % ≥ p > 15 %, B: 15 % ≥ p > 2 %, C: 2 % ≥ p > 0 %, ***State of behavior: A: excellent, B: good, C: average or degraded, ****General assessment: A: excellent, B: all right, C: it's significant.
Source: Natura 2000 Standard Data Form Jar Rzeki Raduni – PLH220011.

Tab.40. Objects of protection of the Natura 2000 site Jar Rzeki Raduni – PLH220011 species listed in Annex II of the Habitats Directive.

Subject-matter of protection			Area assessment			
Code	Polish name	Latin name	Population*	State of Behaviour**	Insulation ***	Overall ****
1032	Coarse scrub	*Unio crassus*	C	C	C	C

Markings: *Evaluation of Population: A: 100 % ≥ p > 15 %, B: 15 % ≥ p > 2 %, C: 2 % ≥ p > 0 %, D: negligible population, **State of behaviour; A: excellent; B: good; C: medium or degraded, ***Insulation; A: population (almost) isolated, B: non-isolated population but occurring at the periphery of the range of the species, C: non-isolated population within a wide range of prevalence, ****General assessment: A: excellent; B: good; C: it's significant.
Source: Natura 2000 Standard Data Form Jar Rzeki Raduni – PLH220011.

Threats:

- lack of cover,
- logging forest management,
- synanthropisation of flora,
- there is too much tourist pressure.

Special Area for the Protection of Habitats Uroczyska Pojezierza Kaszubskiego – PLH220095 – railway line No. 201 crosses the area from km 145,619 to km 158,124, i.e. about 12.5 km long. In addition, the line runs at a distance of about 20-50 m from the axis (in the range of the inventory buffer) on section 158,140 – 158,300. Ostoja is located in the central, highest part of the Kashubian Lake District, with a typical youthful terrain. It includes a complex of extensive valley forms called glacier gutters with lakes filling their deepest places, fragments of highlands (morena leading marginal zone, seam) and fragments of sandy areas. The area in question is the highest elevated area in the entire Pomorskie Lake District and in the whole of Poland. The highest are the so-called Szymbarskie hills, where the "peak" of the Tower (the highest in the whole Central European lowland) reaches the height of 329.5 m above sea level. Due to the proximity of the highest elevations of lakes and deep-cut glacier gutters, we are dealing here with very large, lowland conditions, denivelations reaching up to 160 meters and a very diverse terrain. The vegetation of the area is highly diverse – with many rare plant complexes and rich flora, in which numerous endangered species are present.

According to information obtained from the Regional Directorate for Environmental Protection in Gdańsk, this area does not have a plan of conservation tasks.

There were 19 habitat types listed in Annex I of the Habitats Directive and two species of vascular plants listed in Annex II of the Habitats Directive – footwear and lipiennik. Four species of vertebrate animals listed in Annex II of the Habitats Directive were found in the charming area – otter, mud, goat, crest pot.

The following tables detail the conservation objects of the Natura 2000 site Uroczyska Pojezierza Kaszubskiego – PLH220095.

Tab.41. Objects of protection of the Natura 2000 site Uroczyska Pojezierza Kaszubskiego PLH220095 habitats listed in Annex I to the Habitats Directive.

Subject-matter of protection			Area assessment			
Code	**Habitat name**	**Cover [ha]**	**The Representationof Tyre ***	**Relative area ****	**State of Behaviour *****	**Overall assessment *******
3140	hard-water oligo- and mesotrophic reservoirs with Charetea underwater *meadows*	17,13	B	C	B	B
3150	ancient and natural eutrophic reservoirs with communities from *Nympheion, Potamion*	38,46	B	C	B	B
3160	natural dystrophic water reservoirs	1,45	B	C	B	C
4030	dry heaths	1,0	C	C	C	C
6230	mountain and non-tertiary twin turfs	1,63	B	C	C	C
6510	lowland and mountain fresh meadows used extensively	0,55	C	C	C	C
7110	high peat bogs with peat-forming vegetation (live)	1,19	C	C	B	C
7140	transitional bogs and quakes	43,07	A	C	B	B
7230	mountain and lowland alkaline peat bogs with the character of hammers, sledges and mechowices	12,69	B	C	B	C
9110	sour buoys	171,42	A	C	B	B
9130	fertile beech	284,23	A	C	B	B
9150	thermophilic orchid boulevards	24,59	A	C	B	A
9160	the Sub-Atlantic Game	16,02	A	C	B	C
9190	Pomeranian sour birch-oak forest	10,96	B	C	C	C
91D0	boars and swamp forests and birch-drawn boreal forests	11,16	B	C	B	C
91E0	willow, poplar, alder and ash fields	36,9	B	C	B	B

Markings: *Representative: A: excellent, B: all right, C: significant, D: insignificant, **Relative area: A: 100 % ≥ p > 15 %, B: 15 % ≥ p > 2 %, C: 2 % ≥ p > 0 %, ***Condition of behavior: A: excellent, B: good, C: average or degraded, ****Overall assessment: A: excellent, B: all right, C: it's significant.
Source: Standard Data Form of the Kaszubskie Lake District Natura 2000 – PLH220095

Tab.42. Objects of protection of the Natura 2000 site Uroczyska Pojezierza Kaszubskiego PLH220095 species listed in Annex II of the Habitats Directive.

Subject-matter of protection			Area assessment			
Code	Polish name	Latin name	Population*	State of Behaviour**	Insulation ***	Overall ****
1149	Common goat	*Cobitis taenia*	C	C	C	C
1902	Common footwear	*Cypripedium calceolus*	C	A	B	B
1393	Shiny Sierpowiec	*Drepanocladus vernicosus*	C	C	C	C
1903	Lipiennik Loesela	*Liparis loeselii*	C	B	C	C
1355	European otter	*Lutra Lutra*	C	B	C	C
1037	Green beech	*Ophiogomphus cecilia*	C	B	C	B
4009	Mud steep	*Phoxinus percnurus*	C	B	A	B
1166	Crest weed	*Triturus cristatus*	C	C	C	C

Markings: *Assessment of Population: A: 100 % ≥ p > 15 %; B: 15 % ≥ p > 2 %; C: 2 % ≥ p > 0 %; D: negligible population **Condition of behaviour: A: excellent; B: good; C: medium or degraded; ***Insulation: A: the (almost) isolated population; B: population not isolated but occurring at the periphery of the range of the species; C: non-isolated population within a wide range of occurrences; ****Overall assessment: A: excellent; B: good; C: it's significant.
Source: Standard Data Form of the Kaszubskie Lake District Natura 2000 – PLH220095

The main threats to the natural environment in the residential area are[2]:

- unplanned development of settlements and recreational facilities,
- uncontrolled spread of buildings,
- increasing tourism, especially in the summer,
- over-intensive forest management,
- desiccation drains both in meadows and in forests,
- abandonment of mowing-paste use in intensively hydrated areas, with difficult access, while at the same time
- intensification of use in easy-to-access areas,
- pollution of surface and groundwater.

The Natura 2000 area of Pucka Bay – PLB220005 **–** *a*special protection area for birds with an area of 62 430.4 ha has been designated by the Regulation of the Minister of the Environment. It is located about 1 km from LK 201 (in the nearest location in km 203,975).

The area of Puck Bay includes the waters of the western part of the Gulf of Gdańsk, between the coast of the Hel Peninsula in the north, Władysławów to the mouth of the Vistula Śmiała in the west and south, and the line between the mouth of the Vistula Śmiała and the end of Hel from the east. 98 % of the area described is marine.

There are at least 28 species of birds from Annex I to the Birds Directive, 11 species from the Polish Red Book (PCK). Nests more than 1 % of the national population of the variable*runner (Calidris alpina*schinzii) (PCK), collar seedling (PCK) reaches a population of up to 1 % of the national population. Until recently, a battalion was nested here.

[2] Source: http://obszary.natura2000.org.pl/

During the hiking period, at least 1 % of the population of the hiking route of bichrome percose, horned percose, melanoma is present; relatively large concentrations reach: a flashy swan, head, skewer, runner, runner, variable runner, beard of breakfast, head, camouflage, smaller kulik, big mule, oyster, kneader, seedling, collar seedling and slurry. During winter there are at least 1 % of the population of the following bird species: algae, black, belly, nuroge, whey, biscuit percose; relatively large concentrations reach the swan of mute; water and wet birds far exceed the concentrations of 20000 individuals.

According to information obtained from the Regional Directorate for Environmental Protection in Gdańsk, this area does not have a plan of conservation tasks. There is only a draft security plan available at: http://www.umgdy.gov.pl/wp-content/uploads/2014/09/IOW_POIS_ROZPORZADZENIE_ PLB_ZP.pdf

The following table lists the conservation objects of the Natura 2000 site Zatoka Pucka – PLB220005.

Tab.43. Objects of protection of the Natura 2000 Bay of Pucka – PLB220005.

Subject-matter of protection			Area assessment			
Code	**Polish name**	**Latin name**	**Population***	**State of Behaviour****	**Insulation *** **	**Overall *******
A028	Grey cap	*Ardea cinerea*	B	B	C	B
A061	Czernica	*Aythya Fuligula*	B	C	C	C
A062	Ordinary shader	*Aythya Marila*	C	B	C	C
A067	Goose	*Bucephala clangula*	C	C	C	C
A149	Variable Runus	*Calidris alpina*	B	B	A	B
A137	Collar seedling	*Charadrius hiaticula*	C	B	C	C
A038	Swan screaming	*Cygnus cygnus*	C	B	C	C
A036	Swan mute	*Cygnus olor*	C	C	C	C
A125	Common baldness	*Fulica atra*	C	C	C	C
A184	Silver MEWA	*Larus Argentatus*	B	A	C	B
A066	Uhla Ordinary	*Melanitta fusca*	C	C	C	C
A068	Vitiligo	*Mergus albellus*	C	B	C	C
A070	Nurogear	*Mergus merganser*	C	B	C	C
A069	Nobility	*Mergus Serrator*	B	C	A	B
A608	Lemon follicle	*Motacilla citreola*	A	B	A	A
A160	Kulik the Great	*Numenius arquata*	C	C	C	C
A391	The Ordinary Kormoran	*Phalacrocorax carbo sinensis*	C	C	C	C
A005	Perkoz of Two-	*Podiceps cristatus*	C	C	C	C
A195	White-headed tern	*Sterna albifrons*	B	B	C	B
A193	River tern	*Sterna hirundo*	C	C	C	C
A191	Crimson tern	*Sterna sandvicensis*	A	A	B	A
A048	Ohar	*Tadorna Tadorna*	A	A	A	A

Markings: *Assessment of Population: A: 100 % ≥ p > 15 %; B: 15 % ≥ p > 2 %; C: 2 % ≥ p > 0 %; D: negligible population **Condition of behaviour: A: excellent; B: good; C: medium or degraded; ***Insulation: A: the (almost) isolated population; B: population not isolated but occurring at the periphery of the range of the species; C: population
not isolated within a wide range of occurrences; ****Overall assessment: A: excellent; B: good; C: it's significant.
Source: Standard Data Form Natura 2000 Bay of Pucka – PLB220005

Threats[3]:

- discharges of treated urban waste water from the Dębogóra and Swarzewo treatment plants, carrying a large load of biogens,
- works that can be drawn,
- associated with the transfer of sand from the Gulf to the seaside slope of the Hel Peninsula, destroying the flora and fauna of the bottom,
- mass recreation on the Gulf coasts,
- intensive uncontrolled development of water sports in its waters,
- certain forms of fishing,
- static nets.

The Natura 2000 Leniec nad Wierzyca site – PLH220073 **- is a protective**habitat protection area of 25 ha approved by the European Commission Decision. It is located almost 1 km from LK 201 (in the nearest location in km 136,096). This small area is almost entirely covered by coniferous forests, only 4 % are inland waters. Ostoja includes a fragment of the Wierzyca Valley and the banks of Lake Wierzysko and an adjacent forest on the habitat of the sub-Atlantic grotto, with the presence of a cavity with dystrophic meshes and transitional peat bogs. On the river there are meadows, and in the nearby forest there is a position of the flowerless*lane (Thesium*ebracteatum) – 1437.

Bepodwiatkowy Leniec is served only at a few sites in the Pomeranian Voivodeship. Only two sites are protected under Natura 2000. The position over the Creditor has been observed for 27 years. In addition to the forest, habitats are listed in the refuge: 6510 – low and mountain fresh meadows used extensively, 7140 – transitional bogs and quakes and 9160 – sub-Atlantic turf.

The following tables detail the conservation objects of the Natura 2000 Leniec nad Wierzyca site – PLH220073.

Threats to the Natura 2000 site Leniec nad Wierzyca are progressive dehumidification of meadows over Wierzyca, improper mowing and trampling; shedding debris and rubbish.

The plan of conservation tasks was approved for the site (Gdańsk RDOŚ Management of 24 February 2016 amending the Order on the establishment of a conservation task plan for the Natura 2000 site Leniec nad Wierzyca PLH220073).

The following tables detail the conservation objects of the Natura 2000 Leniec nad Wierzyca site – PLH220073.

Tab.44. Objects of protection of the Natura 2000 Leniec nad Wierzyca site – PLH220073 habitats listed in Annex I to the Habitats Directive.

Subject-matter of protection			Area assessment			
Code	**Habitat name**	**Cover [ha]**	**Representative of a-tity ***	**Relative area ****	**State of Behaviour *****	**Overall assessment ******
6510	lowland and mountain fresh meadows used extensively	1.98	C	C	C	C
7140	transitional bogs and quakes	1.7	B	C	B	B
9160	the Sub-Atlantic Game	1.63	C	C	C	C

Markings: *Representative: A: excellent, B: all right, C: significant, D: insignificant, **Relative area: A: 100 % ≥ p > 15 %, B: 15 % ≥ p > 2 %, C: 2 % ≥ p > 0 %, ***Condition of behavior: A: excellent, B: good, C: average or degraded, ****Overall assessment: A: excellent, B: all right, C: it's significant.
Source: Natura 2000 Leniec nad Wierzyca Standard Data Form – PLH220073.

Tab.45. Objects of protection of the Natura 2000 Leniec nad Wierzyca site – PLH220073 species listed in Annex II of the Habitats Directive.

Subject-matter of protection			Area assessment			
Code	**Polish name**	**Latin name**	**The Population of Me***	**State of Behaviour****	**Insulation ***	**Overall******

[5] Source: http://obszary.natura2000.org.pl/

1437	Leniec flowerless	*Thesium ebracteatum*	C	C	A	C

Designation: *Assessment of Population: A: 100 % ≥ p > 15 %; B: 15 % ≥ p > 2 %; C: 2 % ≥ p > 0 %; D: negligible population **Condition of behaviour: A: excellent; B: good; C: medium or degraded; ***Insulation: A: the (almost) isolated population; B: population not isolated but occurring at the periphery of the range of the species; C: non-isolated population within a wide range of occurrences; ****Overall assessment: A: excellent; B: good; C: it's significant.
Source: Natura 2000 Standard Data Form Leniec nad Wierzyca – PLH220073.

Hazards[4]:

- progressive dehumidification of meadows over the Wierzyca causes a weakening of the habitat, which may have a direct impact on the condition of the lazy position,
- the population is partially weakened by annual mowing and trampling (land road runs through the edge of the site),
- one-time drop near debris and rubbish,
- forest management activities could result in the destruction of the population (e.g. a break by a lazy post).

Natura 2000 site Klify and Kamienne Orlow Reef – PLH220105 – a special area of protection of habitats with an area of 335,68 hectares approved by the European Commission Decision. It is located about 1263 from LK 201 (in the nearest place in km 202,118). The area includes fragments of the waters of the Gulf of Gdańsk (the sea area of the entire refuge is 59.5 %) and a fragment of the "Kępa Redłowska" reserve, as well as the Przymorski belt of the Gdańsk-Wejherowski hills. The marine part of the refuge consists of a variety of plant-landscape habitats, where about 200 valuable species of fauna and flora have been found, including perennial fork dwarf, small grandmother, sandcake, snake or rare marine invertebrates, e.g. biscuits. The land part is mainly covered by forest areas on the surface of the moraine highland of Kępa Redłowcka. The Highland ends on the seashore high at 60 m and steep cliffs. Within the limits of the described area, there are intensive processes of abrasion of the cliffs on the coasts of the Gulf of Gdańsk – Cypel Redłowski, measuring about 650 m. Its retreat is estimated at 1 m per year. The cliff slopes are overgrown by dynamic and diverse scrub and forest vegetation. Actions were carried out to protect the shore from abrasion, including the construction of a concrete band in Redłowo (existing since the mid-20th century), underwater thresholds were made in the coastal zone of the Gulf of Gdańsk in Orłowo, and the mouth of the Kacza River at the height of the beach in Orłowo was regulated.

According to information obtained from the Regional Directorate for Environmental Protection in Gdańsk, this area does not have a plan of conservation tasks.

The table below lists the conservation objects of the Natura 2000 site Klify and Reef Kamienne Orłowa – PLH220105.

Tab.46. Objects of protection of the Natura 2000 site Klify and Reef Kamienne Orłowa — PLH220105 habitats listed in Annex I to the Habitats Directive.

Code	Habitat name	Cover [ha]	The Representati onof Tyre *	Relative area **	State of Behaviour ***	Overall assessment ****
1170	reefs	78.29	A	B	A	B
1230	cliffs on the Baltic coast	16.42	A	B	B	B
9110	sour buoys	7.45	B	C	B	B
9130	fertile beech	81.17	B	C	C	B
9160	the Sub-Atlantic Game	9.10	C	C	C	B
9190	Pomeranian sour birch-oak forest	3.96	B	C	C	B

[5] Source: http://obszary.natura2000.org.pl/

91E0	willow, poplar, alder and ash fields	1.38	C	C	C	B

Designation: *Representative: A: excellent, B: all right, C: significant, D: insignificant, **Relative area: A: 100 % ≥ p > 15 %, B: 15 % ≥ p > 2 %, C: 2 % ≥ p > 0 %, ***Condition of behavior: A: excellent, B: good, C: average or degraded, ****Overall assessment: A: excellent, B: all right, C: it's significant.
Source: Standard Data Form Natura 2000 Cliffs and Reefs Orłowa – PLH220105

Hazards[5]:

- filling ditches, there, joints, ponds, swamps or peat,
- paths, hiking trails, cycling trails,
- drowning off the sea coasts and estuating rivers.

Natura 2000 Prokowo – PLH220080 **–** *Special Area* of Conservation of Habitats with an area of 885.64 ha approved by the Decision of the European Commission. It is located almost 2 km from LK 214 (in the nearest location in km 8,150). Ostoja is located in an area with a very diverse sculpture, mainly covered by forests. In its structure it includes the Białe Lake, along with many jagged cavities, e.g. dystrophic reservoirs with habitats of mud steep, and limestone beech sites with the occurrence of common footwear.

The Prokowo area covers the Białe Lake and its entire catchment area. This lake is quite deep (up to a maximum of 31 m) and a large oligotrophic reservoir. A characteristic feature of the lake is crystal clear, almost colourless water. Described water reservoir in very good condition and has high resistance to degradation. The main plant communities are typically underwater species (chamber meadows, which build lakes up to a depth of 8 m). The area around the lake is largely occupied by forest complexes and agricultural land, as well as developing holiday buildings.

In the area of numerous recesses, where transitional peat bogs are located, potorf excavations and ponds are located. In some of them there are hawthorn habitats. Peat bogs are surrounded by swamp wreck lobes and marsh boars. A fairly widespread forest complex is the habitat of the sub-Atlantic game. There is a very valuable forest area with the habitat of Kashubian orchid beech, with the site of several species from the orchid family (especially common footwear). Diversified landscape conditions are conducive to a large variety of species.

Ostoja also contains numerous gutters, covered with moist meadows with very rich flora, with protected species, e.g. European fully or wide-leaved cuckoo.

[5] Source: http://obszary.natura2000.org.pl/

According to information obtained from the Regional Directorate for Environmental Protection in Gdańsk, this area does not have a plan of conservation tasks.

The following tables detail the conservation objects of the Natura 2000 Prokowo – PLH220080.

Tab.47. Objects of protection of the Natura 2000 Prokowo site – PLH220080 habitats listed in Annex I to the Habitats Directive.

Subject-matter of protection			Area assessment			
Code	**Habitat name**	**Cover [ha]**	**The Representationof Tyre ***	**Relative area ****	**State of Behaviour *****	**Overall assessment ******
3140	hard-water oligo- and mesotrophic water reservoirs with underwater meadows	49,91	A	C	A	A
3160	natural dystrophic water reservoirs	0,26	B	C	B	B
6230	mountain and non-tertiary twin turfs	0,06	B	C	B	B
7140	transitional bogs and quakes	4,09	B	C	B	B
9130	fertile beech	45,07	C	C	C	C
9150	thermophilic orchid boulevards	4,42	C	C	C	C
9160	the Sub-Atlantic Game	100,23	C	C	C	C
91D0	boars and swamp forests and birch-drawn boreal forests	15,21	B	C	B	B
91E0	willow, poplar, alder and ash fields	0,53	C	C	C	C

Designation: *Representative: A: excellent, B: all right, C: significant, D: insignificant, **Relative area: A: 100 % ≥ p > 15 %, B: 15 % ≥ p > 2 %, C: 2 % ≥ p > 0 %, ***Condition of behavior: A: excellent, B: good, C: average or degraded, ****Overall assessment: A: excellent, B: all right, C: it's significant.
Source: Natura 2000 Standard Data Form Prokowo – PLH220080.

Tab.48. Objects of protection of the Natura 2000 Prokowo site – PLH220080 species listed in Annex II of the Habitats Directive.

Subject-matter of protection			Area assessment			
Code	**Polish name**	**Latin name**	**Population ***	**State of Behaviour****	**Insulation *****	**Overall ******
4009	Mud steep	*Phoxinus percnurus*	C	B	A	B
1902	Common footwear	*Cypripedium calceolus*	C	B	B	B

Designation: *Population assessment: A: 100 % ≥ p > 15 %; B: 15 % ≥ p > 2 %; C: 2 % ≥ p > 0 %; D: negligible population **Condition of behaviour: A: excellent; B: good; C: medium or degraded; ***Insulation: A: the (almost) isolated population; B: population not isolated but occurring at the periphery of the range of the species; C: non-isolated population within a wide range of occurrences; ****Overall assessment: A: excellent; B: good; C: it's significant.

Source: Natura 2000 Standard Data Form Prokowo – PLH220080.

Threats[6]:

- development of recreational buildings,
- development of single-family construction in the basin of the direct reservoir,
- Along the banks of the river, year-round and summer buildings are developing very intensively. The biggest threat associated with this phenomenon is the possibility of water pollution with sewage, which may result in eutrophication of the reservoir and, consequently, the disappearance of shoulder meadows.
- recreational use of the lake.

A potential threat to the nature of the lake are:

- water fertilisation resulting from the agricultural use of the catchment area: increased soil erosion, intensification of surface run-off, the possibility of fertilising the tank with fertilisers, pesticide contamination,
- mismanagement, overstocking, harvesting with towed nets, feeding, fertilisation,
- possible disappearance of avillous tanks, their inundation, contamination or restocking with predatory species.
- the risks to footwear may be:
  to overshadow the positions, as a result of excessive short-circuiting of the stand and the layer of shrubs,
  for complete unveiling, as a result of the loggers, causing overgrowth with other perennials, limiting the development of this species.

A detailed list of Natura 2000 sites located within 2 km of the railway lines analysed is provided in the table below.

[6] Source: http://obszary.natura2000.org.pl/

Tab.49 List of Natura 2000 sites located up to 2 km from the extreme axis of the projected track.

Area name (name and code)	Form of protection	Quality and Importance	Line No	Line page	Mileage [km]	Distance from line axis/intersection length [m]
Jar Rzeki Raduni PLH220011	Special Area of Protection	The area includes a landmark section of the Raduni River. The valley and steep slopes (up to 45°) up to 40 m high, are overgrown with a deciduous forest (land, perimeter). There are 7 habitat types in Annex I to Council Directive 92/43/EEC. 537 vascular plant species have also been identified, including 3 species in Annex II to Council Directive 92/43/EEC	201	P	172,544	37
				P	172,906	21
				P	173,541	35
Uroczyska Kaszubskie Lake District PLH220095	Special Area of Protection	Ostoja includes a complex of extensive valley forms called glacier gutters with lakes filling their deepest places and fragments of highlands (morena leading marginal zone, bottom moraine) and fragments of sandy areas. There were 19 habitat types listed in Annex I of the Habitats Directive and two species of vascular plants listed in Annex II of the Habitats Directive – footwear and lipiennik. Four species of vertebrate animals listed in Annex II of the Habitats Directive were found in the charming area – otter, mud, goat, crest pot.	201	Intersection	from km 145,619 to km 158,124	12 505
Bay of Pucka PLB220005	Special Protection Area	The area of the Puck Bay includes the waters of the western part of the Gulf of Gdańsk, 98 % of the area described are marine areas. It's okay here. 28 species of birds in Annex I to the Birds Directive, 11 species from the Polish Red Book (PCK). Nests more than 1 % of the national population of the variable*runner (Calidris alpina*schinzii) (PCK), collar seedling (PCK) reaches a population of up to 1 % of the national population	201	P	203,975	1 001
Leniec nad Wierzyca PLH220073	Special Area of Protection	Ostoja includes a fragment of the Wierzyca Valley and the banks of Lake Wierzysko and an adjacent forest on the habitat of the sub-Atlantic grotto, with the presence of a cavity with dystrophic meshes and transitional peat bogs. It is a habitat for a rare species in the Pomeranian voivodeship, Thesium	201	L	136,096	976
Cliffs and Stone Reefs Orłowa PLH220105	Special Area of Protection	The area includes fragments of the waters of the Gulf of Gdańsk (the sea area of the entire refuge is 59.5 %) and a fragment of the "Kępa Redłowska" reserve, as well as the Przymorski belt of the Gdańsk-Wejherowski hills. The marine part of the refuge consists of a variety of plant-landscape habitats with around 200 valuable species of fauna and	201	P	202,116	1 263

Area name (name and code)	Form of protection	Quality and Importance	Line No	Line page	Mileage [km]	Distance from line axis/intersection length [m]
		e.g. long-term dwarf dwarf, small grandmother, sandcake, snake or rare marine invertebrates, e.g. biscuits. The land part is mainly covered by forest areas on the surface of the moraine highland of Kępa Redłowcka				
Prokowo PLH220080	Special Area of Protection	Ostoja is located in an area with a very diverse sculpture, mainly covered by forests. In the area of numerous recesses, where transitional peat bogs are located, potorf excavations and ponds are located. In some of them there are hawthorn habitats. Peat bogs are surrounded by swamp wreck lobes and marsh boars. Ostoja also contains numerous gutters, covered with moist meadows with very rich flora, with protected species, e.g. European fully or wide-leaved cuckoo	214	L	3,500	4 830
			Switch 214 of 229	L	8,800	1 523

Source: own development

Nature and Landscape Teams

In the buffer 500 m from railway lines no. 201, 214 and 229 as well as junctions there is one natural landscape complex Rynna Dąbrowsko-Ostrzycka. The aim of the protection is to preserve the spatial continuity of natural and landscape structures of particular importance for the functioning of the Park's nature, including the revalorisation and protection of the landscape of lake gutters, the protection of wetland breeding grounds and the restoration of the spatial order of the landscape. This team crosses the railway line 201. The area overlaps 80 % with the Natura 2000 site Uroczyska Pojezierza Kashubianski. It covers an area of 1 785.40 ha. LK 201 repeatedly crosses the natural and landscape complex Rynna Dąbrowsko-Ostrzycka and constitutes its eastern border between 145,602 and 154.760 km.

Ecological uses

The planned investment does not intersect any ecological use. A small area covered by this form of nature conservation, Lake Kackie, is located within 500 m from the analysed lines. It was established in 2008 and covers an area of over 20 hectares. The area is located in the vicinity of LK 201, on the section 193,720 to 194,940 lies about 11 m to 50 m from the axis of the line.

This use is a complex of wetlands in the area of the former lobeli lake, dried in the interwar period. In the central and eastern parts of use there are small surfaces of open water panes in the area of use, you can also admire large surfaces of submerged large turtlenecks. The ornithophauna of this area is over 45 species of birds, of which about 15 – a hundred begin breeding here. They nest here, among others: dropping, coconut, water, streamer, buzzer, crickets, elbow, cane, reed, cane, sphincter and sponge. They build their crane nests here every year. In the area of use you can also observe hunting boxes, gerbils, marshmallows and a regularly appearing hawk. During the hiking period, there are more numerous books and squeaky warts. Herpetofauna (amphibians and reptiles) is, above all, a priority species for the European Union – crest weed. In addition to this, you can see here a common pot, a earth crest, a lake frog and a water frog. From the reptiles, a lizard was found with an axe and a carcass.

Tab.50 List of ecological areas located up to 500 m from the axis the extreme design track.

Protected area	Basis for creation and operation	Subject-matter of protection	Line No	Line page	Mileage [km]	Distance from line/intersec tion length [m]
Lake Kackie	Resolution No XVII/409/08 of the Gdynia City Council of 27 February 2008 on ecological use in the Great Kack district	The subject of protection is a wetland complex in the area of the former lobeli lake	201	L	193,720	11

Source: own development

Desks for documentation

No documentation stations are available at a distance of up to 500 m from the analysed railway lines.

Monuments of nature

In the area of the investment there are no protected objects in the form of a natural monument. At a distance of up to 200 m from the analysed railway line, there are 25 natural monuments in both variants. These are trees growing on railway line 201. They are listed in the table below. Most of the natural monuments (20 pieces) are located in the vicinity of the village Pępowo in Żukowo commune, in the area of km 181,470.

Tab.51 List of natural monuments located up to 200 from the extreme axis of the projected track.

Inspire object code	Object type u	Line page	Mileage [km]	Distance from line axis 201 [m]
PL.ZIPOP.1393.PP.2205062.378	tree	P	149,661	74
PL.ZIPOP.1393.PP.2205062.377	tree	L	150,954	22
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,460	122
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,464	94
PL.ZIPOP.1393.PP.2205083.849	tree	L	181,464	55
PL.ZIPOP.1393.PP.2205083.849	tree	L	181,466	116
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,466	73
PL.ZIPOP.1393.PP.2205083.849	tree	L	181,466	139
PL.ZIPOP.1393.PP.2205083.849	tree	L	181,467	46
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,467	50
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,468	37
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,469	27
PL.ZIPOP.1393.PP.2205083.849	tree	L	181,469	26
PL.ZIPOP.1393.PP.2205083.849	tree	L	181,470	15
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,477	92
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,478	85
PL.ZIPOP.1393.PP.2205083.849	tree	L	181,478	46
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,479	77
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,480	67
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,481	59
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,481	43
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,481	52
PL.ZIPOP.1393.PP.2262011.7275	tree	L	191,749	21
PL.ZIPOP.1393.PP.2262011.7273	tree	L	192,782	91
PL.ZIPOP.1393.PP.2262011.7304	tree	L	194,085	87

Source: own development

3.9. Protected natural habitats and protected fauna and flora species

For the purposes of this documentation, a natural inventory was carried out in the period from August 2016 to 30 April 2017 in a buffer of up to 150 m on each side of the railway lines.

The results of the natural inventory are presented in map attachment No. 3.9-2 Natural Conditions. The natural inventory was carried out by experts with experience in the identification of plants and natural habitats (both during flowering, fruiting, as well as in the wintering state of species) and animals, as well as the habitats of individual animal clusters, taking into account their traces and places of feeding, trops, shelter. Thus, the natural inventory carried out is complete and sufficient to assess the impact of the investment on protected natural habitats, plants and animals.

On the basis of the above, the state of the natural environment on the inventoryed sections of the investment was characterised and the existence of migration corridors and animal transport pathways was verified on the course of the planned investment.

As the investment option differs only slightly from the alternative, the location of protected natural habitats and protected fauna and flora species for both variants will be identical.

The following railway lines with a buffer of 150 m were included in the natural surveys:

- no 201 – km 136,096 to 205,200
- No. 214 – km -0.229 to 8,150
- No. 229 – km 31,000 to 42,100
- linkage – km 8,150 – 11,400.

The methodology of field studies and the results of field work are presented below and in the map annex No 3.9-2 Nature conditions, presenting the results obtained from the conducted natural inventory, as well as data obtained from the Regional Directorate for Environmental Protection in Gdańsk.

Methodology of natural field research

Natural habitats Natura 2000

The inventory covered the Natura 2000 habitats listed in Annex I of the Habitats Directive, which are also included in the Regulation of the Minister of the Environment of 16 May 2005 on natural habitat types and plant and animal species requiring protection in the form of designation of Natura 2000 sites (Journal of Laws 2005, No 94, item. 795) with an indication of their state of behavior. Field work was carried out by the marching method. The entire area covered by the inventory was penetrated, with particular emphasis on forest communities, small bodies of water and extensively cultivated meadows and grasslands. These were potential sites of natural habitats.

Plants

The total and partial protection of plant species was inventoried under the Regulation of the Minister of the Environment of 16 October 2014 on plant species protection (Journal of Laws 2014, item. 1409) and included in Annexes II of the Council Directive of 21 May 1992 (as amended by Directive 97/62/EEC) on the conservation of natural habitats and of wild fauna and flora (Habitats Directive), which are also included in the Regulation of the Minister for the Environment of 16 May 2005 on natural habitat types and plant and animal species requiring protection in the form of designation of Natura 2000 sites (Journal of Laws 2005, No 94, item. 795). Field work was carried out by the marching method. The entire area covered by the inventory was penetrated, with particular reference to forest communities, watercourses and small water reservoirs, as well as extensively cultivated meadows and grasslands. These were ecosystems of the potential presence of protected plant species.

Mushrooms and lichens

A standard marching method was used to search for specimens of protected and endangered mushrooms. It consisted mainly of forest areas, river valleys and meadows. To a lesser extent, it was used in the built-up areas and the railway embankments themselves. For most species, specific positions were given, however, in the case of free-living fungi, it is difficult to talk about a single individual, and the presence of fungal species was assessed only on the basis of fruit. A wider (surface) presence of species registered in the form of individual fruit can not be ruled out, since the fruit itself constitutes only a fraction of the mycelium constituting the main body of the fungus. Mycelium can occupy a large area and be limited by habitat barriers, such as the discontinuity of the substrate (mulch and rupture saprotrophs), different humidity and edaphic conditions (soil-occupied mushrooms) or the absence of a mycortic partner (mycorrosive mushrooms).

Field observations were planned and carried out in such a way as to capture the occurrence of fungi whose fruiting is associated with different seasons. Free-living and lichenised mushrooms were examined in parallel during field visions. The length of each stay in the area depended on the abundance and diversity of all fungi (including common species) observed in the studied lobes of vegetation. This is due to similar preferences for most species in relation to the season and humidity and thermal conditions (especially in the case of mycortic species and mulch saprotrophs).

Invertebrates

The inventory of invertebrates included the aquatic and terrestrial environment. Due to the phenology of individual species of terrestrial invertebrates, field work was carried out during the growing season during the period specified by the principal. Particularly intensive field studies were conducted in the period August-September. During the inventory during the growing season, various harvesting methods were used to make it possible to identify the fauna of land invertebrates occupying the inventory area as fully as possible. The proposed methods are widely used in research into land fauna of invertebrates. Used: entomological nets, lively soil traps (so-called Barber traps), sieving of litter on sieves, night catch of insects for light with the use of incandescent-mercury lamp and UV, use of entomological bucket, active site search and inspections of boars or decay trees were carried out.

In the case of aquatic invertebrates, the primary method is the sampling of benthic tests using a hydrobiological grid. In the flowing waters selected for testing, a fragment of 50-100 m (depending on the habitat differentiation) was selected representative for the analysed section of the watercourse. The work carried out at such sites consisted of collecting samples of bottom sediments from the selected habitats within the site.

Fish and logs

The ichthio-aunistic inventory was used to determine the place of occurrence and to determine the conservation status of populations of species species under national law and listed in Annexes II, IV and V of Habitats Directive 92/43/EW, within a buffer of 150 m on each side of the railway lines of the study.

The positions, which were subject to inventory, were appointed during chamber works based on orthophotomaps. The suitability of pre-selected sites for fish and mines in individual waters was verified during the field inspection, in such a way that the harvested fragments of watercourses or standing water bodies are representative in terms of the differentiation of micro-habitats for the entire buffer.

The presence and status of fish and minog populations were determined using a non-selective, live electro-fishing method, in accordance with the Polish Standard PN-EN 14011: 2006 "Water quality – sampling of fish using electricity" and taking into account the recommendations of the Chief Inspectorate for Environmental Protection (Makomaska-Juchiewicz M., Baran P. (ed.) 2012). Monitoring of animal species. A methodological guide. Part III. GIOŚ, Warsaw). The work was carried out at each stand at a time, in the period from September to November, in accordance with the guidelines developed by the Institute of Nature Conservation of the Polish Academy of Sciences, only after obtaining the necessary permits from, among others, fishing users of water, authorisations to carry out activities prohibited in relation to protected animals, during the hydrological conditions allowing safe fishing. Each time electrofishing was carried out only at low or medium water states (for maximum efficiency and safety during electro-fishing), with a water temperature not lower than 5 °C, in accordance with the Polish Standard PN-EN 14011: 2006.

Amphibians and reptiles

All breeding sites and the occurrence and migration of amphibians and reptiles were monitored in a buffer of at least 150 m on both sides of the track. In the case of amphibians, all potential habitats used by this group of animals were observed – ponds, reservoirs, reservoirs, midfield meshes, old seaweeds, wet meadows, etc. In the case of reptiles, these habitats have been supplemented with thermophilic grasslands, sunny slopes, forest logs, clearings, slopes of embankments, etc.

The observation methodology was adapted to the biology and ecology of individual species:

- during daytime checks, all observed and heard amphibians and traces of their presence were recorded. All visible and responsive adult amphibians were counted.
- the edges of the reservoir were combed with a bucket net, mainly in search of weeds and larval forms;
- the voices of the talking individuals were counted, apart from the earth comb, attributed to males;
- for the inventory of reptiles, both the pre-selected sites and the potential habitats identified during field visits for this group of animals were checked;
- inspection dates, observation start times, duration were selected to maximise the likelihood of reptiles meeting during the inspection (warm, sunny, windless days, middays, southern exhibition stations, etc.);
- information about reptiles, as far as possible, was obtained from local foresters or even accidentally encountered people in the forest;

- the designation of species belonging to adults, larvae and eggs was made on the basis of studies by Juszczyk (1987), Berger (1996, 1975), Młynarski (1991) and Berninghausen (1997).

Birds

The ornithological inventory included all protected bird species. On graphic material, maps, shp layers, sites of key bird species were applied.

Summary of key bird species subject to detailed tagging of all detected sites within the inventory area: from Annex I to the Birds Directive, from the Polish Red Book of Animals, in categories 1-3 as SPEC species (*excluding common species: Pleszka, nutshell, crimson, raspberry, wreath, lark, onions, whitefish, grey flicker, poor sirk, sparrow, mazurek*), covered by zone protection of nesting sites, with breeding & distribution & 10 %, according to the data of the Polish Ornithological Atlas (PAO), with a national population of less than 1000 breeding pairs, colonial species, rare in the scale of the country, region and local.

In September-November 2016 the field vision of the entire section covered by the research was carried out. Field studies were carried out in accordance with the standard methodological assumptions of the inventory of individual bird species (Chylarecki et al. 2009). Breeding criteria were adopted for the Polish Ornithological Atlas (Sikora et al. 2007).

Land and water mammals

The inventory was carried out on the basis of: analysis of literature data and available unpublished results, analysis of cartographic materials and field studies. In the studies of teriofauna, the following test methods were used:

- walking transects in search of leads, faeces, signs of foraging, shelters and other traces of mammals. They will be carried out in particular along the courses (focused primarily on the observations of beavers and otters) and in forest areas and ecotonium zones, as well as in other places with the expected highest activity of mammals; on the basis of the traces found, the species of the animal was determined,
- direct observations at different times of day and night using a reflector (with particular attention to evening and morning hours when expected activity is highest),
- searching for animals killed by vehicles along roads and railway lines passing through the investment site,
- observations of railway engineering objects that can act as passageways for animals, such as viaducts and culverts.

According to the Standard Requirements for Environmental Documentation (ver. 3.0) Investor, the area of the planned project was inventoryed on the basis of previously designated pedestrian transects. They were conducted especially along the watercourses (focused primarily on observations of beavers and otters) as well as in forest areas and ecotonous zones, as well as in other places with the expected highest activity of mammals. In order to ensure the proper identification of the site and the location of the specific conditions of the project, during the first field vision, the inspection was carried out throughout the area along the planned investment. This will make it possible to select the most attractive areas for the study group of animals (based on specialist knowledge of mammal biology and ecology), thus excluding from further inventory areas where the expected activity of mammals was negligible and irrelevant (e.g. highly urbanised areas). Subsequent checks were carried out along fixed transects, the number and length of which were adjusted to the scale of the planned project, indicating that their length was about 60 % of the length of the investment (calculated in km).

Bats

In the case of bats, the inventory for the possible impact of the railway investment focused mainly on areas of expected conflict, i.e. places of intersection of existing routes with the railway line and on the potential immediate threat of breeding colonies or wintering sites. Due to the large diversity of species preferences regarding habitat types, foraging sites, types of hideouts and shelters, no particularly valuable areas were designated on the examined section. For this group of animals, individual objects such as old lofts, churches, cellars, trees, etc. are often considered particularly valuable, but also large areas such as old stands complexes or the surroundings of water reservoirs, midforest clearings or meadows. They are used by bats to varying degrees during the season and it is difficult to consider any more important than others. For the purposes of these studies, it was considered that the most effective method of valorisation would be to select several points along the entire length of the railway line examined, which were representative of the nature of all the habitats present on this section. 7 points were selected in the following mileage:

- okay, okay. 141.600 km/line 201,
- okay, okay. 155.600 km/line 201,
- okay, okay. 171.000 km/line 201,
- okay, okay. 175.000 km/line 201,
- okay, okay. 185.500 km/line 201,
- okay, okay. 199.000 km/line 201,
- okay, okay. 34.000 km/line 229.

The detailed methodology according to which the natural inventory was carried out is set out in the text appendix to report 3.9-1.

3.9.1. Natural habitats and protected plant species

According to data from the resources of the Regional Director of Environmental Protection in Gdańsk obtained in 2016 in the buffer of 2 km from the gauge axis of railway lines 201, 214 and 229 and the planned junctions of lines 214 and 229, and 201 out of 229, there are 17 Natura 2000 natural habitat types (the symbol is designated † priority habitats):

- 9130 – fertile beech (*Dentario glandulosae-Fagenion, Galio odorati-Fagenion*),
- 9150 – thermophilic orchid beech (*Cephalanthero-Fagenion*),
- 9160 – Sub-Atlantic Game*(Stellario-Carpinetum*)
- 9190 – Pomeranian sour birch-oak forest (*betulo-Quercetum*),
- *91D0 – borons and swamp forests (*Vaccinio uliginosi-Betuletum pubescentis, Vaccinio uliginosi-Pinetum, Pino mugo-Sphagnetum, Sphagno girgensohnii-Piceetum* and birch-drawn boreal forests),
- *91E0 – willow, poplar, alder and ash fields (*Salicetum or-fragilis, Populetum albae, Alnenion glutinoso-incanae*, spring alxes),
- 91F0 – algae forests of oak, lignite and ash (*Ficario-Ulmetum*),
- 91T0 – a pine tree (Cladonio*-Pinetum and the robotic form of Peucedano-Pintum*).

The table below contains information on natural habitats located in the buffer 150 m from the railway line – obtained from the RDOŚ in Gdańsk.

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†3150 – ancient and natural eutrophic reservoirs with communities from *Nympheion*, *Potamion*,
- 3160 – natural dystrophic reservoirs,
- *6230 – mountain and low-rise twin grasslands (*Nardion*),
- 6410 – variable moist meadows (*Molinion*),
- 6430 – mountain herbs (*Adenostylion alliariae*) and riverside herbs (C*onvolvuletalia sepium*),
- 6510 – low and mountain fresh meadows used extensively (*Arrhenatherion elatioris*),
- 7140 – transitional bogs and quakes (mostly with vegetation from Scheuchzerio *-Caricetea*),
- 7230 – mountain and lowland alkaline peat bogs with the character of hammers, sedgehogs and mechowices,
- 9110 – sour beech (*Luzulo-Fagenion*),

Tab.52 List of natural habitats according to RDOŚ data in Gdańsk in buffer 150 m from the extreme axis of the designed track.

Habitat code	Habitat location (Line number, kilometre, distance from line [m])	Total natural habitat area in buffer 150 m [ha]	Area of the lobe in the waist 2x15m [ha]
3150 – Older and natural eutrophic reservoirs with communities from Nymphaeion, Potamion	201, Km 153,922, approx. 42 m from the line	306,9224	0
*6230 – Low twin pitches (*Nardion*)	201, Km 146,292, approx. 31 m from the line	0,3194	0
6430 – Mountain herbs (*Adenostylion alliariae* and riverside herb *Convolvuletalia sepium)*	201, Km 191,555, approx. 10 m from the line	0,8193	0,0424
6510 – Low and mountain fresh meadows used extensively (Arrhenatherion elatioris)	201, Km 172,223, approx. 134 m from the line	0,4598	0
	201, Km 172,227, approx. 7 m from the line	2,3692	0,1927
	201, Km 192,074, approx. 27 m from the line	5,7646	0
	201, Km 185,643, approx. 26 m from the line	1,3854	0
7230 – Mountain and lowland alkaline peat bogs of the nature of hammer, sledge and mechowice	201, Km 146,310, approx. 44 m from the line	7,7087	0
9110 – Acid beech (Luzulo-Fagion)	201, Km 174,792, approx. 147 m from the line	3,2766	0
	214/229, Km 0.101, approx. 19 m from the line	1,3404	0
	214/229, Km 0,691 – 0.830 and 1,594 – 1,872, approx. 0 m from the line	39,7372	1,2501
	201, Km 191,359, approx. 12 m from the line	5,3021	0,0268
	201, Km 191,793, approx. 73 m from the line	12,2865	0
	201, Km 193,359, approx. 54 m from the line	58,5576	0
	201, Km 193,448, approx. 39 m from the line	3,618	0
	201, Km 193,472, approx. 72 m from the line	0,9385	0
	201, Km 192,182, approx. 75 m from the line	49,1618	0
	201, Km 193,946, approx. 136 m from the line	409,0436	0
	201, Km 197,058, approx. 103 m from the line	19,6103	0
	201, Km 197,730, approx. 10 m from the line	169,9859	0,0435
	201, Km 198,427, approx. 11 m from the line	10,2712	0,0831
	201, Km 199,070, approx. 13 m from the line	10,8034	0,0183

Habitat code	Habitat location (Line number, kilometre, distance from line [m])	Total natural habitat area in buffer 150 m [ha]	Area of the lobe in the waist 2x15m [ha]
	201, Km 199,803, approx. 10 m from the line	40,6143	0,0363
9130 – fertile beech (*Dentario glandulosae-Fagion, Galio odorati-Fagion*)	201, Km 155,928, approx. 129 m from the line	8,0559	0
	201, Km 157,555, approx. 101 m from the line	102,5816	0
	214/229, Km 2,505 – 2,655 and 2,836 – 3,084, approx. 0 m from the line	25,3728	1,1894
	214/229, Km 2,181, approx. 37 m from the line	2,7137	0
	201, Km 191,142, approx. 25 m from the line	7,3881	0
	201, Km 191,239, approx. 6 m from the line	2,7219	0,1356
	201, Km 191,468, approx. 147 m from the line	6,7704	0
	201, Km 191,974, approx. 33 m from the line	0,3097	0
	201, Km 192,719, approx. 17 m from the line	17,5721	0
	201, Km 193,420, approx. 21 m from the line	0,3147	0
	201, Km 193,452, approx. 22 m from the line	14,6179	0
	201, Km 193,779, approx. 18 m from the line	3,2084	0
	201, Km 192,711, approx. 33 m from the line	0,8032	0
	201, Km 197,691, approx. 11 m from the line	3,6166	0,0962
	201, Km 197,606, approx. 8 m from the line	2,0338	0,2209
	201, Km 200,002, approx. 49 m from the line	2,5110	0
	201, Km 198,677, approx. 69 m from the line	1,1859	0
	201, Km 199,236, approx. 114 m from the line	2,1982	0
	201, Km 201,073, approx. 27 m from the line	5,2928	0
	201, Km 198,932, approx. 23 m from the line	6,2343	0
9160 – Sub-Atlantic Game(*Stellario-Carpinetum*)	201, Km 170,217, approx. 132 m from the line	4,5074	0
	201, Km 170,786, approx. 129 m from the line	15,4203	0
	201. Km 173,024, approx. 55 m from the line	21,7566	0

Habitat code	Habitat location (Line number, kilometre, distance from line [m])	Total natural habitat area in buffer 150 m [ha]	Area of the lobe in the waist 2x15m [ha]
	201, Km 172,525, approx. 16 m from the line	14,1193	0
	201, Km 186,054, approx. 55 m from the line	1,9273	0
	201, Km 186,569, approx. 37 m from the line	2,6225	0
	201, Km 191,476, approx. 13 m from the line	0,1160	0,0081
	201, Km 191,559, approx. 41 m from the line	0,1008	0
	201, Km 191,562, approx. 9 m from the line	0,0890	0,0454
	201, Km 191,673, approx. 13 m from the line	0,2716	0,0324
	201, Km 192,312, approx. 11 m from the line	0,7390	0,0493
	201, Km 192,444, approx. 29 m from the line	1,0301	0
	201, Km 193,730, approx. 53 m from the line	1,7082	0
	201, Km 196,922, approx. 9 m from the line	0,5818	0,0870
	201, Km 199,765, approx. 30 m from the line	0,1975	0
	201, Km 197,700, approx. 9 m from the line	4,9416	0,1495
	201, Km 199,118, approx. 74 m from the line	0,7340	0
	201, Km 199,492, approx. 13 m from the line	1,0307	0,0041
	201, Km 198,151, approx. 8 m from the line	13,5874	0,0242
	201, Km 198,573, approx. 11 m from the line	1,5338	0,0589
	201, Km 201,079, approx. 31 m from the line	1,0105	0
	201, Km 198,120, approx. 8 m from the line	22,3802	0,0297
	201, Km 201,351, approx. 135 m from the line	0,2633	0
	201, Km 201,402, approx. 149 m from the line	1,7295	0
9190 – Pomeranian sour birch-oak forest (Betulo-Quercetum)	201, Km 173,229, approx. 2 m from the line	0,1898	0,1355
91D0 – borons and swamp forests (Vaccinio uliginosi-Betuletum pubescentis, Vaccinio uliginosi-Pinetum, Pino mugo-Sphagnetum, Spagno girgensohnii-Piceetum and birch-drawn boreal forests)	214,6,437, approx. 97 m from the line	23840	0

Habitat code	Habitat location (Line number, kilometre, distance from line [m])	Total natural habitat area in buffer 150 m [ha]	Area of the lobe in the waist 2x15m [ha]
*91E0 – willow, poplar, alder and ash (Salicetum or-fragilis, Populetum albae, Alnenion glutinoso-incanae, spring alxes)	201, Km 150,444, approx. 129 m from the line	2,5150	0
	201, Km 153,090, approx. 144 m from the line	2,6254	0
	201, Km 172,997, approx. 41 m from the line	0,2233	0
	201, Km 173,069, approx. 77 m from the line	0,6008	0
	201, Km 197,285, approx. 9 m from the line	5,8404	0,0796
	201, Km 199,397, approx. 125 m from the line	0,8708	0
	201, Km 184,409, approx. 28 m from the line	1,4705	0
	201, Km 184,291, approx. 15 m from the line	1,2444	0,0022
91F0 – algae forests of oak, lignite and ash (Querco-Ulmetum)	201, Km 171,999, approx. 113 m from the line	2,0871	0
	201, Km 172,620, approx. 111 m from the line	0,5163	0
	201, Km 172,790, approx. 143 m from the line	0,6518	0
	201, Km 198,944, approx. 34 m from the line	2,7876	0
6410 – Molar meadows (Molinion)	201, Km 185,785, approx. 7 m from	2,8456	0,0512
	201, Km 186,205, approx. 10 m from	1,1706	0,1078
3160 – natural dystrophic reservoirs	201, km 157,135, approx. 47 m from	0,2354	0
9150 – thermophilic orchid beech (*Cephalanthero-Fagenion*)	201, km 151,365, approx. 35 m from	0,3487	0
7140 – transitional bogs and quakes (mostly with vegetation from Scheuchzerio-Caricetea),	201, km 145,999 approx 89 m from the line	1,1257	0

Source: own development
**priority habitat*
*** habitats located less than 15 m from the axis of the analysed railway lines (indicated in blue).*

As a result of the natural inventory carried out in 2016 and 2017, a total of 13 natural habitat types listed in Annex I of Council Directive 92/43/EEC of Council Directive 92/43/EEC were identified in a buffer of 150 m from the axis of the planned track of the analysed railway lines. 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive), including 12 habitats consistent with the data of the Gdańsk RDOŚ and 1 new habitat code 7110:

- 3150 – Older and natural eutrophic reservoirs with communities from *Nymphaeion*, *Potamion*,
- *6230 – Low twin pitches (*Nardion*),
- 6410 – Variable moist meadows (*Molinion*),
- 6430 – Mountain herbs (*Adenostylion alliariae*) and riverside herbs (Co*nvolvuletalia sepium*),
- 6510 – Low and mountain fresh meadows used extensively (*Arrhenatherion elatioris*),

- *7110 – High peat bogs with peat-forming vegetation (live),
- 7140 – Transitional bogs and quakes (mostly with vegetation from *Scheuchzerio-Caricetea*),
- 7230 – Mountain and lowland alkaline peat bogs of the nature of hammer, sledge and mechowice,
- 9110 – Acid buoys (*Luzulo-Fagion*),
- 9130 – Fertile beech (*Dentario glandulosae-Fagion*, *Galio odorati-Fagion*),
- 9160 – Sub-Atlantic current*(Stellario-Carpinetum*),
- *91E0 – Willow, poplar, alder and ash (*Salicetum or-fragilis, Populetum albae, Alnenion glutinoso-incanae*, spring alxes)
- 91F0 – algae forests of oak, lignite and ash (*Querco-Ulmetum*).

Other natural habitat types were not identified during the natural inventory.

A summary of the habitat types identified during the inventory, together with the indicated area of their lobes, is presented in the table below.

Tab.53 List of natural habitats and protected plant species found during the inventory of 150 m buffer.

Natural habitat	Location of stations (line, kilometre, distance from the railway line) in option W1 (W2)7**	Total natural habitat area in 150 m buffer in variants W1 and W2	State of Behaviour, Perspectives of Behavior
3150 – Older and natural eutrophic reservoirs with communities from *Nymphaeion, Potamion*	201, Km 147,144, approx. 40 m from the 201, Km 151,405, approx. 81 from the 201, Km 152,553, approx. 31 m from the 201, Km 157,100, approx. 48 m from the 201, Km 159,889, approx. 19 m from the 214, Km 5,563, approx. 75 m from the 201, Km 180,537, approx. 60 m from the 201, Km 139,393, approx. 19 m from the 201, Km 140,029, approx. 53 m from the line	53.89 ha	The habitat is well preserved. The habitat was found at 9 sites. None of the sites is directly exposed to destruction, all located above 15 m. For two sites (LK 201, km 159,405 and LK 201, km 151,405), it is possible to destroy the habitat in connection with the drainage work carried out in the absence of adequate protective measures.
*6230 – Low twin pitches (*Nardion*)	201, Km 146,282, approx. 36 m from the line	0.98 ha	The habitat is well preserved. The habitat was found on 1 site. This station is not directly exposed to destruction, it is located at a distance of more than 15 m

7In brackets the location of the workstations for the alternative option (W2) is indicated.

Natural habitat	Location of stations (line, kilometre, distance from the railway line) in option W1 (W2)[7]**	Total natural habitat area in 150 m buffer in variants W1 and W2	State of Behaviour, Perspectives of Behavior
6410 – Molinomic Molino Meadows (*Molinion*)	201, Km 185,639, approx. 14 m from the line	2.85 ha	The habitat is well preserved. The habitat was found on 1 site. This station is directly exposed to destruction, located at a distance of less than 15 m. The surface of the lobe of approx. 0.0566 ha, representing 1.99 % of the total habitat area in buffer 150 m from the axis of the planned track
6430 – Mountain herbs (*Adenostylion alliariae* and riverside herb *Convolvuletalia sepium)*	201, Km 191,605, approx. 9 m from the line	0.63 ha	The habitat is well preserved. The habitat was found on 1 site. This station is directly exposed to destruction, located at a distance of less than 15 m. The surface of the lobe of approx. 0.0769 ha, representing 12.09 % of the total habitat area in buffer 150 m from the axis of the planned track
6510 – low and mountain fresh meadows used extensively (*Arrhenatherion elatioris*)	201, Km 150,089, approx. 45 m from the 201, Km 192,111, approx. 32 m from the line	42.60 ha	The habitat is well preserved. The habitat was found at 2 sites. None of the inventories are directly exposed to destruction, all located more than 15 m away.
*7110 – High bogs with peat-forming vegetation (live)	201, Km 169,558, approx. 114 m from the line	0.48 ha	The habitat is well preserved. The habitat was found on 1 site. This station is not directly exposed to destruction, it is located at a distance of more than 15 m
7140 – transitional bogs and quakes (mostly with vegetation	201, Km 145,993, approx. 68 m from the 201, Km 157,163, approx. 20 m from the line	3.35 ha	The habitat is well preserved. The habitat was found at 2 sites.

Natural habitat	Location of stations (line, kilometre, distance from the railway line) in option W1 (W2)[7]**	Total natural habitat area in 150 m buffer in variants W1 and W2	State of Behaviour, Perspectives of Behavior
from *Scheuchzerio-Caricetea*)			None of the inventoryed sites is directly exposed to destruction, all located more than 15 m away. For one site (LK 201, km 157,163), it is possible to destroy the habitat in connection with the drainage work carried out in the absence of adequate protective measures.
7230 – Mountain and lowland alkaline peat bogs of the nature of hammer, sledge and mechowice	201, Km 146,296, approx. 62 m from the	5.58 ha	The habitat is well preserved. The habitat was found at 2 sites. None of the inventories are directly exposed to destruction, all located more than 15 m away.
	201, Km 153,413, approx. 92 m from the line		
9110 – Acid buoys (*Luzulo- Fagion*)	201, Km 174,676, approx. 139 m from the	65.24 ha	The habitat is well preserved. The habitat was found at 15 sites, of which 5 are directly exposed to destruction, located at a distance of less than 15 m. The total area of the 1.7561 ha lobes will be destroyed, representing 2.69 % of the total habitat area in the buffer 150 m from the axis of the planned track. For two sites (LK 201, km 191,396 and LK 201, km 193,429) it is possible to destroy the habitat in connection with the reconstruction and modernisation of railway line No 201
	214/229, Km 8,871, approx. 0 m from line (214/229, Km 8,873, approx. 0 m from		
	214/229, Km 9,888, ca. 0 m from line (214/229, Km 9,876, approx. 0 m from		
	229, Km 38,957, approx. 22 m from the		
	201, Km 173,019, approx. 65 m from the		
	201, Km 191,396, 16 m from the line		
	201, Km 192,313, approx. 69 m from the		
	201, Km 191,551, approx. 61 m from the		
	201, Km 191,322, approx. 5 m from the		
	201, Km 193,440, approx. 56 m from the		
	201, Km 193,429, approx. 17 m from the		
	201, Km 197,048, approx. 105 m from the		
	201, Km 199,049, approx. 7 m from the		
	201, Km 200,422, approx. 11 m from the		
	229, Km 38,939, approx. 31 m from the		
9130 – fertile beech (Dentario*)*	214/229, Km 11,069, approx. 0 m from line (214/229, Km 11,067, approx. 0 m	29.52 ha	The habitat is well preserved.

Natural habitat	Location of stations (line, kilometre, distance from the railway line) in option W1 (W2)[7]**	Total natural habitat area in 150 m buffer in variants W1 and W2	State of Behaviour, Perspectives of Behavior
glandulosae-Fagion, Galio odorati-Fagion)	201, Km 191,085, approx. 31 m from 201, Km 192,678, approx. 33 m from 201, Km 193,683, approx. 19 m from 201, Km 197,533, approx. 14 m from 201, Km 197,558, approx. 7 m from the 201, Km 200,015, approx. 43 m from the line		The habitat was found at 7 sites, of which 3 are directly exposed to destruction, located at a distance of less than 15 m. The total area of the 1.8484 ha lobes will be destroyed, which is 6.26 % of the total habitat area in the buffer 150 m from the axis of the planned track
9160 – Sub-Atlantic Game (*Stellario-Carpinetum*)	201, Km 170,823, approx. 6 m from the 201, Km 181,328, approx. 5 m from the 201, Km 181,409, approx. 2 m from the 201, Km 172,945, approx. 23 m from 201, Km 174,547, approx. 48 m from 201, Km 186,677, approx. 31 m from 201, Km 186,071, approx. 47 m from 201, Km 191,496, approx. 21 m from 201, Km 191,710, approx. 2 m from the 201, Km 191,566, approx. 45 m from 201, Km 192,093, approx. 10 m from 201, Km 192,505, approx. 13 m from 201, Km 193,741, approx. 61 m from 201, Km 196,883, approx. 7 m from the 201, Km 197,180, approx. 69 m from 201, Km 198,960, approx. 2 m from the 201, Km 199,487, approx. 8 m from the 201, Km 201,090, approx. 31 m from	190.21 ha	The habitat is well preserved. The habitat was found at 18 sites, of which 9 are directly exposed to destruction, located at a distance of less than 15 m from the axis of the planned track. The total area of the 1.1847 ha lobes will be destroyed, representing 0.62 % of the total habitat area in the buffer 150 m from the axis of the planned track
*91E0 – willow, poplar, alder and ash (*Salicetum or- fragilis, Populetum albae, Alnenion glutinoso-incanae*, spring alder)	201, Km 153,542, approx. 64 m from 201, Km 159,709, approx. 17 m from 201, 158,293, approx. 5 m from the line 201, Km 164,846, approx. 50 m from 201, Km 173,381, approx. 87 m from 201, Km 180,148, approx. 24 m from 201, Km 180,792, approx. 5 m from the 201, Km 184,349, approx. 8 m from the 201, Km 197,204, approx. 17 m from	20.85 ha	The habitat is well preserved. The habitat has been found at 9 sites, of which 4 are directly exposed to destruction, located at a distance of less than 15 m from the axis of the planned track. The total area of the 1.1047 ha lobes will be destroyed, which is 5.30 % of the total habitat area in the buffer 150 m from the axis

Natural habitat	Location of stations (line, kilometre, distance from the railway line) in option W1 (W2)[7]**	Total natural habitat area in 150 m buffer in variants W1 and W2	State of Behaviour, Perspectives of Behavior
			the Designed Track
91F0 – algae forests of oak, ligament and ash (*Querco-Ulmetum*)	201, Km 172,075, approx. 125 m from the 201, Km 172,669, approx. 76 m from the 201, Km 173,412, approx. 134 m from the 201, Km 198,869, approx. 37 m from the line	9.18 ha	The habitat is well preserved. The habitat was found at 4 sites. None of the inventories are directly exposed to destruction, all located more than 15 m away.

Source: own development
*priority habitat
** stations located less than 15 m from the axis of the analysed railway lines *(indicated in blue)*

The area of the inventoryed valuable natural habitats from Annex I of the Habitats Directive in the adopted buffer 150 m from the axis of the planned track is approx. 425,36. The largest share concerns habitat code 9160 – sub-Atlantic game*(Stellario-Carpinetum*) – this is approx. 190.21 ha, thus approx. 44.72 % of the total area of the above-mentioned habitat types. Other forest communities occupy approx. 124.79 ha, giving a contribution of approx. 29.3 %. Next, due to the size of the habitat of 3150 Starorzecza and the natural eutrophic reservoirs with biorhoris from *Nymphaeion*, *Potamion* occupies 53.89 hectares. Meadow habitats with code 6510 – Low and mountain fresh meadows used extensively (*Arrhenatherion elotiaris) and*6410 – *Molinion Molinion* Molilinion Molinino Molino meadows cover a total of 45.45 hectares. The area of the remaining habitat types shall not exceed 6 ha.

Of the identified habitat types, two are of priority within the meaning of the Habitats Directive: 7110* – High peat bogs (living)*, *6230 – Low twin grasslands (Nardion) and 91E0* – Willow, poplar, alder and ash (*Salicetum albae*, *Populetum albae*, *Alnion glutinoso-incanae*, spring albae albae).

The most valuable habitats are those Natura 2000 habitat types, which are represented by the phytocenosis of teams fully formed in terms of the characteristic combination of species, i.e. defined by the presence of the highest-ranking diagnostic species. In the test buffer 150 m from the axis of the designed track to the well-educated are priority habitats: *7110 – high peat bogs with peat-forming vegetation (living), 7140 – transitional peatlands and quakes (mostly with vegetation from *Scheuchzerio-Caricetea*), 7230 – mountain and lowland alkaline peat bogs with the character of hammers, sledges and mechowices, 9110 – sour beeves Luzulo *-Fagion*, 9130 – fertile bogs (Dentario glandulosae*-Fagion, Galio odorati-Fagion*), 9160 – Sub*-Atlantic (Stellario-Carpinetum*), 91E0 – willow, poplar, alder and ash forests, 91F0 – algae and ash algae forests (*Querco-Ulmetum*).

As a result of the inventory, 3 species of plants under partial protection were found in the area covered by the survey in accordance with the Regulation of the Minister of the Environment of 9 October 2014 on the species protection of plants (Journal of Laws 2014, item. 1409). Detailed results can be found in the table below.

Tab.54 Protected plant species within the potential impact zone.

LP.	Polish and Latin name	Protection status	Location of the station (line, kilometre) in option W1 (W2)15*	Number of individuals
1.	Swamp *Ledum palustre*	partial protection	201, Km 145,884	> 50
			201, Km 145,965	5
			201, Km 146,275	3
			201, Km 146,372	2
			201, Km 169,482	3
2.	*Helichrysum arearium sand blankets*	partial protection	201, Km 141,778	> 10
			201, Km 146,519	> 20
			201, Km 163,838	> 20
			201, Km 163,871	> 20
			201, Km 169,059	10
			201, Km 172,072	13
			201, Km 174,094	16
			214, Km 2,139	13
			214, Km 6.544	3
3.	Werewolf *Daphne mezereum*	partial protection	201, Km 145,812	2
			201, Km 145,855	5
			201, Km 145,876	3
			201, Km 172,240	> 30

15In brackets the location of the workstations for the alternative option (W2) is indicated.

LP.	Polish and Latin name	Protection status	Location of the station (line, kilometre) in option W1 (W2)[8]*	Number of individuals
			201, Km 172,394	36
			201, Km 172,418	21
			201, Km 174,718	11
			201, Km 174,865	19

** stations located less than 15 m from the axis of the analysed railway lines*

As a result of the inventory, 6 species of aphids were found to be partially protected in the area covered by the survey. Detailed results can be found in the table below.

Tab.55 Species of aphids protected within the limits of the potential impact zone.

LP.	Polish and Latin name	Protection status	Location of the station (line, kilometre) in option W1 (W2)16*	Total area [ha] in options W1 and W2	Area exposed to destruction [ha]/number of sites exposed to destruction under options W1 and W2
1.	Glossy *Hylocomium splendens*	partial protection	201, Km 174,788	1,68	0/0
			201, Km 174,803	1,77	0/0
			201, Km 198,884	5,00	0/0
2.	Wekradłoszka sharpened *Calliergonella cuspidata*	partial protection	201, Km 146,296	2,81	0/0
			201, Km 153,408	1,33	0/0
			201, Km 160,059	4,21	0,46/1
			201, Km 198,884	5,00	0,/0
3.	Rokietnik common *Pleurozium schreberi*	partial protection	201, Km 145,234	3,04	0,23/1
			201, Km 145,759	3,63	0,03/1
			201, Km 146,863	16,97	0/0
			201, Km 146,444	0,97	0,03/1
			201, Km 144,399	2,67	0/0
			201, Km 144,592	1,32	0/0
			201, Km 141,854	5,31	0/0
			201, Km 141,543	0,61	0/0
			201, Km 152,235	7,47	0,12/1
			201, Km 171,943	134,51	17,19/1
			201, Km 182,520	10,46	1,37/1
			201, Km 189,580	3,45	0,08/1
			201, Km 191,645	0,65	0/0
			201, Km 192,438	1,66	0/0
			201, Km 193,667	1,07	0/0
4.	Thin glow *Polytrichum strictum*	partial protection	201, Km 169,496	0,71	0/0
5.	Magellan peat *Sphagnum magellanicum*	partial protection	201, Km 169,496	0,70	0/0
6.	Narrow leaf peat *Sphagnum angustifolium*	partial protection	201, Km 169,496	0,70	0/0

* stations located at a distance of less than 15 m from the axis of the analysed railway lines (indicated in blue).

The populations of these species at the sites formed compact annoyances, were viable, and reproduced generatively.

16In brackets the location of the workstations for the alternative option (W2) is indicated.

As a result of the inventory, 5 species of invasive plants were found in the area covered by the study. Detailed results can be found in the table below.

Tab.56 Invasive plant species occurring within the limits of the potential impact zone.

LP.	Polish and Latin name	Location of the station (line, kilometre) in option W1 (W2)17*	Area [ha] in variants W1 and W2	Number of posts
1.	Small-flowered *Impatiens parviflora*	201, Km 170,315	–	1
2.	Lupinus durable *Lupinus polyphyllus*	201, Km 171,911 201, Km 171,856 201, Km 170,674 201, Km 160,291 201, Km 174,052 201, Km 193,586	1,3	3
3.	Rose wrinkled by *Rosa rugosa*	201, Km 171,960 201, Km 171,955 201, Km 170,596	–	3
4.	*Acer negundo ash leaf clone*	201, Km 169,25	–	1
5.	Robinia (guest star) acacia *Robinia pseudoacacia*	229, Km 36,339	–	1

Source: own development
* stations located less than 15 m from the axis of the analysed railway lines (indicated in blue)

The populations of small-flowered and permanent lupin were very numerous (from 15 to 100 individuals). The most widespread species is permanent lupins, which forms relatively large lobes along railway tracks.

3.9.2. Mushrooms, including lichens

A total of 14 species of macroscopic fungi of natural value were identified, including one species under strict protection and 11 species at risk of extinction, classified as: E (2 species), V (5 species) and R (6 species). One of the species mentioned*, Ascodichaena rugosa* (bag fungus without a Polish name, in the order Rhytismatales), is very rare in Poland (Kujawa, Gierczyk 2017), known only for two positions: Lagowsko-Sulęciński Landscape Park (near Gorzów Wlkp.; Halama 2015) and Magurski National Park (Rojek 2005). Most species were found at individual sites. The exception is quite common in the examined area *Exidia truncata* observed at a total of 7 sites. Only one species of *Hydnellum concrescens* will be exposed to destruction during the investment. This species is very valuable natural because of its high hazard category.

17In brackets the location of the workstations for the alternative option (W2) is indicated.

Tab.57 List of protected, endangered and very rare species of macroscopic fungi in Poland found in the studied area.

LP.	Polish and Latin name	Hazard category	Protection status	Location of the station (line, kilometre) in option W1 (W2)18*	Number of posts identified
1.	Venomous flyomor *Amanita virosa*	V	unprotected	214, Km 5,100	1
2.	*Ascodichaena rugosa*	absence	unprotected	201, Km 170,228	1
3.	Jelly bagotrzęsak *Ascotremella faginea*	V	unprotected	201, Km 198,980	1
4.	Orange pepper *Cantharellus friesii*	E	unprotected	201, Km 155,658	1
5.	Exidia truncata *shank silhouette*	R	unprotected	201, Km 144,567 201, Km 170,228 201, Km 170,643 201, Km 171,768 201, Km 174,054 214, Km 4.236 229, Km 34,029	7
6.	*Gloeoporus taxicola*	R	unprotected	201, Km 146,538	1
7.	Spruce glue *Gomphidius glutinosus*	R	unprotected	201, Km 156,455	1
8.	Zoned earrings *Hydnellum concrescens*	E	strict protection	201, Km 198,861 201, Km 200,629	2
9.	*Inonotus triqueter pine flash*	V	unprotected	201, Km 175,113	1
10.	Bristler sclerosis *Lentinus strigosus*	V	unprotected	201, Km 145,586 229, Km 37,965	2
11.	White Toe *Lepiota alba*	V	unprotected	201, Km 161,919	1
12.	Safflower mushroom *Mycena crocata*	R	unprotected	201, Km 198,405	1
13.	Forest coat *Serpula himantioides*	R	unprotected	229, Km 37,952	1
14.	*Pigeon Tricholoma columbetta*	R	unprotected	201, Km 155,742	1

Source: own development
** stations located less than 15 m from the axis of the analysed railway lines (indicated in blue)*
Hazard category: V – exposed, R – rare, E – at risk of extinction
Hazard category: V – exposed, R – rare, E – at risk of extinction

On the basis of the conducted natural inventory, a total of 14 protected or rare lichen species were found, including 3 species under strict protection and 8 under partial protection. The species found on the test site are categorised on a national scale in the following categories: CR (2 species), EN (1 species), VU (4 species), NT (3 species) and DD (1 species). However, most of them are not regionally endangered or have lower categories in the regional red lists

18In brackets the location of the workstations for the alternative option (W2) is indicated.

prepared for Gdańsk Pomerania (Fałtynowicz, Kukwa 2003) and Tucholskie Bory (Lipnicki 2003).

About half of the species were observed at individual sites. At many sites (5-11) 4 species were found: *Evernia prunastri*, *Graphis scripta*, *Hypogymnia tubulosa* and *Ramalina farinacea*. 6 species will be destroyed as a result of the investment, including three from numerous sites: *Graphis scripta*, *Hypogymnia tubulosa* and *Ramalina farinacea*. The remaining 3 species exposed to destruction during the works are much rarer on the site – they were found at 1-3 sites.

Table 58 List of protected and endangered species of lichenised fungi (lichenes) found in the test site.

LP.	Polish and Latin name	Hazard category	Protection status	Location of the station (line, kilometre) in option W1 (W2)19*	Number of posts
1.	Hair thin *Bryoria capillaris*	CR, Regional EN	strict protection	201, Km 144,429	1
2.	Icelandic lungs *Cetraria islandica*	VU, regionally not threatened	partial protection	201, Km 145,600	1
3.	Glossy gold *Chrysothrix candelaris*	CR, Regional EN	strict protection	201, Km 142,900 201, Km 175,500	2
4.	Woodworker *Cladonia arbuscula*	absence	partial protection	201, Km 145,658 201, Km 144,402 214, Km 4,365	3
5.	Reindeer Creed *Cladonia Rangiferina*	absence	partial protection	201, Km 144,402	1
6.	Sloe flour *Evernia prunastri*	NT, regionally not threatened	unprotected	201, Km 144,425 201, Km 144,392 201, Km 144,570 201, Km 144,672 201, Km 145,658 201, Km 158,191 201, Km 171,960 201, Km 171,977 201, Km 174,054 214, Km 4.236 229, Km 34,029	11
7.	Author of *Graphis scripta*	NT, regionally not threatened	unprotected	201, Km 170,228 201, Km 170,655 201, Km 171,768 201, Km 198,400 214, Km 4,905 229, Km 33,961 229, Km 37,952	7
8.	Tubular box *Hypogymni a tubulosa*	NT, regionally not threatened	partial protection	201, Km 144,425 201, Km 144,500 201, Km 161,699 214, Km 4,916 214, Km 4,949 214, Km 4,959 214, Km 5,025	9

19In brackets the location of the workstations for the alternative option (W2) is indicated.

LP.	Polish and Latin name	Hazard category	Protection status	Location of the station (line, kilometre) in option W1 (W2)[12]*	Number of posts
				214, Km 5,092 229, Km 34,029	
9.	Gold sticker *Melanelixia subaurifera*	regionally VU	partial protection	201, Km 171,940 229, Km 33,987	2
10.	Peltigera hymenina *salad spider*	DD, regionally not threatened	strict protection	201, Km 165,326	1
11.	Chalice waffle *Pleurosticta acetabulum*	En, Regionally VU	partial protection	201, Km 158,135	1
12.	Shredder *Ramalin Farinacea*	VU, regionally not threatened	partial protection	201, Km 151,475 201, Km 158,191 201, Km 172,437 201, Km 174,054 214, Km 4.236	5
13.	Common Beard *Usnea filipendula*	VU (also regionally)	unprotected	201, Km 172,304	1
14.	Clump ward *Usnea hirta*	VU, regionally not threatened	partial protection	229, Km 34,029	1

4. *Source: own development*
5. ** stations located less than 15 m from the axis of the analysed railway lines (indicated in blue)*
6. *Hazard category: CR – critically endangered, EN endangered, VU – vulnerable, NT – near-hazard, DD – species with an unspecified hazard, requiring more accurate data.*

3.9.3 Protected fauna species

3.9.3.1 Invertebrates

In the research period from August 2016 to the end of April 2017, 20 species of invertebrates under national law, i.e. Regulation of the Minister for the Environment of 16 December 2016 on animal species protection (Journal of Laws 2016, item 2183), including the partial conservation of 15 species and the overall conservation of 2 species. The presence of 2 species found in the Polish Red Book of Animals (Invertebrates) (Głowaciński and Nowacki 2004) or on the Red List of Lost and Threatened Animals in Poland (Głowaciński 2002) (Tables 23-41) was also shown. Both species were also protected under the Habitats Directive (Council Directive 92/43/EEC).

<u>Molluscs (*Mollusca*): bivalve molluscs (*Bivalvia*)</u>

On the basis of the conducted natural inventory on the site of the investment, there were 2 species of bivalve molluscs: coarse scrub (*Unio crassus*) and big breeze (*Anodonta cygnaea*).

All stands of the thick-*skinned scooter (Uno crassus*) are away from the railway line approx. 90 to 250 m. The established population of the great breeze in the studied area is few, and its habitats are located approx. 30-200 m. These species are thus not endangered by planned works and operation of the railway line.

<u>Molluscs (*Mollusca*): snails (*Gastropoda*)</u>

The snail of vineyards (Helix pomatia) is common throughout the studied area. Most sites are directly in contact with the railway line, which is a consequence of the habitat preferences of this species over specific anthropogenic habitats (gardens, parks, scrub). This species is not endangered due to the size of the population.

Tab.59 List of protected and endangered mollusc species found on the test site.

LP.	Polish and Latin name	Protection status	Number of habitats	Surface	Habitat location (line, kilometre) in option W1 (W2)[13]*	Habitat ID
1.	*Unio crassus coarse scrub*	strict protection	3	3.4 ha	201, Km 165,885	b409
					201, Km 172,145	b406
					201, Km 174,582	b424
2.	The Great *Anodonta Cygnaea*	partial protection	3	21.78 ha	201, Km 159,993	b441
					201, Km 152,662	b443
					201, Km 147,195	b444
3.	Snail of vineyards *Helix pomatia*	partial protection	49	3.61 ha	201, Km 157,100	b22
					201, Km 176,600	b61
					201, Km 182,100	b66
					201, Km 200,900	b83
					201, Km 163,800	b98
					201, Km 139,100	b101
					201, Km 139,100	b158
					201, Km 143,400	b160
					201, Km 175,700	b203
					201, Km 177,200	b215
					201, Km 177,400	b217
					201, Km 180,200	b223
					201, Km 181,500	b225
					201, Km 184,900	b231
					201, Km 186,900	b235
					201, Km 190,400	b245
					201, Km 190,600	b246
					201, Km 194,300	b257
					201, Km 200,100	b265
					201, Km 201,900	b266
					201, Km 139,246	b313
					201, Km 142,703	b422
					201, Km 148,924	b420
					201, Km 149,241	b419
					201, Km 152,549	b416
					201, Km 153,249	b415
					201, Km 153,611	b414
					201, Km 168,138	b408
					201, Km 175,284	b401
					201, Km 175,691	b402
					201, Km 200,343	b425
					201, Km 194,149	b426
					201, Km 193,704	b427
					201, Km 192, 933	b428
					201, Km 141,173	b429
					201, Km 151,796	b445
					201, Km 150,347	b446
					201, Km 144,517	b447
					214, Km 0,800	b101
					214, Km 1,000	b102
					214, Km 1,800	b106
					214, Km 2,500	b109
					214, Km 2,900	b114
					214, Km 3,000	b115
					229, Km 37,800	b121

[13] In brackets indicate the location of the stations for the alternative option (W2)

LP.	Polish and Latin name	Protection status	Number of habitats	Surface	Habitat location (line, kilometre) in option W1 (W2)[13]*	Habitat ID
					229, Km 37,300	b313
					229, Km 36,500	b315
					229, Km 35,200	b321

Source: own development
** habitats located less than 15 m from the axis of the analysed railway lines (indicated in blue)*

Insects (*Insecta*): Membranes (*hymenoptera*)

During field work, 12 protected insect species were found to be present in the survey area: bumblebee stone (Bombus lapidarius), earth bumblebee (Bombus terrestris), grove bumblebee (Bombus lucorum), ore bumblebee (Bombus pasucorum), ore bumblebee (Bombus ruderarius), bumblebee (Bombus ruderatus), forest bumblebee (Bombus pratorum), garden bumblebee (Bombus hortorum), red bumblebee (Bombus Sylvarum), yellow bumblebee (Bombus muscorum) and ore forest ants: ant ore (Formica rufa) and moth ants (Formica polyctena).

The above species of bumblebees are quite common species in Poland and in the region, with high dispersion possibilities, although not very numerous. Their habitats often come into contact with the railway line, whose surroundings are the place of feeding. Not endangered by planned works and operation of the railway line. Both species of ore forest ants are common in Poland and the region. There are many or very numerous populations identified. Habitats mostly away from the railway line. These species are not endangered by the planned work and operation of the railway line.

Tab.60 A breakdown of membrane species with regard to their conservation status.

Polish and Latin name	Protection status	Number of areas	Surface	Habitat location (line, kilometre) in option W1 (W2)[14]*	ID code
Bumblebee stonestone *Bombus lapidarius*	partial protection	71	5.77 ha	201, Km 141,300	b9
				201, Km 142,800	b10
				201, Km 148,300	b14
				201, Km 155,300	b19
				201, Km 160,000	b26
				201, Km 161,000	b30
				201, Km 163,300	b34
				201, Km 3.300	b36
				201, Km 173,800	b58
				201, Km 175,200	b60
				201, Km 176,400	b62
				201, Km 178,600	b63
				201, Km 179,600	b65
				201, Km 185,500	b70
				201, Km 191,500	b74
				201, Km 192,200	b77
				201, Km 193,500	b78
				201, Km 194,600	b79
				201, Km 199,000	b81
				201, Km 200,800	b82
				201, Km 205,100	b84
				201, Km 166,200	b85
				201, Km 166,300	b86
				201, Km 164,100	b97
				201, Km 163,800	b99
				201, Km 171,600	b137
				201, Km 171,100	b138
				201, Km 139,100	b152
				201, Km 139,100	b156

[14] In brackets indicate the location of the stations for the alternative option (W2)

Polish and Latin name	Protection status	Number of areas	Surface	Habitat location (line, kilometre) in option W1 (W2)[14]*	ID code
				201, Km 141,600	b166
				201, Km 143,500	b169
				201, Km 146,500	b174
				201, Km 154,500	b179
				201, Km 158,400	b188
				201, Km 160,100	b190
				201, Km 162,000	b193
				201, Km 162,500	b196
				201, Km 174,500	b207
				201, Km 175,700	b211
				201, Km 176,800	b214
				201, Km 179,900	b222
				201, Km 184,300	b229
				201, Km 192,000	b250
				201, Km 195,400	b259
				201, Km 196,600	b261
				201, Km 198,000	b263
				201, Km 201,900	b267
				201, Km 203,400	b268
				201, Km 200,649	b430
				201, Km 198,968	b432
				201, Km 195,096	b433
				201, Km 184,762	b435
				201, Km 163,658	b437
				201, Km 157,898	b438
				201, Km 145,638	b452
				201, Km 140,910	b454
				201, Km 159,993	b26
				214, Km 3,300	b36
				214, Km 3,600	b37
				214, Km 6,500	b41
				214, Km 1,200	b103
				214, Km 1,300	b104
				214, Km 6,800	b116
				214, Km 5,600	b277
				229, Km 37,400	b124
				229, Km 36,800	b125
				229, Km 35,200	b126
				229, Km 39,500	b307
				229, Km 36,200	b317
				229, Km 35,200	b320
				229, Km 35,100	b323
				229, Km 39,600	b117
Bumblebee *Bombus terrestris*	partial protection	36	3.03 ha	201, Km 139,100	b1
				201, Km 139,100	B2
				201, Km 139,100	b4
				201, Km 140,800	b8
				201, Km 144,600	b12
				201, Km 155,200	b20
				201, Km 157,100	b23
				201, Km 169,000	b53
				201, Km 175,300	b59
				201, Km 185,000	b68
				201, Km 167,100	b149
				201, Km 139,100	b154
				201, Km 139,100	b157
				201, Km 139,100	b159
				201, Km 141,000	b165

Polish and Latin name	Protection status	Number of areas	Surface	Habitat location (line, kilometre) in option W1 (W2)[14]*	ID code
				201, Km 156,900	b183
				201, Km 163,000	b197
				201, Km 163,500	b198
				201, Km 173,500	b209
				201, Km 177,200	b216
				201, Km 177,800	b220
				201, Km 186,600	b234
				201, Km 190,051	b434
				201, Km 138,799	b440
				201, Km 139,500	b7
				201, Km 157,500	b24
				201, Km 177,600	b218
				201, Km 186,600	b233
				201, Km 171,000	b139
				201, Km 163,600	b34
				201, Km 142,700	b10
				214, Km 3,700	b23
				214, Km 2,400	b107
				214, Km 2,800	b112
				229, Km 39,700	b305
				229, Km 39,700	b306
				229, Km 37,600	b122
Grove bumblebee *Bombus lucorum*	partial protection	31	2.82 ha	201, Km 139,100	b3
				201, Km 179,000	b64
				201, Km 188,200	b71
				201, Km 189,900	b72
				201, Km 166,000	b87
				201, Km 164,900	b95
				201, Km 168,000	b146
				201, Km 167,700	b147
				201, Km 139,100	b153
				201, Km 146,500	b176
				201, Km 150,500	b177
				201, Km 153,000	b178
				201, Km 156,130	b182
				201, Km 162,200	b195
				201, Km 181,000	b224
				201, Km 193,900	b256
				201, Km 196,900	b262
				201, Km 160,000	b26
				201, Km 161,000	b30
				201, Km 175,700	b211
				201, Km 175,700	b212
				201, Km 179,000	b221
				201, Km 195,400	b259
				214, Km 8,000	b43
				214, Km 1,700	b105
				214, Km 2,400	b107
				214, Km 2,400	b108
				214, Km 2,800	b112
				229, Km 35,100	b127
				229, Km 40,400	b301
				229, Km 39,700	b305
				229, Km 38,300	b310
				229, Km 35,400	b319
				229, Km 35,100	b322
Bumblebee ore *Bombus pasucorum*	partial protection	50	4.04 ha	201, Km 139,100	B5
				201, Km 146,200	b13

Polish and Latin name	Protection status	Number of areas	Surface	Habitat location (line, kilometre) in option W1 (W2)[14]*	ID code
	partial protection			201, Km 157,500	b24
				214, Km 3,800	b39
				214/229 Km 11,150 (214/229, Km 11,150)	b45
				229, Km 36,200	b50
				201, Km 183,200	b67
				229, Km 39,500	b119
				229, Km 37,600	b122
				201, Km 171,000	b139
				201, Km 168,100	b145
				201, Km 139,100	b155
				201, Km 155,800	b181
				201, Km 159,100	b189
				201, Km 174,800	b205
				201, Km 172,600	b210
				201, Km 177,600	b218
				201, Km 181,500	b226
				201, Km 184,900	b230
				201, Km 185,800	b232
				201, Km 186,600	b233
				201, Km 188,400	b236
				201, Km 189,800	b241
				201, Km 190,200	b242
				201, Km 191,400	b249
				201, Km 192,800	b252
				201, Km 200,100	b264
				201, Km 160,000	b26
				201, Km 161,000	b30
				201, Km 179,000	b64
				201, Km 194,500	b79
				201, Km 205,100	b84
				201, Km 162,000	b193
				201, Km 143,400	b169
				214, Km 4,500	b273
				214, Km 6,500	b41
				229, Km 40,500	b300
				229, Km 40,200	b302
				229, Km 39,500	b308
				229, Km 38,300	b311
				229, Km 36,500	b316
				229, Km 35,600	b318
				229, Km 35,000	b324
				229, Km 38,300	b311
				229, Km 35,100	b127
Bumblebee ore *Bombus ruderarius*		7	0.62 ha	201, Km 169,100	b52
				201, Km 166,800	b150
				201, Km 144,200	b172
				201, Km 157,400	b184
				201, Km 193,500	b255
				201, Km 161,000	b30
				201, Km 190,200	b242
Bumblebee dark belts *Bombus ruderatus*	partial protection	1	0.11 ha	201, Km 190,200	b242
Forest bumblebee *Bombus pratorum*	partial protection	2	0.14 ha	201, Km 191,100	b247
				201, Km 193,400	b253
Garden bumblebee *Bombus Hortorum*	partial protection	1	0.13 ha	118, Km 39,500	b117
bumblebee red-gray Bombus Sylvarum	partial protection	1	0.11 ha	201, Km 190,200	b242

Polish and Latin name	Protection status	Number of areas	Surface	Habitat location (line, kilometre) in option W1 (W2)[14]*	ID code
Bumblebee yellow *Bombus muscorum*	partial protection	1	0.07 ha	201, Km 161,100	b192
Red forest ants *Formica rufa, F. polyctena*	partial protection	63	24.03 ha	214, Km 2,800	b111
				229, Km 34,700	b130
				229, Km 34,700	b131
				201, Km 151,100	b18
				201, Km 174,200	b55
				201, Km 174,100	b56
				201, Km 192,100	b75
				201, Km 192,200	b76
				201, Km 165,600	b92
				201, Km 165,400	b93
				201, Km 164,900	b94
				201, Km 172,000	b135
				201, Km 172,200	b136
				201, Km 170,000	b141
				201, Km 141,900	b167
				201, Km 144,200	b171
				201, Km 146,500	b175
				201, Km 155,200	b180
				201, Km 174,700	b206
				201, Km 173,700	b208
				201, Km 182,800	b227
				201, Km 183,400	b228
				201, Km 189,500	b237
				201, Km 189,600	b239
				201, Km 189,700	b240
				201, Km 191,600	b248
				201, Km 201,000	b251
				201, Km 146,463	b421
				201, Km 151,256	b417
				201, Km 142,953	b439
				201, Km 151,74	b449
				201, Km 147,386	b450
				201, Km 147,119	b451
				201, Km 141,934	b167
				201, Km 151,248	b41
				201, Km 165,289	b93
				201, Km 165,284	b93
				201, Km 165,352	b93
				201, Km 174,000	b56
				201, Km 189,500	b237
				214, Km 4,300	b270
				214, Km 4,200	b272
				214, Km 4,600	b274
				214, Km 5,500	b278
				214, Km 5,800	b280
				214, Km 2,500	b110
				214/229 Km 10,750 (214/229, Km 10,750)	b298
				214/229 Km 11,250 (214/229, Km 11,240)	b304
				214, Km 4,300	b270
				214, Km 5,600	b278
				214/229 Km 10,650 (214/229, Km 10,640)	b44
				214, Km 39,700	b46
				229, Km 39,300	b47
				229, Km 38,800	b48

Polish and Latin name	Protection status	Number of areas	Surface	Habitat location (line, kilometre) in option W1 (W2)[14]*	ID code
				229, Km 38,200	b49
				229, Km 38,000	b120
				229, Km 34,900	b129
				229, Km 34,700	b130
				229, Km 34,200	b132
				229, Km 34,100	b134
				229, Km 39,400	b309
				229, Km 33,850	b403
				229, Km 33,914	b404

Source: own development

** habitats located at a distance of less than 15 m from the axis of the analysed railway lines (marked blue)Insects (Insecta): Butterflies (Lepidoptera) and beetles (Coleoptera)*

During the natural inventory of investments in the 150 m buffer, 1 species of butterfly was found: red *Lycaena dispar* and 1 species of beetle: leather runner *Carabus coriaceus*. Both species are common in Poland and the region, thus these insects are not threatened by planned works and operation of the railway line.

Tab.61 List of butterfly and beetle species with regard to their status protection

Polish and Latin name	Protection status	Number of areas	Surface	Habitat location (line, kilometre) in option W1 (W2)*	ID code
Red *Lycaena dispar*	strict protection	6	0.57 ha	201, Km 157,100	b21
				201, Km 161,000	b33
				201, Km 167,300	b54
				201, Km 185,300	b69
				201, Km 190,100	b73
				201, Km 165,900	b26
				214, Km 0,900	b100
Leather runner *Carabus coriaceus*	partial protection	2	0.14 ha	201,Km 197,400	b80
				214, Km 5,200	b276

Source: own development
** habitats located less than 15 m from the axis of the analysed railway lines (indicated in blue)*

3.9.3.2 Fish (ichthiophauna)

The ichthio-aunistic inventory was used to determine the place of occurrence and to determine the conservation status of populations of species species under national law and listed in Annexes II, IV and V of Habitats Directive 92/43/EW within a buffer of 150 m on each side of the railway lines of the study.

The positions that were subject to inventory were appointed during chamber works, based on orthophotomaps. The suitability of pre-selected sites for fish and minogling in individual waters has been verified during the field inspection, in such a way that the extracted fragments of watercourses or standing water bodies are representative in terms of the differentiation of micro-habitats for the entire buffer.

Field visions were carried out in September and October 2016 and included a buffer area of 150 m on both sides of railway lines 201, 214, 229 and link lines 201 and 229. In the buffer 2x 150 m from the junction line 214 with line 229, no works were carried out due to the lack of water bodies. As a result of conducted electro-fishing and as a result of obtaining legal information from water users, 7 species were found, including 5 taxa listed in the Annexes to the Habitats Directive (Council Directive 92/43/EEC), i.e.: flux blister, goat (=common goat), white-tip head, chicks and roses. These taxa are also covered by partial protection under the Regulation of the Minister of the Environment of 16 December 2016 on animal species protection.

In addition, the presence of liquor (species listed in the Habitats Directive and with a protection dimension and period in Polish legislation) and saliva (a species covered by partial protection, listed in the Regulation of the Minister of the Environment of 16 December 2016) have been shown.

Tab.62 List of species with regard to their conservation status and the sensitivity of habitats to the impact of construction works and the operation of the railway line of protected fish species and mines inventoryed on watercourses and reservoirs in buffer 2x150 m from railway lines 201 and 214.

LP.	Polish and Latin name	Hazard category[1]	Protection status	Habitat location (line, kilometre)/avenue**	Number of posts	Sensitivity of species habitats to the impact of construction works and the operation of railway lines
1.	Streaming mound *Lampetra planeri*	VU	partial protection, Annex II DS	201, Km 167,900/Radunia 201, Km 173,100/Radunia	2	very sensitive habitat: characterised by high hydrological diversity (differentiated flow), morphological (gravel-stone substrates with adjacent mud nanoses) and little anthropogenic transformation, inhabited by sensitive species
2.	Goat (=common goat) *Cobitis taenia*	LC	partial protection	201, Km148,500/Jez. Dąbrowskie 201, Km 148,600/trial from Jez. Potulski 201, Km 152,300/Jez. Potulskie 201, Km 154,500/Jez. Ostrzyckie 201, Km 163,652/Radunia 201, Km 167,900/Radunia 214 Km, 0.814/Radunia	7	medium sensitive habitat: characterised by moderate hydrological and morphological diversity (small substrate differentiation; present minimum one dominant type of natural substrate) and moderately transformed anthropogenic, inhabited by medium sensitive species
3.	Rose *of Rhodeus amarus*	VU	partial protection, Annex II DS	201, Km 141,500/Jez. Spindles 201, Km 152,300/Jez. Potulskie 201, Km 154,500/Jez. Ostrzyckie 201, Km 165,900/Radunia 201, Km 188,100/Jez. Wysockie	5	medium sensitive habitat: characterised by moderate hydrological and morphological diversity (small substrate differentiation; present minimum one dominant type of natural substrate) and moderately transformed anthropogenic, inhabited by medium sensitive species
4.	Whitetip head *Cottus gobio*	VU	partial protection, Annex II DS	201, Km 163,652/Radunia 201, Km 167,900/Radunia	6	very sensitive habitat: characterised by high hydrological diversity (differentiated flow), morphological (gravel-stone substrates with

LP.	Polish and Latin name	Hazard category[1]	Protection status	Habitat location (line, kilometre)/avenue*** †††	Number of posts	Sensitivity of species habitats to the impact of construction works and the operation of railway lines
				201, Km 173,100/Radunia 201, Km 175,400/Radunia 201, Km 177,364/Little Słupin 214, Km 0,814/Radunia		adjacent nanoses of silt) and to a small extent anthropogenic, inhabited by sensitive species
5.	Piskorz Misgurnus fossilis	VU	partial protection, Annex II DS	201, Km 167,900/Radunia 201, Km 173,100/Radunia 201, Km 185,800/Shooting tributary 201, Km 189,400/Jez. Wysockie 214, Km 0,814/Radunia	5	medium sensitive habitat: characterised by moderate hydrological and morphological diversity (small substrate differentiation; present minimum one dominant type of natural substrate) and moderately transformed anthropogenic, inhabited by medium sensitive species
6.	Slili (= common slip) *Barbatula barbatula*	LC	partial protection	201, Km 173,100/Radunia 201, Km 175,400/Radunia 201, Km 184,500/Shoulder	3	relatively insensitive habitat: characterised by low hydromorphological diversity, often significantly transformed anthropogenically and inhabited by non-sensitive species
7.	*Thymallus thymallus*	CD	protective dimension (30 cm), protection period from day 1, Annex V DS	201, Km 177,364/Little Słupin	1	very sensitive habitat: characterised by high hydrological diversity (differentiated flow), morphological (gravel-stone substrates with adjacent mud nanoses) and little anthropogenic transformation, inhabited by sensitive species

Source: own development

*threat*** level in Poland/in the Vistula basin according to: Witkowski A., Kotusz J., Przybylski M. 2009. Level of threat to freshwater ichthyofauna in Poland: Red List of Minogs and Fishes – State of 2009. Let's protect Mother Nature 65 (1): 33-52*
Hazard category: VU – exposed, LC – least (reduced) care species, CD – species dependent on conservation
†††habitats located less than 15 m from the axis of the analysed railway lines (indicated in blue)

In view of the presence of protected fish species, the following positions should be considered as the most valuable within the buffer of 2 x 150 m line 201:

- km 163,652, crossed by the railway line – Radunia, inhabited by a goat and a white-tip head,
- km 177,364, crossed by the railway line – Little Słupina, inhabited by limp and white-tipped head.

Due to the presence of protected fish species (white-tip header, goat, piscorz) the most valuable within the buffer 2 x 150 m line 214 should be considered the site located on the Radunia watercourse (km 0,814).

<u>Summary</u>

Areas at particular risk of construction work should be considered primarily the places of intersection of the waters flowing with the railway lines concerned, including mainly the Radunia liquid (line 201, km 163,652; line 214, km 0,814) and Liek Mała Słupina (line 201, km 177,364). Other controlled sections of Radunia and other watercourses contained in a buffer of 2 x 150 m in relation to the railway lines concerned are not crossed by them, are at a relatively long distance from the track or are not inhabited by protected species of fish and minogs.

Existing and planned for modernisation engineering infrastructure may limit fish migration through, among others, modification of light conditions and degradation of the ground. Natural elements used to fortify crossings, e.g. stone overhead, as well as submerged structural elements, can however be a habitat for living and breeding for certain species of fish, e.g. saliva and whitetip head. The functioning railway infrastructure is not the cause of fish mortality (except for railway accidents).

3.9.3.3 Herpetofauna

The inventory of amphibians and reptiles covered the entire test sections of railway lines No 201, 214, 229 and interconnectors. The tests covered all potential (selected at the stage of chamber work) and existing verified breeding sites, as well as the occurrence and migration of amphibians and reptiles in a buffer of 2x150 m from the axes of these railway lines.

As part of the amphibious inventory work, five species were found throughout the research area: gray toad *(Bufo bufo),* grass frog *Rana temporaria,* gore frog *Rana arvalis*, earth crest *Pelobates fuscus, Triturus vulgaris commonweed* and one group of species: frogs from the group of green *Pelophylax esculenta complex.*

Tab.63 A breakdown of amphibious species with regard to their conservation status and habitat sensitivity.

LP.	Polish and Latin name	Protection status	Habitat location (line, kilometre, distance from railway line [m]) in option W1 (W2)[16]*	Number of posts (including at risk**)	Assessment of habitat sensitivity to the impact of construction works and railway operation
1.	Crest *Pelobates fuscus*	strict protection	201, Km 140,859, approx. 8 m from the line	3 (1)	Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 157,095, approx. 57 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 166,771, approx. 113 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
2.	Complex of green frogs *Pelophylax esculentus complex*	partial protection	201, Km 137,538, approx. 66 m from the line	49 (5)	Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 138,361, approx. 16 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 139,432, approx. 8 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 139,803, approx. 35 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 139,975, approx. 56 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 140,522, approx. 61 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 140,161, approx. 19 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 140,511, approx. 105 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 140,929, approx. 80 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 140,859, approx. 8 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line

[16] In brackets indicate the location of the stations for the alternative option (W2)

LP.	Polish and Latin name	Protection status	Habitat location (line, kilometre, distance from railway line [m]) in option W1 (W2)[16]*	Number of posts (including at risk**)	Assessment of habitat sensitivity to the impact of construction works and railway operation
			201, Km 140,742, approx. 40 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 141,413, approx. 27 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, v141,921, approx. 31 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 142,167, approx. 75 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 142,535, approx. 58 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 143,635, approx. 55 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 144,495, approx. 83 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 147,969, approx. 28 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 152,571, approx. 30 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 154,076, approx. 44 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 154,89, approx. 111 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 155,3, approx. 44 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 157,095, approx. 57 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 159,802, approx. 19 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 160,863, approx. 47 m		Relatively insensitive to the impact of construction works and operation

LP.	Polish and Latin name	Protection status	Habitat location (line, kilometre, distance from railway line [m]) in option W1 (W2)[16]*	Number of posts (including at risk**)	Assessment of habitat sensitivity to the impact of construction works and railway operation
					railway line
			201, Km 161,202, approx. 37 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 162,382, approx. 51 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 163,606, approx. 0 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 164,136, approx. 25 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 164,469, approx. 70 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			229, Km 167,918, approx. 14 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			214, Km 6.58, ca. 21 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			229, Km 37,399, approx. 74 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			229.3 Km 6.238, approx. 49 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			229, Km 35,402, approx. 40 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 35,317, approx. 127 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 34,656, approx. 50 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 174,754, approx. 22 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 175,822, approx. 45 m from the line		Medium sensitive to the impact of construction works and railway operation

LP.	Polish and Latin name	Protection status	Habitat location (line, kilometre, distance from railway line [m]) in option W1 (W2)[16]*	Number of posts (including at risk**)	Assessment of habitat sensitivity to the impact of construction works and railway operation
			201, Km 175,948, approx. 28 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 184,704, approx. 55 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 184,938, approx. 96 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 184,998, approx. 27 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 185,345, approx. 15 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 185,543, approx. 88 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 188,937, approx. 120 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 189,497, approx. 72 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 193,182, approx. 35 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 194,671, approx. 20 m from the line		Medium sensitive to the impact of construction works and railway operation
3.	Toad gray *Bufo bufo*	partial protection	201, Km 137,538, approx. 66 m from the line	25 (2)	Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 138,361, approx. 16 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 139,975, approx. 56 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 140,511, approx. 105 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 140,859, approx. 8 m		Medium sensitive to the impact of construction works and line

LP.	Polish and Latin name	Protection status	Habitat location (line, kilometre, distance from railway line [m]) in option W1 (W2)[16]*	Number of posts (including at risk**)	Assessment of habitat sensitivity to the impact of construction works and railway operation
					railway
			201, Km 142,167, approx. 75 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 142,535, approx. 58 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 157,095, approx. 57 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 158,423, approx. 130 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 160,863, approx. 47 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 167,062, approx. 72 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 166,771, approx. 113 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			229, Km 37,399, approx. 74 m from the line		Medium sensitive to the impact of construction works and railway operation
			229, Km 35,317, approx. 127 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			229, Km 34,656, approx. 50 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 175,822, approx. 45 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 175,948, approx. 28 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 184,215, approx. 45 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 184,938, approx. 96 m from the line		Medium sensitive to the impact of construction works and railway operation

LP.	Polish and Latin name	Protection status	Habitat location (line, kilometre, distance from railway line [m]) in option W1 (W2)[16]*	Number of posts (including at risk**)	Assessment of habitat sensitivity to the impact of construction works and railway operation
			201, Km 184,998, approx. 27 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 185,345, approx. 15 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 185,543, approx. 88 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 189,497, approx. 72 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 193,182, approx. 35 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 194,671, approx. 20 m from the line		Medium sensitive to the impact of construction works and railway operation
4.	*Lissotriton vulgaris*	partial protection	201, Km 140,338, approx. 23 m from the line	6 (0)	Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 159,040, approx. 20 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			229, Km 34,656, approx. 50 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 184,215, approx. 45 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 193,182, approx. 35 m from the line		Medium sensitive to the impact of construction works and railway operation
			214, Km 5,556, approx. 61 m from the line		Medium sensitive to the impact of construction works and railway operation
5.	Gore frog *Rana arvalis*	strict protection	201, Km 139,975, approx. 56 m from the line	10 (0)	Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 140,511, approx. 105 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 157,095, approx. 57 m from		Medium sensitive to the impact of construction works and line

LP.	Polish and Latin name	Protection status	Habitat location (line, kilometre, distance from railway line [m]) in option W1 (W2)16*	Number of posts (including at risk**)	Assessment of habitat sensitivity to the impact of construction works and railway operation
					railway
			201, Km 169,553, approx. 111 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			229, Km 34,656, approx. 50 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 175,948, approx. 28 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 184,704, approx. 55 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 193,182, approx. 35 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 194,671, approx. 20 m from the line		Medium sensitive to the impact of construction works and railway operation
6.	*Rana temporaria grass*frog	partial protection	214, Km 5,556, approx. 61 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 137,538, approx. 66 m from the line	25 (1)	Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 138,361, approx. 16 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 139,975, approx. 56 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 140,338, approx. 23 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 140,511, approx. 105 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 142,167, approx. 75 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 142,475, approx. 22 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line

LP.	Polish and Latin name	Protection status	Habitat location (line, kilometre, distance from railway line [m]) in option W1 (W2)16*	Number of posts (including at risk**)	Assessment of habitat sensitivity to the impact of construction works and railway operation
			201, Km 142,535, approx. 58 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 154,89, approx. 111 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 157,095, approx. 57 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 158,423, approx. 130 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 159,04, approx. 20 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 159,802, approx. 29 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 165,569, approx. 81 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 166,771, approx. 113 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 169,553, approx. 111 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			229, Km 35,317, approx. 127 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			229, Km 34,656, approx. 50 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 175,948, approx. 28 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 184,215, approx. 45 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 184,704, approx. 55 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 185,345, approx. 15 m from		Medium sensitive to the impact of construction works and line

LP.	Polish and Latin name	Protection status	Habitat location (line, kilometre, distance from railway line [m]) in option W1 (W2)[16]*	Number of posts (including at risk**)	Assessment of habitat sensitivity to the impact of construction works and railway operation
					railway
			201, Km 193,182, approx. 35 m from the line		Medium sensitive to the impact of construction works and railway operation
			201, Km 194,671, approx. 20 m from the line		Medium sensitive to the impact of construction works and railway operation
			214, Km 5,556, approx. 61 m from the line		Relatively insensitive to the impact of construction works and the operation of the railway line

Source: own development
** habitats located less than 15 m from the axis of the analysed railway lines (indicated in blue)*
*** sites at risk of destruction are located less than 15 m from the axis of the analysed railway lines*

All the species found in the research area belong to common species and quite numerous on a national and regional scale. Based on past observations, it can be concluded that none of the sections of the test lines or any of the habitats shown are particularly important or sensitive for amphibians.

Amphibious migration routes have been identified from km 138,361 to km 138,741 LK 201, from km 157,095 to km 157,124 LK 201, from km 159,802 to km 159,932 Lk 201, from 193,182 to km 193,634 LK 201 and from km 5,556 to km 5,749 LK 214.

An inventory of the test site showed the presence of 2 reptile species: lizards (*Lacerta agilis*) and vivipara lizards (*Zootoca vivipara*). In total, 31 sites were recorded – mainly within well sunny grasslands overgrowing railway embankments and on the edge of forest complexes. The lizard was observed at 28 positions and a vivid lizard at 3 positions. Among the sites where reptiles were found dominated by grasslands on railway embankments and dry grasslands on the edge of coniferous and mixed forests.

On the basis of the field inspections carried out, reptile habitats were selected for the purposes of the natural expertise and were assessed in terms of sensitivity to the impact of construction works and the operation of the railway line. When assessing the potential hazard of amphibious habitats from the operation of railway lines, account was taken in particular of the sensitivity of the habitat to the potential negative impact, relevance and functions performed for the local population of the species/species concerned, and the status of the species present on it.

Tab.64 A breakdown of reptile species in relation to their conservation status and habitat sensitivity.

L.P.	Polish and Latin name	Protection status	Habitat location (line, kilometre, distance from railway line [m]) in option W1 (W2)16*	Number of posts (including at risk**)	Habitat sensitivity
1.	Lizard agilis *Lacerta agilis*	partial protection	201, Km 141,700 approx. 2 m from the line 201, Km 155,600 approx. 1 m from the line 201, Km 171,000 approx. 3 m from the line 229, Km 34,000 approx. 1 m from the line 201, Km 175,200 approx. 2 m from the line 201, Km 139,700 approx. 24 m from the line 201, Km 139,800 approx. 11 m from the line 201, Km 140,000 approx. 7 m from the line 201, Km 145,500 approx. 126 m from the line 201, Km 145,400 approx. 69 m from the line 201, Km 145,500 approx. 54 m from the line 201, Km 165,600 approx. 13 m from the line 201, Km 165,600 approx. 17 m from the line 201, Km 165,700 approx. 17 m from the line 201, Km 176,400 approx. 15 m from the line 201, Km 176,300 approx. 9 m from the line 201, Km 176,300 approx. 35 m from the line 201, Km 185,100 approx. 16 m from the line 201, Km 185,200 approx. 8 m from the line 201, Km 185,300 approx. 10 m from the line 201, Km 185,400 approx. 13 m from the line	28 (15)	Relatively insensitive to the impact of construction works and the operation of the railway line

16In brackets the location of the workstations for the alternative option (W2) is indicated.

L.P.	Polish and Latin name	Protection status	Habitat location (line, kilometre, distance from railway line [m]) in option W1 (W2)[17]*	Number of posts (including at risk**)	Habitat sensitivity
			201, Km 185,500 approx. 4 m from the line		
			201, Km 185,600 approx. 13 m from the line		
			201, Km 185,600 approx. 13 m from the line		
			201, Km 186,100 approx. 17 m from the line		
			201, Km 191,900 approx. 43 m from the line		
			201, Km 192,000 approx. 29 m from the line		
			201, Km 192,300 approx. 32 m from the line		
2.	Live lizard *Zootoca vivipara*	partial protection	201, Km 185,500 approx. 1 m from the line	3 (3)	Relatively insensitive to the impact of construction works and the operation of the railway line
			201, Km 199,000 approx. 1 m from the line		
			201, Km 185,700 approx. 7 m from the line		

Source: own development
** stations located less than 15 m from the axis of the analysed railway lines (indicated in blue)*
*** sites at risk of destruction are located less than 15 m from the axis of the analysed railway lines*

Both identified species belong to partially protected species and are fairly common animals, and none of the sections of lines 201, 229 and 214 are particularly important or sensitive to them. Based on observations to date, no increase in the barrier effect for this group of animals is expected as a result of the planned work. Taking into account the identified poor species composition and the observed abundance, it is not possible to identify valuable or relevant areas for reptile populations. None of the positions identified require additional safeguards or measures to minimise the potential negative impact of the line. No dead individuals were found within the track or in the vicinity of engineering facilities.

3.9.3.4 Birds

Inventory work along the test line showed the presence of 76 bird species, including: 65 species under strict protection, 6 species under partial protection and 5 wild game species. There are 6 species listed in Annex I to the Birds Directive. No species entered in the Polish Red Book of Animals were detected.

The number of species found does not include the full avifauna inhabiting or using the surroundings of the railway line. The studies carried out in March and April did not cover breeding species late returning from winters. This applies to a number of common species, but also to key species that are likely to nest or may nest in an inventory area (including: ternwy *Sterna sp.* i *Chlidonias sp.*, crockery, lelek, lerk, small flyfish, sponge, ortholan).

As part of the ornithological inventory, nesting in the inventory area of rare species of birds subject to zone protection (rare claw species and black stork) was excluded. No endangered species have been identified at national or regional level.

A number of sites of wet bird species have been detected (crow, swan dummy, cyan, water, coconut, loner, perch). Breeding habitats of this group of birds can be considered the most ornithologically valuable natural sites in the inventory area. These objects are most likely also inhabited by other species associated with aquatic and wet habitats) e.g. buzzard, streaming, crickets, cane, cane, sea buckthorn, etc. The presence of these species cannot be excluded even though they have not been detected during the inventory.

Tab.65 Species composition of avifauna observed during field inspections.

LP.	Polish and Latin name	Protection status	Status on the test site	Observation information
1.	Swan dumb *Cygnus olor*	strict protection	nesting likely	Two nesting stations of the mute swan were detected
2.	Circa *Anas crecca*	strict protection	nesting likely	One breeding post detected (1 – 2 breeding pairs)
3.	Crossword *Anas platyrhynchos*	wild species	certain nesting	Breeding species on most bodies of water within the inventory area
4.	Nurogear *Mergus merganser*	strict protection	nesting likely NL	Observed in two locations. Possible nesting along the Raduni River and lakes, on forest sections
5.	Partridge *Perdix perdix*	wild species	nesting likely	Few breeding pairs recorded on sections dominated by farmland
6.	Pheasant *Phasianus colchicus*	wild species	nesting likely	Found on sections with dominance of agricultural fields and meadows
7.	Perkozek *Tachybaptus ruficollis*	strict protection	nesting likely	3 breeding posts of the percose were detected
8.	Perkoz two- *couch Podiceps cristatus*	strict protection	nesting likely	1 breeding post of bichrome percose detected
9.	Kormoran *Phalacrocorax carbo*	partial protection	non-breeding species, infused with a research trust	Observed transient, incoming individual individuals, in the area of large lakes
10.	*Ardea cinerea* grey cap	partial protection	non-breeding species, infused with a research trust	Observed transient, fluctuating and feeding individuals, in the area of water reservoirs
11.	White stork *Ciconia ciconia*	strict protection, Annex I DP	certain nesting	Two occupied white stork nests were detected on the poles of the electric line within the rural farmland
12.	Joint mudguard *Circus aerigunosus*	strict protection, Annex I DP	nesting likely	Two breeding stations were detected. Non-breeding individuals also fly into the inventory area using it as a feeding ground.
13.	Hawk *Accipiter gentilis*	strict protection	nesting likely	Nesting in the buffer zone is not confirmed, although likely in 1 location due to direct observations of the bird and double detection of foraging traces

LP.	Polish and Latin name	Protection status	Status on the test site	Observation information
14.	Buzzard *Buteo Buteo*	strict protection	certain nesting	One breeding territory with a nest was detected. Nesting of mice in the vicinity of the inventory area is possible in 4 locations – not confirmed in the buffer zone, but likely in the vicinity. Gerbils fly into the inventory area using it as a feeding ground
15.	Aquarius *Rallus aquaticus*	strict protection	nesting likely	4 waterborne breeding posts were detected
16.	Kokoszka *Gallinula chloropus*	strict protection	nesting likely	5 Coconut Breeding Stations Detected
17.	Glimpses *Fulica atra*	wild species	nesting likely	Few nesting species on water reservoirs
18.	Crane *Grus grus*	strict protection, Annex I DP	certain nesting	8 breeding sites of the crane have been detected
19.	Chaika *Vanellus vanellus*	strict protection	non-breeding species, infused with a research trust	Observations of individuals flying outside the inventory area
20.	Loner *Tringa ochropus*	strict protection	nesting likely	1 breeding post detected
21.	Laughing *Larus ridibundus*	strict protection	non-breeding species, infused with a research trust	Observed transient, fluctuating and feeding individuals, in the area of water reservoirs
22.	MEWA silvery *Larus argentatus*	partial protection	non-breeding species, infused with a research trust	Observed transient, fluctuating and feeding individuals, in the area of water reservoirs
23.	Bruising *Columba Oenas*	strict protection	nesting likely	4 breeding posts of bruising have been detected
24.	Heater *Columba palumbus*	wild species	certain nesting	Common breeding species
25.	Augustine *Streptopelia decaocto*	strict protection	nesting likely	Common breeding species of human habitats
26.	Green woodpecker *Picus viridis*	strict protection	nesting likely	7 green woodpecker breeding sites detected
27.	Black woodpecker *Dryocopus martius*	strict protection, Annex I DP	nesting likely	1 black woodpecker breeding post detected

LP.	Polish and Latin name	Protection status	Status on the test site	Observation information
28.	Woodpecker Large *Dendrocopos Major*	strict protection	certain nesting	Common breeding species in forest areas and trees
29.	Medium woodpecker *Dendrocopos medius*	strict protection, Annex I DP	nesting likely	2 breeding posts of medium woodpecker were detected
30.	Woodpecker *Dendrocopos minor*	strict protection	nesting likely	4 breeding posts of woodpecker have been detected
31.	Lerka *Lullula arborea*	strict protection, Annex I DP	migratory species, nesting likely	During the inventory period, migratory individuals were observed. In the inventory area there are optimal habitats for nesting this species. Socketing can be considered probable
32.	Lark *Alaudo arvensis*	strict protection	nesting likely	Common breeding species in grassland and meadow areas
33.	Meadow spruce *Anthus pratensis*	strict protection	nesting likely	Few breeding species of moist and wet meadows
34.	Grey follicle *Motacilla alba*	strict protection	nesting likely	Common breeding species in open areas
35.	Troglodytes *Troglodytes Triglodytes*	strict protection	nesting likely	Common breeding species in forest areas and trees
36.	Urticaria *Prunella modularis*	strict protection	nesting likely	Common breeding species in forest areas and trees
37.	Redhead *Erithacus rubecula*	strict protection	nesting likely	Common breeding species in forest areas and trees
38.	Cinderella *Phoenicurus ochruros*	strict protection	nesting likely	Common breeding species of human habitats
39.	Kos *Turdus merula*	strict protection	certain nesting	Common breeding species in forest areas and trees
40.	Squirrel *Turdus pilaris*	strict protection	nesting likely	Common breeding species in forest areas and trees
41.	Singer *Turdus philomelos*	strict protection	nesting likely	Common breeding species in forest areas and trees
42.	Pâté *Turdus viscivorus*	strict protection	nesting likely	Common breeding species in forest areas

LP.	Polish and Latin name	Protection status	Status on the test site	Observation information
43.	Hood *Sylvia atricapilla*	strict protection	nesting likely	Common breeding species in forest areas and trees
44.	Primitive *Phylloscopus collybita*	strict protection	nesting likely	Common breeding species in forest areas and trees
45.	Piecuszek *Phylloscopus trochilus*	strict protection	nesting likely	Common breeding species in forest areas and trees
46.	Mouse roar *Regulus regulus*	strict protection	nesting likely	Common breeding species in forest areas and trees
47.	Wound *Aegithalos caudatus*	strict protection	nesting likely	Common breeding species in forest areas and trees
48.	Sikora poor *Poecile palustris*	strict protection	nesting likely	Common breeding species in forest areas and trees
49.	Blackhead *Poecile montanus*	strict protection	certain nesting	Common breeding species in forest areas and trees
50.	Crimson *Lophophanes cristatus*	strict protection	nesting likely	Common breeding species in forest areas and trees
51.	*Parus ater pine*	strict protection	nesting likely	Common breeding species in forest areas and trees
52.	Larch *Cyanistes caeruleus*	strict protection	certain nesting	Common breeding species in forest areas and trees
53.	The *Rich Parus Major*	strict protection	certain nesting	Common breeding species in forest areas and trees
54.	Kowalik *Sitta europaea*	strict protection	certain nesting	Common breeding species in forest areas and trees
55.	Forest Crawler *Certhia familiaris*	strict protection	nesting likely	Common breeding species in forest areas and trees
56.	*Certhia brachydactyla* Garden Crawler	strict protection	nesting likely	Common breeding species in forest areas and trees
57.	Srokosz *Lanius excubitor*	strict protection	non-breeding species, infused with a research trust	Single observations of incoming individuals from outside the inventory area
58.	Jay *Garrulus glandarius*	strict protection	nesting likely	Common breeding species in forest areas and trees
59.	Sroka *Pica pica*	partial protection	certain nesting	Common breeding species

LP.	Polish and Latin name	Protection status	Status on the test site	Observation information
60.	Coffee *Corvus monedula*	strict protection	certain nesting	Species nesting mainly within human buildings. It's common. Flickering and feeding
61.	Gawron *Corvus frugileus*	strict protection	non-breeding species, infused with a research trust	No breeding colonies were detected in the inventory area. Frequent observations of incoming and preying obstetrics
62.	Crow *Corvus cornix*	partial protection	certain nesting	Common breeding species in forest areas, trees and surroundings of aquatic habitats
63.	Crow Corvus corax	partial protection	certain nesting	5 breeding posts were detected (4 likely and 1 certain)
64.	*Sturnus vulgaris*	strict protection	certain nesting	Common breeding species in forest areas and trees
65.	Mazurek *Passer montanus*	strict protection	nesting likely	Common breeding species
66.	Sparrow *Passer domesticus*	strict protection	nesting likely	Common species of surroundings of human habitats
67.	*Fringilla coelebs*	strict protection	nesting likely	Common breeding species in forest areas and trees
68.	Call *Carduelis chloris*	strict protection	nesting likely	Common breeding species
69.	*Carduelis carduelis*	strict protection	nesting likely	Common breeding species
70.	Is *Carduelis spinus*	strict protection	non-breeding species, infused with a research trust	Single observations of transient individuals. Non-exclusive nesting
71.	Makolagwa *Carduelis cannabina*	strict protection	nesting likely	Common breeding species
72.	Gil *Pyrrhula Pyrrhula*	strict protection	nesting likely	Single observations on hatching sites
73.	*Coccothraustes coccothraustes coccothraustes*	strict protection	nesting likely	Common breeding species in forest areas and trees
74.	Trznadel *Emberiza citrinella*	strict protection	nesting likely	Common breeding species

LP.	Polish and Latin name	Protection status	Status on the test site	Observation information
75.	Pantrail *Emberiza schoeniclus*	strict protection	nesting likely	Common species of scurvy and scrub in the vicinity of aquatic habitats
76.	*Emberiza calandra*	strict protection	nesting likely	Common species of agricultural fields and meadows

Source: own development

Structures related to railway infrastructure and buildings can inhabit species of common birds. These include, among others: Sparrow *Passer domesticus,* mazurek *Passer montanus,* gray follicle *Motacilla alba*, Cinderella *Phoenicurus ochruros*, *Muscicapa striata grey fly* pencil, *Apus apus* ridge, *Hirundo rustica* onions and *Corvus monedula*.

Railway embankments overgrown with shruby vegetation are the habitat of many species of small sparrow birds (Passeriformes). Among the species covered by the inventory, especially geese (Lanius collurio) (Annex I of the Birds Directive) are associated with this type of biotope. It often occurs along the railway line if there are bushes there. It avoids only compact forest complexes, which means that a large part of the sites of the sponge are located outside valuable natural objects. In addition to the presence of shrubs along the line, it is also favored by the xerothermic nature of the embankment habitats and the presence of electrical traction, which is used as a chat room.

The surroundings of the railway line may have different functions for some species of birds. This is especially true for sections passing through forest areas. An open, treeless strip along the track, even narrow, creates a place for birds to feed corridors of free local flights or nesting species that avoid compact stands (e.g. *lerka Lullula arborea*, *trznadel Emberiza citrinella*).

Other forms of use of railway facilities are related to the transfer of birds on them. High, exposed elements of railway infrastructure, e.g. electric traction wires, can act as: resting places, hunting post from seat, observation or mating station. Some species are often seen knitting. The list of bird species whose individuals occasionally or regularly sit on poles or wires of electric traction is very long. It covers almost all bird species except for rows: plaques, combs, cranes, seedlings (except seagulls). The species observed in this way using railway infrastructure include, inter alia, the following species: gerbils, sickle, lerk, sponge, rich, larch, starch, crow, raven, gavron, coffee, jay, trznadel, brush. There were also cases of drumming of woodpeckers with resonating elements: metal poles, tin plates.

3.9.3.5 Bats (chiropterofauna)

During the inspection in the months of August, September, October 2016 and April 2017, inspections were carried out, combined with detector hearings at 7 designated during the work of chamber points and transects and in February 2017, searches for winter hideouts along the entire test section.

Analyses in terms of the occurrence of bats covered the entire section of the Kościerzyna – Gdynia railway line, i.e. lines 201, 214, 229 and planned two connecting points. On this basis, 7 sections were selected for monitoring, on which such species of bats were registered:

1. 141.600 km/line no. 201, gloom, big blueberry,
2. 155,600km/Line No. 201 Mroczek late, type of night,
3. 171,000km/Line No. 201 Borowiec great, Karlik bigger, kind night,
4. 175,000km/Line No. 201 Borowiec great, small Karlik, dwarf bigger, kind of nights,
5. 185,500km/Line No. 201 Borowiec great, Karlik bigger, kind night,
6. 199,000km/Line No. 201 Borowiec great, Karlik bigger,
7. 34.000 km/line no. 229 big blueberry, small dwarf, dwarf bigger, kind of nights.

During all the checks combined with the listening sessions, a total of more than 17.5 hours of material for analysis from listening points and transects was obtained. A total of 144 bat flights were recorded, including 34 large blueberry flights, 25 small dwarf flights, 50 larger dwarf flights, 9 dark flights and 26 night bats.

Tab.66 Average activity indices of individual bat species found on transects and listening points.

Species	Transect/audible point number at which the species was recorded						
	1	2	3	4	5	6	7
twilight late	6,0	2,0					

the Great	2,0		7,0	5,0	3,3	6,0	4,0
type of night		6,0	3,0	4,0	6,0		6
little Karlik				4,0			11,5
Karlik bigger			2,0	4,0	19,3	2,0	12,0

Source: own development

At point 4, the average activity level of individual species was very even during the season and was at the level of 4-5 flights per hour. At point 7, the mean activity of the larger dwarf and the small dwarf was significantly higher (11.5, 12.0 flights per hour). Both sites are located in forest habitats, mixed forests. The highest activity was reached by the dwarf greater – 19.3 units per hour at point 5. This happened twice in the autumn (September, October). These were the highest values ever recorded during all inspections. In this case, the number of units does not represent the number of passing individuals, but only the intensity of the feeding of individual individuals.

The results of observations at other listening points are similar, both in terms of species composition and the average activity shown for each species.

The smallest species variation was recorded at listening spots 1, 2 and 6. These points are located in areas characterised by a mosaic of habitats, with a large share of agricultural and rural areas.

Summing up the results of observation of bat activity, it can be concluded that recorded species at listening points are common in the country and their activity was low and average.

Control of the objects for their use as a winter shelter brought information about 9 habitats of 3 species – brown porch, red night and Natterer night. The exact location of their habitats is given in Chapter 5.1.8. Impact on revived nature.

3.9.3.6 Teriofauna (excluding bats)

An inventory of the entire research area at railway lines showed the presence of 19 species of mammals, of which 7 under partial species protection and 2 listed in Annexes II and IV of the Habitats Directive.

The most common species of polan-forestry mosaic such as deer (*capreolus capreolus*), deer *(Cervus elaphus*), wild boar (*Sus scrofa*) and fox (*Vulpes vulpes*) have been found. Ungulates reach high densities and are found throughout the test area, excluding compact buildings; they are also potentially most vulnerable to collisions with rail vehicles. The largest number of traces intersecting with the railway line was recorded on the part of the closed line 214 behind Kartuza Station and on the recently restored section Kartuzy – Żukowo, low traffic and mileage mainly through forest areas results in high activity of animals in the vicinity of the tracks.

Two species of protected mammals – otters (*Lutra lutra*) and beavers (*Castor fiber*) were found during the tracking. Their presence was found on the basis of bite marks (*beavers*) and traces, faeces (*otter*). Both species inhabit territories that extend far beyond the monitoring areas. Individuals of both species penetrate large areas and lengths of watercourses (in the case of otters up to several dozen kilometers), which is related to habitat quality, food base, period of year, and even the age and sex of the animal. Therefore, it is not possible to determine the exact number of individuals located on the test site, but only to determine the habitats of these species located in the investment area.

Tab.67 List of mammalian species recorded during the inventory.

LP.	Polish and Latin name	Protection status	Number of observations	Estimated numbers for individual observations
1.	Mole *Talpa europaea*	partial protection	35	1
2.	Velvet shrew *Sorex araneus*	partial protection	1	1
3.	East hedgehog *Erinaceus roumanicus*	partial protection	1	1
4.	Hare Grey *Lepus europaeus*	wild species	10	1
5.	Squirrel *Sciurus vulgaris*	partial protection	1	1
6.	European beaver *Castor fiber*	partial protection, Enclosure. 2nd and 4th Habitats Directive	2	1
7.	Mint ore *Myodes glareolus*	–	1	1
8.	Field mouse *Apodemus agrarius*	–	1	1
9.	Asian Yen *Nyctereutes procyonoides*	wild species	1	1
10.	Red fox *Vulpes vulpes*	wild species	15	1
11.	European otter *Luther lutra*	partial protection, Enclosure. 2nd and 4th Habitats Directive	4	4
12.	Home Kuna *Martes Foina*	wild species	2	1
13.	European Badger *Meles meles*	wild species	3	1
14.	*Mustela erminea erminea*	partial protection	1	1
15.	Common coward *Mustela putorius*	wild species	1	1
16.	Wild *Sus scrofa*	wild species	52	1
17.	European deer *Capreolus capreolus*	wild species	103	1-3
18.	Noble deer *Cervus elaphus*	wild species	25	1-2
19.	Daniel Ordinary *Lady Lady*	wild species	2	1

Source: own development

The population of beavers is few in the area studied. Within the buffer of the tested railway lines 201, 214 and 229, only 2 habitats of this species were designated (LK 201, km 141,468 and LK 201 in km 159,633). The beaver is an animal that leads a water-land lifestyle. All of its sites are associated with water. In the studied area it occurred in river valleys, at breeding ponds, and even along drainage channels. It feeds on plant food. In the buffer, no beans or burrows were found. Therefore, the railway line is not burdensome for this species. In the case of this investment, no construction works are foreseen which caused the destruction of beaver habitats or a change of water relations (which could affect these habitats. In conclusion, it should be noted that the works on the railway line will not limit the positions of the presence of beaver and will not affect the deterioration of the foraging base and the possibility of migrating these animals.

The habitats of the second species listed in Annex II and IV of the Habitats Directive are designated in the buffer of railway line 201. Traces of otters and other traces of her presence were recorded in four positions: LK 201 km 137,839, LK 201 km 137,846, LK 201 km 163,570 and LK 201 km 139,394 (and each time there were traces of the presence of a single individual). Otters have small territories and move along watercourses, so no barrier effect is expected. A potential major hazard during construction works is chemical pollution of water caused by failure or leakage.

The list of designated habitats is presented in the table below.

Tab.68 List of habitats of the remaining protected teriofauna found in the inventory buffer.

Habitat ID	Polish name	W1	W2	Overall assessment of mammalian habitat/corridor/increased mammalian activity sites
		Habitat location (line, kilometre)	Habitat location (line, kilometre)	
s9	European beaver (Eurasian)	201, Km 141,468	201, Km 141,472	The species itself creates a habitat, it is mainly active at night, it is not particularly sensitive to noise and the presence of humans. the main thing is not to change the water relations during the reproductive period.
s30	European beaver (Eurasian)	201, Km 159,633	201, Km 159,654	The species itself creates a habitat, it is mainly active at night, it is not particularly sensitive to noise and the presence of humans. the main thing is not to change the water relations during the reproductive period.
s1	European otter	201, Km 137,846	201, Km 137,853	Mobile and currently not particularly sensitive to the presence of people or train traffic, areas adjacent to the railway line use mainly as temporary places of residence, local migrations
s3	European otter	201, Km 139,394	201, Km 139,410	Mobile and currently not particularly sensitive to the presence of people or train traffic, areas adjacent to the railway line use mainly as temporary places of residence, local migrations
s33	European otter	201, Km 163,570	201, Km 163,576	Mobile and currently not particularly sensitive to the presence of people or train traffic, areas adjacent to the railway line use mainly as temporary places of residence, local migrations

Source: own development

Summary

As a result of the natural inventory carried out in the buffer 150 m from the extreme track axis of railway lines 201, 214, 229 and two interconnectors, 13 Natura 2000 natural habitat types (including 3 priority), 3 vascular plant species and 6 moss species were found to be partially protected. Among the identified natural habitats most likely to be destroyed in the 15 m buffer are: peatlands (7110, 7140, 7230), logs (91E0, 91F0), oldwood and natural reservoirs (3150), acid and fertile beech (9110, 9130) and sub-Atlantic (9160). In the planned investment area, 14 species of macroscopic fungi and 14 species of lichens were also identified.

The identified fauna in the investment area covers the presence of 20 species of invertebrates, including 18 species under species protection, 7 species of fish and minogs, including 5 taxa listed in the Annexes to the Habitats Directive, 5 species of amphibians and one group of species, 2 reptile species, 76 species of birds, including 65 species under strict protection, 6 species of partial protection, 6 species listed in Annex I to the Birds Directive and 5 species of wildlife, 8 species of bats and 19 species of mammals, of which 7 under partial species and 2 listed in Annexes II and IV of the Habitats Directive.

Ecological corridors

Ecological corridors are areas for the migration of plants, animals or fungi. They are linear strips of forests, areas covered with shrubs or grasses that allow animals to move and provide shelter and access to food. The existence of these areas determines the proper development of the species, makes it possible to find territory, facilitates escape from predators.

At a distance of up to 10 km from the analysed railway lines, three ecological corridors were located:

- Tucholskie Bory (GKPn – 16),
- Kashubia – intersection (KPN – 20B),
- Forests of Powiśla – intersections (KPN – 16A).

The table below shows the course of the analysed railway line in relation to the ecological corridors.

Tab.69 Summary of ecological corridors up to 10 km from the axis the designed track.

Name of the ecological corridor	Line number	Line page	Mileage [km]	Distance from line axis/intersection length
Bory Tucholskie (GKPn – 16)	201	L	136,096	450
Kashubia – (KPN – 20B)	201	Intersection	from 145,600 to 148,215	2 615
Powiśla Forests – (KPN – 16A)	201	Intersection	up to 148,215 to 159,660	10 120

Source: own development

The planned investment in both options interferes equally with the existing ecological corridors.

Game migration takes place mainly in places where railway lines intersect forest complexes, especially those with smaller areas, in such places an increased number of intersections of game tracks with the railway line can be observed. The inventory area is dominated by ungulates (noble deer, European deer, wild boar). These species cope well with overcoming tracks and are common (often in large densities) across the country and region, but are exposed to collisions with rail vehicles, which, due to their size, poses a potential threat to traffic. In these episodes, there were also cases of death due to collisions with the train – but these were occasional events. 17 corridors for the movement of land and water-land mammals have been designated.

Tab.70 List of designated migration routes for the remaining teriofauna.

LP.	Dominant species	Location (line, mileage)
1.	deer	201, Km 141,313 – 141,900
2.	deer	201, Km 144,078 – 144,485
3.	deer, deer	201, Km 145,678 – 145,856
4.	deer, deer, wild boar	201, Km 156,540 – 157,308
5.	wild boar, deer	201, Km 157,513 – 157,958
6.	wild boar, deer, badger	201, Km 159,660 – 160,316
7.	otter	201, Km 137,846 – 139,394
8.	wild boar, deer	201, Km 164,860 – 165,460
9.	deer, wild boar, deer	201, Km 169,344 – 170,416
10.	boar	201, Km 172,469 – 173,119
11.	deer, deer	201, Km 190,973 – 191,432
12.	deer, deer	201, Km 193,154 – 193,810
13.	deer, wild boar	201, Km 197,931 – 198,799
14.	wild boar and other small	229, Km 34,038 – 34,977
15.	deer, wild boar	229, Km 38,266 – 39,411
16.	deer, wild boar, deer	214, Km 0,740 – 0.513
17.	deer, wild boar	214, Km 5,293 – 6.313

Source: own development

2. 10 Areas and objects protected under the Act on the Protection of Monuments

The analysis of the potential impact of the planned investment on the cultural environment was carried out on the basis of the following legal acts:

3. Act of 23 July 2003 on the protection of monuments and the care of monuments (uniform text: Dz. U. 2014, item. 1446),
4. Ordinance of the Minister of Culture and National Heritage of 26 May 2011 on keeping the register of monuments, national, provincial and municipal records of monuments and the national list of monuments stolen or exported abroad unlawfully (Journal of Laws No. U. No. 113, item. 661, as amended),
5. Ordinance of the Minister of Culture and National Heritage of 22 June 2017 on the conduct of conservation works, restoration works and conservation research at a monument entered in the register of monuments or on the List of Heritage Treasures and construction works, architectural research and other activities related to monuments entered in the register of monuments, as well as archaeological research and search for monuments (Journal of Laws No. U. 2017, item 1265),

and on the basis of information obtained from the city/municipal offices through which the investment takes place. Below is a list of letters obtained:

- Letter from the Municipality of Kościerzyna dated 5.6.2018 (ref.: WRiP.412.01.2.2018).
- Letter of the Stężyc Municipality Office dated 24.5.2018 (ref.: AO.4120.2.2018.WC).
- Letter of the Kościerzyn Municipality Office of 21 May 2018

- Letter from the Authority Cities of Gdynia dated 12.6.2018 (sign: UKZ.1431.4.2018.AL).
- Letter from the Authority Cities of Gdańsk dated 10.6.2018 (sign: BMKZ.4125.838.2018.GZ).
- Letter from the City Hall of Kartuzy, dated 17.05.2018 (sign: U.6724.5.82.2018.AA).
- e-mail from the Office Communes of Żukowo dated 13.6.2018
- e-mail from the Office Communes of Somonino of 17.5.2018

The above letters are textual annex 3.10.1-1 to this study.

In addition, the conservation arrangements set out in the local spatial development plans were analysed.

Detailed analysis covered the area in the belt about 200 m from the axis of the planned investment. Based on the information obtained, it appears that in the area of the planned investment, historical objects entered in the register of monuments, archaeological sites and architectural immovable monuments listed in the municipal register of monuments are located. These objects are illustrated by the tables below. Graphically, historical objects and archaeological sites are presented in the map appendix 3.10-1.

<u>Monuments included in the register of monuments</u>

The table below shows a list of cultural objects entered in the register of monuments.

Tab.71. List of monuments included in the register of monuments, distance from the designed line the railroad.

LP.	Number on the map*	Address	Register number of monuments of the Pomeranian Voivodeship	Object	Indicative mileage of the railway line	Distance to railway line (extreme track) and right/left side [m]
city of Kościerzyna						
1	**1**	Kościerzyna	No. 925 of dn. September 25, 1978.	Urban complex of the city Kościerzyna	138,000	300 m/left
2	**2**	Kościerzyna, ul. Goods 7	Number A-1868 of dn. 17.12.2010	Steam locomotive assembly	137,200	10 m/right
3	**3**	Kościerzyna, Dworcowa 33	Number A-1894 of dn. 17.12.2010	Train station complex (station building, warehouse, scarlet)	137,360	10 m/left
4	**4**	Kościerzyna, ul. Industrial 1	Number 1615 of dn. 15.12.1996r	The complex of the former steam mill and the former owner's house of the	137,630	30 m/right
municipality of Żukowo						
5	**5**	Żukowo	Number 1348 of dn. 06.03.1991r.	Ruralist system of the former monastic village	177,500 — 178,300	collision
City of Gdynia						
6	**6**	Gdynia, ul. Ujeski 40	1933 of Dn. 22.08.2016	the parish church complex of St. John Paul II. St. John's Antoni Padewski and Franciscan monastery	202,820	200 m/right

LP.	Number on the map*	Address	Register number of monuments of the Pomeranian Voivodeship	Object	Indicative mileage of the railway line	Distance to railway line (extreme track) and right/left side [m]
7	**7**	Gdynia, ul. St. John's 122	1782 of Dn. 29.03.2006	Tenement	203,200	160 m/right
8	**8**	Gdynia	No A-1815 of 21.9.2007	The historic urban layout of the downtown	203,300 — 204,700	collision
9	**9**	Gdynia, ul. Silesia 20	1858 of dn. 27.05.2010	Willa	204,050	200 m/left
10	**10**	Gdynia, ul. Army National 46	No. A-1927 of dn. 18.12.2015	The parish church of St. John Paul II. The Sacred Heart of Jesus, the bell tower	204,150	110 m/right
11	**11**	Gdynia, ul. 3 May 27-31	No. 1036 of Dn. 21 October	Apartment house FE BGK	204,300	160 m/right
12	**12**	Gdynia, ul. Słupecka 9	1856 of dn. 16.10.2009	Former rent house A. and B. Cannabis	204,400	250 m/left
13	**13**	Gdynia, ul. 10 February 24	Number 618 of dn. 05.07.1972	The ZUS building	204,400	140 m/right
14	**14**	Gdynia, Pl. Constitution 1	1834 of d. 11.08.2008	Gdynia railway station complex	204,500	10 m/right
15	**15**	Gdynia, ul. Sea 67	1771 of dn. 01.03.2006	Former FKW Non-Official House, now residential building	End of study	200 m/left
municipality of Kartuzy						
16	**16**	Kartuzy, ul. Kościerska 1	No. 961 of dn. April 15, 1986.	Villa and economic building of the Kashubian Museum	7,030	30 m/right
17	**17**	Kartuzy	795 of dn. 30.05.2018	Urban team of the city	7,000 – 7.578	collision

Explanatory notes:

** On the map (Annex 3.10-1) the monuments were marked according to the number in the table. Source: Own drawing on the basis of literature data and the above-mentioned Annex.*

In the buffer 200 meters from the axis of the railway lines there are 17 monuments registered in the Register of Monuments, including 13 point objects and 4 protected areas.

The nearest points are: The complex of the railway station in Kościerzyn, the complex of steam locomotives in Kościerzyn and the complex of the railway station in Gdynia located about 10 meters from the axis of the railway lines. Other monuments are located 30-250 meters away.

Railwayline No. 201 runs through the area of the urban complex of the city Kościerzyna, the rural system of the former monastic village in Żuków and the historical urban layout of the Gdynia City Centre. Railway line 214 runs through the area of the urban complex of the city of Kartuzy in km from 7,000 to 7.578.

Monuments included in the voivodeship and municipal records of monuments

The table below shows a list of cultural objects included in the municipal and provincial register of monuments.

Tab.72. List of monuments included in the municipal and provincial register of monuments.

LP.	Number on the map*	Address	Object	Indicative mileage of the railway line	Distance to railway line (extreme track) and right/left side [m]
city of Kościerzyna					
1	1	Kościerzyna, ul. Dworcowa	Water tower	137,000	50 m/left
2	2	Kościerzyna, ul. Dworcowa 33	Two historic platforms of the railway station	137,360	collision
3	3	Kościerzyna, ul. Dworcowa 40	Residential house	137,400	60 m/left
4	4	Kościerzyna, ul. Dworcowa 38	Residential house	137,400	60 m/left
5	5	Kościerzyna, ul. Dworcowa 36	Residential house	137,400	60 m/left
6	6	Kościerzyna, ul. Dworcowa 34	Residential house	137,400	60 m/left
7	7	Kościerzyna, ul. Dworcowa 32	Residential house	137,400	60 m/left
8	8	Kościerzyna, ul. Dworcowa 30	Residential house	137,400	60 m/left
9	9	Kościerzyna, ul. Dworcowa 18, 19, 20, 22, 24, 25, 26, 28	Residential buildings	137,650	100 – 200 m/left
10	10	Kościerzyna, ul. Dworcowa 23	Power Plant (power plant), currently administrative and residential building	137,800	20 m/left
municipality of Kościerzyna					
11	11	Leather, plot 364/7	Sanitary facilities at the station	142,580	20 m/left
12	12	Leather	The Railway Station is currently a residential building	142,670	10 m/left
13	13	Leather, plot 364/4	Railway utility building, sanitary facilities, railway workshop (currently single-family)	142,700	60 m/left
municipality of Somonino					
14	14	Somonino	Somonino railway station building	162,700	10 m/right

LP.	Number on the map*	Address	Object	Indicative mileage of the railway line	Distance to railway line (extreme track) and right/left side [m]
municipality of Żukowo					
15	**15**	Rutki	Railway viaduct	174,700	90 m/right
16	**16**	Rutki	Rutek hydropower plant complex	175,000	100 m/right
17	**17**	Rutki	Railway facility, animal crossing	175,320	collision
18	**18**	Borkowo	Manor and palace complex	175,700	170 m/left
19	**19**	Żukowo, ul. Dworcowa 10	Building	178,450	10 m/left
20	**20**	Żukowo	Building	178,465	10 m/left
21	**21**	Żukowo, ul. Dworcowa 12/1	Building	178,570	10 m/left
22	**22**	Żukowo	Building	178,590	20 m/left
23	**23**	Żukowo, ul. Dworcowa 24	The building of the railway station Żukowo Wschodnie	178,730	20 m/left
City of Gdańsk					
24	**24**	Gdańsk, ul. Barniewicka 76/76A	The building of the New World farm	187,750	130 m/right
25	**25**	Gdańsk, ul. Barniewicka 66	Utility building related to the railway line	188,170	30 m/right
26	**26**	Gdańsk, ul. Barniewicka 62	House	188,300	10 m/right
27	**27**	Gdańsk, near the address Barniewicka 42	Railway control building in the lane of the track	188,340	10 m/right
28	**28**	Gdańsk, Barniewicka 60 A	Former building of the railway station Gdańsk Osowa	188,430	10 m/right
29	**29**	Gdańsk, Barniewicka 60 A	Kindergarten	188,320	10 m/right
30	**30**	Gdańsk, Barniewicka 58	House	188,500	40 m/right
31	**31**	Gdańsk, Barniewicka 32	House	189,675	125 m/right
City of Gdynia					
32	**32**	At the border between Gdynia and Gdańsk, between the line	Track house	190,930	15 m/left

LP.	Number on the map*	Address	Object	Indicative mileage of the railway line	Distance to railway line (extreme track) and right/left side [m]
		railway and siding			
33	**33**	Gdynia	Road viaduct	191,625	collision
34	**34**	Gdynia	Railway pass	192,600	collision
35	**35**	Gdynia	Railway pass	192,710	collision
36	**36**	Gdynia	Railway pass	193,050	collision
37	**37**	Gdynia	Railway pass	193,080	collision
38	**38**	Gdynia	Road viaduct	193,980	collision
39	**39**	Gdynia	Track house	194,000	10 m/left
40	**40**	Gdynia	Railway control	194,110	10 m/left
41	**41**	Gdynia	Railway pass	194,130	collision
42	**42**	Gdynia, ul. Nowodworcowa 4	Gdynia Wielki Kack railway station, freight warehouse, station paragraph, utility building	194,800	10 m/left
43	**43**	Gdynia, ul. Nowodworcowa 5	Manager's house, manager's warehouse	194,950	Gdynia, ul. Nowodworcowa 5
44	**44**	Gdynia, corner of Wielkopolska and Sopot	Track house with utility building	195,300	20 m/right
45	**45**	Gdynia	Railway facility	196,550	collision
46	**46**	Gdynia	Railway pass	198,100	collision
47	**47**	Gdynia	Railway pass	198,400	collision
48	**48**	Gdynia	Railway pass	199,000	collision
49	**49**	Gdynia, ul. Olkuska 118	Block station Krykulec	199,040	10 m/right
50	**50**	Gdynia, ul. Olkuska 115	Track house with utility building	199,500	140 m/right
51	**51**	Gdynia	Railway pass	200,070	collision

LP.	Number on the map*	Address	Object	Indicative mileage of the railway line	Distance to railway line (extreme track) and right/left side [m]
52	**52**	Gdynia	Railway pass	200,500	collision
53	**53**	Gdynia	Railway viaduct	201,300	collision
54	**54**	Gdynia	Railway viaduct	201,730	collision
55	**55**	Gdynia	Railway viaduct	201,870	collision
56	**56**	Gdynia	Railway viaduct	203,170	collision
57	**57**	Gdynia	Railway viaduct	204,330	collision
58	**58**	Gdynia, ul. Driveway 2, 4, 6	Former housing block for railway officials	204,500	20 m/left
59	**59**	Gdynia, between ul. Sea station and Gdynia Personal Station	Station tunnel with utility building	204,680	collision
Municipality of Kartuzy					
60	**60**	Dzierżyżno, ul. Kartuska 32	Residential building	36,050	70 m/right
61	**61**	Dzierżyżno, ul. National Education 2	Residential building	36,120	140 m/right
62	**62**	Dzierżyżno, ul. Kartuska	Residential building	36,180	60 m/right
63	**63**	Dzierżyżno, ul. Kartuska	Residential building	36,200	130 m/right
64	**64**	Burchadztwo 181	Forester	39,870	110 m/left

Explanatory notes:
** On the map (Annex 3.10-1) the monuments were marked according to the number*
Source: Own drawing on the basis of literature data and the above-mentioned Annex.

Archaeological sites

In the buffer 200 meters from the axis of the railway lines, 51 archaeological sites and 17 points were recorded. 2 sites are in conflict with the project. The location of archaeological sites is shown in map annex 3.10-1.

3.11 Areas protected under the Healthcare Act

Within the scope and scope of the investment, there are no health resorts or spa protection areas defined on the basis of the Act of 28 July 2005 on spa treatment, spas and spa protection areas and spa towns (consolidated text: Journal of Laws 2017, item 1056).

3.12 Local plans – land development along the analysed line

An analysis of the spatial development plans and the actual use of neighbouring areas was carried out. The methods of the Geographic Information System (GIS) and the content of resolutions on local spatial development plans published in the Official Journals of individual municipalities and on the basis of the acoustic classification carried out in accordance with Article 115 of the Environmental Protection Act by the competent authorities were used.

In the table below, you will find a list of local land use plans included in the acoustic analyses. Correspondence from individual municipalities is included in the text appendix to study 3.12-1.

Tab.73. List of local land use plans included in acoustic analysis.

District	Municipality	Name of MPZP
Danzig	Danzig	Resolution No XLVIII/1440/2002 OF THE COUNCIL OF THE GDAŃSKA CITY of 25 April 2002 on the adoption of a local spatial development plan for the south-western region of Barniewice in the city of Gdańsk
Danzig	Danzig	Resolution No XLVIII/1440/2002 OF THE COUNCIL OF THE GDAŃSKA CITY of 25 April 2002 on the adoption of a local spatial development plan for the south-western region of Barniewice in the city of Gdańsk
Danzig	Danzig	Resolution No XV/484/99 OF THE COUNCIL OF THE GDAŃSKA CITY of 28 October 1999 on the adoption of the local spatial development plan BARNIEWICE Northwest in the city of Gdańsk
Danzig	Danzig	Resolution No XV/484/99 OF THE COUNCIL OF THE GDAŃSKA CITY of 28 October 1999 on the adoption of the local spatial development plan BARNIEWICE Northwest in the city of Gdańsk
Danzig	Danzig	Resolution No XXII/627/04 OF THE COUNCIL OF THE GDAŃSKA CITY of 25 March 2004 on the adoption of the local spatial development plan of Osowa – district of streets: Junons and Zeus in Gdańsk
Danzig	Danzig	Resolution No XXII/627/04 OF THE COUNCIL OF THE GDAŃSKA CITY of 25 March 2004 on the adoption of the local spatial development plan of Osowa – district of streets: Junons and Zeus in Gdańsk
Danzig	Danzig	Resolution No IX/97/11 OF THE COUNCIL OF THE GDAŃSKA CITY of 31 March 2011 on the adoption of a local spatial development plan of Osowa – a district of Junona and Barniewicka streets in the city of Gdańsk
Danzig	Danzig	Resolution No LI/1518/2002 OF THE COUNCIL OF THE GDAŃSKA CITY of 11 July 2002 on the adoption of a local spatial development plan for the water reservoir in Osowa in the city of Gdańsk
Danzig	Danzig	Resolution No LII/1472/10 OF THE COUNCIL OF THE GDAŃSKA CITY of 30 September 2010 on the adoption of the local spatial development plan of Osowa – Chełmińska Street district in the city of Gdańsk
Danzig	Danzig	Resolution No LVII/1332/14 OF THE COUNCIL OF THE GDAŃSKA CITY of 25 September 2014 on the adoption of a local spatial development plan Osowa district of Kielnieńska Street at track II in the city of Gdańsk
Danzig	Danzig	Resolution No XLII/1157/17 OF THE COUNCIL OF THE GDAŃSKA CITY of 31 August 2017 on the adoption of the local spatial development plan Osowa district of Poseidona and Junona streets in the city of Gdańsk
Danzig	Danzig	Resolution No XV/357/07 OF THE COUNCIL OF THE GDAŃSKA CITY of 25 October

District	Municipality	Name of MPZP
		of the year on the adoption of the local spatial development plan BARNIEWICE in the area of Jowisza Street in the city of Gdańsk
Danzig	Danzig	Resolution No XVI/231/11 OF THE COUNCIL OF THE GDAŃSKA CITY of 25 August 2011 on the adoption of the local spatial development plan BARNIEWICE district of Planetary Street in the city of Gdańsk
Danzig	Danzig	Resolution No XX/604/2000 of the Gdańsk City Council of 30 March 2000 on the adoption of a change to the MPZP of the Osowa urban district in the area of holiday streets, Barniewicka, Cerery, Zeus and Constellation
Danzig	Danzig	Resolution No XX/604/2000 of the Gdańsk City Council of 30 March 2000 on the adoption of a change to the MPZP of the Osowa urban district in the area of holiday streets, Barniewicka, Cerery, Zeus and Constellation
Danzig	Danzig	Resolution No XX/606/2000 of the Gdańsk City Council of 30 March 2000 on the adoption of an amendment to the local spatial development plan of the Osowa urban district in the city of Gdańsk in the area of Kielnieńska and ground floor streets
Danzig	Danzig	Resolution No XXXI/852/16 OF THE COUNCIL OF THE GDAŃSKA CITY of 24 November 2016 on the adoption of the local spatial development plan BARNIEWICE district of Athens Street in the city of Gdańsk
Danzig	Danzig	Resolution No XXXIX/1323/05 OF THE COUNCIL OF THE GDAŃSKA CITY of 30 June 2005 on the adoption of the local spatial development plan of Osowa – the district of Barniewicka and Herosa streets in the city of Gdańsk
Danzig	Danzig	Resolution No XXXIX/1323/05 OF THE COUNCIL OF THE GDAŃSKA CITY of 30 June 2005 on the adoption of the local spatial development plan of Osowa – the district of Barniewicka and Herosa streets in the city of Gdańsk
Gdynia	Gdynia	Resolution No III/28/06 of the Gdynia City Council of 12 December 2006 on: adoption of a local spatial development plan for the part of the Mały Kack district in Gdynia, Olimpijska Street
Gdynia	Gdynia	Resolution No IX/227/07 of the Gdynia City Council of 27 June 2007 on: the adoption of a local spatial development plan for the part of the Great Kack district in Gdynia – the so-called Great Kack District in Gdynia. Duck Buki.
Gdynia	Gdynia	Resolution No VI/92/11 of the Gdynia City Council of 23 March 2011 on: enacting a local spatial development plan for parts of Śródmieście and Wzgórze Śwmieście districts. Maksymiliana in Gdynia, Władysława IV, 10 February and Świętojańska streets
Gdynia	Gdynia	Resolution No XIII/247/11 of the Gdynia City Council of 26 October 2011 on: resolution of MPZP parts of Kamienna Góra and Śródmieście districts in Gdynia, J. Słowacki, I. Krasickiego and al. Marshal Piłsudski
Gdynia	Gdynia	Resolution No XIX/403/04 OF THE COUNCIL OF THE CITY OF THE GDYNI of 28 April 2004 on: adoption of a local spatial development plan for the part of the Mały Kack district in Gdynia, the area of niwna and Grenadiers streets
Gdynia	Gdynia	Resolution No XLII/1336/2002 of the Gdynia City Council of 26 June 2002 on: the adoption of a local spatial development plan for the part of the Great Kack district in Gdynia.
Gdynia	Gdynia	Resolution No XLIV/908/14 OF THE COUNCIL OF THE CITY OF GDYNI of 25 June 2014 on: adoption of a local spatial development plan for the part of the Dziki Leśne district in Gdynia, the district of Warsaw, Freedom and Witomińska streets
Gdynia	Gdynia	Resolution No XV/316/15 OF THE COUNCIL OF THE GDYNI CITY of 30 December 2015 on the amendment of the local spatial development plan of the part of the Mały Kack district in Gdynia, the district of Wielkopolska, Spokojna and Sopocka
Gdynia	Gdynia	Resolution No XVII/377/16 OF THE COUNCIL OF THE CITY OF GDYNI of 9 March 2016 on: adoption of a local spatial development plan for the part of the Leśne plots district in Gdynia, the Silesian, Kielecka and Poznańska streets
Gdynia	Gdynia	Resolution No XVIII/335/12 of the Gdynia City Council of 28 March 2012 on: adoption of a local spatial development plan for the districts of Mały Kack and Karwiny in Gdynia, district of Wielkopolska and Strzelców streets
Gdynia	Gdynia	Resolution No XX/473/08 OF THE COUNCIL OF THE CITY OF THE GDYNI of 28 May 2008 on: adoption of a local spatial development plan for the part of the Mały Kack district in Gdynia, the district of Wielkopolska, Spokojna and Sopocka streets
Gdynia	Gdynia	Resolution No XXIV/566/08 of the Gdynia City Council of 22 October 2008 on: adoption of a local spatial development plan for the part of the Mały Kack district in Gdynia, an area located west of ul. It's Łęczycka.

District	Municipality	Name of MPZP
Gdynia	Gdynia	Resolution No XXVIII/648/05 of the Gdynia City Council of 23 February 2005 on: adoption of a local spatial development plan for the part of the Mały Kack district in Gdynia, Stryjska and Łużycka Streets.
Gdynia	Gdynia	Resolution No XXXI/790/17 OF THE COUNCIL OF THE GDYNI CITY of 26 April 2017 on the adoption of a local spatial development plan for the part of the Śródmieście district in Gdynia, the district of Jana z Kolna Streets and the projected Nowa Węglowa
Gdynia	Gdynia	Resolution No XXXII/657/13 OF THE COUNCIL OF THE CITY OF THE GDYNI of 26 June 2013 on: adoption of a local spatial development plan for the part of the Dziki Leśne district in Gdynia, the Silesian and Podolska streets
Gdynia	Gdynia	Resolution No XXXII/716/09 OF THE COUNCIL OF THE CITY OF THE DAYS of 27 May 2009 on: enactment of the MPZP part of the districts Mały Kack and Wielki Kack in Gdynia, an area located to the west of Sopocka Street, the so-called Sopocka district.
Gdynia	Gdynia	Resolution No XXXII/795/17 OF THE COUNCIL OF THE GDYNI CITY of 24 May 2017 on the adoption of a local spatial development plan for parts of the districts Mały Kack and Orłowo in Gdynia, a district of the Kacza River on the section from the Industrial Stream to the Gdynia Road
Gdynia	Gdynia	Resolution No XXXIV/917/17 OF THE COUNCIL OF THE GDYNI CITY of 30 August 2017 on the adoption of a local spatial development plan for the part of Mały Kack district in Gdynia, district of Strzelców and Dragonów streets
Gdynia	Gdynia	Resolution No XXXVII/838/09 of the Gdynia City Council of 25 November 2009 on: adoption of a local spatial development plan for the part of the district of Leśne plots in Gdynia, district of Kielecka Streets and Gdynia Road
Gdynia	Gdynia	Resolution No XXXVII/839/09 of the Gdynia City Council of 25 November 2009 on: adoption of a local spatial development plan for the part of Śródmieście district in Gdynia, Kościuszko Square district and Jana z Kolna Street and 10 February
Carthusian	Kartuzy	Resolution No III/19/98 of the Kartuzy City Council of 22 December 98 on the adoption of a local land development plan No 223/1 in the village Dzierżyżno Municipality of Kartuzy
Carthusian	Kartuzy	Resolution No VI/48/2015 of the Town Council in Kartuzy of 11 March 2015 on: adoption of the amendment of the local spatial development plan of a part of the village Dzierżyżno, the municipality of Kartuzy for plots No 463/1, 339/4 and 339/5
Carthusian	Kartuzy	Resolution No XI/152/99 of the Kartuzy City Council of 07 September 1999 on the adoption of a local land development plan No 559/22 (now 599/23 and 599/24) in the village of Kiełpino Municipality of Kartuzy
Carthusian	Kartuzy	Resolution No XII/206/2011 of the Town Council in Kartuzy of 16 November 2011 on the adoption of an amendment to the local spatial development plan of the city of Kartuzy, comprising part of plot No 63/2, located at ul. 3 rd May in Kartuzy
Carthusian	Kartuzy	Resolution No XIV/238/2012 of the Town Council in Kartuzy of 8 February 2012 on the adoption of a local spatial development plan of a part of the village Dzierżyżno, district of Kartuska and Hospitalna streets
Carthusian	Kartuzy	Resolution No XIX/244/08 of the Kartuzy City Council of 23 April 2008 on the adoption of a local spatial development plan for a part of the village Dzierżażno, a district of Kartuska, Sideczna and Kashubian streets in the municipality of Kartuzy
Carthusian	Kartuzy	Resolution No XIX/257/2000 of the City Council in Kartuzy of 27 June 2000 on the adoption of a Local Spatial Development Plan for plots no. 48/5, 48/6, 48/3, 48/7, 48/8 located in the town of Kartuzy, at ul. By the Torah.
Carthusian	Kartuzy	Resolution No XL/444/2017 of the Town Council in Kartuzy of 25 October 2017 on the adoption of a local spatial development plan of a part of the city of Kartuzy, district of Bielinski, Dworzecowa and 3-go Maja streets
Carthusian	Kartuzy	Resolution No XLIII/569/2014 of the Town Council in Kartuzy of 27 August 2014 on the adoption of a local spatial development plan of a part of the city of Kartuzy located between ul. 3 rd May and ul. Railway
Carthusia	Kartuzy	Resolution No XLIV/506/2018 of the Town Council in Kartuzy of 14 March

District	Municipality	Name of MPZP
		2018 on the adoption of a local spatial development plan for a part of the village Dzierżyżno – district of Kartuska and Sideczna streets
Carthusian	Kartuzy	Resolution No XLIV/507/2018 of the Town Council in Kartuzy of 14 March 2018 on the adoption of a local spatial development plan of a part of the city of Kartuzy – district of ul. Kościerska
Carthusian	Kartuzy	Resolution No XLV/373/98 of the Kartuzy City Council of 31 March 1998 on the adoption of a local spatial development plan for the city of Kartuzy
Carthusian	Kartuzy	Resolution No XLV/378/98 of the City Council in Kartuzy of 31 March 1998 on the adoption of a local spatial development plan for the city of Kartuzy
Carthusian	Kartuzy	Resolution No XVI/224/2000 of the City Council in Kartuzy of 1 February 2000 on the adoption of a local spatial development plan covering plot No 10/20 located in Mezów, the municipality of Kartuzy
Carthusian	Kartuzy	Resolution No XVII/212/08 of the Kartuzy City Council of 27 February 2008 on the adoption of a local spatial development plan for a part of the village Kiełpino
Carthusian	Kartuzy	Resolution No XVII/213/08 of the Kartuzy City Council of 27 February 2008 on the adoption of a local spatial development plan for a part of the village Dzierżyżno
Carthusian	Kartuzy	Resolution No XXIII/307/00 of the City Council in Kartuzy of 10 October 2000 on the adoption of a local spatial development plan for plot No 329/3 located in Dzierżno, the municipality of Kartuzy
Carthusian	Kartuzy	Resolution No XXIV/352/00 of the Town Council in the Charters of 28.XI.001 on the Severance of the Municipality of Mezowo, including the FRAGMENT of Acts No 5/2
Carthusian	Kartuzy	Resolution No XXV/378/00 of the Town Council in the Charters of 28 December 2000 on the HEALTH OF THE HEALTH PLAN OF THE GENERAL FRAGMENT OF THE Commune of Cards, COMMITTEE IN MESOVO, including Sections No 326/4, 326/5, 326/6, 321/3
Carthusian	Kartuzy	RESOLUTION NO XXVII/413/01 OF THE CITY COUNCIL IN KARTUZY OF 24 APRIL 2001 ON THE ADOPTION OF A LOCAL LAND-USE PLAN FOR A PART OF THE MUNICIPALITY OF KARTUZY, LOCATED IN THE VILLAGE OF KIEŁPINO, PLOTS NOS 190/1 AND 170/17
Carthusian	Kartuzy	Resolution No XXVIII/409/05 of the Town Council in the Charters of 7.10.2005 on the REVELATION OF THE COURT OF THE PLAN OF THE COMMUNITY OF THE PARLIAMENT OF THE FRAGMENT OF THE Commune of Cards, COMMUNITY IN THE KIEŁPINO – LESZNO
Carthusian	Kartuzy	Resolution No XXX/488/01 of the Kartuzy City Council of 30.X.2001 on the adoption of a local spatial development plan for plot 352/4 rpm. Dzierżyżno, Gm. Kartuzy
Carthusian	Kartuzy	Resolution No XXXIII/531/02 of the City Council in Kartuzy of 19 March 2002 on the adoption of the local spatial development plan extended to plot No 304/7 obr. Dzierżyżno, Gm. Kartuzy
Carthusian	Kartuzy	Resolution No XXXIX/529/06 of the Kartuzy City Council of 30.8.2006 on the adoption of a local spatial development plan fragments of the village Kiełpino, Raduńska and Osiedlowa Streets in the municipality of Kartuzy
Carthusian	Kartuzy	Resolution No XXXV/407/2017 of the Town Council in Kartuzy of 31 May 2017 on the adoption of an amendment to the local spatial development plan of a part of the village Mezowo
Carthusian	Kartuzy	Resolution No XXXVIII/490/06 of the Town Council in Kartuzy of 5 July 2006 on the adoption of an amendment to the local spatial development plan of the town of Kartuzy covering plots located in the area of the intersection of ul. Piłsudzki and ul. Gdańsk
Carthusian	Somonino	Resolution No 120/XXVI/96 of the Somonin Municipal Council of 21 November 1996 adopting an amendment to the local general spatial development plan of the municipality of Somonino
Carthusian	Somonino	Resolution No 150/XXX/97 of the Somonin Municipal Council of 5 March 1997 on the adoption of an amendment to the local general spatial development plan of the municipality of Somonino
Carthusian	Somonino	Resolution No XL/311/2006 of the Municipality of Somonino of 28 September 2006 on the adoption of a local land use plan

District	Municipality	Name of MPZP
		Somonino
Carthusian	Somonino	Resolution No XX/200/04 of 30 September 2004 on the adoption of a local spatial development plan covering part of plot No 59/2 in the village of Rybaki
Carthusian	Somonino	Resolution of the Somonino Municipal Council No 137/XVI/2000 of 3 February 2000 on the adoption of a local spatial development plan covering the area of part of plot No 167/2, plots No 233/7 and 233/8 and part of plot No 228/2 in the village of Rąty
Carthusian	Concentric	Resolutions No VII/70/2007 of 12 June 2007 on the adoption of a local spatial development plan for a part of the village Gołubie – Golubie Zachód
Carthusian	Concentric	Resolutions No VII/72/2007 of the Council of the Municipality of Stężyca of 12 June 2007 on the adoption of a local spatial development plan for a part of the village of Szymbark
Carthusian	Concentric	Resolution No VI/37/2011 of the Council of the Municipality of Stężyca of 31 March 2011 on the adoption of a local spatial development plan for the part of the surveying zone of Pierszczewo, in the municipality of Stężyca.
Carthusian	Concentric	Resolution No VI/38/2011 of the Council of the Municipality of Stężyca of 31 March 2011 on the adoption of an amendment to the local spatial development plan for the geodetic area of Potuła, in the municipality of Stężyca
Carthusian	Concentric	Resolution No VII/71/2007 OF THE COUNCIL OF THE ST.ĘŻYCA Municipality of 12 June 2007 on the adoption of a local spatial development plan for a part of the village of Gołubie
Carthusian	Concentric	Resolution No XIV/158/2012 of the Council of the Municipality of Stężyca of 19 June 2012 on the adoption of an amendment to the local spatial development plan of a part of the village of Gołubie
Carthusian	Concentric	Resolution No XX/224/2008 OF THE COUNCIL OF THE STĘŻYCA Municipality of 28 October 2008 on the adoption of a local spatial development plan for a part of the village of Golubie – between Lake Dąbrowski and railway tracks
Carthusian	Concentric	Resolution No XXXIII/329/2010 of the Council of the Municipality of Stężyca of 26 January 2010 on the adoption of an amendment to the local spatial development plan of a part of the village of Gołubie – Gołubie Zachód
Carthusian	Żukowo	Resolution No III/56/2002 of the Municipal Council of Żuków of 12 December 2002 on the adoption of a Local Spatial Development Plan for plots no. 50/10 to 50/17, 50/18 to 50/25 in the village of Pępowo, Żukowo commune
Carthusian	Żukowo	Resolution No III/64/2002 of the Municipal Council of Żuków of 12 December 2002 on the adoption of a local spatial development plan for plot No 36/2 located in the village of Rębiechowo, Żukowo commune
Carthusian	Żukowo	Resolution No L/620/2014 of the Municipal Council in Żuków of 3 October 2014 on the adoption of an amendment to the local spatial development plan of the Commune Żukowo for a fragment of the village of Chwaszczyno between Lake Wysocki and ul. It's Chełmińska.
Carthusian	Żukowo	Resolution No V/112/2003 of the Municipal Council of Żuków of 28 January 2003 on the adoption of a local spatial development plan for plot No 93/5 located in the village of Banino, Żukowo commune
Carthusian	Żukowo	Resolution No V/103/2003 of the Zhuków City Council of 28 January 2003. On the adoption of a local spatial development plan for plot No 123/5 located in the village of Rębiechowo, Żukowo commune
Carthusian	Żukowo	Resolution No VI/49/99 of the Municipal Council in Żuków on 29 January 1999 on the adoption of a local zoning plan for the Zukowo Municipality for the fragment of plot No. 196/8 rpm. Rębiechowo
Carthusian	Żukowo	Resolution No VII/69/99 of the Zhukov City Council of 25 February 1999 on the adoption of a local spatial development plan for the Zhukowo Municipality for plot No 38/1 obr. Banino
Carthusian	Żukowo	Resolution No VII/72/99 of the Zhuków City Council of 25 February 1999 on the adoption of a local spatial development plan for the fragment of plot No 36/9 obr. Rębiechowo
Carthusian	Żukowo	Resolution No XII/260/2003 of the Municipal Council of Żuków of 30 September 2003 on the adoption of a local spatial development plan for plots No 25/8, 25/9 located in the village of Rębiechowo, Żukowo commune
Carthusia	Żukowo	Resolution No XII/263/2003 of the Zhuków City Council of 30 September 2003. W

District	Municipality	Name of MPZP
		adopting a local spatial development plan for the part of plot No 198/2 located in the village of Rębiechowo, Żukowo commune
Carthusian	Żukowo	Resolution No XII/270/2003 of the Municipal Council of Żuków of 30 September 2003 on the adoption of a local spatial development plan for the part of plot No 56 located in Żukowo, Żukowo commune
Carthusian	Żukowo	Resolution No XII/278/2003 of the Żuków City Council of 30 September 2003. On the adoption of a local spatial development plan for plot No 768 located in Żukowo, Żukowo commune
Carthusian	Żukowo	Resolution No XIII/133/95 of the Municipal Council in Żuków of 19 June 1995 on the adoption of a local spatial development plan for the Elżbietowo estate in Żuków
Carthusian	Żukowo	Resolution No XIII/133/95 of the Municipal Council in Żuków of 19 June 1995 on the adoption of a local spatial development plan for the Elżbietowo estate in Żuków
Carthusian	Żukowo	Resolution No XL/649/2006 of the Żuków City Council of 27 and 2006 In the matter, make a resolution. MPZP part of the village Pępowo ogran. halfway Pępowo-Miszewo, from the e.g. road to Banino, to the south. chapter no. 48,49,51,196 and these chapters.
Carthusian	Żukowo	Resolution No XLII/683/2006 of the Żukowo City Council of 31 III 2006 on the adoption of the MPZP The town of Żukowa ogran. half through the PKP area, from the eastern part of the building in the rej. Mściwoja, from half of ul. Gdańska, from the way to the road. Smołdzina gm. Żukowo
Carthusian	Żukowo	Resolution No XLII/689/2006 of the Żukowo City Council of the date of 31III 2006 On the adoption of the MPZP of the Borkowo village area in the vol. Areas located to the south of the district road leading to Smołdzino, to the south of Smołdzino. From the PKP to the village border in Żukowo
Carthusian	Żukowo	Resolution No XLIII/710/2010 of the Municipal Council in Żuków of 28 May 2010 on the adoption of an amendment to the local spatial development plan for a part of the village of Chwaszczyno between Lake Wysocki and ul. Chełmińska, Żukowo Municipality
Carthusian	Żukowo	Resolution No XLIV/511/2014 of the Municipal Council in Żuków of 21 March 2014 on the adoption of a local spatial development plan for the part of the town of Żuków, in the area of streets: Gdańsk and Kościerska
Carthusian	Żukowo	Resolution No XLIX/594/2018 of the Municipal Council in Żuków of 30 January 2018 on the adoption of an amendment to the MPZP of part of the village Borkowo and Żukowo, an area adjacent to Jez. Głęboki and Karlikowski, Kartuska and Novowiejska streets, Żukowo commune
Carthusian	Żukowo	Resolution No XLIX/600/2018 of the Municipal Council in Żuków of 30 January 2018 on the adoption of a local spatial development plan "Nowy Świat" part of the village BARNIEWICE
Carthusian	Żukowo	Resolution No XLVII/551/2014 of the Municipal Council of Żuków of 26 June 2014 on the adoption of an amendment to the local spatial development plan for plot No 652/3 located in Żukowo, Żukowo commune
Carthusian	Żukowo	Resolution No XLVII/799/2010 of the Municipal Council in Żuków of 27 VIII 2010 on the adoption of an amendment to the local spatial development plan of part of the town of Żuków
Carthusian	Żukowo	Resolution No XV/222/99 of the Zhuków City Council of 18 October 1999 on the adoption of a local spatial development plan for plots No 117/5,117/6,113/3,122/3,123/3,547,548,549,550,551,552 located in Borków
Carthusian	Żukowo	Resolution No XV/250/2008 of the Municipal Council of Żuków of 15 February 2008 on the adoption of the MPZP part of the village of Borkowo and śukowo, an area adjacent to Jez. Głęboki and Karlikowski, district of Kartuska and Novowiejska streets,
Carthusian	Żukowo	Resolution No XV/250/2008 of the Municipal Council of Żuków of 15 February 2008 on the adoption of the MPZP part of the village of Borkowo and Żukowo, an area adjacent to Jez. Głęboki and Karlikowski, district of Kartuska and Novowiejska streets,
Carthusian	Żukowo	Resolution No XVI/257/99 of the Zhuków City Council of 24 November 1999. On the adoption of a local spatial development plan for part of plot No 65/9 in the village of Pępowo Municipality Żukowo
Carthusia	Żukowo	Resolution No XXII/353/2000 of the Żuków City Council of 31 May 2000

District	Municipality	Name of MPZP
		on the adoption of a local land-use plan for plot No 68/1 rpm Rębiechowo, Żukowo Municipality
Carthusian	Żukowo	Resolution No XXII/354/2000 of the Municipal Council of Żuków of 31 May 2000 on the adoption of a local spatial development plan for plots No 70/6,70/7,70/8 rpm. Rębiechowo, Żukowo Municipality
Carthusian	Żukowo	Resolution No XXX/347/2016 of the Municipal Council in Żuków of 29 November 2016 on the adoption of a local spatial development plan for the part of the village of Banino in the area of Diamentowa and Leśna streets
Carthusian	Żukowo	Resolution No XXXVI/392/2017 of the Municipal Council in Żuków of 7 March 2017 on the adoption of a local spatial development plan for a part of the village of Glincz, in the area of Świerkowa Street, Żukowo commune
Carthusian	Żukowo	Resolution No XXXVIII/409/2017 of the Municipal Council in Żuków of 11 April 2017 on the adoption of the MPZP for a part of the town of Żukowo, in the area of the former Poultry Plants and Public Gymnasium No. 2 Jan Heweliusz in Żuków
Carthusian	Żukowo	Resolution XVIII/311/2008 of the Municipal Council of Żuków of 25 April 2008 on the adoption of an amendment to the local spatial development plan for plot No 64/16 within Pępowo, Gm. Żukowo
skeleton	Kościerzyna	Resolution No XXXII/255/2000 of the Kościerzyn City Council of 28.12.2000 in e.g. MPZP fragm. m. Kościerzyna for land no. 101/5rpr.1, 347rev2, 96, 100/5, 104/15, 19/10r06, 35/6, 28/4rev.07, 236/3, 126/3rev.09, 55rp.10 per ter. M. Kościerzyna
skeleton	Kościerzyna	Resolution No XXXIX/253/2008 of the Council of M. Kościerzyn of 10 December 2008 as amended. UCHW. No X/66/11 of the Council of M. Kościerzyna of 25.5.2011, as amended. UCHW. No
skeleton	Kościerzyna	Resolution No LV/431/10 of Kościerzyna City Council of D.C. 31 March 2010 on the adoption of the MPZP in the northern part of the city between Drogowiec Street, railway tract and the northern border of Kościerzyna
skeleton	Kościerzyna	Resolution No LV/431/10 OF THE COUNCIL OF MIASTA Kościerzyna of 31 March 2010 on the adoption of the MPZP of the area located in the northern part of the city between Drogowiec Street, railway traction and the northern border of the city of
skeleton	Kościerzyna	Resolution No LXVI/511/10 OF THE COUNCIL OF MIASTA Kościerzyna of 3 November 2010 on the adoption of the MPZP of the area located in the northern part of the city between the railway track to Chojnice and the railway route to Gdynia, and the city
skeleton	Kościerzyna	Resolution No XIV/91/15 of the Kościerzyna City Council of 1 July 2015 (Dz. It's Urz. Voivodeship. Pom. of 2015, item. 2260)
skeleton	Kościerzyna	Resolution No XLII/338/01 of the Kościerzyna City Council of 17 October 2001 on the adoption of a local spatial development plan for a part of the city of Kościerzyna
skeleton	Kościerzyna	Resolution No XLIV/295/98 of the City Council in Kościerzyn of 22 April 1998 on the adoption of a local spatial development plan
skeleton	Kościerzyna	Resolution No. XXII/186/2000 of Kościerzyna City Council of the day 26 April 2000 on the adoption of MPZP fragments of the city of Kościerzyna concerning plots No. 155/18. 6, 155/16 rpm. 6.237 rpm. 2.238 rpm. 2, (...), in the city of Kościerzyna
skeleton	Kościerzyna	Resolution No XXII/186/2000 of the Kościerzyna City Council of 26 April 2000 on the adoption of a local spatial development plan for fragments of the city Kościerzyna
skeleton	Kościerzyna	Resolution No XXXI/225/04 of the Kościerzyna City Council of 8 December 2004 on the adoption of the local spatial development plan of the "Plebanka II" estate in Kościerzyn
skeleton	Kościerzyna	Resolution No XXXI/250/2000 of the Kościerzyn City Council of 20 December 200. On the adoption of a local land use plan for the town of Kościerzyna
skeleton	Kościerzyna	Resolution No XXXII/255/2000 of the Kościerzyna City Council of 28 December 2000 on the adoption of a local spatial development plan for the town of Kościerzyna

Source: own development

3.13 Areas and facilities subject to acoustic protection

The results of the identification of environmental conditions, including the list of areas subject to acoustic protection, with an indication of the source of classification and the distance from the axis of the nearest track located within 20 m to 50 m, and in the range from 50 to 300 m from the nearest track are listed in Text Annex 3.13-1.

In turn, text annex 3.13-2 contains photographic documentation of buildings requiring acoustic protection that are within the range of potential acoustic interactions.

4. DESCRIPTION OF THE ENVISAGED EFFECTS ON THE ENVIRONMENT IN THE EVENT OF NO UNDERTAKING

The solution consisting of not undertaking a project is a solution in which the investment in question is not implemented, the current road and rail system is functioning, and the financial expenditure is limited to the current maintenance of the railway, without the funds allocated to increase the technical parameters.

Leaving the surface elements of line 201, whose operating status is or will be exceeded in the near future, may result in the emergence of local speed limits in the coming years, as well as the possibility of a danger to the safety of trains and various types of failures.

Failure to add a second track on line 201 would make it impossible to develop an optimal offer of level crossings. Route Kościerzyna – Gdańsk Osowa – Gdynia Main is of great importance for regional passenger transport. Due to the increase in rail traffic caused by the construction of line 248 (line PKM) and the fact that line 201 is an important connection between the Tri-City ports and the rest of the country, while leaving single track sections traffic will not be able to run smoothly and it will be very difficult to lay down the cyclical timetable. In addition, line 201 will be an alternative to freight traffic.

The aim of the planned project is to restore passenger traffic on line 214 Somonino – Kartuzy. The lack of implementation of the project means that these lines will remain practically excluded from passenger traffic. This could lead to a further deepening of the transport exclusion of some residents (especially the towns of Kartuzy).

In the light of Intercity S.A.'s Declaration on Feasibility Study, after completion of works on railway line No. 201, in the long-term plan, the carrier envisages the commissioning of trains on two routes:

Report 1: Gdynia Main – Kartuzy – Kościerzyna – Czersk – Bydgoszcz – Toruń Główny – Kutno – Central Warsaw – Lublin – Rzeszów;

Report 2: Gdynia Główna – Kartuzy – Kościerzyna – Czersk – Bydgoszcz Główna – Poznań Główny – Zielona Góra.

Currently, in many places there is no space left between the upper surface of the ballast and the lower plane of the foot of the rails. This solution will be ensured by remodeling the line, which will facilitate the movement of small animals.

Due to social aspects, the degradation of railway infrastructure could lead to a reduction in the crossing speeds of rolling stock due to the need to maintain pass-by safety for passengers. This, in turn, could potentially lead to a gradual shift of rail passengers to other modes of transport – primarily passenger cars, and thus less environmentally friendly ones. This can lead to increased traffic on the roads in the Tri-City area.

The lack of implementation of the project would also mean the lack of improvement of the aesthetics of platforms and small architecture objects and their non-adaptation to the needs of people with disabilities.

Failure to carry out the investment in subsequent years, so the lack of electrification of the line would mean that the traffic would continue to take place on the basis of diesel rolling stock, which is less favourable to the environment due to emissions of gases and dusts to the air.

5. ENVIRONMENTAL IMPACT OF THE PLANNED VENTURES

5.1 Implementation/decommissioning phase

5.1.1 Impact on the surface of the earth, including soil

The implementation of the investment in both variants W1 and W2 involves the construction of the second track of railway line No. 201, the reconstruction of existing railway lines 214 and 229, the construction of railway links and option W1 with the construction of a third railway track between Gdańsk Osowa station and Gdynia OP St Maximilian Hill, together with the expansion of passenger stops and the necessary infrastructure. The decommissioning phase involves the demolition of these elements. Both implementation and decommissioning phases may result in the following forms of interaction:

1. permanent occupation of the strip of land intended for the construction of new railway and road infrastructure, resulting in removal of the surface (0.2 – 0.4 m) of the humus layer (applicable to the implementation phase),
2. temporary occupation of the area belt for construction facilities, including machine park, material and warehouse base, access roads to the construction site,
3. distortion of the structure of the soil as a result of its compaction and strong deflection,
4. earth surface conversion associated with earthworks,
5. creation of wind and water erosion conditions as a result of the removal of the top layer of soil and changes in the terrain,
6. potential pollution of land by substances dangerous to the environment, which may result from:

- leakage of substances from poorly maintained or defectively used machinery, equipment and cars,
- the penetration of harmful substances into the ground-water environment as a result of improper storage of building materials, improper protection of building equipment bases, improper waste management and inadequate wastewater management.

In the case of the implementation of the investment option (W1), due to the addition of the third track, the permanent occupation of the strip of land intended for the construction of new railway and road infrastructure will be greater by approx. 69 ha than alternative option (W2). The remaining scale of interactions for both variants is the same.

During the construction works, no negative impact of the construction works on the soil is foreseen. Construction works will be carried out mostly on the trace of the existing railway line, in addition, mainly works will be carried out using the so-called track method, i.e. using machines moving on the track. The construction facilities, including the base of materials and equipment, will be arranged in the first order in urban areas, which do not represent valuable natural values. In compliance with the recommendations contained in the report, using the provisions of law and the guidelines contained in the internal instructions of PKP PLK S.A. regarding construction works, waste storage and complying with technical standards in the field of environmental protection in the event of an emergency situation, there should be no risk of soil contamination.

5.1.2 Influence on the ground and water environment, including water bodies

In the implementation/decommissioning phase, regardless of the option (investment option (W1), alternative option (W2)), ongoing construction works can contribute to:

1. Potential groundwater pollution that may result from:

a) the leaching of hazardous substances from improperly stored waste and its direct supply to watercourses or infiltration into groundwater,
b) leaching of hazardous substances as a result of improper organisation of the construction facilities, refuelling of vehicles and machinery in undesignated places (fuel spill), carrying out repairs of construction machinery (disposal of substances used for the maintenance of equipment and

equipment) and their direct supply to watercourses or infiltration into groundwater,
c) direct leakage of hazardous substances from construction machinery to surface water.

2. Short-term and local water flow disturbance in places where bridges or culverts in the waterway will be renovated/rebuilt.

3. Short-term and local increase in the smudging of watercourses as a result of raising bottom sludge during demolition and construction of engineering facilities.

It should be noted that the implementation of the investment will periodically and in the short term affect the aquatic environment. Once the work is completed, the impact will cease.

<u>Uniform Parts of Surface Water</u>

The analysis of the impact on the environmental objectives of the JCWP was carried out by the Investor (PKP Polskie Linie Kolejowe S.A.) for all projects covered by the investment plans on the occasion of the work of the National Water Management Board to update the Water Management Plans and presented to the KZGW. On this basis, the President of the National Management Board by letter No KZGW/DPIZW- pgw/1957/2014/agr of 30 December 2014 (Annex II) 5.1.1) stated that railway investments do not have to be covered by the provisions of the National Water Management Plans, which means that there is no negative impact on the environmental objectives of the CSF and do not require derogations under the WFD.

The main factors affecting the elements of the JCWP during the implementation of this investment will be works on engineering facilities located on watercourses relevant to surface water bodies. These works will mostly consist of demolition of existing facilities and construction of new ones at the same site and maintenance of watercourses (demultation).

Investment option (W1)

The table below summarises the scope of works on engineering facilities within the JCWP (the so-called JCWP). JCWP river). The scope of works on Engineering facilities is the main factor in the impact on surface water bodies at the stage of implementation of the investment.

Tab. 74 Scope of work on engineering facilities within the river JCWP – variant investment (W1).

L.P.	River JCWP	Railway line number	Km of railway line	Type of object	Scope of work that may affect the JCWP
1	Bibrova	201	137,788	culvert	dismantling the existing culvert, construction of a new culvert
2	Rakownica	201	142,164	culvert	dismantling the existing culvert, construction of a new culvert
3	Radunia	201	163,577	bridge	demolition of an existing facility, construction of a new building with two bridges
L.P.	**River JCWP**	**Railway line number**	**Km of railway line**	**Type of object**	**Scope of work that may affect the JCWP**
4	Radunia	214	0,814	bridge	railway bridge repair, ballast trough extension
5	Little Supina	201	177,261	bridge	dismantling the existing bridge, adding two bridges on existing supports
6	Shooter	201	184,483	bridge	demolition of an existing facility, construction of an object with two bridges
7	Tributary from Jez. Wysocki	201	185,705	culvert	no works
8	Tributary from the Great Kack	201	193,295	culvert	dismantling the existing culvert, construction of a new culvert
9	Tributary from the Great Kack	201	196,555	bridge	demolition of the bridge, construction of a new facility
10	Duck	201	198,100	bridge	demolition of the bridge, construction of a new

Source: own development

<u>Impact on biological elements</u>

- Phytobenthos, there will be temporary damage to the habitat on the section of the works.

- Phytoplankton, there will be temporary damage to the habitat on the section of the works.
- Macrophytes, there will be temporary damage to the habitat on the section of ongoing works.
- Benthic macro invertebrates, temporary damage to the habitat on the section of works will occur.
- Ichthyofauna, the occurrence of short-term deterioration of habitat conditions, resulting from the smudging and sunking of prey and the increase of water suspension limiting the visibility and acquisition of food, is expected.

Due to the fact that the construction works as well as the cutting of the herb will be limited to engineering facilities (point and local impact), and the scope of the work will not be related to the strengthening of the bottom and slopes of the trough, it is concluded that the works carried out in the area of the watercourse will not have a negative impact on all biological elements in a given CBWP. Potential effects on phytoplankton, zooplankton, benthos will be short-lived, transient and local. The impact will not adversely affect the preservation of the existing natural structures of the aquatic environment of elements of the surface water network (liquids, reservoirs).

Indirect effects will be noise and ground vibrations associated with the work carried out, which may reduce the migration of fish and cause them to be sent out. This phase of the investment can potentially also involve local water flow disruptions, the impact will be transient. During construction works, there is also a risk of pollution of water by chemical substances (e.g. by leakage of fuel from construction machinery). It is therefore necessary to ensure proper organisation of the construction site and appropriate storage of building materials on the construction site. It will be the responsibility of the contractor to properly store and secure materials on the construction site. The places and manner of storage of materials should be specified in the construction site management plan. Storage sites should ensure that the properties and suitability of the stored materials are preserved. Proper storage of materials will allow to protect the surface of the land and, consequently, surface waters from the possibility of contamination.

<u>Effect on hydromorphological elements</u>

The implementation of the investment will not affect the connection with groundwater bodies. No sealing or strengthening of the bottom of the watercourses is foreseen.

The planned works will not interrupt the hydrological continuity of the watercourses on which or within which construction works will be carried out (Tab. 74).

The investment will affect hydromorphological elements of rivers (morphological conditions) only in the area of engineering facilities (Tab.74). The implementation of the investment will not affect the hydromorphological conditions of water reservoirs present in the neighbouring railway lines.

Removal of vegetation from the trough will affect the volume and dynamics of water flow (there will be a temporary increase in speed and flow dynamics – until new vegetation grows).

In view of the work on bridges on river continuity, the indicator on the number and type of barriers in the watercourses will remain unchanged (Tab. 74). With regard to the indicator on movements of aquatic organisms during renovation works, disturbances in the migration of aquatic organisms and sediments may periodically occur. However, these disruptions will be short-lived, transient and will cease after construction works have been completed.

At the stage of construction, there may be a direct violation of short stretches of banks and riverbeds. This impact will be short-lived and will cover only the period during which the construction works will be carried out.

In conclusion, it should be noted that during the construction works there is no significant negative impact on hydromorphology of rivers. The expected impacts will not result in a deterioration of the values of the current indicators relating to the hydromorphological elements of the water of the CBWP located in the project area.

<u>Effect on physico-chemical elements</u>

The main impurity at the construction stage, affecting the quality of water, may be increased concentration of suspension. Work carried out in the trough of the watercourses may cause temporary drainage of the water. The resulting suspension can cause a temporary decrease in the dissolved oxygen content in the water. After some time in the cross section below the point of introduction or formation of pollutants, the suspension will be fully mixed with the receiver waters. Estimating the distance of full mixing with empirical patterns involves many simplifications. The potential range estimated on the basis of the Rutherford formula can range from 100 m to more than 3 km (depending on the flow size). However, the process of self-cleaning in nature usually takes place much faster than the calculations.

The planned construction work under the project, apart from the temporary increase in the concentration of the suspension and the associated possible reduction of dissolved oxygen in water, is not expected to affect the concentrations of other physicochemical indicators and indicators responsible for the chemical status of the water.

During the work, there will be no additional salinity and acidification of the flowing waters. The implementation of the project does not involve the introduction of chlorides, sulphates or nitrates into the waters.

During construction works, there is also a risk of pollution of water by chemical substances (e.g. by leakage of fuel from construction machinery). It is therefore necessary to ensure proper organisation of the construction site and adequate storage of waste (waste management is described in Chapter 5.1.11) on the construction site. Proper storage of waste (waste management is described in chapter 5.1.11) will help to protect the surface area and, consequently, surface waters from the possibility of contamination.

Due to the scale of the planned works, the deterioration of the state of the JCWP in terms of physico-chemical parameters will be local and short-lived (period of carrying out works in the riverbed). After the completion of the works, the state of the JCWP will naturally return to the previous one – before the start of the investment.

Alternative option (W2)

The impact on surface water bodies of the alternative option (W2) will be similar to that of the investment option (W1), although the impact will be less, due to the extent of works on engineering facilities, which mainly consists of their renovation.

Tab. 75 The scope of work on engineering facilities within the river JCWP – alternative option (W2).

L.P.	River JCWP	Railway line number	Km of railway line	Type of object	Scope of work that may affect the JCWP
1	Bibrova	201	137,797	culvert	repair of concrete defects (stones), possible local reinforcement of the structure and its extension in case of the need to widen the embankment, ordering the area in the culvert area, clearing (removal, cleaning of the bottom) with the cleaning of the ditches to the border of the railway plot, reprofiling and strengthening the embankments around the inlets.
2	Rakownica	201	142,160	culvert	repair of concrete defects (stones), possible local reinforcement of the structure and its extension in case of the need to widen the embankment, ordering the area in the culvert area, clearing (removal, cleaning of the bottom) with the cleaning of the ditches to the border of the railway plot, reprofiling and strengthening the embankments around the inlets.
3	Radunia	201	163,595	bridge	comprehensive repair and strengthening of concrete supports, demolition of the existing carrying system, implementation of completely new 2 systems carrying together with insulation, protective coatings and protection of expansion joints.
4	Little Supina	201	177,297	bridge	unstrengthening and superstructure of the top supports with cleaning and construction of protective coatings, leaving the existing steel structure with modifications of the bridge, backing bridges on centering tables (applies only to the object in km 177,364), making a new system for the second track
5	Shooter	201	184,400	bridge	unstrengthening and superstructure of the top supports with cleaning and construction of protective coatings, leaving the existing steel structure with modifications of the bridge, backing bridges on centering tables (applies only to the object in km 177,364), making a new system for the second track
6	Tributary from Jez. Wysocki	201	185,740	culvert	repair of concrete defects (stones), possible local reinforcement of the structure and its extension in case of the need to widen the embankment, ordering the area in the culvert area, clearing (removal, cleaning of the bottom) with the cleaning of the ditches to the border of the railway plot, reprofiling and strengthening the embankments around the inlets.
7	Tributary from the Great Kack	201	193,410	culvert	repair of concrete defects (stones), possible local reinforcement of the structure and its extension in case of the need to widen the embankment, ordering the area in the culvert area, clearing (removal, cleaning of the bottom) with the cleaning of the ditches to the border of the railway plot, reprofiling and strengthening the embankments around the inlets.
8	Tributary from the Great Kack	201	196,675	bridge	comprehensive repair and strengthening of concrete supports, demolition of 1 or 2 existing systems carrying, implementation of completely new 2 systems carrying together with insulation, protective coatings and protection of expansion joints.
9	Duck	201	198,220	bridge/large culvert	repair of cavities, local reinforcement construction, construction of protective coatings

L.P.	River JCWP	Railway line number	Km of railway line	Type of object	Scope of work that may affect the JCWP
					the surface of the inlets and the visible surface of the vault, possible local reinforcement of the structure, protection of the crushing plant against overscoring, ordering the area in the area of the culvert, clearing (multipulation, cleaning of the bottom) with the cleaning of the ditches to the border of the railway plot, reprofiling and strengthening the slopes of embankments around the inlets.

Source: own development

Impact on biological elements

- Phytobenthos, there will be temporary damage to the habitat on the section of the works.
- Phytoplankton, there will be temporary damage to the habitat on the section of the works.
- Macrophytes, there will be temporary damage to the habitat on the section of ongoing works.
- Benthic macro invertebrates, temporary damage to the habitat on the section of works will occur.
- Ichthyofauna, the occurrence of short-term deterioration of habitat conditions, resulting from the smudging and sunking of prey and the increase of water suspension limiting the visibility and acquisition of food, is expected.

Renovation works will be carried out within existing bridges and culverts, which already have bottom and slope insurance and interference in the trough will not be associated with significant changes to existing biological elements in the trough. Potential effects on phytoplankton, zooplankton, benthos will be short-lived, transient and local. The impact will not adversely affect the preservation of the existing natural structures of the aquatic environment of elements of the surface water network (liquids, reservoirs).

Indirect effects will be noise and ground vibrations associated with the work carried out, which may reduce the migration of fish and cause them to be sent out. This phase of the investment can potentially also involve local water flow disruptions, the impact will be transient. During construction works, there is also a risk of pollution of water by chemical substances (e.g. by leakage of fuel from construction machinery). It is therefore necessary to ensure proper organisation of the construction site and appropriate storage of building materials on the construction site. It will be the responsibility of the contractor to properly store and secure materials on the construction site. The places and manner of storage of materials should be specified in the construction site management plan. Storage sites should ensure that the properties and suitability of the stored materials are preserved. Proper storage of materials will allow to protect the surface of the land and, consequently, surface waters from the possibility of contamination.

Effect on hydromorphological elements

The implementation of the investment will not affect the connection with groundwater bodies.

The planned works will not interrupt the hydrological continuity of the watercourses on which or within which the work will be carried out (Tab. 75).

The investment will not affect the morphological conditions of watercourses, works on Engineering facilities are related to their renovation. The implementation of the investment will not affect the hydromorphological conditions of water reservoirs present in the neighbouring railway lines.

Removal of vegetation from the watercourse trough (the section limited to the immediate vicinity of the objects) will affect the volume and dynamics of water flow (there will be a temporary increase in the speed and dynamics of flow – until the new vegetation grows).

In connection with the work on bridges on river continuity, the indicator on the number and type of barriers in the watercourses will not change. With regard to the indicator on movements of aquatic organisms during renovation works, disturbances in the migration of aquatic organisms and sediments may periodically occur. However, these disruptions will be short-lived, transient and will cease after construction works have been completed.

In conclusion, it should be noted that during the construction works there is no significant negative impact on hydromorphology of rivers. The expected impacts will not result in a deterioration of the values of the current indicators relating to the hydromorphological elements of the water of the CBWP located in the project area.

Effect on physico-chemical elements

The main impurity at the construction stage, affecting the quality of water, may be increased concentration of suspension. Work carried out in the trough of the watercourses may cause temporary drainage of the water. The resulting suspension can cause a temporary decrease in the dissolved oxygen content in the water. After some time in the cross section below the point of introduction or formation of pollutants, the suspension will be fully mixed with the receiver waters. Estimating the distance of full mixing with empirical patterns involves many simplifications. The potential range estimated on the basis of the Rutherford formula can range from 100 m to more than 3 km (depending on the flow size). However, the process of self-cleaning in nature usually takes place much faster than the calculations.

The planned construction work under the project, apart from the temporary increase in the concentration of the suspension and the associated possible reduction of dissolved oxygen in water, is not expected to affect the concentrations of other physicochemical indicators and indicators responsible for the chemical status of the water.

During the work, there will be no additional salinity and acidification of the flowing waters. The implementation of the project does not involve the introduction of chlorides, sulphates or nitrates into the waters.

During construction works, there is also a risk of pollution of water by chemical substances (e.g. by leakage of fuel from construction machinery). It is therefore necessary to ensure proper organisation of the construction site and adequate storage of waste (waste management is described in Chapter 5.1.11) on the construction site. Proper storage of waste (waste management is described in chapter 5.1.11) will help to protect the surface area and, consequently, surface waters from the possibility of contamination.

Due to the scale of the planned works, the deterioration of the state of the JCWP in terms of physico-chemical parameters will be local and short-lived (period of carrying out works in the riverbed). After the completion of the works, the state of the JCWP will naturally return to the previous one – before the start of the investment.

Uniform Parts of Underground Waters

Investment option (W1) and alternative option (W2)

Effect on chemical parameters

The implementation of the investment will not involve the use of substances (e.g. Mg chloride, Ca, Na) that cause the salinity effect of the aquatic environment.

During the implementation of the investment, groundwater pollution may occur, but these will be an emergency situation limited to the construction site. Due to the use of appropriate protective measures, e.g. protection of the site's facilities against harmful substances entering the ground (e.g. protection of the area with geo-coat), the availability of sorbents will effectively reduce the possibility of pollution of the ground and water environment.

The analysed railway lines pass through the area of one Main Underground Water Tank No. 111. GZWP Nr 111 Subniecka Gdańska is a pore tank in chalk works. The tank is present at significant depths. The ceiling of the sandy aquifer lies mostly on rows from – 100 to -140 m above sea level. Due to the deep position of the reservoir, it is characterised by resistance to pollution from the surface of the earth. For this reason, it is not anticipated that properly carried out construction works – with proper storage of materials and storage of heavy equipment – will have a negative impact on the groundwater of that reservoir.

Impact on quantitative parameters

The investment will not be related to the abstraction of groundwater, both at the stage of implementation and decommissioning. The implementation of the investment does not involve a change in the direction of water circulation.

Impact on groundwater and surface water bodies intended for abstraction for the purpose of

supplying the population with drinking water

Investment option (W1) and alternative option (W2)

The following is an analysis of the impact of the planned project on the intermediate protection zones crossed by the railway line 201.

Area of indirect protection of groundwater intake in Kościerzyn – the site of protection is cut over a length of about 2 310 m. In the area of the established indirect protection zone in accordance with Regulation No 4/2013 of the Director of the RZGW in Gdańsk, it is prohibited to:

1. discharge of effluents into surface waters or into the ground, with the exception of:
   a) purified rainwater and melting water,
   b) rainwater and melting waters which can be introduced into waters or into the earth without purification,
   c) treated waste water from a water treatment plant;
2. storage and agricultural use of wastewater and sewage sludge and slurry;
3. use of plant protection products other than those authorised for use in zones protective water intakes;
4. use higher than recommended doses of plant protection products authorised for use in water intake protection zones;
5. localisation of landfills of municipal, hazardous, non-hazardous, inert and inert waste;
6. locating storage facilities for petroleum products and storage of particularly harmful substances and priority substances specified in the provisions issued under the Water Law Act (with the exception of petroleum products and substances related to the operation of water treatment plants and ground, backyard liquefied gas tanks), as well as pipelines for their transport;
7. locating fuel distribution facilities;
8. locating cemeteries and burying animal corpses;
9. exploitation of minerals;
10. locating new groundwater intakes, including dug and drilled wells, excluding modernisation and expansion of the intake in Kościerzyn and areas not connected and without the possibility of connection to the water supply and sewerage network, for the normal use of water;
11. drainage works and excavations with a depth exceeding 2.5 m, with the exception of works related to the maintenance of natural watercourses and water installations and the construction and modernisation of water, sewerage and rainwater infrastructure;
12. carrying out construction drainage other than short-term drainage by means of needle filters, with the exception of drainages related to the construction of the technical infrastructure of the water, sewerage and rainwater networks;
13. localisation of domestic, municipal and industrial waste water treatment plants;
14. location of industrial plants;
15. washing equipment and motor vehicles other than washes equipped with waste water treatment systems;
16. arranging car parks without sealed surfaces and rainwater sewerage equipment.

When analysing the prohibitions in the area of indirect groundwater capture in Kościerzyn, it should be noted that the planned project will not result in violations of the applicable orders and prohibitions: it will not be related to the discharge of contaminated rainwater and melt water, the railway lines concerned will be equipped with drainage systems over the entire length, nor will the project be related to breaking the remaining prohibitions. There will be no storage and/or use of substances posing a risk of ground-water pollution during the construction phase on the section of line 201 passing through the intermediate protection area in km 137,675 – 139,985 (W1) or in km 137,650 – 139,990 (W2) directly on the construction sites. Technical facilities, refuelling sites for machinery and equipment, a station for ongoing repairs and inspections will be located outside the construction site. The equipment used and the means of transport used will have valid technical approvals and entry into service. There will be no storage of waste on the construction site.

The site of**indirect protection of groundwater intake "Wielki Kack" in Gdynia – the site of protection is cut over a length of about 2 445 m. In the area** of the established indirect protection zone in accordance with Regulation No 7/2014 of the Director of the RZGW in Gdańsk, it is prohibited to:

1) discharge of effluents into waters or into the ground, except for:
   a) purified rainwater and melting water,
   b) rainwater and melting waters which may be introduced into waters or into the earth without purification,
2) the use of plant protection products other than those authorised for use in water intake protection zones,
3) use higher than recommended doses of plant protection products authorised for use in water intake protection zones,
4) localisation of landfills of municipal, hazardous, non-hazardous, inert and inert waste;
5) storage or disposal of radioactive waste;
6) locating storage facilities for petroleum products and storage of particularly harmful substances and priority substances specified in the provisions issued under the Water Law Act (except for petroleum products and substances related to the operation of water treatment plants and ground, backyard liquefied gas tanks); and pipelines for their transport;
7) exploitation of minerals;
8) locating new groundwater intakes, with the exception of intakes for collectively supplying the population with water intended for consumption;
9) the use of chemicals against road icing on roads that are not connected to the rainwater system;
10) locating livestock farms;
11) construction of new facilities of type: car parks, storage areas, car washes, workshops and car commissions, vehicle inspection stations and transport bases, without the use of:
    a) a leaky medium that prevents rainwater and melting water from entering the ground;
    b) airtight rainwater and meltwater treatment systems with purification equipment;
12) the carrying out of other projects, provided that the hydrogeological documentation prepared for them specifying hydrogeological conditions in connection with the intended implementation of projects likely to adversely affect groundwater, including their pollution, demonstrates any danger.

When analysing the prohibitions in the area of indirect protection of the "Great Kack" it should be noted that the planned project will not result in violation of the applicable orders and prohibitions: it will not be related to the discharge of contaminated rainwater and melt water, the railway lines concerned will be equipped with drainage systems over the entire length, nor will the project be related to breaking the remaining prohibitions. There will be no storage and/or use of substances posing a risk of ground-water pollution during the construction phase on the section of line 201 passing through the intermediate protection area in km 192,590 – 195,035 (W1) or in km 192,705 – 195,150 (W2) directly on the construction sites. Technical facilities, refuelling sites for machinery and equipment, a station for ongoing repairs and inspections will be located outside the construction site. Equipment used means of transport will have valid technical approvals and entry into service. There will be no storage of waste on the construction site.

Site of indirect protection of groundwater intake "Sieradzka" in Gdynia – the site of protection is crossed twice over a length of approximately 1 125 m (area I) and 1 305 m (area II). In the area of the established indirect protection zone in accordance with Regulation No 8/2013 of the Director of RZGW in Gdańsk, it is prohibited to:

1. discharge of effluents into waters or into the ground, with the exception of:
a) purified rainwater and melting water,
b) rainwater and meltwater, which can be introduced into water or into the ground without purification.
2. washing of motor vehicles in addition to washes equipped with a system for collecting, pre-treatment and discharging waste water into the sanitary sewer;
3. localisation of landfills of municipal, hazardous, non-hazardous, inert and inert waste;
4. storage or disposal of radioactive waste;
5. locating storage facilities for petroleum products and particularly harmful substances and priority substances specified in the provisions issued under the Water Law Act (with the exception of petroleum products and substances related to the operation of water treatment plants and ground, backyard liquefied gas tanks), as well as pipelines for their transport;
6. locating car ducts and raids not equipped with wastewater collection, treatment and discharge systems into sanitary sewers;
7. parking facilities excluding places with sealed surfaces and connected to rainwater sewers;
8. locating new groundwater intakes except for collective water supply;
9. drilling or drilling for the use of ground heat in 'I' area of indirect protection zone;
10. extraction of minerals;
11. to mutilate projects other than previously mentioned which may have a significant or potential impact on the environment, without obtaining an environmental decision.

When analysing the prohibitions in the 'Sieradzka' groundwater catchment zone in Gdynia, it should be noted that the planned project will not result in violations of the applicable orders and prohibitions: it will not be related to the discharge of contaminated rainwater and melt water, the railway lines concerned will be equipped with drainage systems over the entire length, nor will the project be related to breaking the remaining prohibitions. During the construction phase of the two sections of line 201 passing through the intermediate protection area in km 195,380 – 196,685 and 199,055 – 200,180 (W1) or in km 191,85 – 200,300 (W2), there will be no storage and/or use of substances posing a risk of pollution of the ground-water environment directly on the construction sites. Technical facilities, refuelling sites for machinery and equipment, a station for ongoing repairs and inspections will be located outside the construction site. The equipment used and the means of transport used will have valid technical approvals and entry into service. There will be no storage of waste on the construction site.

Area of indirect protection of surface water intake "Straszyn" – the site of protection is cut over a length of about 215 m. In the area of the established indirect protection zone in accordance with Regulation No 3/2007 of the Director of the RZGW in Gdańsk, it is prohibited to:

1) the introduction of waste water into waters and into the ground, with the exception of treated rainwater;
2) agricultural use of waste water;
3) the use of emergency overflows and triggers in sewage pumping stations into waters and into the ground;
4) the use of fertilisers;
5) the use of plant protection products other than those authorised for use in water intake protection zones;

6) the construction of public roads without the inclusion of rainwater into rainwater systems and their purification before entry into waters and into the ground;
7) locating industrial plants and livestock farms;
8) locating storage facilities for liquid petroleum products and other hazardous substances, pipelines for their transport and service stations;
9) localisation of landfills of municipal, hazardous, non-hazardous, inert and inert waste;
10) parking facilities – the prohibition does not apply to the location of car parks at a distance of more than 20 m from the shore of surface waters within the limits of compact buildings and facilities allowed to be located in the zone, provided that rainwater from the parking lot discharged to water or to the ground is cleaned;
11) arranging camps over the waters;
12) arranging bathing areas and water sports in the Straszyn reservoir; locating new cemeteries and burying animal corpses;
14) construction of new residential, livestock and service facilities at a distance of less than 100 m from the coastline, with the exception of tourist construction located above the hydropower plant in Bielkowo. The prohibition does not apply to the construction of hydropower plants and facilities within the limits of compact buildings equipped with a sanitary sewer network;
15) the construction of manure storage panels and silage prisms in a way that does not guarantee the protection of water against pollution;
16) the construction of water installations related to the breeding of salmonids and carpidae;
17) in the Reservoir of Straszyn farming, feeding or harassing and catching fish with the exception of selective fishing carried out by the user of the Radunia River fishing region No 5, in accordance with the fishing frame drawn up for the Straszyn reservoir;
18) watering animals in waters and ditches and grazing at a distance of less than 20 m from waters and ditches;
19) the extraction of gravel, sand and other materials and the removal of plants from water or shore, with the exception of felling of plants, carried out by the watercourse administrator, in order to ensure free run-off;
20) the use of combustion-powered vessels – the prohibition does not apply to the operator of the watercourse;
21) traffic of vehicles on access roads to the "Straszyn" reservoir running from the village: Bąkowo, Lublewo, Bielkowo, Goszyn and Straszyn (from ul. Młyńska) except for vehicles carrying out tasks related to the handling of shots.

When analysing the prohibitions in the area of indirect abstraction of surface waters "Straszyn" it should be noted that the planned project will not result in violation of the applicable orders and prohibitions: it will not be related to the discharge of contaminated rainwater and melt water, the railway lines concerned will be equipped with drainage systems over the entire length, nor will the project be related to breaking the remaining prohibitions. During the construction phase of the section of line 201 passing through the indirect protection area in option W1 in km 177,140 – 177,355 and in option W2 in km 177,165 – 177,380, there will be no storage and/or use of substances posing a risk of pollution of the ground-water environment directly on the construction sites. Technical facilities, refuelling sites for machinery and equipment, a station for ongoing repairs and inspections will be located outside the construction site. The equipment used and the means of transport used will have valid technical approvals and entry into service. There will be no storage of waste on the construction site.

Summary

Railway line No. 201 has been operated for many years and does not have a negative impact on the waters recognised on the Straszyn approach. Once the investment has been completed, the drained rainwater from the area of the analysed railway line No. 201 will be of good quality (which is in line with the results of the analyses mentioned above at: "Analysis of the effects on surface waters taking into account the impact on the current purity status of watercourses"). Discharged rainwaters will not cause deterioration of indicators responsible for biological elements, hydromorphological elements and physico-chemical and chemical elements in the waters of the JCWPD, or deterioration of indicators responsible for chemical status and quantitative status of waters in the waters of the JCWPD.

The planned project will not adversely affect the quality of groundwater and surface water bodies intended for abstraction for the purpose of supplying the population with drinking water located in the investment area. The project will not adversely affect the continued quality of physico-chemical indicators of water intended for consumption and will not result in the need to modify water treatment processes. The planned project will not contribute to the failure to meet the environmental objectives of the CBWP and the CBWPs intended for abstraction for the purpose of supplying the population with drinking water – for which the objective of protection is to prevent deterioration of the quality of those water bodies in such a way as in particular to minimise the need for their treatment.

5.1.3 Effects on atmospheric air

The planned investment in both investment and alternative variants involves construction works of a very diverse nature. In addition to the works related to the track and the track, the project also includes the renovation, reconstruction and construction of new engineering facilities, as well as improvement of the surface of crossings at the level of rails. In connection with these construction works, both in the investment and alternative variants, fugitive gas emissions are inevitable, the main source of which will be internal combustion engines of construction machinery and transport vehicles – used during construction. Emissions will depend mainly on the works technology used and the type of equipment used. The heavy equipment necessary to implement the investment both in the investment and alternative variant is characterised by high power, and thus high fuel consumption, i.e. the emission of a large amount of exhaust gases to the environment. The main types of emissions on which air quality in the surroundings of construction work will depend are:

- dust emissions associated with the demolition of objects,
- exhaust emissions from machines operating during construction (e.g. NO2, SO2, CO);
- emissions of mainly dust resulting from the movement of vehicles on the construction site and access roads;
- emissions mainly of dust during loading and unloading of vehicles and during the transport of loose materials with uncovered trucks.

Due to the lack of detailed data on the stages of construction, assumptions have been adopted that reflect very well the actual emission conditions.

For the purposes of this analysis, the following data were assumed:

- construction works will be carried out in stages (section by section),
- the length of the section on which work will be carried out at the same time will be about 2 km,
- the estimated duration of work on one section will be about 30 days,
- the effective working time of engines of working construction machinery and vehicles will be up to 50 %^{of}the total working time, fuel consumption (propulsion oil) for all machinery and vehicles on the construction site is estimated at 250 dm 3/h (pessimistic assumption – reflecting the unfavourable variant – high fuel consumption and high emissions).

According to previous assumptions, the fuel consumption in both the investment and alternative variants in the planned two-kilometre section will then be:

- 16 h/day * 50 % * 30 days * 250 dm 3/h =^{60000}dm 3$^{(}$ total amount of fuel consumed) over the entire section of the line will be about 1 440 000 dm 3)$^{.}$
- assuming a diesel density of 0.835 kg/dm^3 (the oil density of 150 °C),^{the}fuel consumption will be the product of the diesel density at the specified temperature and calculated fuel consumption over one section: 0.835 kg/dm^3 *60000 dm 3$^{=}$ 50100 kg,
- the amount of fuel consumed for the conditions set out above, expressed in mass units, will be: 50 100 kg (50.10 Mg).

For further calculations, the following emission factors at the construction stage expressed in grams/kilogram of fuel were used:

Tab.76. Factors used to calculate air pollutant emissions.

Emission factors at	NOx	PM10	SO_2	VZO

construction stage [g/kg fuel]	48,8	2,29	0,0001	7,08

** assuming that all the sulphur contained in the fuel is converted into sulphur dioxide and the S content in the SA is at the level of 50 ppm.*
Source: Emission factors for diesel engines were adopted on the basis of the study "EMEP/Corinair Emission Inventory Guidebook – 2007". Technical report No 16/2007.

By multiplying the above factors and the amount of fuel consumption expressed in mass units, the amount of gases emitted to the atmosphere on a 2-kilometer section of the analysed railway line was calculated.

For NOx: 48.8 g/kg of fuel * 50 100 kg = 2 444.88 kg.

For NO_2: the amount of NO_2 emitted is approx. 14 % NOx from here: 14 %*2 444.88 kg = 342.28 kg.

For PM10: 2.29 g/kg of fuel * 50 100 kg = 114.73 kg.

For SO_2: 0.0001 g/kg of fuel * 50 100 kg = 0.01 kg.

For VOCs: 7.08 g/kg of fuel * 50 100 kg = 354.71 kg.

According to the above sizes, to the atmosphere on a 2-kilometre section of the investment both in the investment and alternative variants can be emitted approx. 2 445 kg NOx (of which approx. 14 % is NO_2, i.e. about 342 kg), approx. 115 kg of particulate matter with a diameter of 10 micrometres or less (PM10), approx. 355 kg of volatile organic compounds (VOCs). The amount of SO_2 emitted is almost negligible – mainly due to the low sulphur content of diesel fuel.

Due to the additional work in the investment option (3 tracks), the duration of construction works in this option will be longer than in the alternative option. Therefore, the time of emissions of the substance into the air for this option will be longer.

Reducing dusting will be possible through proper organisation of construction works, construction site, transport of materials, e.g.: introduction of chronology of works, organisation of construction vehicles traffic (use of existing hardened access roads), water spraying of construction site and areas exposed to wind erosion (earth shafts, embankments).

When transporting ground masses and raw materials that may cause dust during dry and windy periods, dust-proof covers will be used.

On the scale of the above nuisances will also be affected to a small extent by weather conditions, which will increase (solar, high temperature, strength and direction of the wind) or decrease (rain, high humidity) depending on the prevailing weather. However, despite adverse weather conditions, emissions of dust into the air will continue to be of a periodic nature and will be of little relevance.

During the implementation of the project, only vehicles with up-to-date technical inspection will be used.

There is no need for solutions to protect the environment from negative impacts on air pollution at the construction stage.

5.1.4 Impact on the acoustic climate

At the stage of construction, the source of noise emitted to the environment will be the machines and devices used in the construction of the track surface. This impact will be short-lived and moving along with the front of the works. Due to the type of work carried out, the use of heavy machinery is necessary. Typical sources of noise will be provided during the implementation of high-power construction equipment, such as excavator, loader, etc., as well as specialised railway machinery, i.e.:

- heavy machinery for track works – track breakers and turnouts, profiling machines, railway cranes,
- system cranes,
- specialised equipment – rail drills, rail grinders, impact hammers.

In addition, the means of transport (lorries and vans) that will produce noise with the sound power of LWA ≈ 100 dB will be important sources of noise. The size of the acoustic nuisance will be influenced by the work schedule of machines and devices and their mutual location. The construction works will take place in stages and during the same period on different sections of the railway line work will be of varying degrees of advancement. In terms of acoustics, the most burdensome phase will be the earthworks phase and the replacement of the track, during which a significant number of heavy equipment will be concentrated in a small area.

For the purposes of this assessment, in order to calculate the estimated noise coverage of the construction site, the following assumptions have been made for the construction phase:

- Use of 4 100 kW high power machines each – 1 compaction machine (LWA = 108 dBA), 1 excavator (LWA = 104 dBA) and 2 chargers (LWA = 102 dBA);
- Use of 30 trucks;
- The devices were modeled in the SoundPlan program in the built-up area, as point sources spread along the modernised track. The height of the replacement source was adopted at 1 m above the projected site;
- The traffic of heavy goods vehicles has been modelled as a road along the planned railway line;
- Work with heavy machinery has been modeled for use for half the time, i.e. 30 minutes/h.

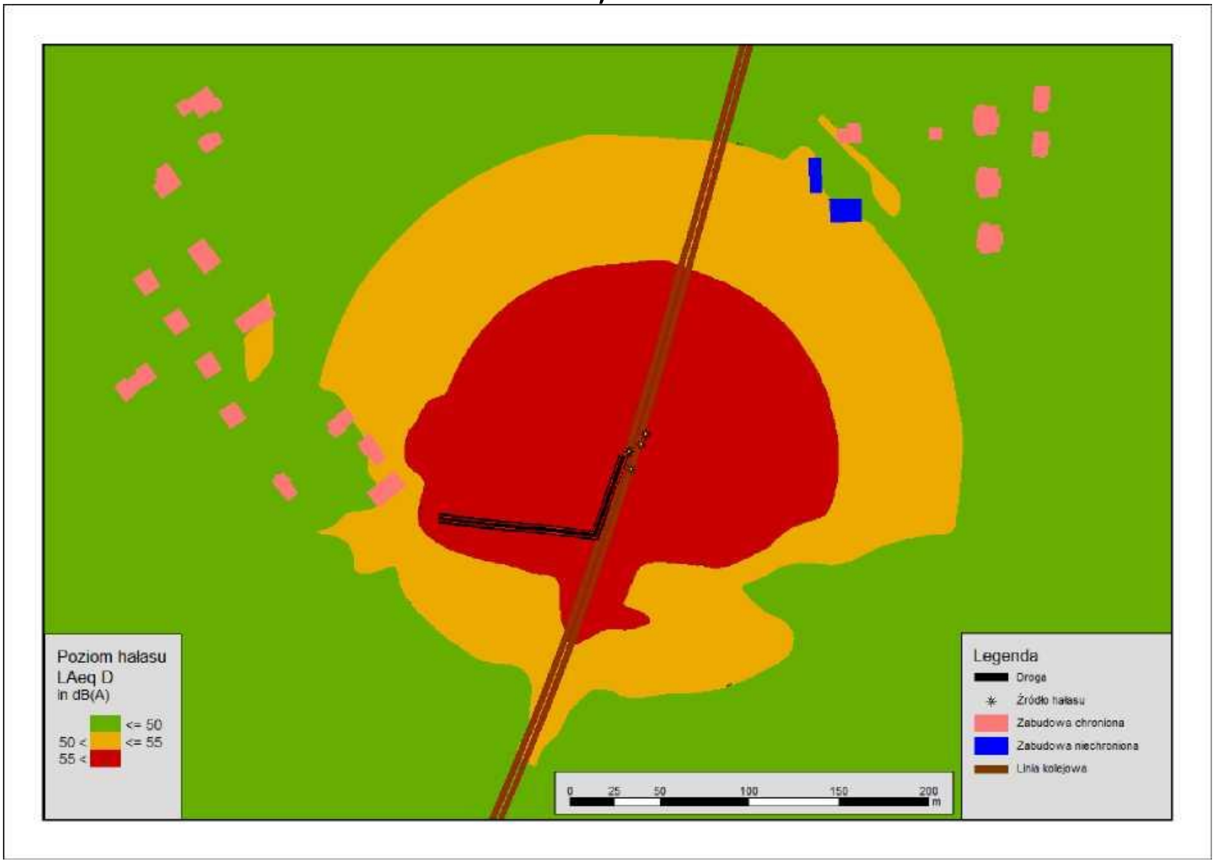
The sound power levels of machinery have been calculated on the basis of the Regulation on essential requirements for outdoor equipment for noise emissions into the environment.

Using the above assumptions, the maximum area range with an equivalent A sound level was calculated at:

- 50 dBA (noise permissible level for residential areas)
  detached at the time of day) of 200 m,
- 55 dBA (noise permissible level for multi-family residential areas)
  and farm, residential, service and recreational and leisure areas at the time of the day) amounting to 120 m.

The estimated noise coverage at the stage of implementation/decommissioning of the investment in question is shown in the figure below.

Fig. 19 Estimated noise ranges of the implementation/decommissioning stage – LK201, km 182,900.



Source: Develop your own.

At the decommissioning stage, it is envisaged to use similar machines as at the stage of implementation, i.e. the use of 4 high-power machines, which will have a decisive impact on the shaping of the acoustic climate. Therefore, the impact of the decommissioning phase is estimated at the same level as the above-mentioned scope of the implementation phase.

The impact range defined above at the implementation and decommissioning phases applies to both options W1 and W2.

5.1.5 Vibration impact

In the scope of implementation/decommissioning of the project, in each of the analysed variants, no work is foreseen to cause significant emissions of vibrations to the environment. For the most part, the works will consist of replacing track surfaces with drainage, reconstruction of railway line crossings with roads, installation of railway traffic control systems (srk), construction of overhead contact line, which do not cause significant emissions of vibrations to the environment.

In the case of construction of new or reconstruction/renovation of existing engineering structures and installation of pile foundations of traction poles in residential buildings and historic (conservatorial protection) located in close proximity to the railway line, the works will be carried out on the basis of methods characterised by a smaller zone of dynamic influences, e.g. such as: drilling or excavations in tight walls.

This recommendation applies to both options W1 and W2.

5.1.6 Impact on the emission of electromagnetic fields

In Poland, the basic formal and legal regulations in the field of protection against non-ionising electromagnetic fields are:

- The Environmental Protection Law of 27 April 2011 (consolidated text: Journal of Laws 2018, item 799);
- Regulation of the Minister for the Environment of 30 October 2003 on acceptable levels of semi-electromagnetic in the environment and methods of checking compliance with these levels (Journal of Laws No 192, item 1883).

According to the above Act, emissions mean the introduction, directly or indirectly, as a result of human activity, into the air, water, soil or earth of substances or energy – inter alia, semi-electromagnetic (Art. 4).

Electromagnetic field means electric, magnetic and electromagnetic fields with frequencies from 0 Hz to 300 GHz (Article 3, paragraph 18). Protection against electromagnetic fields consists of ensuring the best possible environmental status by keeping half-electromagnetic levels below or at least at acceptable levels and reducing semi-electromagnetic levels to at least acceptable levels when they are not met (Article 121).

The above-mentioned Regulation sets the permissible electric field strength in the natural environment (for areas accessible to the population) at 10 kV/m and the limit value of the magnetic field at 60 A/m.

During the implementation of the project, no equipment the operation of which could cause environmental hazards in terms of field emissions or electromagnetic radiation will be used. Evolutionary electrical equipment will be saturated by means of portable generators and will operate at a seed voltage of 220V or 400V, i.e. at low voltage, like all household appliances, hence the electrical fields generated by them will be negligible in relation to the prevailing electromagnetic background.

Therefore, no negative EMF impact is foreseen for both options at the investment stage.

5.1.7 Impact on material goods

Construction works will be carried out on the border of the area owned by the Investor and other entities, including natural persons. The reconstruction of the railway line and the construction of interconnectors entails the necessity of expropriation of the land in both variants.

All works will be carried out under construction supervision in accordance with the applicable regulations. Construction works will be carried out and secured in such a way that objects in their immediate vicinity will not be damaged – this applies to both buildings and underground weapons networks.

The implementation of the investment foresees the demolition of buildings. In the W1 investment option, there will be 7 railway buildings: adjustable, transit guard and building serving as a service at the Somonino station. Alternative option W2 plans to demolish 11 buildings, of which 4 are residential buildings.

The implementation of the planned project will lead to an increase in the Investor's assets and may affect the revival of the local real estate market in the area of the investment. The investment may also reduce the value of properties adjacent to the railway lane.

5.1.8 Impact on revived nature

For the purpose of assessing the impact, including the impact of construction works and the operation of the railway, on the identified natural habitats and habitats of flora and fauna species, it was assumed that the passion for the investment would be 15 m from the extreme axis of the track on both sides of the railway line. In this area, natural habitats, flora and fauna habitats may be transformed and/or destroyed. The impact assessment was presented on the basis of data from the conducted natural inventory and information provided by the RDOŚ in Gdańsk.

As the investment option differs only slightly from the alternative, the impact on nature at the implementation/decommissioning stage for both options is the same.

Areas and sites protected under the Nature Conservation Act

Due to the location of the project, which is the reconstruction of existing railway lines Nos 201, 214 and 229 and the construction of two junctions 214/229 and 201/229, the impact of the investment on such forms of nature protection as: national parks and documentary stands, since this investment does not cut through or take place in the immediate vicinity of these areas.

The following are the results of analyses concerning the potential impact of the planned project on: landscape parks, nature reserves, protected landscape areas, Natura 2000 sites, natural and landscape complexes, ecological uses and natural monuments. The conclusions of the analysis of the impact of the planned project on the above-mentioned surface forms of conservation are presented in relation to the whole of these protected areas.

Landscape parks

Kashubian Landscape Park was created to protect the typical landscape of youth lakes in the central part of the Kashubian Lake District. The park is dominated by a diversified post-glacial landscape, which is an image of geomorphological processes taking place in the Pleistocene.

The following specific conservation objectives have been defined:

a) preservation of the specificity of the terrain – moraine hills, river valleys and lake gutters and glacial meltings,
b) improvement of the cleanliness of surface waters,
c) maintaining and restoring the mosaic of plant communities, specific to the various types of natural environment of the Park, in particular the protection of springs, peatlands and phytocenoses involving boreal and sub-mountainous species,
d) maintaining the spatial coherence of forest ecosystems and their renaturalisation,
e) protection of natural and semi-natural communities along the watercourses and shores of lakes in order to obtain the biological development of their perimeters,
f) maintaining the natural diversity of fauna and creating conditions for the restoration of extinct species, in particular capercaillie and noble cancer,
g) preserving and exposing cultural heritage resources, in particular the structure and values of the cultural landscape, valuable spatial layouts of settlements, traditional and historical forms of development, tangible cultural objects and intangible cultural values, h) protecting the unique values of the landscape, in particular lake gutters and river valleys and exposed hills and slopes with significant landfalls,
1) economical use and planned shaping of the space with particular emphasis on the protection of landscape values.

The planned project within and in the vicinity of the park involves the reconstruction of the existing railway line No. 201 to the double track system. The implementation of the investment will not significantly affect the specific conservation objectives of the park:

A. (a), (h) and (i) Given that the investment consists of the reconstruction of an already existing railway line, it was considered that the impact on the landscape, which is one of the main assets of the park, would not be significant. A slight change in the course of the LK201 line is planned. However, this will not affect the change of landscape interiors and observation points of the closest surroundings of this line. The railway line is not in principle visible from the characteristic viewpoints. Only from the observation tower on the top of the Tower, located within the Kashubian Landscape Park, a trace of the railway line is visible (looking towards the east). A detailed description of the impact of the investment on the landscape can be found in Chapter 5.1.9.

A. b). The implementation of the investment will not adversely affect the status of surface water – the detailed impact is outlined in Chapter 5.1.2.

C)., (d) and (e). The implementation of the investment will not adversely affect the maintenance and restoration of the mosaic of plant communities, appropriate for the various types of natural environment of the Park, in particular the protection of springs, peatlands and phytocenoses involving boreal and sub-mountain species, the maintenance of spatial cohesion of forest ecosystems and their restoration, and the conservation of natural and semi-natural communities along the watercourses and shores of lakes in order to achieve the biological development of their periphery. The most valuable areas of the Park are located at least 15 m and protected in the form of reserves. The closest located reserve is Jar Rzeki Raduni. The area is described below in the section on reserves.

Ad. f) The implementation of the investment will not adversely affect the maintenance of the natural diversity of fauna and the creation of conditions enabling the restoration of extinct species, in particular capercinoma and noble cancer, since the scope of works does not pose a threat to the restored species.

Ad. g) The implementation of the investment will not adversely affect the preservation and visibility of cultural heritage resources, in particular the structure and value of the cultural landscape, valuable spatial layouts of settlements, traditional and historical forms of development, tangible cultural objects and the value of intangible culture, as the planned scope of modernisation works will not interfere with the state and structure of protected urban areas (Gdyni and Kartuz). Modernisation works will not affect the spatial structure of these areas. They will be implemented within the boundaries of areas separated as railway areas already transformed for the purpose of this function. For a detailed description of the implementation of the investments in relation to cultural and historical heritage, see Chapter 5.1.10.

Taking into account the above, it was assessed that the reconstruction of the railway line would not significantly affect the protection objects and functioning of the Kashubian Landscape Park. .

The Tri-City Landscape Park with a cover – is an area protected by natural, historical and cultural values, and the purpose of its creation is to preserve, popularise and disseminate these values in conditions of sustainable development. One of the most valuable natural values of the Tri-City Landscape Park is the unique post-glacial landscape, formed by processes related to North Poland's glaciation, and especially its last phase, Pomeranian – from 15 to 13 thousand years ago, from which the final withdrawal of the ice sheet from our land began. The rich youthful terrain, mosaic of mineral substrates, heterogeneous systems of aquifers and impermeable layers and the associated complexity of water relations resulted in a large variety of habitat and microclimate conditions in the area of this park. The most valuable natural elements of the park were protected in the form of a reserve.

The following specific conservation objectives have been defined:

a) preservation of a complex of forms of terrain of the edge zone of the moraine elevation, which is a morphological unique on a European scale,

b) preserving the special qualities of the aquatic environment of the park, especially lobel lakes and watercourses of a submountain character,

c) maintaining the positive impact of the park's forests on the climatic conditions of the Gdańsk agglomeration, (d) preserving the richness of vegetation with its botanical diversity and the regional specificity of forest and non-forestry ecosystems, in particular spring, peat bog, meadow and field phytocenoses,

 e) striving to renaturalise forest communities in terms of species composition and age and spatial structure of stands,

f) maintaining the diversity of habitats and micro-habitats that determine the richness of mycoflora and fauna, (g) ensuring conditions for the migration of fauna within the park and between the park and its regionalsurroundings, and preventing fragmentation of forest complexes,

h) protection of the cultural heritage of the park, in particular the preservation of the historical network of transport and recreational roads, urban and rural systems and architectural and natural complexes, as well as intangible cultural heritage,

i) protection and revalorisation of the special landscape values of the park, in particular forest-free valleys, the uni-cat exposure of the edge zone and the areas of coexistence of natural and cultural landscapes.

The investment includes the reconstruction of the existing railway line No. 201 to the three-track system. Therefore, its implementation will not significantly affect the specific conservation objectives of the park:

A) and i). The impact on the terrain will not be significant. A slight change in the course of the LK 201 line is planned within the park. However, this will not affect the change of landscape interiors and observation points of the closest surroundings of this line. A detailed description of the impact of the investment on the landscape can be found in Chapter 5.1.9. The landscape analyses presented in Chapter 5.1.9 of the report show that a factor that may affect the visual qualities of the landscape is the emergence of traction in connection with the planned electrification of the line. However, this is a minor impact and, in the context of the preservation of the subject-matter in question, the impact is marginal.

A. b). The investment does not take place in close proximity to valuable lobeli lakes and watercourses of a Podgórze character. Its implementation will not have a significant impact on the special qualities of the aquatic environment of the Park.

A. c. The implementation of the investment will not change the positive impact of the park's forests on the climatic conditions of the Gdańsk agglomeration – electrification of the line will have a positive effect on maintaining the appropriate atmospheric air condition. Due to construction work, it may be necessary to cut trees located in the belt up to 15 m from the axis of the extreme track, but due to the scale of the felling, this will not have a negative impact on the forests of the entire park.

A. (d). The implementation of the investment will not adversely affect the preservation of the richness of plant robes with its botanical diversity and regional specificity of forest and non-forest ecosystems, especially source, peat bog, meadow and field phytocenoses. The most valuable areas of the park are 15 m away and protected in the form of reserves. The closest located reserve is Kacze Łęgi. The site is described below in the section on reserves.

(E) and (f). The investment will not adversely affect the pursuit of the restoration of forest communities in terms of species composition, age and spatial structure of stands, and maintenance of the diversity of habitats and micro-habitats that determine the richness of mycoflora and fauna. The most valuable protected forest natural habitats of Natura 2000 (and thus plant communities) are located at a distance of at least 25 m from the boundaries of the planned investment. The investment therefore does not endanger their species composition, age and spatial structure and the diversity of habitats. As a result of the implementation of the investment, it will be necessary to cut small parts of the habitat with code 91E0 in the 15 m belt from the axis of the railway line. It is a habitat found throughout the landscape park and this will not adversely affect the pursuit of its renaturalisation in terms of species composition, age and spatial structure of stands and maintenance of the diversity of habitats and micro-habitats that determine the richness of mycoflora and fauna. This is described in detail in the Natura 2000 section.

A. g. During the implementation of the investment, there may be a short-term impediment to animal migration. It will not be continuous and intense. The investment includes modernisation and reconstruction of the existing railway line, so the conditions for the migration of fauna within the park and between the park and its regional surroundings and the fragmentation of forest complexes will not change (it will not deteriorate).

Ad h) The implementation of the investment will not adversely affect the conservation of the park's cultural heritage, in particular the preservation of the historical network of roads of a communication nature recreational, urban and rural systems, as well as architectural and natural complexes, as well as intangible cultural heritage. A detailed description of the implementation of the investments for cultural and historical heritage is described in Chapter 5.1.10.

Taking into account the above, it was assessed that the reconstruction of the railway line would not significantly affect the objects and protection objectives of the Tri-City Landscape Park.

Nature reserves

In the map appendix No 3.9-1 Nature conditions – reserves are presented individual natural habitats, located within the limits of both reserves against the background of variants.

Jar Rzeki Raduni Reserve – the aim of the protection of the Jar of the Raduni reserve is to preserve the unique ecosystems of the landmark section of the Radunia River, including the complex of gravel and riparian forests, rivers of a mountainous nature, lobes of extensively used meadows, one of the richest places of mountain species of flora and fauna and an important refuge of saproxylbionts.

In the case of this reserve, the planned tree felling in the strip up to 15 m from LK 201 will not cover the area of the reserve, as it is located at its nearest location by min. 21 m from LK 201. The boundary of the project does not enter the reserve area, in the nearest place the project area borders the reserve.

The reconstruction of the analysed railway line, due to the nature of the works and the location, will not affect the dynamics of slope and fluvial processes of the Radunia river, so it will not adversely affect the preservation of the unique ecosystems of its groundbreaking section.

In view of the precautionary and precautionary principle, it was considered that all measures should be taken to prevent the potential negative impact of e.g. accidental felling/breaking/damage of trees, littering and trampling of the site, etc. by using temporary fences so that the risk of potential interference in the site is as low as possible. A detailed description of the location of the fences can be found in Chapter 8.

With the use of the above mentioned as well as other minimisation measures described in Chapter 8, no significant negative impact on the conservation objectives of the reserve is foreseen.

Kacze Łęga Reserve – the purpose of protecting the Kacze Łęga reserve is to preserve a bundle with many monumental trees. The boundary of the project does not enter the reserve area, in the nearest place the boundaries of the reserve are about 9 m from LK201.

In the case of this reserve, an imminent threat of interference in this area and its natural value would constitute felling of trees in the strip up to 15 m from LK 201. It is a belt with a length of approx. 900 m (km 198,200 – 199,100). It is therefore necessary to apply the appropriate minimisation measures set out in Chapter 8 of the report. A single natural habitat with code 9160, occurring at a distance of less than 15 m from the extreme axis of the projected track and the animal habitats present in the reserve, is threatened. A detailed description of the impact on the site's individual natural habitats and plant, animal and fungal species can be found in the following chapters.

Indirect effects may also arise as a result of the project. Potentially endangered objects of protection of the aforementioned reserves, in particular wet vegetation, which is very sensitive to changes in water relations and trophies of the site. However, while maintaining the recommended measures to minimise the impact on these areas, it will be very limited. Appropriate minimisation measures are presented in Chapter 8 of the EIA report.

With the appropriate minimisation measures described in Chapter 8, no significant negative impact on the conservation objectives of the reserve is foreseen.

Protected Landscape Areas

In accordance with the Nature Conservation Act of 16 April 2004, the protected landscape includes areas protected by a distinctive landscape with diverse ecosystems, which are valuable because of the possibility of meeting the needs of tourism and leisure or the function of ecological corridors. The main tasks of such areas are to protect against deterioration of the environment, manage them in a way that promotes ecological balance, and strengthens the effectiveness of other forms of protection (landscape parks and reserves). In accordance with Article 24(1). 2 of the Act of 16 April 2004 on nature conservation, the prohibitions laid down in the acts establishing those areas do not concern the planned project, since it is the implementation of an investment of a public purpose.

The*area of the Protected Landscape of the Raduni Valley* – includes the bottom and slopes of the Raduni river valley and directly adjacent forest and agricultural areas. The purpose of this area is to protect against the erosion of the steep banks of the river and to maintain and improve the purity of its waters. The implementation of the investment will not adversely affect the purpose and object of the protection of the area. The most valuable part of the Radunia valley, i.e. the slope and the bottom of the river valley, are also protected in the form of a Natura 2000 site Jar Rzeki Raduni and in the form of a nature reserve Jar Rzeki Raduni. The impact of the investment on the Natura 2000 site is described below in the Natura 2000 section, while the impact on the reserve is described above in the section on nature reserves.

The impact on landscape values is described in chapter 5.1.9 of the report. Landscape analyses show that a factor that can affect the visual qualities of the landscape is the appearance of traction in connection with the planned electrification of the line. This impact will be marginal.

No negative impact on the objectives and objects of protection of the Raduni Valley Protected Landscape Area is foreseen.

The Carthusian Protected Landscape Area **–** the purpose of creating the Kartuski Protected Landscape Area is to protect very picturesque moraine areas covered with mixed forests, both state and private, with numerous lakes and swamps.

The impact on landscape values is described in chapter 5.1.9 of the report. Landscape analyses show that a factor that can affect the visual qualities of the landscape is the appearance of traction in connection with the planned electrification of the line. This impact will be marginal.

The investment may have a potentially negative impact on the 150 m lake and swamping located in the buffer. These are the following wetlands.

Tab.77. Wetlands located in the Kartuski Protected Area Landscape in buffer up to 15 m from the extreme axis of the designed track.

L.P.	Wetland habitat type	Line number	Line page	Distance from line axis/intersection length [m]	Mileage [km]
1	Mudslides, namuliska and podmokliska	Connection LK214 with LK229	Collision	108	from km 1.520 to km 1,628
2	Transitional bogs	Connection LK214 with LK229	Collision	268	from km 1,628 to km 1,896

Source: Own development

The threat to the existence of wetlands is primarily the change in the water relations of the area – both their drying and flooding. For the investment in question, no change in water ratios is foreseen with appropriate minimisation measures. The planned works will not result in interruption of the hydrological continuity of the watercourses, nor will the connections with groundwater bodies. The need for reconstruction of the facilities will only have a slight impact on the flow of water, through the partial maintenance of watercourses in the immediate vicinity of the facility. The ditches will be designed in a way that does not cause excessive outflow of water from neighbouring areas. It was therefore concluded that the investment would not affect the assumptions of protection of the Kartuski Protected Landscape Area concerning the stabilisation of water relations, nor the change in the natural nature of watercourses and reservoirs.

Although the investment will involve the removal of trees and shrubs in the 15 m strip from the extreme axis of the projected track, this will not interrupt the continuity of the forest complexes present in its area.

Natura 2000 sites

The assessment of the impact of the planned project on Natura 2000 sites has been carried out in accordance with the Commission18guidelines, which indicate the following steps of the analysis, citing:

First stage: *Identification – a process during which the likely impacts of a project or plan on a Natura 2000 site are identified (individually or in conjunction with other projects or plans) and an analysis is made as to whether the expected impacts are likely to have a significant impact on the site.*

Second stage: *Appropriate assessment – assessment of the impact of a project or plan on the integrity of a Natura 2000 site (individually or in conjunction with other projects or plans) in relation to the site's structure, functions and conservation objectives. If negative impacts occur, potential mitigation measures shall be further assessed.*

Third stage: *Assessment of alternatives – a process during which alternative options for achieving the objectives of a project or plan are analysed to avoid adverse impacts on the integrity of a Natura 2000 site.*

Fourth stage: *Assessment where there are no alternatives and negative impacts persist – assessment of compensatory measures where, in the light of the necessary requirements of overriding public interest, it is considered that the project or plan should be implemented (it should be emphasised that the guidelines do not address the problem of assessing the necessary overriding public interest requirements).*

According to Article 33 of the Nature Conservation Act of 16 April 2004, it is prohibited to take measures likely to have a significant negative impact on the conservation objectives of a Natura 2000 site, including, in particular, worsening the status of natural habitats or habitats of plant and animal species, as well as species for which the site has been designated or impaired the integrity of the Natura 2000 site or its links with other sites.

It was assumed that objects of protection of Natura 2000 sites, which are close to the existing railway lines analysed, will be exposed. Chapter 3.8 describes in detail the objects of protection of Natura 2000 refuges present in the 2 km buffer from the analysed railway lines and defines their hazards.

The impact of the planned investment on Natura 2000 sites is described below, taking into account the scope of works in the area of individual refuges, the location of the mainland relative to the boundaries of the planned investment and the probability of destroying part of the patches of natural habitats and sites of plant and animal species being the objects of conservation of these areas.

The Bay of Puck

This area is approximately 1 km from the railway line 201. According to the assumed scope of the investment, the reconstruction of railway lines at the stage of implementation/decommissioning or exploitation will not have a direct or indirect impact on the functioning of key populations of species that are the subject of conservation of the area. The planned works do not involve the emergence of the types of threats that are listed in the SDF of this area as likely to have a negative impact on the site's objects of protection.

Leniec on the Belief

This area is almost 1 km away from the analysed line No 201, from the initial point of the analysed section of this line. According to the assumed scope of the investment, the reconstruction of railway lines at the stage of implementation/decommissioning or operation will not have a direct or indirect impact on the functioning of the non-subfloor flare, which is the subject of protection of the area in question. The planned work does not involve the emergence of the types of threats listed in the site's conservation task plan as likely to have a negative impact on the site's conservation objects.

Prokowo

The area is approximately 1.5 km from the planned LK214 and LK229 in W1 and, in the case of W2, at the nearest point it is about 2 km from LK 214. According to the assumed scope of the investment, the reconstruction of railway lines at the stage of implementation/decommissioning or exploitation will not have a direct or indirect impact on the functioning of the species protected by the area in question. The planned works do not involve the emergence of the types of threats that are listed in the SDF of this area

European18 Commission. DG Environment. "*Evaluation of plans and projects significantly affecting Natura 2000 sites Methodological guidelines on the provisions of Articles 6(3) and (4) of Habitats Directive 92/43/EEC*." November 2001 as likely to have a negative impact on the site's objects of protection.

Cliffs and Stone Reefs Orlow

This area is approximately 1.2 km from the analysed LK 201. According to the assumed scope of the investment, the reconstruction of railway lines at the stage of implementation/decommissioning or exploitation will not affect the functioning and condition of natural habitats, rather than species whose nature (connected with the sea coast) makes it possible to conclude that there is no influencing into the area.

The Jar of the Raduni River

The planned project will not be carried out within the Natura 2000 site in question (in the nearest place, the boundary of the project coincides with the boundary of the Jar Rzeki Raduni area, without exceeding it). Natura 2000 Jar Rzeki Raduni is located on the right side of the track of line 201. In the nearest location (LK 201, Km 172,906), the boundary of the Natura 2000 site is 21 m away. The closest natural habitat is a habitat with code 9160 (sub-Atlantic land), which is also the subject of protection of the site in question. It is at a distance of OK. 25 m from LK 201, and to the project border at a distance of 21 m in 172.906 km LK 201. Once the minimisation measures set out in Chapter 8 are applied, the impact of investments will be negligible.

The species of freshwater bivalve molluscs from the coke family – *Unio crassus coarse collar is also the subject of protection.* A threat to this species is the mechanical destruction of the bentos of the Raduni river by canoeing and pollution of the Raduni River. On the section where the boundary of the Natura 2000 site under analysis is adjacent to the boundary of the project site on LK 201, there are no overpasses/bridges. The nearest are two reinforced concrete culverts on LK 201: in km 172,354 (approximately 106 m from the Natura 2000 site border) and in km 173,060 (approximately 23 m from the boundaries of the Natura 2000 site), which will be subject to work as part of the planned project. These culverts are not located on the Raduni River. Radunia intersects the analysed railway lines in km 163,652 LK 201 and in km 0,814 LK214. Both bridges are planned for comprehensive repair and are about 5 km away (in a straight line) from the Natura 2000 site. If construction works are carried out in accordance with the recommendations, the probability of impact of the investment on the above-mentioned species is very low, negligible.

Pressures such as fishing, forest felling, erosion and forest restoration after felling (seedings) have also been identified in the SDF for the Natura 2000 site in question. The operation, construction or reconstruction of the railway line is not listed as a potential threat to the objects of protection of the area in question.

The planned project will not generate the above-mentioned factors that could be detrimental to the protected objects of the Natura 2000 site under consideration. The construction or operation of the railway does not involve the emergence of the types of hazards listed in the SDF of this area as likely to have a negative impact on the site's objects of protection.

Both construction and exploitation phases are not expected to have a negative impact on surface water quality. Drained and melting waters from the track meet the requirements of legal regulations, i.e. Ordinance of 18 November 2014 on the conditions to be met for the discharge of waste water into or into the ground and on substances particularly harmful to the aquatic environment.

Kaszubski Lake District

In the case of the implementation of the investment, there is no provision for direct interference with any of the natural habitats protected by the Natura 2000 site in question within the boundaries of the site. None of the affected habitat fragments are located within the boundaries of the Natura 2000 site Uroczyska Pojezierza Kashubianski. In addition, one patch of habitat code 3150 located in km 152,553 at a distance of 31 m on the left side of LK201 is at risk of deterioration. This lobe is located within the Natura 2000 site and is at risk of indirect impact. It will not be destroyed, but habitat 3150 is sensitive to changes in groundwater levels and may potentially deteriorate. Potential impacts may occur if the minimisation measures described in Chapter 8 are not applied. After applying the indicated measures to minimise the impact of the project under consideration, it will be of little importance. For the remaining habitats subject to protection of the Natura 2000 site in question, due to their distance from the analysed line 201, no direct or indirect negative impact is foreseen.

On the basis of the established natural inventory within the buffer of 2 x 150 m of line LK 201 running in the immediate vicinity of the Natura 2000 site in question, the presence of one species of fish, which is the subject of the protection of a Natura 2000 site, was found to be present – i.e. a common goat. In addition, there was another protected species of fish – rose on this section of line 201. Modernisation works within line L 201 in the immediate vicinity of the Natura 2000 site PLH220095 Uroczyska Pojezierza Kashubianskie should not disrupt the functioning of the population of fish species subject to the conservation of the site, nor should it reduce the density of fish species subject to conservation of the site and other protected fish species if recommendations for contractors of the works are implemented and the recommended minimisation measures indicated in the study are applied.

Threats to the objects of protection of this area (according to the SDF) are both internal and external. Among the pressures and risks, the following risks are important in the event of the implementation of the planned project: railways – entered as a threat to the SDF (low level – L), bridges, overpasses, regulation (correction) of riverbeds and changes in the course of riverbeds, modification of water functioning, pollution, electric and telephone lines and roads. It should be emphasised that railway line 201 is a line that has existed here for many years, even before the creation of the Natura 2000 site in question. The addition of a second track and correction of arches will not be of significant importance. With the implementation of the project, the number of trains running LK 201 will increase. The noise generated by rolling stock will not have a significant negative impact on the functioning of the species protected in the area in question.

With the implementation of the investment, there is no need to change the water relations that could affect the protected objects of the Natura 2000 site in question. Locally, at the construction site of railway overpasses, where excavations under LK 201 will be required, short-term dehydration may be necessary at the construction stage. These sites are not located in the immediate vicinity of habitats subject to conservation of the site. The closest is planned in the viaduct at km 157,000 LK 201, about 80 m from habitat 3150. At this point, particular attention should be paid not to significantly alter the level of groundwater and not to worsen the condition of this habitat. Following the application of the mitigation measures indicated in Chapter 8, i.e. the application of fortifications with sealed walls in drainage ditches or other adequate solutions to prevent the dehydration of habitats, the possibility of changing groundwater levels and deterioration of the habitat is not foreseen.

As part of the investment, the reconstruction of roads, including those within the Natura 2000 site, is planned. However, this does not apply to habitats protected by the Natura 2000 site in question.

Nature and Landscape Teams

At a distance of 18 m from the railway line 201 Km 193,850 there is one natural landscape complex Rynna Dąbrowsko-Ostrzycka. The purpose of the protection of this site is to preserve the spatial continuity of natural and landscape structures of particular importance for the functioning of the site's nature, including the revalorisation and protection of the landscape of lake gutters, the protection of wetland breeding grounds and the restoration of the spatial order of the landscape.

Analysing the nature and scope of the planned project, it was assessed that the impact on the terrain would not be significant. A detailed description of the impact of the investment on the landscape can be found in Chapter 5.1.9. Similarly, the marginal impact of the investment will be on wetland breeding sites. A detailed description of the impact on ornitofauna can be found in the following chapters.

In accordance with Article 45(1). 2 of the Act of 16 April 2004 on nature conservation, the prohibitions laid down in the acts establishing the area do not concern the planned investment, since it is the implementation of an investment of a public purpose.

Ecological uses

In close proximity, at a distance of 11 m from the realised investment, there is one ecological use of Lake Kackie. The purpose of conservation is primarily the habitats and sites of protected species of birds and amphibians and reptiles. Due to the fact that it is a wetland, and the planned works will take place in the immediate vicinity of the lake's coastal zone, it is expected that the habitats of animal species will deteriorate by a potential slight decrease in its surface area and partial temporary dehydration.

The impact at the implementation stage should be considered significant. However, if the appropriate minimisation measures described in Chapter 8 are applied, the impact of the investment on the site will be much smaller, and given the natural capacity of animal habitats, including bird habitats, amphibians and reptiles to regenerate (assuming that there is no negative impact in the long term), the negative impact and disturbance of the status of these habitats should be considered temporary.

In addition, it is worth noting that, in accordance with the provisions of the Nature Conservation Act of 16 April 2004, the prohibitions laid down in the acts establishing the site do not apply to the planned project, since it is the implementation of an investment of a public purpose. At the stage of implementation of the investment, every effort will be made to ensure that the impact of the investment on the site is as little as possible (Chapter 8).

Monuments of trees

On the basis of the analysis carried out, the planned investment will not contribute to the cutting of any tree constituting a natural monument, due to the fact that none of them is less than 15 m from the axis of the extreme tracks (not located in the strip to be cut). One tree (PL.ZIPOP.1393.PP.2205083.849) is located at a distance of 15 m from the extreme axis of the projected track. In the opinion of the expert, there is no need to cut this tree. A list of trees located at a distance of 15-30 m from the axis of the railway line is set out below. These trees can potentially be exposed to accidental damage. Chapter 8 defines minimisation measures for these trees.

Tab.78. List of natural monuments located up to 30 from the axis the extreme design track.

Inspire object code	Object type	Tree species	Mileage [km]	Line page	Distance from line axis 201 [m]
PL.ZIPOP.1393.PP.2205062.377	tree	species: Peduncle oak – Quercus robur; chest ring: 156.0 cm; height: 22.0 m	150,954	L	22
PL.ZIPOP.1393.PP.2205083.849	tree	multi-object monument – tree avenue (501 Jul, 3 oaks, 11 ashs, 2 field clones, 34 clones)	181,469	P	27
PL.ZIPOP.1393.PP.2205083.849	tree	J.W.	181,469	L	26
PL.ZIPOP.1393.PP.2205083.849	tree	J.W.	181,470	L	15
PL.ZIPOP.1393.PP.2262011.7275	tree	group of 2 beeches – trees grown in 1 object, withered branches species: Common beech (Ordinary Buke) – Fagus sylvatica; chest ring: 111.0 cm; height: 25.0 m	191,749	L	21

Source: own development

<u>Natural habitats and protected plant species</u>

The analysis of the impact of the investment on Natura 2000 natural habitats was based on the assumption that all patches of habitats at a distance of 15 m from the extreme axis of the track are at risk of destruction at the construction stage. According to the assumptions, during the implementation of the investment, trees and shrubs will be cut – within 15 m from the track axis along the entire track for the course of all the analysed railway lines. Fragments of habitats located in a 15-meter buffer will therefore be destroyed.

The following table provides information on the risks posed by investments to identified natural habitats located at a minimum distance of less than or equal to 15 m, i.e. those that will be partially destroyed.

Tab.79. Assessment of the impact of the project on protected natural habitats within 15 m from the extreme axis of the projected track.

.Habitat code	Habitat location (Line, kilometre distance from line [m])	Page	Total area of habitat in the test buffer [ha]	Habitat area exposed to destruction in the strip 2x15m [ha]	Area of the lobe exposed to destruction [%]	Assessment of the impact of investments	Investment threat
6410	201, Km 185,639, approx. 14 m from the line	rights	2,8485	0,0566	1,99	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small section of the habitat associated with the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
6430	201, Km 191,605, approx. 9 m from the line	rights	0,6361	0,0769	12,09	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small part of the lobe of habitat associated with the construction of the third track on the section Gdańsk Osowa –
9110	214/229, Km 0,721, approx. 0 m from the line	right-left	4,0945	0,4704	11,49	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small patch of habitat associated with the construction of a new section of line 214 as a link to line 229
9110	214/229, Km 1,738, approx.0 m from the line	right-left	7,0794	0,8837	12,48	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small patch of habitat associated with the construction of a new section of line 214 as a link to line 229
9110	201, Km 191,322, approx. 5 m from the line	left	2,6363	0,2912	11,05	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small section of the habitat associated with the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
9110	201, Km 199,049, approx. 7 m from the line	left	10,4736	0,0183	0,17	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small part of the lobe of habitat associated with the construction of the third track on the section Gdańsk Osowa –
9110	201, Km 200,422, approx. 11 m from the line	left	10,9424	0,0808	0,74	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small section of the habitat associated with the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
9130	214/229, Km 2,919, ca. 0 m from the line	right-left	15,195	1,4046	9,24	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small patch of habitat associated with the construction of a new section of line 214 as a link to line 229

.Habitat code	Habitat location (Line, kilometre distance from line [m])	Page	Total area of habitat in the test buffer [ha]	Habitat area exposed to destruction in the strip 2x15m [ha]	Area of the lobe exposed to destruction [%]	Assessment of the impact of investments	Investment threat
9130	201, Km 197,533, approx. 14 m from the line	left	3,2132	0,1695	5,28	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small part of the lobe of habitat associated with the construction of the third track on the section Gdańsk Osowa –
9130	201, Km 197,558, approx. 7 m from the line	rights	1,5745	0,2743	17,42	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small part of the lobe of habitat associated with the construction of the third track on the section Gdańsk Osowa –
9160	201, Km 170,823, approx. 6 m from the line	left	5,4788	0,2083	3,80	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small section of the habitat associated with the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
9160	201, Km 181,328, approx. 5 m from the line	rights	6,2722	0,1023	1,63	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small section of the habitat associated with the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
9160	201, Km 181,409, approx. 2 m from the line	left	2,3836	0,1264	5,30	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small section of the habitat associated with the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
9160	201, Km 191,710, approx. 2 m from the line	rights	0,4643	0,0734	15,81	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small part of the lobe of habitat associated with the construction of the third track on the section Gdańsk Osowa –
9160	201, Km 192,093, approx. 10 m from the line	rights	1,4816	0,3191	21,54	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small part of the lobe of habitat associated with the construction of the third track on the section Gdańsk Osowa –
9160	201, Km 192,505, approx. 13 m from the line	rights	1,6489	0,0046	0,28	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small part of the lobe of habitat associated with the construction of the third track on the section Gdańsk Osowa –
9160	201, Km 196,883, approx. 7 m from the line	rights	0,6013	0,0927	15,42	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small part of the lobe of habitat associated with the construction of the third track on the section Gdańsk Osowa –

.Habitat code	Habitat location (Line, kilometre distance from line [m])	Page	Total area of habitat in the test buffer [ha]	Habitat area exposed to destruction in the strip 2x15m [ha]	Area of the lobe exposed to destruction [%]	Assessment of the impact of investments	Investment threat
9160	201, Km 198,960, approx. 2 m from the line	rights	1,625	0,2269	13,96	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small part of the lobe of habitat associated with the construction of the third track on the section Gdańsk Osowa –
9160	201, Km 199,487, approx. 8 m from the line	left	1,2581	0,031	2,46	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small part of the lobe of habitat associated with the construction of the third track on the section Gdańsk Osowa –
91E0	201, Km 158,293, approx. 5 m from the line	left	2,7561	0,469	17,02	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small section of the habitat associated with the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
91E0	201, Km 159,681, approx. 7 m from the line	left	3,3942	0,0321	0,94	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small section of the habitat associated with the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
91E0	201, Km 180,792, approx. 5 m from the line	right-left	0,8316	0,2463	29,62	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small section of the habitat associated with the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
91E0	201, Km 184,349, approx. 8 m from the line	rights	2,4443	0,3894	15,93	direct, long-term, permanent, impossibility to preserve the habitat	Destruction of a small section of the habitat associated with the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201

Source: own development

In the area of the planned project, on the basis of a natural inventory carried out at a distance equal to or less than 15 m from the extreme track, fragments of 23 lobes belonging to 6 protected natural habitat types were found. For most habitats, their area exceeds the area covered by the inventory, so it can be concluded that their total area is larger.

Thus, it follows from the above list that at the stage of implementation there may be a negative impact on natural habitats occurring at a distance of up to 15 m from the extreme track, due to the planned felling of trees and shrubs in the railway area along the entire track for the course of all the railway lines analysed. In order to avoid the destruction of habitats located more than 15 m away, habitat fencing is planned, as indicated in the chapter on minimisation measures. The identified natural habitats located more than 100 m from the analysed investment are not exposed to destruction, so there is no need to win them.

None of the affected habitat fragments are located within the boundaries of the Natura 2000 site Uroczyska Pojezierza Kashubianski. The reduction in the area of these lobes will be marginal. These habitats are common in the Pomeranian Voivodeship, so the loss caused by the implementation of the investment will be unnoticed.

Another identified potential risk is the possibility of adverse changes in water relations as a result of the earthworks carried out. Habitats (codes 3150, 6410, 7140, 7230, 91E0 and 91F0) are particularly sensitive to changes in water relations, as are wetlands located in the 15 m buffer.

Tab.80 Location of wetland natural habitats located up to 100 m from the extreme axis of the projected track.

Habitat code	Habitat location (line, kilometre, distance from line [m])	Page	Total habitat area [ha]	Assessment of the impact of investments	Investment threat
3150	201, Km 147,144 (Cashubian Vessel), approx. 40 m from the line	left	106235	no impact on the status of habitats/species with minimisation measures	–
	201, Km 151,405 (Feature VEHICLES) Kaszubski), OK. 81 m from the line	left	18882	no impact on the status of habitats/species with minimisation measures	–
	201, Km 152,553 (Cashubian Vessel), approx. 31 m from the line	left	88873	intermediate, short-term	Site dehydration risk and habitat disturbances associated with comprehensive reconstruction of existing drainage and new construction
	201, Km 157,100 (Cashubian Vessel), approx. 61 m from the line	left	14478	no impact on the status of habitats/species with minimisation measures	–
	201, Km 159,889, approx. 19 m from the line	left	159345	intermediate, short-term	Site dehydration risk and habitat disturbances associated with comprehensive reconstruction of existing drainage and new construction
	214, Km 5,563, approx. 75 m from the line	rights	31039	no impact on the status of habitats/species with minimisation measures	–
	201, Km 180,537, approx. 60 m from the line	rights	4299	no impact on the status of habitats/species with minimisation measures	–
	201, Km 139,393, approx. 19 m from the line	rights	80138	intermediate, short-term	Site dehydration risk and habitat disturbances associated with comprehensive reconstruction of existing drainage and new construction
	201, Km 140,029, approx. 53 m from the line	rights	35632	no impact on the status of habitats/species with minimisation measures	Site dehydration risk and habitat disturbances associated with comprehensive reconstruction of existing drainage and new construction

Habitat code	Habitat location (line, kilometre, distance from line [m])	Page	Total habitat area [ha]	Assessment of the impact of investments	Investment threat
7140	201, Km 145,993 (Cashubian Vessel), approx. 68 m from the line	left	2,7404	no impact on the status of habitats/species with minimisation measures	–
	201, Km 157,163 (Cashubian Vessel), approx. 20 m from the line	left	0,6111	intermediate, short-term	Site dehydration risk and habitat disturbances associated with comprehensive reconstruction of existing drainage and new construction
7230	201, Km 146,296 (Cashubian Vessel), approx. 62 m from the line	left	4,9519	no impact on the status of habitats/species with minimisation measures	–
	201, Km 153,413 (Feature VEHICLES) Kaszubski), OK. 92 m from the line	left	0,6363	no impact on the status of habitats/species with minimisation measures	–
91E0	201, Km 153,542 (Feature VEHICLES) Kaszubski), OK. 64 m from the line	left	0,8663	no impact on the status of habitats/species with minimisation measures	–
	201, Km 159,709, approx. 17 m from the line	left	27561	no impact on the status of habitats/species with minimisation measures	–
	201, Km 164,846, approx. 50 m from the line	left	3,3942	no impact on the status of habitats/species with minimisation measures	–
	201, Km 173,381, approx. 87 m from the line	left	21138	no impact on the status of habitats/species with minimisation measures	–
	201, Km 180,148, approx. 24 m from the line	rights	4117	no impact on the status of habitats/species with minimisation measures	–

Habitat code	Habitat location (line, kilometre, distance from line [m])	Page	Total habitat area [ha]	Assessment of the impact of investments	Investment threat
	201, Km 197,204, approx. 17 m from the line	rights	46809	intermediate, short-term	Site dehydration risk and habitat disturbances related to the construction of the third track on the section Gdańsk Osowa – Gdynia Główna
91F0	201, Km 172,669, approx. 76 m from the line	rights	26544	no impact on the status of habitats/species with minimisation measures	–

Source: own development

The table below shows the wetlands located in the buffer up to 15 m from the axis of the designed track.

Tab.81. Wetlands located up to 15 m from the extreme axis of the projected track.

LP.	Wetland habitat type	Line number	Mileage [km]	Line page	Distance from line axis/intersection length [m]
1.	Mudslides, namuliska and podmokliska	Connection LK214 with LK229	from km 1.520 to km 1,628	Intersection	108
2.	Transitional bogs	Connection LK214 with LK229	from km 1,628 to km 1,896	Intersection	268

Source: own development

All of the above-mentioned habitat lobes and wetlands are very sensitive to changes in the water relations of the site. Therefore, special care will be exercised when performing works related to drainage of the line – permanent drainage of the surrounding area is unacceptable. Therefore, it is important to apply the minimisation measures described in Chapter 8.

2 sites of one vascular plant species under partial protection are exposed to direct destruction – sand blankets with a total area of 0,0042 hectares. The destruction of individuals on an area of 0.58 % will not significantly affect the state of the local population. The following table provides information on the risks posed by investments during the implementation phase for the identified protected vascular plant species.

Tab.82. Assessment of the impact of the project on protected plant species at a distance up to 15 m from the extreme axis of the designed track.

Polish and Latin name	Location of the station (Line, kilometre distance from line [m])	Page	Total area [ha]	Area [ha] in waist 2x15m	Area exposed to destruction [%]	Investment Impact Assessment/Investment Risk
Helichrysum arearium sand blankets	201, Km 163,838, approx. 0 m from	rights	1 individual	–	–	direct, long-term, impossibility to preserve the species, after the completion of the investment stage there is a possibility of repopulation of the habitat by the species.Destruction of individuals and habitats associated with the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201 Km 141,778, approx. 0 m from the line	rights	0,73	0,0042	0,58	

Source: own development

The above table indicates that the investment will have a slight negative impact on vascular plant species protected during the implementation phase. In the event of destruction of habitats and sites of plants covered by species protection, the Helichrysum arearium will be authorised for the above action (derogations from the prohibitions of Article 52 of the Nature Protection Act) from the Regional Director of Environmental Protection in Gdańsk in accordance with Article 56 of the Nature Protection Act.

In the area of the planned project, on the basis of a natural inventory of distances equal to or less than 15 m from the extreme track, the presence of 2 moss species was found. The table below provides information on the risks posed by investments at the implementation stage for the detected protected moss species.

Tab.83. Assessment of the impact of the project on protected moss species at a distance of up to 15 m from the extreme axis of the projected track.

Polish and Latin name	Location of the station (Line, kilometre distance from line [m])	Page	Total area [ha]	Surface exposed to destruction [ha] in the waist 2x15m	Area exposed to destruction [%]	Assessment of the impact of investments	Investment threat
Wekradłoszka sharpened *Calliergonella cuspidata*	201, Km 160,059, approx. 2 m from the line	left	4,21	0,46	10,93	direct, long-term, permanent, impossibility to preserve the habitat of the species	Destruction of species sites related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
Rokietnik common *Pleurozium schreberi*	201, Km 145,234, approx. 0 m from	left	3,04	0,23	7,57	direct, long-term, permanent, impossibility to preserve the habitat of the species	Destruction of species sites related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 145,759, approx. 14 m from	left	3,63	0,03	0,83		
	201, Km 146,444, approx. 15 m from	rights	0,97	0,03	3,09		
	201, Km 152,235, approx. 6 m from	right-left	7,47	0,12	1,61		
	201, Km 171,943, approx. 0 m from	rights	134,51	17,19	12,78		
	201, Km 182,520, approx. 2 m from	left	10,46	1,37	13,10		
	201, Km 189,580, approx. 11 m from	right-left	3,45	0,08	2,32		

Source: own development

As part of the construction works, 8 sites will be destroyed, two species will be destroyed: wetlands of the *sharpened Calliergonella* cuspidata and the seacoat of *the common Pleurozium* schreberi by carrying out works at a distance of up to 15 m from the extreme track. The total area of sites exposed to direct destruction in the 2x15m belt will be 19.51 hectares, of which 15.30 ha is a seacoat surface. However, this represents only 7.8 % of the habitat area of this species in the area studied.

As part of the planned investment, it will be necessary to cut trees in the 2x15 m strip along all analysed railway lines. The section will also include the construction sites of two railway junctions 214/229 and 201/229. The necessity of the felling is due to the safety of rail traffic, which are included in the legal requirements (Regulation of the Minister of Infrastructure of 7 August 2008 on distance requirements and conditions allowing the location of trees and bushes, elements of acoustic protection and the execution of earthworks in the vicinity of the railway line, as well as the method of organising and maintaining snow curtains and fire-fighting belts (uniform text Journal of Laws 2014 item. 1227).

An analysis of the state of the existing greenery along the analysed railway lines indicates that, in total, the parcel may be intended for approx. Twenty-four thousand trees. The most common species among the trees are: common clone and beech. Among the bushes are dominated by hazelnut, without black, alych plum. The analysis carried out in a buffer of 2x15 m showed the total area of shrubs to be cut out – approx. 85 thousand m^2. Most trees and shrubs will be removed in order to build railway links.

In the case of the investment under consideration, the application of appropriate minimisation measures indicated in Chapter 8 will reduce the negative impact of the investment on natural habitats and protected plant species.

Mushrooms, including lichens

The impact of the environment on fungi (including lichens) is direct and indirect, as they are trophically related, including symbiotically, to algae and woody plants (at least in the case of identified species). Disturbances affecting the condition of the stands of a given area therefore indirectly affect fungi, including epiphytic lichenised species (lichenised). The planned felling of trees up to 15 m from the extreme axis of the railway track will directly affect the destruction of the habitats of mushrooms and lichens living there. 3 sites of two species of macroscopic mushrooms, one species under strict protection – the earrings zoned Hydnellum concrescens, associated *with* the mycorsis relationship with oaks, and one species with the threat category R – Exidia truncata capillary, will *be destroyed*. In the event that the general living conditions of macroscopic mushrooms at these sites do not deteriorate, there is a chance that diasporas will naturally inhabit coastal, sunny trees. The following table provides information on the risks posed by investments during the implementation phase for the identified protected species of macroscopic fungi.

Tab.84. Assessment of the impact of the project on protected fungal species up to 15 m from the extreme axis of the projected track.

Polish and Latin name	Location of the station (Line, kilometre distance from line [m])	Page	Investment Impact Assessment/Investment Risk
Exidia *truncate cap pelvis*	201, Km 170,643, approx. 9 m from the line	left	direct, long-term, permanent, impossibility to preserve the habitat of the species/Destruction of species sites related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 171,768, approx. 13 m from the line	rights	
Zoned earrings *Hydnellum concrescens*	201, Km 98,861, approx. 3 m from the line	left	direct, long-term, permanent, impossibility to preserve the habitat of the species/Destruction of species sites related to the reconstruction and modernisation of

Polish and Latin name	Location of the station (Line, kilometre distance from line [m])	Page	Investment Impact Assessment/Investment Risk
			201 and electrification of the entire modernised section of line 201

Source: own development

In the case of lichenised mushrooms (lichenised mushrooms) exposed to destruction, there are 8 sites where 6 species are found to be present, including 5 species subject to legal partial protection and 1 with a hazard category NT. Lichen tribes reaching only small sizes will be lost in these habitats. All species except chalice liquor have also been found at a distance of more than 15 m from the extreme axis of the designed track. Thus, the destruction of their tribes at the construction stage will not cause significant damage to the population. In the case of Pleurosticta acetabulum*, it is* recommended to carry out the procedure to transfer it with a piece of bark to oaks located in the immediate vicinity of the station. This lichen belongs to the category EN (extinctive) and has been found at only one post along the entire inventory section of the railway line (201, Km 158,135, approx. 0 m from the line). The area exposed to destruction of the limestone's habitat is 30 m^2. Chapter 8 presents actions to minimise the immediate threat of destruction of his tribe.

The potential air pollution at the construction stage is related to the exhaust emissions of construction machinery and is transient. Therefore, the change in air condition should not have a long-term impact on the development of hychenised fungi. On the other hand, water conditions are not expected to be severe enough to disrupt the living conditions of free-living and lichenised fungi. The table below provides information on the risks posed by investments during the implementation phase for the identified protected lichen species.

Tab.85. Assessment of the impact of the project on protected lichen species up to 15 m from the extreme axis of the projected track.

Polish and Latin name	Location of the station (Line, kilometre distance from line [m])	Page	Investment Impact Assessment/Investment Risk
Woodworker *Cladonia arbuscula*	214, Km 4,365, ca. 13 m from the line	rights	direct, long-term, permanent, impossibility of conservation of the habitat of the species, the destruction of the habitat of the species will not significantly affect the state of its population/ Destruction of species sites related to the construction of a new section of line 214 as
The Right Writer *Graphis scripta*	201, Km 171,768, approx. 13 m from the line	rights	direct, long-term, permanent, impossibility to preserve the habitat of the species/destruction of the habitat of the species does not significantly affect the state of its population/Destruction of species sites related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised
Tubular box *Hypogymnia tubulosa*	214, Km 4,959, ca. 1 m from the line	left	direct, long-term, permanent, impossibility to conserve the habitat of the species/destruction of the habitat of the species does not significantly affect the state of its population/ Destruction of species sites related to the construction of a new section of line 214 as
	214, Km 5,025, approx. 1 m from the line	rights	
	214, Km 5,092, approx. 8 m from the line	rights	
Gold sticker *Melanelixia subaurifera*	229, Km 33,987, approx. 1 m from the line	left	direct, long-term, permanent, impossibility to conserve the habitat of the species/destruction of the habitat of the species does not significantly affect the

Polish and Latin name	Location of the station (Line, kilometre distance from line [m])	Page	Investment Impact Assessment/Investment Risk
			Destruction of species sites related to the construction of a new section of line 214 as a link to line 229
Chalice waffle *Pleurosticta acetabulum*	201, Km 158,135, approx. 0 m from the line	right-left	direct, long-term, permanent, impossibility to conserve the habitat of the species/destruction of the habitat of the species does not significantly affect the state of its population/ Destruction of species sites related to the reconstruction and modernisation of railway line 201 and electrification of the entire
Shredder *Ramalin Farinacea*	201, Km 151,475, approx. 12 m from the line	rights	direct, long-term, permanent, impossibility to conserve the habitat of the species/destruction of the habitat of the species does not significantly affect the state of its population/ Destruction of species sites related to the reconstruction and modernisation of railway line 201 and electrification of the entire

Source: own development

In the event of destruction of habitats and fungi sites, including lichens, covered by species protection, a permit will be obtained (derogations from the prohibitions of Article 51 of the Nature Protection Act) from the Regional Director of Environmental Protection in Gdańsk in accordance with Article 56 of the Nature Protection Act.

In the case of the investment under analysis, the application of appropriate minimisation measures indicated in Chapter 8 will reduce the negative impact of the investment on protected fungal and lichen species.

Invertebrates

The link between invertebrates and the site of the project is in most cases weak, and the sensitivity to the impact of construction works and the operation of the railway is in most cases low. On the basis of the natural inventory at a distance of up to 15 m from the extreme railway track, there were 8 species of invertebrates under legal protection, including 1 species of snail and 7 species of insects. The *Helix pomatia vines* snail is a large number of species, therefore, despite the destruction of its habitat, its population size is not endangered. The table below provides information on the risks posed by investments during the implementation phase for the identified protected snail species.

Tab.86. Assessment of the impact of the project on protected snail species at a distance of up to 15 m from the extreme axis of the designed track.

Polish name, Latin name	Habitat location (Line, kilometre distance from line [m])	Page	Area exposed to destruction in buffer 2x15 m [ha]	Investment Impact Assessment/Investment Risk
Snail of vineyards *Helix pomatia*	201, Km 182,100, approx. 9 m from	rights	0,07	direct, long-term, permanent, impossibility to conserve the habitat of the species/ Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 181,500, approx. 10 m from	rights	0,07	
	201, Km 149,241, approx. 13 m from	left	0,07	
	201, Km 153,249, approx. 14 m from	rights	0,07	

Polish name, Latin name	Habitat location (Line, kilometre distance from line [m])	Page	Area exposed to destruction in buffer 2x15 m [ha]	Investment Impact Assessment/Investment Risk
	201, Km 153,611, approx. 11 m from	rights	0,07	
	201, Km 142,703, approx. 14 m from	rights	0,07	
	214, Km 0,800, approx. 12 m from the line	left	0,07	direct, long-term, permanent, impossibility to preserve the habitat of the species/Destruction of species sites related to the construction of a new section of line 214 as a link to line 229

Source: own development

The species most exposed to the negative impact of construction works include, above all, ore forest ants. Most nests of protected species of ants are more than 15 meters away from the analysed railway lines. Only two sockets are located in a buffer of 15 m and are directly exposed to damage during construction:

- socket located 15 m from the axis of the LK 214 track in km 2,800.
- socket located 15 m from the axis of the LK 229 track in km 34,700.

Five other outlets are located between 16 and 20 m from the line (LK 201, 214, 229) and there is a risk of damage during construction works (e.g. during the transport of machinery and building materials). The remaining nests are more than 20 m away from the railway line and are much less likely to be destroyed. The table below provides information on the risks posed by investments during the implementation phase for the identified protected insect species.

The findings of species protected outside ants concerned mainly cases of short-term insect insects in a buffer of 2 x 15 m due to foraging or overflight. In the case of insects, 5 species of bumble bees were found to be partially protected. Due to the fact that tracksides and fallows are a frequent place of foraging of the above-mentioned species, they are common and therefore there is no risk.

Tab.87. The habitat area of invertebrate species exposed to destruction.

Polish and Latin name	Total area [ha]	Surface exposed to destruction [ha] in the waist 2x15m	Area exposed to destruction [%]
Bumblebee stone *Bombus lapidarius*	5,77	0,9378	16,25
Bumblebee *Bombus terrestris*	3,03	0,6469	21,33
Grove bumblebee *Bombus lucorum*	2,82	0,5119	18,15
Bumblebee ore *Bombus pasucorum*	4,04	0,4734	11,72
Forest bumblebee *Bombus pratorum*	0,14	0,0707	50,5
Red forest ants *Formica rufa, F. polyctena*	24,03	1,8646	7,76

Source: own development

Tab.88. Assessment of the impact of the project on protected insect species at a distance of up to 15 m from the extreme axis of the projected track.

Polish and Latin name	Habitat location (Line, kilometre distance from line [m])	Page	Area exposed to destruction [%]	Assessment of the impact of investments	Investment threat
Bumblebee stone *Bombus lapidarius*	201, Km 142,800, approx. 15 m from the line	rights	16,25	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 175,200, approx. 15 m from the line	left		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 178,600, approx. 15 m from the line	rights		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 179,600, approx. 8 m from the line	rights		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 175,700, approx. 10 m from the line	left		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 184,300, approx. 8 m from the line	left		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 200,649, approx. 8 m from the line	rights		direct, short-term, after the completion of the investment stage, it is possible to repopulate the habitat	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201

Polish and Latin name	Habitat location (Line, kilometre distance from line [m])	Page	Area exposed to destruction [%]	Assessment of the impact of investments	Investment threat
				by species	
	201, Km 140,910, approx. 14 m from the line	left		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	229, Km 39,500, approx. 10 m from the line	left		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats associated with the construction of a new section of line 214 as a link to line 229
	229, Km 36,200, approx. 10 m from the line	left		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats associated with the construction of a new section of line 214 as a link to line 229
	214, Km 3,300, approx. 9 m from the line	left		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats associated with the construction of a new section of line 214 as a link to line 229
Bumblebee *Bombus terrestris*	201, Km 139,100, approx. 9 m from the line	rights	21,33	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	. Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 140,800, approx. 12 m from the line	rights		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 144,600, approx. 10 m from the line	rights		direct, short-term, after the completion of the investment stage, it is possible to repopulate the habitat	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201

Polish and Latin name	Habitat location (Line, kilometre distance from line [m])	Page	Area exposed to destruction [%]	Assessment of the impact of investments	Investment threat
				by species	
	201, Km 185,000, approx. 13 m from the line	left		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 186,600, approx. 6 m from the line	left		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	214, Km 2,400, approx. 9 m from the line	rights		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats associated with the construction of a new section of line 214 as a link to line 229
	229, Km 39,700, approx. 6 m from the line	left		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats associated with the construction of a new section of line 214 as a link to line 229
Bombus lucorum *grove bumblebee*	201, Km 164,900, approx. 13 m from the line	rights	15,56	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	214, Km 1,700, approx. 13 m from the line	rights		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 167,700, approx. 6 m from the line	rights		direct, short-term, after the completion of the investment stage, it is possible to repopulate the habitat	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201

Polish and Latin name	Habitat location (Line, kilometre distance from line [m])	Page	Area exposed to destruction [%]	Assessment of the impact of investments	Investment threat
				by species	
	201, Km 156,000, approx. 13 m from the line	rights		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	229, Km 39,700, approx. 8 m from the line	Left		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats associated with the construction of a new section of line 214 as a link to line 229
	201, km 175,700, approx. 12 m from the line	left		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
Bumblebee ore *Bombus pasucorum*	201, Km 139,100, approx. 12 m from the line	rights	11,72	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	214.229 Km 3,000, approx. 13 m from the line	rights		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Possible frightening of insects during the work The risk of accidental killing of animals. Destruction of species habitats associated with the construction of a new section of line 214 as a link to line 229
	201, Km 183,200, approx. 12 m from the line	rights		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
	201, Km 1 884.14 m from line	left		direct, short-term, after the completion of the investment stage, it is possible to repopulate the habitat	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201

Polish and Latin name	**Habitat location (Line, kilometre distance from line [m])**	**Page**	**Area exposed to destruction [%]**	**Assessment of the impact of investments**	**Investment threat**
				by species	
	214, Km 4,500, 11 m from the line	rights		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats associated with the construction of a new section of line 214 as a link to line 229
	229, Km 39,500, 14 m from the line	left		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats associated with the construction of a new section of line 214 as a link to line 229
Forest bumblebee *Bombus pratorum*	201, Km 191,100, 5 m from the line	left	0,51	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats related to the reconstruction and modernisation of railway line 201 and electrification of the entire modernised section of line 201
Red forest ants *Formica rufa, F. polyctena*	214, km 2,800, 15 m from the line	rights	7,76	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats associated with the construction of a new section of line 214 as a link to line 229
	229, Km 34,700, 15 m from the line	rights		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of species habitats associated with the construction of a new section of line 214 as a link to line 229

Source: own development

In the case of the investment under consideration, the application of the appropriate minimisation measures indicated in Chapter 8 will reduce the negative impact of the investment on protected invertebrate species.

Fish (ichthiophauna)

As a result of field work within the buffer of 2 x 15 m lines 201 and 214, there were 4 protected species of fish (goat, whitetip head, chicks, saliva) and 1 species with a protective dimension – limp.

In view of the presence of protected fish species, the following positions should be considered as the most valuable within the buffer of 2 x 150 m:

- 201, km 163,652, crossed by the railway line Ciek – Radunia, inhabited by a goat and a white-tip head,
- 201, km 177,364, crossed by the railway line – Little Słupina, inhabited by a white-tip head,
- 201, km 185,800, crossed by the railway line – the Strzelenka tributary, inhabited by the Piscar,
- 201, Km 184,500, crossed by the railway line – Strzelenki, inhabited by slippers,
- 214, km 0.814, crossed by the railway line – Radunia, inhabited by a goat, head white-tip and pencil.

In connection with planned works on bridges, potential impacts at the stage of implementation of the project may be:

- risk of contamination of water and soil by entering the water of building materials or measures used to protect structural elements, e.g.: during maintenance of infrastructure (e.g. track, bridges, culverts) near the watercourses, noise, change of light conditions,
- change, as a result of works, within the structure of the bottom – smelting or flooding of positions located below the place of implementation of the investment,
- disturbance of the flow of water in places where bridges or culverts in the watercourse will be renovated.

Interference in the form of linear investments, including railways, river valleys, or the immediate vicinity of standing waters inhabited by fish and/or logs, may affect internal cohesion and impair their function as an ecological corridor. The potential impact is associated with noise and vibration caused by rolling stock, as well as the modification of habitats in the form of settlements related to crossings (a possible migratory barrier). The negative effects of linear investments and the operation of crossings (engineering facilities) may concern disruptions to the continuity of the ecotonium zone (the place of feeding and shelter for fish) or increased predatory pressure (accumulation of fish-eating organisms). The impact on fish and logs is also associated with the possible leakage of fluids from the machines used during construction works.

The table below provides information on the risks posed by investments during the implementation phase for the identified protected fish species.

Tab.89. Assessment of the impact of the project on protected fish species up to 15 m from the extreme axis of the projected track.

Polish and Latin name	Habitat location (Line, kilometre distance from line [m])	Page	Scope of work on the facility	Assessment of the impact of investments	Investment threat
Goat (=common goat) *Cobitis taenia*	201, Km 163,577, approx. 0 m from line/Radunia	right-left	In the first demolition of an existing facility, construction of a new one with two bridges IN II —	direct, long-term, permanent, local, impossibility to preserve the habitat of the species	Risk of contamination of water and soil by entering the water of building materials or measures used to protect structural elements, e.g.: during the demolition, construction and maintenance of the bridge structures and tracks in the vicinity of the watercourses, Noise, change of light conditions; change in the structure of the bottom (simulation, sanding); disturbance of the flow of water in places where bridges or culverts will be refurbished and/or built in connection with the reconstruction of existing or demolition and construction of new or new engineering sites (railway overpasses, overpasses, railway bridges and culverts)
	214 Km, 0.814, approx. 0 m from line/Radunia	right-left	In I repair of the railway bridge, expansion of the ballast trough W II comprehensive repair		
Whitetip head *Cottus gobio*	201, Km 163,577, approx. 0 m from line/Radunia	right-left	In the first demolition of an existing facility, construction of a new one with two bridges IN II —	direct, long-term, permanent, local, impossibility to preserve the habitat of the species	Risk of contamination of water and soil by entering the water of building materials or measures used to protect structural elements, e.g.: during the demolition, construction and maintenance of the bridge structures and track in the vicinity of the watercourses, Noise, change of light conditions; change in the structure of the bottom (simulation, sanding); disturbance of the flow of water in places where bridges or culverts will be refurbished and/or built in connection with the reconstruction of existing or demolition and construction of new or new engineering sites (railway overpasses, overpasses, railway bridges and culverts)
	201, Km 177,261, approx. 0 m from line/Small Słupin	right-left	W I dismantling the existing bridge, adding two bridges on existing supports	direct, long-term, permanent, local, impossibility to preserve the habitat of the species	Risk of contamination of water and soil by entering the water of building materials or measures used to protect structural elements, e.g.: during the demolition, construction and maintenance of the bridge structures and track in the vicinity of the watercourses, Noise, change of light conditions; change in the structure of the bottom

Polish and Latin name	Habitat location (Line, kilometre distance from line [m])	Page	Scope of work on the facility	Assessment of the impact of investments	Investment threat
			IN II –		(simulation, sanding); disturbance of the flow of water in places where bridges or culverts will be refurbished and/or built in connection with the reconstruction of existing or demolition and construction of new or new engineering sites (railway overpasses, overpasses, railway bridges and culverts)
	214, Km 0,814, approx. 0 m from line/Radunia	right-left	In I repair of the railway bridge, extension of the ballast trough In II comprehensive repair	direct, long-term, permanent, local, impossibility to preserve the habitat of the species	Risk of contamination of water and soil by entering the water of building materials or measures used to protect structural elements, e.g.: during the demolition, construction and maintenance of the bridge structures and track in the vicinity of the watercourses, Noise, change of light conditions; change in the structure of the bottom (simulation, sanding); disturbance of the flow of water in places where bridges or culverts will be refurbished and/or built in connection with the reconstruction of existing or demolition and construction of new or new engineering sites (railway overpasses, overpasses, railway bridges and culverts)
Piskorz *Misgurnus fossilis*	201, Km 184,484 approx. 0 m from line/flower Shooter	right-left	In I demolition of an existing facility, construction of an object with two bridges IN II –	direct, long-term, permanent, local, impossibility to preserve the habitat of the species	Risk of contamination of water and soil by entering the water of building materials or measures used to protect structural elements, e.g.: during the demolition, construction and maintenance of the bridge structures and track in the vicinity of the watercourses, Noise, change of light conditions; change in the structure of the bottom (simulation, sanding); disturbance of the flow of water in places where bridges or culverts will be refurbished and/or built in connection with the reconstruction of existing or demolition and construction of new or new engineering sites (railway overpasses, overpasses, railway bridges and culverts)
	214, Km 0,814, approx. 0 m from line/Radunia	right-left	In I repair of the railway bridge, extension of the ballast trough	direct, long-term, permanent, local, impossibility to preserve the habitat of the species	Risk of contamination of water and soil by entering the water of building materials or measures used to protect structural elements, e.g.: during demolition, construction and maintenance

Polish and Latin name	Habitat location (Line, kilometre distance from line [m])	Page	Scope of work on the facility	Assessment of the impact of investments	Investment threat
			In II comprehensive repair		the bridges and tracks in question in the vicinity of the watercourses, Noise, change of light conditions; change in the structure of the bottom (simulation, sanding); disturbance of the flow of water in places where bridges or culverts will be refurbished and/or built in connection with the reconstruction of existing or demolition and construction of new or new engineering sites (railway overpasses, overpasses, railway bridges and culverts)
Slili *Barbatula barbatula*	201, Km 184,483, approx. 0 m from line/flower Shooter	right-left	In I demolition of an existing facility, construction of an object with two bridges IN II –	direct, long-term, permanent, local, impossibility to preserve the habitat of the species	Risk of contamination of water and soil by entering the water of building materials or measures used to protect structural elements, e.g.: during the demolition, construction and maintenance of the bridge structures and track in the vicinity of the watercourses, Noise, change of light conditions; change in the structure of the bottom (simulation, sanding); disturbance of the flow of water in places where bridges or culverts will be refurbished and/or built in connection with the reconstruction of existing or demolition and construction of new or new engineering sites (railway overpasses, overpasses, railway bridges and culverts)
Thymallus thymallus	201, Km 177,261, approx. 0 m from the line Little Słupina	right-left	W I dismantling the existing bridge, adding two bridges on existing supports IN II –	direct, long-term, permanent, local, impossibility to preserve the habitat of the species	Risk of contamination of water and soil by entering the water of building materials or measures used to protect structural elements, e.g.: during the demolition, construction and maintenance of the bridge structures and track in the vicinity of the watercourses, Noise, change of light conditions; change in the structure of the bottom (simulation, sanding); disturbance of the flow of water in places where bridges or culverts will be refurbished and/or built in connection with the reconstruction of existing or demolition and construction of new or new engineering sites (railway overpasses, overpasses, railway bridges and culverts)

Source: own development

For the investment under consideration, the application of the relevant minimisation measures indicated in Chapter 8 will reduce the negative impact of investments on protected fish species.

Herpetofauna

In the area of the planned project, on the basis of a natural inventory of a distance equal to or less than 15 m from the extreme railway track, one group of species was found: frogs from the group of greens (*Pelophylax esculenta complex*) and 3 species, including 1 of which are strictly protected – *Pelobates fuscus* and 2 partially protected by law: toad gray *Bufo bufo* and grass frog *Rana temporaria*.

During the implementation phase of the project, the following nuisances for the natural environment, which may affect the herpetofauna and its habitats, can be expected:

- solid waste generation – e.g. materials or elements used in the reconstruction, execution or correction of drainage ditches, ditches, renovation or reconstruction of bridges, replacement of existing culverts under track and construction of new ones, reconstruction of infrastructure in connection with collisions, etc. — which may cause changes in the quality of herpetofauna habitats,
- emissions of air and water pollutants – primarily as a result of the use of mechanical construction equipment for construction works,
- noise emissions caused by the operation of construction machinery – the reconstruction of the railway line may cause local nuisances for the herpetofauna,
- direct mortality of amphibians and reptiles associated with increased circular traffic near construction sites, building materials storage sites, etc.,
- at the construction stage, there may be a negative impact of lines for amphibians and reptiles through overshadowing, disturbing and limiting the possibility of migration. This impact will be proportionate to the intensity and duration of construction works on individual sections where the work will currently be carried out,
- short-term destruction habitats, be excerpts habitat lizards pencils located within the track and embankments,
- short-term destruction habitats, be excerpts habitat lizards pencils and fertile, which was found within the track and embankments. It should be emphasised that track and railway embankments are optimal habitats for this species. Potential risks will be short-lived and will only occur at the stage of work. After completion of the works, the habitats will quickly return to their original state,
- destruction of the inventoryed habitats of amphibians and reptiles within the area intended for connection LK 214,229 and its immediate vicinity.

The use of minimising measures will avoid or reduce the above-mentioned impacts. The following table provides information on the risks posed by investments during the implementation phase for the identified protected species of amphibians.

Table 90. Assessment of the impact of the project on amphibians species up to 15 m from the extreme axis of the projected track.

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Total area [ha]	Area exposed to destruction in buffer 2x15 m [ha]	Area exposed to destruction [%]	Assessment of the impact of investments	Investment threat
Crest *Pelobates fuscus*	201, Km 140,859, approx. 8 m from the line	left	1,8312	0,0975	5,32	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of the amphibious habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, storage sites for building materials
Complex of green frogs *Pelophylax esculentus complex*	201, Km 139,432, approx. 8 m from the line	rights	148,7171	4,6412	7,05	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of the amphibious habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, storage of building materials
	201, Km 140,859, approx. 8 m from the line	left		0,0975		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of the amphibious habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, storage of building materials
	201, Km 163,606, approx. 0 m from the line	left		1,9329		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of the amphibious habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, material storage sites

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Total area [ha]	Area exposed to destruction in buffer 2x15 m [ha]	Area exposed to destruction [%]	Assessment of the impact of investments	Investment threat
							construction
	201, Km 167,918, approx. 14 m from the line	rights		3,3866		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of the amphibious habitat associated with the reconstruction of railway line 229, electrification of the entire modernised section of line 229 and increased traffic in the vicinity of construction sites, storage of building materials
	201, Km 185,345, approx. 15 m from the line	left		0,4308		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of the amphibious habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, storage of building materials
Gray toad *Bufo bufo*	201, Km 140,859, approx. 8 m from the line	left	58,8033	0,0975	0,90	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of the amphibious habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, storage of building materials
	201, Km 185,345, approx. 15 m from the line	left		0,4308		direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of the amphibious habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, storage of building materials

Polish and Latin name	**Location of habitats (line, kilometre, distance from railway line [m])**	**Side of the railway line**	**Total area [ha]**	**Area exposed to destruction in buffer 2x15 m [ha]**	**Area exposed to destruction [%]**	**Assessment of the impact of investments**	**Investment threat**
*Rana temporaria grass*frog	201, Km 185,345, approx. 15 m from the line	left	93,336	0,4308	0,46	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of the amphibious habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, storage of building materials

Source: own development

In the area of the planned project, on the basis of a natural inventory of distances equal to or less than 15 m from the extreme track, there were 2 reptile species covered by partial legal protection: lizard *Lacerta agilis* and vivid lizard *Zootoca vivipara*. The table below provides information on the risks posed by investments during the implementation phase for the identified protected reptile species.

Table 91. Assessment of the impact of the project on reptile species up to 15 m from the axis of the planned track.

Polish and Latin name	**Habitat location (line, kilometre, distance from the railway [m])**	**Side of the railway line**	**Total area [ha]**	**Area exposed to destruction in buffer 2x15 m [ha]**	**Area exposed to destruction [%]**	**Assessment of the impact of investments**	**Investment threat**
Lizard agilis *Lacerta agilis*	201, Km 141,700 approx. 2 m from the line	left	11,742	5,8362	49,70	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, sites

Polish and Latin name	Habitat location (line, kilometre, distance from the railway [m])	Side of the railway line	Total area [ha]	Area exposed to destruction in buffer 2x15 m [ha]	Area exposed to destruction [%]	Assessment of the impact of investments	Investment threat
							storage of building materials
	201, Km 155,600 approx. 1 m from the line	left				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, building materials storage sites
	201, Km 171,000 approx. 3 m from the line	left				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, building materials storage sites
	229, Km 34,000 approx. 1 m from the line	left				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 229, electrification of the entire modernised section of line 229 and increased traffic in the vicinity of construction sites, building materials storage sites
	201, Km 175,200 approx. 2 m from the line	rights				direct, short-term, after completion of the investment phase	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the whole

Polish and Latin name	Habitat location (line, kilometre, distance from the railway [m])	Side of the railway line	Total area [ha]	Area exposed to destruction in buffer 2x15 m [ha]	Area exposed to destruction [%]	Assessment of the impact of investments	Investment threat
						it is possible for the species to repopulate the habitat	modernised section of line 201 and with increased traffic in the vicinity of construction sites, storage sites for building materials
	201, Km 139,800 approx. 11 m from the line	left				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, building materials storage sites
	201, Km 140,000 approx. 7 m from the line	left				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, building materials storage sites
	201, Km 165,600 approx. 13 m from the line	rights				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, building materials storage sites
	201, Km	left				direct,	Destruction of a fragment of the

Polish and Latin name	Habitat location (line, kilometre, distance from the railway [m])	Side of the railway line	Total area [ha]	Area exposed to destruction in buffer 2x15 m [ha]	Area exposed to destruction [%]	Assessment of the impact of investments	Investment threat
	176,400 approx. 15 m from the line					short term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	reptiles related to the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, storage sites for building materials
	201, Km 176,300 approx. 9 m from the line	rights				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, building materials storage sites
	201, Km 185,200 approx. 8 m from the line	left				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, building materials storage sites
	201, Km 185,300 approx. 10 m from the line	rights				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, sites

Polish and Latin name	Habitat location (line, kilometre, distance from the railway [m])	Side of the railway line	Total area [ha]	Area exposed to destruction in buffer 2x15 m [ha]	Area exposed to destruction [%]	Assessment of the impact of investments	Investment threat
							storage of building materials
	201, Km 185,400 approx. 13 m from the line	left				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, building materials storage sites
	201, Km 185,500 approx. 4 m from the line	rights				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, building materials storage sites
	201, Km 185,600 approx. 13 m from the line	rights				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, building materials storage sites
	201, Km 185,600 approx. 13 m from the line	left				direct, short-term, after completion of the investment phase	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire

Polish and Latin name	**Habitat location (line, kilometre, distance from the railway [m])**	**Side of the railway line**	**Total area [ha]**	**Area exposed to destruction in buffer 2x15 m [ha]**	**Area exposed to destruction [%]**	**Assessment of the impact of investments**	**Investment threat**
						it is possible for the species to repopulate the habitat	line 201 and with increased traffic in the vicinity of construction sites, storage sites for building materials
Live lizard *Zootoca vivipara*	201, Km 185,500 approx. 1 m from the line	left	3,5035	2,7590	78,75	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, building materials storage sites
	201, Km 199,000 approx. 1 m from the line	right-left				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat related to the construction of the third track on the section Gdańsk Osowa – Gdynia Główna
	201, Km 185,700 approx. 7 m from the line	rights				direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Destruction of a fragment of reptile habitat associated with the reconstruction of railway line 201, electrification of the entire modernised section of line 201 and increased traffic in the vicinity of construction sites, building materials storage sites

Source: own development

The herpetofauna habitats identified in the 2 x 15 m buffer of this project are characterised by high diversity, area extension and general area. These habitats are both permanent and ephemeral reservoirs, mainly related to the periodic filling of local recesses in the agricultural landscape. For this reason, the work on the line will affect the habitats of amphibians and reptiles not only at the construction stage, but also during the movement of construction equipment or, as an indirect effect, which may be manifested by a change in water relations and possible dehumidification in the short term of aquatic habitats located in the vicinity of deep excavations. Taking into account the scope of the work and the results of herpetofauna research, it is pointed to the need to implement various types of minimisation measures, such as: construction of herpetological fences, use of tight walls in excavations or limiting the deadline for carrying out works in the habitats of the most valuable species of amphibians and reptiles. The indicated set of minimising measures in Chapter 8 will significantly reduce the negative impact of the modernisation of the line on the herpetofauna of the investment site.

Birds

The areas most valuable for ornitofauna in the vicinity of the railway line under consideration include the following areas:

- Water reservoir (with surroundings), Kościerzyna, LK 201 km 138,100 – 138,700
- Ponds, gravels, peat bogs, surroundings Stara Sikorska Huta, LK 201 km 145,200 – 145,700
- Golubie, LK 201 km 146,100 – 146,500
- Water reservoir, LK 201 km 157,000 – 157,200
- Rąty Lake (with surroundings), LK 201 km 159,100 – 160,400
- Water reservoir, floodplains, valley of Potok Źródła Maria, LK 201 km 193,000 – 193,400
- Lake Kackie, LK 201 km 193,900 – 195,200.
- Lake (on E from Dzierżazna), LK 229 km 34,600 – 34,700
- Oak mud, LK 214 km 5,400 – 5,600.

The results of the analyses are presented in the table below.

Tab.92 Analysis of bird habitats present in the buffer covered by the inventory taking into account the risk of the planned investment.

Habitat ID	Polish name of species	Location (line, kilometre [m])*	Justification for the assessment of the overall habitat of birds	Preliminary assessment of the impact of the construction works and the operation of the railway line on the habitat
P33	Hawk	214/229, Km 1,618	Nesting in the buffer zone is not confirmed, although likely in 1 location due to direct observations of the bird and double detection of foraging marks.	Sensitive to the impact of construction works and railway operation
P36	Crane, loner, coconut	214, Km 5.555	Complex of midforest water meshes and peat bog fragments. Habitat of water and wet birds, including crane, loner, coconut.	Medium sensitive to the impact of construction works and railway operation
P28	Crane, wig	229, Km 34,656	A small midforest lake, which in only a small fragment is located in the buffer zone of the inventory area, but in this part the breeding station of the crane.	Relatively insensitive to the impact of construction works and the operation of the railway line
P30	Perkoz of Two-Comentes	229, Km 36,257	Breeding station in a fragment of the cane shuwar of the lake.	Relatively insensitive to the impact of construction works and the operation of the railway line
P31	Crane	229, Km 38,193	The mid-forest meadow. The crane feeding ground.	Relatively insensitive to the impact of construction works and the operation of the railway line
P32	Medium woodpecker	229, Km 39,544	Diversified deciduous tree.	Medium sensitive to the impact of construction works and railway operation
P56	Crane, Swan Timber, Arthritis	201, Km 138,399	Water reservoir (with surroundings), Kościerzyna, LK 201 km 138,100 – 138,700 A complex of cane gravels, shrubs and trees surrounding the water reservoir. The position of mud birds (crow, joint mud, swan).	Medium sensitive to the impact of construction works and railway operation
P59	Aquarius, Coconut	201, Km 140,001	A small reservoir with expanded gutter.	Relatively insensitive to the impact of construction works and the operation of
P55	Crane	201, Km 145,324	Small surface water and wetland habitats. Fragments of the nature of peatland. The crane's position.	Sensitive to the impact of construction works and railway operation
P54	Articular mudguard	201, Km 146,29	A spillage covered with vegetation forming a shrub. The position of the birds of the pond mudguard	Medium sensitive to the impact of construction works and railway operation

Habitat ID	Polish name of species	Location (line, kilometre [m])*	Justification for the assessment of the overall habitat of birds	Preliminary assessment of the impact of the construction works and the operation of the railway line on the habitat
P53	Nurogear	201, Km 147,079	Group of individuals feeding on the lake	Relatively insensitive to the impact of construction works and the operation of the
P52	Green woodpecker	201, Km 153,556	Diversified deciduous tree	Relatively insensitive to the impact of construction works and the operation of the railway line
P51	Kokoszka	201, Km 157,124	Small reservoir with expanded glamour	Relatively insensitive to the impact of construction works and the operation of the
P50	White stork	201, Km 157,377	Occupied nests within rural development	Medium sensitive to the impact of construction works and railway operation
P49	Crow	201, Km 159,814	Edge of the forest on a moraine hill	Relatively insensitive to the impact of construction works and the operation of the railway line
P44	Crane, wig, Swan mute, Kokoszka, water	201, Km 159,790	Rąty Lake with developed shuwar vegetation and trees in the surroundings. Wetland birds stand, e.g. crane, mud swan, percose, coconut, waterwater	Medium sensitive to the impact of construction works and railway operation
P43	White stork	201, Km 160,824	Occupied nests within rural development	Medium sensitive to the impact of construction works and railway operation
P42	Swan mute	201, Km 164,054	Breeding joints. Preying individual	Relatively insensitive to the impact of construction works and the operation of the
P39	Crow	201, Km 167,037	A small forest fragment with the main participation of pine dragovina	Relatively insensitive to the impact of construction works and the operation of
P40	Nurogear	201, Km 167,782	Meandering fragment of the Raduni River	Relatively insensitive to the impact of construction works and the operation of
P41	Green woodpecker	201, Km 168,179	Diversified deciduous tree	Relatively insensitive to the impact of construction works and the operation of
P27	Woodpecker	201, Km 172,51	Diversified deciduous tree	Medium sensitive to the impact of construction works and railway operation
P26	Green woodpecker	201, Km 174,01	Diversified deciduous tree	Relatively insensitive to the impact of construction works and the operation of the railway line
P25	Kokoszka	201, Km 175,868	Small water reservoir	Relatively insensitive to the impact of construction works and the operation of

Habitat ID	Polish name of species	Location (line, kilometre [m])*	Justification for the assessment of the overall habitat of birds	Preliminary assessment of the impact of the construction works and the operation of the railway line on the habitat
P24	Woodpecker	201, Km 181,247	Diversified deciduous tree	Relatively insensitive to the impact of construction works and the operation of the railway line
P23	Green woodpecker	201, Km 184,285	Diversified deciduous tree	Relatively insensitive to the impact of construction works and the operation of the railway line
P22	Crow	201, Km 186,812	Pine stand	Relatively insensitive to the impact of construction works and the operation of
P21	Green woodpecker	201, Km 19.5	Diversified deciduous tree	Relatively insensitive to the impact of construction works and the operation of the railway line
P20	Bruising	201, Km 192,536	Diversified deciduous tree with the participation of an old stand	Relatively insensitive to the impact of construction works and the operation of the railway line
P18	Bruise, Black Woodpecker	201, Km 192,725	Diversified deciduous tree with the participation of an old stand	Relatively insensitive to the impact of construction works and the operation of the railway line
P17	Crow	201, Km 192,926	Breeding station of the crow. Forest fragment in the vicinity of the clearing	Relatively insensitive to the impact of construction works and the operation of the railway line
P14	Crane, Wig, Water	201, Km 193,205	A small spillage covered with shuvar vegetation and willow scrub. Crane and percose and waterwater position	Sensitive to the impact of construction works and railway operation
P10	Crane, circadian, water	201, Km 194,697	One of the most valuable ornithologically valuable natural objects in the inventory area. A basin of a former dehydrated lake overgrown with large-tourism sewer. Spills and fragments of an open water mirror. Habitat of water and mud birds, e.g. cyranettes, waterwater and cranes (1-2 breeding pairs)	Sensitive to the impact of construction works and railway operation
P9	Green woodpecker	201, Km 196,852	Diversified deciduous tree with the participation of an old stand	Medium sensitive to the impact of construction works and railway operation
P7	Medium woodpecker	201, Km 19,541	Diversified deciduous tree with the participation of an old stand	Relatively insensitive to the impact of construction works and the operation of the railway line
P8	Bruising	201, Km 19,618	Diversified deciduous tree with the participation of an old stand	Relatively insensitive to the impact of construction works and the operation of the railway line

Habitat ID	Polish name of species	Location (line, kilometre [m])*	Justification for the assessment of the overall habitat of birds	Preliminary assessment of the impact of the construction works and the operation of the railway line on the habitat
P6	Gerbils	201, Km 198,363	The breeding station of the mouse. Forest fragment in the vicinity of the clearing	Medium sensitive to the impact of construction works and railway operation
P4	Green woodpecker	201, Km 198,859	Diversified deciduous tree with the participation of an old stand	Medium sensitive to the impact of construction works and railway operation
P3	Bruising	201, Km 198,946	A diversified deciduous tree stand with an old tree stand.	Relatively insensitive to the impact of construction works and the operation of the railway line
P5	Woodpecker	201, Km 19,956	Small trees of a park nature	Relatively insensitive to the impact of construction works and the operation of the railway line
P2	Crow	201, Km 200,194	Small trees of a park nature	Relatively insensitive to the impact of construction works and the operation of the railway line
P1	Woodpecker	201, Km 200,83	Small trees of a park nature	Medium sensitive to the impact of construction works and railway operation

Source: own development
** stations located less than 15 m from the axis of the analysed railway lines (indicated in blue)*

In the case of habitats identified as medium sensitive, those that may be destroyed to a certain extent have been identified. They mainly concern the positions of woodpeckers. Due to the availability of habitats with similar characteristics in the surroundings, there is no risk of real habitat loss for these birds.

In other cases, there is no threat of habitat destruction. The sensitivity assessed is rather referred to as a periodic impact on the habitat during construction works, so there is no risk of permanent destruction. The proposed minimisation measures will also avoid frightening during the construction works. In general, it should be noted that habitats are moderately sensitive to the impact of construction works and the operation of the railway line. For the identified habitats, an assessment of the impact of planned works on the railway line and the operation of the railway line was carried out.

Observations and traces of foraging carried out as part of the ornithological inventory indicate nesting near or even within the buffer zone – due to the fact that no specific site of this species (the rot, territory) was detected, it was found that it was possible to destroy part of its habitat on a section of the planned railway link. This is due to the fact that the construction of the railway link No 214/229 involves the felling of the forest belt, which will affect the condition of the hawk habitat. Most likely, the tracks are his foraging place, so there is little danger of reducing its population.

At a distance of up to 50 m from the extreme track, there were 3 bird species: Dendrocopos minor woodpecker, *Accipiter gentilis* hawk and mouse *Buteo buteo*, while at a distance of up to 100 m – 13 species, including crane *Grus grus*, coconut *Gallinula chloropus*, crow *Corvus corax*, *Rallus aquaticus*, *Anas crecca*, middle woodpecker *Dendrocopos medius* and swan of mum Cygnus olor*.* At the stage of implementation of the investment, a significant threat will be possible to harbor and disturb birds, including breeding sites, feeding grounds, places of concentration of birds during the non-hatching period, resting places, porridges. Due to the planned felling of trees and shrubs in a buffer of 2 x 15 m, it is also possible to destroy part of the habitats of species nesting directly at the railway line and withdraw them from the occupied habitats due to the change in habitat conditions. The remaining sites of the identified bird species are located between 36 m and 150 m from the gauge axis of the track.

Table 93. Assessment of the impact of the project on bird species up to 15 m from the extreme axis of the designed track.

Polish and Latin name	Habitat location (line, kilometre, distance from the railway [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
Hawk *Accipiter gentilis*	214/229, Km 9.768, ca. 15 m from the line	Rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Possible frightening of individuals during foraging associated with the construction of the 21/229 junction, its electrification and increased circular traffic near construction sites, building materials storage sites

Source: own development

Tab.94. The habitat area of bird species at risk of destruction.

Line number	Polish name of species	Total area [ha]	Surface exposed to destruction [ha] in the waist 2x15m	Area exposed to destruction [%]
201 214 229	cyan, crane, water, wig, hawk	19,774	2,105	10,645

	swan mums, wigs, white stork, crane, water, coconut, loner, mice, joint mud, medium woodpecker, woodpecker, green woodpecker	22,024	0,376	1,71
	swan dummy, noroga, double-tailed percose, percose, crane, coconut, waterflower, green woodpecker, woodpecker, black woodpecker, bruise, raven	40,424	0	0

Source: own development

Due to the large habitat area and the operation of the line for many years, the potential damage to bird habitats should be considered as negligible. After the investment, birds will be able to reuse the railway area, among others, for feeding, concentration during the non-hatching period, rest and porch.

In the case of the investment under consideration, the application of the relevant minimisation measures indicated in Chapter 8 will reduce the negative impact of the investment on protected bird species.

Bats

Strategic habitats for bat populations, i.e. breeding colonies, wintering sites, day hiding places, etc., have not been identified so far within the impact of the investment phase. The highest levels of foraging activity of bats and the greatest taxonomic variation were recorded in listening points and transects Nos 3, 5 and 7. All of them are located within larger forest complexes.

In the area of the planned project, on the basis of a natural inventory of distances equal to or less than 15 m from the extreme track, 7 bat species were found, i.e.: Borowiec great *Nyctalus noctula*, brown porch *Plecotus auritus*, dusk late *Eptesicus serotinus*, dwarf larger Pipistrellus *nathusii,* little dwarf Pipistrellus *pipistrellus,* Natterera *Myotis nattereri's nightmare, Myotis daubentonii* red bed and one group of species from the genus *Myotis sp.* All identified species are under strict legal protection.

The area of the identified bat habitats will be limited only temporarily during the work. Although all bat positions shown during the inventory work are located within the investment, it should be emphasised that this is due to the methodology – the locations of listening points and transects were located at the track. However, the implementation of the investment is not conclusive with the destruction of their habitats. Due to the nightlife of bats, the use of feeding grounds located within the scope of investment works will not be disrupted by the implementation work. The implementation of the investment will not result in the destruction of bat shelters. During their inventory carried out for the purposes of this investment, bats were not found to be present in railway infrastructure facilities – buildings, culverts, viaducts and bridges – resting, swarming, breeding or wintering places. The planned felling of trees linked to the reconstruction of railway line 201 will not have a significant impact on the transformation of linear landscape structures, as this line has existed for many years. A completely new component of the landscape will be a strip of terrain occupied under the junction line 214 – 229. As a result of the delineation of the route of the junction, a forest comma with a width of several meters and a length of about 3 km will be created.

The second link between LK 201 and LK 229 is about 300 m long and is located in close proximity to LK 201, so it will not be a significant change in the context of the landscape. On the road sections, apart from the extension in selected places of the embankment under the second and third tracks, no significant changes in the course of the railway line are foreseen. The design in both variants provides only a slight correction of the arcs to adapt to higher speeds.

In conclusion, during the implementation phase, the following were diagnosed:

- direct effects: partial loss of part of the habitat as a result of occupying the site for investment, felling trees, accidental, unintentional killing of animals,
- indirect effects: deterioration of the quality of neighbouring habitats through possible pollution, trapping and littering of habitats arising during the investment phase, noise and disturbance.

The table below provides information on the risks posed by investments during the implementation phase for the identified protected bat species.

Table 95. Assessment of the impact of the project on bat species at a distance of up to 15 m from the extreme axis of the projected track.

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
The Great Borowiec *Nyctalus noctula*	201, Km 141,718, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 141,718, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 141,718, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 170,955, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 170,955, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	229, Km 34,038, approx. 1 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 229 and demolition works of railway infrastructure
	201, Km 34,038, approx. 1 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 175,136, approx. 4 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 175,136, approx. 4 m from the line	rights	direct, short-term, after the completion of the investment stage, there is a possibility of re-execution	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
			habitat occupation by species	
	201, Km 175,136, approx. 4 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 185,398, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 199,008, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 199,008, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 199,008, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 199,008, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
Brown Gacek *Plecotus auritus*	201, Km 192,836, approx. 1 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 175,275, approx. 3 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 181,305, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure

Polish and Latin name	**Location of habitats (line, kilometre, distance from railway line [m])**	**Side of the railway line**	**Assessment of the impact of investments**	**Investment threat**
Dark blue *Eptesicus serotinus*	201, Km 141,718, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 141,718, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 155,611, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
Karlik bigger *Pipistrellus nathusii*	201, Km 170,955, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	229, Km 34,038, approx. 1 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 229 and demolition works of railway infrastructure
	229, Km 34,038, approx. 1 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 229 and demolition works of railway infrastructure
	201, Km 170,955, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 175,136, approx. 4 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 175,136, approx. 4 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 175,136,	rights	direct, short-term, after	Risk of destruction of bat habitat fragments

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
	4 m from the line		the completion of the investment phase is possible for the species to repopulate the habitat	reconstruction of railway line 201 and demolition works of railway infrastructure
	201, Km 185,398, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 185,398, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 185,398, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 199,008, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 199,008, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
Little Karlik *Pipistrellus pipistrellus*	229, Km 34,038, approx. 1 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 229 and demolition works of railway infrastructure
	201, Km 199,008, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 199,008, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 199,008, approx. 0 m from the	right-left	direct, short-term, after completion of the investment phase	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition works

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
			it is possible for the species to repopulate the habitat	railway infrastructure
	201, Km 199,008, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
Natterer's Night *Myotis Nattereri*	201, Km 192,836, approx. 1 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 142,165, approx. 2 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
*Myotis daubentonii*ore night	201, Km 192,125, approx. 4 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
Type of nights *Myotis sp.*	201, Km 170,955, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 155,611, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 155,611, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 170,955, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 170,955, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment stage, there is a possibility of re-execution	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
			habitat occupation by species	
	201, Km 170,955, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	229, Km 34,038, approx. 1 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 229 and demolition works of railway infrastructure
	201, Km 175,136, approx. 4 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 175,136, approx. 4 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 175,136, approx. 4 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure
	201, Km 199,008, approx. 0 m from the line	right-left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Risk of destruction of bat habitat fragments related to the reconstruction of railway line 201 and demolition of railway infrastructure

Source: own development

Tab.96. The habitat area of bat species at risk of destruction.

Line number	Polish and Latin name	Total area [ha]	Surface exposed to destruction [ha] in the waist 2x15m	Area exposed to destruction [%]
201	Brown Gacek *Plecotus auritus*	0,0994	0,0717	72,13
	Petite Karlik *Pipistrellus pygmaeus*	0,0072	0	0
	Natterer's Night *Myotis Nattereri*	0,0454	0,0383	84,36
	*Myotis daubentonii*ore night	0,0142	0,0095	66,90
229	The Great Borowiec	0,0354	0,0094	26,55
	Karlik bigger *Pipistrellus nathusii*	0,0141	0,0045	31,91
	Little Karlik *Pipistrellus pipistrellus*	0,0846	0,0241	28,47
	Type of nights *Myotis sp.*	0,0682	0,0176	25,81

Source: own development

In the case of the investment under consideration, the application of the appropriate minimisation measures indicated in Chapter 8 will reduce the negative impact of the investment on protected bat species.

Teriofauna (excluding bats)

In the area of the planned project, 16 species of mammals, including 6 species under partial legal protection, were found to be present on the basis of a natural inventory equal to or less than 15 m from the extreme track: European beaver *Castor fiber*, squirrel Sciurius *vulgaris,* European mustela *erminea erminea,* European otter *Lutra lutra*, mole *Talpa europaea* and velvet *shrew Sorex araneus*.

The stage of implementation of the investment, as in the case of amphibians, reptiles and birds, will affect mammals when performing works along the railway line and during the movement of construction equipment. The track is not a physical obstacle for large and medium-sized wild animals, i.e. fox, wild boar, deer. In the case of an existing railway line, the barrier effect is understood as all phenomena related to the presence of railway infrastructure and train traffic – stress, overshadowing, space limitation. Therefore, this will not be of significant importance for local populations, as most common mammalian species (all identified in the inventory) treat it as an existing element.

One of the main threats to the identified mammal species is the conversion of their habitats due to the implementation of planned works along the entire railway line, as well as the occupation of the nearby area into building facilities. At this stage of work, there may also be temporary, short-lived animal scarring, due to noise emissions and the presence of a construction crew. This change will be temporary and completely reversible. Another threat may be the restriction of free migration, especially within forest areas, as a result of ongoing work for species sensitive to this impact occurring in the area of investment (ungulates, hare, badger, wild boar, fox). Interference in the construction of the line in the coastal areas of the rivers (beavers and otters) is assessed as negligible. The following table provides information on the risks posed by investments during the implementation phase for identified mammalian species.

Table 97. Assessment of the impact of the project on mammalian species up to 15 m from the extreme axis of the projected track.

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
Beaver European *Castor fiber*	201, Km 141,468, approx. 5 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Disturbance and deterrence of the species related to the reconstruction of railway line 201 and caused by noise emissions, the presence of the construction crew
Squirrel *Sciurius vulgaris*	201, Km 187,307, approx. 8 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
Gronostaj European *Mustela erminea*	201, Km 198,348, approx. 3 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
Common coward *Mustela putorius*	229, Km 34,418, approx. 10 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229
European otter *Luther lutra*	201, Km 139,394, approx. 0 m from the line	left- Right	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Disturbance and deterrence of the species related to the reconstruction of railway line 201 and caused by noise emissions, the presence of the construction crew
Mole *Talpa europaea*	201, Km 148,000, approx. 7 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	201, Km 167,200, approx. 10 m from the line	rights		
	229, Km 34,100, approx. 6 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229
	229, Km 34,100, approx. 6 m from the line	rights		
	229, Km 34,120, approx. 15 m from the line	left		
	229, Km 35,320, approx. 13 m from the line	Left		
	229, Km 36,110, approx. 10 m from the line	Rights		
	229, Km 39,500, approx.	Rights		

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
	m from the line			
	201, Km 176,646, approx. 8 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	201, Km 139,570, approx. 2 m from the line	rights		
	201, Km 141,504, approx. 3 m from the line	left		
	201, Km 146,328, approx. 4 m from the line	left		
	201, Km 151,110, approx. 1 m from the line	left		
	201, Km 196,604, approx. 13 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the construction of the third track on the section Gdańsk Osowa – Gdynia Główna
	201, Km 198,909, approx. 15 m from the line	rights		
Velvet shrew *Sorex araneus*	201, Km 146,300, approx. 1 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
Fox ore *Vulpes vulpes*	229, Km 38,000, approx. 8 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229
	229, Km 39,500, approx. 4 m from the line	rights		
	214, Km 5,910, approx. 1 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 214
	214, Km 5,385, approx. 4 m from the line	rights		
	229, Km 34,798, approx. 10 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229
	229, Km 34,649, approx. 10 m from the line	rights		

	201, Km 159,900, approx.	the left—	direct, short-term, after	Transformation of mammalian habitats, disturbance and their

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
	0 m from the line	rights	the completion of the investment phase is possible for the species to repopulate the habitat	deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of the construction crew
	201, Km 182,500, approx. 3 m from the line	left		
	201, Km 158,674, approx. 8 m from the line	rights		
	201, Km 146,047, approx. 12 m from the line	left		
	201, Km 152,399, approx. 6 m from the line	rights		
Noble deer *Cervus elaphus*	229, Km 37,900, approx. 10 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229
	229, Km 39,600, approx. 6 m from the line	rights		
	201, Km 171,100, approx. 5 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	201, Km 198,806, approx. 3 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the construction of the third track on the section Gdańsk Osowa – Gdynia Główna
	201, Km 194,304, approx. 19 m from the line	rights		
	201, Km 193,524, approx. 4 m from the line	rights		
	201, Km 196,789, approx. 9 m from the line	rights		
	201, Km 191,152, approx. 4 m from the line	rights		
	201, Km 142,715, approx. 6 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	201, Km 141,388, approx. 4 m from the line	left		
	201, Km 142,718, approx. 9 m from the line	left		
	201, Km 145,809, approx. 3 m from the line	rights		
	201, Km 157,628, approx.	left		

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
	6 m from the line			
	214/229, Km 0.154, approx. 5 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the construction of a new section of line 214 as a link to line 229
Boar *SUS scrofa*	201, Km 191,388, approx. 1 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the construction of the third track on the section Gdańsk Osowa – Gdynia Główna
	201, 191,420, approx. 3 m from the line	left		
	201, Km 194,201, approx. 13 m from the line	rights		
	201, Km 198,266, approx. 10 m from the line	left		
	201, Km 200,276, approx. 9 m from the line	rights		
	201, Km 165,300, approx. 10 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	201, Km 154,164, approx. 2 m from the line	left		
	201, Km 157,690, approx. 5 m from the line	left		
	201, Km 186,845, approx. 7 m from the line	rights		
	201, Km 138,302, approx. 4 m from the line	left		
	201, Km 147,356, approx. 5 m from the line	rights		
	201, Km 172,836, approx. 5 m from the line	left		
	201, Km 154,129, approx. 9 m from the line	rights		
	229, Km 34,846, approx. 5 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229
	229, Km 35,000, approx. 15 m from the line	left		
	229, Km 37,869, approx.	left		

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
	m from the line			
	214, Km 5,928, ca. 4 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 214
	201, Km 165,286, approx. 4 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	201, Km 170,837, approx. 8 m from the line	rights		
	201, Km 170,387, approx. 7 m from the line	rights		
	201, Km 191,740, approx. 2 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the construction of the third track on the section Gdańsk Osowa – Gdynia Główna
	201, Km 192,710, approx. 4 m from the line	left		
	201, Km 193,469, approx. 4 m from the line	rights		
	201, Km 197,312, approx. 5 m from the line	left		
	201, Km 197,371, approx. 6 m from the line	left		
	201, Km 198,279, approx. 14 m from the line	left		
	201, Km 200,846, approx. 11 m from the line	left		
European deer *Capreolus capreolus*	201, Km 146,000, approx. 1 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	229, Km 37,900, approx. 10 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229
	229, Km 38,300, approx. 12 m from the line	Left		
	201, Km 144,100, approx. 0 m from the line	left- Right	direct, short-term, after the completion of the investment there is a possibility of repopulation	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of the construction crew
	201, Km 149,900, approx.	left		

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
	2 m from the line		habitats by Species	
	201, Km 151,000, approx. 2 m from the line	left		
	201, Km 164,900, approx. 3 m from the line	left		
	201, Km 169,500, approx. 12 m from the line	left		
	229, Km 34,200, approx. 1 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229
	201, Km 183,681, approx. 0 m from the line	left- Right	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	229, Km 34,708, approx. 8 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229
	201, Km 194,101, approx. 10 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the construction of the third track on the section Gdańsk Osowa – Gdynia Główna
	201, Km 196,705, approx. 15 m from the line	rights		
	201, Km 140,392, approx. 6 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	201, Km 145,652, approx. 14 m from the line	rights		
	201, Km 152,476 approx. 10 m from the line	rights		
	201, Km 159,056, approx. 9 m from the line	rights		
	214, Km 4,192, ca. 9 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 214
	214, Km 5,647, approx. 2 m from the line	left		
	214, Km 5,674, approx. 2	rights—		

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
	m from the line	left		
	214, Km 5,732, approx. 3 m from the line	right-left		
	214, Km 6.201, approx. 7 m from the line	rights		
	214, Km 6.425, approx. 2 m from the line	left		
	201, Km 144,267, approx. 0 m from the line	left- Right	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	201, Km 145,713, approx. 13 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	
	201, Km 156,576, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	
	201, Km 156,643, approx. 6 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	
	201, Km 156,740, approx. 5 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	
	201, Km 192,199, approx. 11 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the construction of the third track on the section Gdańsk Osowa – Gdynia Główna
	201, Km 193,307, approx. 7 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	
	201, Km 191,004, approx.	rights	direct, short-term, after	

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
	3 m from the line		the completion of the investment phase is possible for the species to repopulate the habitat	
	201, Km 191,082, approx. 9 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	
	201, Km 161,372, approx. 10 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	214, Km 6,262, approx. 6 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 214
	214, Km 5,880, approx. 3 m from the line	left		
	201, Km 141,042, approx. 15 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	201, Km 149,922, approx. 11 m from the line	left		
	229, Km 38,917, approx. 8 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229
	201, Km 173,273, approx. 13 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	201, Km 165,165, approx. 6 m from the line	left		
	201, Km 144,209, approx. 6 m from the line	rights		
	201, Km 156,785, approx. 5 m from the line	rights		
	201, Km 156,613, approx. 14 m from the line	left		
	201, Km 161,314, approx. 1 m from the line	left		
	201, Km 161,454, approx.	left		

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
	2 m from the line			
	201, Km 185,946, approx. 3 m from the line	left		
	201, Km 186,253, approx. 8 m from the line	rights		
	201, Km 176,138, approx. 6 m from the line	left		
	214/229, Km 8.911, ca. 10 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229
	201, Km 141,472, approx. 7 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
	201, Km 165,039, approx. 12 m from the line	left		
	201, Km 186,904, approx. 2 m from the line	left		
	201, Km 187,360, approx. 2 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the construction of the third track on the section Gdańsk Osowa – Gdynia Główna
	201, Km 190,346, approx. 5 m from the line	left		
	201, Km 191,201, approx. 2 m from the line	left		
	201, Km 192,181, approx. 1 m from the line	rights		
Hare gray *Lepus europaeus*	229, Km 37,690, approx. 11 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229
	201, Km 191,221, approx. 0 m from the line	left- Right	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the construction of the third track on the section Gdańsk Osowa – Gdynia Główna
	229, Km 34,967, approx. 13 m from the line	rights	direct, short-term, after the completion of the investment there is a possibility of repopulation	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229

Polish and Latin name	Location of habitats (line, kilometre, distance from railway line [m])	Side of the railway line	Assessment of the impact of investments	Investment threat
			habitats by Species	
	229, Km 39,698, approx. 5 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of line 229
Raccoon Asian *Nyctereutes procyonoides*	201, Km 174,877, approx. 8 m from the line	left	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
Home Kuna *Martes Foina*	201, Km 183,803, approx. 0 m from the line	left- Right	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
European Badger *Meles meles*	201, Km 160,088, approx. 2 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the reconstruction of railway line 201 and caused by noise emissions, the presence of a construction crew
Mint ore *Myodes glareolus*	201, Km 194,201, approx. 13 m from the line	rights	direct, short-term, after the completion of the investment phase, it is possible to repopulate the habitat by the species	Conversion of mammalian habitats, disturbance and deterrence related to the construction of the third track on the section Gdańsk Osowa – Gdynia Główna

Source: own development

Two species of mammals: the European beaver *Castor fiber* and the European otter *Luther lutra* are placed in Annex II and IV of the Habitats Directive. Therefore, during the implementation of the investment, particular attention should be paid to their positions. In the case of other mammalian species, despite the location of their sites within 15 m from the extreme axis of the projected track, the planned reconstruction of the railway lines will not significantly affect the size of the species, their local population or their habitats.

Tab.98. Habitat area of mammalian species (except bats) exposed to destruction.

Line number	Polish and Latin name	Total area [ha]	Surface exposed to destruction [ha] in the waist 2x15m	Surface exposed for destruction [%]
201	European beaver (Eurasian) Castor fiber	33,8534	4,2563	12,57
	European otter Luther lutra	5,5116	0,1543	2,80

Source: own development

For the investment under consideration, the application of the relevant minimisation measures indicated in Chapter 8 will reduce the negative impact of the investment on protected mammalian species.

5.1.9 Impact on landscape

In the context of the impact on the landscape, works related to the construction (or demolition in the decommissioning phase) of tracks, engineering facilities and accompanying infrastructure are envisaged.

Characteristic of this stage will be the infrastructure related to the construction of an additional track, storage sites and equipment bases and a new strip of land constituting a construction site. Storage sites and equipment bases will, for organisational reasons, be located within the existing railway infrastructure. The main elements affecting changes in the physiognomy of the site will take place primarily in the area of bases and storage sites and at the site of construction of additional tracks.

The characteristic features of the construction landscape will gradually move along the railway line as work progresses and will be of a short-term nature.

A significant part of the works along the analysed railway lines will take place within the boundaries of the trees (no viewing axes) as well as within the existing development of the village. It should therefore be assumed that the construction works related to the construction of the railway line under consideration and the accompanying infrastructure will not significantly affect the landscape features of the areas adjacent to the lines.

5.1.10 Impact on monuments

The protection of the conservator of monuments is covered by cubature objects associated with historically line 201. This line between Gdynia and Kościerzyna was built in the interwar period. The line served as a coal bus from Silesia to the port of Gdynia, it also served passenger traffic, so railway stations were also built, some of which were preserved and protected. The project does not foresee interference with historic buildings located in the immediate vicinity of lines 201, 214, 219. Only those monuments (protected in the register of monuments) that form part of these lines – bridge structures, culverts and cubature buildings related to the need to manage traffic on the line remain in collision with the analysed railway lines.

The planned scope of modernisation works will not interfere with the state and structure of protected urban areas (Gdyni, Kartuz and Kościerzyny). Modernisation works will not affect the spatial structure of these areas. They will be implemented within the boundaries of areas separated as railway areas already transformed for the purpose of this function.

The analysed railway line No. 201 borders directly with archaeological protection zones. Directly at the track or in the buffer zone, there are areas where archaeological monuments from different prehistoric periods have been discovered during surface studies. They are subject to conservation protection. All earthworks must be carried out under permanent archaeological supervision. In the event of collisions with archaeological sites, earthworks should be preceded by pre-emptive archaeological research. Regarding the arrangement of archaeological supervision for earthworks in the archaeological protection zone, please contact the Pomeranian Voivodeship Conservator of Monuments in Gdańsk.

Objects that are supposed to be archaeological monuments are also protected. In the case of discovery of monuments, the find should be secured for the location of its discovery and immediately notify the discovery of the proper provincial conservator of monuments. The continuation of the works will be possible under archaeological supervision, after prior archaeological rescue research.

5.1.11 Waste management

Waste management will consist of the collection of waste arising during the implementation of the investment or during its operation before its transport to the treatment sites, i.e. the waste will be pre-storageed by the waste producer. Waste will be collected separately in a way that takes into account its nature and characteristics. At the construction stage, waste will be stored at a designated site on the construction site in accordance with the health and safety plan. Waste management at the stage of implementation of the investment will lie with the contractor of the works, while the waste management that will arise as a result of maintaining the line will be the responsibility of the Investor – PKP PLK S.A.

Waste management resulting from construction works and the operation of railway lines and passengers will be carried out in such a way as to ensure the protection of human life and health and the environment, in particular in such a way as to:

- do not endanger water, air, soil, plants and animals,
- do not cause noise or odour nuisance, do not have adverse effects on rural areas or places of particular cultural and natural interest.

A case-by-case approach to each potential waste is assumed, thus applying the principle of waste reduction through the reuse of components and extending the lifetime of further use.

In the case of this project, waste prevention can only be limited to the classification of the substance arising during the "waste/no waste" process and the preparation of certain waste for re-use in accordance with the internal instructions of PKP PLK S.A. The waste management will be carried out in such a way that waste can first be recycled after prior separation at source, in order to reduce the amount of waste sent to the landfill.

Elements that are useful for further use on other lines are used by the Investor, while materials for which the Investor sees no use are treated as waste and the further management of such useless substances/materials is subject to waste management.

The rules governing the management of items which have not been recognised as waste and constitute reusable material shall be governed by the instructions of Investor Im-2 and Im-3. This applies in particular to the infrastructure elements of the existing railway line, which will be rebuilt, as well as works related to the current maintenance of the line.

As part of the supervision of waste management generated during the investment, PKP PLK S.A. controls the service provider in terms of proper storage of waste and the selection of waste recipients and methods of its further transformation. Responsibility for further management of the generated waste by contractors lies with the contractor and subsequent waste holders.

Waste management will be controlled on the basis of legally required waste records and reporting, as well as on the basis of internal rules of PKP PLK S.A., as defined in the instructions Is-1.

According to the requirements of the regulations, the storage sites of the generated waste will be adapted to its segregation. In addition, they will comply with the legal requirements, i.e. in the case of hazardous waste, waste will be stored in closed places, inaccessible to third parties and isolated from the ground-water environment, while dusty waste will be protected against the influence of weather conditions in order to reduce dust. Currently, no waste recovery or disposal operations are foreseen as part of the projected investment.

Waste generation at the construction stage

At present, it is expected that the amount of waste generated by the construction process will be limited, inter alia, by:

- qualification of dismantled elements as useful for use in other lines of PKP PLK Company,
- the use of uncontaminated crusher and debris for the purpose of substructures for service roads or cubature facilities (according to the construction design),
- land and soil management in the area covered by the investment.

Sources of waste

At the stage of implementation of the investment, the sources of waste will include:

- demolition of existing railway tracks (support, sleepers, rails, overhead contact line),
- demolition of engineering and cubature facilities,
- elimination of collisions with the armament of the area,
- cutting of trees and shrubs,
- construction and finishing works,
- packaging of the materials used,
- waste from the maintenance of construction machinery,
- technical and social facilities of construction.

The planned investment foresees the production of inert, hazardous and non-hazardous and inert waste. This waste can be categorised according to the order adopted for the waste classification in the Waste Catalogue Regulation:

- 08 wastes from the production, preparation, marketing and use of protective coatings (paint, varnishes, ceramic enamels), putty, adhesives, sealants and printing inks;
- 12 wastes from shaping and physical and mechanical surface treatment of metals and plastics artificial;
- 13 waste oils and waste of liquid fuels (excl. edible oils and groups 05, 12 and 19);
- 15 packaging waste; sorbents, Wipering Fabrics, Filter Materials and Clothes protection not included in other groups;
- 16 wastes not included in other groups;
- 17 wastes from construction, renovation and dismantling of buildings and infrastructure road (including soil and soil from contaminated areas);
- 20 municipal waste including fractions collected separately.

It is expected that at this stage the dominant group will be group 17 described in the Waste Catalogue Regulation.

The choice of option will not have a significant impact on waste management. The quantities of waste generated at the stage of decommissioning of the project are comparable to those forecasted for production at the construction stage. The table below summarises the types and quantities of waste that can be generated at the construction stage for the investment and alternative options.

Tab. 99. Types and quantities of waste that may arise during the construction phase – investment option and alternative

L.P.	Code	Type of waste	Description of waste	Alternative option – estimated amount of waste [Mg]	Investment option – estimated amount of waste [Mg]	Predicted Ways to Recycle Waste #
1.	08 01 11*	Waste paints and varnishes containing organic solvents or other hazardous substances	Waste generated during painting finishing works.	0,1	0,1	R1, R12, R13, D10, D5
2.	08 01 12	Waste paints and varnishes other than those mentioned in	Waste generated during painting finishing works.			
3.	12 01 13	Welding waste	Waste arising during welding and grinding. Their number will depend on the scope of work.	0,1	0,1	R4, R13, D10, D5
4.	12 01 17	Sanding waste other than those mentioned in 12 01 16*	Waste arising during welding and grinding. Their number will depend on the scope of work.			
5.	15 01 01	Packaging of paper and paperboard	Waste with this code will come from the packaging of materials and equipment used in the construction.	4,0	4,0	R3, R13
6.	15 01 02	Plastic packaging	Waste with this code will come from the packaging of materials and equipment used in the construction.	8,5	8,5	R3, R13, R12, R1,
7.	15 01 03	Wood packaging	Waste with this code will come from the packaging of materials and equipment used in the construction.	8,5	8,5	R3, R13, R12, R1,
8.	15 01 04	Metal packaging	Waste with this code will come from the packaging of materials and equipment used in the construction.	4,7	4,7	R4, R13, R12, R1,
9.	15 01 06	Mixed packaging waste	Waste with this code will come from the packaging of materials and equipment used in the construction.	6,2	6,2	R3,R5,R4,R13,R12,R1,
10.	15 01 10*	Packaging containing or contaminated with residues of dangerous substances (e.g. class I and II plant protection products)	Packaging of paints, oils, solvents, preservatives and other substances that may harm the environment and human health.	0,5	0,5	R3,R5,R4,R11 R13,R12,R1

L.P.	Code	Type of waste	Description of waste	Alternative option – estimated amount of waste [Mg]	Investment option – estimated amount of waste [Mg]	Predicted Ways to Recycle Waste #
		toxicity – very toxic and toxic)				
11.	15 02 02*	Sorbents, filter materials (including oil filters not included in other groups), wiping fabrics (e.g. rags, cloths) and protective clothing contaminated with dangerous substances (e.g. PCB)	Waste will consist mainly of clothing and rags used for finishing works and minor repairs at the construction site, as well as filters from the maintenance of machinery and equipment.	0,1	0,1	D10, R1, R11, R12, R13
12.	15 02 03	Sorbents, filtering materials, wiping fabrics (e.g. rags, cloths) and protective clothing other than those mentioned in 15 02 02*	The waste will consist of workwear, helmets, etc.	1,0	1,0	D10, R1, R11, R12, R13
13.	16 02 13*	Used equipment containing hazardous elements other than those mentioned in 16 02 09* to 16 02 12*	These will be equipment derived from the dismantling of electrical and electronic infrastructure or replacement of spare parts in machinery and equipment used during construction works and maintenance of the lighting of the construction site. It is assumed that parts of disassembled equipment can be reused and used in other activities of PKP PLK. The amount of such waste depends, inter alia, on the qualification of individual components in accordance with the internal instructions Im-2 and Im-3.	3,0	3,0	R12, R11, R3, R5, R4, R12, R13
14.	16 02 16	Items removed from worn devices other than those mentioned in 16 02 15*	These will be elements derived from the disassembly or replacement of parts of electrical and electronic equipment, arising during the operation of machinery and equipment during construction works, including for illumination of the construction site. It is assumed that parts of disassembled equipment can be reused and used as part of the process or elsewhere for the needs of PKP PLK. The amount of this type of waste depends	10,0	10,0	R12, R11, R3, R5, R4, R12, R13

L.P.	Code	Type of waste	Description of waste	Alternative option – estimated amount of waste [Mg]	Investment option – estimated amount of waste [Mg]	Predicted Ways to Recycle Waste #
			it is, among other things, from the qualification of individual elements according to the internal instructions Im-2 and Im-3.			
15.	17 01 01	Concrete waste and concrete debris from demolition and repairs	Waste will consist of construction waste in the form of concrete and concrete debris from demolition and renovations.	14 000,0	14 000,0	R5, R13, D5
16.	17 01 02	Brick debris	Waste will constitute building waste in the form of brick debris.	10 000,0	10 000,0	
17.	17 01 03	Waste of other ceramic materials and fittings	Waste will be the construction waste of other ceramic materials and equipment.	10 000,0	10 000,0	
18.	17 01 07	Mixed wastes of concrete, brick debris, waste ceramic materials and fittings other than those mentioned in 17 01 06*	The waste will be mixed waste from concrete, brick debris, waste ceramic materials.	14 000,0	14 000,0	
19.	17 01 81	Waste from road repairs and reconstructions	Waste will consist of construction waste from road repairs and reconstructions.	12 000,0	12 000,0	
20.	17 08 02	Construction materials containing plaster other than those mentioned in 17 08 01*	Waste will consist of construction materials containing plaster.	10 000,0	10 000,0	
21.	17 09 04	Mixed construction, repair and dismantling waste other than those mentioned in 17 09 01*, 17 09 02* and 17 09 03*	Waste will be mixed waste from construction, renovation and dismantling.	14 000,0	14 000,0	
22.	17 02 04*	Wood, glass and plastic waste containing or contaminated with hazardous substances (railway sleepers)	It is expected that dismantled wooden railway sleepers will be partially used for other needs of PKP PLK.	1,2	1,2	

23.	17 02 01	Wood	Shrubs and fine vegetation, as part of the preparation of the site. It is expected that the removed vegetation will undergo biological disposal processes, e.g.	192,0	192,0	R3, R13

L.P.	Code	Type of waste	Description of waste	Alternative option – estimated amount of waste [Mg]	Investment option – estimated amount of waste [Mg]	Predicted Ways to Recycle Waste #
			it's composted. This method of waste management will reduce the burden on the environment of this type of waste. Waste management will be on the side of the contractor.			
24.	17 02 02	Glass	Glass from renovation processes/construction/deconstruction is mainly elements of equipment (windows, door glazing).	10,0	10,0	R5, R13
25.	17 02 03	Plastics	Plastics from the renovation process/construction are mainly elements of equipment (doors, facade cladding, window frames).	4,8	4,8	R3, R13
26.	17 03 80	Waste papa	Waste may arise as a result of the dismantling or reconstruction of technical facilities. Currently, waste papa is not expected to be used on the spot.	1,0	1,0	R12, R13, R1, D10, D5
27.	17 04 01	Copper, bronze, brass	Waste will be elements of equipment and infrastructure dismantled in connection with the revitalisation of the section.	10,0	10,0	R4, R13
28.	17 04 02	Aluminium	Waste will be elements of equipment and infrastructure dismantled in connection with the revitalisation of the section.	10,0	10,0	R4, R13
29.	17 04 05	Iron and steel	Steel waste will come from the adjustment and grinding of rails, as well as from rebuilt objects, i.e. bridges and steel culverts.	6700,0	6700,0	R4, R13
30.	17 04 07	Mixtures of metals	Waste will be structural elements from the dismantled infrastructure.	10,0	10,0	R4, R13
31.	17 04 11	Cables other than those mentioned in 17 04 10*	Waste will be part of the dismantled overhead and telecommunications network.	10,0	10,0	R4, R3, R12, R13

32.	17 05 03*	Soil and soil, including stones contaminated with dangerous substances	It is difficult to determine at this stage how much waste land will be considered contaminated. In the course of work in obvious cases, where it will be possible to determine the contamination of waste land will be selected and segregated so as not to contaminate the remaining uncontaminated	16 000,0	16 000,0	R5, R12, R13, D5, D10, D8, D9, D15

L.P.	Code	Type of waste	Description of waste	Alternative option – estimated amount of waste [Mg]	Investment option – estimated amount of waste [Mg]	Predicted Ways to Recycle Waste #
			it's ground. In cases where there is a suspicion of soil contamination, waste will be referred for research. The management of both types of waste will be carried out separately. In most cases, soil, earth and stones will be used as part of the process and will not constitute waste. Waste will be removed, excess land from excavations, and removed land and mules from the cleaning of culverts.			
33.	17 05 04	Soil and earth, including stones other than those mentioned in 17 05 03	It is difficult to determine at this stage how much waste land will be considered contaminated. In the course of work in obvious cases, where it will be possible to visually identify waste pollution, the land will be selected and segregated so as not to contaminate the remaining uncontaminated land. In cases where there is a suspicion of soil contamination, waste will be referred for research. The management of both types of waste will be carried out separately. In most cases, soil, earth and stones will be used as part of the process and will not constitute waste. Waste will be removed, excess land from excavations, and removed land and mules from the cleaning of culverts.	36 000,0	36 000,0	R5, R10, R12, R13
34.	17 05 07*	Track crushing (aggregate) containing dangerous substances	In connection with the reconstruction and revitalisation of the railway line, the replacement of the crushing plant is envisaged.	100 000,0	100 000,0	R12, R13
35.	17 05 08	Track crushing (aggregate) other than those mentioned in 17 05 07*	In connection with the reconstruction and revitalisation of the railway line, the replacement of the crushing plant is envisaged.	190 000,0	190 000,0	
36.	17 06 01*	Insulating materials containing asbestos	It is anticipated that some of the buildings intended for demolition or revitalisation may have elements made of asbestos slabs (roof coverings, facades). The economy of the elements	5,0	5,0	D5, D9, D15

L.P.	Code	Type of waste	Description of waste	Alternative option – estimated amount of waste [Mg]	Investment option – estimated amount of waste [Mg]	Predicted Ways to Recycle Waste #
			asbestos-containing will be run by a qualified and authorised third-party company.			
37.	17 06 04	Insulating materials other than those mentioned in 17 06 01 and 17 06 03	It is anticipated that some of the buildings intended for demolition or revitalisation may have elements made of asbestos slabs (roof coverings, facades). The management of elements containing asbestos will be carried out by a qualified and authorised external company.	50,0	50,0	D5, D15, R12, R13
38.	17 06 05*	Construction materials containing asbestos.	It is anticipated that some of the buildings intended for demolition or revitalisation may have elements made of asbestos slabs (roof coverings, facades). The management of elements containing asbestos will be carried out by a qualified and authorised external company.	5,0	5,0	D5, D15, D9
39.	20 03 01	Non-segregated (mixed) municipal waste	This will be typical mixed municipal waste from the construction site. The number of them depends on the number of people employed and the duration of the work.	60,0	60,0	D5, R12, R11

Source: Develop your own.

The processing methods proposed above are in accordance with Annex 1 and No. 2 to the Waste Act, they do not constitute a closed catalogue. During the generation of waste, the holder will carry out ongoing research on the waste consumer market and will choose the most environmentally and economically beneficial option for further treatment. It is assumed that this will be the closest installation to keep the principle of proximity. During the selection of the recipient, the waste hierarchy and the principles of resource-efficient management and the principles of the product life cycle will be taken into account.

Characteristics of the impact of railway lines at the construction stage

In order to reduce the environmental impact of waste management from the planned investment, both line planning processes and line operation will take into account, as far as possible, the selection of building materials and consumables in terms of reducing harmfulness and taking into account the life cycle.

At the stage of implementation of the investment, the impact of waste management on the environment on individual sections may be of a short – or long-term nature, and it is directly and indirectly dependent on the organisation of the waste management system. The intensity of the impacts depends mainly on the adopted solutions for the organisation of execution works and the awareness and knowledge of waste management people. It is estimated that proper management of waste generated during the investment process will have a short-term impact on the environment and will be limited mainly to the area occupied for construction.

The direct impact of waste and material management on the environment relates in particular to the way it is deposited on the ground, the size of the land occupied, and the degree of their selection. This influence consists of leaching or ejecting substances and particles of waste into the environment. It is essential, therefore, to separate waste storage and transfer, in accordance with the waste hierarchy, to specialised companies for further treatment (recovery or disposal) or to landfill. This applies in particular to hazardous waste, which should be selected and separated from direct contact with the environment.

In order to reduce the impact of waste during its storage on the investment site, it is envisaged to organise storage places away from surface waters, floodplains and spring areas. It is assumed that waste storage sites will not be located in areas of legal protection. Waste storage sites will be guarded and fenced so that outsiders cannot access.

The storage sites will correspond to the nature and characteristics of the waste.

5.2 Stage of operation

5.2.1 Impact on the surface of the earth (soil, earth, groundwater)

5.2.1.1 Earth (soil, earth)

As the investment option differs only slightly from the alternative, the impact on nature at the exploitation stage for the two options will be the same.

The direct impact of the railway during its operation on the soil will be related to rolling stock moving on it (exhaust trains). On the new railway line, mainly electric trains will move, the diesel fleet will make up a small share. Thus, this influence will be irrelevant, and may involve the occurrence of:

- emissions of particulate pollutants resulting from abrasion and corrosion of track parts and components;
- emissions of liquid pollutants associated with leakage of lubricants, oils, brake fluids and other substances dangerous to the ground environment.

These pollutants can enter the soil through two routes: by direct settlement on their surface or surface runoffs and their infiltration into the soil. However, for the most part, these impurities are retained on the embankment of the track. During the exploitation phase of the project, the negative impact on soils is expected to be reduced due to: deconstruction, reconstruction and construction of the track drainage system.

In addition, on behalf of PKP Polskie Linie Kolejowe S.A. SGS Eko-Projekt Sp. z o.o. carried out in 2014 "Expertise on the impact of railway lines on land pollution", the aim of which was to determine the state of the ground environment in areas belonging to PKP PLK S.A. (stations, routes). The results of the study relate to the classification of protected areas in accordance with the repealed Regulation of the Minister of the Environment of 9 September 2002 on soil quality standards and land quality standards

(Journal of Laws 2002 No. 165 item. 1359) which classified the land as protected (group A), agricultural and urban (group B) and industrial transport (Group C).

Soil tests have been carried out in the scope of:

- sum of hydrocarbons (C6-C12) (petrol sum),
- sum of hydrocarbons (C12-C35) (mineral oil),
- sum of aromatic hydrocarbons,
- sums of polycyclic aromatic hydrocarbons,
- copper (Cu).

All samples tested at different sites selected for the analysis of the railway lines met the criteria set for Group C land, and in addition, most of the samples tested also met the strict criteria appropriate for Group A land.

In conclusion, it is not expected that there will be significant negative impacts on the quality of the land during the operation of the railway line.

5.2.1.2 Surface and underground water

<u>Investment option (W1)</u>

In accordance with §21.1 of the Regulation of the Minister of the Environment of 18 November 2014 on the conditions to be met when discharging waste water into waters or into the ground, and on substances particularly harmful to the aquatic environment (Journal of Laws of 2014, No. U. 2014, item. 1800) rainwater and meltwater, included in open or closed sewerage systems, originating from contaminated surfaces of industrial areas, components, transport bases, ports, airports, cities, roads belonging to the category of national, provincial or district roads of class G, as well as parking lots with an area of more than 0.1 ha, in the amount resulting from precipitation of at least 15 l per second per hectare may be introduced into waters or into the ground, provided that they do not contain contaminants in quantities exceeding 100 mg/l of general suspensions and 15 mg/l petroleum hydrocarbons.

According to §21.2 of the aforementioned Ordinance, rainwater or melting water from surfaces other than those mentioned above may be introduced into water or into the earth without purification.

The above provisions exempt from the obligation to use pre-treatment equipment in the case of drainage of rainwater or meltwater from areas other than those mentioned in §21.1. e.g. railway area.

PKP Polskie Linie Kolejowe has been developed by the Polish Railway Lines. "Analysis of the qualitative composition of rainwater and meltwater from railway areas" in which the tests of rainwater and meltwater collected in areas belonging to PKP PLK S.A. The study compiled together the results of 867 tests of rainwater and melt water in terms of general suspension and petroleum hydrocarbons. The study covered the section of railway line 201 from km 33,550 – 137,400. The results of these studies are presented in the table below.

Table 100 Quality characteristics of rainwater and meltwater from land the railroad.

Indicator	Limit value	Number of samples	min	Max
Petroleum hydrocarbons	15 mg/l	33	& 0.2	& 0.2
General suspension	100 mg/l		22	52

Source: Analysis of the qualitative composition of rainwater and meltwater from railway areas http://www.plk-sa.pl/files/public/userupload/pdf/AktypRawneipvelpisy/Protection asancestry/21.04.2017/Analiz ajakosc iw tofallhiroztopowe.pdf

Based on the results of the analyses presented, it can be concluded that the expected quality of discharged rainwater from the analysed railway lines will be good and will meet the requirements currently in force for the discharged rainwater:

- concentration of total suspensions Shaw & 100 mg/dm^3,

- concentration of petroleum hydrocarbons S & L; 15 mg/dm^3.

On the basis of the analysis of the results presented in the above table, it is necessary to determine the good quality of rainwater and melt water discharged from railway lines and the lack of grounds for the construction of rainwater treatment systems.

Analysis of the impact on water bodies

Uniform Parts of Surface Water

Biological and physicochemical elements

During the operation of the considered railway lines from the surface of the track, engineering facilities, stations and stops, rainwater will be drained. As described above, the quality of discharged rainwater will comply with the requirements of the Regulation of the Minister of the Environment of 18 November 2014 on the conditions to be met when introducing waste water into or into the ground, and on substances particularly harmful to the aquatic environment.

Discharged rainwater from the whole project will not pose a threat to the ecological status/potential of water and will not cause deterioration of indicators responsible for biological and physicochemical elements of water.

Hydromorphological elements

At the stage of operation of the railway line and associated infrastructure, no negative impact on hydromorphology of rivers is foreseen: hydrological regime – including the amount and dynamics of water flow and connection with groundwater bodies, continuity of rivers – the number and type of barriers and the movement of aquatic organisms. Properly designed lights of refurbished bridges will ensure adequate water flow conditions in rivers and smooth migration of aquatic organisms and transport of river sediments. No adverse effects on morphological conditions are foreseen in operation either: depth and variability of width, structure and substrate of riverbeds, coastal zone structure and current rate. The project at the use stage will not cause a disturbance of the morphological continuity of rivers.

Uniform Parts of Underground Waters

Effect on chemical parameters

The operation of the investment will not involve the use of substances (e.g. Mg chloride, Ca, Na) that cause the salinity effect of the aquatic environment.

Rainwater discharged from the railway lines concerned will meet the requirements of the Regulation of the Minister of the Environment of 18 November 2014 on the conditions to be met for the introduction of waste water into or into the ground, and on substances particularly harmful to the aquatic environment.

Impact on quantitative parameters

The investment will not be related to the abstraction of groundwater, both at the exploitation stage. The operation of railway lines does not involve a change in the direction of water circulation.

Alternative option (W2)

The impact of the exploitation phase of the investment option described in this chapter will also be wider for the alternative option.

5.2.2 Effects on atmospheric air

Railway lines on the analysed sections are mainly non-electrified. Only the final 1 km section of LK 201 in the city of Gdynia is electrified. The planned project foresees electrification of lines 214 and 229 and the remaining section of the analysed LK 201, as well as the planned connections. In the existing state, the movement of combustion vehicles takes place on all analysed existing railway lines.

After the investment (in the first full year of operation), only a small share of combustion vehicles is foreseen in both the investment option and the alternative option, on the following sections:

- Kartuzy (old line) LK 229,
- Glincz – Kartuzy Burkhadtwo lk 229,

- quantities up to about 1 combustion vehicle/h on each of the above-mentioned sections.

In addition, after each of the analysed railway lines, there will be maintenance and repair vehicles, the amount of which is difficult to estimate. The implementation of the investment will have a positive impact on the improvement of the aerosanitary conditions of the region, due to the electrification of railway lines and the reduction of the number of combustion vehicles travelling on the analysed sections of railway lines.

The average daily volume of combustion vehicles (both in the investment and alternative variants) which are the source of emissions of substances into the air, is summarised in the table below.

Tab. 101. Number of combustion vehicles [pcs/day].

Section of the railway line	Existing state	Year of commissioning of the investment	First full year of operation
Kościerzyna – Somonino LK 201	19	19	0
Somonino – Glincz LK 201	19	19	0
Glincz – Gdańsk Osowa R1 PZS LK 201	32	32	0
Gdańsk Osowa R1 PZS— Gdańsk OsowaR4 PZS LK 201	6	6	0
Gdańsk OsowaR4 PZS- Gdynia Main LK 201	34	34	0
Somonino – Kartuzy LK 214	1	1	0
Kartuzy (new junction) LK 229	0	0	0
Kartuzy (old line) LK 229	14	14	20
Glincz – Kartuzy Burchardztwo LK 229	14	14	20

Source: Develop your own.

In addition, the construction/redevelopment of roads and car parks is planned as part of the investment. On these roads and parking lots, vehicles related to service and maintenance on the analysed sections of railway lines will mainly be used. Due to the low volume of traffic, emissions from these sources in both the investment and alternative options will be negligible, with no significant negative impact on air quality.

During the operation of the railway infrastructure, direct emissions of greenhouse gases into the atmosphere are mainly due to the combustion of fuels in combustion engines and from the operation of infrastructure equipment (e.g. individual heating at railway stations, etc.). However, these emissions are marginal and trace compared to emissions from the transport sector as a whole, and their share of external transport costs is unnoticed. It is estimated that the share of emissions generated by rail transport accounts for between 1 and 3 % of total transport emissions. The most burdensome is emissions from the diesel fleet.

Due to the large mass and relatively low friction resistance, the energy consumption of diesel locomotives strongly depends on the number of speeding operations, which in turn depends on the number of stops and sections with speed limits (e.g. as a result of infrastructure degradation).

As a result of this project, the line will be electrified, so that after the analysed railway lines will be able to run trains powered by electricity, and only to a small extent also combustion vehicles (maximum about 1 combustion vehicle/h on 2 sections of line LK 229). Emissions of pollutants, including greenhouse gases into the atmosphere, will then be indirect as emissions from power plants. Facilities of this type are a source of organised emissions and are subject to relevant laws and emission standards.

The amount of emissions regardless of the choice of investment option will be the same.

5.2.3 Impact on the acoustic climate

The calculations of emissions and environmental noise propagation are based on the following inputs and assumptions:

- numerical terrain model NMT,
- the course of the railway line in the investment option W1 and alternative W2,
- projections were made for the investment option W1 and the alternative W2 in the time horizons 2023 and 2024 (one year after the investment was put into operation),
- forecasts of rail traffic volumes for the analysed variants (equivalent to both variants) in 2023 (year of investment commissioning) and in 2024,
- the speeds of each category of trains were adopted on the basis of the forecasted permissible speeds,
- use of strunoconcrete sleepers and contactless joints (pots. 1 and 1 in the RMR method),
- length of train formations – according to the table below,
- topographical data on the development, taking into account the purpose of buildings and acoustic classification of areas in the 300 m strip from the axis of the gauge tracks,
- train braking has not been taken into account – deceleration during braking reduces noise emissions and brake performance increases emissions. On average, however, the noise emissions from braking trains are lower than those that move at full speed, so the braking effect was omitted in the calculations.
- due to the distant horizon of putting the investment into service, an amendment was adopted to reduce the noise emission of freight trains by 3 dB due to the use of composite blocks and the expected improvement in the technical condition of existing rolling stock and the introduction of newer models in view of:
  - on the requirements of the European Commission (Decision No 2011/229/EU of 4 April 2011) "Railway rolling stock – noise", p. 2012/464/EU of 23 July 2012 which requires all rolling stock circulating on the trans-European conventional rail network to comply with stricter noise limits (stationary, starting, passing and noise inside the driver's cab),
  - on the European Commission's ambition to introduce an obligation to ensure a reduction in the noise levels of freight trains by replacing steel brake pads with composite ones by 2020 – 2022 (noise reduction of about 8 dB).

Table 102. Limit values for pass-by noise.

Rolling stock subsystem category	LpAeqTp (80 km/h) [dB]	LpAeqTp (250 km/h) [dB]
Electric locomotives and OTM electric locomotives	84	99
Diesel locomotives and OTMs	85	not
EMU	80	95
DMU	81	96
Passenger wagons	79	not
Freight wagons (standardised to o/d = 0.225) (*)	83	not
(*) o/d: number of axles divided by the length between bumpers [m-1]		

Source: Develop your own.

The traffic volumes of the trains that have been introduced into the calculation model are shown in the following tables.

Tab. 103. Traffic and speed of trains used in noise calculations Option W1 and W2 – year of commissioning (2023).

Episode	Type of traffic	Type of train	Kat. RMR	number of units	day	day	night	Speed [km/h]
Kościerzyna – Somonino LK201	POC. Regional passenger	Railbuses	6	2	17	13,6	3,4	100
	POC. Interregional passenger	Long-distance exhaust gas (loc, weight)	2	6	1	0,8	0,2	100
	POC. Goods	Goods (local, weight)	4	19	1	0,8	0,2	80
Somonino – Glincz LK201	POC. Regional passenger	Railbuses	6	2	17	13,6	3,4	100
	POC. Interregional passenger	Long-distance exhaust gas (loc, weight)	2	6	1	0,8	0,2	100
	POC. Goods	Goods (local, weight)	4	19	1	0,8	0,2	80
Glincz – Gdańsk Osowa R1 PZS LK201	POC. Regional passenger	Railbuses	6	2	30	24	6	100
	POC. Interregional passenger	Long-distance exhaust gas (loc, weight)	2	6	1	0,8	0,2	100
	POC. Goods	Goods (local, weight)	4	19	1	0,8	0,2	80
Gdańsk Osowa R1 PZS – Gdańsk Osowa R4 PZS LK201	POC. Regional passenger	Railbuses	6	2	4	3,2	0,8	100
	POC. Interregional passenger	Long-distance exhaust gas (loc, weight)	2	6	1	0,8	0,2	100
	POC. Goods	Goods (local, weight)	4	19	1	0,8	0,2	80
Gdańsk Osowa R4 PZS – Gdynia Main LK201	POC. Regional passenger	Railbuses	6	2	32	25,6	6,4	100
	POC. Interregional passenger	Long-distance exhaust gas (loc, weight)	2	6	1	0,8	0,2	100
	POC. Goods	Goods (local, weight)	4	19	1	0,8	0,2	80
Somonino – Cards LK214	POC. Goods	Goods (local, weight)	4	19	1	0,8	0,2	80
Kartuzy (old line) LK229	POC. Regional passenger	Railbuses	6	2	13	10,4	2,6	100
	POC. Goods	Goods (local, weight)	4	19	1	0,8	0,2	80
Glincz – Kartuzy Burkhadtwo LK229	POC. Regional passenger	Railbuses	6	2	13	10,4	2,6	100
	POC. Goods	Goods (local, weight)	4	19	1	0,8	0,2	80

Episode	Type of traffic	Type of train	Kat. RMR	number of units	day	day	night	Speed [km/h]
LK253	POC. Regional passenger	Railbuses	6	2	26	20,8	5,2	60
LK248	POC. Regional passenger	Railbuses	6	2	28	22,4	5,6	60

Source: Develop your own.

Table 104. Traffic and speed of trains used in noise calculations Options W1 and W2 – one year after commissioning (2024).

Episode	Type of traffic	Type of train	Kat. RMR	number of units	day	day	night	Speed [km/h]
Kościerzyna – Somonino LK201	POC. Regional passenger	EZT of a new type	3	2	34	27,2	6,8	130
	POC. Interregional passenger	IC (loc+weight)	8	6	1	0,8	0,2	130
	POC. Goods	Goods (local + weight)	4	19	15	12	3	100
Somonino — Glincz LK201	POC. Regional passenger	EZT of a new type	3	2	11	8,8	2,2	130
	POC. Interregional passenger	IC (loc+weight)	8	6	1	0,8	0,2	130
	POC. Goods	Goods (local + weight)	4	19	16	12,8	3,2	100
Glincz – Gdańsk Osowa R1 PZS LK201	POC. Regional passenger	EZT of a new type	3	2	34	27,2	6,8	130
	POC. Interregional passenger	IC (loc+weight)	8	6	1	0,8	0,2	130
	POC. Goods	Goods (local + weight)	4	19	16	12,8	3,2	100
Gdańsk Osowa R1 PZS – Gdańsk Osowa R4 PZS LK201	POC. Interregional passenger	IC (loc+weight)	8	6	1	0,8	0,2	130
	POC. Goods	Goods (local + weight)	4	19	16	12,8	3,2	100
Gdańsk Osowa R4 PZS – Gdynia Main LK201	POC. Regional passenger	EZT of a new type	3	2	48	38,4	9,6	100
	POC. Interregional passenger	IC (loc+weight)	8	6	1	0,8	0,2	100
	POC. Goods	Goods (local + weight)	4	19	16	12,8	3,2	80
Somonino – Cards LK214	POC. Regional passenger	EZT of a new type	3	2	24	19,2	4,8	100
	POC. Goods	Goods (local + weight)	4	19	1	0,8	0,2	80
Kartuzy (new junction) LK229	POC. Regional passenger	EZT of a new type	3	2	24	19,2	4,8	100
Kartuzy (old line) LK229	Railbuses	Railbuses	6	2	20	16	4	100
	POC. Goods	Goods (local + weight)	4	19	1	0,8	0,2	80
Glincz – Kartuzy Burkhadtwo LK229	POC. Regional passenger	EZT of a new type	3	2	24	19,2	4,8	100
	Railbuses	Railbuses	6	2	20	16	4	100
	POC. Goods	Goods (local + weight)	4	19	1	0,8	0,2	80
LK253	POC. Regional passenger	EZT of a new type	3	2	34	27,2	6,8	96
LK248	POC. Regional passenger	EZT of a new type	3	2	48	38,4	9,6	96

Source: Develop your own.

The calculation takes into account the cumulative impact with other railway lines adjacent to the railway line under analysis No 201, 214, 229. The table below summarises the adopted traffic parameters based on measurements from 2017. The speeds adopted shall be 80 % of the speeds allowed on a given section in the existing state due to the crossing/incorporation of these railways into the lines covered by the investment.

Tab.105. Traffic and train speeds used in noise calculations – cumulative impact.

Line No	Name of the episode	Long-distance cat.8		Regional Cat.3/6		Buses Kat.6		Goods Cat.4		Long-distance	Regional	Railbuses	Goods
		day	night	day	night	day	night	day	night	Speed [km/h]			
202	Gdańsk Główny – Gdynia Main Personal	83,2	20,8	28,0	7,0	18, 0	4,5	29, 3	7,3	80	80	80	48
211	Lipusz – Kościerzyna	0,0	0,0	0,1	0,0	2,6	0,7	0,4	0,1	64	64	64	64
229	Old Saw – Kartuzy	0,0	0,0	0,0	0,0	15, 2	3,8	0,2	0,1	0	0	64	24
248	Gdańsk Osowa GPLK – Gdańsk Osowa	0,0	0,0	0,0	0,0	21, 8	5,4	0,0	0,0	0	0	96	0
250	Rumia SKM — Rumia R 38	0,3	0,1	47,4	11, 8	0,9	0,2	0,0	0,0	56	56	56	32
253	Gdańsk Rębiechowo – Gdańsk Osowa	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0

Source: Own study based on information from PKP PLK S.A.

Using the above data and assumptions in the SoundPlan program, calculations of sound levels in the receptor grid (mesh every 10 m) were performed at a height of 4 m, taking into account one reflection and in the receptors at buildings.

The results of the calculation are presented in Map Annexes 5.2.3-1, 5.2.3-2, 5.2.3-3 and 5.2.3-4, in the form of noise range maps. In contrast, the results of calculations in receptors located on facades of buildings located in areas subject to acoustic protection closest to the analysed railway line and residential buildings in railway areas are given in the table in text annexes 3.5.6-1 and 3.5.6-2. The calculations were made for a more accurate assessment of the projected acoustic impact from a single reflection and a tolerance of 0.1 dB. The results do not take into account reflections from the façade (in accordance with the Regulation on requirements for measurements of the levels of substances or energy in the environment by the operator of the road, railway, tramway, airport or port). The above statement confirms the projected reduction of the acoustic impact from the railway line under analysis. In several cases, buildings located outside the railway area and the adjacent strip of land will need to propose measures to minimise the impact of noise.

Environmental law in accordance with the provision – Article 114 para. 3, introduces for residential buildings located in closed areas or areas intended for production, storage and storage activities, instead of acoustic protection in the environment, acoustic protection inside premises in buildings. In this case, "noise protection consists of the use of technical solutions that ensure appropriate acoustic conditions in buildings".

In accordance with Article 114(1). 4, similarly in the case of acoustically protected buildings located on the 'road lane border or adjacent lane of land' within the meaning of the Rail Transport Act of 28 March 2003 (Journal of Laws 2003, No. U. of 2017, item 2117), noise protection consists of the application of technical solutions ensuring appropriate acoustic conditions in buildings.

The Rail Transport Act (U.T.k.), in Article 4, defines 'an adjacent strip of land' as 'land along railway lines, situated on both sides, intended to ensure the safe operation of rail traffic'. According to this definition, the width of the adjacent belt should be due to its function and it appears to be variable depending on local conditions. For the purpose of the study, it was assumed that the minimum width of the "contiguous strip of land" determines the permissible distance of the buildings. According to Article 53.2. of the ICC, 'buildings and buildings may be situated at a distance of not less than 10 m from the boundary of the railway area, except that the distance from the gauge axis of the track shall not be less than 20 m'.

In view of the above, it is assumed that the boundaries of the "adjoin belt of land" are located at a distance of 10 m from the boundaries of the railway cadastral parcels (railway area) and 20 m from the gauge axis of the track. Residential buildings in this area, as well as in existing enclosed areas, are subject to noise protection by applying technical solutions ensuring appropriate acoustic conditions inside them.

Analysis in the light of Article 114. 3 and 4 all buildings located on an adjacent strip of land or closed area were subjected. The results of the analyses are set out in the table in the text annex 5.2.3-1.

Permissible noise levels in residential spaces are determined by the Regulation of the Minister of Infrastructure of 12 April 2002 on technical conditions to be met by buildings and their location (Journal of Laws 2015, item. 1422), together with the referenced standard PN-87/B- 02151/02 Construction acoustics. Protection against noise in buildings. Limit values for indoor sound levels. The above-mentioned standard specifies permissible sound levels depending on the type of noise, time of day and purpose of the room. The noise level in rooms inside the building is determined by the dependencies described in PN-B-02151-3:2015-10 Construction acoustics. Noise protection in buildings. Part 3: Requirements for the sound insulation of partitions in buildings and building elements.

In view of the above, an inventory of residential buildings located in the railway area was carried out. The inventoryed buildings are so-called barracks and other buildings (e.g. station buildings) originally owned by PKP S.A. and now adapted to residential buildings. These buildings did not require acoustic protection due to the original purpose function associated, for example, with rail traffic. They were located in accordance with Article 53(1). 2 of the Rail Transport Act (Dz. U. 2017 item. 2117). Once they have been reassigned to residential buildings, their locations do not comply with the provisions of Article 53(1). 3 of the Act, which stipulates that 'for residential buildings, hospitals, social welfare homes, recreational and sports facilities, buildings related to the long-term stay of children and young people, they should be increased, depending on the purpose of the building, in order to maintain the permissible environmental noise standards laid down in separate regulations'.

The amendment to the POŚ Act allows for noise protection by applying technical solutions to ensure proper acoustic conditions in buildings, which is an appropriate action for residential buildings whose status has been shown above. The required sound insulation of external partitions specified in the Polish Standard concerning the requirements of acoustic insulation of partitions in buildings and acoustic insulation of building elements.

For residential accommodation, the permissible noise levels shall be:

- $L'Aeq_{D,\ wew}$ = 40 dBA for the time of day,
- $L'Aeq_{N,\ wew}$ = 30 dBA for nighttime,

however, for rooms, there are different averaging intervals of an equivalent sound level than for the environmental noise assessment, i.e.:

- for the daily season, the level of $L_{'Aeq\ D,\ the\ inw}$ is determined for the most unfavourable, another 8 hours between 06:00 and 6:00 hrs. 22:00,

- for the nighttime, the level of $L'_{Aeq\ N,\ inw}$ is determined for the most unfavourable ½ hours of night, between hours. 22:00 a.m. 06:00.

Therefore, noise levels in the external environment, on the facade of buildings, i.e. L'Aeq D, call and L'Aeq D, call, shall be determined for the same time intervals. Given the data on the daily distribution of traffic on the railway line concerned, it should be assumed that this distribution is even. The basic dependencies then show that the levels of L'Aeq D, Zw and L'Aeq D, Zw, are equal to the elevation level of 16 hours of daily time and 8 hours of night time respectively, i.e.: L'Aeq D, call = LAeq D (for 16 hours of the day) and L'Aeq D, call = LAeq N (for 8 hours of night).

Noise level in rooms inside the building is determined by dependency (PN-B-02151-3:2015-10 Construction acoustics. Noise protection in buildings. Part 3: Requirements for the sound insulation of partitions in buildings and building elements: where:

$$L'_{AEQ,\ wew} = L'_{AEQ} \quad R_{A2} + 10 \cdot \lg \left(\frac{S}{A}\right) + 3,$$

- R'A2 is the resulting sound insulation of the façade (including spectral adaptive indicator for rail noise Ctr and lateral transmission K, i.e. $R'_{A2} = R'_{in,}$ Ctr, and $R'_{in} = R_w - K$), including the full part and the window, as defined in PN-EN ISO 717-1:2013-08 (Acoustics. Assessment of acoustic insulation in buildings and acoustic insulation of building elements. Air sound insulation),
- S [m^2] is the total surface area of the façade (full part, window) from the side rooms,
- A [m^2] means the acoustic absorption of a living space.

The assessment of the sound level in the room was carried out by calculation method, using typical building materials used for the analysed class of buildings. The facades take into account the presence of windows containing insulated glass, with an average degree of wear and proper installation. For one living room (bedroom), windows with an average area of approx. 2 m² and facade walls in the full part (i.e. without a window) with an average area of approx. 12 m², i.e. the window is approx. 1/6 of the façade surface from the side of the room.

The accident acoustic insulation of the facade, determined for typical building materials at the above-mentioned surfaces of the elements, is approx. R'A2 = 34 dB. Adopting the acoustic absorbency of the furnished room at a standard level approx. A = 30 m², from the above formula we will get that: L'Aeq, wew = L'Aeq, call – 33 dB.

It should be noted that taking into account the above assumptions, the permissible noise levels inside these rooms (decisive 30 dB at night) will not be exceeded outside one building – receptor No 268, km 203 + 387, left side (in both analysed investment variants). In this case, due to small overruns (up to 2 dB), preventive action at this stage is not recommended. On the other hand, at the stage of preparation of the post-implementation analysis, the actual acoustic conditions in the vicinity of this building and in the premises should be verified. If noise levels are exceeded, corrective action will be necessary.

The text annex 5.2.3-1 contains tables with the results of acoustic analyses inside the premises of buildings located on the railway area and the adjacent strip of land.

When analysing the results of detailed calculations made in the receptors on the facades of buildings, it should be noted that:

- The projected acoustic impact of both variants will be very similar (differences to approx. 1 dB),

- Exceedances will occur only in a dozen or so cases (in each variant)
- The limit values shall be less than 2 dB.

The following tables show the construction for which the results of the forecasts indicate the possibility of exceeding the permissible levels (without the use of acoustic protections). However, the photographic documentation is set out in Annex 3.13-2.

Tab.106 List of buildings exposed to oversized acoustic effects – Option W1.

LP	Receptor No	Coordinate X [m]	Coordinate Y [m]	Railway line number	Page	Distance from track axis [m]	Mileage	District	Municipality
1	95	447629,7	712681,5	201	P	29	163 + 434	Carthusian	Somonino
2	116	449743,6	713938,1	201	L	24	166 + 093	Carthusian	Kartuzy
3	117	449771,5	713941,6	201	L	25	166 + 121	Carthusian	Kartuzy
4	118	449800,4	713945,4	201	L	24	166 + 150	Carthusian	Kartuzy
5	149	458787,1	720266,8	201	P	21	178 + 165	Carthusian	Żukowo
6	150	458803,4	720273,5	201	P	21	178 + 182	Carthusian	Żukowo
7	152	458841,4	720342,2	201	L	25	178 + 248	Carthusian	Żukowo
8	157	459007,9	720379,8	201	P	21	178 + 408	Carthusian	Żukowo
9	158	459024,9	720390,3	201	P	23	178 + 427	Carthusian	Żukowo
10	159	459047,5	720403,8	201	P	26	178 + 453	Carthusian	Żukowo
11	160	459060	720417,5	201	P	23	178 + 470	Carthusian	Żukowo
12	175	461420,3	722986,8	201	P	23	181 + 961	Carthusian	Żukowo
13	178	462415,6	725119,1	201	L	26	184 + 345	Carthusian	Żukowo
14	181	463025,4	725705,7	201	P	19	185 + 183	Carthusian	Żukowo

Source: Own development

Tab.107 List of buildings exposed to oversized acoustic effects – Option W2.

LP	Receptor No	Coordinate X [m]	Coordinate Y [m]	Railway line number	Page	Distance from track axis [m]	Mileage	District	Municipality
1	95	447629,7	712681,5	201	P	29	163 + 434	Carthusian	Somonino
2	111	449668,1	713928,3	201	L	22	166 + 016	Carthusian	Kartuzy
3	149	458787,1	720266,8	201	P	22	178 + 165	Carthusian	Żukowo
4	150	458803,4	720273,5	201	P	21	178 + 182	Carthusian	Żukowo
5	152	458841,4	720342,2	201	L	24	178 + 248	Carthusian	Żukowo
6	157	459007,9	720379,8	201	P	24	178 + 408	Carthusian	Żukowo
7	158	459024,9	720390,3	201	P	26	178 + 427	Carthusian	Żukowo
8	159	459047,5	720403,8	201	P	29	178 + 453	Carthusian	Żukowo
9	160	459060	720417,5	201	P	26	178 + 470	Carthusian	Żukowo
10	162	459067,7	720431,9	201	P	20	178 + 485	Carthusian	Żukowo
11	163	459097,4	720457	201	P	22	178 + 524	Carthusian	Żukowo
12	164	459102,9	720462,9	201	P	21	178 + 532	Carthusian	Żukowo
13	165	459099,1	720530	201	L	21	178 + 580	Carthusian	Żukowo
14	181	463025,4	725705,7	201	P	19	185 + 183	Carthusian	Żukowo

Source: Own development

In view of the projected occurrence of distortions of the permissible noise levels in both analysed variants, it will be necessary to take preventive measures, which are described in chapter **Error! The source of the appeal cannot be found.**.

5.2.4 Vibration impact

In order to assess the vibration emissions caused by crossings of trains on the railway line covered by this investment task, the results obtained as part of a separate study report on the impact of ground vibrations on buildings were analysed and to determine the magnitude of dynamic influences on people in buildings in accordance with PN-85/B-02170: "Assessment of the harmfulness of vibrations transmitted by the ground to buildings" and PN-88/B- 02171: "Assessment of the impact of vibrations on people in buildings", carried out by the Institute of Construction Mechanics – Laboratory for the Study of Deformations and Vibration of Buildings of the Cracow University of Technology on behalf of EKKOM Sp. z o.o.

As part of the above-mentioned report, the impact of vibrations caused by the modernised railway line No. 1 on the section Skierniewice-Łódź with a traffic volume of about 200 trips per day was analysed, on a single-family building, residential, partly basement, with a residential attic located in Skierniewice at ul. Plantowa 6 is about 32 meters from the railway line. Taking into account the parameters of railway line 1, it was concluded that these data would be representative for the assessment of vibration emissions for the railway lines concerned under this task.

As part of the assessment, vibrations were measured in three directions: two horizontal relative to each other perpendicular x and y, and vertical z. Directions x and y were consistent with the horizontal projections of the building, the direction x being consistent with the direction of propagation of vibrations, i.e. perpendicular to the axis of the railway line. The Y direction was parallel to the axis of the railway line. With the help of accelerometers, 27 time waveforms of vibrations caused by the passages of individual train crossings were recorded. These runs were then analysed in order to assess the impact of vibrations on buildings and on people staying in buildings, in accordance with Polish standards PN-85/B-02170 and PN-88/B-02171. On the basis of the time waves of acceleration of vibrations from sensors in the horizontal plane presented in the report, located on the ground level foundation of the building in accordance with PN-85/B-02170 and the assessment of the impact of vibrations on the structure of the building using the SWD scale, it was concluded that the vibrations of the analysed building are imperceptible to its construction and will not cause accelerated wear and tear of its construction. In the case of analysis and evaluation of the impact of vibrations on humans based on the results of vertical measurements and horizontal ceiling vibrations in accordance with PN-88/B-02171, there was also no exceedance of the threshold of perception of vibrations by humans.

In view of the above, it is assumed by analogy that on the planned railway line covered by this proposal, on which trains of similar speed and type structure of passenger and freight trains will operate, the vibrations caused by rolling stock crossings will not be felt for the structures adjacent to the railway lines of buildings and will not exceed the threshold of perceptibility of vibrations on people in buildings. At the same time, it should also be noted that at the stage of operation of the investment there will be train journeys, about ten times less daily train traffic compared to the section of railway line No. 1 Skierniewice-Łódź, for which dynamic influence measurements were made.

In addition, as part of the modernisation of railway lines, the reduction of the impact of vibrations will be ensured by the use of new rails without damage (e.g. explosions, exfoliations, corrugated wear, creases, cracks, etc.), curing the track substructure and using spring rail fastening.

5.2.5 Impact on the emission of electromagnetic fields

Investment option (W1)

The impact assessment of the fields in this dossier has been carried out taking into account the provisions of Chapter 2.4.2.3.

Impact of systems and equipment on electromagnetic field emissions:

Electricity and srk

The scope of the work envisaged under the project will entail the need to build the infrastructure of srk and power systems in the scope of, inter alia:

- the construction of line traffic control equipment;
- extension of the overhead contact line power supply system (construction of overhead contact line devices with power supply and control of disconnectors);

- self-construction of linear interlock,
- construction of telecommunications cables for fiber optic and copper.

Detailed information on the infrastructure elements for the systems analysed under the srk, power and power supply systems and overhead contact line can be found in Chapters 2.4.2.3 and 2.4.2.8.

Railway vehicles have the greatest demand for electric current among the above-mentioned elements of the modernised infrastructure. In order to supply them in Poland, a 3 kV DC network is used. This is much lower than that defined for determining the types of projects likely to have significant effects on the environment. The rated voltage value lower than 110 kV for power stations or overhead power lines is a value below which projects do not require an environmental impact assessment and do not constitute sources of electromagnetic fields whose levels could significantly endanger the natural environment and human health.

It is also important that the lines of the overhead contact line are powered by direct current. Therefore, they are not sources of electromagnetic radiation within the meaning of the Environmental Protection Act. It can therefore be concluded that, in general, within the limits of the project in question, there are no significant risks to the environment caused by the emission of electromagnetic radiation associated with the operation or operation of electrical equipment and installations, communication and data transmission systems and srk connected with the construction of a railway line.

Teletechnics

As described in detail in Chapter 2.4.2.2, the construction of telecommunications infrastructure components will include, inter alia, the following elements:

- installation of radio communication remote control equipment;
- the extension of the equipment of the travel information system;
- the installation of an intrusion signaling and robbery signalling system for intrusion detection in traffic-related rooms;
- construction of fiber optic and copper cables.

Transmission fiber optic cables do not conduct electric current, only light, and therefore do not constitute an electromagnetic radiation source within the meaning of radiation from 0 Hz to 300 GHz. Transmission in the optical fiber is carried out by means of light waves from the near-infrared range. As far as copper cables are concerned, the voltage used in digital telecommunications is of the order of 60V DC, and therefore negligible small and irrelevant when it comes to the possibility of environmental impact in this human being.

Alternative option (W2)

The option does not plan to build a line of unattractive needs.

In view of the above information, when analysing the impacts in the scope of the analysed options, no negative impact of electromagnetic fields on the environment and human health during the construction and exploitation phases is foreseen.

5.2.6 Impact on revived nature

As the investment option differs only slightly from the alternative, the impact on nature at the exploitation stage for the two options will be identical.

Areas and sites protected under the Nature Conservation Act

Landscape parks

No significant impact.

Protected landscape areas

No significant impact.

Natura 2000 sites

Natural habitats within Natura 2000 sites, which may be affected by a railway line, have been operating in the immediate vicinity of or near an existing line for years. With properly carried out construction works (this applies especially to land drainage works), the rebuilt/built railway line will not have a significant negative impact on natural habitats.

Potential threats to Natura 2000 natural habitats at the exploitation stage may be random events, e.g. fire, railway disaster.

Directive 2009/128/EC of the European Parliament and of the Council requires the use of herbicides for the removal of weeds and harmful plants, as limited as possible, where other methods cannot be used. Currently, the destruction of vegetation on the tracks by chemical methods is regulated by § 57 of the document "Technical conditions for the maintenance and reception of surfaces on railway lines", which is an annex to Ordinance No 14/2005 of the PKP Management Board of 18 May 2005 as amended. The chemicals used must be certified for use on railway tracks. Moreover, under the Law of 8 March 2013 on plant protection products PKP Polskie Linie Kolejowe S.A. is obliged to use only plant protection products for which the Minister of Agriculture and Rural Development has authorised the placing of the plant protection product on the market and use (clear indication that the product may be used on the railway track, indication of the number of treatments per year and the permissible quantity of the product used). Employees of PKP Polskie Linie Kolejowe S.A. and contractors performing herbicide treatments comply with the provisions of the Regulation of the Minister of Agriculture and Rural Development of 31 March 2014 on the conditions of use of plant protection products, as well as the provisions on safety measures contained on the label of the plant protection product. With the use of herbicides in accordance with the conditions of the manufacturer and the above-mentioned Regulation, there will be no risk arising from the use of such measures.

<u>Nature reserves</u>

No significant impact on the objects of protection of the reserves. The operation of the railway line after the reconstruction will not generate significant pressure related to tourism (the pressure on the part of tourists is one of the threats defined in the plan for the protection of this reserve). There are no plans to create new passenger stops in the area of the reserve. Improving rail infrastructure may encourage some people to use rail transport more frequently, however, this cannot be explicitly referred to as a possible increase in the number of tourists in the area of the reserve.

At the same time, it is indicated that on line 201, from about 181.380 km to about 181.530 km in Żukowo commune, a new nature reserve called "Pępowskie Grądy" is planned. It should be assumed, however, that since the line existed in this place for many years, in the vicinity valuable natural areas, its reconstruction will not be of significant importance for the establishment of the aforementioned reserve.

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No significant impact.

Ecological use of Lake Kackie

No significant impact.

Monuments of nature

No significant impact.

Natural habitats and protected plant species

With properly carried out construction works (especially works related to land drainage), the modernised and newly built railway line will not have a significant negative impact on natural habitats. The impact of pollution generated during the exploitation phase would affect habitats directly adjacent to railway lines and newly built linkages. Potential threats to Natura 2000 natural habitats at the exploitation stage may be invasive species or random events, e.g. fire, railway disaster. The greatest risk may also be associated with potential accidents or accidents. The magnitude of pollution of natural habitats (petroleum substances, chemicals, etc.) in an emergency situation can be significant. The probability of such an event is difficult to estimate, but its reality must be taken into account. Potential impacts at the exploitation stage of the project on protected plant species may relate to indirect random effects, e.g. related to surface water pollution. On the basis of the research carried out as part of the study "Analysis of the qualitative composition of rainwater and meltwater from railway areas", it was found that these waters are of good quality in terms of concentration of general suspensions and concentration of petroleum hydrocarbons. Thus, the impact will be virtually negligible.

Mushrooms, including lichens

No negative effects are expected at the exploitation stage on the fungal population, including lichens.

Invertebrates

During the exploitation phase, no negative effects on invertebrate populations are foreseen.

Fish (ichthiophauna)

The potential impact at the exploitation stage of the project could be related to the drainage of rainwater and melting water from railway lines to surface waters. According to the materials submitted by PKP PLK S.A., no pollution in the form of suspensions and petroleum hydrocarbons in quantities that could affect ichthyofauna was found in the quality of rainwater and meltwater discharged from railway lines. When using herbicides using appropriate doses and conditions in accordance with applicable law, this effect should be considered as insignificant. The greatest risk, however, is associated with potential accidents, accidents or rail accidents, which are, however, unpredictable events.

Herpetofauna

The reconstruction of the railway line will not significantly affect the status of the populations of the species of amphibians and reptiles shown. Potential impacts will occur at a similar level in relation to the operation of the non-modernised line. The possibility of migration will be ensured by existing culverts. Maintaining the spacing between the ballast and the foot of the rail will increase the possibility of crossing the railway line, especially through amphibians and reptiles.

Birds

Impact of railway operation on bird population

The movement of rail vehicles can cause bird mortality caused by collisions in places of high concentration of birds. In the case of the investment under analysis, the scale of this impact should not be high. The railway manager has not yet identified collisions with animals on the assessed sections of railway lines. The number of collisions with birds undoubtedly remains in correlation with the frequency of train passages and the speed at which rail vehicles travel. On ornithologically rich sections, with high frequency trains, the probability of collision will be increased. The expected increase in the speed of trains on the renovated railway line may increase the likelihood of collisions with birds, but the scale of this phenomenon will not be significant for maintaining the stability of local populations of protected bird species. The magnitude of collisions between birds and rail vehicles is very low in relation to road transport. This is mainly due to the much lower traffic on the railway lines.

Impact of line operation on bird clusters

The operation of the railway will not have a significant negative impact on the bird species and the places of their aggregation. Only the intensive operation of the railway line in a limited way can affect the disturbance and disturbance of birds. Most bird species, however, tolerate the neighborhood of the railway line well. Birds adapt easily to new conditions, so this factor does not appear to be significant. Many species successfully breed breeding in the immediate vicinity of the railway line or even on engineering facilities. The impact in the form of bird frightening can be considered negligible, due to the low traffic frequency of vehicles, completely different from those on wheeled roads.

Bats (chiropterofauna)

At the operating stage due to the specificity of the railway line's interactions limited to noise emissions and due to the existing lack of identified facilities used by bats as breeding, rearing and wintering sites in the immediate vicinity of the railway line, no negative effects on the identified species of chiropterofauna are foreseen.

The hazards of chiropterofauna related to train movements are relatively poorly studied, and observations to date tend to suggest that bat mortality from train collisions is likely to be very low and not significant in the scale of their population. The upgraded sections of lines 201, 214 and 229, as well as the two interconnectors, will also not constitute a barrier to preying and wandering bats. The method of development of the railway area after the reconstruction will change to a small extent, and currently the line does not pose a threat to bats. On the basis of the observations made and from the available literature, objects that are used by bats as a site of swarm, reproduction or wintering have not been shown. In the absence of identified significant impacts, the minimisation measures necessary for use at the operational stage have not been identified.

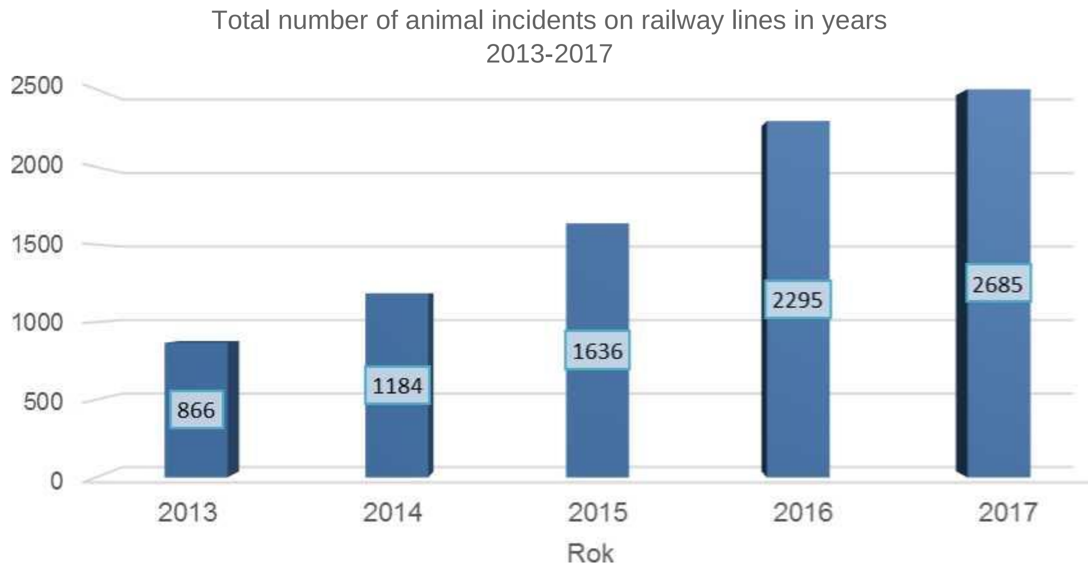
Mammals (excluding bats)

The operation of the analysed sections of the railway lines will not pose significant risks to the mammalian population. The project will not create new ecological barriers, as the use of the analysed sections and the development of their surroundings does not change significantly. Therefore, the conditions of the migration to date will also not change, i.e. the migration of mammals across the line will be undisturbed. In the case of the investment, a new part of the line (two connecting lines) will be created. The existing railway line did not have a major negative impact on the mammalian populations in the area and did not constitute a major barrier for them. The main factors determining the scale of animal mortality on railway lines are train speed and traffic intensity. In the event of an increase in train traffic, an increase in animal mortality due to collisions with trains should be assumed. According to the "Expertise on the impact of railway lines on animals and migration routes for investment projects from the perspective of 2014 – 2020 – part I – mammals" carried out for PKP Polskie Linie Kolejowe S.A., on the basis of conducted tests on railway lines, no collisions of trains with protected and rare animals were recorded. The analysis of the collected data in the study showed that on the tracks, the largest share of accidents occurred in numerous and common species, i.e. large and medium ungulate mammals. Mammal species found within the scope of the investment are common species and numerous throughout the country, among others: fox, boar, deer, deer. The populations of these species due to their large numbers, wide spread throughout the region and country, and the severely limited impact of the project stage are in no way threatened by investment. Between 2014 and 2017, 147 cases of collisions between animals and trains were found on these railway cut-offs (129 on LK 201 and 18 on LK 229) – the dominant species among these cases was deer – a large, common, huntable species.

Characteristics of collisions between animals and trains on railway lines of PKP PLK S.A.

On the railway lines managed by PKP Polskie Linie Kolejowe S.A. averages up to approx. 1700 events involving animals (average from 2013-2017). These events include collisions between animals and trains, or animal migration resulting in the need to stop or extend the running time of trains. The figure below shows the number of all animal-related events on railway lines between 2013 and 2017.

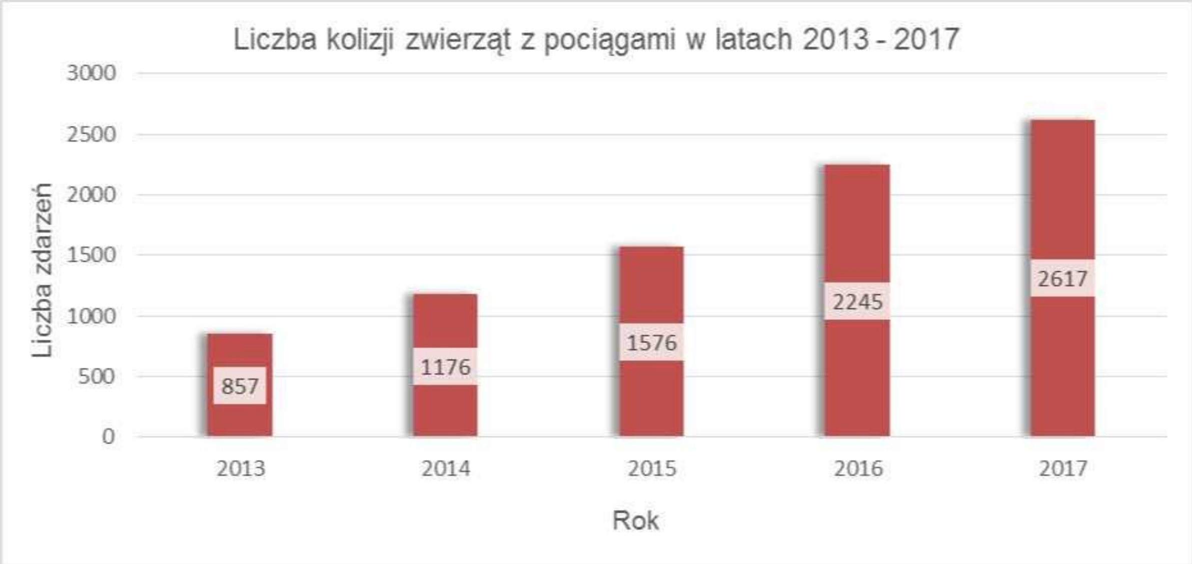
Fig. 20. Total number of animal incidents on railway lines in 2013 – 2017



Source: Develop your own.

Animal collisions with trains are OK. 93 % of all recorded events. The number of collisions between animals and trains is shown in the figure below.

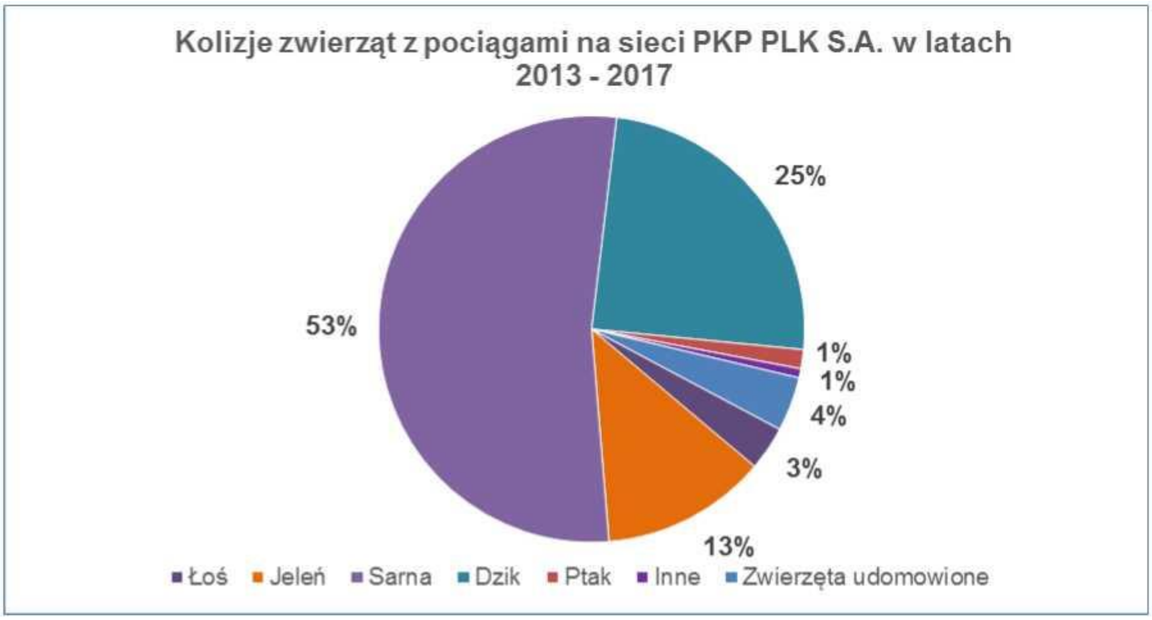
Fig. 21. Number of animal collisions with trains in 2013 – 2017



Source: Develop your own.

Between 2013 and 2017, as many as 53 % of collisions concerned events involving deer, while 25 % concerned wild boar.

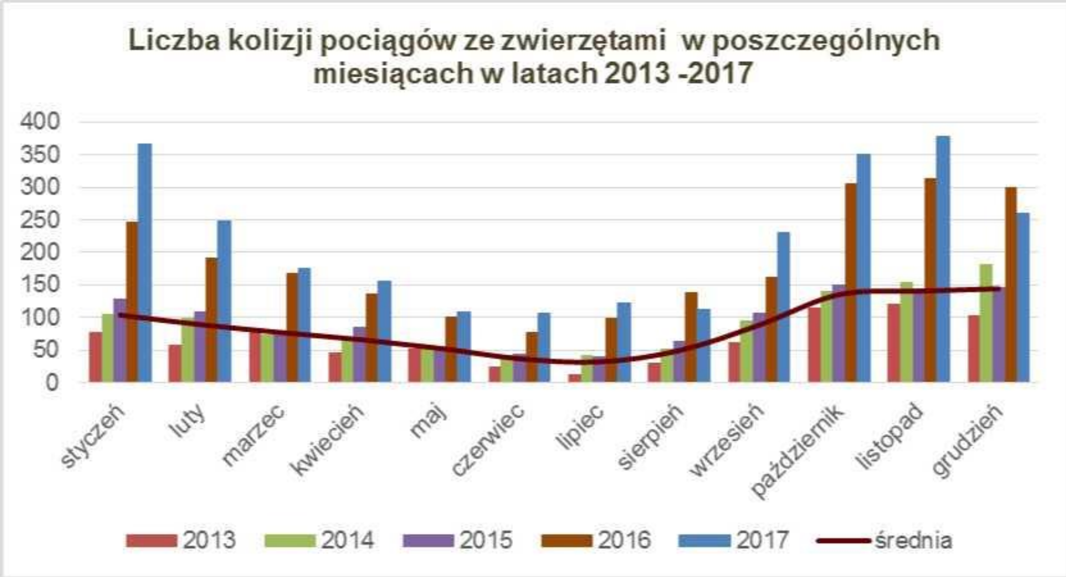
Fig. 22. Share of individual animal species in collisions with trains on PKP PLK S.A. network in 2013-2017



Source: Develop your own.

The most collisions (more than 10 % of the total number of collisions in 2013-2017 in a given month) with animals were recorded in the autumn and winter months, i.e. from October to January.

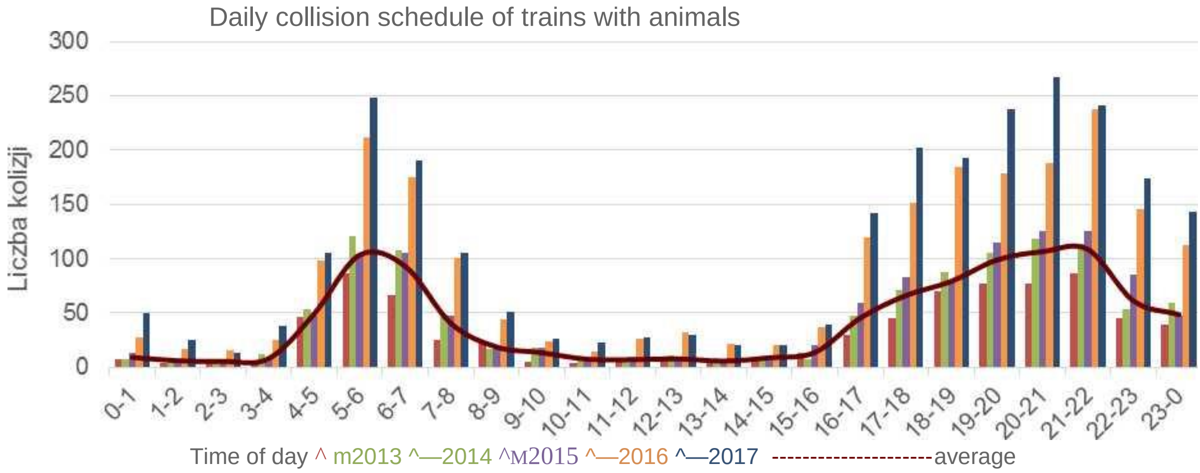
Fig. 23. Number of animal collisions with trains in individual months in 2013-2017.



Source: Develop your own.

Most often, collisions of animals occurred in the morning between 5am and 7 p.m., and in the afternoons and evenings between 17 and 23.

Fig. 24. Daily schedule of animal collisions with trains in 2013 – 2017



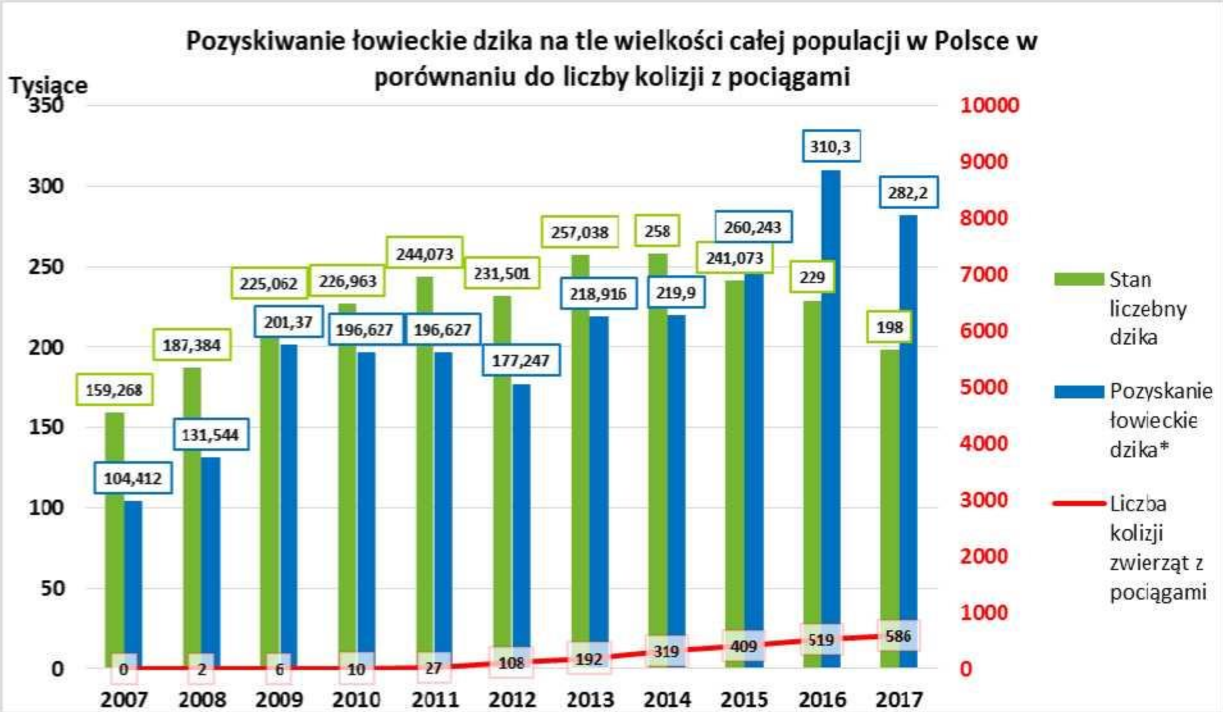
Source: Develop your own.

<u>The scale of the problem of animal collision with trains</u>

On the basis of the data of the Polish Hunting Association, the analysis of changes in the population of the two most frequently colliding species of wild game in Poland, i.e. deer and wild boar. Population data are derived from the monitoring of wild game animals, the aim of which is to obtain current information on the situation of these species in the country and the management of their population, and on this basis formulate conclusions for hunting practice concerning conservation and exploitation of wild game populations in the country. The hunting vessel is also covered by specimens obtained in a given hunting year. Hunting has developed in recent years in the amount of more than 188 thousand individuals in the case of deer and more than 280 thousand in the case of wild boar.

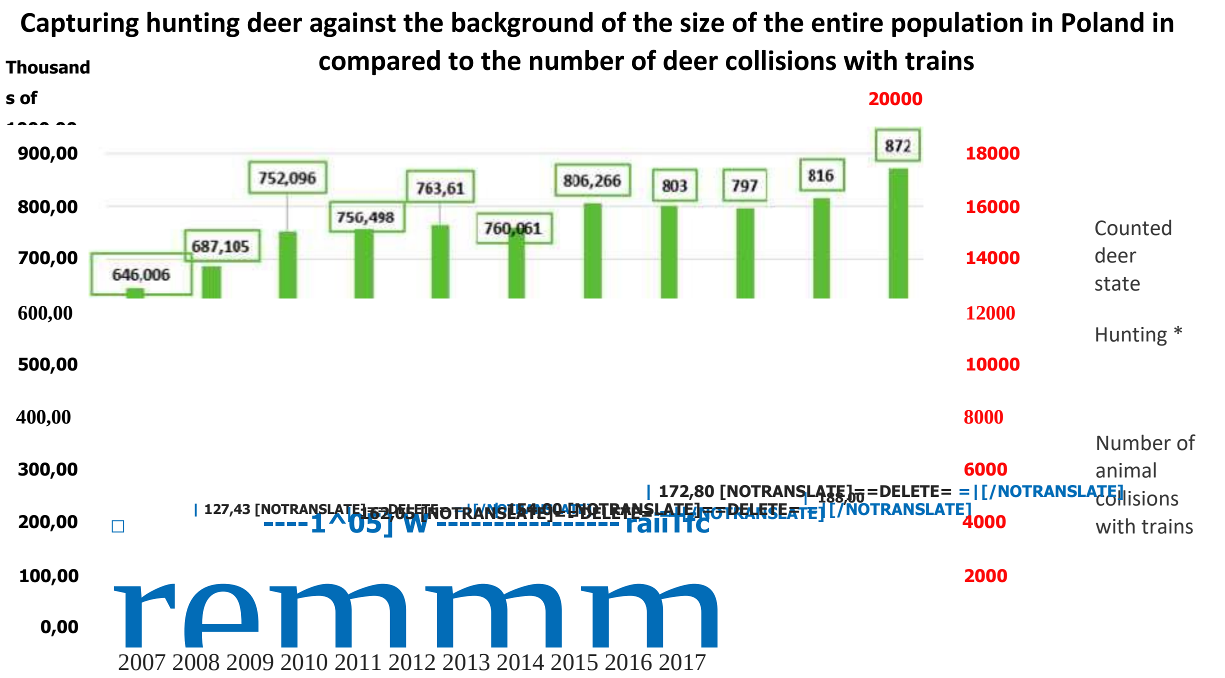
This number is significantly higher than the number of individuals colliding with trains (801 and 417 individuals in 2015, 1197 and 519 individuals in 2016 and 1440 and 586 individuals in 2017). Two species of wild game are compared below: deer and wild boar with the number of collisions of these species with trains. Data were presented for the period 2007-2017.

Fig. 25. Acquisition of deer compared to the number of collisions with trains in terms the Whole Population in



Source: Develop your own.

Fig. 26. Capture of wild boar compared to the number of collisions with trains in terms of size the entire wild boar population in Poland



Source: Develop your own.

On the basis of this data, it can be concluded that the population of each of the species in question shows a significant upward trend. However, the scale of animal collisions with trains on railway lines is insignificant for the population of these animals listed by the Polish Hunting Association.

It can be concluded that railways do not have a significant negative impact on animal populations. The implementation of the investment on railway lines does not require the construction of facilities dedicated exclusively to the functions of animal passages, unless the construction of motorways is planned in the vicinity. In this case, only cumulative effects should be considered.

5.2.7 Impact on landscape

The permanent landscape effect of the modernisation works of railway lines 201, 214, 229 will be:

- the second track on the Kościerzyna – Gdańsk-Osowa section in both variants and the third track on the section Gdańsk Osowa – Gdynia Main in option W1,
- a new trace of the LK 229 railway link with LK 214 and the shorter link between LK 201 and LK 229 (departure) in both variants,
- new embankments for the changed geometry of the arcs of the existing tracks and the second track and additionally the third track in variant W1,
- new engineering facilities in variants W1 and W2 (transfers instead of crossings on line 201 in km 149,425, 156,085, 159,123, 162,875, 177,364, 185,800, 185,900, 186,100, □, and on line 214 in km 8.697, □,
- new layout or rebuilt platforms at stations and stops (including their roofing),
- retaining walls (section from km 159,300 to km 159,600 – strengthening the slope of a deep excavation or construction of a retaining wall – due to the immediate vicinity of the existing buildings, the section from km 173,100 to km 173,250 – strengthening the slope of the deep excavation or the construction of a retaining wall – due to the immediate and close proximity of the embankment of the railway line 229, the section from km 178,150 to km 178,300 – strengthening the trench slope or construction of a retaining wall – due to the immediate proximity of the embankment of the local road in the vicinity of the Żukowo stop,
- overhead electric traction on all analysed sections of lines 201, 214, 229 and new interconnectors.

An entirely new component of the anthropogenic landscape mentioned above will be the area occupied under the junction line 214 – 229. Almost the entire section of the new line runs within a forest complex covered by the borders of the Kartuski Protected Landscape Area. As a result of the delineation of the route of the junction, a forest comma with a width of several meters and a length of about 3 km will be created.

The second link between LK 201 and LK 229 is about 300 m long and is located in close proximity to LK 201, so it will not be a significant change in the context of the landscape.

On the road sections, apart from the extension in selected places of the embankment under the second and third tracks, no significant changes in the course of the railway line are foreseen. The design in both variants provides only a slight correction of the arcs to adapt to higher speeds.

New elements of the railway line visible from longer distances are mainly viaducts and elements of electric traction.

New engineering facilities (viaducts) will be located within the following areas, where the landscape is one of the protected elements (in variants W1 and W2):

- Area of the Protected Landscape of Raduni,
- The Carthusian Protected Landscape Area,
- Nature-landscape team. Dąbrowsko-Ostrzycka gutter,
- Kashubian Landscape Park.

In forest complexes and tree trees, the landscape will be shaped by an expanded comma related to the construction of a second track and joints (both variants) and required protective belt up to 15 m from the track. Within forest complexes, changes will not be significant from the point of view of visual and human reception due to lack of buildings and obscuration of decimal trees.

Below are the differences in the physiognomy of the terrain between the single track line and the two-track line.

Photo: 1 Double track section of line at km 191

Source: Report on the environmental impact of the project for investments entitled "The second stage of revitalisation and modernisation of the Kościerski Corridor together with modernisation of srk equipment and electrification of railway lines No. 201, 214, 229 and PKM line"*, Multiconsult 2017r.*

Fig.2 Single track section of line No. (Small chair)

Source: Report on the environmental impact of the project for investments entitled "The second stage of revitalisation and modernisation of the Kościerski Corridor together with modernisation of srk equipment and electrification of railway lines No. 201, 214, 229 and PKM line"*, Multiconsult*

The above-mentioned elements of railway lines, apart from traction, will be marked in landscape interiors limited to the immediate vicinity of railway lines. From further distances only elements of overhead traction (ticticles, brackets, wires, etc.) will be visible.

As indicated in Chapter 3.1, the railway line is not in principle visible from the characteristic viewpoints. Only from the observation tower on the top of the Tower is a trace of the railway line visible (looking towards the east). The addition of a second track and electrification will not significantly change the perception of this part of the space from the above-mentioned viewpoint.

In the areas of attractive tourist lines: 201, 214, 229 and the junction run through forest complexes or trees (total approx. 33 km) and on significant sections in excavations (line 201), which significantly limits the viewing area. It should be noted here that in selected places the line will be visible from outside the trees during leafless periods (autumn-winter).

The railway lines under analysis intersect areas covered by a form of protection aimed, inter alia, at the protection of the landscape values of the site, i.e.:

- Section of line 201 located within the Tri-City Landscape Park – the total length of the collision is about 4.7 km, including the extension of the line by a third track in variant W1,
- The section of line 201 located within the Kashubian Landscape Park – cthe total length of the collision is about 6.5 km.
- Kartuski OChK – all analysed railway lines together with both links are located within the Kartuski Protected Landscape Area, the total collision length is in W0/investment option (W1) about 24 km and alterant variant (W2) about 26.6 km.
- OChK Dolina Raduni – all analysed railway lines No. 201, 214 and 229 are within the analysed landscape protected area, the total length of the collision is about 13.7 km.
- The natural and landscape complex of Rynna Dąbrowsko-Ostrzycka overlaps 80 % with the Natura 2000 site Uroczyska Pojezierza Kaszubskiego. LK 201 repeatedly crosses the natural and landscape complex Rynna Dąbrowsko-Ostrzycka and constitutes its eastern border between 145,602 and 154.760 km.

The landscape is protected here on the basis of legal acts:

- Resolution No 143/VII/11 of the Pomeranian Regional Assembly of 27 April 2011 on the Tri-City Landscape Park (Official Gazette of Pomeranian Voivodeship No 66 of 2.6.2011),

- Resolution No 147/VII/11 of 27 April 2011 on the Kashubian Landscape Park (Official Gazette of Pomeranian Voivodeship No 66 of 2.6.2011),
- Resolution No 1161/XLVII/10 of the Pomeranian Voivodeship Sejm of 28 April 2010 on protected landscape areas in the Pomeranian Voivodeship (Journal of Laws of 2010, No. It's Urz. Voivodeship. POM. 2010.80.1455).

One of the objectives of the protection of parks is the protection of cultural heritage, including, among others, the road network (therefore and the railway line), the preservation of cultural heritage resources (this undoubtedly includes the historical line 201). Prohibitions are introduced in landscape parks and protected landscape areas, including those relating to landscape protection, but these prohibitions exclude public-purpose investments, which include the planned project.

As mentioned above, the existing railways constitute the cultural heritage of the Kashubian Lake District and are part of the landscape of attractive tourist areas. Modernisation of the line will not adversely affect the physiognomy of landscape protected areas. On the forest sections and sections in the trenches, the railway infrastructure will remain visible only from the closest surroundings. New infrastructure (e.g. overhead traction will be visible only on small sections within agricultural areas, without natural shelters in the form of trees or settlements.

From the point of view of the scope and scale of the planned investment, option W1 is a more space and landscape variant, mainly through the planned construction of the third track on LK 201 Both variants will interfere with space and landscape through the reconstruction and construction of engineering facilities (bridges, viaducts). Locally, new facilities will be dominant in the field. The issue of landscape aesthetics is important in this case, especially in relation to contemporary infrastructure investments. Modern elements of railway infrastructure therefore contribute in a sense to the disappearance of diversity in the landscape.

Summary:

- The main new component of the landscape identifying existing railway lines (201, 214, 229) will be the overhead contact line (both variants).
- Both options will interfere with the landscape. These will be permanent changes due to the presence of new engineering facilities, an expanded two-track line line along the entire length of LK 201. In addition, the implementation of option W1 will significantly interfere with the local landscape compared to the implementation of the W2 variant due to the construction of a third track with a length of approx. 18.2 km.
- A completely new element in the landscape will be a railway link in the Kartuz region with a length of about 3 km. It will be delineated within forest areas, which will create a new comma. This will not affect the landscape exposure fields. The second junction, due to its length and location, will not have a significant impact on the landscape.
- Since the planned project concerns a public-purpose investment, the prohibitions laid down in the legislation establishing the landscape park and the protected landscape area do not apply.

5.2.8 Impact on monuments

During the exploitation phase, no negative impact factors on the protected sites are foreseen.

5.2.9 Waste management

Sources of waste

In the operation phase of railway lines, it is envisaged that the lines will be intended for passenger and freight traffic.

Sources of waste generated during the operation of railway lines:

- maintenance of technical infrastructure including ferrous roads (repair, maintenance, weeding, maintenance of the ballast),
- maintenance of cleanliness (perons and tracks),
- traveller service.

Categories of waste generated in the exploitation phase

The operation of the planned investment foresees the production of inert, hazardous and non-hazardous and inert waste. This waste can be categorised according to the order adopted for the waste classification in the Waste Catalogue Regulation:

- 06 wastes from the production, preparation, marketing and use of products of the chemical industry inorganic,
- 08 wastes from the production, preparation, marketing and use of protective coatings (paint, varnishes, ceramic enamels), putty, adhesives, sealants and printing inks,
- 12 wastes from shaping and physical and mechanical treatment of metal surfaces and plastics
- 13 waste oils and waste of liquid fuels (excl. edible oils and groups 05, 12 and 19),
- 15 packaging waste; sorbents, Wipering Fabrics, Filter Materials and protective clothing not included in other groups,
- 16 wastes not included in other groups,
- 17 wastes from construction, renovation and dismantling of buildings and infrastructure road (including soil and soil from contaminated areas),
- 19 wastes from waste management installations and facilities, from treatment plants waste water and treatment of drinking water and water for industrial purposes,
- 20 municipal waste including fractions collected separately.

The table below contains indicative quantities and types of waste that can be generated within 1 year of operation of the analysed investment in accordance with the classification contained in the Regulation of the Minister of the Environment on the Waste Catalogue.

No waste is foreseen for which there are no customers on the market or the waste management technology is unknown.

Tab.108. The types and quantities of waste that may arise during the exploitation phase.

L.P.	Code	Type of waste	Description of waste	Alternative option – estimated amount of waste [Mg]	Investment option – estimated amount of waste [Mg]	Predicted Ways to Recycle Waste #
1.	08 01 11*	Waste paints and varnishes containing organic solvents or other hazardous substances	Waste arising from the maintenance and maintenance of railway infrastructure.	Up to 0.016 Mg	Up to 0.016 Mg	R1, R12, R13, D10, D5
2.	08 01 12	Waste paints and varnishes other than those mentioned in 08 01 11*	Waste arising from the maintenance and maintenance of railway infrastructure.	Up to 0.16 Mg	Up to 0.16 Mg	R1, R12, R13, D10, D5
3.	12 01 13	Welding waste	Waste resulting from maintenance works of railway infrastructure.	Up to 0.08 Mg	Up to 0.08 Mg	R4, R13, D10, D5
4.	12 01 17	Sanding waste other than those mentioned in 12 01 16*	Waste resulting from maintenance works of railway infrastructure.	Up to 0.08 Mg	Up to 0.08 Mg	R4, R3, R13, D10, D5
5.	13 02 04*	Mineral motor, gear and lubricating oils containing halogenated organic compounds	Waste resulting from maintenance works of railway infrastructure.	Up to 0.08 Mg	Up to 0.08 Mg	R9, R12, R11, R13, D10, D15
6.	13 02 08*	Other motor, gear and lubricating oils	Oil worked from functioning equipment, locomotives, etc.	Up to 0.08 Mg	Up to 0.08 Mg	R9, R12, R11, R13, D10, D15
7.	13 03 01*	Oils and liquids used as insulators and heat carriers containing PCBs	Waste resulting from maintenance works of railway infrastructure.	Up to 0.08 Mg	Up to 0.08 Mg	R9, R12, R11, R13, D10, D15
8.	15 01 10*	Packaging containing or contaminated with residues of dangerous substances (e.g. plant protection products Class I and II – very toxic and toxic)	Packaging waste after hazardous materials used, e.g. pesticides, oils, lubricants.	Up to 0.08 Mg	Up to 0.08 Mg	R3,R5,R4,R11 R13,R12,R1
9.	15 02 02*	Sorbents, filter materials (including oil filters not included in other groups), wiping fabrics (e.g. rags, cloths) and protective clothing contaminated with substances	Workwear, cleaners and rags contaminated with dangerous substances.	Up to 0.08 Mg	Up to 0.08 Mg	D10, R1, R11, R12, R13

L.P.	Code	Type of waste	Description of waste	Alternative option – estimated amount of waste [Mg]	Investment option – estimated amount of waste [Mg]	Predicted Ways to Recycle Waste #
		dangerous (e.g. PCB)				
10.	15 02 03	Sorbents, filtering materials, wiping fabrics (e.g. rags, cloths) and protective clothing other than 15 02 02*	Workwear, cleaners and rags contaminated with dangerous substances.	Up to 0.08 Mg	Up to 0.08 Mg	D10, R1, R11, R12, R13
11.	16 02 11*	Used equipment containing freons		Up to 0.16 Mg	Up to 0.16 Mg	R12, R11, R13, D9, D15
12.	16 02 13*	Used equipment containing hazardous elements other than those mentioned in 16 02 09* to 16 02 12*	Lighting devices, bulbs, etc.	Up to 0.16 Mg	Up to 0.16 Mg	R12, R11, R3, R5, R4, R12, R13
13.	16 02 14	Used equipment other than those mentioned in 16 02 09 to 16 02 13		Up to 0.16 Mg	Up to 0.16 Mg	R12, R11, R3, R5, R4, R12, R13
14.	16 02 15*	Hazardous components or components removed from waste equipment		Up to 0.16 Mg	Up to 0.16 Mg	R12, R11, R3, R5, R4, R13
15.	16 02 16	Items removed from worn devices other than those mentioned in 16 02 15*	Used control elements.	Up to 1.6 Mg	Up to 1.6 Mg	R12, R11, R3, R5, R4, R13
16.	16 03 03*	Inorganic waste containing hazardous substances	Expired products for line maintenance (paints, pesticides, etc.).	Up to 0.08 Mg	Up to 0.08 Mg	R12, R11, R3, R5, R4, R13, D10, D15
17.	16 03 04	Inorganic waste other than those mentioned in 16 03 03, 16 03 80		Up to 0.08 Mg	Up to 0.08 Mg	R12, R11, R3, R5, R4, R13, D10, D15
18.	16 06 01*	Lead batteries and accumulators	Traction batteries and accumulators.	Up to 0.08 Mg	Up to 0.08 Mg	R12, R11, R3, R4
19.	16 06 02*	Nickel-cadmium batteries and accumulators	Batteries and accumulators used in handheld devices.	Up to 0.08 Mg	Up to 0.08 Mg	R12, R11, R3, R4
20.	16 06 04	Alkaline batteries (excl. 16 06 03)		Up to 1.6 Mg	Up to 1.6 Mg	R12, R11, R3, R4
21.	16 06 05	Other batteries and accumulators		Up to 1.6 Mg	Up to 1.6 Mg	R12, R11, R3, R4

L.P.	Code	Type of waste	Description of waste	Alternative option – estimated amount of waste [Mg]	Investment option – estimated amount of waste [Mg]	Predicted Ways to Recycle Waste #
22.	17 01 01	Concrete waste and concrete debris from demolition and repairs	Demolition of engineering and cubature facilities.	Up to 80.0 Mg (for larger planned works)	Up to 80.0 Mg (for larger planned works)	R5, R13, D5
23.	17 02 01	Wood	Waste resulting from the felling of vegetation along the tracks.	Up to 4.8 Mg	Up to 4.8 Mg	R1, R3, R12, R11, R13
24.	17 02 04*	Wood, glass and plastic waste containing or contaminated with hazardous substances (e.g. wooden railway sleepers)		Up to 2 Mg	Up to 2 Mg	D10, D17
25.	17 04 01	Copper, bronze, brass	Items exchanged.	Up to 3.2 Mg	Up to 3.2 Mg	R4, R13
26.	17 04 02	Aluminium	Items exchanged.	Up to 3.2 Mg	Up to 3.2 Mg	R4, R13
27.	17 04 05	Iron and steel	Items exchanged.	Up to 160.0 Mg (for larger planned works)	Up to 160.0 Mg (for larger planned works)	R4, R13
28.	17 04 07	Mixtures of metals		Up to 0.16 Mg	Up to 0.16 Mg	R4, R13
29.	17 04 11	Cables other than those mentioned in 17 04 10		Up to 0.16 Mg	Up to 0.16 Mg	R4, R3, R12, R13
30.	17 05 04	Soil and earth, including stones, other than those mentioned in		Up to 1.6 Mg	Up to 1.6 Mg	R5, R12, R13, D5, D10, D8, D9, D15
31.	17 05 08	Track crushing (aggregate) other than those mentioned in 17 05 07		Up to 80.0 Mg	Up to 80.0 Mg	R12, R13
32.	20 01 01	Paper and paperboard	Municipal waste from passenger handling.	Up to 1.6 Mg	Up to 1.6 Mg	R3, R13, R12, R11
33.	20 03 01	Non-segregated (mixed) municipal waste	Mixed municipal waste from passenger handling.	Up to 4.8 Mg	Up to 4.8 Mg	R12, R11, R3, R4, R5, D5

Source: Develop your own.

Investor PKP PLK S.A. has internal instructions developed on the basis of legal provisions regulating both the exploitation stage and the implementation of waste management. In accordance with these procedures, dismantled materials and equipment are to be assessed by the commissions as to the suitability of the material for re-incorporation for its original purpose. Qualified as useful material, they are used on sections of railway lines with lower parameters during renovation works. This reduces the amount of waste generated at the source. For the exploitation stage, the investor has appropriate administrative decisions, in which the methods of handling waste are specified. In the case of implementation of waste management requirements, including the possession of administrative decisions, are included in contracts with contractors. In view of the above, no negative impact on the environment resulting from waste management is foreseen, both at the stage of implementation and operation.

6 CLIMATE ISSUES

6.1. Compliance with Strategy Papers

The table below lists the main strategy papers on climate issues and examines the compatibility of the project with these documents (this analysis applies to all options considered):

Tab.109. Compliance of the project with strategic documents.

L.P.	Strategy paper	Compatibility of the project
1	Europe 2020 strategy Objective 3. Climate change and sustainable use of energy	The project fulfils the objectives of the specified documents by: • contribute to the reduction of greenhouse gas emissions, as a result of electrification of lines and increased flow of trains, which will result in a reduction in fuel consumption and, consequently, a reduction in the charge of greenhouse gases emitted and improved attractiveness travelling by train as alternative for travel e.g. vehicles by automobiles, • increase in energy efficiency (replacement of electrical appliances and heating).
2	Message Commission to Parliament European, Council, European Economic and Social Committee and Committee of the Regions – Climate and Energy Policy Framework 2020-2030	
3	Poland's climate policy – Strategies for reducing greenhouse gas emissions in Poland until 2020	
4	A Strategic Adaptation Plan for sectors and areas sensitive to climate change by 2020, with a 2030 perspective, Direction of action 3.1 – elaboration of standards structural taking into account climate change, Direction 3.2 – management of communication routes under climate change	The project is in line with the SPA: • climate change is taken into account in the design process, the investor owns and uses the tools to management trails railways, events caused by climatic factors are monitored. The project will contribute to improving air quality – minimising the impact of the railway in terms of emissions to the air, reducing CO2 emissions from the transport sector and increasing energy efficiency.

Source: Develop your own.

On the basis of the analysis carried out, it is concluded that the project will contribute to the achievement of the climate policy objectives.

6.2. Impact of investment on climate and climate change

According to the results of the work on climate change obtained in the project KLIMADA, there is a steady increase in average temperature worldwide. Greenhouse gas emissions (carbon dioxide, methane, freon, nitrous oxide) caused by human activities (industry and transport) are a factor that is considered relevant in this change. In the document, n. "National Inventory Report 2015. Greenhouse gas inventory for 1988-2013. The report made for the purposes of the United Nations Framework Convention on Climate Change (IOŚ – PIB, KOBISE, Warsaw, October 2015) – hereinafter the Women's National Report 2015" – indicated that in Poland the role of CO2 emissions is predominant in total greenhouse gas emissions, with a share of nearly 82 %. Therefore, climate analysis was carried out focusing on this substance. Two main areas of possible climate impacts of railway lines have been identified:

1. direct and indirect greenhouse gas emissions,
2. reduce the area of areas that provide carbon sequestration.

2.1.1. Implementation/decommissioning phase

At the stage of implementation/decommissioning, the occurrence of short-term nuisances associated with greenhouse gas emissions such as CO2 should be expected. It will be related to the combustion of fuels in the engines of vehicles and machines used at the construction stage, mainly heavy construction equipment (dozers, loaders, truck transport, etc.). Emissions of these pollutants will be concentrated in the ongoing work on the railway line.

Vehicles and construction machinery will have up-to-date technical inspections, and the equipment will meet the requirements of the Regulation of the Minister of Economy of 30 April 2014 on detailed requirements for internal combustion engines in the field of limiting the emission of gaseous and particulate pollutants by these engines (Journal of Laws of 2014, No. U. of 2014 item 588).

Indirect greenhouse gas emissions, mainly CO2, will at this stage be related to electricity consumption and will be generated at the siteof its production, i.e. at the power plant.

Due to the implementation of the project, the areas providing carbon sequestration will be depleted to a very limited extent. For information on the felling of trees and shrubs, see Chapter 2.4.5 of this study.

It should be noted that the above measures will not have a significant impact on overall greenhouse gas emissions.

In view of the temporary and transient impacts (determined at the end of the works), the relatively short duration of the construction, the impact on climate both locally and over-local, should be considered negligible.

2.1.2. Operating stage

Data from the European Environment Agency published in 2013 (EEA, 2013) show that rail transport is more energy efficient than road transport. The amount of greenhouse gases converted per tonne-kilometre (g/tkm) and passenger-kilometre (g/pkm), for rail transport is 2.5 – 3.5 times smaller compared to road transport.

The information provided above indicates that rail is a climate-friendly mode of transport and more energy efficient than road transport.

It should be stressed that, from a climate perspective, as a global phenomenon, the impact that these railways will have on this component will not be significant. Below are the emission sources at the operating stage of the line.

<u>Line operationCO2 emission sources – direct emissions</u>

In the case of the railway lines concerned, direct and local CO2 emissionswill only be generated by internal combustion engines such as passenger trains, manoeuvring locomotives and, possibly, engines of other machinery (snow plows, dresines), which will be used occasionally.

 to carry out repairs and maintenance works (snow clearance, transport of materials). In this case, greenhouse gas emissions will be negligible in relation to their national emission balance.

CO2 emission sources related to the transport operation of the line – indirect emissions

CO2 emissions related to electricity consumption

These sections of railway lines 214, 229 and 201 are almost entirely non-electrified. These lines are driven by diesel locomotives which are the source of CO2 emissions. As a result of the project, the electrification of the lines under consideration will result in a significant reduction in the number of combustion vehicles travelling on the analysed sections of the line. The use of electric current for the operation of this line will mainly result in indirect emissions, of a point nature, arising away from areas adjacent to it, i.e. in the workplace of a power plant producing electricity for its needs. The railway line's electricity consumption is closely related and depends on the following factors:

- from the number of speeding operations carried out, which is mainly related to the number of sections with speed limits, e.g. on degraded infrastructure, and the number of stops on the route,
- from the generation of electricity losses in distribution resulting from poor condition and consumption of the existing overhead contact line and transmission cables.

As a result of the project, the technical condition of the line (total electrification) will be improved and modernised and emissions from engines currently running on the line of combustion locomotives will be significantly reduced. In this respect, the project will have a positive impact on the climate.

CO2 emissions related to the remodelling of the transport system

With the implementation of works on railway lines No 201, 214, 229, as a result of which the quality of transport will improve, the flow of traffic will increase, as well as the transfer of part of the existing freight transport from road to rail. In the context of climate impacts, such a change in the transport system reduces greenhouse gas emissions.

From a climate perspective, as a global phenomenon, the impact that these railways will have on this component will not be significant.

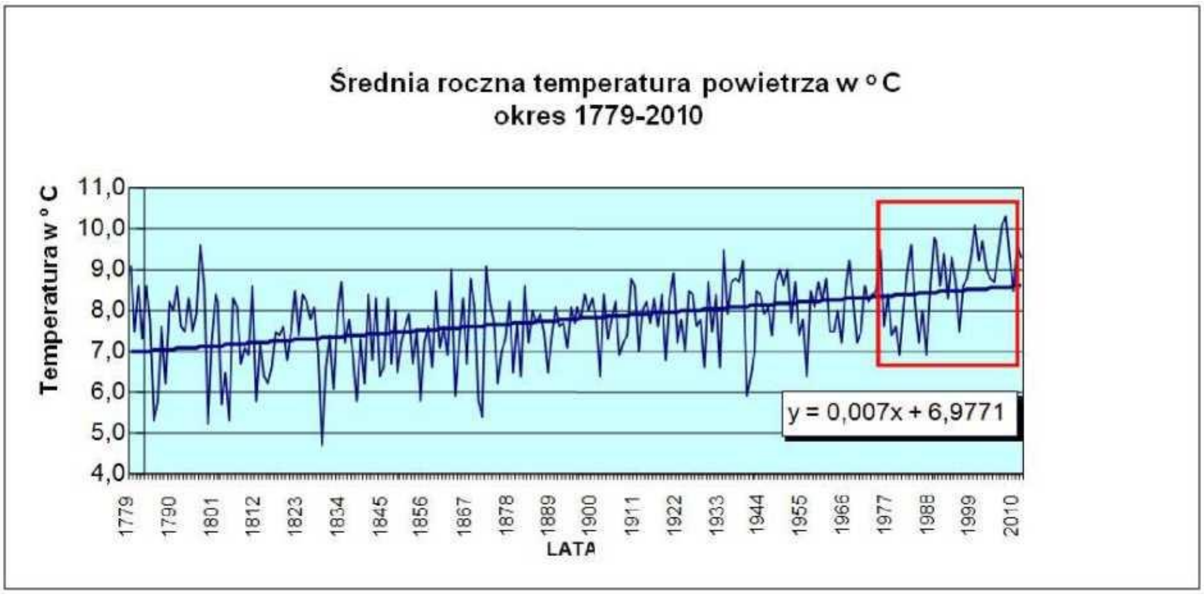
6.3. Ongoing and projected climate change

Projected climate change in Poland

On the basis of observation of meteorological conditions over many years, it is possible to determine the oscillation of individual elements that determine the weather in Poland (i.e. temperature, precipitation, etc.), their trends in shorter or longer periods.

The figure below showing the average temperature of 17792010 shows that the average temperature rises markedly throughout the country and it can be concluded that this trend will continue in the current century.

Fig. 27 Mileage of average air temperature values in Poland in the years (1779-2010)



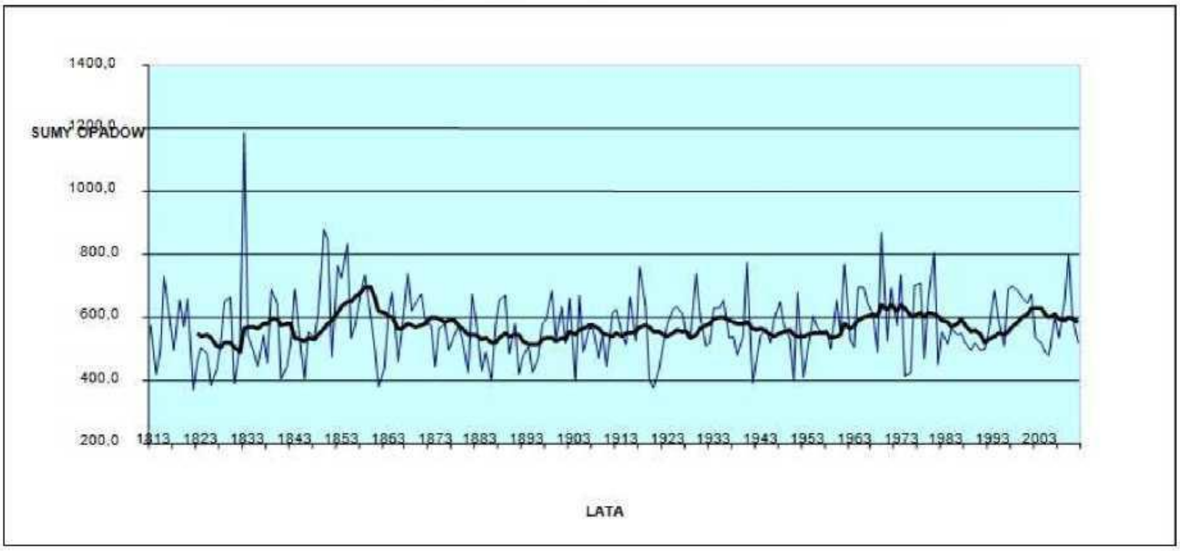
Source: IMGW.

From a detailed analysis of the above data, in addition to the increase in average temperature, it can be noted that:

- over the years, there is a high variation in air temperature from year to year;
- the temperature trend is steadily increasing – 0.5 °C over 30 years.

On the other hand, precipitation does not show any clear trends in quantitative changes. On the other hand, the structure of precipitation changes in the direction of extending the duration of rainless periods (with high temperatures in summer) interrupted by heavy rainfalls, accompanied by storms and strong winds. Due to the decrease in the number of days with negative temperature, the period of snow cover will also be shortened.

Fig. 28 Variability of perennial rainfall



Source: IMGW.

In most areas of Poland there was a change in the structure of precipitation, consisting of a sharp increase in the number of days with high daily rainfall, while the amount of precipitation with an average intensity, lasting several days, decreased. Heavy rainfall, i.e. above 2 mm/min, occurs most often in the summer period (April – 335

September). The average amount of precipitation is about 500-600 mm, but these amounts largely depend on the terrain (500 mm in the central part of the country, approx. 800 mm on the coast and over 1 000 mm in the mountains).

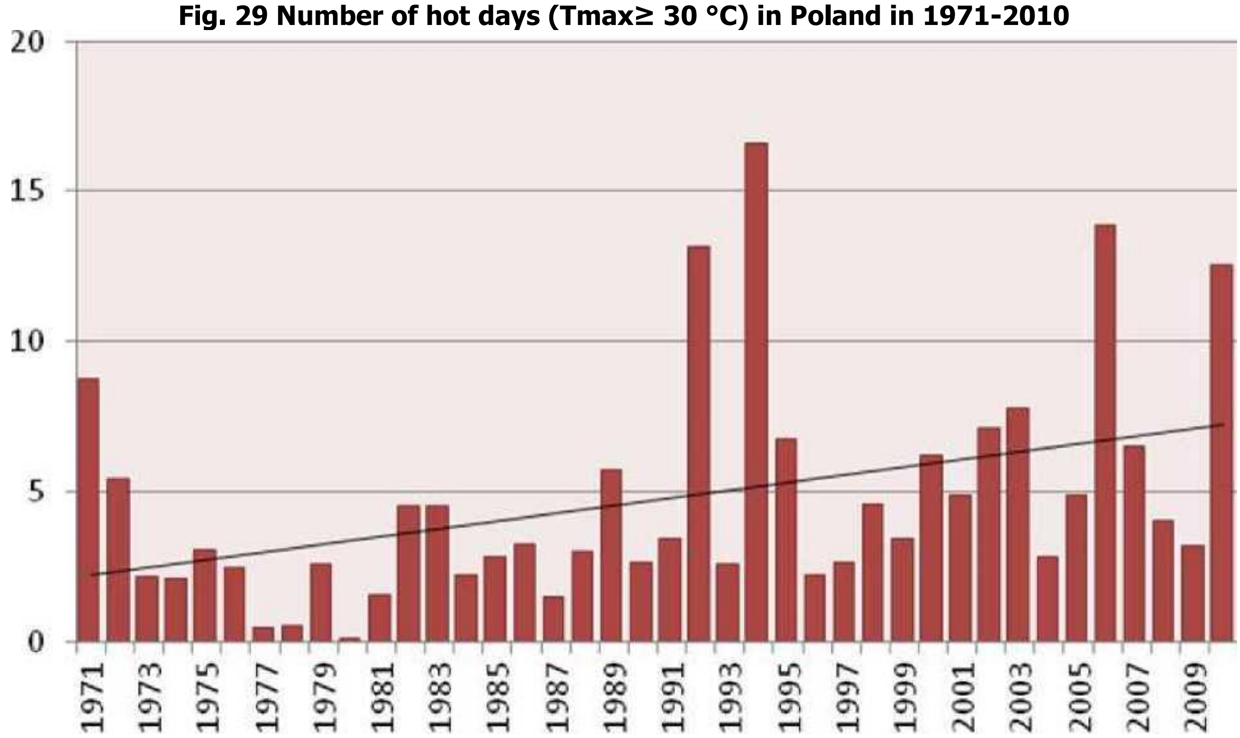
Due to changes in the structure of precipitation (longer rain-free periods, increased precipitation intensity at the time of its occurrence), the possibility of flooding was also analysed.

The greatest damage and danger are associated with extreme phenomena appearing more and more often, which noticeably change the characteristics of the climate in Poland. These phenomena include, first and foremost:

- heavy rain and snow, including hail;
- storms, strong winds;
- storms and atmospheric discharges;
- cold days;
- the heat waves.

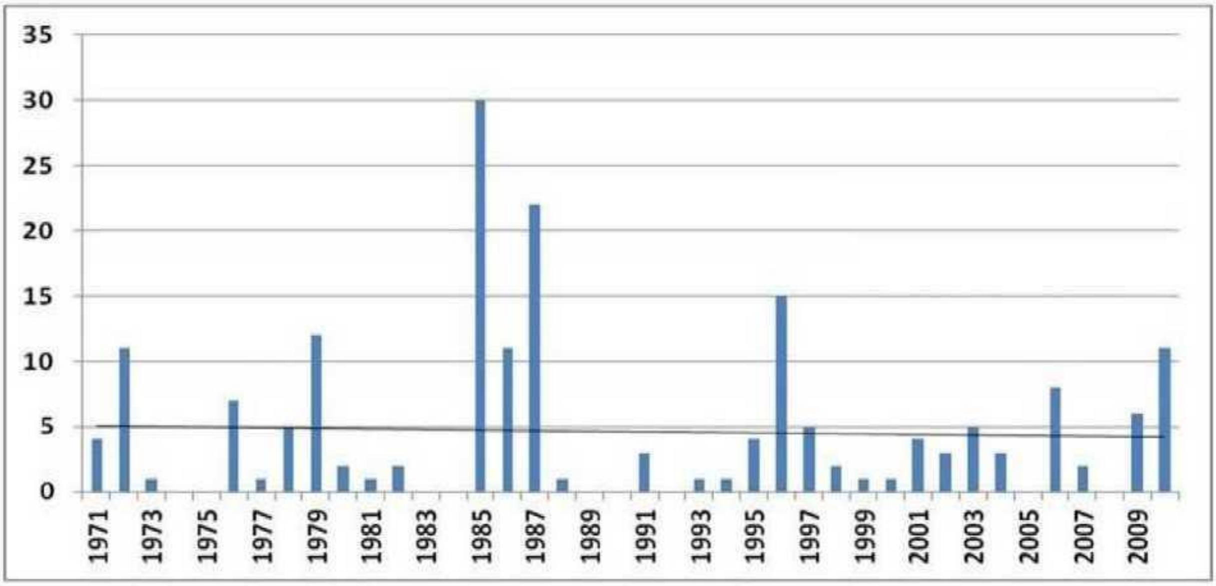
Several-day periods with a maximum daily air temperature ≥ 30 °C lasting for at least 3 days are most common in the south-western part of Poland, and the least common in the coastal region and in the mountains. Observing the number of hot days in Poland in the period 1971-2010, it can be concluded that the average number of hot days increased by approx. 5. At the same time, there is a downward trend in the number of cold days, which covers most of Poland, with the exception of mountain areas.

Fig. 29 Number of hot days (Tmax≥ 30 °C) in Poland in 1971-2010



Source: http://klimada.mos.gov.pl

Fig. 30 Multiannual variability of days with T_{max} ≤ -10 °C at Suwałki station in the period 1971-2010



Source: http://klimada.mos.gov.pl

In conclusion, an analysis of projected climate change shows that over the next decades:

- there will be warming, expressed by an increase in the average daily temperature and a reduction in the number of cold days,
- the period of snow cover on the ground will decrease,
- rainfall will increase, expressed both by an increase in maximum daily precipitation and the number of days with extreme precipitation, while reducing the number of days in which precipitation occurs,
- climate parameters will be characterised by high variability in relation to extreme values.

6.4. Previous events related to atmospheric phenomena in the area of the planned project

The methodology presented in the following chapter, together with the analysis, covering all the analysed variants, was made to identify the atmospheric factors that cause events on railway lines.

Methodology for determining weather-related events

PKP Polskie Linie Kolejowe S.A. reviewed and analysed the impact of weather conditions on the operations of the infrastructure manager in 2013-2017 on the basis of the company's records. The above analysis also concerned the railway lines concerned.

Atmospheric phenomena may cause railway events, i.e. undesirable situations occurring in the rail transport system or its surroundings, disrupting the transport process, in particular causing a risk to railway safety, which, according to the "Instructions on the handling of serious accidents, accidents, incidents on railway lines – Ir 8", are divided into the following categories:

I. The event is a serious accident, accident or incident on railway lines:

1. **Serious accident** – accident caused by a collision, derailment or other similar event:
   a) with at least one fatal victim or at least five severely injured victims, or
   b) causing significant damage to a railway vehicle, railway infrastructure or the environment, which can be immediately estimated by the accident investigation committee at least EUR 2 million,

   having an obvious impact on railway safety regulations or safety management.
2. **Accident** – an unintended sudden event or sequence of such events involving a railway vehicle with negative consequences for human health, property or the environment. Accidents include in

particular:

a) collisions;

b) derailment;

c) events on crossings;

d) incidents involving persons caused by a unit in motion;

e) fire of the railway vehicle.

3. **Incident** – any event other than an accident or serious accident, related to the operation of trains and affecting its safety.

II. Potentially dangerous situation – i.e. an operational situation or a railway event that is not a major accident, accident or incident causing a slight increase in risk – to a controlled level not exceeding the level of acceptable risk.

III. Other railway event

For the purposes of this study, events related to atmospheric factors were analysed on the analysed railway lines No. 201, 214, 229.

Table 110. Number of weather-related events in 2013 2017 on railway line No. 201 between Kościerzyna and Gdynia Główna in km 136,096 – 205,200.

L.P.	trail/Station	km from	km to	date	cause of the event
1	Kościerzyna – Gołubie Kashubian	147,800	147,800	2013-12-06	Wind (including trees, branches and leaves)
2	Zhukovo Eastern	178,400	179,705	2013-12-06	Low temperatures, snowfall
3	Gdynia Wielki Kack – Gdynia Main Personal	198,000	198,000	2013-12-06	Wind (including trees, branches and leaves)
4	Gdańsk Osowa – Gdynia Wielki Kack	194,300	194,300	2013-12-07	Low temperatures, snowfall
5	Kościerzyna – Gołubie Kashubian	137,332	148,344	2014-06-09	Storms (atmospheric discharges)
6	Somonino – Zhukowo Eastern	167,541	167,541	2014-07-08	Storms (atmospheric discharges)
7	Gdynia Wielki Kack – Gdynia Main Personal	198,000	198,000	2014-12-24	Wind (including trees, branches and leaves)
8	Gdynia Wielki Kack – Gdynia Main Personal	197,150	197,150	2015-01-02	Wind (including trees, branches and leaves)
9	Żukowo Eastern – Gdańsk Osowa	182,700	182,700	2015-01-10	Wind (including trees, branches and leaves)
10	Gołubie Kashubian – Somonino	155,500	155,500	2015-01-10	Wind (including trees, branches and leaves)
11	Gdańsk Osowa – Gdynia Wielki Kack	187,979	195,266	2015-01-11	Wind (including trees, branches and leaves)
12	Gdynia Wielki Kack – Gdynia Main Personal	193,928	205,668	2015-01-11	Wind (including trees, branches and leaves)
13	Gdańsk Osowa	187,979	189,640	2015-11-08	Wind (including trees, branches and leaves)

L.P.	trail/Station	km from	km to	date	cause of the event
14	Gdynia Wielki Kack – Gdynia Main Personal	197,200	197,200	2015-11-08	Wind (including trees, branches and leaves)
15	Somonino – Zhukowo Eastern	170,380	170,380	2015-11-12	Wind (including trees, branches and leaves)
16	Gdańsk Osowa	187,979	189,64	2016-01-10	Low temperatures, snowfall
17	Kościerzyna – Gołubie Kashubian	137,097	149,701	2016-05-31	Storms (atmospheric discharges)
18	Somonino – Zhukowo Eastern	161,73	179,705	2016-05-31	Storms (atmospheric discharges)
19	Gołubie Kashubian – Somonino	148,344	163,363	2016-05-31	Storms (atmospheric discharges)
20	Gołubie Kashubian – Somonino	152,7	152,7	2016-06-14	Wind (including trees, branches and leaves)
21	Żukowo Eastern – Gdańsk Osowa	182,1	182,1	2016-06-17	Wind (including trees, branches and leaves)
22	Somonino – Zhukowo Eastern	161,73	179,705	2016-06-25	Storms (atmospheric discharges)
23	Gołubie Kashubian – Somonino	148,344	163,363	2016-06-25	Storms (atmospheric discharges)
24	Kościerzyna – Gołubie Kashubian	137,097	149,701	2016-06-25	Storms (atmospheric discharges)
25	Gołubie Kashubian – Somonino	151,6	153,9	2016-07-14	Wind (including trees, branches and leaves)
26	Gdynia Wielki Kack – Gdynia Main Personal	193,928	205,668	2016-07-14	Wind (including trees, branches and leaves)
27	Gdynia Wielki Kack – Gdynia Main Personal	193,928	205,668	2016-07-14	Wind (including trees, branches and leaves)
28	Gdynia the Great Kack	193,928	195,266	2016-07-14	Rainfall (including flooding, landslides)
29	Gdynia Wielki Kack – Gdynia Main Personal	193,928	205,668	2016-07-14	Rainfall (including flooding, landslides)
30	Gdynia Wielki Kack – Gdynia Main Personal	196,4	196,4	2016-07-15	Wind (including trees, branches and leaves)
31	Gołubie Kashubian – Somonino	157,5	158	2016-07-15	Wind (including trees, branches and leaves)
32	Zhukovo Eastern	178,4	179,705	2016-07-15	Rainfall (including flooding, landslides)
33	Somonino – Zhukowo Eastern	167,541	167,541	2017-07-28	Storms (atmospheric discharges)
34	Somonino – Zhukowo Eastern	162,817	242,9	2017-07-29	Storms (atmospheric discharges)
35	Somonino – Zhukowo Eastern	167,541	167,541	2017-08-12	Storms (atmospheric discharges)
36	Somonino – Zhukowo Eastern	162,8	178,824	2017-08-27	Storms (atmospheric discharges)
37	Żukowo Eastern – Gdańsk Osowa	178,824	188,53	2017-08-27	Storms (atmospheric discharges)

Source: Information provided by PKP PLK.

Tab.111. Events in 2013-2017 caused by atmospheric phenomena that occurred on railway line 229 on the section Glincz-Kartuzy from km 31,000 – 42,100.

L.P.	trail/Station	km from	km to	date	cause of the event
1	Pruszcz Gdański – Kartuzy	36,034	36,034	2017-08-12	Storms (atmospheric discharges)
2	Pruszcz Gdański – Kartuzy	36,244	36,244	2017-08-12	Storms (atmospheric discharges)

L.P.	trail/Station	km from	km to	date	cause of the event

3	Pruszcz Gdański – Kartuzy	31,193	41,365	2017-08-27	Storms (atmospheric discharges)

Source: Information provided by PKP PLK.

For railway line No. 214 on the Somonino – Kartuzy section in km -0.229 – 8,150, events caused by atmospheric phenomena were not recorded in 2013-2017.

6.5. Methodology for determining the climate impact on rail infrastructure

The following methodologies made available by PKP PLK for the purposes of this study were used to assess the impact of current and future climate change on rail infrastructure and to consider the need for possible adaptation measures:

1. Methodology for assessing the vulnerability of railway infrastructure to particular groups of phenomena (including the methodology for assessing sensitivity and exposure).
2. Methodology for estimating the risk of occurrence of atmospheric phenomena.
3. Methodology to address current and future climate change in vulnerability assessment and risk estimation.
4. Methodology for the overall assessment of the impact of climate factors on rail infrastructure.

6.6. Methodology for assessing the vulnerability of railway infrastructure to atmospheric factors

The assessment of the vulnerabilities of railway infrastructure to particular atmospheric factors for all analysed variants was carried out on the basis of a specific sensitivity and exposure.

Methodology for assessing the sensitivity of railway infrastructure to atmospheric factors

The methodology used allows to determine the sensitivity of infrastructure to climatic factors, as well as to identify infrastructure elements sensitive to specific atmospheric factors. The methodology set out in the document 'Developing transport sector vulnerability indicators to climate change' has been used to carry out this assessment. Selection of key elements of the transport system (infrastructure, means of transport, traffic conditions) particularly sensitive to climatic phenomena and impact assessment", which has been detailed and expanded to include experiences and information held by PKP Polskie Linie Kolejowe S.A.

In order to determine the sensitivity of railway infrastructure to particular climatic factors, the dependency was used:

$$\frac{z_{and}}{(with_{and} + d_{and})}$$

where:

S – the sensitivity of infrastructure to a given climate element,

Z_i – parameter characterising the adverse impact of the climate element (degree of nuisance = 2 and 3 w/on scale),

D_i – parameter characterising the remaining impact of the climate element (degree of nuisance = 1 w/on scale).

The above function varies from 0 to 1, where S=0 means no unfavourable features, and S = 1 state that prevents functioning.

In order to assess the sensitivity of railway infrastructure to current and future climate change, for the 4 ranges of values to be adopted, 4 categories were assigned to determine the impact of climate elements on rail infrastructure:

Tab.112. Assessment of sensitivities.

L.P.	Value of indicator S	Impacts
1	0 ≤ S≤ 0.55	neutral
2	0.55 & S ≤ 0.70	impediments to functioning
3	0.70 & S ≤ 0.85	great nuisance
4	0.85 & S ≤ 1.0	prevented from functioning

Source: Materials provided by PKP PLK S.A.

In order to determine the sensitivity indicator S, it is necessary to specify the most significant disturbances in rail transport (railway infrastructure) and then assign them a degree of nuisance.

The following table shows the climatic factors, together with the most significant disturbances recorded in the SEPE system. Then the defined disorders were assigned a degree of nuisance.

When determining the impact of a given atmospheric agent, its degree of nuisance was assessed according to the following scale:

- non-burdensome conditions – 1,
- unfavourable conditions – burdensome – 2,
- unfavourable conditions – preventing functioning – 3.

When assigning the nuisance scale to the types of disturbance caused by a given atmospheric factor, account was taken of the number of events, the time of obstructions/delays caused by particular disturbances and the experience of the railway infrastructure manager.

Tab.113. Determination of the degree of nuisance of disturbances resulting from the occurrence

a given atmospheric factor.

L.P.	Atmospheric agent	Type of disturbance/effect caused by the atmospheric agent	Degree of nuisance
I	Low temperatures, snowfall	1. icing of the overhead contact line,	2
		2. heavy snowfall – snowfalls on the track,	1
		3. blizzard and blowing snow,	1
		4. Tumbled/tilted tree on track/traction net caused by strong winds, large snow or rainfall (root flushing),	2 (wit hand)
		5. blowing up plates on crossings through the ice, above the level of the rails (frozen floor)	2 (wit
		6. faults in the track and/or turnouts caused by snow or ice (low temperature),	3 (wit
		7. malfunction of srk equipment caused by salinity of the substrate,	2 (wit
		8. frosting of contact wires of the overhead contact line	1
II	High temperatures	1. high temperatures threatening track deformation	2
		2. high temperatures causing faults in overhead contact line and srk	2

L.P.	Atmospheric agent	Type of disturbance/effect caused by the atmospheric agent	Degree of nuisance
		3. fires of slopes, sleepers, dry grass,	1
III	Strong winds	1. Tumbled/tilted tree on track/traction net caused by strong winds, large snowfall or rain (root flushing)	2 (wit hand)
		2. faults of overhead contact line caused by falling branches from trees	2 (wit
		3. Lists on tracks	1
IV	Storms (atmospheric discharges)	1. Tumbled/tilted tree on track/traction net caused by strong winds, large snowfall or rain (root flushing)	2 (wit hand)
		2. strong atmospheric discharges causing in particular damage to srk equipment,	2 (wit
		3. strong atmospheric discharges causing in particular damage to the overhead contact line, power depletion, etc.,	1 (Dand
V	Rainfall (including flooding, landslides)	1. Tumbled/tilted tree on track/traction net caused by strong winds, large snowfall or rain (root flushing),	2 (wit hand)
		2. flooding/melting of the track through melting snow or heavy rainfall, including the application of silt and sand or stones to the track and flooding of the passage,	3 (wit hand)
		3. flooding/floating station or other objects by continuous and heavy rainfall,	2 (wit
		4. landslides/stones from the slope/embankment and washings caused by continuous and strong rainfall,	3 (wit
		5. high water levels in rivers caused by continuous and strong rainfall – endangered engineering facilities,	2 (wit
		6. Sliding of overhead contact line poles, caused by continuous and strong rainfall,	2 (wit
		7. subsidence of the track caused by continuous and strong rainfall,	2 (wit
		8. faults of overhead contact line caused by falling branches from trees,	1 (Dand
VI	Mist	1. limitation of visibility,	2
		2. speed limit,	1

Source: Materials provided by PKP PLK S.A.

Methodology for determining the exposure of railway infrastructure to atmospheric factors

The identification of areas of exposure to climate-related risks consists of identifying or excluding geographical areas exposed to climate change and increasing climate variability based on knowledge of the environmental conditions of the project under consideration. The risk assessment will be presented in tabular form.

The following scale was used to determine the degree of exposure (exposure – E) resulting from the climatic factor:

- no risk – 0,
- low risk – 1,
- medium threat – 2,
- high risk – 3.

The overall risk assessment from the geographical location of the investment will be an arithmetic average of all identified and assessed risks for the atmospheric agent.

Tab. 114. Assessment of the exposure rate.

L.P.	Exposure indicator value – E	Degree of exposure
1	0 & E≤ 1	low exposure (none)
2	1 & E ≤ 2	average exposure
3	2 & E ≤ 3	high exposure

Source: Materials provided by PKP PLK S.A.

The values of sensitivities and exposures that have been harmonised have been used to determine vulnerabilities. Therefore, a value of 1 to 4 is assigned to each of the sensitivities/exposure levels as shown in the following tables.

Tab.115 Assessment of the sensitivities.

L.P.	Value of indicator S	Impacts	Overall sensitivity assessment
1	0 ≤ S≤ 0.55	neutral	1
2	0.55 & S ≤ 0.70	impediments to functioning	2
3	0.70 & S ≤ 0.85	great nuisance	3
4	0.85 &S ≤ 1.0	prevented from functioning	4

Source: PKP Polskie Linie Kolejowe S.A., own analysis

Tab.116 Overall assessment of the exposure ratio.

L.P.	Exposure indicator value – E	Degree of exposure	Overall assessment of exposures
1	0 & E ≤ 1.5	no risk	1
2	1.5 & E ≤ 2	low exposure	2
3	2 & E ≤ 2.5	average exposure	3
4	2.5 & E ≤ 3	high exposure	4

Source: PKP Polskie Linie Kolejowe S.A., own analysis

Indicator V values (vulnerability) are assigned categories indicating the degree of impact of climate elements on rail infrastructure (low vulnerabilities – absence, average vulnerabilities, high vulnerabilities) according to the following table:

Tab.117 Values of the indicator of the vulnerability of railway infrastructure to climate change.

L.P.	Value of indicator V	Degree of vulnerability
1	1 & V≤ 6	low susceptibility (none)
2	6 & V ≤ 11	average vulnerabilities
3	11 & V ≤ 16	high susceptibility

Source: PKP Polskie Linie Kolejowe S.A., own analysis

6.6.1. Methodology for assessing the risk of hazard arising from emerging atmospheric factors

Another element of the analysis of the influence of atmospheric factors on railway infrastructure was the assessment of the risk of occurrence of a given phenomenon. For this purpose, the methodology set out in the SMS/MMS-PR-02 Procedure – Technical and Operational Risk Assessment (version 1.1.) of 21 May 2015 laying down the principles of risk analysis and evaluation within the framework of the Safety Management System – SMS or Maintenance Management System – MMS in PKP Polskie Linie Kolejowe was used. In the above-mentioned procedure, the FMEA (FMEA) method was used for risk assessment. Failure Mode and Effect Analysis – analysis of the causes and effects of defects), according to which the number of risk "R" taking the integer is determined for each threat. The number of risk 'R' is defined as the product of three factors:

R= P X IN XZ

where:

P – probability of occurrence of an event (resulting from a given threat). The number "P" takes an integer value from 1 to 10.

W – the probability of detecting a hazard with the risk control measures applied so far. The number "W" takes an integer value from 1 to 10.

Z – the number determining the value of the effects per event, and in the event of more than one event occurring in the assessed period, the mean value for the effects of the hazard. The number "Z" takes an integer value from 1 to 10.

a) probability of occurrence of hazard – "P"

The probability of occurrence of "P" hazard was determined on the basis of quantitative criteria consisting of dividing the volume of transport work performed (in pot. km) in the analysed period by the number of hazards of the same type revealed in the same period of time.

$$\mathbf{P} = \frac{}{\mathbf{L}}$$

where:

P – indicator of probability of occurrence of an event,

C – the volume of operational work expressed in train-kilometres.

L – the number of events caused by atmospheric factors.

In the years 2013 – 2017, a total of 40 events related to atmospheric factors were recorded on the analysed railway lines.

b) probability of detection – "W"

The determination of the likelihood of detection of a hazard is a relative assessment in the specific risk assessment carried out by the expert carrying out the assessment. The assessment is related to the best risk control measure currently in place to detect the cause of the hazard, as set out in the table below.

Tab.118 Probability of detection – "W".

L.P.	Probability of detection – "W"	Scoring
1	The probability of detecting a threat is very high. The disclosure of the cause of the error is certain.	1 2
2	The probability of detecting a threat is high. The control measures put in place make it possible to reveal the cause of the error. Symptoms of the cause of danger are noticeable.	3 4
3	Average probability of detection. The control measures used may make it possible to reveal the cause of the error. Symptoms indicating the possibility of a threat can be identified and identified.	5 6
4	Low probability of detection. It is very likely that the control measures put in place will not allow disclosure of the cause of the threat. Determining the cause of the threat is very difficult.	7 8
5	Negligible probability of detecting a threat. It is virtually impossible to determine the cause of the threat.	9 10

Source: PKP Polskie Linie Kolejowe S.A., own analysis

c) impact (consequences) of the occurrence of the threat – "Z"

The effects of an event shall be determined by assessing the impact of the threat on the level of safety and/or by the average financial loss per event resulting from the same type of hazards that occurred during the analysed period. In determining the above value, account must be taken of the costs incurred – including the costs of removing the effects of railway events. Information on the number of events, time of obstructions/delays (effects of the occurrence of the hazard) was used to determine the impact assessment of the occurrence of a risk, which was then referred to the values shown in the table below.

Tab.119 Effect (consequences) of the occurrence of the threat – "Z".

L.P.	Impact (consequences) of the occurrence of the threat – "Z"	Scoring
1	The effects of the threat are not relevant to the level of safety. No cost.	1
2	The effects of the threat may be minor and lead only to a slight decrease in the level of safety (e.g. traffic disruption) and/or costs: '2' up to EUR 10000* and '3' to EUR 50000*.	2 3
3	The effects of the threat can be quite significant and lead to a reduction in the level of safety (e.g. railway accident, seriously injured, etc.) and/or costs: '4' up to EUR 100000*, 5' to EUR 250000 and '6' to EUR 500000*.	4 5 6
4	The consequences of the threat can be severe and lead to a significant reduction in the level of safety (e.g. railway accident, seriously injured, etc.) and/or costs: '7' to EUR 750000* and '8' to EUR 1000000*.	7 8
5	The consequences of the threat can be very serious and lead to a drastic reduction in the level of safety (e.g. a major railway accident, fatalities, etc.) and/or costs: '9' to 2000000	9

L.P.	Impact (consequences) of the occurrence of the threat – "Z"	Scoring
	euro* and "10" above EUR 2000000*.	10

** – according to the average rate published by the National Bank of Poland in force on the day of the risk assessment (course of the previous day), published on the website www.nbp.pl. Source: PKP Polskie Linie Kolejowe S.A., own analysis.*

d) risk classification

The three levels of risk acceptability shown in the table below are defined.

Tab.120 Risk matrix – level of risk acceptability.

Risk class	Risk indicator R	Level of risk	Risk assessment
Small	R ≤ 125	Low likelihood of risk	1
Average	125 & R ≤ 180	Consideration should be given to identifying and implementing additional risk control measures	2
Large	> 180	A critical threat directly threatening the safety of rail transport requiring corrective action	3

Source: PKP Polskie Linie Kolejowe S.A., own analysis

6.6.2. Methodology for addressing climate change scenarios in the impact assessment

The next step of assessment is that they may cause an increase or factors. consideration of projected climate change, which reduces the intensity of individual occurrences

The SRES A1B scenario was used to determine the projected changes. The table below shows the main projected changes that could have an impact on rail infrastructure elements. It was assumed that an indicator (ZK) with a value of = 1 was assigned to each of the climatic factors. Depending on the climate change projected, this indicator will increase or decrease by 0.1 for each projected climate change.

Tab.121 Summary assessment of climate change.

L.P.	Climate factor	Projected climate change	Assessment of climate change	Summary assessment of climate change
I	Low temperatures	Shortening periods with low temperature	—0.1	**0,9**
		Decrease in the number of days with snow cover/snowfall	— 0.1	
		Extreme phenomena – heavy snowfall	0,1	
II	High temperatures	Increase in periods with high temperature	0,1	**1,2**

L.P.	Climate factor	Projected climate change	Assessment of climate change	Summary assessment of climate change
		Extreme phenomena – hot days	0,1	
III	Strong winds	Extreme phenomena – hurricanes	0,1	**1,1**
IV	Atmospheric discharges	Extreme phenomena	0,1	1,1
V	Rainfall (including flooding, landslides)	Prolongation of rain-free periods	—0.1	1,1
		Increase in maximum precipitation	0,1	
		Extreme phenomena	0,1	
VI	Mist	–	–	**1,0**

Source: PKP Polskie Linie Kolejowe S.A., own analysis.

6.6.3. Methodology for carrying out an overall assessment of the impact of climate factors on rail infrastructure

The overall impact assessment shall be determined on the basis of a vulnerability and threat risk analysis taking into account the climate change indicator.

The following dependencies were used to determine the overall assessment of individual climatic factors for infrastructure elements:

$$K = V \times R \times ZK$$

where:

K – an overall assessment of the impact of a given climate factor,

V – an overall assessment of the vulnerability to a given climatic factor,

R – an overall assessment of the risk of a climate factor,

ZK – an indicator of projected changes in a given climate factor, as a result of climate change.

The values of vulnerabilities and risk indicators that have been harmonised have been used to determine the overall assessment. Therefore, each of the vulnerabilities and risk grades has been assigned a value of 1 to 3, as shown in the tables below.

Tab.122 Overall Vulnerability Assessment (V).

L.P.	Value of indicator V	Degree of vulnerability	Overall Vulnerability Assessment (V)
1	1 & V≤ 6	low susceptibility (none)	1
2	6 & V ≤ 11	average vulnerabilities	2
3	11 & V ≤ 16	high susceptibility	3

Source: PKP Polskie Linie Kolejowe S.A., own analysis.

Tab.123 Overall risk assessment.

L.P.	Risk class	Risk indicator R	Level of risk	Overall Risk Assessment (R)
1	Acceptable	R ≤ 125	Low probability of risk.	1
2	Tolerated	125 & R ≤ 180	Consideration should be given to the appropriateness of identifying and implementing additional risk control measures.	2
3	Unacceptable	> 180	A critical threat directly threatening the safety of rail transport requiring corrective action.	3

Source: PKP Polskie Linie Kolejowe S.A., own analysis.

The indicators of climate change projected are assigned values:

Table 124 The value of the climate change indicator.

L.P.	Climate factor	Value of the indicator of climate change projected (ZK)
1	Low temperatures	0,9
2	High temperatures	1,2
3	Strong winds	1,1
4	Storms (atmospheric discharges)	1,1
5	Rainfall (including flooding, landslides)	1,1
6	Mist	1,0

Source: PKP Polskie Linie Kolejowe S.A., own analysis.

It was assumed that measures of an organisational, technical, preventive or rescue nature may be proposed if the product of the assessment of vulnerability, threat risk and climate change will be at least 3.8.

Table 125 The need to propose actions.

L.P.	Value of impact indicator K	Degree of impact	The need to propose actions
1	K≤ 3.8	no impact	no need for solutions
2	3.8 & K≤ 6.8	low impact	need to consider the need for organizational solutions
3	6.8 & K ≤ 9.8	average impact	need to consider the need for organisational and/or technical solutions
4	9.8 & K ≤ 10.8	high impact	the need for solutions

Source: PKP Polskie Linie Kolejowe S.A., own analysis.

6.7. Assessment of the impact of climate factors on rail infrastructure

Assessment of rail infrastructure vulnerabilities to atmospheric factors

Assessment of rail infrastructure's sensitivity to climate factors

On the basis of the specific nuisance of the most significant disturbances caused by individual climate elements, the sensitivity of the railway infrastructure has been calculated in accordance with the formula below:

$$Z_{and}$$

$$(with_{and} + d_{and})$$

where:

S – the sensitivity of infrastructure to a given climate element,

ZI – parameter characterising unfavourable (degree of nuisance 2 – 3 scale),

di – parameter characterising the remaining impact of the climate element (degree of nuisance 1).

The results of the sensitivity calculations are presented in the table below.

Table 126 Results of sensitivity calculations with assessment.

L.P.	Climate element	Results of calculations
1	Low temperatures	0,63
2	High temperatures	0,67
3	Strong winds	0,67
4	Storms (atmospheric discharges)	0,67
5	Rainfall (including flooding, landslides)	0,87
6	Mist	0,50

Source: PKP Polskie Linie Kolejowe S.A., own analysis.

According to the above results, it should be noted that low and high temperatures, strong winds and atmospheric discharges cause difficulties in the functioning of the railway infrastructure, while rainfall prevents the proper functioning of the railway infrastructure.

Mist-related phenomena have been classified as neutral conditions for railway infrastructure.

Assessment of rail infrastructure's exposure to atmospheric factors

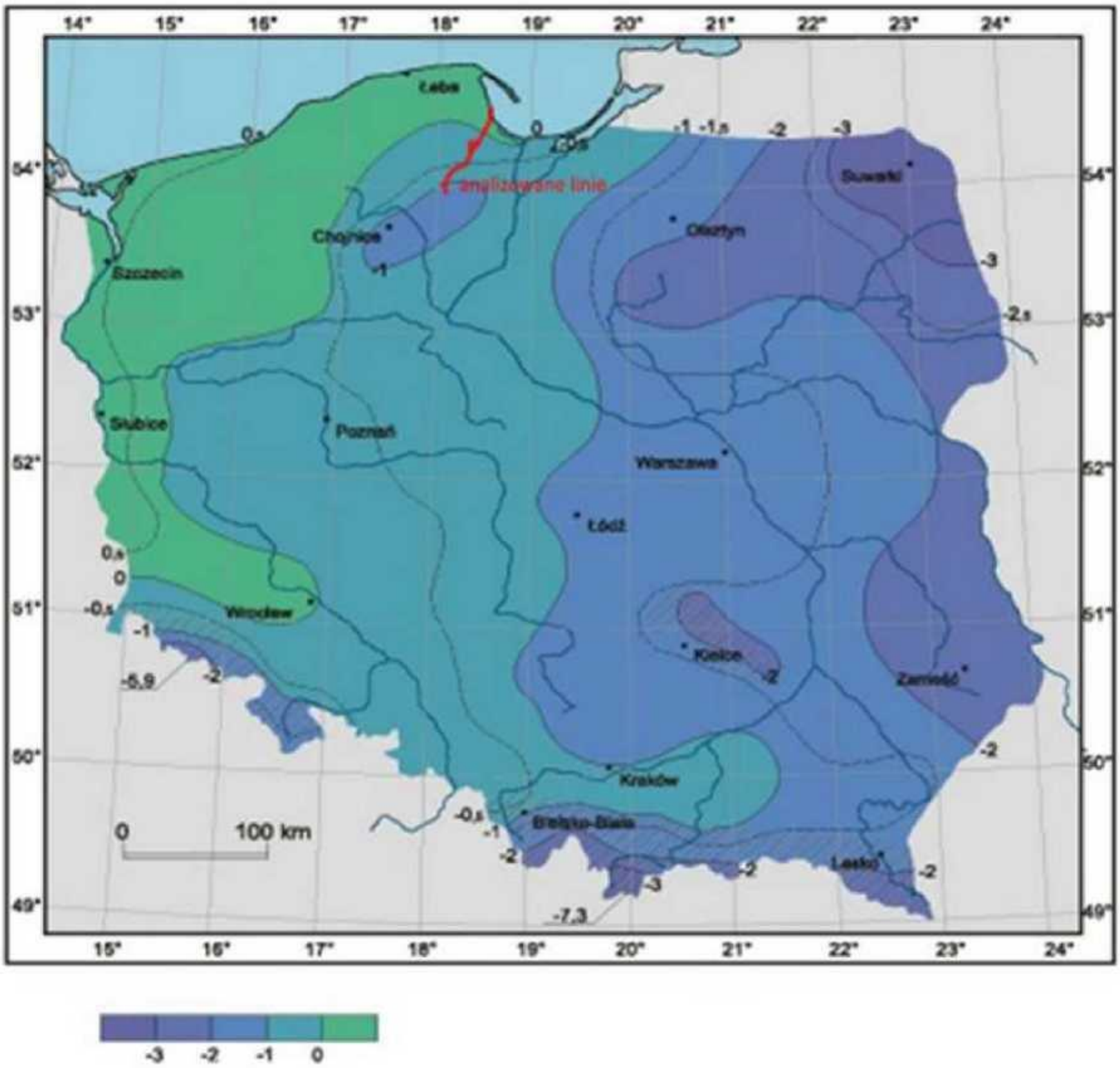
In accordance with the methodology presented below, the results of the analysis of the project's exposure to geographical location hazards are presented below.

a) low temperatures

Regions where average annual temperatures are low and where the number of days with snow cover is high were analysed to determine the risks of low temperatures.

On the basis of the data from the KLIMADA project, it was determined whether the project is located in an area of low temperatures in winter. On the basis of the map below, it should be concluded that the project in question (a vast majority) is located in an area where the average annual temperature during the winter period is between 0 °C and 1 °C from 1 °C and smaller parts in the area with temperatures ranging from,1 °C to 0 °C and in an area with temperatures ranging from -1 °C to -2 °C. In view of the above, the risk resulting from the location of the project in question should be determined as low – assessment 1 according to the methodology.

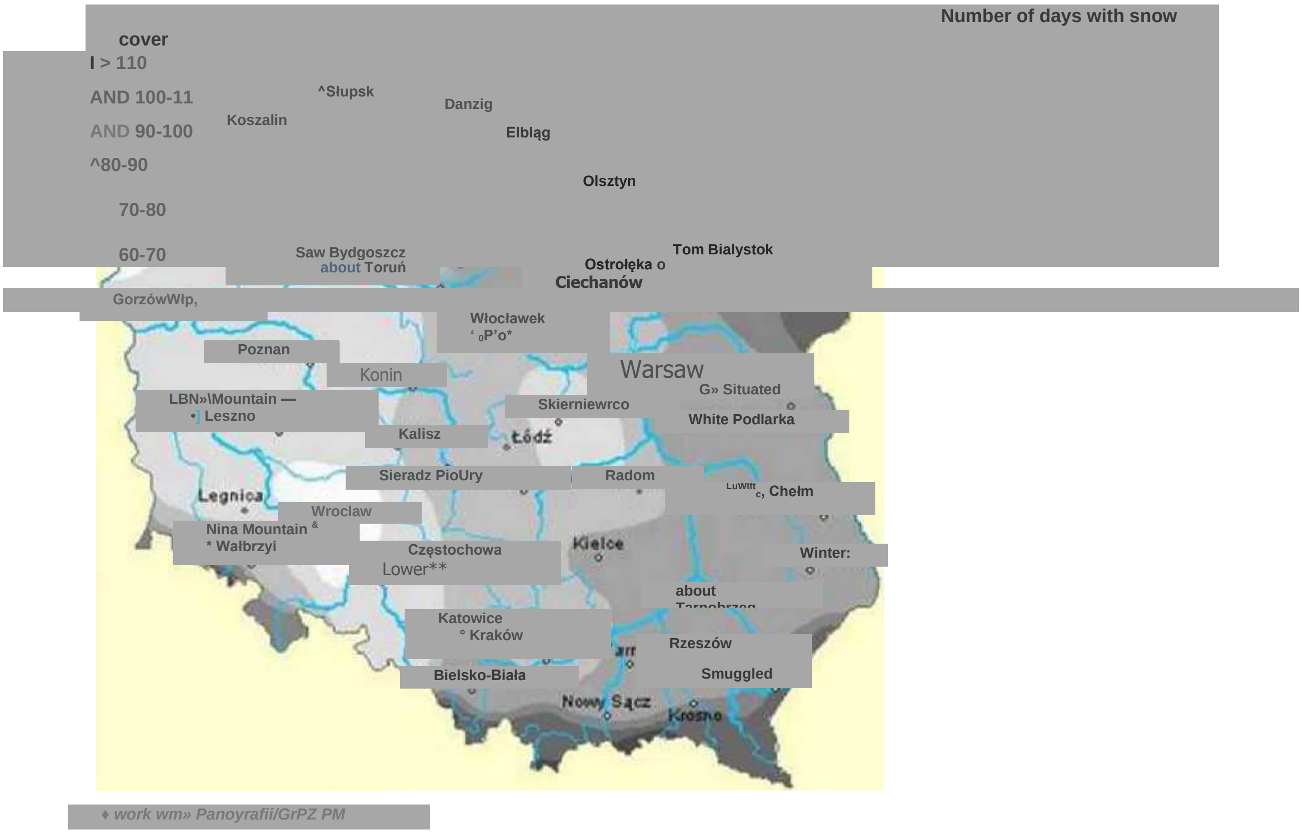
Fig. 31 Average air temperature in [°C] during the winter in Poland (1971-2000)



Source: IMGW.

The risk assessment resulting from the occurrence of snow cover was carried out on the basis of the study of Bn. Natural disasters and the internal security of the country. According to the map below, the investment in question is located in regions characterised by an average number of days with snow cover from 70 to 80 and 60 to 70 – rating 1 according to the methodology.

Fig. 32 Average number of days a year with snow cover



Source: IGiPZ PAN Cartography Laboratory.

A summary of the exposure assessment for low temperatures is given in the table below.

Table 127 Exposure assessment for low temperatures.

L.P.	**Climate factor**	**Areas particularly exposed to climate factors**	**Exposure Assessment (E)**
1.	Low temperatures	regions where average temperatures are low – winter	1
		regions where the number of days with snow cover is high	1
Average			**1**

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

b) high temperatures

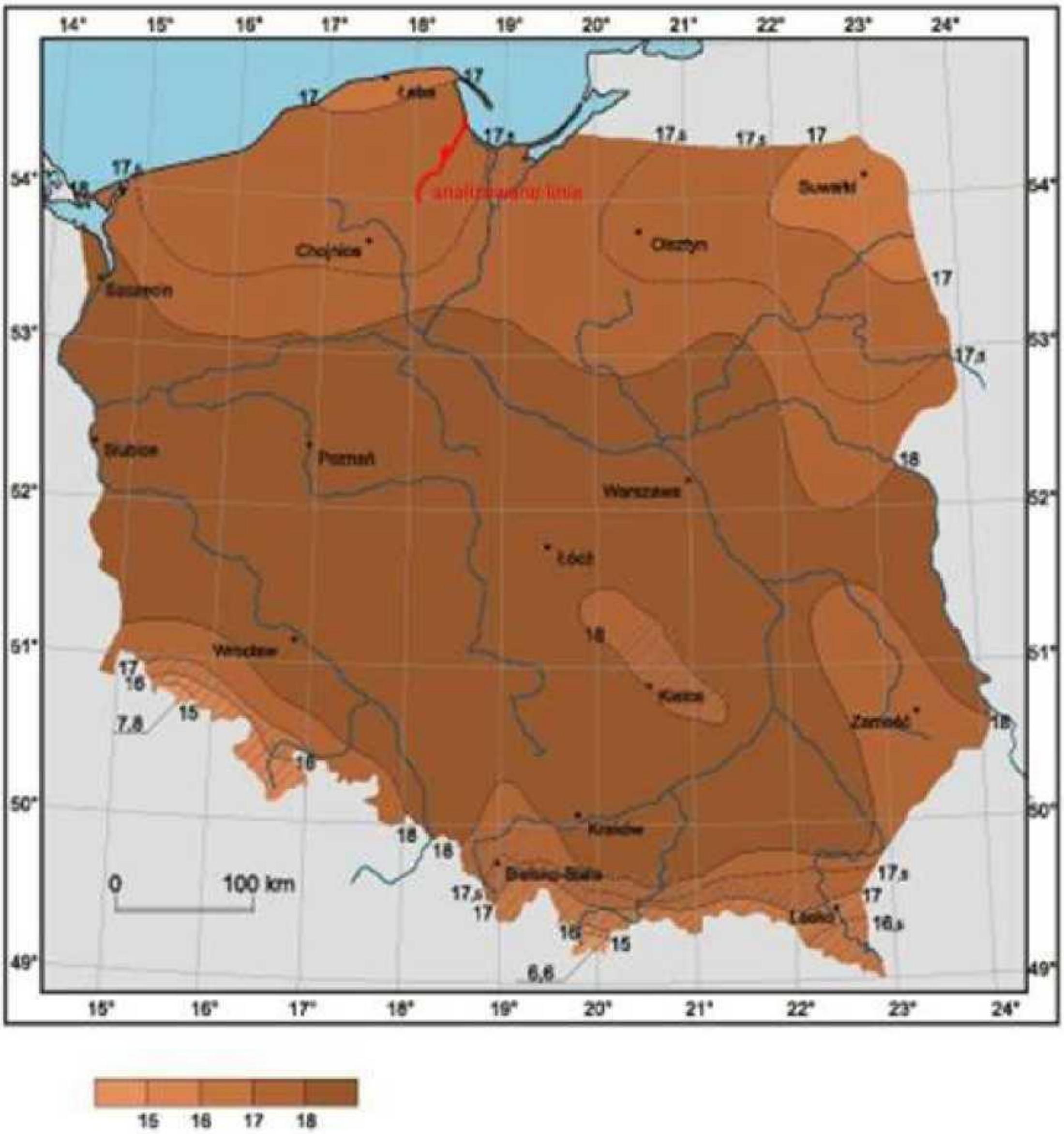
In order to determine the hazards resulting from the atmospheric factor, which are high temperatures, it was analysed whether the investment in question is located in an area where there are:

- high average temperatures – summer period,
- high average annual sunshine,
- the phenomenon of the City Heat Island,

- low annual rainfall.

Based on data from the KLIMADA project, it was determined whether the project is located in an area with high temperatures (summer), with high average annual sunshine – and low rainfall.

Fig. 33 Average air temperature in summer

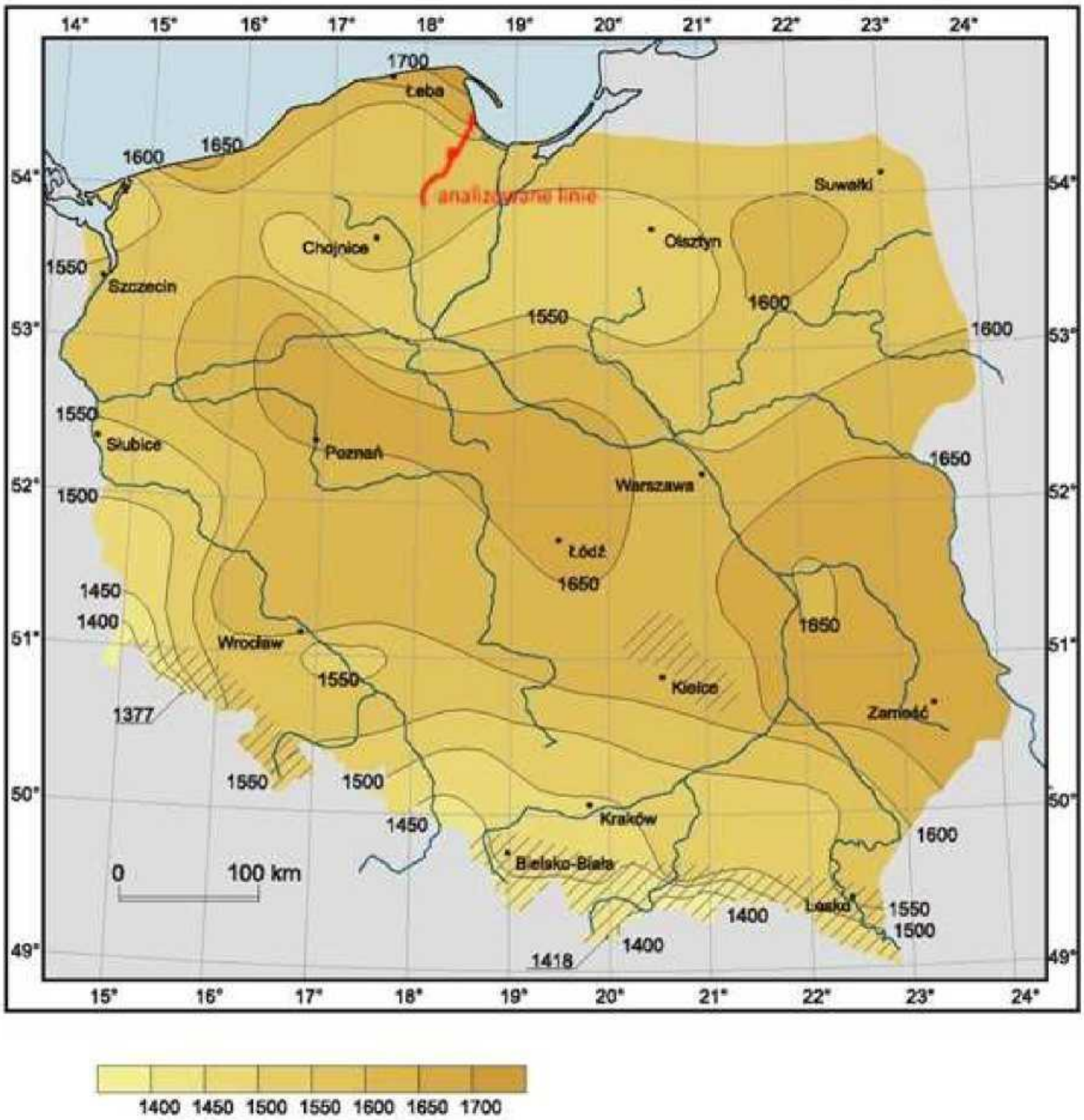


Source: IMGW.

As can be seen from the above map, the project is located in an area where the average summer temperature is approx. 17 °C, therefore it has to be assessed that the risk will be average – assessment 2 according to the methodology.

The map below shows the average annual sums of sunshine (in hours), which show that the investment in question (most of the planned investment) is located in the area with average sunshine – assessment 2 according to the methodology.

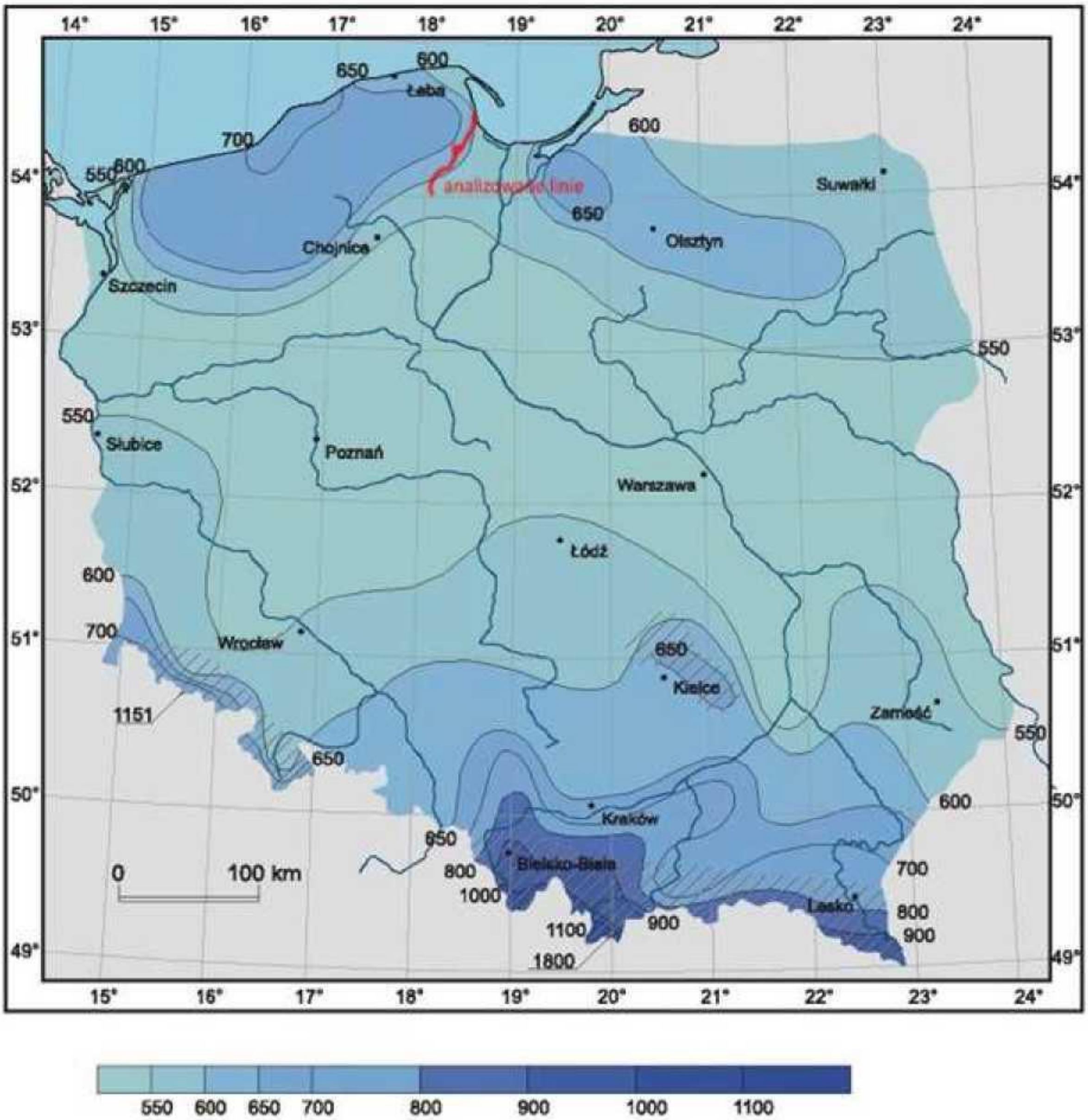
Fig. 34 Average annual sunshine sums (in hours)



Source: IMGW.

Based on the average annual rainfall shown in the map below, the investment in question was estimated to be located in an area with low rainfall, and therefore an assessment of 3 was assigned according to the methodology.

Fig. 35 Average annual rainfall in [mm] in Poland (1971-2000)



Source: IMGW.

In addition, orthophotomaps were analysed in order to determine the magnitude of the phenomenon of the Urban Heat Island, which shows that although the investment in question runs through several cities such as: Gdynia, Kościerzyna and Kartuzy, however, are not such large cities where this phenomenon would be very high. In addition, the railway lines in question only run a small part through urban areas and therefore the risk of heat island phenomenon was assessed as low – assessment 1 according to the methodology.

A summary of the exposure assessment for high temperatures is given in the table below.

Tab. 128 Exposure assessment for high temperatures.

L.P.	Climate factor	Areas particularly exposed to climate factors	Exposure Assessment (E)
1	High temperatures	regions where average temperatures are currently high – summer	2
		areas where annual averages	2

L.P.	Climate factor	Areas particularly exposed to climate factors	Exposure Assessment (E)
		sunshine is high	
		urban centres where the phenomenon of the Urban Heat Island occurs (the masses of hot air, which often lie above the city and urbanised areas, which dramatically raises the temperature)	1
		areas with low annual rainfall	3
Average			**2**

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

c) strong winds

The risk assessment resulting from the occurrence of strong winds was made on the basis of the analysis of the risk of winds at the appropriate maximum speeds, as presented in the study entitled ed. H. Lorenc "Natural disasters and internal security of the country", Warsaw, 2012. According to the map below, this investment takes place through a region characterised by medium-speed winds (from 25 to 30 m/s). In view of the above, this aspect was assessed at 2 in accordance with the methodology.

Fig. 36 Wind occurrence zones with appropriate maximum speeds

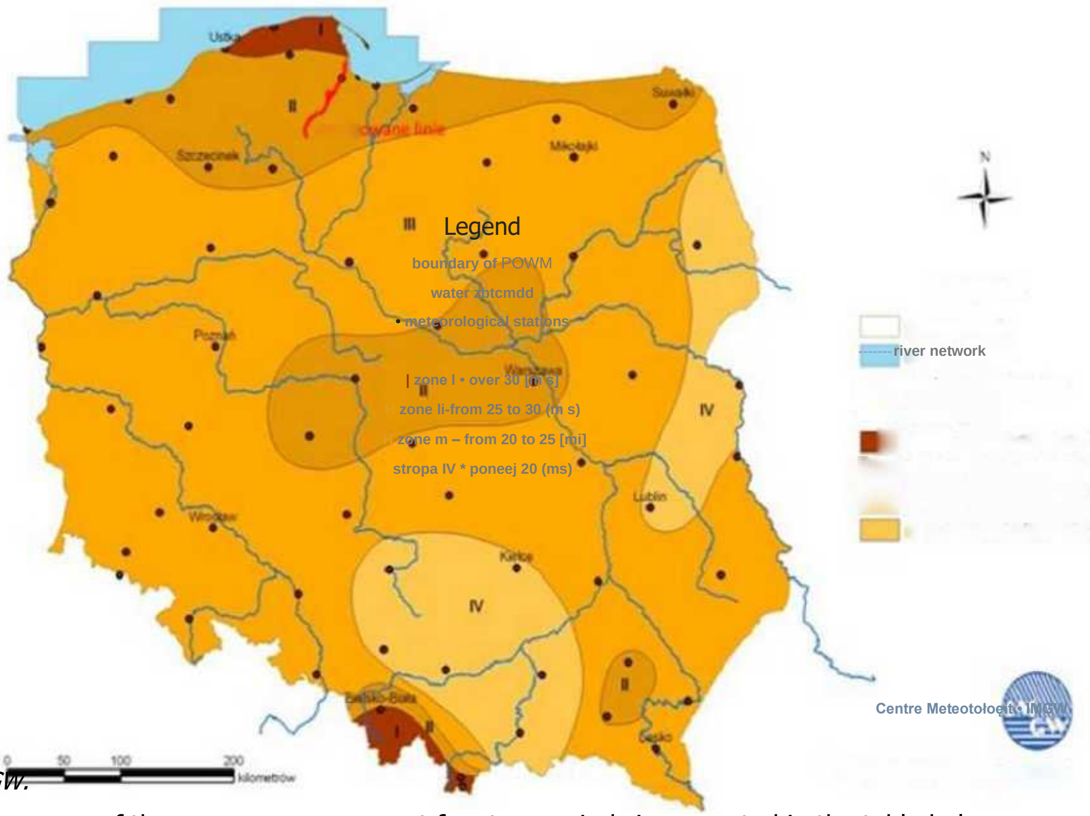


Figure 17

Source: IMGW.

A summary of the exposure assessment for strong winds is presented in the table below.

Tab. 129 Exposure assessment for strong winds.

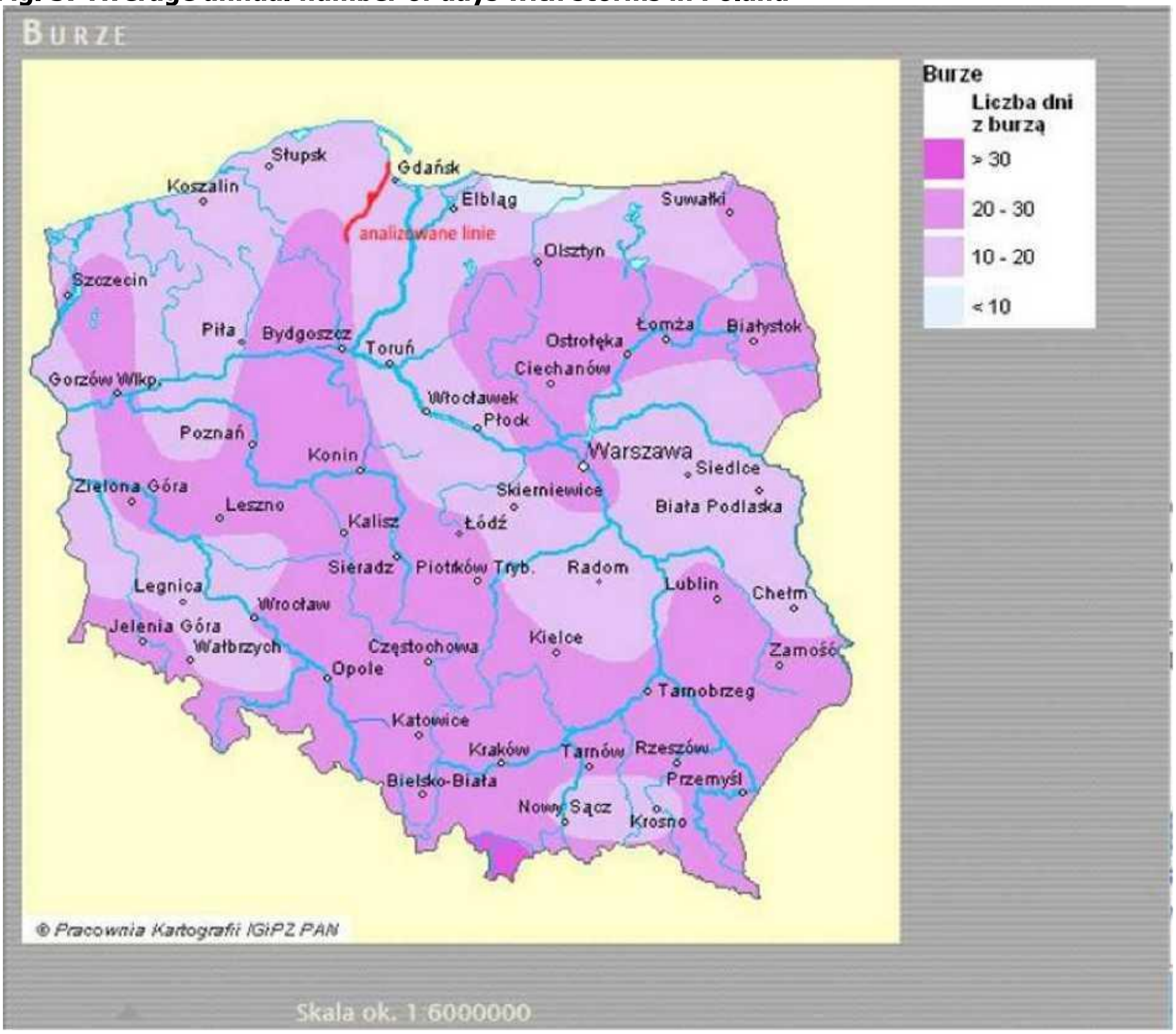
L.P.	Climate factor	Areas particularly exposed to climate factors	Exposure Assessment (E)
1	Strong winds	Areas exposed to storms, hurricanes, strong winds	2
Average			**2**

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

d) atmospheric discharges

The hazard resulting from the occurrence of atmospheric discharges was determined on the basis of the analysis of the average number of days with storms, presented in the study entitled "Numbers". Natural disasters and the internal security of the country. As shown in the figure below, the investment in question is located in a region characterised by a low number of days with storms, and therefore this aspect has been assessed as 1 according to the methodology.

Fig. 37 Average annual number of days with storms in Poland



Source: IGiPZ PAN Cartography Laboratory.

A summary of the exposure assessment for atmospheric discharges is included in the table below.

Tab. 130 Evaluation of exposure for atmospheric discharges.

L.P.	Climate factor	Areas particularly exposed to climate factors	Exposure Assessment (E)
1	Atmospheric discharges	Areas where the average annual number of days with storms is high	1
Average			**1**

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

e) rainfall

In order to determine the hazards resulting from the atmospheric factor, such as rainfall, it was analysed whether the investment in question is located in an area where there are:

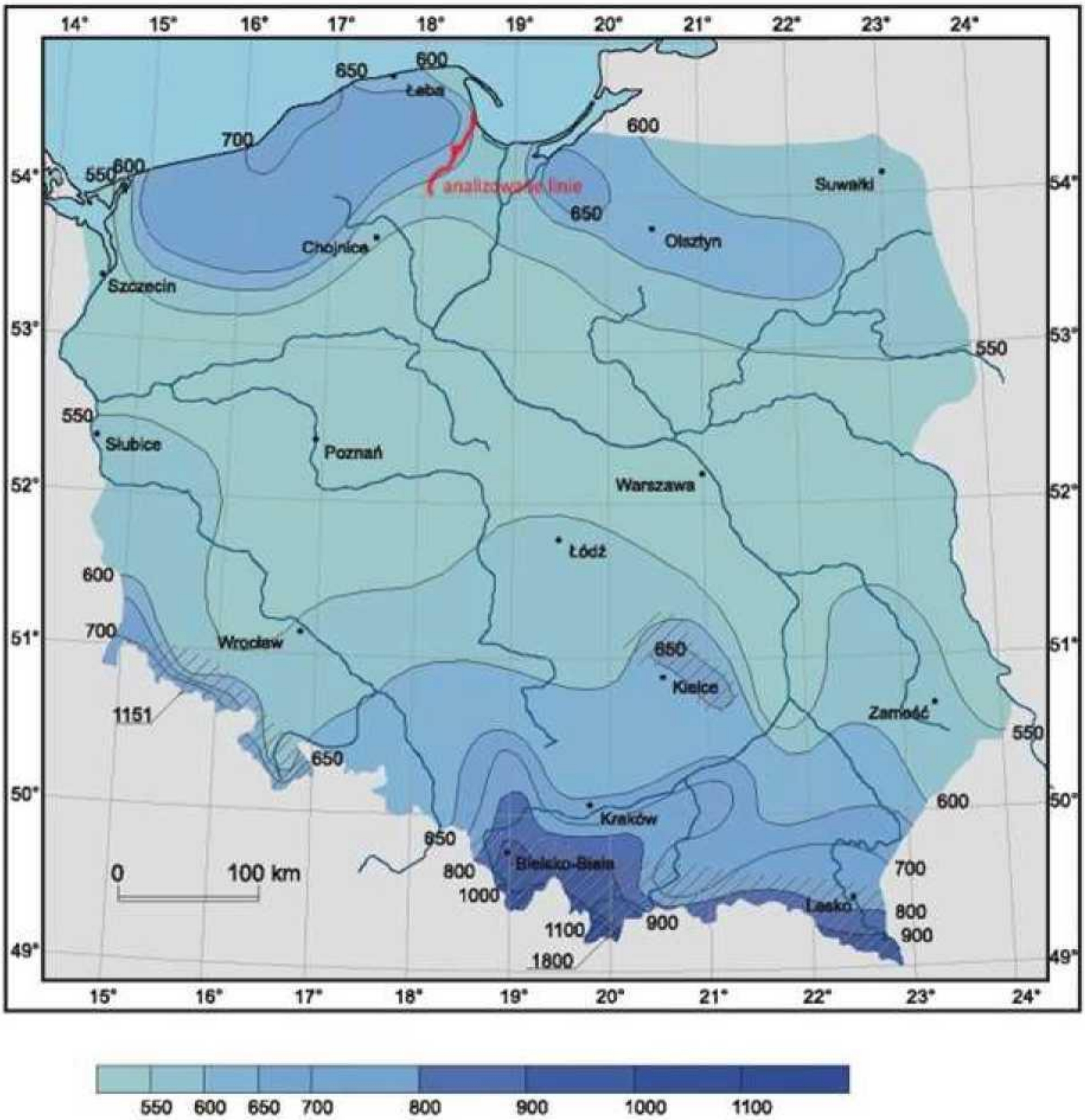
- high levels of annual rainfall,
- river estuaries, delta and flood plains of rivers,
- landslides (seats),
- risks and risks of flooding,
- local flooding,

and mountain areas and areas exposed to sea level rise.

Based on data from the KLIMADA project, it[19] was determined whether the project is located in an area with high rainfall. The map below shows that there is a low level of rainfall in the investment area and therefore an assessment of 1 according to the methodology has been assigned.

[19] Source: http://klimada.mos.gov.pl/zmiany-klimatu-w-polsce/tendencje-zmian-klimatu/

Fig. 38 Average annual rainfall in [mm] in Poland (1971-2000)



Source: IMGW.

The investment in question is not located in the estuaries of rivers, delts, floodplains of rivers and mountainous areas. Therefore, no risk should be identified for all of these aspects – assessment 0 according to the methodology.

This investment takes place outside areas exposed to sea level rise – for this aspect there is no risk – assessment 0 according to the methodology.

On the basis of data from the National Geological Institute – System of Obesity Shield, it was found that the investment in question runs through areas in the Pomeranian Voivodeship predisposed to the occurrence of landslides and the occurrence of mass movements. The project is located in the vicinity of 4 existing landslides. The nearest landslide area is about 20 meters from the axis of the LK 201 railway line in km 196,780. The presence of sites susceptible to landslides was assessed as an average risk – assessment 2 according to the methodology.

The resources of the IT System for National Protection were used to determine the degree of danger and risk of floods, which show that the investment in question crosses 1 flood hazard area designated on the river Mała Słupina. Therefore, it should be assessed that the occurrence of floods in the case of a project is relatively low – assessment 1 according to the methodology.

A summary of the exposure assessment for rainfall can be found in the table below.

Tab. 131 Exposure assessment for rainfall.

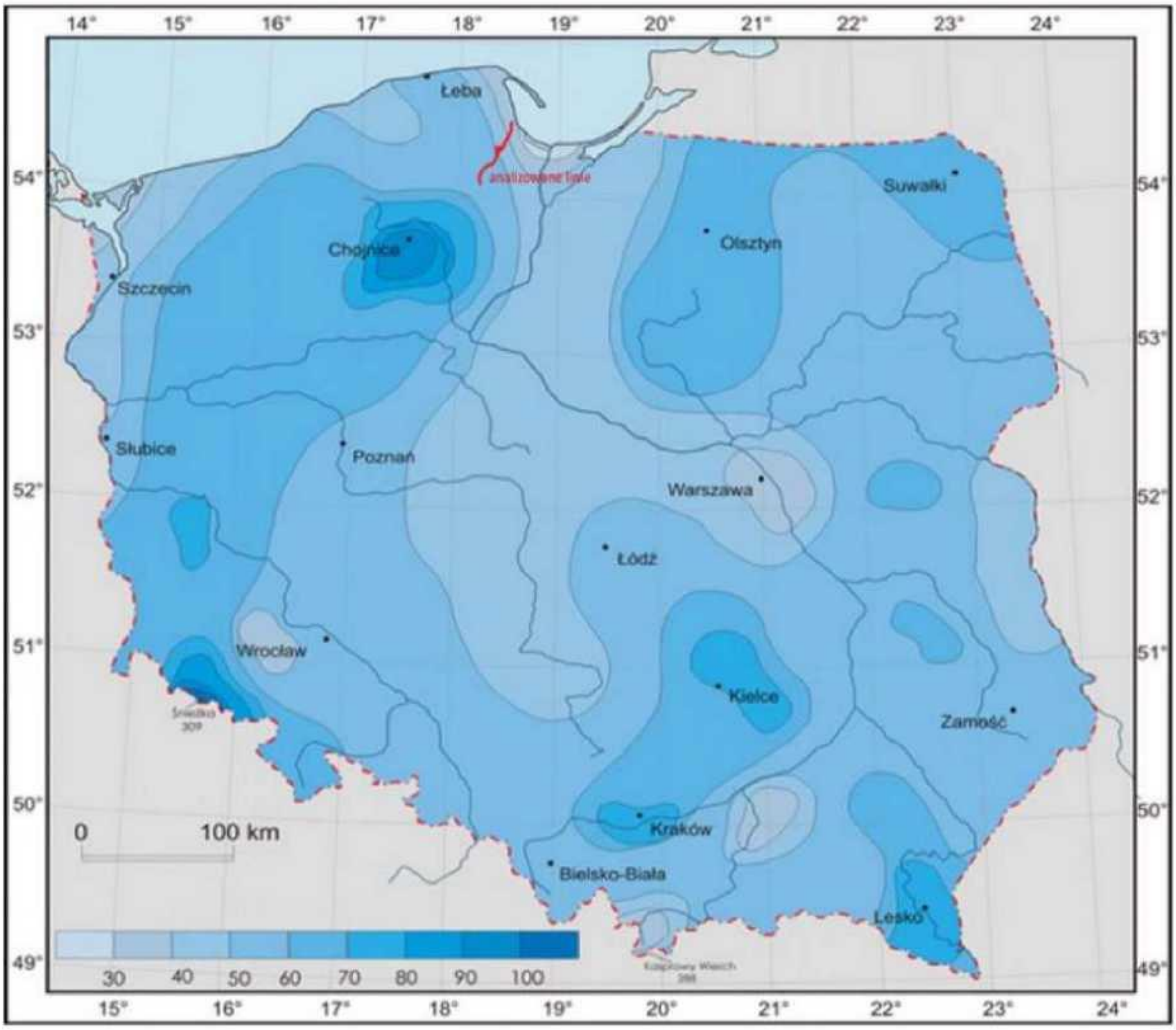
L.P.	**Climate factor**	**Areas particularly exposed to climate factors**	**Exposure Assessment (E)**
1	Rainfall	regions with high annual rainfall	1
		estuaries, delta areas and floodplains of rivers	0
		mountain areas	0
		areas exposed to sea level rise	0
		landslides susceptible to landslides	2
		areas of local flooding	0
		areas at risk of flooding and flood risk	1
Average			**0,57**

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

f) mist

The risk of mist was determined on the basis of the analysis of the average number of days with fog, presented in the study entitled Bn. Natural disasters and the internal security of the country. As can be seen from the figure below, the investment in question is located in a region characterised by an average number of days with fogs, and therefore this aspect has been assessed at 2 according to the methodology.

Fig. 39 Average annual number of days with fog



Source: IMGW.

A summary of the exposure assessment for mists is presented in the table below.

Tab. 132 Exposure assessment for mist.

L.P.	**Climate factor**	**Areas particularly exposed to climate factors**	**Exposure Assessment (E)**
1	Mist	areas with high average number of days with fog [20]	2
	Average		**2**

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

g) summary of the results of the exposure analysis

On the basis of the methodology presented, the degree of risk resulting from geographical location was determined on the basis of the arithmetic mean of the identified and assessed hazards. The results of the above analysis are presented in the table below.

Red. H. Lorenc, Natural Disasters and Homeland Security, Warsaw, 2012.

Table 133 Results of the analysis of the degree of danger resulting from geographical location.

L.P.	Climate element	Degree of risk
1	Low temperatures	1
2	High temperatures	2
3	Strong winds	2
4	Storms (atmospheric discharges)	1
5	Rainfall (including flooding, landslides)	0,57
6	Mist	2

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

Assessment of rail infrastructure vulnerabilities to atmospheric factors

The values of sensitivities and exposures that have been harmonised have been used to determine vulnerabilities. Each of the sensitivity/exposure grades is assigned a value of 1 to 4.

The following is a harmonised assessment of sensitivities (according to the methodology) and exposures (according to the results of the analyses).

Table 134 Overall assessment of sensitivities.

L.P.	Climate element	Results of calculations	Sensitivity assessment according to methodology
1	Low temperatures	0,63	2
2	High temperatures	0,67	2
3	Strong winds	0,67	2
4	Storms (atmospheric discharges)	0,67	2
5	Rainfall (including flooding, landslides)	0,87	4
6	Mist	0,50	1

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

Tab. 135 Overall assessment of exposure indicators.

L.P.	Climate element	Degree of risk	Generic evaluation exposures
1	Low temperatures	1	1
2	High temperatures	2	2
3	Strong winds	2	2
4	Storms (atmospheric discharges)	1	1

L.P.	Climate element	Degree of risk	Generic evaluation exposures
5	Rainfall (including flooding, landslides)	0,57	1
6	Mist	2	2

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

The vulnerabilities of railway infrastructure are determined on the basis of the following dependency:

$$V = S \times E$$

where:

V – vulnerabilities,

S – an overall assessment of the sensitivity of a given atmospheric agent,

E – the overall assessment of the exposure of a given atmospheric agent.

Table 136 Summary of the overall vulnerability assessment.

L.P.	Atmospheric agent	Overall sensitivity assessment	Overall assessment of exposures	Vulnerability assessment [V]
1	Low temperatures	2	1	**2**
2	High temperatures	2	2	**4**
3	Strong winds	2	2	**4**
4	Storms (atmospheric discharges)	2	1	**2**
5	Rainfall	4	1	**4**
6	Mist	1	2	**2**

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

Indicator V values (vulnerability) are assigned categories determining the degree of impact of climate elements on rail infrastructure (low vulnerabilities, average vulnerabilities, high vulnerabilities).

Table 137 Values of the indicator of the vulnerability of railway infrastructure to climate change.

L.P.	Value of indicator *V*	Degree of vulnerability
1	1 & V≤ 6	low susceptibility
2	6 & V ≤ 11	average vulnerabilities
3	11 & V ≤ 16	high susceptibility

Source: Materials provided by PKP PLK S.A.

According to the above analysis, the investment in question (railway infrastructure) for each atmospheric agent is characterised by low atmospheric susceptibility, where V≤ 4.

<u>Ad. 2. Risk assessment of hazards arising from emerging atmospheric factors</u>

According to the methodology for assessing the impact of climatic factors on railway infrastructure, the risk assessment was carried out on the basis of the FMEA method. The results are presented below:

$$\mathbf{R = P \times W \times Z}$$

where:

P – frequency of occurrence of an event resulting from a given threat. The number "P" takes an integer value from 1 to 10.

W – the probability of detecting a hazard with the risk control measures applied so far. The number "W" takes an integer value from 1 to 10.

Z – the number determining the value of the effects per event, and in the event of more than one event occurring in the assessed period, the mean value for the effects of the hazard. The number "Z" takes an integer value from 1 to 10.

a) **probability of Hazard (P)**

The results of the probability of occurrence of hazard (P) are presented in the table below. For the calculation of the probability of occurrence of a hazard, data on the number of events and transport work data covering the same sections of railway lines No 201, 214229 were used to analyse the occurrence of weather events C = 1 414 910,72 poc. km.

Table 138 Results of probability of occurrence of hazard.

L.P.	**Atmospheric agent**	**Transport work performed – "C" (poc.km.)**	**Number of events – "L"**	**Result of calculation – "P"**	**Scoring by Methodology**
1	Low temperatures	1 414 910,72	8	176 863,85	**1**
2	High temperatures		9	157 212,3	**1**
3	Strong winds		28	50 532,5 6	**6**
4	Storms (atmospheric discharges)		20	70 745,5	**4**
5	Rainfall		0	–	**1**
6	Mist		0	–	**1**

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

According to the above analysis, the probability of occurrence of hazards for all atmospheric factors was assessed from 1 to 6.

b) **probability of detection – "W"**

Due to the fact that almost all threats causing disruption on railway lines are detected shortly after their occurrence (information obtained from differentiators, train drivers and other employees of PKP Companies) and the fact that the probability of detection of the threat is high, a single value was taken for all elements: 4 – i.e. "The probability of detection is high. The control measures put in place make it possible to reveal the cause of the error. Symptoms of the cause of danger are noticeable.'

c) **impact of the threat – "Z"**

According to the methodology, based on the data and experience available, the table below shows the impact values of the different types of disturbances.

The arithmetic mean determines the overall value of the indicator 'Z' for the different climatic factors.

Table 139 Determination of the mean value of the effects of the occurrence of disorders.

L.P.	**Atmospheric agent**	**Type of disturbance/effect caused by the atmospheric agent**	**The value of the effects of the occurrence of disorders**	**Average**
I	Low temperatures, snowfall	1. icing of the overhead contact line,	3	**4**
		2. heavy snowfall – snowfalls on the track,	2	
		3. blizzard and blowing snow,	2	
		4. Tumbled/tilted tree on track/traction net caused by strong winds, large snow or rainfall (root flushing),	8	
		5. blowing up plates on crossings through the ice, above the level of the rails (frozen floor)	2	
		6. faults in the track and/or in turnouts caused by snow or ice (low) temperature),	7	
		7. malfunction of srk equipment caused by salinity of the substrate,	2	
		8. frosting of contact wires of the overhead contact line	2	
II	High temperatures	1. high temperatures threatening track deformation	8	**4**
		2. high temperatures causing faults of overhead contact line and srk	4	
		3. fires of slopes, sleepers, dry grass	1	
III	Strong winds	1. Tumbled/tilted tree on track/traction net caused by strong winds, large snowfall or rain (root flushing)	8	**4**
		2. faults of overhead contact line caused by falling branches from trees	3	
		3. Lists on tracks	1	
IV	Storms (atmospheric discharges)	1. Tumbled/tilted tree on track/traction net caused by strong winds, large snowfall or rain (root flushing)	8	**4**
		2. strong atmospheric discharges causing in particular damage to srk equipment,	2	
		3. strong atmospheric discharges causing in particular damage to the overhead contact line, power depletion	2	

L.P.	Atmospheric agent	Type of disturbance/effect caused by the atmospheric agent	The value of the effects of the occurrence of disorders	Average
V	Rainfall (in this flooding, landslides)	1. Tumbled/tilted tree on track/traction net caused by strong winds, large snowfall or rain (root flushing),	8	**5**
		2. flooding/melting of the track through melting snow or heavy rainfall, including the application of silt and sand or stones to the track and flooding of the passage,	7	
		3. flooding/floating station or other objects by continuous and heavy rainfall,	4	
		4. landslides/stones from the slope/embankment and washings caused by continuous and strong rainfall,	7	
		5. high water levels in rivers caused by continuous and strong rainfall – endangered engineering facilities,	2	
		6. Sliding of overhead contact line poles, caused by continuous and strong rainfall,	3	
		7. subsidence of the track caused by continuous and strong rainfall,	5	
		8. faults of overhead contact line caused by falling branches from trees,	2	
VI	Mist	1. Limitation of visibility	7	**4**
		2. speed limit	1	

Source: Materials provided by PKP PLK S.A.

The table below shows the values of the effects of the occurrence of the atmospheric agent.

Tab. 140 Determination of the magnitude of the effects of the occurrence of a given atmospheric agent.

L.P.	Atmospheric agent	Scoring by Methodology
1	Low temperatures	4
2	High temperatures	4
3	Strong winds	4
4	Storms (atmospheric discharges)	4
5	Rainfall	5
6	Mist	4

Source: Materials provided by PKP PLK S.A.

d) identification of risks for individual climate elements

The table below presents, for particular atmospheric factors, the sub-results of individual indicators that are a component for the calculation of hazard risk.

Tab. 141 Results of risk calculations

L.P.	Atmospheric agent	Indicator 'P'	Indicator "W"	Indicator "Z"	Risk score 'R'	Risk assessme
1	Low temperatures	1	4	4	16 (R≤ 125)	**1**
2	High temperatures	1	4	4	16 (R≤ 125)	**1**
3	Strong winds	6	4	4	96 (R≤ 125)	**1**
4	Storms (atmospheric discharges)	4	4	4	64 (R≤ 125)	**1**
5	Rainfall	1	4	5	20 (R≤ 125)	**1**
6	Mist	1	4	4	16 (R≤ 125)	**1**

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

According to the above results, all of the atmospheric factors analysed were classified as factors with a low probability of occurrence.

Ad. 3. Inclusion of climate change scenarios in impact assessment

The next step of the assessment is to take into account projected climate change, which may increase or decrease the intensity of individual factors.

The SRES A1B scenario was used to determine the projected changes.

The table below shows the main projected changes that could have an impact on rail infrastructure elements. It was assumed that an indicator (ZK) with a value of=1 was assigned to each of the climatic factors. Depending on the climate change projected, this indicator will increase or decrease by 0.1 for each projected climate change.

Table 142 Summary of climate change.

L.P.	Climate factor	Projected climate change	Assessment of climate change	Summary assessment of climate change
1	Low temperatures	Shortening periods with low temperature	—0.1	0,9
		Decrease in the number of days with snow cover/snowfall	— 0.1	
		Extreme phenomena – heavy snowfall	0,1	
2	High temperatures	Increase in periods with high temperature	0,1	1,2

L.P.	Climate factor	Projected climate change	Assessment of climate change	Summary assessment of climate change
1	Low temperatures	Shortening periods with low temperature	—0.1	0,9
		Decrease in the number of days with snow cover/snowfall	— 0.1	
		Extreme phenomena – heavy snowfall	0,1	
		Extreme phenomena – hot days	0,1	
3	Strong winds	Extreme phenomena – hurricanes	0,1	1,1
4	Atmospheric discharges	Extreme phenomena	0,1	1,1
5	Rainfall	Elongation periods rainless	—0.1	1,1
		Growth sums precipitation maximum	0,1	
		Extreme phenomena	0,1	
6	Mist	–	–	1,0

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

Ad. 4. An overall assessment of the impact of climate factors on rail infrastructure (including climate change) and the need to propose adaptation measures.

The overall impact assessment shall be determined on the basis of a vulnerability and threat risk analysis taking into account the climate change indicator. The following dependency was used to determine the overall assessment of individual climatic factors for infrastructure elements:

$$K = V \times R \times ZK$$

where:

K – an overall assessment of the impact of a given climate factor,

V – an overall assessment of the vulnerability to a given climatic factor,

R – an overall assessment of the risk of a climate factor,

ZK – an indicator of projected changes in a given climate factor, as a result of climate change.

The values of vulnerabilities and risk indicators that have been harmonised have been used to determine the overall assessment. Therefore, each of the vulnerabilities and risk grades has been assigned a value of 1 to 3, as shown in the tables below.

Table 143 Overall Vulnerability Assessment (V).

L.P.	Value of indicator V	Degree of vulnerability	Overall Vulnerability Assessment (V)
1	1 & V≤ 6	low susceptibility (none)	1
2	6 & V ≤ 11	average vulnerabilities	2
3	11 & V ≤ 16	high susceptibility	3

Source: Materials provided by PKP PLK S.A.

Tab. 144 Overall risk assessment.

L.P.	Risk class	Risk indicator R	Level of risk	Overall Risk Assessment (R)
1	Acceptable	R ≤ 125	Small probability occurrence of risk	1
2	Tolerated	125 & R ≤ 180	Consideration should be given to the appropriateness of identifying and implementing additional risk control measures.	2
3	Unacceptable	> 180	Immediate Critical Threat safety rail transport requiring corrective action	3

Source: Materials provided by PKP PLK S.A.

It was assumed that measures of an organisational, technical, preventive or rescue nature may be proposed if the product of the assessment of vulnerability, threat risk and climate change will be at least 3.8.

On the basis of the assessment of vulnerabilities, risks and projected climate change, the table below sets out the overall impact of climate factors on rail infrastructure within the project under consideration.

Tab. 145 Results of the assessment of railway infrastructure vulnerabilities and risks to changes climate.

L.P.	Event	Overall Vulnerability Assessment – "V"	Overall risk assessment – "R"	Climate change factor – "ZK"	Overall assessment of the impact of the relevant factor- "K"	The need to propose actions
1	Low temperatures	1	1	0,9	0,9	None (K≤ 3.8)
2	High temperatures	1	1	1,2	1,2	None (K≤ 3.8)
3	Strong winds	1	1	1,1	1,1	None (K≤ 3.8)
4	Discharge	1	1	1,1	1,1	None (K≤ 3.8)

L.P.	Event	Overall Vulnerability Assessment – "V"	Overall risk assessment – "R"	Climate change factor – "ZK"	Overall assessment of the impact of the relevant factor- "K"	The need to propose actions
	atmospheric					
5	Rainfall	1	1	1,1	1,1	None (K≤ 3.8)
6	Mist	1	1	1	1	None (K≤ 3.8)

Source: Materials made available by PKP PLK S.A. and the results of its own assessment.

Conclusion

As shown above and the methodology adopted, it is not necessary to propose actions/remedial measures for the project in question. The phenomena are only operational handicaps, which to a small extent interfere with the operation of the railway infrastructure, and therefore it is not necessary to propose measures to limit their negative impact on rail infrastructure.

7. IMPACT ON BIODIVERSITY

The planned investment includes the modernisation of the existing railway lines 201, 214, 229 and the construction of two junctions 214/229 and 201/229. Therefore, the nearest sections along the tracks are ruderal areas. The implementation of the investment will not significantly affect the biodiversity of natural valuable areas, including forms of nature conservation, which intersect, inter alia, landscape parks, protected landscape areas, Natura 2000 sites, nature reserves, natural and landscape complexes, ecological landscapings and existing natural monuments. The investment also cuts through watercourses and reservoirs, which can provide a haven of biodiversity. In order to prevent and/or reduce the risk of deterioration, the minimisation measures included in Chapter 8 will be applied during the implementation, operation and decommissioning phases.

8. LIST OF ACTIONS TO MINIMISE IMPACT ON IMPLEMENTATION AND EXPLOITATION PHASE

This chapter proposes the application of minimisation measures aimed at reducing the potential environmental impact of the planned project (investment option). Some of the recommendations stem from the use of good practices in the investment process. Some of the recommendations result from analyses carried out for several environmental components, e.g. from analyses of the impact of the planned project on the surface of the earth and soil and surface waters. Then, a given recommendation was proposed with only one component, in order to avoid repetitions.

8.1. Ground-water environment

Construction and decommissioning phase

Since the impact on the ground and water environment during the implementation of the investment will be negligible and short-term, and its scope will be limited to the closest surroundings of the investment site, solutions minimising the negative impact are limited to the location and appropriate organisation of the site of the site of the construction site:

Since the impact on the ground and water environment during the implementation of the investment will be negligible and short-term, and its scope will be limited to the closest surroundings of the investment site, solutions minimising the negative impact are limited to the location and appropriate

organisation of the site of the site of the construction site:

1. Construction facilities, including machine park, material bases, waste storage sites, will be located: at a minimum distance of 50 m from the watercourses or off the flood path, if its width is less than 50 m; outside the wetlands.
2. Places of refuelling of construction machinery and places of operation of mechanical equipment will be protected against possible contamination of the ground-water environment by curing e.g. concrete slabs and sealing e.g. with geotextiles
3. Construction facilities will be provided with means to neutralise spills and spills of hazardous substances, including: mats, sorbents.
4. The construction facilities will be provided with portable sanitary facilities, which will be systematically emptied.
5. During works on bridges, materials will be used (e.g.: nets) protecting against the entry of waste, debris and other elements into the watercourses.
6. As part of the demolition, construction, reconstruction and renovation of engineering works, all construction works will be carried out in such a way as to reduce the impact on the troughs and waters of the watercourses and drainage ditches on which the work will be carried out (if possible in the riverbed will be carried out during a period of low water levels; during the renovation, reconstruction, demolition and construction of bridges and culverts, the introduction of heavy equipment into the riverbed and watercourses will be limited to the minimum necessary, the works will not result in narrowing down the trough and concentration, nor will it cause excessive expansion of the trough and drainage flows, renovation works on bridges will be carried out in such a way as not to interfere with the watercourse bed).

During the construction works, a layer of caries and soil from excavations will also be collected separately and will be used as much as possible on the site, e.g. to organise the project site after completion of construction.

Operating phase

Actions to minimise the impact of the use of the railway lines concerned are mainly related to the maintenance of the drainage system in good condition and the proper use of plant protection products to maintain the proper technical condition of the track. In view of the above, during the exploitation phase of the investment, it is necessary to:

1. Regularly clear grasses, demulgate and remove waste from railway drainage trenches.
2. Conduct systematic cleaning of bridges and culverts with low light.
3. Use herbicides in doses recommended by the manufacturer, for which the Minister of Agriculture and Rural Development has issued an appropriate authorisation for the placing on the market and use of those products which have undergone a risk assessment with regard to human and animal health and the environment, in accordance with the provisions of the Plant Protection Products Act of 8 March 2013. In addition, the provisions of the Regulation of the Minister of Agriculture and Rural Development of 31 March 2014 on the conditions of use of plant protection products determining, inter alia, the minimum distance from water reservoirs and watercourses and apiaries for the application of the product, weather conditions, i.e. wind speed and direction, relative humidity of the air, in which the product can be applied or in the manner indicated on the label of the preparation, should be complied with.

8.2. Atmospheric air

Implementation/decommissioning phase

Emissions of substances to air arising during the implementation and possible decommissioning of the investment are of a periodic nature. Using machinery and equipment equipped with internal combustion engines meeting the emission performance requirements in accordance with the Regulation of the Minister of Economy of 30 April 2014 on detailed requirements for internal combustion engines in the field of limiting the emission of gaseous and particulate pollutants by these engines (Dz. U.S. 2014 item 588), there is no need for solutions to protect the environment from adverse effects on air pollution at the construction stage.

The only nuisance for the environment can be associated with dusting during dry and windy periods, transported earth masses and raw materials. This inconvenience will be reduced by the use of protective covers against excessive dust. During dry periods, temporary storage sites containing fine dust fractions will be sprinkled.

Operating phase

There is no provision for minimising the air component.

8.3. Climate

Implementation/decommissioning phase

Analysing the impact of the investment on the climate, it was considered that its implementation and possible decommissioning of investments would not be a source of significant emissions into the atmosphere of greenhouse gases. Therefore, there is no need for additional solutions to minimise the impact of investments on the climate.

Operating phase

This investment will improve the climate by taking over part of traffic from road transport and due to electrification of railway lines, including a significant reduction in the number of exhaust trains operating on the analysed sections of the railway lines. Therefore, there is no need for additional solutions to minimise the impact of investments on the climate.

8.4. Acoustic climate and vibration

Implementation and decommissioning phase

Reducing the nuisance of noise generated during the construction of a railway line is complicated due to the dimensions of the machinery, the technological requirements and the characteristics of the noise sources themselves. Such machines cannot be mounted on the screen due to the technology of the work performed and due to the negligible effectiveness of the screens for large construction equipment – mainly due to the size and emission of sounds with a high content of low-frequency components. Acoustic waves in the low frequency range are several meters long and do not undergo shielding like medium and high frequency waves.

The best solution to reduce noise during construction is to reduce it at source by:

- use of modern machines and equipped with elements that reduce noise emissions into the environment (i.e. suppression of engines, exhaust discharges),
- machinery complying with applicable noise emission regulations,
- use of equipment in good technical condition,
- minimising the most noisy works in particular in the vicinity of inhabited areas (temporarily limited).

Operating phase

According to the Environmental Protection Act, noise protection consists of ensuring the best possible acoustic condition of the environment by maintaining a noise level not greater than acceptable or reducing it to at least acceptable noise when it is exceeded.

Taking into account the projected occurrence of small (up to 2 dB) exceedances of permissible noise levels in the case of buildings outside the enclosed area and adjacent area of the ground, the use of acoustic dampers (with an efficiency of at least 3 dB) has been chosen as measures minimising the acoustic impact.

At the moment, only passenger traffic (commodity traffic) is carried out after the analysed railway lines, while after the investment is put into service, it is planned to change the nature of the traffic by introducing regular freight train traffic. The acoustic model has been calibrated to the existing state – the movement of bus buses is taken into account, while it is not possible to calibrate the calculation model taking into account also freight trains, i.e. calibration to the planned nature of the traffic. Therefore, in view of the uncertainty of the results of the calculations, no measures to minimise the acoustic impact at this stage were recommended for exceedances of less than 1 dB. These places will be analysed at the stage of preparation of the post-implementation analysis, taking into account the actual flow of train traffic, enabling accurate calibration of the computational model. In addition, for these cases, points were designated to perform noise measurements at the stage of post-implementation analysis.

Below, the tables summarise the location of the proposed noise dampers fitted to the rails. It should be noted that the silencers should be fitted to the rails of both tracks.

Tab. 146. Location of the proposed acoustic dampers – investment variant (W1).

LP.	Beginning	End	Length (counted on rails) [m]
1	178,106	178,624	2072
2	184,245	184,421	704
3	185,092	185,294	808

source: own development

Tab. 147. Location of the proposed acoustic dampers – alternative variant (W2).

LP.	Beginning	End	Length (counted on rails) [m]
1	178,106	178,624	2072
2	185,092	185,294	808

source: own development

SUMMARY

The noise control measures presented above were taken into account in the acoustic model, which re-examined the prognostic calculations. The mappings provided in the annexes (5.2.3-1, 5.2.3-2, 5.2.3-3 and 5.2.3-4) indicate that the above-mentioned solutions will be sufficient to ensure acoustic comfort in adjacent acoustically protected buildings. The table with the results of the calculations in the receptors set out in the text annexes 8.4-1 and 8.4-2 shows that no exceedance of the permissible environmental noise level in the building area for which these protections are proposed will occur after the safety features are applied.

8.5. Nature is revived

Areas and sites protected under nature conservation regulations

Implementation and decommissioning phase

The location of the site's facilities, including storage of raw materials and waste, parking lots, stops and handling of heavy equipment within the Natura 2000 site Uroczyska Pojezierza Kashubianski will be limited to the areas of railway stations/railway stops. In particular, existing access roads will be used to access construction equipment. If a new access road is needed, it will be located as far as possible within the investment site. Any necessary exits will be agreed with natural surveillance.

Facilities of the construction site, including storage and storage of raw materials and waste, parking lots, parking places and handling of heavy equipment and access roads, will not be located within nature reserves (Kacze Łęgi, Jar Rzeki Raduni) and ecological use of Lake Kackie.

These areas should be secured with a high (at least 2 m) temporary fence before starting work. The purpose of the fence is to limit and prevent unintentional, accidental destruction, trampling, heavy equipment of areas considered to be the most valuable natural during the entire construction phase. The table below shows the maximum lengths of recommended fences. The need for fences in protected areas and their length will be indicated by the general nature supervision. It is advisable, in particular, to take account of habitat enclosures closer than about 15 m from the railway line. The reward of valuable areas and the length of this wage must be planned in such a way as to enable construction works to be carried out.

The list of protected areas, together with minimisation measures, is presented in detail below.

Table 8.1 List of nature reserves with an indication of mileage and measures minimising.

Name of the area form	Line number	Line page	Mileage [km]	Distance from the axis of the line/at what is necessary to apply the minimising measures [m]	Minimising action
The Jar of the Raduni River	201	P	172,550 — 172,770	37/220	Prohibition of the location of construction facilities and access roads. Temporary fence. Environmental supervision (general).
	201	P	172,850 — 173,150	21/300	Prohibition of the location of construction facilities and access roads. Temporary fence. Environmental supervision (general).
	201	P	173,500 — 173,620	35/120	Prohibition of the location of construction facilities and access roads. Temporary fence. Environmental supervision (general).
Ducks of Łęgi	201	P	198,200 — 199,100	9/900	Prohibition of the location of construction facilities and access roads. Temporary fence. Environmental supervision (general).

Source: Own development based on GDOŚ data
Distances from railway lines to reserves are given to the nearest point (limits of the reserve)

Table 8.2 Eco-use of Lake Kackie with an indication of mileage and measures minimising.

Name of the area form	Line number	Line page	Mileage [km]	Minimum distance from line axis/length at which minimum measures need to beapplied [m]	Minimising action
Lake Kackie	201	P	193,800 — 195,300	18/1500	Before proceeding with construction works, there is a need for detailed recognition of ground and water conditions after

Name of the area form	Line number	Line page	Mileage [km]	Minimum distance from line axis/length at which minimum measures need to beapplied [m]	Minimising action
					this is to plan the construction work appropriately. At the stage of the construction project, it will be determined whether it is necessary to carry out works in the housing of tight or gap walls. Prohibition of the location of construction facilities and access roads. Temporary fence. Environmental supervision (general).

Source: Own development based on GDOŚ data
Distances from railway lines for ecological use are given to the nearest point (limits of use)

<u>Operating stage</u>

There is no need for minimising activities.

<u>Monuments of nature</u>

<u>Implementation and decommissioning phase</u>

During the work in LK 201 km 150,954, 181,469 and 191,749, where natural monuments are located, work will be carried out with particular care to prevent accidental damage to monument trees and their root system.

At a distance of up to 30 m from the axis of the track, 5 monumental trees were located, for which the minimisation measures described in the table should be applied.

Table 8.3 List of nature monuments located within 30 axes designed track with minimising measures.

Inspire object code	Object type	Line page	Mileage [km]	Distance from line axis 201 [m]	Minimising measures
PL.ZIPOP.1393.PP.2205062.377	tree	L	150,954	22	Consultation of botanical surveillance on the necessity and manner of safeguarding or protecting the tree in accordance with the recommendations of the table below.
PL.ZIPOP.1393.PP.2205083.849	tree	P	181,469	27	J.W.
PL.ZIPOP.1393.PP.2205083.849	tree	L	181,469	26	J.W.
PL.ZIPOP.1393.PP.2205083.849	tree	L	181,470	15	J.W.
PL.ZIPOP.1393.PP.2262011.7275	tree	L	191,749	21	J.W.

Source: Own development based on GDOŚ data
*Explanatory notes: * – protection according to the recommendations described below*
<u>Recommendations for the protection of monumental trees</u>

Proper protection of trees must apply to all parts of the tree as well as to the habitat conditions.

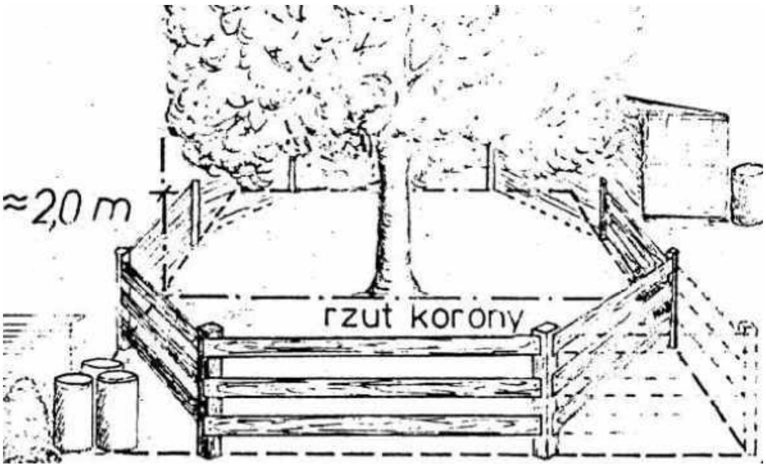
It is necessary to categorically exclude the possibility of mechanical damage and to prevent changes in the properties of the soil by applying the above mentioned methods, i.e.:

- winning the tree root system (at least the tree canopy zone, and optimally: a crown projection plus 1.5 m) and a clear indication of this zone with an information plate;
- fences of the tree root system zone: the protective fence of the root system should be visible, high (not lower than 1.5 m) and durable. It will not be a mechanical barrier for many equipment, but a sign for all participants in the construction process that the precious value, which in this case are trees, is protected;
- in order to protect the canopy of trees, the area should be fenced within the limits of their projection. In addition, the height of means of transport, machinery and construction equipment should be taken into account.

Raiding the trunk with boards recommended in old literature is not a way to protect a tree. It is not an effective method, but only giving a false sense of fulfilling the duty to protect trees on the construction site (Ziemiańska M., Dworniczak Ł., 2012, 2014).

The only most effective way to protect trees in the investment process is to exclude the crown projection zone from communication (even pedestrians) at a distance plus a minimum of 1.5 m.

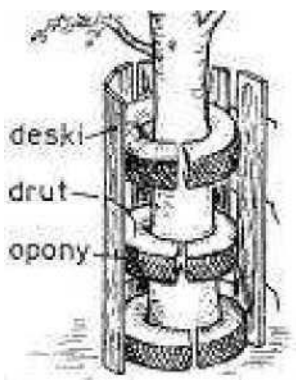
Fig. 40 Fencing of Trees



Source: Urban Green No. 11/2009 (32) article"Threat to trees in construction sites cz. AND.

In exceptional situations, when the tree is very close to the work performed and it is not possible to make the fencing of the entire zone of the crown projection, and the tree can be preserved, the trunk should be properly protected against mechanical damage and/or overburdening. In this case, de-escaling or wrapping the trunk with jute materials, straw mats up to a height of not less than 150 cm should be applied. The lower part of the boards must be based on the substrate, not on the trunk or root buttresses. The boards shall be tied with tape or wire, the boards must adhere strictly to the trunk. Nailing boards to the tree trunk with nails is excluded. The tree trunk protection scheme is shown in the figure below.

Fig. 41 Protecting trunks against mechanical damage and overfilling (instead of tires, use drainage pipes or straw mats)



Source: Urban Green No. 12/2009 (33) article"Threat to trees in construction squares cz. II'

In case of doubt, it is for the decision of the environmental surveillance of the botanical to decide on the detailed method of protecting the trees. If necessary, supervision will decide on the need to protect other trees (not shown in the table above) from mechanical damage.

Operating stage

There is no need for minimising activities.

Natural habitats

Implementation and decommissioning phase

The general minimisation measures to be applied are:

1. ensuring natural and botanical supervision during construction. The duties of natural botanical surveillance include, in particular:

a) control of the state of natural habitats and wetlands. Water, meadow, peat bog and sea habitats, i.e. 9110, 9130, 9160, 91E0, 3150, 7140, 7230, 91F0, 6410 and 6430, will be carefully controlled during the spring, summer and early autumn months (i.e. from 1 April to 30 September) for the presence of protected plant species and for changes in water relations. Checks will take place at least once every 21 days. In the remaining months, the conservation status of the habitats will be checked (at least once a month). Inspections will be carried out during the duration of the works on a given section,

b) in the event that environmental surveillance identifies protected plant species or patches of natural habitats, appropriate minimisation measures or the acquisition of the necessary authorisations to carry out prohibited activities should be applied to the surveillance decision,

c) deciding on the need for additional minimisation measures (e.g. additional temporary fencing, the use of additional valves on drainage ditches, etc.). Environmental – botanical supervision will make such a decision on the basis of field inspections carried out during construction works.

2. Organisation of works in a way that minimises the risk of habitat destruction by:

a) limiting the occupancy of the site during construction – in the vicinity of the identified natural habitats at a minimum distance of 50 m, the site and access roads will not be located,

b) temporary habitat fencing, in order to prevent accidental violation of the habitat lobe (for habitats up to about 15 m, compensation will necessarily be used for habitats above 15 m per line, the indication of the need for remuneration will depend on the supervision decision).

3. For aquatic and wet habitats, i.e. 9110, 9130, 9160, 91E0, 3150, 7140, 7230, 91F0, 6410 and 6430 – protection of water conditions by maintaining the current groundwater level or ensuring optimal humidity conditions by using fortifications with tight walls in drainage ditches that prevent the drainage of valuable habitats or other adequate solutions.

The table below describes the minimisation measures adapted to the requirements of a specific Natura 2000 habitat located at a distance of 15 m from the axis of the track and for very sensitive water conditions of wetland habitats. The symbols a, b, c are marked with appropriate types of minimising actions. In the case of minimisation – natural surveillance – botanical symbols a, b, c refer to the above-mentioned point 1, and for the operation – organisation of works in such a way as to minimise the time and extent of the symbols a, b used in the table below refer to the above mentioned point 2.

The following tables show additional or no minimisation measures during the construction and operation phases of the railway line.

Table 148 Minimising measures for conservation found less than or equal to 15 m from the extreme track of Natura 2000 natural habitats at risk as a result of the investment.

Habitat code a	Location of stations (line, kilometre, distance from the railway)**	Parties a	Area and total lobe [ha]	Surface a lobe in the waist 2x15 m [ha]	How to minimise negative impacts	Assessment of the impact of the investment after the application of measures minimising h

6410	201, Km 185,639, approx. 14 m from the line	rights	2.8485	0,0566	Nature surveillance – botanical (a, b, c) habitats in the indicated kilometre 185.639 km to 185.821 km Lk 201 Organisation of works in such a way as to minimise the range (a, b) Protection of water conditions by maintaining the current level of groundwater or ensuring optimal humidity conditions by using fortifications with sealed fortifications in drainage ditches	Impact of little significance

Habitat code a	Location of stations (line, kilometre, distance from the railway)* *	Parties a	Area and total lobe [ha]	Surface a lobe in the waist 2x15 m [ha]	How to minimise negative impacts	Assessment of the impact of the investment after the application of measures minimising h
					walls or other adequate solutions preventing the dehydration of valuable habitats	
6430	201, Km 191,605, approx. 9 m from the line	rights	0,6361	0,0769	Nature surveillance – botanical (a, b, c) habitats from 191.605 km to 192.214 km LK 201 Organisation of works in such a way as to minimise the range (a, b) Protection of water conditions by maintaining the current level of groundwater or ensuring optimal humidity conditions by using fortifications with tight walls or other adequate solutions preventing the drainage of valuable habitats in the drainage ditches of the site	Impact of little significance
9110	214/229, Km 8,871, approx. 0 m from the	right-left	4,0945	0,4704	Nature surveillance – botanical (a, b, c) habitats from 191.322 km to 200.422 km LK	Impact of little significance
	214/229, Km 9,888, ca. 0 m from the line	right-left	7,0794	0,8837		

Habitat code a	Location of stations (line, kilometre, distance from the railway)**	Parties a	Area and total lobe [ha]	Surface a lobe in the waist 2x15 m [ha]	How to minimise negative impacts	Assessment of the impact of the investment after the application of measures minimising h
	201, Km 191,322, approx. 5 m from the line	left	2,6363	0,2912	202 and new built and junction from km 8,871 to 10,100 LK 214/229 Organisation of works in such a way as to minimise the range (a, b)	
	201, Km 199,049, approx. 7 m	left	10,4736	0,0300		
	201, Km 200,422, approx. 11 m from the line	left	10,9424	0,0808		
9130	214/229, Km 11,069, approx. 0 m from the	right-left	15,1950	1,4046	Nature surveillance – botanical (a, b, c) habitats from 197.533 km to 197.558 km LK 201 and new built and linkage from km 11,069 to 0,721 to 9.908 LK 214/229 Organisation of works in such a way as to minimise the range (a, b)	Impact of little significance
9130	201, Km 197,533, approx. 14 m	left	3,2132	0,1695		
9130	201, Km 197,558, approx. 7 m from the line	rights	1,5745	0,2743		
9160	201, Km 170,823, approx. 6 m	left	5,4788	0,2083	Nature surveillance – botanical (a, b, c) habitats from 170.823 km to 199.487 km LK 201 Organisation of works in such a way as to minimise the range (a, b)	Impact of little significance
9160	201, Km 181,328, approx. 5 m	rights	6,2722	0,1023		
9160	201, Km 181,409, approx. 2 m	left	2,3836	0,1264		
9160	201, Km 191,710, approx. 2 m from the line	rights	0,4643	0,0734		
9160	201, Km 192,093, approx. 10 m from the line	rights	1,4816	0,3191		
9160	201, Km 192,505, approx. 13 m from the line	rights	1,6489	0,0046		
9160	201, Km 196,883,	rights	0,6013	0,0927		

Habitat code a	Location of stations (line, kilometre, distance from the railway)* *	Parties a	Area and total lobe [ha]	Surface a lobe in the waist 2x15 m [ha]	How to minimise negative impacts	Assessment of the impact of the investment after the application of measures minimising h
	7 m from the line					
	201, Km 198,960, approx. 2 m from the line	rights	1,625	0,2269		
	201, Km 199,487, approx. 8 m	left	1,2581	0,0310		
91E0	201, 158,293, approx. 5 m from the line	left	2,7561	0,4690	Nature surveillance – botanical (a, b, c) habitats from 158.293 km to 184.349 km LK 201 Organisation of works in such a way as to minimise the range (a, b) Protection of water conditions by maintaining the current level of groundwater or ensuring optimal humidity conditions by using fortifications with tight walls or other adequate solutions preventing the drainage of valuable habitats in the drainage ditches of the site	Impact of little significance
	201, Km 180,792, approx. 5 m	right-left	0,8316	0,2463		
	201, Km 184,349, approx. 8 m from the line	rights	2,4443	0,3894		

Source: own development

<u>Operating stage</u>

There is no need for minimising activities.

Protected plant species

Implementation and decommissioning phase

On the basis of the natural inventory, it was found that part of the population of one species of vascular plants – *helichrysum arenaria, partially protected* on 2 habitats with an area of 0.0042 ha (141.778 km LK 201 and 163.838 km LK 201) was found to be exposed to destruction. In order to limit the possible destruction of the remaining larger patch of habitat, a fence will be used.

Due to the presence in the buffer of 15 m of protected plant species, including mosses, it is necessary to cover parts of railway lines on which they have been found to be present in botanical natural surveillance (Table 82 and Table 83). This supervision will be carried out with particular attention in the spring and summer months from April to September and throughout the construction period during which construction works will be carried out.

Operating stage

There is no need for minimising activities.

Mushrooms, including lichens

Implementation and decommissioning phase

In order to destroy or transfer protected mushrooms and lichens, the consent of the competent authority will be obtained. Especially in the case of one species – Pleurosticta acetabulum chalice liquor*, it is* recommended to carry out the procedure to transfer it with a piece of bark to oaks located in the immediate vicinity of the station. This lichen is covered by partial protection, belongs to the category EN (extinctive) and has been found at only one site along the entire inventory section of the railway line – the current position in km 158+ 135 on railway line No 201 (distance from line 0 m). Prior to the start of the procedure, a permit will be obtained from the Regional Directorate for Environmental Protection in Gdańsk for the above action before the transfer of the protected species. The relocation procedure will significantly increase the chances of this species surviving in this habitat. This activity must be performed by a mycologist specialist, taking into account the ecology of this taxon.

Operating stage

There is no need for minimising activities.

Invertebrates

Implementation and decommissioning phase

- Works accompanying the construction, such as the parking of machinery and the storage of building materials, will be carried out in areas of low nature value, e.g. hardened surfaces, crops, fallows overgrown by invasive plants (e.g. overwrap). Dehydration works not directly related to construction will also be carried out as little as possible, leaving natural habitats in a non-deteriorated state.
- In order to minimise the risk of accidental destruction of ants' nests (the nests most exposed to negative effects, i.e. located at a distance of 15 m to 20 m from the analysed railway lines, as indicated in the table below), a circle of at least 2 m in diameter and left intact will be determined by means of a warning tape.
- Appropriate permits must be obtained to carry out activities prohibited against animals in accordance with the provisions of the Nature Conservation Act.

Table 149 Minimising measures for protection found at a distance of less than or equal to 15 m from the extreme axis of the projected invertebrate invertebrate track at risk as a result of the investment.

ID	Polish name of species	Habitat location (Line number, kilometre, distance from the railway)	Line page railway-entrance	Expected impact of the planned project*	Tape-protected area (circle diameter around the nest)
111	ant ore Formica rufa	214, km 2,800, approx. 15 from the line	rights	Destroy it.	Not applicable
131	ant ore Formica rufa	229, km 34,700, approx. 15 m from the line	rights	Destroy it.	Not applicable
227	moth ant Formica polyctena	201, km 182,800, approx. 20 m from the line	left	Destroy the risk.	2 m
237	ant ore Formica rufa	201, km 189,500, approx. 18 m from the line	left	Destroy the risk.	2 m
303	ant ore Formica rufa	229, 39,900, approx. 19 m from the line	left	Destroy the risk.	2 m
411	red forest ants Formica sp.	201, km 165,284, approx. 20 m from the line	left	Destroy the risk.	2 m
410	red forest ants Formica sp.	201, km 165,352, approx. 19 m from the line	left	Destroy the risk.	2 m

Source: Own development

- *Destroy the risk. the station is located between 15 m and 20 m from the tracks, which poses the risk of its destruction during construction works; Destroy it. the station is located less than or equal to 15 m from the tracks, which poses a high risk of its destruction during construction works*

The table below provides information on how to reduce the negative impact of the investment during the implementation phase and assess the impact of the investment after the application of the minimisation measures.

Table 150 Minimising measures for the protection of habitats of endangered invertebrates in

the result of the investment.

An element of living nature	How to minimise negative impacts	Assessment of the impact of investments after the application of minimising measures
Invertebrates	Protection of the nest during construction works – means doing the following: around the socket near which work will be carried out, a circle with a diameter of at least 2 m and left intact shall be determined by means of a warning tape. The work will be carried out under the supervision of an entomologist Protection of the nest during construction works (Forest ants *Formica rufa* & *F. polyctena*)	Impact of little significance

Source: own development

Operating stage

There is no need for minimising activities.

Fish (ichthiophauna)

Implementation and decommissioning phase

- Organisation of facilities for construction and access roads, storage of building materials and equipment in a way that limits the possibility of destroying protected habitats and species, in particular in the most valuable places. It is absolutely not necessary to locate construction facilities in the following areas:
- km 163,652 (LK 201), crossed by the railway line – Radunia, inhabited by a goat and a white-tipped head,
- km 177,364 (LK 201), crossed by the railway line – Little Słupina, inhabited by liquor and white-tipped head.
- km 0,814 (LK 214), a site located on the Radunia watercourse, intersected by a railway line (white-tipped head, goat, piskorz).
- Carrying out construction works, including works interfering with riverbeds (use of equipment in a way that affects changes in local physico-chemical conditions of water and hydromorphometric characteristics of the waterbed), outside the protection period, respectively for the following sections of the watercourses, and in case of necessity to carry out works during this period, they will be carried out under natural supervision:
- white-tipped head – protection period 15 March – 20 April, section LK 201 km 163,652, LK 201 km 177,364 and LK 214 km 0,814
- July – protection period 1 March – 31 May, on section LK 201, km 177,364
- Śliz – protection period 15 May – 30 June, on section LK 201, km 184,500
- Piskorz – protection period 1 April – 31 May, on section LK 214, km 0,814
- goat – protection period from 1 May to 30 June, on section LK 201, km 163,652 and LK 214, km 0.814.
- Construction works interfering with the waterways and their coastline in km 163,652 (LK 201), at km 177,364 (LK 201) and in km 0,814 (LK 214) will be carried out under the supervision of an ichthyologist. The tasks of supervision will include, among others: control the timing and manner in which the work is carried out, the equipment used and the extent of interference with the waterways in the sites concerned; control of the water status and habitat quality of protected species of fish and mines during revitalisation/construction works in the field of engineering facilities.
- The work of heavy equipment in the troughs will be kept to a minimum. For example, temporary platforms made of rinsed gravel or concrete slabs will be used as places of heavy equipment, limiting the possibility of water flushing, or guards/houses limiting fragments of the watercourse within the construction site.
- The bridges will be designed in a way that does not lead to narrowing of the troughs.
- The use of fortifications on the bottom of the riverbed (gurts, thresholds, etc.) will be avoided; the reinforced bottom reduces the quantity and diversity of the habitats of ichthiophauna, and in the event of deep erosion, it can lead to the creation of a migratory barrier and the interruption of the migration of aquatic organisms.
- Coast insurance, if necessary, will be limited to short stretches in the vicinity of bridges (e.g. 20-30 m to bridge light), from biological elements, or loose stone overhead. Mesh-stone or concrete structures will not be used to strengthen the trough, due to the permanent deterioration of ecological functions regulated by such structures of the watercourse (a significant deterioration of hydromorphological parameters), and in case of necessity of their use, they will be covered with geotextile and humus layer.

The table below contains detailed provisions for minimising actions, where:

1 organisation of construction facilities and access roads, storage of building materials and equipment in a way that reduces the possibility of contamination of surface waters

2 application of design solutions taking into account the habitat requirements of fish (e.g. avoiding the use of concrete riverbed under bridges, bridge supports located as wide as possible without interference in the river bed),

3 locating construction sites outside river valleys, facilities construction,places storage of materials and waste will be located at a distance minimum 50 m from the river or outside the flood deck, if its width is less than 50 m,

4 work of heavy equipment in troughs will be kept to a minimum watercourses, in order to prevent the stirring of bottom sediments. For example, temporary platforms made of rinsed gravel or concrete slabs will be used as places of heavy equipment, limiting the possibility of water flushing, or guards/houses limiting fragments of the watercourse within the construction site,

5 an efficient drainage system will be maintained,

6 the emergency procedures specified in the internal instructions of PKP PLK S.A. will be applied,

7 natural supervision of theirthyological will be established.

8 bridges will be designed in a way that does not lead to narrowing of troughs, shifts of watercourses,

9 shore insurance, if necessary, will be limited to short sections in the vicinity of bridges (e.g. up to 20-30 m for bridge light), from biological elements, or loose stone bedspread. Mesh-stone or concrete structures will not be used to strengthen the trough, due to the permanent deterioration of ecological functions regulated by such structures of the watercourse (a significant deterioration of hydromorphological parameters), and in case of necessity of their use, they will be covered with geotextile and humus layer.

Table 151 Minimising measures for conservation established at a distance from the extreme axis of the projected track of fish species and mines threatened as a result of the investment.

Polish and Latin name of the species	Habitat location (Line number, kilometre, distance from railway line [m])	Side of the railway line	Minimising measures		Assessment of the impact of investments after the application of minimising measures
			Implementation and decommissioning phase	Operating phase	
Cobitis taenia	201, km 163,652, approx. 0 m from the line	right-left	1, 2, 3, 4, 7, 8, 9 — works interfering with riverbeds outside the spawning and incubation period of eggs, which falls from 1 May to 30 June	6, 7	Impact of little significance
whitetip head *Cottus gobio*	201, km 163,652, approx. 0 m from the line	right-left	1, 2, 3, 4, 7, 8, 9 — works interfering with riverbeds outside the spawning and incubation period of eggs, which falls between 15 March – 20 April	6, 7	Impact of little significance
Thymallus thymallus	201, km 177,364, approx. 0 m from the line	right-left	1, 2, 3, 4, 5, 8, 9 — works interfering with riverbeds outside the spawning and incubation period of eggs, which falls from 1 March to 31 May	6, 7	Impact of little significance
whitetip head *Cottus gobio*	201, km 177,364, approx. 0 m from the line	right-left	1, 2, 3, 4, 5, 8, 9, — works interfering with riverbeds outside the spawning and incubation period of eggs, which falls between 15 March – 20 April	6, 7	Impact of little significance
Śliz *Barbatula barbatula*	201, km 184,500, approx. 0 m from the line	right-left	1, 2, 3, 4, 5, 9, — works interfering with riverbeds outside the spawning and incubation period of eggs, which falls from 15 May to 30 June	6, 7	Impact of little significance
Piskorz *Misgurnus fossilis*	201, km 185,800, approx. 0 m from the line	right-left	1, 2, 3, 4, 5, 9, — works interfering with riverbeds outside the spawning and incubation period of eggs, which falls from 1 April to 31 May	6, 7	Impact of little significance
whitetip head *Cottus gobio*	214, km 0.814, approx. 0 m from the line	right-left	1, 2, 3, 4, 5, 8, 9, — works interfering with riverbeds outside the spawning and incubation period of eggs, which falls between 15 March – 20 April	6, 7	Impact of little significance
Piskorz *Misgurnus fossilis*	214, km 0.814, approx. 0 m from the line	right-left	1, 2, 3, 4, 5, 8, 9, — work interfering with riverbeds carried out outside	6, 7	Impact of little significance

Polish and Latin name of the species	**Habitat location (Line number, kilometre, distance from railway line [m])**	**Side of the railway line**	**Minimising measures**		**Assessment of the impact of investments after the application of minimising measures**
			Implementation and decommissioning phase	**Operating phase**	
			spawning period of fish and incubation of eggs, which falls from 1 April to 31 May		
Goat *Cobitis taenia*	214, km 0.814, approx. 0 m from the line	right-left	1, 2, 3, 4, 5, 8, 9, — works interfering with riverbeds outside the spawning and incubation period of eggs, which falls from 1 May to 30 June	6, 7	Impact of little significance

Source: Own development

Operating stage

During the exploitation phase, the following minimising measures will be applied:

- maintenance of an efficient drainage system,
- the application of the emergency procedures set out in the investor's internal instructions,
- plant protection products shall be used lawfully and in accordance with the authorisations of the preparation.

Herpetofauna

Implementation and decommissioning phase

Due to the recognition of habitats of amphibians and reptiles located less than 15 m from the axis of the projected track as directly exposed to destruction, minimising activities are presented for the species found in them.

Table 152 Minimising measures for protection detected at a distance of less or equal to 15 m from the extreme axis of the projected track of amphibians and reptiles endangered as a result of the investment

Polish name of species	Habitat location (Line number, kilometre, distance from railway line [m])	Minimising measures	Assessment of the impact of investment after application of minimising measures
complex of green frogs *Pelophylax esculentus complex*	201, km 139,432, approx. 8 m from the line	1,2,	Impact of little significance
complex of green frogs *Pelophylax esculentus complex*	201, km 140,859, approx. 8 m from the line	1,2	Impact of little significance
complex of green frogs *Pelophylax esculentus complex*	201, km 163,606, approx. 0 m from the line	1	Impact of little significance
complex of green frogs *Pelophylax esculentus complex*	201, km 167,918, approx. 14 m from the line	1,2	Impact of little significance
complex of green frogs *Pelophylax esculentus complex*	229, 167,918, approx. 14 m from the line	1,2	Impact of little significance
complex of green frogs *Pelophylax esculentus complex*	201, 185,345, approx. 15 m from the line	1,2	Impact of little significance
Crest *Pelobates fuscus*	201, 140,859, approx. 8 m from the line	1,2	Impact of little significance
toad gray *Bufo bufo*	201, 140,859, approx. 8 m from the line	1,2	Impact of little significance
toad gray *Bufo buf*o	201, 185,345, approx. 15 m from line 1	1,2	Impact of little significance
*Rana temporaria grass*frog	201, 185,345, approx. 15 m from the line		Impact of little significance
Lizard agilis *Lacerta agilis*	201, km 141,700, approx. 2 m from the line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	201, km 155,600, approx. 1 m from the line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	201, km 171, approx. 3 m from the line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	229, km 34,000, approx. 1 m from the line	1,2	Impact of little significance

Polish name of species	Habitat location (Line number, kilometre, distance from railway line [m])	Minimising measures	Assessment of the impact of investment after application of minimising measures
Lizard agilis *Lacerta agilis*	201, km175,200, approx. 2 m from the line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	201, km 185,500, approx. 1 m from the line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	201, km 199,000, from 1 m from line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	201, km 139,800, approx. 11 m from the line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	201, km 140,000, approx. 7 m from the line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	201, km 165,600, approx. 13 m from the line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	201, km 176,400, approx. 15 m from the line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	201, 176,300, approx. 9 m from the line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	201, 185,200, approx. 8 m from the line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	201,185,300, approx. 10 m from the line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	201, km 185,400, approx. 13 m from the line	1,2	Impact of little significance
Lizard agilis *Lacerta agilis*	201, km 185,500, approx. 4 m from the line	1,2	Impact of little significance
Live lizard *Zootoca vivipara*	201, Km 185,500 approx. 1 m from the line	1,2	Impact of little significance
Live lizard *Zootoca vivipara*	201, Km 199,000 approx. 1 m from the line	1,2	Impact of little significance
Live lizard *Zootoca vivipara*	201, km 185,700, approx. 7 m from the line	1,2	Impact of little significance

Source: Develop your own.

1- Organisation of works in a way that minimises the risk of pollution flow to the habitat site

2- Use of technically efficient construction machinery.

<u>Operating stage</u>

There is no need for minimising activities.

Birds

<u>Implementation and decommissioning phase</u>

- Works involving the renovation and reconstruction of bridges, viaducts will be carried out under the supervision of an ornithologist in order to assess the current settlement of the objects by the *Motacilla cinerea* mountain plaque and the *Delichon urbicum* window (a colonial species). In the case of nesting mountain flies or windows, construction work should be carried out after breeding by birds, in accordance with the recommendations of ornithological surveillance.
- The deadline for felling trees and shrubs should cover the non-hatching period (from 16 October to the end of February).
- In case of the need to cut trees (especially gleaplasty), if the felling is to take place in the spring and summer season, a prior assessment of the current settlement of trees by an ornithologist will be carried out. If the felling is found, it will be stopped, within the scope and time limit allowing for the effective completion of the breeding, indicated by the ornithologist.

The following are presented solutions minimising which will be applied at the stage of construction and preparatory works.

Tab.153 Minimising measures for conservation detected at a distance of less than or equal to 15 m from the extreme axis of the projected track of endangered bird species as a result of the implementation of the investment

Species	How to minimise negative impacts	Assessment of the impact of investments after the application of minimising measures
Swan dummy, circadian, porch, crane, water, coconut, loner, mice, bruise, medium woodpecker, green woodpecker, woodpecker, woodpecker, black woodpecker	Removal of shrubs and trees along the railway line will be kept to a minimum throughout the entire section of the work carried out. Works related to the destruction/removal of bird habitats (trapping, trees, reeds) will be carried out outside the breeding season of birds (except for the period 1 March – 15 October). Tree felling will be carried out without ornithological supervision, but only during the non-hatching period of the birds (from 15 October to 1 March). When it is necessary to cut trees and shrubs during the breeding period, work will be carried out under ornithological supervision. Replacement places of refuge and nesting will be created in the form of 60 nesting booths (30 type A, 20 type B, 6 type D and 4 for owls) and hung in a belt with a width of 0.5 km from the tree felling line in a density of 3-4 booths per 1 ha Investment works will not affect the structure of existing water bodies Earthworks will be carried out in such a way as to ensure that adequate water levels are maintained in these tanks. Technical equipment will be used. The range of the site and the site and the machinery park will be limited to the smallest possible area and duration of work	Impact of little significance

Source: own development

Operating stage

There is no need for minimising activities.

Bats (chiropterofauna)

Implementation and decommissioning phase

All works related to the reconstruction of railway lines 201, 214 and 229 and the construction of two junctions will be carried out under natural supervision. If surveillance finds winter bat hides in the culverts, none of the works within the indicated culverts will be carried out without consultation with the chiropterologist, especially during the winter period (from 15 November to 15 March). During the natural inventory, no settlement of culverts by bats was found.

Depending on the planned scope of work on the objects, it will be possible to agree on other measures minimising in agreement with the contractor and taking into account technical conditions (artificial gaps, walling of the St. John's brick, leaving existing gaps, etc.).

In the case of planned removal of trees along the line, the natural surveillance must conclude that it is impossible to destroy shelters inhabited by bats (for old trees with a diameter of > 50 cm and shrubs less than 15 m from the extreme axis of the railway track).

Table 154 Minimising measures for protection found at a distance of less than or equal to 15 m from the extreme axis of the projected bat track at risk as a result of the investment.

Polish and Latin name	Habitat location (Line number, kilometre, distance from railway line [m])	Line page	Minimisation measures at the construction stage	Assessment of the impact of investments after the application of minimising
the Great Borowiec *Nyctalus noctula*	201, km 141,700, approx. 2 m from the line	left	1;2;3	Impact of little significance
type of nights *Myotis sp*	201, km 155,600, approx. 1 m from the line	rights	1;2;3	Impact of little significance
Karlik larger Pipistrellus *nathusii* *great* blueberry Nyctalus *noctula* kind of nightmares *Myotis sp.*	201, km 171,000, approx. 0 m from the line	left	1;2;3	Impact of little significance
Karlik bigger *Pipistrellus nathusii*	229, km 34,000, approx. 1 m from the line	left	1;2;3	Impact of little significance
Karlik larger Pipistrellus *nathusii* *great* blueberry Nyctalus *noctula* kind of nightmares *Myotis sp.*	201, km 175,200, approx. 1 m from the line	left	1;2;3	Impact of little significance
Karlik bigger *Pipistrellus nathusii* blueberry great *Nyctalus noctula*	201, km 185,500, approx. 0 m from the line	left	1;2;3	Impact of little significance
Karlik tiny *Pipistrellus pipistrellus* karlik larger *Pipistrellus nathusii* blueberry great *Nyctalus noctula*	201, km 199,000, approx. 2 m from the line	right-left	1;2;3	Impact of little significance

Source: Develop your own.

1. Limiting the number of trees and shrubs removed to the minimum necessary to ensure that construction works can be carried out and railway traffic is safe (at a distance of up to 15 m from the railway gauge axis and within the planned linkage).

2. In particular, environmental supervision will concern the inspection of decommissioned engineering facilities, the removal of trees that are a potential habitat of bats – at the stage before the start of works

3. If necessary, the construction site illuminates with insect-free light, i.e. the use of sodium or diode lamps giving the so-called insects. "warm" light spectrum, limiting the lure of insects at night. (Replacement of illumination with sodium or other non-UV-emitting allows practically 100 % to limit the influence of this factor on insects, the problem mainly affects all species of dark, dwarf (especially small) and big blueberry species (Rydell and Racey 1993). Artificial light sources installed as part of modernisation disrupt the behaviour of many species, including migratory ones, disrupt migration and may become an ecological trap for animals (Stone et al. 2009)).

<u>Operating stage</u>

There is no need for minimising activities.

Teriofauna (excluding bats)

Implementation, decommissioning and exploitation phases

Due to the fact that the potential impacts were not considered significant and the whole project will be carried out under general nature supervision, there is no need to propose additional minimisation measures at the construction stage.

8.6. Landscape

Construction and decommissioning phase

The impact on the landscape that occurs during the implementation phase will be reversible. After completion of the construction works, the site of the construction site will be restored to its original state. In terms of conditions, it is recommended to use the site during the construction phase, to run access roads as far as possible on the basis of the existing road network.

Operating stage

The most important measure to minimise the negative impact of the built railway line is the systematic ordering of the railway lane (declaration of grasses, waste disposal).

8.7. Sights

Construction and decommissioning phase

Only those monuments (protected in the register of monuments) that form part of these lines – bridge structures, culverts and cubature buildings related to the need to manage traffic on the line remain in collision with the analysed railway lines. At the stage of the construction project, the scope of works will be agreed with the appropriate monument conservator.

In the event of collisions with archaeological sites, earthworks should be preceded by pre-emptive archaeological research. Regarding the arrangement of archaeological supervision for earthworks in the archaeological protection zone, please contact the Pomeranian Voivodeship Conservator of Monuments in Gdańsk.

It is recommended that construction sites, storage sites of materials are located, as far as possible, at a distance from historic buildings, ensuring their adequate protection.

Operating stage

There are no solutions to protect the environment.

Decommissioning phase

Solutions similar to the construction phase are envisaged.

8.8. Waste

Construction/decommissioning phase

The storage of waste should take place in accordance with Article 25 of the Waste Act, which concerns the storage conditions of waste. In addition, according to the provisions of the Internal Instruction for Waste Management Is-1, waste should:

- store selectively in separate and adapted places, under conditions that prevent pollution from entering the environment, and ensure that they are reused or subsequently received by entities holding appropriate permits in this regard;
- store in accordance with requirements relating to the protection of the environment and safety of life, human health, in particular in a manner that takes into account the chemical and physical characteristics of the waste, including the state of concentration and the risks that the waste may cause;
- store in the area to which the Company has a legal title, in designated places;

- it is prohibited to mix hazardous waste with non-hazardous waste;
- it is prohibited to store hazardous and non-hazardous waste in a place not intended for that purpose;
- whereas liquid waste should be stored in sealed containers made of materials resistant to waste stored therein, fitted with sealed seals, in hardened places protected against ground pollution and precipitation, equipped with equipment or means for collecting leakages of that waste;
- hazardous waste should be stored in sealed containers made of materials, resistant to waste stored in it or in hardened places, protected against ground pollution and precipitation.

Operating stage

- proper management of waste generated during operation, including minimisation of waste, will be stored selectively in separate and adapted sites, under conditions that prevent pollution from entering the environment and ensuring its re-use or subsequent receipt by entities holding appropriate permits in this regard.

9. MAJOR ACCIDENTS, NATURAL AND CONSTRUCTION DISASTERS

The definition of major accident is defined by the Environmental Protection Law of 27 April 2001 (consolidated text: Dz. U. 2018 item 799) is an event, in particular emissions, fire or explosion, arising during an industrial process, storage or transport in which one or more hazardous substances occur, leading to an immediate threat to human life or health or the environment or the environment with delay.

On the described section of the railway line, it is not possible to have a major industrial accident within the meaning of Article 248 of the Environmental Protection Law, only a major accident is possible (uniform text: Dz. U. 2018 item 799). Serious failures can occur along an opinioned section of the line, on the site and in the back of the construction site, as well as roads and facilities in the surroundings of the railway area. Environmental pollution can occur as a result of:

- a single, large uncontrolled discharge of dangerous substances into the environment, e.g. following a railway accident. One or more components of the environment may be contaminated.
- small, but over a long period of leakage (spreading) of transported hazardous substances along the entire route, resulting from technical and operational defects, including leaks, e.g. valves, packaging, etc. These pollutants migrate into the ground during precipitation and are washed out into drainage ditches.
- small, single-use leaks of fuel or other operating fluids from traction vehicles, motor vehicles and construction machinery, which will be immediately removed by railway personnel or the Contractor.

The scale of the hazard in the event of a major accident depends on a number of factors, which include:

- amount of substance released into the environment chemical,
- the length of time the substance remains in the environment,
- physical state of the substance/material,
- toxicity of the substance/material,
- topographical and meteorological conditions,
- degree of land urbanisation.

Such incidents are largely countered by technical, organisational and appropriate provisions governing safety in transport, including the transport of dangerous goods, applied in rail transport, such as:

- requirements for the construction of packaging (including tanks) for the carriage of dangerous goods specified in the standards and in the Regulations for the international carriage of dangerous goods by rail,

- entry into service only of efficient wagons and traction vehicles,
- an efficient, computerised rail traffic control system,
- plans for alerting incidents and incidents of railways, together with an alarm instruction for traffic controllers,
- plans to ensure the safety of high-risk dangerous goods,
- a system of periodic training for workers involved in the transport of dangerous goods,
- maintenance of own emergency services (technical rescue trains and emergency teams in Railway Line Plants),
- the use of efficient vehicles, machinery and equipment by Contractors.

At the stage of implementation of the project, the following events related to the transport and use of hazardous substances are possible:

- minor fuel spills during refuelling of machinery and equipment at the construction site,
- minor leakage of operating fluids during operation of vehicles, machinery and construction equipment,
- fuel leaks from damaged fuel tanks of motor and railway vehicles and construction machinery and equipment.

In the event of a major accident, rescue operations shall consist of:

- neutralise and remove the source of the hazard and minimise losses caused by the accident and focus on reducing the scale and severity of the hazard. These activities will be carried out by specialised units of the State Fire Service and, if necessary, other emergency services (medical, police and other – appointed by the headquarters of the management of the action),
- removal of the effects of accidents aimed at restoring the environment to the pre-accident state consisting of neutralising the hazardous substance, collecting and cleaning the contaminated soil layer of pollution removal in surface and/or groundwater. In the event that it is not possible to completely remove the pollution from one element of the environment immediately after the accident, it will be necessary to use techniques to stop the migration of pollutants, and methods of their removal from the environment for the time necessary for that time. In the above-signed situation, monitoring of the soil and water environment of the contaminated area will have to be applied until it is completely cleaned.

Construction/natural catastrophe

According to the construction law, a construction catastrophe should be understood as the unintended, violent destruction of the building or parts thereof, as well as structural elements of scaffolding, elements of forming equipment, sealed walls and trench housing.

The main causes of construction disasters include:

- Design defects (insufficient load capacity, failure to include Polish climatic conditions in design solutions),
- Structural and technological defects (bad quality of materials used for construction, incorrect construction technology, incorrect execution of works),
- Improper conditions of use of the object (e.g. too much of its load),
- Explosion of gas,
- Washing of structural elements,
- Technical ageing of buildings,
- Lack of adequate supervision nad execution of construction works,
- A random event that could cause a construction disaster (fires, earthquakes, winds, rain and snow, floods).

There is always a risk of a construction catastrophe in this area of work, so it is important during the implementation of the project to maintain technological regimes, control of machinery, equipment, works control, health and safety checks.

By contrast, natural catastrophe means an event related to the operation of natural forces, in particular atmospheric discharges, seismic shocks, strong winds, intense precipitation, prolonged extreme temperatures, landslides, fires, droughts, floods, ice phenomena on rivers and seas and lakes and water reservoirs, the mass occurrence of pests, plant or animal diseases or infectious diseases of humans, or the action of another element. The atmospheric phenomena around the site of the project will only have the character of operational handicaps, which may to a small extent interfere with the operation of the railway infrastructure.

10. POSSIBLE CROSS-BORDER IMPACT ON ENVIRONMENT

Due to the location, scale of the investment and the extent of the impact, the implementation of the project will not reveal itself in the form of a negative impact on the environment outside the Republic of Poland. The projected very local impact (limited to areas adjacent to the investment under consideration) will have no impact on the environment outside the country.

11. ANALYSIS OF THE POSSIBILITY OF CONFLICT SOCIAL

As a result of the implementation of the project will increase competitiveness and improve the quality and accessibility of services in regional rail transport, and passenger traffic on LK 214 will be restored. With the implementation of the project many positive aspects can be expected in the social context. They will concern:

- increasing the crossing speed for passenger trains (reducing the journey time of trains),
- improvement of aesthetics (in connection with the reconstruction of engineering objects, platforms, installation of small architecture objects, etc.),
- improving safety at existing level crossings, both for cars and pedestrians,
- increase in employment at the construction stage.

In view of the above, it is important to emphasise the positive impact of the project on increasing the accessibility of the inhabitants of the region to rail transport both in the context of commuting to work, service centres, culture and tourism (especially on lines where traffic is currently withdrawn or seasonal). The secondary effect will be to increase the mobility of the population and stimulate the socio-economic development of the region. This can indirectly have positive effects to the extent, for example, the reduction of social exclusion.

The transfer of part of road transport to rail, as an expected result of the investment, can lead to increased road capacity and thus also safety for road users.

At the stage of the environmental impact procedure for the task of "the second stage of revitalisation and modernisation of the Kościerski Corridor together with the modernisation of srk equipment and electrification of railway lines No. 201, 214, 229 and the PKM line" in 2017, comments and complaints of surrounding residents concerning the acoustic climate appeared. They mainly concerned the demand for the construction of acoustic screens due to high noise and the construction of an additional platform. The authority issuing the environmental decision referred to the above complaints in the grounds for the decision. In addition, an appeal against the decision of the Regional Director of Environmental Protection of 29 November 2017 was received on 24 January 2018. RDOŚ-Gd-WOO.4210.31.2015.JP.KP.36 on environmental conditions. The appeal was sent to the General Director of Environmental Protection, was dismissed in its entirety and the decision became final.

In addition, the current noise protection programmes covering railway lines Nos 201, 214 and 229, including the Noise Protection Programme for the City of Gdynia, 2013.

However, the programme does not cover the planned investment. Described in the program of revitalisation of the so-called The Kocierski railway corridor has already been completed.

The planned electrification of the line is also indirectly a positive effect on people by eliminating emissions of gases and dusts into the air, which is associated with the movement of the combustion rolling stock when the line is not electrified.

Despite the tangible benefits, the implementation of the investment can be a source of potential social conflicts both during the implementation/decommissioning of the investment and at the stage of its exploitation.

Social conflicts can be expected during land purchases and demolition of buildings. It should be emphasised that the demolition of residential buildings is envisaged only in the alternative option W2, so in this respect it will generate much more conflicts. It is recommended that earlier information measures be taken to minimise conflicts related to land buy-back and demolition.

Sources of conflict during the implementation/dissolution of the project

During the construction works, there may be unorganised emissions of dusts and gases into the air associated with the operation of heavy equipment. However, environmental quality standards are not expected to be exceeded in this respect. Therefore, the investment should not be a nuisance for residents of adjacent areas.

In turn, it should be noted that any work requiring the use of heavy equipment is primarily a source of noise. However, this factor will not be particularly burdensome, as the negative impact of the implementation phases will be temporary and will be limited to the duration of the works. In view of the above, it is concluded that the health status of the inhabitants of the buildings adjacent to the railway line will not be affected.

An additional factor of conflict may be works related to the elimination of level crossings and the construction of two-level junctions.

Moreover, there is a risk of so-called data conflict. This occurs when interested parties do not have the information they need or have different or outdated information. It is important for the whole project to properly and actively inform the local community about investment intentions. An example may be notice boards in offices, local press, television or announcements at railway stations.

Sources of conflict at the investment exploitation stage

At the operational stage, nuisances related to air pollution were excluded, as limit values are not expected to be exceeded.

When analysing the results of the calculations of noise emissions to the environment, it should be noted that in the case of investment variants there are exceedances of permissible environmental noise levels in areas subject to acoustic protection and it is necessary to apply minimisation measures, i.e., i.e. dampers.

It should also be borne in mind that the implementation of the analysed investment will bring great social benefits in the form of:

- the resumption of passenger traffic on railway line 214,
- improving traffic conditions, bandwidth line,
- improving the safety of travellers,
- reduction of travel time,
- the development impulse of the surrounding areas, by increasing the availability of rail transport.

It is therefore concluded that social conflicts are unlikely at the exploitation stage.

12. COMPARATIVE ANALYSIS WITH OPTIONS ACCEPTABLE FOR THE ENVIRONMENT

The choice of the most favourable option due to the environmental components analysed was based on a number of criteria specific to the different investment options.

The table below shows 18 criteria to be assessed qualitatively and quantitatively during the analysis of the environmental impact of the investment.

Table 155 Environmental criteria with values describing a given criterion for the implementation and operation phase.

LP.	Criteria	W0 – non-investment option	Implementation phase		Operating stage	
			Investment option (W1)	Alternative option (W2)	Investment option (W1)	Alternative option (W2)
1.	Impact on acoustic climate – noise exceedances	1	1	1	1	1
2.	Impact on air and climate	2	2	2	1	1
3.	Impact on the surface of the earth – occupancy of the	1	3	3	2	1
4.	Impact on surface and underground waters – ordering the drainage system	1	2	2	0	0
5.	Effects on animals	1	3	3	1	1

LP.	Criteria	W0 – non-investment option	Implementation phase		Operating stage	
			Investment option (W1)	Alternative option (W2)	Investment option (W1)	Alternative option (W2)
6.	Impact on natural habitats	1	3	3	1	1
7.	Impact on protected plant and fungal species	1	3	3	1	1
8.	Impact on biodiversity of the area	1	2	2	1	1
9.	Impact on protected areas	2	2	2	2	2
10.	Impact on ecological corridors	1	2	2	1	1
11.	Impact on landscape	1	3	3	2	2
12.	Impact on monuments	1	2	2	1	1
13.	Impact for archaeological sites	1	2	2	1	1
14.	Social conflicts — dismantling of journeys	1	3	3	2	2
15.	Conflicts social — demolition of residential buildings	1	1	2	1	1
16.	Possible protests by environmental organisations	1	2	2	1	1
17.	Risk of data conflicts	1	2	2	1	1
18.	Impact for safety – construction of two-level intersections, srk	3	0	0	0	0

0 – positive impact,
1 — no impact,
2 — non-significant impact,
3 — acceptable impact (for the implementation phase – short term)
4 — significant impact,

Source: Develop your own.

Among the above criteria, the most important factors are:

- the impact of the planned investment on the acoustic climate (noise emission level),
- number and type of social conflicts (expropriation, elimination of passages, demolition of buildings, construction of acoustic screens).

Thus, the analysis of the choice of the most environmentally advantageous option was based on a comparison of those environmental components that differentiate the impact of the planned investment on the state of the environment.

Each criterion was compared with pairs and assessed on a scale from 0 to 1, with 1 representing a better environmental impact, 0 – worse environmental impact. Each of the criteria was then assigned weights. Greater weight has been given to this criterion, which has a greater (more significant) impact on the environment and on human health and living conditions. The sum of the weights of the criteria shall be 100 %.

Table 156 Points and weightings of environmental criteria.

L.p.	**Criteria**	**W0 – non-investment option**	**Investment option W(1)**	**Alternative option (W2)**	**Weight [%]**
1	Impact on acoustic climate – noise exceedances	–	1	1	10
2	Impact on air and climate	–	1	1	10
3	Impact on the surface of the earth – occupancy of	–	1	1	6
4	Impact on surface and underground waters – ordering the drainage system	–	**1**	**1**	2
5	Effects on animals	–	**0**	**0**	6
6	Impact on natural habitats	–	**1**	**1**	6
7	Impact on protected plant and fungal species	–	**1**	**1**	2
8	Impact on biodiversity of the area	–	**0**	**0**	2
9	Impact on protected areas	–	**1**	**1**	10
10	Impact on ecological corridors	–	**1**	**1**	10
11	Impact on landscape	–	**1**	**1**	6
12	Impact on monuments	–	**1**	**1**	6
13	Impact on archaeological sites	–	**1**	**1**	2
14	Social Conflicts – Elimination of Travel	–	**1**	**1**	2
15	Social Conflicts – Demolition buildings residential	–	**0**	**1**	6
16	Possible protests environmental organisations	–	**1**	**1**	6
17	Risk of data conflicts	–	**1**	**1**	6
18	Impact on safety – construction of two-level intersections, srk	–	**1**	**1**	2
	Sum				**100**

Source: Develop your own.

The assessment of the different options is the sum of the products of weights and points awarded to a specific criterion. The option with the highest score is the most favourable option for the environment.

Table 157 Evaluation of environmental criteria.

L.p.	Criteria	W0 – non-investment option	Investment option (W1)	Alternative option (W2)
1	Impact on acoustic climate – noise exceedances	–	0,10	0,10
2	Impact on air and climate	–	0,10	0,10
3	Impact on the surface of the earth – occupancy of the area	–	0,06	0,06
4	Impact on surface and underground waters – ordering the drainage system	–	0,02	0,02
5	Effects on animals	–	0	0
6	Impact on natural habitats	–	0,06	0,06
7	Impact on protected plant and fungal species	–	0,02	0,02
8	Impact on biodiversity of the area	–	0	0
9	Impact on protected areas	–	0,02	0,02
10	Impact on ecological corridors	–	0	0
11	Impact on landscape	–	0,06	0,06
12	Impact on monuments	–	0,06	0,06
13	Impact on archaeological sites	–	0,02	0,02
14	Social Conflicts – Elimination of Travel	–	0,02	0,02
15	Social conflicts – demolition of residential buildings	–	0	0,06
16	Possible protests organisations organic	–	0,06	0,6
17	Risk of data conflicts	–	0,06	0,06
18	Impact on safety – construction of two-level intersections, srk	–	0,02	0,02
		SUM	**0,68**	**0,68**

Source: Develop your own.

Acoustic climate

In terms of acoustic impact, the analysed variants are comparable. The difference lies primarily in the addition of a third track over a length of about 18 km and small corrections of the level. The forecast traffic and speeds are allowed to be the same for both variants. In view of the above, the impact of both variants on the acoustic climate in the vicinity of the railway lines under consideration is expected to be similar. Local noise immission differences recorded in receptors on buildings are below 1 dB, so they are not distinguishable by the human ear and can be considered negligible.

Air

At the stage of operation, train traffic will be operated almost entirely by electric traction in both the investment and alternative variants. After the investment has been put into service, regardless of the choice of the investment option, a small flow of combustion vehicles is expected on the analysed lines in the amount of approximately 1 combustion vehicle/h on the 2 sections of line LK229 analysed. The movement of combustion vehicles will be a source of emissions of substances into the air. The amount of emissions of substances from these sources in both the investment and alternative options will be negligible, with no significant negative impact on air quality status.

In addition, the construction/redevelopment of roads and car parks is planned as part of the investment. On these roads and parking lots, vehicles related to service and maintenance on the analysed sections of railway lines will mainly be used. Due to the low volume of traffic, emissions from these sources in both the investment and alternative options will be negligible, with no significant negative impact on air quality.

Natural environment

In view of the fact that the investment option is only slightly different (the construction of a third track on a distance of approx.187.000 km to 205.200 km) and the alternative option, their impact on individual environmental components is similar. In addition, the investment will not constitute a new barrier to the environment, as the railway lines analysed are existing lines (except for planned linkages). Their modernisation will not fundamentally change the way and extent of the impact on protected areas, although the addition of a second track will lead to the occupation of additional areas currently active.

In the case of all identified protected species found in the 2 x 15 m buffer, a permit (derogations from the prohibitions of Article 52 of the Nature Protection Act) will be obtained from the Regional Director of Environmental Protection in Gdańsk in accordance with Article 56 of the Nature Conservation Act before proceeding with the investment, and all works will be supervised by nature supervision.

In the case of natural habitats, fragments of 22 lobes belonging to 6 protected natural habitats have been found in the area of the planned project at a distance equal to or less than 15 m from the extreme track. The total area exposed to destruction is 6.0274 ha, representing 1.42 % of the total area of all identified natural habitats in a buffer 150 m from the extreme axis of the projected track. At intersection sites, the planting of priority habitat 91E0 will be limited to the minimum necessary. In addition, a beneficial solution will be the implementation of replacement plantings of species typical of lagoons characterised by not very high altitude (*e.g. Salix* triandra willows*, S. viminalis* and others). In the case of natural habitats with codes 3150, 6410, 7140, 7230, 91E0 and 91F0 particularly sensitive to changes in water relations, the work will be carried out in a way that does not alter their current water conditions, which are necessary to preserve the habitat. 2 sites of one partially protected plant species (sandwiches) with a total area of 0,0042 hectares are exposed to direct destruction. The destruction of individuals on such a surface will not significantly affect the state of the local population. In places where valuable lichens occur, tree felling will be limited to the necessary minimum. Therefore, from the point of view of the conservation of natural habitats and plant, fungi and lichen species, the planned investment will have a limited negative impact on biodiversity reduction.

As a result of carrying out works related to the implementation of the investment, there may be partial seizure and/or destruction of the habitats of protected species of invertebrates, amphibians, reptiles, birds and mammals, which serve them, among others, to hide, reproduce and forage, as well as to accidentally kill the individuals present there. In relation to protected animal species found in the area of research, the following immediate risks arising from the implementation of the investment have been identified:

- fragmentation and partial destruction of fauna habitats and accidental killing of individuals (mainly invertebrates, potentially amphibians, reptiles, small mammals) within the construction of foundations and heavy equipment workplaces,
- warding of animals (especially invertebrates, birds and mammals) mainly during work related to the suspension and tension of power ducts,
- changing the way the habitat is used by animal species, as well as their partial destruction as a result of felling trees and shrubs.

The proposed measures minimising (including the establishment of natural surveillance) in relation to the impact of the project on natural habitats, protected species of flora, fauna and their habitats will effectively and significantly reduce the negative impact of individual stages of the investment.

Summary

A comparative analysis of the options showed that both would have a similar impact on the environment. The advantage **of choosing the investment option** is the facilities resulting from the construction of 3 tracks on the section Gdańsk Osowa-Gdańsk Główny to improve rail freight traffic. Operational analyses have shown that in a variant without a 3 track, the assumed railway infrastructure is not able to transfer the traffic set up in the transport offer. The transfer of part of road transport to rail, as an expected result of the investment, can lead to increased road capacity and thus also safety for road users.

It is important to emphasise the positive impact of the project on increasing the accessibility of the inhabitants of the region to rail transport both in the context of commuting to work, service centres, culture and tourism (especially on lines where traffic is currently withdrawn or seasonal).

13. CUMULATIVE IMPACT

13.1. Methodology used

In accordance with Article 62a(a). 1 point 11 of the Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and environmental impact assessments (consolidated text: Journal of Laws 2017, item 1405 as amended) in order to assess the possibility of cumulative effects, it is necessary to take into account the projects carried out and implemented on the site on which the project is planned and in the area of impact of the project or whose effects fall within the area of impact of the planned project.

With regard to the investment under analysis, the cumulation of impacts may be caused by a combination of interactions from facilities (industrial plants and communication systems) located in the vicinity of the planned investment. These impacts may occur in terms of increasing noise and vibration levels, increasing dust emissions into the air or increasing emissions of pollutants to surface and groundwater.

The basis for the analysis was information obtained from the Regional Director of Environmental Protection in Gdańsk and from the relevant Municipality/Cities Offices, through which the investment is being carried out (letters are textual appendix 13.11), as well as analysis of orthophotomaps and topographic maps as well as analysis of local spatial development plans, studies of conditions and directions of spatial development.

13.2. Analysis of cumulative interactions

In order to verify the potential accumulation of impacts, in the first stage, the sites identified on the basis of the above information were analysed and selected those whose impacts could accumulate with the project in question were analysed. The criteria on the basis of which the selection was made consisted of:

- the characteristics of the different impacts identified in the document;
- characteristics interactions from Identified Investments (current/planned);
- location relative to the planned investment.

As a result of the selection, the following groups of objects were identified:

Existing projects

- objectsarea/Point including e.g. production facilities, etc.
- objectslinear including national/provincial roads, lines railway.

Planned projects indicated in strategies, plans, etc.,

- objectsarea/point,
- objectslinear.

In the next step, the above-mentioned group of objects underwent a thorough analysis (see table below) specifying the possibility of accumulation of indirect interactions and interactions with identified objects in relation to individual components of the environment.

Table 158. List of sites the impact of which, when combined with the impact of the planned project, may lead to the accumulation of impacts

LP.	Object – short description	Location km of railway/distance/page)	Accumulation of interactions				
			Ground and water environment	Acoustic climate	Atmospheric air and climate	Natural environment	Sights
Existing projects							
1	National Road No. 20	136,096 LK201/80-130 m (P/L)	(0) R, E, L	(1) R, E, L	(0) R, E, L	(1) R, E, L	(0) R, E, L
2	Expressway S6	193,583 (road viaduct)	(0) R, E, L	(1) R, E, L	(0) R, E, L	(0) R, E, L	(0) R, E, L
3	Voivodship road DW468	viaduct over the Gdynia Road, Gdynia Redłowo – km 202,109 LK201	(0) R, E, L	(1) R, E, L	(0) R, E, L	(1) R, E, L	(0) R, E, L
4	Voivodship road DW474	195,453 and 195,493 (two road viaducts)	(0) R, E, L	(1) R, E, L	(0) R, E, L	(0) R, E, L	(0) R, E, L
5	Voivodship road DW218	190,581 (road viaduct)	(0) R, E, L	(1) R, E, L	(0) R, E, L	(0) R, E, L	(0) R, E, L
6	Voivodship road DW211	railway viaduct over DW211 – km 175,424 LK201railway over road DW211 – km 10,614 LK214	(0) R, E, L	(1) R, E, L	(0) R, E, L	(1) R, E, L	(0) R, E, L
7	Voivodeship Road DW214	137,800 LK201 – collision (P/L)	(0) R, E, L	(1) R, E, L	(0) R, E, L	(1) R, E, L	(0) R, E, L
8	Voivodship road DW221	137,600 – 137,850 LK201/10-20 m (P)	(0) R, E, L	(1) R, E, L	(0) R, E, L	(1) R, E, L	(0) R, E, L
9	Voivodship road DW224	railway viaduct over road DW224 – km 8.697 LK214	(0) R, E, L	(1) R, E, L	(0) R, E, L	(1) R, E, L	(0) R, E, L
10	Railway line 202	railway viaduct above railway line 202 – km 202,193 LK201	(0) R, E, L	(1) R, E, L	(0) R, E, L	(1) R, E, L	(0) R, E, L
11	Railway line 248	185,850 – 186,500 – parallel mileage	(0) R, E, L	(1) R, E, L	(0) R, E, L	(0) R, E, L	(0) R, E, L
12	Railway line 250	201,950 – 205,200 – parallel mileage	(0) R, E, L	(1) R, E, L	(0) R, E, L	(0) R, E, L	(0) R, E, L
13	Railway line 253	184,510 – 184,780 – parallel mileage	(0) R, E, L	(1) R, E, L	(0) R, E, L	(0) R, E, L	(0) R, E, L
14	Railway line 211	136,300 – 137,800 – parallel mileage, 139,066 – railway overpass over LK 201	(0) R, E, L	(1) R, E, L	(0) R, E, L	(1) R, E, L	(0) R, E, L
15	Railway line 235	187,850 – 189,370 – parallel mileage	(0) R, E, L	(0) R, E, L	(0) R, E, L	(0) R, E, L	(0) R, E, L
16	Railway line 725	204,537 – 205,200 – parallel mileage	(0) R, E, L	(1) R, E, L	(0) R, E, L	(0) R, E, L	(0) R, E, L

Explanatory notes:
(1) – at the current design stage, there are indications of cumulative interactions,
(0) – at the current design stage, no cumulative effects are foreseen,
(N) – it is impossible to determine unambiguously whether there will be accumulation of interactions – they depend on detailed solutions or other currently unpredictable and included in simulations, conditions/data,
R – implementation stage, E – exploitation stage, L – decommissioning phase.

In view of the above data in the table, the conclusions of the analysis are set out below: **Ground-water environment**

At the stage of implementation, operation and possible decommissioning, it is not foreseen that the impact of the investment analysed with the linear infrastructure (road and rail) could be cumulated, inter alia due to the planned scope of works and the fact that the operation phase of the railway line will not adversely affect the state of the ground-water environment.

Acoustic climate

The analysis of the results of the noise calculations showed that the acoustic impact from railway lines 201, 214 and 229 would be small. Noise with acceptable levels will slightly extend beyond railway areas. Therefore, the calculations of cumulative noise impact mainly show effects from other noise sources outside the scope of the investment. Cumulative effects from railway lines Nos 202, 211, 229, 248, 250, 253 were taken into account. In addition, calculations were carried out taking into account the cumulative impact of railway lines with roads No.: S6, 20, 211, 213, 214, 218, 221, 224, 235. Below are the adopted vehicle traffic parameters converted to 2024 on the basis of GPR 2015.

Table 159. Car traffic – cumulative impact.

Road No	Name of the episode	Light vehicles [p/h]		Heavy-duty vehicles [p/h]	
		Day	Night	Day	Night
474	GDYNIA	1293	193	81	40
S6	GDYNIA GRAND KACK-NODE GDAŃSK OSOWA NODE	4133	615	376	218
20	KOŚCIERZYNA/TRANSITION1/	1217	244	85	25
20	ŻUKOWO/TRANSITION/	1611	324	114	34
20	KORNE-CHURCH	701	141	65	19
224	KARTUZY/GR.M./-EGIERTO	621	92	15	6
211	KARTUZY/SK. FROM DW224/-ŻUKOWO/SK. WITH DK20/	872	131	43	18
218	GDAŃSK/GR.MIASTA/-CHWASZCZYNO	850	128	34	14
214	LEBA-WICKO	420	61	11	4
213	WICKO-IRON	111	16	7	2
211	KARTUZY/SK. DW228/-CARTUZY/SK. FROM DW224/	899	135	30	12
214	KLUKOWA HUTA-KOŚCIERZYNA/SK. WITH DK20/	342	53	25	12
235	KORNE-BRUSY/SK. FROM DW236/	219	33	25	13
235	BRUSY/SK. FROM DW236/-MĘCIKAŁ	324	48	27	14
235	MĘCIKAŁ-CHOJNICE/GR.M./	403	59	29	13
221	NW.KARCZMA-KOŚCIERZYNA/SK. WITH DK20/	264	41	23	9

Source: own study based on GPR 2015

The results of the cumulative noise calculations are given in Map annexes 13.2.-1 and 13.2-2. When analysing the results, it should be noted that the railways covered by the investment do not cause the noise limit values to be exceeded. The increased acoustic impact (isoline of acceptable levels) comes primarily from neighbouring roads. For a more detailed analysis, calculations were made in the receptors on the facades of buildings in the area of accumulation of interactions from railways and roads. The calculations were made for the joint interaction of railways and roads and the roads themselves and the railway lines themselves, in order to better identify the dominant source of noise. The results are presented in the tables in the text annex 13.2-1.

Natural environment

The investment under analysis will affect various environmental components to varying degrees and at different stages, but for most components it is limited to the stage of implementation of the project. In the course of the environmental analysis of the anticipated cumulative impacts, it was found that in the case of the natural environment the possibility of cumulative impacts is foreseen in the case of 8 projects (sites). The cumulative impact will concern sections where work will be carried out on railway viaducts crossing national and voivodeship roads and other railway lines. Therefore, the impact will be local, small in scope, short-lived and reversible. As a result of the works carried out, there may be temporary degradation of natural habitats near the investment, related to carrying out construction works and temporary reduction of the migration of animals and their living conditions. During the modernisation of the line, and especially during the implementation phase, a number of measures will be applied to minimise the negative impact on the natural environment (Chapter 8). No accumulation of environmental impacts is foreseen at the exploitation stage. In other cases, cumulative interactions are not foreseen.

Atmospheric air and climate

At the stage of implementation, operation and possible decommissioning, it is not foreseen that the impact of the analysed investment with the linear infrastructure (road and rail) could be cumulated, inter alia due to the planned scope of works and the fact that the operation stage of the railway line will not adversely affect the state of ambient air. Train traffic will only be operated by electric traction. Only a small movement of combustion vehicles on the analysed railway lines is foreseen after the first full year of operation, i.e.: on the following sections in both the investment and alternative options:

- Kartuzy (old line) lk 229,
- Glincz – Kartuzy Burkhadtwo lk 229.

in an amount of approximately 1 unit of exhaust gas/h on each of the above-mentioned sections.

Sights

In terms of impact on monuments, at the stage of implementation, exploitation and possible decommissioning, the possibility of cumulative interactions of the analysed investment with the linear infrastructure (road and rail) occurring in the immediate vicinity of the investment under consideration is not foreseen.

14. PROPOSAL FOR IMPACT MONITORING PLANNED PROJECT

14.1. Implementation phase

The contractor of the construction works will carry out monitoring during the construction process as part of environmental supervision, which will include checking the correctness of the construction works, their compliance with the recommendations of the environmental permit, the provisions agreeing and the recommendations of this report on the environmental impact.

Construction work will be carried out under (general) nature supervision. This applies to construction works on the entire section of the analysed lines and throughout the duration of the construction works.

A detailed description of the scope and obligation of nature supervision, taking into account individual specialisations, is presented in the table below.

Tab.160 Scope and obligations of natural surveillance.

LP.	Supervision (specialty)	Supervision obligations	Period of supervision	Sections of railway lines subject to supervision
1.	Natural supervision (general) One environmental protection person with at least two years of experience working in the supervision of linear investments	Agreeing on details of how the work is carried out, including the location of construction facilities and bases of construction equipment, technological roads, waste storage sites and toilets Ongoing inspection of the construction works carried out (conformity with the provisions of the decision on environmental conditions and the applicable regulations in the field of environmental and nature protection) Intervention in case of the need to move protected species – halt work in case of risk of destruction of valuable or protected species of plants, fungi, lichens or animals and natural habitats If necessary, prepare derogation applications (for permission to derogate from prohibitions) on the basis of the Act of 16 April 2004 on nature conservation Control of areas in the vicinity of investments identified as valuable natural resources, i.e. in particular nature reserves, Natura 2000 sites, ecological uses, habitats of species, plant species, fungi, lichens and animals and natural habitats identified in the 150 m buffer.	The entire duration of the construction works. Reporting at least once a month.	The entire investment area – all sections of the analysed lines
2.	Natural supervision – botanical specialist botanist (one person) with at least two years of work experience (including at least two botanical natural inventories covering protected plants and Natura 2000 habitats)	The decision on the detailed method of protecting monument trees. If necessary, supervision will decide on the need to protect other trees (not shown in the section on natural monuments) from mechanical damage	Preparation period prior to commencement of construction works. The term is not dependent on the time of year and	The entire investment area – all sections of the analysed lines
		Control of the state of natural habitats and wetlands Water, meadow, peat bog and seaside habitats, i.e. 3150, 6430, 6410, 6510, 7140, 7230, 91E0 and 91F0 should be monitored in detail during the spring, summer and early autumn months (i.e. from 1 April to 30 September) for the presence of protected plant species and for changes in water relations. Checks should take place at least once every 21 days. In the remaining months, the conservation status of the habitats should be checked at least once a month. In case of environmental surveillance – botanical	Growing season (months from early May to mid-October) Where necessary, interventions during the entire construction period	The entire investment area – all sections of the analysed lines with particular attention to the areas indicated in the tables in chapter 8.5 and within the Jar Rzeki Raduni reserve (km 201: 172,550 – 172,770 172,850 – 173,150;173,500 —

LP.	Supervision (specialty)	Supervision obligations	Period of supervision	Sections of railway lines subject to supervision
		protected plant species or patches of natural habitats should be used for surveillance decisions to apply appropriate minimisation measures and to obtain the necessary authorisations to carry out prohibited activities Deciding on the need for additional minimisation measures (e.g. additional temporary fencing, the use of additional valves on drainage ditches, etc.). Environmental supervision – botanical will make such decision on the basis of field inspections carried out during construction works	The necessity of consultation/intervention of botanical surveillance is determined by natural surveillance (general)	173,620), Lago ducks (km 201: 198,200 – 199,100) and ecological use of Lake Kackie (km 201: 193,800 – 195,300)
3.	Mycologist/lichenologist (one person) with at least two years of work experience (including at least two natural mycologic/lichenological inventories)	Supervision during the transfer of Pleurosticta acetabulum *Pleurosticta acetabulum*	Period of relocation of chalice lobster *Pleurosticta acetabulum*	Km 158,135 LK 201
4.	Nature supervision – ornithological	Due to the fact that the potential impacts were not considered significant and the whole project will be carried out under (general) nature supervision, no specialised ornithological supervision is foreseen. Unless tree felling is carried out during the breeding period of birds (from the end of February to 15 October), then ornithological surveillance will be ensured according to the indications described in chapter 8.5 of this report.		
5.	Chiropterological Specialist (one person) with work experience (including at least two Chiropterological Inventories)	Control of engineering facilities, trees, trees that are the potential habitat of bats before they are destroyed/cut Inspection of all sites that may potentially be hiding places, breeding colonies and wintering sites In case of environmental surveillance – chiropterological surveillance of protected bat species, it is necessary to apply appropriate minimisation measures and obtain the necessary authorisations for prohibited activities. Decision on possible minimisation measures following the collection of data on the occurrence of bats	Preparation period before I started construction work Where necessary, interventions during the entire construction period The need for consultation/intervention of chiropterological surveillance is determined by natural surveillance (general)	The entire investment area – all sections of the analysed lines with particular emphasis on engineering facilities for demolition and tree trees, which are a potential habitat for bats before they are cut out

Source: own development

14.2. Operating phase

Due to the anticipated improvement in the acoustic conditions, it does not appear necessary to monitor the impact of the planned investment.

There is no need for monitoring at the exploitation stage due to environmental conditions.

15. DETERMINATION OF THE NEED TO ESTABLISH AN AREA LIMITED USE

The need to create an area of limited use arises from Article 135 of the Environmental Protection Law Act of 27 April 2001 and is related to the lack of technical, technological and organisational solutions available to ensure compliance with acoustic environmental quality standards.

On the basis of the results of the acoustic analyses presented, there is no need for a restricted use area at this stage. Where a post-implementation analysis (range below) reveals that environmental noise levels are exceeded, decisions may be taken, depending on the available noise abatement possibilities, to create a restricted-use area in accordance with the provisions of Article 135(1). 1 and paragraph. 5 of the Environmental Protection Act.

Scope of post-implementation analysis

In order to verify the correctness of the assumptions made and to check the actual acoustic impact in places where there is a possibility of small noise exceedances (up to 1 dB), it is recommended to perform a post-implementation analysis in the field of noise. It is proposed to carry out measurements at the following points (receptors):

Table 161 List of noise measurement points location – W1 and W2 variants.

Receptor number	Coordinate X [m]	Coordinate Y [m]	Side of the railway line	Distance from the railway line	Mileage of the railway line	Type of site	Noise limit values [dB(A)]	
							Time of day	Time of
10	433799,4	699171,2	P	36	141 + 134	MR	65	56
43	438528,7	706760,6	L	35	150 + 987	MR	65	56
71	440748	708379,5	L	32	153 + 788	MN	61	56
95	447629,7	712681,5	P	29	163 + 434	MN	61	56
111	449668,1	713928,3	L	22	166 + 016	MU	65	56
116/117/118	449771,5	713941,6	L	24	166 + 121	MU	65	56
175	461420,3	722986,8	P	23	181 + 961	MU	65	56

Source: own development

The control measurements carried out as part of the post-implementation analysis are aimed at:

verification of the accuracy of acoustic forecasts, traffic forecasts presented here,
determination of the actual values of the equivalent sound level A in the environment,
allow the effective effectiveness of the protective measures taken to be determined,
confirm compliance with acoustic standards in the environment or indicate the need for additional measures (construction of additional safeguards), including the creation of restricted use areas.

The measurement procedure should be in line with the Environmental Measurement Regulation. It is recommended to carry out control measurements of environmental noise within one year after the end of the investment.

Where exceedances of sound levels in the environment are demonstrated, the results of acoustic monitoring will form the basis for a decision on whether to take further anti-noise measures or to designate an area of restricted use.

16. DESCRIPTION OF DIFFICULTIES RESULTING FROM DEFICIENCIES

TECHNIQUES

During the work on the report, no precise design solutions were available (construction project, pre-measures of works). It was based on the data contained in the prepared feasibility study and on current information obtained from the Investor (PKP PLK S.A.). For this reason, the analyses carried out were based on general technical assumptions and expert experience gained in carrying out similar tasks. In the absence of data in accordance with the precautionary principle, the least favourable scenarios/assumptions were used to determine the environmental impact of the planned project.

The analysis in the field of the natural environment was based on data contained in the available literature, scientific and technical journals, as well as documents and legal acts concerning forms of nature protection, and no difficulties were encountered which could affect the actual finding of nuisance of the project on the environment. In addition, the results of the natural inventory made available by the Investor and obtained from the RDOŚ in Gdańsk were used.

In addition, difficulties have been encountered with regard to acoustic analysis.

The acoustic impact during the implementation phase depends on the characteristics of the equipment used – the type of device, its technical condition, as well as the number of machines working. Due to the fact that at this stage of the project there is insufficient information in this respect (the selection and technical condition of the equipment is the responsibility of the Contractor of construction works), it is not possible to precisely determine the impact of the investment during the implementation phase.

During the preparation of this report, it was based, inter alia, on data contained in the available literature and scientific and technical journals, and no difficulties were encountered that could have an impact on the actual finding of nuisance of the projected investment on the environment.

The best available methods for assessing these risks, used at home and abroad (European Union), have been used to develop acoustic climate risks in the environment.

When analysing the ready-made noise spread model, one should be aware of the errors generated at the various stages of the procedure:

Data errors – traffic data entered into the model is a forecast that must take into account a number of factors, all of which cannot be properly predicted and estimated. From the prepared data, a model is constructed that simplifies reality.

Errors of calculation – result from the need to perform calculations using a methodology that does not take into account technological progress. Rolling stock included in the RMR methodology dates back to the turn of the century.

The uncertainty of the calculation method used for noise forecasting and the predictive nature of the input data (e.g. used for the calculation of acoustic traffic volumes, type of rolling stock) determines the accuracy of the presented acoustic analyses at the level of approx. 1-2 dB.

17. SUMMARY

<u>Ground-water environment</u>

In order to determine the possible impact of the project on the ground-water environment, an analysis of geological, hydrogeological and hydrological reconnaissance was carried out in a buffer of 500 m from the railway lines concerned.

Railway line No 201 crosses 8 watercourses constituting 7 surface water bodies (Bibrowa, Rakownica, Radunia, Mała Słupia, Strzelanka, Wysocki, Tributary from Wielki Kack, Kacza), railway line No 214 crosses one such river (Radunia), while the other lines do not cross rivers constituting jcwp.

The area of the investment in question is located within eight catchment areas of the JCWP: Wierzyca with lakes Grabowskie and Wierzysko to the outflow from the castle (RW200017298173), Wda to the outflow from Wdzydze (RW200025294379), Radunia from the outflow from Ostrzycki to Strzelenka (RW20001948683), Little Słupina with lakes Sitno, Monastery Duże, Białe (RW200017486829), Strzelenka with Lake Tuchomskie (RW200017486849), Kacza (RW20001747989), Tributary from Rąt (RW2000174868178). The update for the JCWP through the catchment areas of the analysed railway lines sets out the following environmental objectives:

- for 5 JCWP established for purpose reachgood environmental status/potential and the achievement of good chemical status,
- for 3 JCWP established for purpose upkeep good environmental status/potential and achieving good chemical status.

In the area concerned, there were 4 lakes constituting surface water bodies: Jez. Ostrzyckie, Patulskie, Dąbrowskie, J. Wierzysko. The distance from the axis of railway line No 201 to the nearest lake (jez. Ostrzyckie) is about 33 m. It is anticipated that this distance should be sufficient to ensure that the implementation of the investment does not adversely affect the qualitative and quantitative status of the lake's waters. In the buffer 500 from the railway lines concerned, there were still 10 lakes not constituting jcwp and several dozen small water reservoirs. The CBWP's assessment of the risk of non-achievement of environmental objectives according to the APGW showed that 4 CBWPs are at risk of failing to meet environmental objectives. They were therefore covered by the derogation under point 4(4)-1 of the WFD and extended the deadline for achieving the environmental objectives until 2021.

The investment in question crosses 1 flood-prone area located in the commune of Żukowo in the area of intersection by LK 201 river Mała Słupina (from km approx. 177,270 to km approx. 177,280)

The area under development is located within two Uniform Parts of Underground Waters: PLGW200013 and PLGW200028. They are of good quality and quantitative status and are not at risk of failing to meet the environmental objectives set out in the APGW.

All the railway lines concerned are within the boundaries of the quaternary main groundwater reservoir GZWP111 Subniecka Gdańska

During the investment phase, construction works may contribute to the potential pollution of the ground-water environment, which may occur as a result of the leaching of hazardous substances from improperly stored waste, incorrect organisation of construction facilities, or direct leakage to surface waters; short-term and local disturbance of water flow and smudging as a result of works carried out in the riverbed. The implementation of the investment will periodically and in the short term affect the aquatic environment – after completion of the works, this impact will cease.

Actions minimising the negative impact of investments at the implementation stage:

1. Construction facilities, including machine park, material bases, waste storage sites, localise: at a minimum distance of 50 m from the watercourses or off the flood path, if its width is less than 50 m; outside the wetlands.
2. Places of refuelling of construction machinery and places of operation of mechanical equipment protect against possible contamination of the ground-water environment by curing e.g. concrete slabs and sealing e.g. with geotextiles
3. The construction facilities shall be provided with measures to combat spillage and spillage of hazardous substances, including: mats, sorbents.
4. The construction facilities are provided with portable sanitary facilities, which will be systematically emptied.

During the operation of the railway line, there will be no negative impact on the aquatic environment. Rainwater and meltwater from railway areas do not constitute a source of pollution with petroleum hydrocarbons and a general suspension as shown by the results of analyses carried out on behalf of PKP PLK A.S in 2013 and 2014.

Actions minimising the negative impact of investments at the implementation stage:

1. Regularly clear grasses, demulgate and remove waste from railway drainage trenches.
2. Conduct systematic cleaning of bridges and culverts with low light.
3. Use herbicides in doses recommended by the manufacturer, for which the Minister of Agriculture and Rural Development has issued an appropriate authorisation for the placing on the market and use of those products which have undergone a risk assessment with regard to human and animal health and the environment, in accordance with the provisions of the Plant Protection Products Act of 8 March 2013. In addition, the provisions of the Regulation of the Minister of Agriculture and Rural Development of 31 March 2014 on the conditions of use of plant protection products determining, inter alia, the minimum distance from water reservoirs and watercourses and apiaries for the application of the product, weather conditions, i.e. wind speed and direction, relative humidity of the air, in which the product can be applied or in the manner indicated on the label of the preparation, should be complied with.

Air and climate

Emissions of substances to air arising during the investment are of a periodic nature. Using machinery and equipment equipped with internal combustion engines meeting the emission performance requirements in accordance with the Regulation of the Minister of Economy of 30 April 2014 on detailed requirements for internal combustion engines in the field of limiting the emission of gaseous and particulate pollutants by these engines (Dz. U.S. 2014 item 588), there is no need for solutions to protect the environment from adverse effects on air pollution at the construction stage.

The only nuisance for the environment can be associated with dusting during dry and windy periods, transported earth masses and raw materials. This inconvenience will be reduced by the use of protective covers against excessive dust.

At the operational stage, railway lines will not adversely affect the state of ambient air. Train traffic will only be operated by electric traction. Low internal combustion vehicle traffic is expected in the amount of approximately 1 combustion vehicle/h on 2 sections of the LK 229 railway line analysed.

Analysing the impact of the investment on the climate, it was considered that according to the results of the analyses it is concluded that the planned route will not generate significant impacts on climatic conditions, both at the stage of implementation and exploitation.

The exploitation of this investment will improve the climate by taking over part of the traffic from road transport.

Noise

At the stage of construction, the source of noise emitted to the environment will be the machines and equipment used in the construction. This impact will be short-lived and moving along with the front of the works. Due to the type of work carried out, the use of heavy machinery is necessary. Reducing the nuisance of noise generated during the construction of a railway line is complicated due to the dimensions of the machinery, the technological requirements and the characteristics of the noise sources themselves. The best solution to reduce noise during construction is to reduce it at source by using modern machines and equipped with elements that reduce noise emissions into the environment (i.e. suppression of engines, exhaust discharges) that comply with the applicable regulations.

noise emissions and appropriate organisation of works in such a way that the work of the loudest machines is as short as possible in the area of built-up areas.

The computational model used for noise impact forecasts is based on: the existing numerical land model taking into account the planned changes (e.g. track adjustment), inventoryed development and land use. The model is based on the results of noise measurements made at points in the vicinity of the analysed railway line. The results of the measurements were used to calibrate sound sources – railway lines – in order to reproduce as accurately as possible the actual acoustic conditions in the computer model. Then, forecast train volumes and speeds were introduced into the calibrated model, taking into account the improvement of track condition and the quality of rolling stock, and area calculations (noise maps) and calculations at points on the facades of buildings were made. The calculation takes into account the impact of noise from other railway lines outside the scope of the investment.

The calculated values for exceeding the permissible noise levels are small. Based on the results of calculations in points on the facades of buildings for each storey, it was found that exceedances will occur at night and amount to no more than 2 dB. Given the uncertainty of the results of the calculation, it was decided that for overruns of less than 1 dB, no protection would be proposed at this stage – in these places, measurement points were designated to carry out noise tests at the stage of preparation of the post-implementation analysis, which will determine the actual impact of the railway on the acoustic climate. For exceedances 1-2 dB it was proposed to use acoustic protections in the form of dampers mounted on rails. After offering acoustic protections, in order to verify them, the area calculations (noise maps) and calculations at points on the facades of buildings were again carried out. The noise ranges shown in the annexes after the application of the safety features show that the above-mentioned solutions will be sufficient to ensure acoustic comfort in the adjacent acoustically protected building. The table with the results of the calculations in the receptors set out in the text annex shows that no exceedance of the permissible environmental noise level in the building area for which these safeguards are proposed will occur after the safety features are applied.

Sights

The project does not foresee interference with historic buildings located in the immediate vicinity of lines 201, 214, 219. Only those monuments (protected in the register of monuments) that form part of these lines – bridge structures, culverts and cubature buildings related to the need to manage traffic on the line remain in collision with the analysed railway lines.

The planned scope of modernisation works will not interfere with the state and structure of protected urban areas (Gdyni, Kartuz and Kościerzyny). Modernisation works will not affect the spatial structure of these areas. They will be implemented within the boundaries of areas separated as railway areas already transformed for the purpose of this function.

The analysed railway line No. 201 borders directly with archaeological protection zones. Directly at the track or in the buffer zone, there are areas where archaeological monuments from different prehistoric periods have been discovered during surface studies.

Nature is revived

In order to characterise the state of the natural environment and verify the existence of migration corridors and animal movement paths on the route of the planned railway line, a natural inventory was carried out in the period from August 2016 to 30 April 2017. Nature studies included the following railway lines with a buffer of 150 m on each side of the line: No 201 – km 136,096 to 205,200, No 214 – km -0.229 to 8,150, No 229 – km 31,000 to 42,100 and the linkage – km 8,150 – 11,400.

As a result of the conducted natural inventory, 14 natural habitat types Natura 2000 (including 3 priority), 3 vascular plant species and 6 moss species under partial protection were found. Among the identified natural habitats most likely to be destroyed in the 15 m buffer are: peat bogs (7110, 7140, 7230), logs (91E0, 91F0), old-growth and natural reservoirs (3150), acid and fertile beech (9110, 9130) and sub-Atlantic Game (9160). 13 species of macroscopic fungi and 14 species of lichen have also been identified in the planned investment area. The identified fauna in the investment area covers the presence of 20 species of invertebrates, including 18 species under species protection, 7 species of fish and minogs, including 5 taxa listed in the Annexes to the Habitats Directive, 5 species of amphibians and one group of species, 2 reptile species, 76 species of birds, including 65 species under strict protection, 6 species of partial protection, 6 species listed in Annex I to the Birds Directive and 5 species of game, 8 species of bats and 19 mammal species, of which 7 under partial species and 2 listed in Annexes II and IV of the Habitats Directive.

The analysed investment at the implementation stage will have an impact on the identified natural habitats and habitats of flora and fauna species, which are located up to 15 m from the extreme axis of the track. In this area, natural habitats, flora and fauna habitats may be transformed and/or destroyed.

At the exploitation stage with properly carried out construction works (especially works related to land drainage), the modernised and newly built railway line will not have a significant negative impact on natural habitats. Potential threats to Natura 2000 natural habitats at the exploitation stage may be invasive species or random events, e.g. fire, railway disaster. The possible impact at the exploitation stage of the project on ichthyofauna may be associated with the drainage of rainwater and melting water from railway lines to surface waters. In the case of herpetofauna, avifauna and teriofauna, the adverse effects of the operation of the railway line may be manifested in the so-called barrier effect, as well as may affect the mortality and disturbance of identified animal species. However, given the fact that the analysed railway line has been operating in the described course for many years, this impact will not be significant. However, no negative effects are expected at the exploitation stage on the fungal population, including lichens, invertebrates and bats.

Actions minimising the negative impact of investments at the implementation stage:

1. Construction sites will be located outside river valleys, construction facilities, material and waste landfills will be located at a distance of at least 50 m from the river or outside the floodplain if its width is less than 50 m and at a distance of at least 20 m from trees and shrubs, wetlands, old-growths and water reservoirs and drainage ditches
2. Construction facilities, material and equipment bases and waste collection sites will be designated outside the sites of the Natura 2000 site Uroczyska Pojezierza Kaszubskiego PLH220095, Natura 2000 Jar Rzeki Raduni PLH220011 and the Jar Rzeki Raduni Nature Reserve, as well as the Kacze Łęgi Nature Reserve, as well as outside the natural inventory of species subject to legal protection under the Act of 16 April 2004 on Nature Protection (Journal of Laws of 2004, no. U. of 2018 item 142 as amended) and natural habitats and species of Community interest, in accordance with the Regulation of the Minister of the Environment of 13 April 2010 on natural habitats and species of Community interest, as well as criteria for the selection of areas eligible for recognition or designation as Natura 2000 sites (Journal of Laws of 2010, No. U. 2010 No. 77 item. 510)
3. The organisation of construction works, including the movement of vehicles serving the investment, shall be designed in such a way as to prevent any interference in nature reserves: Rzeki Raduni and Kacze Łęga,
4. For the duration of the construction work, the following sites will be labelled or temporarily rewarded in order to prevent accidental damage to the patches of habitats: the boundaries of the nature reserve Kacze Łęgi, from km 198,200 to km 199,100, LK 201, the limits of the Jar Rzeki Raduni nature reserve, located up to 30 m from the axis of the track, Natura 2000 natural habitats located within 15 m from the axis of the track,
5. During the period of migration, amphibious reproduction and amphibious dispersion, i.e. in the period from 15 February to 15 May and from 15 September to 15 November, the entire area of the planned investment will provide herpetological supervision, which, in cases necessary, will indicate the need for temporary fences, preventing migratory amphibians from entering the place where the current construction works and the movement of construction vehicles take place. A fence for amphibians in the form of fences of geotextile strips or polymer mesh with a mesh diameter of about 5 mm will be used. The height of the fence should be not less than 50 cm, the fence will be dug into the ground to a depth of 10 cm,
6. Works related to removal of the topsoil will be carried out outside the breeding period of birds, i.e. outside the period from 1 March to 31 August. The topsoil layer will be stored outside the sites of species subject to legal protection under the Act on Nature Conservation and Natural Habitats and Species of Community Interest, in accordance with the Regulation of the Minister for the

Environment of 13 April 2010 on natural habitats and species of Community interest, as well as criteria for the selection of areas eligible for recognition or designation as Natura 2000 sites,

7. Works involving the renovation and reconstruction of bridges and viaducts will be carried out under the supervision of a natural specialist – ornithologist,
8. Work related to the felling of trees and shrubs, especially in areas constituting bird breeding grounds and the felling of trees constituting potential sites of summer shelters or breeding colonies of bats, will be carried out outside the breeding season of birds and after leaving breeding colonies and bat groups, i.e. outside the period from 1 March to 31 August. Tree felling will be carried out under ornithological and chiropterological supervision,
9. As part of nature compensation, in order to minimise the impact of the investment related to the felling of trees, substitute places of refuge and nesting for birds in the form of breeding booths in the amount of 60 pieces will be created, as well as for bats in the form of booths/shelters amounting to 10 pieces,

All trees and shrubs unplanned for felling, occurring in the vicinity of the planned investment, will be protected against mechanical damage.

18. SOURCES OF INFORMATION

Legal acts

1. Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (OJ EU L of 28 January 2012).
2. Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and environmental impact assessments (uniform text: Dz. U. 2017 item. 1405, as amended).
3. Act of 27 April 2001 Environmental Protection Law (consolidated text: Dz. U. 2018 item 799, as amended).
4. Regulation of the Council of Ministers of 9 November 2010 on projects likely to have significant effects on the environment (uniform text: Dz. U. 2016 item 71).
5. The Rail Transport Act of 28 March 2003 (Journal of Laws 2017 item. 2117, as amended).
6. Ordinance of 12 April 2002 of the Minister of Infrastructure and Development on the technical conditions to be met by buildings and their location (i.e. U. 2015 item 1422, as amended).
7. Act of 16 April 2004 on nature conservation (Dz. U. 2018 item 142, as amended).
8. Regulation of the Minister for the Environment of 17 September 2014 on the publication of a consolidated text of the Regulation of the Minister for Infrastructure on distance requirements and conditions allowing the location of trees and bushes, elements of acoustic protection and earthworks in the vicinity of the railway line, as well as the method of arranging and maintaining snow curtains and fire-fighting strips of earthworks (Journal of Laws of 2014, No. U.S. 2014 item 1227).
9. Regulation of the Minister of the Environment of 24 August 2012 on the levels of certain substances in the air (Dz. U.P. 1031).
10. Regulation of the Minister of the Environment of 2 August 2012 on zones in which air quality assessment is carried out (Journal of Laws of 2012, No. U.P. 914).
11. Regulation of the Minister of the Environment of 26 January 2010 on the reference values for certain substances in the air (Journal of Laws of 2010 No. U. No. 16 item. 87).
12. Act of 28 July 2005 on spa treatment, spas and spa protection areas and spa towns (consolidated text: Journal of Laws 2017, item 1056).
13. Regulation of the Minister of Economy of 30 April 2014 on detailed requirements for internal combustion engines with regard to the limitation of emissions of gaseous pollutants and particulate matter from these engines (Journal of Laws of 2014, No. U.S. 2014 item 588).
14. Regulation of the Minister for Infrastructure and Construction of 20 April 2016 amending the Regulation amending the Regulation on distance requirements and conditions allowing the location of trees and bushes, acoustic protection elements and earthworks in the vicinity of the railway line, as well as the method of organising and maintaining snow curtains and fire-fighting belts (Journal of Laws 2016, item. 563).

15. The Waste Act of 14 December 2012 (consolidated text: Journal of Laws 2018, item 992, as amended).
16. Regulation of the Minister for the Environment of 9 December 2014 on the Waste Catalogue (Journal of Laws 2014, item. 1923).
17. Act on the management of packaging and packaging waste (uniform text: Dz. U. 2018, item. 150, as amended).
18. Act of 13 September 1996 on the maintenance of cleanliness and order in municipalities (uniform text: Journal of Laws 2017, item 1289, as amended).
19. Regulation of the Minister for the Environment of 11 May 2015 on the recovery of waste outside installations and equipment (Journal of Laws 2015, item 796).
20. Regulation of the Minister for the Environment of 10 November 2015 on the list of types of waste that natural persons or organisational units that are not entrepreneurs may undergo recovery for their own needs and acceptable methods of their recovery (Journal of Laws of 2015, No. U. 2016 item 93).
21. Act of 24 April 2009 on batteries and accumulators (uniform text: Journal of Laws 2016, item 1803, as amended).
22. Regulation of the Minister of Economy of 5 October 2015 on the detailed treatment of waste oils (Journal of Laws 2015, item 1694).
23. Water Framework Directive 2000/60/EC (RDW) of 23 October 2000.
24. The Water Law Act of 20 July 2017 (uniform text: Dz. U. of 2017 item. 1566, as amended).
25. Regulation of the Minister of the Environment of 21 July 2016 on the method of classification of the status of surface water bodies and environmental quality standards for priority substances (DZ.U. 2016, item. 1187).
26. Regulation of the Minister for the Environment of 21 December 2015 on criteria and methods for assessing the status of groundwater bodies (DZ.U. 2016, item 85).
27. Regulation of the Minister of the Environment of 14 June 2007 on permissible levels of environmental noise (uniform text: Journal of Laws 2014, item 112).
28. Regulation of the Minister for the Environment of 16 June 2011 on requirements for the measurement of levels of substances or energy in the environment by the operator of a road, railway, tram line, airport or port (Journal of Laws 2011 No 140 item. 824).
29. European Commission Decision 2011/229/EU of 4 April 2011 concerning the technical specification for interoperability relating to the subsystem 'rolling stock – noise' of the trans-European conventional rail system.
30. Water Framework Directive 2000/60/EC (RDW) of 23 October 2000.
31. Regulation of the Minister of the Environment of 21 July 2016 on the method of classification of the status of surface water bodies and environmental quality standards for priority substances (DZ.U. 2016, item. 1187).
32. Regulation of the Minister for the Environment of 21 December 2015 on criteria and methods for assessing the status of groundwater bodies (DZ.U. 2016, item 85).

<u>Literature</u>

1. Development and implementation of a Strategic Adaptation Plan for sectors and areas sensitive to climate change", stage III, Institute of Environmental Protection – National Research Institute, Warsaw, September 2013.
2. EMEP/Corinair Emission Inventory Guidebook – 2007. Technical report No 16/2007.
3. Emission factors for diesel engines were adopted on the basis of the study "EMEP/Corinair Emission Inventory Guidebook – 2007". Technical report No 16/2007.
4. Letter from the Pomeranian Voivodeship Inspector for Environmental Protection, dated 23 May 2018 setting out the state of air quality.
5. Red. H. Lorenc, Natural Disasters and Homeland Security, Warsaw, 2012.
6. Climate Atlas of Poland edited by Halina Lorenc, Institute of Meteorology and Water Management, Warsaw 2005.
7. Assessment of air quality in Pomorskie Voivodeship for 2017.
8. B. Rymsza, Development of sensitivity indicators for the transport sector to climate change. Selection of key elements of the transport system (infrastructure, means of transport, traffic conditions) particularly sensitive to climatic phenomena with impact assessment, Warsaw, 2010.

9. Report on the environmental impact of the project for investments entitled "The second stage of the revitalisation and modernisation of the Kościerski Corridor with the modernisation of the srk equipment and the electrification of railway lines No. 201, 214, 229 and the PKM line", Multiconsult, Warsaw February 2017.
10. Update of the Water Management Plan in the Vistula River Basin Area
11. PKP Polskie Linie Kolejowe S.A. has developed a project entitled 'Analysis of the qualitative composition of rainwater and meltwater from railway areas'.

<u>Websites</u>

http://klimada.mos.gov.pl/zmiany-klimatu-w-polsce/tendencje-zmian-klimatu/
http://mjwp.gios.gov.pl/mapa/mapa,172.html
http://www.isok.gov.pl/