2026

# Environmental and Social Management Framework

Version 2

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# List of Abbreviations

| Abbreviation | Full Form / Explanation |
|---|---|
| **AoF** | Area of Influence |
| **B2B** | Business to Business (civil law contracts for business owners) |
| **BDO** | Biochemical Oxygen Demand |
| **BDO (BDO register)** | Waste Database |
| **BIOZ** | Occupational Health and Safety Plan |
| **BMP** | Biodiversity Management Plan (BMP) |
| **C-ESMP** | Contractor's Environmental and Social Management Plan (ESMP) |
| **CHMP** | Cultural Heritage Management Plan |
| **CITES** | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| **Civil Code / CC** | Civil Code |
| **Construction Law** | Act – Construction Law |
| **Contract Engineer** | The entity responsible for construction supervision and quality assurance, appointed by the PIU. |
| **DD** | Due Diligence |
| **DEC** | Decision on Environmental Conditions |
| **DUC** | Dam under construction |
| **E&S** | Environmental and Social |
| **EHS / EHSGs** | Environmental, Health, and Safety Guidelines |
| **EIA** | Environmental Impact Assessment |
| **ESF** | Environmental and Social Framework (World Bank) |
| **ESIA** | Environmental and Social Impact Assessment |
| **ESMF** | Environmental and Social Management Framework – this document (ESMF) |
| **ESMP** | Environmental and Social Management Plan |
| **ESPOE** | The Panel of Environmental and Social Experts |
| **ESS** | Environmental and Social Standards |
| **EUTR** | Regulation (EU) No. 995/2010 (on the placing of timber and timber products on the market) |
| **FIDIC** | International Federation of Consulting Engineers |
| **FLEGT** | Regulation (EC) No. 2173/2005 (on timber trade) |
| **FRMP** | Flood Risk Management Plan |
| **GIIP** | Good International Industry Practice |
| **GIOŚ** | Chief Inspectorate for Environmental Protection |
| **GRM** | Grievance Redress Mechanism |
| **GUS** | Central Statistical Office |
| **GWB** | Groundwater Body |

| Abbreviation | Full Form / Explanation |
|---|---|
| **HI** | Hydraulic Infrastructure |
| **IAS** | Invasive Alien Species |
| **IDSPoE** | Independent Dam Safety Panel of Experts |
| **IFC** | International Finance Corporation |
| **IMGW-PIB** | Institute of Meteorology and Water Management – National Research Institute |
| **IPIP** | Investment Project Implementation Permit (a decision issued under the Special Act on Flood Protection allowing for construction of a Flood Protection Project) |
| **k.p. / KP** | Labor Code |
| **KIP** | Project Information Sheet |
| **KOWR** | National Center For Agricultural Support |
| **KPA** | Code of Administrative Procedure |
| **LARAP** | Land Acquisition and Resettlement Action Plan |
| **LARF** | Land Acquisition and Resettlement Framework |
| **LMP** | Labor Management Procedures |
| **MCA** | Multi-Criteria Analysis |
| **MEF** | Minimum Environmental Flow |
| **NBS** | Nature-based Solutions |
| **O&M** | Operations and Maintenance |
| **ODS** | Ozone-Depleting Substances |
| **OHS** | Occupational Health and Safety |
| **OZP** | Flood-Prone Areas |
| **PAP(s)** | Project-Affected Person(s) |
| **PCB** | Polychlorinated biphenyls |
| **PCU** | Project Coordination Unit |
| **PDO** | Project Development Objective |
| **PGW WP**<br>**PGW Wody Polskie** | State Water Holding Polish Waters (*Państwowe Gospodarstwo Wodne Wody Polskie*) |
| **PIU** | Project Implementation Unit / Project Implementation Units - State Water Holding Polish Waters Regional Water Management Directorate in Wrocław, Kraków, Rzeszów, and Warsaw |
| **POPs** | Persistent Organic Pollutants |
| **POŚ** | Environmental Protection Act |
| **PPE** | Personal Protective Equipment |
| **QA/QC** | Quality Assurance / Quality Control |
| **RDOŚ** | Regional Directorate for Environmental Protection |
| **REMA** | Act of August 21, 1997, on Real Estate Management |
| **SEA/SH** | Sexual Exploitation and Abuse / Sexual Harassment |
| **SEF** | Stakeholder Engagement Framework |
| **SEP** | Stakeholder Engagement Plan |
| **SPA2020** | Strategic Adaptation Plan for Climate-Vulnerable Sectors and Areas through 2020 with a Vision to 2030 |
| **Special Act on Flood Protection /SAFP** | Act of July 8, 2010, on Special Rules for the Preparation and Implementation of Projects Concerning Flood Control Structures |
| **SSE** | Special Economic Zone |
| **SWB** | Surface Water Body |
| **u.o.g.r.l.** | Act on the Protection of Agricultural and Forest Lands |
| **u.odp.** | Waste Act |
| **u.z.s.ś.** | Act on the Prevention and Remediation of Environmental Damage |
| **UDP** | Public Roads Act |
| **UGN** | Real Estate Management Act |
| **UL** | Forest Act |
| **UOOŚ** | Act on Access to Information on the Environment and Its Protection, Public Participation in Environmental Protection, and Environmental Impact Assessments |
| **UOP** | Nature Conservation Act |
| **UOZ** | Act on the Protection and Care of Historical Monuments |

| Abbreviation | Full Form / Explanation |
|---|---|
| **ust. IOŚ** | Act on the Environmental Protection Inspectorate |
| **Water Act** | Water Law Act |
| **WB** | World Bank |
| **ZUS** | Social Insurance Institution |

# 1 Summary

This Environmental and Social Management Framework (ESMF) was developed to serve and support implementation of the Climate Resilience in Water Management Project. The purpose of this document is to define the principles and procedures and assign responsibility for the assessment, management, and monitoring of the Project's potential environmental and social risks. The document establishes a framework for activities whose detailed scope, location, and technical solutions are not yet fully known at the Project preparation stage.

The principal objective of the Project is to reduce the risk of floods and droughts in Poland and to provide protection for people living in the areas covered by the Project implementation. The impetus for its preparation is the worsening water shortage and the growing threat of flooding.

The history of flooding in the Vistula and Odra river basins shows an increasing frequency and intensity of extreme events. The earliest recorded floods date back to the early twentieth century. In 1997, the "flood of the millennium" occurred. In 2024, a flood of comparable magnitude to historic events took place, but occurring more frequently than in the past. This trend is consistent with climate change projections for Poland. These projections foresee an increased frequency of torrential rainfall and more sudden rises in water levels. They also foresee longer and more intense periods of drought. These threats are of a varied nature. In some regions, sudden, sharp flood surges dominate. In others, prolonged water scarcity occurs. For this reason, the Project does not rely on a single type of intervention. The Project is composed of a complementary set of measures, tailored to different aspects and scales of climate risk. The first element is hydraulic infrastructure, comprising dry polders and retention reservoirs. It provides flood storage capacity and retention capability at critical points in the catchment. The second element is Nature-based Solutions (NBS). These increase natural water retention capacity. At the same time, they mitigate the effects of both floods and droughts. The third element consists of non-structural measures. These include the modernization of monitoring, forecasting, and early warning systems. They increase the capacity to respond to extreme events, independent of the progress of infrastructure

works. The Project therefore combines different types of measures. Together, they reduce the impact of floods and droughts on the region's residents.

In summary, the Project consists of four components:

- Component 1: Enhancing resilience to climate risks in the Upper and Middle Vistula River Basin,
- Component 2: Enhancing resilience to climate risks in the Upper and Middle Odra River Basin,
- Component 3: Strengthening institutional capacity to mitigate the impact of floods and droughts,
- Component 4: Project Management, Monitoring, and Evaluation.

Within each of the above components, investment Tasks have been identified – Tasks are the smallest operational elements of the Project, constitutes a specific investment or institutional activity. A list of all Tasks planned under the project is provided in Table 1 in subsection 2.3.

The exact locations and technical parameters of all the Tasks falling within the scope of each component have not yet been finalized and will be determined during further project work. Exception is the Kamieniec Ząbkowicki reservoir, for which concurrently with this ESMF an ESIA is being developed. The ESIA integrates an ESMP, LARAP, SEP, and site-specific grievance mechanisms. The final siting, delineation, extent, and scope of other Tasks remain dependent on the outcomes of ongoing and planned technical studies, including hydrological and hydraulic analyses, environmental and social assessments, consideration of impact avoidance and minimization measures, and the development of engineering designs. Accordingly, the environmental and social baseline presented in this ESMF is based on publicly available regional and national data, aggregated to the level of the municipalities and counties where individual Tasks are planned to be implemented. The scope and level of detail of the information currently available differ depending on the type of intervention, reflecting the different nature of each component category. Environmental and social assessments for these Tasks will be conducted immediately after they are finalized.

This ESMF has been prepared in accordance with national and World Bank's Environmental and Social Framework (ESF) requirements.

This ESMF serves as the main environmental and social (E&S) risk management framework for the Project. Its preparation is required by the World Bank for projects in which not all Tasks are known at the time of Project appraisal. The ESMF provides guiding principles and defines procedures for risk assessment and classification, guidelines for selecting specific instruments, mitigation measures, requirements for implementation, monitoring, and reporting, as well as the allocation of responsibilities and required resources. The ESMF also applies to any Associated Facilities[1] that may be identified in accordance with the requirements of the ESF. (*Associated Facilities meaning facilities or activities that are not funded as part of the Project and are: (a) directly and*

[1] (*Associated Facilities meaning facilities or activities that are not funded as part of the Project and are: (a) directly and significantly related to the Project; (b) carried out, or planned to be carried out, contemporaneously with the Project; and (c) necessary for the Project to be viable and that would not have been constructed, expanded, or conducted if the Project did not exist. For a facility or activity to be considered an Associated Facility, all three criteria must be met*)

*significantly related to the Project; (b) carried out, or planned to be carried out, contemporaneously with the Project; and (c) necessary for the Project to be viable and that would not have been constructed, expanded, or conducted if the Project did not exist. For a facility or activity to be considered an Associated Facility, all three criteria must be met*).

The most significant E&S risks and impacts identified at this stage include: involuntary land acquisition and physical or economical resettlement ; dam safety risks in the event of dam failure; loss of natural habitats and impacts on biodiversity, including potential impacts on Natura 2000 sites in the vicinity of the planned investments; permanent changes to the hydrological regime and river channel morphology; impacts of the construction phase on the health and safety of workers and surrounding communities - including community health and safety related to construction traffic, and disruption of daily and livelihood-generating activities due to noise, dust, etc.; the risk of social conflicts and tensions due to land acquisition; threats to cultural heritage and archaeological sites; as well as cumulative impacts resulting from the parallel implementation of multiple Tasks within the same watershed. In the case of projects in the Biała Lądecka watershed, an additional risk factor is the significant depletion of local communities' adaptive capacity following the 2024 flood which reflects broader post-disaster psychosocial impacts, including community-level trauma, documented in affected populations following major floods in Poland.

E&S risk management will be implemented using a set of specific instruments developed for each Task: the Environmental and Social Management Plan (ESMP) and specialized sub-plans addressing more detailed specific risks and impacts as warranted by the Environmental and Social impact Assessment (ESIA), together with the Contractor's Environmental and Social Management Plan (C-ESMP), including a Biodiversity Management Plan (BMP), Rapid Cumulative Impact Assessment (R-CIA), a Land Acquisition and Resettlement Action Plan (LARAP) as relevant, a Labor Management Procedures (LMP), and a Stakeholder Engagement Plan (SEP). SEPs will be prepared for each Task guided by the Project Level Stakeholder Engagement Framework considering the specific risks, impacts and needs of the local community. A multitiered Project level Grievance Redress Mechanism (GRM) shall be in place at all stages of implementation and available to all stakeholders. Project level GRM will be complemented by site and sub-project specific GRMs constituting a part of the Site specific SEPs.

Responsibility for Project implementation lies with the Project Coordination Unit (PCU) at the overall Project level and the Project Implementation Units (PIU) within the structures of the relevant Regional Water Management Authorities at the level of individual Tasks. The preparation of E&S instruments will be entrusted to the Technical Assistance Consultant; monitoring and oversight of environmental and social performance during construction works at construction sites will be carried out by the Contract Engineer. Contractor management arrangements are further detailed in Section 7. The PCU and PIUs will be supported by the Environmental and Social Panel of Experts (ESPOE), which will provide independent review of environmental and social assessments and plans, advise on grievance handling, and offer technical support as needed. The Panel will be established following signature of the Loan Agreement.

An independent Panel of Experts (IDSPoE) will be established by the Client to review the safety and quality of the dam's design and safety plans, and to identify potential safety issues that might otherwise be overlooked by those directly involved in project development. The IDSPoE will be

established as early as possible during project preparation and maintained at least until completion of the first reservoir filling and initial commissioning period. All Project participants will undergo a tiered training program on the World Bank's Environmental and Social Framework (ESF) and the Environmental and Social Standards (ESSs). Separate budget lines will be allocated for the implementation of E&S requirements - costs of implementation of site specific E&S mitigation and monitoring measures will be factored in specific Tasks project costs. The implementation of all site-specific environmental and social mitigation, monitoring, management, and reporting measures identified through the relevant E&S instruments (e.g., ESIAs, ESMPs, Biodiversity Management Plans, Traffic Management Plans, etc.) will be fully costed and incorporated into the respective bidding documents, Bills of Quantities (where applicable), and construction contracts. This will ensure that contractors price these requirements during tendering and are contractually obligated to implement them throughout the execution of the works.

Monitoring of E&S requirement implementation takes place at four levels—the Contractor, the Contract Engineer, the respective PIU, and the PCU and the World Bank as part of its implementation support. It includes regular site visits, documentation reviews, and summary reports submitted to the Bank on a quarterly or semi-annual basis. In the event of a serious E&S incident, the World Bank is notified within 48 hours of its occurrence following the Environmental and Social Incident Notification and Reporting Procedure set out in Appendix 4 .

This ESMF together with other environmental and social instruments (framework or site specific) prepared under the Project shall be disclosed in accordance with the World Bank's Environmental and Social Standard 10 (ESS10) and the World Bank Access to Information Policy, in a manner and form accessible to stakeholders and understandable to affected communities. The Project Stakeholder Engagement Framework (SEF), includes detailed guidance on the disclosure requirements and is accessible at: [insert disclosure link].

# 2 Introduction

## 2.1 Purpose and Scope of the ESMF

This Environmental and Social Management Framework (ESMF) was prepared as the overarching instrument for assessing and managing environmental and social (E&S) risks for the Climate Resilience in Water Management Project. The ESMF was prepared in accordance with the World Bank's Environmental and Social Framework and applicable Polish law. The Environmental and Social Management Framework (ESMF) is prepared since the Project comprises a series of subprojects or activities whose precise locations, designs, technical characteristics, or implementation details are not yet sufficiently defined to enable a complete assessment of environmental and social risks and impacts at the time of project appraisal. The Environmental and Social Management Framework (ESMF) establishes the principles, procedures, and institutional arrangements for identifying, assessing, and managing environmental and social risks and impacts associated with activities financed under the Project. As the Project also finances the preparation of technical documentation, detailed designs, and other preparatory activities for some of the schemes, the ESMF provides the framework to ensure that these

activities are undertaken in accordance with the World Bank's Environmental and Social Framework (ESF). It guides the integration of environmental and social considerations into project planning and design, supports stakeholder engagement, identifies the environmental and social studies and management instruments that will be required for future investments. Also ensures that proposed designs adequately address environmental and social risks, including opportunities to avoid or minimize adverse impacts through the design process.

In the event of any discrepancy between the ESMF requirements and national regulations, the requirements of the World Bank's Environmental and Social Framework (ESF) shall prevail where gaps exist that would otherwise prevent the Project from achieving material compliance with the ESF. The ESMF serves as a framework for the preparation of detailed documents, in particular Environmental and Social Impact Assessments (ESIA), Environmental and Social Management Plans (ESMPs), and Land Acquisition and Resettlement Action Plans (LARAP) for Projects whose locations and technical designs have not yet been finalized. The ESMF establishes procedures for the verification and classification of E&S risks in accordance with ESS1, defines exclusion criteria, and specifies the scope of required detailed instruments depending on the nature and scale of the impacts of individual Projects and Sub-projects.

The ESMF serves the following purposes:

- assessing the Project’s potential E&S risks and impacts and proposing appropriate mitigation measures;
- establishing procedures for the verification, review, approval, and implementation of E&S measures throughout the Project’s life cycle;
- establishing procedures for monitoring E&S performance throughout the Project's life cycle;
- defining the roles, responsibilities, and reporting requirements of the entities involved in the Project’s implementation;
- identification of staffing, training, and institutional capacity-building needs;
- describing mechanisms for public consultation, document disclosure, and complaint handling as detailed in the Stakeholder Engagement Framework [link];
- defining the budgetary requirements related to E&S risk management, as discussed in detail in Chapter 12 .

With regard to the individual ESF standards, this ESMF:

- applies the requirements of ESS1 through the E&S risk assessment, screening, and classification procedures set out in this ESMF;
- requires the application of the Land Acquisition and Resettlement Policy Framework (LARF) and the preparation of resettlement instruments for Tasks in which impacts covered by ESS5 have been identified;
- implements ESS2 through the Labor Management Procedures (LMP);
- addresses the ESS3 requirements regarding resource efficiency and pollution prevention and management;

- integrates the ESS4 requirements regarding community health and safety;
- addresses the ESS6 requirements regarding biodiversity conservation and sustainable management of living natural resources;
- addresses the ESS8 requirements regarding cultural heritage;
- supports the implementation of ESS10 through stakeholder engagement requirements and a grievance mechanism; and
- harmonizes ESF requirements with national administrative procedures, in particular with the EIA procedure and the IPIP issuance process.

The ESMF applies throughout the entire Project lifecycle and remains in effect after the preparation of specific instruments for individual Tasks.

The ESMF shall be read in conjunction with the following documents:

- Land Acquisition and Resettlement Framework (LARF) — sets out detailed requirements and procedures regarding ESS5;
- Labor Management Plan (LMP) — sets out requirements regarding ESS2;
- Project level Stakeholder Engagement Framework (SEF)— sets out the requirements for ESS10.
- Environmental and Social Commitment Plan (ESCP) - is the legally binding document agreed between the Borrower and the World Bank that sets out the material environmental and social measures and actions the Borrower will implement to achieve compliance with the Environmental and Social Standards (ESSs) over a specified timeframe.

## 2.2 Project Objectives

Poland is one of the European countries most vulnerable to the effects of climate change in terms of water management. Since 1951, the average temperature in Poland has risen by more than 2°C. This translates into increased frequency and intensity of floods and prolonged droughts. Meanwhile, the storage capacity of Polish reservoirs amounts to less than 6% of annual river flows. This is one of the lowest rates in Europe. During dry years, water availability drops to approximately 1,100 $m^3$ per person. At this level, water supply for agriculture, the energy sector, and the population becomes unreliable. The effects of flooding can result in billions of dollars in losses, as exemplified by the flood caused by Low-Pressure System Borys in September 2024.

The overarching objective of the Project is to reduce flood and drought risks in Poland. The Project aims to ultimately provide protection for up to 5 million people. The Project pursues this objective through the following specific objectives:

- reducing flood risk in the upper and middle Vistula River basin and in the Biała Lądecka River basin within the Nysa Kłodzka River basin through the construction of dry reservoirs and polders to protect major urban areas;

- reducing the risk of drought nationwide by increasing retention capacity, including the construction of multifunctional retention reservoirs and the implementation of green (natural) water retention measures;
- strengthening institutional capacity in the areas of forecasting and early warning for floods and droughts, water resource management, and water quality monitoring;
- improving institutional preparedness at the national level by modernizing water management systems using digital tools.

## 2.3 Project Components

The Climate Resilience in Water Management Project comprises four components, each consisting of specific Tasks. The breakdown of the project into main Components and Tasks is presented in the table below.

*Table 1 Division of the Project into Components and Tasks*

| Code | Component / Task | | |
|---|---|---|---|
| **I** | **Component 1: Enhancing resilience to climate risks in the Upper and Middle Vistula River Basin** | | |
| I.1 | Flood risk reduction in the Vistula River Basin to protect Kraków - | | |
| I.2 | Flood risk reduction from Kraków to Zawichost | | |
| I.3 | Modernize the Sulejów water reservoir | | |
| I.4 | Enhance nature-based water retention in the Upper Vistula River Basin | | |
| **II** | **Component 2: Enhancing resilience to climate risks in the Upper and Middle Odra River Basin** | | |
| II.1 | Construct the Kamieniec Ząbkowicki multifunctional reservoir | | |
| II.2 | Flood risk reduction in the Biała Lądecka catchment of the Nysa Kłodzka | | |
| II.3 | Enhance nature-based water retention in the Nysa Kłodzka catchment | | |
| II.4 | Enhance forest retention in the upper part of the Nysa Kłodzka catchment | | |
| **III** | **Component 3: Strengthen institutional capacity in mitigating the impact of floods and droughts** | | |
| III.1 | Enhance flood risk reduction in the Nysa Kłodzka catchment by non-structural measures | | |
| | III.1.1 | Strengthen the forecasting and early warning system (FEWS) and alerting in the Nysa Kłodzka catchment | |
| | III.1.2 | Pilot program for floodproofing in the Nysa Kłodzka catchment | |
| | III.1.3 | Flood-resilient urban transformation study for Stronie Śląskie Municipality | |
| | III.1.4 | Flood-resilient urban transformation study for Lądek-Zdrój Municipality | |
| III.2 | Strengthen the forecasting, warning and alerting system in the Iłownica and Biała catchments (Little Vistula Basin) | | |
| III.3 | Integrate the water quantity and water quality monitoring | | |
| III.4 | Modernize and develop of RZGW Operational Centers in the Vistula and Odra basins | | |

| Code | Component / Task | |
|---|---|---|
| III.5 | Establish and populate of the Water Management Information System for drainage infrastructure | |
| III.6 | Prepare the Master Plans for the key stretches of the Vistula and Odra River Basins, integrating flood protection, drought mitigation and economic objectives | |
| III.7 | Establish The Hydroclimate Monitoring Centre in IMGW-PIB | |
| III.8 | Develop the Crisis Management Centers | |
| **IV** | **Component 4: Project Management, Monitoring and Evaluation** | |
| IV.1 | Project Management, Monitoring and Evaluation | |

Within the project area, investments related to Project components are implemented as a part of the Project. These may include, in particular, riverbed regulation, the relocation of technical infrastructure that conflicts with hydrotechnical structures, and the construction of internal and access roads. These investments will be financed as part of the Project and as such, do not constitute Associated Facilities. Any facilities or activities not financed as part of the Project will be screened to determine whether they meet the criteria of Associated Facilities under the World Bank ESF, namely whether they are: (a) directly and significantly related to the Project; (b) carried out or planned to be carried out contemporaneously with the Project; and (c) necessary for the Project to be viable and would not have been constructed, expanded, or conducted if the Project did not exist.

### 2.3.1 Component 1: Enhancing Resilience to Climate Risks in the Upper and Middle Vistula River Basin

Component 1 includes infrastructure investments aimed at reducing flood risk in the upper and middle Vistula River Basin. The tasks implemented under this component involve the construction of dry polder systems, which, by temporarily retaining part of the flood wave and controlled discharge, reduce peak flow at critical river sections. Component 1 combines flood protection with building climate resilience, mitigating social and economic losses, and strengthening the capacity of public institutions to respond to extreme events.

#### *2.3.1.1 I.1 Flood risk reduction in the Vistula River Basin to protect Kraków*

The basic scope of the program includes the construction of a dispersed flood storage system in the Vistula River watershed upstream of Kraków. This system will consist of controlled lateral polders located in the Vistula Valley and two storage reservoirs on the tributaries of the Little Vistula. The functional purpose of these structures is to capture part of the flood wave’s volume, store it temporarily, and release the floodwater in a controlled manner after the flood peak has passed.

Kraków’s current flood protection system consists of existing storage reservoirs and linear infrastructure (flood embankments), but it does not yet provide a sufficient level of flood peak reduction under extreme event conditions. The analyses conducted show that simply optimizing the operation of the existing storage reservoirs and relying on passive protection alone are insufficient to achieve the required hydraulic effect of flood peak reduction. Therefore, it is necessary to supplement this system by constructing additional dispersed flood retention capacity in the Vistula Valley and to implement measures designed to reduce rapid runoff from urban and suburban tributaries.

In its current version, the program comprises 8 polders (Czernichów, Rusocice-Kłokoczyn, Kamień-Rusocice, Wiśnicz, Smolice, Jankowice-Rozkochów, Mętków and Gromiec) and 2 dry flood reservoirs (Gostyń and Mizerów). Due to ongoing multi-criteria analyses, the final number and detailed location of the planned polders and flood reservoirs may still change. These facilities will be designed to operate as a single, mutually cooperating flood storage system—during a flood event, they will capture part of the flood wave's volume, store it temporarily, and subsequently release the floodwater in a controlled manner after the flood peak has passed. The protective effect shall be visible downstream of the respective polders and reservoirs, including in the densely populated Krakow agglomeration.

*Figure 1 Location of planned hydrotechnical structures under Task I.1*


### *2.3.1.2 I.2 Flood Risk Reduction from Kraków to Zawichost*

Task I.2 includes the preparation and phased implementation of measures aimed at increasing flood storage in the Vistula River valley from Kraków to Zawichost. Its objective is to strengthen flood protection in the areas downstream of Kraków, reduce the transfer of flood risk downstream along the Vistula River, and improve conditions for the safe conveyance of the flood wave.

The basis for further work is provided by the Feasibility Study, the Strategic Environmental Assessment, and the Strategic Social Impact Assessment prepared under Contract 5.7.2 of the previous World Bank-financed Odra–Vistula Flood Management Project (OVFMP).

The Project will include additional hydraulic, technical, economic, environmental, and social analyses and, where necessary, the updating of the studies prepared to date. The analyses will serve to verify possible options for increasing flood storage, assess their rationale, feasibility, and impacts, and identify the optimal set of measures required to achieve the intended flood protection effect. In selecting the solutions, particular consideration will be given to opportunities to avoid and, where avoidance is not feasible, minimize environmental and social impacts.

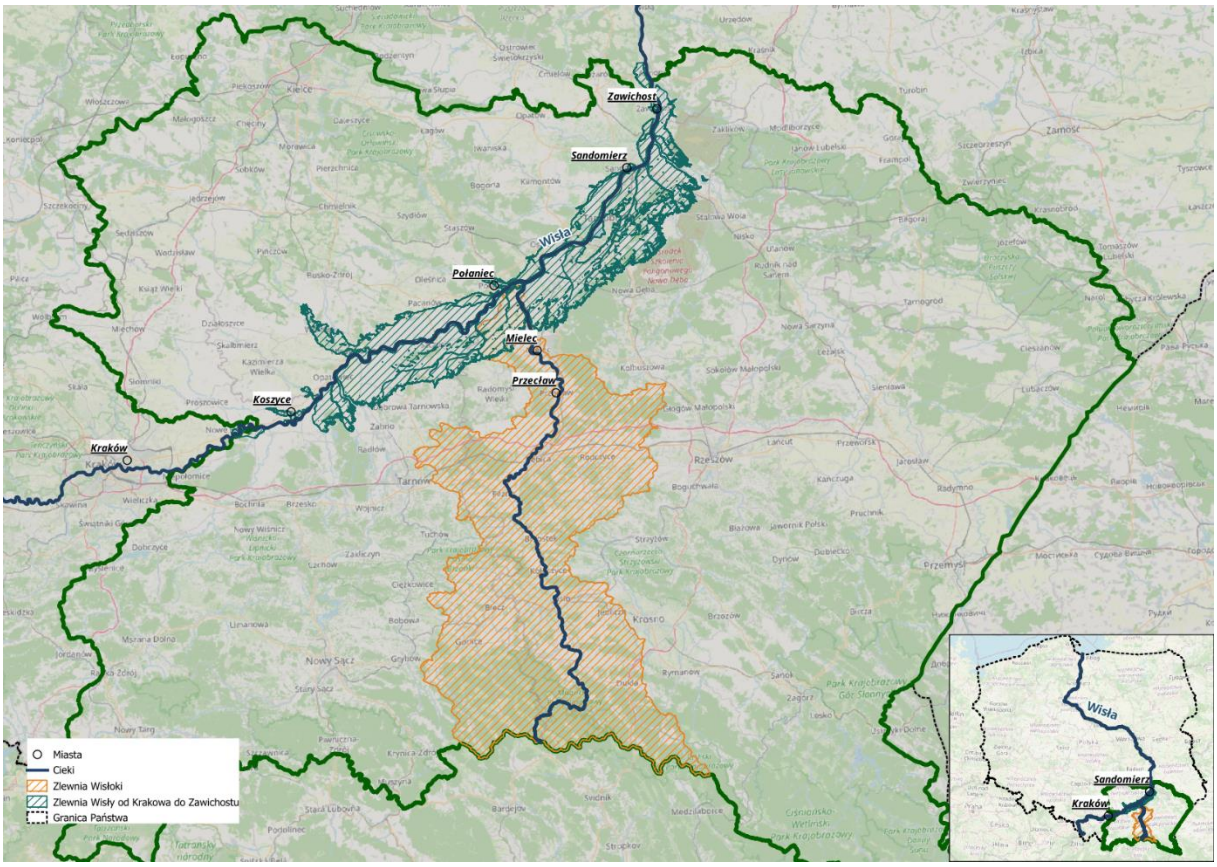
Based on the results of the analyses, investments may be identified for further preparation. Depending on the extent to which they have been assessed and on the results of the evaluations, such work may include the preparation of concepts, design documentation, environmental and social documentation, as well as other preparatory activities. The undertaking of such work will not in itself constitute a decision to implement a given investment. The scope of the investments to be implemented will be determined in phases, taking into account the results of the analyses, the required administrative decisions, the availability of financing, and consultations conducted with stakeholders.

At the current stage, the Project provides for the preparation and construction of the Przykop side polder on the Vistula River. According to the current assumptions, the investment will be implemented through a Design and Build civil works contract. The anticipated scope of social impacts is limited. Based on the current assumptions, the relocation of three residential buildings will be required.

The remaining potential investment measures may be subject to further preparation or implementation only after the completion of the relevant analyses and assessments. At this stage, their final scope, location, and implementation arrangements have not yet been determined.

The activities under Task 1.2 will be implemented at the locations shown on the map below:

*Figure 2 Location of planned hydrotechnical structures under Task I.2*




### *2.3.1.3 I.3 Modernize the Sulejów Water Reservoir*

The modernization of the Sulejów Reservoir is an adaptation project of high public importance. Its purpose is not to create new storage capacity but to maintain and strengthen the existing structure's ability to perform its key functions of water storage, flood protection, drought mitigation, flow regulation, environmental protection, and operational management. The Task implemented by RZGW Warszawa will increase the sustainability and reliability of the infrastructure and enable the storage of an additional 84.33 million $m^3$ of water, the maintenance of a flood storage capacity of approximately 7.030 million $m^3$, the provision of environmental flow during periods of water scarcity, and more efficient management of the reservoir's operation under conditions of variable hydrology and the increasing effects of climate change.

### *2.3.1.4 I.4 Enhance nature-based water retention in the Upper Vistula River Basin*

This Task includes proposals for implementing measures designed to retain water and delay its runoff within the Upper Vistula basin, with special attention to the Prądnik River catchment—an area where technical, environmental, and social studies have already been conducted. The essence of this scheme is not to construct new hydraulic structures, but to restore and adapt the numerous naturally occurring valleys capable of temporarily retaining water. Achieving the ecological continuity of watercourses—by increasing the area of wetlands and green spaces to enhance the capacity to capture rainfall before it turns into dangerous runoff—is the intended outcome of implementing these measures, which will utilize nature-based solutions (NBS).

The scope of this scheme also includes the Skawinka River watershed. For the Skawinka watershed, older conceptual documents, prepared between 2013 and 2014, are available and indicate the need to construct four dry polders and local flood defenses, including embankments, retaining walls, and mobile flood protection systems. As part of this Task, it will be necessary to supplement this program to include non-structural and NBS measures, such as restoring the natural water retention capacity of the valley, slowing runoff, protecting floodplains, locally reducing impervious surfaces in the catchment, re-naturalizing certain sections of watercourses, and prioritizing solutions that reduce the need for hard river channel lining.

### 2.3.2 Component 2: Enhancing resilience to climate risks in the Upper and Middle Odra River Basin

Component 2 encompasses investments and actions aimed at reducing the risk of drought and improving the water balance in the Nysa Kłodzka River Basin and, more broadly, on a national scale. The investments implemented under this component combine the functions of water retention, flow regulation, flood protection, and the implementation of nature-based solutions. Component 2 addresses the growing threat of water scarcity resulting from climate change, including prolonged periods of low flow and increasingly severe hydrological and agricultural droughts.

#### *2.3.2.1 II.1 Construct the Kamieniec Ząbkowicki Multifunctional Reservoir*

The construction of the Kamieniec Ząbkowicki reservoir is a strategic investment aimed at increasing the resilience of the water management system to the effects of climate variability and change. In the context of the growing frequency and intensity of extreme events, including both floods and prolonged low-flow periods, integrated solutions are needed that combine protective, water retention, flow regulation, environmental, and operational functions.

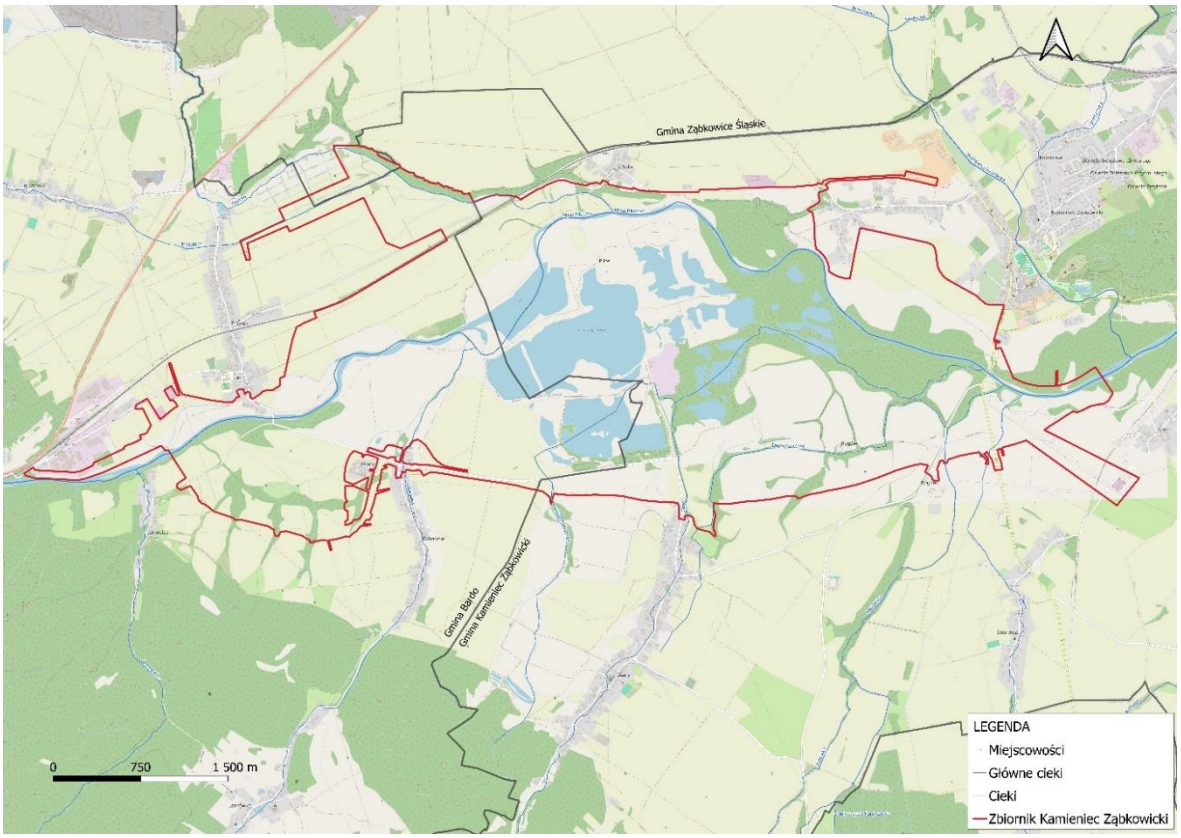
This is an advanced-stage subproject, for which sufficient technical, environmental, and social details are known to support the preparation of site-specific E&S instruments. The Stakeholder Engagement Plan (SEP) and the Grievance Redress Mechanism (GRM) have been prepared; the Environmental and Social Impact Assessment (ESIA), the Environmental and Social Management Plan (ESMP), the Rapid Cumulative Impact Assessment, and the Critical Habitat Assessment are under preparation. The tentative implementation timeline and detailed risk and impact information are provided in these site-specific instruments, which are disclosed separately and updated as the subproject progresses.

The reservoir's storage capacity at the normal water level is 54.0 million $m^3$, of which the live storage capacity is 23.0 million $m^3$. The permanent flood storage capacity is 49.0 million $m^3$, while the additional forced flood storage capacity is 10.0 million $m^3$. This operating arrangement makes it possible to balance flood protection with the functions of water retention, flow regulation, and power generation, while enhancing the system's ability to respond to variable hydrological conditions. The reservoir's primary function will be to provide flood protection for the areas located directly downstream of the structure, but also—in conjunction with the other already constructed reservoirs in the cascade (the Topola Reservoir, the Kozielno Reservoir, the Otmuchów Reservoir, and the Nysa Reservoir) —for the areas located further downstream along the lower course of the Nysa Kłodzka River. At the same time, the reservoir will perform important

additional functions, including the creation of water reserves, augmentation of low flows, supporting augmentation discharges to the Odra River, electricity generation at a hydropower plant, as well as recreational and tourism-related uses. The concept also indicates the possibility of using the reservoir for fishery purposes and to provide water for municipal and agricultural needs. This range of functions confirms the multi-purpose nature of the project and its importance for the region's long-term water security and development.

The scope of the project includes a complete set of structures and facilities necessary for the safe and efficient operation of the reservoir. In terms of hydraulic engineering, this includes: the construction of the main dam, side embankments, the main outlet works and a spillway, a hydropower plant, a fish pass, the relocation of the Nysa Kłodzka river channel, and the shaping of the reservoir basin. In addition, the design includes: tributary conveyance systems, the relocation of public roads, the construction of service roads, bridge structures, the reservoir's operation and maintenance facilities, a slipway, and a wharf, the construction of a drinking water intake, the relocation of utility infrastructure, as well as environmental and recreational land development. This means that the project is comprehensive in nature and integrates safety, operation, environmental protection, and transportation accessibility objectives.

*Figure 3 Schematic location map of the Kamieniec Ząbkowicki reservoir*




#### *2.3.2.2 II.2 Flood Risk Reduction in the Biała Lądecka Catchment of the Nysa Kłodzka*

The scope of this Task includes the design and construction of a system of dry polders in the Biała Lądecka catchment as the primary measure for flood risk reduction in Stronie Śląskie and Lądek-Zdrój, as well as for the villages located in the middle and lower reaches of the Biała Lądecka River.

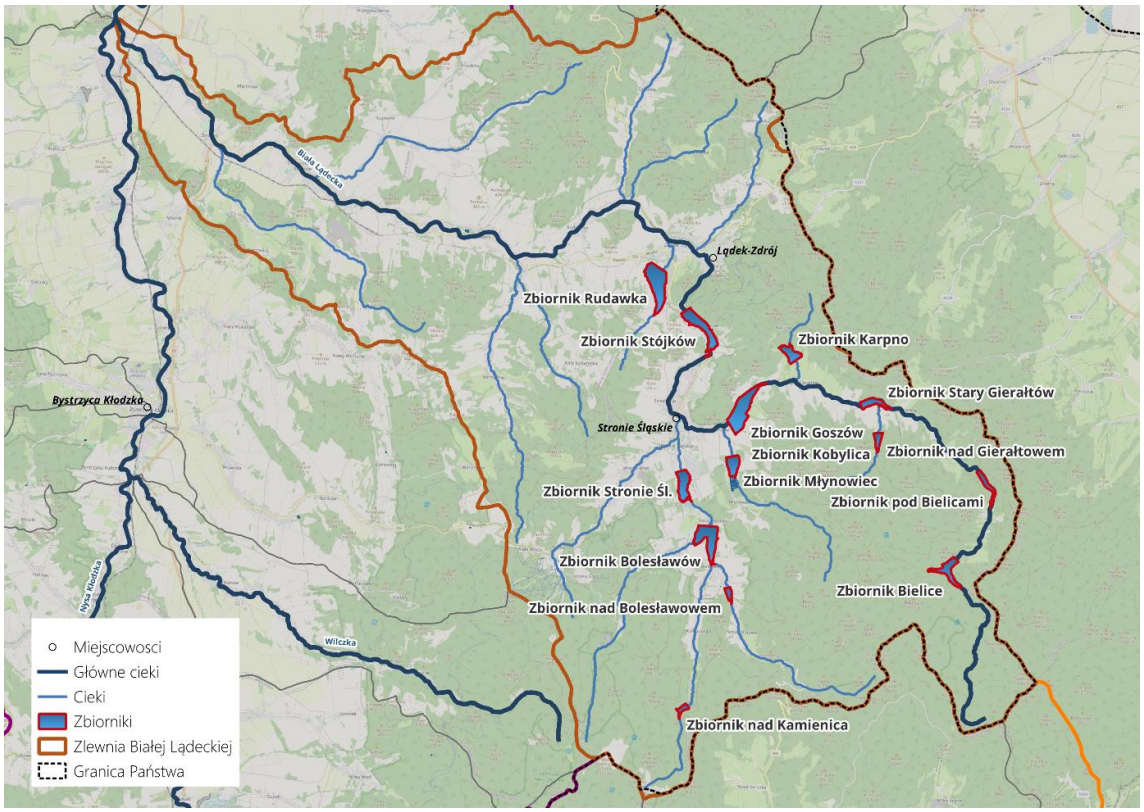
The rationale for constructing the dry polder system stems from the unique characteristics of the Biała Lądecka catchment. It is a mountainous and submontane catchment characterized by a short discharge concentration time, steep terrain gradients, high flow energy, and significant transport of coarse sediment and tree debris during flood events. The main areas at risk are concentrated in the valleys of the watercourses, where urban and rural infrastructure—including roads, bridges, retaining walls, and local revetments—restrict the space available for high water flow. Consequently, the flood risk encompasses not only the risk of flooding but also the risk of erosion, debris dams, and infrastructure damage.

The objective of this Task will be to construct a system of dry polders that functions to transform the flood wave before it enters the most vulnerable sections of the river valley. These structures are designed to temporarily capture part of the flood wave volume, reduce peak flows, lower water levels at the control profiles, and reduce flow energy in urban sections and at locations that limit the river's flood-carrying capacity. The system shall be designed to include the reconstruction of the Stronie Śląskie polder on the Morawka River, an expansion of the hydrometeorological monitoring system, and the implementation of local measures to improve the hydraulic capacity of the river channel and bridge structures.

Four options for the construction of flood storage structures are currently being analyzed. The final selection among them shall be made in a Feasibility Study based on an integrated assessment of the following factors: reduction of flows and water levels in the Stronie Śląskie,

Lądek-Zdrój, Radochów, Trzebieszowice, Ołdrzychowice Kłodzkie, and Żelazno profiles; the number of people and buildings removed from the flood risk zone; the scale of necessary land acquisition and resettlement; impacts on areas of high natural value, including Natura 2000 sites; investment and maintenance costs; and the possibility of phased implementation. Both options assume that protection against a flood of a scale similar to the September 2024 flood shall be complemented by non-structural measures, including through spatial planning, flood-proofing of buildings, warning systems, and evacuation procedures, as well as measures designed to increase the water retention capacity of forests.

*Figure 4 Location of potential reservoirs*




### *2.3.2.3 II.3 Enhance nature-based water retention in the Nysa Kłodzka catchment*

This Task involves the planning, preparation, and implementation of activities in the Nysa Kłodzka catchment area (with special attention to the portion covered by the Biała Lądecka catchment) that utilize nature-based solutions (NBS) aimed at increasing the capacity to retain and store rainwater where it falls by delaying the runoff of rainwater and snowmelt into river valleys. For the selected model catchment, an analysis will be conducted, and a set of optimal measures suited to the climatic and geomorphological conditions of the Kłodzko region will be selected; some of these measures will be implemented as part of this Task.

Nature-based solutions (NBS) are solutions that support the population's resilience to the effects of climate change (extreme weather phenomena such as storms, heat waves, cold waves, droughts, floods, fires, etc.), prevent the degradation of valuable ecosystems, and restore those that have already been altered, based on methods inspired by and supported by nature.

In the Nysa Kłodzka catchment area, measures that utilize the landscape's natural ability to store water and mitigate the effects of both rainfall and drought include, among others: the restoration of wetlands and improvement of the water regime in waterlogged areas, the restoration of natural features of rivers and valleys, increased soil and forest water retention capacity, the construction of small water retention structures, and the slowing of water runoff into river valleys in the upper parts of the catchment.

#### *2.3.2.4 II.4 Enhance forest water retention in the upper part of the Nysa Kłodzka catchment*

This Task involves the planning, preparation, and implementation of measures to reduce rainwater runoff into river valleys and increase its retention in forested areas of the Nysa Kłodzka catchment (with special attention to its upper part).

As part of the implementation of this Task, it is planned to construct and upgrade hydraulic water-retention structures and structures that slow down water runoff, such as penstock valves, small water reservoirs, water pools, riverbed sills, damming culverts, caisson boxes, and drain trenches (most frequently built from natural materials such as stones, earth, wood, and fascines). As part of these measures, natural ponds and wetlands can also be restored. It may be necessary to grade the forest slopes and roads along the skidding trails after logging operations are completed, which will result in the creation of a series of cascades in the water runoff (using locally available materials—wood, stone, etc.) so that the trails formed in this way, leading down the slopes, are transformed into a series of basins that accumulate water and debris carried by the water, where siltation and leveling will occur over time. In forests growing on slopes, as well as along internal roads and transportation trails, ditch dams, training dams, palisades, logs placed across the direction of water runoff, drainage trenches, cascades, etc., shall be constructed to create a series of depressions in the terrain that will retain part of the flowing water. All these measures will serve to increase the amount of water stored in forests and to prevent overly intense runoff that causes excessive water erosion in mountainous areas by constructing anti-erosion infrastructure along watercourses, skidding trails, and roads.

### 2.3.3 Component 3: Strengthen institutional capacity to mitigate the impact of floods and droughts

Component 3 encompasses non-structural, institutional, and environmental measures that complement the investments carried out under Components 1 and 2. Its objective is to strengthen the capacity of Poland's water resources management system by modernizing the monitoring and forecasting network, expanding the national registry of land improvement facilities, and improving the flood emergency response system.

#### *2.3.3.1 III.1 Enhance flood risk reduction in the Nysa Kłodzka catchment by non-structural measures*

##### 2.3.3.1.1 III.1.1 Strengthen the forecasting and early warning system (FEWS) and alerting in the Nysa Kłodzka catchment

The physical scope of this project includes expanding the hydrological network, developing meteorological and radar observations, upgrading existing stations, and integrating data with the IMGW's systems. Regarding the hydrological component, the plan is to incorporate approximately

14 new gauging stations into the system, to be installed on key tributaries of the Nysa Kłodzka catchment. These stations will be equipped with water level sensors, telemetry systems, and, at locations where hydraulically justified, equipment for flow measurement, such as radar surface velocity sensors or acoustic technologies. Concurrently, a campaign of surveying measurements of the cross-sections of the river channels and valleys is planned, which is necessary to prepare and update the rating curves Q(h) and to incorporate such measurement data into the hydraulic models.

As for the meteorological component, the project involves the installation of approximately 9 new automatic weather and precipitation stations, as well as several sensors to measure environmental parameters, including soil moisture and snow water equivalent (SWE). A key element of this activity is to enhance the resilience of the monitoring infrastructure. It is planned to upgrade approximately 30 existing monitoring stations—including about 20 hydrological and 10 meteorological stations—by equipping them with autonomous and redundant power supply systems and multi-channel data transmission. This activity also includes an analytical layer supporting the IMGW's existing forecasting systems.

#### 2.3.3.1.2 III.1.2 Pilot program for floodproofing in the Nysa Kłodzka catchment

The main element of this initiative is to develop a concept for a mechanism to provide public funding to property owners and managers of existing buildings who decide to upgrade residential and public buildings using Property Flood Resilience / flood-proofing solutions. This mechanism shall only finance measures designed to reduce flood damage, protect critical infrastructure, and shorten building recovery time. It shall not be treated as a program for general building renovation or thermal insulation upgrades, nor as a guarantee of full protection against water damage. As part of this project, rules governing the operation of such a mechanism shall be developed, including its objective and the technical scope of the supported measures. First and foremost, it is necessary to specifically identify the groups of beneficiaries eligible for such support and to position this mechanism within Poland's system for financing water management-related issues. The support model shall be tailored separately to the following three groups of beneficiaries: (1) private individuals, owners of single-family homes, and small housing associations; (2) owners of public buildings and other facilities belonging to local government units or public entities; and (3) small and medium-sized enterprises (SMEs) and service facilities, taking into account public aid rules, in particular de minimis aid or some other appropriate legal basis.

In addition, a national practical framework for implementing flood-proofing solutions—understood as measures that enhance the resilience of buildings and properties to the effects of flooding—shall be developed under this scheme. The scope of this project activity shall be intentionally limited to the preparation of a catalog of best practices, technical guidelines, and recommendations for amending or clarifying legal regulations. This is not an investment activity involving the installation of flood-proofing measures in specific buildings, but rather an activity aimed at developing a standard that can subsequently be used by government agencies, municipalities, property owners, designers, and contractors. Flood-proofing shall be treated as a complementary element of flood risk management, not as an alternative to catchment-based, retention-enhancing, river regulation, or flood protection measures.

#### 2.3.3.1.3 III.1.3 Flood-resilient urban transformation study for Stronie Śląskie Municipality and III.1.4 Flood-resilient urban transformation study for Lądek – Zdrój Municipality

This project involves the development of a concept for the spatial transformation of the upper part of the Biała Lądecka River valley within the boundaries of the municipalities of Lądek-Zdrój and Stronie Śląskie. This project activity focuses on planning, program development, coordination, and public participation. It is a tool designed to organize the reconstruction and further development of the Biała Lądecka Valley following the September 2024 flood, taking into account flood risk, planned and completed hydraulic infrastructure projects, residents' needs, environmental constraints, cultural heritage, and land management requirements.

The key objective is to prepare two studies—one for Stronie Śląskie and one for Lądek-Zdrój—while simultaneously formulating consistent and practical implementation guidelines. This approach reduces sector-based management and aligns with the multi-level governance logic of the " integrated water resources management the Biała Lądecka Valley is a functional, hydrological, and landscape system that cannot be effectively planned within the boundaries of a single administrative unit. At the same time, implementation tools must be useful for the specific municipalities and for their planning documents, budgets, investment procedures, and relations with residents.

The physical scope of this plan shall include two interrelated components for each municipality: a multi-criteria analysis and a spatial transformation concept. The analytical and diagnostic component shall identify the factors determining a safe and realistic transformation of the valley. In particular, it shall include an analysis of flood zones and hazards, the conditions of the river channels and flood zones, the potential for micro-retention and nature-based measures, environmental considerations in the context of extreme events, flood damage and its spatial distribution, the municipalities' planning status, the transportation system, the distribution of public services, the ownership structure, property management, structural and critical infrastructure, historical conservation requirements, as well as the sociodemographic and economic situation.

Consequently, individual implementation packages shall be prepared for the Municipality of Lądek-Zdrój and the Municipality of Stronie Śląskie. Each package shall contain a land-use concept for the key areas of the municipality, a model for implementing the investments, the proposed operationalization of the activities, guidelines for planning documents, and an estimate of implementation costs. The guidelines shall clearly distinguish between short-term measures—needed during the reconstruction process—medium-term measures associated with the adaptation of documents and investments, and long-term measures designed to bring about a permanent change in the valley's spatial structure.

An important part of this project activity will be public participation. The consultant shall prepare a separate consultation plan, in accordance with the project's Stakeholder Engagement Framework (SEF), that includes the objectives, a stakeholder map, the selection of consultation tools, communication channels, and a method for evaluating the process. Participation shall include various groups: residents of flood-affected areas, business owners, property owners, local leaders, nongovernmental organizations, representatives of public services, institutions responsible for infrastructure, and administrative authorities. Its purpose is not solely to gather

opinions, but also to identify conflicts, foster an understanding of spatial constraints, and develop agreements that can be incorporated into formal documents and investment processes.

#### *2.3.3.2 III.2 Strengthen the forecasting, warning, and alerting system in the Iłownica and Biała catchments (Little Vistula Basin)*

The physical scope of this project includes expanding the hydrological network, developing meteorological and radar observations, upgrading existing stations, and integrating data with the IMGW's systems. With regard to the hydrological component, the plan is to incorporate approximately 6 new gauging stations into the system, to be installed on key tributaries of the Little Vistula catchment. These stations will be equipped with water level sensors, telemetry systems, and, at locations where hydraulically justified, equipment for determining flow, such as radar surface velocity sensors or acoustic technologies. Concurrently, a campaign of surveying measurements of the cross-sections of the river channels and valleys is planned, which is necessary to prepare and update the rating curves Q(h) and to incorporate such measurement data into the hydraulic models.

As for the meteorological component, the project calls for the installation of approximately 2 new automatic weather and precipitation stations, as well as several environmental sensors, including those for soil moisture and snow water equivalent (SWE). An important aspect of this activity is to enhance the resilience of the monitoring infrastructure. It is planned to upgrade approximately 23 existing monitoring stations—including about 11 hydrological and 12 meteorological stations—by equipping them with autonomous and redundant power supply systems and multi-channel data transmission capabilities. This activity also includes an analytical layer supporting the IMGW's existing forecasting systems. It does not involve the construction of a separate IT platform but rather the development of tools that integrate hydrological, meteorological, and radar data and support the identification of anomalies and potential failures in the monitoring system.

#### *2.3.3.3 III.3 Integrate water quantity and water quality monitoring*

The plan envisages the creation of an integrated system that will combine IMGW-PIB's existing hydrological monitoring network with automatic monitoring of surface water quality in rivers and lakes. This system is not intended to replace the statutory monitoring conducted for the purposes of water status classification under the Water Framework Directive, but rather to serve as a significant protective and operational complement to it. Its purpose will be to continuously track changes occurring in the aquatic environment, rapidly identify threats to humans and ecosystems, and produce short-term forecasts with a horizon of at least 72 hours. Such an integrated approach will enable the simultaneous analysis of flow rate indicators, water levels, and other quantitative parameters, as well as basic water quality parameters, thereby allowing for a better interpretation of the causes of changes and more effective forecasting of their effects.

An important component of this investment will be the development of institutional, operational, and analytical capabilities. A Water Quality Monitoring Center is to be established within the IMGW-PIB structure, responsible for the development, maintenance, and operation of the system, while the Central Laboratory for Measuring Instruments will be additionally equipped with sensor calibration stations. The project also provides for the development of a data quality

assurance and control module, laboratories supporting sample analysis, as well as a hydrodynamic and eco-hydrodynamic modeling module. This will allow not only for the verification of the accuracy of data from the automated system but also for forecasting the transport and distribution of pollutants. Of particular importance is the possibility of further developing the salinity models—an initiative launched following the ecological disaster in the Odra River in 2022—and feeding them with current measurement data. Furthermore, the system will transmit results to the Chief Inspectorate for Environmental Protection (GIOŚ), and Polish Waters and the Ministry of Infrastructure will also be able to utilize this data.

#### *2.3.3.4 III.4 Modernization and Development of RZGW Operational Centers in the Vistula and Odra Basins*

This Task will constitute the second stage of creating a national system to support decision-making in water management using modern IT tools. This initiative involves the further development of the Operational Centers, addressing critical gaps, and expanding the Centers' coverage to the lower reaches of both basins. The existing core—which includes the Data Acquisition, Archiving, and Sharing Subsystem (DAASS), the Modeling Subsystem, the internal and external portals, user roles, redundancy capabilities, and data source integration—remains the system' foundation. The new phase shall transform it into a modern decision support system (DSS), operating according to the logic: "observe – predict – compare options – evaluate effects – recommend," using machine learning and AI.

The scope of this Task shall include not only further strengthening the existing Operational Centers for the Upper Vistula and the Upper and Middle Odra—namely, the centers in Kraków and Wrocław, along with supplementary centers in Rzeszów and Gliwice—but also the establishment of two additional centers for areas not yet included in the implementation and the installation of necessary equipment in them. Such a system will enable a transition from a regional operating system to a coherent network of centers covering the key stretches of the Vistula and Odra Rivers, including their most important tributaries, as well as reservoirs, polders, weirs, barrages, and associated structures. This will also require upgrading the existing backup centers and establishing new ones to support the newly established Operational Centers.

The first subtask will be to standardize and develop the DAASS as a common data environment for all the Centers. This will involve standardizing the method for data collection and transmission from local SCADA (Supervisory Control and Data Acquisition) systems, PLCs (Programmable Logic Controllers), and data loggers to the DAASS; consolidating data into a single communication standard; implementing local data buffering at hydraulic facilities; ensuring transmission redundancy; and expanding the scope of acquired variables to include information regarding the actual operation of the hydraulic infrastructure. The second subtask will be to develop the technical and telecommunications infrastructure. It is necessary to increase the reliability of data transmission from the hydraulic structures to the Centers through fiber-optic cables, radio links, DMR (Digital Mobile Radio)/MCX (Mission Critical Communications), secure SD-WAN/VPN mechanisms, redundant links, and local data buffering. This applies to both the existing Centers and the new ones. The third subtask will involve establishing a uniform reporting database and crisis communication system.

#### *2.3.3.5 III.5 Establishment and Population of the Water Management Information System for Drainage Infrastructure*

This initiative involves a comprehensive inventory of land drainage facilities and drained areas, the preparation of data for upload into the GeoMelio national registry, and subsequently their controlled import, including validation, error reporting, and the maintenance of a complete audit trail. This project is a continuation of earlier efforts aimed at standardizing land drainage records for 15 Catchment Management Boards and aims to expand national coverage by including an additional 35 Catchment Management Boards for which the data is incomplete, inconsistent, or does not reflect the actual condition of the infastructure on the ground.

This activity shall be treated as a project combining field, registry, and IT-related components. The field component of this activity includes a comprehensive inventory of land drainage facilities and the areas where these facilities operate. Data will be acquired according to a uniform methodology, using GNSS RTK measurements with sub-decimeter accuracy, aerial photogrammetric surveys, orthophotomaps with a resolution of at least 5 cm, point clouds with a density sufficient for 3D analysis, and photographic documentation. The scope of the inventory includes linear, point, and surface features, such as ditches, pipelines, culverts, outlets, damming structures, and associated technical infrastructure.The second key component of this activity is the implementation of a controlled process for importing data acquired by field contractors directly into GeoMelio. This process will include data transfer standards, a catalog of required formats, attribute schemas, controlled vocabularies, a system of identifiers, the required coordinate reference system, and a complete structure for a contractor's data package. Standardization is essential for reducing errors and preventing a situation in which different field teams deliver data that is incompatible or requires costly manual processing. The IT component is essential for the feasibility of the entire Project. The scale of the planned inventory—covering a substantial area of the country and many categories of spatial data—will result in at least a threefold increase in data volume compared to the data currently stored in the database. This increase will result not only from the number of land drainage objects but also from the nature of the outputs: high-resolution ortho-photomaps, point clouds, cross-sections, profiles, reports, field photos, intermediate data, validation registers, and import history. Without expanding the GIS platform and database layer, the risk would include a loss of efficiency, prolonged imports, a reduced ability to publish mapping services, and decreased reliability of the national register.

#### *2.3.3.6 III.6 Prepare Master Plans for key stretches of the Vistula and Odra River Basins, integrating flood protection, drought mitigation, and economic objectives*

Master plans for the key sections of the Vistula and Oder river basins will integrate objectives related to flood protection, drought impact reduction, and economic functions. These are strategic planning documents at the river basin level. They set the framework for the future identification and phasing of investments, but they do not in themselves approve specific projects. Their detailed scope and the scope of tasks will be defined at the Project implementation stage, based on the existing river basin management plans and flood risk management plans prepared by PGW WP under the Water Law.

Because the Master Plans set the framework for future consent for projects that may have a significant impact on the environment, they are subject to a mandatory Strategic Environmental

Assessment (SEA). In accordance with World Bank requirements, a Strategic Social Assessment (SSA) will be prepared as part of the SEA.

Each SEA/SSA for the Master Plans will cover cumulative basin-scale risks, including biodiversity and the connectivity of Natura 2000 areas, hydromorphological alterations, social impacts (including resettlement), vulnerable groups, and cultural heritage. These assessments will include stakeholder engagement in line with the Project Stakeholder Engagement Framework and will apply the project's environmental and social screening criteria.

#### *2.3.3.7 III.7 Establish the Hydroclimate Monitoring Center at IMGW-PIB*

As part of a project planned for implementation with the co-financing of international financial institutions, including the World Bank, in the area of water management focused on reducing flood and drought risk, titled "Climate Resilience in Water Management Project", under the component "Strengthening Institutional Capacity in Reducing Flood and Drought Risk", it is proposed to develop a Hydroclimatic Risk Monitoring System (HRMS) within the structure of IMGW-PIB (Institute of Meteorology and Water Management – National Research Institute).

Hydroclimatic risk monitoring is the process of collecting, analyzing, and interpreting data on extreme water and climate-related phenomena, such as droughts, floods, heat waves, storms, and heavy rainfall. Its purpose is to detect hazards, identify synergistic effects of threats, assess their impact on socio-ecological systems, and support decision-makers in taking adaptive and preventive actions. The HRMS will utilize advanced technologies such as artificial intelligence (AI), the Internet of Things (IoT), GIS systems, and risk analysis tools to provide up-to-date information on extreme weather events and their consequences.

The HRMS shall have a modular structure that allows for continuous improvement and development of model layers: Data Exploration Module, Simulation Component for Modeling and Forecasting Extreme Events, Aggregator for Socio-economic and Environmental Impact Assessment Models, and Information Systems Component.

#### *2.3.3.8 III.8 Develop Crisis Management Centers*

This initiative is systemic and non-structural and aims to enhance the efficiency of responding to flood hazards at the municipal (*gmina*), county (*powiat*), and regional (*województwo*) levels. The project shall complement infrastructure and hydraulic measures by strengthening the final link in the safety chain: translating information about a flood hazard into an operational decision, coordinating crisis management services, warning the public, managing resource logistics, and carrying out actual actions on the ground. In this sense, this initiative will create an organizational and information layer that will enable the administration and crisis management services to make efficient use of hydrological data, flood hazard maps, warning messages, and field information.

The first element of this activity will be a comprehensive analysis of the current crisis management system in flood situations. It shall include a review of the crisis management plans applicable in the respective municipalities, counties, and voivodeships; an assessment of their current relevance, completeness, and compliance with higher-level documents; as well as an identification of legal, jurisdictional, and technical barriers. The analysis shall be conducted not only from a formal perspective but also from an operational one, and the following shall be

examined: decision-making pathways, points of contact, the operation of crisis management centers, the flow of information between the administration, the services, and Polish Waters, as well as the ability to rapidly launch field operations.

The second pillar will focus on the optimization of early warning and communication systems. The Task shall assess the efficiency of the currently used channels, including text messages, alarm sirens, regional warning systems, alerts sent by the Government Center for Security (RCB), mobile applications, and local communication channels. The assessment shall include message latency, territorial coverage, readability, content consistency, and the level of public understanding and trust. Special emphasis shall be placed on the ability to warn people directly in risk zones and on tailoring messages to different groups of recipients, including the elderly, people with limited mobility, and the rural population.

The third pillar of the Task will be an inventory and optimization of logistical resources. It will cover rescue equipment, pumps, sandbags, boats, drones, radio communication stations, warehouses, evacuation points, manpower concentration points, key roads and bridges, as well as the capabilities of the State Fire Service, the Volunteer Fire Service, the Territorial Defense Force, the local administration, volunteers, and nongovernmental organizations. The output shall be logistical maps showing the deployment of resources, access times, accessibility restrictions, and recommendations regarding regional equipment reserves.

### 2.3.4 Component 4: Project Management, Monitoring, and Evaluation

Component 4 covers activities supporting the implementation of the Project, including institutional coordination, reporting, and the exchange of knowledge and experience.

#### *2.3.4.1 IV.1 Project Management, Monitoring, and Evaluation*

Component 4 will support Project implementation through institutional coordination, monitoring and reporting, fiduciary oversight, environmental and social oversight, and knowledge management. It will provide the implementing entities with adequate staffing and technical resources for the management of Project activities, and will ensure systematic, timely, and transparent monitoring and reporting of progress toward the achievement of Project objectives. In addition, the component will strengthen coordination among institutions responsible for structural and non-structural measures and facilitate the dissemination of lessons learned, thereby informing the preparation and planning of future flood and drought risk management investments in Poland.

## 2.4 Entities involved in the Project

Overall strategic coordination, guidance, and quality control will be provided by an Inter-Ministerial Project Steering Committee (PSC) co-chaired by the Ministry of Interior Affairs and Administration (MoIA) and the Ministry of Infrastructure. The PSC will also include representatives of the Ministry of Finance, the Ministry of Regional Policy and European Funds, the Implementing Agency for European Funds, and the President of Polish Waters.

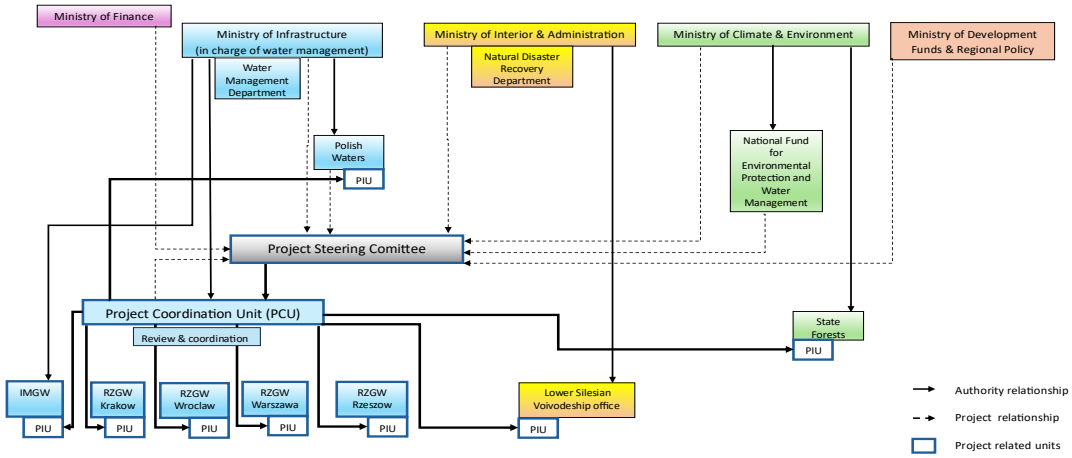
At the operational, day-to-day level, coordination and quality control will be the responsibility of the Project Coordination Unit (PCU). The PCU will coordinate between financial institutions, ministries, and implementing agencies. The PCU will be established as an independent budgetary unit subordinated to the Ministry of Infrastructure. It will be responsible for preparation of disbursement documentation, reporting, financial planning and monitoring, and monitoring of the flow of funds. The PCU will also be responsible for monitoring and evaluation of project implementation and results. The Director of the PCU will participate in meetings of the PSC in an advisory role.

Four PIUs (Kraków, Wrocław, Rzeszów, and Warsaw) will be established within the respective Regional Water Management Authorities (RZGWs) to support project investments in the respective regions under Components 1 and 2. PIUs will be established in three national agencies to support activities in Component 3: one PIU within Lower Silesian Voivodship Office to manage the development Crisis Management Centers, one PIU in IMGW, and one PIU in State Forests. These three agency PIUs, together with the PCU, will support implementation of the institutional strengthening tasks under Component 3.

PIUs will also be supported by Technical Assistance Consultant (TA), which will provide the Project Implementation Units (PIUs) with technical support, procurement support, contract management support, and support in the area of environmental and social (E&S) standards in carrying out their assigned tasks. Each PIU will be responsible for implementation of assigned project subcomponents and activities, including procurement, contract supervision and monitoring, application of effective internal controls and procedures, accounting for expenditures in the respective budgetary accounting systems, receipt of funds, payments, preparation of documentation and information related to use of loan proceeds, provision of statements of expenditures and supporting documentation for eligible expenditures, and delivery of project reporting and monitoring.

The project implementation framework also includes two Panels of Experts: the Environmental and Social Panel of Experts (ESPOE) and the Independent Panel of Experts (IDSPoE). The ESPOE provides independent review of environmental and social assessments and plans, advises on grievance handling, and offers technical support as needed. The ESPOE was established following signature of the Loan Agreement. The IDSPoE was established by the Client to review the safety and quality of the dam's design and safety plans, and to identify potential safety issues that might otherwise be overlooked by those directly involved in project development. The IDSPoE comprises: (i) Hydraulics and Hydraulic Structures Expert; (ii) Hydrology and Hydrometer Instrumentation Expert; and (iii) Hydromechanical and Iron & Steel Outlet Works Expert.

The Project implementation structure is shown below:




# 3 Legal Framework and Standards

## 3.1 National Regulations

Tables 2 and 3 summarize the national regulations, policies, and strategies applicable to the Project.

*Table 2 National-level regulations*

| Regulation | Reference to the Project |
|---|---|
| **Environmental Impact Assessments and Stakeholder Engagement** | |
| a) Act of October 3, 2008, on Access to Information on the Environment and Its Protection, Public Participation in Environmental Protection, and Environmental Impact Assessments (consolidated text: Journal of Laws of 2024, item 1112);<br>b) Regulation of the Council of Ministers of September 10, 2019, on projects that may have a significant impact on the environment (Journal of Laws of 2019, item 1839). | The project includes investments that qualify as projects that may always have a significant impact on the environment, for which an environmental impact assessment must be conducted and a Decision on Environmental Conditions must be obtained. |
| **Nature Conservation** | |
| a) The Act of April 16, 2004, on Nature Conservation (consolidated text: Journal of Laws of 2026, item 13);<br>b) Regulation of the Minister of the Environment of December 16, 2016, on the protection of animal species (consolidated text: Journal of Laws of 2022, item 2380);<br>c) Regulation of the Minister of the Environment of October 9, 2014, on the protection of plant species (Journal of Laws of 2014, item 1409);<br>d) Regulation of the Minister of the Environment of October 9, 2014, on the species protection of fungi (Journal of Laws of 2014, item 1408). | All necessary permits related to nature conservation will be obtained as part of the Project. Construction work will be carried out in accordance with species conservation and nature conservation requirements. |
| **Environmental Protection and Environmental Quality Standards** | |
| a) Act of April 17, 2001—Environmental Protection Law (consolidated text: Journal of Laws of 2025, item 647);<br>b) Regulation of the Minister of the Environment of August 24, 2012, on the levels of certain substances in the air (consolidated text: Journal of Laws of 2021, item 845); | The investments planned as part of the Project will be carried out and operated in accordance with environmental protection regulations. Compliance with environmental quality standards will be ensured as part of the Project. |

| Regulation | Reference to the Project |
|---|---|
| c) Regulation of the Minister of the Environment of September 1, 2016, on the method of conducting an assessment of soil contamination (Journal of Laws of 2016, item 1395);<br>d) Regulation of the Minister of the Environment of June 14, 2007, on permissible levels of environmental noise (consolidated text: Journal of Laws of 2014, item 112). | |
| **Water Protection** | |
| a) Act of July 20, 2017—Water Law (consolidated text: Journal of Laws of 2025, item 960);<br>b) Regulation of the Minister of Maritime Economy and Inland Navigation of July 12, 2019, on substances that are particularly harmful to the aquatic environment and the conditions that must be met when discharging wastewater into water bodies or the ground, as well as when discharging rainwater or meltwater into water bodies or water facilities (Journal of Laws of 2019, item 1311). | The necessary water permits will be obtained for the implementation of the Project. |
| **Waste Management** | |
| a) The Act of December 14, 2012, on Waste (consolidated text: Journal of Laws of 2023, item 1587);<br>b) Regulation of the Minister of Climate of January 2, 2020, on the waste catalog (Journal of Laws of 2020, item 10). | Waste generated in connection with the Project will be managed in accordance with applicable regulations. |
| **Protection of Historic Monuments** | |
| a) The Act of July 27, 2003, on the Protection and Care of Historic Monuments (consolidated text: Journal of Laws of 2024, item 1292). | For the purposes of implementing the Project, all necessary decisions, consents, and permits to conduct work in the vicinity of historic structures will be obtained. |
| **Land Acquisition** | |
| **a)** Act of August 21, 1997, on Real Estate Management (consolidated text: Journal of Laws of 2026, item 399).<br>**b)** Regulation (EU) 2016/679 of the European Parliament and of the Council of April 27, 2016, on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation), | The Project will be implemented in accordance with the rules governing the acquisition of real estate for public purposes and personal data protection regulations |
| **Investment Preparation and Land acquisition** | |
| a) Act of July 8, 2010, on Special Rules for Preparing to Implement Investments in Flood Control Structures (consolidated text: Journal of Laws of 2026, item 104). | The project will be carried out in accordance with the rules and conditions for the preparation of investments in flood control structures. |
| **Labor Law** | |
| a) Act of June 26, 1974—Labor Code (consolidated text: Journal of Laws of 2023, item 1465);<br>b) Act of June 10, 2016, on the Posting of Workers in the Provision of Services (consolidated text: Journal of Laws of 2023, item 2131);<br>c) Act of March 13, 2003, on Special Rules for Terminating Employment Relationships with Employees for Reasons Not Attributable to the Employees (consolidated text: Journal of Laws of 2018, item 1969). | Contractors and subcontractors responsible for the implementation of the Project are required to comply with labor law provisions with respect to all employees, regardless of their form of employment. Requirements concerning employees hired under civil law agreements and B2B contracts are set forth in the LMP. |

| Regulation | Reference to the Project |
|---|---|
| **Occupational Health and Safety** | |
| a) Labor Code – Section X Occupational Health and Safety (consolidated text: Journal of Laws of 2023, item 1465);<br>b) Regulation of the Minister of Labor and Social Policy of September 26, 1997, on general provisions regarding Occupational Health and Safety (consolidated text: Journal of Laws of 2003, item 1650, as amended);<br>c) Regulation of the Minister of Infrastructure of February 6, 2003, on Occupational Health and Safety during the performance of construction works (Journal of Laws of 2003, item 401);<br>d) Act of July 7, 1994—Construction Law, Article 21a (consolidated text: Journal of Laws of 2024, item 725). | The Contractor is required to ensure safe and hygienic working conditions at the construction site, including the preparation of a Health and Safety Plan (BIOZ) prior to the commencement of work. The accident reporting system covers all persons working on the Project. |
| **Anti-Discrimination Provisions** | |
| a) Labor Code – Chapter IIa Equal Treatment in Employment, Articles $18^{3a}$–$18^{3e}$ (consolidated text: Journal of Laws of 2023, item 1465);<br>b) Act of December 3, 2010, on the Implementation of Certain European Union Provisions Regarding Equal Treatment (consolidated text: Journal of Laws of 2020, item 2156). | Contractors and subcontractors responsible for the implementation of the Project are required to comply with the principle of equal treatment and the prohibition of discrimination against all employees. The requirements in this regard are detailed in the LMP and the Contractor's Code of Conduct. |

*Table 3 National Policies and Strategies*

| Policy / Strategy | Reference to the Project |
|---|---|
| **Water Management and Flood Protection** | |
| Flood Risk Management Plan for the Vistula River Basin, adopted by Regulation of the Minister of Infrastructure dated October 26, 2022 (Journal of Laws of 2022, item 2712) | The Tasks planned as part of the Project were included in the final list of measures aimed at reducing flood risk in the Vistula River Basin. |
| Flood Risk Management Plan for the Odra River Basin, adopted by Regulation of the Minister of Infrastructure dated October 26, 2022 (Journal of Laws of 2022, item 2714) | The Tasks planned under the Project were included in the final list of measures aimed at reducing flood risk in the Odra River Basin. |
| The Plan for Counteracting the Effects of Drought, adopted by the Regulation of the Minister of Infrastructure of July 15, 2021 (Journal of Laws of 2021, item 1615) | The Tasks planned under the Project have been included in the list of investment tasks aimed at increasing water retention and supporting measures to mitigate the effects of drought. |
| The Program for Counteracting Water Shortages for 2023–2027 with a Perspective through 2030, adopted by Resolution No. 152 of the Council of Ministers dated August 22, 2023 (Official Gazette of 2023, item 1119) | The Tasks planned as part of the Project have been included in the list of investment measures aimed at improving water retention. |
| **Environmental Protection and Climate Change Adaptation** | |

| Policy / Strategy | Reference to the Project |
|---|---|
| National Environmental Policy 2030 – a development strategy in the areas of the environment and water management, adopted by Resolution No. 67 of the Council of Ministers dated July 16, 2019 (Official Journal of 2019, item 794) | The Project aligns with the intervention priority concerning adaptation to climate change and natural disaster risk management. |
| Strategic Adaptation Plan for Sectors and Areas Vulnerable to Climate Change through 2020 with a Perspective to 2030 (SPA2020), adopted by the Council of Ministers on October 29, 2013. | The Project aligns with the priority areas of adaptation measures to be undertaken in the field of water management. |
| **Employment and Working Conditions** | |
| National Action Program on Occupational Health and Safety for 2023–2025, adopted by the Council of Ministers pursuant to Article 10 of the Act of April 13, 2007, on the State Labor Inspectorate | The Project will be implemented in accordance with applicable Occupational Health and Safety standards. The contractor will ensure working conditions that comply with national requirements and ESS2 standards. |

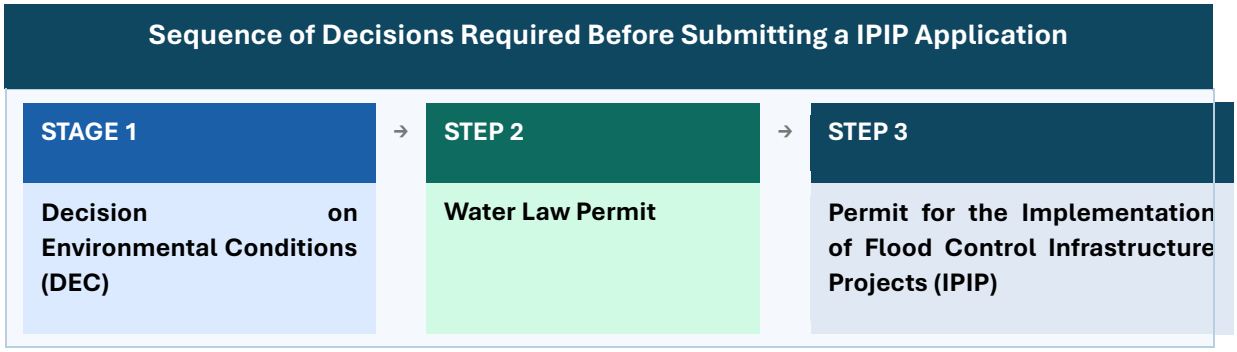
## 3.2 National EIA Procedures and Permits

Dry flood control reservoirs and flood control polders constitute flood control structures within the meaning of the law. The procedure for obtaining approval for their construction is governed by two main legal acts: the Act of July 8, 2010, on Special Rules for Preparing for the Implementation of Projects Involving Flood Control Structures (hereinafter: the Special Flood Act) and the Act of October 3, 2008, on Access to Information on the Environment and Its Protection, Public Participation in Environmental Protection, and Environmental Impact Assessments (hereinafter: the EIA Act).

Flood control structures are classified as projects that may always have a significant impact on the environment, which means that an environmental impact assessment (EIA) procedure must be conducted before subsequent administrative decisions are issued.

Obtaining a permit for the implementation of a flood protection project (IPIP) requires first obtaining two decisions in a strictly defined sequence, as shown in diagram below (Figure 5).

*Figure 5 Sequence of Decisions Required Before Submitting a IPIP Application*



| | | |
|---|---|---|
| **Authority:** RDOŚ<br><br>**Deadline:** 45 days from the date of application<br><br>**Required:** prior to the issuance of the water rights permit | **Authority:** Minister responsible for water management<br><br>**Required:** prior to issuance of the IPIP | **Authority:** Provincial Governor<br><br>**Deadline:** 90 days from the date of application |

**Re-evaluation of the EIA — may be required at the IPIP stage**

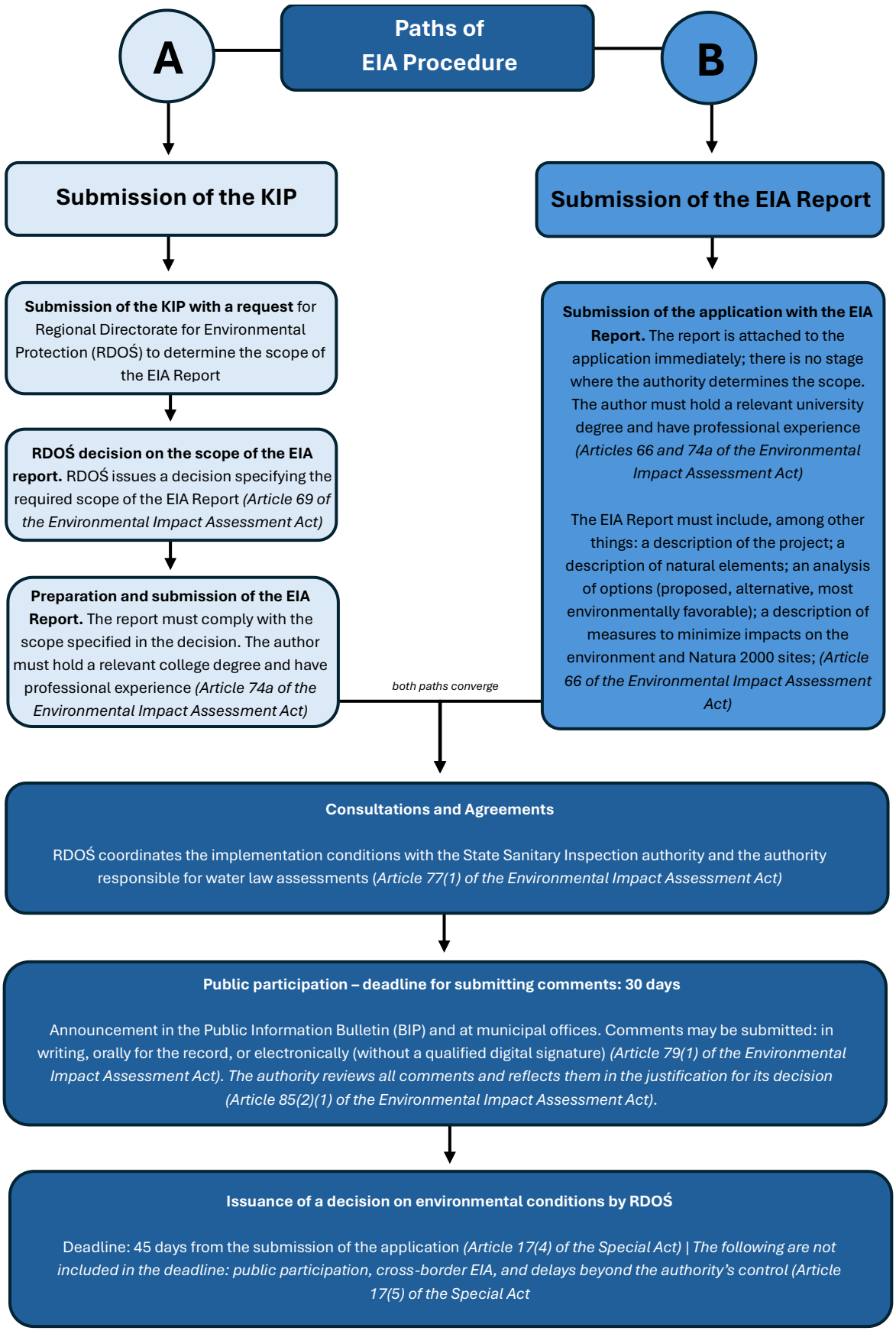
Two grounds: **(1)** The Environmental Protection Law explicitly imposes such an obligation (Article 82(1)(4) of the Environmental Impact Assessment Act); **(2)** The Provincial Governor deems it necessary due to changed circumstances or new information (Article 88(1) of the Environmental Impact Assessment Act). The re-EIA is conducted by the Provincial Governor with mandatory public participation.

### 3.2.1 Environmental Impact Assessment (EIA) Procedure

An application for a decision on environmental conditions must be accompanied by a cadastral map indicating the boundaries of the project site and an extract from the land registry (Article 74(1) of the Environmental Impact Assessment Act). A key element of the application is the main environmental document, which may take one of two forms depending on the chosen procedure path (see figure below).

The EIA procedure can follow two paths. In **Path A**, the PIU submits a Project Information Sheet (KIP) along with a request for the Regional Directorate for Environmental Protection (RDOŚ) to determine the scope of the report (scoping). In **Path B,** the PIU submits the full Environmental Impact Report immediately—without the scoping stage. Both paths are permissible for projects that are always likely to have a significant impact on the environment.

*Figure 6 Paths of EIA Procedure*



*Environmental Impact Report*

The EIA report is the primary environmental document in the proceedings. Pursuant to Article 66 of the Environmental Impact Assessment Act, it must include at least:

- a detailed description of the planned project and the conditions of land use during the construction, operation, and decommissioning phases;
- a description of the natural elements of the environment that may be affected;
- an analysis of project alternatives–including the alternative proposed by the PIU, a reasonable alternative, and the alternative most favorable to the environment;
- a description of measures aimed at avoiding, preventing, mitigating, or compensating for adverse environmental impacts on the environment and on Natura 2000 sites;
- an assessment of the risk of major accidents and natural disasters.

The report may be prepared only by a person or, where the report is prepared by a team of authors, by a team led by a person with a relevant university degree and at least 5 years of professional experience in environmental impact assessment work, or by a person listed in the register of environmental impact assessment experts *(Article 74a of the Environmental Impact Assessment Act)*.

*Content and Effects of the EIA Decision*

In the environmental conditions decision, the Regional Directorate for Environmental Protection (RDOŚ) specifies the conditions for environmental use during the implementation and operation phases of the project, sets forth environmental protection requirements, and, if necessary, imposes an obligation to carry out environmental compensation, prevent environmental impacts, or monitor such impacts *(Article 82(1) of the Environmental Impact Assessment Act)*. If the analysis of alternatives indicates that the option proposed by the PIU cannot be implemented, the authority, with the PIU' s consent, specifies in the decision the alternative approved for implementation.

The environmental conditions decision may also impose an obligation to conduct a new EIA at the IPIP stage *(Article 82(1)(4) of the EIA Act)*. Regardless of this, the Provincial Governor, prior to issuing the IPIP, may, on his own initiative and after consulting with the Regional Directorate for Environmental Protection (RDOŚ), order a repeat EIA if he deems it necessary due to changed circumstances or new information *(Article 88(1) of the EIA Act)*. The repeat EIA is conducted with mandatory public participation.

### 3.2.2 Water Permit

A water law permit for the construction of a flood control structure is required prior to the issuance of a IPIP and must be attached to the application for the IPIP as a mandatory attachment. For projects carried out by PGW Wody Polskie, the competent authority for issuing the water law permit is the minister responsible for water management.

The primary document required to initiate proceedings for the issuance of a water law permit is a water law assessment report. The report is prepared by a qualified professional and must include,

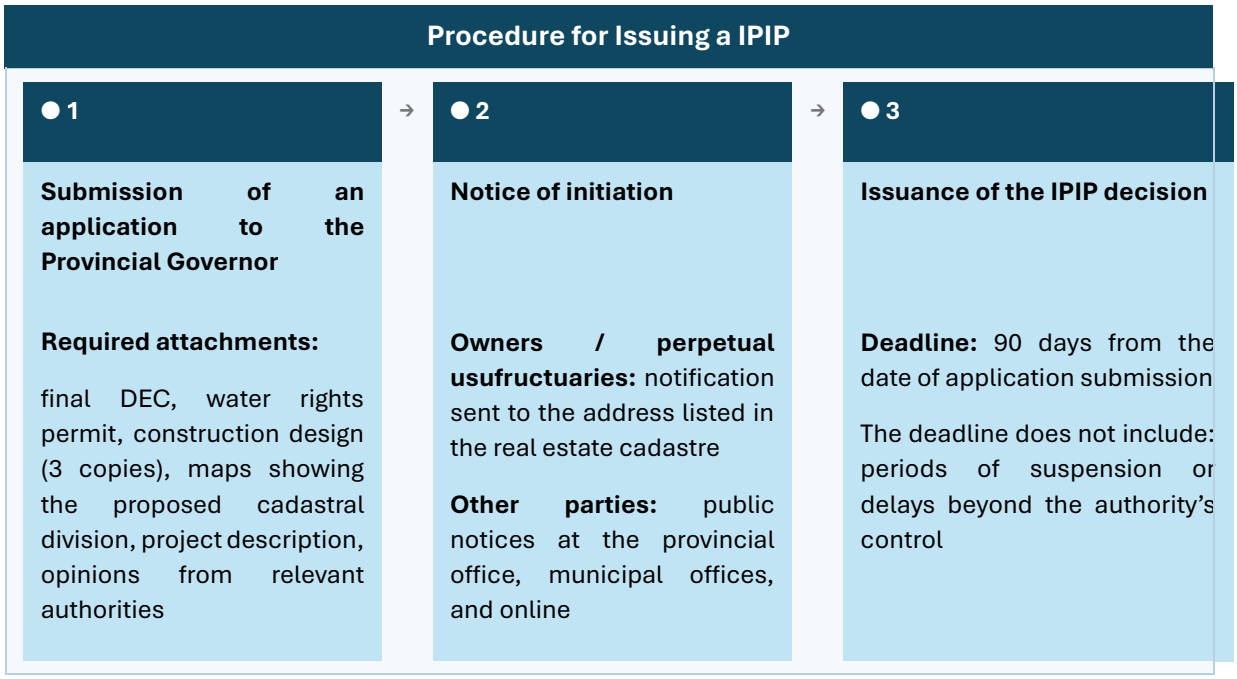
among other things: a description of the legal status of properties located within the impact area of the planned activities; a characterization of the waters covered by the permit and a description of their current condition; the purpose and scope of the intended use of the waters; a description of the condition of water facilities; and the planned duration of the permit.

The permit specifies the conditions for performing the work, the deadline for completion, and the PIU's obligations regarding the protection of the aquatic environment during construction.

### 3.2.3 Procedure for Obtaining a Permit for the Implementation of a Flood Protection Project (IPIP)

After obtaining a final EIA decision and a water permit, the PIU submits an application to the Voivode for the issuance of a IPIP. If the project covers the territory of two or more voivodeships, the competent authority is the Voivode in whose territory the largest portion of the acquired real estate is located.

*Figure 7 Procedure for Issuing a IPIP*




Instead of separate approvals, permits, and authorizations required by specific regulations, the PIU obtains opinions from the relevant authorities, which are attached to the application for the IPIP. The authorities issue their opinions within 14 days of receiving the application. These opinions replace the approvals and permits required by separate regulations (not the IPIP itself, to which they are attached), which constitutes one of the most significant procedural simplifications of the special act. The jurisdiction of the authorities issuing opinions depends on the nature of the investment site and may include, among others: the Provincial Conservator of Historical Monuments (sites containing cultural assets), the Director of the Regional Directorate of State Forests (state-owned forest lands), the Director of the National Park (the park area or its buffer zone), and road and rail infrastructure managers (infrastructure conflicts).

The final IPIP decision triggers a number of legal consequences by operation of law. It approves the division of real estate–the boundary lines of the investment site become the new cadastral boundaries of the parcels. On the date the decision becomes final, the necessary real estate is transferred by operation of law to the ownership of the State Treasury or the competent local government unit.

Furthermore, the IPIP' s decision is equivalent to obtaining a building permit and a decision on zoning conditions or the determination of the location of a public-purpose investment–the PIU does not need to apply for these decisions in separate proceedings.

Upon a justified request by the PIU, supported by an overriding public interest, the provincial governor may declare the IPIP decision immediately enforceable. A decision bearing this enforceability obligates the current owners to surrender the property and vacate the premises within 90 days and entitles the PIU to physically take possession of the site and immediately commence construction work, even before the decision becomes final.

## 3.3 World Bank Environmental and Social Standards

The World Bank's Environmental and Social Framework (ESF) comprises ten Environmental and Social Standards (ESS), which define the Bank's environmental and social policy requirements for investment projects co-financed by World Bank funds. In the context of the Project, eight standards apply: ESS1 (Assessment and Management of Environmental and Social Risks and Impacts), ESS2 (Labor and Working Conditions), ESS3 (Resource Efficiency and Pollution Prevention and Management), ESS4 (Community Health and Safety), ESS5 (Land Acquisition, Restrictions on Land Use and Involuntary Resettlement), ESS6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources), ESS8 (Cultural Heritage), and ESS10 (Stakeholder Engagement and Information Disclosure)..

## 3.4 Summary of the Gap Analysis Between National Regulations and ESF Requirements

This chapter presents a summary of the analysis of the compliance of Polish law with the requirements of the World Bank's Environmental and Social Standards (ESS) applicable to the Project. The purpose of the analysis was to identify areas where national regulations are consistent with ESS requirements, as well as gaps that need to be addressed through additional measures, procedures, or project documents on the part of the Borrower.

The full gap analysis—containing a detailed comparison of individual ESS requirements, corresponding provisions of Polish law, compliance status assessments, and comments—is presented in Annex 1 to this document.

### 3.4.1 ESS1 – Environmental and Social Risk Assessment and Management

Polish law provides for a comprehensive environmental impact assessment system; however, it has gaps regarding the assessment of social impacts. The EIA procedure focuses primarily on

environmental and health aspects, whereas ESS1 requires a comprehensive and equivalent assessment of social risks and impacts—including economic, cultural, and social effects on affected communities. Polish law does not contain an explicit requirement for the systematic identification and assessment of specifically social risks. Furthermore, the assessment of ecosystem services is not conducted as a separate analytical category.

Polish law does not provide for an instrument equivalent to an Environmental and Social Management Plan (ESMP), although a decision on environmental conditions may include monitoring obligations of a similar nature.

To address these gaps, a comprehensive ESIA will be prepared to supplement the national requirements under the EIA procedure, incorporating a social impact assessment that goes beyond the national scope and takes into account , the economic, cultural, and social impacts on all groups affected by the project, including vulnerable groups.

Furthermore, the assessment of ecosystem services is not conducted as a separate analytical category. Polish law requires an assessment of impacts on natural elements—flora, fauna, habitats, water, and soil—under Article 66(1) of the Environmental Impact Assessment Act, which indirectly covers some ecosystem services. However, there is no explicit requirement to systematically assess ecosystem services as a distinct category, nor to analyze local communities' dependence on living natural resources and the project's effects on their availability.

The environmental impact assessment shall also include an analysis of ecosystem services. The hierarchy of mitigation measures shall be applied consistently to both environmental and social impacts. On this basis, an ESMP shall be prepared as a management document integrating all mitigation measures, monitoring obligations, and the allocation of responsibilities throughout the project’s life cycle.

### 3.4.2 ESS2 – Labor and Working Conditions

Polish law provides a wide range of protections for employees hired under employment contracts—it regulates wages, working hours, vacation time, sick leave and maternity benefits, occupational health and safety, and the reporting of accidents in accordance with ESS2 requirements. These protections apply equally to all workers regardless of nationality, including migrant workers; Polish labor law does not differentiate the scope of protection based on citizenship.

Certain gaps apply only to individuals employed under civil law contracts (B2B). With regard to this group, the Labor Code does not mandate monthly payment periods—payment deadlines may be extended by contractual provisions. In Polish practice, however, monthly settlements are customary. Sickness insurance is voluntary for contractors. The absence of active contributions means no entitlement to sick pay. Contractors and B2B employees are not protected against termination of their contracts due to pregnancy.

These gaps shall be addressed in the Labor Management Procedures (LMP). The LMP shall cover all project workers regardless of their form of employment and ensure they receive an equivalent level of protection—particularly regarding timely payments, guaranteed breaks and rest periods,

access to sick leave benefits, access to a workers' grievance mechanism, and protection against retaliation. Contracts with contractors and subcontractors shall include provisions requiring them to comply with ESS2 standards for all employees, and the accident reporting system shall cover all persons working on the Project.

### 3.4.3 ESS3 – Efficient Resource Management and Pollution Prevention

Polish regulations are generally aligned with ESS3 requirements. The Environmental Protection Law, the Waste Act, the Water Law, and the Construction Law collectively implement the principles of the pollution prevention hierarchy, resource efficiency, cleaner production, optimal energy consumption, and pollution prevention in accordance with GIIP and EHS guidelines. Detailed regulations govern hazardous waste management, waste management chain record-keeping and tracking, noise and vibration control, wastewater management, erosion and dust prevention during the construction phase, and quality assurance systems for environmental testing. Remediation of historically contaminated sites is carried out in accordance with procedures that fully comply with ESS3 requirements. No gaps requiring corrective action were identified within the scope of ESS3.

### 3.4.4 ESS4 – Community Health and Safety

Polish regulations are largely consistent with the requirements of ESS4. The EIA procedure, the Construction Law, the Public Roads Act, the Drivers Act, and the Crisis Management Act collectively ensure the assessment of risks to public health and safety, requirements for the safe design of infrastructure, the management of road traffic and vehicle safety, and emergency preparedness and response systems. For dams as hydrotechnical structures, specialized state supervision and stringent qualification requirements are in place.

The only identified gap concerns the requirement for the PIU to appoint an independent Panel of Experts for large dams or high-risk dams. Polish law achieves this objective through the state service for the safety of impounding structures (IMGW-PIB) and the building permit system; however, it does not impose a direct obligation on the PIU to appoint its own panel of experts. As part of the project, the Borrower shall therefore appoint an Independent Dam Safety Panel of Experts (IDSPoE) in accordance with ESS4 requirements and prepare the documents required by this standard. The Panel will review and advise on dam safety aspects during design, construction, commissioning, operation, and emergency preparedness planning.

### 3.4.5 ESS5 – Involuntary Land Acquisition, Restrictions on land use and involuntary resettlement

ESS5 is the standard for which Polish law exhibits the greatest number of gaps. National regulations ensure compliance regarding the treatment of expropriation as a measure of last resort, transparent rules for determining compensation, the possibility of granting replacement property, the establishment of a cut-off date for eligibility, and procedures to protect against forced evictions.

Polish law does not require development of a comprehensive Land Acquisition and Resettlement Plan as a separate management document. Nor does it contain an explicit principle to avoid or minimize land acquisition or restrictions on land use, especially where this would result in physical or economic displacement, as a priority when selecting an investment alternative—the approach to analyzing alternatives is environmental and technical, rather than social. Polish law also affords only partial protection to persons without formal title to property: while it takes into account real estate with unregulated legal status, it does not grant such persons full rights consistent with ESS5.

The Special Act on Flood Protection allows for a IPIP decision to be made immediately enforceable, which in practice may lead to a situation where an expropriated person loses possession over the property before receiving any payment—which is directly contrary to the ESS5 requirement. The regulations do not provide for specific support measures for particularly vulnerable groups, comprehensive support in restoring livelihoods, or transitional support in the event of economic resettlement. There are no provisions requiring an in depth socio-economic survey, no measure regarding compensation for business owners for damages other than the loss of property, such as the costs of relocating their business or lost profits.

Corrective actions require the development of a comprehensive LARAP in accordance with ESS5, including a census of all persons affected by the project regardless of legal status on or before the cut-off date, a matrix of entitlements, eligibility criteria, and compensation procedures ensuring payment of compensation prior to the physical acquisition of the property, a program to restore living conditions and livelihoods, specific support measures for vulnerable groups, and a grievance mechanism available to all PAPs. The site specific ESMPs integrated and part of the site specific Construction works Contracts shall include strict provisions forbidding access to land before compensation payments have been executed.

### 3.4.6 ESS6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources

Polish regulations are consistent with most of the ESS6 requirements—in particular regarding biodiversity impact assessments, the precautionary approach, adaptive management, nature-based compensation, the protection of valuable modified habitats, regulations concerning alien and invasive species, and the sustainable management of living natural resources. However, compliance is incomplete in several areas.

The first gap is the absence of a three-tier classification of habitats as “modified,” “natural,” and “critical” as defined by ESS6, which shall be conducted prior to the actual environmental assessment. The PIU must conduct this classification independently before proceeding with the EIA process. The second gap is the lack of a requirement to prepare a separate Biodiversity Management Plan (BMP)—elements corresponding to this document are scattered throughout the EIA report and the environmental conditions decision. The borrower shall compile and consolidate these elements into a single document compliant with ESS6 requirements.

With regard to critical habitats, a gap is the lack of a requirement to engage an independent expert of recognized international standing to assess the feasibility of compensation—the borrower shall

engage such an expert if the presence of critical habitats is identified. Finally, Polish law lacks a horizontal mechanism for verifying the supply chain in terms of its impact on biodiversity—with the exception of timber covered by FLEGT/EUTR regulations; this means that the Borrower shall implement its own procedures for assessing suppliers of construction materials.

### 3.4.7 ESS8 – Cultural Heritage

Polish law provides strong protection for tangible cultural heritage and complies with most of the ESS8 requirements —regarding the identification of heritage, impact assessment as part of the EIA process, the protection of archaeological sites, built heritage and its surroundings, the involvement of experts and stakeholders, access to cultural sites, and the protection of natural features of cultural significance. A chance finds procedure is in place under Polish law: the discovery of a suspected historic artifact triggers an automatic obligation to suspend work, secure the site, and notify the heritage conservation authority for expert assessment. However, this obligation stems directly from statute and applies generally, without a corresponding requirement for staff training or a dedicated contractor code of conduct—both of which must be added to meet ESS8 §11 in full.

Polish law focuses on tangible cultural heritage and does not include instruments mandating an assessment of impacts on intangible cultural heritage or mechanisms regulating its commercial use. To the extent that the project may affect such heritage, the Borrower shall conduct an appropriate assessment and consultations.

Furthermore, Polish law does not require the preparation of a separate Cultural Heritage Management Plan—this means that, in certain cases, the Borrower shall develop such a document, integrating the requirements arising from the Decision on Environmental Conditions and conservation permits.

The regulations also do not impose an obligation to train staff on accidental finds or to develop a contractor's code of conduct—these requirements shall be included in contracts with contractors. Finally, while neither Polish law nor ESS8 requires the implementation of additional programs that proactively reinforce the conservation objectives of legally protected historic areas. ESS8 focuses instead on the protection and management of impacts on cultural heritage, rather than on separate support programs.—However if the project is located within such an area or its buffer zone, the PIU shall, as a Project commitment, develop an appropriate support program.

## 3.5 ESS10 – Stakeholder Engagement and Disclosure

Polish regulations ensure compliance regarding the disclosure of information about the project and the environment, general public consultation procedures under the EIA, and the functioning of grievance mechanisms based on the Code of Administrative Procedure. However, certain gaps in this regard can be identified.

Polish law does not require the development and implementation of a Stakeholder Engagement Plan as a separate management document. ESS10's core requirement is to ensure meaningful stakeholder engagement throughout the project cycle; the Stakeholder Engagement Plan (SEP) is one of the planning instruments used to operationalize this requirement, and it must be prepared

by the PIU to close this gap The law does not contain an explicit requirement to actively identify all stakeholders, particularly vulnerable groups—the general right to participate in proceedings is insufficient here, as it does not guarantee reaching individuals who are not parties to the administrative proceedings. There are no provisions explicitly requiring that the perspective of women be taken into account in the consultation process, which must be addressed in the SEP by designing tools and channels to engage women as a distinct stakeholder group.

Corrective actions include: developing a SEP that identifies all project stakeholders—including vulnerable and marginalized groups—and specifies methodologies for their active engagement at every stage of the project; ensuring that the SEP includes specific mechanisms for women's participation; ensuring timely and accessible disclosure of project-related information and documentation to all stakeholders beyond the minimum required under the EIA procedure, in line with ESS10; and establishing a grievance redress mechanism (GRM) accessible to all stakeholders that goes beyond the standard administrative procedures of the Code of Administrative Procedure (KPA).

# 4 Baseline Data

## 4.1 Historical floods

### 4.1.1 The Vistula River Valley and the Kraków metropolitan area

The history of floods occurring in the 20th century in the Vistula River basin dates back to 1924, when sudden spring thaws caused a rapid rise in water levels in the Vistula and its tributaries. The flood particularly affected southern Poland, including Kraków and towns located along the Vistula's tributaries, such as Mielec. In Kraków, floodwaters breached the city's defenses, inundating the lowest-lying districts and causing significant damage to infrastructure and destruction to households. In the vicinity of Mielec, the flooding caused extensive inundation of farmland and villages.

The flood of 1934 also went down in history as a tragic event. The flood was triggered by heavy rainfall, which subsequently turned into intense, torrential downpours. The rainfall led to rapid river rises in the Vistula basin, resulting in numerous breaches of the levees along the Vistula and Dunajec rivers, which in turn caused massive and catastrophic flooding. The effects of the disaster were felt mainly in the southern provinces. The water flooded thousands of farms, destroying homes, sweeping away livestock and crops, and causing enormous material losses in agriculture. In Kraków alone, the water flooded numerous private and industrial buildings; bridges, roads, and urban infrastructure were destroyed. As a result of the Wisłoka River's flooding, Mielec was almost completely cut off from the outside world—for the duration of the flood, the city became an island surrounded by the waters of the Wisłoka. The 1934 flood became a cataclysm described as the greatest natural disaster in interwar Poland, causing the deaths of approximately 100 people.

Areas located in the Vistula River basin faced the effects of flash floods several more times — among the largest and most devastating were the floods in 1960, 1970, 1980, and 1983. Heavy rainfall caused rapid rises in water levels in the Vistula and its tributaries, which in turn led to flooding in nearby cities, towns, and villages. A sudden rise in the Vistula's water level in 1970 led

to a critical situation in Kraków, revealing structural flaws in the city's levees. The flood wave also caused widespread flooding in the Mielec and Szczurowa regions. The floods of 1980 and 1983 contributed to the intensification of the socio-economic crisis in Poland at that time. Their effects impacted one in every three municipalities in southeastern Poland.

The Vistula River basin was also struck by one of the greatest natural disasters in Polish history — the "flood of the millennium" in 1997. Water levels at that time exceeded those of previous floods, and the disaster caused immense destruction and loss of life. The flood was a catastrophe of enormous scope. The water surged into Kraków, among other places, flooding numerous areas and bringing the city to a standstill. The Szczurowa region and its surroundings were particularly hard hit by the flood, where the levees were breached. The surrounding towns struggled with widespread flooding and water that lingered for a long time. Residents of Mielec and the surrounding area also faced the disaster; when the Wisłoka River overflowed, water flooded into the city and the homes closest to the river. The flooding in the region destroyed road and bridge infrastructure, cutting off many towns from the outside world and forcing a mass evacuation of residents.

In May and June 2010, heavy rainfall once again caused the Vistula and its tributaries to swell. During the flood, the Vistula reached its highest level on record near Kraków. The water flooded the lowest-lying districts and forced the closure of some roads, which significantly paralyzed the city's functioning. As a result of the rising waters, the floodwall in the village of Kwików (Szczurowa municipality) also broke, causing the surrounding villages to be almost completely flooded. In the municipality of Szczurowa alone, several hundred residential buildings and several dozen kilometers of roads were damaged. The rise in the Wisłoka River's water level and backwater from the swollen Vistula River also led to a crisis situation in the Mielec area. The Wisłoka River significantly exceeded its flood warning levels, flooding the nearest farms. The situation in the region was further exacerbated by a breach in the flood embankment on the Vistula River in the town of Słupiec, which caused secondary flooding of areas on the border between the Mielec and Dąbrowa counties.

A difficult hydrological situation on the Vistula and its tributaries also occurred in September 2024, when the upper Vistula basin was hit by heavy rainfall. In many places, particularly around Kraków, states of emergency and flood alerts were in effect. Although the passage of the peak flood wave through Kraków did not have as drastic consequences as historic floods, it still caused the boulevards to flood and led to localized flooding. In the area of the Vistula's tributaries, the situation was equally serious, though it also did not reach the scale of historic floods.

### 4.1.2 The Kłodzko Basin

The history of the Kłodzko Basin is marked by frequent flooding, particularly due to the region's geographical location and mountainous terrain. One of the most severe natural disasters to strike the region was the 1938 rain-induced flood, caused by heavy and prolonged rainfall that led to rising water levels in the Nysa Kłodzka River and its tributaries. At that time, the flow of water in the Nysa Kłodzka River exceeded the riverbed's capacity several times over. The effects of the flood were felt throughout the entire Kłodzko Basin, including the Biała Lądecka Valley, where the water level reached approximately 2 m. The flood wave that swept into Kłodzko reached a height of nearly 7 m. The water flooded a significant part of the city, including the train station and the

historic center. The current of the Nysa Kłodzka River destroyed several hundred buildings. Damage was also reported in the areas of Lądek Zdrój and Stronie Śląskie, where the floodwaters inundated public buildings and residential homes.

The Kłodzko Valley was also hit hardest by the "flood of the millennium," which struck southern and western Poland in 1997. The 1997 flood is considered the greatest natural disaster to have struck the Kłodzko Valley. As a result of torrential rains that lasted nearly a week, the water levels in the Nysa Kłodzka River and its tributaries rose rapidly, leading to record-breaking flooding. The flood wave spread very rapidly, causing extreme damage in Kłodzko, Gorzanów, Bystrzyca Kłodzka, Bardo Śląskie, and Kamieniec Ząbkowicki. The disaster cut off many towns from the outside world, leaving them without electricity or communication. In Kłodzko, after bursting its banks, the Nysa Kłodzka River reached a level of nearly 7–8 meters above normal. The water flooded most of the town, washing away bridges and destroying buildings, roads, and infrastructure. As a result of the disaster, the village of Pilce was completely destroyed, becoming one of the most tragic sites on the flood map. The water flooded nearly the entire village, flowing through buildings, farms, and streets, destroying the residents' life's work in its wake. On a regional scale, the flood caused losses estimated at hundreds of millions of zlotys, and the destruction in Kłodzko and the surrounding area was so extensive that post-flood reconstruction took years.

In 2024, the Kłodzko Basin once again experienced a flood with dramatic consequences, on a scale and intensity comparable to the "flood of the millennium" in 1997. Due to the sudden onset and rapid pace of the flood, it was one of the most catastrophic hydrological events in the region's history. Similar to the "flood of the millennium," the 2024 flood was triggered by intense rainfall, which led to rapid river rises. The flood completely devastated the Kłodzko infrastructure, destroying dozens of kilometers of roads, bridges, and other infrastructure. A factor that exacerbated the scale of the disaster was the breach of the dam at the dry retention reservoir on the Morawka River, which caused an immediate release of massive amounts of water and sent a flood wave in Stronie Śląskie, Lądek Zdrój, and Kłodzko, causing catastrophic destruction. The event was of an extreme nature, necessitating the evacuation of thousands of residents and leaving behind destruction requiring long-term reconstruction.

## 4.2 Natural Environment

The current state of the natural environment within the Project area is described below. Given the framework nature of this document, the final locations, extent, and technical solutions have not yet been determined at this stage of preparation for all Tasks envisaged under the Project. Accordingly, the environmental baseline presented in this chapter is based on publicly available regional and national data, aggregated to the level of the municipalities and counties within which individual Project components are planned to be implemented.

The scope and level of detail of the information currently available differ depending on the type of intervention, reflecting the different nature of each component category. For hydraulic infrastructure – such as dry polders and retention reservoirs – for which a general area of location has been preliminarily identified, the baseline describes the surface water bodies (SWB) and groundwater bodies (GWB), protected areas, and other environmental receptors located within

the anticipated area of direct and indirect impact. For Nature-based Solutions (NBS), information is presented at the catchment level, as their final location and technical form will be determined through further hydrological, hydraulic, and environmental analyses. For non-structural components – including institutional and regulatory measures, as well as monitoring and early warning systems – a general environmental characterization of the area in which they will operate is provided, and the detailed scope of the environmental assessment required will be confirmed at the Screening stage for each Task.

It should be emphasized that the inclusion in this chapter of a given environmental element (e.g., a water body, protected area, species, habitat, or heritage feature) within the municipality or county in which a given Task is planned does not automatically imply that the planned activities will affect that element. The environmental baseline is descriptive and informational in nature; its purpose is to identify potential environmental receptors present within an area broader than the Task's eventual footprint, so that no material element is overlooked at the planning stage. Whether, and to what extent, a given environmental element will actually be exposed to impact will be assessed separately – on the basis of the Task's final location, extent, and technical design – through the Screening process and the Task-specific ESIA and ESMP.

The environmental baseline presented here therefore constitutes the first stage of a multi-stage environmental assessment process, consistent with the World Bank's Environmental and Social Standards (ESS1) and recognized good practice for the preparation of large infrastructure projects. In line with this approach, each Task will undergo Screening, and where potential impacts are identified, detailed, site-specific ESIA and ESMP will be prepared, covering the full characterization of surface and groundwater, cultural landscape and tangible heritage, protected areas, biodiversity, soils, air quality and noise, ecosystem services, and climate parameters.

### 4.2.1 Surface and Groundwater

*I.1 Flood Risk Reduction in the Vistula River Basin to Protect Kraków*

The planned hydrotechnical structures are located within the boundaries of 8 surface water bodies (SWB).

- The SWB *Vistula from Skawa to Skawinka* with code RW2000112135599 is classified as a heavily modified water body. This SWB is characterized by low ecological potential and a chemical status below good resulting in an overall status rating of poor. It has been identified as at risk of failing to achieve its environmental objectives. The assessment of ecological potential is primarily determined by unfavorable values of indicators including electrical conductivity and biological components such as phytobenthos, macrophytes, macroinvertebrates, and ichthyofauna. The chemical status below good is determined by the exceedance of the limit value for benzo(a)pyrene. The main sources of hydromorphological pressures include impoundment structures, water regulation structures, flood control embankments and mining. Chemical pressures stem from the development of urban areas - transport, tourism and urban runoff.
- The SWB *Płazanka* with code RW200006213389 is classified as a natural water body. This SWB is characterized by poor ecological potential and a chemical status below good

resulting in an overall status rating of poor. It was identified as at risk of failing to achieve its environmental objectives. The poor ecological status is primarily determined by unfavorable values of physicochemical indicators—including electrical conductivity, total nitrogen concentration, and nitrate nitrogen concentration—as well as the condition of biological components, particularly phytobenthos and ichthyofauna. The presence of benzo(a)pyrene is the decisive indicator of a chemical status below good. The main hydromorphological pressures affecting the SWB are associated with river channel modifications, bridges and mining. Chemical pressures stem from the development of urban areas - transport, tourism and urban runoff. Additionally, the condition of the SWB is affected by pressures related to eutrophication processes.

- The SWB *The Vistula from the Przemsza to the Skawa* with code RW20001121339 is classified as a heavily modified water body. This SWB is characterized by low ecological potential and a chemical status below good resulting in an overall status rating of poor. It has been identified as at risk of failing to achieve its environmental objectives. The ecological status is primarily determined by unfavorable values of physicochemical indicators, including conductivity and ammonium nitrogen concentration, as well as biological components such as phytobenthos, macrophytes, benthic macroinvertebrates, and ichthyofauna. The chemical status below good is determined by the exceedance of the limit value for benzo(a)pyrene and nickel. The main hydromorphological pressures affecting the SWB are associated with impoundment structures, flood control embankments and mining. Chemical pressures stem from the development of urban areas - transport, tourism and urban runoff. Pressures associated with agricultural and forestry activities, as well as industrial and municipal sources and leachate from landfills, also have a significant impact. In addition, water quality is affected by trophic pressures resulting from fertilization and pollutant deposition, urban stormwater runoff, and sources of industrial, domestic, and municipal pollution.
- The SWB *Gromiecki Stream* with code RW200006213329 is classified as a natural water body. This SWB is characterized by poor ecological potential and a chemical status below good resulting in an overall status rating of poor. It was identified as at risk of failing to achieve its environmental objectives. The poor ecological status is primarily determined by unfavorable values of physicochemical indicators, including BOD, conductivity, total nitrogen, and ammonium nitrogen, as well as the condition of the phytobenthos. The chemical status below good is determined by the exceedance of the limit value for cadmium and nickel. The main hydromorphological pressures affecting the SWB are associated with river channel modifications, bridges and mining. Chemical pressures stem from the development of urban areas - transport, tourism and urban runoff. In addition, water quality is affected by trophic pressures associated with domestic and municipal sources, as well as salinization pressures resulting from the discharge of industrial and municipal wastewater.
- The SWB *Tributary from Grodzisko* with code RW200009213514 is classified as a natural water body. This SWB is characterized by low ecological potential and a chemical status below good resulting in an overall status rating of poor. It was identified as at risk of failing to achieve its environmental objectives. The ecological status is determined by the condition of macroinvertebrates. The chemical status is determined by the presence of

brominated diphenyl ethers and heptachlor. The main sources of hydromorphological pressures include river channel modifications, impoundment structures, water management facilities and bridges. Chemical pressures stem from the development of urban areas - transport, tourism and urban runoff.

- The SWB *Bachówka* with code RW2000092135189 is classified as a natural water body. This SWB is characterized by poor ecological potential and a chemical status below good resulting in an overall status rating of poor. It was identified as at risk of failing to achieve its environmental objectives. The poor ecological status is primarily determined by unfavorable values of physicochemical indicators, including $BOD_5$, total nitrogen, ammonium nitrogen, nitrate nitrogen, total phosphorus, and phosphate phosphorus(V), as well as the condition of biological components, in particular phytobenthos, macroinvertebrates, and ichthyofauna. The chemical status is classified as below good due to exceedances of the threshold values for benzo(a)pyrene and fluoranthene. The main sources of hydromorphological pressures include river channel modifications and bridges. Chemical pressures stem from the development of urban areas - transport, tourism and urban runoff. Trophic pressures related to fertilization, pollutant deposition, and urban stormwater runoff also have a significant impact on water quality.
- The SWB *Gostynia from its sources to the Stara Gostynia, including the Stara Gostynia* with code RW200010211851 is classified as a heavily modified water body. This SWB is characterized by low ecological potential and a good chemical status resulting in an overall status rating of poor. It was identified as at risk of failing to achieve its environmental objectives. The low ecological status is primarily determined by unfavorable values of physicochemical indicators, including conductivity, total nitrogen, ammonium nitrogen, and nitrate nitrogen, as well as the condition of the phytobenthos. The chemical status is determined by nickel. The main sources of hydromorphological pressures include river channel modifications, impoundment structures, bridges and mining. Chemical pressures stem from the development of urban areas. In addition, water quality is affected by trophic pressures associated with urban stormwater runoff, fertilization, and pollutant deposition, as well as salinization pressures resulting from the discharge of industrial and municipal wastewater.
- The SWB *Pszczynka to Łąka Reservoir* with code RW2000092116559 is classified as a heavily modified water body. This SWB is characterized by poor ecological potential and a good chemical status resulting in an overall status rating of poor. It was identified as at risk of failing to achieve its environmental objectives. The ecological status is primarily determined by unfavorable values of physicochemical indicators, including conductivity, total nitrogen, ammonium nitrogen, and nitrate nitrogen. The main sources of hydromorphological pressures include river channel modifications, impoundment structures, water regulation structures, bridges and mining. There are also trophic pressures associated with urban stormwater runoff, fertilization, and deposition. Water quality is also affected by pressures related to eutrophication.

The planned hydrotechnical structures are located within the area of 4 groundwater bodies (GWB).

- GWB with the code PLGW2000145 is characterized by poor chemical status, good quantitative status, and poor overall status. The GWB is at risk of failing to achieve the environmental objectives set for it. Within the GWB area, significant pressures related to water abstraction for the drainage of mine workings have been identified, as well as diffuse pressures associated with agriculture and municipal services.
- GWB with the code PLGW2000147 is characterized by good chemical status, good quantitative status and good overall status. The GWB is at risk of failing to achieve the environmental objectives set for it. Within the GWB area, significant pressures related to water abstraction for the drainage of mine workings have been identified, as well as diffuse pressures associated with agriculture and municipal services.
- GWB with the code PLGW2000156 is characterized by good chemical status, good quantitative status, and good overall status. The GWB is at risk of failing to achieve the environmental objectives set for it. Within the GWB area, significant pressures have been identified, including diffuse pressures related to agriculture and municipal activities, as well as point-source pressures from groundwater abstractions and the dewatering of mine workings.
- GWB with the code PLGW2000159 is characterized by good chemical status, good quantitative status, and good overall status. The GWB is not at risk of failing to achieve the environmental objectives set for it. No pressures have been identified within the GWB.

### *I.2 Flood Risk Reduction from Kraków to Zawichost*

The area of the Koszyce and Szczurowa municipalities is located within the Upper Western Vistula water region, which is part of the Vistula River basin. The Vistula River forms the boundary between the territories of both municipalities. The main tributaries of the Vistula within the municipality of Szczurowa are the Uszwica and the Raba, which flows along the western boundary of the municipality. Both rivers are right-bank tributaries of the Vistula. In the Koszyce municipality, on the other hand, the main tributary of the Vistula is the Nidzica, which is a left-bank tributary.

Within the Koszyce municipality, there are 5 SWB, including 2 SWBs covering the Vistula:

- *The Vistula from Podłężanka to the Raba*, with code RW200011213799 and status of natural water body. This SWB has poor ecological status and chemical status below good. The ecological potential of this SWB is determined by phytobenthos, macroinvertebrates and ichthyofauna. The overall status of the SWB is poor, and it is at risk of failing to achieve the environmental objectives set for it. Fertilization and urban runoff is the primary source of trophic pressures within the water body. The main source of hydromorphological pressures within the SWB is river training structures. Chemical pressures are caused by the expansion of urban areas, transport, tourism, urban runoff and industrial and municipal activities.
- *The Vistula from the Raba to the Nida*, with code RW2000122159 and status of natural water body. This SWB has moderate ecological status and chemical status below good. The ecological potential of this SWB is determined by phytoplankton and ichthyofauna.

The overall status of the SWB is poor, and it is at risk of failing to achieve the environmental objectives set for it. The main source of hydromorphological pressures within the SWB is river training structures. Chemical pressures are caused by the expansion of urban areas, transport, tourism, agriculture, forestry, and urban runoff.

Within the municipality of Szczurowa, however, 9 surface water bodies have been identified, including one water body covering the Vistula: *The Vistula from the Raba to the Nida* with code RW2000122159 - the characteristics of this SWB are provided above.

The territory of the Szczurowa municipality is located within the boundaries of 4 Groundwater Body Units (GWB):

- GWB with code PLGW2000132 of good chemical and quantitative status and good overall status. The GWB is at risk of failing to achieve the environmental objectives set for it - in terms of chemical status. Within the GWB there is diffuse area-source pressure associated with agriculture, municipal activities, or industry.
- GWB with code PLGW2000148 of good chemical and quantitative status and good overall status. The GWB is not at risk of failing to achieve the environmental objectives set for it. No pressures have been identified within the GWB.
- GWB with code PLGW2000114 of good chemical and quantitative status and good overall status. The GWB is not at risk of failing to achieve the environmental objectives set for it. No pressures have been identified within the GWB.
- GWB with code PLGW2000149 of good chemical and quantitative status and good overall status. The GWB is not at risk of failing to achieve the environmental objectives set for it. No pressures have been identified within the GWB.

The Mielec County encompasses part of the Upper Western Vistula and Upper Eastern Vistula river basins. In Mielec County, the Vistula River forms the county's northwestern border. Drainage of the county's territory occurs mainly through the Vistula and Wisłoka rivers, along with its tributary, the Tuszymka. The county also includes a significant portion of the Babulówka River's watershed, encompassing its left-bank tributary, the Rów Stream.

Within the county's boundaries, 15 surface water bodies have been identified, including 2 surface water bodies covering the Vistula:

- *The Vistula from the Nida to the Wisłoka*, with code RW20001221799 and status of natural water body. This SWB has poor ecological status and chemical status below good. The ecological potential of this SWB is determined by phytoplankton, macroinvertebrates and ichthyofauna. The overall status of the SWB is poor, and it is at risk of failing to achieve the environmental objectives set for it. The main source of hydromorphological pressures within the SWB is river training structures. Chemical pressures are caused by the expansion of urban areas, transport, tourism, agriculture, forestry, and urban runoff.
- *The Vistula from the Wisłoka to the Sanna*, with code RW2000122319 and status of natural water body. This SWB has moderate ecological status and chemical status below good. The ecological potential of this SWB is determined by phytoplankton, macroinvertebrates and ichthyofauna. The overall status of the SWB is poor, and it is at risk of failing to achieve the environmental objectives set for it. Hydromorphological

pressures within the surface water body include channel straightening as well as impoundment and river training structures. Chemical pressures stem from the development of urban areas, transport, tourism, urban runoff, diffuse agricultural sources, forestry, and industrial and municipal activities.

The Mielec County is located within the boundaries of the groundwater body:

- GWB with the code PLGW2000134 of good chemical and quantitative status and good overall status. The GWB is not at risk of failing to achieve the environmental objectives set for it. Within the GWB there is diffuse area-source pressure associated with agriculture, municipal activities, or industry.
- GWB with the code PLGW2000133 of good chemical and quantitative status and good overall status. The GWB is not at risk of failing to achieve the environmental objectives set for it. No pressures have been identified within the GWB.
- GWB with the code PLGW2000135 of poor chemical, good quantitative status and poor overall status. The GWB is at risk of failing to achieve the environmental objectives set for it - in terms of chemical status. Within the GWB there is diffuse area-source pressure associated with agriculture, municipal activities, or industry.
- GWB with the code PLGW2000115 of good chemical and quantitative status and good overall status. The GWB is not at risk of failing to achieve the environmental objectives set for it. No pressures have been identified within the GWB.
- GWB with the code PLGW2000116 of good chemical and quantitative status and good overall status. The GWB is not at risk of failing to achieve the environmental objectives set for it. No pressures have been identified within the GWB.

The following Major Groundwater Reservoirs are located in the Mielec County: GZWP No. 424 Dolina Borowa and GZWP No. 425 Dębica–Stalowa Wola–Rzeszów. The Dębica–Stalowa Wola–Rzeszów aquifer is the region's main water source. It is characterized by poor isolation from the ground surface and is vulnerable to anthropogenic threats.

### *I.3 Modernize the Sulejów Water Reservoir*

The Task area is located in the Pilica River watershed, which is one of the most important left-bank tributaries of the Vistula River. The scope of the Task is located within the boundaries of three Surface Water Body (SWB):

- *The Pilica River from Zwlecza to the Sulejów Reservoir*, with code RW2000112545399 and status of natural water body. This SWB has poor ecological status and chemical status below good. The ecological potential of this SWB is determined by macroinvertebrates and ichthyofauna. The overall status of the SWB is poor, and it is at risk of failing to achieve the environmental objectives set for it. Urban runoff is the primary source of trophic and hydromorphological pressures within the water body. Chemical pressures stem from the development of urbanized areas, transport, tourism, and urban runoff.
- *The Pilica River from the Sulejów Reservoir to the mouth,* with code RW200011254399 and status of natural water body. This SWB has poor ecological status and chemical status

below good. The ecological potential of this SWB is determined by phytoplankton, macrophytes, macroinvertebrates, and ichthyofauna. The overall status of the SWB is poor, and it is at risk of failing to achieve the environmental objectives set for it. Hydromorphological pressures within the surface water body include channel straightening as well as impoundment and river training structures. Chemical pressures stem from the development of urban areas, transport, tourism, urban runoff, diffuse agricultural sources, forestry, and industrial and municipal activities.

- *The Sulejów Reservoir,* with code RW2000222545399 and status of heavily modified water body. This SWB has poor ecological potential and chemical status below good. The ecological potential of this SWB is determined by BOD and phytoplankton. The overall status of the SWB is poor, and it is at risk of failing to achieve the environmental objectives set for it. Urban runoff is the primary source of trophic and hydromorphological pressures within the water body. Chemical pressures stem from the development of urbanized areas, transport, tourism, and urban runoff.

In terms of groundwater, the analyzed area lies within the boundaries of two Groundwater Body Units (GWB):

- GWB with code PLGW200084 of good chemical and quantitative status and good overall status. The GWB is not at risk of failing to achieve the environmental objectives set for it. Within the GWB there is diffuse area-source pressure associated with agriculture, municipal activities, or industry.
- GWB with code PLGW20085 of good chemical and quantitative status and good overall status. The GWB is not at risk of failing to achieve the environmental objectives set for it. No pressures have been identified within the GWB.

### *I.4 Enhance nature-based water retention in the Upper Vistula River Basin*

The Kraków agglomeration is located within the Vistula River Basin, within the boundaries of two water regions: the Upper Western Vistula region and the Little Vistula region. The hydrographic axis of the agglomeration is formed by the Vistula River, which flows through the center of the area. According to *the Water Management Plan for the Vistula River Basin*, the city of Kraków and the counties of Kraków, Wieliczka, Bochnia, Myślenice, Olkusz, Proszowice, and Miechów counties are collectively located within the boundaries of 72 surface water bodies (SWB), of which 47 are natural water bodies, 23 are heavily modified water bodies, and 2 are artificial water bodies. Of all the SWBs designated within the agglomeration, 70 are at risk of failing to meet the environmental objectives set for them.

In terms of groundwater, the agglomeration area falls within the boundaries of 14 groundwater bodies (GWB), 12 of which are in good overall condition. The condition of the remaining 2 GWB was assessed as poor.

The following Major Groundwater Bodies (GZWP) run through the Kraków agglomeration area: No. 450 Vistula River Valley (Kraków), No. 451 Bogucice Sub-Aquifer, No. 326 Częstochowa Aquifer (E), No. 451 Chrzanów Aquifer, No. 454 Olkusz-Zawiercie Aquifer, No. 408 Miechowska Basin (northwestern part), No. 453 Biskupi Bór Aquifer, and No. 409 Miechowska Basin (southeastern part).

*II.1 Construct the Kamieniec Ząbkowicki multifunctional reservoir*

The area of the planned Kamieniec Ząbkowicki reservoir is located in the watershed of the Nysa Kłodzka, a left-bank tributary of the Odra river. The Nysa Kłodzka River originates in the Śnieżnik Massif and, in the analyzed section, flows along a west–east axis, exhibiting the characteristics of a lowland river with a varied hydrological regime, shaped primarily by precipitation. In the catchment area of the Kamieniec Ząbkowicki reservoir, in addition to the main river, there are numerous tributaries, the most important of which are the Studew, Ożarski Potok, Mąkolnica, and Świda. According to the Second Update of the Water Management Plan for the Odra River Basin, the catchment area of the Kamieniec Ząbkowicki reservoir comprises five surface water bodies (SWB):

- *Studew*, with code RW600003123149 and status of natural water body. This SWB has good chemical status. Due to the lack of biological data, the ecological status/potential of the SWB was not assessed. The ecological potential of this SWB is determined by macrophytes, invertebrates and ichthyofauna. There is no data regarding the overall status of the SWB. The SWB is at risk of failing to achieve the environmental objectives set for it. Within the SWB, there are trophic pressures resulting from fertilization and originating from industrial, domestic, and municipal sources. Hydromorphological pressures are caused by bridge structures and mining.
- *The Nysa Kłodzka from Ścinawka to the point where the Młynówka Pomianowska branches off*, with code RW60000512333 and status of natural water body. This SWB has moderate ecological status and chemical status below good. The ecological potential of this SWB is determined by phytobenthos. The overall status of the SWB is poor, and it is at risk of failing to achieve the environmental objectives set for it. Within the SWB, there are trophic pressures resulting from fertilization and urban runoff. Hydromorphological pressures within the surface water body include channel straightening as well as impoundment and river training structures. Chemical pressures stem from the development of urban areas, transport, tourism and urban runoff.
- *The Ożarski Stream*, with code RW600003123169 and status of heavily modified water body. Due to the lack of biological data, the ecological status/potential of the SWB was not assessed. The ecological potential of this SWB is determined by macrophytes, invertebrates and ichthyofauna. There is no data regarding the overall status of the SWB. The SWB is at risk of failing to achieve the environmental objectives set for it. Within the SWB, there are trophic pressures resulting from fertilization and originating from industrial, domestic, and municipal sources. Hydromorphological pressures are caused by bridge structures and impoundment and river training structures.
- *Mąkolnica*, with code RW600003123189 and status of heavily modified water body. Due to the lack of biological data, the ecological status/potential of the SWB was not assessed. The ecological potential of this SWB is determined by macrophytes, invertebrates and ichthyofauna. There is no data regarding the overall status of the SWB. The SWB is at risk of failing to achieve the environmental objectives set for it. Within the SWB, there are trophic pressures resulting from fertilization and industrial sources. Hydromorphological pressures within the SWB are caused by bridge structures and impoundment and river training structures.

- *Budzówka*, with code RW60000312329 and status of natural water body. This SWB has moderate ecological status. There is no data about chemical status of SWB. The ecological potential of this SWB is determined by phytobenthos. The overall status of the SWB is poor, and it is at risk of failing to achieve the environmental objectives set for it. Within the SWB, there are trophic pressures associated with fertilization and urban runoff, salinization pressures (including eutrophication), and hydromorphological pressures caused by river regulation structures and bridges.

The designated environmental objectives include achieving good ecological status or potential and good chemical status of the waters, as well as ensuring the passability of watercourses for the migration of fish fauna, including sea trout and Atlantic salmon in the Nysa Kłodzka River. The catchment areas of the analyzed watercourses have been classified as areas sensitive to eutrophication. In terms of groundwater, the area of the planned Kamieniec Ząbkowicki reservoir is located in the Pre-Sudeten region. The groundwater is associated with sandy-gravelly Quaternary sediments, which lie shallow and remain in hydraulic connection with the surface waters of the river valley. The area of the Kamieniec Ząbkowicki reservoir lies within the boundaries of the GW6000109 groundwater body, whose chemical, quantitative and overall status has been assessed as good, with no risk of failing to meet environmental objectives. Within the GWB, there is pressure associated with water abstraction from groundwater sources. Within the area of the planned Kamieniec Ząbkowicki reservoir, there are groundwater infiltration intakes that are part of the Sudeten Water Supply System, supplying the local population with drinking water; these intakes conflict with the planned project and are scheduled to be restored while maintaining the continuity of water supply.

### *II.2 Flood Risk Reduction in the Biała Lądecka Catchment of the Nysa Kłodzka*

The upper part of the Biała Lądecka catchment (above Lądek-Zdrój) comprises three main surface water bodies (SWB), representing river and mountain stream ecosystems typical of the Eastern Sudetes:

- *Morawka* with code RW60002121625 and status of heavily modified water body. This SWB has moderate ecological potential and chemical status below good. Indicators determining ecological potential have not been established. The overall status of the SWB is poor, and it is at risk of failing to achieve the environmental objectives set for it. Within the SWB, there are trophic pressures associated with fertilization and urban runoff. Hydromorphological pressures within a distinct surface water body include channel straightening, impoundment and regulation structures, and bridges. Chemical pressures stem from the development of urban areas, transport, tourism and urban runoff.
- *Biala Ladecka from the source to Kobylica* with code RW60002121613 and status of heavily modified water body. This SWB has moderate ecological potential and chemical status below good. Indicators determining ecological potential have not been established. The overall status of the SWB is poor, and it is at risk of failing to achieve the environmental objectives set for it. Within the SWB, there are trophic pressures associated with fertilization and urban runoff. Hydromorphological pressures within a distinct surface water body include channel straightening, impoundment and regulation

structures, and bridges. Chemical pressures stem from the development of urban areas, transport, tourism, urban runoff and industrial and municipal activities.

- *Biala Ladecka from Kobylica to the mouth* with code RW60003121699 and status of heavily modified water body. This SWB has good ecological potential and chemical status below good. Indicators determining ecological potential have not been established. The overall status of the SWB is poor, and it is at risk of failing to achieve the environmental objectives set for it. Within the SWB, there are chemical pressures from the development of urban areas, transport, tourism and urban runoff.

The SWB with code RW60002121625 is the most important SWB in the analyzed part of the watershed, covering the main course of the Biała Lądecka from its headwaters to Stronie Śląskie, as well as its largest tributaries, including the Morawka and Kleśnica. This area is characterized by a predominance of forested watersheds and a small proportion of urbanized areas outside the towns of Stronie Śląskie, Kletno, and Stara Morawa. In many places, the watercourses retain their natural character with stony bottoms, rapids, and headwater sections featuring very high water quality. The SWB contains habitats of submontane Batrachium penicillatum rivers (3260), populations of the brush-leaved *batrachium* (*Batrachium penicillatum*), and valuable fish communities represented by the brook lamprey, white-finned bullhead, striped bullhead, loach, and brown trout. A significant portion of this SWB lies within the boundaries of Natura 2000 sites and the Śnieżnik Landscape Park, which accounts for its high ecological value.

The SWB with code RW60002121613 encompasses the Kobylica watershed, including the Młynówka and a series of small tributaries draining the northeastern part of the Śnieżnik Massif and the Złote Mountains. These are typical mountain watercourses characterized by steep longitudinal gradients, high flow dynamics, and well-oxygenated waters. Forest catchments with a low degree of human alteration dominate here, thanks to which conditions favorable for the occurrence of organisms associated with mountain waters have been preserved. These streams play an important ecological role as breeding and habitat sites for rheophilic fish. Due to their location within extensive forest complexes, they also constitute a significant element of the regional network of ecological corridors. The ecological character of this SWB is strongly linked to the functioning of the Natura 2000 sites of the Bialskie Mountains, the Śnieżnik Group, and the Złote Mountains.

The SWB *Biala Ladecka from Kobylica to the mouth* with code RW60003121699 covers the section of the Biała Lądecka River from the confluence with the Morawka in Stronie Śląskie to its confluence with the Nysa Kłodzka. The upper part of the SWB, encompassing Stronie Śląskie and Lądek-Zdrój, lies within the boundaries of the analyzed area. Compared to the headwater sections, this section has been more significantly altered by human activity, yet it still retains many characteristics of a foothill river. The valley contains valuable riparian habitats, floodplain forests, and sites inhabited by species associated with well-oxygenated flowing waters. At the same time, this is the section most vulnerable to pressures resulting from valley development, transportation infrastructure, and the effects of the catastrophic flood of September 2024, which led to local changes in the riverbed's morphology, sediment displacement, and the transformation of some aquatic and riparian habitats. Despite these changes, this section continues to play a key role as the main ecological corridor for the entire Biała Lądecka watershed.

The upper part of the Biała Lądecka watershed lies within the boundaries of the PLGW6000126 Groundwater Body (GWB 126), which encompasses, among others, the Śnieżnik Massif, the Bialskie Mountains, and parts of the Złote Mountains. Groundwater here occurs mainly in fissured and fissured-weathered aquifers associated with the metamorphic rocks that form the Eastern Sudetes. The aquifers are replenished primarily through direct infiltration of precipitation in forested areas and infiltration of surface water within river valleys. Due to the significant proportion of forested areas and relatively low anthropogenic pressure, groundwater plays a key role in maintaining the region's water resources and sustaining flows in the headwater sections of the Biała Lądecka, Morawka, Kleśnica, and other tributaries.

The quantitative and chemical status of GWB 126 is assessed as good , with no risk of failing to meet environmental objectives. Within the GWB, there is pressure associated with water abstraction from groundwater sources. There are no significant sources of pressure within the watershed that could pose a permanent threat to groundwater resources, and the predominant land-use patterns support the preservation of natural infiltration and retention processes. Potential impacts on the GWB are mainly associated with local earthworks carried out within river valleys, which may cause short-term and localized changes in infiltration conditions or an increase in the turbidity of infiltrating water. However, these impacts are temporary and do not pose a risk of deteriorating the quantitative or chemical status of the GWB.

### 4.2.2 Cultural Landscape

This chapter presents a general overview of the cultural landscape of the regions where the Climate Resilience in Water Management Project's individual Tasks will be implemented. Issues related to historical sites/tangible heritage located within the Tasks' footprints are described in chapter 4.2.3. Where known cultural heritage will be impacted by the project, a cultural heritage management plan may be warranted, outlining special protection measures, including required qualifications and permits. Such a plan could be part of the ESMP, depending on the complexity, or presented as a standalone plan.

#### *I.1 Flood Risk Reduction in the Vistula River Basin to Protect Kraków*

The Task area is characterized by a diverse cultural landscape, combining the natural features of the Upper Vistula Valley and its tributaries with historical influences typical of the Małopolska and Silesia regions.

The cultural landscape around the planned polders bears the hallmarks of a centuries-old tradition of fishing and agriculture. The areas of the municipalities of Zator, Spytkowice, and Brzeźnica form a unique landscape shaped by man-made water bodies, dikes, ponds, and canals—all elements of the tradition associated with fish farming. Another significant element of the cultural landscape in this area is its historic architecture, including the ruins of Lipowiec Castle in Babice, the castle in Zator, and the palace in Spytkowice, along with their accompanying park and manor grounds. The project area also features unique examples of sacred architecture—the Monastery of the Stigmata of St. Francis in Alwernia—as well as numerous Jurassic landforms characteristic of the Kraków-Częstochowa Upland landscape.

The area designated for the planned reservoirs combines the features of a forest-hunting landscape with those of an agricultural-mining landscape, showing distinct influences of Silesian traditions. The area is distinguished by compact forest tracts (in the municipalities of Kobiór, Wyry, and Suszec), which were historically used for intensive hunting—forest settlements and hunting lodges, remnants of the hunting tradition, have been preserved in the landscape. The area around the municipalities of Pawłowice and Suszec, on the other hand, features a landscape characteristic of Silesia, dominated by vast farmlands interspersed with elements of mining architecture. The cultural landscape of this area is further shaped by typical Silesian rural and farmstead architecture - whitewashed or unpainted brick houses, brick farmsteads with distinctive entrance gates, and traditional roadside shrines. The area of the planned reservoirs also possesses the qualities of an urbanized industrial landscape, as exemplified by Żory. The city combines elements of its historic center with remnants of its former steel and foundry industries.

### *I.2 Flood Risk Reduction from Kraków to Zawichost*

The Vistula River Valley belongs to historical-cultural region III.A, the southwestern part of Lesser Poland [...]. According to the region's description, its multi-layered cultural landscape, with a mosaic structure, consists of croplands, grasslands, and forests. This landscape bears clear traces of long-term human activity (high field ridges, dry stone walls, loess ravines, and travel ditches) and is also characterized by numerous historic buildings, churches, and small-scale sacred architecture[2] .

In the area of the municipalities of Szczurowa and Koszyce, the cultural landscape has been shaped by the Vistula River and its tributaries, as well as by the presence of fertile soils. The exceptional fertility of these soils attracted settlers in the early Middle Ages. These conditions fostered early and continuous settlement, and the landscape has retained its character as an intensively farmed agricultural plain to this day. An ancient salt route from Bochnia ran along the right bank of the Raba River to the port of Uście on the Vistula, and the town of Uście Solne (now a village with a historic market square, one of the largest in Poland) was established in the municipality of Szczurowa. The largest group of historic structures consists of houses and farm buildings constructed using traditional methods associated with agricultural settlement. The cultural landscape of the Vistula River-side municipalities in Milec County (Czermin, Padew Narodowa, Borowa, and Gawłuszowice) also corresponds to the characteristics of historical-cultural region III.A., resulting from early and continuous settlement and agricultural land use. Within the cultural landscape, the numerous elements of the sacred landscape—shrines and roadside crosses—shall be highlighted. These monuments are strongly linked to the agricultural landscape and emphasize its traditional character.

### *I.3 Modernize the Sulejów Water Reservoir*

The cultural landscape within the Project area is a mosaic of natural, historical, and functional values. The most important element of the landscape is the Pilica River valley,

[2] Plit, J. (2016). Cultural Landscapes of Poland and Their Transformations. Warsaw: Institute of Geography and Spatial Planning, Polish Academy of Sciences

along with its accompanying meadows, oxbow lakes, and strips of woodland. The river valley forms the natural backbone of the landscape, around which settlements have developed. The Project area is a space where the natural environment and human activity remain closely intertwined.

Among the most recognizable elements of the cultural landscape within the Sulejów commune area is the Cistercian Abbey in Sulejów, which serves as the region's dominant historical landmark. The abbey is located approximately 2 km from the nearest boundary of the reservoir. Within the abbey grounds, elements of the original layout have been preserved, including fortifications, towers, and the former monastery church. The abbey is unique on a national scale, as it is one of the best-preserved and most valuable monastic complexes in Poland. The site has been inscribed on the List of Historic Monuments.

The landscape also features elements attesting to the region's settlement history, including religious structures, shrines, and the few remaining wooden houses that are remnants of traditional folk architecture. Due to the geological conditions of the area in question, the landscape also features remnants of local traditions of lime extraction and burning.

### *I.4 Enhance nature-based water retention in the Upper Vistula River Basin*

The Kraków metropolitan area is distinguished by a unique cultural landscape that forms a mosaic of Kraków's historical heritage and the unique assets of the counties surrounding the city. The main element of the metropolitan area's cultural landscape is Kraków's urban layout, which includes the Old Town complex, a UNESCO World Heritage Site. Other landscape features characteristic of the agglomeration's center include: Wawel Royal Castle, the historic Jewish district of Kazimierz, numerous religious buildings, complexes of former fortifications, elements of historic urban greenery, and the post-industrial urban layout of Nowa Huta, which is listed as a Historic Monument. On the scale of the entire Kraków metropolitan area, other significant elements of cultural heritage include sites inscribed on the UNESCO World Heritage List, such as the Wieliczka Salt Mine, the architectural and landscape complex and pilgrimage park in Kalwaria Zebrzydowska, and wooden religious buildings.

The cultural landscape of the Kraków metropolitan area also includes numerous historic parks and gardens scattered throughout the region, such as the historic park surroundings of the Royal Castle in Niepołomice, as well as manor houses and villas that are remnants of Polish noble culture. In addition, the agglomeration features traditional villages with preserved historic street layouts and the mosaic of fields characteristic of Lesser Poland, integrated into loess valleys and hills.

A distinctive feature of the Kraków metropolitan area's cultural landscape is its natural visual axes shaped by the area's natural assets—the Vistula River Valley, numerous forests and green enclaves, as well as the terrain's topography, including geological and karst formations.

### *II.1 Construct the Kamieniec Ząbkowicki Multifunctional Reservoir*

The area of the planned Kamieniec Ząbkowicki reservoir is characterized by a cultural landscape typical of the rural river valleys of Lower Silesia, shaped by historical agricultural use and centuries-old settlement along the Nysa Kłodzka Valley. The landscape is dominated by agricultural land, patterns of cultivated fields, and local roads; historical elements have survived only fragmentarily, which is partly the result of the damage caused by the 1997 floods and many years of aggregate extraction, which degraded a significant portion of the valley. Within the area of the planned Kamieniec Ząbkowicki reservoir, cultural heritage elements have been identified, including immovable monuments, archaeological sites, movable heritage items, and fragments of the historical spatial layouts of local settlements. The provincial register of historic monuments lists two structures directly affected by the Task: the three-span road bridge over the Nysa Kłodzka River in Przyłęk and the manor house in Dzbanów. The register of monuments also includes: the remains of a church and cemetery in Pilce and an avenue along the county road toward Rogów, both located within the reservoir's floodplain; the park complex in Dzbanów near the planned side dam; and two railway viaducts. Within the Task area, 19 direct conflicts between the planned infrastructure and surface-level archaeological sites listed in national cultural heritage registers have been identified. Before starting the earthworks, archaeological excavations will be carried out on areas where archaeological sites have been identified, by a qualified archaeologist. In the event of an immediate threat to the site, rescue or excavation investigations will be conducted. In addition, there will be ongoing archaeological supervision throughout the entire project, with permission from the Lower Silesian Provincial Conservator of Monuments. According to information from the Lower Silesian Provincial Conservator of Monuments, the task boundary encompasses fragments of the historical rural layouts of the villages of Przyłęk, Istebka, and Kamieniec Ząbkowicki, and also runs along the southern boundary of the rural layout of Suszki. These elements are fragmentary in nature and form part of the region's broader settlement landscape.

### *II.2 Flood Risk Reduction in the Biała Lądecka Catchment of the Nysa Kłodzka*

The cultural landscape of the upper part of the Biała Lądecka catchment area is one of the most distinctive and best-preserved examples of the mountainous settlement valleys of the Eastern Sudetes. Its current appearance is the result of centuries of interaction between natural factors and human activity, which since the Middle Ages have shaped the region's settlement structure, land use, and transportation network. The Biała Lądecka Valley itself played a particularly significant role in the formation of the landscape, serving as a natural axis for settlement and transportation between the Kłodzko Basin and the areas within the Śnieżnik Massif, the Bialskie Mountains, and the Złote Mountains.

A characteristic feature of the cultural landscape are the villages of medieval origin, which developed in a chain-like pattern along the river valley and its tributaries. Towns such as Bielice, Nowy Gierałtów, Stary Gierałtów, Goszów, Stronie Śląskie, and Kletno have retained a clear spatial connection to the course of the river valleys and the historical layout of agricultural land. For centuries, the foundation of local communities' livelihoods was agriculture, forestry, and the exploitation of the region's mineral resources, including metal ores and Śnieżnica marble. The

result of these processes is a mosaic landscape comprising built-up areas, former field and meadow patterns, forest complexes, and numerous elements of technical and industrial heritage.

Historic settlements in the Biała Lądecka Valley were located on floodplain terraces and within the wider parts of the valleys, leaving the steep sections of the slopes forested. This spatial arrangement is still clearly visible in the landscape and constitutes one of the most valuable features of the region's cultural heritage.

The landscape is further enriched by numerous religious buildings, roadside shrines, former farmsteads, relics of historical mining, and elements of transportation infrastructure associated with the region's development in the 19th and 20th centuries. Of particular significance is the historic railway line running through the Biała Lądecka Valley, which has become one of the key elements of the region's cultural identity.

The valley's contemporary cultural landscape is also the result of socioeconomic changes that took place after World War II. The depopulation of parts of the mountainous areas, the decline of traditional agriculture, and natural succession have led to a gradual increase in the area covered by forests and scrub at the expense of former agricultural lands. Despite these changes, in many places the historical spatial layouts of villages, old roads, field boundaries, field-edge trees, and other elements attesting to centuries of land use have been preserved. As a result, the Biała Lądecka Valley now stands as a valuable example of a cultural landscape in which historical, natural, and scenic values form a cohesive whole and remain one of the most important assets of the Kłodzko Region.

Another important element of the cultural landscape of the Biała Lądecka Valley is the historic palace and manor complexes, linked to the development of local estates and the activities of Princess Marianna Orańska, who played a key role in the region's economic development in the 19th century. The most recognizable structure is the palace in Stronie Śląskie. Also preserved are former manor houses, farm complexes, and historic park complexes associated with the villages of Goszów, Stary Gierałtów, and Radochów. These structures bear witness to the centuries-long history of settlement and the economic use of the river valley.

### 4.2.3 Historic Sites and Tangible Heritage

*I.1 Flood Risk Reduction in the Vistula River Basin to Protect Kraków*

A The preliminary screening did not identify structures listed in the register of historic monuments within the Task Area. The exception is a postwar infantry shelter in the forest on the northern edge of the Gostynia River valley (Wyry municipality), located within the floodplain of the planned Gostyń reservoir—the structure has been entered in the Silesian Voivodeship's register of historic monuments under number A/766/2021.

Within the boundaries of the planned polders and reservoirs, there are also small shrines and roadside crosses that are of significant cultural importance but are not formally protected. Discussions will be held with the local community to identify alternative locations for these historical features, and then they will be moved outside the polders' area to previously agreed sites.

*I.2 Flood Risk Reduction from Kraków to Zawichost*

Within the Koszyce municipality, cultural heritage resources include 9 sites listed in the Register of Immovable Monuments of the Małopolska Voivodeship. These are parks, manor houses, and historic buildings in the following localities: Koszyce, Książnice Wielki, Przemyków, Rachwałowice, Witów, and Włostowice. There are 30 sites listed in the National Register of Historic Monuments and 128 sites listed in the Municipal Register of Historic Monuments. A significant historic site within the municipality is the Market Square in Koszyce, dating back to the 14th century. The historic sites also include religious buildings, which play a dominant role in the spatial and functional structure of individual villages. It is also worth noting the presence of 6 archaeological sites listed in the register of historic monuments (existing burial mounds and a fortified settlement) as well as approximately 200 archaeological sites included in the inventory

Within the Szczurowa municipality, cultural heritage resources include 14 sites listed in the Register of Immovable Monuments of the Małopolska Voivodeship. These are religious buildings and cemeteries, manor complexes and palaces, as well as a granary in the following localities: Dołęga, Rudy Rysie, Strzelce Wielkie, Uście Solne, and Zaborów. Szczurowa is distinguished by its significant material cultural heritage resources. A significant percentage of the municipality's residential and farm buildings consists of historic wooden houses. In the historic town of Uście Solne—including the Market Square, one of the largest in Poland and modeled after Kraków's market square—there are several dozen structures under conservation protection. The municipal register of monuments in the Szczurowa municipality lists 574 immovable and movable monuments. It is also worth noting the presence of over 200 archaeological sites.

In the Mielec County, the Vistula River forms its northwestern border. In this section, the Vistula Valley is associated with the municipalities of Czermin, Padew Narodowa, Borowa, and Gawłuszowice. In these municipalities, 15 structures and complexes are listed in the register of historic monuments, including: the church and cemetery chapel in Czermin (Czermin Municipality); the church and cemetery in Borowa, the manor park and " " in Gliny Małe; the manor complexes in Sadowa Góra and Sadowa Góra–Lisówek, and the former school in Orłów (Borowa Municipality); the church and cemetery complex in Padwi Narodowa, and the chapels in Wojków and Zaduszki (Padew Narodowa municipality); the church, rectory, and former school in Gawłuszowice, and the manor complex in Wola Zdakowska (Gawłuszowice municipality). Municipal registers of historic monuments also list over one hundred sites within the municipalities, mainly places of worship. Among the most valuable monuments is the parish church of St. Adalbert in Gawłuszowice, built in 1677. The municipalities also contain nearly 200 archaeological sites.

At this stage, there is no data on the location of the Task elements that would allow for the specification of the historical sites/tangible heritage that will be affected by this Task.

*I.3 Modernize the Sulejów Water Reservoir*

Within the Task area and the investment's impact zone, there are no historic structures listed in the register of immovable monuments.

On a regional scale, however, the Cistercian Abbey in Sulejów stands out as one of the best-preserved and most valuable monastic complexes in Poland, holding the status of a Historic

Monument. The complex is characterized by Romanesque architecture from the turn of the 12th and 13th centuries. The most important elements of the abbey are: the monastery church of St. Thomas Becket, the eastern wing of the monastery, and the Gothic-Renaissance defensive walls.

### *I.4 Enhance nature-based water retention in the Upper Vistula River Basin*

The Kraków metropolitan area stands out on a national scale for its wealth of cultural resources in the form of historic buildings and archaeological sites. The agglomeration is home to a wide variety of historic sites, including: urban layouts, parks, palace complexes, castles, monasteries, administrative and residential buildings, religious structures, historic cemeteries, and other structures.

The greatest concentration of historic sites is found in Kraków, which serves as the center of the metropolitan area. The city itself constitutes an architectural and urban complex of unique value, comprising numerous historic sites and the urban landscape. A distinctive feature of the metropolitan area is the historic center of Kraków, inscribed on the UNESCO World Heritage List. Among the city's most recognizable historic sites are also: the Main Market Square, St. Mary's Basilica, the Cloth Hall, the Royal Castle and Wawel Cathedral, the Barbican, the Collegium Maius of the Jagiellonian University, and the urban layout of the Nowa Huta district.

According to data from the National Heritage Institute, all counties comprising the metropolitan area contain sites listed in the Register of Immovable Monuments of the Małopolska Voivodeship. Among the most distinctive are, among others, the Wieliczka Salt Mine - located in Wieliczka County and inscribed on the UNESCO World Heritage List - and the Royal Castle in Niepołomice. The area surrounding Kraków is also famous for its historic residential and religious buildings, urban layouts, and geological heritage sites. Among the most important are the urban layouts in Myślenice and Proszowice.

At this stage, there is no data on the location of the Task elements that would allow for the specification of the historical sites/tangible heritage that will be affected by this Task.

### *II.1 Construct the Kamieniec Ząbkowicki multifunctional reservoir*

No extensive historic sites or significant complexes of historic architecture have been identified within the area of the planned Kamieniec Ząbkowicki reservoir. The cultural heritage is represented by individual elements of a local nature, typical of the historic settlement structure of Lower Silesian villages. In the village of Pilce, partially dismantled remnants of a church and a rural cemetery, as well as the remains of historic farm buildings, have been preserved; all are severely degraded and fragmentary in nature. Among the structures formally protected by the provincial register of historic monuments are the three-span road bridge over the Nysa Kłodzka River in Przyłęk, built in 1902 (reg. no. A/4479/1445/Wł) and the manor house in Dzbanów (reg. no. A/4052/1836); two railway viaducts are listed in the municipal register of historic monuments. A number of archaeological sites related to the historical use of the Nysa Kłodzka Valley have been identified within the reservoir area; these are included in national registers and inventories of cultural heritage. Most of these sites are surface-level in nature, and their identification is based on ceramic materials found on the ground surface. Also located within the AoI of the Task are a

penitential cross in Dzbanów and, directly along the project boundary, a wayside shrine on Kłodzka Street in Kamieniec Ząbkowicki and a penitential cross in Suszka. The cultural landscape of the area is typical of the rural river valleys of Lower Silesia; only fragments of the historical rural layouts of the villages of Przyłęk, Istebka, Kamieniec Ząbkowicki, and Suszka have survived. Cultural heritage within the Project Area is scattered and fragmentary.

### *II.2 Flood Risk Reduction in the Biała Lądecka Catchment of the Nysa Kłodzka*

The upper part of the Biała Lądecka catchment is among the areas of exceptional cultural and historical significance within the Kłodzko region. Centuries of development in settlement, mining, health resorts, and forestry have left behind numerous historic structures and complexes, including the historic layouts of towns and villages, as well as religious, residential, industrial, and technical buildings.

The most valuable historic complex is the historic spa town of Lądek-Zdrój, along with the preserved urban layout of its spa district. Among the most important landmarks are:

- the Wojciech Natural Therapy Center—one of the oldest spa facilities in Poland and a symbol of the town;
- the historic spa complex, including the pump room, the spa park, and the sanatorium buildings;
- the town square along with the historic urban layout of the old town;
- St. John's Bridge—a stone bridge featuring a statue of St. John of Nepomuk;
- Church of the Nativity of the Blessed Virgin Mary;
- numerous historic guesthouses and spa villas from the 19th and early 20th centuries.

In Stronie Śląskie, the most significant historic complex consists of the town's historic urban layout and structures associated with the development of industry and the estates of Marianna Orańska. Among the most valuable monuments are: the Palace of Marianna Orańska with its historic park, the Church of Our Lady, Queen of Poland, and St. Maternus, and the historic Kłodzko–Stronie Śląskie railway line along with its engineering structures.

The preserved historical rural layouts of the chain villages, which developed along the Biała Lądecka River and its tributaries, also hold significant cultural value. Among the most important are the layouts within the following localities: Stary Gierałtów, Nowy Gierałtów, Goszów, Bolesławów, Kletno, Strachocin, the rural area of Stronie Śląskie, and Stara Morawa.

These localities feature numerous examples of traditional Sudeten architecture, including historic farmsteads, roadside shrines, penitential crosses, and structures related to forestry and mining.

### 4.2.4 Protected Areas

*I.1 Flood Risk Reduction in the Vistula River Basin to Protect Kraków*

The planned activities are partially located within the boundaries of Natura 2000 sites, including the Dolina Dolnej Skawy Special Protection Area for Birds (PLB120005) and the Wiśliska Special Area of Conservation for Habitats (PLH120084). Additionally, some of the polders covered by the Task
within the boundaries of the Tenczyński Landscape Park and its buffer zone, the Rudniański Landscape Park and its buffer zone, the buffer zone of the Bielańsko-Tyniecki Landscape Park, and the buffer zone of the Cysterskie Kompozycje Krajobrazowe Rud Wielkich Landscape Park.

Most of the facilities covered by the Task are at least partially located within ecological corridors of supra-regional significance: the KPd-10 Upper Vistula Valley corridor, the KPdC-11 Kraków-Częstochowa Uplands corridor, and the KPd-15B Pszczyna Forests corridor. In addition, a small portion of the Task is located in the immediate vicinity of the KPd-15A Pszczyna Forests–Silesian Beskids corridor.

*I.2 Flood Risk Reduction from Kraków to Zawichost*

Legally protected areas account for 59.6% of the total area of the Szczurowa municipality[3] . The majority of the municipality's territory lies within the boundaries of protected landscape areas, which include[4] :

- The Vistula Valley Protected Landscape Area, established to preserve the natural character of the Vistula River and its surroundings as a refuge for waterfowl and marsh birds, as well as rare riparian plant communities, and to preserve the particularly important, natural ecological corridor of the Vistula River, which is of international significance. The area features forest ecosystems typical of periodically flooded areas, as well as aquatic and marsh ecosystems, and anthropogenic ecosystems (farmland and meadows). Among the most interesting plant communities are the numerous patches of willow-poplar riparian forests still found here, which are becoming increasingly rare in Poland.
- Bratucice Protected Landscape Area. The landscape of the Protected Landscape Area is characterized by forest complexes in the Bratucice and Przyborów regions, consisting mainly of mixed pine-oak forests, as well as meadows and pastures associated with the Vistula Lowlands. Notable flora includes the Spiš crocus and the royal lily-of-the-valley. The historic architectural layout of the village of Mokrzyska, along with historic churches and cemeteries dating from World War I, constitute the area's cultural heritage.
- The Radłowsko-Wierzchosławicki Protected Landscape Area was established to preserve the integrity of a compact forest complex and the distinctive landscape and architecture of the villages in the Bochnia Foothills, as well as to serve as a refuge for waterfowl and marsh birds and to protect sites with rare plant species. The landscape is dominated by

[3] Local Data Bank of the Central Statistical Office (GUS)
[4] Description of the OChK from the Central Register of Nature Conservation Forms (https://crfop.gdos.gov.pl)

forests, mostly mixed coniferous forests, and in wet areas—moist coniferous forests with wet meadows within the woods. The Area's cultural heritage sites include primarily churches, manor-and-park complexes, and the 19th-century family home of Wincenty Witos in Wierzchosławice.

The municipality also includes Natura 2000 habitat protection areas:

- Dębówka on the Uszewka River (habitat site, site code: PLH120066). The area's conservation targets include the following natural habitats: 6410—variably moist molinia meadows (Molinion) and 6440—*Cnidion dubii* meadows (*Cnidion dubii*), as well as the following butterfly species: the small copper, the telejus blue, and the nausithous blue.
- The Gróbka River Valley (habitat area, area code: PLH120067). The objects of protection in this area are: the natural habitat 6410—variably moist molinia meadows (Molinion)—and the butterfly species the small copper, the telejus blue, and the nausithous blue.

Legally protected areas account for 99.9% of the total area of the Koszyce municipality[5] . The Koszyce municipality is located within the Koszyce Protected Landscape Area, which was established to protect the natural and ecological values of the Szreniawa, the Nidzica, and the Vistula Valley itself, which, within a densely populated and developed agricultural landscape, play important biocenotic roles as ecological corridors and pathways. The area has been inhabited since the Neolithic period, and many historic structures have been preserved. The oldest are the remains of characteristic Lesser Poland burial mounds (registered as archaeological sites in Łapszów, Przemyków, Siedliska, and Skałka) as well as the hillfort and defensive settlement in Witów[6] .

Just south of its administrative borders lies the Vistula Valley Protected Landscape Area.

Legally protected areas account for 13.2% of the total area of the Mielec County[7] . The forms of protection found within the Mielec County include: protected landscape areas, nature reserves, Natura 2000 sites, ecological land, and natural monuments.

Protected landscape areas[8] :

- Mielec-Kolbuszowa-Głogów Protected Landscape Area . The Protected Landscape Area (OChK) covers a section of the Kolbuszowa Plateau characterized by an agricultural and forested landscape. It features a wide variety of habitats—ranging from sandy dunes to peat bogs and water bodies. The area is home to pine and mixed coniferous forests, mixed broadleaf forests, alder forests, riparian forests, acid meadows, reed beds, manna grass communities, dune communities, herbaceous communities, moor grass communities, thistle meadows, and ryegrass meadows.
- Jastrząbsko-Żdżarski Protected Landscape Area. The main ecosystems of the Protected Landscape Area are forest complexes of oak-hornbeam forests, mixed pine-oak forests (in the northern part of the area), and fresh pine forests (in the southern part). The most

[5] GUS Local Data Bank
[6] Description of the OChK from the Central Register of Nature Conservation Forms (https://crfop.gdos.gov.pl)
[7] GUS Local Data Bank
[8] Description of OChK from the Central Register of Nature Conservation Forms (https://crfop.gdos.gov.pl)

valuable plant communities include transitional peatlands and bog forests. A unique feature of the flora is the population of ostrich fern in Podlesie Machowskie. The area's cultural heritage includes historic churches and manor houses.

- Przecław Protected Landscape Area. The area encompasses the Radogoszcz Upland. Part of the area is covered by forests (two larger forest complexes), in which mixed coniferous forests in moist habitats predominate. Protected plant species found here include lily of the valley, mezereon, and common ivy.

*Natura 2000 Sites:*

- Sandomierz Primeval Forest (bird area, area code PLB180005). The area serves as a highly valuable refuge for many bird species. The following bird species found here are listed in Annex I of the Birds Directive: red-necked grebe, black-necked grebe, bittern, little bittern, , night heron, great white egret, purple heron, black stork, white stork, little bittern, honey buzzard, black kite, white-tailed eagle, short-toed snake eagle, marsh harrier, lesser spotted eagle, osprey, little bustard, peregrine falcon, spotted crake, green sandpiper, corncrake, crane, ruff, shoveler, common tern, whiskered tern, black tern, nightjar, kingfisher, roller, green-backed woodpecker, black woodpecker, middle spotted woodpecker, white-backed woodpecker, lark, meadow pipit, whinchat, whitethroat, red-breasted flycatcher, red-backed shrike, ortolan bunting, black grouse, white-throated woodpecker.
- Lower Wisłoka River with Tributaries (habitat area, area code PLH180005). The subject of protection in this area is natural habitat 91E0 Willow, poplar, alder, and ash riparian forests (*Salicetum albo-fragilis, Populetum albae, Alnenion glutinoso-incanae*, spring alder forests), as well as 8 species of aquatic animals (fish: asp, dace, loach, roach, white-finned gudgeon, goatfish, white-finned bullhead, golden goatfish, Ukrainian lamprey, brook lamprey, and thick-shelled river mussel)
- The Tarnobrzeg Vistula Valley (habitat area, area code: PLH180049). The area contains 6 natural habitats, 5 of which are conservation targets: 3150 Oxbow lakes and natural eutrophic water bodies with Nympheion communities, Potamion, 3270 Flooded silty riverbanks with Chenopodion rubri p.p. and Bidention p.p. vegetation, 6440 Celery meadows, 6510 Lowland and mountain fresh meadows used extensively, 91E0 Willow, poplar, alder, and ash riparian forests (*Salicetum albo-fragilis, Populetum albae, Alnenion glutinoso-incanae*) and spring alder forests, 6430 Mountain herb communities (*Adenostylion alliariae*) and riparian herb communities (*Convolvuletalia sepium*). In addition to natural habitats, eight animal species have been identified in the area as subjects of protection: the beaver, otter, fire-bellied toad, red-tailed hawk, Nausitous blue butterfly, white-finned gudgeon, asp, and rose-eared minnow.

### *I.3 Modernize the Sulejów Water Reservoir*

The scope of the planned Task is located within the boundaries of the Sulejów Landscape Park. The Pilica River forms the backbone of the Park—the Park encompasses one of the most valuable sections of its watershed in the middle reaches of the river. The Park contains a section of the Pilica's best-preserved riverbed, characterized by numerous natural and picturesque meanders.

The Task will also be located within the Natura 2000 Special Area of Conservation (SAC) "Middle Pilica Valley" (PLH100008), which protects a section of the Pilica River in its middle course, from the vicinity of Sulejów to the vicinity of Przedbórz. The main purpose of establishing this area is to protect rare natural habitats (including riparian forests, oxbow lakes, and grasslands) as well as endangered animal and plant species.

The Task area also includes the Na Murowańcu ecological site, established to protect diverse natural habitats featuring bird nesting sites, feeding grounds, and resting areas.

Additionally, the GKPdC-7 Southern Pilica Valley ecological corridor runs through the project area.

### *I.4 Enhance nature-based water retention in the Upper Vistula River Basin*

The Kraków metropolitan area is distinguished by the presence of numerous protected areas. The area of greatest significance for the entire metropolitan area is Ojców National Park, together with its buffer zone, located within the boundaries of Kraków County. The park is distinguished by the diversity of its terrain and its picturesque landscape. Karst formations, gorges, ravines, and rock formations are characteristic of the park. The park is also home to 19 species of bats, approximately 1,000 species of vascular plants, over 311 species of bryophytes, over 1,200 species of fungi, and nearly 200 species of lichens.

In terms of the presence of protected areas, the agglomeration is characterized by great diversity. Within the city of Kraków and the counties of Kraków, Wieliczka, Bochnia, Myślenice, Olkusz, Proszowice, and Miechów, there are a total of 42 nature reserves, which were established, among other things, to protect remnants of deciduous forests, habitats of rare plants, and unique geological formations characteristic of the agglomeration. The agglomeration's boundaries also include 7 landscape parks and 9 protected landscape areas. Among the most important in the entire agglomeration are the Bielańsko-Tyniecki Landscape Park and the Vistula Valley Protected Landscape Area.

Within the boundaries of the Kraków agglomeration, there are a total of 50 Natura 2000 sites, 49 of which are Special Areas of Conservation. Among the most important are the Skawiński Meadow Area (PLH120079), the Nowohuckie Meadows (PLH120069), and the Dębnicko-Tyniecki Meadow Area (PLH120065), all located in the center of the agglomeration. The only Special Protection Area for birds located within the agglomeration is the Niepołomice Forest (PLB120002).

There is one nature and landscape complex within the agglomeration, known as *"At the Confluence of the Vistula and Raba Rivers*," located entirely within Bochnia County. In addition, there are a total of 39 ecological land parcels within the boundaries of the analyzed area.

Ecological corridors also run through the agglomeration area: KPd-10 Upper Vistula Valley, KPdC-11 Kraków-Częstochowa Uplands, KPd-13B Middle Beskids, KPd-12C Wiśnickie Foothills, KPd-12B Niepołomice Primeval Forest, and KPd-12A Vistula Valley – Wiśnickie Foothills.

### *II.1 Construct the Kamieniec Ząbkowicki multifunctional reservoir*

There are no surface-level nature conservation areas within the boundaries of the planned Kamieniec Ząbkowicki reservoir site. However, the project area contains natural monuments, including five specimens of English oak (*Quercus robur*) that are individually protected.

In the immediate vicinity of the reservoir site lies the Góry Bardzkie Natura 2000 site (PLH020062), located approximately 150 m away. The primary focus of conservation in this area is on valuable forest habitats and animal species associated with forest complexes and mountainous terrain, including bat and invertebrate species.

Approximately 700 m from the project site lies the Góry Bardzkie and Sowie Protected Landscape Area, whose conservation objective is to preserve landscape and natural values as well as the continuity of ecological corridors.In the wider vicinity, approximately 3 km away, lies the buffer zone of the Śnieżnicki Landscape Park, while the Śnieżnicki Landscape Park itself is located approximately 5.5 km away. The area is designated to protect natural mountain ecosystems, including forests, rocky habitats, and the associated plant and animal species.

Approximately 1.7 km from the project site is the “Obryw skalny” nature and landscape reserve, established to protect natural rock formations and the associated vegetation and landscape features.

### *II.2 Flood Risk Reduction in the Biała Lądecka Catchment of the Nysa Kłodzka*

The Task area covers the Biała Lądecka River watershed upstream of the town of Lądek-Zdrój. The planned activities are located directly on the Biała Lądecka River and its tributaries: the Morawka, Kleśnica, and Kamienica streams, as well as the Młynówka, Kobylnica, and Rudnia streams, which are mountainous in character in this region and follow their natural course in certain sections.

The Biała Lądecka watershed is distinguished by its very high ecological value, resulting from the combination of well-preserved river ecosystems and mountain forest complexes. The Biała Lądecka River itself serves as the region’s ecological backbone, providing ecological connectivity between the Natura 2000 sites: Biała Lądecka, the Golden Mountains, the Bialskie Mountains, and the Śnieżnik Group. The most valuable elements of the environment are the natural river habitats, populations of fish and lampreys that require clean, well-oxygenated waters, and the extensive complexes of beech and riparian forests characteristic of the Eastern Sudetes.

*Natura 2000 sites:*

- Biała Lądecka PLH020035. The area encompasses the mountainous and foothill sections of the Biała Lądecka River, along with its most valuable aquatic and riparian habitats. It is one of the most important areas in the Sudetes for the protection of highly natural river ecosystems, retaining the characteristics of a dynamic mountain river with a stony bed, rapids, gravel bars, and well-developed riparian vegetation. The area’s particular value lies in maintaining the ecological continuity of the river channel and its function as a regional migration corridor for aquatic organisms. The Biała Lądecka also serves as an important fish migration route, connecting Natura 2000 sites located in the upper part of the watershed with the Nysa Kłodzka valley.

The primary conservation targets are habitats associated with the river ecosystem, including 3260—lowland and submontane rivers with *Ranunculion fluitantis* communities ([9])—as well as riparian herbaceous vegetation and extensively managed fresh meadows. The key species subject to protection is the white-finned bullhead (*Cottus gobio*), which is associated with clean, well-oxygenated watercourses with stony bottoms.

- The Góry Złote PLH020096 Natura 2000 site encompasses the extensive forest complex of the Góry Złote Mountains, which is one of the best-preserved mountainous areas in the Eastern Sudetes. It is characterized by significant variations in elevation, the presence of numerous springs, mountain streams, rock outcrops, and a mosaic of forest and non-forest habitats.

  The main conservation targets in this Natura 2000 site are valuable forest and peatland habitats, including acidic mountain beech forests (9110), fertile beech forests (9130), sycamore forests, and maple-linden forests on steep slopes (9180), alder-ash riparian forests (91E0), as well as transitional and alkaline peatlands and rocky habitats associated with siliceous outcrops. The area is also an important habitat for numerous species of mammals, bats, and invertebrates associated with natural forest ecosystems.

- The Natura 2000 site "Bialskie Mountains and Śnieżnik Group" (PLH020016) is one of the largest and most valuable habitat areas in the Eastern Sudetes. It encompasses extensive forest complexes of the Śnieżnik Massif, the Bialskie Mountains, and the highest parts of the Złote Mountains, characterized by a high degree of naturalness and minimal anthropogenic disturbance. The area is distinguished by substantial elevation variation, the presence of numerous springs, mountain streams, rock outcrops, scree slopes, and habitats associated with a mountain climate.

  The conservation targets include numerous natural habitats of European importance, in particular acidic mountain beech forests (9110), fertile Sudeten beech forests (9130), sycamore forests and maple-linden forests on steep slopes (9180), alder and ash riparian forests (91E0), as well as mountain spruce forests (9410), peatlands, and habitats associated with mountain streams and springs. Of particular value are the well-preserved aquatic ecosystems inhabited by fish and lamprey species characteristic of clean mountain streams.

Other protected areas:

- The Śnieżnik Landscape Park encompasses the highest parts of the Eastern Sudetes within Poland's borders, including the Śnieżnik Massif, the Bialskie Mountains, and a section of the Złote Mountains. It was established to protect the region's exceptionally valuable natural, landscape, and cultural assets. The park is characterized by substantial variations in elevation, a high proportion of forests, well-preserved mountain stream valleys, and a wealth of geomorphological features, such as rock debris fields, rock

[9] The habitat resources were damaged and their area reduced as a result of a flood wave in the Biała Lądecka Valley in September 2024.

outcrops, springs, and deeply incised river valleys. The headwaters of most of the watercourses forming the Biała Lądecka watershed are located within the park's boundaries, which accounts for its special hydrological and ecological significance.

- The "Śnieżnik Kłodzki" Nature Reserve encompasses the highest parts of the Śnieżnik Massif, including the summit of Śnieżnik (1,425 m above sea level), and was established to protect unique high-mountain habitats as well as relict elements of the Sudetes' flora and fauna. This area is distinguished by the presence of natural and semi-natural plant communities characteristic of the highest mountain regions, extensive rock scree, gneiss outcrops, and spring habitats. The reserve is one of the most valuable sites for mountain species in the Eastern Sudetes.
- The "Puszcza Śnieżnej Białki" Nature Reserve protects one of the best-preserved sections of natural mountain forests in the Sudetes. It encompasses the valley of the Biała Lądecka stream near the state border, along with the adjacent steep slopes. Valuable sections of natural Sudeten beech forests, sycamore forests, and forests with a near-pristine character have been preserved here. The reserve is distinguished by the high degree of naturalness of its ecological processes and the presence of numerous dead trees that serve as habitats for many species of invertebrates, fungi, and birds. Another significant asset of the reserve is the well-preserved sections of the mountain stream with their natural arrangement of rapids, rock thresholds, and gravel beds.
- The "Nowa Morawa" Reserve was established to protect valuable geological and mineralogical sites and the accompanying forest communities. It encompasses a section of the Morawka Valley along with the surrounding slopes. This area is known for its metamorphic rocks and minerals characteristic of the Śnieżnik Massif. In addition to its geological features, the area possesses significant natural value due to the presence of deciduous and mixed forests, as well as well-preserved habitats associated with mountain watercourses.
- The "Jaskinia Niedźwiedzia" Nature Reserve is located in the Śnieżnik Massif, in the Kletno area, outside the Biała Lądecka Valley and beyond the immediate impact zone of projects carried out in its riverbed. The reserve was established to protect the unique karst system developed in the Śnieżnik marbles, as well as the associated geological, hydrological, and natural values. The central feature of the area is Niedźwiedzia Cave—the largest cave in the Sudetes, distinguished by its rich and well-preserved stalactite and stalagmite formations and its high scientific value. The reserve's particular natural significance lies in the protection of underground habitats that constitute one of the most important wintering grounds for bats in the Sudetes and Lower Silesia. The reserve thus plays a vital role in preserving regional bat populations and maintaining the continuity of the habitat network used by bats during their seasonal migrations.
- The "Biała Marianna" ecological site is located in the Kletno area, on the slopes of the Śnieżnik Massif, outside the Biała Lądecka Valley. The site was established to protect valuable elements of the abiotic and biotic environment associated with the former "Biała Marianna" marble quarry. The area's particular value lies in the outcrops of Śnieżnik marble and the associated plant communities thriving on soil rich in calcium carbonate.

### 4.2.5 Biodiversity (flora, fauna, habitats)

*I.1 Flood Risk Reduction in the Vistula River Basin to Protect Kraków*

The Taskarea is characterized by vegetation typical of diverse agricultural lands, used for crop cultivation or as small fruit shrub plantations, with some unused fallow patches. Agricultural lands within the Task area are dominated by artificially introduced monocultures, along with a small proportion of accompanying plants occurring as communities of annual or biennial weeds. Among cereal crops, there are poorly developed communities of the order *Aperion spicae-venti,* comprising small species growing near the soil surface, such as field bindweed, annual bedstraw, common sorrel, field chickweed, field poppy, and cornflower. In areas designated for root crops and fruit shrubs, however, communities of the *Polygono-Chenopodietalia* order, featuring species such as: one-sided chickweed, green goosefoot, thread-leaved chickweed, spotted knotweed, and field mustard.

In the Wiśnicz polder area, within the boundaries of the Wiśliska Natura 2000 site (PLH120084), there is a natural habitat (3150) consisting of oxbow lakes and natural eutrophic water bodies with plant communities from *the Nympheion* and *Potamion orders*. Within the oxbow lake, the species *Trapa natans* (water chestnut)—a strictly protected species—is found, among others. The polder's location is also a potential site for riparian forest habitats. Furthermore, in the Jankowice-Rozkochów polder area, the presence of strictly protected species—the water lily *Nymphoides peltata*—and partially protected species—the white water lily *Nymphaea alba*—has been confirmed. Among common species, the yellow water lily *Nuphar lutea* is present.

The Task area, located in the Oświęcim Basin (the Mizerów and Gostyń reservoirs), is characterized by the presence of plant communities typical of river valleys, including willow-poplar riparian forests of the *Salicetea purpureae* class, aquatic vegetation of the *Lemnetea minoris* and *Charetea fragilis*, and *Potametea*; reed beds of the *Phragmitetea australis* class; therophyte communities of the *Bidentetea tripartitae* and *Isöeto durieui-Juncetea bufoni* classes; and communities of moist nitrophilous forest edges of the *Artemisietea vulgaris* class. Forest communities consist primarily of marsh reed forests.

The areas designated for the planned polders and reservoirs are potential habitats for mammals such as roe deer, hares, house mice, red voles, the red-backed vole, and small insectivorous mammals such as the common shrew, the mole, and the hedgehog. Furthermore, species under partial protection—the beaver and the otter—have been observed in the Gromiec polder area. The polder area also offers favorable habitat conditions for the musk rat.

The avifauna in the Task area includes bird species typical of riparian, field, and forest ecosystems, such as: the mallard, the coot, the rusty-necked grebe, the spotted crake, the common buzzard, the yellow wagtail, the robin, the yellowhammer, the skylark, and numerous species of passerines. Within the Project area, within the boundaries of the Dolina Dolnej Skawy Natura 2000 site, islands have formed that host breeding colonies of the night herons, the Mediterranean gull, the black-headed gull, the white-headed gull, and the common tern. Areas near the planned facilities also provide a suitable habitat for strictly protected amphibian species, including the fire-bellied toad, crested newt, tree frog, and green toad, as well as species under partial protection—the common toad, grass frog, and water frog. Among reptile species, the sand lizard, the common grass snake, and the common slow worm may be present. The fish fauna

consists mainly of species inhabiting fish ponds located in the area of the planned polders, including: common crucian carp, silver crucian carp, carp, bream, tench, perch, grass carp, roach, zander, catfish, pike, European eel, rudd, and grass carp. Protected invertebrate species may also be found in the area of the planned facilities, including: the red ant, the vineyard snail, the medicinal leech, the striped tiger beetle, the golden water strider, the green-and-gold water strider, and most species of bumblebees. A strictly protected beetle species—the oak longhorn beetle—has also been identified in the area of the planned Gostyń reservoir dam.

### *I.2 Flood risk reduction from Kraków to Zawichost*

The municipalities of Szczurowa and Koszyce are home to a rich and diverse fauna. The forests are home to, among others, roe deer, hares, partridges, and pheasants, as well as, less commonly, wild boars, badgers, martens, raccoon dogs, and red deer, along with birds of prey such as hawks and buzzards. Meadows, pastures, and fields serve as habitats for small songbirds and small game. Fish ponds and their surroundings serve as important habitats for many, often rare, species of waterfowl and marsh birds. The valley of the unregulated Vistula River is characterized by a particularly high diversity of habitats—ranging from riparian forests and sandy islands to floodplains. The waters are home to fish species typical of both slow- and fast-flowing rivers, as well as standing bodies of water. This diversity of natural habitats also translates into a diverse avifauna. The Vistula's avifauna includes species characteristic of: sandy islands and sandbars in the river's current, steep banks (slopes), riverside willow thickets, oxbow lakes, and artificial water bodies. This area features forest ecosystems characteristic of periodically flooded lands, as well as aquatic, marsh, and anthropogenic environments, such as farmland and meadows. Among the most valuable plant communities are the numerous patches of willow-poplar riparian forests that still remain here.

The most valuable areas for biodiversity in the Mielec County are protected under the Natura 2000 network and include areas in the Vistula and Wisłoka valleys (the Tarnobrzeg Vistula Valley PLH180049 and the Lower Wisłoka with Tributaries PLH180005 in the northernmost part of the county—Gawłuszowice and Padew Narodowa) as well as areas west of Mielec (the Sandomierz Forest PLB180005).

The Wisłok and Vistula Valleys—the Vistula Valley in particular—are characterized by a large number of oxbow lakes and ponds fed by the Vistula's regular flooding. They are distinguished by a high level of biodiversity in plant and animal species and natural habitats. Among the natural habitats in this area, the most significant are riparian forests, celery meadows, and lowland and mountain fresh meadows used extensively. The area is rich in numerous fish species (including protected species such as the white-finned gudgeon, asp, and roach) and amphibians. The meadow areas are inhabited by protected insect species, such as the red-tailed skipper and the nausitous blue. The Wisłoka Valley is dominated by communities of riparian willow forests. The river's riparian zones and floodplains are covered by shrubby communities of narrow-leaved willows, which form a spatial pattern with lowland riverside herbaceous vegetation and preserved fragments of poplar riparian forests, most often occurring as rows or small clusters, with a predominance of black poplar. The European beaver and otter are found in this area, as well as numerous species of reptiles and amphibians. From an ichthyological perspective, the area

belongs to the grayling and barbel region. The most abundant species here are: minnow, barbel, chub, ide, and vimba; and in the tributaries—brown trout, grayling, salmon, and sea trout.

The Sandomierz Primeval Forest, together with the Mielec-Kolbuszowa-Głogów Protected Landscape Area, is a region that was partially deforested in the past and now forms a mosaic of forests and agricultural lands. Over twenty habitat types of European significance have been identified within the Forest, including peatlands, sandy grasslands, and heathlands. Approximately one thousand species of vascular plants have been recorded here. The area serves as a highly valuable refuge for many bird species; 43 protected bird species have been recorded here. The area is notable in terms of the population sizes of the black stork, white stork, birds of prey, and the corncrake (accounting for over 1% of the Polish population). For the roller, the little bittern, and the great white egret, the area serves as a nesting site for over 10% of the species' populations in Poland, making it one of the key refuges for their conservation. The Sandomierz Primeval Forest is distinguished by its rich fauna, including many species that are rare and endangered on a national scale. For example, the common mantis, which occurs only sporadically in other regions of Poland, is found throughout the entire forest. In addition to common mammals such as red deer, roe deer, and wild boars, the forest is also home to wolves, otters, beavers, dormice, and European hamsters. Numerous reptiles and amphibians can be found here, including the spotted snake, the common European adder, the fire-bellied toad, and the crested newt. The invertebrate fauna includes many valuable species of insects and spiders, such as the stag beetle and the oak stink bug.

### *I.3 Modernize the Sulejów Water Reservoir*

Within the Task area, along the banks of the Pilica River, the vegetation consists mainly of reed beds: *the Glycerietum maximae* and *Phalaridetum arundinaceae* communities. Within the Task area, the following reed beds are also present, though to a lesser extent: *Sparganietum erecti* (branchy spargane reed bed), *Iridetum pseudacori (*irises and sedges reed bed), and *Typhetum latifoliae (*broad-leaved rush reed bed). Among aquatic and riparian plant species, the arrowhead (*Sagittaria sagittifolia*) and water mint (*Mentha aquatica*) have been recorded, forming patches along the river. Additionally, the *Urtico-Calystegietum sepium* community, consisting of stinging nettle and hedge bindweed, is present in this area. The riverbed is covered in places by macrophytes, dominated by the *Potametum pectinati* community, the *Potametum natantis* community, and the *Potametum crispi* community.

Among tree species, the ash-leaved maple (*Acer negundo*) is dominant. The surrounding area is also covered with typical meadow vegetation, including stands of trees and shrubs characteristic of river valleys.

There are no monumental trees, patches of old-growth forest, or individual hollow trees within the Task area, which are the most valuable from a biodiversity perspective.

The fauna in the Task area is typical of riparian zones. Numerous species of dragonflies, butterflies, arachnids, and snails have been identified in the area, including the Roman snail (*Helix pomatia*), which is partially protected.

With regard to ichthyofauna, based on research catches conducted as part of the surface water monitoring program carried out by the Chief Inspectorate for Environmental Protection (GIOŚ), the presence of species such as the ide (*Leuciscus idus*), pike (*Esox lucius*), burbot (*Lota lota*), barbel (*Barbatula barbatula*), bleak (*Alburnus alburnus*), roach (*Rutilus rutilus*), river perch (*Perca fluviatilis),* and the common gudgeon (short-whiskered) (*Gobio gobio*).

Representatives of the herpetofauna were also found within the Task area, including, among others, the common frog (*Rana temporaria*).

In terms of avifauna, species commonly found in Poland were observed, including the barn swallow (*Hirundo rustica*), the whinchat *(Saxicola ruberta*), the tree sparrow (*Passer montanus*), the blackbird ( *)*, the *Eurasian* blackbird (*Turdus merula)*, and the magpie (*Pica pica*). However, the Task area does not constitute a site of high bird concentration.

Near the Task area, there are mammal species common throughout the country, such as the wild boar (*Sus sorfa*), the red fox (*Vulpes vulpes*), the roe deer (*Capreolus capreolus)*, and the *European* hare (*Lepus europaeus*).

The concentration of valuable natural habitats is highest within the Natura 2000 site "Dolina Środkowej Pilicy" (PLH100008), which is home to a total of 15 habitats. The most valuable of these are habitats closely linked to the river and river valley ecosystem, including oxbow lakes with *Nymphaeion* communities*, Potamion* (3150), flooded silty riverbanks (3270), riparian herbaceous vegetation (6430), and willow, poplar, alder, and ash riparian forests (91E0).

### *I.4 Enhance nature-based water retention in the Upper Vistula River Basin*

The dominant vegetation type in the Kraków metropolitan area is *the subcontinental oak-hornbeam forest* of the Lesser Poland variety, in its upland and foothill forms, belonging to the fertile series. Sizeable areas within the agglomeration are also occupied by *the subcontinental oak-hornbeam forest* of the Małopolska variety, in its upland form and poor series, as well as *the lowland ash-alder riparian forest*. The Vistula River valley in the Kraków agglomeration is also a potential habitat for *the riverside ash-elm riparian forest*. The vegetation currently found within the agglomeration includes natural, semi-natural, and synanthropic communities. Natural communities consist mainly of forested areas, where the most abundant species are Scots pine, European beech, and oak. The most valuable plant communities in the agglomeration are found within protected areas; these include, among others, lowland peatlands within the Natura 2000 site "Torfowisko Wielkie Błoto" (PLH120080), xerothermic grasslands within the Natura 2000 site "Rudniańskie Modraszki – Kajasówka" (PLH120077), and patches of moor grass meadows found in the Natura 2000 sites: the Dębnicko-Tyniecki Meadow Area (PLH1224) and the Skawiński Meadow Area (PLH120079).

The fauna of the Kraków agglomeration is diverse, which stems, among other things, from its location within the Vistula River Valley. Among mammals, roe deer and mountain hares are common, and wild boars, beavers, and otters are also being observed with increasing frequency. The amphibian fauna is rich and includes many species—the common spadefoot toad, the fire-bellied toad, and the crested newt. The sand lizard and the viviparous lizard are also widespread throughout the agglomeration. Reptile diversity is relatively lower across the entire agglomeration.

Among invertebrates, butterflies and beetles are the most easily identified. Additionally, species associated with aquatic environments are observed: water striders, backswimmers, snails, mussels, and leeches. The Kraków agglomeration is rich in bird species, many of which are breeding species. Among others, the following are found here: flycatchers, woodpeckers, the common tern, the kingfisher, the marsh harrier, the corncrake, the woodlark, the red-backed shrike, the ortolan bunting, and the white stork.

The greatest biodiversity resources within the agglomeration are found in protected areas, which are identified in subsection 4.2.4.

### *II.1 Construct the Kamieniec Ząbkowicki multifunctional reservoir*

The area of the planned Kamieniec Ząbkowicki reservoir comprises a mosaic of habitats typical of river valleys, including bodies of water and oxbow lakes, meadows, fragments of forest communities, and areas used for agriculture, such as croplands and fallow lands. At the same time, part of the analyzed area lies within a mining region, where mining activities have altered the landscape and created anthropogenic landforms. In these areas—such as artificially shaped mounds, slopes, or water bodies created as a result of raw material extraction—vegetation has developed over time, forming secondary natural habitats. Habitat conditions are primarily shaped by high groundwater levels, periodic fluctuations in water levels, and the presence of numerous depressions in the terrain, some of which were also created as a result of mining activities. Nevertheless, natural habitats are also present here, including 3150—oxbow lakes and natural eutrophic water bodies, 91E0—willow, poplar, alder, and ash riparian forests, 9170—Central European and subcontinental oak-hornbeam forests (including variant 9170a), 9180—sycamore and maple-linden forests on slopes and hillsides (priority habitat), and 9190—acidic oak forests. Protected plant species have been recorded in this area, including wild garlic (*Allium ursinum*), oxlip (*Primula elatior*), and snowdrop (*Galanthus nivalis*), which are associated with fertile and moist forest and riparian habitats.

Birds constitute the most numerous group of fauna; the project site serves as a feeding, resting, and nesting ground for them. Among the species associated with aquatic environments are, among others, the common kingfisher (*Alcedo atthis*) and the great crested grebe (*Podiceps cristatus*), while species such as the northern lapwing (*Vanellus vanellus*) and the skylark (*Alauda arvensis*) are observed in open and agricultural areas. Observations to date confirm the presence of 74 bird species, including 10 species listed in Annex I of the Birds Directive. The presence of numerous water bodies and periodically wet depressions within the area also supports the occurrence of amphibians, including the fire-bellied toad (*Bombina bombina*) and the common toad *(Bufo bufo*). Environmental conditions also support the presence of mammals associated with watercourses and riparian woodlands. Among the most important species are the otter (Lutra lutra) and the European beaver (Castor fiber), which use water bodies and watercourses as feeding grounds and shelters. Other mammal species characteristic of the forest-agricultural landscape are also found in the riparian woodlands and forest fragments. The animal communities are complemented by numerous invertebrate species whose presence is linked to habitat diversity. Old-growth trees and the presence of dead wood provide habitats for saproxylic species, such as the hermit beetle (*Osmoderma eremita*), while meadows and wet habitats support butterflies of the genus Phengaris (*Phengaris spp.)*.

*II.2 Flood Risk Reduction in the Biała Lądecka Catchment of the Nysa Kłodzka*

The upper part of the Biała Lądecka catchment is one of the most ecologically valuable areas in the Eastern Sudetes. The high biodiversity of this area is primarily due to a mosaic of well-preserved aquatic, spring, forest, and meadow ecosystems associated with the Biała Lądecka valley and its mountain tributaries, particularly the Morawka, Kleśnica, and Kamienica. In many places, the rivers and streams have retained their natural or near-natural character, with stony beds, rapids, shoals, and a well-developed zone of riparian vegetation.

The natural habitat 3260 is of particular ecological value — lowland and foothill rivers with communities of water avens (Ranunculion fluitantis and Callitricho-Batrachion)—which runs along nearly the entire stretch of the Biała Lądecka River from Stronie Śląskie to its confluence with the Nysa Kłodzka.

One of the most valuable elements of the aquatic flora within the watershed is the brush-leaved water-crowfoot (Batrachium penicillatum[10] ), a species characteristic of clean, well-oxygenated watercourses with natural flow dynamics. In the past, it formed extensive patches in the channel of the Biała Lądecka, constituting a significant component of the habitat of submontane rivers where this plant thrives. It shall be emphasized, however, that the catastrophic flood that occurred in the Biała Lądecka watershed in September 2024 led to substantial alterations in the river channel, localized erosion of bottom sediments, and the destruction of some aquatic vegetation sites. As a result, there has been a marked reduction in the area where the brush-leaved hairgrass occurs compared to the situation prior to the flood. Despite these losses, there is considerable potential for the habitat to regenerate naturally as hydromorphological conditions in the river channel stabilize.

Another important component of biodiversity in the upper part of the Biała Lądecka watershed is the fauna associated with river and riparian ecosystems. Of particular ecological value are the populations of the brook lamprey (Lampetra planeri), the white-finned bullhead (Cottus gobio), and the spotted bullhead (Cottus poecilopus)—species associated with cool, well-oxygenated waters with stony or gravelly bottoms. The presence of these organisms indicates a high degree of naturalness in the watercourses and the preservation of suitable habitat conditions. In the channels of the Biała Lądecka and its tributaries, the presence of the barbatula (Barbatula barbatula) and the brown trout (Salmo trutta fario) has also been documented; these are typical representatives of the fish fauna of the Sudeten Mountains' mountain rivers.

The Biała Lądecka Valley and its tributaries also constitute an important habitat for many bird species associated with aquatic ecosystems. Of particular significance is the dipper (Cinclus cinclus), a species characteristic of mountain streams and rivers with clean, well-oxygenated water.

In addition to river habitats, forest habitats associated with riparian areas and valley slopes constitute a important natural feature of the Biała Lądecka Valley. In the immediate vicinity of watercourses, there are primarily fragments of alder-ash riparian forests (91E0), which develop in periodically flooded areas. On the higher terraces and locally on the valley slopes, small patches

[10] Status: EN (Endangered) in the Polish Red List of Plants (Kaźmierczakowa, R., Zarzycki, K., and Mirek, Z. (eds.), 2014. Polish Red List of Plants. Ferns and Flowering Plants. 3rd updated and expanded edition. Institute of Nature Conservation, Polish Academy of Sciences, Kraków).

of Central European and subcontinental oak-hornbeam forests (9170) as well as sycamore forests and maple-linden forests on steep slopes and hillsides (9180) have been preserved. Sycamore and maple-linden forests on steep slopes and hillsides are relict in nature and, within the Sudetes, occur exclusively in areas with specific habitat conditions associated with steep slopes, rock debris, and high soil moisture.

### 4.2.6 Soils

*I.1 Flood Risk Reduction in the Vistula River Basin to Protect Kraków*

The predominant soil types in the Task area are alluvial soils and gleyed alluvial soils, which are found throughout all the planned polders and reservoirs. The presence of these soils is closely linked to the deposition of river sediments during high-water periods and floods of the Vistula River and its tributaries. Alluvial soils are characterized by high utility value, particularly in the context of their agricultural use. Within the Mizerów and Gostyń reservoirs, there are also alluvial soils of similar origin.

In the area of the Czernichów, Kamień-Rusocice, and Jankowice-Rozkochów polders, brown soils—proper, leached, and acidic—also occur sporadically. These soils are characterized by moderately favorable physical and chemical properties.

The area of the Mizerów and Gostyń reservoirs is also home to gray soils and wet gray soils. Within the Task area, degraded gray and black soils are also found locally. Additionally, in the Mętków polder region, low peat, as well as humus-mineral and humus-rich soils, have been recorded.

*I.2 Flood Risk Reduction from Kraków to Zawichost*

The Koszyce municipality is dominated by true brown soils (occasionally leached), covering approximately 37% of the area, and chernozems (34%), developed on loess. In the valleys of the Vistula and its tributaries—the Szreniawa and Nidzica—alluvial floodplains cover about 24% of the area, formed from alluvial sediments such as silt and fine sediment. Agricultural land clearly dominates the land-use structure, covering approximately 91% of the municipality's area, of which nearly 71% is arable land and about 17% is grassland. Most arable soils are classified in the high fertility classes I–III (approx. 84%). Among grasslands, meadows predominate, located mainly in the valleys of the Vistula, Szreniawa, and Nidzica rivers, more than half of which also belong to classes I–III.

The soils found in the Szczurowa municipality are characterized by typological diversity, resulting from the topography, the geological structure of the subsoil, the mechanical composition of the soils, hydrological conditions, the type of vegetation cover, and the varying impact of human activity. Five basic soil types can be distinguished within the municipality: alluvial soils, brown soils, podzolic soils, humus-rich soils, and degraded black soils. Alluvial soils constitute the largest soil complexes in terms of area within the municipality. They occur mainly in the valleys of the Vistula, Gróbka, and Uszwica rivers, as well as in the valleys of their tributaries. They are characterized by distinct spatial variation, typical of alluvial soils. They are used both as arable land and grassland, as well as parts of riparian forests. Soils classified in fertility classes IIIa, IIIb, IVa, and IVb dominate throughout the entire municipality, collectively covering approximately 68%

of the arable land area. In contrast, soils with the best agricultural parameters—belonging to classes I, II, IIIa, and IIIb—account for approximately 35% of the arable land area. Soils in soil quality classes I–IV collectively cover 84.9% of the arable land area[11] .

Hydrogenic soils dominate the Mielec County area, occurring primarily in the valleys of the Vistula and Wisłoka rivers. In addition to these, there are also podzolic soils formed on slightly clayey sands, as well as brown soils derived from alluvial clays. Despite the county's small area, there is large soil diversity here, including, among others, bielic soils, marshy soils, and alluvial soils. In the soil classification system, soils of classes IVa, IVb, V, and IIIb predominate. In terms of agricultural land use, arable land predominates, occupying nearly half of the county's area. A significant problem related to the soils of Mielec County is their contamination resulting from agricultural activities, as well as the high proportion of soils with a low soil quality rating.

### *I.3 Modernize the Sulejów Water Reservoir*

The soil cover in the Task area consists of rusty and podzolic soils formed from light loam sands and light alluvial clays. In areas covered by glacial-floodplain sands, loam sands, and light alluvial clays, pale and leached brown soils, as well as pseudogley soils, have developed. River valleys contain hydromorphic—peaty—soils. Within Sulejów, leached brown soils and true brown soils predominate. Alluvial plains have developed along the Pilica River, consisting of medium-quality grasslands. In some places, leached brown soils and acidic brown soils with a weak rye complex are found. Silt-peat soils with medium-quality grasslands have also developed along watercourses.

### *I.4 Enhance nature-based water retention in the Upper Vistula River Basin*

The Kraków metropolitan area is characterized by diverse soil conditions, which result primarily from its location at the junction of several large physiographic regions and its highly varied topography. The soil cover of the Kraków metropolitan area consists mainly of soils occurring on loess substrates, including brown soils, clayey soils, silty and silt soils, as well as fertile chernozems in some areas. In the Vistula River Valley and the depressions of the Sandomierz Basin, however, there are fertile alluvial soils, which, due to their high fertility, are mainly used for agriculture. In the southern part of the agglomeration, in the Wieliczka Foothills, brown and gray soils predominate. In Kraków itself, soil profiles have been largely altered due to urban and industrial development - the predominant type so - called technosols (anthropogenic soils), which may exhibit signs of contamination or degradation. Soil contamination in the form of heavy metals occurs primarily near large industrial plants, in the vicinity of landfills, and along high-traffic transportation routes.

### *II.1 Construction of the Kamieniec Ząbkowicki Multifunctional Reservoir*

The area of the planned Kamieniec Ząbkowicki reservoir is characterized by diverse soil conditions related to the geomorphology of the Nysa Kłodzka Valley and the pattern of land use in the region

[11] Study of Conditions and Directions for Spatial Planning in the Municipality of Szczurowa (2014)

. The area contains both soils with high agricultural suitability—represented by very good and good wheat complexes—and soils of lower quality, including rye complexes and grasslands with varying productive value. River floodplains, formed by the accumulation of alluvial sediments, constitute the largest portion of the project area. There are also brown soils with moderate agricultural suitability, as well as podzolic and pseudopodzolic soils developed on sandy substrates, which typically have lower agricultural productivity than brown soils.

*II.2 Flood Risk Reduction in the Biała Lądecka Catchment of the Nysa Kłodzka*

The Biała Lądecka valley is dominated by soils associated with the accumulation and erosion processes of rivers, as well as slope processes characteristic of mountainous and foothill areas. Within the valley floor, river floodplains predominate; these were formed from alluvial deposits carried during high water and floods and are characterized by a varied grain-size composition—ranging from gravel and sand to silty and clayey sediments. On the slopes surrounding the valley, however, brown soils and acidic brown soils dominate, formed from the weathered products of metamorphic rocks of the Śnieżnik Massif, the Bialskie Mountains, and the Złote Mountains.

In the immediate vicinity of watercourses and in areas with higher moisture levels, gley and soil-gley soils associated with high groundwater levels develop locally. Due to the mountainous nature of the watershed, the soil profile is often shallow, and processes of erosion and redeposition of mineral material play a significant role in shaping it. The current topography of the valley and the soils found there are strongly influenced by periodic flooding and fluvial processes, which determine the functioning of riparian natural habitats, including riparian forests and riverine habitats associated with the Biała Lądecka River and its tributaries.

It shall be emphasized that the catastrophic flood that occurred in the Biała Lądecka watershed in September 2024 may have significantly altered local soil conditions within the valley floor and the immediate vicinity of the river channel. High flows led to intense processes of erosion, scouring, and sediment redeposition, resulting in the localized removal of topsoil layers, the exposure of gravelly and stony layers, and the accumulation of new alluvial material. In many places, the existing vegetation cover was also destroyed or largely altered, particularly in the area immediately adjacent to the river channel.

### 4.2.7 Air Quality and Noise

*I.1 Flood Risk Reduction in the Vistula River Basin to Protect Kraków*

The Task area is located within two air quality assessment zones: Małopolska (PL1203) and Silesia (PL2405). The main source of air pollutant emissions in the Task area is anthropogenic emissions, which result primarily from its location between major urban centers—Kraków, Katowice, and Bielsko-Biała. Emissions from the municipal and residential sector account for the largest share of PM10 and PM2.5 concentrations, as well as benzo(a)pyrene in PM10; for nitrogen oxides, the main source is transportation; and sulfur oxides originate primarily from industrial activities.

According to the results of the annual air quality assessment conducted by the Chief Inspectorate for Environmental Protection (GIOŚ), air quality standards related to the protection of human health are largely met in the area covered by the Task. Among the pollutants analyzed,

exceedances of permissible or target levels were found only for PM10 particulate matter and benzo(a)pyrene. Levels of the remaining substances did not exceed air quality standards. With regard to the criterion of plant protection, the results of the annual air quality assessment showed no exceedances of regulatory levels for all analyzed substances, i.e., sulfur dioxide, nitrogen oxides, and ozone.

The noise environment in the Task area is primarily shaped by emissions from road traffic. The planned polders and reservoirs will be located in an area with a dense road network, which are themselves meaningful sources of noise emissions. An additional source of traffic noise is the railway line running in the vicinity of the planned polders. Industrial noise in the Task area, however, occurs locally, only in the immediate vicinity of plants and production sites, and its scale and range are smaller than those of traffic noise.

### *I.2 Flood Risk Reduction from Kraków to Zawichost*

Air quality in the municipalities of Koszyce and Szczurowa, located in the Lesser Poland region, is mainly influenced by so-called low-level surface emissions from sources such as household coal stoves and boiler rooms, which emit carbon oxides, sulfur oxides, and particulate matter. In the case of emissions associated with single-family housing, especially in densely built-up areas, pollutants released at low altitudes often remain and accumulate in the vicinity of the emission source, becoming a serious environmental and health problem for the local community. The level of pollution depends primarily on atmospheric conditions and the quality of the fuel. During the spring and summer, pollution levels are lower, while in the fall and winter they are significantly higher. Air quality monitoring data published annually by the Chief Inspectorate for Environmental Protection (included in Provincial/ Voivodeship Air Quality Assessment Reports) indicate that concentration levels in the Małopolska region exceed the permissible limit plus the tolerance margin. Exceedances of concentrations of PM10 and PM2.5 particulate matter, as well as benzo(a)pyrene in PM10 particulate matter, have been recorded. Furthermore, the Małopolska region exceeds the long-term target level for ozone.

In the municipalities of Koszyce and Szczurowa, the dominant factor influencing noise levels is road traffic, associated mainly with transportation routes of supra-local significance (DK 79, DW 768, and 964), and to a lesser extent with local routes as well. The acoustic environment is also influenced by residential noise, which generally does not constitute a significant nuisance. Given the agricultural nature of the municipalities, the operation of farm machinery on agricultural land is also a substantial, though intermittent, source of noise. In contrast, industrial noise associated with the operation of small plants within the municipalities is local in nature and has a limited range. In the municipality of Szczurowa, the acoustic environment is also affected by aviation activities at the “Strzelce Małe–Szczurowa” airfield.

Within the Mielec County, in rural municipalities, air quality is primarily influenced by so-called low-level surface emissions associated with single-family housing. The city of Mielec, as a major center of the aviation industry—home to the “Euro-Park” Mielec Special Economic Zone—has an important impact on emissions in the county.

The Mielec County is located in the Podkarpackie Province (Voivodeship), within the Podkarpackie Zone. In the GIOŚ’s annual air quality assessment for 2025, with regard to the protection of human

health in the Podkarpackie Zone, all legally prescribed permissible levels of air pollutants were met. Target levels were also met, with the exception of the target level for benzo(a)pyrene in PM10 particulate matter. However, in Mielec County, PM2.5 concentrations were approaching the permissible level. Furthermore, in the Podkarpackie region, the long-term target level for ozone—set to protect human health—was exceeded; these zones were classified as D2.

In the Mielec County, the dominant factor influencing noise levels is road traffic, primarily associated with transportation routes of supra-local significance (Provincial Roads 764 and 985), and to a lesser extent with local routes, particularly within the densely built-up area of Mielec. Additionally, noise sources are concentrated within urban areas and are caused by economic activities (industrial noise). The Mielec Airport, located approximately 5 km from the city of Mielec, also operates within the county. The acoustic environment around the airport is shaped by aircraft takeoffs, landings, and overflights.

*I.3 Modernize the Sulejów water reservoir*

Within the Task area, urban centers account for the largest concentration of air pollutant emissions due to population density and the associated infrastructure development. Pollution is primarily generated by diffuse sources (residential boiler rooms, stoves, and household fireplaces) and linear sources (e.g., national highways). However, the extent of pollution depends on local meteorological conditions and topography. The Task area is located within the Łódź air quality assessment zone (PL1002). According to the results of the annual air quality assessment conducted by the Chief Inspectorate for Environmental Protection (GIOŚ), within the Łódź zone, with regard to the criterion for the protection of human health, exceedances of the permissible level of PM10 particulate matter, PM2.5 particulate matter, and the target level of benzo(a)pyrene in PM10 particulate matter were recorded. With regard to the plant protection criterion, the target and permissible levels for the analyzed pollutants were met.

The acoustic environment within the Task site is primarily shaped by traffic noise from road transport. Sources of noise pollution include, among others, national roads running through the region. Given the agricultural and tourist nature of the analyzed area, including its location within the Pilica Valley, sources of industrial noise are dispersed and limited to local-level services. The Sulejów Reservoir, as a whole, serves a recreational function, and residential receptors are present in the vicinity. Accordingly, the shoreline and nearby residential areas should be considered as sensitive receptors in the assessment of potential noise and air quality impacts during the construction phase.*I.4 Enhance nature-based water retention in the Upper Vistula River Basin*

Air quality in the Kraków metropolitan area is primarily influenced by emissions from road traffic. Heavy vehicle traffic is responsible for exhaust emissions, including nitrogen oxides and particulate matter from tire and brake pad wear. Emissions from road transport are particularly noticeable in the center of the agglomeration due to Kraków's strategic location in the transportation network. On the scale of the metropolitan area, municipal and residential emissions also constitute a significant source of air pollution; these (due to the ban on the use of solid fuels implemented in Kraków) primarily affect the outskirts of the metropolitan area.

Nevertheless, poor ventilation throughout the metropolitan area and the topography of the terrain favor the transport of pollutants toward the city.

Substantial air pollution concentrations within the metropolitan area are recorded for large part of the year. Seasonal variability can be noted. The highest pollution levels are recorded during the winter, as confirmed by regular monitoring studies. High concentrations of pollutants during the heating season cause the metropolitan area to struggle with smog. Air quality within the metropolitan area is monitored by a network of GIOŚ reference stations, which continuously track concentrations of PM10 and PM2.5 particulate matter and other pollutants. According to the results of the 2025 Annual Air Quality Assessment in the Małopolska Province conducted by GIOŚ, exceedances of the permissible 24-hour limit for PM10 particulate matter and the target level for benzo(a)pyrene in PM10 particulate matter. Despite high daily concentrations of PM10 particulate matter during the heating season, a gradual decline in airborne particulate matter concentrations has been observed over the past decade.

The acoustic environment in the Kraków metropolitan area is dominated primarily by traffic noise, which is particularly noticeable within Kraków and in the counties most closely linked to the city—Kraków and Wieliczka. The acoustic conditions within the metropolitan area are typical of a vast and heavily urbanized region with a dense network of roads and rail lines. The largest sources of traffic noise in the Kraków metropolitan area include: the A4 highway, provincial and national roads, Kraków's main urban thoroughfares along with tram lines, main railway lines, and railway junctions. An additional source of traffic noise within the agglomeration is Kraków Balice Airport, although noise associated with flight operations is most noticeable in the Kraków area and within Kraków County.

Industrial noise within the agglomeration occurs locally and is concentrated mainly in industrial zones. On the scale of the entire agglomeration, it is dispersed in nature, and its significance is less than that of traffic noise. The largest sources of industrial noise are located within Kraków and in the Kraków and Wieliczka counties, which are characterized by the dynamic development of industrial and warehouse zones. Industrial noise is particularly noticeable at night and in the immediate vicinity of residential areas.

### *II.1 Construct the Kamieniec Ząbkowicki multifunctional reservoir*

In the area of the planned Kamieniec Ząbkowicki reservoir, air quality is primarily influenced by municipal and residential emissions from individual heating systems, road traffic, and, to a lesser extent, emissions associated with agricultural activities and small-scale commercial operations. During the heating season, there may be periodic increases in particulate matter concentrations, typical of small towns with predominantly single-family housing. A significant factor influencing ventilation conditions is the layout of the Nysa Kłodzka Valley, which acts as a local airflow corridor. The open nature of the valley and the significant proportion of agricultural land promote the dispersion of pollutants and air exchange, although short-term episodes of deteriorating air quality may occur during periods of calm weather.

Background noise is primarily shaped by land-use patterns, with a predominance of agricultural land, meadows, and areas covered by vegetation. Buildings are scattered, and the proportion of areas subject to noise protection is relatively small. The main sources of noise are transportation

routes, including roads and the railroad line. However, due to their routes and the significant proportion of open areas, the impact of noise is local in nature and spatially limited. As a result, the acoustic environment of the planned area of the reservoir can be considered typical of areas with a low degree of urbanization, where noise levels are primarily shaped by local traffic and seasonal agricultural activities.

### *II.2 Flood Risk Reduction in the Biała Lądecka Catchment of the Nysa Kłodzka*

The upper part of the Biała Lądecka catchment is characterized by relatively favorable acoustic climate conditions. This area is predominantly mountainous and forested, and the main sources of noise are local transportation routes running through the Biała Lądecka valley, primarily Provincial Road No. 392 and the network of county and municipal roads serving the towns of Lądek-Zdrój, Stronie Śląskie, Stary Gierałtów, Nowy Gierałtów, Kletno, and Stara Morawa. Outside built-up areas, noise levels remain low. Locally elevated noise levels may occur in town centers and in areas heavily frequented by tourists; however, these do not constitute permanent or widespread impacts. There are no substantial sources of industrial noise in the analyzed area, and the acoustic climate is assessed as good.

The upper part of the Biała Lądecka watershed is characterized by relatively favorable air quality conditions, resulting from the absence of substantial industrial emission sources, a high proportion of forested areas, and its location within mountainous regions with good ventilation conditions. The main sources of air pollution are individual heating systems in residential buildings and traffic-related emissions from vehicle movement in the Biała Lądecka valley. Locally, air quality is also affected by unfavorable topographic conditions in narrow sections of river valleys, which contribute to the periodic accumulation of pollutants during the heating season.

According to the “Annual Assessment of Air Quality in the Lower Silesian Voivodeship for 2025,” the analyzed area falls within the Lower Silesian zone (PL0204). No exceedances of the permissible levels for nitrogen dioxide, sulfur dioxide, benzene, carbon monoxide, PM2.5, lead, cadmium, and nickel were observed in this zone, and the zone was classified as Class A (or A1 in the case of PM2.5) for these substances.

In 2025, however, the Lower Silesia zone was classified as Class C due to exceedances of the limit value for PM10 particulate matter for daily concentrations and the target level for benzo(a)pyrene in PM10. In addition, exceedances of the target levels for ozone and arsenic in PM10 were recorded; however, the arsenic exceedances were concentrated mainly in the Legnica and Głogów areas, which are a considerable distance from the analyzed watershed.

With regard to the mountainous areas of the Kłodzko Region, including the Biała Lądecka Valley, periodic increases in concentrations of particulate matter and benzo(a)pyrene associated with so-called “low emissions” from the municipal and residential sectors have the greatest impact on air quality. At the same time, monitoring results indicate a gradual improvement in PM10 levels—the number of days on which the information threshold for this pollutant was exceeded in the province decreased from 45 in 2024 to 26 in 2025.

Air quality in the upper part of the Biała Lądecka watershed shall be assessed as good compared to the Lower Silesian Voivodeship as a whole. The main air quality issues are related to seasonal emissions from individual heating sources and episodic exceedances of particulate matter and benzo(a)pyrene during the fall and winter months. However, there are no substantial sources of industrial emissions that could have a lasting and significant impact on the air quality of the analyzed area

### 4.2.8 Ecosystem services

*I.1 Flood Risk Reduction in the Vistula River Basin to Protect Kraków*

Due to its geographic location and natural values, the area designated for the planned facilities provides ecosystem services across all basic categories. Regulatory services include, among others, water retention and flood risk mitigation. Natural floodplains along the Vistula River channel and complexes of fish-farming ponds act as natural hydrological buffers that capture excess water during sudden and sudden rises in water levels. Aquatic ecosystems also regulate the local microclimate, lowering air temperature during heat waves and increasing relative humidity. Regulatory services are also linked to improved air quality resulting from the absorption of pollutants by the forest canopy. Trees assimilate carbon dioxide and help neutralize particulate matter, nitrogen oxides, and sulfur oxides, thereby regulating the levels of these pollutants in the air.

In terms of ecosystem provisioning services, the Task area is distinguished by fish production carried out in natural and artificial water bodies. The existing ponds are a source of freshwater fish biomass with high market value. The floodplains in the river valley are also a significant source of provisioning services, as they support intensive agricultural production. Another specific provisioning service found in the Czernichów municipality area is the harvesting of wicker from riverside sites, which serves, among other things, as a raw material for local crafts. Provisioning services in the Task area are also provided in forest ecosystems, which provide timber and other plant-based products—such as mushrooms, berries, etc.

Cultural ecosystem services are based primarily on the area's potential for tourism and recreation. The natural assets and cultural heritage found within the Task area also constitute a high-quality educational resource.

Sources of supporting ecosystem services in the Task area include, among others, ecological corridors, natural habitats, and protected areas, which contribute to the maintenance of biodiversity and support the integrity of local ecosystems and species migration.

*I.2 Flood Risk Reduction from Kraków to Zawichost*

The areas in the Vistula River valley contain lands with the highest soil quality classes, characterized by high agricultural suitability and significant production potential. They provide provisioning and regulating ecosystem services (e.g., carbon sequestration and erosion control), and to some extent also cultural services, by shaping a mosaic agricultural landscape that enhances the region's tourist appeal and creates conditions conducive to the development of agritourism.

High ecosystem potential can also be attributed to the forested areas found in the Vistula River valley and its tributaries, as well as in the Sandomierz Forest in Mielec County, which—like agricultural areas—provide multiple ecosystem services. The regulatory role of forests is manifested, among other things, in the partial mitigation of the effects of droughts and climate change, thanks to intense evaporation from vegetation and soil, the absorption of carbon dioxide from the atmosphere, and the prevention of floods by delaying and slowing the runoff of rainwater and snowmelt. Forests also serve cultural functions (e.g., recreational, such as mushroom picking) and provide resources.

### *I.3 Modernize the Sulejów Water Reservoir*

Ecosystem services within the Task area are concentrated primarily within the Pilica River valley. The river ecosystem provides ecosystem services across all categories. Provisioning services are directly linked to the supply of water resources—fish and other organisms—as well as other raw materials associated with the river valley; the valley provides, among other things, grasses, riparian vegetation, and other natural elements indirectly used by humans in agriculture, education, and tourism.

Regulatory ecosystem services within the Task area primarily involve water retention, flood risk reduction, and regulation of the local microclimate. Cultural ecosystem services primarily encompass the recreational and tourism potential of the river valley. The area in question offers opportunities for cycling, kayaking, and fishing. Furthermore, the river and its valley are a valuable area for environmental education and nature observation.

Supporting services are linked, among other things, to the river's function as an ecological corridor, which serves as a route for species movement, supporting their migration between habitats. Furthermore, the natural processes occurring within the river support the formation of diverse and ecologically attractive habitats (e.g., riparian forests, reed beds, and oxbow lakes).

### *I.4 Enhance nature-based water retention in the Upper Vistula River Basin*

The Kraków metropolitan area has the potential to provide ecosystem services across all categories. This stems from the metropolitan area's functional connection to the ecosystems of the Vistula River valley, which provide regulatory, provisioning, and supporting services. In the face of rapid urbanization, regulatory services related to improving air quality—based on the ability of trees and other plants to absorb pollutants—are crucial for the metropolitan area. Additionally, green spaces regulate local climatic conditions and reduce the *urban heat island* effect, which Kraków faces. Green areas, particularly forests and natural enclaves outside the agglomeration's center, also provide supporting ecosystem services by providing habitats, facilitating species migration, and supporting ecosystem functioning. Provisioning services consist of agricultural production on the outskirts of the agglomeration and the use of surface and groundwater resources. Due to the abundance of tangible heritage resources and cultural assets, the Kraków agglomeration is characterized by a high level of cultural ecosystem services. The agglomeration area provides space for leisure, recreation, and tourism. Furthermore, the agglomeration offers cultural resources of historical significance that provide aesthetic and educational value.

### *II.1 Construct the Kamieniec Ząbkowicki Multifunctional Reservoir*

The area of the planned Kamieniec Ząbkowicki reservoir fulfills functions typical of river valleys with a diverse habitat structure. These primarily include agricultural lands, water bodies and oxbow lakes, patches of woodland, and habitats created as a result of mining activities related to the extraction of natural aggregates. Consequently, this area has the potential to provide ecosystem services across all basic categories. Provisioning services are primarily associated with agricultural land use, the availability of water resources, and the operation of a drinking water intake within the analyzed area. The provision of mineral resources, including natural aggregates, can also be classified as provisioning services. Regulatory ecosystem services stem mainly from the functioning of the Nysa Kłodzka Valley and include, among others, water retention, regulation of surface runoff, and filtration and infiltration processes within alluvial deposits, which are important for replenishing groundwater. Cultural services are associated with the scenic values of the river valley and the potential for recreational use of the area. Support services, on the other hand, encompass ecological processes occurring within the river valley and the maintenance of ecological continuity within the ecological corridor of the Nysa Kłodzka Valley.

### *II.2 Flood Risk Reduction in the Biała Lądecka Catchment of the Nysa Kłodzka*

The upper part of the Biała Lądecka catchment is characterized by high-value ecosystem services resulting from the large proportion of natural and semi-natural forest, river, and meadow ecosystems. Of particular importance are regulatory services related to water retention, the mitigation of erosion processes, the stabilization of hydrological conditions, and the shaping of the local microclimate. The extensive forest complexes of the Śnieżnik Massif, the Bialskie Mountains, and the Złote Mountains play a vital role in air purification and the protection of water resources feeding the Biała Lądecka River and its tributaries.

A key feature of the analyzed area is the presence of ecosystem services directly linked to the operation of the Lądek-Zdrój health resort. Well-preserved forest ecosystems and the region's low level of industrialization contribute to maintaining high air quality, favorable bioclimatic conditions, and scenic values—which constitute one of the resort's fundamental therapeutic factors. Preserving the natural character of the Biała Lądecka Valley and the surrounding forest areas helps maintain conditions conducive to recreation, rehabilitation, and health tourism, which have been the foundation of Lądek-Zdrój's socioeconomic development for centuries.

Cultural and recreational services are also of great importance. The scenic beauty of the Biała Lądecka Valley, the presence of Natura 2000 sites, the Śnieżnik Landscape Park, numerous hiking trails, cycling and skiing routes, and natural attractions such as the Bear Cave and the peaks of the Śnieżnik Massif make the region one of the most important tourist destinations in the Eastern Sudetes. Tourism is currently one of the key elements of the local economy, generating jobs and income related to lodging, dining, spa, and recreational services. Preserving the high quality of the natural environment is therefore not only a prerequisite for protecting biodiversity but also the foundation for sustaining many ecosystem services with social and economic dimensions, upon which the region's further development depends.

## 4.2.9 Climate and Climate Change Adaptation

*I.1 Flood Risk Reduction in the Vistula River Basin to Protect Kraków*

This area is characterized by a climate typical of southern Poland. Considering the average air temperatures and humidity levels, it is a temperate continental climate zone, characterized by relatively warm summers and the absence of a distinct dry season. The average air temperature is approximately 8.6 °C. The warmest month of the year is July, with an average temperature of about 18.9 °C, while the coldest is January, with an average temperature of about -3.5 °C. Throughout the year, the average temperature fluctuates by about 22.4 °C.

Even during the dry months, the area in question experiences significant precipitation. The average annual precipitation over the course of the year is approximately 719–730 mm. The driest month is February, when precipitation is 33 mm. The highest precipitation was recorded in June, with an average of 101 mm. The difference in precipitation between the driest and wettest months is 68 mm.

Snow cover persists here for an average of 70–75 days, and the growing season lasts 210–220 days. For most of the year, winds blowing from the west or east predominate.

*I.2 Flood Risk Reduction from Kraków to Zawichost*

Based on the division of Poland into climatic regions proposed by Woś[12] , the analyzed area of the Vistula River valley is located within three regions: the Silesian-Kraków Region (XXVI), the Tarnów-Rzeszów Region (XXVII), and the Sandomierz Region (XXII). The Silesian-Kraków region is distinguished by a relatively high number of days per year with warm weather accompanied by precipitation, as well as moderately warm weather with heavy cloud cover and precipitation. The Tarnów-Rzeszów region is characterized by climatic conditions similar to those of region XXVI. Days with subzero temperatures are observed more frequently here than in other areas. The Sandomierz region is characterized by the highest number of days with very warm weather, accompanied by sunshine or light cloud cover. According to the updated Köppen-Geiger classification, the areas of the planned polders lie within zone Dfb—the temperate continental climate zone.

According to current climate projections for Poland and the Małopolska and Podkarpackie provinces, a further increase in average air temperature, a longer growing season, and more frequent extreme weather events are expected. Annual precipitation is projected to increase; according to the RCP 8.5 scenario, these changes may already be evident by 2050. The proportion of heavy precipitation events will increase significantly on an annual basis. At the same time, an increase in the number of days with high temperatures and a significant decrease in the number of days with snow cover are projected. These changes will result in the simultaneous occurrence of water deficits and surpluses, as well as an increasingly uneven distribution of water resources, manifested by torrential rainfall followed by prolonged periods of drought. Consequently, a simultaneous increase in the risk of both flooding and drought is to be expected.

[12] Woś, A., “Climatic Regions of Poland in Light of the Frequency of Various Weather Types,” IGiPZ PAN, No. 20, 1993

*I.3 Modernize the Sulejów Water Reservoir*

The climate in the Task area does not differ significantly from that of Poland as a whole, exhibiting the transitional climate characteristics typical of the country. This transitional nature is associated with the interplay of continental and oceanic zones, as well as the influence of the Baltic Sea, mountains, and highlands on climate formation. Additional factors shaping the local climate include differences in relative and absolute elevations, topography, and soil moisture. The coldest month is January, with an average temperature $^{of}$–3°C, while the warmest is July with a temperature $^{of}$ 17.5°C. The growing season lasts 210 days. The average annual precipitation is 600 mm, which is relatively high for the province.

*I.4 Enhance nature-based water retention in the Upper Vistula River Basin*

The Kraków metropolitan area is located in a temperate climate zone with transitional characteristics. Climatic conditions are shaped mainly by warm and humid air masses flowing from the west and dry, cool air flowing in from the east. The diversity and topography of the terrain have a significant impact on the agglomeration's climate.

The average annual air temperature is 8–9° C, and the average annual precipitation is 700–750 mm. The number of hot days in the metropolitan area is increasing year by year, as is the frequency of dry spells accompanied by high air temperatures. However, this area is characterized by heavy rainfall lasting several days, associated with the accumulation of moist air masses, which is the most common cause of flooding in the upper Vistula River basin.

According to the assessment contained in the Kraków Metropolitan Area Climate Strategy 2024–2030, an elevated level of flood risk is observed within the agglomeration, which is further exacerbated by impervious development in the agglomeration's center and investment projects carried out in floodplains. The agglomeration area is also characterized by landslides—the number of areas at risk of mass earth movements is increasing, posing a real threat, particularly to the southern part of the agglomeration. In urbanized areas, due to surface sealing, there has been a sharp increase in surface runoff, accompanied by a reduction in evaporation, infiltration, retention, and transpiration. The Kraków metropolitan area is also vulnerable to drought—municipalities within the metropolitan area are struggling with agricultural drought and the effects of prolonged periods without precipitation. The central part of the metropolitan area is also vulnerable to heat waves and fire hazards. According to the assessment presented in the Kraków Metropolitan Area Climate Strategy 2024–2030, Kraków exhibits the greatest vulnerability to climate change across the entire metropolitan area, primarily due to its topography, population density, and high degree of urbanization.

*II.1 Construct the Kamieniec Ząbkowicki multifunctional reservoir*

The Task is located in southwestern Poland, in the Lower Silesian Voivodeship, in the Nysa Kłodzka Valley and near the Sudeten Foothills. The climate of this area is temperate transitional, with a distinct influence from air masses flowing in from both the west (Atlantic air) and the east (continental air). The average annual air temperature is approximately 8–9°C. The growing season is relatively long, lasting an average of 200–220 days per year, which is favorable for agriculture

and horticulture. Annual precipitation averages 600–700 mm, with the heaviest rainfall occurring in the summer, especially in June and July, often in the form of intense thunderstorms. In winter, precipitation is lighter and often falls as snow, and snow cover usually lasts only a short time.

In recent decades, the Sudeten Foothills and the Nysa Kłodzka Valley have been increasingly affected by drought-like conditions, manifested by prolonged periods without precipitation and increased surface evaporation, leading to a growing soil moisture deficit in agricultural and meadow areas. These phenomena result in a reduction in the catchment's water retention capacity—soil with reduced infiltration loses its ability to absorb rainfall, which intensifies surface runoff. Consequently, heavy storm rainfall, characteristic of this area during the summer season, generates an increased risk of local flooding.

### *II.2 Flood Risk Reduction in the Biała Lądecka Catchment of the Nysa Kłodzka*

The upper part of the Biała Lądecka catchment is located within the Eastern Sudetes and is characterized by a mountain and foothill climate, strongly influenced by the terrain. Climatic conditions are characterized by significant spatial variation resulting from large differences in relative elevation between the bottom of the Biała Lądecka valley and the surrounding mountain massifs. Average air temperatures decrease with increasing elevation above sea level, while total precipitation increases toward the higher elevations of the Śnieżnik Massif, the Bialskie Mountains, and the Złote Mountains. A characteristic feature of the region is relatively high air humidity, frequent fog in river valleys, and generally favorable bioclimatic conditions.

The region's climate is characterized by relatively cool summers, long winters at higher elevations, and a significant proportion of summer precipitation associated with convective processes and the orographic barrier of the Sudetes. At the same time, its location in a mountainous area makes the region more susceptible to extreme weather events, such as heavy rainfall, sudden flooding of streams and rivers, and strong winds in the higher mountain areas.

According to current climate change scenarios developed for Poland and the Lower Silesian Voivodeship, a further increase in average air temperature, a lengthening of the growing season, and an increase in the frequency of extreme weather events are projected. Of particular significance for the upper part of the Biała Lądecka watershed are the projected changes in the precipitation regime, involving an increase in the proportion of torrential rainfall and a heightened risk of sudden rises in water levels and flash floods. At the same time, an increase in the frequency and intensity of droughts is anticipated, especially during the summer months, which may affect water resources, the condition of river ecosystems, and the functioning of natural habitats. The mountainous areas of the Eastern Sudetes, due to their steep topography and the concentration of surface runoff, are particularly vulnerable to the effects of extreme precipitation events. The catastrophic flood that occurred in the Biała Lądecka watershed in September 2024 confirmed the region's high vulnerability to such events and highlights the need to incorporate climate change adaptation considerations into land-use planning, water management, and environmental protection measures.

## 4.3 Social baseline conditions

This chapter presents social baseline data to the extent and level known at this stage for in the areas covered by the Project. These data serve as a reference point for the preliminary social risk assessment conducted in the following chapter and as the basis for detailed social impact assessments to be undertaken during the ESIA and LARAP stages for individual Tasks. At the current stage of Project preparation, not all implementation locations and the specific characteristics of the proposed intervention areas have been identified, with the exception of the Kamieniec Ząbkowicki reservoir, for which concurrently with this ESMF an ESIA integrating an ESMP, LARAP, SEP, and site-specific grievance mechanisms are being developed. The final siting, delineation, extent, and scope of individual Project activities remain dependent on the outcomes of ongoing and planned technical studies, including hydrological and hydraulic analyses, environmental and social assessments, consideration of impact avoidance and minimization measures, and the development of engineering designs. Accordingly, the information presented at this stage is based on the best available information and, where appropriate, has been aggregated to the municipal and county level until the precise locations and Project footprint are confirmed. Detailed baseline data for specific locations will be collected during the preparation of the ESIA and LARAP for each Task. The social baseline is presented by Project subcomponent, with the description of social receptors based on the best available information for the currently anticipated AoF. As the siting and design of individual interventions are refined through ongoing technical studies, the characterization of social receptors will be updated in the relevant site-specific ESF instruments.

For the non-structural activities under Component 3, including, inter alia, the modernization of monitoring and forecasting systems and the establishment of Operational Centers and Crisis Management Centers, the socio-economic data presented in relation to Components 1 and 2 are of limited relevance, given the system-wide nature of these interventions and the absence of a discrete project footprint at individual locations. These activities are implemented across entire catchments or river basins through established institutional arrangements involving state and regional entities, including IMGW-PIB, the Regional Water Management Authorities in Kraków, Wrocław, Rzeszów, and Gliwice, as well as the competent voivodeship offices. Accordingly, a detailed site-specific social assessment would not be required, as the relevant considerations relate primarily to institutional stakeholders and coordination mechanisms rather than localized social impacts.

An exception to this general rule applies to Activities III.1.1 (FEWS), III.1.2 (pilot flood protection measures), and III.1.3/III.1.4 (urban transformation studies), which are implemented in the Nysa Kłodzka catchment and in the municipalities of Lądek-Zdrój and Stronie Śląskie. The social profile presented below for Task I.3, including the demographic, economic, and vulnerability characteristics of this catchment, is therefore directly relevant to these activities. The remaining activities under Component 3, given their system-wide nature and broader spatial scale, such as III.2 (the Iłownica and Biała catchments) and III.4 (Operational Centers in Kraków, Wrocław, Rzeszów, and Gliwice), are not addressed in further detail in this chapter.

A distinct analytical dimension of the social assessment for Component 3, beyond its territorial delineation, concerns the enabling conditions for equitable access to, uptake of, and effective

utilization of communication tools, particularly in relation to early warning systems and crisis communication mechanisms (Subcomponent III.8 and Activity III.1.1).

According to Statistics Poland (GUS, 2025), household access to the Internet in Poland reaches 96.2% (95.5% in rural areas versus 97.1% in large cities). However, significant structural disparities persist in patterns of regular internet use: the rate is 58.8% among persons aged 65–74 and 67.7% among pensioners and economically inactive persons, compared with more than 97% among employed persons. Similarly, use of interactive digital services and applications (broadly comparable to warning platforms and e-government applications) is 27.6% among persons aged 65–74, compared with more than 80% in the 25–44 age group.

This profile is consistent with the demographic characteristics of the Project's intervention areas, including the municipalities of Lądek-Zdrój, Stronie Śląskie, Bardo, and Kamieniec Ząbkowicki, which are characterized by a relatively high concentration of older persons and, consequently, a potentially higher risk of digital exclusion in relation to warning and communication systems.

In line with ESS10, these conditions call for the direct engagement of diverse stakeholder groups in the design and implementation of warning and crisis communication systems under the SEP, to ensure that alert channels and response procedures are aligned with the needs and capacities of local communities, including older and digitally excluded persons.

### 4.3.1 I.1 Flood Risk Reduction in the Vistula River Basin to Protect Kraków

The implementation area of Task I.1 covers the border region between Małopolska and Silesia—two provinces with the highest population densities in Poland (225.8 and 347.9 people/km$^2$, respectively, compared to the national average of 119.4 people/km$^2$). The demographic structure of the municipalities located within the zone of direct and indirect impact of the planned infrastructure is characterized by extremely deep diversity, which accurately reflects broader, macroregional processes—, , urbanization, and suburbanization—as well as the overlapping trend of gradual depopulation in peripheral areas. An analysis of the territories involved in the project reveals a dichotomy between local government units exhibiting strong functional and metropolitan ties (concentrated around the Kraków agglomeration and the Upper Silesian conurbation) and those of a typically rural and small-town character, which face entirely different demographic challenges. Some municipalities—Wyry, Suszec, and Czernichów—are experiencing an influx of residents as bedroom communities for the Kraków and Upper Silesian agglomerations; towns such as Alwernia, Libiąż, and Żory are characterized by unfavorable demographic trends.

The age structure indicates a clear aging of the population—the share of people of post-working age has risen to 25.3% in the Silesian Voivodeship and reaches 24.3% in the municipality of Alwernia. Women account for 52–53% of registered unemployed persons in both provinces, although the total number of unemployed has fallen by approximately 73% over the past twenty years. The dominant sectors of the economy are trade, construction, and professional and technical services. In municipalities such as Alwernia, Zator, and Brzeźnica, a polycentric network of local roads and investments in Special Economic Zones (e.g., in Zator and Skawina) have spared them the fate of deeply economically excluded peripheries.

The municipalities covered by Task I.1 are mixed in character—agricultural in the Małopolska region and industrial and mining in the Silesian region. The share of agricultural land held by individual farms in the total area of the counties varies: it is highest in Kraków County (43%) and Pszczyna County (38%), and lowest in Chrzanów County (10%) and Mikołów County (24%), reflecting the degree of urbanization and industrialization in each area.

Land ownership is highly fragmented, particularly in Lesser Poland, where the average farm size is approximately 4 ha, and there are more than 6 parcels per farm. In the Silesian Voivodeship, the average is approximately 8 ha; however, agriculture plays a marginal role there due to the high degree of urbanization. Such a high degree of fragmentation means that acquiring land for the planned facilities requires conducting proceedings involving a very large number of owners and parcels. This process is further complicated by the lack of up-to-date data in the EGiB, pending inheritance proceedings, and unresolved legal statuses of real estate. Land ownership and legal conditions are an important risk factor in the land acquisition process under ESS5, as they can lead to delays, disputes, and difficulties in identifying persons eligible for compensation. For this reason, they are addressed in the due diligence procedures and voluntary land acquisition procedures set out in the LARAF (Land Acquisition and Resettlement Framework), and have also been identified as matters requiring special review during screening under Annex 2.

Within the Task area, a number of categories of particularly vulnerable groups have been identified, though they differ in scale and nature. Given the demographic data, the most significant of these groups are older adults (65+). Another identified group consists of people with disabilities. These groups are particularly relevant to the Project risk assessment, as land use restrictions and any potential land acquisition may disproportionately affect older persons and persons with disabilities, including due to limited livelihood opportunities and barriers to meaningful participation in consultations. These considerations have informed the screening criteria for vulnerable groups in Annex 2 and will be reflected in the consultation arrangements and mitigation measures under the SEP and LARAP, in accordance with ESS5.

The implementation of Task I.1 will require the reconstruction of selected sections of local roads, including municipal and county roads. Due to conflicts between existing power lines and the planned hydrotechnical structures, most of the power infrastructure located within the planned polders and reservoirs will need to be relocated outside their boundaries or redeveloped.

Agriculture is one of the key sectors of the economy in the area covered by the planned investment. Continued agricultural use within the polder basin will be possible through the introduction of permanent restrictions, without the need for land expropriation. Permanent restrictions on land use fall within the scope of ESS5 and are reflected in Annex 2 and the LARAF.

The second major economic activity in the polder area is mining, specifically aggregate extraction. These activities will be maintained and will be able to develop further, creating opportunities for increased employment among local residents and generating tax revenue for the budgets of the municipalities where the polders are planned. The aggregate mine is one of the largest employers operating within six of the eight planned polders.

### 4.3.2 I.2 Program of flood storage measures as an element of flood risk management in the Upper West Vistula and Upper East Vistula water regions between Kraków and Zawichost

Conceptual work is underway to select the optimal flood protection option for this area. Various location and technical options are being considered, including potential solutions in the Koszyce and Szczurowa area, as well as alternative or complementary measures in Mielec and Brzesko Counties. At this stage, no decision has been made regarding the selection of any of the options under consideration or their final location, scope, technical parameters, or implementation arrangements. Accordingly, the baseline data presented below are general and indicative in nature and provide an overview of the areas covered by the analyses. Their inclusion does not constitute a decision to prepare or implement any specific investment.

The municipalities of Koszyce, Szczurowa, Padew Narodowa, Przykop, and Baranów Sandomierski are distinctly rural in character. Social and economic life is based primarily on agriculture, small-scale services, and employment in the public sector. The communities in these municipalities are deeply rooted, and attachment to the land and the local area plays a key role in the daily lives of residents.

The natural population growth rate is -6.29 per 1,000 residents in the Koszyce municipality and -3.28 in the Szczurowa municipality. The age structure confirms the advanced aging of the population: 25% of the residents of the Koszyce municipality are of post-working age, and the demographic dependency ratio for the elderly is 32.2 in Koszyce and 28.3 in Szczurowa. According to GUS projections, Proszowice County, in which the Koszyce municipality is located, will lose over 22% of its population by 2060. In turn, Brzesko County, in which the Szczurowa municipality is located, will lose approximately 15–18% of its population by 2060.

The Mielec County has a population of 132,723. Although the population decline over the long term (2002–2024) amounted to only 0.1%, a deeper analysis reveals growing structural problems. The negative natural growth rate stands at -2.63 per 1,000 residents. In Mielec itself, the population is aging particularly rapidly: the share of people of working age decreased from 59.35% in 2019 to 56.42% in 2023, while the share of the post-working-age group rose to 26.67%. The demographic dependency ratio rose from 66 in 2018 to 77 in 2023. The net internal migration stood at -166 people in 2024, and for the city of Mielec alone, the migration rate was -4.4 in 2023. GUS projections indicate that by 2035, the number of people of working age in the Podkarpackie Voivodeship may decrease by 28% compared to 2019.

The economies of the municipalities of Koszyce and Szczurowa rely almost exclusively on agriculture. In the municipality of Koszyce, over 50.9% of the workforce is employed in the agricultural sector. The number of employed persons per 1,000 residents is only 55 in Koszyce and 92 in Szczurowa, compared to the national average of 259. Average wages are 13–24% lower than the national average, and the local labor market is practically limited to family-run microenterprises. Agriculture plays an important role in the local economic structure, and income levels are below the national average, which may influence the extent of potential economic impacts under ESS5. Households in the municipalities of Koszyce and Szczurowa may have more limited opportunities to diversify their livelihoods, which should be taken into account when assessing potential impacts associated with agricultural land acquisition or permanent

restrictions on land use. These circumstances have been reflected in the economic displacement risk screening criteria in Annex 2 and in the compensation principles developed under the LARAF.

The economy of the Mielec County is divided between the industrial sector and traditional agriculture. The EURO-PARK MIELEC Special Economic Zone has been established within the county, where nearly 300 companies operate, employing over 44,000 people. The registered unemployment rate stands at 5.0% - the same as the national average, but significantly below the average for the Podkarpackie Voivodeship (8.4%). Agriculture in the county is largely supplementary in nature—owners of small farms earn their livelihood primarily from work outside of agriculture.

The areas of the Koszyce and Szczurowa municipalities are agricultural in character, with a highly fragmented ownership structure typical of the agricultural model in Lesser Poland. Small, multigenerational family farms with an area of 4–5 ha predominate; over 75% of farms in the Lesser Poland Voivodeship have an area of less than 5 ha. The fragmented agrarian structure increases administrative complexity and may lengthen the time required for land acquisition and negotiated acquisition processes. It has therefore been identified in Annex 2 as an issue requiring particular attention during environmental and social screening.

In the Mielec County, agricultural land accounts for approximately 64% of the county's total area, and forest cover stands at 24.3%. The agricultural structure is highly fragmented: of the approximately 7,600 farms, 72% have an area of 1–5 ha. Forest lands are predominantly managed by the State Forests (15,590.23 ha out of a total of 21,902.55 ha of forests in the county).

A number of common categories of particularly vulnerable groups have been identified in both locations, although they differ in scale and nature. Older adults constitute a important group in both locations: approximately 25% of the residents of the municipalities of Koszyce and Szczurowa are of post-working age, while in Mielec, the share of this group rose to 26.67% in 2023. In the municipalities of Koszyce and Szczurowa, agricultural incomes are significantly below the national average, which is particularly important in the context of potential relocation. In the Mielec County, special attention shall be given to owners of small farms with low-quality soils, for whom the loss of land means the loss of their sole asset, given limited employment opportunities outside the Special Economic Zone (SSE). In all locations, the digitally excluded constitute a significant group. These findings will inform the screening of vulnerable groups in Annex 2. Under the SEP, information dissemination and consultation activities in these areas will also make use of traditional formats, including in-person meetings, printed materials, and information boards, to facilitate participation by persons with no or limited access to digital tools.

### 4.3.3 I.3 Flood Risk Reduction in the Biała Lądecka Catchment of the Nysa Kłodzka

Task I.4 and Task II.3 are located in the same area as the investments under Task I.3. All Tasks will be implemented in the municipalities of Lądek-Zdrój and Stronie Śląskie in Kłodzko County.

*Demographic Characteristics*

The demographic profile of both municipalities is among the most challenging in the Lower Silesian Voivodeship. The municipality of Lądek-Zdrój has 4,914 residents–24% fewer than in 2002; the municipality of Stronie Śląskie has 6,721 residents, representing a 17.3% decline since 2002. The natural population growth rate is -13.02 per 1,000 residents in Lądek-Zdrój and -8.78 in Stronie Śląskie. The average age of a resident of Lądek-Zdrój is 47.4 years, compared to the provincial average of 43.4 years, and the percentage of people of post-working age reaches 31.9%.

*Economic Situation and Sources of Livelihood*

The economies of both municipalities are based on tourism—spa tourism in Lądek-Zdrój and active tourism in Stronie Śląskie. The unemployment rate in Kłodzko County at the end of October 2025 was 13.1%, compared to the national average of approximately 6%. Per capita tax revenue for 2025 was significantly lower than the national average: 1,821.79 PLN in Lądek-Zdrój and 2,058.59 PLN in Stronie Śląskie, compared to an average of 2,788.93 PLN. The functioning of the local economy is further constrained by the legal framework for spa and nature conservation: spa protection zones A, B, and C in Lądek-Zdrój impose restrictions on development and economic activity, while the Natura 2000 network covers approximately 70% of the Stronie Śląskie municipality's area. The 2024 flood severely damaged the economic base of both municipalities, destroying tourist facilities and infrastructure; both local governments are currently implementing record-breaking investment budgets dedicated to addressing its aftermath.

The existing restrictions are relevant to the assessment of Project risks and impacts. Under the current legal framework, affected businesses and residents in the spa zone and Natura 2000 areas may have limited opportunities to relocate, re-establish their activities, or restore their livelihoods in the event of Project impacts. These restrictions may also limit the availability of replacement land and compensation. In addition, the constraints associated with the 2024 flood may further affect the availability of suitable replacement land and the capacity of affected persons to restore livelihoods. These considerations are reflected in Annex 2 and in the compensation principles under the LARAF.

*Land Ownership and Use Structure*

The land ownership structure differs significantly from that of the Małopolska region - public ownership predominates. In the municipality of Stronie Śląskie, the State Treasury owns 77.6% of the area (11,362 ha), the land is mainly managed by the State Forest Enterprise (Lasy Państwowe); forests account for 76.4% of the municipality's area. In the municipality of Lądek-Zdrój, the public sector owns approximately 63% of the area. Private ownership is concentrated in river valleys, where residential buildings and small farms are located. Restrictions resulting from health resort and nature conservation measures further reduce the availability of replacement properties, which may hinder the use of "land-for-land" compensation. This consideration has been incorporated into the compensation principles under the LARAF for this Project and reflected in the screening form prepared in accordance with Annex 2.

*Vulnerable Groups*

There are a number of particularly vulnerable groups in the analyzed area. These include the elderly (who account for approximately 30% of the area's residents) and low-income families. Those whose homes or workplaces were damaged or destroyed in the 2024 flood are in a particularly difficult situation—their ability to relocate on their own is limited, and their sense of

security has been severely compromised. People whose sole source of income comes from tourism and spa-related businesses may be vulnerable to the economic impacts of the project; some of them have already suffered losses as a result of the 2024 flood. Another significant group consists of the digitally excluded and people with disabilities who face barriers to accessing information and participating in consultations. These conditions have been reflected in the screening form in Annex 2 and will be taken into account in the mitigation measures under the LARAP and in the consultation arrangements implemented in accordance with the SEP.

*Community Health and Safety*

The Biała Lądecka watershed is characterized by a high and complex flood risk. The September 2024 flood caused extensive damage across both municipalities: the building inspectorate deemed 75 buildings in Lądek-Zdrój and 31 in Stronie Śląskie unfit for use, and by mid-2025, more than 890 people were unable to return to their homes. Immediately after the flood, damaged properties were purchased, which requires conducting due diligence during the preparation of the LARAP to verify compliance with ESS5 requirements.

In May 2026, the flood risk remains high. The main risk factor is the lack of full functionality of the dam in Stronie Śląskie—following the breach of the earthen embankment in 2024, the Biała Lądecka Valley has been deprived of its main retention buffer on the Morawka River. Work is underway to rebuild the structure; however, until it is completed and recertified, the area remains unprotected against flood waves flowing down from the Śnieżnik Massif.

*Access to Public Services*

Access to public services in both municipalities is limited due to the mountainous terrain and ongoing depopulation. Specialized healthcare and social services are available mainly in the municipal seats; residents of outlying areas must travel to Kłodzko or larger centers. Road and municipal infrastructure in both municipalities is still partially undergoing reconstruction following the 2024 flood.

### 4.3.4 II.1 Construct the Kamieniec Ząbkowicki multifunctional reservoir

The municipalities of Kamieniec Ząbkowicki and Bardo are located in Ząbkowice County. The municipality of Kamieniec Ząbkowicki has a population of approximately 7,326, while the municipality of Bardo has 4,910 residents; approximately 6,300 people live in the reservoir's immediate impact zone. Both municipalities are experiencing a deepening negative natural growth rate—in the municipality of Bardo, it stood at -14.05 per 1,000 residents in 2024, compared to -5.0 for the province and -4.2 for the country. GUS projections foresee a further systematic decline in the county's population. In both municipalities, there is a growing surplus of women in the post-working-age group—the percentage of people in the post-working-age group stands at 26.4% in the municipality of Bardo. The phenomenon of the feminization of old age translates into a specific profile of needs for this group: living alone, lower retirement incomes, and limited mobility, which has direct implications for the design of consultation and assistance activities within the framework of the Task.

Among the distinguishable categories of social vulnerability in the municipalities of Bardo and Kamieniec Ząbkowicki, two groups requiring special attention were identified in as part of this

assessment: older adults (65+) and people with disabilities. These groups are vulnerable to a combination of adverse impacts, a more difficult financial situation, and significant psychosocial stress associated with a change in their environment.

The unemployment rate in the Ząbkowice County is 10.4%, compared to 5.1% for the country as a whole. The average gross wage is 85.6% of the national average. The local economy is based on industry and construction (34.7% of the workforce) as well as services, trade, and transportation (19.3%). Agriculture provides a livelihood for 15.7% of the economically active population, with individual farms predominating. A notable feature is high occupational mobility—a significant portion of income is generated in external labor markets. The economic situation of farmers is particularly difficult: the median monthly income per person is 2,200 PLN, the lowest figure among all socio-occupational groups. The loss of land by farms operating at the break-even point can have a significant impact on them, even when the area being acquired is small in absolute terms. The main economic entity directly linked to the investment area is KSM "Byczeń"; mining operations will mostly cease before the reservoir is completed due to the depletion of the deposits.

The land ownership structure within the reservoir's immediate impact area is diverse. Public ownership predominates—PGW Wody Polskie (26%), the State Treasury through KOWR (21%), and the State Forests (5%)—accounting for a total of approximately 52% of the area. Private ownership by individuals accounts for 25%, while the remainder is controlled by municipalities and KSM "Byczeń," which is actively purchasing land for the Przyłęk–Pilce deposit.

In terms of land use, agricultural land predominates (1,130 ha, 73% of the area); however, a notable feature of the area is the high degree of post-mining degradation—more than half of the future pit area is covered by pits left after aggregate extraction, whose actual productive value is negligible. The agriculturally used lands consist of arable fields and pastures planted with cereals, corn, and rapeseed. Forests cover approximately 109 ha (7% of the area) and do not form large complexes; the only notable forest community is an oak-linden riparian forest growing along both banks of the Nysa River in the western part of the planned reservoir. Land under water covers 155 ha (10%), while built-up and urbanized land covers 61 ha.

The average area of agricultural land per farm in the Lower Silesian Voivodeship is 14.59 ha, which indicates a significantly more favorable agricultural structure than in Lesser Poland. Within the municipality of Bardo, agricultural land covers 3,053 ha out of a total area of 7,341 ha, while forests cover 3,544 ha, representing the highest forest cover rate in Ząbkowice County.

As the Project is at the site-specific ESIA/SIA and LARAP stage, these conditions have directly informed the compensation principles, relocation support, and consultation methods provided under the LARAP.

### 4.3.5 II.2 Modernize the Sulejów Water Reservoir

The Sulejów reservoir, along with the adjacent land, remains under the management of the Regional Water Management Authority (RZGW) in Warsaw, which serves as the project's PIU. The project's direct impact area covers four municipalities in the Łódź Voivodeship: Tomaszów Mazowiecki (rural municipality, ~11,500 residents), Wolbórz (urban-rural municipality, ~7,800

residents), Mniszków (rural municipality, ~4,700 residents, population density 38 people/km$^2$), and Sulejów (urban-rural municipality, ~16,500 residents). The total population of the impact area is estimated at approximately 40,500 people. The municipality of Sulejów is experiencing moderate population growth. The Tomaszów Mazowiecki municipality is experiencing an influx of new residents as a result of suburbanization, accompanied by negative natural growth. The Wolbórz municipality remains demographically stable, while the Mniszków municipality is characterized by a peripheral settlement pattern and scattered development, with the lowest population density in the impact area.

The land-use structure in these four municipalities is distinctly agricultural and forested. The main features of the area are the Sulejowski Reservoir and the Pilica River valley, which account for a significant proportion of water bodies and forested areas. The municipalities of Sulejów and Mniszków have similar proportions of agricultural land and forests—approximately 48% and 43%, and approximately 49% and 35–40% of their total area, respectively. The municipality of Tomaszów Mazowiecki is characterized by an almost equal division between agricultural land (45%) and forests (44%). The municipality of Wolbórz stands out for having the highest proportion of agricultural land (60%) combined with lower forest cover (27%) and its immediate proximity to the reservoir—the shoreline of the Sulejów Reservoir within the municipality is approximately 11 km long. The reservoir also serves a recreational function, and residential houses are located along parts of the shoreline; this should be reflected in the screening form in Annex 2.

Local economies in the impact area rely on agriculture, seasonal domestic tourism, and services related to recreational activities around the reservoir, although individual municipalities exhibit different economic profiles. The municipality of Wolbórz, thanks to its location along the S8 highway, is developing its logistics sector (711 registered businesses) and partially serves as a suburban area for Piotrków Trybunalski. The municipality of Sulejów is most strongly oriented toward serving tourism, which is distinctly seasonal in nature. The rural municipality of Tomaszów Mazowiecki has 1,304 registered businesses; most of its economically active residents commute to work in the city of Tomaszów Mazowiecki, where industry and construction dominate; quartz sand mining operates within the municipality itself. The Mniszków municipality is the most peripheral in nature—the main sources of livelihood are small farms and commuting to ceramic industry plants in Owczary and Opoczno.

# 5 Environmental and Social Risks and Impacts, and Standard Mitigation Measures

## 5.1 Environmental Risks and Impacts

At this stage of the Project’s preparation, the final locations, technical alternatives, and design solutions are not yet known for most of the Tasks. For this reason, the assessment presented in Appendix 6 to this document is of a general nature and identifies typical environmental impacts that are foreseeable at the current stage of the Project’s preparation. The assessment covers

Tasks implemented under Component 1, Component 2, and Component 3 of the Project. For each Task, the environmental component affected by the potential impact (e.g., surface and groundwater, soil, air quality, biodiversity, protected areas, cultural heritage, landscape, safety of hydrotechnical structures) has been identified, along with its type and phase of occurrence (construction/operation), its potential significance, the applicable World Bank Environmental and Social Standard (ESS), and the required environmental management documents and instruments. The significance of impacts and ESS standards indicated in Annex 3 serve as a starting point, which will be verified and refined during the preparation phase of each Task–in particular as part of the Environmental and Social Impact Assessment (ESIA), prepared after the final location and technical solution have been determined. Based on the results of the ESIA, site-specific environmental and social instruments will be prepared as required, which may include biodiversity management plans (BMP) and cultural heritage management plans (CHMP) and other management plans proportionate to the identified risks and impacts during the design phase, followed by the contractor's environmental and social management plan (C-ESMP), which is an implementation document prepared by the contractor during the construction phase. The potential significance of environmental impacts was assessed on the basis of professional expert judgment, taking into account the nature of the impact (direct or indirect, temporary or permanent, reversible or irreversible), its magnitude and spatial extent, the likelihood of occurrence, and the sensitivity and environmental value of the affected environmental component—in particular, the presence of protected areas, including Natura 2000 sites; the ecological status of surface water and groundwater; and the resilience of the environment within the area affected by a given Task. Given the early stage of preparation of most Tasks and the absence of final location and technical solutions, the assessment was based on the precautionary principle. Where there was uncertainty regarding the extent, magnitude, or likelihood of an impact, a higher and more conservative significance level was assigned in order to avoid underestimating the environmental management measures that may be required at the ESIA stage for a given Task. The above criteria are assessed collectively, taking into account the environmental characteristics of the individual Project areas, including existing anthropogenic pressures and the presence of environmental receptors of heightened sensitivity.

Based on the above analysis, each impact was assigned one of four significance levels, in accordance with the classification applied in the environmental impact matrix (Annex 6):

**High** – potentially significant or irreversible impacts, or impacts affecting critical habitats or involving physical/economic displacement; these require a stand-alone ESIA together with additional instruments (e.g. BMP, CHMP, EPP, LARAP) supplementing the standard ESMP measures.

**Substantial** – impacts that can be managed through the mitigation hierarchy and standard management plans (e.g. BMP, CHMP, operational plans); they may require dedicated studies (e.g. biodiversity inventories/surveys) and specialized monitoring.

**Moderate** – predictable, reversible impacts limited in scope and duration to the construction phase; fully manageable through measures included in the ESMP and C-ESMP.

**Low** – no detectable adverse impacts or positive impacts; no additional measures are required beyond standard good practice.

The results of the assessment are presented in tabular form (Annex 6), broken down by individual Tasks. For each identified impact, the table specifies the environmental component concerned (e.g. soils, surface water, groundwater, aquatic biota, protected areas, fauna), the type and phase of the impact (construction/operation), the significance level, the applicable World Bank Environmental and Social Standard (ESS), and the required environmental management documents and instruments.

## 5.2 Social Risks and Impacts

This chapter presents a systematic identification of the Project's social risks and negative impacts.

The assessment of social risks and impacts presented in this ESMF is undertaken at a strategic level, based on the best available information regarding the proposed interventions, the characteristics of the receiving environment, and the types of impacts typically associated with comparable activities. Site-specific significance assessments will be undertaken as part of the preparation of the relevant environmental and social instruments once sufficient technical information becomes. The potential significance of social risks and impacts has been assessed using professional judgement against the following criteria:

Nature of the impact - whether the impact is beneficial or adverse, direct or indirect, cumulative, induced, temporary or permanent.

Magnitude - the anticipated scale or severity of the impact, including the number of people affected by involuntary land acquisition (including economic and physical displacement), the degree of change to existing social conditions, and the extent of disruption to livelihoods, assets, access, services, or community wellbeing.

Geographic extent - whether impacts are expected to be site-specific, local, regional, or wider, including downstream effects.

Duration and reversibility - the anticipated duration of the impact and the extent to which baseline conditions can reasonably be restored.

Likelihood - the probability that the impact will occur, taking into account the nature of the proposed activity and existing baseline conditions.

Sensitivity of receptors - the vulnerability of affected individuals, households, communities, and institutions, including the presence of disadvantaged or vulnerable groups, existing social tensions, cultural heritage, dependence on land and natural resources, and community resilience.

Context and cumulative effects - consideration of existing environmental and social pressures, stakeholder concerns, known grievances, associated facilities, and the potential for cumulative or induced impacts.

The overall significance of each potential social impact has been determined by considering the interaction between the magnitude of the impact and the sensitivity of the affected social receptors, while taking into account the likelihood of occurrence. These criteria are assessed

jointly, taking into account the social context of the Project areas–in particular the advanced ageing of the population, dependence on agriculture as the sole source of livelihood, and pre-existing flood-related losses. This materially limits the capacity of affected households to absorb additional project-related burdens; households that have already lost housing, income, or assets, or experienced displacement or prolonged loss of access to their dwellings as a result of the 2024 floods, are more vulnerable to further project-related disturbance and associated psychosocial stress; this pre-existing vulnerability shall be reflected in the social impact assessment and addressed through screening of vulnerable groups, tailored consultation under the SEP, and, where relevant, coordination with the LARAP and due diligence process.

A three-tier significance scale has been applied:

High - an impact that deeply affects the situation of those affected, is permanent or difficult to reverse, and has a high likelihood of occurrence; it requires comprehensive mitigation or compensatory measures.

Medium - an impact of moderate extent or magnitude, partially reversible or limited to a specific group of persons; it requires mitigation measures, but its effects can be effectively limited.

Low - an impact of limited extent and magnitude, generally reversible; its effects can be effectively mitigated through standard mitigation measures.

The impacts have been organized by thematic category rather than by project phase, as most categories may materialize at more than one stage of implementation. For each category, the type of component it applies to—hydraulic infrastructure (HI), nature-based solutions (NBS), or both—is indicated, allowing for quick filtering of relevant risks depending on the nature of the Task or Subtask. The ESS Standard column indicates the regulatory basis within the World Bank's Environmental and Social Standards, specifying the required impact management procedure.

*Table 4 Social Risks and Adverse Impacts*

Legend: **HI** = hydraulic infrastructure; **NBS** = nature-based solutions; **HI+NBS** = both types of components; NSM – Non-structural measures.

| Impact Category | Type | ESS Standard | Phase | Potential Significance | Standard mitigation measures |
|---|---|---|---|---|---|
| Physical displacement | HI | ESS5 | Design / Construction | High | LARAP; compensation at replacement value; relocation support; post-resettlement PAP monitoring |
| Economic Displacement | HI | ESS5 | Design / Construction | High | LARAP with a plan to restore sources of income |
| Restrictions on the use of real estate and property | HI | ESS5 | Operation | Medium | LARAP; compensation for restrictions on property rights; information on protected zones |
| Loss of access to shared resources | HI | ESS5 | Construction / Operation | Medium | LARAP; inventory of shared resources; compensation for users |
| Loss of community social infrastructure | HI | ESS5, ESS8 | Construction | Medium | LARAP; inventory of community-significant facilities; restoration or compensation |

| Impact Category | Type | ESS Standard | Phase | Potential Significance | Standard mitigation measures |
|---|---|---|---|---|---|
| Disintegration of the local community | HI | ESS1, ESS5 | Construction | Medium | LARAP; preference for collective relocation within the same settlement unit; monitoring of social cohesion |
| Impact on host communities | HI | ESS5 | Construction | Low | LARAP; assessment of absorption capacity; measures to support integration PAP |
| Community Safety and Public Health | HI | ESS4 | Construction | Medium | ESMP; safety management plan during construction; monitoring of construction-related nuisances; coordination with local emergency services |
| Dam safety risks for downstream communities in the event of structural failure | HI | ESS4 | Construction / Operation | High | Panel of Experts established at early design stage; dam safety instrumentation plan; Emergency Preparedness Plan (EPP) prior to impoundment; community-level early warning and evacuation procedures; regular technical safety inspections during operation; community communication on residual risk |
| Disruptions to access to infrastructure and public services | HI+NBS | ESS4 | Construction | Low–Medium | ESMP; ensuring the continuity of utility supply and access to local roads during construction |
| Influx of workers and related social risks | HI | ESS2, ESS4 | Construction | Low–Medium | LMP; contractor's code of conduct; monitoring of relations with the local community |
| Labor and working conditions and OHS | HI + NBS | ESS2 | Construction | Low | LMP for each subproject; contractor's OHS plan; contractor's code of conduct; workers' grievance mechanism |
| Project-induced demographic changes | HI+NBS | ESS1 | Construction / Operation | Low | Social monitoring; coordination with local governments regarding infrastructure and service capacity |
| Disruption of local economic networks | HI+NBS | ESS1 | Construction | Low | ESMP; work schedule taking into account the seasonality of tourism and agricultural activities |
| Disruption of tourism and recreational activities, including reduced access to tourism assets, changes in visitor experience, and impacts on tourism-dependent businesses and livelihoods | HI+NBS | ESS1, ESS5 | Construction / Operation | Medium | ESMP: minimize closures of tourism and spa infrastructure during peak season; LARAP: inventory of tourism-dependent PAP; livelihood restoration measures for affected businesses |
| Land use changes — transition to flood-compatible agricultural land use in dry polders | HI | ESS1, ESS5 | Design / Construction/ Operation | Medium | LARAP: assessment of impacts on agricultural livelihoods resulting from land use restrictions; livelihood restoration measures; consultation with affected |

| Impact Category | Type | ESS Standard | Phase | Potential Significance | Standard mitigation measures |
|---|---|---|---|---|---|
| | | | | | farmers on acceptable land use alternatives |
| Loss or disruption of forest ecosystem services, including regulated timber harvesting and other forest-dependent livelihood activities | HI, NBS | ESS6, ESS5 | Construction / Operation | Medium | ESMP: inventory of forest-dependent livelihoods in the impact zone; coordination with State Forests; LARAP: compensation for loss of forest-based income |
| Cumulative social impacts from multiple sources | HI+NBS | ESS1 | Construction | High | ESIA shall include a CIA/RCIA Report identifying VECs (Valued Environmental and Social Components), spatial and temporal boundaries, and cumulative impact significance; ESMP shall include measures to mitigate the project's contribution to cumulative impacts, monitoring indicators for VEC status, and adaptive management strategies with defined trigger thresholds; |
| Social conflicts, stakeholder tensions, and social polarization, including the risk of stakeholder opposition to the Project and unresolved grievances | HI+NBS | ESS1, ESS5, ESS10 | All phases | High | SEP; GRM; monitoring of public sentiment |
| Environmental justice | NBS | ESS1 | Operation | Low–Medium | Prioritizing the location of NBS in areas with the greatest social and environmental needs; SEP |
| Cultural Heritage and Archaeological Resources | HI | ESS8 | Identification / Design / Construction | Medium | Inventory of resources within the impact zone; cultural heritage management plan; archaeological supervision during earthworks |
| Legacy issues: pre-existing community distrust and unresolved historical grievances | HI | ESS1, ESS5 | Identification / Design | High | SEP taking into account the existing relationship with the community, retrospective assessment of previous resettlement and consultation processes |
| Potential exclusion of vulnerable and digitally excluded groups from early warning and emergency communication systems | NSM | ESS1 ESS4 ESS10 | Design / Operation | Medium | Multi-channel communication strategy with redundant non-digital alerts, stakeholder engagement under the SEP, and inclusive Standard Operating Procedures for Operational and Crisis Management Centres. |

The Project also generates a number of positive social impacts, the realization of which requires reinforcement and communication measures. Unlike risks and negative impacts, positive impacts do not require mitigation measures, but rather measures to enhance the positive impacts, conscious planning, monitoring of effects, and communication with beneficiaries. Table 6 presents a summary of the positive impacts along with an indication of the required reinforcement measures.

*Table 5 Positive social impacts*

Legend: **HI** = hydraulic infrastructure; **NBS** = nature-based solutions; NSM – Non-structural measures.

| Impact category | Type | ESS Standard | Phase | Enhancement Measures |
|---|---|---|---|---|
| Improving flood safety | HI<br>NSM | ESS4<br>ESS10 | Design/<br>Operation | Early warning system; communication regarding the protection area; integration into flood risk management plans; community-co-designed alerts and redundant non-digital notification channels for elderly and rural residents. |
| Strengthening of institutional capacity and coordination | NSM | Ess1<br>ESS4 | Operation | Joint exercises and standardized data exchange among IMGW-PIB, regional and local authorities, and crisis management teams. |
| Reducing the risk of waterlogging and localized flooding in urban areas | NBS | ESS4 | Operation | Monitoring the retention effectiveness of NBS; integration into stormwater management plans |
| Public health and quality of life | NBS | ESS4 | Operation | Selection of species with high phytoremediation and thermoregulatory capacity; ensuring that space is accessible to all social groups |
| Social Cohesion and Social Capital | NBS | ESS10 | Design / Operation | Collaboration with the local community during the design and maintenance phases |
| Local Economy and Tourism | HI | ESS1 | Operation | Coordination with local governments and local businesses; synergistic planning with flood recovery and flood protection programs |
| Demographic stabilization | HI | ESS1 | Operation | Coordination with local planning strategies |

## 5.3 Risks Specific to Vulnerable and Particularly Vulnerable Groups

This chapter identifies groups that may be disproportionately affected by the Project's impacts, face barriers in disaster response or have limited access to its benefits, including risks associated with Component 3 early warning and crisis management systems. The final verification of particularly vulnerable groups shall be conducted during the ESIA phase for each Task.

*Table 6 Preliminary identification of particularly vulnerable groups*

| Vulnerable group | Source of vulnerability in the context of the Project | Standard mitigation measures |
|---|---|---|
| Elderly people | High demographic share in project areas; limited ability to adapt to resettlement; barriers to access to information and consultation; risk of exclusion from app-based early warning alerts and reduced mobility during emergency evacuation. | In accordance with the following sections: Sections 8.3 and 8.4 of the LARF; Section 8.4 of the SEF; Emergency Preparedness and Response Plan and Crisis Management Plan; |
| Low-income families | Limited own resources for relocation and economic adaptation | In accordance with Chapters 8.3 and 8.4 of the LARF |

| Vulnerable group | Source of vulnerability in the context of the Project | Standard mitigation measures |
|---|---|---|
| Owners of small farms dependent on land as their sole source of livelihood | Loss of land as the loss of their sole asset; risk of de facto displacement | In accordance with Chapters 8.3, 8.4, and 10.3 of the LARF |
| Digitally excluded individuals | Lack of access to information and consultation processes conducted through digital channels; inability to receive or interpret smartphone- or web-based early warning and crisis management notifications. | In accordance with Chapters 7.2 and 8.4 of the SEF; Emergency Preparedness and Response Plan and Crisis Management Plan; |
| People with disabilities | Architectural and communication barriers to accessing information and consultations; increased difficulties with relocation; heightened risks during emergency evacuation and need for specialized alert formats. | In accordance with the following sections: Section 8.3 of the LARF; Section 8.4 of the SEF; Emergency Preparedness and Response Plan and Crisis Management Plan |
| People affected by crisis events | Exhausted adaptive and economic resources; trauma; risk of non-compliance of prior transactions with ESS5 | In accordance with the following sections: Sections 8.3 and 8.4 of the LARF; Annex IV of the LARF |
| Migrants facing language barriers | Limited access to project information; unfamiliarity with Polish administrative procedures; risk of missing non-translated emergency and early warning communications. | In accordance with Chapters 7.2 and 8.4 of the SEF; Emergency Preparedness and Response Plan and Crisis Management Plan; |

In areas where institutions housing particularly vulnerable individuals or other sensitive receptors (including social welfare homes, schools, nursing homes, childcare centers, and public infrastructure) are located within the impact zone, their early identification during the screening phase is required, along with the development of a separate action plan in cooperation with the operating authority.

## 5.4 Incorporating environmental and social considerations during the planning and design phases

In accordance with the requirements of the World Bank's Environmental and Social Standards, the planning and design of flood control investments shall include the comprehensive integration of environmental and social aspects as early as the Task preparation stage. This chapter sets out guidelines for future investments covered by the Project. These guidelines are illustrated in practice by the Kamieniec Ząbkowicki reservoir, the most advanced subproject under the Project, where the integration of environmental and social considerations at the design stage–including alternatives analysis, environmental flow assessment, and stakeholder engagement–is already underway through the site-specific ESIA, ESMP, SEP, and GRM described in Section 2.3.2. For the remaining tasks under the Components, technical design has not yet been finalized, and this chapter accordingly sets out the principles to be applied as their preparation advances.

### 5.4.1 Mitigation hierarchy and alternative analysis

The design shall be based on the mitigation hierarchy: first, environmental and social risks shall be anticipated and avoided; if this is not possible, they shall be minimized, mitigated, and, as a last resort, compensated for. The design shall include an analysis of alternatives, consisting of a

systematic comparison of feasible options in terms of location, technology used, technical design, and operation, as well as a no-investment option, with regard to their potential environmental and social impacts. The key criterion for site selection shall be the minimization of involuntary resettlements. Options resulting in fewer people affected by the project (PAP) and a smaller scope of expropriations are preferred even if they entail higher implementation costs, provided that the difference remains economically justified and still has the expected outcomes in line with the overall Project objectives

The selection of the location, technical parameters, and design solutions for each Task shall be preceded by a multi-criteria analysis (MCA), which systematically compares the alternatives, taking into account technical, economic, environmental, and social criteria. The environmental and social criteria considered in the MCA shall include at least:

- the scale of physical and economic displacement;
- Livelihood impacts;
- the number and composition of affected populations, including the presence of particularly vulnerable groups;
- the impact on shared resources and social infrastructure;
- the impact on natural habitats, protected areas, and ecological corridors;
- the impact on surface and groundwater;
- the impact on cultural heritage and archaeological resources;
- the possibility of using nature-based solutions as alternatives to or supplements for technical infrastructure.

Environmental and social criteria shall not be treated solely as factors that adjust the results of technical and economic analysis. For alternatives that result in significant resettlements or impacts on protected areas, the documentation shall demonstrate the unavailability of alternatives with lower impacts.

### 5.4.2 Stakeholder engagement

Stakeholder engagement and consultation shall be integrated into the planning and design process from an early stage, rather than being limited to the disclosure of finalized design decisions. The primary objectives of stakeholder engagement during the design phase are to:

- obtain information on existing environmental and social conditions that may influence Project design;
- identify environmental and social constraints, opportunities, and locally valued resources at an early stage;
- support the identification and evaluation of feasible alternatives and avoidance measures;
- inform the selection of preferred technical solutions through consideration of stakeholder views and local knowledge;

- identify potential environmental and social risks, impacts, and cumulative effects requiring further assessment;
- improve the technical feasibility, operational effectiveness, and long-term sustainability of proposed interventions;
- build transparency, trust, and stakeholder ownership throughout Project preparation; and
- reduce implementation risks by identifying and addressing concerns before finalization of detailed designs.

Local communities, Project Affected Persons, and relevant authorities shall be consulted during the identification and comparison of siting and design alternatives under the MCA, so that their views and local knowledge inform the selection of the preferred option. Particular attention shall be given to ensuring that vulnerable groups and stakeholders with limited access to standard consultation channels are able to participate meaningfully at this stage. The outcomes of these consultations, including how stakeholder input influenced the choice of site and design, shall be documented and reflected in the relevant site-specific ESF instruments, consistent with the applicable Stakeholder Engagement Plan. This approach is consistent with the stakeholder engagement objectives already applied under the Kamieniec Ząbkowicki reservoir Stakeholder Engagement Plan, the most advanced subproject under the Project.

### 5.4.3 Environmental flows and water management

Because flood control projects interfere with the water cycle, an assessment of environmental flows shall be conducted during the design phase. This assessment shall determine the optimal quantity, quality, and timing of water flows necessary to sustain aquatic ecosystems and meet the needs of downstream communities. For projects with a significant impact on the river system, a detailed water balance must be developed, taking into account climate change scenarios. During the design phase, water management guidelines shall be established to minimize the impact on the environment and the interests of other users. The results of these analyses shall be incorporated into the environmental impact assessment, as well as into the social impact assessment regarding potential changes in water availability for communities located downstream of the hydrotechnical structure.

For Tasks involving the construction of a new dam or reservoir, or a substantial modification of an existing impounding structure, that will produce a permanent alteration of the river's flow regime, the Minimum Environmental Flow (MEF) shall be determined through a two-step procedure. First, the statutory minimum permissible flow (przepływ nienaruszalny) shall be calculated in accordance with the Water Law (Prawo wodne) and its implementing regulations. Second, the resulting value shall be reviewed by a qualified environmental specialist, who shall assess its sufficiency, taking into account the ecological sensitivity of the affected river reach, to sustain the ecological functions of the river and maintain valuable aquatic habitats located downstream. Where this review indicates that the statutory value is insufficient, the specialist shall determine a higher, ecologically substantiated flow, which shall be adopted as the MEF. This requirement applies to structures that create permanent impoundment or regulate baseline flow; it does not apply to dry polders designed solely for temporary attenuation of the flood wave, which do not alter the river's baseline flow regime. The MEF shall be expressed as a seasonally variable flow

regime reflecting natural hydrological variability, rather than as a single fixed value, in particular for multi-purpose reservoirs combining flood protection, water supply, energy generation, and recreational functions. The MEF determination shall be carried out as part of the Task-specific ESIA and shall be documented in, and form an integral part of, the Biodiversity Management Plan (BMP) prepared for the Task, together with associated monitoring indicators, the operating rules for the structure under normal and low-flow conditions, and the adaptive management triggers to be applied where post-construction monitoring indicates that the adopted MEF fails to sustain downstream aquatic ecosystems or the water needs of downstream communities. Compliance with the MEF shall be reflected in the structure's operating manual and reported as part of the Project's environmental and social monitoring program. By ensuring that an adequate flow is maintained at all times, in particular during periods of low flow, the MEF shall help protect downstream aquatic ecosystems from oxygen depletion, fish kills, and other acute ecological disruptions.

### 5.4.4 Dam safety

The applicability of the ESS4 requirements on dam safety to a given Task shall be determined at the screening stage for the relevant Task, in accordance with Annex 2, taking into account the World Bank's applicable thresholds for large dams, the potential downstream impact of the structure, and the degree of technical complexity of the facility. Where screening confirms that such requirements apply, the ESIA/ESMP prepared for the relevant Task shall include the necessary dam safety assessments and plans, in accordance with the guidance set out below.

Where the screening process determines that dam safety requirements apply, the relevant technical infrastructure shall be designed by qualified specialists and properly verified for resilience to climate change, extreme events, and natural hazards. For high-risk structures or new, large dams, an Independent Dam Safety Panel of Experts must be established at an early stage of preparation. The panel's composition must ensure expertise not only in engineering but also in public safety and social risk management.

The International Dam Safety Panel of Experts (IDSPoE) has been established to support the Project through the review of dam safety aspects across the Project's dam and reservoir infrastructure. The Panel will continue its involvement throughout design, construction, initial reservoir filling, commissioning, and handover to operation, as applicable to the individual structures under the Project. Its scope includes the review of technical studies, design criteria and assumptions, dam safety arrangements, and the required dam safety plans for the relevant facilities. The Environmental and Social Panel of Experts (ESPoE) is a separate advisory mechanism and does not replace the IDSPoE.

During the design phase, a monitoring plan and the framework for an Emergency Preparedness Plan shall be developed. The dam safety plans required under ESS4 will be prepared in parallel with the ongoing detailed design. The scope of the ongoing design services will be reviewed and, where necessary, supplemented to ensure the preparation of the Instrumentation Plan, including the dam safety monitoring and surveillance arrangements, and the framework Emergency Preparedness Plan.

The established Dam Safety Panel of Experts will review the dam safety plans, the relevant design documentation and the technical assumptions adopted for monitoring, initial reservoir impoundment and emergency preparedness. The framework EPP will be prepared and made available by Project appraisal. The final EPP will be completed and submitted to the Dam Safety Panel of Experts and the World Bank for review not later than one year before the planned commencement of initial reservoir impoundment.

Emergency preparedness and response arrangements for the construction phase will be set out in a separate Contractor's Emergency Response Plan. The plan will form part of the Contractor's Environmental and Social Management Plan and the occupational health and safety management arrangements and will be prepared, reviewed and approved before the commencement of the relevant construction activities.

The Contractor's Emergency Response Plan will address, as applicable, construction floods, failure or overtopping of cofferdams, malfunction of river diversion arrangements, instability of temporary works, geotechnical incidents, loss of power or communications, fires, spills and other construction-related emergencies. Where river diversion or temporary impoundment creates a significant downstream risk, the relevant provisions will also be reflected in the framework EPP and in the Contractor's method statements for river diversion and temporary works.

The technical execution of the initial reservoir impoundment and commissioning of the dam and its appurtenant structures will be governed by the First Reservoir Impoundment Plan, the commissioning procedures, the Operation and Maintenance Plan and the Instrumentation Plan. Emergency preparedness during these phases will be governed by the final EPP.

These documents will define the responsibilities of the Owner, the future dam Operator, the Engineer, the Works Contractor and the competent public authorities. They will also establish instrumentation trigger values, alert and alarm thresholds, emergency classification levels, decision-making and notification procedures, and arrangements for the suspension or modification of reservoir impoundment where monitoring results indicate abnormal dam behaviour.

The EPP will include dam-break analysis and downstream inundation maps, warning and communication procedures, and coordination arrangements with municipal, district and regional crisis-management authorities, emergency and rescue services and downstream communities, including vulnerable and disadvantaged groups. The dam Owner or Operator will be responsible for assessing dam safety conditions and issuing the required notifications and warnings, while the competent public authorities will retain responsibility for planning and carrying out public evacuation.

The emergency preparedness plan shall address the social dimension of an emergency: identification of vulnerable communities, early warning systems tailored to the needs of vulnerable groups, evacuation plans developed in cooperation with local governments, and crisis communication procedures with residents.

### 5.4.5 Minimizing physical footprint

Once a site option has been selected, the detailed design phase shall aim to further minimize the physical footprint of the project in residential and agricultural areas by considering adjustments to the alignment of access roads, the location of technical facilities, and the extent of the flood zone. Minimizing physical resettlements shall be treated as a design principle, rather than merely a matter of subsequent compensation.

### 5.4.6 Natural habitats

During the design phase, potential threats to natural habitats shall be identified, including loss, degradation, fragmentation, hydrological changes, and risks associated with invasive alien species and the measures required for their control. In cases of significant gaps in knowledge about ecosystems, surveys of fauna and flora shall be conducted before irreversible design decisions are made. Nature-based solutions shall be considered as part of the project both to mitigate environmental impacts and to generate additional ecosystem and social benefits.

For NBS projects implemented in urban and suburban areas, the planning phase shall include early engagement of the local community in determining the location and nature of the interventions. NBS sites shall be prioritized in areas with the greatest environmental and social needs. NBS projects shall take into account long-term maintenance requirements and plan for community involvement in the operation and maintenance of green spaces.

### 5.4.7 Cumulative impacts

Flood control projects shall include an assessment of cumulative impacts conducted as part of the site-specific ESIA, or through a Rapid Cumulative Impact Assessment (Rapid CIA) where a full ESIA-integrated assessment is not yet warranted,—particularly when multiple hydrotechnical structures or parallel infrastructure projects are planned within a given watershed. The analysis shall ensure the protection of the river's integrity and the equitable distribution of water resources; from a social perspective, it shall also account for the overlap of expropriation areas from other projects being implemented in the same area and their combined impact on the PAP. The identification of parallel projects shall be conducted during the Task screening phase. The guidelines for preparing both the full cumulative impact assessment and Rapid CIA are provided in Appendix 9.

### 5.4.8 Waste management

During the design phase, the anticipated types and quantities of construction waste, excavated material, and hazardous materials, as well as methods for their management, shall also be determined. The waste management plan shall form an integral part of the Tasks's ESMP and be developed prior to the commencement of work.

### 5.4.9 Integration of Environmental and Social Considerations into Non-Structural Activities

Not all Project activities will involve civil works. Non-structural activities, especially under Component 3, including in particular monitoring and forecasting systems, Operational Centers, and crisis management, shall not be subject to the site-specific design process described above; however, they shall be subject to environmental and social screening and shall be planned and implemented in a manner proportionate to the nature and scale of the activity and its potential environmental and social risks and impacts.

For each such activity, this shall include:

(i) environmental and social screening to identify the relevant risks and impacts;
(ii) identification of relevant stakeholders, including vulnerable groups and other stakeholders who may face barriers to access to, or benefit from, the system, service, or infrastructure being implemented;
(iii) stakeholder engagement with such stakeholders, including vulnerable groups where applicable, to ensure that their views are taken into account during the design of the activity; and
(iv) incorporation of the resulting risk mitigation measures and supporting actions, together with the resources necessary for their implementation, into the final design of the activity.

These requirements shall be reflected in the terms of reference (ToR) and other guidance documents prepared for consultants and contractors responsible for the preparation and implementation of such systems.

# 6 Environmental and Social Risk Management Procedures

This chapter describes the environmental and social (E&S) risk management procedures at every stage of the Project cycle: from site identification, through planning and implementation, to Task closure.

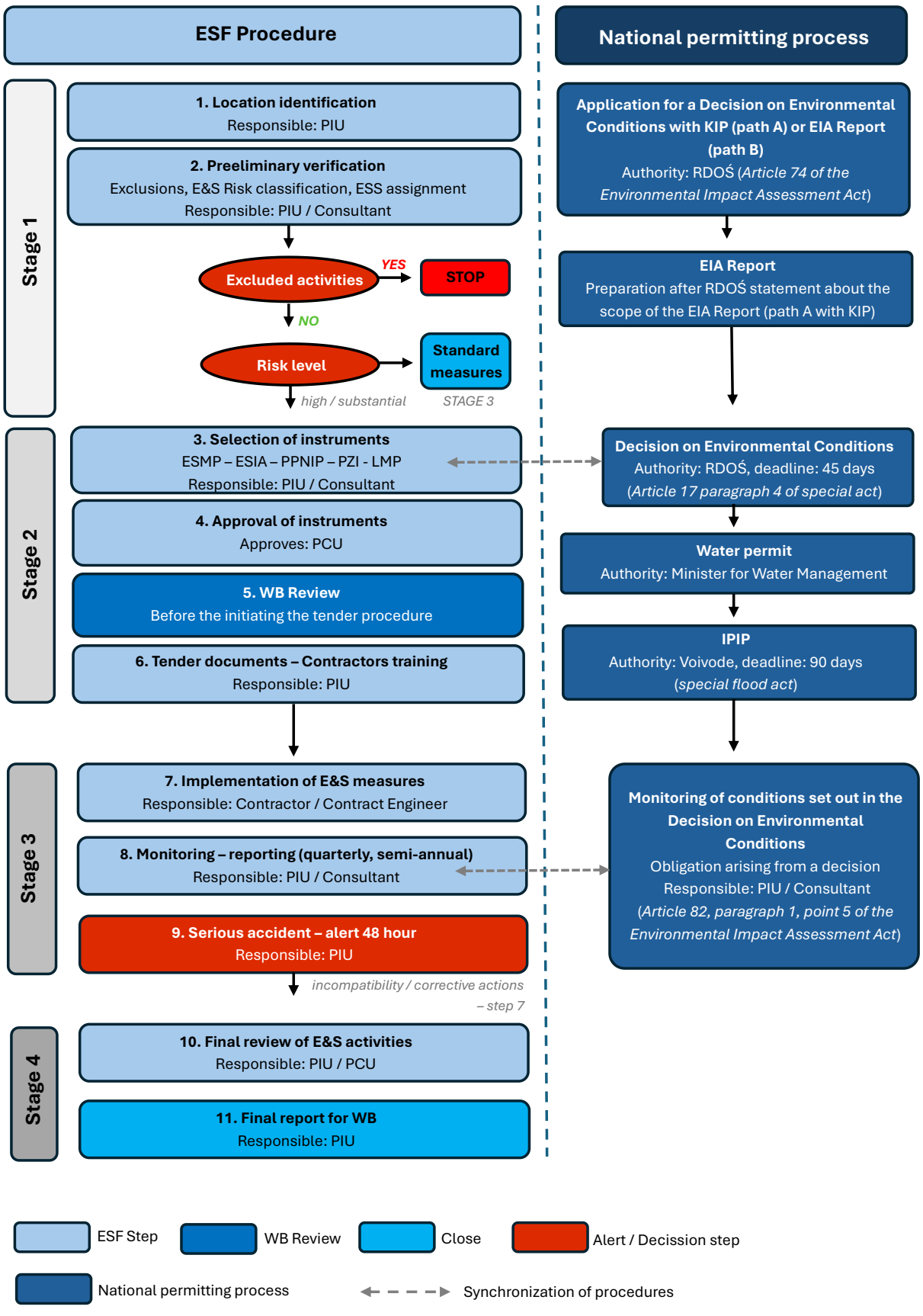
The procedures are based on the ESS1 requirements and apply a hierarchy of mitigation measures: avoiding risks and impacts, minimizing them, mitigating them, and, as a last resort, offsetting them.

The requirements of the specific instruments are set forth in separate framework documents: LARF (ESS5) and SEP (ESS10). This chapter sets out the minimum procedural requirements applicable to the PIU, PCU, Consultant, and Contractors.

## 6.1 Flowchart of the Environmental and Social Assessment Process

The diagram below illustrates the sequence of steps in the E&S assessment procedure for Tasks including civil works implemented under the Project. The diagram includes two parallel tracks: the Project's internal procedure under the ESF and the national process for permits and administrative approvals.

*Figure 8 Flowchart of the Environmental and Social Assessment Process for Tasks*



## 6.2 Phase 1 –Screening of Tasks

Stage 1 consists of three steps carried out before planning the E&S instruments. The PIU initiates each Task by completing these steps, regardless of its scale and location.

*Table 7 Screening of investment projects – steps*

| Step | Description of Action | Responsible | Result / Document |
|---|---|---|---|
| 1. Checking the catalog of excluded activities | Verify whether the action is listed in the catalog of excluded actions. An action subject to exclusion is suspended. | PIU | Completed screening form |
| 2. Preliminary screening form | Completion of the preliminary screening form (template: Chapter 6.2.2 ): identification of E&S risks, risk classification, relevant ESS, preliminary mitigation measures, determination of instruments required (ESIA, ESMP, LARAP etc.). | Consultant (completes) / PIU (approves) | Completed screening form |
| 3. Identification of Required National Permits and Approvals | Identification of permits required under Polish law: EIA decision (environmental conditions decision), water permit, IPIP and identification of relevant supplementary gap-filling measures required to fully meet the requirements of each applicable ESS, beyond what is achieved through national permitting. The schedule for obtaining permits is included in the Task implementation plan. | PIU | List of required permits and approvals and applicable gap-filling measures |

PIU provides stakeholders with the opportunity to submit comments on the project's location and technical design before the screening phase is completed. At this stage, the E&S-related information made available for stakeholder review and comment includes: the outcomes of the Preliminary Environmental and Social Screening (identified risks, applicable ESS, and preliminary mitigation measures), the proposed project location, and the technical design information available at this stage of preparation.

The consultant documents the comments received. PIU takes them into account before deciding on further action.

### 6.2.1 Catalog of Activities Excluded from Funding

This catalog specifies the categories of activities that are not eligible for funding under the Project. The list was developed based on the International Finance Corporation's Exclusion List (IFC Exclusion List), the requirements of the World Bank's Environmental and Social Standards (ESF/ESS), in particular ESS1, and the provisions of Polish law. The catalog has been adapted to the specific nature of the Project.

The following categories of activities are excluded from project financing, regardless of their scale or context:

1. The production or trade of products or activities prohibited under Polish law, international agreements, or conventions, including those related to pharmaceuticals, pesticides, and herbicides; ozone-depleting substances; PCBs; wildlife; or products regulated by the CITES Convention.

2. The production or trade in weapons and ammunition.
3. The production or sale of alcoholic beverages, excluding beer and wine.
4. The production or trade in tobacco products.
5. Operating gambling establishments, casinos, and equivalent businesses.
6. The production or trade in unbound asbestos fibers
7. Fishing using drifting pelagic nets longer than 2.5 km.
8. Activities involving harmful or exploitative forms of forced labor.
9. Activities involving harmful child labor, defined as employment that is economically exploitative, endangers the health, safety, or proper physical, mental, spiritual, moral, or social development of the child, or interferes with the child's education.
10. Activities involving commercial logging operations in primary tropical forests.
11. Production or trade in timber or other forest products originating from forests that are not managed in a sustainable manner.

Furthermore, the following categories of activities are excluded from project funding due to the project's high environmental and social risks and the natural and legal conditions of the implementation area:

1. Activities in Natura 2000 areas for which no derogation has been obtained as referred to in Article 34 of the UOP
2. Activities for which the UOP-required permit for a derogation from the prohibitions applicable to protected species has not been obtained.
3. Activities resulting in physical or economic resettlement that go beyond the scope and framework approved in the Land Acquisition and Resettlement Framework (LARF).
4. Activities involving the financing of works on existing state-owned facilities constructed without the required building permit or other statutory approvals under the Construction Law. This exclusion does not extend to, and does not affect the eligibility of, compensation or assistance provided to project-affected persons occupying pre-existing informal structures, which is governed by ESS5 and the Land Acquisition and Resettlement Framework (LARF) / LARAP. .
5. Activities carried out without the required environmental conditions decision.
6. Activities carried out without the required water-law permit.
7. Activities that violate the conditions of administrative decisions obtained during the investment permit procedure.

Verification of the activities' compliance with this catalog is conducted during the review and qualification stage of each Task. The verification is performed jointly by an environmental specialist and a social specialist designated by the PIU as part of the integrated screening process..

If it is determined that a proposed activity falls into any of the categories listed in this chapter, that activity is not eligible for financing. The decision to exclude the activity is documented and submitted to the World Bank in accordance with reporting procedures.

In case of doubt regarding the eligibility of an activity, the PIU is required to consult with the World Bank before making a financing decision.

### 6.2.2 Preliminary Screening Form and Risk Classification

The Preliminary Environmental and Social Screening Form (hereinafter referred to as "the Form") is the primary tool for environmental and social assessment during the Task eligibility phase. A template of the Form is provided in Annex 2 to this ESMF.

The form is used to identify and preliminarily assess the environmental and social risks specific to the planned activity, taking into account its location, scale, and nature of impact. The form is tailored to the Project's risk profile, in particular to the identified social risks related to impacts on local communities, households subject to resettlement, and areas of high natural value.

Based on the results of the review, the form identifies:

- Environmental and Social Standards (ESS) relevant to the activity in question,
- the activity's risk classification (low, moderate, substantial, high),
- the required E&S risk management instruments, as appropriate to the identified risks and impacts, including: Environmental and Social Management Plan (ESMP), Environmental and Social Management Checklist (ESMP CL), Labor Management Procedures (LMP), Chance Finds Procedures, Stakeholder Engagement Plan (SEP), Land Acquisition & Resettlement Action Plan (LARAP), and other plans required by the scope of the activity's impact.

The assessment process conducted using the form is illustrated by the flowchart in Section 8.1.

**Roles and Responsibilities**

The following division of tasks applies at each stage of risk verification and classification:

*Table 8 Division of Tasks for Preliminary environmental and social risk classification*

| Stage | Activity | Responsible |
|---|---|---|
| Identification of the location and technical parameters | Determination of the project's location, its physical scope, and its anticipated impact on the environment and communities | Consultant / PIU |
| Completing the form | Conducting a preliminary E&S assessment using the form (Appendix 2): risk identification, classification, assignment of ESS, selection of instruments | Consultant |
| Stakeholder engagement | Ensuring that stakeholders have the opportunity to provide feedback on the location and technical parameters of the project before the assessment results are approved | PIU |
| Independent technical review (high-risk / dam-related activities) | For activities involving high-risk structures or new, large dams, review and input from the Independent Dam Safety Panel of Experts, prior to finalization of the risk classification and required instruments. | IDSPoE |

| Stage | Activity | Responsible |
|---|---|---|
| Approval of the assessment results | Review and approval of the completed form and risk classification | PIU |
| Oversight and quality control | Overall oversight and quality control of the screening and classification process across all stages, including review of the consistency and adequacy of the risk classification and selected instruments. | PCU |
| Acceptance of the high-risk classification | Verification of the classification of the activity as high-risk and the scope of required instruments | PCU |
| Independent environmental and social audit | Overall oversight and quality control of the screening and classification process across all stages, including review of the consistency and adequacy of the risk classification and selected instruments. | Independent Environmental and Social Experts |

The screening results approved by the PIU serve as the basis for initiating further stages of the E&S assessment and the preparation of relevant environmental and social instruments. If an activity is classified as substantial or high-risk, the results and relevant E&S instruments must be submitted to the World Bank prior to implementation.

## 6.3 Stage 2 – Planning and Determination of Environmental and Social Instruments

Stage 2 involves determining the appropriate environmental and social (E&S) risk management instruments based on the outcomes of the preliminary screening. The selection of instruments is proportional to the risk classification specified in Part D of the preliminary screening form (Annex 2) and to the scope of impacts identified in Part C. Instruments fall into two categories: standard instruments, for which templates are attached as annexes to this ESMF and which are applied directly, without the need for separate drafting; and site-specific instruments, which must be individually prepared as a dedicated document for the given Task or sub-task, tailored to its specific location, scope, and identified risks.

*Table 9 Planning and Selection of Environmental and Social Instruments – Steps*

| Step | Description of Operation | Responsible | Result |
|---|---|---|---|
| 1. Selection and approval of instruments | Based on Parts D and E of the form: identification of required instruments distinguishing standard instruments (adopted from the ESMF annexes) from site-specific instruments requiring dedicated preparation | Consultant / PIU/ PCU (quality control) | Approved list of E&S instruments in accordance with the Instrument Selection Matrix |
| 2. Development of instruments | Preparation of Terms of Reference (TORs) for site-specific instruments and their development, including the underlying assessments, disclosure, and consultations. Where an instrument is subject to World Bank prior review, the corresponding TORs shall be submitted to the World Bank for review and clearance before the assessment work begins. For high-risk structures or new, large dams, TORs and instruments are reviewed by the Independent E&S Experts / IDSPoE. | Consultant/PIU Independent E&S Experts IDSPoE | Approved TORs; E&S instruments (ESIA, ESMP, LARAP, SEP) in accordance with the Instrument Selection Matrix |

| Step | Description of Operation | Responsible | Result |
|---|---|---|---|
| 3. Consultations and Submission to the Bank | Environmental and social instruments (including the ESIA, ESMP, LARAP, SEP, and other associated documents) shall be disclosed and consulted upon, as required by the ESF, national legislation, and the SEP. Instruments subject to World Bank prior review shall be submitted to the World Bank before implementation and, where applicable, prior to the commencement of procurement activities | Consultant / PIU | Approved ESMP; consultation report |
| 4. Training and cascading to contractors | Cascading of relevant ESHS requirements to the Contractor is ensured by incorporating them into the bidding documents and the corresponding contract clauses. PIU, PCU, and Consultant staff are trained prior to the implementation of the plans. The Contractor conducts cascade training for subcontractors and suppliers prior to mobilization. Training documentation is subject to verification by the Consultant. | PIU / Contractor / Consultant (verification) | Training Documentation |

The table below specifies the indicative environmental and social instruments that may be required based on the screening results, risk classification, and nature of the identified environmental and social risks and impacts.. The detailed conditions for applying the instruments correspond to the questions on the preliminary Environmental and Social Screening form indicated in the “Condition” column. The requirement to prepare a specific instrument is determined by the E&S risks identified during the screening of a given Task, rather than by the overall risk category alone (High/Substantial/Moderate). The risk category defines the minimum set of required documents, but it does not preclude the need to prepare an additional instrument identified through screening or a more detailed assessment.

*Table 10 Instrument Selection Matrix*

| Instrument | High | Substantial | Moderate | Condition |
|---|---|---|---|---|
| ESMP | ● | ● | ● | Required for all physical interventions and any Task where specific environmental and social risks/impacts are identified that require management measures. |
| C-ESMP | ● | ● | ● | All construction contracts (*) |
| ESIA | ● | ○ | — | Required where national legislation and/or ESS1 require a detailed ESIA due to the significance of the potential environmental and social risks and impacts |
| LARAP | ● | ● | — | Required where the preliminary screening identifies involuntary land acquisition |
| SEP | ● | ● | ● | — |
| LMP | ● | ● | ● | Required whenever the Task involves project workers, regardless of risk classification (ESS2). |
| Biodiversity Management Plan | ● | ○ | — | Required where screening or assessment identifies substantial risks to biodiversity, critical habitats, protected areas, ecological corridors, or ecosystem services |
| Chance Finds Procedure | ● | ● | ● | Required for all activities involving excavation, earthworks, or other ground-disturbing activities where there is potential for chance finds (*) |

| Instrument | High | Substantial | Moderate | Condition |
|---|---|---|---|---|
| Panel of Experts (IDSPoE) confirmation of dam design adequacy | ● | ○ | — | New or large dams (per World Bank large-dam thresholds), or existing dams/DUC exhibiting substantial or high risk due to downstream impact potential or technical complexity; required at Appraisal stage |
| Emergency Preparedness Plan (EPP) | ● | ○ | — | New or large dams (per World Bank large-dam thresholds), or existing dams/DUC exhibiting substantial or high risk due to downstream impact potential or technical complexity; required at Appraisal stage |
| Dam Safety Status / Assessment Report | ● | ● | — | Required where the Task relies on an existing dam or a dam under construction (e.g. Sulejów modernization) |
| First Reservoir Filling / Impoundment Plan | ● | — | — | New dams creating a permanent reservoir |

● required ○ required if YES is selected for the corresponding question on the form

(*) Required regardless of risk classification.

Environmental and social instruments shall be prepared and implemented in accordance with the results of the screening and assessment process. Site-specific instruments, including but not limited to ESMPs, C-ESMPs, LARAPs, Biodiversity Management Plans, and Chance Finds Procedures, shall be prepared as required based on the identified environmental and social risks and impacts. For Tasks involving the construction of a new dam or reservoir, or significant works on an existing dam, dam safety requirements under ESS4 Annex 1 shall also be ensured. The implementation of E&S instruments is preceded by training for personnel involved in the Task. Training takes place before the implementation of a given plan begins and covers two groups:

- PIU, PCU, and Consultant personnel - regarding ESMF procedures, ESF requirements, and the methodology for monitoring E&S instruments;
- personnel of the contractor, subcontractors, and suppliers - on the C-ESMP, the Chance Finds Procedure, LMP requirements, and the contractor's code of conduct.

For Tasks implemented using the design-and-build method, consistent with ESS1's provisions on projects with limited information at the time of appraisal, the preliminary screening and instrument selection under this chapter shall nonetheless apply the conservative, worst-case approach, based on the best available information at the time of contracting, including the anticipated scope, location corridor, and type of works. Bidding and contract documents shall require the Contractor to confirm the site-specific conditions and finalize the corresponding E&S instruments, including the C-ESMP, prior to mobilization.

Where the risk classification is confirmed or updated as High following completion of the design, or where instruments not anticipated at the screening stage (e.g. ESIA, LARAP) are found to be required, this shall be submitted to the World Bank for prior review and no-objection before the commencement of works.

Cascade training for subcontractors and suppliers is ensured by incorporating them into subcontracts and supply contracts, and reinforced through cascade training, conducted by the contractor prior to their mobilization. The completion of training must be documented. The Consultant verifies the training documentation as part of regular contract monitoring.

## 6.4 Phase 3 – Implementation and Monitoring

Phase 3 involves the implementation of E&S measures during the execution of works and the continuous monitoring of environmental and social impacts. Contractors are responsible for implementing the mitigation measures specified in the C-ESMP and other detailed plans, under the supervision of the Consultant and the PIU. This phase lasts from the contractor's mobilization until the final acceptance of the works.

*Table 11 Implementation and Monitoring – Steps*

| Step | Description | Responsible | Result |
|---|---|---|---|
| 1. Mobilization , preparation od of E&S instruments | Verification of the contractor's readiness prior to the start of work: preparation and approval of the C-ESMP by the Contract Engineer, confirmation of training, approval of the code of conduct, and activation of the GRM. | Contract Engineer / PIU | E&S Readiness Report |
| 2. Monitoring visits | Regular visits to the construction site in accordance with the frequency specified in Section 7.4.2; documentation of results. | Contract Engineer | Visit Reports |
| 3. Reporting | Contractor's monthly reports; aggregation and reporting to the Bank in accordance with Section 7.4.3. | Contractor / Contract Engineer / PIU | Reports in accordance with Section 7.4.3 |
| 4. Corrective Actions and Follow-Up | Identification and issuance of corrective actions in response to non-conformities identified during monitoring visits or reporting; verification of implementation and effectiveness; formal closure of the issue, in accordance with the adaptive management procedure (Section 11.3). | Contract Engineer / PIU | Record of corrective actions and closure confirmation |

### 6.4.1 Roles and Responsibilities

The division of E&S tasks during the implementation phase takes into account the Contract Engineer's authority under the FIDIC contract conditions, particularly with regard to stop-work orders. The PIU remains ultimately responsible for environmental and social compliance throughout implementation, regardless of the contractual arrangements in place.

*Table 12 Allocation of E&S Tasks During the Implementation Phase*

| Entity | Tasks during the implementation phase |
|---|---|
| PIU | Oversight of implementation of the ESCP and environmental and social instruments; approval of monthly, quarterly, and semi-annual reports; submission of reports and notifications to the World Bank; ensuring appropriate corrective actions in response to significant environmental and social non-compliance; oversight of stakeholder engagement and management of the GRM at the Task level.. |
| PCU | Verification of E&S reports and incident notifications; oversight of compliance with ESF requirements, including ESCP; Project-wide capacity building; oversight of stakeholder engagement and functioning of the GRM. |
| Consultant / Contract Engineer | Monitoring visits and verification of C-ESMP implementation; recording non-conformities; aggregating local reports; operational administration of GRM; issuing corrective orders and—where justified—work suspension orders in accordance with the contract terms; receiving and verifying the Contractor's reports. |
| Contractor | Implementation of mitigation measures from the C-ESMP; monthly E&S reports; supervision of subcontractors; immediate notification of incidents and accidents in accordance with the ESCP and Incident Notification Procedure and |

| Entity | Tasks during the implementation phase |
|---|---|
| Subcontractors and Suppliers | Implementation of E&S measures in accordance with the C-ESMP; reporting of Contractor incidents. |
| IDSPoE | Independent technical review of dam safety aspects of design and construction, continuing through the implementation phase (construction and commissioning), in accordance with the timelines and commitments set out in the ESCP; advice to the PIU on dam safety and related public safety matters, where the Task involves a new dam, DUC, or significant works on an existing dam. |
| Independent Environmental and Social Experts | Periodic independent verification of the adequacy and implementation of E&S instruments, conducted independently of the Consultant and the PIU. |

### 6.4.2 Monitoring Visits

The frequency of the Engineer's monitoring visits shall be proportionate to the environmental and social risk classification of the Task the nature of the activities being undertaken and the phase of work execution.

A minimum visit frequency shall be set as a standard requirement in construction contracts, proportionate to the Task's risk classification, with additional visits required where warranted by the potential significance of identified impacts.

In addition to the Engineer's monitoring visits, the PIU conducts periodic oversight visits to verify overall E&S compliance and the Engineer's performance of its monitoring role. The PCU conducts periodic verification visits at the Project level to confirm consistency of E&S monitoring across Tasks and compliance with ESF requirements. For Tasks involving a new dam, dam under construction or significant works on an existing dam, the Independent Panel of Experts/dam safety specialists conduct periodic site visits to review dam safety aspects of construction, in accordance with the timelines set out in the ESCP.

The results of each visit are documented in the Engineer's monthly report submitted to the PIU. If a material non-compliance with E&S requirements is identified, the Engineer immediately notifies the PIU. A work suspension order may be issued by the Contract Engineer in accordance with the authorities granted under the contract terms.

### 6.4.3 Reporting

The Contractor prepares monthly E&S reports and submits them to the Engineer. The Engineer aggregates the data at the local level and prepares summary reports to be submitted to the PIU. . The PIU prepares and submits environmental and social monitoring reports to the World Bank in accordance with the reporting requirements set out in the ESCP and financing agreements
The minimum content of the report includes:

- status of the implementation of E&S instruments;
- progress on implementation of mitigation measures and corrective actions;
- environmental, social, health and safety (ESHS) performance;
- incidents and accidents, including corrective actions;

- community health and safety issues;
- stakeholder engagement activities and grievance management, in accordance with the Stakeholder Engagement Plan (SEP);
- status of permits and compliance obligations;

key E&S risks, issues, and planned actions for the next reporting period. In the event of a serious E&S incident (in particular, a fatal accident, a mass workplace accident, an event causing significant environmental damage, or an incident of an SEA/SH nature), the PIU shall notify the World Bank within 48 hours of its occurrence, regardless of the regular reporting cycle.

## 6.5 Phase 4 – Evaluation and Closure

Phase 4 involves verifying the completeness of the implementation of E&S instruments and formally closing the Project in accordance with ESF requirements. This process shall be undertaken separately for each Task (polder and/or reservoir), and shall include a post-implementation E&S audit to identify any outstanding issues, including a dam safety audit prior to handover for Tasks involving a new dam, dams under construction (DUC), or significant works on an existing dam. For the Project to be considered completed, all open E&S issues must be resolved, including complaints registered in the GRM, mitigation commitments, and corrective actions.

*Table 13 Assessment and Closure – Steps*

| Step | Description of Action | Responsible | Result |
|---|---|---|---|
| 1. Review of the completeness of E&S instruments | Verification of the implementation of mitigation measures specified in the ESMP, C-ESMP, LARAP, and other detailed plans; identification of unresolved E&S issues. | Consulting Engineer | List of open E&S issues |
| 2. Monitoring of site reclamation | Assessment of the status of site reclamation and restoration to its pre-construction condition; verification of compliance with ESMP requirements. | Engineer | Site Remediation Acceptance Report |
| 3. Closure of Open E&S Issues | Ensuring that all unresolved E&S issues are closed prior to the formal completion of the Task; documenting the actions taken. | Contractor / Consulting Engineer / PIU (verification) | Confirmation of the closure of E&S issues |
| 4. Post-implementation E&S and dam safety audit | Independent post-implementation audit verifying the adequacy and effectiveness of implemented E&S measures; for Tasks involving a new dam or significant works on an existing dam, a dam safety audit conducted prior to handover. | Independent Environmental and Social Auditors / Independent Panel of Experts (dam safety) | Post-implementation audit report |
| 5. Final Report | Prepare the final E&S report and submit it to the World Bank. | Consulting Engineer (preparation) / PIU (review and submission)/ Independent E&S Auditors (review) | Approved Final Report |

The final report shall include at least:

- a summary of the implementation of E&S instruments and commitments,
- a description ey of environmental and social issues encountered during implementation and how they were addressed,

- the results of site restoration monitoring,
- the results of the post-implementation E&S and, where applicable, dam safety audit,
- a summary of complaints and how they were addressed,
- a clear description of any outstanding non-compliance issues at closing, together with the corresponding corrective action plans,
- confirmation of the status of corrective actions and any outstanding environmental and social commitments; and
- an overall assessment of compliance with the applicable Environmental and Social Standards (ESSs) and the Environmental and Social Commitment Plan (ESCP), where applicable.

The report is submitted to the World Bank before project completion or as otherwise agreed with the World Bank.

# 7 Management of Contractors and Subcontractors

This chapter sets forth the environmental and social requirements applicable to contractors and subcontractors carrying out Tasks under the Project, as well as the mechanisms for monitoring their implementation. These requirements apply to all construction contracts, regardless of the Task's risk classification. The legal and contractual basis consists of the World Bank's Environmental and Social Standards (ESS), this ESMF, and the FIDIC contract conditions as adapted to the World Bank's requirements.

## 7.1 Environmental and Social Requirements in Bidding Documents and Contracts

E&S requirements are incorporated into the bidding and contract documentation during the preparation of each procurement by the PIU, prior to verification by the PCU and submission to the World Bank in accordance with the procedure set forth in Chapter 7.3.

For Tasks implemented under the design-and-build method, the bidding and contract documentation shall reflect the preliminary E&S risk classification and instruments established at the procurement stage, in accordance with the staged approach set out in Section 6.3. Bidding and contract documents shall require the Contractor to confirm site-specific conditions and finalize the corresponding E&S instruments, including the C-ESMP, prior to mobilization. The bidding documents contain two categories of E&S elements: contractual provisions incorporated by the PIU and documents required from the contractor.

The PIU shall ensure that the bidding documents include the applicable Environmental, Social, Health and Safety (ESHS) requirements, consistent with the World Bank Standard Procurement Documents and the relevant environmental and social instruments. These shall include, as applicable, requirements relating to incident notification, occupational and community health and safety, site security, management of contractor activities, chance finds procedures, Codes of Conduct, management of subcontractors, and Technical Specifications shall incorporate the environmental and social requirements applicable to the specific Task, based on the approved

environmental and social instruments. The Contractor is required to submit the following prior to mobilization:

- a C-ESMP prepared in accordance with the requirements of this ESMF and the approved ESMP;
- a code of conduct for the Contractor's personnel that meets the requirements of FIDIC Contract Conditions and the Accountability and Response Framework the latter setting out, at a minimum: procedures and timeframes for handling allegations of Code of Conduct violations, including SEA/SH, and the range of possible disciplinary actions, observing due process; internal procedures for reporting allegations for case accountability; survivor-centered response protocols, including a referral pathway to appropriate support services; confidentiality requirements for handling cases; specific provisions for allegations involving children, including consideration of the best interests of the child and the role of parents or guardians; protocols for compliance with mandatory reporting requirements under Polish law; procedures for review, verification, and investigation of complaints; and protections for whistleblowers against retaliation, consistent with the World Bank's Commitments on Reprisals;
- Occupational Health and Safety (OHS) Management Plan, including emergency preparedness and response procedures
- an LMP compliant with the requirements of ESS2 and this ESMF.

The Contractor is required to include E&S requirements in contracts entered into with subcontractors and to require subcontractors to apply the same requirements to their own subcontractors. The Contractor shall remain responsible for ensuring compliance with the E&S requirements by all subcontractors in accordance with the Contract Conditions

## 7.2 Obligations of Contractors and Subcontractors

The Contractor bears full responsibility for implementing E&S requirements on the construction site, including the acts and omissions of subcontractors and suppliers at every level of the subcontracting chain. The Contractor shall develop and implement a code of conduct for all personnel consistent with the Contract Conditions.

The Contractor shall develop the C-ESMP prior to mobilization and implement it throughout the duration of the works. The Contractor shall enforce the C-ESMP requirements with respect to subcontractors and suppliers. The Contractor shall develop and implement a Labor Management Procedures (LMP) in accordance with the requirements of ESS2 and the LMP Framework attached as an appendix to this ESMF.

The Contractor shall verify and document the environmental and social performance of subcontractors and suppliers, including their compliance with the C-ESMP, the Code of Conduct, and applicable ESHS requirements, as part of regular contract monitoring. Contracts shall establish penalties for E&S non-compliance by the Contractor and its subcontractors, and shall consider the use of an ES Performance Security for major civil works, in each case as agreed with the PCU's procurement team.

The Contractor shall immediately notify the Engineer of any events that have or may have a substantial adverse impact on the environment, communities affected by the project, or personnel, including SEA/SH incidents, in consistent with the Contract Conditions. Detailed requirements regarding the scope and procedure for reporting are specified in the C-ESMP. Allegations of SEA/SH received by the Contractor, including those referred from the Task's Grievance Redress Mechanism, are handled in accordance with the Accountability and Response Framework submitted under Section 7.1.

The Contractor shall implement the Chance Finds Procedure included in the site-specific ESMP for the relevant Task, consistent with the Contract Conditions..

The Contractor shall fulfill its obligations regarding the security of the construction site and the protection of neighboring properties as set forth in in the Contract Conditions.

The Contractor shall not commence work on land that has not been formally acquired and transferred by the Contracting Authority in accordance with the LARAP. The Contractor shall cooperate with the PIU in monitoring the situation of persons affected by the project (PAP) during the execution of the works.

The Contractor is obligated to pay subcontractors on time as set forth in the procurement and contract documentation. Before certifying the next payment to the Contractor, the Engineer shall verify proof of payment to subcontractors for work accepted during the previous billing period; this requirement is incorporated into the Special Conditions of the Contract. In the event of a documented failure to pay, the contracting authority is entitled to make direct payment to the subcontractor and to deduct this amount from the contractor’s remuneration in accordance with the Contract Conditions.

## 7.3 Supervision of Contractors

Supervision of contractors’ implementation of E&S requirements is carried out by the Contract Engineer and the PIU, in accordance with the division of responsibilities set forth below.

The Contract Engineer exercises day-to-day supervision over the implementation of E&S requirements at the construction site. The Contract Engineer’s responsibilities include verifying the implementation of the C-ESMP during monitoring visits conducted at the frequency specified in Section 6.4.2, documenting identified nonconformities, and issuing corrective orders to the contractor. In the event of a serious non-compliance with E&S requirements, the Contract Engineer is authorized to issue a work suspension order in accordance with the contractual terms. The Contract Engineer also verifies proof of payment to subcontractors before certifying payment to the contractor, in accordance with the requirement included in the Special Conditions of Contract.

The PIU exercises general oversight over the implementation of E&S requirements at the Project level. The PIU receives reports from the Contract Engineer on monitoring visits and notifications of identified non-conformities, makes decisions in the event of significant violations requiring actions beyond the Contract Engineer’s authority, and forwards reports and incident notifications to the World Bank in accordance with the procedure set forth in Chapter 6.4.3. Prior to authorizing

mobilization, the PIU verifies that the Contractor's C-ESMP includes an Accountability and Response Framework meeting the requirements set out in Section 7.1, and reports completion of this verification to the PCU.

Identified nonconformities are documented and tracked until they are resolved. The Contractor is required to resolve nonconformities within the timeframe agreed upon with the Contract Engineer. Nonconformities not resolved by the specified deadline are escalated to the PIU and, where financial penalties for E&S non-compliance have been established in the contract in accordance with Section 7.2, may result in the application of such penalty.

## 7.4 Training

The Contractor shall ensure that E&S training is conducted for all personnel prior to mobilization. The training shall cover, at a minimum, the requirements of the C-ESMP, the code of conduct, and the procedure for reporting incidents and complaints. Training documentation shall be submitted to the Contract Engineer prior to the commencement of work.

The Contractor shall ensure that cascade training is provided to subcontractors and suppliers prior to their mobilization, to the extent appropriate to the nature of the work they perform.

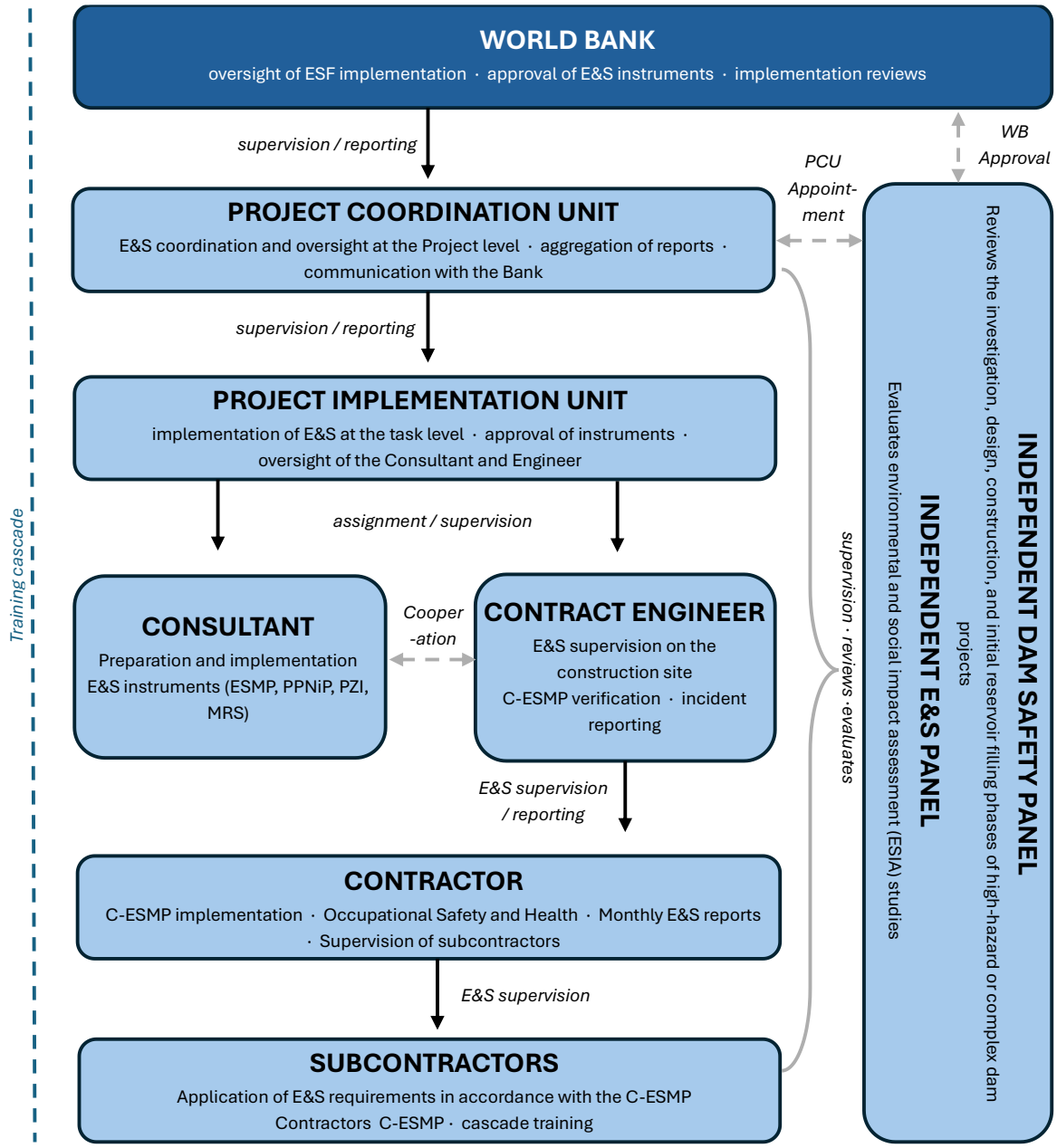
Entities and communities responsible for the operation and maintenance of the infrastructure are trained in E&S management during the operational phase prior to the formal handover of the facility for operation. The scope of training is determined during the development of the ESMP for a given Task.

# 8 Organizational Structure and Institutional Arrangements

The project is implemented by the State Water Holding Polish Waters (PGW WP) as the PIU. Project implementation is carried out through the Project Coordination Unit (PCU), which operates within the structure of the National Water Management Authority (KZGW), and the Project Implementation Units (PIU), which operate within the structures of the Regional Water Management Authorities (RZGW). The PCU performs coordination and supervisory functions at the project-wide level, while the PIU are responsible for the day-to-day implementation of individual tasks. The organizational structure for project implementation is presented in Chapter 9.1.

## 8.1 Organizational Chart for Environmental and Social Management

*Figure 9 Organizational Chart for Environmental and Social Management*



## 8.2 Roles and Responsibilities

The table shows the breakdown of E&S tasks by project lifecycle stages.

*Table 14 Breakdown of E&S Tasks Across the Project Life Cycle*

| Task | PCU | PIU | Consultant | Contract Engineer | Contractor |
|---|---|---|---|---|---|
| Phase 1 – Preliminary Verification | | | | | |
| Review of the Exclusion Catalog | Supervision | Approval | Person in Charge | — | — |
| Completing the preliminary verification form | supervision* | approval | responsible | — | — |
| Identification of required national permits | — | Approval | Responsible | — | — |
| Stage 2 – Planning and Selection of Instruments | | | | | |
| Selection and development of E&S instruments | oversight | Approval | Responsible | — | — |
| Public consultation on the ESMP | oversight | oversight | responsible | — | — |
| Incorporating E&S requirements into tender documents | supervision | approval | responsible | — | — |
| Phase 3 – Implementation and Monitoring | | | | | |
| Monitoring visits to the construction site | — | Supervision | Responsible | cooperation | — |
| Monthly E&S Reports | — | — | cooperation | Supervision | Responsible |
| Verification of proof of payment to subcontractors | — | supervision | — | Responsible | — |
| Verification of Chance Finds Procedure Implementation | — | supervision | — | Responsible | — |
| Notifying the Bank of a Serious Incident | supervision | responsible | cooperation | — | — |
| Oversight of the implementation of C-ESMP | supervision | supervision | responsible | cooperation | — |
| Enforcing E&S requirements on subcontractors | — | — | — | supervision | Responsible |
| Stage 4 – Assessment and Closure | | | | | |
| Review of the completeness of E&S instruments | oversight | Approval | Responsible | — | — |
| Site reclamation monitoring (assessment of the status of site reclamation and restoration to pre-construction condition) | supervision | supervision | Responsible | Cooperation | — |
| Preparation of the final E&S report | supervision | approval | Responsible | — | — |

** The PCU approves the high-risk classification.*

## 8.3 Assessment of institutional capacity

The table below presents the assessment of the E&S capacity of entities involved in the implementation of the Project and identifies gaps that need to be addressed through training and capacity building in accordance with Section 9.4.

*Table 15 Assessment of E&S Capacity*

| Entity | Existing E&S Capacity | Identified Gaps |
|---|---|---|
| PCU | Experience in coordinating E&S requirements from previous World Bank projects implemented under the Operational Policies (OP) framework; familiarity with reporting and oversight procedures at the project level. | Transition from the OP framework to the ESF: a new approach to the mitigation hierarchy, an expanded scope of ESS5, and ESS2 and ESS10 requirements not present in the previous framework; updating documentation and reporting procedures in accordance with the ESF including the SEF |
| PIU | Experience in preparing and implementing E&S documents (ESMP, LARAP, SEP) from previous World Bank projects; knowledge of national administrative procedures (EIA, IPIP, water law permit). | Updating expertise on ESF requirements relative to the previous OP framework; strengthening expertise in resettlement management in accordance with ESS5 and stakeholder engagement in accordance with ESS10 including preparation and implementation of the SEP; approving and overseeing E&S instruments under the new framework. |
| TA Consultant | Expertise in environmental and social assessments, socioeconomic studies, public consultations, and the preparation of E&S documentation. | Knowledge of specific ESF requirements and World Bank standards; integration of E&S aspects into project documentation at an early stage of planning; documentation and reporting in accordance with ESF requirements including preparation of the SEP. |
| Contract Engineer | Competence in technical supervision of construction works; knowledge of FIDIC contract conditions. | E&S supervision on the construction site; verification of C-ESMP implementation; application of E&S subclauses in the contract terms; reporting of E&S incidents, including monitoring of SEP implementation at the contract level. |
| Contractor | Varies - depending on experience with projects funded by development finance institutions. | Knowledge of the World Bank's E&S requirements; development and implementation of the C-ESMP; monitoring and reporting on health and safety performance; application of the code of conduct; management of subcontractors with regard to E&S, including participation in stakeholder engagement activities in accordance with the SEP. |
| Entities and units responsible for O&M | Capacity varies by institution and prior experience with the operation of similar hydraulic infrastructure; generally limited familiarity with the World Bank ESF, as involvement typically begins only at final acceptance and handover of the infrastructure. | Clarifying E&S responsibilities during the operational phase, including implementation of the O&M ESMP; strengthening emergency preparedness and response procedures; improving operation of early warning systems, including communication with vulnerable and digitally excluded groups in line with the SEP; and establishing monitoring and incident reporting arrangements for the operational phase. |

## 8.4 Training and Institutional Capacity Building

The effective implementation of E&S instruments requires systematic capacity building of all entities involved in the project's implementation. Training is organized in accordance with a cascade model of knowledge transfer: the World Bank supports the PCU and PIU, which then provide training to the Consultant and the Contract Engineer, and the Contractor conducts cascade training for subcontractors and the workforce in accordance with the requirements of Section 8.4. The training plan is updated as the Project progresses and new training needs arise.

*Table 16 Implementation of E&S Instruments – Training*

| Level | Responsible | Target Audience | Topics | Schedule and Frequency | Method | Resources |
|---|---|---|---|---|---|---|
| Project | PCU | PCU, PIU – E&S management team | ESF requirements; transition from OP to ESF; ESS1, ESS2, ESS4, ESS5, ESS8, ESS10; reporting procedures to the WB; mitigation hierarchy; ESMF, LARF and SEF requirements | Prior to Project launch; annual update or following significant changes to requirements | In-person workshops; remote training | Project budget; World Bank support |
| Project – | PCU | PIU – E&S specialists | ESMF procedures; preliminary verification form and risk classification; selection of E&S instruments; LARF and ESS5; SEF and ESS10; GRM; reporting requirements | Before launching the first Tasks; update after each change to ESMF procedures | In-person workshops; working sessions on documents | Project Budget |
| Project – project briefing | PCU / PIU | Consultant | ESMF procedures; preliminary verification forms; project-specific E&S reporting and documentation requirements | Before launching the first Tasks; update following changes to procedures | Working session | Project Budget |
| Task | Consultant | Contract Engineer | ESMP Tasks; C-ESMP; E&S monitoring and reporting procedures; FIDIC E&S contract provisions; Chance Finds Procedure | Prior to contractor mobilization; supplementary in the event of changes to the ESMP | In-person workshops; on-site training at the construction site | Task Budget |
| Contract | Contractor | Contractor's personnel; subcontractors; suppliers | C-ESMP; Code of Conduct; Occupational Health and Safety; Incident and GRM Procedure; Requirements for Subcontractors | Prior to commencement of work; supplemental training upon change of personnel or subcontractors | On-site training; orientation; materials in the staff's languages | Contract budget (contractor) |

| Level | Responsible | Target Audience | Topics | Schedule and Frequency | Method | Resources |
|---|---|---|---|---|---|---|
| Operation | PIU / Consultant | Entities and communities responsible for O&M | E&S management during the operational phase; emergency procedures; early warning system | Prior to the formal handover of the facility for operation | Workshops ; training | Project Budget |

# 9 Grievance Redress Mechanism

The SEF requires the establishment of a Grievance Redress Mechanism for each Task, to be launched at the earliest possible stage. The GRM will be multi-channel, free of charge to the complainant, and will include binding deadlines for handling complaints. Each GRM shall include a separate, fully confidential pathway for handling cases of sexual exploitation and abuse (SEA) and sexual harassment (SH) allegations, based on a victim-centered approach - the priority will be to refer victims to the appropriate support services. Use of the GRM will not limit access to judicial or administrative legal remedies. The Project-level GRM shall be consulted upon and disclosed prior to Project Appraisal.

To ensure consistency across all Tasks, a template Project-level GRM is provided in Appendix 8 to this ESMF, setting out a standard structure, intake channels, workflow, and reporting format. Each PIU shall use this template as the basis for developing its Task-specific GRM, adapting it as necessary to the scale and risk profile of the relevant Task, in accordance with the principle of proportionality set out below.

## 9.1 Principles and Objectives of the Mechanism

The Grievance Redress Mechanism (GRM) is an accessible and inclusive system for receiving, registering, and addressing submissions from stakeholders, and for facilitating their timely resolution. The GRM accepts submissions regarding the environmental and social impacts of the Project—including complaints, requests, questions, and comments related to the preparation and implementation of the Tasks.

The GRM performs four basic functions:

1) It provides individuals affected by the Project with effective access to remedies to protect their rights.
2) It supports the early identification and resolution of environmental and social issues.
3) It builds public trust in the Project.
4) It provides a safe and confidential channel for reporting cases of sexual exploitation and abuse (SEA) and sexual harassment (SH), based on a victim-centered approach.

The GRM does not replace national administrative and judicial procedures. The GRM does not limit the reporter’s access to judicial and administrative legal remedies.

The Task-level GRM is developed by the PIU for each Task covered by the Project. It specifies detailed operational procedures, reporting channels, deadlines, and the organizational structure applicable to the given Task. The Project-level GRM is subject to approval by the PCU prior to its implementation.

The GRM described in this ESMF is a system intended for the community members and external stakeholders. It is separate from the employee Grievance Redress Mechanism, which is established and operated in accordance with the procedures set forth in the Labor Management Procedures (LMP) developed under the Project in accordance with ESS2 requirements.

## 9.2 Channels for Receiving Complaints

Each GRM will be multi-channel. The specific channels applicable to each Task are set out in the Task-specific GRM, prepared in accordance with the template in Appendix 8, may be expanded depending on the specific characteristics of the Task, and may be updated over time as needed. Available channels shall include traditional and electronic methods, as well as the option to submit a report during consultation meetings and field visits by Project staff. The procedures for submitting reports will be simple and understandable to all stakeholders.

Each GRM will have at least one fixed complaint reception point located within the Task' s area of impact. All complaint reception points will provide a paper complaint form and information describing the available channels, processing times, and the complainant's rights.

Each GRM will accept anonymous reports. Anonymous reports will be treated on an equal footing with reports submitted under a name. The lack of contact information makes it impossible to provide feedback—the GRM will inform the public of this limitation in an informational leaflet.

Each GRM will document verbal reports. The person receiving the report will prepare a written note, which must be immediately recorded in the GRM registry.

Each GRM will be accessible to vulnerable groups, particularly the elderly, people with disabilities, and the digitally excluded.

The PIU will publicly disclose information about the GRM—including available channels, processing deadlines, and the rights of the reporter—on the Project's website, at information points for PAP, and at local municipal offices within the Task's area of impact. This information will be updated whenever there is a significant change to the GRM.

In accordance with World Bank requirements, each GRM will provide secure and confidential channels for reporting SEA/SH, including the option to submit reports anonymously. The PIU will inform the community and Project staff about these channels. Survivors will be informed of their legal obligations regarding the reporting of such cases under Polish law.

## 9.3 Process for Registering, Assessing, and Resolving Complaints

Each GRM will establish binding deadlines for processing reports. In accordance with ESS10 requirements, the deadlines will cover three stages: acknowledgment of receipt, interim

response, and final resolution. The deadlines will be publicly announced in GRM informational materials.

The GRM will register each complaint immediately upon receipt and will confirm receipt to the complainant within the same timeframe.

Each GRM will provide an expedited processing track for simple cases, a standard track for cases not requiring detailed investigation, and an extended track for complex cases requiring the collection of documentation or expert opinions in accordance with the classification set out in the GRM template (Appendix 8). The deadlines applicable to each track will be specified in the SEP in accordance with the scale and risks of the Task.

In accordance with ESS10 requirements, if meeting a deadline is not possible, the GRM Coordinator will inform the submitter of the reasons for the delay and agree on a new deadline with the submitter. This approach will be applied in cases requiring coordination with multiple entities or a detailed investigation.

The reporter will have the right to file a notice of dissatisfaction within a specified timeframe from the date of receipt of the response. The GRM Committee will issue a final decision without undue delay from the date of receipt of the notice. The deadlines for both actions will be specified in the SEP.

SEA/SH reports will not be subject to standard deadlines. The GRM Coordinator will refer the survivor to the appropriate support services immediately upon receipt of the report in accordance with the SEA/SH-specific procedure set out in the GRM template (Appendix 8).

All framework-level environmental and social documents, as well as site-specific ESIAs, ESMPs, LMPs, LARAPs, and SEPs, will be disclosed in English in addition to Polish.

## 9.4 Reporting and Archiving

Each GRM will maintain a centralized registry of all reports, containing the data necessary to monitor the status and timeliness of their processing. The registry will include all reports—regardless of whether they are processed through the GRM or by external authorities. The personal data of reporters will be processed in accordance with data protection regulations. The SEA/SH report registry will be stored in a separate, restricted-access section of the registry, distinct from other reports. Data in the registry will be retained until the completion of the Task and the final settlement of its implementation.

Each GRM will be subject to regular monitoring using the quantitative and qualitative indicators specified in the SEP. SEA/SH indicators will be monitored separately. The PIU will regularly verify whether the reporting channels are appropriate, effective, and easily accessible to people affected by the Project and vulnerable groups. In accordance with ESS10 requirements, the PIU will analyze data from the GRM registry to improve the Project's environmental and social performance and reduce the risk of recurring issues.

The GRM Coordinator will prepare regular internal reports on the functioning of the GRM and submit them to the PCU. The PCU will consolidate data from all GRMs and submit it to the World Bank.

# 10 Stakeholder Engagement, Consultation, and Disclosure

## 10.1 Reference to the Stakeholder Engagement Plan

The Stakeholder Engagement Framework (SEF) sets out the principles and procedures for stakeholder engagement throughout the Project's life cycle, serving as the overarching document for the operational site specific Stakeholder Engagement Plans (SEPs) developed for individual Components. For the purposes of this ESMF, the Stakeholder Engagement Framework (SEF) and all site-specific Stakeholder Engagement Plans (SEPs) prepared for individual Project Components or subprojects are collectively referred to as the "Stakeholder Engagement Plans (SEPs)", unless otherwise specified) The Stakeholder Engagement Plans (SEPs) are developed in accordance with the requirements of the World Bank Environmental and Social Standard 10 (ESS10), applicable Polish legislation and Stakeholder Engagement Framework. They form an integral part of the Task's environmental and social risk management system and establish the framework and procedures for the systematic identification of stakeholders, meaningful stakeholder engagement, information disclosure, consultation, and grievance management throughout the Tsk life cycle. Where there is a discrepancy between national legislation and the requirements of the World Bank ESF, the more stringent requirement shall apply. Draft SEPs shall be publicly disclosed and subject to meaningful public consultation prior to their finalization and, submitted to the World Bank for prior review and no-objection.

## 10.2 Document Disclosure Requirements

PIU The PIU shall disclose Project information to stakeholders in a timely, understandable, accessible and culturally appropriate manner, taking into account the diverse needs and communication preferences of different stakeholder groups. Special measures shall be adopted to ensure that disadvantaged or vulnerable individuals and groups, including those facing physical, sensory, cognitive, linguistic, socioeconomic or other barriers to participation, have equitable access to Project information and opportunities for meaningful engagement throughout the Project life cycle.

The PIU ensures that the disclosed information is accessible to digitally excluded groups in accordance with the principles set forth in Chapter 8.4 of SEF The SEF consultation principles are described in Chapter 8.1.

*Table 17 Method of Disclosing Information About the Project*

| Document | Level | Disclosure Date | Channels | Languages |
|---|---|---|---|---|
| SEF | Project | Prior to the Bank's approval of the Project | PIU's and PCU website; headquarters of individual Regional Water Management Authorities (RZGW) | Polish<br>English |
| LARF | Project | Before the Project is approved by the Bank | PIU's and PCU website; offices of individual Regional Water Management Authorities (RZGW) | Polish<br>English |
| ESMF | Project | Before the Bank's approval of the Project | PIU's and PCU website; offices of individual Regional Water Management Authorities (RZGW) | Polish<br>English |
| SEP | Task | As per the schedule in the SEP | PIU's website; Regional Water Management Authority (RZGW) headquarters; bulletin boards, task-specific community engagement steps at each project stage, as set out in the relevant SEP | Polish<br>English |
| ESIA and ESMP | Task | As per the schedule in the SEP | PIU's website; RZGW headquarters; bulletin boards; task-specific community engagement steps at each project stage, as set out in the relevant SEP | Polish<br>English |
| LARAP (draft) | Task | At least 30 days before the end of the comment period | PIU's website; RZGW offices; bulletin boards; local media; task-specific community engagement steps at each project stage, as set out in the relevant SEP | Polish<br>English |
| LARAP (final version) | Task | Upon approval by the Bank | PIU's website; RZGW headquarters; task-specific community engagement steps at each project stage, as set out in the relevant SEP | Polish<br>English |

Where gaps in national disclosure practice would otherwise prevent the Project from achieving material compliance with the ESF, World Bank requirements shall prevail.

After the completion of each consultation, the PIU informs stakeholders about how their opinions influenced decisions regarding the Project. The updated documents include a chapter summarizing the consultation process and how the submitted comments were addressed. The PIU discloses the updated documents after each significant change to the Project's scope.

## 10.3 Consultation Requirements for Individual Tasks

Stakeholder engagement takes place throughout the Project's entire lifecycle. The table below presents key engagement activities at each stage. A detailed engagement schedule for each Task is specified in the Stakeholder Engagement Plan (SEP) prepared by the Project Implementation Unit (PIU).

*Table 18 Key Stakeholder Engagement Activities Throughout the Task Lifecycle*

| Stage | Key Activities | Target Stakeholders |
|---|---|---|
| **Project Preparation** | Disclosure of the SEF and LARF; institutional consultations; acceptance of written comments; obtaining approval from the World Bank. | Public administration bodies; non-governmental organizations; all interested parties. |
| **Task Preparation** | Early identification of stakeholders; initial informational meetings with local authorities; preparation and disclosure of the Project Description; establishment of the Project Management Team; consultations on the Project Description; public consultations as part of the EIA process; preparation and disclosure of the ESIA and ESMP. | PAP; local governments; administrative bodies; non-governmental organizations; the public. |
| **Task Preparation – Land acquisition** | Census and socioeconomic surveys; individual meetings with PAP; disclosure of the draft LARAP; LARAP consultations (at least 30 days); finalization of the LARAP based on comments from the consultations; obtaining the Bank's approval. | PAP; local governments; administrative bodies; non-governmental organizations. |
| **Implementation of the LARAP** | Notifying PAP of the initiation of the IPIP process; keeping PAP informed on an ongoing basis about the relocation schedule and compensation payments; providing individual support to PAP during the resettlement process; implementing the GRM; monitoring the implementation of the LARAP. | PAP; local governments; PCU; World Bank. |
| **Execution of works** | Providing ongoing updates to PAP and local communities on the progress of works and changes to the schedule; implementation of the SEP; implementation of the LARAP; operation of the GRM; implementation of C-ESMP mitigation measures; updating the SEP in the event of significant changes to the scope. | PAP; local community; technical infrastructure managers. |
| **Closure** | Closure of the GRM upon completion of all proceedings; assessment of the effectiveness of the implementation of the LARAP (including a LARAP completion audit assessing compliance) and SEP; informing stakeholders about how their opinions influenced the Project; final report on the implementation of the SEP and LARAP. | PAP; local community; non-governmental organizations; PCU; World Bank. |

The PIU tailors communication methods and channels to the needs of specific stakeholder categories. The selection of methods takes into account the level of interest in the Task, the ability to participate in consultations, and barriers to accessing information.

Component 1 and 2 are implemented in areas with an elevated risk of social conflict. Engagement methods must take this context into account. Open public meetings may be replaced by other forms of consultation where they carry the risk of escalating tensions. In situations of high social tension, the PIU may engage a neutral mediator or an organization trusted by the local community. Communication channels mediated by local governments or local media may be of limited effectiveness in situations where these entities are actively involved in a dispute concerning the Project. In such cases, the PIU identifies alternative channels for reaching stakeholders and outlines them in the SEP. The PIU selects engagement methods appropriate to the current social situation and justifies this choice in the SEP.

If a PAP or another category of stakeholders refuses to engage, the PIU documents all attempts to contact them and uses alternative communication channels. A PAP's refusal to engage does not relieve the PIU of the obligation to disclose information and ensure access to the GRM

# 11 Monitoring, Oversight, and Reporting

## 11.1 Environmental and Social Monitoring System

This chapter defines the structure, principles, and requirements of the system for monitoring the implementation of environmental and social (E&S) requirements within the Project. The monitoring system covers all stages of the Tasks' life cycle—from the verification and planning of E&S instruments through the execution of works to the formal closure of the Task. It applies to both hydrotechnical infrastructure and nature-based solutions (NBS).

The E&S monitoring system is organized into four interrelated levels:

**Level I — Contractor Self-Monitoring.** The Contractor conducts ongoing monitoring of the implementation of E&S measures specified in the C-ESMP, documents the results, and submits reports to the Contract Engineer in accordance with the requirements set forth in Section 11.2 The Contractor is responsible for monitoring throughout the entire subcontracting chain.

**Level II — Contract Engineer Oversight.** The Contract Engineer conducts independent monitoring of the implementation of E&S requirements through regular site visits, verification of the Contractor's documentation, and recording of non-conformities. The results of the monitoring are documented in reports submitted to the PIU.

In addition to the construction work reporting chain, there is a separate reporting pathway for social instruments. The Consultant Engineer responsible for implementing the LARAP and SEP submits progress reports on the implementation of these instruments directly to the Client (PIU) at the frequency specified in the contract with the Consultant Engineer

**Level III — PIU Oversight.** The PIU oversees the implementation of E&S requirements at the Task-wide level, approves reports submitted by the Contract Engineer, makes decisions in the event of significant violations, and submits reports and notifications to the PCU and the World Bank.

**Level IV — Oversight by the PCU and the World Bank.** The PCU coordinates monitoring at the Project-wide level, verifies E&S reports and incident notifications, and oversees compliance with ESF requirements. The World Bank provides oversight through implementation reviews, site visits, and verification of reports.

The E&S monitoring system covers the following thematic areas:

- **implementation of E&S instruments**—compliance of the Project's implementation with the requirements of the ESMF, ESMP, C-ESMP, LARF, SEF, LARAP, LMP, and SEP;
- **environment and nature conservation** — environmental impacts during the construction and operation phases, and fulfillment of nature conservation obligations arising from the Task's environmental assessment;
- **labor and occupational health and safety** — working conditions, occupational health and safety, incidents and accidents, and compliance with the LMP by Contractors and Subcontractors;

- **community health and safety, including dam safety** — impacts on local communities in the project area;
- **Land Acquisition and Resettlement** — progress in implementing the Land Acquisition and Resettlement Action Plan (LARAP), timely payment of compensation, and the situation of project affected persons (PAP);
- **stakeholder engagement** — implementation of the Environmental Impact Assessment (EIA), public communication, and the operation and effectiveness of the Environmental Monitoring System (EMS).

Each Task requires an environmental monitoring program covering both the construction and operation phases. The scope of environmental monitoring is determined in proportion to the identified risks and impacts on the natural environment resulting from the environmental assessment of a given Task, and may not be narrower than the obligations imposed in the decision on environmental conditions (EIA decision).

For Tasks implemented as nature-based solutions (NBS), the monitoring program additionally includes an assessment of the ecological effectiveness of the intervention. Unlike hydrotechnical infrastructure, in the case of NBS, achieving ecological objectives constitutes an integral indicator of the Task's success, rather than merely a mitigation requirement.

The frequency of the Contract Engineer's monitoring visits is tailored to the Task's risk classification and the phase of work execution, as shown in the table below. Detailed rules for conducting monitoring visits and the Contract Engineer's authority to issue corrective orders and orders to suspend work are specified in Chapter 7.

*Table 19 Frequency of the Contract Engineer's monitoring visits*

| Risk Classification | Intensive Work Phase | Limited work phase |
|---|---|---|
| High | At least once a week | At least once every two weeks |
| Substantial | at least once every two weeks | once a month |
| Moderate | once a month | once per quarter |

The results of each visit are documented in a report submitted to the PIU. If a significant non-compliance with E&S requirements is identified, the Engineer shall immediately notify the PIU.

If independent external monitoring is planned for a given Task, its principles, scope, responsibilities, and frequency are defined during the preparation of the E&S instruments for that Task. The results of external monitoring are submitted to the PIU and made available to the World Bank. The external monitor operates independently of the Contract Engineer and does not assume the Contract Engineer's supervisory responsibilities arising from the contractual terms.

*Table 20 Roles and Responsibilities in the Monitoring System*

| Entity | Scope of Responsibility in the Monitoring System |
|---|---|
| Contractor | Ongoing monitoring of C-ESMP implementation; monthly E&S reports submitted to the Contract Engineer; prompt notification of the Contract Engineer regarding incidents; oversight of subcontractors' monitoring of E&S requirements implementation. |
| Contract Engineer | Monitoring visits in accordance with the frequency specified in the table above; verification of the Contractor's reports; recording of non-conformities; preparation of summary reports submitted to the PIU; maintenance of the GRM at the Task level. |

| Entity | Scope of Responsibility in the Monitoring System |
|---|---|
| Consultant | Monitoring the implementation of the LARAP and SEP; submitting progress reports on these instruments directly to the PIU at least quarterly; supporting the PIU in aggregating social data for summary reports submitted to the World Bank. |
| PIU | Overall oversight of E&S implementation at the Task level; approving reports; submitting reports and notifications to the PCU and the World Bank; making decisions in the event of significant violations. |
| PCU | Coordination of monitoring at the Project-wide level; verification of E&S reports and incident notifications; oversight of compliance with ESF requirements. |
| Independent E&S Experts | Oversight of Project implementation; implementation reviews; verification of reports. |

## 11.2 Internal and World Bank Reporting

E&S reporting is organized along the following chain: Contractor → Contract Engineer → PIU → PCU → World Bank. Each level is responsible for aggregating data from the level below it, verifying its completeness and accuracy, and submitting it to the next higher level in a timely manner.

*Table 21 Report Types and Frequency*

| Report Type | Prepared by | Recipient | Frequency |
|---|---|---|---|
| E&S Monthly Report | Contractor | Contract Engineer | Monthly |
| Monitoring Visit Report | Contract Engineer | PIU and PCU | In accordance with the frequency of visits (Section11.1) |
| E&S Summary Report | Contract Engineer / PIU | PCU (review and clearance prior to submission to the World Bank) | Quarterly or semi-annually, as specified in the ESCP |
| Final Task Report | PIU | PCU (review and clearance prior to submission to the World Bank) | Prior to the formal closure of the Task |
| Notification of a serious incident | PIU | World Bank via PCU | Within 48 hours of the incident |

Each E&S summary report submitted to the World Bank must include at least:

- an overview of the status of E&S instrument implementation in relation to the timeline and commitments under the ESMP;
- E&S issues that arose during the reporting period and how they were resolved or planned corrective actions;
- progress on project implementation relative to the schedule.

In the event of a serious E&S incident, the PIU shall notify the World Bank, through the PCU, within 48 hours of its occurrence, regardless of the regular reporting cycle.

The following, in particular, are considered serious E&S incidents:

- a fatal accident or a mass workplace accident;
- an event causing substantial environmental damage;
- an incident of an SEA/SH nature.

The initial notification shall contain available information about the incident and shall be supplemented by a detailed post-incident report immediately after the completion of the internal investigation.

Upon completion of each PIU Task, a final E&S report is prepared and submitted to the World Bank prior to the formal closure of the Task. The report includes at least:

- a summary of the implementation of E&S instruments;
- a description of the problems encountered and how they were resolved;
- the results of monitoring site rehabilitation and the implementation of ecological compensation;
- a summary of complaints and how they were addressed;
- an assessment of compliance with ESF requirements.

## 11.3 Adaptive management

Adaptive management is a mechanism for adjusting the implementation of E&S instruments based on the results of monitoring and supervision, without waiting for the next planning cycle. Its purpose is to ensure that identified non-compliance, unforeseen impacts, and changing on-site or social conditions are identified and addressed on an ongoing basis, in proportion to their scale and significance. Adaptive management does not replace regular oversight and reporting procedures, but rather complements them in cases requiring intervention outside the standard reporting cycle.

Adaptive management actions are initiated in the event of: the identification of non-compliance with E&S requirements during monitoring visits; the occurrence of a serious E&S incident; an influx of complaints in the GRM indicating a systemic problem not addressed by existing measures; findings or recommendations arising from World Bank implementation support missions, supervision activities, or review of Project documentation; a significant change in field, environmental, or social conditions relative to the assumptions made during the E&S assessment phase; reports by the Consulting Engineer regarding problems with the implementation of the LARAP or SEP, in particular delays in fulfilling obligations toward the PAP or disruptions in the stakeholder engagement process; results of environmental monitoring indicating the ineffectiveness of the mitigation or compensation measures implemented.
The procedure includes: identification of the problem by the Contract Engineer, the Consulting Engineer, or PIU → assessment of materiality and classification of the required action → implementation of the corrective action → verification of effectiveness → formal closure of the issue. Depending on the scale and nature of the identified problem, corrective actions may include: the Contract Engineer issuing a corrective order to the Contractor, specifying a deadline for rectifying the nonconformity; the Contract Engineer issuing an order to suspend work in accordance with the authority granted under the contract terms; adjustment of the schedule or scope of the Consultant Engineer's activities regarding the LARAP or SEP, initiated by the PIU**;** revision of the E&S instrument (ESMP, C-ESMP, LARAP, or other) by the PIU; escalation to the PCU or the World Bank in the event of violations requiring actions beyond the PIU's authority and,

where required under the ESCP, incident reporting procedures, or contractual obligations, notification to the World Bank.. All identified non-conformities and corrective actions taken are documented and tracked until they are formally closed. The closure of an issue requires confirmation by the Consultant Engineer or the PIU, depending on the level at which the non-conformity was identified.

The ESMF is subject to review and—if necessary—update in the event of: a significant change in the scope or components of the Project; the identification of new locations or types of Activities not covered by the original E&S assessment; changes in national legislation or ESF standards affecting Project requirements; or a request from the World Bank. The ESMF revision is conducted by the PIU in collaboration with the PCU, is subject to public consultation, and must be approved by the World Bank before taking effect.

# 12 Estimated Implementation Budget

The costs of implementing E&S requirements under the Project fall into two categories. The first category consists of costs embedded in construction and service contracts - including, in particular, E&S supervision by the Contract Engineer, the preparation and implementation of the C-ESMP by Contractors, and the operation of the GRM at the Task level - which are financed through standard Project financing mechanisms.

The second category covers environmental and social (E&S) management costs financed under Component IV (Project Management, Monitoring and Evaluation). These costs form an integral part of the Component IV budget and cover staff costs, resources for monitoring and training, and system development — including the grievance redress mechanism (GRM) and the E&S monitoring system — required to manage E&S aspects at the Project level, as well as the preparation and implementation of E&S instruments (ESMP, LARAP, LMP, and other specific plans), stakeholder engagement and GRM operations, E&S staff at the PIU and PCU levels, and obtaining the required permits and decisions. Where justified, this budget may also include the costs of external independent monitoring. These costs are budgeted in aggregate under Component IV rather than as a separate, stand-alone E&S budget line.

The E&S budget is indicative at the ESMF level; detailed budgets are prepared at the level of each Task as part of the relevant E&S instruments. These budgets are subject to updates as the Project progresses.