



REGIONAL DIRECTOR FOR
ENVIRONMENT PROTECTION
IN SZCZECIN

Date 18.03.2020

No ZPT.011.42.2020 Signature

Szczecin, 18 March 2020

WONS-OŚ.4233.1.2017.KK.68

DECISION NO. 5/2020

on ENVIRONMENTAL CONDITIONS [ENVIRONMENTAL PERMIT]

Pursuant to Article 104 and 108(1) of the Law of 14 June 1960 – Code of Administrative Procedure (consolidated text: Journal of Laws of 2020, item 256) – hereinafter: CAP, pursuant to Article 75(1)(1i), Article 75(5), Article 82, and Article 85 of the Act of 3 October 2008 on providing information on the environment and its protection, citizen engagement in environmental protection, and on environmental impact assessments (consolidated text: Journal of Laws 2020, item 283 as amended) – hereinafter: the EIA Act, and the provisions of the Regulation of the Council of Ministers of 9 November 2010 on projects which may materially affect the environment (consolidated text: Journal of Laws of 2016, item 71), having considered the application of the Director of the Regional Water Management Authority in Szczecin State Water Management Polish Waters, submitted through Ms. Krystyna Araszkiewicz of Sweco Consulting Sp. z o. o., for an environmental permit for the project entitled **“1B.2 Stage I and Stage II Modernisation works on the border Odra as part of the Odra-Vistula Flood Management Project”**

I hereby decide

A. To define the type and site of the project.

The planned project includes modernisation works on the border Odra, to be carried out as part of the Odra-Vistula Flood Management Project (OVFMP). The objective of the OVFMP is to increase flood protection for people living in selected areas of the Odra River and Upper Vistula River basins and to strengthen the institutional capacity of the government administration to mitigate the impact of summer, winter, and flash floods more effectively. The works included in the project were divided into 2 stages:

- Stage I – Modernization works on Border Odra to enable winter icebreaking;
- STAGE II – Modernisation of River Control Infrastructure.

Following works are planned as part of the modernisation:

- demolition and reconstruction of the existing groynes and the construction of new groynes;
- demolition and reconstruction of the existing longitudinal dams and the construction of new dams;
- demolition and reconstruction of the existing river walls and revetments and the construction of new ones.

The planned project will be implemented in stages, i.e. stage I is currently planned for implementation, while stage II will be implemented at a later date, after the necessary project documentation is prepared.

The project involving modernisation works on the abovementioned sections of the Odra River will be implemented in 3 districts located in two voivodeships: Zachodniopomorskie voivodeship: in the Gryfino district, in the communes of: Cedynia - stage I and II, Chojna - stage II, Mieszkowice - stage I and Lubuskie voivodeship: in the Gorzów district: in the commune of Kostrzyn nad Odrą

– stages I and II and in the Słubice district: in the commune: Górzycza - stage I and II and Słubice - stage I. However, in Lubuskie voivodeship, the works will be carried out on sections of the border Odra with a total length of about 21.9 km, while in Zachodniopomorskie Voivodeship - about 32.5 km. The project in question is planned in accordance with the assumptions of the Polish-German *Update of the concept of the border Odra watercourse*, prepared by the Federal Waterways Engineering and Research Institute in Karlsruhe (BAW) with the participation of German and Polish experts, developed in 2014, and the *Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow and shipping conditions) signed in Warsaw on 27 April 2015*. In total, plans for Stages I and II include the regulation, reconstruction, and demolition of river control structures on a section of about 54.4 km of the Odra, which means a modernisation of about 58% (54.4 km out of 94.4 km) of the limiting places listed in the Polish-German agreement.

A detailed description of the project is set out in Annex 1 to this permit, while the location of the project – in Annex 2 to this permit.

B. To establish the environmental requirements for the planned project and at the same time define the following conditions for its implementation.

I. Conditions for using the area at the stage of implementation, operation, or use of the project, considering in particular the need to protect valuable environmental assets, natural resources, and monuments, as well as to limit the nuisance for the neighbouring areas.

1. At the stage of construction works, carry out environmental supervision in the following way:

- a) implementation of investment tasks (including demolition), especially within the scope of minimisation activities, carried out with the participation of environmental supervision, i.e. specialists in the field of biology, nature conservation, ecology of flowing waters (botanist, ornithologist, chiropterologist, entomologist, ichthyologist, herpetologist, hydrologist);
 - b) the environmental supervision should cover in particular:
 - ongoing specialist assistance, including assistance in the field of identification of protected species of beetles, ornithofauna, chiropteran fauna, herpetofauna, ichthyofauna before the works are carried out, including tree felling and removal of low vegetation (including invasive species) and modernisation of groynes and bank reinforcement, in case of their occurrence, should take appropriate protective measures, including carrying out safe evacuation of animals; adjusting the deadline for the works, obtaining appropriate permits for activities subject to bans in relation to protected species issued under the Nature Conservation Act;
 - temporary marking of environmentally valuable areas in order to protect them from destruction, being run over, trampled on;
 - preparing reports covering all relevant events concerning the conservation of protected natural elements that occurred when the environmental supervision was conducted, which should be submitted to the Regional Director for Environment Protection in Szczecin and the Regional Director for Environment Protection in Gorzów Wielkopolski, every 3 months from the start of the works related to the implementation of the investment, or more often if necessary (e.g. in the event of significant adverse changes in the conservation status of natural habitats or habitats of protected plant species and animal species);
 - submitting a summary final report on the implementation of nature protection measures within six months of the end of each stage of the investment, with an assessment of the effectiveness of the measures applied.
- Take action to diversify habitats in the bank zone to accelerate the process of natural colonisation of the river sections subject to works by characteristic groups of aquatic organisms through:
- a) introducing habitat-forming elements, i.e. oversized boulders (0.8 - 1.5 m) in the spaces behind longitudinal dams (groups of 4-5 boulders every 50 m of dam length) and in all deep (1.5 - 2.0 m or deeper at SN W) groyne fields that cut into the banks, adjacent to the reconstructed groynes, from the downstream side at the base of the modernised groyne;
 - b) where possible, leaving oversized boulders and large woody debris that do not interfere with the planned structures in groyne fields;
 - c) restoring riffles of loose stone of various granulations (5-45 cm) in the structure of the foot

and the slope of the groyne on the current side of each of the renovated and new groynes, thus supplementing the stone structure;

- d) creating alternative habitats – oxbows in the form of bays cutting into the bank, with an area of 220 to 1320 m², (5300 m² in total): 8 structures with the following parameters: length 50-100 m, irregular oval shape, width approx. 10-12 m, depth from 0.5 to 1.5-2.0 m, in the following locations on sections of the JCWP (body of surface water) Odra from the Nysa Łużycka to the Warta: No. 1 at 582.4 km; No. 2 at 585.7 km; No. 3 at 602.3 km; No. 4 at 606.2 km; No. 5 at 606.6 km; No. 6 at 609.5 km; No. 7 at 616.5 km, and No. 8 at 616.8 km, ensuring effective communication with the main channel;
- e) replanting patches of submerged plants with floating leaves (surface over 10 m²), as well as fragments of patches (up to half of their surface) of rushes growing on the bottom of the Odra (especially the nymphaea, including all identified endangered sites of the fringed water lily) from the area of works, to a close location with similar habitat conditions (with particular emphasis on the places at the base of the groyne and spaces in the fields of reconstructed groynes and behind the dams). Plants should be moved with the use of a technology that will allow them to be transferred together with their invertebrate fauna and that will allow to collect Unionidae mussels, transporting them in conditions of adequate moisture content;
- f) investment works on groynes adjacent to the nymphaea sites (including those found at approx.: 646.1, 645.7, 656.3, 654.6, 654.1, 651.4, 661.1, 657.9, 658.1 km) to be carried out after the growing season, in October-November;
- g) using natural materials such as stone, fascine, wood, gravel, sand; however, geotextile may be used to separate newly constructed elements from the existing ones;
- h) no clamping of riprap with concrete; to stabilise riprap of 15-45 cm hydro-technical stone, lock it in with finer stone (5-15 cm) in the top part;
- i) metaplanning patches of *Nymphoides peltata* threatened by the works (including those colliding with the investment at 647.5 km - site 3; at 648.2 km - site 4 and at 656.5 km - site 8) in accordance with the following assumptions:
 - if possible, work should be carried out when water levels are low, to allow for proper implementation;
 - due to the need for precise execution of works during plant settlement in the ecosystem base, the depth of water should not exceed 0.7 m;
 - the new site must be located in the downstream part of the river, as this species is highly sensitive to water currents;
 - the site should not be located in the zone of rush vegetation formation, as one of the reasons for the disappearance of fringed water lily patches is the elimination of its phytocoenosis by expansive rush communities causing the disappearance of open, fast-heating water surfaces; at the same time, sites should be located in places sheltered by rushes, protecting against strong winds which cause water ripples;
 - the bottom of the site should be sandy with a small proportion of gravel fractions and a small layer of organic sediment to enable the plant to take root;
 - executing works in time that will allow a sufficiently long period of growth for the transported plants in new conditions, taking into account the environmental conditions in each year; the optimal deadline for the implementation is the turn of June and July;
- j) transferring mussels from the family *Unionidae* from the area of works to safe habitats located above the current area of work, in order to preserve protected species from this group (including the swan mussel *Anodonta cygnea* and the depressed river mussel *Pseudanodonta complanata*) in the following way:
 - during the period of up to one week prior to the commencement of the works involving the occupation of the bottom for the reconstruction of groynes, their wings, river walls or longitudinal dams, the mussels of the family *Unionidae* should be collected from the bottom area, at a distance of 3-5 m from the edge of the existing riprap using the wading method, with hand nets with 5 mm mesh in shallow places, and in places with a depth of more than 0.7 m, using the method of multiple hauls with a bottom dredge operated from a boat, with 5 mm mesh and inlet dimensions of approx. 100 x 30 cm and net length of approx. 80 cm;
 - the mussels must be placed in containers with water and immediately moved to safe places

above the current work area.

- The following measures should be taken with regard to the existing ichthyofauna:
 - a) earthworks in the riverbed carried out during the modernisation and construction of groynes shall be carried out between 16 July and the end of February, taking into account the spawning, growth, and hatching periods for fish, including the spined loach *Cobitis taenia*, amur bitterling *Rhodeus amarus*, white-finned gudgeon *Romanogobio bellingi*, asp *Aspius aspius*, *Sabanajewia aurata*, barbel *Barbus barbatula*, stone loach *Barbatula barbatula* and spring migration of Atlantic sturgeon *Acipenser oxyrinchus* and river lamprey *Lamptera fluviatilis*;
 - b) during the works involving the demolition of groynes and the foundation of new structures in the bottom, carried out in October-December, i.e. during the migration of diadromous salmonids and the river lamprey, curtains should be used to limit the area of work to approx. 10 m around the reconstructed groyne and the constructed longitudinal dams;
 - c) the following steps must be taken in relation to construction work carried out in the period from October to December which interferes with the bottom of the river (e.g. demolition of damaged groynes, founding of new structures in the bottom):
 - if concentrations of suspension higher than 200 mg/l or dissolved oxygen concentrations < 4 mg O₂/l are recorded, work intensity should be reduced by introducing 2-hour breaks;
 - if concentrations >400 mg/l of suspension or <3 mg of O₂/l are observed, work should be suspended for at least 24 hours until a value is obtained that does not endanger the existence of the diadromous species of ichthyofauna, i.e. a suspension concentration below 200 mg/l.Resumption of works after each break caused by exceeding the suspension concentrations will depend on the results of the next survey carried out as part of the investment monitoring.
 - d) if the littoral zone of the river in the area of the planned work is found to be populated by protected species, e.g. spined loach, amur bitterling, or white-finned gudgeon, inhabiting growing submerged and floating hydrophytes, they must be caught and then released into the river, above the area of works;
 - e) all work should be carried out during the day in order not to disrupt activities, including migration, of nocturnal species (e.g. eels);
 - f) introducing stocking with the following fish species:
 - Burbot (*Iota lota*) - sections of Odra covered by the investment during the period of the works (approx. 3 years) and for 3 years after their completion. Supplementary stocking doses will be established in agreement with fishing users (at least 500,000 hatchlings per year), and the stocking material will be obtained from spawners from the Odra basin;
 - the European whitefish (*Coregonus lavaretus*) - Odra below the mouth of the Warta River, by introducing at least 1,000,000 hatchlings per year for the duration of the works (approx. 3 years) and up to 5 years after their completion.
- In order to minimise the impact of investment works on ornithofauna:
 - a) in order to prevent the loss of breeding of sparrow species nesting in rushes and in willow shrubs on the bank, before work begins on a given groyne and in the area of a river wall, vegetation that grows on them, within 30 m of their foot, should be removed outside the breeding season, i.e. in the period from August to the end of February;
 - b) carry out tree felling outside the bird breeding season; it is possible to carry it out during the abovementioned protection period in case it is not possible to adjust the felling time for technological reasons, however, an ornithologist from environmental supervision must carry out an inspection during the breeding season, a maximum of 3 days before the date of felling, to confirm the absence of nests and breeding of birds. The above derogation does not apply to hollow trees (inventoried in the following locations: English oak - 1 pc at 585.68 km, white willow - 3 pcs, European willow - 1 pc at 606.15 - 614.52 km, white willow at 645.77 km, European willow - 2 pcs at 652.59 km, white willow at 655.05 km, poplars and willows at 662.12 - 662.23 km; 662.33 - 662.45 km; European white elms and black poplar at 662.56 - 662.77 km; white willows at 673.01 km; white willows and European white elms at 673.75 km and white willows at 677.45 km), the felling of which must be carried out during the period of reduced activity and wintering of bats, i.e. in the period from 15 August to 30 April, taking into account the bird breeding period. Protect trees and shrubs not intended for felling against

- mechanical damage by using a guard made of boards;
- c) carry out works on the embankment located at 648.3 km, by the 4/649 groyne outside the breeding season of the kingfisher *Alcedo atthis*, i.e. from October to the end of February;
 - d) carry out works at the bank slope - at 646.5km, outside the breeding period of *Riparia riparia*, i.e. from 1 August to the end of February and, if necessary, protect the slope before the next breeding season, before nests are built, with fine mesh, i.e. less than 4 cm, made of plastic or metal, after obtaining the required permits for derogations;
 - e) carry out construction works within a 500 m radius of the bridge structure located at about 653.9 km, outside the eagle owl breeding period, i.e. from the beginning of September to the end of December. Before commencing work in the non-breeding period, the presence of the eagle owl in the area will be verified by environmental supervision and, if necessary, the manner of conducting this work will be indicated;
 - f) in order to prevent the temporary limitation of the availability of potential breeding habitats for the laniar and the charadriid, at least two low floating islands with a total area of approx. 250 m² should be constructed for the duration of stage I and stage II of the investment, outside the riverbed, i.e. in the vicinity of Chlevice, on plot no. 272 Chlevice precinct, Boleszkowice commune, Myślibórz district with the following assumptions: construct low floating islands without a "sill" protruding above the water, with a cellular concrete structure with positive buoyancy, quickly overgrowing with vegetation. The surface of the platform will be covered with a few centimetres' layer of soil and a special biotextile for the development of plants, so that it quickly fits into the landscape and becomes settled by ornithofauna.
- In order to minimise the impact of investment works on herpetofauna in Section 2-602.1 km the breeding site of the moor frog located near the embankment should be visibly marked so that it is not damaged by the construction equipment that uses the road.
 - In order to minimise the impact of investment works on bats construction works in areas of particular concentration of bats (at 585.5-586, 600.5-604, 604.5-608, 614-615 km, 655 km, 658 - 659.5 km, 662.5-663 km, 673-674 km) should be conducted during the period of reduced activity and wintering of bats, i.e. in the period from 15 August to 30 April.
 - Construction of all longitudinal dams should be carried out along with the installation of two pipes with a diameter of 1000 mm in the dam structure on each groyne field, removal of some groynes (on approx. 30 m) in the middle part of the dam and the creation of an open connection of the area behind the dam with the downstream side in order to improve the oxygen conditions in the reservoir, allowing for the migration of fauna (invertebrates and fish), reducing the tendency of the reservoir to silt and overgrow, and to prevent the death of benthofauna taxa and the loss of fish.
 - In places where river walls are to be constructed:
 - only use natural materials; however, geotextile may also be used;
 - construct the wall with an undulating line, i.e. in accordance with the existing physical composition of the land;
 - Behind the designed longitudinal dams, in groyne fields cutting deeply into the bank, revetments should be demolished in places where they are not justified, i.e. at groynes 12/675 - 16/675.
 - Carry out works from the water; only in cases where this will be impossible due to environmental conditions, i.e. dynamic water status, is it possible to carry out part of the works from the side of the land, while the possibility of carrying out works from the side of the land and the location of material storage sites (taking into account areas where the distance from the embankment to the Odra bank is more than 100 m) are excluded at the following sections: 581 - 583.2 km (nature reserve area and swamps); 585.3 - 585.7 km (nature reserve); 608 - 613 km, 615.3 - 615.6 km (areas where the distance from the embankment to the bank of the Odra is greater than 100 m); 650.5 - 656 km (northern, wetland part of section IV); 656.5 - 661 km (the Kostrzyneckie swamp); 672 - 673.4 km (swamps); 678 - 682 km (swamps).
 - Storage sites should be organised with the participation of environmental supervision (selected just before the start of the works, due to the dynamic levels of water and, consequently, different

settlement of the area by animals), outside of the patches of natural habitats and ornithofauna habitats in the following locations: in Section I in the location: at approx.: 580.55 km, 583.45 km or from 584.5 to 585.3 km; in Section II in the location at approx.: 602.07, 604.35, 607.9, 615.98 km; near groyne 6/605; in Section III in the location at: 647.30; 649.30; 652.90; 656.0 km (if there are appropriate ground and water conditions, a temporary storage area can be created, outside of the breeding season, 500 m east of the concrete road (approx. 656.4 km), if it is not possible to store the material on the groyne) and 663.45 or 665.2 km; in section IV in the location at approx.: 668.20 km (at 668.0 - 668.7 km, materials may only be stored in the vicinity of the existing river wall); 671.40; 673.9; 676.61; 677.9; 682.6 km. In the case of unfavourable weather conditions and dynamic water levels, it is possible to organise storage sites for materials in another location, after it has been inspected by the environmental supervision, up to 3 days before the date of material storage, which will confirm the absence of valuable elements of the natural environment in these places.

- In order to protect individual elements of the environment against the adverse impact of the project, during the planned works (earthworks, storage of materials, passage of machines) the location of natural habitats and habitats of protected animal and plant species should be taken into account, and they should be fenced off (e.g. with a forest net) or visibly marked by environmental supervision (e.g. with an information board) at the following kilometres: section I: within natural habitats: 3150 - approx. 581.0 km; 583.7; 6430 - approx. 581.0 km; 582.1; 583.2; 584.5; 584.8; 91F0 - approx. 581.0 - 582.6 km; 585.4 - 585.7; 6510 - approx. 582.7 - 583.7 km; section II: 616.4 km; 616.9 - 617.3 km; 616.5 km; 608.6 - 609.4 km; 608 - 613 km and 615.3 - 615.6 km; within natural habitats: 6430 - approx. 602.5 km; 603.3; 606.3 - 606.5 km ; 606.9 km; 6440 - approx. 608.6 - 609.5; 615.7- 615.8; 616.9 - 617.3 km; Section III: 650.5 - 656.0 km; 656.5 - 661 km; within natural habitats: 6430 – approx. 645.5-645.6 km; 655.2 km; 661.2 km; 91E0 - approx. 648.0-648.5 km; 653.5 - 653.9 km; 654.2 - 654.4 km; 655.0 - 655.3 km; 657.9 - 661.0 km; 661.2-662.3 km; Section IV: 672 - 673.4 km, 678 - 682 km; 679.9 km; 684.4, 684.7 km, 685.5 km, 685.7 km, 685.8 km; within natural habitats: 3150- approx. 663.6; 665.6; 668.0-668.1; 668.8-669.1; 669.3-669.9; 671.9-672.0 km; 91E0 approx. 677.4-677.7; 678.8-679.8; 673.0-673.8; 683.1-683.9; 680.6-681.0 km; 6430 - approx. 666.0-666.4; 665.5-666.9; 683.9 - 684.0; 684.5 km; 6440 - approx. 663.8 km; 6120 - approx. 663.8 km.
- Take measures to restore the riverbank characteristics enabling the development of habitat 3270 by:
 - strengthening the population of the strapwort by securing the site against accidental destruction (with particular regard to the Odra bank at SW from Stary Kostrzyn and between Kostrzyn and Górzycze, approx. 612.5; 608 km) and, if possible, obtaining seeds to maintain the species in conservation cultivation (in accordance with established practice) during the works,
 - excluding as potential material storage sites the locations within wet depressions where indicator communities for this habitat could develop during the summer,
 - During the execution of works involving groyne reconstruction, not interfering with deposits located in groyne fields, with the exception of places directly interfering with the designed structures (wings),
 - carrying out works on the construction of wings from the furthest point of a wing towards the groyne,
 - when strengthening the foundations of slopes and groynes, avoiding sodding and sowing on large areas, preferring openwork solutions (riprap, gabions, fences, fascine-stone and mesh-stone rolls), which easily silt and are overgrown with vegetation.
 - carrying out works related to the reconstruction and construction of groynes outside the period from April to September.
- Reduce the spread of invasive species of flora (especially *Echinocystis lobata* and the riverside cocklebur) by controlling invasive plants growing on the banks directly affected by the investment (groynes and the adjacent groyne fields) in accordance with the following:
 - prior to the commencement of the construction works, carry out a field inspection of the work sites with the participation of a phytosaniologist/botanist who will locate the places of occurrence and the population of invasive plants (listed invasive annual

species are characterized by a high dynamics of occurrence and require annual updating of information on their local ranges and frequency of occurrence, which are variable and depend to a large extent on weather conditions and other factors) and then visibly mark them;

- prevent, through the environmental supervision, the development of annual invasive species colonising disturbed habitats on the banks of the Odra, in places where, as a result of the works carried out, the existing vegetation will be disturbed and the bare surface of the ground or riprap will be revealed or formed, by an annual inspection of all such sites, carried out preferably in the first half of June (or possibly from the third decade of May to the first decade of July);
 - identified characteristic seedlings and young plants belonging to the following species should be removed: *Echinocystis lobata*, the Himalayan balsam, rough cocklebur, and riverside cocklebur. Young, emerging plants will be removed mechanically (picked); in case of mass occurrence they can be cut or mown; however, these operations are to be carried out before fructification (by mid-July);
 - in the case of very high numbers, the biomass of invasive species should be removed from riverside habitats in order to allow the development of native alluvial species. The preferred method is to pull out the invasive plants (most effective and precise). Mowing should be carried out as low as possible to prevent the plants from growing back and only in places where it will not endanger rare native plant species;
 - secure the earth and plant material obtained in the area of invasive species and then dispose of it in accordance with applicable regulations.
- 15.** Harden the surface of storage areas, e.g. with road slabs.
- 16.** Work related to the demolition of existing structures should be carried out with due care in order to prevent removed structural elements and other contaminants from falling into the riverbed.
- 17.** Materials used for the implementation should mainly be such construction materials and raw materials as: gravel, sand, stone, and fascine, which will not deteriorate the environmental condition compared to the present status.
- 18.** Store the waste generated during the implementation of the investment in designated places, e.g. on vessels, and then hand it over for disposal and possible recovery to specialised, authorized companies.
- 19.** Deliveries of fuel to the construction site should be carried out using bunkering barges, refuelled in designated places, with properly equipped quays, and after the bunkering barge arrives at the construction site, refuel with pushers and transportable temporary petrol stations located on pontoons with excavators.
- 20.** Install the transportable service station in a sealed tank in order to avoid spillage of fuel on the deck of the pontoon, and prepare materials and equipment on the vessels to eliminate spillages, such as flexible dams, pneumatic or sorbent dams and sorbents (mats, rolls, pillows, booms). Other work sites and material storage sites should also be equipped with the abovementioned materials and equipment; in the event of leakage of harmful substances, contaminants should be immediately removed and the used material should be handed over to an authorised recipient.
- 21.** Soil from excavations should be used for land reclamation and shaping, except for earth masses obtained in the area where invasive species are found.
- 22.** Persons handling the construction of investment elements should meet the sanitary and hygienic standards in accordance with applicable regulations, including the Health and Safety Plan (BIOZ) developed for the duration of the investment.
- 23.** To reduce nuisance during the construction phase, i.e. the temporary increase of dust and noise emissions:
- conduct construction works only during daytime, while for works generating higher noise levels, take into account the acoustically protected areas located in Słubice, Kostrzyn nad Odrą and in the Górzycza commune (in the area of the border with the Kostrzyn nad Odrą commune), e.g. by limiting the engine working time at the highest speed;
 - use equipment and machinery that meets environmental requirements and standards, including equipment that is adequately soundproofed, technically sound and has low levels of pollutant emission;

- limit the operating time of engines at top speed;
 - use technically efficient machinery and vehicles; the machinery used for the investment should have modern drive units with limited exhaust emissions;
 - switch off unnecessary noise-emitting equipment, machines, and tools that are not in use at the time.
24. Store the sorted generated waste in places adapted for this purpose in the least environmentally hazardous way, and then dispose of it in accordance with the regulations. Due to the nature of the investment and the manner of its implementation, in order to protect the aquatic and terrestrial environment against waste pollution, a Waste Management Plan should be drawn up for the duration of the works.
25. Provide archaeological supervision if work is carried out in the vicinity of the Kostrzyn Fortress fortifications.

II. The environmental requirements which have to be included in the documentation necessary for issuing the permits defined in Article 72(1)(1) of the Act of 3 October 2008 on providing information about the environment and its protection, citizen engagement in environmental protection and on environmental impact assessments

1. The requirements set forth in item I hereof must be included in the specification of works.

III. Environmental requirements with respect to reducing transboundary environmental impacts:

1. Model tests using the 2D-MTR model (two-dimensional numerical model of sediment transport) for the section of the Warta river mouth region (610.0 - 620.05 km) and the Słubice region (581.0-585.7 km) should be submitted to the German side immediately after completion.
2. Conduct monitoring covering such issues as: effectiveness of the implemented minimisation activities (carried out 1 year and 3 years following the completion of the works); long-term effects of hydraulic and morphological impact (carried out every 5 years); long-term effects on the ecological status of surface water bodies (carried out every 5 years) with the following assumptions:
 - agree the scope of the above monitoring with the competent authorities on the German side (including the Polish-German Border Water Commission, The International Commission for the Protection of the Odra and the Polish-German Programme Council of the Lower Odra Valley Network of Protected Areas under the aegis of the Polish-German Environmental Protection Council) before submitting them for approval to the Regional Director for Environment Protection in Szczecin;
 - the monitoring programme and the final monitoring reports covering the above issues should also be drawn up in German;
 - the results of the submitted monitoring studies on transboundary impact issues will be forwarded to the German side as soon as they are received;
 - The Regional Director for Environment Protection in Szczecin, after prior approval by the German side may decide, on the basis of the monitoring results provided, e.g. to extend the monitoring time, change its scope or apply additional minimisation measures;
 - provide the Regional Director for Environment Protection in Szczecin with the results of monitoring and a proposal for preventive or minimising actions, if necessary, in the form of: periodic reports, within 3 months from the end of a given survey year (2 copies); final reports (summarising the entire survey cycle) - within 6 months after the completion of the surveys for a given environmental resource (2 copies);
 - where significant negative impacts on a given environmental resource or other significant environmental risks are identified in the periodic or final report, propose preventive or minimising actions and a method of implementation and control of the results in the monitoring report. Should there be any unexpected, uncontrolled occurrence of significant changes in the conservation status of natural habitats as well as habitats of protected plant and animal species, including those protected in Natura 2000 sites, which may have a significant impact on elements of the natural environment, the Regional Director for Environment Protection Szczecin and the competent authorities on the German side must be immediately notified and a professional assessment of the causes of the observed

changes should be provided, including a presentation of methods to remedy and prevent the adverse phenomena. Expert assessment, together with conclusions and recommendations, should be completed within one month from the date on which adverse phenomena were observed and (each time) send it to the Regional Director for Environment Protection in Szczecin immediately after its execution, but no later than one month from the preparation of the assessment.

IV. Requirements to prevent, reduce, and monitor the environmental impact of the project

1. Control the technical condition of individual elements covered by the implementation of the investment during the investment, with particular emphasis on pipes installed in the dam structure - conducting regular inspections, ongoing removal of faults.
2. Check the proper condition of construction equipment and transport vehicles during construction works.
3. Conduct environmental monitoring on the investment site and in the area which the project may affect, in the following way.

3.1. Monitor the project's environmental impact at the construction and operation stages, in accordance with the scope, schedule, and methods described below.

3.2. Monitoring at the construction stage should include the following elements of the environment:

a) concentration of suspended load and water oxygenation

Monitoring of concentration of suspended load and water oxygenation should be carried out in accordance with the following assumptions:

- monitoring of concentrations of suspended load should be carried out daily, with measurements taken after at least 2 hours of work (with normal intensity). Measurements of dissolved oxygen concentration will be carried out in parallel with the measurement of concentrations of suspended load. Oxygen concentration should be measured in the middle of the water column - approx. 1.0 m below the water surface.
- if concentrations of suspension higher than 200 mg/l or dissolved oxygen concentrations < 4 mg O₂/l are recorded (at monitoring points located approx. 200 m below the site of works), works should be suspended for 2 hours, after which the measurement should be repeated. Works will resume if the values in the repeated measurement fall below 200 mg/l.
- if concentration >400 mg/l of suspension or <3 mg O₂/l are recorded, works will be suspended immediately for at least 24 hours until the concentration falls below 200 mg/l, as confirmed by the results of the repeated measurement;
- markings will be made at monitoring points located approx. 200 m below the site of works.

b) degree to which artificial breeding islands created/established in the Lower Odra Valley Natura 2000 site PLB320003 are used by the Iari and the Charadriid to assess the effectiveness of the floating islands constructed during the implementation of the investment (i.e. until the completion of the works in stage II of the project, with the possibility of extending this deadline for the duration of the investment), with two inspections: the first one between the third decade of April and the second decade of May, and the second one between the first and third decade of June

c) the conservation status of the natural habitats within the range of investment impact such as: 3270, 3150, 91E0, 91F0, 6440, 6430, 6510 and the number and distribution of species subject to protection in Natura 2000 sites and of European Community interest in particular fish, including spined loach, asp, European bullhead, amur bitterling, weatherfish; birds - including bird species associated with the river bank, such as the Iari and the Charadrii, waterfowl, as well as the Eurasian eagle-owl, whose site is located in the bridge structure at approx. 653,9 km; endangered, rarely encountered, and legally protected species covered by this Permit, with particular regard to species such as: the fringed water lily, river strapwort, water chestnut, *Unionidae* family mussels.

Monitoring of individual species and habitats should be carried out according to the adopted methodology in this respect (in accordance with the State Environmental Monitoring).

Monitoring should, to the extent possible, include control points covered by field surveys carried out for the purposes of the report.

3.3. Monitoring at the operation stage should cover the following issues.

- a) the degree to which the riverbank characteristics have been restored to enable the development of habitat 3270.

Field surveys with respect to the monitoring of habitats should be carried out regularly for the first five years after the construction site has been cleared (after each stage of the investment implementation). The recommended time for conducting field surveys as part of the monitoring is July, August and September. The basis for monitoring will be phytosociological photographs taken during field surveys in the following years, preferably at fixed points (sections of the bank), taking into account the effects of work carried out on strengthening the population of the strapwort.

Reports with monitoring results, with the exception of the report from the first year of monitoring, should include information on the progress of habitat restoration compared to the results of previous surveys.

- b) the spread of invasive alien species

Monitoring concerns the control of the spread of invasive alien species of plants, including such species as *Echinocystis lobata*, riverside cocklebur, Reynoutria, Himalayan balsam, on the sections of the banks directly affected by the investment (groynes and the adjacent groyne field), where, as a result of the conducted works, the existing vegetation was disturbed and the bare surface of the ground or riprap was exposed or created.

Field surveys in the monitoring of invasive alien species should be carried out regularly for the first five years (after each stage of the investment) after the construction site has been cleared - every year, during the growing season, preferably in the first half of June (possibly from the third decade of May to the first decade of July).

If during monitoring the presence of the abovementioned species or other invasive species is found, measures should be taken to remove them from the monitored area, in accordance with the assumptions indicated in item 1.14 of this permit.

An additional single inspection of the presence of invasive species should be carried out during the growing season, 10 years after the site has been cleared.

- c) the extent to which diversification of habitats in the bank zone has been restored.

The monitoring should cover in particular groyne fields in the form of oxbows, sand deposits, aquatic vegetation with particular emphasis on protected species subjected to metaplanting (fringed water lily), shallow rock deposits (riffles) at the tops of modernised groynes, longitudinal dams and spaces cut off by them from the current, groyne fields - accumulations of woody debris, oversized boulders; groyne fields - cut-off bays in the form of oxbows. Monitoring should be carried out after 1 year and after 3 years from the completion of the works (after each stage of the investment implementation). An additional inspection should be carried out 10 years after the site has been cleared;

- d) long-term effects of the hydraulic and morphological impact of the investment on the conservation status of species and habitat types dependent on the waters that are subject of protection of Natura 2000 sites.

The subject of monitoring will be as follows:

- natural habitats with particular emphasis on the habitats subject to protection in the Natura 2000 sites, including the habitats within the scope of the impact of the investment, such as: 3270, 3150, 91E0, 91F0, 6440, 6430, 6510,
- species that are the subject of protection in Natura 2000 sites and which are of interest to the European Community, with particular emphasis on species of birds: the lari and the charadrii,
- endangered, rare, and legally protected species, with particular regard to such species as the fringed water lily, river strapwort, water chestnut,
- the integrity of Natura 2000 sites, understood as the coherence of structural and functional factors determining the sustainable survival of the populations of the species and natural habitats for which those sites have been designed or

designated;

- other species, ecological groups of organisms, or ecological processes relevant to the assessment of the impact of the investment on the natural environment (indicative, valuable for the protection of natural, landscape or utility values).

Monitoring should be carried out every 5 years following the completion of the first stage of the investment. Monitoring should also address the issue of transboundary impact.

- e) long-term impacts of the investment on the ecological capacity/status of bodies of surface water.

Monitoring should be carried out in accordance with the adopted methodology in this area (including, among others, the Chief Inspector of Environment Protection) and include quality elements for classifying the ecological capacity/status of the JCWP, i.e. biological, hydromorphological and physical-chemical elements.

Monitoring should be carried out every 5 years following the completion of the first stage of the investment. Monitoring should also address the issue of transboundary impact.

- f) status of water flow in the river and the status of groundwater within the range of habitats dependent on waters.

Monitoring will begin after the completion of the first stage of the investment and will be carried out annually for 40 years.

Monitoring of the status of river water will include inspections of records from water gauges located along the section covered by the investment (including, among others, those in Gozdowice and Słubice) and specification of the location of the water table for water gauges and specification of flows recorded in the reference period. Records will include average annual water flows, but in extreme situations, i.e. extreme low and extreme high waters, the frequency of inspections should be increased and should include e.g. average monthly flows or average daily flows.

Groundwater status monitoring will determine the level of groundwater within the range of selected habitats dependent on waters within the range of the investment impact (e.g. 6440, 91E0) on the basis of data from installed piezometers (and/or staff gauges), supplemented with readings from the abovementioned water gauges in, among others, Gozdowice and Słubice.

Groundwater monitoring carried out during the operation of the investment should be preceded by surveys of the pre-implementation state, the so-called state 0, carried out prior to the commencement of the investment works, constituting the background for further monitoring surveys and enabling a comparison of the presented results;

- g) the state of changes in the formation of the river bottom, including riverbed mesoforms, bumps, channels and other manifestations of deep erosion, and overgrowing of groyne fields.

Monitoring should also include the assessment of river load transport.

Monitoring will begin after the completion of the first stage of the investment and will be carried out every 5 years. Monitoring will include the assessment of river load transport, starting with the assessment of state „0” as the starting point for further surveys. As part of the monitoring, hydrographic measurements will be carried out by means of an echosounder at average water level for selected reference sections jointly agreed with the German side;

- 3.4. Provide the Regional Director for Environment Protection in Szczecin with the results of monitoring and a proposal for preventive or minimising actions, if necessary, in the form of:

- periodical reports, within 3 months of the end of a given survey year (2 copies);
- final reports (summarizing the entire test cycle) - within 6 months after the completion of the survey for a given environmental resource (2 copies).

- 3.5. Where significant negative impacts on a given environmental resource or other significant environmental risks are identified in the periodic or final report, propose preventive or minimising actions in the monitoring report and the proposed method of implementation and control of the results. Should there be any unexpected, uncontrolled occurrence of significant changes in the conservation status of natural habitats or habitats of protected plant and animal species, including those protected in Natura 2000

- sites, which may have a significant impact on elements of the natural environment, the Regional Director for Environment Protection Szczecin must be notified and a professional assessment of the causes of the observed changes should be provided, including a presentation of methods to remedy and prevent the adverse phenomena. A technical assessment with conclusions and recommendations should be completed within one month from the date on which the adverse phenomena were observed and (each time) sent to the Regional Director for Environment Protection in Szczecin immediately after it is completed, but no later than one month from the assessment.
- 3.6. The assessment of the impact of the investment on individual elements of the natural environment should be carried out by qualified specialists in this field, who will document and properly analyse the impact of the project and propose effective minimisation measures.
 - 3.7. Final monitoring reports for a given environmental resource should be drawn up in two parts: the first part: survey results from a given period; the second - comparison of the results with the findings contained in the report constituting the basis for this permit and in this permit, in order to carry out a proper assessment of the impact of the project on a given environmental resource.
 - 3.8. The monitoring programme, together with an indication of its implementation and deadlines for the submission of its results to the local authority, should be submitted for approval to the Regional Director for Environment Protection in Szczecin before it is commenced, with the exception of monitoring covering the water status and flow in the river and the level of groundwater within the range of habitats dependent on waters, as well as changes in the formation of the bottom, including riverbed mesoforms, bumps, channels and other manifestations of deep erosion and the overgrowing of groyne fields, which should be submitted before the commencement of works related to the implementation of the investment, i.e. before the 1st stage of the investment implementation. When establishing the scope of monitoring, it is necessary to take into account the assumptions included in the justification of this permit, information collected during the works on the report on the environmental impact of the project, and other data on the natural environment of the analysed area.
 - 3.9. Methodology of monitoring covering long-term effects of the hydraulic and morphological and long-term effects of the impact on the ecological status/potential of surface water bodies, as well as the effectiveness of the implemented minimisation measures in the context of the transboundary impact will be submitted for approval to Regional Director for Environment Protection in Szczecin, after prior agreement with the competent authorities on the German side (e.g. the Polish-German Border Water Commission, in the International Commission for the Protection of the Odra and the Polish-German Programme Council of the Lower Odra Valley Network of Protected Areas under the aegis of the Polish-German Environmental Protection Council).
 - 3.10. The monitoring programme and the final monitoring reports covering the effectiveness of the minimisation activities carried out in the context of transboundary impact, the long-term hydraulic and morphological effects, and the long-term effects on the environmental status of bodies of surface water should also be drawn up in the German language.
 - 3.11. The Regional Director for Environment Protection in Szczecin, after prior consultation with the Regional Director for Environment Protection in Gorzów Wielkopolski and approval by the German side, may decide on the basis of the monitoring results provided, e.g. to extend the monitoring time, change its scope or apply other minimisation measures, including a change of the scope of the investment in stage II);

V. I do not impose a requirement to conduct an environmental impact assessment as part of the procedure for issuing the permit defined in Article 72(1)(1) of the Act of 3 October 2008 on providing information about the environment and its protection, citizen engagement in environmental protection, and on environmental impact assessments.

C. The permit is immediately enforceable.

Justification

The Director of the Regional Water Management Authority in Szczecin State Water Management Polish Waters submitted, through Ms. Krystyna Araszkiwicz of Sweco Consulting Sp. z o. o., an application for the issue of an environmental permit for the project entitled "IB.2 Stage I and Stage II Modernisation works on the border Odra as part of the Odra-Vistula Flood Management Project". The following documents were attached to the application for an environmental permit:

- project information sheet (PIS),
- a map with the area on which the project is planned to be carried out and the area predicted to be affected by the project marked, an electronic copy of the map;
- a copy of the power of attorney granted to Ms. Krystyna Araszkiwicz from Sweco Consulting Sp. z o.o. to apply on behalf of the State Treasury - Regional Water Management Authority in Szczecin, to local and government authorities and other entities for the necessary permits and arrangements, as well as to apply to industry institutions for the necessary conditions, opinions, arrangements for performing tasks which are part of the Odra-Vistula Flood Management Project.

In connection with information provided in the application for a permit concerning the number of parties to proceedings exceeding 20, the investor applied the provisions of Art. 74(1a) of the EIA Act, according to which a copy of the cadastral map certified by the competent authority and excerpts from the land register are submitted together with the project environmental impact report.

Due to the fact that formal and legal omissions were found in the submitted materials, the local authority, in letter dated 24.11.2017, ref. no.: WONS.OS.4233.1.2017.KK.1 requested the applicant to complete them.

The supplement was received on: 27.11.2017 and 04.12.2017.

The examination of the documents related to the case in question shows that in accordance with the provisions of the Regulation of the Council of Ministers of 9 November 2010 on projects which may materially affect the environment (Journal of Laws of 2016, item 71) applicable as at the day of submission, the investment was classified as a project that may potentially materially affect the environment, as listed in § 3(1)(65) 65 - *"flood control structures, excluding the reconstruction of embankments consisting in sealing the body of embankments and their base in order to limit the possibility of them being washed out and broken during the passage of flood waters, as well as water regulation or sewerage understood as management of waters that enables them to be used for navigation purposes"*. It should be noted, that on 11 October 2019 the Regulation of the Council of Ministers of 10 September 2019 on projects which may materially affect the environment (Journal of Laws of 2019, item 1839) came into force. However, the project covered by this procedure was classified on the basis of the regulation of 9 November 2010 in accordance with the provision of § 4 of the Regulation of the Council of Ministers of 10 September 2019 on projects that may materially affect the environment (Journal of Laws of 2019, item 1839), which indicates that for proceedings on the issue of an environmental permit initiated and not concluded before the date of entry into force of the regulation, the existing provisions apply. This is the case in these proceedings.

It should be emphasised that with the Act of 19 July 2019 on the amendment of the act on providing information on the environment and its protection, citizen engagement in environmental protection, and on environmental impact assessments and certain other Acts (Journal of Laws of 2019, item

1839), which came into force on 24 September 2019, the EIA Act was amended. Nevertheless, the issue of this environmental permit by the local authority is governed by art. 4(1) of the Act of 19 July 2019, which indicates that the existing provisions apply to cases initiated and not concluded before the date of entry into force of the abovementioned Act.

The investment in question belongs to investments consisting in the implementation of an investment within the meaning of the Law of 8 July 2010 on special rules of preparing projects involving flood prevention structures. Therefore, in accordance with Article 75 (1)(1i) of the EIA Act, the competent authority to issue an environmental permit for the planned project is the Regional Director for Environment Protection. The project will be carried out in the Zachodniopomorskie and Lubuskie voivodeships. Due to the fact that the majority of the project is located in the Zachodniopomorskie voivodeship, in accordance with Article 75(5) of the abovementioned EIA Act, the authority competent to issue an environmental permit is the Regional Director for Environment Protection in Szczecin. In this situation, in accordance with Article 75(5) of the abovementioned Act, the environmental permit is issued in consultation with the Regional Director for Environment Protection concerned, i.e. the Regional Director for Environment Protection in Gorzów Wielkopolski.

After the application has been formally completed, pursuant to Article 61(4) and Article 10(1) of the CAP, by letter dated 11 December 2017, ref. no.: WONS.OŚ.4233.1.2017.KK.2, the authority notified the parties that the administrative procedure had been initiated. Due to the fact that the number of parties to the proceedings exceeded 20, pursuant to the statutory disposition specified in Article 74(3) of the EIA Act, the parties to the proceedings were notified of all actions of the authority on the terms specified in Article 49 of the Law of 14 June 1960 Code of Administrative Procedure hereinafter referred to as CAP, i.e. by way of notices. Given the territorial range of the project's impact, the local authority published its notices (in addition to the notice on the notice board and the BIP Bulletin of the Office) on the notice boards (or by notifying the parties in any other customary manner) through the following offices: Regional Directorate for Environment Protection in Gorzów Wlkp., Chojna Commune Office, Cedynia Commune Office, Mieszkowice Commune Office, Kostrzyn nad Odrą Commune Office, Górzycze Commune Office and Słubice Commune Office.

After the initiation of the procedure, the local authority proceeded to carry out a substantive assessment of the submitted documentation. After examining the submitted project information sheet, the local authority concluded that it clearly indicates the possibility of transboundary environmental impacts for the project. The information presented in the PIS shows that the areas exposed to noise and air pollution emissions on the German side are: the town of Frankfurt (Oder) and the villages of: Hohensaaten, Hohenwutzen, Rudnitzer Ausbau, Gustebieser Loose, Bleyen and Kustrin Kietz. Additionally, the authors of the PIS stated that the planned project may also have an impact on Natura 2000 sites located in Germany. It was also indicated that the transboundary impact on the environment will take place both during the modernisation and renovation works on the river control structures in the Odra, as well as after their completion, i.e. at the stage of project operation. Therefore, in accordance with art. 108(1)(1), (3), and (4) of the EIA Act, the local authority, on 11.12.2017, with the ref. no.: WONS-OŚ.4233.1.2017.KK.3, issued a decision on the necessity to conduct proceedings on the transboundary environmental impact of the project in question and imposed an obligation on the applicant to prepare the following documents in the German language: the PIS, the application for an environmental permit and the part of the documentation drawn up at a later stage of the procedure that will enable the State whose territory the planned project may affect to assess the potential material transboundary impact on the environment.

After obtaining the abovementioned documents translated into German from the applicant on 12.01.2018, in accordance with Article 108(1)(2) of the EIA Act, by letter of 16.01.2018, ref. no.: WONS-OŚ.4233.1.2017.KK.9, the RDOS in Szczecin submitted translations to the General Director for Environment Protection (GDOŚ), the authority responsible for coordinating the procedure of environmental impact assessment in a transboundary context. The official notification of a possible material transboundary impact of the project under Article 2(1) of the Agreement between the

Government of the Republic of Poland and the Government of the Federal Republic of Germany on the implementation of the Convention on Environmental Impact Assessment in a transboundary Context of 25 February 1991 signed in Neuhardenberg on 11 April 2006, hereinafter referred to as the Polish-German Agreement, was sent by the General Director for Environment Protection to the Brandenburg Ministry of Rural Development, Environment and Agriculture on 23 January 2018. By letter of 21 February 2018 (submitted by the GDOŚ by letter of 6 March 2018), the German side declared its participation in the proceedings on the transboundary environmental impact of the project in accordance with the provisions of the abovementioned Polish-German agreement, indicating that the documentation should include a detailed definition, assessment, and description of the environmental impacts of the planned project on the territory of the Federal Republic of Germany.

Pursuant to Article 66 (3) of the EIA Act, in the case there is a possibility of transboundary impact on the environment, in the items specified in Article 66(1)(1-16) of the EIA Act, the report should take into account the impact of the planned project outside the territory of the Republic of Poland. In addition, in accordance with Article 66(1)(6) of the EIA Act, the report should contain an indication of the expected environmental impact of the analysed variants, including the possible transboundary environmental impact. These issues were included in the decision on the necessity to carry out the EIA determining the scope of the report, which, on 29.03.2018, ref. no.: WONS-OŚ.4233.1.2017.KK.13 was issued after the submitted documents were analysed, including the opinions of the authorities participating in the proceedings.

In the course of the proceedings, taking into account the provisions of the EIA Act and the resulting need to cooperate with the relevant authorities, the local Authority, by the letter dated 11.12.2017, ref. no.: WONS.OŚ.4233.1.2017.KK.5 based on Art. 64(1)(2) of the EIA Act, requested an opinion on the necessity to conduct an environmental impact assessment from the following sanitary inspection authorities: State District Sanitary Inspector in Gryfino, State District Sanitary Inspector in Gorzów Wielkopolski, and State District Sanitary Inspector in Ślubice. The State District Sanitary Inspector in Gryfino, the State District Sanitary Inspector in Gorzów Wlkp. and the State District Sanitary Inspector in Ślubice, by letters dated 14.12.2017, ref. no.: PS-N-NZ/4011-29/186/17, dated 22.12.2017, ref. no.: NZ-771 -102/1 -80/17 and 29.12.2017 ref. no.: NZ.772 / -51/17, concluded that an environmental impact assessment of the planned project was not required.

Furthermore, in view of the entry into force on 1 January 2018 of the Act of 20 July 2017, the Water Law (Journal of Laws of 2017, item 1566, consolidated text), which obliges the State Water Management Polish Waters to participate in procedures for issuing environmental permits, by letter of 15 January 2018, ref. no.: WONS-OŚ.4233.1.2017.KK.8, in accordance with Art. 64(1)(4) of the EIA Act, an opinion was requested on the necessity to conduct an environmental impact assessment for the project from the authorities responsible for the water assessment, i.e.: the Director of the Regional Water Management Authority in Szczecin and the Director of the Regional Water Management Authority in Wrocław. The abovementioned authorities, in accordance with the jurisdiction, handed over the documentation in the case to the Minister of Maritime Economy and Inland Waterways, who, by letter dated 19.02.2018, ref. no.: DOK.WO.80.9.1.2018.KO, stated that there was no need for an environmental impact assessment for the planned project.

Due to the fact that part of the project will be implemented in the Lubuskie voivodeship, in accordance with Article 75(5) of the abovementioned EIA Act, by letter dated 11.12.2017, ref. no.: WONS.OŚ.4233.1.2017.KK.4 the Regional Director for Environment Protection in Gorzów Wlkp. was asked to participate in the proceedings and provide an opinion on the necessity of conducting an environmental impact assessment. The Authority, by the letter dated 17.01.2017, ref. no.: WZŚ.4220.2.2018. AN stated the need to carry out an environmental impact assessment of the project and at the same time pointed to a number of issues that should be analysed in the report. These issues were included in the decision on the necessity to conduct an environmental impact assessment determining the scope of the report for the project issued on 29.03.2018, ref. no.: WONS-OŚ.4233.1.2017.KK.13.

In the course of the conducted administrative proceedings, which analysed the need to carry out an

environmental impact assessment, Ms. Iwona Krępic, the President of the Management Board of the Stepnica Tourist Organization Nie Tylko Dla Orłów [Not Only For Eagles], submitted an application on 25.01.2018 (supplemented on 05.02.2018) for the admission of the Stepnica Tourist Organization Nie Tylko Dla Orłów, hereinafter referred to as "SOT", to participate in the proceedings for issuing an environmental permit for the project in question as a party to the proceeding. After the analysis of the submitted documents and examination of the statutory prerequisites, including the Statute of the "SOT", adopted on 12.01.2011, by the decision of 15.02.2018, ref. no.: WONS-OŚ.4233.1.2017.KK.12, in accordance with art. 31 § 1(2) of the CAP, SOT was allowed to participate as a party in the proceedings in question.

On 02.05.2018, the applicant submitted to the Regional Director for Environment Protection in Szczecin a report on the environmental impact of the project drawn up by Sweco Consulting Sp. z o.o. (May, 2018), as well as formal documents in accordance with art. 74(1a) of the EIA Act. After the submitted documentation was reviewed, it was first evaluated in formal terms. Due to formal deficiencies in the submitted documentation, i.e. lack of: original cadastral maps the copies of which were certified by the competent authority, a German translation of the environmental impact report, that enables the state exposed to the impact of the project to assess possible material transboundary environmental impact, the list of plots of land which the project will affect broken down into investment plots and plots within the range of impact, by letter of 11.05.2017, ref. no.: WONS-OŚ.4233.1.2017.KK. 16, the investor was asked to supplement them.

The supplement was submitted on 30.05.2018.

In possession of the formally complete documentation, the local authority proceeded to assess the content of the submitted documentation. After analysing the documents submitted, the authority, by letter of 5 June 2018, ref. no.: WONS-OŚ.4233.1.2017.KK.19, called on the investor to supplement a number of issues concerning the impact of the investment on individual elements of the environment, with particular emphasis on the natural environment, including the context of transboundary impact.

In order to continue the proceedings on transboundary environmental impact, by letter of 05.06.2018, ref. no.: WONS-OŚ.4233.1.2017.KK.20, the General Director for Environment Protection was provided with a part of the report translated into German, enabling the state whose territory the planned project may affect to assess the possible material transboundary impact on the environment. In addition, the GDOŚ was informed about a call for an EIA report addressed to the investor and sent on 5 June 2018. The GDOŚ, by the letter dated 20.06.2018, ref. no.: DOOŚ- TSOŚ.440.5.2017.az3 informed the local authority that the EIA report will be submitted to the German side only after it has been supplemented in order to allow the affected party's public to review the same documentation as the party of origin.

A supplement to the report was submitted on 09.08.2018, including the part translated into German. These documents were submitted to the GDOS by letter dated 14.08.2018.

With regard to the proceedings taking place in the local office, on 28.06.2018, the Stepnica Tourist Organization Nie tylko Dla Orłów, as a party to the proceedings, sent a request by e-mail to take the following studies into account in the proceedings: "Identification of key zones for water retention in the Polish part of the Odra basin. Analysis of potential water retention of drainage systems and its possible impact on the reduction of low winter flows" by Grygoruk, M., Osuch, P. & Trandziuk, P. (2018) and "Effectiveness of the planned Międzyodrze detention basin and the concept of watercourse regulation to improve flood protection in the lower Odra" by Gerstgraser, Ch., Schnauder, I. & Domagalski, B. (2018). These documents were examined by the local authority in these proceedings and subsequently taken into account in the next letter of formal notice addressed to the investor.

During the administrative procedure, the Environmental Association EKO-UNIA with its registered office in Wrocław, hereinafter referred to as "EKO - UNIA", through Dr. Beata Filopcova, applied on 26.06.2018 (date of receipt 29.06.2018) for permission to participate in the proceedings for issuing an

environmental permit for the project in question. After the analysis of the submitted documents, including the statutes and the National Court Register and statutory prerequisites, in accordance with Art. 44 of the EIA Act, by decision of 09.07.2018, ref. no.: WONS-OŚ.4233.1.2017.KK.23 the Environmental Association EKO-UNIA was allowed to participate as a party in the proceedings.

Due to the necessity to perform activities resulting from the applicable provisions, including the wait for the submitted documents to be supplemented, as well as the complexity of the case, by the notice of 14.06.2019, the parties to the proceedings were notified that the environmental permit would be issued at a later date, i.e. by 28.09.2019.

In connection with the report on the environmental impact of the project submitted on 02.05.2018, prepared by Sweco Consulting Sp. z o.o. (May, 2018), supplemented formally and substantively on: 30.05.2018 and 09.08.2018, pursuant to Art. 77 of the EIA Act, by letter dated 12.09.2018, an opinion and agreement on the terms of implementation of the project was requested from the authorities participating in the proceedings, i.e.: the Regional Director for Environment Protection in Gorzów Wlkp. and sanitary inspection authorities, i.e. the State District Sanitary Inspector in Gryfino, State District Sanitary Inspector in Gorzów Wlkp., and the State District Sanitary Inspector in Słubice.

The Regional Director for Environment Protection in Gorzów Wielkopolski, by the letter dated 16.10.2018, ref. no.: WZŚ.4221.49.2018.AN approved the project in the Lubuskie voivodeship, at the same time specifying the conditions of its implementation, which were taken into account in this permit.

The State District Sanitary Inspector in Gorzów Wlkp., in a letter dated 27.09.2018, ref. no: NZ-771-50/2-11/18 and the State District Sanitary Inspector in Gryfino, by the letter dated 16.10.2018, ref. no: PS-N-NZ/401-4/103/18, on the basis of the analysis of the submitted documents, gave a positive opinion in terms of environmental hygiene requirements on the conditions for the implementation of the project without imposing conditions for its implementation. Whereas the State District Sanitary Inspector in Słubice, in a letter dated 28.09.2018, NZ 7721- 6-2/18 gave a positive opinion on its implementation, taking into account the conditions ensuring the fulfilment of hygiene and health requirements. The conditions presented by the sanitary inspection body were fully taken into account in this permit, and the authority, in possession of detailed information on the natural conditions of the area covered by the investment, clarified in this permit some of the conditions imposed by the sanitary inspection body regarding the works carried out on land (e.g., indicating river sections excluded from conducting works from the side of the land), the method of securing the construction sites, the manner of conducting works in relation to elements of the natural environment, taking into account the time limits.

Although at the stage of determining the scope of the report for the project the authority responsible for water law assessment, i.e. the Minister of Maritime and Inland Waterways, was consulted, at the next stage of the proceedings, i.e. after the submission of the report, it was not necessary to obtain the opinion of the above authority due to the entry into force on 26 April 2018 of the provisions of the Act of 28 February 2018 amending the Water Law Act (Journal of Laws of 2018, item 710), which indicated that authorities issuing environmental permits were exempted from the obligation to consult the authorities competent to issue water law assessment in the case of proceedings initiated and not completed before 1 January 2018, which is the case in these proceedings.

In the course of the proceedings, given the complexity of the case, the parties to the proceedings were informed by the notice of 12.09.2018 that the environmental permit would be issued at a later date, i.e. by 30.11.2018.

One of the elements of the proceedings conducted on the basis of the submitted EIA report is conducting public consultations in the proceedings in accordance with Article 33(1) in conjunction with Article 79 of the EIA Act. As part of the public consultations, the local authority, by the notice of 07.09.2018, ref.: WONS-OŚ.4233.1.2017.KK.25 made public information about the ongoing environmental impact assessment proceedings for the project in question. The notice included

information referred to in art. 33(1) of the EIA Act, including the possibility of submitting comments and applications, and indicated the place and 30-day deadline for their submission, in the period from 12.09.2018 to 11.10.2018. The information was made public on the website of the Public Information Bulletin of the Regional Director for Environment Protection in Szczecin and announced in the usual way, i.e. on the notice board, in the seat of the Regional Director for Environment Protection in Szczecin and the following offices: Regional Directorate for Environment Protection in Gorzów Wlkp., Chojna Commune Office, Cedynia Commune Office, Mieszkowice Commune Office, Kostrzyn nad Odrą Commune Office, Górzycy Commune Office and Słubice Commune Office.

During the ongoing public consultations, comments and requests were made by:

- Koalicja Ratujmy Rzeki [Coalition Save the Rivers] - e-mail dated 11.10.2018 with an attachment containing a study entitled “Comments and conclusions of Koalicja Ratujmy Rzeki for the administrative procedure for issuing an environmental permit for the project entitled: “1B.2 Stage I and Stage II Modernisation works on the border Odra as part of the Odra-Vistula Flood Management Project” by the Odra team of Koalicja Ratujmy Rzeki, supplemented on 05.12.2018.
- Ecological Association EKO-UNIA - e-mail dated 11.10.2018 with attachments containing the following studies: “Assessment of the environmental impact report entitled: Modernisation works on the Border Odra (IB.2 Stage I and II) as part of the Odra-Vistula Flood Management Project, by Radosław Gawlik, President of the Ecological Association EKO-UNIA and “Initial assessment of the possible impact of the World Bank Project P147460 “Odra-Vistula”, the Government “Strategy for the Development of Inland Waterways in Poland for 2016-2020 with a perspective to 2030” on protected natural areas”, developed by Klub Przyrodników [the Naturalists’ Club] in July 2016).
- the Naturalists’ Club - letter dated 29.09.2018.
- Association for the Development of Inland Navigation and Waterways “Rada Kapitanów Żeglugi Śródlądowej” [“Council of Inland Navigation Captains”] - e-mail dated 11.10.2018.
- Zachodniopomorskie Towarzystwo Przyrodnicze [Zachodniopomorskie Association of Naturalists] - letter dated 03.10.2018.
- Dr. Magdalena Abraham - Diefenbach - e-mail dated 10.10.2018, requesting a negative decision on the environmental permit for the project in question and a consideration of the possibility to implement alternative, more effective and nature-friendly concepts of flood protection and ice jam prevention and other less costly and more efficient methods of improving flood protection on the river Odra.

The submitted letters mainly addressed issues concerning the lack of:

- a thorough analysis of the long-term impact of the investment on the hydrological and hydromorphological regime of the river;
- reasons for recognising the planned project as an overriding public interest, including an unequivocal indication, with an appropriate justification, that the implementation of the planned project serves the purpose of flood protection for the areas adjacent to the Odra by improving working conditions for icebreakers;
- alternative ways to improve the level of flood protection for the population living in the Odra basin, including the presentation of other effective methods of ice breaking, in terms of the predicted cumulative effects of the project on the environment, as well as a number of issues related to the impact on elements of the natural environment, including subjects of protection in Natura 2000 sites, also in the context of transboundary impact.

With regard to transboundary consultations, the procedure was as follows. Having received the documentation translated into German (letter dated 05.06.2018, ref. no.: WONS-OŚ.4233.1.2017.KK.2, supplemented by the letter dated 14.08.2018) from the local authority, by the letter dated 20 September 2018, ref. no.: DOOŚ-TSOOŚ.440.3.2018.PR.1, the General Director for Environment Protection provided the affected party, i.e. the German side, with the abovementioned materials with a request to define its position on the matter within 30 days from the date of submitting the documentation to the public, and to provide information on the date and method of its submission for public inspection in accordance with the provisions of Article 4(1) of the agreement between the Government of Poland and the Government of Germany, signed in Neuhausen on 11.04.2006.

After public consultations conducted on the German side, by letter dated 18.12.2018, ref. no.: DOOŚ-TSOOŚ.440.3.2018.PR.2, the GDOŚ forwarded to the local authority the opinions of the following authorities, as well as the comments and requests of the public regarding the report submitted by the German side, i.e. the Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft des Landes Brandenburg of 26.11.2018.; Rainer Witt of 15.11.2018; Regionale Planungsgemeinschaft Uckermark - Barnim, Regionale Planungsstelle of 05.11.2018; Amt Brieskow-Finkenheerd Der Amtsdirektor of 06.11.2018, ref. 511.15.2#1/1; Regionale Planungsgemeinschaft Oderland-Spree of 19.11.2018; Landkreis Markisch- Oderland Der Landrat of 19.11.2018; Landkreis Oder-Spree Der Landrat of 20.11.2018; Amt für nachhaltige Entwicklung, Bau, Kataster und Vermessung Strukturentwicklung Landkreis Barnim of 07.11.2018; Amt Neuzelle Der Amtsdirektor of 28.11.2018; Wasser- und Schifffahrtsverwaltung des Bundes of 15.11.2018; Pia Isle of 20.11.2018; Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft des Landes Brandenburg of 19.11.2018; Land Brandenburg, Landesamt für Umwelt, Abteilung Technischer Umweltschutz 2 of 15.11.2018; Land Brandenburg, Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum, Wunsdorf of 25.10.2018; Amt Oder-Welse, Der Amtsdirektor of 23.10.2018; Land Brandenburg, Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum of 25.10.2018; Land Brandenburg, Nationalpark Unteres Odertal - Verwaltung of 15.11.2018; Stadt Frankfurt (Oder) Ślubice of 15.11.2018; Landkreis Uckermark- Die Landratin of 15.11.2018; Henrike Rieken dated 15.11.2018; Matthias Dórr of 20.11.2018; Frauke Bennett dated 18.11.2018; Nils Naber dated 30.11.2018; IHK Ostbrandenburg of 20.11.2018 Deutscher Naturschutzring (DNR) e. V. of 19.11.2018; Landesbüro anerkannter Naturschutzverbände GbR of 19.11.2018.

The submitted letters raised issues of inadequate assessment and lack of detailed description of the environmental impact of the planned project on the territory of the Federal Republic of Germany with particular emphasis on issues concerning: flood risk management, compliance with the requirements of the Water Framework Directive (e.g. in the context of chemical and biological quality components, hydromorphological quality components, general components of physicochemical quality, but also transboundary effect on groundwater), effect on flood protection and maintenance of water bodies and structures, impact on the environment of animals, plants and their habitats, natural habitats and landscapes and the Lower Odra Valley National Park, as well as noise emissions.

In the letter forwarding the above comments, the GDOŚ also pointed out the need to provide a good quality translation of the documentation into German, due to the need for new transboundary consultations. Furthermore, it was announced that the affected party may decide, on the basis of the explanations received, that a meeting is necessary.

Comments and requests made in connection with the notice of 07.09.2018, ref. no.: WONS-OŚ.4233.1.2017.KK.25 in accordance with the applicable regulations have been analysed in these proceedings, and a detailed reference to the issues raised is presented in Annex 3 to this permit. This Annex also refers to the comments raised during the transboundary consultation. The comments submitted were analysed and the authority addressed the issues raised, thereby fulfilling the obligation under the EIA Act.

It should be noted that during the public consultations, the Naturalists' Club and Council of Inland Navigation Captains, in letters dated respectively 29.09.2018 and 11.10.2018 in addition to their comments on the implementation of the investment in question, asked to be allowed to participate in the proceedings as parties. Having analysed the submitted documents and the statutory premises, by the decision of 31.10.2018, ref. no.: WONS-OŚ.4233.1.2017.KK.30, in accordance with art. 44 of the EIA Act, the authority permitted the Naturalists' Club to participate as a party, and by the decision of 28.01.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.37 (after the formal deficiencies of the application were rectified), permitted Mr. Czesław Szarek, President of the Management Board of the Association for the Development of Inland Navigation and Waterways "Council of Inland Navigation Captains", to participate as a party to the proceedings.

Due to the numerous deficiencies in the submitted documents, emphasised during the public consultations by non-governmental organizations, institutions and the public on both the Polish and German sides, and due to concerns regarding the quality of the documentation submitted in the course

of the proceedings, by letter dated 18.01.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.36 the applicant was invited to address the objections. It should be noted that comments and requests sent in by the authorities and the public during public consultations were sent to the representative via electronic mail immediately upon receipt.

In response to the above, on: 20.03.2019, 12.04.2019 and 19.04.2019, the applicant announced that explanations would be submitted at a later date as a result of the call of 18.01.2019, and by letter of 30.04.2019 (date of receipt 06.05.2019) the following documents were submitted in the Polish language: an updated environmental impact report for the project prepared by Sweco Consulting Sp. z o.o. (April 2019), a document addressing the comments and requests submitted during public consultation.

Due to formal deficiencies in the submitted documents and three extensions of the deadline for submitting the necessary supplements, by letter dated 23.05.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.41 the applicant was asked to submit within the non-extendible deadline, i.e. by 31 May 2019, documents translated into German that

would enable the State whose territory the planned project may affect to assess the potential material transboundary impact on the environment. The reply was submitted on 03.06.2019 (letter dated 31.05.2019), which was subsequently submitted by letter of 10.06.2019., WONS-OŚ.4233.1.2017.KK.42 by the local authority to GDOŚ.

Due to the necessity to perform administrative actions and the related deadlines resulting from the environmental impact assessment procedure for the project in question, including in the context of transboundary impact, as well as the complicated nature of the case, by notices of 29.11.2018, ref. no.: WONS-OŚ.4233.1.2017.KK.33, dated 27.03.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.39, dated 24.06.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.44, it was announced that the environmental permit would be issued at a later date, i.e. by 29.03.2019, then by 28.06.2019 and then by 25.10.2019.

Being in possession of the documentation received on 06.05.2019, supplemented on 03.06.2019, i.e. the updated report, submitted to the GDOŚ on 10.06.2019, the local authority began the substantive assessment of the submitted documentation. After analysing the documents submitted, the authority, by letter of 19.06.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.43 called on the investor to supplement it, among others, within the scope of systematisation and specification of activities minimising the negative impact of the investment on the natural environment. The supplement was submitted on 05.07.2019. It should be noted that in the letter dated 15.07.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.52 the GDOŚ was informed about the submitted supplement as a result of the call of 19.06.2019, as well as about the fact that the submitted data do not affect the decision regarding the impact of the investment on the environment in a transboundary context indicated in earlier documents.

In connection with the materials submitted by the applicant on 06.05.2019, and 05.07.2019, the authorities participating in this procedure were consulted again, i.e. the Regional Director for Environment Protection in Gorzów Wielkopolski, in accordance with 75.5 of the EIA Act (letter dated 12.07.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.51); health inspection authorities: State District Sanitary Inspector in Gryfino, State District Sanitary Inspector in Gorzów Wielkopolski, and State District Sanitary Inspector in Słubice (letter dated 12.07.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.50).

The Regional Director for Environment Protection in Gorzów Wielkopolski, by the letter dated 14.08.2019, ref. no.: WZŚ.4221.74.2019.AN agreed in a subsequent letter on the implementation of the project, imposing at the same time the conditions for the implementation of the project in the Lubuskie voivodeship, which were fully taken into account in the ruling of this decision, with the local authority clarifying some of the conditions, among others within the scope of the method and frequency of submitting reports on environmental supervision, the way in which the soil from excavations was to be used, taking into account the ground masses obtained in the area of occurrence

of invasive species and the method of carrying out works related to the demolition of existing structures.

The State District Sanitary Inspector in Gorzów Wlkp., and the State District Sanitary Inspector in Gryfino by letters dated 29.07.2019, ref. no.: NZ-771-55/2019 and 26.07.2019, ref. no.: PS-N-NZ/401-4/103/18 gave a positive opinion for the implementation of the project, without imposing conditions for its implementation. The State District Sanitary Inspector in Słubice, however, by letter dated 26.07.2019, NS.NZ.4541.5.2019 gave a positive opinion for the implementation, provided that conditions are observed that ensure the fulfilment of hygiene and health requirements, specified in the previous opinion of this authority expressed in the letter of 28.09.2018., NZ 7721-6-2/18 and taken into account after clarification by the local authority in this permit.

It should be noted that, in view of the entry into force on 26 April 2018 of the provisions of Act of 28 February 2018 on the amendment of the Water Law Act (Journal of Laws of 2018, item 710), the authority responsible for water law assessment was not consulted.

The materials submitted by the applicant on 06.05.2019 and 05.07.2019 concerning the investment in question were also subject to another procedure with the participation of the public, in accordance with Article 33 in connection with Article 79 of the EIA Act, in the period of 30 days, i.e. from **25.07.2019 to 23.08.2019**, by means of the notice of 23.07.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.54. It should be noted that the original deadline for submitting comments was 16.07.2019 to 15.08.2019 - notices dated 12.07.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.46, however, due to the need to change the period, the notice of 23.07.2019 set a new deadline for public consultations. The information was made public by being made available on the website of the Public Information Bulletin of the Regional Director for Environment Protection in Szczecin and announced in the usual way, i.e. on the notice board, in the seat of the Regional Director for Environment Protection in Szczecin and the following offices: Regional Directorate for Environment Protection in Gorzów Wlkp., Chojna Commune Office, Cedynia Commune Office, Mieszkowice Commune Office, Kostrzyn nad Odrą Commune Office, Górzycy Commune Office and Słubice Commune Office.

During the ongoing public consultations, comments and requests were made by:

- Zachodniopomorskie Towarzystwo Przyrodnicze [Zachodniopomorskie Association of Naturalists], dated 22.08.2019 (e-mail dated 22.08.2019).
- Stepnica Tourist Organization Nie Tylko Dla Orłów [Not Only For Eagles], dated 23.08.2019, submitted by Mr. Arthur Furdyna by e-mail.
- Mr. Piotr Matyjasiak, dated 21.08.2019 (e-mail dated 22.08.2019).
- Mr. Paweł Mikołowicz, dated 20.08.2019 (e-mail dated 20.08.2019).
- Mr. Paweł Mikołowicz Aurico, dated 20.08.2019 (e-mail dated 20.08.2019).
- Ms. Diana Trzcińska, dated 20.08.2019 (e-mail dated 20.08.2019).
- Ms. Urszula Sadowska, dated 22.08.2019 (e-mail dated 22.08.2019).
- Mr. Tomasz Okruszko (e-mail dated 22.08.2019).
- Ms. Joanna Tomaszewicz, dated 20.08.2019 (e-mail dated 20.08.2019).
- Mr. Krzysztof Szoszkiewicz, dated 20.08.2019 (e-mail dated 20.08.2019).

It should be pointed out that in connection with the materials subject to public consultation, comments on the implementation of the investment in the context of its negative impact were submitted by Zachodniopomorskie Towarzystwo Przyrodnicze [Zachodniopomorskie Association of Naturalists] and the Stepnica Tourist Organization Nie Tylko dla Orłów. Other comments and requests made by the public were positive with respect to the implementation of the project, including the measures taken to minimise the negative impact on elements of the environment, e.g. the biological condition of the river, as well as species and ecosystems dependent on waters.

Furthermore, on 26.08.2019, after public consultations, the authority received a letter from Mr. Piotr Nawrocki from WWF Poland, concerning comments on the programme of measures to minimise and compensate the impact on the biological and hydromorphological elements of water status". Pursuant to this letter, a request was made to take the following into account in the implementation of this investment: a pilot project for the reconstruction of groynes on a selected section of the Border Odra, aimed at improving the habitat conditions in the riverbed and valley; taking into account, in the sections covered by Stage I works and beyond these sections, the introduction of anchored large woody debris into the groyne fields, in sections with an accelerated current, and introducing improved stabilisation of the river bottom and increasing the diversity of habitats on selected sections of the Odra by introducing gravel of appropriate grain size, as applied on rivers in Western European countries.

Comments and requests made in connection with the notice of 23.07.2018, ref. no.: WONS-AŚ.4233.1.2017.KK in accordance with applicable regulations were analysed in the proceedings in question, while the issues raised by Zachodniopomorskie Association of Naturalists and the Stepnica Tourist Organisation Nie tylko dla Orłów, as well as by the representative of WWF are addressed in

detail in Annex 3 to this permit.

Under proceedings concerning transboundary impact, having received the documentation translated into German from the local authority (letter of 10.06.2019), the GDOŚ, by letter of 2 July 2019, ref. no: DOOŚ-TSOOŚ.440.3.2018.PR.5, sent it to the German side together with a request for it to submit its position in the case in question, as a potentially affected party, and to make the documentation public. Based on the letter of the GDOŚ of 07.08.2019, ref.: DOOŚ-TSOOŚ.440.3.2018.PR.8 the submitted materials were made public in Germany from 31 July 2019 to 29 August 2019. During the public consultation, comments and requests were received from the authorities listed below, as well as from the public, and were forwarded directly to the local authority by traditional mail and electronic mail, as well as by the GDOŚ in a letter dated 09.09.2019, ref. no.: DOOŚ-TSOOŚ.440.3.2018.PR.9), i.e.: Amt Oder-Welse of 8 August 2019, Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum, Abteilung Bodendenkmalpflege / Archäologisches Landesmuseum of 5 August 2019, ref. GV 2018: 147a, Landesjagdverband Brandenburg e. V. of 20 August 2019, Landesamt für Bergbau, Geologie und Rohstoffe of 20 August 2019, ref. 74.7-19-212, Stadt Frankfurt (Oder) of 22 August 2019, ref. DII61-6/615 6/UVP-Oder- Weichsel/20, Landkreis Uckermark - Die Landrätin of 23 August 2019, ref. 68.032018/1762, Nationalparkfleisch Eine Marka der Oko Agrar GmbH Unteres Odertal of 25 August 2019., Internationalpark Unteres Odertal GmbH of 25 August 2019, Generaldirektion Wasserstraßen und Schifffahrt of 28 August 2019, letter No 3800W13-213.02/0001 /0300-002, Verein der Freunde des Deutsch-Polnischen Europa-Nationalparks Unteres Odertal e. V. of 26 August 2019, Nationalparkstiftung Unteres Odertal - rechtsfähige, gemeinnützige Stiftung bürgerlichen Rechts of 27 August 2019, Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft of 28 August 2019, ref. MLUL-51- 0421/14+15#223701/2019; Landesbüro anerkannter Naturschutzverbände GbR of 28 August 2019.; Industrie- und Handelskammer (IHK) Ostbrandenburg of 28 August 2019, Landkreis Oder-Spree of 27 August 2019, ref. 20318-19-96; Regionale Planungsgemeinschaft Oderland-Spree of 29 August 2019.; Amt für nachhaltige Entwicklung, Bau, Kataster und Vermessung - Landkreis Barnim of 29 August 2019, ref. ToB-2019-149; Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum, Abteilung Bau- und Kunstdenkmalpflege of 14 August 2019.; Regionale Planungsgemeinschaft Uckermark - Barnim - Regionale Planungsstelle of 21 August 2019; Gewässer- und Deichverband Oderbruch of 16 August 2019, ref. por-ud; Landkreis Oder-Spree, Der Landrat Untere Naturschutzbehörde dated 29 August 2019, ref. no. 4 67 3 17 1387/19; Landkreis Markisch - Oderland Der Landrat dated 29.08.2019 (received 05.09.2019) - date of dispatch - 02.09.2019; Landkreis Oder-Spree, Der Landrat dated 27.08.2019, ref. no.: 20318-19-96 and Stadt Eisenhüttenstadt Der Bürgermeister of 08.08.2019.

At the same time, by the letter dated 09.09.2019, ref. no.: DOOŚ-TSOOŚ.440.3.2018.PR.9 addressed to the local authority, citing Article 8 of the *Agreement between the Government of the Republic of Poland and the Government of the Federal Republic of Germany in the field of environmental impact assessments and strategic environmental impact assessments in a transboundary context*, drawn up in Neuhardenberg, signed and drawn up on 10 October 2018, the GDOŚ proposed to hold an intergovernmental transboundary consultation in the form of a meeting of experts in case of further comments and doubts regarding the issue of the potential significant transboundary impact of the investment in question, after the German side had previously notified such a possibility. It was also announced that the proposition of holding consultations in the form of a meeting of experts had also been raised by the General Directorate for Waterways and Navigation in Magdeburg.

It should be noted that during the public consultations, on 01.08.2019, the investor sent a letter to the GDOŚ with an invitation to a meeting in order to discuss the issues that are the subject of comments and doubts raised during the consultations. Nevertheless, due to the stage of the proceedings at that point, i.e. the ongoing public consultation and public disclosure of the documentation, the GDOŚ did not find it was justified for him to participate in the meeting at this stage of the proceedings. At the same time, he pointed out that if the German side indicates the necessity of conducting transboundary consultations at intergovernmental level, in the form of a meeting of experts, it would be the duty of the Polish side to comply with the request of the affected party and to conduct an official

intergovernmental meeting (the above position was expressed by the GDOŚ in a letter dated 07.08.2019, ref. no.: DOOŚ- TSOOŚ.440.3.2018.PR.8).

After public consultations on the Polish side and on the German side, after an analysis of the documentation submitted on 06.05.2019 in the proceedings aimed at issuing an environmental permit for the project entitled "1B.2 Stage I and Stage II Modernisation works on the border Odra as part of the Odra-Vistula Flood Management Project" including the updated report on the environmental impact of the project, prepared by Sweco Consulting Sp. z o.o. (April 2019), supplemented on 05.07.2019 and in connection with subsequent comments and requests submitted by the institutions and the public, by letter of 25.09.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.55 the applicant was invited to address all submitted comments and to prepare explanations in relation to the comments and requests made in connection with the implementation of the investment. It should be noted that comments and requests sent in by the authorities and the public during public consultations were sent to the representative via electronic mail immediately upon receipt.

An appropriate supplement containing the results of the environmental impact assessment for the investment in the following scope: assessment of the impact of the river control structures to be modernised on the hydrological conditions and fluvial processes of the river, including water levels, the risk of excessive erosion and the risk of excessive sedimentation in groyne fields; assessment of the impact of the investment on the subjects of protection in Natura 2000 sites and presentation of the economic effects of project implementation, as well as the documentation translated into German, which clarifies the doubts of the German side regarding the supplemented documentation for the project in question, was submitted to the local authority, by letter dated 29.10.2019, supplemented (due to formal deficiencies) on 08.11.2019. The above materials were simultaneously submitted to the GDOŚ.

In the submitted supplement, in order to prevent the temporary limitation of the availability of potential breeding habitats for the lani and the charadrii found in the Odra river valley, the investor proposed, for the duration of the investment, the execution of low floating islands with a total area of approx. 250 m² outside the riverbed, i.e. in the vicinity of Chlewice, on plot no. 272 Chlewice precinct, Boleszkowice commune, Myślibórz district. Considering the territorial scope of the project's impact assumed at the stage of submitting the application for the permit, not taking into account the abovementioned works within plot no. 272, Chlewice precinct, it was necessary to recognise the owners of the abovementioned property and the properties directly adjacent to the abovementioned property as parties to the proceedings. The parties were informed of the above event in the course of the proceedings by letter dated 15.11.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.60.

In view of the scope of the submitted supplement, which, in the opinion of the authority, was of material importance in the procedure, by the notice of 15.11.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.58 it was once again subject to public consultations. The notice included information referred to in art. 33(1) of the EIA Act, including the possibility of submitting comments and applications, and indicated the place and 30-day deadline for their submission in the period from **18.11.2019 to 17.12.2019**. The information was made public on the website of the Public Information Bulletin of the Regional Director for Environment Protection in Szczecin and announced in the usual way, i.e. on the notice board, in the seat of the Regional Director for Environment Protection in Szczecin and the following offices: Regional Directorate for Environment Protection in Gorzów Wlkp., Chojna Commune Office, Cedynia Commune Office, Mieszkowice Commune Office, Kostrzyn nad Odrą Commune Office, Górzycy Commune Office and Słubice Commune Office and the Boleszkowice Commune Office. During the public consultations, comments and requests concerning the implementation of the project were submitted to the local authority by the Stepnica Tourist Organization Nie tylko dla Orłów (e-mail dated 17.12.2019), which raised issues related mainly to the lack of proof of the advisability of the investment implementation in the scope of flood protection and the adverse changes in the Odra ecosystem, which may arise in connection with the implementation, as well as non-compliance with the provisions of the Water Framework Directive (the abovementioned issues are addressed in detail in Annex 3 to this permit). In view of the above, by letter of 20.12.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.61, the local authority called the applicant

to address the indicated objections (which were also sent to the investor via e-mail). These comments were addressed in a letter submitted to the local authority on 23.12.2019, supplemented on 17.01.2020. The submitted supplement also includes a study entitled "Synthesis of the information contained in the report on the environmental impact of the investment "IB.2 Stage I and Stage II Modernisation works on the border Odra as part of the Odra-Vistula Flood Management Project", which organised the information contained in earlier documents on the impact of the investment on elements of the natural environment and on the measures taken to minimise it. It should be noted that the said supplement did not have substantive significance in the EIA process and did not require it to once again be subject to public consultations. The GDOŚ was informed of the above supplements with the letter dated 22.01.2020, ref. no.: WONS-OŚ.4233.1.2017.KK.65, which also indicated that the presented explanations do not affect the decision regarding the impact of the investment on the environment in a transboundary context.

Bearing in mind the additional materials submitted on 29.10.2019 concerning the implementation of the investment, supplemented on: 08.11.2019, 20.12.2019, and 17.01.2020, and taking into account the increased territorial scope of the project as a result of the planned works on the territory of the commune of Boleszkowice, by letters dated 20.01.2020, the local authority requested an opinion and agreement on the conditions for the implementation of the project from the following authorities participating in the proceedings, i.e.: Regional Director for Environment Protection in Gorzów Wielkopolski (letter ref. no.: WONS-OŚ.4233.1.2017.KK.62); health inspection authorities: State District Sanitary Inspector in Gryfino, State District Sanitary Inspector in Gorzów Wielkopolski, and State District Sanitary Inspector in Słubice (letter ref. no.: WONS-OŚ.4233.1.2017.KK.63) and due to the increased territorial reach, to the State District Sanitary Inspector in Myślibórz (letter ref. no.: WONS-OŚ.423 3.1.2017.KK.64).

The State District Sanitary Inspector in Gryfino, the State District Sanitary Inspector in Słubice, and the State District Sanitary Inspector in Gorzów Wlkp., by letters dated respectively 30.01.2020, ref. no.: PS-N-NZ/401-4/103/18, dated 05.02.2020, ref. no.: NS.NZ.454.3.1.2020, and 28.01.2020, ref. no.: NZ-771/55/2019 gave a positive opinion on the implementation of the project and maintained their positions expressed in previous letters. Whereas the State District Sanitary Inspector in Myślibórz, having reviewed the files in the case in question, in a letter dated 31.01.2020, ref. no.: PS-NZNS/403-1/20 gave an opinion on the implementation of the project in terms of its impact on human health and life, indicating the need to take into account the assumptions contained in the report when implementing the investment.

The Regional Director for Environment Protection in Gorzów Wielkopolski, by the letter dated 04.02.2020, ref. no.: WZŚ.4221.26.2020.AN also maintained the opinion expressed in the letter of 14.08.2019, in which the implementation of the project was agreed on.

Due to the need to perform activities resulting from the applicable regulations, including those resulting from the proceeding in a transboundary context, the notice of 26.09.2019 and 20.12.2019, ref. no.: WONS-OŚ.4233.1.2017.KK.64, it was announced that the environmental permit would be issued at a later date, i.e. by 20.12.2020 and then by 31.03.2020.

With regard to the transboundary environmental impact of the project, having received documentation translated into German, which clarifies the doubts of the German side to the previously supplemented documentation (letter of 29.10.2019) directly from the investor, by letter of 30.10.2019, ref. no.: DOOŚ-TSOOŚ.440.3.2018.PR.13, the GDOŚ provided the abovementioned materials to the General Directorate for Waterways and Navigation in Magdeburg with a request for it to define its position on the matter, within 30 days from the date of delivery of the documentation. In this letter, the GDOŚ also proposed that if the German side found that there is a need to clarify certain issues, an intergovernmental consultation in the form of an expert meeting should be held in the 49th week of 2019, in accordance with Article 7 of the Agreement between the Government of the Republic of Poland and the Government of the Federal Republic of Germany in the field of environmental impact assessments and strategic environmental impact assessments in a transboundary context, drawn up and signed in Neuhausen on 10.10.2018.

The GDOŚ, by the letters dated 17.12.2019, ref. no.: DOOŚ-TSOOŚ.440.3.2018.PR.13, dated 23.12.2019, ref. no.: DOOŚ-TSOOŚ.440.3.2018.PR.16 informed that the German side (letter dated 06.12.2019, ref. no.: WR I 4-23021-5/1) sent in their view on the investor's replies to the comments and requests previously submitted by the German side (by the Federal Ministry of Environment, Nature Conservation and Nuclear Safety of the Federal Republic of Germany, dated 06.12.2019, the Ministry of Agriculture, Environment and Climate Protection of 5 December 2019, and the joint view of the Department for Nature Protection of the Ministry of Agriculture, Environment and Climate Protection) and informed about the need to hold an intergovernmental meeting as part of transboundary consultations in order to clarify specific contentious issues concerning the implementation of the investment, as indicated in the provisions of Article 5 of *The Convention on Environmental Impact Assessment in a Transboundary Context, drawn up in Espoo on 25 February 1991*, scheduled for 17.01.2020.

On 10.01.2020, as indicated in the abovementioned letters, a meeting preceding the planned transboundary consultations took place at the headquarters of the General Directorate for Environment Protection, in order to make both organisational and substantive arrangements regarding the procedure on transboundary environmental impact for the project "IB,2 Stage I and Stage I Modernisation works on the border Odra as part of the Odra-Vistula Flood Management Project". The meeting was attended by representatives of the GDOŚ, the Regional Directorate for Environment Protection in Szczecin, the Regional Water Management Authority in Szczecin and the Technical Support Consultant for Sweco Consulting Sp, z o.o., and a team of experts. At the meeting it was agreed that due to the particularly complex nature of the case, in accordance with Article 110 of the EIA Act, the consultations in question would be conducted by the General Director for Environment Protection.

On 17.01.2020, transboundary consultations took place at the headquarters of the Zachodniopomorskie Voivodeship Office in Szczecin. The consultation meeting was organised in accordance with Article 7 (2) of the Agreement between the Government of the Republic of Poland and the Government of the Federal Republic of Germany in the field of environmental impact assessments and strategic environmental impact assessments in a transboundary context, drawn up and signed in Neuhausen am Neckar on 10.10.2018, and Article 5 of the *Convention on Environmental Impact Assessments in a Transboundary Context, drawn up in Espoo, on 25 February 1991*. Pursuant to the cited regulation, the subject of the consultation was the potential material transboundary impact of the planned investment and the measures to reduce or eliminate that impact. The consultation did not constitute an administrative hearing and was therefore not available to the general public. Minutes of the consultations were prepared and included in the case file, which, after translation into German, was approved by signature by the heads of delegation of the two Parties.

The Polish side was represented by representatives of the General Directorate for Environment Protection, the Regional Directorate for Environment Protection in Szczecin, the Regional Water Management Authority in Szczecin PGW WP and the Technical Support Consultant for Sweco Consulting Sp, z o.o., and a team of experts. The German side was represented by Ms. Nathalie Klasen from the Federal Ministry of the Environment, Nature Conservation and Nuclear Safety, with representatives of the authorities interested in the investment.

The scope of the consultations were the issues raised by the representatives of the Federal Republic of Germany in their letter of 6 December 2019, ref. no.: WRI4-23021-5/1, which included the following issues: hydrological modelling - basis and methodology of hydraulic modelling, correctness of the model, degree of hydrological impact; hydrological and hydromorphological impact on biological elements of water status within the meaning of the Water Framework Directive in the long term; impact of construction works and changes in hydromorphology on the ecological status of water in the short and long term; impact of construction works on the chemical status of water in the short and long term; impact on water-dependent ecosystems, including Natura 2000 sites on the German side.

The consultation was carried out in accordance with the order set out in the agenda. All items on the agenda were discussed in detail by experts from Poland and discussed with representatives of the

Federal Republic of Germany (except for the issue of the impact of construction works on the chemical state of the waters in the short and long term, which was omitted at the request of the German side).

During the discussion of the above items, the Polish side pointed out that the project in question is planned in accordance with the assumptions of the Polish-German *Update of the Concept of the Border Odra Watercourse*, prepared by the Federal Waterways Engineering and Research Institute in Karlsruhe (BAW) with the participation of German and Polish experts, developed in 2014, and the *Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow and shipping conditions) signed in Warsaw on 27 April 2015*. The aim of the BAW concept was to determine the scope of modernisation works necessary to achieve the river depth suitable for the operation of icebreakers at low and medium water levels, with minimal interference with the water level and the existing river control system. *The update of the concept of the Border Odra watercourse* contains a number of precise guidelines for the design of river control structures, which are binding for both Parties to the *Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow and shipping conditions) signed in Warsaw on 27 April 2015*. The German side was also informed that for the purposes of developing the Concept (document entitled: *The update of the concept of the Border Odra watercourse* prepared by the Federal Waterways Engineering and Research Institute in Karlsruhe), a one-dimensional numerical model of sediment transport (1D-MTR) and a physical model of river load transport (for the Odra section from 654.7 to 662.5 km - Hohenwutzen area) were used. The Polish side also informed that in accordance with the recommendation of the BAW concept, model tests were being carried out using the 2D-MTR model (a two-dimensional numerical model for sediment transport) for a critical section of the Warta estuary region (at 610.0 - 620.05 km) and a 2D-MTR model would be prepared for the section limiting the Ślubice region (at 581.0-585.7 km), which would be made available to the German side.

After the issues in the agenda were discussed, the German authorities responsible for flood protection, water management and nature protection expressed doubts as to whether the results of the model used were sufficient to predict the existence of significant impacts on flood safety, as well as water and nature protection issues, and therefore suggested the use of a two-dimensional hydronumeric model (2D-HN) for selected critical locations and those most at risk, yet to be indicated. The Polish side reported that, in accordance with the recommendation of the BAW concept, model tests were being conducted using the 2D-MTR model (two-dimensional numerical model for sediment transport) for a critical section of the Warta river mouth area (at 610.0 - 620.05 km) and a 2D-MTR model will be prepared for the section limiting the Ślubice region (at 581.0-585.7 km), the results of which will be submitted to the German side.

The Polish and German sides presented different views on the correctness of the adopted model and, consequently, on the prediction of the occurrence of a significant impact on flood safety, as well as on the issue of water and nature protection on the German side of the project area. Discrepancies between the parties to the transboundary consultation concerned issues and comments on:

- a) hydraulic modelling, including: the need to execute two-dimensional hydronumeric models (2D-HN) to assess the hydraulic effects of investments in selected areas at the highest risk of flooding; the need to execute two-dimensional hydronumeric models (2D-HN) to assess the impact of the investment on the increase in flood risk and the need to execute two-dimensional hydronumeric models to assess the hydraulic effects of the investment on the hydromorphological quality elements.
- b) hydrological and hydromorphological impact on the biological elements of water status within the meaning of the Water Framework Directive in the long term, including:
 - the need to develop a two-dimensional model for assessing the hydromorphological effects, including the distribution and changes in flow velocity, the overgrowing of groyne fields and elevations due to sediment, changes in grain size distribution and connection of the riparian forest with the river;
 - assessment of the impact on ichthyofauna and macrozoobenthos;
 - assessment of the hydromorphological impact on the biological elements of water

quality, in particular on water structure and habitat conditions for macrozoobenthos and fish.

- c) hydrological impact on water-dependent habitats, which are the subject of protection of Natura 2000 sites on the German side, including in particular habitat 3270 and habitat types 3260, 3270, 6430, 6440 and 6510 in the Lower Odra Valley National Park, which stands out in terms of nature conservation expertise in the state of Brandenburg.

The German authorities responsible for flood protection, water management, and nature conservation expressed their views, referring to the previous written statements made on the basis of the data and statements made available by the Polish side, indicating that the impact of the project on flood risk and on possible effects on the hydromorphological and biological quality elements referred to in the WDF as well as on water-dependent habitats and species under protection of Natura 2000 sites, in particular habitats 3270, 3260, 3270, 6430, 6440 and 6510 in the Lower Odra Valley National Park cannot be assessed with certainty. Therefore, in their view, a two-dimensional hydronumeric model (2D-HN) should be developed for the remaining sections of the river most at risk to be identified. For this purpose, watercourse sections should be selected for which water structure mapping and measurements are available and which are located in the vicinity of the planned construction works. Modelling should take into account different flows and, in addition to the riverbed, the inter-embankment.

The Polish side expressed a different opinion in this case. In their view, the 1D-MTR model used for the development of the BAW concept is a tool providing sufficient results for the assessment of flood risk associated with the implementation of the planned investment, as well as other hydromorphological aspects, and thus for the environmental impact assessment and for issuing the environmental permit. The Polish side explained that a dense grid of cross-sections was used to construct the model (cross-sections every 100-200 m for the entire border section of the river and more dense in characteristic, hydraulically complicated places). In addition, bottom roughness and riverbed parameters were tested. The model was calibrated on the basis of characteristic flow values and known natural data (water table position, flow velocity and sedimentological parameters) from the previously agreed mean annual discharge for normal flow rates. The geometry of the model includes terrain obstacles in the form of river control structures. Therefore, in the opinion of the Polish side, it is possible to determine with sufficient accuracy the expected position of the water table at large water flows on the basis of the results of modelling with the 1D-MTR, which will reach the level of about 1 m below the crest of the embankments on the section most at risk. The results of 1D-MTR modelling supported by additional pre-design materials allowed, in the view of the Polish side, to draw conclusions with regard to the expected changes in water level, which was taken into account in the assessment of the project's environmental impact, in particular in the assessment of the impact on habitats dependent on waters.

This view was contradicted by the German side, which argued that, according to the authorities responsible for flood protection, water management and water protection on the basis of the studies submitted to date, it was not possible to carry out a sufficient assessment of the transboundary impact of the project.

When asked by the Polish side, what issues would the 2D-HN model explain in terms of flood safety – the German authorities indicated only in general terms that detailed 2D models were better suited to answer questions concerning flood safety and impact assessment for hydromorphological and biological quality elements and Natura 2000 sites than the 1D-FTM model. 2D-HN models are regularly used in the Federal Republic of Germany for flood risk analyses, in particular for critical areas, most at risk.

It should be pointed out that the German side did not present different modelling results, which would contradict the assessment of impact significance adopted by Poland, pointing only to the fact that the burden of proof and argumentation in the context of the (transboundary) EIA rested on the investor or on the origin side. It was also pointed out that the party must ensure that the concerns expressed in writing and the German expert views listed are addressed in detail during the EIA as part of the assessment of possible transboundary environmental impacts and that the concerns

expressed are clarified in a professional manner. The Polish side, while agreeing with the above statement, pointed out that in its opinion it had presented, both in writing and during the transboundary consultations in the form of an expert meeting, a professional response to all the comments and doubts raised by the German side.

In view of the above, in order to verify discrepancies in the positions of the parties, the Polish side proposed to agree on a monitoring process after the completion of the project, which would allow for a retrospective examination of the actual impact on the environment. It also announced that the authority competent to issue an environmental permit, i.e. the Regional Director for Environment Protection in Szczecin, would impose on the investor the obligation of monitoring in the post-implementation analysis within the following scope: monitoring the effectiveness of the implemented minimisation activities 1 year and 3 years after the completion of works; monitoring of the long-term effects of hydraulic and morphological impact carried out every 5 years; monitoring of the long-term effects of the impact on the ecological status of surface water bodies carried out every 5 years.

The German side declared its willingness to discuss with the Polish side the guidelines for such monitoring in relevant expert bodies (e.g. the Polish-German Border Water Commission, the International Commission for the Protection of the Odra and the Polish-German Programme Council of the Lower Odra Valley Network of Protected Areas under the aegis of the Polish-German Environmental Protection Council), but refused to record the arrangements for such monitoring during this meeting.

It should be pointed out that in this decision the authority took into account the above provisions concerning the implementation of monitoring and the agreement on its provisions with the German Party.

The meeting set deadlines for agreeing on the provisions of these minutes, as well as the subsequent stages of the procedure for issuing the environmental permit, and the manner in which the comments and requests submitted by Germany were to be taken into account.

The GDOŚ, by the letter dated 17.02.2020, ref. no.: DOOŚ-TSOOŚ.440.3.2018.PR.21 informed the local authority about the working mode agreement between the Polish and German parties on the minutes of the abovementioned consultations. In view of the above, the next stage of the procedure, which concludes the procedure for issuing an environmental permit, was commenced.

Once the evidence for issuing the requested permit in accordance Article 10 § 1 of the CAP was collected, before an environmental permit was issued, by notice of 18 February 2020, ref. no.: WONS-OŚ.4233.1.2017.KK.66 the local authority informed the parties about the possibility to read the case files within the prescribed period. No comments were received within the deadline. Therefore, the authority issued this permit taking into account the evidence collected in the case.

This permit was issued on the basis of art. 104 of the CAP, indicating that the administrative authority settles the matter by issuing a decision. The legal basis also refers to Articles 82 and 85 of the EIA Act, indicating respectively the scope of necessary information required in the decision and its justification.

Pursuant to Article 80(2) of the EIA Act, the competent authority shall issue the environmental permit having first confirmed that the project location conforms to the local zoning plan, if such a plan has been adopted. Since the project in question concerns an investment carried out on the basis of the provisions of the Act of 8 July 2010 on special rules of preparing projects involving flood prevention structures, Article 74(1)(5) of the EIA Act applies, according to which the requirement to submit an excerpt and a map extract from the local zoning plan or information about its absence does not apply in the case of an application for an environmental permit for such an investment.

The main document on the basis of which the local authority conducted analyses regarding the impact

of the planned project on individual elements, determined the scope of the project's impact and determined the conditions necessary for its implementation at the construction stage and after the completion of the project, was the report on the project's environmental impact with supplements and the results of transboundary consultations. After examining the evidence in question, the local authority concluded as follows.

The planned project includes modernisation works on the border Odra, to be carried out as part of the Odra-Vistula Flood Management Project (OVFMP), and the detailed scope of the project is contained in Annex 1 to this permit. The objective of the OVFMP is to increase flood protection for people living in selected areas of the Odra River and Upper Vistula River basins and to strengthen the institutional capacity of the government administration to mitigate the impact of summer, winter, and flash floods more effectively.

The works included in the project were divided into 2 stages:

- Stage – I – Modernization works on Border Odra to enable winter icebreaking;
- STAGE II – Modernisation of River Control Infrastructure.

The planned project will be implemented in stages, i.e. stage I is currently planned for implementation, while stage II will be implemented at a later date, after the necessary project documentation is prepared.

As part of stage I, modernisation works are planned to be carried out, on a total length of approx. 24.4 km, on the following sections of the river Odra:

- 1) Section: 581.0 - 585.7 km - Słubice region
- 2) Section: 604.0 - 605.0 km - Górzycza - Reitwein region
- 3) Section: 613.5 - 614.7 km - Kostrzyn nad Odrą region
- 4) Section: 645.5 - 654.0 km - Gozdowice - Stara Rudnica region
- 5) Section: 654.0 - 663.0 km - Stara Rudnica - Osinów Dolny region.

As part of stage II, the planned works will be carried out on a section of approx. 30.0 km, on the following sections of the Odra:

- 1) Section: 600.4 - 604.0 km
- 2) Section: 605.0 - 613.5 km
- 3) Section: 614.7 - 617.6 km
- 4) Section: 668.0 - 683.0 km - Piasek region

In total, plans for Stages I and II include the regulation, reconstruction, and demolition of river control structures on a section of about 54.4 km of the Odra, which means a modernisation of about 58% (54.4 km out of 94.4 km) of the limiting places listed in the Polish-German agreement.

It should be indicated that the Concept update contains the results of model testing, defines the SWP2010 mean design water level elevation, (water level at average river discharge from the years 1981-2010 established on the basis of the analysis of readings from Polish and German stream gauges on the Border Odra) and the basic parameters of the river control system: the elevations of river control structures and minimum setback distance, depending on the type of river control structures.

During the design of the investment, the principle of least interference in the existing river control structures was applied, i.e.:

- modernisation of the river control structures consists mainly in the reconstruction of existing structures, and to a small extent on the construction of new ones,
- new structures have been designed only on sections where the distance between existing structures is too large for the proper functioning of the river control system (groynes) and in places where the current arrangement of the banks indicates the need for their construction (longitudinal dams, river walls, revetments).

Longitudinal dams have been designed in critical areas, such as sharp river bends, which prevented the use of groynes (as they could degrade rapidly). River walls, unlike revetments, were used in places of “transition” from groynes to the longitudinal dam. In these places, it was not possible to construct a revetment (which does not protrude into water - it covers the existing bank and its foot), it was necessary to adapt to the parameters of the longitudinal dam, therefore, the river walls were designed - similar in structure to revetments, but are extending in the direction of the minimum setback - like longitudinal dams - and in this case they constitute an intermediate structure, eliminating the formation of degradation points for both the groynes and longitudinal dams.

According to the submitted materials, modernisation works resulting from the Polish-German agreement are planned to be carried out with a time delay on the Polish and German banks (minimum 3 years, preferably 5 years) in order to allow species dependent on waters, including fish habitats on the opposite bank, to use them as refugia during the implementation of the investment and to ensure sufficient regeneration of habitats on the modernised bank before commencing works on the other bank.

The investment project planned for implementation will be located in the Odra riverbed, in the right-hand part of its valley. Due to the extensive scope of all modernisation works on the Odra at stage I and stage II, the project was divided into 4 sections in relation to which the investment was analysed in terms of its impact on individual elements of the environment, i.e.:

- Section I Słubice (581.0 - 585.7 km)
- Section II Kostrzyn nad Odrą (600.4 - 617.6 km)
- Section III Gozdowice - Osinów Dolny (645.0 - 663.0 km)
- Section IV Piasek (668.8 - 683.0 km).

According to the submitted documentation, before commencing dredging works, the contractor will be obliged to draw up a bathymetric plan of the Odra in order to justify the execution of these works and determine their quantity.

One of the mandatory elements of the report on the environmental impact of the planned project is the variant analysis.

In the submitted report, taking into account an objective of the investment, i.e. ensuring the minimum depth of 1.8 m necessary for the operation of icebreakers, with the least impact on water relations and the environment, variants were prepared in the scope of: parameters of reconstruction and modernisation of river control structures, methods of conducting icebreaking, construction of river control structures and construction technology.

At the outset, it should be pointed out that two different and complementary research methods were used for the purposes of the development of the *Update of the concept of the border Odra watercourse*:

- comprehensive one-dimensional hydrodynamic numerical model of the entire border section of the Odra (hereinafter: 1D-MTR model) - using this model, the water level at different flow rates, the balance of river load transport and resulting changes in the bottom and changes in the position of the water table over a simulated 40-year forecasting period were calculated. The geometry of the riverbed is described by cross-sections distributed in the longitudinal profile of the river at intervals of not less than 100 m. The model was verified and calibrated. Calibration was carried out with appropriate values of the Manning roughness coefficient selected. The verification was carried out by comparing the flow values calculated using the model and measured with an ADCP current meter. Comparison of water table elevations and flow rates shows a very good model performance;
- the physical model of sediment transport of the Odra section in the Hohenwutzen area, which made it possible to carry out a variant analysis of river control structures that differ in types

and dimensions, as well as to choose the variant for implementation - this model allows very accurate mapping of the impact of the analysed variants of river control systems on the development of the average height of the river bottom, its form, as well as on the water table. The physical model made it possible to obtain an image of the formation of the river bottom deformations as regards mesoforms (bars and folds), as well as local deformations in the area of groyne heads and groyne fields.

A wide range of data and source materials were used for the construction of the model system, including natural data (probing results, data on the location of the water table, data on the distribution of bottom grain size and transport of solid bottom material), maps, result of the BAW studies on maintenance and regulatory projects from the years 1995-2012, reports and research results of the Water and Navigation Office in Eberswald, RZGW in Szczecin and third parties (including Warsaw University of Technology, Szczecin University of Technology, Federal Institute for Hydrology - Bundesanstalt für Gewässerkunde). The model was calibrated on the basis of characteristic flow values and known natural data (water table position, flow velocity and sedimentological parameters) from the previously agreed mean annual discharge for normal flow rates. The geometry of the model includes terrain obstacles in the form of river control structures. On the basis of the modelling carried out as part of the preparation of the *Update of the concept of the border Odra watercourse*, a set of results was obtained for the whole section of the Border Odra with regard to both low and high flood flows. The set of results obtained as part of the development of the *Update of the concept of the border Odra watercourse* and from the 2D modelling report made for the Odra-Warta junction allowed to precisely determine the minimum scope of work for achieving the appropriate depth for ice breakers and the effect they will cause in the aquatic environment in terms of changing water levels and the state of the bottom. With regard to the modernisation of the river control structures, one of the key assumptions of the *Update of the concept of the border Odra watercourse*, which is the basis of the project, was to find such an option that would allow the least possible interference with the current water levels and would not increase the flood risk in the adjacent areas with the assumption of a spontaneous, slow lowering of the bottom. The analysis of the variants carried out in the BAW Concept showed that the KRC-W5 variant was recommended for implementation. This variant assumes parameters of the river control structures that will ensure adequate deepening of the bottom through a very long, slow erosion process, which, after an initial deepening over time, stabilises at the desired bottom elevation without the risk of progression. According to the results of the model tests, the erosion of the bottom will be increased in relation to the current conditions only in the first period after the construction - then it will be significantly slowed down and stabilised.

In the context of the analysis of the options for conducting icebreaking, the investor presented relevant expert opinions in this regard, which are annexed to the report on the environmental impact of the project, such as: "Report summarising the conditions associated with conducting icebreaking on the border Odra" by dr hab. inż. T. Kolerski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, December 2018) and "Expert opinion on the use of AMPHIBEX type dredgers for icebreaking on the Odra" by dr hab. inż. T. Kolerski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, August 2018). These documents analysed the conditions of the occurrence of ice phenomena in the Odra, the conditions of conducting ice breaking, alternative methods of protection against jam-related floods and the possibility of using low-immersion Amphibex dredgers for conducting ice breaking operations in the Odra. It was found that the only possible solution among the analysed methods of counteracting ice jams for the Odra is icebreaking with the use of specially adapted vessels (icebreakers), whose engine power parameters, hull dimensions (draught, width, hull inclination angles to the water line) are adjusted to the ice conditions of the Odra. Other methods of elimination of ice jams, e.g. using the Amphibex device, were considered ineffective or impossible to apply due to the nature of the river. The application of passive methods in the form of ice barriers has been considered only as an auxiliary measure that does eliminate the risk of jam-related floods. The use of icebreakers with less draught, which are effectively used in Europe on the Elbe and the Danube, was also considered. Nevertheless, due to the different ice conditions in the border and central Odra and the icebreaking operations, this variant was rejected. This is due to the fact that, under the current bathymetric conditions in the border and central Odra, ice in the form of free-flowing ice floe can stop and form a large jam of considerable thickness (up to

80 cm thick) in a very short time (12 to 18 hours). As a result, icebreakers must have parameters adapted to the ice conditions in the border and central Odra, and small-scale vessels (e.g. the Delfin icebreaker, with a draught of 1 m) cannot cope with the ice conditions in the Odra, and are currently mainly auxiliary.

The variant analysis included the analysis of the construction of newly built and rebuilt structures through the construction of groynes and longitudinal dams (the so-called pile dams) and the execution of revetment in the form of slopes reinforced in the central and upper part with asphalt. Due to the heavy nature of the works (piling), the type of construction materials to be used, and the need to carry out works from the side of the land, which would result in significant interference with the environment, the investor rejected these actions. In addition, as a result of comments submitted during the public consultation, the investor also decided not to carry out the previously planned bonding of riprap with cement mix (so-called clamping). Geotextile will be used during the execution of the works, as the explanations provided by the investor show that this material is necessary to separate the new elements from the existing ones. It should also be emphasised that this type of separation material is water- and air-permeable and thus it is not a tight separation layer and is environmentally neutral.

As for the technical and technological variants, the technological conditions of the planned works in the BAW Concept excluded the possibility of presenting a rational alternative variant in this scope, which would not cause a significant negative impact on the environment.

The report presents the analysis of a situation the project is not carried out, i.e. the so-called current state variant (W0). During the analysis that used the results of numerical modelling, took into account the current state variant (W0) and the recommended variant (KRC-W5), the following issues were taken into account: impact on groundwater levels, change of the current hydrological system and changes in flows, water stagnation length after high water levels, dynamics of water levels - annual extreme lows and highs, deposition of material as a result of highs.

The research and calculations presented in the report based on *the Update of the concept of the border Odra watercourse* clearly show that the rise of the water table at high and flood levels, as well as its lowering in the case of lows (which is a natural consequence of the lowering of the bottom) will be small in relation to the conditions on the river in its current state, and the implementation of the investment does not increase the risk of flooding and will not lead to a significant lowering of the groundwater table, which could result in the drying of bank areas. Maximum anticipated lowering of the bottom and thus estimated maximum anticipated lowering of the groundwater level according to the results of the conducted analyses could potentially range from a few to several centimetres, depending on the section of the river. However, the results of modelling carried out for the purposes of *the Update of the concept of the border Odra watercourse* indicate that during low water levels, the water table will rise on average by 15-20 cm on most sections, and by a maximum of 25 cm on the section located at approx. 585.0 km. In addition, the analysis of the results of the conducted tests and models indicates that the functioning of the reconstructed river control structures will not affect the current hydrological system of the Odra. The planned activities will not affect the way in which the river is fed, the volume of flows and the nature and course of lows or highs, and slight increases in the level of the water table can be expected in the long term. The results of the analyses carried out for *the Update of the concept of the border Odra watercourse* showed that the functioning of the reconstructed river control structures will not affect the volume of flows and the dynamics of highs and lows, or the lowering of the level of groundwater in the inter-embankment, which is also confirmed by the results of modelling carried out on the section of the free-flowing Odra, which were also taken into account in the project's environmental impact assessment. According to the submitted report, if renovation work on existing river control structures were to be abandoned, spontaneous habitat restoration would still occur, which in the near future (10-30 years) would result in maintaining or increasing habitat diversity and diversity of aquatic organism communities. However, further progressive degradation of these structures within a few decades - or a few hundred years - would lead to their disappearance and the transformation of the Odra riverbed into a fairly homogeneous channel with straight banks of little morphological diversity. This would result in significant long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity.

Summing up, in the opinion of the authority, the variant preferred by the investor, due to the design assumptions and the planned wide range of activities mitigating the environmental impact, taking into account, among others: limiting to a minimum the interference in groyne fields, leaving the sand deposits and aquatic and shrub vegetation, replanting patches of endangered vegetation (especially nymphaeids, including all identified fringed water lily patches) and leaving the currently developed habitats of aquatic organisms and habitat forming elements (boulders, woody debris), indicating periods for which certain types of works are excluded, including for the protection of fish during spawning and wintering, indicating the locations excluded from certain categories of works, minimisation actions dedicated to particular species in connection with the results of wildlife inventories, etc., is also the most favourable variant in relation to the environment.

According to the analysis carried out on the basis of the submitted documents, the risks for individual environmental components will appear in the implementation and operation phase of the project. In view of the above, the local authority carried out a thorough analysis before issuing this permit in order to assess the direct and indirect effects of the planned investment mainly in terms of natural conditions, waste management, water and sewage management, as well as air pollution and noise emissions.

According to the information contained in the report, during the implementation of the modernisation works, the ground surface and landscape will be disturbed by:

- construction work within the riverbed: reconstruction and construction of groynes, dams, river walls, revetments,
- access to work sites: temporary access roads will be built;
- grubbing-up of vegetation on existing bars and river control structures (groynes, dams) and possible felling of trees within the area of designed structures;
- construction of new groynes.

During the implementation of the investment, the following equipment is planned to be used, in particular: excavators on a pontoon, barges with a load capacity of 150 tonnes and 80 tonnes (in the case of sufficient depth, route barges of 400-500 tonnes) with appropriate pushers, bolting rig, survey motorboat, a floating concrete plant, and power generators.

The basic assumptions of the implementation of the project concern the execution of works from the water using, among others, pontoons equipped with anchor piles, barges of adequate capacity, floating concrete plant, etc. Occasionally, situations may occur that prevent the execution of specific works from the water, which is currently impossible to predict due to the variability of hydrological conditions throughout the year. Nevertheless, public roads, e.g. municipal or district roads, will be used first. If access roads have to be designated, they will be planned in such a way that their location does not entail significant felling of trees or shrubs, in particular those constituting natural habitats, habitats of protected animal and plant species. Nevertheless, on the basis of the conducted wildlife inventories, the areas with no possibility of carrying out the works from the land side were selected, i.e.: 581 - 583.2 km (area of nature reserve and swamps); 585.3 - 585.7 km (nature reserve); 608 - 613 km and 615.3 - 615.6 km (where the distance from the flood embankment to the Odra bank is greater than 100 m); 650.5 - 656 km (wetlands, northern part of section IV); 656.5 - 661 km (Kostrzyneckie swamp); 672 - 673.4 km (swamps); km 678 - 682 km (swamps).

The basic building material for the construction of new and reconstructed river control structures will be crushed stone. Storage yards for crushed stone will be organised at each section of the works. The stone will be transported to the storage yards on route barges. It will be unloaded onto land from a pontoon with long-arm excavators. The surface of the storage yard will be hardened, which will allow the use of a charger and high heaping of the stone. The transport of stone for the construction of groynes, the longitudinal dam, river wall or revetment will be carried out with pontoons and barges with a small draught, once the stone from the temporary storage yard is loaded in appropriate quantity that allows for free manoeuvring. In addition, other building materials such as fascine, sand, geotextile and other materials needed for carrying out construction works, will be stored in the same

storage yards. Storage yards will have convenient road access, enabling the transportation of the fascine by land, and allowing the employees or, in case of fire, fire brigades, to access them easily.

At the current stage of the design assumptions, due to the variability of the hydrological conditions of the area, the investor is not able to indicate the final location of the material storage sites. Therefore, proposed locations were indicated, presented in Annex 19 to the report entitled "Material storage sites" (section I 581.0-585.7 km - approx.: 580.55, 583.45 or 584.5-585.3 km; section II 600.4-617.6 km - approx. 602.07, 604.35, 607.9, 615.98 km; section III 645.0-663.0 km - approx.: 647.30; 649.30; 652.90; 656.0 km (outside the breeding season, it is permissible to create a temporary storage site at a section 500 m east of the concrete road (approx. 656.4 km), provided that the current terrain conditions allow for it (sufficiently low water level), if this is not possible, it may be permissible to store material on a groyne there) and 663.45 or 665.2 km; section IV 668.8-683.0 km - approx. 668.20 (at 668.0 - 668.7 km due to the existing river wall, on which material storage would be possible); 671.40; 673.9; 676.61; 677.9; 682.6 km). It should be emphasised that these are approximate sites, and their number and location may change depending on the hydrological conditions and the technology of works adopted by the contractor.

Nevertheless, on the basis of the conducted wildlife inventories, areas where storage yards cannot be located in environmentally valuable areas were selected, including the following parts of the Odra:

1. Section I Słubice (581.0 - 585.7 km):

- 581 - 583.2 km and 585.3 - 585.7 km - bird habitats (nature reserve area and swamps);
- within natural habitats: 3150 - approx. 581.0; 583.7 km; 6430 - approx. 581.0; 582.1; 583.2; 584.5; 584.8 km; 91F0 - approx. 581.0 - 582.6; 585.4 - 585.7 km; 6510 - approx. 582.7-583.7 km.

2. Section II Kostrzyn nad Odrą (600.4 - 617.6 km):

- 616,4 km - Red-backed shrike sites;
- 616.9 - 617.3 km, near Osinów Dolny, i.e. mouse garlic site (in the area of alluvial meadows);
- 616.5 km - Spear-leaved skullcap site in the meadows west of Kostrzyn;
- 608.6 - 609.4 km, near Kostrzyn, mouse garlic site (in the area of alluvial meadows);
- 608 - 613 km and 615.3 - 615.6 km - bird and herpetofauna habitats (where the distance from the flood embankment to the Odra bank is greater than 100 m);
- within natural habitats: 6430 - approx. 602.5; 603.3; 606.3 - 606.5; 606.9 km; 6440 - approx. 608.6 - 609.5; 615.7- 615.8; 616.9 - 617.3 km;

3. Section III Gozdowice - Osinów Dolny (645.0 - 663.0 km):

- section from 650.5 - 656.0 km - bird and herpetofauna habitats (northern wetland part of section 4);
- from 656.5 - 661 km - bird and herpetofauna habitats (Kostrzyneckie swamp);
- within natural habitats: 6430 - approx. 645.5-645.6; 655.2; 661.2 km; 91E0 - approx. 648.0-648.5; 653.5 - 653.9; 654.2 - 654.4; 655.0 - 655.3; 657.9 - 661.0; 661.2-662.3 km;

4. Section IV Piasek (668.8 - 683.0 km):

- 672 - 673.4 km and 678 - 682 km - bird and herpetofauna habitats (swamps);
- 679.9 km above the Odra channel near Piasek, the occurrence of pear-leaved skullcap near the dirt road;
- 684.4, 684.7, 685.5, 685.7, 685.8 km of the small teasel which was inventoried within habitat 9170 - Central European and Subcontinental broadleaved forest;
- within natural habitats: 3150 - approx. 663.6; 665.6; 668.0-668.1; 668.8-669.1; 669.3-

669.9; 671.9 - 672.0 km; 91E0 - approx. 677.4-677.7; 678.8- 679.8; 673.0-673.8; 683.1-683.9; 680.6-681.0 km; 6430 - approx. 666.0-666.4; 665.5-666.9; 683.9 - 684.0; 684.5 km; 6440 - approx. 663.8 km; 6120 - approx. 663.8 km.

In addition, due to the significant spatial and seasonal variability of the natural habitat -3270 flooded muddy riverbanks, after prior verification by the environmental supervision, the investor undertook to exclude from the locations of storage sites the wet depressions in which indicator communities for this habitat could develop in the summer.

Taking into account the specifics of the project in question, its linear nature, as well as the assumption of implementation from the water side, there are also plans to organize floating welfare facilities in order to minimise interference in the land part. This solution enables efficient transport of facilities closer to the work site, and also protects against flooding with high waters. Ship crews and equipment operators will be provided with welfare facilities on the vessels on which they work. Other employees will use social facilities on a houseboat (floating hotel) or a floating pontoon (e.g. W-Z type) equipped with a set of containers.

Water for welfare purposes will be supplied in plastic tanks with a capacity of approx. 1000 l and drinking water in 5 litre bottles. Water supply, garbage collection, and replacement of portable toilets will be carried out using floating equipment such as a bolting rig with a loaded crane. The berth of the houseboat or pontoon with container facilities will provide a free, safe access from the land side with access gangways. The employees will be transported from the social facilities to individual building sites and back by a pusher, bolting rig or motor boat.

Fuel for the operation of equipment and power generators will be delivered to the construction site on bunkering barges. Bunkering barges will be supplied with fuel from tankers in designated places with appropriately equipped quays. When the bunkering barge arrives at the site, fuel will be refuelled on pushers and to mobile temporary petrol stations located on the pontoons with excavators. Temporary petrol station tank capacity is approx. 5000 l. The mobile petrol station will be installed in a sealed vat to avoid fuel spillage on the pontoon deck. Fuel from the mobile petrol station will be pumped to the excavator as needed. The bunkering barge's schedule will ensure a regular supply of fuel for all works sections. The above issues will be addressed in detail by the Contractor of the works, who, prior to the commencement of the construction, is obliged to prepare, among others: Health and Safety Plan (BIOZ), Waste Management Plan, Quality Assurance Plan, Site Flood Protection Plan for the duration of the works and Site Organization Plan.

The implementation of the investment may give rise to the possibility of situations causing a release of hazardous substances into the environment, which may indirectly contribute to the pollution of the ground-water environment. However, such situations are impossible to predict. Nonetheless, the investor was obliged to control the technical condition of machinery, technical equipment and vehicles, in order to keep them in perfect condition, to maintain order on the construction site and its facilities, which would eliminate possible spillages of petroleum substances, and thus eliminate any negative impact on soil, surface water, and groundwater. In the case of leakage of oils from construction and transport equipment, the condition imposed involves the use of appropriate sorption materials in order to neutralise the contaminated surface of the earth or water, e.g. loose hydrophobic sorbents, hydrophobic sorption mats in sheets or rolls, sorption pillows and booms, biopreparations, etc.) and then management of the contaminated material in accordance with applicable regulations. In addition, in order to minimise the risk to the ground-water environment, the following actions were imposed on the investor:

- harden the surface of storage areas, e.g. with road slabs.
- work in the Odra riverbed (related to the demolition of existing structures) should be carried out with due care in order to prevent removed structural elements and other contaminants from falling into the riverbed.

At the operation stage of the project, there are no impacts in terms of influence on surface water

in relation to the impacts occurring during the current operation of the investment.

In this permit, the environmental impact assessment for the investment was considered in the context of the direct destruction of natural elements during the construction phase as well as in the context of the long-term impact of the project. In the context of the impact on the natural environment, the analysis covered the individual stages of investment implementation. Taking into account the results of the conducted surveys and models and analyses carried out for the purposes of the *Update of the concept of the border Odra watercourse*, it was found that the greatest threat to the environment will arise during the construction phase of the investment and mainly concerns interference in the bank zone of the Odra, due to the construction and modernisation of groynes and the construction of longitudinal dams, river walls, and revetments.

With regard to the natural components indicated in the permit, in the years 2017 and 2018 comprehensive nature surveys were carried out, taking into account the presence of plant and animal species and habitats from Annexes I and II to the Habitats Directive, as well as bird species from Annex I to the Birds Directive and their habitats, as well as other species of plants, animals, lichen, and fungi subject to protection. The inventory included the riverbed with adjacent areas, within the width of approx. 200-300 m on both sides of the embankments, at the sites of the planned works and their surroundings. In addition, an analysis of source materials of the area covered by the investment was carried out in order to determine the current state of knowledge about the natural resources of the research area, also using published information, including the research of the Chief Inspectorate of Environment Protection conducted within the framework of the State Environmental Monitoring Programme.

In the course of these proceedings, due to the scale of the project, the nature of the investment, and its interference with valuable natural elements, the authority carefully analysed the impact of the investment on individual elements of the natural environment, taking into account the following documents:

- Order of the Regional Director for Environment Protection in Szczecin dated 31 March 2014 on adopting the protective action plan for the Natura 2000 area “The Lower Odra river” (PLH320037), and the amending orders dated 10 December 2015 and 6 December 2016 and the basic materials;
- Order of the Regional Director for Environment Protection in Szczecin dated 30 April 2014 on adopting the protective action plan for the Natura 2000 area “The Lower Odra river valley” (PLB320003), and the amending order dated 27 April 2017 and the basic materials;
- Order of the Regional Director for Environment Protection in Gorzów Wielkopolski and the Regional Director for Environment Protection in Wrocław dated 13 July 2017 on establishing a plan of conservation tasks for the Natura 2000 site “Central Odra Valley” (PLB080004) (Official Journal of Lubuskie voivodeship of 2017, item 1642);
- Order of the Regional Director for Environment Protection in Szczecin dated 08 February 2016 on adopting the protective action plan for the Natura 2000 area “Słubice Riparian Forests” (PLH080013), (Official Journal of Lubuskie voivodeship of 2016, item 304);
- Order of the Regional Director for Environment Protection in Gorzów Wielkopolski dated 29 April 2015 on establishing a conservation plan for the nature reserve “Riparian Forests near Słubice” (Official Journal of Lubuskie voivodeship of 2017, item 886);
- Resolution No. XLIII/647/18 of Lubuskie Province Assembly of 26 March 2018 on The Warta Rive-Mouth Landscape Park (Official Journal of Lubuskie voivodeship of 2018, item 828);
- Order no. 24/2006 of 16 February 2006 on Cedynia Landscape Park (Official Journal of the Zachodniopomorskie voivodeship no. 31 item 539).

- “Natural valorisation of the Zachodniopomorskie Voivodeship” (Nature Conservation Office, Szczecin 2010);
- Standard Data Forms for Natura 2000 sites, including information on site characteristics, the natural environment and hazard identification.

In the scope of environmentally valuable areas, including Natura 2000 sites, the sections of the planned project in the Zachodniopomorskie voivodeship (Section III and IV) is located within the following boundaries:

- area of Community importance: Lower Odra PLH320037 and the area of special bird protection: Lower Odra Valley PLB320003 and
- Cedynia Landscape Park (Section III and IV), and in the

Lubuskie voivodship within:

- special bird protection area Central Odra Valley PLB080004 (Section I),
- area of Community importance Słubice Riparian Forests PLH080013 (Section I),
- special bird protection area and area of Community importance Warta River Mouth PLC080001 (Section II),
- The Warta River Mouth Landscape Park (Section II);
- the buffer strip of the Warta River Mouth National Park (Section II),

In addition, the investment is located in the immediate vicinity of the nature reserve “Riparian Forests near Słubice” (Section I) located within the boundaries of the Natura 2000 Słubice Riparian Forests area, as well as in areas of national and international wildlife corridors, updated in 2012: Central Odra Valley GKZ-19, Swamp of the Warta River Mouth GKPn- 22, Nadodrzańskie Forests GKPn-28A, Southern Odra Valley GKPn-22.

For the abovementioned Natura 2000 sites, i.e. Lower Odra Valley PLB320003, Central Odra Valley PLB080004, Lower Odra PLH320037 and Słubice Riparian Forests PLH080013 protective action plans (PZO) were established. Whereas for the nature reserve “Riparian Forests near Słubice”, a protection plan was established. In addition, for the Warta River Mouth PLC080001 site, preparation of a protection plan is now underway.

According to the submitted materials, the Odra sections inventoried for the report show a significant variation in terms of the conservation status of natural values. However, despite sometimes significant anthropogenic transformations of the riverbed and the littoral zones, valuable elements of flora or natural habitats were found in all its sections. The Odra riverbed near Słubice is strongly transformed as a result of structures built on its banks and riverbed, with numerous regulatory groynes. The flood embankment is more than a kilometre away from the river, which made it possible to preserve plant communities in its vicinity, the occurrence of which is conditioned by cyclical flooding with flood waters, e.g. riparian forests and riparian tall herb fringe communities. In Słubice there are extensive sandy bars between the groynes, which can potentially lead to the formation of silt. The Odra between Owczary and Kostrzyn, as before, is also regulated by numerous groynes. In addition, in the southern part it is embanked very close to the riverbed, and its banks are artificially reinforced with stone. The wide belt between the embankment and the riverbed consists mainly of grassland with wood small-reed, nettle thickets, sedge reeds, reed beds, and willow thickets. As for valuable species of flora, the marsh spurge is abundant here. Between Górzycyca and Ługi Górzycyckie, just behind the flood embankment, extensive patches of riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor* (habitat 91F0) were preserved. However, they occur outside the investment impact zone. The

section between Gozdowice and Osinów Dolny covers vast areas of grassland, mainly pastures, as well as reeds and sedge reeds, vast areas of riparian forests with numerous canals. Willow riparian forests in this area occur mainly at a fairly large distance from the Odra riverbed, their largest complexes are concentrated along smaller streams, canals, and swamps. Directly above the river, there are small fragments of those forests and willow trees, probably a remnant of the former extensive riparian complexes. The Nadodrze region between Osinów Dolny and Bielinek are largely occupied by extensive reeds and nettle thickets. Strongly overgrown oxbow lakes and willow thickets are found here. The flood embankment is relatively close to the riverbed. North of Bielinek mainly sandy wastelands are found. The areas near the “Bielinek” aggregate mine are heavily anthropogenically transformed, along the banks of the Odra there are piles of sand occupied mostly by the wood small-reed, and the tansy is also common. Exposed areas of sand are found at the riverbank as a result of anthropogenic activities, but there are no silt species. On the section near Piasek, near the riverbed, fragments of riparian forests have been preserved, a significant part of the area is occupied by pastures and wetlands covered with rushes. Closer to Zatoń there are mixed and deciduous forest complexes of a transitional nature, between a riparian forest and a broadleaved forest. Despite significant anthropogenic transformations, the Nadodrze region still has a great natural potential. Valuable plant species can be found here even on artificially reinforced banks, and in the vicinity of the river regulated with groynes, extensive riparian forests still subject to cyclical flooding have been preserved.

The Odra Valley, in conjunction with the extensive hydrographic network, adjacent river valleys and forest areas, ensures the ecological continuity of natural areas. Within the area of planned investment, there is a large wildlife corridor of the Southern Odra Valley GKPn-22, which is an important element of the western part of the Northern Wildlife Corridor (hereinafter: KPn). The spatial concept of the key areas for the dispersion of large mammals (mainly lynx, wolf, and elk) is associated with the long-term conservation of this species. As regards the section of the Lower Odra in question, it should be noted that it is an important migration route for the river lamprey *Lampetra fluviatilis*, European eel *Anguilla anguilla*, vimba *Vimba vimba*, salmon *Salmo salar*, and sea trout *Salmo trutta m. trutta*. It is also a potential breeding ground for other species of anadromous fish - the twait shad *Alosa fallax* and allis shad *Alosa alosa*, associated with the Baltic Sea. For many years, a diadromous species extinct in the last century has been subject to restoring – i.e. the Atlantic sturgeon *Acipenser oxyrinchus oxyrinchus*.

Regarding the stage of investment implementation in the context of the impact on Natura 2000 sites, the following is stated.

According to the basic materials for the protective action plan and the Standard Data Forms (SDF), the area of Lower Odra PLH320037 with an area of 30,458.09 ha includes a fragment of river valley over a length of approximately 90 km, consisting of meadows, alder carrs and riparian forests, and flooded oxbow lakes. A large proportion of the area are natural floodplains, flooded annually in spring and occasionally in summer and autumn. The refuge also includes fragments of the bank zone of the Odra valley with patches of xerophilous vegetation, including xerothermic grasslands, broadleaved forests, and beech forests. This area is characterised by well-preserved habitats, including 21 types of habitat from Annex I to Council Directive 92/43/EEC. The key habitats in the refuge are dependent on flowing waters: oxbow lakes and natural eutrophic water reservoirs with *Nympheion* and *Potamion* (habitat code: 3150), lowland and sub-mountain rivers with batrachium communities (habitat code: 3260), flooded muddy riverbanks (habitat code: 3270), *Molinion* meadows on calcareous, peaty or clayey-silt laden soils (habitat code: 6410), mountain herbs *Adenostylion alliariae* and riverside herbs *Convolvuletalia sepium* (habitat code: 6430) and *Cnidion dubii* alluvial meadows (habitat code: 6440 psc.) Huge areas are occupied by willow, poplar, alder, and ash riparian forests (habitat code 91E0). Rare and endangered animal species are also numerous, including 17 species from Annex II to Council Directive 92/43/EEC. The lesser ramshorn snail, crested newt, and fire-bellied toad are associated with oxbow lakes, and archival data indicate the presence of the European pond turtle (currently population with assessment D). Ichthyofauna is represented by three species from the Habitats Directive: the white-finned gudgeon, asp, and spined loach. Mammals protected in this area include: greater mouse-eared bat and pond bat, beaver, otter, and wolf, while the protected insects are: oak hermit beetle, stag beetle and great capricorn beetle.

When analysing the impact of the implementation of the investment in the context of natural habitats which are the subject of protection in the Lower Odra Natura 2000 site PLH320037, in accordance with the submitted documents, the following habitats in conflict with the planned project were found in the area covered by the investment and in the range of its impact:

3270 Flooded muddy riverbanks with *Chenopodium rubri* p.p. and *Bidention* p.p. vegetation

According to the submitted materials, habitat 3270 was recorded in the following locations: Section III: south of Stara Rudnica - habitat developed on the exposed rocky river bank revetment (N52 49.180 E14 12.476); south of Stara Rudnica - habitat developed on a groyne (N52 49.249 E14 11.445); west of Stara Rudnica - habitat on a sandy bank (52°49.362'N 14°10.133'E); west of Stara Rudnica - habitat on a sandy bank (52°49.397'N 14°09.808'E); west of Stary Kostrzynek - habitat on a sandy bank (52°49.600'N 14°08.233'E); south of Osinów Dolny - habitat developed on an exposed sandy-stony riverbank and partly on groynes (N52 50.419 E14 7.456, N52 50.179 E14 7.523, N52 50.419 E14 7.456); west of Siekierki - habitat developed on exposed sandy banks of the river in front of the rushes, sometimes in gaps in the rushes (N52 48.394 E14 13.873, N52 48.634 E14 13.636, N52 48.740 E14 13.522); west of Siekierki - habitat developed on exposed sandy river bank surrounded by rushes (N52 48.941 E14 13.289); west of Siekierki - habitat developed on exposed stone revetment of the river bank (N52 48.921 E14 13.345); Gozdowice-Stare Łysogórki - habitat developed on top of a groyne (N52 45.965 E14 18.530); Gozdowice-Stare Łysogórki - habitat developed on point bar (N52 46.013 E14 18.336); Gozdowice-Stare Łysogórki - habitat developed on a naturally exposed sandy river bank (N52 46.045 E14 18.265); Gozdowice-Stare Łysogórki - habitat developed on a naturally exposed sandy river bank and partially on point bars in the river current inaccessible from the land (N52 46.094 E14 18.183, N52 46.106 E14 18.151, N52 46.126 E14 18.051); Gozdowice-Stare Łysogórki - habitat developed on a sandy, broken off slope of the river bank. Occasionally, patches of habitat occur at a height of more than 1 m from the water table (N52 46.253 E14 17.770, N52 46.255 E14 17.732, N52 46.262 E14 17.687); Gozdowice-Stare Łysogórki - habitat developed on top of a groyne (N52 46.305 E14 17.457); Gozdowice-Stare Łysogórki - habitat developed on top of a groyne (N52 46.410 E14 17.084); Gozdowice-Stare Łysogórki - habitat developed on a sandy bank of a river (N52 46.721 E14 16.510); Gozdowice-Stare Łysogórki - habitat developed in a reed rush gap (N52 46.820 E14 16.311); Gozdowice-Stare Łysogórki - habitat developed on a sandy, exposed bank of a river (N52 46.944 E14 16.100); Gozdowice Starysogórki - habitat developed on a stone-concrete base on the bank of the river, by the ruins of an old building (N52 47.144 E14 15.740); Gozdowice-Stare Łysogórki - habitat developed between the dirt road running along the river and the reed shore belt (N 52° 47' 20.407" E 14° 15' 27.212"); Gozdowice-Stare Łysogórki - habitat developed on top of a groyne (N52 47.402 E14 15.299); Gozdowice-Stare Łysogórki - habitat developed behind the reed shore belt, at the foot of the hill covered by the wood small-reed (N52 47.534 E14 15.081); west of Lubiechów Dolny - habitat on a sandy bank, by the stone revetment (52° 53.698'N 14°09.499'E); west of Lubiechów Dolny - habitat on a sandy point bar (52°54.169'N 14°09.232'E); west of Lubiechów Dolny - habitat on a sandy point bar (52°54.795'N 14°09.128'E); Section IV: Bielinek Mine - habitat developed on a naturally exposed, sandy bank of the river (N52 57.848 E14 9.661); Bielinek - habitat developed on a naturally exposed, sandy bank of the river (N52 56.316 E14 8.698, N52 56.300 E14 8.697, N52 56.233 E14 8.690).

According to the PZO, the identified existing and potential threats to habitat 3270 occurring in the area, which may result from the implementation of the investment include J02 changes in water relations caused by humans (hydrotechnical development of the Odra limiting the dynamics of the river and causing the elimination of silts; fascine application, cladding with stones and concrete slabs preventing the formation of habitats suitable for annual plants growing in silt - the strapwort and flood vegetation); 101 alien invasive species (riverside cocklebur invasion); J02.03 controlling (straightening) riverbeds and changing the course of riverbeds, J02.12.02 dams and flood protection in inland water systems; K01.03 drying; K01.04 flooding resulting from hydrotechnical works related to the regulation of river valleys, including the construction of river walls and embankments eliminating or limiting the area of sediment accumulation and the natural dynamics of biocenosis. In accordance with the provisions of the PZO, the need to maintain a natural hydroecological regime, consisting of floods of different frequency, duration, as well as abundance and quality of the existing transported material and

taking into account the need to preserve and reproduce conditions conducive to the formation of deposits during the design and implementation of hydrotechnical investments, was indicated as a protective action. Moreover, it was pointed out that it is necessary to apply environmentally friendly methods of flow control as part of flood protection, as well as to re-naturalise river valleys in the immersion zone by, among others, shaping habitat elements (abutments for new settlements) modelled on natural fluvial forms, as well as increasing the zones of calm water conducive to spontaneous alluvial processes (e.g. using groynes). On the other hand, in relation to the patch of habitat located on plot no. 153/3 in Stary Bleszyn precinct, Mieszkowice commune (plot outside the area covered by the investment), strengthening of the population of the strapwort was indicated, a species considered extinct, whose population needs to be strengthened by multiplication by the ex situ method.

The inventory of this natural habitat conducted for the needs of the report in 2017 and 2018 gave significantly different results due to the diametrically different hydro- and meteorological conditions, which are crucial for the formation of the habitat. 2017 was an exceptionally rainy year, resulting in high water levels and almost no conditions for its development. Summer 2018, on the other hand, due to prolonged heat and drought, resulted in the exposure of the normal bottom of the Odra bed in larger areas and significantly more abundant and better developed patches of habitat.

According to SDF, habitat 3270, which is the subject of conservation in the Natura 2000 site PLH320037 Lower Odra, is an area of 2.82 ha with representativeness A, conservation status B and overall assessment B. The degree of habitat recognition in the area according to the documentation for the PZO was determined as insufficient.

According to the submitted materials, during the field surveys, approximately 0.24 ha of habitat 3270 was inventoried within the area of Lower Odra. It is important to note that in accordance with the basic materials for the PZO presenting the location of individual objects of protection within the area, these are additional patches, not shown in the abovementioned materials, and thus not included in the area of 2.82 ha included in SDF. In connection with the implementation of the investment, only those habitat patches that were inventoried for the needs of the report in 2018 will be partially destroyed on the area of 797 m², which corresponds to 32.8% of the inventoried habitat resources in the area of potential project impact, while the habitat in the location found in SDF will not be damaged, and thus the area of 2.82 ha included there will remain unchanged.

Considering that only a fragment of the Odra ecosystem within the habitat refuge Lower Odra PLH320037 was subject to the inventory, it should be expected that area 3270 is strongly underestimated in SDF and amounts to much more than indicated by SDF.

To confirm this thesis, the inventory data from the PZO for the Natura 2000 site Warta River Mouth PLC080001, whose authors, due to the spatial and seasonal variability of the natural habitat and the occurrence of appropriate conditions for the formation of this habitat in groyne fields, on groynes, possibly on changed riverbanks, reported the area of this habitat as 632 ha, designating the river ecosystem within Natura 2000 as habitat 3270.

At the same time, the authority notes that, taking into account the area of the habitat inventoried for the purposes of the report, i.e. 0.24 ha and the area given in SDF, i.e. 2.82 ha (the total area within the refuge amounting to 3.06 ha), the loss of this habitat as a result of the works may represent 2.6% of the resources of this habitat in Lower Odra.

In relation to the assessment of natural habitat, out of 26 inventoried patches of habitat conflicting with the investment, the condition of 14 patches was assessed as inadequate (U1), while the remaining 12 patches were assessed as bad (U2). According to the submitted materials, the conflict will concern less-developed habitats located on existing groynes (recorded on maps as point habitats with an area of less than 25 m²) and in groyne fields where they occupied a larger area or formed an intermittent band of nearby patches of habitats.

The habitat patches inventoried in 2018 significantly differed from the floristic composition of patches inventoried in 2017, but also from the results of national monitoring from 2013-2014, in

which patches with less than 4 characteristic species dominated the Odra. The share of dominant species was variable, with the most common being: the reed canary grass *Phalaris arundinacea*, hairy sedge *Carex hirta*, species passing from the rushes. Among invasive alien species, the following were found at the sites: riverside cocklebur *Xanthium albinum*, *Eragrostis albensis*, devil's beggarticks *Bidens frondosa*, during the growing season, a greater share of *Echinocystis lobata*.

Taking into account the species impoverishment, the occurrence of invasive species and the strong fragmentation and small area of patches of habitat conflicting with the investment, the authority does not anticipate a significant negative impact of the investment on the abovementioned object of protection in the Natura 2000 site Lower Odra.

In addition, taking into account that the occurrence of habitat 3270 depends on anthropogenic substitute habitats, it is expected that after the completion of the construction works, the substitute habitats on groynes and banks will be subject to reconstruction, while the conditions for the formation of silts typical for groyne fields will be improved in those fields. In order to restore the riverbank properties enabling the development of habitat 3270, the investor was obliged to take the following actions:

- excluding as potential material storage sites the locations within wet depressions where indicator communities for this habitat could develop during the summer,
- not interfering in the execution of works related to the conversion of groynes into point bars located in groyne fields, with the exception of places directly interfering with the designed structures (wings),
- carrying out works on the construction of wings from the furthest point of a wing towards the groyne,
- when strengthening the foundations of slopes and groynes, avoiding sodding and sowing on large areas, preferring openwork solutions (riprap, gabions, fences, fascine-stone and mesh-stone rolls), which easily silt and are overgrown with vegetation.

One of the most important values of habitat 3270 is the presence of the plant species of the river strapwort which is under strict protection, listed as a critically endangered species in the Polish Red Book of Plants and in the Red List of plants and fungi in Poland. In 2018, this species was found on the banks of the Odra, SW from Stary Kostrzynek - 5 specimens. Given that this species develops from April to September, after which it ceases to exist and appears in various positions in the following years, the execution of works in the riverbed outside this period and the lack of interference in key bars for the species in groyne fields will not pose a significant threat to its resources. In order to further minimise the risk, in the case of registration of this species by environmental supervision, the site should be protected against accidental destruction and, if possible, seeds should be obtained to maintain the species in conservation cultivation during the works. Given the fact that the species of this plant produces significant quantities of germinating seeds, is easy to cultivate and has a negligible genetic diversity; according to the authority, it is possible to rebuild the population even from a small area of cultivation (i.e. several m²).

Due to the spatial and seasonal variability of the habitat, construction works should be carried out under environmental supervision, which will verify the presence of the habitat and, in the case of its presence, indicate the date of works, i.e. outside the period of its formation (summer). In the assessment of the authority, in view of the dominance of annual species with a short development cycle among those forming silt communities, the fact that construction works take place outside the period of habitat formation excludes a significant impact on populations of species typical for the habitat.

On the sections of banks covered by the works, the removal of permanent vegetation (rushes) may result in the creation of new habitats for silts, while it may also contribute to the emergence of invasive species, the presence of which was confirmed during inventory surveys. In order to reduce the spread of invasive species and thus improve the condition of species typical of silt habitats and increase the

number of their diaspores, invasive plants growing on the banks of the river (especially *Echinocystis lobata* and the riverside cocklebur) will be removed. This is why in the pre-investment period, prior to the commencement of the construction works, a field inspection of the work sites will be carried out on the sections directly affected by the project (groynes and the adjacent groyne fields) with the participation of a phytosociologist/botanist who will locate the places of occurrence and the population of invasive plants (listed invasive annual species are characterised by a high dynamics of occurrence and require annual updating of information on their local ranges and frequency of occurrence, which are variable and depend to a large extent on weather conditions and other factors). Once the sites which are overgrown with invasive plants have been located and visibly marked, preventive measures will be taken during the execution of the works which will limit the spread of these plants (if it is impossible to remove them immediately due to their large numbers). The purpose of environmental supervision in this area is to prevent the development of annual invasive species colonising disturbed habitats on the banks of the Odra, in places where, as a result of the conducted works, the existing vegetation will be disturbed and the bare surface of the ground riprap will be exposed or created. Each year, all such sites will be inspected, preferably in the first half of June (possibly from the third decade of May to the first decade of July). If characteristic seedlings and young plants belonging to species: *Echinocystis lobata*, Himalayan balsam, rough cocklebur, and riverside cocklebur are found, they will be removed. Young, emerging plants will be removed mechanically (picked), in case of mass occurrence they can be cut or mown, however, these operations are to be carried out before fructification (by mid-July). As they are annual plants, they do not pose a threat to the environment after they are removed or after they wither. In the case of very high numbers, the biomass of invasive species should be removed from riverside habitats in order to allow the development of native alluvial species. The preferred method is to pull out the invasive plants (most effective and precise). Mowing will have to be carried out as low as possible to prevent the regrowth of plants (the Himalayan balsam can continue to grow if it is not mown low enough) and only in places where it will not endanger rare, native plant species.

Taking into account the scope of the works covered by the project and the proposed minimisation actions during the works, as well as due to spatial and seasonal variability of the natural habitat, the authority does not foresee significant losses in the biodiversity of communities of organisms typical of silt.

91E0 - Willow, poplar, alder, and ash riparian forests (*Salicetum albae*, *Populetum albae*, *Alnion glutinoso-incanae*, spring alders).

The habitat was inventoried in the zone along the bank on the following sections of the river: south of Stare Łysogórki (approx. 648.0-648.5 km), south of the bridge near Siekierki (approx. 653.5-653.9 km), north of the bridge near Siekierki (approx. 654.2 - 654.4 km), 1.3 km southeast of Stara Rudnica (Kostrzyneckie swamp on the Odra) (approx. 655.0 - 655.3 km), south of Stary Kostrzynek (approx. 657.9 - 661.0 km), south of Osinów Dolny (approx. 661.2-662.3 km), near the Bielinek mine (approx. 677.4 - 677.7 km); west of Piasek (approx. 678.8 - 679.8 km); south of Bielinek (approx. 673.0 - 673.8 km); eastern part of the extensive riparian forest complex west of Raduń (683.1 - 683.9 km); 0.4 km north of Piasek (approx. 680.6 - 681.0 km).

According to the PZO, the identified existing and potential threats to 91E0 occurring in the area and in the vicinity of the investment, which may result from the implementation of the investment, include 101 invasive alien species; J02 changes in water relations caused by humans; J03.02 anthropogenic decrease in the cohesion of habitats, J02.03 river control (straightening riverbeds and changing the course of riverbeds) and J02.12.02 dams and flood protection in inland water systems. Protective measures for this habitat in the PZO indicate the need to ensure the flow of water without stagnation and deficiencies in the valleys of watercourses when designing any activities interfering with water relations. Securing or restoring high water levels in valleys was indicated as conditioning the fluvisol-forming processes, as was the conservation of riparian habitats by not implementing projects limiting natural water retention in valleys and natural fluctuations in water level, with the

exception of flood control activities, implemented taking into account the need to protect natural habitats.

The most valuable riparian forest complexes in this area include willow riparian forests located on the Kostrzynecki swamp near Stara Rudnica, near Raduń and near Piasek. According to the report, considering the possibility of flooding by high river waters, the habitat area and natural restoration of the stand, their conservation status is good. In addition, a number of small strips or patches of willow riparian forests, severely deformed by various forms of human activity, were also reported.

The main assumptions of the proposed investment concern the execution of works from the side of water. According to the submitted documents, the construction of groynes, walls, and revetments will require profiling of the bank slopes and laying riprap on geotextile. Therefore, the interference of the investment in the abovementioned habitats will only involve the removal of a few trees, without interference in the ground-water conditions, on patches interfering with the abovementioned works, and this applies to the following patches of the habitat: at: 653.5 - 653.9 km; 654.2 - 654.4 km; 655.0 - 655.3 km; 661.2 - 662.3 km; 673.0 - 673.8 km; 677.4 - 677.7 km; 678.8 - 679.8 km.

In order to protect patches of natural habitat located outside the area of the planned works, which may be accidentally and unintentionally damaged or disturbed, the following areas where storage sites cannot be located were indicated: approx. 648.0-648.5; 653.5 - 653.9; 654.2 - 654.4; 655.0 - 655.3; 657.9 - 661.0; 661.2-662.3; 677.4-677.7; 678.8- 679.8; 673.0-673.8; 683.1-683.9; 680.6-681.0 km.

Bearing in mind the design assumptions regarding the implementation of the investment, i.e. carrying out works from water, and the extent of interference in the patches of this habitat, no significant negative impact of the investment on the conservation status of the abovementioned habitat in the area of Lower Odra is expected in its implementation stage.

3150 – Oxbows and natural eutrophic lakes with *Nymphaeion, Potamion*.

The habitat was inventoried between Bielinka and Osinów Dolny in the following locations: 663.7; 668.0 - 668.1; 668.8 - 669.1; 669.3 - 669.9; 672.0 km. They occupy small areas but are mostly characterised by a large variety of macrophytes. These oxbows are characterized by a higher proportion of pleustophiles, such as salvinia natans, common duckweed, and spirodela polyrhiza, and are largely overgrown by rushes. Due to the phytosterotic depletion of the community patches resulting from the dominance of only one type of aquatic vegetation in individual patches of the habitat and overgrowth with rushes, its conservation status was assessed as U1 - unsatisfactory.

According to the PZO, the identified existing and potential threats to 3150 occurring in the area and in the vicinity of the investment, which may result from the implementation of the investment, include H01 pollution of surface water; K.02.03 eutrophication; J02.12.02 dams and flood protection in inland water systems; K01.02 silting; K02.02 accumulation of organic matter; J02.02.01 dredging/removal of lime sediments; 101 alien invasive species; J02.02.01 dredging/removal of lime sediments; J02.03 controlling (straightening) riverbeds and changing the course of riverbeds; J02.11.01 storage of garbage, deposition of dredged material; J02.12.02 dams and flood protection in inland water systems.

Conservation measures for this habitat indicate the need to take into account the activities when designing hydrotechnical devices with the need to leave oxbows within the inter-embankment or planning solutions that enable contact with river waters. Introduction to the oxbows in hydrological contact with the Odra stream, which do not require de-sludging, e.g. Porzecze, Stara Rudnica, of the locally extinct species - water chestnut was noted, as was the strengthening of the fringed water lily resources through its reintroduction to the northern part of the Natura 2000 site and increasing the chances of species conservation by introducing the species to oxbows in the area of the current site.

According to the submitted materials, due to the need to rebuild the groyne, direct destruction of the habitat will occur (at approx. 672 km) on the area of 0.08 ha, which constitutes 0.02% of the resources of habitat 3150 within the Natura 2000 site (SDF - 397.81 ha).

In order to minimise the risk of deterioration of a habitat located outside the area of the planned works, and which may be accidentally and unintentionally damaged or disturbed, the works (any earthworks, machine passages, material storage, etc.) will be carried out in a manner that takes into account the location of these habitats, by excluding the possibility of locating storage yards on the following sections at approx.: 663.6; 665.6; 668.0-668.1; 668.8-669.1; 669.3-669.9; 671.9-672.0 km.

In addition, the planning and execution of earthworks in the riverbed in places of poorly flowing or standing waters (bays within groyne fields, stretches of weak current behind longitudinal dams) will take into account the need to protect populations of rare habitat species (e.g. water chestnut, fringed water lily, salvinia natans) and the work will be organised in such a way as not to endanger the conservation of these populations. In the event of an unavoidable conflict, diaspores of rare species shall be protected and moved by environmental supervision to a safe location, as close as possible, with similar habitat conditions, so as not to cause loss of their populations.

Taking into account the scope of works covered by the project and the extent of interference in the patches of this habitat, no impact of the investment on the conservation status of the abovementioned habitat is expected at the implementation stage.

According to the submitted documents, the scope of the works covered by the investment includes no other natural habitats that are the subject of protection in the area of Lower Odra. Nevertheless, in order to protect patches of natural habitats located outside the area of the planned works, which may be accidentally and unintentionally damaged or disturbed, areas where it is impossible to locate storage sites in relation to the following habitats were indicated: 9170: 684.4, 684.7, 685.5, 685.7, 685.8 km; 6430: approx. 645.5-645.6; 655.2; 661.2; 666.0-666.4; 665.5-666.9; 683.9 - 684.0; 684.5 km; 6440, 6120 - approx. 663.8 km. In addition, it should be noted that the works planned to be carried out (reconstruction of the body, head of a groyne, dams or revetments) will be carried out from the water, which significantly reduces the potential impact on the abovementioned habitats, including habitat 6430, whose herb communities develop from the land side behind the rushes. Due to the above and due to the specificity of the works and the manner of their execution, no significant interference in the patches of the abovementioned natural habitats is expected.

Therefore, no significant negative impact of the investment on the abovementioned conservation objects in the Natura 2000 site of Lower Odra is expected.

When analysing the implementation of the investment in the context of ichthyofauna, which is the subject of protection in the Natura 2000 site Lower Odra PLH320037, it should be pointed out that the implementation of the investment may contribute to the local deterioration of habitats and living conditions of fish, located in the bank zone of groynes and depressions in groyne fields,

The following species were identified in the collected materials on the species composition and structure of ichthyofauna in the Odra, taking into account field surveys carried out using the electrofishing method:

- the asp *Aspius aspius* - recorded on 3 transects: no. 4 Odra Porzecze (oxbow), no. 5 Odra Porzecze-2 (bank - bank zone), no. 13 Odra - Piasek 2 (groyne field, bank zone). A total of 6 specimens were caught, mostly in sections of the open shore, with typical current habitats, but only one specimen of this year was caught in the oxbow. In the inventory the species was identified as rare (0.0009-0.006 specimens/m²), but was considered to be moderately abundant for impact assessment purposes, due to methodological difficulties in obtaining a representative sample in electrofishing and general data on its quite frequent occurrence in the Odra (angling and fishing);
- spined loach *cobitis taenia*, a very numerous species, reaching a density in the range of 0.009-0.5 specimens/m², caught most frequently in oxbows (most frequently around the Piasek canal) and shallow zones of groyne fields. This species was not recorded in typical current habitats or deeper habitats;

- white-finned gudgeon *Romanogobio albipinnatus* species occurring throughout the entire section of the Odra. Among the recorded white-finned gudgeon specimens: three belonged to this year's specimens, 22 were juveniles - sexually immature, and 27 were adult specimens (ADULT). This species inhabits the bottom of the current zones of the riverbed and habitats with rocky base and swift current at the tops of groynes. In the inventory the white-finned gudgeon was identified as rare (0.002-0.05 specimens/m²), but was considered to be moderately abundant for impact assessment purposes, due to methodological difficulties in obtaining a representative sample in electrofishing and literature data on its occurrence in the Odra;

In accordance with the provisions of the SDF, the conservation status of the abovementioned species was defined as good - B.

The identified existing and potential threats to the abovementioned species, which are the subject of protection in Lower Odra, and which may result from the implementation of the investment, include H01 pollution of surface water through deterioration of physicochemical conditions of waters and J03.01 reduction or loss of certain features of habitats and J02 changes in water relations caused by humans. The protective measure for these species is monitoring of water pollution in the species' habitats, twice during the period of validity of the PZO, with a three-year interval between surveys.

For most species forming the river ichthyofauna complex, floodplains and the shallow zones of the river ecosystem abundantly overgrown with aquatic vegetation are of key importance. The maintenance of these environments, and thus the abundance of ichthyofauna, depends on the preservation of the natural hydrological cycle of the river, characterised by periodic outflow of water outside the riverbed.

It should be emphasised that the negative effects of the regulation of the Odra on fish and the associated depletion of habitats are mitigated to some extent by spontaneous renaturalisation taking place most intensively in groyne fields. These processes lead to the formation of habitats with features similar to natural ones: riffles in the current, stream pools, and marginal lakes with the characteristics of oxbows. Damage to groynes enables the formation of riffles - valuable habitats of rheophilic species such as the barbel, asp, dace, chub, and white-finned gudgeon. Sand deposits in groyne fields determine the availability of juvenile fish habitats. The occurrence of marginal lakes cutting deeply into the bank, with aquatic vegetation, is of particular importance for the maintenance of numerous populations of phytophilic species, including the protected spined loach and amur bitterling. The presence of Unionidae family mussels, numerous in this type of environment, is also crucial for the occurrence of the amur bitterling. One of the factors increasing the diversity of habitats is the presence of thick woody debris, as well as larger boulders.

According to the submitted materials, the planned investment will be carried out for approx. 15% of the length of the river (for the first stage, which is planned to be carried out first). The nature and scope of the investment related to the movement of the works as they progress and the time delay of the works carried out during stage I and stage II of the project, as well as those carried out on the Polish and German banks (minimum 3 years, preferably 5 years), will allow fish to use habitats on the opposite side, or in adjacent river control structures, as alternative habitats during their development cycle. Nevertheless, during the implementation of the investment, the following actions will be implemented to minimise the negative impact on ichthyofauna, i.e.: limiting to a minimum interference in groyne fields (materials for the construction of groynes will not be stored there, deposits of sand and the aquatic and rush vegetation will be left undisturbed, endangered patches of vegetation (especially nymphaeids) will be replanted, woody debris (tree trunks, logs, stumps) located in groyne fields will not be removed. In addition, the construction of the wings will be carried out starting from the edge furthest from the base of the groyne, using equipment moving along the bank, in the zone to be occupied by the wing construction. Transferring the Unionidae mussels from hazardous areas to safe areas is also planned - a minimisation of the impact on the amur bitterling. In addition, in order to accelerate the regeneration of habitat diversity in the bank zone, during the implementation of the investment, the following actions were introduced to improve the ecological capacity of the river and to limit the negative impact of the investment on species protected in Lower Odra PLH320037: restoring the riffles of loose stones on the downstream side of the tops of the renovated groynes and leaving the habitat elements, supplementing the habitat elements by placing oversized boulders in spaces behind longitudinal dams and in all deep

groynes fields adjacent to the renovated groynes, and proper construction of longitudinal dams and developing the spaces behind the dams in a form corresponding to the conditions in open oxbows. It is expected that with the application of the abovementioned measures, the habitats for the spined loach, asp, and white-finned gudgeon will regenerate within 3-5 years. Appropriate periods of exclusion from certain types of work were also indicated, including for the protection of fish during spawning and wintering, i.e. carrying out work outside the period from March - mid-July in order to limit the impact of increased suspension and stressors on fish; curtains will be used during works interfering with the bottom in order to minimise the inflow of excessive quantities of suspension during the migration of salmonids from October-December. In addition, monitoring the level of suspended matter and water oxygenation and, if necessary, suspending the works, should fully protect the abovementioned group of fish from adverse impact of the investment.

In the light of the above, it should be concluded that the implementation of the investment will not cause a material negative impact on the fish species protected in the Natura 2000 site Lower Odra PLH320037.

In relation to the remaining conservation objects in the Natura 2000 site Lower Odra, the inventory carried out for the purposes of the report did not show any significant negative impact on species such as: greater mouse-eared bat and pond bat, beaver, otter, wolf, lesser ramshorn snail, crested newt, and fire-bellied toad, and insects. Among the abovementioned species, the existence of mammals such as otters, beavers, and wolves and potential places of occurrence of bats were found during the surveys. Due to the nature of the investment and its design assumptions, including the execution of works from the land side, the location of storage sites outside environmentally valuable areas, the removal of trees after prior control by a chiropterologist and entomologist, the execution of construction works in areas of particular concentration of bats (at 655 km, 658 - 659.5 km, 662.5-663 km) during the period of reduced activity and wintering of bats, i.e. in the period September-April, no significant negative impact on the abovementioned species is expected.

In addition, the environmental supervision carried out as part of the investment will fully protect the abovementioned elements of the environment from the adverse impact of the works.

With respect to another Natura 2000 site located within the borders of the Zachodniopomorskie voivodeship, i.e. the bird refuge Lower Odra Valley PLB320003, the following is stated.

The Natura 2000 site Lower Odra Valley PLB320003 includes the Odra valley between Kostrzyn and the Szczecin Lagoon (length approx. 150 km) with Lake Dąbie included. Significant areas are occupied by willow thickets and riparian forests. A large number of large islands are covered by wetlands which, as a result of succession, are overgrown by alder and ash-alder riparian forests. In the estuary section, the Odra has two main branches - the East Odra and the Regalica. The area between the main branches (canals) (Międzyodrze) is a flat plain with numerous lakes and smaller canals, it is marshy, has periodically flooded meadows and fragments of riparian forests. The area below Cedynia is called the Freienwalde Basin, within which the so-called Kostrzyneckie swamp has a special significance for birds. The refuge includes the entire habitat area Natura 2000 Lower Odra. On the German side along the Odra stretches the Lower Odra Valley National Park. In the central and southern parts of the area, fragments of forests adjacent to the valley with the highest density of birds of prey were included. There are at least 43 species of birds from Annex I to the Birds Directive, 14 species from the Polish Red Book (PCK). A very important area especially for wetland birds during the breeding, migration, and wintering periods. During the breeding season, the area is inhabited by at least 1% of the national population of the following bird species: the Eurasian bittern, Montagu's harrier, and greylag goose; relatively high density of: the black tern and red-backed shrike. The refuge also includes one of the last sites of the aquatic warbler in the Zachodniopomorskie voivodeship. During the migratory period, at least 1% of the population of the migratory route of the following species of birds occur: taiga bean goose and white-fronted goose; at a relatively high density: whooper swan, great crested grebe, gadwall, lapwing and European golden plover; in the autumn staging area, cranes are present in the number of up to 5,000 specimens. In winter, the great crested grebe occurs in high numbers. The following species of birds are protected: the aquatic warbler (*Acrocephalus paludicola*), kingfisher (*Alcedo atthis*), northern pintail (*Anas acuta*), Eurasian teal (*Anas crecca*),

Eurasian wigeon (*Anas penelope*), mallard (*Anas platyrhynchos*), gadwall (*Anas strepera*), white-fronted goose (*Anser albifrons*), greylag goose (*Anser anser*), taiga bean goose (*Anser fabalis*), short-eared owl (*Asio flammeus*), common pochard (*Aythya ferina*), tufted duck (*Aythya fuligula*), greater scaup (*Aythya marila*), Eurasian bittern (*Botaurus stellaris*), eagle-owl (*Bubo bubo*), common goldeneye (*Bucephala clangula*), black tern (*Chlidonias niger*), black stork (*Ciconia nigra*), western marsh harrier (*Circus aeruginosus*), Montagu's harrier (*Circus pygargus*), corn crake (*Crex crex*), whooper swan (*Cygnus Cygnus*), mute swan (*Cygnus olor*), great egret (*Egretta alba*), peregrine falcon (*Falco peregrinus*), Eurasian coot (*Fulica atra*), crane (*Grus grus*), Eurasian oystercatcher (*Haematopus ostralegus*), white-tailed eagle (*Haliaeetus albicilla*), Mediterranean gull (*Larus melanocephalus*), little gull (*Larus minutus*), Savi's warbler (*Locustella luscinioides*), bluethroat (*Luscinia svecica*), smew (*Mergus albellus*), common merganser (*Mergus merganser*), red kite (*Milvus migrans*), black kite (*Milvus milvus*), osprey (*Pandion haliaetus*), bearded reedling (*Panurus biarmicus*), European honey buzzard (*Pernis apivorus*), cormorant (*Phalacrocorax carbo sinensis*), ruff (*Philomachus pugnax*), little crake (*Porzana parva*), spotted crake (*Porzana porzana*), little tern (*Sternula albifrons*), common tern (*Sterna hirundo*), common shelduck (*Tadorna tadorna*), wood sandpiper (*Tringa glareola*), northern lapwing (*Vanellus vanellus*), ruff (*Philomachus pugnax*).

At the outset, it should be noted that for the purposes of the report, a thorough wildlife inventory was carried out with regard to the ornithofauna. On each section of the planned investment, bird counts were carried out during the day, the selected time of day was the time of the highest activity of birds, and in the case of species active at night, additional counts were carried out at night. The method of conducting field surveys was adapted to the conditions, i.e. the use of boats in the bank zone inventory was abandoned, as it was largely impossible at the controlled sections in the 200m zone to penetrate the bank and rushes were not large enough to hinder the inventory from the banks. Particular attention during inventory works was devoted to species that are objects of protection in Natura 2000 sites located on the site of the planned project. Observations of larger flocks of other bird species were also reported. As in other periods of the year, particular attention was paid to the species protected in Natura 2000 sites located on the site of the planned project. The counting methods were adapted to different groups of species in accordance with the adopted methodological recommendations. Early spring counts, carried out in March-April, focused on searching for potentially breeding pairs of cranes, birds of prey, woodpeckers, and the raven. Owls, rails, and Eurasian bitterns were counted during night checks. In May, the focus was on species from the 1st Annex to the Birds Directive: the charadrii and waterfowl. The corncrakes, little bitterns, and little crakes were counted during the night checks. The June and July inspections were intended to supplement knowledge on the distribution and abundance of breeding species of birds in open areas, as well as swallows and other species nesting on the structures of bridges. Autumn inventory works - lasting from September to November, consisted in counting birds appearing on the Odra during the autumn migration. They were carried out at predetermined fixed points located in the vicinity of Zatoń Dolna, Osinów Dolny, Gozdowice, Kostrzyn, Górzycza, and Słubice. During the inspection, the number of specimens passing through, the number of herds members, and the height and direction of their passage were recorded. Counts were performed in two one-hour sessions scheduled at different times of the day. In addition, during each inspection, the birds present at the Bielinek Mine, at the Odra oxbow near Piasek and at the Kostrzyneckie Swamp were counted. In the winter months - in December, January, and February - bird counts were carried out on transects covering the Odra and the adjacent 200-metre strip of the right-hand side inter-embankment (the adopted buffer for the investment impact), located within the area of the planned project. At that time, both resting birds and birds flying over the survey area were recorded. Counting was based on the "spotting" method, in which ornithologists were assisted by optical equipment: binoculars and telescopes. In addition, in places of exceptional value for the avifauna (e.g. floodplains in the Odra inter-embankment, flooded excavations of former gravel mines), the observed species were also recorded at a distance greater than the 200-metre buffer. Since in the vast majority of cases determining the exact location of the birds' nests was not possible, birds species that were observed (or heard) more than once in the breeding season on the site were considered breeding, as was the case where territorial voices of males were heard. The works were carried out from the land side from places that enabled the most accurate observation and listening.

The inventory surveys carried out for the purposes of the report showed that the most common

group of birds were geese (75% of all recorded birds), among which the greylag goose and taiga bean goose dominated. Water birds, such as ducks (especially mallards), cormorants, swans and coots, were represented in large numbers. Numerous flights of starlings and chaffinches along the thickets on the banks of the Odra were also recorded. The less numerous species, whose total number was not more than 1000 specimens, included the fairly common mergansers, rare duck species, but also crows, gulls and herons. It is also worth noting the fact that a total of 78 white-tailed eagles, the most widely recorded bird of prey, was recorded. They used the high concentrations of wetlands as a potential source of food.

The conducted inventory surveys show the lack of significant negative impact of the investment during its implementation on the objects of protection in Lower Odra Valley PLB320003. According to the results of the surveys, in autumn and winter, the floodplains were used most intensively by avifauna, including those located along the entire length of the Kostrzynecki Swamp and the areas between Bielinek and Piasek. In addition, very high concentrations of geese and mute swans were recorded just below Gozdów, but they were concentrated mainly on the German side. According to the submitted materials, the following objects of protection were found in the area covered by the investment and in its vicinity: white-tailed eagle (the territory on the entire section of the Odra), osprey (the territory south of Piasek), breeding pair of the western marsh harrier (at a distance of 500m from the planned works), corn crake (on meadows and swamps from Gozdowo to Stara Rudnica), crane (on meadows and swamps from Gozdowo to Stara Rudnica and on the Cedyński polder), northern lapwing (on wet meadows at a distance of approx. 300-400 m from the planned works), Mediterranean gull (on sandy islands on the reservoir on the former gravel pit - at a distance of 500 m from the planned works), little gull and common tern (on sandy islands on the reservoir on the former gravel pit in Bielinek, at a distance of 600 m from the planned works), black tern (swamp in the vicinity of Siekierki, at a distance of 400 m from the planned works), the eagle owl (the bridge construction at 653.9 km), kingfisher (in the bank slope at 648.3 km, at groyne 4/649), the bluethroat (the area of the Cedynia polder), Savi's warbler (the area of the Cedynia polder and in the area of Piasek), bearded reedling (oxbows in the vicinity of Cedynia polder), greylag goose (gravel pit reservoir in Bielinek), common shelduck (between Gozdowice and Siekierki), Eurasian teal (potential places of occurrence on the banks of the river on the whole section).

One of the most valuable habitats for birds in river valleys are sandy mid-channel bars and point bars, which take the form of low islands in the river current or sandy beaches along the banks and constitute natural habitat 3270 and at the same time are used by birds throughout their period of development. They are breeding grounds for valuable and rare species of the lani (common gull *Larus canus*, lesser black-backed gull *Larus fuscus*, Mediterranean gull *Ichthyophaga melanocephalus*, black-headed gull *Chroicocephalus ridibundus*, common tern *Sterna hirundo*, little tern *Sternula albifrons*) and the charadrii (Eurasian oystercatcher *Haematopus ostralegus*, northern lapwing *Vanellus vanellus*, common redshank *Tringa totanus*, common ringed plover *Charadrius hiaticula*, little ringed plover *Charadrius dubius*). In the period of dispersion and seasonal migration or wintering, they are a stopover and resting place for wetland birds. The inventory carried out for the needs of the report, covering the breeding period of birds, their seasonal migration and wintering, did not show the presence of any mid-channel sandy bars in the zone of potential impact. Numerous point bars located in groyne fields were reported, including the most valuable ones occurring on the Odra section between Gozdowice and Stare Łysogórki, where no nesting terns, gulls or oystercatchers were found. As a result of the washing out of the base of the groynes and the significant erosion of the riverbanks, these bars gained good separation from the land and expanded towards the centre of the river. Taking into account the condition of the habitat (good separation of the bars from the land, their height, large size and hideouts on their surface in the form of patches of low herbaceous vegetation), the authors of the report considered these bars to be a suitable breeding habitat for the common tern, little tern, and oystercatcher.

According to the records of the authors of the inventory of birds made for the needs of the Report and publicly available source materials, numerous predators threatening the breeding of birds on islands and bars were recorded by the Odra, which may effectively discourage birds from breeding in these areas. A similar effect may be brought about by frequent flooding of bars during the breeding season

by the reservoir waters of the Odra. The above thesis is confirmed by the results of natural surveys carried out for the purposes of the report, as well as publicly available materials related to the study of the Odra avifauna, which showed that terns, gulls and oystercatchers do not nest on bars in the Odra, but on islands or peninsulas on artificial water reservoirs of the gravel pit located just by the river. In view of the above, it should be concluded that sandy bars in the Odra at the site of the planned project do not satisfactorily fulfil the functions of breeding habitats of terns, gulls, and oystercatchers. Taking into account that sandy bars constitute a potential habitat for gulls, terns, and plovers, in order to counteract the temporary limitation of the availability of potential breeding habitats for the abovementioned group of birds, low floating islands will be executed for the duration of the investment covering stage I and stage II (with the possibility of extending this deadline to cover the operation stage of the investment, which will depend on the results of the monitoring carried out).

At low water levels, bars are an important resting and feeding place for wetland birds. Nevertheless, it will not be difficult for birds migrating over long distances (plovers, terns) to find alternative feeding grounds during the implementation of the investment. Work on groynes will be carried out in stages on several sections of the river, so that some of the shallows associated with them will not lose their value as a feeding ground for migratory birds. Once the investment process is completed, the mid-channel bars should be restored in a short time. However, bearing in mind the forecasts concerning the formation of precipitation in Poland in conditions of global warming, which suggest a decrease in the amount of precipitation in the summer period and an increase in the amount of precipitation in the winter period (without significant changes in the total annual amount of precipitation), it is possible to forecast a future decrease in the role of sandy bars for wetland birds during the period of migration and in the winter.

Works carried out in the autumn-winter period may cause temporary and local deterioration of the feeding and resting conditions for some migrating and wintering birds of the order Anseriformes. Nevertheless, given that the work will concentrate on short sections and then slowly move on as the work progresses, the spatial range of disturbances that may occur in the riverbed zone will be limited. Therefore, no significant loss of habitats for migratory and wintering species is expected during the implementation of the investment. In addition, the conditions in the river valley, providing many suitable places to feed, rest and sleep, will enable birds to find suitable habitats for the duration of the works. Therefore, the effects on wintering and migratory birds will be temporary and will cease upon the completion of the works.

Due to the possibility of scaring protected species of birds in order to minimise the negative impact of the investment during its implementation on the conservation objects in Lower Odra Valley, the following actions were introduced;

- carry out works on the embankment located at 648.3 km, by the 4/649 groyne outside the breeding season of the kingfisher *Alcedo atthis*, i.e. Outside the period from March to the end of September;
- carry out construction works within a 500 m radius of the bridge structure located at about 653.9 km, outside the eagle owl breeding period, i.e. from the beginning of September to the end of December. Before commencing work in the non-breeding period, the presence of the eagle owl in the area will be verified and, if necessary, the manner of conducting this work will be indicated;
- excluding areas located at approx.: 650.5 - 656.0; 656.5 - 661 km (Kostrzyneckie Swamp); 672 - 673.4, 678 - 682 km as possible storage sites and carrying out works from the land side: approx.: 650.5-656 km, 656.5-661 km, 672-673.4 km, 678-682 km.

Taking into account the design assumptions of the investment implementation, i.e. carrying out works from the water side, mainly in the autumn-winter period and the planned implementation in stages, as well as the postponement of the works on the Polish and German side, the implementation of the investment will not result in the depletion of the population of breeding species of birds, and it

will not pose a significant threat to migrating and wintering birds in the refuge.

In view of the above, no significant negative impact of the investment on the objects of protection in Lower Odra Valley PLB320003 is predicted in its implementation stage.

In relation to the Natura 2000 sites located in the Lubuskie voivodeship, due to their territorial reach, they were assessed by the Regional Director for Environment Protection in Gorzów Wlkp., who expressed his view in this case in letters dated 14.08.2019 and 04.02.2020.

In relation to the Natura 2000 site, Słubice Riparian Forests PLH080013 area, conflicting with the planned project, the following is stated.

This area covers a total of 825.1 ha and is elongated, associated with the Odra and its river valley. The area is crucial for the protection of natural forest habitats of the riparian forest type (91F0 and 91E0) and the *Cucujus cinnaberinus* habitats. The following natural habitats are protected: 3150 - oxbows and natural eutrophic water reservoirs with communities with *Nympheion*, *Potamion*, 6510 - extensively used lowland and mountain meadows (*Aeohenatherion elatioris*), 9170 - central and subcontinental broadleaved forest (*Galio-Carpinetum*, *Tilio-Carpinetum*), 91E0 - willow, poplar, alder, and ash riparian forests (*Salicetum albo-fragilis*, *Populetum albae*, *Alnenion glutinoso-incanae*) and spring alders, 91F0 - oak-elm-ash riparian forests (*Ficario-Ulmetum*) and among insects: *Cucujus cinnaberinus*. Within the boundaries of the abovementioned Natura 2000 site, the "Riparian forests near Słubice" nature reserve is located, in the vicinity of the implementation of the investment. This area is a mosaic of riparian forests with the oak dominating, with mid-forest meadows and clearings, and small oxbows. The main objective of nature conservation in this site is the conservation of natural habitats (including 3150, 6440, 9170, 91E0 and 91F0) and animal species (white-tailed eagle, black woodpecker, middle spotted woodpecker, red-backed shrike, barred warbler, red kite, European honey buzzard, fire-bellied toad, European beaver and otter). The planned investment in this area does not violate the boundaries of the nature reserve but may indirectly affect the condition of the riparian forests (as a result of changes in the hydrological regime).

The content of the Protective Action Plan (hereinafter referred to as the PZO), as well as the Standard Data Form and the Plan of Protection (hereinafter referred to as the PO) of the nature reserve "Riparian forests near Słubice", in the part shared with the abovementioned Natura 2000 site, lists a number of significant threats in relation to its objects of protection, in particular with regard to: 3150 – Oxbows and natural eutrophic lakes with *Nympheion*, *Potamion*; potential threats: J02.03 controlling (straightening) riverbeds and changing river courses (threat to habitat conditions due to a disturbance of the hydrological regime); 9170 - Central European and subcontinental broadleaved forest (*Galio-Carpinetum*, *Tilio-Carpinetum*); existing threat K.02 Biogenetic evolution, succession, potential: J02.04.02 no flooding; 9170 Central European and subcontinental broadleaved forest (*Galio-Carpinetum*, *Tilio-Carpinetum*); existing threats: K02 Biogenetic evolution, succession, potential: K02.01 - change in the species composition; *91E0 - Willow, poplar, alder, and ash riparian forests (*Salicetum albae*, *Populetum albae*, *Alnenion glutinoso-incanae*, spring alders), potential threats: J02.03 controlling (straightening) riverbeds and changing river courses (threat to habitat conditions due to a disturbance of the hydrological regime); 91F0 - oak-elm and ash riparian forests: potential threat: J02.04.02 no flooding, (threat to habitat conditions caused by lack of periodic flooding with river waters.) and 1086- *Cucujus cinnaberinus*.

According to the submitted documents, during the inventory works the following patches of habitat were found within the scope of the impact of the investment:

- 3150 including the Odra floodplain south of Słubice, near the Słubice Riparian Forests reserve and the railway bridge (approx. 581.0 km); and the Odra floodplain south of the bridge in Słubice (approx. 583.7 km). Those habitats occupy small areas but are mostly characterised by a large variety of macrophytes. The habitat is mostly populated with nympheids with the dominant yellow water lily. Due to the phytosterotic depletion of the community patches resulting from the dominance of only one type of aquatic vegetation (nympheids) in individual patches of the habitat

and overgrowth with rushes, the conservation status was assessed as U1 - unsatisfactory.

The execution of modernisation works may cause deterioration of the habitat located by groynes no. 2/582 and 18/584. It is possible to directly destroy 0.15 ha of habitat 3150, which represents 1.07% of the resources within the refuge (13.99 ha - SDF area of Community importance Słubice Riparian Forests PLH080013). When comparing spatial data from existing documents (PZO for the site and Nature Conservation Plan for the "Słubice Riparian Forests" reserve) with data from the inventory carried out for the purposes of the report, it transpires that the area of the habitat in the refuge resulting from the SDF is underestimated and currently amounts to 15.83 ha, which will result in the destruction of 0.94% of the total habitat resources in the area.

Nevertheless, the authors of the report indicate that the expected amount of damage is an estimate and, as a result of detailed design data, this area may be significantly reduced.

In order to minimise the risk of deterioration of the identified patches, the abovementioned habitat was excluded as a potential site for a storage yard at approx. 581.0 and 583.7 km.

In addition, the planning and execution of earthworks in the riverbed in places of poorly flowing or standing waters (bays within groyne fields, stretches of weak current behind longitudinal dams) will take into account the need to protect populations of rare habitat species (e.g. water chestnut, fringed water lily, salvinia natans) and the work will be organised in such a way as not to endanger the conservation of these populations. In the event of an unavoidable conflict, diaspores of rare species shall be protected and moved by environmental supervision to a safe location, as close as possible, with similar habitat conditions, so as not to cause loss of their populations.

In relation to other objects of protection, which are located in the vicinity of the works, in order to prevent accidental and unintentional destruction, areas excluded as possible sites for locating storage yards in relation to the following habitats were indicated:

6430 - approx. 581.0; 582.1; 583.2; 584.5; 584.8 km; **91F0** - approx. 581.0 - 582.6; 585.4 - 585.7 km; and excluded from carrying out works from the land side: section of the Odra: approx. 581 km - 583.2 km and approx. 585.3 - 585.7 km (nature reserve area), **6510** - approx. 582.7 - 583.7 km.

Taking into account the above, as well as the nature of the project and the planned solutions protecting elements of the natural environment, no significant negative impact of the investment on the objects of conservation in the Natura 2000 Słubice Riparian Forests site is expected.

Another Natura 2000 area subject to in-depth analysis is the bird refuge Central Odra Valley PLB080004.

The area of 33,677.8 ha covers a fragment of the Odra valley from 408 km to 592 km (length approx. 184 km, width ranges from nearly 5 km to only a few hundred meters). In the area there are non-forest ecosystems crucial for bird conservation, in a mosaic with perfectly preserved riparian forests and aquatic ecosystems. Area of particular importance for the protection of the breeding and migratory populations of 14 bird species, including 8 species included in Annex I to Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. Protected birds: whooper swan *Cygnus Cygnus*, taiga bean goose *Anser fabalis*, mallard *Anas platyrhynchos*, garganey *Anas querquedula*, northern shoveller *Anas clypeata*, European honey buzzard *Pernis apivorus*, black kite *Milvus migrans*, red kite *Milvus milvus*, western marsh harrier *Circus aeruginosus*, corncrake *Crex crex*, whiskered tern *Chlidonias hybridus*, white-winged tern *Chlidonias leucopterus*, kingfisher *Alcedo atthis*, middle spotted woodpecker *Dendrocopos medius*.

The Protective Action Plan (hereinafter referred to as PZO) and the Standard Data Form list the following significant risks in relation to the objects of protection that may result from the implementation of the investment, i.e. D03.02 - shipping routes, 101 - invasive alien species, J02.04.02 - no flooding, J03.01 - reduction or loss of specific habitat features.

The inventory carried out for the needs of the report did not show any material negative impact of the investment during its implementation on the abovementioned objects of protection. Suitable habitat conditions for such species as: the northern shoveller, mallard, whooper swan, taiga bean goose were found outside the range of planned works. In addition, due to the fact that part of the valley is the habitat of the red kite (the identified area), it is not expected that the scope of works and the adopted design assumptions could cause a significant impact on this species of bird. In addition, it has been demonstrated that conducting works in the spring and summer period may cause scaring of the garganey which is found in swamps in the Odra inter-embankment, whose nests have been inventoried at a distance from the planned works. Considering the fact that the works on the reconstruction of the groynes will focus on shorter sections and after their completion the front of the works will move on with as the works progress, the spatial range of disturbances that may occur in the riverbed will be limited. In addition, the adopted deadline for the works, i.e. outside the period March - mid-July (due to the spawning season of the fish), will prevent the negative impact of the investment on this object of protection, as well as other objects that may potentially be found there, within the area of the planned works. In addition, the exclusion of any possibility to carry out works on the land side and to locate material storage sites at the following kilometres: from 581.0 to 583.2 km and from 585.3 to 585.7 km, will significantly reduce the impact of the investment on species protected in the Natura 2000 site

In view of the above, no significant impact of the investment during its implementation on the Natura 2000 site Central Odra Valley PLB080004 is expected.

With reference to the last Natura 2000 site analysed, i.e. the bird refuge Warta River Mouth PLC080001, the following is stated. This area, which also includes the buffer strip of the Warta River Mouth National Park and the Warta River Mouth Landscape Park within its boundaries, is ecosystemically associated with the Warta valley in its lower course and the valley of the Odra, to which the Warta flows. The main natural habitats are those dependent on fluvio-genic recharge. The area is covered in part by the Ramsar Convention. Within the Natura 2000 site, 11 natural habitat types listed in Annex I to the Habitats Directive have been identified. The refuge is of key importance in Europe (overall assessment A) for the preservation of oxbows and natural eutrophic water reservoirs with *Nymphaeion* and *Potamion* (habitat code: 3150) and flooded muddy riverbanks (habitat code: 3270). Significant areas, over 832 ha, are occupied by willow, poplar, alder, and ash riparian forests (91E0) and alluvial meadows *Cnidion dubii* (habitat code: 6440; area 432 ha). The high value of this site is also due to the occurrence of the *Adenostylion alliariae* mountain herbs and the *Convolvuletalia sepium* riverside herbs (code: 6430; area 66.59 ha), vegetation of sandy grasslands (habitat code: 6120) and xerothermic (habitat code: 6210) and broadleaved forests (habitat code: 9170) and hay meadows extensively used (habitat code: 6510 psc.) There are at least 35 species of birds from Annex I to the Birds Directive, including 5 species from the Polish Red Book (PCK). The Warta River Mouth is a breeding ground for, among others: common shelduck (10% of the national population), greylag goose (more than 7% of the national population), northern shoveller (more than 5% of the national population), spotted crake (3-4% of the national population), gadwall (more than 2% of the national population), oystercatcher (PCK), common redshank (more than 1% of the national population), tufted duck, little gull, little tern, white-winged tern (PCK), black tern, aquatic warbler (PCK; at least 1% of the national population), common pochard, common snipe, black-headed gull (about 1% of the national population). In relatively high density there are: the white stork, black stork, corncrake, red-backed shrike, barred warbler, tawny pipit, bluethroat, woodlark, and ortolan. The Natura 2000 site is also an important area during the migration of birds. Taiga bean goose (more than 15% of the population of the migration trail), whooper swan (more than 10% of the population of the migration trail), mallard (more than 5% of the population of the migration trail) appear in flight. 25,000 moulting birds gather on the moulting site, including: the northern shoveller (more than 4% of the migration trail population), black stork, tufted duck, common pochard (more than 2% of the migration trail population) and crane (more than 1% of the migration trail population). There are high concentrations of: the tundra swan, teal, northern pintail, wigeon, battalion, hen harrier (SDF PLC080001, 2017). The biocenotic diversity of the Natura 2000 site is also shaped by other species directly or indirectly related to the aquatic environment, including: the European bullhead, spined loach, weatherfish, amur bitterling, white-finned gudgeon, asp, river lamprey, brook lamprey, fire-bellied toad, green snaketail, large copper,

large white-faced darter, greater otter, and bats. The objects of protection are as follows: **natural habitats:** 3150 - oxbows and natural eutrophic water bodies with communities of *Nymphaeion* and *Potamion*, *yi'IQ* - flooded muddy river banks, 6120 -Stenothermic inland sand grasslands (*Koelerion glaucae*), 6210 - xerothermic grasslands (*Festuco-Brometea* and thermophilic grasslands with *Asplenion septentrionalis-Festucion pallentis*), 6430 mountain herbs (*Adenostylian alliariae*) and riverside herbs (*Convolvuletalia sepium*), 6440 Alluvial meadows (*Cnidion dubii*), 6510 Lowland and montane hay meadows extensively used (*Arrhenatherion elatioris*), 9170 - central European and sub-continental broadleaved forest (*Galio-Carpinetum*, *Tilio-Carpinetum*) and 91F0 - oak-elm-ash riparian forests (*Ficario-Ulmetum*), **insects:** great capricorn beetle (*Cerambyx cerdo*), oak hermit beetle (*Osmoderma eremita*), **fish:** asp (*Aspius aspius*), spined loach (*Cobitis taenia*), weatherfish (*Misgurnus fossilis*), amur bitterling (*Rhodeus amarus*), white-finned gudgeon (*Romanogobio albipinnatus*), **bird species:** aquatic warbler (*Acrocephalus paludicola*), northern shoveller (*Anas clypeata*), teal (*Anas crecca*), Eurasian widgeon (*Anas penelope*), mallard (*Anas platyrhynchos*), garganey (*Anas querquedula*), gadwall (*Anas strepera*), white-fronted goose (*Anser albifrons*), greylag goose (*Anser anser*), taiga bean goose (*Anser fabalis*), common pochard (*Aythya ferina*), tufted duck (*Aythya fuligula*), whiskered tern (*Chlidonias hybridus*), white-winged tern (*Chlidonias leucopterus*), black tern (*Chlidonias niger*), corncrake (*Crex crex*), whooper swan (*Cygnus cygnus*), white heron (*Egretta alba*), coot (*Fulica atra*), snipe (*Gallinago gallinago*), crane (*Grus grus*), white-tailed eagle (*Haliaeetus albicilla*), little gull (*Larus minutus*), black-headed gull (*Larus ridibundus*), black kite (*Milvus migrans*), red kite (*Milvus milvus*), common curlew (*Numenius arquata*), black-crowned night heron (*Nycticorax nycticorax*), battalion (*Philomachus pugnax*), spotted crane (*Porzana porzana*), little tern (*Sterna albifrons*), common tern (*Sterna hirundo*), barred warbler (*Sylvia nisoria*), common shelduck (*Tadorna tadorna*), redshank (*Tringa totanus*) and **mammals:** European beaver (*Castor fiber*), European otter (*Lutra lutra*), also bats: western barbastelle (*Barbastella barbastellus*), greater mouse-eared bat (*Myotis myotis*).

As for the ornithofauna, the inventory showed that the floodplains of meadows in the mouth of the Warta to the Odra, are a place of feeding and migration of Anseriformes, plovers, terns, and gulls, while in the narrow zone of the Odra inter-embankment, only single breeds of Anseriformes were observed. At a distance of approx. 150-250 m from the area of planned works, at: 610.5-611 km species such as garganey, northern shoveller were recorded, in the water reservoirs of the Odra inter-embankment, south of Kostrzyn, several pairs of gadwall were found, while the area of Kostrzyński Reservoir, far from the work zone, was considered as suitable habitat for, among others, spotted crane, corncrake, coot, and battalion. Taking into account the planned date of the works, as well as the fact that the works on the construction of groynes on this section of the river will shift locally, the implementation of the investment in the bank zone will not threaten the stability of the local population of bird species found there. In addition, the exclusion of any possibility to carry out works on the land side and to locate material storage sites at the following kilometres: from 608.0 to 613.0 km and from 615.3 to 615.6 km, will significantly reduce the impact of the investment on species protected in the Natura 2000 site

According to the analysis of the impact of the investment during its implementation on natural habitats, in accordance with the submitted materials on the section in the Lubuskie voivodeship, the investment conflicts with the following habitats.

3270 Flooded muddy riverbanks with *Chenopodium rubri* p.p. and *Bidention* p.p. vegetation

According to the submitted materials, habitat 3270 was recorded in the following locations: **Section II:** sandy bank of the Odra between groynes, near Ługi Górzyckie (approx. 608.0 km); west of Górzyca - bars in the riverbed (52°28.662'N 14°37.012'E); west of Górzyca - bar in the riverbed (52°29.273'N 14°37.960'E); south of Chyrzyno - bar in the riverbed (52°33.636'N 14°37.684'E); south of Chyrzyno - bar in the riverbed (52°33.747'N 14°37.909'E); south of Chyrzyno - bar in the riverbed (52°34.013'N 14°38.353'E); south of Chyrzyno - bar in the riverbed (52°34.303'N 14°38.443'E).

According to the SDF and the draft protection plan, the identified existing and potential threats to habitat 3270 occurring on the site, which may result from the implementation of the

investment, include: J02.05. modification of water functioning - regulation of watercourses, construction of hydrotechnical facilities limiting or completely eliminating floods; J02.02 removal of sediments - deepening of watercourses to limit the inflow of water causing periodic flooding of habitats; J02.04.02 lack of flooding - as a consequence of the abovementioned threats and long periods of drought.

As it was indicated before, in the analysis of this habitat in Lower Odra PLH320037 site, the inventory of this natural habitat conducted for the needs of the report in 2017 and 2018 gave significantly different results due to the diametrically different hydro- and meteorological conditions, which are crucial for the formation of the habitat. 2017 was an exceptionally rainy year, resulting in high water levels and almost no conditions for its development. Summer 2018, on the other hand, due to prolonged heat and drought, resulted in the exposure of the normal bottom of the Odra bed in larger areas and significantly more abundant and better developed patches of habitat.

Modernisation works are in direct conflict with and will, in the short term, destroy a small part of the habitat patches in comparison with their 2018 condition, when they developed on large surfaces and in many places due to optimal conditions caused by long-term significant decrease of water level. According to SDF habitat 3270 protected in the Natura 2000 site PLC080001 Warta River Mouth covers an area of 632.65 ha (based on "average" data quality), but with representativeness A, conservation status A, and overall assessment A (with a relative area of B). The direct conflict concerns 253 m² of the then documented habitat area, which represents 2.3% of the inventoried resources in the potential project impact area and only 0.004% of the habitat resources reported for this Natura 2000 site (SDF). After the completion of the works, the substitute habitats on the groynes and banks will be able to recover without any hindrance and, what is particularly important, the conditions for the formation of typical silts will be improved in the groyne fields. In addition, the execution of construction works outside the period of its formation (summer), which will be subject to verification by environmental supervision, due to the variability due to weather conditions in different years, exclusion as a potential location of storage sites in wet depressions, in which indicator communities of habitats could develop in the summer, avoiding turving and sowing on large areas while strengthening the foundations of slopes and groynes, giving preference to openwork solutions, and the removal of invasive species from the surface, will not cause the depletion of habitat resources or species typical of it. In addition, due to the strapwort being reported in the inventory (three sites in the Odra riverbed between Kostrzyn and Górzycze - approx. 612.5 and 608 km), carrying out works in the riverbed outside of its developmental period, and no interference with the key bars will not pose a material threat to its resources. In order to further minimise the risk, should this species be found by environmental supervision, in order to strengthen the population, the site should be protected against accidental destruction and, if possible, seeds should be obtained to maintain the species in conservation cultivation during the works.

In view of the scope of the works under the project and the minimising measures applied during the implementation, due to the spatial and seasonal variability of the natural habitat and the appropriate conditions for the development of this habitat, the authority does not expect any material negative impact of the investment on the condition of the abovementioned habitat in the implementation stage.

6430, mountain herbs *Adenostylion alliariae* and riverside herbs *Convolvuletalia sepium*

The habitat was inventoried at the following sites: Odra floodplain near Górzycza (approx. 602.5 km), Odra floodplain near Górzycza (approx. 603.3 km), Odra floodplain near Górzycza (approx. 606.3-606.5 km), Odra floodplain near Górzycza (approx. 606.9 km). A patch of the habitat with an area of approx. 5,22 m², in conflict with the works by groyne 8/604 will be destroyed. It constitutes 0.44% loss of this habitat from the entire area of its patches inventoried for the purpose of this report, and only 0.00078% of the resources of the habitat for the Natura 2000 Warta River Mouth site (according to SDF - 66.59 ha). This habitat consists mainly of nettle with a significant share of reed canary grass, whose overall condition was assessed as poor - U2. The habitat is threatened by being overgrown with rushes.

According to the SDF and the PZO draft, the identified existing and potential threats to 6430 occurring in the area and in the vicinity of the investment, which may result from the implementation of the investment, include 101 invasive alien species - the *Echinocystis lobata*, J02.04.01 flooding - intense, regular flooding adversely affects the condition of the habitat, J02.01 area backfilling, drainage and drying.

The works planned to be carried out (reconstruction of the body and head of groyne, dams, or revetments) will be carried out from the water, which significantly reduces the degree of possible impact on the habitat in question. The herbs grow from the side of the land, behind the rushes. Due to the above and due to the specificity of the works and the manner of their execution, no significant interference in the patches of the habitat. However, in order to minimise the risk of deterioration of the habitat located outside the area of the planned works, which may be accidentally and unintentionally damaged or disturbed while the works are being carried out (as a result of earthworks, passage of machines, storage of material, etc.), the planned works will take into account the location of these habitats, and exclude them as potential sites for locating storage yards and carrying out works from the land side, on the following sections: approx. 602.5; 603.3; 606.3 - 606.5; 606.9 km.

The disturbance of the soil layer may result in the penetration of diaspores of invasive species into patches of the habitat, including the *Echinocystis lobata*, therefore, as part of the minimisation activities, it was indicated that when planning and carrying out maintenance works and other earthworks in the riverbed zone, the ground and plant material obtained in the area of the occurrence of invasive species be treated as waste and managed in accordance with the applicable regulations, in order to prevent the spread of invasive species. In addition, the need to control dense patches of invasive vegetation along the banks was indicated (the reynoutria, indian balsam, *echinocystis lobata*, asters, solidagos, and sunflowers).

Taking into account the scope of works covered by the project and the extent of interference in the patches of this habitat, no material negative impact of the investment on the conservation status of the abovementioned habitat in the Natura 2000 site is expected at the implementation stage.

According to the submitted documents, the scope of the works covered by the investment includes no other natural habitats that are the subject of protection in the area of Warta River Mouth. Nevertheless, in order to protect patches of natural habitats located outside the area of the planned works, which may be accidentally and unintentionally damaged or disturbed, areas where it is impossible to locate storage sites in relation to the following habitat were indicated: 6440 - approx. 608.6 - 609.5; 615.7- 615.8; 616.9 - 617.3 km.

Therefore, no significant negative impact of the investment on the abovementioned conservation objects in the Natura 2000 site of Warta River Mouth PLC080001 is expected.

When analysing the implementation of the investment in the context of ichthyofauna, which is the subject of protection in the Natura 2000 site Warta River Mouth PLC080001, it should be pointed out that, as is the case for Lower Odra PLH320037, the implementation of the investment may contribute to the local deterioration of habitats and living conditions of fish, located in the bank zone of groynes and depressions in groyne fields,

The following species were found in the collected materials on the species composition and structure of ichthyofauna in the Odra:

- The asp *Aspius aspius* - species was not recorded in catches, but was considered to be moderately abundant for impact assessment purposes, due to methodological difficulties in obtaining a representative sample in electrofishing and the general data indicating its quite frequent occurrence in the Odra (angling and fishing);
- spined loach *cobitis taenia*, a very numerous species, found along the entire length of the section under investigation, was mostly caught in oxbows and shallower zones of groyne

fields.;

- white-finned gudgeon *Romanogobio albipinnatus* species occurring throughout the entire section of the Odra. This species inhabits the bottom of the current zones of the riverbed and habitats with rocky base and swift current at the tops of groynes. The white-finned gudgeon in the inventory was identified as rare (0.002-0.05 specimens/m²), but was considered to be moderately abundant for impact assessment purposes, due to methodological difficulties in obtaining a representative sample in electrofishing and literature data on its occurrence in the Odra;
- weatherfish *misgurnus fossilis* - species not recorded in the catch in the Natura 2000 site Warta River Mouth, found, however, in the Natura 2000 site Lower Odra, where it is not a protected (canal near the town of Piasek). This species, designated in the inventory as rare in the entire surveyed section of the Odra, is found in riverside habitats, marginal lakes and stagnant waters of canals permanently or periodically connected with the river, with muddy bottom and lush aquatic vegetation,
- Amur bitterling *rhodeus amarus* - this species was caught at inventory sites located in both Natura 2000 sites: the Warta River Mouth and the Lower Odra. It mainly inhabits oxbows, where it occurs most frequently, but also groyne fields. Individual specimens were also recorded in current habitats. This species was considered to be common in the Odra section covered by the project.

The identified existing and potential threats to the abovementioned species, which are the subject of protection in Warta River Mouth, and which may result from the implementation of the investment, include H01 pollution of surface water through deterioration of physicochemical conditions of waters and J03.01 reduction or loss of certain features of habitats and J02 changes in water relations caused by humans. The protective measure for these species is monitoring of water pollution in the species' habitats, twice during the period of validity of the PZO, with a three-year interval between surveys.

The analyses of the impact of the investment on the abovementioned fish species are similar to that of the group of animals protected in the Natura 2000 site of Lower Odra PLH320037.

It should be emphasised that the negative effects of the regulation of the Odra on fish and the associated depletion of habitats will be mitigated to some extent by spontaneous renaturalisation taking place most intensively in groyne fields. These processes lead to the formation of habitats with features similar to natural ones: riffles in the current, stream pools, and marginal lakes with the characteristics of oxbows. Damage to groynes enables the formation of riffles - valuable habitats of rheophilic species such as the barbel, asp, dace, chub, and white-finned gudgeon. Sand deposits in groyne fields determine the availability of juvenile fish habitats. The occurrence of marginal lakes cutting deeply into the bank, with aquatic vegetation, is of particular importance for the maintenance of numerous populations of phytophilic species, including the protected spined loach and amur bitterling. The presence of Unionidae family mussels, numerous in this type of environment, is also crucial for the occurrence of the amur bitterling. One of the factors increasing the diversity of habitats is the presence of thick woody debris, as well as larger boulders.

During the implementation of the investment, the following actions will be implemented to minimise the negative impact on ichthyofauna, i.e.: limiting to a minimum interference in groyne fields (materials for the construction of groynes will not be stored there, leaving deposits of sand and the aquatic and rush vegetation fields, replanting endangered patches of vegetation (especially nymphaeids) and abandoning the removal of woody debris (tree trunks, logs, stumps) located in groyne fields. In addition, the construction of the wings will be carried out starting from the edge furthest from the base of the groyne, using equipment moving along the bank, in the zone to be occupied by the wing construction. Transferring the Unionidae mussels from hazardous areas to safe areas is also planned - a minimisation of the impact on the amur bitterling. In addition, in order to accelerate the regeneration of habitat diversity in the bank zone, during the implementation of the investment, the following actions were introduced to limit the negative impact of the investment on species protected in Warta River Mouth PLC0800017: restoring the riffles of loose stones on the downstream side of the tops of the renovated groynes and leaving the habitat elements, supplementing the habitat elements by placing oversized boulders in spaces behind longitudinal dams and in all deep

groyne fields adjacent to the renovated groynes, and proper construction of longitudinal dams and developing the spaces behind the dams in a form corresponding to the conditions in open oxbows. It is expected that with the application of the abovementioned measures, the habitats for the spined loach, asp, white-finned gudgeon, weatherfish, and amur bitterling, will regenerate within 3-5 years. Appropriate periods of exclusion from certain types of work were also indicated, including for the protection of fish during spawning and wintering, i.e. carrying out work outside the period from March - mid-July in order to limit the impact of increased suspension and stressors on fish; curtains will be used during works interfering with the bottom in order to minimise the inflow of excessive quantities of suspension during the migration of salmonids from October-December. The nature and scope of the investment related to the performance of work (time delay of the works carried out during stage I and stage II of the project, as well as those carried out on the Polish and German banks (minimum 3 years, preferably 5 years), will allow fish to use habitats on the opposite side, or in adjacent river control structures, as alternative habitats during their development cycle. In addition, monitoring the level of suspended matter and water oxygenation and, if necessary, suspending the works, should fully protect the abovementioned group of fish from adverse impact of the investment.

In the light of the above, it should be concluded that the implementation of the investment will not cause a material negative impact on the fish species protected in the Natura 2000 site Warta River Mouth.

The wildlife inventory carried out for the purposes of the report did not show any interference of the investment with other animal species that are the subject of protection in the Natura 2000 Warta River Mouth site. Due to the nature of the investment and its design assumptions, including carrying out works from the land side, the location of storage sites outside environmentally valuable areas, carrying out construction works in areas of particular concentration of bats (at: 600.5-604, 604.5-608, 614-615 km) during the period of reduced activity and wintering, i.e. in the period September-April, no material negative impact on the abovementioned species is expected. In addition, the environmental supervision, including the supervision of a chiropterologist during tree felling, carried out as part of the investment, will fully protect the abovementioned elements of the environment from the adverse impact of the works.

In view of the above, and the minimisation measures applied, in the opinion of the authority, the implementation of the investment in question will not result in a material negative impact of the project on the conservation status of subjects of protection in the abovementioned Natura 2000 site, or on the coherence and integrity of this site.

During these proceedings, the impact of the investment in the context of long-term influence on elements of the natural environment, including on subjects of protection in the Natura 2000 site, was also thoroughly analysed.

The main factors that may affect habitats and plant and animal species associated with valley habitats, which may occur as a result of river regulation, are the change in hydrological conditions, and consequently hydromorphological conditions causing the transformation of riverbank habitats and valley habitats, and the reduction of their range as the natural processes conditioning their duration cease. The main potential threats include: lowering of the bottom in the longitudinal profile, intensifying the drainage of floodplains and decrease of the groundwater table, drying of the valley habitats dependent on water (oxbow, floodplains, swamps).

In the case of the project in question, we are dealing with the modernisation of the existing hydrotechnical structures on a river heavily transformed by humans, where, in addition to the natural processes of sediment transport and riverbed formation, phenomena used in hydrotechnical construction to regulate the river also occur. The biggest changes in the hydrological conditions of the Odra occurred after the 19th century regulation operations. Significant changes to the longitudinal profile of the river were made. Since then, the results of measurements of the bottom elevations indicate that the longitudinal profile has stabilised. As a result of hydrotechnical structures being made, and with the current intensity of sediment transport, the Odra has reached a state of bottom

equilibrium, which is confirmed by the cumulative results of bottom deformation based on observations made since the 1960s by the Federal Hydrological Institute. According to their assessment, the Odra reached a stable bottom level in the years 1998-2008. The planned modernisation of river control structures will not cause bottom deformations as deep as those from the 19th century. According to the available literature, in spite of the lower Odra riverbed narrowing due to the conducted regulatory works, no significant processes of bottom lowering occurred, and neither did strong sedimentation on the floodplain. In view of these results, it can be assumed that a slight narrowing of the regulatory route of the lower Odra will not lead to significant deformations in the river valley, and the regulatory works will only level the bottom. On the basis of hydrodynamic calculations and sediment transport processes (using MBH Software 2015) carried out for the purposes of the development of the *Update of the concept of the border Odra watercourse*, it is predicted that the reconstruction of the Odra river control structures on the surveyed section will not cause significant changes in the position of the water table, the size and dynamics of the flow and the transport of sediment. The project will not change the flow conditions during high waters, because the river control structures are constructed in order to regulate the hydraulic conditions of medium and low flows. The results of hydrodynamic modelling indicate that in low waters, the water table will rise by 0-25 cm, with an average of 15-20 cm on most sections, and a maximum of 25 cm on the section located at approx. 585.0 km. Although in the area of approximately 685.0-690.0 km, located outside the project area, according to the modelling results there may be a slight lowering of the level of the water table at low waters, the value of this reduction will be 1-2 cm, which is negligible. The scale of this lowering can be considered negligible, due to the fact that the value of the lowering of the water table is lower than the daily fluctuations of water levels occurring naturally in the Odra.

The groundwater in the zone adjacent to the Odra will be affected more by regional hydrogeological conditions and the amount of recharge by precipitation under changed climate conditions than by changes in the water level in the Odra caused by regulation. The regulation of the river will not affect the hydrological system of the Odra, which depends on the conditions of supply and drainage from the catchment area. River control structures (including those undergoing modernisation) do not alter hydrological conditions on the scale of the basin. Climate changes, which may manifest itself in prolonged droughts, will be a bigger problem on a regional scale.

In the context of the natural habitats most affected by the investment, including, among others, 3270, 3150 91E0, 91F0, 6440, 6510, the following facts should be indicated.

In the Odra, silts are formed to a large extent in substitute habitats - in groyne fields, less frequently on groynes, possibly changed - on the banks of the riverbed, also in spaces between beds. It is to be expected that rebuilding and adding structures, i.e. groynes, will result (on a smaller scale) in a process similar to that which occurred after the regulation of the Odra in the 19th and 20th centuries, when intensive accumulation of bed load occurred in groyne fields, which gradually decreased in subsequent decades. This is related to the effects of riverbed deepening and accumulation of load in groyne fields. The project will therefore increase the frequency of occurrence of conditions appropriate for the formation of the habitat (new groyne fields will be created, with conditions for formation of bars) and the amount of bed load in the river will increase, and so will the amount of deposit forms created in groyne fields.

Maintaining summer water level declines in the river is critical to maintaining the river valley habitat. In the conditions of the central Odra valley, this is defined as an acceptance that for at least 30 days during the summer period levels will be below 150 cm on the water gauge in Nowa Sól. The planned reconstruction of the river control structures will not affect the change in the size of river flows and thus will not affect the critical factor for the occurrence of the habitat. The assumed small changes in the water level in the river (on different sections) are not important for the formation of this habitat, as it depends on the occurrence of a decrease in the water level in the summer period (relative to the year) and the exposure of fragments of the riverbed flooded for the rest of the year. Changes to the annual water levels in a given section of the river will result in shifting of potential patches of habitat higher or lower on the cross-section of the riverbed. At the same time, it should be emphasised that regulating riverbanks with groynes promotes the repeatability of the conditions in which the natural

habitat occurs and, in a sense, the lack of natural, large-scale bars and deposits is compensated by an ecological system repeating regularly every 100-200 m, shaping silt habitats in groyne fields and to a lesser extent on the groynes themselves. In relation to habitat 3270 resources from 2018, a direct project-related conflict would affect theoretically 15% of those resources (if they developed in the same locations during construction, which is unlikely given the differences in the status of the habitat recorded in different years). This value includes the replacement habitat of the silt associated with the groynes (for reconstruction) and the silt that forms along the banks of the riverbed. Silts forming on groynes are in poor condition, have little floral diversity, and small surface. As for patches of habitats formed on the banks of the riverbed - out of more than 20 conflicting sites - 4 are patches stretching along the banks, conflicting only slightly with the designed structures. The others have small areas (below 25 m² each). In addition to the enormous natural fluctuations in resources and the state of the 3270 habitat, it is important to emphasise the short-term direct impacts associated with the construction of structures. In the longer term, it is to be expected that the rebuilt groynes will again become a substitute habitat for indicator vegetation for silts. This will be facilitated by the adopted design assumptions, as well as the introduction of a number of actions accelerating the regeneration of this habitat, e.g. as conducting works outside the formation period, limiting the spread of invasive species, strengthening the population of the strapwort.

In relation to riparian habitats 91E0 and 91F0, it should be pointed out that riparian forests located on the section of the Odra covered by the planned investment lie on a low floodplain and are not cut off from the river by embankments. The valorisation of the most valuable riparian complexes (oak-elm-ash "Ślubice Riparian Forests" and willow riparian forests near Stara Rudnica, Raduń, and Piasek) presented in the report showed that their conservation status is good. Riverbank riparian forests are therefore performing well in the conditions of the river valley, which has been transformed as a result of regulatory works. The most important factor determining the good conservation status of riparian forests in the conditions of the valley of a large river (such as the border Odra) is periodic flooding of the riparian forests habitat by high river waters. This flooding is completely sufficient to prevent the process of riparian forests turning into broadleaved forests (broadleaved forest vegetation does not tolerate flooding) and to sustain the fluvisol-forming process, which will not be affected by the modernised structures. According to the conducted analyses, initially a slight increase in the water level can be expected (due to the refocusing of the current by rebuilt groynes), which will, in time, return to the state from before the modernisation works. There is therefore no reason to fear that the riparian forest habitat will be deprived of periodic flooding by high waters, which is a necessary (cardinal) factor for its preservation with a good conservation status in the long term. Climate forecasts suggest that there is no risk of the disappearance of suitably high rises on the Odra and other large rivers in Poland. More frequent summer droughts, which are predicted by current climatological models, can reduce the humidity of the riparian habitat in the period from late spring to early autumn. However, the high rises of the river will not disappear, which will effectively prevent the degradation of these habitats. In view of the above, there is no reason to fear that the implementation of the planned project will cause damage to the habitat of riverside riparian forests due to any changed to the hydrological regime of the river necessary for their functioning.

A key process for the functioning of oxbows (3150) is the periodic supply of fresh, oxygenated river waters. This occurs during water rises, when the water in the reservoir is replaced, and in some cases even when sediment is washed and washed out, which is understood as a "rejuvenation" of the reservoir. It is therefore extremely important to maintain the hydrological regime of the river with consecutive rises and lows, which will result in regular refreshment of the water in isolated water reservoirs located on the floodplain of the river. The restoration of groyne structures will result in the loss of habitats in the form of side arms and slow-flowing or stagnant fragments of groyne fields (currently created by degraded and broken groynes). Nevertheless, it should be pointed out that in order to minimise the effects of bank unification, on the sections covered by the renovation works of the regulatory structures, the creation of oxbow-like habitats is planned - in the space behind the planned longitudinal dams with a total length of 1650 m. Plans include also creating additional habitats in the form of bays cutting into the bank, with an area of 220 to 1320 m², in total approx. 5300 m². Therefore, in return, habitats will be created, which will constitute an additional area to be inhabited by aquatic plants and rushes (including those introduced as part of the replanting of endangered patches of plants).

Settlement of mussels (Unionidae) harvested prior to the commencement of the works in spaces behind the dams and in bays is also predicted (organisms transferred from other parts of the river, after the completion of all works in a given created habitat). These actions will promote the conservation of protected species of this group (swan mussel *Anodonta Cygnea* and depressed river mussel *Pseudanodonta complanata*). In addition, the created habitats, after a 2-3-year stabilisation period, will provide suitable habitats for the existence and reproduction of protected fish species: spined loach, amur bitterling, and weatherfish.

With regard to the impact on birds, including the potential loss of the bird feed base, which is the subject of protection in the abovementioned Natura 2000 sites, it should be emphasised that the expected deterioration of fish and invertebrate habitats as a result of the planned works will be reversible, and the planned minimising actions to increase the diversification of habitats in the littoral zone will reduce the regeneration time of habitats to 3-5 years. The anticipated loss of fish habitats will not result in a significant reduction in their overall numbers, as the most abundant species in the Odra are eurytopic species, which have high habitat plasticity. Temporary changes will affect the proportion of species and not the overall size of the community and will not significantly affect the availability of food for birds feeding on fish and aquatic invertebrates.

During the operation phase, the riverbed will gradually deepen, but it is forecast that this should not drain water from around the riverbed. As a result, natural fluctuations in the water level in the vicinity of the river (e.g. Kostrzyneckie Swamp) will be preserved and the habitats associated with it will not be endangered. Shallows between the groynes, which are the habitat of invertebrates and fish associated with standing or free-flowing waters, will be left undisturbed. In the immediate vicinity of renovated groynes, such habitats will gradually recover, and this process will be accelerated thanks to the minimising actions (replanting plants, transferring mussels of the family Unionidae).

After the planned modernisation, the sandy banks of the river and the riverbanks will be destroyed, which will periodically decrease the area of potential breeding grounds and feeding grounds for plovers and terns. However, this should not have a negative impact on the conservation status of these groups of birds. The sandy banks of the river are mainly used during the migration season. Taking into account the nature of the works, i.e. their slow movement over time, it should be concluded that the implementation of the investment will not cause a material impact on bird populations. Banks of a regulated river, like the Odra, are not an attractive breeding ground for these birds – they prefer the nearby gravel pits. It should be pointed out that due to the pressure of predators and flooding by high waters, the habitat on sandy bars has lost its usefulness for the breeding key species of birds of the lower Odra. The inventory carried out for the purposes of the report showed the disappearance of tern breeding sites in the Odra riverbed and of the stability of breeding colonies of these and other species of the lani in the local reservoirs of gravel pits. Nevertheless, it cannot be ruled out that this site may be a potential habitat for the lani. In order to prevent the loss of habitats of the abovementioned species and to maintain breeding success at the current level, as part of the planned project, until the spaces between the groyne fields regenerate naturally and favourable conditions for the lani and the charadrii, the investor will construct several low floating islands with a total area of about 250 square meters outside the Odra riverbed in the vicinity of Chlewice (plot no. 272 precinct of Chlewice, Boleszkowice commune), which would act as a “nursery”, i.e. a place that the fledglings could swim to and dry safely and, due to their proximity to the breeding island, be fed by their parents. Distance from land would ensure safety. In case of danger from neoviviparous or dogs, the fledglings would fly away, once dry, or swim away. Additional platforms will be located next to breeding platforms already in operation. Low floating islands without a “sill” protruding above the water will be made of cellular concrete, which has positive buoyancy and quickly becomes invisible, overgrown with vegetation. The surface of the platform will be covered with a few centimetres' layer of soil and a special biotextile for the development of plants, in order to quickly fit into the landscape and be adapted by the ornithofauna. Bearing in mind the above, it is concluded that the implementation of the project will not result in the loss of habitats of the aforementioned species of birds and will not cause their habitats to deteriorate. In addition, due to the adopted design assumptions and the manner of implementation of the investment, with the planned minimising actions applied, the implementation of the investment will not negatively affect the wintering birds that are the objects of protection of the Natura 2000 site Lower

Odra Valley, such as: mallard, white-fronted goose and taiga bean goose, tufted duck, common pochard, or whooper swan

In conclusion, in the light of the results of hydrodynamic modelling, there will be no deterioration in the conditions thanks to which the abovementioned valuable natural habitats in conflict with the planned project, as well as other natural habitats dependent on waters (i.e. 6440, 6510) providing habitats for numerous species of waterfowl and meadow birds, are maintained in the Odra valley. The level of the stabilised water table at medium flows will increase on average by several centimetres. This effect will be felt most strongly at medium level, less at low levels, and will be almost unnoticeable at high levels. Thus, groundwater levels are not expected to decrease, but to increase slightly in the bank zone. During lows, the areas adjacent to the river will be subject to slightly less drought than under the current state of river control structures, which should be considered as a positive effect for the preservation of river habitats.

At the same time, the authority emphasises that in order to confirm the assumptions adopted in the report, the investor is required to monitor the effectiveness of the implemented activities and the effects of the investment on the hydromorphological elements of the river, after the first stage of project implementation. In the event of adverse changes in the environment, actions will be taken to limit such impact, including the change in the scope of works provided for in the second stage.

Detailed analysis of probable changes in the characteristics of the abovementioned forms of nature protection, i.e. Natura 2000 sites: *Ślubice Riparian Forests PLH080013*, *Central Odra Valley PLB080004*, *Warta River Mouth PLC080001*, *Lower Odra PLH320037*, *Lower Odra Valley PLB320003*, resulting, among others, from a possible decrease in the area of habitats, lasting disturbances in the functioning of key species, interruption of continuity of wildlife corridors, fragmentation and loss of habitats or species population, reduction of species density, changes in key indicators of conservation value, showed that, with the indicated conditions of project implementation applied, it will not adversely affect the abovementioned parameters.

In relation to other protected animal and plant species, the following is stated.

The wildlife inventory carried out for the purposes of the report showed the presence of the following species of protected plants: water chestnut *Trapa natans* (1 site, bay between groynes south of Ślubice, approx. 581.1 km and along the banks of the Odra, SE of Stara Rudnica approx. 655.3 km); salvinia natans *Salvinia natans* (littoral waters of the Odra over the entire inventory section), mouse garlic *Allium angulosum* (site in the area of Kostrzyn and a small population near Osinów Dolny), broad-leaved helleborine *Epipactis helleborine* (site between Osinów Dolny and Stary Kostrzynek), dwarf everlast *Helichrysum arenarium* (between Bielinkek and Osinów Dolny and near Kostrzyn), spear-leaved skullcap *Scutellaria hastifolia* (by the Odra canal near Piasek and in meadows north of Kostrzyn), marsh spurge *Euphorbia palustris*, shining spurge *Euphorbia lucida* (numerous only south of Ślubice, otherwise dispersed), small teasel *Pirga pilosa* in deciduous forests in the vicinity of Raduń and Zatoń Dolna, strapwort (5 specimens on the banks of the Odra, SW of Stary Kostrzynek approx. 660.0 km) and three sites in the Odra bed between Kostrzyn and Górzyce approx. 612.5 and 608 km), fringed water lily (11 sites - on the right bank of the Odra and in the Rudnica Canal at its mouth to the Odra at approx. 648.2; 647.5; 646.1; 645.7; 656.5; 654.6; 654.1 ;651.4; 661.1; 657.9; 658.1; 656.5 km). The most valuable of the abovementioned species are the strapwort and the fringed water lily. As for the fringed water lily, the conflict with the investment will occur at 3 out of the 11 found sites (647.5 - site 3; 648.2 km -site 4 and 656,5 km -site 8), as a result of which 150m² of patches of this species will be destroyed, which represents 10 % of the total inventoried population. In order to limit the impact on this species, reintroduction of plants from endangered sites into groyne fields that will not be affected by the works and into oxbows is planned. The replanting (transfer) of vegetation will be carried out at the beginning of the growing season by excavating plants, placing them in containers with river water, transporting them to new sites and planting them in groyne fields on the same day. Whole phytocenosis systems will be transferred (replanted), i.e. submerged plants co-existing with patches of floating-leaved plants from the area of works to places where the works have already been completed (e.g. groyne fields at the foot of the reconstructed groynes). The number of planting sites will depend on the

size of the patches at risk (every 2-5th reconstructed groyne). Monitoring of the restoration of the transferred patches is planned after 1 year and 3 years following the completion of the works (patches >10 m² transferred with fauna on the plants). To protect vegetation not at risk of mechanical damage, investment works on groynes neighbouring with sites of the fringed water lily will be carried out after the growing period, in October-November. Taking into account the size of the population of this species on the Odra, the natural dynamics of changes in macrophyte populations, and the planned mitigating actions, the investment will not significantly affect this species.

With regard to the strapwort, which is subject to strict protection and listed as a critically endangered species in the Polish Red Book, due to the implementation of works in the riverbed outside the growing season and no interference in bars essential for the species in groyne fields - no significant threat to its resources is expected. In order to minimise the risk, in the case of registration of this species by environmental supervision, the site should be protected against accidental destruction and, if possible, seeds should be obtained to maintain the species in conservation cultivation during the works.

Other protected species, with the exception of the spurge, due to their occurrence outside the range of works and the applied minimisation activities within the scope of works and location of storage yards, in the opinion of the authority, are not significantly endangered due to the implementation of the investment. In addition, some species such as the spurge, are quite common on a local and nationwide scale. They also have their sites outside the investment area; therefore, the implementation of the investment will not significantly affect the depletion of their population. Taking into account that at the current stage of the investment there are no definitive arrangements as to the location of some structures, first of all, the sites of the abovementioned species should be protected against destruction, e.g. by fencing, and if it is necessary to damage them, appropriate permits must be obtained. This should be part of the environmental supervision tasks.

As regards herpetofauna, the report concludes that the majority of frogs prefer small bodies of water and distant habitats from the river stream as their habitats, and therefore the work carried out in the Odra littoral zone should not have a significant impact on the populations of this group of animals. However, the implementation of the investment may temporarily deteriorate the living conditions of herpetofauna. The wildlife inventory for the purposes of the report found the following species: pool frog *Pelophylax lessonae* - at 615.0 km; marsh frog *Pelophylax ridibundus* - at 583.2, 585.7 and 602.7 km; common newt *Lissotriton vulgaris* - near Osinów Dolny; common toad *Bufo bufo* - at 581.0-585.7, 600.4-617.6 km; moor frog *Rana arvalis* - at 602.1 km by the flood embankment; green toad *Bufo viridis* - Kostrzyneckie Swamp; viviparous lizard *Zootoca vivipara* - at 679.5 km, area between Piasek and Bielinek; grass snake *Natrix natrix*, deaf adder *Anguis fragilis* - mainly the area of the town of Piasek. The vast majority of the planned works will be carried out on the water side, however, the possible construction of access roads and material storage yards for the implementation of the project and the adoption of the precautionary principle indicate that there is a risk of local loss of amphibian and reptile habitats. In order to limit the negative impact of the investment on animals, the following actions will be taken: visibly marking the breeding site of the pool frog located by the flood embankment - at 602.1 km in order to prevent its destruction when the road is used by construction equipment; during the modernisation of groynes 26/615 (at 615 km) carried out near the water reservoir, fencing this reservoir, carrying out works at 581.0-585.7, 600.4-617.6 km outside the breeding and development period of common toad tadpoles, i.e. outside the period from March to June.

In addition, the investor was obliged to carry out environmental supervision for the presence of animals (with particular emphasis on amphibians) and, if necessary, to ensure they are safely removed outside the area of works. The above should be carried out in cooperation with the construction management. The above solutions should also be adapted to other animals that may be found on the construction site. In addition, any depressions created during the works, where water may stagnate, will be secured in a way that will prevent amphibians from inhabiting them.

The conducted inventory works showed that the Odra is an important feeding ground for bats, which is consistent with the knowledge that water-related habitats are characterised by the highest bat activity. The greatest activity of bats was recorded for the genus *Pipistrellus* and *Nyctalus*, which hunt

for insects above the water surface, in contrast to the mouse bats that collect insects on the water surface. Bat populations are very dynamic and the location and size of colonies in daytime shelters changes from year to year, resulting in changes in feeding patterns. Interference with the structure of the river's bank zone will entail changes in the quality of entomofauna habitats, which may affect how attractive the feeding grounds along the Odra are. Potential areas that could constitute bat habitats were identified: 683 km - willow thickets near Piasek (hollow trees can be a day shelter during the breeding period), 679 km - willow thickets near Piasek (hollow trees can be a daily shelter during the breeding period), 673 km - buildings of the town of Bielinek (buildings can be a day shelter during the breeding period, unheated underground facilities with constant temperature can be used as wintering places), km 662 - the town of Osinów Dolny (buildings can be a daily shelter for bats during the breeding period, unheated underground facilities with constant temperature can be used as wintering places), 659 km - willow thickets near Stary Kostrzynek (hollow trees can be a daytime shelter for bats during the breeding period), 655 km - near Stara Rudnica (hollow trees can be a shelter for bats during the breeding period), 650 km - willow thickets near Stare Łysogórki (hollow trees can be a daily shelter for bats during the breeding period), 614-615 km - buildings near Kostrzyn nad Odrą (buildings can be a day shelter for bats during the breeding period, the Kostrzyn Fortress is an important wintering ground for bats), 605-608 km - riparian forests near Ługi Górzyckie (hollow trees can be a daily shelter for bats during the breeding period), 601-604 km - old-growth oak and alder trees near the town of Górzycza (hollow trees can be a day shelter for bats during the breeding period), 585 km - old oak trees in the northern parts of Słubice and 584 - 585 km - buildings in Słubice (buildings and hollow trees can be a daily shelter for bats during the breeding period, unheated underground facilities with constant temperature can be used as wintering places), 581-582 km - old oak forest south of Słubice - the area of the Riparian Forests near Słubice nature reserve (hollow trees can be a daily shelter for bats during the breeding period). With regard to chiropterafauna species, including those protected in Natura 2000 sites (greater mouse-eared bat and pond bat), the applied design assumptions on the implementation of the investment during the day and activities minimising the potential impact on bats in the implementation phase including carrying out construction works in areas of particular bat concentration (585.5-586, 600.5-604, 604.5-608, 614-615, 655, 658 - 659.5, 662.5-663 km) during the period of reduced activity and wintering of bats, i.e. in the period from 15 August to 30 April and each time checking the trees for felling or the construction of buildings, for the presence of bats, with particular emphasis on hollow trees constituting a potential site of bats of the following tree species: pine oak - 1 pc at 585.68 km and white willow - 3 pcs., European white elm - 1 pc at 606.15 - 614.52 km, white willow at 645.77 km, European white elm - 2 pieces at 652.59 km, white willow at 655.05 km, poplars and willows at 662.12 - 662, 23; 662.33 - 662.45 km; European white elms and black poplar at 662.56 - 662.77 km; white willows at 673.01 km; white willows and European white elms at 673.75 km and white willows at 677.45 km and if their presence is confirmed - taking appropriate actions, including obtaining permits in accordance with the provisions of the Nature Conservation Act, should fully secure the abovementioned group of animals against possible risks from the investment.

Other mammals whose presence was reported included: common shrew *Sorex Araneus* and pygmy shrew *Sorex minutus* (along the entire Odra section), harvest mouse *Micromys minutus* (647-647,5; 678-679 km); stoat *Mustela erminea* (582,5; 609-609,5; 610-610,5; 614,5-615; 651,5; 673,5-674,0 km), as well as species protected in the abovementioned Natura 2000 habitats, i.e. European beaver *Castor fiber* (601-605; 605-608; 650 -651; 655-658,5; 675-678,5 km; European otter *Lutra Lutra* (602,5-603,5; 612,5-614,5; 646,5-647,5; 652,5-653; 655-655,5; 661; 671; 674,5-678,5 km) and wolf *Canis lupus* (south of Słubice in the area of the railway bridge, near Chojna), water vole *Aramphibius* (603,5; 606; 608,608,605; 616; 656; 650,5; 675,5; 677,5 km). Due to the regular occurrence of the abovementioned species throughout the surveyed area, it is not expected that the planned works will constitute significant threats to the species in the Odra valley. Taking into account the implementation of the investment from the side of the road, in the autumn-winter season, as well as the temporary foundation of storage yards in a few spots, no significant negative impact of the investment on the abovementioned animals is expected.

In view of the above, the investment will also have no impact on the identified insect species, including the protected species green snaketail *Ophiogomphus cecilia*, which was regularly found along the entire bank of the Odra.

In relation to the identified other species of protected birds, which are not protected in Natura 2000 sites, the following threats were identified at the stage of the implementation of the investment: land occupation for the investment, temporary mechanical destruction of habitats, including: felling of trees and shrubs (in the case of birds nesting and feeding on trees and shrubs), contamination of habitats - loss or reduction of potential feeding sites, vibration of the ground and noise at the stage of construction works resulting in scaring birds and creating a barrier effect, accidental mortality.

According to the results of the inventory surveys on the species of protected birds, the following threatened protected species were identified in the construction of bridges:

- on the bridge in Słubice, 70-80 nests, and on the bridge in Kostrzyn nad Odrą – 10 nests of the common house martin *Delichon Urtica* were recorded. No reconstruction of the bridge is planned as part of the project, therefore there is no risk of destruction of nests; no significant negative impact on populations is foreseen - the common house martin tolerates the presence of humans, hence no minimisation actions were indicated;
- on the bridge in Kostrzyn nad Odra, an active nest of the common kestrel *Falco tinnunculus* was identified (615.1 km); the planned scope of works assumes no interference with the bridge structure, therefore there is no danger that the nest will be destroyed. In addition, the risk of scaring birds during the execution of the works on groynes no 22/615, 24/615, 26/615, 2/616, 4/616, 8/616, 10/616, 12/616 in Section II near the bridge and the risk of breeding abandonment is negligible, as the species who choose infrastructure elements where noise is common (railway bridge) are not sensitive to this factor, hence no minimisation actions were indicated.

In addition, in higher parts of the bank slope, at 646.5 km, sand martin *Riparia riparia* habitats were recorded. Due to the fact that the conducted works will not directly interfere with the habitat of this species and will take place outside the breeding period of this species, with the participation of an ornithologist, no significant negative impact on the sand martin population during the implementation of the investment is expected.

To protect the local population of bird species, in order to prevent the loss of breeding of sparrow species nesting in reeds and in willow shrubs on the bank, before work begins on a groyne and river wall, their vegetation within 30 m of their foot should be removed, outside the breeding season, i.e. in the period from August to the end of February. Some of the work will require felling trees and shrubs. According to the submitted materials, this will be carried out outside the bird breeding season. Nevertheless, it is possible to carry out the above activity during the abovementioned conservation period if it is not possible to adapt the felling to the conservation period for technological reasons, provided, however, that the environmental supervision excludes the existence of sites of occurrence and breeding of protected bird species, and if they are found, appropriate permits must be held, in accordance with the Nature Conservation Act. At the same time, it is recommended that hollow trees, as they can constitute a potential habitat for bats, should be removed outside their period of activity. The trees intended for felling may also be inhabited by protected plant and animal species not found during the wildlife inventory for the purpose of the report, which should be re-verified by environmental supervision prior to the implementation of the project. In addition, imposing an obligation on the investor to exclude the possibility of carrying out works from the land side, including the location of material storage sites, in areas constituting convenient habitats for protected birds, will limit its significant impact on this group of animals.

The project is to be located in the Warta River Mouth Landscape Park and the Cedynia Landscape Park, where there is a number of applicable bans. Pursuant to Article 17(2)(4) of the Nature Conservation Act, these bans “do not apply to the implementation of public purpose investments” within the meaning of Article 2(5) of the Act of 27 March 2003 on spatial planning and development (consolidated text: Journal of Laws of 2018, item 1945 as amended), which includes the investment in question.

Nevertheless, it should be pointed out that the analysis carried out in the report shows that the implementation of the investment does not pose a threat to the subjects of protection of the

abovementioned protected sites. In the light of the above evidence, it is concluded that it will also not constitute a significant impact on the buffer strip of the Warta River Mouth National Park.

Taking into account the analyses carried out as part of the ongoing proceedings in the context of the impact of the project on particular elements of the natural environment, it should be pointed out that, under the application of a number of conditions imposed in this permit, the investment in question will not negatively affect protected plant and animal species.

In addition, minimisation of losses in the natural environment will be ensured by environmental supervision carried out by qualified specialists in the field, who will document and properly verify local conditions and propose effective minimisation actions adequate to the place of implementation. It should be noted that the purpose of environmental supervision is to control the course of works, with particular emphasis on the need to introduce solutions for the protection of elements of the natural environment and the need to indicate the date and manner of conducting these works in relation to the sites of protected species and natural habitats.

In conclusion, taking into account the results of the surveys carried out and the application of measures minimising the negative impact imposed in this permit, it is not expected that the project will have a significant negative impact on the conservation status of subjects of protection in the abovementioned Natura 2000 sites, as well as on other protected plant and animal species. Nor will the project threaten the coherence and integrity of these areas.

In the course of this procedure, the compatibility of the planned implementation of the investment with the provisions of *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (WFD)*, which obliges Member States to use rationally and protect water resources in accordance with the principle of sustainable development, was also examined. The project, as mentioned above, includes works that will be carried out in the Odra riverbed and on its banks. The Odra is one of the largest rivers in the Baltic Sea basin. It is also the second largest river in Poland. The total length of the Odra is 854 km, including 742 km located in Poland. The total catchment area covers 118,861 km² (89% in Poland 6% in the Czech Republic and 5% in Germany). The upper part of the river - from the sources to the Polish border is mountainous, with a significant drop (7.2‰). The next section of the river - to Kędzierzyn Koźle, has a smaller drop (0.33‰) and constitutes a highland part of the river. This entire 202 km-long section is called the Upper Odra. From Kędzierzyn Koźle to the mouth of Warta stretches the central Odra, with a length of 522 km and a drop in the range of 0.28-0.19‰. Initially, at a length of 187 km, the river is canalised, with damming (24 degrees), while below Wrocław, over a length of 335 km, stretches the free-flowing Odra, controlled on its entire length with a system of groynes. Lower Odra, from the mouth of the Warta to the Szczecin Lagoon, is 130 km long and has a very small slope (0.05-0.001‰). It is also largely controlled with groynes. The average flows (SSQ) for the central Odra above the mouth of the Warta (in Słubice) are 305.9 m³/s and for the lower Odra below the mouth of the Warta (in Gozdowice) - 525.2 m³/s. The river is characterised by significant fluctuations in flow with frequent lows and flooding phenomena, the largest of which occurred most recently in 1997 and 2010.

Morphological transformations of the central and lower Odra riverbed are related to its adaptation to the function of a waterway. They originated mainly in the 19th and 20th centuries, when the river course was shortened, a number of bends were straightened, and the banks were strengthened with a system of groynes. As a result, the Odra lost its natural character, and the occurrence of riverbed forms typical of unregulated great lowland rivers was drastically reduced. The Odra is also currently a significant waterway of international importance, whose maintenance is one of the economic priorities. In addition, the ice phenomena in the Odra pose the risk of ice jam-related floods of significant size, when the accumulated ice in sections blocks the outflow of water, especially during spring water level rises. Effective prevention of such floods on the Odra requires ice breaking operations with the use of large size, powerful units. In order to ensure that such operations can be carried out, it is necessary to maintain the appropriate navigability parameters of the Odra, which is

the overarching objective of the currently planned investment – the modernisation of the river control structures.

The planned activities in the scope of the project are included in the sector planning document, which sets the framework for the implementation of tasks aimed at limiting the risk of flooding, i.e. in the Flood Risk Management Plan for the Odra Basin Area adopted by the Regulation of the Council of Ministers of 18 October 2016 on the adoption of the Flood Risk Management Plan for the Odra Basin Area (Journal of Laws of 2016, item 1938), in which activities within the scope of modernisation and reconstruction of the river control structures of the border Odra for the purpose of ice breaking are part of the package of flood control measures in the problem area (Hot spot) “Zatorowy”. FRMPs were adopted on the basis of the Regulation of the Council of Ministers of 18 October 2016. (Journal of Laws of 2016, item 1938). The implementation of the project in question is in accordance with the assumptions of water management planning included in the update of the Odra River Basin Management Plan (aPGW), adopted by the Regulation of the Council of Ministers of 18 October 2016 on the Odra River Basin Management Plan (Journal Laws of 2016, item 1967).

In accordance with the currently applicable Odra River Basin Management Plan, the investment site is located within a surface water body (JCWP):

- Odra from Nysa Łużycka to Warta, code PLRW60002117999. The abovementioned JCWP is a heavily modified body of water whose status has been identified as poor and the achievement of environmental objectives as endangered. The environmental objective is a good ecological capacity, the possibility of migration of aquatic life in the section of the important watercourse (the river Odra within the JCWP), and a good chemical status. For JCWP Odra from the Nysa Łużycka to the Warta, the deadline for achieving the environmental objectives was set as 2027, with the following justification: “Lack of technical possibilities. The JCWP catchment area is under low emission pressure. The action programme provides for: revision of the environmental protection programme for the commune, aiming at detailed identification and, as a result, reducing this pressure so that indicators consistent with the values for good status can be achieved. However, due to the time needed for the implementation of this action, and then specific corrective actions, as well as the time needed for the implemented actions to bring measurable results, good status can be achieved by 2027.”
- Odra from the mouth of the Warta to the Western Odra, code PLRW60002119199. The abovementioned JCWP is a heavily modified body of water whose status has been identified as poor and the achievement of environmental objectives is at risk. The environmental objective is to achieve a good ecological capacity, the possibility of migration of aquatic life in the section of the important watercourse (the river Odra within the JCWP), and a good chemical status. The deadline for achieving good status was set for 2021, with the following justification: “Lack of technical possibilities. No pressure has been identified in the JCWP catchment area that may be the cause of exceeding quality indicators. It is necessary to make a detailed diagnosis of the causes in order to properly plan corrective actions. Identifying the causes of failure to achieve good status will be ensured by the implementation of actions at national level: the creation of a national database on hydromorphological changes, an in-depth analysis of pressure in terms of hydromorphological changes, the development of good practices in the field of hydrotechnical works and maintenance works and the establishment of rules for their implementation, and the development of a national programme for the renaturlisation of surface waters.”

The provisions for the achievement of environmental objectives in the abovementioned JCWP indicate the justification of derogation for their achievement, such as “Modernisation works on the border Odra to enable winter icebreaking, Renovation and modernisation of the remaining river control structures on the border Odra, Renovation and modernisation of the river control structures on the border Odra”.

In addition, the investment site is located in the area of the following bodies of groundwater (JCWPd), i.e. JCWPd no. 23, code PLGW600023 (the Lower Odra and Przymorze Zachodnie water region), JCWPd no. 40, code PLGW600040 (the Warta water region) and JCWPd no. 40, code

PLGW600058 (the Lower Odra and Przymorze Zachodnie water region). The environmental objective for these bodies of groundwater is to achieve good quantitative status and good chemical status. The identified JCWPs are not at risk of not achieving the environmental objectives.

In the update of the Odra River Basin Management Plan, the scope of works of the project in question was defined in Annex 3 as the following investments:

- 3_381_O Modernisation works on Border Odra to enable winter icebreaking
- 3_392_O Reconstruction of River Control Infrastructure.

In addition, the update of the Odra River Basin Management Plan indicates that the implementation of the works in question may contribute to the failure to achieve the environmental objectives of the abovementioned bodies of surface water, but it is an overriding public interest resulting from the need to ensure flood protection and discusses alternative ways of achieving the objective; it was assessed that there are no activities that would be less invasive in relation to the natural environment - all proposed alternative actions that can improve the conditions for icebreaking have an equally or more negative impact on the environment.

For the above investments, the plan indicates, among others, the following actions aimed at minimising the impact on the status of surface water bodies:

- introduction of location restrictions,
- use of environmentally friendly solutions, enabling the maintenance of the riffle-stream pool system,
- creating conditions for natural riverbed processes (side erosion, bottom erosion and sedimentation) and creating conditions for the development of natural aquatic vegetation, submerged and emerged (growing along the banks of the riverbed),
- replacing artificial revetments with natural materials (fascine, natural stone, wood, planting willows and rushes),
- maintaining the level of groundwater within adjacent habitats, maintaining the level of the main watercourse bottom,
- section-by-section execution of works, with the exception of sensitive sites - breeding sites of bird species,
- section-by-section execution of works, maintaining a mosaic of patches of habitats of species directly associated with the bottom of the watercourse, installation of elements which differentiate the current, creating hiding places for aquatic and semi-aquatic organisms,
- felling only selected trees and shrubs, leaving the bank vegetation as natural as possible on the regulated section,
- introducing natural elements to partially regulated sections of the river - e.g. adding oversized boulders and woody debris, replacing concrete elements of revetments with natural elements (fascine, wood, stone, planting willows and rushes);

it was indicated that the activities will be planned in detail at the investment design stage.

A number of these actions have been taken into account by the investor who indicated specific mitigating actions included in the scope of the project, as described in this permit.

As part of this procedure, the impact of the analysed project on the environmental objectives of the bodies of surface water and groundwater within which the project will be carried out was assessed, taking into account protected areas (listed in Annex IV to the Water Framework Directive) within the meaning of Article 4.1 in conjunction with Article 4.7 of the Water Framework Directive (Directive 2000/60/EC of 23 October 2000 establishing a framework for Community action in the field of water policy). This assessment was the subject of a report on the project's environmental impact and was taken into account in the preparation of this permit.

Both of the abovementioned JCWP belong to abiotic type no. 21 - large lowland river. The middle and lower course of the Odra is a habitat of the bream. These are rivers with mostly sandy or muddy bottoms, slower current, and moderately warm water. Breakthrough sections, with a faster current and

gravel-stone bottom, which are spawning grounds for fish species of lithophilic breeding group are an important habitat element in this type of rivers. On the other hand, marginal lakes and oxbow lakes connected with the current of the riverbed, with rich water and rush vegetation, constitute spawning and undergrowth sites of juvenile fish of phytophilic species - which use the plant for spawning. Rheophilic species (which prefer currents) dominant in ichthyofauna of great lowland rivers include: the barbel, chub, dace, nase, burbot. They are accompanied by species with a high tolerance for habitat conditions: bream, white bream, roach, bleak, perch, ruffe and predatory species (feeding on fish): asp, pike, zander and catfish. In addition, another important element of ichthyofauna are small species, often under various forms of protection: white-finned gudgeon, spined loach, golden loach and amur bitterling - species with a specific biology that uses mussels of the family Unionidae for breeding. Large lowland rivers are the main route of migration for diadromous fish - anadromous fish, spawning upstream and its tributaries: Atlantic salmon, sea trout, vimba, and river lamprey. In the lower sections with a low degree of transformation there are spawning grounds of migratory form of whitefish, twait shad, ziege, and sea lamprey. Eel - a catadromous species that grows in fresh water and reproduces in the sea - also migrates through the Odra. Historically, spawning grounds of European sturgeon and Atlantic sturgeon *Acipenser oxyrinchus* were located in swift current with gravel bottoms, so the Odra was both a route of migration and a breeding ground for these species. The presence of rheophilic, lithophilic, and predatory fish, as well as the free migration of diadromous species, is a determinant for a high assessment of the ecological status of great lowland rivers based on their ichthyofauna. Among macroinvertebrates, good ecological status is evidenced by the presence of organisms associated with swift current and having higher oxygen requirements: larvae caddisflies, mayflies, and dragonflies. Mussels from the family Unionidae also play an important role among macroinvertebrates. On the section from the mouth of Nysa Łużycka to the Western Odra, the Odra flows through a wide valley and has a mostly sinusoidal course, but in sections the riverbed is straight.

The morphology of the section of the Odra covered by the investment indicates a strong transformation of the course of the riverbed and the shape of its banks, while maintaining some of the riverside habitats and transverse communication within the floodplain between the embankments. This is due to the fact that over many years the Odra has undergone significant anthropogenic modifications related to flood protection (embankments), as well as the use of the river as a waterway. These modifications included: changes in the route of the riverbed - shortening the course of the river, cutting off the meanders causing an increase in the hydraulic drop, numerous structures concentrating and directing the current - groynes and river walls. The sum of these impacts contributed to the qualification of the abovementioned JCWP as heavily changed water body. Despite anthropogenic transformations, single oxbow lakes have been preserved within the floodplain – one-sided open and closed ones. However, there are no side arms or drainage oxbows. Significant sections of the river are embanked, however, usually the embankments are located at a distance of several dozen to several hundred meters from the riverbed, which allows to preserve some of the riverside environments typical of the floodplain area. Some of the closed oxbows, which lie in the inter-embankment, can periodically connect with the river at high water levels, but some of them are located outside the embankments and permanently cut off from the river. The location of the preserved oxbows indicates a much higher degree of riverbed meandering in the past than today. There are no of riverbed forms typical for large rivers: sandy bars at the banks and in the middle of the riverbed, side arms, variable course of the current at one or the other bank. The role of these natural habitats is taken over in the regulated riverbed of the Odra by riverbed forms formed in the groyne fields. Spaces between groynes are artificial habitats: marginal lakes, sand deposits and shallows, while the groynes themselves are stretches of banks and bottoms composed of stone substrate, creating convenient hideouts for fish and macroinvertebrates between larger stones. Artificial riffles formed at the points where riprap is washed out at the top of groynes, with a stone-gravel substrate and a rapid current constitute potential spawning sites for lithophilic fish species. In addition, transverse connection with preserved oxbows, as well as the creation of substitute habitats of this type in the deeply indented groyne fields, ensures maintenance of habitat diversity, availability of spawning and fry growth sites for phytophilic species and habitats for protected small fish species: spined loach, mackerel, and amur bitterling. Therefore, maintaining such a structure of riverbank control in a regulated river is necessary in order to maintain its natural functions. If renovation work on existing river control structures were to be abandoned, spontaneous habitat restoration would still occur, which in the near future (10-30 years) would result in maintaining or increasing habitat

diversity and diversity of aquatic organism communities. However, further progressive degradation of these strengthening structures in the perspective of a few decades - or a few hundred years - would lead to their gradual disappearance and progressive depletion of morphological diversity in the regulated Odra riverbed. This would result in long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity. It should be pointed out that such an effect is clearly visible on sections of the Odra within which an almost complete degradation of groynes has already occurred, and on sections where there is no control with groynes, and the riverbed is straightened, with banks strengthened with riprap.

Taking into account the planned scope of the investment, it should be assumed that the implementation of the project may contribute to the local deterioration of habitats and living conditions of fish, including protected species, macroinvertebrates and hydrophytes located, among others, in the bank zone of groynes and depressions in groyne fields.

With regard to the works connected with modernisation and construction of groynes, it should be pointed out that almost the entire section of the Odra within the discussed JCWP is subject to regulation of banks in the form of groynes at the length of several to several dozen metres, located on both banks every 80-110 metres. These groynes are to maintain the concentration of the current in the central part of the riverbed and the required depth of the fairway and prevent erosion of the banks. The riverbed above the mouth of the Warta is usually 150-250 m wide, and below the Warta - 250-300 m. The current between the well-preserved groynes is about 110-130 m and 150-170 m wide for the abovementioned sections of the Odra, respectively. Signs of degradation of varying severity can be found on many of the groynes and the current part of the riverbed expands significantly in these sections. This is particularly visible below the mouth of the Warta, where groynes are less regular. Groyne fields are in many places covered with sand, and their fragments which are cut off from the stream - covered with submerged vegetation, floating-leaved vegetation, and rushes. The project includes plans to modernise the existing groynes by shortening or lengthening them, filling in the cavities with riprap, and constructing groyne heads with a 1:10 inclination, and for its slopes, up and downhill, 1:2 and 1:3 respectively. New structures will be built in places where groynes necessary in order to achieve the river control objective are missing. According to the provisions of the report, plans include the reconstruction of 205 groynes in the Odra JCWP from the Nysa Łużycka to the Warta and 172 groynes in the JCWP from the Warta to the West Odra.

Both the rebuilt and newly designed groynes will interfere with the riverbank due to the use of so-called "wings". The average length of the wing will be 11 m, but it will usually not exceed 35 m (it is expected that only 5.2% of wings will longer than 30 m). On average, groyne field covered by the works will occupy up to 20% of the groyne field bank. This value in relation to the total length of the Odra JCWP from the Nysa Łużycka to the Warta will be 4.6%, while for the Odra JCWP from the Warta to the West Odra - 6.0%. In the parameterisation of the impact of hydrotechnical investments on biological and hydromorphological elements of water status, included in the study "Retrospective assessment of the status of water bodies for the purposes of individual analysis of compliance with the Water Framework Directive of projects co-financed from EU funds" (Pchałek M. and others), National Water Management Authority, Warsaw 2014, the threshold value for a significant impact was determined as 20% of the length of the JCWP. The indicated values of the proportions of the JCWP bank sections subject of the changes will therefore be significantly lower than the threshold for the significant impact of the renovation of hydro-technical development on the JCWP of great lowland rivers.

In order to minimise the impact of the investment, i.e. renovation and reconstruction of groynes, on the existing fish habitats and hiding places, habitats of macrozoobenthos, submerged macrophytes, phytobenthos, the investor undertook to limit the interference in the groyne fields through:

- during the execution of works related to the reconstruction of groynes, not interfering in deposits located in groyne fields, with the exception of places in direct conflict with the designed structures (wings),
- carrying out works on the construction of wings from the furthest point of a wing towards the

groyne,

In addition, in the case of works interfering with the river bottom and with structures, in the case of protected species being found, the investor is obliged to stop the works and move those species to safe places above the area of works.

In addition, in order to accelerate the regeneration of degraded habitats and to maintain the habitat potential of the Odra section in a state not significantly different from the current one and at the same time ensuring that the impact of the investment on biological elements and habitats and species which are subjects of protection in Natura 2000 sites and protected by national law is limited to a moderate level, the following measures are planned:

- introduction of oversized boulders into selected, deeply indented groyne fields (as suggested by the ichthyological supervision), with a depth of 1.5 - 2.0 m at SN W;
- restoration of riffles of loose stones of various granulations (5-45 cm) in the structure of the foot and slope of the groyne on the downstream side of each of the renovated groynes, as a supplement to the stone structure of each renovated and selected new groynes;
- creating alternative habitats – oxbows in the form of bays cutting into the bank, with an area of 220 to 1320 m², (5300 m² in total): 8 structures with the following parameters: length 50-100 m, irregular oval shape, width approx. 10-12 m, depth from 0.5 to 1.5-2.0 m, in the following locations on sections of the JCWP (body of surface water) Odra from the Nysa Łużycka to the Warta: No 1 at 582,4 km; No 2 at 585,7 km; No 3 at 602,3 km; No 4 at 606,2 km; No 5 at 606,6 km; No 6 at 609,5 km; No 7 at 616,5 km and No 8 at 616,8 km;
- using natural materials such as stone, fascine, wood, however, geotextile may be used to separate newly constructed elements from existing ones;
- not clamping the riprap with concrete. In order to stabilise the hydrotechnical stone with a granulation of 15-45 cm, a finer stone (5-15 cm) should be wedged in the top layer, to allow differentiation of macroinvertebrate and fish habitats, especially in the area of the groyne foot from the downstream side, where restored riffles with a varied stone substrate will thus be formed.
- replanting patches of submerged plants with floating leaves (surface over 10 m²), as well as fragments of patches (up to half of their surface) of aquatic plants growing on the bottom of the Odra (especially the nymphaea, including all identified endangered sites of the fringed water lily) from the area of works, to sites the base of and along the reconstructed groynes. Plants should be moved with the use of a technology that will allow them to be transferred together with their invertebrate fauna and allow to collect the unionids, transporting them in conditions of adequate moisture content;
- transferring mussels from the family *Unionidae* from the area of works to safe habitats located above the current area of work, in order to preserve protected species from this group (including the swan mussel *Anodonta cygnea* and the depressed river mussel *Pseudanodonta complanata*) in the following way:
 - during the period of up to one week prior to the commencement of the works involving the occupation of the bottom for the reconstruction of groynes, their wings, river walls or longitudinal dams, the mussels of the family *Unionidae* should be collected from the bottom area, at a distance of 3-5 m from the edge of the existing riprap, using the wading method with hand nets with 5 mm mesh in shallow places, and in places with a depth of more than 0.7 m, using the method of multiple hauls with a bottom dredge operated from a boat, with 5 mm mesh and inlet dimensions of approx. 100 x 30 cm and net length of approx. 80 cm;
 - the mussels must be placed in water containers and immediately moved to safe places above the current work area.

Periodic turbidity of the water may occur when the riprap is laid. The area of works is small in relation to the width of the river and the flow on this section of the Warta and the suspension will be dispersed rapidly. However, it is possible that increased concentrations of suspension may persist in groyne fields in the work area, which may lead to local deterioration of habitats and living conditions of fish and macroinvertebrates, which is particularly dangerous during spawning, spawn incubation and

hatching. In addition, from the point of view of the resources of the ichthyofauna inhabiting the bank zone and groyne fields, increased movement of construction equipment and, above all, vibrations associated with the placement of strengthening elements may pose a significant threat to the abovementioned elements of the natural environment, as a result of which the local ichthyofauna will be scared away to neighbouring areas for the duration of the works. Nevertheless, it is to be expected that after the completion of the works, the affected sections of the river will be quickly recolonised by fish. In addition, the anticipated time delay between the works carried out on the Polish and German banks (minimum 3 years, preferably 5 years) will allow fish to use habitats on the opposite bank as refugias during the implementation of the investment. Nevertheless, in order to limit the impact of increased amount of suspended matter and stress factors on fish, earthworks in the riverbed will be carried out outside the period of spawning, growth and hatching of fish, which for most of the species found in the Odra falls in the period from March to mid-July, including protected species, i.e.: spined loach *Cobitis taenia*, amur bitterling *Rhodeus amarus*, white-finned gudgeon *Romanogobio belingi*, asp *Aspius aspius*, golden loach *Sabanaevia aurata*, barbel *Barbus barbus*, stone loach *Barbatula barbatula* and the spring migration of the Atlantic sturgeon *Acipenser oxyrinchus* and the river lamprey *Lamptera fluviatilis*.

This time limit will not reduce potential spawn and fry losses of: burbot (*Lota lota*), which prefers deep stream pools in groyne fields, where the spawning grounds of this species are located (parts of sandy-muddy bottoms, often overgrown with vegetation, 1-3 m deep), spawning in winter (December-February) and whitefish (*Coregonus lavaretus*), spawning also in winter (spawning in December, incubation until March-April). Therefore, compensation consisting of restocking Odra sections with mint is planned for the period of the works (approx. 3 years) and for 3 years after their completion. Supplementary stocking doses will be established in agreement with fishing users (at least 500,000 hatchlings per year), and the stocking material will be obtained from spawners from the Odra basin. Stocking with the European whitefish (*Coregonus lavaretus*) - Odra below the mouth of the Warta River - is also planned, involving introducing at least 1,000,000 hatchlings per year for the duration of the works (approx. 3 years) and up to 5 years after their completion. The proposed compensatory stocking will help to maintain populations of both species, which are not legally protected (other than size and conservation period) but are economically valuable and an indicator of good ecological capacity of waters. Therefore, these stocking activities will reduce losses in fisheries and the risk of deterioration of surface water quality indicators in terms of elements determining the ecological capacity of JCWPs located in the area of work implementation.

In addition, due to the fact that the Odra is a migration route for many species of diadromous fish, including the eel, the investor also undertook to introduce time limits related to the implementation of the project and technological solutions, as follows:

1. Carrying out works on individual sections in a way that prevents sediment raised during works from persisting for more than a week.
2. Works involving the demolition of groynes and the foundation of new structures at the bottom, conducted in the period October-December, i.e. during the migration of diadromous salmonids and the river lamprey, will be conducted with the use of curtains separating the area of works from the current and limiting the area of work to approx. 10 m around the reconstructed groynes and constructed longitudinal dams.
3. During construction works interfering with the bottom of the riverbed (e.g. demolition of damaged groynes, foundation of new structures in the bottom) carried out in the period from October to December in order to protect diadromous species of ichthyofauna during migration, the level of suspension concentration and oxygenation of water will be monitored (in case of values dangerous for aquatic organisms, the works will be temporarily suspended), in accordance with the following principles:
 - monitoring of concentrations of suspended load should be carried out daily, with measurements taken after at least 2 hours of work (with normal intensity). If the concentration exceeds 200 mg/l, the measurement should be repeated after a 2-hour break. Measurements of dissolved oxygen concentration will be carried out in parallel with the measurement of concentrations of suspended load. At values below 5 mg O₂/l

the work will be suspended for a minimum of 2 hours, and below 3 mg O₂/l – for a minimum of 24 hours. Oxygen concentration should be measured in the middle of the water column - approx. 1.0 m below the water surface.

- if concentrations of suspension higher than 200 mg/l or dissolved oxygen concentrations < 4 mg O₂/l are recorded (at monitoring points located approx. 200 m below the area of works), the intensity of the works will be limited (introduce 2-hour breaks every 2 hours) and in the case of suspension concentrations >400 mg/l or <3 mg O₂/l, the executed works will be immediately suspended for a period of at least 24 hours,
- the resumption of the works after each break caused by exceeding the suspension concentrations must be preceded by another measurement of the suspension concentration at monitoring points,
- works may only be resumed if suspension concentration is below 200 mg/l at monitoring points.
- markings will be made at monitoring points located approx. 200 m below the site of works.

Planned longitudinal dams will be based mainly on appropriate reinforcements made of hydrotechnical crushed stone. Dams will be placed on fascine mattresses laid directly on the existing bottom. The preferred dam structure will be stone, in particular the main strengthening of the dam slopes will be hydrotechnical crushed stone, which creates convenient microhabitats for invertebrates and fish.

Consequently, the negative impacts will be related to the occupation of the bottom to place the dam (direct destruction of fish and invertebrates), scaring fish during the works and the possible formation of a small amount of sediment during the works. Dams are planned on stretches of banks that are not attractive for aquatic organisms, therefore, despite some of the bottom area being occupied, no depletion of habitats is expected. In order to minimise the effects of bank unification on the sections covered by the works and to accelerate the natural settlement of river sections covered by the works by characteristic groups of aquatic organisms, plans were made to create habitats similar to oxbows - in the space behind the planned longitudinal dams with a total length of 1650 m. These habitats in spaces behind the dams will be made as a result of creating rear flows and of the demolition of 30-metre sections from the tops of groynes cut off by the longitudinal dam. In order to diversify the habitat structure, groups of 4-5 oversized boulders will be introduced into the spaces behind the dam, approx. every 50 m in the existing depressions, and 1000 mm irrigation pipes will be installed in the space behind the dam (two in each groyne field cut off by the longitudinal dam, allowing water to flow freely even at the lowest water levels) in order to improve the oxygen conditions in the reservoir, allow migration of fauna (invertebrates and fish), reduce the tendency of the reservoir to silt and overgrow and prevent the death of benthofauna taxa and fish. The created habitat will be similar to open oxbows, which will overgrow with hydrophytes over time and will be a good site for the development of macroinvertebrates and for spawning and juvenile growth for many fish species. After a period of 2-3 years of stabilisation, the established habitats behind the dams are expected to be suitable for the existence and reproduction of protected fish species: spined loach (*Cobitis taenia*), amur bitterling (*Rhodeus amarus*), and weatherfish (*Misgurnus fossilis*). The use of riprap on the body of the dam will additionally diversify the habitat, as periphyton will appear on immersed stones, and over time other benthic organisms will appear, while between stones several species of fish will also find habitat. In addition, in order to create favourable conditions for the settlement of the river sections covered by the works by characteristic groups of aquatic organisms, plans were made to introduce habitat forming elements (groups of oversized boulders placed every 50 m along the dam), introduce aquatic plants and rushes (threatened by the conducted works, including those covered by legal protection - fringed water lily), introduce mussels (Unionidae) removed before the commencement of the works and demolish of revetments in places where they are not justified, i.e. behind the designed longitudinal dams in deeply indented groyne fields, i.e. behind the designed longitudinal dam at the height of groynes 12/675 - 16/675.

It should be pointed out that the above activities, including the creation of substitute habitats in the form of bays in the Odra JCWP from the mouth of the Warta to the Western Odra, will ultimately

contribute to maintaining the habitat potential of the Odra section in a state not significantly different from the current one and to accelerating the process of natural settlement by characteristic groups of aquatic organisms.

Interference with the structure of the riverbank due to the construction of 12 revetment and one dam (at 1720 m and 500 m respectively) will contribute to the local destruction of microhabitats of plants, invertebrates, and ichthyofauna. However, in view of the length of the two JCWPs covered by the project, the impact of these works, which will be conducted on short sections, will be negligible. At the same time, the use of natural materials, i.e. stone, will create the right conditions for the creation of habitats for rheophilic groups of invertebrates (mayflies, caddisflies, gammarus), settled mussels of the *Unionidae* family and fish which prefer hard bottoms with hiding places - e.g. the burbot, barbel, stone loach. River walls, like dams, are planned on stretches of previously strengthened banks, unattractive for aquatic organisms, therefore, no significant depletion of habitats in connection with the implementation of this investment element is expected. Additionally, the construction works, including laying geotextile, sinking mattresses, and laying riprap, will be carried out in a manner limiting the negative impact of the investment on the submerged and floating-leaved vegetation located in the littoral zone, by way of replanting them to places where the works have already been completed (e.g. the places at the base of the renovated groynes or behind the dam). Moreover, in order to minimise the effects of the bank unification in the sections covered by the works, plans were made to construct the wall with an undulating line, i.e. to construct the wall in accordance with the existing terrain, without straightening the bank.

As for the achievement of the environmental objectives for the bodies of surface water within which the project will be carried out, the potential impact of the project on the objectives of protection of the following protected areas located at the site of the works and in their potential impact zone was analysed: PLB080004 Central Odra Valley, PLH080013 Ślubice Riparian Forests, PLC080001 Warta River Mouth and Riparian Forests near Ślubice nature reserve, Lower Odra PLH320037, Lower Odra Valley PLB320003, as set out in this permit. In addition to the abovementioned measures limiting the negative impacts of the investment on natural habitats and species of protected animals and plants, a number of conditions were introduced to protect birds during the implementation of the investment, as set out in this permit.

Taking into account factors such as: the section-by-section performance of works, the technology of conducting the works with floating equipment, conducting the works only in the autumn-winter season and possible impacts being spread out over time (no accumulation of the effects of the reconstruction of river control structures and the effects of possible dredging at the stage of maintenance works), no cumulation with the works on the German bank, implementation of additional measures minimising the impact on the environment and the results of the assessment of investment impact on the abovementioned protected areas presented in this permit, it was concluded that the implementation of the task is not associated with any risk of significant negative impacts on Natura 2000 sites.

With regard to the long-term impact of the implementation of the investment on species and habitats dependent on water, the following should be stated. The analysis of the results of the conducted tests and models indicates that the functioning of the reconstructed river control structures will not affect the current hydrological system of the Odra. The planned activities will not affect the way in which the river is fed, the volume of flows and the nature and course of lows or highs, and slight increases in the level of the water table can be expected in the long term. The results of the analyses carried out for *the Update of the concept of the border Odra watercourse* showed that the functioning of the reconstructed river control structures will not affect the volume of flows and the dynamics of highs and lows, or the lowering of the level of groundwater in the inter-embankment, which is also confirmed by the results of modelling carried out on the section of the free-flowing Odra, which were also taken into account in the project's environmental impact assessment.

Taking into account the results of the analysis of the impact of the investment on environmental elements affecting the condition of the JCW, it should be pointed out that maintaining

the groynes in good condition, in addition to the tangible benefits associated with maintaining the navigability of the river and enabling effective icebreaking to prevent flooding, may also contribute in the longer term to the maintenance of the biodiversity of the regulated Odra. As part of the development of the project for the reconstruction of groynes for the purpose of the planned investment, the principle of not disturbing groyne fields was adopted, so that the processes of spontaneous renaturalisation that occurred in them would not be significantly reversed. In addition, it should be pointed out that the investor abandoned the intention to dredge the riverbed, which, in the original assumption, was one of the elements of the project that could at the same time have a significant impact on the objectives of the WFD. In addition, the proposed minimisation measures, which aim to maintain the necessary habitat conditions in the riverbed, including proper hydromorphological variation, will ensure a balance between the need to maintain the river control structures of the Odra and its function as a waterway (in particular for ice breaking and flood prevention), and the need to preserve and improve the diversity of river habitats. As a consequence, this will contribute to the achievement of social objectives pursued, while ensuring that the ecological capacity and the assessment of the biological elements of the quality of the Odra waters are not impaired and that habitats and species under legal protection are preserved, including within the framework of the Natura 2000 network.

With regard to the physical-chemical parameters of the JCWP, the following should be indicated. In order to assess the potential for increased release of pollutants from the mobilised bottom substrate, the investor conducted detailed analyses in this regard, the results of which are presented in the document entitled “The impact of the modernisation of groynes in the border Odra on the transport of bottom sediments and potential release of pollutants”, by Kolarski and Mateja-Lukowicz (Gdańsk 2019), constituting an annex to the submitted report. The basis for carrying out this analysis were the results of laboratory tests carried out on samples of bottom sediments taken from 5 points located on different sections of the Odra (assessment of sediment contamination) and the results of hydrological analysis carried out using the two-dimensional mathematical model DynaRICE, which gave values of unit flows and tangent stresses at the bottom, which in turn can be compared with the limit diameters of river load grain, which can be eroded as a result of the flowing water. The results of the analysis showed that sediments from the bottom of the Odra are not contaminated or are only slightly contaminated. Therefore, it should be concluded that the planned works will not cause a risk of an increased inflow of pollution to waters.

Therefore, the Odra River Basin Management Plan does not provide for any adverse impact of the project on the achievement of the environmental objectives set for the JCWP. In the opinion of the authority, the investment will not generate permanent changes affecting the condition of hydromorphological elements or the biological and hydromorphological continuity of JCWP. The project poses no threat to the achievement of the environmental objectives of other nearby water bodies.

Taking into account the nature of the project, the manner of its implementation, including the adopted design assumptions, as well as a number of conditions imposed on the investor, preventing pollution of the ground-water environment, it was assessed that the implementation of the project will not negatively affect the state of the JCWP. In addition, according to the submitted documents, the implementation of the project does not provide for a permanent change in the groundwater water relations of waters covered by the project during implementation and operation. Moreover, risks associated with possible accidents (leakage of fuel and petroleum substances into groundwater) will be eliminated by complying with the conditions referred to in the operative part of this permit.

Bearing in mind the nature of the project and the manner of its implementation, with the application of the abovementioned design assumptions and a number of conditions imposed on the investor, preventing pollution of the ground-water environment during the works, taking into account the maintenance of good level/potential of waters, such as: adequate protection of hazardous waste storage sites to prevent introduction of hazardous substances into the ground-water environment (e.g. geomembrane); appropriate segregation and storage of waste in a separate, designated place, enabling it to be regularly collected by authorized entities, the implementation of the intended investment will not negatively affect the level of water bodies (groundwater and surface water), including the fact that

it will not lead to deterioration of the level of waters and ecosystems dependent on waters, and thus will not jeopardise the achievement of environmental objectives determined in accordance with the currently applicable Odra River Basin Management Plan.

Issues analysed in depth in this proceeding included also the effects of the implementation of the investment in terms of the impact of noise emission on acoustically protected areas, the impact of pollutant emission and the generation of waste.

The works carried out as part of the project will be carried out in areas of diverse development/usage. Some of the works will be carried out in the vicinity of forested areas, meadows and farmlands. In several places, tasks will be carried out in the vicinity of built-up areas, and this applies to such towns as: Słubice, Kostrzyn nad Odrą, Frankfurt(Oder) and villages: Chyrzyno, Gozdowice, Stare Łysogórki, Siekierki, Stary Kostrzynek, Osinów Dolny, Bielinek, Piasek.

The execution stage will cause a short noise emission during temporary use of the machinery and equipment required to carry out the works. The emitted noise will be intermittent, and its intensity will vary at different stages of works, depending on their course and the use of specific machines and equipment. The works will be carried out in the riverbed and directly on its bank, which means that they will not pose a threat to the health of people living in built-up areas located in the area of the project implementation sites. In addition, conducting work during the daytime will further limit the negative impact of noise emissions on the nearest built-up areas. Due to the above, the noise generated during the implementation of the project will be local and limited to the area of the works. The planned project, i.e. the reconstructed river control structures on the Odra, will not in itself be a source of noise emission. However, achieving the depth objective for ice breakers, as a result of the functioning of the reconstructed river control structures, will improve the navigation conditions in the Odra and potentially contribute to the increase in barge traffic. Analyses of the forecast acoustic impact generated by freight transport on the Odra in the area of the project showed that the implementation of the project will not cause negative impact on acoustically protected areas located in the vicinity. Moreover, the application of organisational solutions such as: only starting machines and devices during the works, reducing the number of devices working simultaneously, will limit the range of noise emitted to the acoustically protected areas in the opinion of the authority. In addition, it should be pointed out that most of the planned works will be carried out outside built-up areas.

The lack of impact of the investment implementation on the residential buildings located in the vicinity, with the application of measures minimising the negative impact, is also confirmed by the opinions of the sanitary inspection authorities participating in the proceedings.

During the implementation of the project, the main sources of pollutant emissions will be construction works carried out within the riverbed and transport of materials and equipment by water. Calculations of the pollution spread in the air made in the report using the FB Operator program registered to Ansee Consulting Michał Jaśkiewicz (license number 691/OW/14) showed that the implementation of the project will not cause deterioration of air quality in the area of works. This is due to the fact that these pollutants will be emitted at low altitude and therefore the extent of their spread will be significantly reduced. In order to reduce emissions of gases and dust to the environment, the investor will carry out all works using only modern, technically efficient equipment, while the machines used will have modern drive units with limited exhaust emissions and the running time of the engines at the highest speed will be limited. During the operation of the investment, the possible emission of dust and gases is due to the movement of ice breakers on river as part of modernisation works. The analyses carried out in the report showed no deterioration of air quality as a result of the conducted works. In addition, it should be pointed out that the implementation of the investment will allow more efficient work of icebreakers, which will further reduce the emission of pollutants into the air.

Taking into account the results of the analyses carried out with respect to noise emission and the spread of pollutants into the air, it should be concluded that it is not necessary to create an area of limited use as referred to in art. 135(1) of the Act of 27 April 2001 Environmental Law.

Works related to the reconstruction, construction, and demolition of river control structures will generate waste belonging mainly to the following groups: 15, 17, and 20 as per the Regulation of the Minister of Climate of 2 January 2020 on the waste catalogue (Journal of Laws of 2018, item 10). According to the submitted documentation, the generated waste will be collected selectively, stored on vessels in places and containers adapted for this purpose, and then handed over to specialized companies for recovery or disposal. Nevertheless, it should be pointed out that waste such as soil and ground (17 05 04), which will be temporarily stored, will first be recovered through proper management at the location of the investment. After the project is completed, the operation of the river control structures on the border Odra river will not entail any waste generation.

The impact of the investment on tangible goods was also analysed in this proceeding. Goods are all means that can be used, directly or indirectly, to meet human needs. It should be pointed out that the project concerns the modernisation of river control structures in the riverbed. The planned scope of work will not require a demolition of any residential buildings. The works planned as part of the project will be conducted in the riverbed. Taking into account the scope of construction works and the way they are carried out (mainly from the water side), no possibility of potential adverse effects on the material goods located in the built-up area was found.

According to the submitted materials, in the city of Kostrzyn nad Odrą, works on river groynes will be carried out in the immediate vicinity of fortifications of the Fortress in Kostrzyn entered in the register of monuments under No. KOK-1-81/76 on 2 November 1976. Taking into account the design assumptions for the implementation of the investment, i.e. carrying out works from the water side, the inability to use heavy equipment on the banks and the execution of most of the works related to the reconstruction of groynes manually, no negative impact of the investment on the abovementioned structure under conservation protection is expected. In addition, archaeological supervision during the works will fully protect the abovementioned structure against any adverse impact of the investment.

The issue of cumulative impact was also examined in this proceeding. The issue of cumulative impacts was considered in particular with regard to tasks carried out on the German side under the Polish-German agreement. In accordance with the Polish-German concept, achieving the planned navigation objective for icebreakers is possible only by carrying out the scope of works related to the regulation of the river on both sides of the river. Taking into account the anticipated schedule of works on the German side, i.e. at least 3 years after the completion of works on the Polish side, no accumulated negative impacts on the environment are expected. The period between the completion of the works on the Polish side and their commencement on the German side will allow for partial regeneration of aquatic vegetation complexes and fish and invertebrate habitats, which will be inhabited by organisms that use refugias on the German side. During later operations on the German bank, the role of refuges will be taken over by the habitats on the Polish bank, which will be to some extent rebuilt. In addition, other projects carried out on the Odra, including those planned as part of the Odra-Vistula Flood Management Project, were analysed: reconstruction of bridges on the Odra in Kostrzyn nad Odrą (railway and road bridge), reconstruction of the railway bridge in Siekierki, Cedynia commune, construction of mooring spaces (dolphins) for icebreakers, reconstruction of river control structures on the free-flowing Odra, above the mouth of Nysa Łużycka. Taking into account the nature of the individual works and their scope, as well as the minimisation measures introduced as part of the investment, no significant cumulation of the impact of the project subject to this proceeding with other activities carried out on the Odra is expected. Moreover, the results of BAW modelling presented in this proceeding do not predict negative impacts during the functioning of the abovementioned projects.

The cumulative impact of the investment in question with dredging not covered by this proceeding, which is foreseen as part of fairway maintenance in case of excessive sediment deposition, was also analysed. According to the submitted documentation, before conducting dredging works, the contractor will be obliged to draw up a bathymetric plan of the Odra in order to justify the execution of these works and determine their quantity. Taking into account the fact that these works, generating long-term water turbidity, will be carried out after the execution of the investment in question, no significant accumulation of the impact of the project being the subject of this procedure with the

aforementioned works is expected. In addition, as part of minimisation actions, the low floating islands constructed by the investor will limit the possible negative impact of dredging works on the potential habitats of breeding gulls and plovers, such as sandy bars.

In the light of the above analyses, it should be assumed that there will be no cumulative effects at the operation stage of the investment, which may lead to negative effects on elements of the environment.

Impacts associated with the possibility of a major accident were also analysed in these proceedings. In accordance with the provisions of the Act of 27 April 2001 Environmental Law, a major accident is an event, in particular an emission, fire, or explosion, occurring in the course of an industrial process, storage, or transport, involving one or more dangerous substances, leading to an immediate or delayed threat to life, human health, or the environment. Given the nature of the project, it does not generate the risk of a serious accident. Moreover, at the stage of investment operation, cyclical maintenance works will prevent any emergencies. Moreover, the new river control structures on the border Odra river, to be built during the project, will enable safe and effective breaking and removal of ice, which will allow for mitigating the risk of flooding caused by ice jams. The project operation will help prevent natural disasters.

The nature of the work carried out as part of the implementation of the planned project will have no impact on the climate and the impacts will not be significant from the point of view of adaptation to climate change. The impact of the investment in question on the emission of greenhouse gases will be temporary, of relatively low intensity, occurring only at the construction stage. When analysing the possibility of occurrence of phenomena causing a natural disaster in connection with the implementation of the investment, the following should be indicated. The analyses presented in the report, based on the mathematical model developed for the purposes of the concept by the Federal Waterways Engineering and Research Institute in Karlsruhe, showed that the rise of the water table at high and flood levels, as well as its drop in the case of lows (which are a natural consequence of lowering the bottom), will be insignificant in relation to the conditions on the river in its current state, and the project itself will neither increase the risk of flooding nor lead to a significant lowering of the groundwater table. The planned river control structures will not affect the frequency of rises, high flows, nor the frequency of their occurrence, nor will they lower the water table at low river levels.

Due to the fact that the implementation of the investment concerns the modernisation of control structures on the river, no negative impact on the landscape is expected. The reconstruction of groynes and other river control structures will not result in the loss of landscape value of the Odra Valley and will be integrated into the landscape of the already partially regulated river.

In the context of the procedure carried out, in accordance with the Espoo Convention, the following should be indicated. Implementation of the project will result in an impact, for which the possibility of transboundary impact cannot be ruled out, especially since the project concerns the Odra, which is the border between the Republic of Poland and the Federal Republic of Germany. The areas exposed to noise and air pollution emissions on the German side are: the town of Frankfurt (Oder) and the villages of: Hohensaaten, Hohenwutzen, Rudnitzer Ausbau, Gustebieser Loose, Bleyen and Kustrin Kietz. Due to the nature of the investment and its scope, the investment is not expected to have a negative impact on the residential buildings located on the German side.

As for protected areas, the following Natura 2000 sites are located in the vicinity of the investment: Mittlere Odemiederung DE3453422, Unteres Odertal DE2951302 and Unteres Odertal DE2951401, Oderinsel Kietz DE3453301, Oder-NeiBe Ergantung DE3553308 Oderwiesen Neurudnitz (DE3151301) and the area of the German Lower Odra National Park (Nationalpark Unteres Odertal).

The project is planned in accordance with the assumptions of the Polish-German *Update of the Concept of the Border Odra Watercourse* and the *Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow and shipping conditions) signed in Warsaw on 27 April 2015*. As the submitted documents show, according to the initial version of the consolidated schedule of regulatory modernisation in the border Odra on the Polish and German

side, the first commencement of modernisation works on the German side is planned for 2027, while on the Polish side for 2020. This will prevent the accumulation of negative impacts at the project implementation stage (e.g. in terms of inflow of sediment to water, noise, destruction of habitats and aquatic organisms). Moreover, water habitats left on the German bank without interference will be a refugium for fish and macroinvertebrates migrating from the sections of the Polish bank where works are conducted. The accumulated impact at the operation stage will also be reduced with the time shift for works on the two banks – the period between the completion of the works on the Polish side and their commencement on the German side will allow for partial regeneration of aquatic vegetation complexes and fish and invertebrate habitats, which will be inhabited by organisms that use refugias on the German side. During later operations on the German bank, this will be repeated, and the role of refuges will be taken over by the habitats on the Polish bank, which will be to some extent rebuilt. Noise will be emitted during bank strengthening and the reconstruction of groynes, due to the presence of people and moving equipment, resulting in the scaring of avifauna, which may also be of a transboundary nature due to the proximity of the neighbouring country. Due to the large number of environmentally valuable habitats in the vicinity of the area of the inventory, birds will move to neighbouring areas for the duration of the investment works and return after the implementation stage is completed. Nevertheless, during the period of investment implementation, continuous environmental supervision will be carried out, the task of which will be to minimise the risk associated with the negative impact of the investment, including, among others, ensuring appropriate deadlines for the execution of the planned works. Bearing in mind the above, taking into account the results of the analyses carried out in the report, it should be concluded that the stage of implementation of the investment will not cause a significant negative impact on the objects of protection in Natura 2000 sites.

The issue of the long-term impact of the investment has been carefully analysed in the submitted material and was the subject of a meeting during a transboundary consultation held on 17 January 2020, as set out in this permit.

Nevertheless, it should be emphasised that in order to verify the discrepancies in the opinions of the parties regarding the long-term impact of the investment on environmental elements, including on the ecological capacity/status of surface water bodies, the Polish side proposed to conduct post-investment monitoring, with the scope agreed by appropriate expert bodies (e.g. in the Polish-German Border Water Commission, the International Commission for the Protection of the Odra and the Polish-German Programme Council of the Lower Odra Valley Network of Protected Areas under the aegis of the Polish-German Environmental Protection Council), which would allow to verify the assumptions adopted in the report. It should be pointed out that the need to carry out monitoring in the context of transboundary impacts has been taken into account in this permit.

The conducted investigation analysed the impact of the entire project on the environment, paying particular attention to the aquatic environment, people, acoustic climate, air pollution, and the natural environment, including Natura 2000 sites. Based on the information contained in the submitted documentation, the conditions for the implementation and operation of the project ensuring environmental protection were defined. To verify the results of the environmental impact assessment carried out in this proceeding, and to examine the effectiveness of the implemented actions aimed at the protection of individual elements of the environment, including objects of protection in the Natura 2000 site, this permit, in accordance with Article 82(1)(2c) of the EIA Act, specifies the need to carry out investment and post-investment monitoring in the scope of:

1. Suspension concentration and water oxygenation levels.
2. Degree to which the created/founded artificial breeding islands are used by the lani and the charadrii in the Natura 2000 site Lower Odra Valley PLB320003.
3. The conservation status of natural habitats within the range of the impact of investments such as: 3270, 3150, 91E0, 91F0, 6440, 6430, 6510, and the abundance and distribution of species subject to protection in Natura 2000 sites and of interest to the European Community.
4. Degree of restoration of the riverbank properties enabling the development of habitat 3270.
5. The spread of invasive alien species.
6. The extent to which diversification of habitats in the bank zone has been restored.
7. Long-term effects of the hydraulic and morphological impact of the investment on the

protection status of species and habitat types dependent on the waters being the subject of protection of Natura 2000 sites.

8. Long-term impacts of the investment on the ecological capacity/status of surface water bodies.
9. Water flow in the river and the level of groundwater within the range of habitats
10. The formation of the bottom, including riverbed mesoforms, bumps, channels, and other manifestations of deep erosion and overgrowing of groyne fields.

The assumptions of the monitoring programme should be detailed at further stages related to the implementation of the project, and then submitted to the Regional Director for Environment Protection in Szczecin for approval before commencing works related to the implementation of the investment.

The analysis of the submitted environmental documents showed no indications of the necessity of the obligation to conduct a re-assessment of the project's impact on the environment within the procedure for issuing the permit referred to in Article 72(1)(1) of the EIA Act.

The basis for resolving the case was the assessment of all the evidence collected in the course of the proceedings, whereby the authority met the conditions of Article 75(1), 77(1) and 80 of the Code of Administrative Procedure.

This permit was issued pursuant to the provisions of the Act of 3 October 2008 on publishing information about the environment and its conservation, public participation in environmental protection and on environmental impact assessments (consolidated text: Journal of Laws of 2020, item 283 as amended), taking into account:

- results of the arrangements of the Director of the Regional Directorate for Environment Protection in Gorzów Wielkopolski and the opinions of health inspection authorities;
- findings of the environmental impact report;
- results of proceedings with the participation of the public, in accordance with the provisions of Art. 80 of the EIA Act;
- the results of proceedings in the context of transboundary impacts carried out in accordance with the Espoo Convention on Environmental Impact Assessment in a Transboundary Context of 25 February 1991. (Journal of Laws of 3 December 1991);
- the substantive and formal scope, which should be specified in the permit, in accordance with Art. 82 and 85 of the EIA Act.

In the course of the proceedings, by letter dated 24.06.2019, supplemented on 17.01.2020, the local authority was requested to make this permit immediately enforceable in accordance with Art. 108 of the Code of Administrative Procedure. According to the submitted letters, the request for immediate enforceability of the environmental permit is due to the need to obtain funds for the implementation of the flood protection investment. The Investor will carry out the task with the help of international financial institutions, including the International Bank for Reconstruction and Development (World Bank) and the Council of Europe Development Bank, as well as with the support of the Cohesion Fund under the Infrastructure and Environment Operational Program 2014-2020 and the state budget. The planned investment is included in the sector planning document, which sets out the framework for the implementation of tasks aimed at limiting the risk before flooding, i.e. the Flood Risk Management Plan for the Odra Basin (FRMP for the Odra Basin). In the FRMP activities within the scope of modernisation and reconstruction of the river control structures of the border Odra for the purpose of ice breaking are part of the package of flood control measures in the problem area (Hot spot) "Zatorowy". FRMPs was adopted on the basis of the Regulation of the Council of Ministers of 18 October 2016. (Journal of Laws of 2016, item 1938) on the adoption of the Flood Risk Management Plan for the Odra Basin Area. Losing the possibility to apply for funds will result in a failure to implement the investment, and thus no increase of the level of flood protection for the population living in selected areas of the Odra basin.

In view of the above, due to the fact that making the environmental permit immediately enforceable is necessary due to an important interest of the party, i.e. obtaining funds for the implementation of the investment aimed at the protection of human life and thus associated with important social interest, pursuant to Article 108(1) of the CAP, the permit was made immediately enforceable.

With the above in mind, I rule as stated.

The following annexes shall constitute an integral part of the permit:

Annex 1 - Characteristics of the entire project.

Annex 2 - Location of the project.

Annex 3 - Responses to comments and requests submitted during public consultations, including proceedings in the context of transboundary impact assessments carried out in accordance with the Espoo Convention on Environmental Impact Assessment in a Transboundary Context of 25 February 1991, hereinafter referred to as the Espoo Convention (Journal of Laws of 3 December 1991).

INSTRUCTION

Parties may appeal to the General Director for Environment Protection, through the Regional Director for Environment Protection in Szczecin, within 14 days of the date the decision was served. In accordance with Art. 127 of the Code of Administrative Procedure, during the time for submitting the appeal, a Party may waive the right to appeal against the public administration authority which issued the permit. This permit shall become final and binding on the date the public administration authority receives the statement of waiver of the right to appeal from the last of the Parties to the proceedings, which means that from that date the permit may not be complained against to the Provincial Administrative Court.

The applicant paid a stamp duty for the issuance of this permit in the amount of PLN 205 in accordance with the applicable Stamp Duty Act of 16 November 2006 (Journal of Laws of 2019, item 1000 as amended).



p.o. REGIONALNEGO D. IKTORA
OCHRONY ŚRODOWISKA
w Szczecinie
Aleksandra Siodulna

Recipients:

1. Ms Krystyna Araszekiewicz - against confirmation of receipt Sweco Consulting Sp. z o.o.
ul. I. Łyskowskiego 16, 71-641 Szczecin
Legal representative of the Director of Regional Water Management Authority in Szczecin
2. Other parties in accordance with Article 49 of the CAP.

Copy to:

1. General Director for Environment Protection
2. RDOŚ in Gorzów Wlkp
3. State District Sanitary Inspector in Gryfino
ul. Flisacza 6, 74-100 Gryfino
4. State District Sanitary Inspector in Gorzów Wlkp.
ul. Kosynierów Gdyńskich 27, 66-400 Gorzów Wlkp.
5. State District Sanitary Inspector in Słubice
69-100 Słubice, ul. Mickiewicza
6. State District Sanitary Inspector in Myślibórz

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ZIK I		
ZIK II		

Annex to the Environmental Permit no. 5/2020 of 18 March 2020 issued by
the Regional Director for Environment Protection in Szczecin,
ref. no.: WONS-OŚ.4233.1.2017.KK.68

Characteristics of the project **entitled “IB.2 Stage I and Stage II Modernisation works on the border Odra as part of the Odra-Vistula Flood Management Project”**, in accordance with Art. 84(2) of the Act of 3 October 2008 on publishing information about the environment and its conservation, public participation in environmental protection and on environmental impact assessments (Journal of Laws of 2020, item 283 as amended).

The planned project includes modernisation works on the border Odra, to be carried out as part of the Odra-Vistula Flood Management Project (OVFMP). The objective of the OVFMP is to increase flood protection for people living in selected areas of the Odra River and Upper Vistula River basins and to strengthen the institutional capacity of the government administration to mitigate the impact of summer, winter, and flash floods more effectively.

The works included in the project were divided into 2 stages:

- Stage I – Modernization works on Border Odra to enable winter icebreaking;
- STAGE II – Modernisation of River Control Infrastructure.

The planned project will be implemented in stages, i.e. stage I is currently planned for implementation, while stage II will be implemented at a later date, after the necessary project documentation is prepared.

As part of stage I, modernisation works are planned to be carried out, on a total length of approx. 24.4 km, on the following sections of the river Odra:

- 1) Section: 581.0 - 585.7 km - Słubice region
- 2) Section: 604.0 - 605.0 km - Górzycza - Reitwein region
- 3) Section: 613.5 - 614.7 km - Kostrzyn nad Odrą region
- 4) Section: 645.5 - 654.0 km - Gozdowice - Stara Rudnica region
- 5) Section: 654.0 - 663.0 km - Stara Rudnica - Osinów Dolny region.

As part of stage II, the planned works will be carried out on a section of approx. 30.0 km, on the following sections of the Odra:

- 1) Section: 600.4 - 604.0 km
- 2) Section: 605.0 - 613.5 km
- 3) Section: 614.7 - 617.6 km
- 4) Section: 668.0 - 683.0 km - Piasek region

In total, plans for Stages I and II include the regulation, reconstruction, and demolition of river control structures on a section of about 54.4 km of the Odra, which means a modernisation of about 58% (54.4 km out of 94.4 km) of the limiting places listed in the Polish-German agreement.

The project involving modernisation works on the abovementioned sections of the Odra will be implemented in 3 districts located in two voivodeships:

- 1) zachodniopomorskie:
 - in the Gryfino district, in the communes of: Cedynia - stage I and II, Chojna - stage II, Mieszkowice - stage I;
- 2) lubuskie:
 - in the Gorzów district: in the commune of Kostrzyn nad Odrą - stages I and II,
 - in the Słubice district, in the communes of: Górzycza - stage I and II and Słubice - stage I.

In Lubuskie voivodeship, the works will be carried out on sections of the Border Odra with a total length of about 21.9 km, while in Zachodniopomorskie Voivodeship - about 32.5 km.

Following works are planned as part of the modernisation:

- demolition and reconstruction of the existing groynes and the construction of new groynes;
- demolition and reconstruction of the existing longitudinal dams and the construction of new dams;
- demolition and reconstruction of the existing river walls and revetments and the construction of new ones.

According to the submitted documents, including the assumptions of the BAW concept, the aim of the investment is to achieve the target water depth, corresponding to the requirements due to icebreaking with the use of icebreakers, of 1.80 m with an average annual probability of exceeding at min. 80% of the year for the section above the mouth of the Warta to the Odra at dependable flow $Q_m = 160\text{m}^3/\text{s}$ and with an average annual probability of exceeding at the level of min. 90% of the year for the section below the Warta mouth at dependable flow $Q_m = 250\text{m}^3/\text{s}$.

The investment project planned for implementation will be located in the Odra riverbed, in the right-hand part of its valley. Due to the extensive scope of all modernisation works on the Odra at stage I and stage II, the project was divided into 4 sections in relation to which the investment was analysed in terms of its impact on individual elements of the environment, i.e.:

- Section I Słubice (581.0 - 585.7 km)
- Section II Kostrzyn nad Odrą (600.4 - 617.6 km)
- Section III Gozdowice - Osinów Dolny (645.0 - 663.0 km)
- Section IV Piasek (668.8 - 683.0 km).

The location of the river control structures planned to be executed or modernised as part of the investment, broken down into individual sections, is as follows.

Summary of the number of river control structures											
No.	km from	km to	length	Control structures							
				Groynes		Longitudinal dams (new structures)		Revetments (new structures)		River walls (new structures)	
				Reconst ruction	New	number (pcs)	length (m)	number (pcs)	length (m)	number (pcs)	length (m)
1.	581.0	585.7	4.7	49	0	1	100	1	125	0	0
2.	600.4	617.6	17.2	156	0	1	1550	0	0	0	0
3.	645.5	663.	17.5	112	22	1	275	3	270	1	500

		0									
4.	668.0	683.0	15.0	60	5	3	1550	8	1325	0	0
<i>Total:</i>				377	27	6	3475	12	1720	1	500

Groynes

Groynes will consist of a head part, stream part, bank part, and wings. Plans include the modernisation of the existing groynes by shortening or lengthening them, filling the gaps with riprap, and giving the groyne head a 1:10 inclination. The upstream and downstream slopes will be constructed on the basis of the existing inclination, however, the maximum planned inclinations will be: upstream and downstream: 1:2 and 1:3. New structures will be built in places where groynes necessary in order to achieve the river control objective are missing. Newly designed groynes will be subject to the same construction rules as the rebuilt groynes but will require more stone. Both the rebuilt and newly designed groynes will have the so-called “wings” constituting local bank strengthening at the base of the groyne. Plans include the construction of approx. 24% of groynes without wings, approx. 36% groynes with one wing and 40% groynes with two wings. The average length of the wing will be 11 m, but it will usually not exceed 35 m (it is expected that only 5.2% of wings will longer than 30 m).

It is expected that river control structures will be built successively, one after the other, beginning with the structure closest to the river spring and then moving along the flow (downstream).

Reconstruction of each groyne will include the following works:

1. Removal of vegetation along the entire length of the existing groyne and on the surfaces where the construction of reinforcements (wings) is planned.
2. Demolition of paving up to the depth of SNW (the material obtained during demolition can be used).
3. Laying geotextile with an overlap width of at least 1.0 m, with welding allowed - when dry laying - and then the overlap width is 0.15 m (when laying geotextile underwater, it will be necessary to stabilise it in order to prevent displacement due to water current or other factors. Nevertheless, the contractor decides on the method in which the geotextile is to be fixed to the underwater substrate in a way that ensures that its position remains unchanged, depending on: the width of the laid strips, current hydrological conditions, including the speed of water flow and local ground conditions.
4. Laying riprap (beginning by creating the revetment toe, and then laying the riprap from the bottom of the slope. The use of crushed stone from magmatic rocks (e.g. light granite) is planned, while riprap from other rocks will be allowed after prior consultation with the author's supervision.

The riprap on the body of the groyne will be supplemented with crushed stone of small granulation, in order for the riprap to set properly. According to the submitted documents, interference in the bank zone of the groyne will be limited as much as possible and adequately minimised.

Longitudinal dam

The longitudinal dam will be made of crushed stone laid on fascine mattresses. It is permissible to change the structure of the inside (core) of the dam by using Big-Bag sacks, and in the case of the dam in the Słubice area, using a sheet piling.

The basic technical parameters of the longitudinal dam are as follows:

- inclination to the river - 1:3.0
- inclination to the bank - 1:2.0
- crest width - 2.0 m

The top of the foot of the drained dam will be sunk at least 2.7 m below SWP2010 at the section above

the Warta mouth and 3.0 m below SWP2010 at the section below the Warta mouth.

Behind the designed longitudinal dam, demolition of the head part and the body of the groyne is planned at the length of min. 30 m, in order to ensure rear flow from the land-side edge of the crest of the designed dam. If possible, the material obtained in the course of removal works can be put to further use. Slopes of existing groynes will be profiled with an inclination of 1: 2.5. And the underwater slopes – with 1:5 inclination.

In order to ensure the exchange of water and access of fish to the basin between the bank and the longitudinal dam, 2 pipe culverts per groyne field are planned. The culverts will be made of 01000/12 mm steel pipes laid horizontally on a fascine mattress or on the SNW elevation (pipe axis). Horizontal inclination of the pipe to the minimum setback approx. 45° alternately, once upstream, once downstream. The pipes will be fitted with screens every 2.0 meters, made of sheet metal with holes with a diameter of min. 500 mm. In order to avoid washing out at the transition from the longitudinal dam to the section of the river regulated by groynes, two transition groynes will be constructed below the dam. The first groyne below the dam will have a 1:5 inclination. The head part of the next groyne will have a 1:7.5 inclination.

Construction of the longitudinal dam will proceed from the top of the river and will consist of sinking successive mattresses forming a continuous band, leaving the tip of the last mattresses floating. The floating end will be marked. When the mattress band reaches the planned length of the dam, the end will be sunk. The construction of the body of the longitudinal dam involves laying underwater and exposed riprap on sunk mattresses. The stone will be delivered by route barges.

River walls

The basic technical parameters of the river wall are as follows:

- inclination to the river - 1:3.0
- extending the crest of the river wall 9.5 m from the design minimum setback at the section above the Warta mouth and 10.5 m below the Warta mouth

The river wall will be made of crushed stone laid on fascine mattresses. The top of the foot of the wall slope will be sunk at least 2.7 m below SWP2010 at the section above the Warta mouth and 3.0 m below SWP2010 at the section below the Warta mouth.

The riprap on the crest and slope of the wall will be supplemented with crushed stone of small granulation, in order for the riprap to set properly.

In order to avoid washing out at the transition from the river wall to the section of the river regulated by groynes, two transition groynes will be constructed below the wall. The first groyne below the dam will have the inclination of 1:5, while the head part of the next groyne – 1:7.5. Same as for the longitudinal dams.

Construction of the river wall will proceed from the top of the river and will consist of sinking successive mattresses forming a continuous band, leaving the tip of the last mattresses floating. The floating end will be marked. When the mattress band reaches the planned length of the wall, the end will be sunk. The construction of the body of the river wall involves laying underwater and exposed riprap on sunk mattresses. The stone will be delivered by route barges.

The technology of works during the construction of the river wall includes the following elements: determination of revetments, clearing the ground of lichen, laying geotextile, laying riprap with a floating excavator.

Revetments

The revetment will be executed using the existing bank slope, on which geotextile will be laid. A slope of riprap will be formed on this substrate, terminated at the bottom with a 3 meters wide foot.

The basic technical parameters of the revetment are as follows:

- inclination to the river - max 1:3.0
- crest width - min. 2.0 m
- position of the revetment crest min. 1.0 m above SWP2010 level

As part of the abovementioned works, it may be necessary to reconstruct fragments of existing longitudinal dams, revetments, and river walls in places where new structures meet the existing ones.

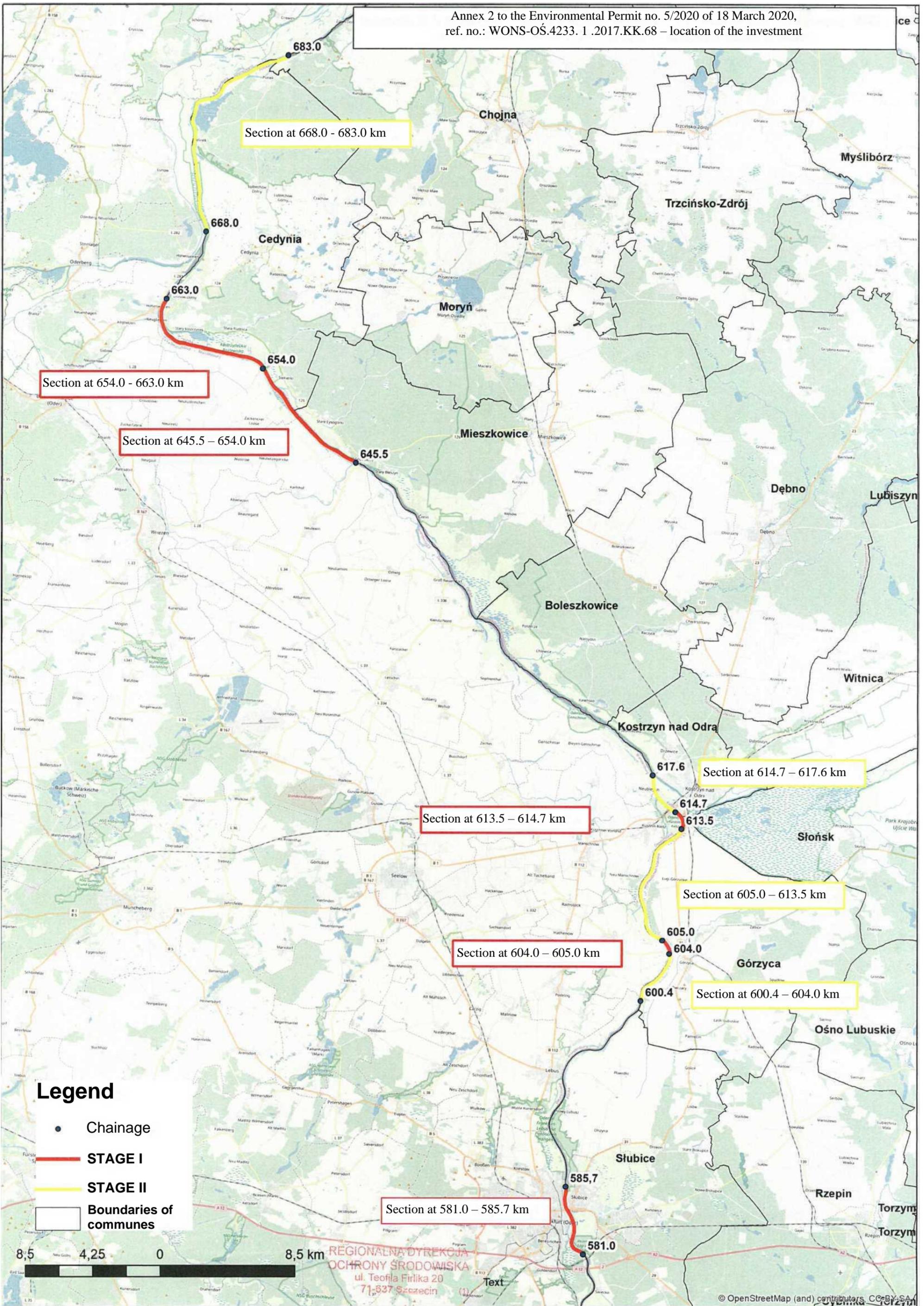
The technical concept resulting from the assumptions of the "Update of the Concept of the Border Odra Watercourse" provides for the execution of dredging works within 40 years after the execution of the investment in question. Nevertheless, it should be pointed out that these works are not covered by this proceeding and will constitute activities carried out as part of maintenance works on the river.

Modernisation works on the Odra in individual communes will be carried out under the following conditions.

1. In the Słubice commune (581.0 - 586.2 km section of the river), the planned works will include all elements of the project. Most of the works will be carried out in an undeveloped area. The groynes covered by the planned activities are located both in the undeveloped and built-up area, i.e. the town of Słubice. In the north-western part of the town, works will be carried out in order to build a longitudinal dam and revetment. The demolition of existing river control structures is also planned.
2. In the Górzycza commune (600.4 - 614.3 km section of the river), the planned works will include the construction of groynes and a longitudinal dam (located on the border between the communes of Górzycza and Kostrzyn nad Odrą). The works will be carried out almost entirely in an undeveloped area. Only the section where the longitudinal dam is planned (613.1 - 614.5 km) is located near partially built-up areas (petrol station, utility buildings, Philipp Bastion - located in the Kostrzyn nad Odrą commune).
3. In the Kostrzyn nad Odrą commune (614.3 - 618.1 km section of the river), the planned works will include the construction of groynes and a longitudinal dam. Most of the works will be carried out in an undeveloped area. The section on which the longitudinal dam and some of the groynes are planned (613.1 - 615.2 km of the river) is a partially developed area (Philipp Bastion, Brandenburg Bastion, Kónig Bastion, border road bridge and railway bridge).
4. In the Mieszkowice commune (645.5 - 650.7 km of the river) only works on existing groynes and fragments of river walls are planned for implementation. Works will be carried out in an undeveloped area.
5. In the Cedynia commune (650.7 - 663.5 and 668.0 - 682.2 km sections of the river), the planned works will include all elements of the project. Only in the proximity of Osinów Dolny, where new groynes are to be constructed (approximately 662.1 - 662.8 km of the river), will the works be carried out near a built-up area; the remaining works will take place in undeveloped areas.
6. In the Chojna commune (682.3 - 683.5 km of the river), the planned works concern only existing groynes and will be carried out in undeveloped areas.



URZĘD REGIONALNEGO DZIAŁALNOŚCI
 OCHRONY ŚRODOWISKA
 w Szczecinie
Aleksandra Stodulna



Annex 3 to the Environmental Permit no. 5/2020 of 18 March 2020, ref. no.: WONS-OŚ.4233.1.2017.KK.68 - **Responses to comments submitted in the public consultation conducted during the procedure**

National consultation

1. Period: 12.09.2018 - 11.10.2018 Announcement of 07.09.2018, ref. no.: WONS.4233.1.2017.KK.15

Comments and requests submitted by:

- Koalicja Ratujmy Rzeki [Coalition Save the Rivers] - e-mail dated 11.10.2018 with an attachment containing a study entitled “Comments and conclusions of Koalicja Ratujmy Rzeki [Coalition Save the Rivers] for the administrative procedure for issuing an environmental permit for the project entitled: “1B.2 Stage I and Stage II Modernisation works on the border Odra as part of the Odra-Vistula Flood Management Project” by the Odra team of Koalicja Ratujmy Rzeki [Coalition Save the Rivers], supplemented on 05.12.2018.
- Ecological Association EKO-UNIA - e-mail dated 11.10.2018 with attachments containing the following studies: “Assessment of the environmental impact report entitled: Modernisation works on the Border Odra (1B.2 Stage I and II) as part of the Odra-Vistula Flood Management Project, by Radosław Gawlik, President of the Ecological Association EKO-UNIA and “Initial assessment of the possible impact of the World Bank Project PI47460 “Odra-Vistula”, the Government “Strategy for the Development of Inland Waterways in Poland for 2016-2020 with a perspective to 2030” on protected natural areas”, developed by Klub Przyrodników [the Naturalists’ Club] in July 2016).
- the Naturalists’ Club - letter dated 29.09.2018.
- Association for the Development of Inland Navigation and Waterways “Rada Kapitanów Żeglugi Śródlądowej” [“Council of Inland Navigation Captains”] - e-mail dated 11.10.2018.
- Zachodniopomorskie Towarzystwo Przyrodnicze [Zachodniopomorskie Association of Naturalists] - letter dated 03.10.2018.
- Dr. Magdalena Abraham-Diefenbach - e-mail dated 10.10.2018

Addressing the allegation of *insufficient evidence of an “overriding reason relating to the public interest” in the implementation of the investment* raised by **the Association for the Development of Inland Navigation and Waterways “Rada Kapitanów Żeglugi Śródlądowej” [Council of Inland Navigation Captains], Koalicja Ratujmy Rzeki [Coalition Save the Rivers], the Stepnica Tourist Organisation Nie tylko dla Orłów, Ecological Association EKO-UNIA, and Dr. Magdalena Abraham-Diefenbach**, the following shall be stated.

Addressing the above, it should be pointed out that the protection of human health and safety is always an overriding reason relating to the public interest, provided that the absence of alternatives is demonstrated. Evidence of an overriding reason relating to the public interest shall be required where conditions arise under Article 6(4) of *Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora* or under Article 4(7) of *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy* – such conditions do not apply to the project in question. However, it should be indicated that the ice phenomena in the Odra pose the risk of ice jam-related floods of significant size, when the ice that accumulates in sections blocks the outflow of water, especially during spring water level rises. Effective prevention of such floods on the Odra requires ice breaking operations with the use of large size, powerful units. In order to ensure that such operations can be carried out, it is necessary to maintain

the appropriate navigability parameters of the Odra for icebreakers, which is the overarching objective of the investment. The investor indicated that he considered alternatives for conducting icebreaking, he also presented relevant expert opinions attached to the report on the environmental impact of the project: “Report summarising the conditions associated with conducting icebreaking on the border Odra” by dr hab. inż. T. Kolerski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, December 2018) and “Expert opinion on the use of AMPHIBEX type dredgers for icebreaking on the Odra” by dr hab. inż. T. Kolerski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, August 2018). These documents analysed the conditions of the occurrence of ice phenomena in the Odra, the conditions of conducting ice breaking, alternative methods of protection against jam-related floods and the possibility of using low-immersion Amphibex dredgers for conducting ice breaking operations in the Odra. The report on the environmental impact of the project submitted by the investor included the analysis of alternative variants both for the possibility of using other methods of counteracting ice jams, including icebreakers with smaller draught and alternative construction of control structures which are to be modernised, as well as for a different technology of works, i.e. conducting works from the land.

Addressing the allegation that there is *insufficient evidence that the project will have an impact on improving flood protection, since the real impact on improving the work of icebreakers is not known* raised by **Koalicja Ratujmy Rzeki [Coalition Save the Rivers]**, **Stepnica Tourism Organisation Nie Tylko Dla Orlów**, Ecological Association **EKO-UNIA**, **Dr. Magdalena Abraham-Diefenbach** the following shall be stated.

The justification of the investment in question in the context of improving the working conditions for icebreakers and improving protection against winter floods was demonstrated by the investor in the expert opinion on the environmental impact of the project attached to the updated report (submitted on 06.05.2019) entitled “Report summarising the conditions associated with conducting icebreaking on the border Odra” by dr hab. inż. T. Kolerski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, December 2018). The abovementioned study includes, among others, the conditions of conducting icebreaking in the conditions of the border Odra; a historical outline of ice phenomena in the Odra and technical aspects of ice jam removal (in accordance with the annual icebreaking reports), conditions for selecting icebreakers appropriate for ice conditions in the border Odra; experience in using icebreakers for icebreaking in the border Odra. Information from the last 10 winter seasons, included in the Icebreaking reports issued annually by RZGW Szczecin, was also used. According to the data in the icebreaking reports, in the last 10 years problems with insufficient depth of the Odra and Lake Dąbie, which hindered the work of the icebreakers, were noted during the winter seasons: 2008/2009, 2009/2010, 2011/2012, 2015/2016. In accordance with the assumptions of the “Concept of regulation of the Border Odra watercourse”, increase of the depth of the riverbed to 1.8 m is planned, as a result of long-term morphological changes caused by the adjustment of the parameters of the existing river control structures. Increasing the depth of the riverbed will mitigate the currently reported problems with insufficient depth, such as: difficulties in the movement of icebreakers during operations, icebreakers getting stuck in shoals, necessity to end icebreakers’ work/inability to conduct safe work of icebreakers, inability to reach the jam. These problems concern both the possibility of removing ice jams and the safety of icebreaker crews. In addition, it should be pointed out that the reason for the conclusion of *the Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015* is the need to provide flood protection, ensuring that the parties jointly conduct icebreaking operations. In addition, the agreement indicates that the current state of maintenance of the border Odra river control structures is insufficient, which has had negative effects on the flow profile of high waters in recent decades. Therefore, there is no reason to believe that the objective of the investment is not to *improve flood protection*.

Addressing the allegation that the implementation of the project will result in a large-scale breach of Article 4(7) of the EU Water Framework Directive and Article 6(4) of the EU Habitats Directive, i.e. loss

of the integrity of Natura 2000 protected sites raised by **Koalicja Ratujmy Rzeki [Coalition Save the Rivers]**, the **Stepnica Tourism Organization Nie Tylko Dla Orłów**, the **Ecological Association EKO-UNIA**, the following shall be stated.

During the investigation, the authority carefully analysed the impact of the investment on the subjects of protection in Natura 2000 sites and on the JCWP surface water bodies and the bodies of groundwater. A detailed analysis of probable changes in the characteristics of Natura 2000 sites: *Slubice Riparian Forests PLH080013*, *Central Odra Valley PLB080004*, *Warta River Mouth PLC080001*, *Lower Odra PLH320037*, *Lower Odra Valley PLB320003*, resulting, among others, from a possible decrease in the area of habitats, the occurrence of disturbances in the functioning of key species, interruption of continuity of ecological corridors, fragmentation and loss of habitats or species population, reduction of species density, changes in key indicators of conservation value, showed that, with the indicated conditions of project implementation applied, it will not adversely affect the abovementioned parameters. The analyses also showed no negative impact of the project on the possibility of achieving the environmental objectives set for JCWP within which the investment is located (the Odra from the Nysa Łużycka to the Warta, code PLRW60002117999, the Odra from the mouth of the Warta to the West Odra, code PLRW60002119199) in the Odra River Basin Management Plan. In the assessment of the authority, taking into account a number of actions limiting the negative environmental impact indicated in the decision, as well as the results of modelling carried out for the needs of the Concept of regulation of the Border Odra watercourse developed by BAW, the investment will not generate permanent changes affecting the condition of hydromorphological elements or the biological and hydromorphological continuity of the JCWP. The project poses no threat to the achievement of the environmental objectives of other nearby water bodies. Taking into account the results of the analysis of the impact of the investment on environmental elements affecting the condition of the JCW, it should be pointed out that maintaining the groynes in good condition, in addition to the tangible benefits associated with maintaining the navigability of the river and enabling effective icebreaking to prevent flooding, may also contribute in the longer term to the maintenance of the biodiversity of the regulated Odra. As part of the development of the project for the reconstruction of groynes for the purpose of the planned investment, the principle of not disturbing groyne fields was adopted, so that the processes of spontaneous renaturalisation that occurred in them would not be significantly reversed. In addition, it should be pointed out that the investor abandoned the intention to dredge the riverbed, which, in the original assumption, was one of the elements of the project that could at the same time have a significant impact on the objectives of the WFD. In addition, the proposed minimisation measures, which aim to maintain the necessary habitat conditions in the riverbed, including proper hydromorphological variation, will ensure a balance between the need to maintain the river control structures of the Odra and its function as a waterway (in particular for ice breaking and flood prevention), and the need to preserve and improve the diversity of river habitats. As a consequence, this will contribute to the achievement of social objectives pursued, while ensuring that the ecological capacity and the assessment of the biological elements of the quality of the Odra waters are not impaired and that habitats and species under legal protection are preserved, including within the framework of the Natura 2000 network. It should be noted that the valuable habitats of fish and other aquatic organisms currently found in the Odra riverbed are closely related to the existence of the system of groynes and groyne fields. When the planned investment commences, it will to some extent reverse the processes of spontaneous renaturalisation of the river that have been taking place for several decades and in the short term (10-20 years) will cause periodic deterioration of hydromorphological conditions and depletion of habitats. However, should the reconstruction works on the existing river control structures be abandoned, further progressive degradation of these structures within a few decades would lead to their disappearance and the transformation of the Odra riverbed into a fairly homogeneous channel with straight banks of little morphological diversity. This would result in significant long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity. Such an effect is clearly visible on sections of the Odra within which a degradation of groynes has already occurred, and on sections where there is no control with groynes, and the riverbed is straightened, with banks strengthened with riprap. The planned minimisation measures, introduced after taking into account the suggestions and comments submitted as part of public consultations, will allow to achieve the technical assumptions of the project while limiting the negative environmental impact to a moderate level, including the impact on species and habitats protected under national regulations and under the Natura 2000 network and also on biological elements of ecological capacity. Minimising activities include, among others, limiting to a

minimum interference in groyne fields, leaving uninterrupted the sand deposits and aquatic vegetation and rushes growing in the fields, replanting vegetation patches endangered by works (especially nymphaeids) and leaving the developed habitats of aquatic organisms and habitat forming elements (boulders, woody debris) in them. Appropriate periods excluded from certain types of work were also indicated, including those for the protection of fish during spawning, as were ways of reducing the negative impact of the work during the migration period of diadromous species. In addition, it should be emphasised that thanks to the applied technology of rebuilding the foot and the slope of groynes on the downstream side of the tops of reconstructed groynes, leaving the habitat elements uninterrupted and supplementing them (oversized boulders located in spaces behind longitudinal dams and in deeper groyne fields on the downstream side), the planned solutions protecting the environment related to the restoration of habitats in the form of riffles will ultimately contribute to maintaining the habitat potential of the Odra section covered by the works in a state not significantly different from the current one. The expected deterioration of habitats of aquatic organisms resulting from the works in the project will be reversible, and the indicated minimisation and compensation measures will reduce the regeneration time of habitats to 3-5 years. In addition, the implementation of modernisation works on the two banks of the Odra at different times will allow for partial regeneration of aquatic vegetation complexes and fish and aquatic invertebrate habitats and will allow them to be settled by organisms which use refugias on the side that is not currently a site of works.

Addressing the comment on the *need to carry out an assessment in the context of the cumulative impact of the other components of the Odra-Warta Flood Management Project*, submitted by **Koalicja Ratujmy Rzeki [Coalition Save the Rivers], Ecological Association EKO-UNIA**, the following shall be stated. The authority analysed the issue of cumulative impact in this proceeding to issue an environmental permit. The issue of cumulative impacts was considered in particular taking into account the tasks carried out on the German side resulting from the Polish-German agreement, as well as those planned under the Odra-Vistula Flood Management Project. Taking into account the nature of the individual works and their scope, as well as the minimisation measures introduced as part of the investment, no significant cumulation of the impact of the project subject to this proceeding with other activities carried out on the Odra is expected. Moreover, the results of BAW modelling presented in this proceeding do not predict negative impacts during the functioning of the abovementioned projects.

Addressing the comment on *the negative impact of the investment in the context of the long-term impact on elements of the natural environment dependent on waters, including subjects of protection in a Natura 2000 site (including, among others, natural habitats 91E0, 3270, bird species- the lari and the charadrii)*, submitted by **the Naturalists' Club, Zachodniopomorskie Association of Naturalists, Koalicja Ratujmy Rzeki [Coalition Save the Rivers], Stepnica Tourist Organisation Nie Tylko Dla Orlów, Ecological Association EKO-UNIA**, the following is stated.

The main factors that may affect habitats and plant and animal species associated with valley habitats, which may occur as a result of river regulation, are the change in hydrological conditions, and consequently hydromorphological conditions causing the transformation of riverbank habitats and valley habitats, and the reduction of their range as the natural processes conditioning their duration cease. The main potential threats include: lowering of the bottom in the longitudinal profile, intensifying the drainage of floodplains and decrease of the groundwater table, drying of the valley habitats dependent on water (oxbow, floodplains, swamps). In the case of the project in question, we are dealing with the modernisation of the existing hydrotechnical structures on a river heavily transformed by humans, where, in addition to the natural processes of sediment transport and riverbed formation, phenomena resulting from the functioning of the hydrotechnical structures. The biggest changes in the hydrological conditions of the Odra occurred after the 19th century regulation operations. Significant changes to the longitudinal profile of the river were made. Since then, the results of measurements of the bottom elevations indicate that the longitudinal profile has stabilised. As a result of hydrotechnical structures being made, and with the current intensity of sediment transport, the Odra has reached a state of bottom equilibrium, which is confirmed by the cumulative results of bottom deformation based on observations made since the 1960s by the Federal Hydrological Institute. According to their assessment, the Odra reached a stable bottom

level in the years 1998-2008. The planned modernisation of river control structures will not cause bottom deformations as deep as those from the 19th century. According to the available literature, in spite of the lower Odra riverbed narrowing due to the conducted regulatory works, no significant processes of bottom lowering occurred, and neither did strong sedimentation on the floodplain. In view of these results, it can be assumed that a slight narrowing of the regulatory route of the lower Odra will not lead to significant deformations in the river valley, and the regulatory works will only level the bottom. On the basis of hydrodynamic calculations and sediment transport processes (using MBH Software 2015) carried out for the purposes of the development of the *Update of the concept of the border Odra watercourse*, it is predicted that the reconstruction of the Odra river control structures on the surveyed section will not cause significant changes in the position of the water table, the size and dynamics of the flow and the transport of sediment. The project will not change the flow conditions during high waters, because the river control structures are constructed in order to regulate the hydraulic conditions of medium and low flows. The results of hydrodynamic modelling indicate that in low waters, the water table will rise by 0-25 cm, with an average of 15-20 cm on most sections, and a maximum of 25 cm on the section located at approx. 585.0 km. Although in the area of approximately 685.0-690.0 km, located outside the project area, according to the modelling results there may be a slight lowering of the level of the water table at low waters, the value of this reduction will be 1-2 cm, which is negligible. The scale of this lowering can be considered negligible, due to the fact that the value of the lowering of the water table is lower than the daily fluctuations of water levels occurring naturally in the Odra. The groundwater level in the zone adjacent to the Odra will be affected more by regional hydrogeological conditions and the amount of recharge by precipitation under changed climate conditions than by changes in the water level in the Odra caused by regulation. The regulation of the river will not affect the hydrological system of the Odra, which depends on the conditions of supply and drainage from the catchment area. River control structures (including those undergoing modernisation) do not alter hydrological conditions on the scale of the basin. Climate changes, which may manifest itself in prolonged droughts, will be a bigger problem on a regional scale. In the context of the natural habitats most affected by the investment, including, among others, 3270, 3150 91E0, 91F0, 6440, 6510, the following facts should be indicated. In the Odra, silts are formed to a large extent in substitute habitats - in groyne fields, less frequently on groynes, possibly changed - on the banks of the riverbed, also in spaces between beds. It is to be expected that rebuilding and adding structures, i.e. groynes, will result (on a smaller scale) in a process similar to that which occurred after the regulation of the Odra in the 19th and 20th centuries, when intensive accumulation of bed load occurred in groyne fields, which gradually decreased in subsequent decades. This is related to the effects of riverbed deepening and accumulation of load in groyne fields. The project will therefore increase the frequency of occurrence of conditions appropriate for the formation of the habitat (new groyne fields will be created, with conditions for formation of bars) and the amount of bed load in the river will increase, and so will the amount of deposit forms created in groyne fields. Maintaining summer water level declines in the river is critical to maintaining the river valley habitat. In the conditions of the central Odra valley, this is defined as an acceptance that for at least 30 days during the summer period levels will be below 150 cm on the water gauge in Nowa Sól. The planned reconstruction of the river control structures will not affect the change in the size of river flows and thus will not affect the critical factor for the occurrence of the habitat. The assumed small changes in the water level in the river (on different sections) are not important for the formation of this habitat, as it depends on the occurrence of a decrease in the water level in the summer period (relative to the year) and the exposure of fragments of the riverbed flooded for the rest of the year. Changes to the annual water levels in a given section of the river will result in shifting of potential patches of habitat higher or lower on the cross-section of the riverbed. At the same time, it should be emphasised that regulating riverbanks with groynes promotes the repeatability of the conditions in which the natural habitat occurs and, in a sense, the lack of natural, large-scale bars and deposits is compensated by an ecological system repeating regularly every 100-200 m, shaping silt habitats in groyne fields and to a lesser extent on the groynes themselves. In relation to habitat 3270 resources from 2018, a direct project-related conflict would affect theoretically 15% of those resources (if they developed in the same locations during construction, which is unlikely given the differences in the status of the habitat

recorded in different years). This value includes the replacement habitat of the silt associated with the groynes (for reconstruction) and the silt that forms along the banks of the riverbed. Silts forming on groynes are in poor condition, have little floral diversity, and small surface. As for patches of habitats formed on the banks of the riverbed - out of more than 20 conflicting sites - 4 are patches stretching along the banks, conflicting only slightly with the designed structures. The others have small areas (below 25 m² each). In addition to the enormous natural fluctuations in resources and the state of the 3270 habitat, it is important to emphasise the short-term direct impacts associated with the construction of structures. In the longer term, it is to be expected that the rebuilt groynes will again become a substitute habitat for indicator vegetation for silts. This will be facilitated by the adopted design assumptions, as well as the introduction of a number of actions accelerating the regeneration of this habitat, e.g. as conducting works outside the formation period, limiting the spread of invasive species, strengthening the population of the strapwort. In relation to riparian habitats 91E0 and 91F0, it should be pointed out that riparian forests located on the section of the Odra covered by the planned investment lie on a low floodplain and are not cut off from the river by embankments. The valorisation of the most valuable riparian complexes (oak-elm-ash "Słubice Riparian Forests" and willow riparian forests near Stara Rudnica, Raduń, and Piasek) presented in the report showed that their conservation status is good. Riverbank riparian forests are therefore performing well in the conditions of the river valley, which has been transformed as a result of regulatory works. The most important factor determining the good conservation status of riparian forests in the conditions of the valley of a large river (such as the border Odra) is periodic flooding of the riparian forest habitats by high river waters. This flooding is completely sufficient to prevent the process of riparian forests turning into broadleaved forests (broadleaved forest vegetation does not tolerate flooding) and to sustain the fluvisol-forming process, which will not be affected by the modernised structures. According to the conducted analyses, initially a slight increase in the water level can be expected (due to the refocusing of the current by rebuilt groynes), which will, in time, return to the state from before the modernisation works. There is therefore no reason to fear that the riparian forest habitat will be deprived of periodic flooding by high waters, which is a necessary (cardinal) factor for its preservation with a good conservation status in the long term. Climate forecasts suggest that there is no risk of the disappearance of suitably high rises on the Odra and other large rivers in Poland. More frequent summer droughts, which are predicted by current climatological models, can reduce the humidity of the riparian habitat in the period from late spring to early autumn. However, the high rises of the river will not disappear, which will effectively prevent the degradation of these habitats. In view of the above, there is no reason to fear that the implementation of the planned project will cause damage to the habitat of riverside riparian forests due to any changed to the hydrological regime of the river necessary for their functioning. A key process for the functioning of oxbows (3150) is the periodic supply of fresh, oxygenated river waters. This occurs during water rises, when the water in the reservoir is replaced, and in some cases even when sediment is washed and washed out, which is understood as a "rejuvenation" of the reservoir. It is therefore extremely important to maintain the hydrological regime of the river with consecutive rises and lows, which will result in regular refreshment of the water in isolated water reservoirs located on the floodplain of the river. The restoration of groyne structures will result in the loss of habitats in the form of side arms and slow-flowing or stagnant fragments of groyne fields (currently created by degraded and broken groynes). Nevertheless, it should be pointed out that in order to minimise the effects of bank unification, on the sections covered by the renovation works of the regulatory structures, the creation of oxbow-like habitats is planned - in the space behind the planned longitudinal dams with a total length of 1650 m. Plans include also creating additional habitats in the form of bays cutting into the bank, with an area of 220 to 1320 m², in total approx. 5300 m². Therefore, in return, habitats will be created, which will constitute an additional area to be inhabited by aquatic plants and rushes (including those introduced as part of the replanting of endangered patches of plants). Settlement of mussels (Unionidae) harvested prior to the commencement of the works in spaces behind the dams and in bays is also predicted (organisms transferred from other parts of the river, after the completion of all works in a given created habitat). These actions will promote the conservation of protected species of this group (swan mussel *Cygne Anodont* and depressed river mussel *Pseudanodonta complanata*). In addition, the created habitats, after a 2-3-year stabilisation period,

will provide suitable habitats for the existence and reproduction of protected fish species: spined loach, amur bitterling, and weatherfish. With regard to the impact on birds, including the potential loss of the bird feed base, which is the subject of protection in the abovementioned Natura 2000 sites, it should be emphasised that the expected deterioration of fish and invertebrate habitats as a result of the planned works will be reversible, and the planned minimising actions to increase the diversification of habitats in the coastal zone will reduce the regeneration time of habitats to 3-5 years. The anticipated loss of fish habitats will not result in a significant reduction in their overall numbers, as the most abundant species in the Odra are eurytopic species, which have high habitat plasticity. Temporary changes will affect the proportion of species and not the overall size of the community and will not significantly affect the availability of food for birds feeding on fish and aquatic invertebrates. During the operation phase, the riverbed will gradually deepen, but it is forecast that this should not drain water from around the riverbed. As a result, natural fluctuations in the water level in the vicinity of the river (e.g. Kostrzyneckie Swamp) will be preserved and the habitats associated with it will not be endangered. Shallows between the groynes, which are the habitat of invertebrates and fish associated with standing or free-flowing waters, will be left undisturbed. In the immediate vicinity of reconstructed groynes, such habitats will gradually recover, and this process will be accelerated thanks to the minimising actions (replanting plants, transferring mussels of the family Unionidae). After the planned modernisation, the sandy banks of the river and the riverbanks will be destroyed, which will periodically decrease the area of potential breeding grounds and feeding grounds for plovers and terns. However, this should not have a negative impact on the conservation status of these groups of birds. The sandy banks of the river are mainly used during the migration season. Taking into account the nature of the works, i.e. their slow movement over time, it should be concluded that the implementation of the investment will not cause a material impact on bird populations. Banks of a regulated river, like the Odra, are not an attractive breeding ground for these birds – they prefer the nearby gravel pits. It should be pointed out that due to the pressure of predators and flooding by high waters, the habitat on sandy bars has lost its usefulness for the breeding key species of birds of the lower Odra. The inventory carried out for the purposes of the report showed the disappearance of tern breeding sites in the Odra riverbed and of the stability of breeding colonies of these and other species of the lari in the local reservoirs of gravel pits. Nevertheless, it cannot be ruled out that this site may be a potential habitat for the lari. In order to prevent the loss of habitats of the abovementioned species and to maintain breeding success at a level similar to the current one, as part of the planned project, until the spaces between the groyne fields regenerate naturally and favourable conditions for the lari and the charadrii, the investor will construct at least two low floating islands with a total area of about 250 square meters outside the Odra riverbed in the vicinity of Chlewice (plot no. 272 precinct of Chlewice, Boleszkowice commune), which would act as a “nursery”, i.e. a place that the fledglings could swim to and dry safely and, due to their proximity to the breeding island, be fed by their parents. Distance from land would ensure safety. In case of danger from neovisons or dogs, the fledglings would fly away, once dry, or swim away. Additional platforms will be located next to breeding platforms already in operation. Low floating islands without a “sill” protruding above the water will be made of cellular concrete, which has positive buoyancy and quickly becomes invisible, overgrown with vegetation. The surface of the platform will be covered with a few centimetres' layer of soil and a special biotextile for the development of plants, in order to quickly fit into the landscape and be adapted by the ornithofauna. Bearing in mind the above, it is concluded that the implementation of the project will not result in the loss of habitats of the aforementioned species of birds and will not cause their habitats to deteriorate. In addition, due to the adopted design assumptions and the manner of implementation of the investment, with the planned minimising actions applied, the implementation of the investment will not negatively affect the wintering birds that are the objects of protection of the Natura 2000 site Lower Odra Valley, such as: mallard, white-fronted goose and taiga bean goose, tufted duck, common pochard, or whooper swan. In conclusion, in the light of the results of hydrodynamic modelling, there will be no deterioration in the conditions thanks to which the abovementioned valuable natural habitats in conflict with the planned project, as well as other natural habitats dependent on waters (i.e. 6440, 6510) providing habitats for numerous species of waterfowl and meadow birds, are maintained in the Odra valley. The level of the stabilised water table at

medium flows will increase on average by several centimetres. This effect will be felt most strongly at medium level, less at low levels, and will be almost unnoticeable at high levels. Thus, groundwater levels are not expected to decrease, but to increase slightly in the bank zone. During lows, the areas adjacent to the river will be subject to slightly less drought than under the current state of river control structures, which should be considered as a positive effect for the preservation of river habitats. At the same time, the authority emphasises that in order to confirm the assumptions adopted in the report, following the completion of the first stage of the project the investor is required to monitor the effectiveness of the implemented activities and the effects of the investment on the hydromorphological elements of the river, monitoring the level of groundwaters. In the event of adverse changes in the environment, actions will be taken to limit such impact, including the change in the scope of works provided for in the second stage.

Addressing the allegation that *other alternatives to the project in order to prevent ice jams in the Odra and at the same time not jeopardising the protection of individual elements of the environment have not been adequately analysed* raised by **Koalicja Ratujmy Rzeki [Coalition Save the Rivers], the Stepnica Tourism Organisation Nie Tylko Dla Orlów, Ecological Association EKO-UNIA, the Association for the Development of Inland Navigation and Waterways “Rada Kapitanów Żeglugi Śródlądowej” [“Council of Inland Navigation Captains”]**, the following is stated.

Addressing the above allegation, the authority indicates that, taking into account an objective of the investment, i.e. ensuring the minimum depth of 1.8 m necessary for the operation of icebreakers, with the least impact on water relations and the environment, variants were prepared in the scope of: parameters of reconstruction and modernisation of river control structures, methods of conducting icebreaking, construction of river control structures and construction technology. For this purpose, appropriate expert opinions, annexed to the updated report on the environmental impact of the project (submitted on 06.05.2019.), were submitted by the investor: “Report summarising the conditions associated with conducting icebreaking on the border Odra” and “Expert opinion on the use of AMPHIBEX type dredgers for icebreaking on the Odra”. These documents analysed the conditions of the occurrence of ice phenomena in the Odra, the conditions of conducting ice breaking, alternative methods of protection against jam-related floods and the possibility of using low-immersion Amphibex dredgers for conducting ice breaking operations in the Odra. The report on the environmental impact of the project submitted by the investor included the analysis of alternative variants both for the possibility of using other methods of counteracting ice jams, including icebreakers with smaller draught and alternative construction of control structures which are to be modernised, as well as for a different technology of works, i.e. conducting works from the land. It was found that the only possible solution among the analysed methods of counteracting ice jams for the Odra is icebreaking with the use of specially adapted vessels (icebreakers), whose engine power parameters, hull dimensions (draught, width, hull inclination angles to the water line) are adjusted to the ice conditions of the Odra. Other methods of elimination of ice jams, e.g. using the Amphibex device, were considered ineffective or impossible to apply due to the nature of the river. The application of passive methods in the form of ice barriers has been considered only as an auxiliary measure that does not eliminate the risk of jam-related floods. The use of icebreakers with less draught, which are effectively used in Europe on the Elbe and the Danube, was also considered. Nevertheless, due to the different ice conditions in the border and central Odra and the icebreaking operations, this variant was rejected. This is due to the fact that, under the current bathymetric conditions in the border and central Odra, ice in the form of free-flowing ice floe can stop and form a large jam of considerable thickness (up to 80 cm thick) in a very short time (12 to 18 hours). As a result, icebreakers must have parameters adapted to the ice conditions in the border and central Odra, and small-scale vessels (e.g. the Delfin icebreaker, with a draught of 1 m) cannot cope with such a situation. It should be pointed out that the investor analysed the conditions of the occurrence of ice phenomena in the Odra, the conditions for conducting icebreaking, and the technical parameters of icebreakers and provided a summary of the results of these analyses in the documentation. The investor indicated the sections of the Odra where the smallest transit depths at medium flow occur (e.g. 0.95 m locally on the section from the mouth of the Nysa Łużycka to the mouth of the Warta, or 0.8-1.2 m on the section near Hohensaaten). Meanwhile, in the border Odra, the

icebreakers currently used to carry out icebreaking operations and remove ice jams have parameters adapted to the ice conditions there. *The instructions for icebreaking on the border and the lower section of the Odra* in force during the Polish-German icebreaking operation assume that at least 10 Odra icebreakers with a capacity of 400-1000 hp are used. Maximum draught of high-power front icebreakers (Polish units: Dzik, Odyniec, Stanisław and German units: Frankfurt, Kietz, Schwedt) is up to 2.0 m. Smaller linear icebreakers operating on the border Odra have draughts from 1.44 m (the lowest average minimum draught) to 1.86 m (the maximum draught). As explained by the investor, the practice of using icebreakers has shown in previous years that linear icebreakers with a smaller draught do not have sufficient capacity to effectively remove ice jams in the Odra. Icebreakers with a draught of up to 1 m were used in the past on the Odra (e.g. the LR-400 Dolphin), however, due to the lack of sufficient power to work in difficult ice conditions they were directed to other tasks. Currently, such units have only auxiliary functions and are not used for frontal or linear operation for eliminating ice jams. German vessels with small draught were moved to the Elbe, which freezes occasionally, for the same reasons.

Addressing the comment that *the implementation of the project may increase the risk of flooding in the areas adjacent to the Odra, including in the northern part, Oderbruch* raised by **Koalicja Raturmy Rzeki [Coalition Save the Rivers]**, the following is stated.

Documentation submitted by the investor shows that the project will not increase the risk of flooding in residential areas in the Odra valley. One of the key assumptions of the Update of the concept of regulation of the Border Odra Watercourse, which is the basis of the project, was to find such an option that would allow the least possible interference with the current water levels and would not increase the flood risk in the adjacent areas with the assumption of a spontaneous, slow lowering of the bottom. During the development of this concept, numerous variants for the modernisation of the river control structures were analysed. For most of the variants, the expected elevation of the water table at high levels was unacceptably high and these variants were therefore discarded. The KRC-W5 variant was selected for implementation. It involved a slight elevation of the water table at its high levels - the expected maximum elevation of the water table is about 12 cm in the vicinity of 660 km of the Odra. The investor carried out an additional analysis of the cross-section located on the section of the river in question, in which he took into account the elevation of the crest of the flood embankment located on the German side, which is +9.00 m a.s.l. Kr and water levels from the nearest water gauge (Hohenwutzen water gauge). The highest water levels in the indicated location were recorded in the years: 1997 and 2010 during extreme floods on the Odra - these levels can be considered representative; they were: +7.13 m above the sea level Kr (1997) and +6.81 m a.s.l. Kr (2010). This indicates a considerable reserve of embankment height as regards any possible risk of water overflowing through the embankment crest at extremely high levels. This reserve is about 3 meters, so it is much larger than the projected 0.12 m rise of the water table as a result of the project. This shows that there is no flood risk associated with the implementation of the investment.

The explanations provided by the investor show that the parameters of the river control structures to be modernised ensure neutrality in relation to the flow of high waters, while being designed for medium waters. Thus, the change in the cross-sectional area of the riverbed in connection with the project in question will be negligible in relation to the surface of the riverbed for high water, therefore, the average increase of the water table by less than 5 cm during extreme flood phenomena after the execution of the works in relation to the state prior to the implementation of the investment is expected. In addition, the project includes plans to remove vegetation from the existing groynes, which will improve the conditions of flood water flow.

In a regulated river, the main problem is the migration of point bars, which causes the current to shift and causes the formation of milling. The higher tangent stress resulting from the modernisation of the river control structures and the transition in the transport of sediment from load to suspension transport will have a beneficial effect on the levelling of the bottom in the control route. Groynes maintained in good condition and modernised with the assumption of equalising the velocity distribution in the riverbed are

important for maintaining transit depth in the riverbed (which is important for the operation of icebreakers), but also do not allow for large current deviations from the regulatory route, which threatens to erode the banks and form a secondary riverbed with water flowing at the base of embankments. This phenomenon seriously threatens the stability of embankments, because during floods a high-speed stream of water flows beneath their base, directed diagonally to the bank. Thus, it can be concluded that the project will not adversely affect the functioning of existing flood protection structures.

Addressing questioning of the results of the wildlife inventory conducted for the purposes of the project environmental impact report, which do not show protected plant and animal species within the range of the investment, including the fringed water lily or the lani and charadrii species by the Zachodniopomorskie Association of Naturalists and the Naturalists' Club, the following is stated.

With regard to the indicated natural components, to supplement data following the comments raised during public consultations, comprehensive nature research was carried out, taking into account the presence of plant and animal species and habitats from Annexes I and II to the Habitats Directive, as well as bird species from Annex I to the Birds Directive and their habitats, as well as other species of plants, animals, lichen, and fungi subject to protection. The inventory included the riverbed with adjacent areas, within the width of approx. 200-300 m on both sides of the embankments, at the sites of the planned works and their surroundings. In addition, an analysis of source materials of the area covered by the investment was carried out in order to determine the current state of knowledge about the natural resources of the research area, also using published information, including the research of the Chief Inspectorate of Environment Protection conducted within the framework of the State Environmental Monitoring Programme.

It should be pointed out that the investor, due to the possibility that there may be more sites of protected species within the reach of the impact of the investment, including the fringed water lily, conducted additional surveys in this area in 2018. The results of these surveys confirmed the occurrence of the fringed water lily in more sites. Therefore, it was possible to supplement the assessment of the impact of the investment on this species and to plan actions to minimise this impact, including: reintroduction of plants obtained from endangered sites into groyne fields which will not be affected by the works and into oxbows, and monitoring the reproduction of replanted patches 1 and 3 years following the completion of the investment; carrying out investment works on groynes adjacent to fringed water lily sites after the growing season, in October and November, which was taken into account in the decision of this permit. It should be noted that for the purposes of the report, a thorough wildlife inventory was carried out with regard to birds. On each section of the planned investment, bird counts were carried out during the day, the selected time of day was the time of the highest activity of birds, and in the case of species active at night, additional counts were carried out at night. The method of conducting field surveys was adapted to the conditions, i.e. the use of boats in the bank zone inventory was abandoned, as it was largely impossible at the controlled sections in the 200m zone to penetrate the bank and rushes were not large enough to hinder the inventory from the banks. Particular attention during inventory works was devoted to species that are objects of protection in Natura 2000 sites located on the site of the planned project. Observations of larger flocks of other bird species were also reported. As in other periods of the year, particular attention was paid to the species protected in Natura 2000 sites located on the site of the planned project. The counting methods were adapted to different groups of species in accordance with the adopted methodological recommendations. Early spring counts, carried out in March-April, focused on searching for potentially breeding pairs of cranes, birds of prey, woodpeckers, and the raven. Owls, rails, and Eurasian bitterns were counted during night checks. In May, the focus was on species from the 1st Annex to the Birds Directive: the charadrii and waterfowl. The corncrakes, little bitterns, and little crakes were counted during the night checks. The June and July inspections were intended to supplement knowledge on the distribution and abundance of breeding species of birds in open areas, as well as swallows and other species nesting on the structures of bridges. Autumn inventory works - lasting from September to November, consisted in counting birds appearing on the Odra during the autumn migration. They were carried out at predetermined fixed points located in the vicinity of Zatoń Dolna, Osinów Dolny, Gozdowice, Kostrzyn, Górzycza, and Słubice. During the inspection, the number of specimens passing

through, the number of herds members, and the height and direction of their passage were recorded. Counts were performed in two one-hour sessions scheduled at different times of the day. In addition, during each inspection, the birds present at the Bielinek Mine, at the Odra oxbow near Piasek and at the Kostrzyneckie Swamp were counted. In the winter months - in December, January, and February - bird counts were carried out on transects covering the Odra and the adjacent 200-metre strip of the right-hand side inter-embankment (the adopted buffer for the investment impact), located within the area of the planned project. At that time, both resting birds and birds flying over the survey area were recorded. Counting was based on the "spotting" method, in which ornithologists were assisted by optical equipment: binoculars and telescopes. In addition, in places of exceptional value for the avifauna (e.g. floodplains in the Odra inter-embankment, flooded excavations of former gravel mines), the observed species were also recorded at a distance greater than the 200-metre buffer. Since in the vast majority of cases determining the exact location of the birds' nests was not possible, birds species that were observed (or heard) more than once in the breeding season on the site were considered breeding, as was the case where territorial voices of males were heard. The works were carried out from the land side from places that enabled the most accurate observation and listening.

In order to counteract the temporary limitation of the availability of potential breeding habitats for protected species of birds, the investor, after additional analysis of the results of the inventory, specified some of the conditions (among others in terms of minimising the impact of the investment on the sand martin, the kingfisher, or the eagle owl) and proposed additional minimising measures, including the implementation of low floating islands for the lari and the charadrii, with a total area of about 250 square meters outside the Odra riverbed in the vicinity of Chlewice (plot no. 272 in the Chlewice precinct, Boleszkowice commune), which would act as a "nursery", i.e. a place that the fledglings could swim to and dry safely and, due to their proximity to the breeding island, be fed by their parents. Distance from land would also ensure that the birds are safe. In addition, in the light of the comments on the general wording of the minimisation conditions for other protected species, the investor specified them and subsequently presented them in the submitted supplements to the report. It should be pointed out that the above actions are included in the decision in this permit.

Addressing the comment made by **the Naturalists' Club** regarding the increase in the expansion of neophytes in connection with the implementation of the project, it should be pointed out that during the implementation of the investment, the investor is obliged to limit the spread of invasive species of flora (especially the *Echinocystis lobata* and the riverside cocklebur) by means of constant control of the investment works by a botanist specialist and removing invasive plants growing on the banks covered by the direct impact of the investment (groynes and adjacent groyne fields) according to the assumptions indicated in the decision in this permit. In addition, in order to assess the effectiveness of the abovementioned activities, the investor was obliged to conduct post-investment monitoring of the spread of invasive alien species. Where significant negative impacts on a given environmental resource or other significant environmental risks are identified in the periodic or final report (one of the elements of monitoring), preventive or minimising actions and the proposed method of implementation and control of the results will be proposed in the monitoring report.

Addressing the request of **the Tourist Organisation Nie Tylko Dla Orłów, the Ecological Association EKO-UNIA and the Zachodniopomorskie Association of Naturalists** to take into account the following expert opinions in the proceedings: - Grygoruk, IVI., Osuch, P. St Trandziuk, P. (2018): „Identyfikacja kluczowych stref dla retencjonowania wody w polskiej części zlewni Odry. Analiza potencjalnej retencji wodnej systemów melioracyjnych i jej możliwego oddziaływania na redukcję niskich przepływów zimowych. " (*Delineation of key zones for water retention enhancement in the Polish part of the Oder catchment. Analysis of potential water retention in land reclamation Systems and its possible role in mitigating winter low flows of Oder, Gutachten*), and Gerstgraser, Ch., Schnauder. St Domagalski, 8. (2018): „Skuteczność planowanego polderu zalewowego Międzyodrze i koncepcji regulacji cieków na poprawę ochrony przeciwpowodziowej na dolnej Odrze ["*Effectiveness of the planned Międzyodrze detention basin and the concept of watercourse regulation to improve flood protection in the lower*

Odra”] (*Wirksamkeit des Między odrze-Polders und der Stromregelungskonzeption für die Untere Oder. Gutachten*), it should be indicated that in the present proceedings for issuing an environmental permit, the authority took the abovementioned documents into account. In addition, in view of a need for clarification on some of the issues related to the implementation of the project, including in the context of increasing the risk of flooding for Polish and German citizens of the Odra Valley, the authority called on the investor to clarify them. Therefore, in order to justify the necessity of the implementation of the project, the investor submitted appropriate expert opinions attached to the updated report on the environmental impact of the project submitted on 06.05.2019, such as: “Report summarising the conditions associated with conducting icebreaking on the border Odra” by dr hab. inż. T. Kolerski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, December 2018) and “Expert opinion on the use of AMPHIBEX type dredgers for icebreaking on the Odra” by dr hab. inż. T. Kolerski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, August 2018), which the authority used to give an opinion on the subject matter.

**2. Period: 25.07.2019 - 23.08.2019 Announcement of 23.07.2019, ref. no.:
WONS.4233.1.2017.KK.54**

Comments and requests submitted by:

- Zachodniopomorskie Towarzystwo Przyrodnicze [Zachodniopomorskie Association of Naturalists], dated 22.08.2019 (e-mail dated 22.08.2019).
- Stepnica Tourist Organization Nie Tylko Dla Orłów [Not Only For Eagles], dated 23.08.2019, submitted by Mr. Arthur Furdyna by e-mail.
- Mr. Piotr Matyjasiak, dated 21.08.2019 (e-mail dated 22.08.2019).
- Mr. Paweł Mikołowicz, dated 20.08.2019 (e-mail dated 20.08.2019).
- Mr. Paweł Mikołowicz Aurico, dated 20.08.2019 (e-mail dated 20.08.2019).
- Ms. Diana Trzcńska, dated 20.08.2019 (e-mail dated 20.08.2019).
- Ms. Urszula Sadowska, dated 22.08.2019 (e-mail dated 22.08.2019).
- Mr. Tomasz Okruszko (e-mail dated 22.08.2019).
- Ms. Joanna Tomaszewicz, dated 20.08.2019 (e-mail dated 20.08.2019).
- Mr. Krzysztof Szoszkiewicz, dated 20.08.2019 (e-mail dated 20.08.2019).

It should be pointed out that in connection with the materials subject to public consultation, comments on the implementation of the investment in the context of its negative impact were submitted by Zachodniopomorskie Towarzystwo Przyrodnicze [Zachodniopomorskie Association of Naturalists] and the Stepnica Tourist Organization Nie Tylko dla Orłów. Other comments and requests made by the public were positive with respect to the implementation of the project, including the measures taken to minimise the negative impact on elements of the environment, e.g. the biological condition of the river, as well as species and ecosystems dependent on waters.

Addressing *the questioning by the Zachodniopomorskie Association of Naturalists of the methodology of conducting wildlife inventory of the fringed water lily, resulting in an incorrectly conducted assessment of the impact of the investment on this species*, the following is stated.

In view of the comments made during the first public consultation on the inadequate methodology adopted for the inventory carried out for the needs of the report, the investor conducted additional nature studies in 2018 to identify protected species that may be found within the range of the impact of the investment. The results of the studies confirmed the presence of more sites of the above species than indicated in the original report. Taking into account that this species is classified as endangered, this permit imposes on the investor a number of conditions limiting the negative impact, including: reintroduction of plants obtained from endangered sites into groyne fields which will not be affected by the works and into

oxbows, monitoring replanted patches 1 year and 3 years following the completion of the first stage of investment; conducting investment works on groynes adjacent to fringed water lily sites after the growing season, in October and November. In the opinion of the authority, these activities will fully protect populations of this species during the works.

Addressing another issue raised by **the Zachodniopomorskie Association of Naturalists**, *the impact of the planned investment on the species of birds (and their habitats) protected in the Natura 2000 site Lower Odra Valley, with particular regard to the occurrence of sandy mid-channel point bars*, the following is stated.

One of the most valuable habitats for birds in river valleys are sandy mid-channel bars and point bars, which take the form of low islands in the river current or sandy beaches along the banks and constitute natural habitat 3270 and at the same time are used by birds throughout their period of development. They are breeding grounds for valuable and rare species of the lari (common gull *Larus canus*, lesser black-backed gull *Larus fuscus*, Mediterranean gull *Ichthyaetus melanocephalus*, black-headed gull *Chroicocephalus ridibundus*, common tern *Sterna hirundo*, little tern *Sternula albifrons*) and the charadrii (Eurasian oystercatcher *Haematopus ostralegus*, northern lapwing *Vanellus vanellus*, common redshank *Tringa totanus*, common ringed plover *Charadrius hiaticula*, little ringed plover *Charadrius dubius*). In the period of dispersion and seasonal migration or wintering, they are a stopover and resting place for wetland birds. The inventory carried out for the needs of the report, covering the breeding period of birds, their seasonal migration and wintering, did not show the presence of any sandy mid-channel bars in the zone of potential impact. Numerous point bars located in groyne fields were reported, including the most valuable ones occurring on the Odra section between Gozdowice and Stare Łysogórki, where no nesting terns, gulls or oystercatchers were found. As a result of the washing out of the base of the groynes and the significant erosion of the riverbanks, these bars gained good separation from the land and expanded towards the centre of the river. Taking into account the condition of the habitat (good separation of the bars from the land, their height, large size and hideouts on their surface in the form of patches of low herbaceous vegetation), the authors of the report considered these bars to be a suitable breeding habitat for the common tern, little tern, and oystercatcher. According to the records of the authors of the inventory of birds made for the needs of the Report and publicly available source materials, numerous predators threatening the breeding of birds on islands and bars were recorded by the Odra, which may effectively discourage birds from breeding in these areas. A similar effect may be brought about by frequent flooding of bars during the breeding season by the reservoir waters of the Odra. The above thesis is confirmed by the results of natural surveys carried out for the purposes of the report, as well as publicly available materials related to the study of the Odra avifauna, which showed that terns, gulls and oystercatchers do not nest on bars in the Odra, but on islands or peninsulas on artificial water reservoirs of the gravel pit located just by the river. In view of the above, it should be concluded that sandy bars in the Odra at the site of the planned project do not satisfactorily fulfil the functions of breeding habitats of terns, gulls, and oystercatchers. Taking into account that sandy point bars constitute a potential habitat for gulls, terns, and plovers, in order to counteract the temporary limitation of the availability of potential breeding habitats for the abovementioned group of birds, low floating islands with total area of up to 250 m will be created outside of the Odra riverbed for the duration of the investment covering stage I and stage II (with the possibility of extending this deadline to cover the operation stage of the investment, which will depend on the results of the monitoring carried out). At low water levels, bars are an important resting and feeding place for wetland birds. Nevertheless, it will not be difficult for birds migrating over long distances (plovers, terns) to find alternative feeding grounds during the implementation of the investment. Work on groynes will be carried out in stages on several sections of the river, so that some of the shallows associated with them will not lose their value as a feeding ground for migratory birds. However, bearing in mind the forecasts concerning the formation of precipitation in Poland in conditions of global warming, which suggest a decrease in the amount of precipitation in the summer period and an increase in the amount of precipitation in the winter period (without significant changes in the total annual amount of

precipitation), it is possible to forecast a future decrease in the role of sandy bars for wetland birds during the period of migration and in the winter. With regard to the impact on birds, including the potential loss of the bird feed base, which is the subject of protection in the abovementioned Natura 2000 sites, it should be emphasised that the expected deterioration of fish and invertebrate habitats as a result of the planned works will be reversible, and the planned minimising actions to increase the diversification of habitats in the littoral zone will reduce the regeneration time of habitats to 3-5 years. The anticipated loss of fish habitats will not result in a significant reduction in their overall numbers, as the most abundant species in the Odra are eurytopic species, which have high habitat plasticity. Temporary changes will affect the proportion of species and not the overall size of the community and will not significantly affect the availability of food for birds feeding on fish and aquatic invertebrates. During the operation phase, the riverbed will gradually deepen, but it is forecast that this should not drain water from around the riverbed. As a result, natural fluctuations in the water level in the vicinity of the river (e.g. Kostrzyneckie Swamp) will be preserved and the habitats associated with it will not be endangered. Shallows between the groynes, which are the habitat of invertebrates and fish associated with standing or free-flowing waters, will be left undisturbed. In the immediate vicinity of reconstructed groynes, such habitats will gradually recover, and this process will be accelerated thanks to the minimising actions (replanting plants, transferring mussels of the family Unionidae).

Given the above, it is concluded that the implementation of the project will not cause the loss of breeding bird species sites that are the subject of protection in the Natura 2000 site Lower Odra Valley, and will not deteriorate their habitats. In addition, due to the adopted design assumptions and the manner of implementation of the investment, with the planned minimising actions applied, the implementation of the investment will not negatively affect the wintering birds that are the objects of protection of the Natura 2000 site Lower Odra Valley, such as: mallard, white-fronted goose and taiga bean goose, tufted duck, common pochard, or whooper swan.

Addressing the allegation of *failure to present a solution to the increase in the risk of flooding and the negative economic consequences of the implementation of the project* submitted by **the Stepnica Tourist Organization Nie tylko dla Orłów**, the following is stated.

At the outset, it should be noted that the investment in question is planned in accordance with the assumptions of the Polish-German *Update of the concept of regulation of the Border Odra Watercourse* developed by the German Federal Waterways Engineering and Research Institute in Karlsruhe (BAW) with the participation of German and Polish experts, developed in 2014 and *The Polish-German agreement on joint efforts to improve the situation on waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015*.

The aim of the BAW concept was to determine the scope of modernisation works necessary to achieve the river depth suitable for the operation of icebreakers at low and medium water levels, with minimal interference with the water level and the existing river control system. *The update of the concept of the Border Odra watercourse* contains a number of precise guidelines for the design of river control structures, which are binding for both Parties to the *Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015*.

Two different and complementary research methods were used for the purposes of the development of the *Update of the concept of the Border Odra Watercourse*:

- comprehensive one-dimensional hydrodynamic numerical model of the entire border section of the Odra (hereinafter: 1D-MTR model) - using this model, the water level at different flow rates, the balance of river load transport and resulting changes in the bottom and changes in the position of the water table over a simulated 40-year forecasting period were calculated. The geometry of the riverbed is described by cross-sections distributed in the longitudinal profile of the river at intervals of not less than 100 m. The model was verified and calibrated. Calibration was carried out with appropriate values of the Manning roughness coefficient selected. The verification was

carried out by comparing the flow values calculated using the model and measured with an ADCP current meter. Comparison of water table elevations and flow rates shows a very good model performance;

- the physical model of sediment transport of the Odra section in the Hohenwutzen area, which made it possible to carry out a variant analysis of river control structures that differ in types and dimensions, as well as to choose the variant for implementation - this model allows very accurate mapping of the impact of the analysed variants of river control systems on the development of the average height of the river bottom, its form, as well as on the water table. The physical model made it possible to obtain an image of the formation of the river bottom deformations as regards mesoforms (bars and folds), as well as local deformations in the area of groyne heads and groyne fields.

A wide range of data and source materials were used for the construction of the model system, including natural data (probing results, data on the location of the water table, data on the distribution of bottom grain size and transport of solid bottom material), maps, result of the BAW studies on maintenance and regulatory projects from the years 1995-2012, reports and research results of the Water and Navigation Office in Eberswald, RZGW in Szczecin and third parties (including Warsaw University of Technology, Szczecin University of Technology, Federal Institute for Hydrology - Bundesanstalt für Gewässerkunde). A dense grid of cross-sections was used to construct the model (cross-sections every 100-200 m for the entire border section of the river and more dense in characteristic, hydraulically complicated places). In addition, bottom roughness and riverbed parameters were tested. The model was calibrated on the basis of characteristic flow values and known natural data (water table position, flow velocity and sedimentological parameters) from the previously agreed mean annual discharge for normal flow rates. The geometry of the model includes terrain obstacles in the form of river control structures.

The research and calculations presented in the environmental impact report based on *the Update of the concept of regulation of the Border Odra watercourse* clearly show that the rise of the water table at high and flood levels, as well as its lowering in the case of lows (which is a natural consequence of the lowering of the bottom) will be small in relation to the conditions on the river in its current state, and the implementation of the investment does not increase the risk of flooding and will not lead to a significant lowering of the groundwater table, which could result in the drying of bank areas. The maximum predicted lowering of the bottom, and thus the estimated maximum predicted lowering of the groundwater table according to the results of the conducted analyses, could potentially range from a few to several centimetres, depending on the section of the river. However, the results of modelling carried out for the purposes of *the Update of the concept of regulation of the border Odra watercourse* indicate that during low water levels, the water table will rise by 0-25 cm, on average by 15-20 cm on most sections, and by a maximum of 25 cm on the section located at approx. 585.0 km. Although in the area of approximately 685.0-690.0 km, located outside the project area, according to the modelling results there may be a slight lowering of the level of the water table at low waters, the value of this reduction will be 1-2 cm, which is negligible. The scale of this lowering can be considered negligible, due to the fact that the value of the lowering of the water table is lower than the daily fluctuations of water levels occurring naturally in the Odra. In addition, the analysis of the results of the conducted tests and models indicates that the functioning of the reconstructed river control structures will not affect the current hydrological system of the Odra. The planned activities will not affect the way in which the river is fed, the volume of flows and the nature and course of lows or highs, and slight increases in the level of the water table can be expected in the long term. The results of the analyses carried out for *the Update of the concept of regulation of the border Odra watercourse* showed that the functioning of the reconstructed river control structures will not affect the volume of flows and the dynamics of highs and lows, or the lowering of the level of groundwater in the inter-embankment, which is also confirmed by the results of modelling carried out on the section of the free-flowing Odra, which were also taken into account in the project's environmental impact assessment.

According to the documents submitted by the investor, the adopted design solutions do not pose a risk of

erosion. The authors of the German-Polish „Update of the concept of regulation of the border Odra watercourse” considered several variants of modernisation of the river control structures. Some of the rejected variants showed a much greater deepening of the bottom, and the resulting increase of the depth of the river to over two metres. The K.RC-W5 variant was chosen for implementation, providing the minimum depth of 1.8 m, necessary for the operation of icebreakers, with the least impact on water relations and the environment. This variant assumes parameters of the river control structures that will ensure adequate deepening of the bottom through a very long, gradual, slow erosion process, which, after an initial deepening over time, stabilises at the desired bottom elevation without the risk of progression. In view of the above, the scenario based on experience with the phenomena on the middle Elbe, cited by the authors of the comments, should be excluded.

The justification of the investment in question in the context of improving the working conditions for icebreakers and improving protection against winter floods was demonstrated by the investor in the expert opinion on the environmental impact of the project attached to the updated report (submitted on 06.05.2019) entitled “Report summarising the conditions associated with conducting icebreaking on the border Odra” by dr hab. inż. T. Kolerski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, December 2018).

As regards the issue concerning the negative economic effects of project implementation, it should be stated that the arguments concerning the water table lowering and erosion clearly indicate that the works provided for in the project will not cause such an effect. Consequently, the modernisation of the existing river control structures in poor technical condition will in no way lead to an increase in costs resulting from a need to continuously monitor hydrogeological changes in order to ensure the continuous abstraction/extraction of drinking water and water for industrial use, an increase in the costs of abstraction energy/abstraction of drinking water and water for industrial use, a reduction

Addressing the allegation of *threats to Natura 2000 sites* in connection with the implementation of the investment raised by **the Stepnica Tourist Organisation Nie tylko dla Orłów** *The issue of the impact of the investment on Natura 2000 sites during the implementation of the investment and in the context of its long-term impact was raised several times by organisations and by the public during the public consultations, which the authority already addressed.* It should be noted that the issue of the impact of the investment on Natura 2000 objects were thoroughly analysed in the present proceedings and the results of this analysis are presented in the justification of the permit. During this analysis, the authority took into account all available materials helpful in a proper assessment of the impact of the investment on the subject of protection in Natura 2000 sites, including orders establishing conservation task plans for Natura 2000 sites, basic materials for PZO, the results of “natural valorisation of the Zachodniopomorskie Voivodeship” (Nature Conservation Office, Szczecin 2010) and Standard Data Forms prepared for Natura 2000 sites, including information on the characteristics of the site, the natural environment, and the identification of threats. A detailed analysis of probable changes in the characteristics of Natura 2000 sites: *Ślubice Riparian Forests PLH080013, Central Odra Valley PLB080004, Warta River Mouth PLC080001, Lower Odra PLH320037, Lower Odra Valley PLB320003*, resulting, among others, from a possible decrease in the area of habitats, lasting disturbances in the functioning of key species, interruption of continuity of wildlife corridors, fragmentation and loss of habitats or species population, reduction of species density, changes in key indicators of conservation value, showed that, with the indicated conditions of project implementation applied, it will not adversely affect the abovementioned parameters. In addition, the impact of the investment on other protected species not protected in Natura 2000 sites was analysed as part of this procedure and minimisation measures were also indicated for them. Furthermore, on 26.08.2019, after public consultations, the authority received a letter from Mr. Piotr Nawrocki from WWF Poland, concerning proposed measures to minimise and compensate the impact on the biological and hydromorphological elements of water status. In this letter, a request was made to take the following into account in the implementation of this investment: a pilot project for the reconstruction

of groynes on a selected section of the Border Odra, aimed at improving the habitat conditions in the riverbed and valley; taking into account, in the sections covered by Stage I works and beyond these sections, the introduction of anchored large woody debris into the groyne fields, in sections with an accelerated current, and introducing improved stabilisation of the river bottom and increasing the diversity of habitats on selected sections of the Odra by introducing gravel of appropriate grain size, as applied on rivers in Western European countries. Bearing in mind the natural values of the area covered by the investment, the authority decided to analyse the proposals that would minimise the negative environmental impact of the investment presented by WWF. To this end, the investor was asked to comment on the actions indicated.

During the assessment of the impact of the planned works on individual elements of the environment, the authors of the report considered the introduction of a number of minimisation and compensatory actions, including the introduction of tree trunks, stumps, etc. into groyne fields. However, in the course of the conducted analyses, it was necessary to exclude the solution consisting in the introduction of tree trunks and stumps, due to the fact that these elements would be a danger to shipping because of the high risk that they could enter the area of the fairway on the Odra. The Odra is a navigable river with a large and strong flow, which is additionally fed in winter by ice run and drift ice. This means that such elements would be subjected to forces trying to move/tear out such structures and carry them along with the current. Such measures could be applied on the Traisen in Austria, the Elwha in the USA or the Danube below Vienna. The material available on the Internet shows that the introduction of such elements did not take place in the main riverbed, but only in lateral channels not intended for navigation.

In view of the above, the implementation of the proposed solutions would create a danger to shipping and such actions would be in direct contradiction with the idea of maintenance works on navigable rivers. Nevertheless, in order to improve the diversity of habitats on the banks, groups of 4-5 oversized boulders (width 0.8-1.2 m, height 1.2-1.5 m) were introduced into the space behind longitudinal dams and into deep (1.5-2.0 m) groyne fields on the downstream side. Boulders are not a natural element of habitats in the lower Odra, although they occur naturally above the Warta mouth - they will therefore constitute a substitute habitat element. The introduced oversized boulders will have the function of diversifying habitats in groyne fields, similarly to the large woody debris. At the same time, thanks to their significant weight (from 1.5 to more than 4.5 tons) and stable foundation in the bottom, the boulders will not pose a threat due to any possible entrance of the current zone (fairway) because of water level rises or ice run. In addition, it should be pointed out that, as part of the minimisation activities, the investor undertook to leave undisturbed the woody debris (tree trunks, logs, stumps) located in groyne fields. In the light of the above, it should be pointed out that the minimisation measures imposed in this permit in relation to aquatic organisms will fully protect those elements of the natural environment from the adverse effects of the investment.

**3. Period: 18.11.2019 - 17.12.2019 Announcement of 15.11.2019, ref. no.:
WONS.4233.1.2017.KK.58**

Comments were submitted by the Stepnica Tourist Organisation Nie Tylko dla Orłów (letter dated 17.12.2019). Addressing the allegations made by the Stepnica Tourist Organisation, it should be pointed out that their scope did not change in comparison with the comments made at the stage of public consultations held on **25.07.2019 - 23.08.2019** (e-mail dated 23.08.2019). The authority addressed the allegations above (responding to the comments in item 2), thereby fulfilling the obligation under the EIA Act.

Cross-border consultations

1. Forwarding comments and requests by the General Director for Environment Protection by letter of 18.12.2018, ref. no.: DOOŚ-TSOOŚ.440.3.2018.PR.2 (consultations held on 22.10.2018-20.11.2018)

The German water and shipping authority **Wasserstraßen- und Schifffahrtsverwaltung des Bundes (WSV)** raised *the issue of the lack of information in the submitted documentation on future plans to implement the modernisation of the river control structures on the remaining sections of the border Odra in accordance with the Concept of the Border Odra Watercourse, as well as information on the procedure in case of deterioration of navigation conditions due to sedimentation, information on how to prevent the deterioration of safety and freedom of navigation during the works. The authority also recommended prior notification of the commencement of work and joint agreement on their progress.*

The documentation submitted by the investor includes specific sections of the Odra selected by the investor, indicated in the *Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015* (Official Gazette of the Republic of Poland 2015 item 1273), on which modernisation works will be carried out without taking into account the reconstruction of river control structures on the remaining sections of the watercourse. In the event of local deterioration of navigation conditions due to sedimentation, the investor predicts execution of the so-called accompanying dredging as part of the maintenance of the waterway. During the execution of works and the transport of construction material, traffic on the waterway will temporarily increase. However, there should be no deterioration in the safety and freedom of navigation, because the contractor will be obliged to comply with the regulations in the field of construction and inland navigation and occupational health and safety regulations, and the work sites will be properly marked. Prior to the commencement of the works, an Occupational Safety and Health Plan will be drawn up, defining solutions for the protection of construction workers, bystanders, and users of the waterway. The investor also undertook to inform the relevant authorities on the Polish and German sides of the commencement of construction works.

The German water and shipping authority **Wasserstraßen- und Schifffahrtsverwaltung des Bundes (WSV)** pointed out that *the documentation did not indicate alternative variants of the construction of the river control structures and no reference was made to the Reitwein remedy, the implementation of which started in 2017, and to the actions carried out on the German side.*

The project documentation covers the scope of modernisation works planned to be carried out on the Polish bank of the Odra. Nevertheless, the scope of works on both banks of the Odra is consistent with *the Update of the concept of the Border Odra watercourse*. The project documentation indicates alternative constructions of river control structures - groynes, longitudinal dams, and river walls - they are included in the annexes to the report on the environmental impact of the project.

The Head of Uckermark District pointed out that *the section of the river from 668.0 km to 683.0 km, on which the works under Stage 11 of the project are planned, belongs only partially to the so-called limiting places indicated in the Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015, calling into question the validity of the works on the entire length of the section in question. He also referred to the insufficient description of the effects of the implementation of the investment in the context of flood safety on this section.*

The explanations provided by the investor show that this section of the river is included in the scope of the project due to insufficient transit depths, which cause significant navigation difficulties. In the archival data from 1994-2018, the section 681.5-682 km was indicated as a limiting place 68 times, and the section 682.0-682.5 km - 30 times. On this basis, the entire section with existing river control structures was included in the scope of the investment - up to 683.0 km. As regards the assessment of the flood risk, the

investor indicated that the Polish bank below the section in question is not embanked, which may give rise to the possibility of a flood wave overflowing there. Moreover, the parameters of river control structures to be modernised ensure neutrality in relation to high waters flows and are designed for medium waters. Therefore, the average increase of the water table by less than 5 cm during extreme flood phenomena after the execution of the works in relation to the state prior to the implementation of the investment is expected.

The Head of Oder-Spree District pointed out that *dredging works may have cross-border impact, which should be properly analysed.*

Dredging works are indicated in the report on the environmental impact of the project as a possible element of the future maintenance of the inland waterway - however, they are not provided for in the scope of the project and will not be carried out during its implementation.

The head of Oder-Spree District addressed the *need to take into account the access of relevant emergency services, including fire brigades, when implementing the investment.*

In response to this comment, the Investor indicated that the project will be agreed with the State Fire Service, and the Contractor carrying out the works will be obliged to prepare an Occupational Health and Safety Plan, in which, among other things, the method of active and passive fire protection of the construction area will be set out. In addition, he pointed out that in accordance with *the Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015*, on the basis of which the project is implemented, “Contracting Parties shall ensure that the projects are in accordance with the provisions applicable in their respective territories”, and thus in relation to the investment in question, which will be carried out entirely in the territory of Poland, the investor is subject to the provisions of Polish law.

In its observations, **the Landesamt für Bergbau, Geologie und Rohstoffe Brandenburg**, the State Office for Mining, Geology and Raw Materials in Brandenburg, *pointed out the sites of existing and old mines on the German side as areas with construction restrictions.*

In response to the investor's comment, the investor explained that the investment in question will not affect the extraction of fossil deposits - the range of the project does not include any mine, either on the Polish or on the German side.

Comments submitted by **the Mayor of Frankfurt (Oder)** indicate *that the documentation provided should take into account the impact of the project on the safety and health of people and the protection of material goods - the documents do not specify whether the planned works will reduce the section of the Odra riverbed in the area between Ślubice and Frankfurt (Oder), and thus whether they will not cause changes in water levels north of the B5 or DK 29/31 city bridge. Information on the impact of the investment on flood safety in the area is expected. To this end, it would be advisable to conduct 2D-HN modelling.*

The explanations indicate that in accordance with the assumptions of *the Update of the concept of regulation of the border Odra watercourse*, which is the basis for the execution of the works in question, the modernisation of the river control structures in the area in question will increase the level of the water table for high water ($Q=1300 \text{ nr/s}$, i.e. $p=5\%$ water) by a maximum of 12 cm (in accordance with variant V5 of the concept, which is to be implemented). Modernisation of the control system in the medium water riverbed is planned. Flood flows move across much larger sections - the high water riverbed includes the medium water riverbed, the bank riverbed, and the inter-embankment area. The higher the water level, the lower the impact of control structures. *The Update of the concept of regulation of the border Odra watercourse* describes the maximum increase in the water level for the water flow $p=5\%$ ($Q=1300 \text{ nr/s}$)

at the level of 12 cm. Meanwhile, for water p=1%, the water table level in Słubice is 23.65 m Kr. Taking into account the increase of the water table by 12 cm (although the actual increase in the water level for 1% due to the modernisation of groynes will be lower), the expected elevation of the water table will be 23.77 m Kr. This level is significantly lower than the elevation of flood embankment crests - 25.0 m Kr. The impact of this investment on the level of the high water table is small. Additionally, it does not pose a threat to the existing flood embankments and allows to avoid winter floods by making icebreaking more efficient. The level of the high water table is influenced by many factors. The Manning roughness coefficient is very important. Elimination of high growths along the high water riverbed can increase this factor and significantly lower the high water table. In the area of Słubice and Frankfurt, an important element narrowing the cross-section of the riverbed and thus damming flood waters is the existing bridge, the pillars of which currently narrow the cross-section of the riverbed to a much greater extent than the proposed reconstruction of the river control structures. In addition, the investment in question provides for reconstruction by way of moving the existing lead-in pier towards the Polish bank at the entrance to the docking harbour in Słubice, just in front of the road bridge. The lead-in pier is intended to be directed towards the existing bridge pillar, now it ends between the pillars. This will widen the riverbed in front of the bridge by about 25-30 m, which will significantly improve the flow of flood waters. In conclusion, this investment will have a positive impact on flood protection in the winter in the areas in Słubice and Frankfurt (Oder) and is also likely to improve the conditions for flood water flow in the bottleneck of the existing road bridge by widening the riverbed in front of the bridge. In addition, during the expert meeting as part of the cross-border consultations on 17 January 2020, the investor said that he would prepare a two-dimensional model for the section limiting the Słubice area (at 581.0-585.7 km) and the results of the model tests would be communicated to the German side.

Rainer Witt pointed out that, *in the case of the implementation of the investment, it is necessary to preserve the avenue of trees located on the top of the flood embankment in the urban area of Słubice due to its high ecological, historical, and intangible value. In addition, meadows and pastures located in the vicinity of groynes in the Słubice region should also be preserved due to their ecological value. The impact of the project on numerous animal species associated with transitional riverbank biotopes should be taken into account.*

The explanations provided by the investor show that the planned works will be carried out from water, so that meadows and pastures located at the groynes will not be destroyed. There are no plans to remove trees indicated by the author of the comment.

The project may have a negative impact on the protected goods: plant species, animals, biodiversity, water and landscape, as well as on the interactions between them as a result of changes in hydrological processes that occur in the river system. The project may adversely affect the nature of the Unteres Odertal National Park, which is part of the Natura 2000 network and on its subjects of protection. Adverse changes in the Odra waters may occur, e.g. changes in flow conditions, increased current velocity, sediment displacement, accumulation of sediment in local depressions in the river bottom, and on the banks, deepening of the riverbed or lowering of the water table in the river and groundwater table in adjacent floodplains. Natural habitats dependent on waters, fish species in the Odra and animal species associated with the river and its valley may be adversely affected by these changes. These comments were submitted by **Brandenburg - Unteres Odertal National Park Administration** and by **the Unteres Odertal National Park Administration** through the Brandenburg Ministry of Rural Development, Environment and Agriculture, **Ländliche Entwicklung, Umwelt und Landwirtschaft des Landes Brandenburg**. **The Head of Märkisch-Oderland and Deutscher Naturschutzring (DNR)** also indicated the *risk of lowering of the groundwater table and possible deterioration of subjects of protection of Natura 2000 along the Odra.*

Addressing the above comments, it should be pointed out that the project involves the modernisation of existing hydrotechnical structures located on a river heavily transformed by human, which was already regulated in the 19th century. This is when the most significant changes in the longitudinal profile of the river occurred, resulting in a new level of its equilibrium being established. According to the explanations submitted by the investor, the modernisation of the existing structures will not affect the hydrological system of the Odra, which is dependent on the conditions of supply and drainage from the catchment area. The project will also not cause any significant changes in the location of the water table in the riverbed, the size, or dynamics of the flow and transport of river load, as discussed in the report on the environmental impact of the project. Taking into account the relatively small amounts of river load transported in the lower Odra riverbed, it is not expected that spaces between groynes will be overgrown, that the material already deposited on the new floodplain will be significantly eroded, or that the elevation of the floodplain will rise significantly. Nor will the project change the flow conditions at high waters, because the parameters of the river control structures to be modernised are optimised to regulate the hydraulic conditions of medium and low flows - according to the results of hydrodynamic modelling, the medium water level is expected to increase by about 20 cm, while the water levels at high flows above SWQ ($>900 \text{ m}^3/\text{s}$) as well as at low flows below SNQ ($<100 \text{ m}^3/\text{s}$) will increase by only 5-10 cm. Therefore, no significant changes in the conditions affecting the occurrence of natural habitats and associated animal species in the Odra and its valley are foreseen. In addition, the implementation of modernisation works on the two banks of the Odra at different times will allow for partial regeneration of aquatic vegetation complexes and fish and aquatic invertebrate habitats and will allow them to be settled by organisms which use refugias on the side that is not currently a site of works. It should be noted that the valuable habitats currently found in the Odra riverbed are closely related to the existence of the system of groynes and groyne fields. Should the reconstruction works on the existing river control structures be abandoned, further progressive degradation of these structures within a few decades would lead to their disappearance and the transformation of the Odra riverbed into a fairly homogeneous channel with straight banks of little morphological diversity. This would result in significant long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity. This is noticeable in the sections of the Odra, within which the groynes have degraded and in the sections where there river is not controlled with groynes. Therefore, reconstructing groynes is, in the long term, beneficial for the preservation of the habitat diversity of the section of the Odra in question, despite temporary and reversible loss of fish habitats as a result of modernisation works. The anticipated loss of fish habitats will not result in a significant reduction in their overall numbers, as the most abundant species in the Odra are eurytopic species, which have high habitat plasticity. Temporary changes will affect the proportion of species and not the overall size of the community and will not significantly affect the availability of food for birds feeding on fish. The natural structure of the Odra valley area, in particular the floodplains, with its mosaic of habitats typical of natural valleys of large lowland rivers which are not intensively used, creates a valuable living environment for many groups of organisms, including in particular waterfowl, waders, and large predators. Due to the fact that the implementation of the investment will not significantly change the hydrological regime of the Odra, including the natural floods occurring in its valley during seasonal rises which ensure conditions for natural habitats constituting habitats for species of these groups of animals, it is not expected that any significant impacts will occur in relation to the population of these species. Furthermore, with regard to the issue of the project's impact on the preservation of biodiversity raised in the abovementioned comments, it should be pointed out that high biodiversity is fostered by a wide variety of environmental conditions manifested by a large number of microhabitats and, consequently, resources available to organisms of different species, with different ecological requirements. Large capacity habitats can accommodate a large number of specimens, which naturally increases the likelihood of finding more species. The local abundance of species is also proportional to regional abundance. The structure of complexes depends on the biological properties of the species and the interactions between them, and the composition of local complexes depends on exchanges with neighbouring complexes, which together form a species pool specific to the region. The project will be carried out on designated sections of the river, so migration of individuals along the entire

border Odra will be possible. In addition, the exchange of specimens will be facilitated by the presence of large wildlife corridors within the investment area and in its vicinity, which increases the ability of organisms to spread and, consequently, their ability to colonise affected habitats. In each ecosystem, organisms of different species coexist, together forming a food chain. High mortality in the population of one species could therefore affect the other links of the food web. However, in the case of the analysed project, thanks to appropriate minimisation measures, no significant threat was found in relation to any ecological group of organisms. Therefore, no significant disturbances in the food chain are anticipated. According to the submitted documentation, there is no basis for forecasting that the permanent functions of the Natura 2000 sites on the German side could be impaired or that their integrity and coherence could be interrupted.

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drew attention to the *insufficient assessment of flood risk after the execution of works in the documentation in question and the insufficient assessment of the impact of the project on the functioning of flood protection structures (e.g. embankments).*

The explanations provided by the investor show that the parameters of the river control structures to be modernised ensure neutrality in relation to the flow of high waters, while being designed for medium waters. Thus, the change in the cross-sectional area of the riverbed in connection with the project in question will be negligible in relation to the surface of the riverbed for high water, therefore, the average increase of the water table by less than 5 cm during extreme flood phenomena after the execution of the works in relation to the state prior to the implementation of the investment is expected. In addition, the project includes plans to remove vegetation from the existing groynes, which will improve the conditions of flood water flow.

In a regulated river, the main problem is the migration of point bars, which causes the current to shift and causes the formation of milling. The higher tangent stress resulting from the modernisation of the river control structures and the transition in the transport of sediment from load to suspension transport will have a beneficial effect on the levelling of the bottom in the control route. Groynes maintained in good condition and modernised in order to level out the velocity distribution in the riverbed are important for maintaining transit depth in the riverbed (which is important for the operation of icebreakers), but also do not allow for large current deviations from the regulatory route, which threatens to erode the banks and form a secondary riverbed with water flowing at the base of embankments. This phenomenon seriously threatens the stability of embankments, because during floods a high-speed stream of water flows beneath their base, directed diagonally to the bank. Thus, it can be concluded that the project will not adversely affect the functioning of existing flood protection structures.

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asserted that *basin the project only on the results of modelling conducted for the purpose of Concept of regulation of the border Odra watercourse is insufficient to assess the effects of the project and recommended the use of 2D hydronumeric models for individual sections of the Odra.*

In response to this comment, the investor pointed out that according to *the Update of the Concept of regulation of the border Odra watercourse*, using 2D hydrodynamic models is recommended for specific sections of the river, for which the one-dimensional model, due to its limitations, does not allow for full mapping of processes occurring in the river. Such a two-dimensional model was developed by the investor for a section of the river located in the area of the Odra-Warta junction.

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drew attention to the *difference in the classification of the two surface water bodies on which the planned project is located: on the German side they are classified as natural surface water bodies and on the*

Polish side as heavily modified surface water bodies. The authority therefore expressed doubts as to the correctness of the impact assessment of the investment on the ecological status of waters and the environmental objectives of Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

Addressing the above comment, it should be pointed out that the different classification of the surface water bodies in question on the Polish and German sides affects the differences in environmental objectives set for them - on the German side, the environmental objective set for the surface water bodies in question is to achieve good ecological status, while on the Polish side - to achieve good ecological capacity. However, it should be noted that the assessment of impact on the achievement of the environmental objectives of *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy* for bodies of surface water used the same significance indicators, both with regard to the achievement of good ecological status and good ecological capacity. After taking into account the minimisation measures proposed by the investor, the impact of the works included in the scope of the project on the bodies of surface water was assessed as moderate.

Brandenburg Ministry of Rural Development, Environment and Agriculture **Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft des Landes Brandenburg** *challenged the correctness of the assessment of the ecological and chemical status of the bodies of surface water within which the planned project is located presented in the available documentation.* A similar comment was also made by **Deutscher Naturschutzring (DNR)**

In response to this comment, the investor supplemented the report on the environmental impact of the project with the available updated results of the assessment of water potential from the State Environmental Monitoring.

Brandenburg Ministry of Rural Development, Environment and Agriculture **Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft des Landes Brandenburg** *raised the issue of the possible deterioration of the hydromorphological conditions of the Odra as a result of the implementation of the project - a regular system of groynes may lead to unification of flow conditions and structures in the riverbed, which will negatively affect the ecological status of waters, the state of biological elements, and biodiversity in the watercourse.*

The explanations provided by the investor show that due to the significant scope of the project and the expected scope of interference with the environment during the renovation, reconstruction, and construction of groynes, the construction of longitudinal dams and river walls, the execution of the planned activities would only technically result in a long-term significant negative impact of the investment on the environment and protected natural habitats and species. Therefore, the report on the environmental impact of the project indicates numerous measures to minimise the impact of the investment, the consistent application of which will significantly reduce the potential negative impact of the works on the environment - both short-term, related to the stage of project implementation, and long-term, related to the stage of investment operation. Taking into account the comments submitted during the public consultation, the investor indicated an additional catalogue of measures aimed at restoring the habitat elements that will be lost as a result of the works, as well as promoting the acceleration of the natural process of restoring the river ecosystem balance. At the same time, the investor extended the scope of minimising measures to include activities such as replanting patches of vegetation and transferring mussels from endangered areas to safe sites located in groyne fields. The combined application of minimisation measures is expected to reduce the impact of the investment on the environment, natural habitats, and species to a moderate level and allow most river ecosystem functions to regenerate within 3-5 years. The proposed measures limiting the impact of investments, such as the creation of artificial riffles, the creation of oxbow habitats (bays) or the introduction of oversized boulders into spaces behind dams and groyne fields, will contribute to the local heterogeneity of fish and invertebrate habitats. The

proposed solutions will make it possible to achieve the planned effect of flood protection due to the improvement of icebreaking conditions on the section of the border Odra, while at the same time maintaining and restoring the ecological capacity. It should be noted that the valuable habitats currently found in the Odra riverbed are closely related to the existence of the system of groynes and groyne fields. When the planned investment commences, it will to some extent reverse the processes of spontaneous renaturalisation of the river that have been taking place for several decades and in the short term (10-20 years) will cause periodic deterioration of hydromorphological conditions and depletion of habitats. However, should the reconstruction works on the existing river control structures be abandoned, further progressive degradation of these structures within a few decades would lead to their disappearance and the transformation of the Odra riverbed into a fairly homogeneous channel with straight banks of little morphological diversity. This would result in significant long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity. This is clearly visible on sections of the Odra within which a degradation of groynes has already occurred, and on sections where there is no control with groynes, and the riverbed is straightened, with banks strengthened with riprap. In the longer term (more than 100-200 years), if river control work on the Odra was completely discontinued, there would be a gradual spontaneous renaturalisation of the morphology and course of the riverbed, with the restoration of bed forms typical of natural sections of large rivers. This would, however, involve the occupation of developed and built-up areas in the valley by the river and the total loss of its function as a waterway, which is unacceptable for social and economic reasons. The presented conditions show that maintaining the existing control groynes on the banks of the Odra (and consequently their periodic renovation and reconstruction) is beneficial for maintaining the current diversity of habitats in the regulated riverbed, while maintaining its economic functions and the use of the areas by the river.

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commented on the assessment of the impact on the groundwater balance and the status of bodies of groundwater, pointing to the exchange of water between the Odra and bodies of groundwater - the planned works may increase the level of water in the river, which will increase the inflow of water to groundwaters; in this context it should be assessed whether the project will not cause the deterioration of the chemical status of the bodies of groundwater.

According to the explanations submitted by the investor, the modernisation of river control structures will not affect the hydrological system of the Odra, which is dependent on the conditions of supply and drainage from the catchment area. The groundwater level in the zone adjacent to the Odra will be affected more by regional hydrogeological conditions and the amount of recharge by precipitation under changed climate conditions than by changes in the water level in the Odra caused by the implementation of the project.

The German water and shipping authority **Wasserstraßen- und Schifffahrtsverwaltung des Bundes (WSV)** and **Deutscher Naturschutzring (DNR)** raised *the issue of the lack of a strategic environmental impact assessment for Concept of regulation of the border Odra watercourse.*

Addressing the above issue, it should be pointed out that conducting a strategic environmental impact assessment for the *Update of the concept of regulation of the border Odra watercourse*, and then the environmental impact assessment of the project based on the concept would constitute a duplication of assessments, as indicated in the legal opinion submitted together with the investment documentation. Due to the level of detail of the *Update of the concept of regulation of the border Odra watercourse*, subjecting it to a strategic environmental impact assessment from a procedural point of view would not bring additional evidence in relation to the environmental impact assessment. Conceptual solutions are so precise that the appropriate instrument for preparing variants of design solutions and defining minimisation measures for the construction projects is the environmental impact assessment for the

project. The planned activities in the scope of the project are included in the sector planning document, which sets the framework for the implementation of tasks aimed at limiting the risk of flooding, i.e. in the Flood Risk Management Plan for the Odra Basin Area adopted by the *Regulation of the Council of Ministers of 18 October 2016 on the adoption of the Flood Risk Management Plan for the Odra Basin Area* (Journal of Laws of 2016, item 1938), in which activities within the scope of modernisation and reconstruction of the river control structures of the border Odra for the purpose of icebreaking are part of the package of flood control measures in the problem area (Hot-spot) “Zatorowy”. At the stage of plan preparation, and before its adoption by means of a regulation, its draft was subjected to a strategic environmental impact assessment procedure.

The project documentation did not specify the conditions for considering the investment as an overriding reason relating to the public interest. In addition, the consideration of alternatives for winter flood prevention other than icebreakers, such as icebreaking with Amphibex floating excavators, was not sufficiently thorough. This comment was submitted by **Deutscher Naturschutzring (DNR)**.

Addressing the above, it should be pointed out that the protection of human health and safety is always an overriding reason relating to the public interest, provided that the absence of alternatives is demonstrated. Evidence of an overriding reason relating to the public interest shall be required where conditions arise under Article 6(4) of *Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora* or under Article 4(7) of *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy* – such conditions do not apply to the project in question. The investor indicated that he considered alternatives for conducting icebreaking, he also presented relevant expert opinions attached to the report on the environmental impact of the project: “Report summarising the conditions associated with conducting icebreaking on the border Odra” by dr hab. inż. T. Kolarski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, December 2018) and “Expert opinion on the use of AMPHIBEX type dredgers for icebreaking on the Odra” by dr hab. inż. T. Kolarski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, August 2018). These documents analysed the conditions of the occurrence of ice phenomena in the Odra, the conditions of conducting ice breaking, alternative methods of protection against jam-related floods and the possibility of using low-immersion Amphibex dredgers for conducting ice breaking operations in the Odra. The report on the environmental impact of the project submitted by the investor included the analysis of alternative variants both for the possibility of using other methods of counteracting ice jams, including icebreakers with smaller draught and alternative construction of control structures which are to be modernised, as well as for a different technology of works, i.e. conducting works from the land. Addressing the proposed possibility of using Amphibex floating excavators for icebreaking in the Odra, the documentation submitted by the investor shows that these devices can be used in the Odra only as support for traditional icebreakers. Due to their technical parameters, these units are designed to operate in smaller watercourses with much smaller depth and flow. Using Amphibex excavators in the removal of ice jams in the border Odra would pose a danger to the operators of these units and the risk of damage to the unit or sinking under the influence of water and ice pressure, because the sudden movement of water trapped by the jam may lead to an increase in the flow rate to more than 3 m/s. These units have much lower efficiency and work at a slower speed than icebreakers. Because of their technical parameters, Amphibex excavators cannot replace linear icebreakers - they cannot be used to move quickly in the river to monitor the ice flow, and when used to widen the ice run-off channel, they are very slow and inefficient. Admittedly, Amphibex units can perform the work of front icebreakers by preparing a run-off channel for the ice, but the speed of their operation is almost 20 times slower than that of traditional front icebreakers.

Deutscher Naturschutzring (DNR) raised the issue of *insufficient evidence to support the argument that too low water depths limit icebreaking operations and that icebreakers with a draught of less than 1.8 m are not able to break the ice in the Odra.*

Addressing the above comment, the investor analysed the conditions of the occurrence of ice phenomena in the Odra, the conditions for conducting icebreaking, and the technical parameters of icebreakers and provided a summary of the results of these analyses in the expert opinion “Report summarising the conditions associated with conducting icebreaking on the border Odra” by dr hab. inż. T. Kolarski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, December 2018). The investor indicated the sections of the Odra where the smallest transit depths at medium flow occur (e.g. 0.95 m locally on the section from the mouth of the Nysa Łużycka to the mouth of the Warta, or 0.8-1.2 m on the section near Hohensaaten). Meanwhile, in the border Odra, the icebreakers currently used to carry out icebreaking operations and remove ice jams have parameters adapted to the ice conditions there. *The instructions for icebreaking on the border and the lower section of the Odra* in force during the Polish-German icebreaking operation assume that at least 10 Odra icebreakers with a capacity of 400-1000 hp are used. Maximum draught of high-power front icebreakers (Polish units: Dzik, Odyniec, Stanisław and German units: Frankfurt, Kietz, Schwedt) is up to 2.0 m. Smaller linear icebreakers operating on the border Odra have draughts from 1.44 m (the lowest average minimum draught) to 1.86 m (the maximum draught). As explained by the investor, the practice of using icebreakers has shown in previous years that linear icebreakers with a smaller draught do not have sufficient capacity to effectively remove ice jams in the Odra. Icebreakers with a draught of up to 1 m were used in the past on the Odra (e.g. the LR-400 Dolphin), however, due to the lack of sufficient power to work in difficult ice conditions they were directed to other tasks. Currently, such units have only auxiliary functions and are not used for frontal or linear operation for eliminating ice jams. German vessels with small draught were moved to the Elbe, which freezes occasionally, for the same reasons.

Deutscher Naturschutzring (DNR) *disputed the investor's objective of carrying out the investment in question, pointing out that the works are to serve navigation purposes for inland navigation. The Association indicated also that the Odra has least significance for inland navigation among German waterways, and the Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015 (Official Gazette of the Republic of Poland does not serve a flood protection purpose.*

With regard to this comment, it should be noted that although the Odra is a navigable river on which an inland waterway has been designated, and therefore the river has a navigational function, this fact does not constitute a sufficient reason to undermine the objective of the project indicated by the investor, namely to strengthen the protection against winter floods for the towns located along the Odra. This objective is to be achieved both by improving the depth for the work of icebreakers and by opening up the riverbed to facilitate ice run-off and reduce the risk of ice jams. Operations for the prevention of winter floods in the Odra valley are carried out with the use of vessels – icebreakers – therefore, the effect of the planned works will be beneficial both for the improvement of icebreaking efficiency as well as for the improvement of the navigation conditions of the river, which is an additional benefit for shipping. The justification of the investment in question in the context of improving the working conditions for icebreakers and improving protection against winter floods was demonstrated by the investor in the expert opinion on the environmental impact of the project attached to the report entitled “Report summarising the conditions associated with conducting icebreaking on the border Odra” by dr hab. inż. T. Kolarski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, December 2018). In addition, *the Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015* indicated that the agreement was concluded for reasons related to flood protection, as well as that the joint implementation of icebreaking operations must be provided by both parties, and indicated that the condition of the river control structures of the border Odra is insufficient, which in recent decades had negative effects on the flow profile of large waters.

Deutscher Naturschutzring (DNR) *pointed out that the project is focused on protection against ice jam-related winter floods, while effective flood protection should include solutions dedicated to other types of floods, including summer floods. Issues related to the risk of floods of origins other than ice jams were*

not taken into account in the preparation of the investment, and neither were long-term forecasts of changes in the hydrological situation, including forecasts of the increase in water levels in the Baltic Sea.

With regard to this comment, it should be pointed out that the implementation of the project in question results from the assumptions of the Flood Risk Management Plan for the Odra Basin Area adopted by *the Regulation of the Council of Ministers of 18 October 2016 on the adoption of the flood risk management plan for the Odra basin area* (Journal of Laws of 2016, item 1938), which includes all elements of flood risk management, with particular emphasis on flood prevention and protection measures and information on the state of proper preparation in the event of a flood. Factors related to the forecast climate change, including the increase in the level of the Baltic Sea, were taken into account in the development of the Flood Risk Management Plan for the Odra Basin Area. In addition, risks related to the impact of the investment on flood risk in the case of summer floods were analysed in the project documentation.

The lack of analysis of the effects of unilateral execution of the works provided for in the Concept of regulation of the border Odra watercourse, i.e. modernisation of river control structures only on the Polish bank of the Odra was indicated by **Deutscher Naturschutzring (DNR)**.

In relation to the above issue, it should be noted that the governments of Poland and Germany undertook to implement *the Update of the concept of regulation of the Border Odra watercourse*, and thus to modernise the river control structures in accordance with the guidelines indicated therein, which was finalised by the conclusion of *the Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015*. In order to jointly coordinate work, in accordance with Article 14 of the Agreement, the two Parties set up a Joint Committee and Working Party for the Implementation of the Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions). The work is monitored and coordinated on an ongoing basis in accordance with a jointly developed and agreed material and time schedule. In addition, observing the provisions of the agreement, the German side already completed works on one section of the Odra - in Reitwein, the priority limiting place (604.6-605.5 km). Therefore, there is no reason to believe that the assumptions of *the Update of the concept of regulation of the Border Odra watercourse* will be implemented on only one bank of the Odra - both the Polish and the German side undertook to carry out modernisation works in accordance with the jointly agreed concept.

Deutscher Naturschutzring (DNR) pointed out *a provision in the documentation submitted by the investor indicating that the planned works concern a section of the Odra with a length of approximately 95 km, while the total length of the Odra border section exceeds 150 km.*

The explanations submitted by the investor show that the provision concerned the total length of sections designated as limiting places in the *Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015*, and the modernisation works planned on them. The project documentation shows that approximately 58% of the limiting places indicated in the above agreement will be covered by the scope of the investment.

Deutscher Naturschutzring (DNR) commented on *the dredging works indicated in the documentation, which may interfere with the process of restoring the morphological balance of the Odra after the works have been completed.*

The explanations provided by the investor show that dredging works are not part of the scope of the project. Any possible dredging may only be carried out as part of subsequent maintenance works carried out on the waterway, within 40 years after the implementation of the investment in question, provided that it results from the indications of the monitoring of the riverbed condition.

Deutscher Naturschutzring (DNR) commented on *the division of the project into two stages indicated in the available documentation, which suggests that works will be executed section-by-section, and in*

practice the investment will be carried out continuously (with sections from both stages taking place alternately).

The simultaneous execution of works within both stages was indicated in the documentation made available during the cross-border consultation held on 22.10.2018-20.11.2018. However, in the documentation updated after the national and cross-border consultations, the investor indicated a phase implementation of the investment - in the first place, works in Stage I of the project will be carried out, i.e. construction works on the following 5 sections of the Odra: 581.0 - 585.7 km; 604.0 - 605.0 km; 613.5 - 614.7 km; 645.5 - 654.0 km; 654.0 - 663.0 km. Works within the remaining 4 sections of the river will be carried out at a later date, as part of Stage II of the investment (sections: 600.4 - 604.0 km; 605.0 - 613.5 km; 614.7 - 617.6 km; 668.0 - 683.0 km).

Deutscher Naturschutzring (DNR) *pointed out that the long-term effect of the investment could include a permanent lowering of the level of the water table in the Odra and, consequently, lowering of the level of groundwater in adjacent areas.*

The explanations submitted by the investor show that after the completion of the modernisation works, in the area of the reconstructed structures, there will be an increase in the water level in the river by a maximum of 25 cm at medium flows. The reconstruction of the groyne heads will also result in an increase in the flow rate, which will result in an increased movement of river load resulting in an automatic deepening of the riverbed and levelling of the bottom. In accordance with the results of modelling carried out for the purposes of *the Update of the concept of regulation of the Border Odra watercourse*, it is expected that this process will slow down over time, leading to a gradual stabilisation of the water table level, which at medium flows will be 4-7 cm higher than the water table level before the execution of the works. The results of model calculations indicate that the flow velocity in the section of the rebuilt groyne will be 1.16 m/s, with the flow corresponding to $Q=240$ m³/s. This corresponds to the average flow velocity of the undamaged groyne sections. The impact of the project on the formation of the groundwater level was indirectly determined by comparing the location of the water table in variant W0 and variant KR.C-W5 indicated in *the Update of the concept of regulation of the Border Odra watercourse* in the 40-year period perspective covered by the forecast. The results of the analysis indicate that the reconstruction of groynes will not cause a significant lowering of the water table in the riverbed at low and medium levels or a decrease in the level of groundwater in the inter-embankment.

Deutscher Naturschutzring (DNR) *pointed out that an outdated climate change scenario was taken into account when developing the Concept of regulation of the border Odra watercourse.*

The environmental impact report submitted by the investor analysed the impact of the project on the climate and conducted a climate risk analysis, which determined how resistant to climate variability and future climate change the project will be. As a result of the analyses, it was concluded that the nature of the work carried out as part of the implementation of the planned project will have no impact on the climate and the impacts will not be significant from the point of view of adaptation to climate change. Based on the results of the analysis of the project's vulnerability to climate risks, appropriate adaptation options were proposed in the submitted documentation.

Deutscher Naturschutzring (DNR) *raised the issue of the risk of long-term lowering of water levels as a result of the implementation of the project and the associated threat to species and natural habitats associated with littoral zones and floodplain areas.* A similar comment was submitted by **Brandenburg - Unteres Odertal National Park Administration** and by **the Unteres Odertal National Park Administration** through the Brandenburg Ministry of Rural Development, Environment and Agriculture, **Ländliche Entwicklung, Umwelt und Landwirtschaft des Landes Brandenburg**.

The documentation submitted by the investor indicates that the planned modernisation of river control structures will not affect the conditions of the flow at high levels, because the parameters of the modernised structures are designed to regulate the hydraulic conditions of medium and low flows, so they

will not affect the high water levels, dates, ranges, and duration of floodplains and floods in the areas by the river. Therefore, the implementation of the project will not limit the occurrence of summer floods. The aim of the project is to prevent winter floods, but it should be noted that the regular Polish-German icebreaking operations have been effectively preventing their occurrence for years, so the implementation of the project will not significantly change the regime of winter floods in the Odra valley on the border section. Therefore, no significant impacts on species and natural habitats whose occurrence is conditioned by seasonal river floods are expected.

*The issue of the difficulty of distinguishing between local and cumulative impacts in the documentation made available due to the lack of definition of these concepts was raised by **Deutscher Naturschutzring (DNR)**. Therefore, the statement that the modernised groynes will only have a local impact on the riverbed, as indicated in the report on environmental impact of the project made available, was challenged. A question about the scale of impacts used in the assessment of the impact of the project on protected species was also posed.*

The investor's report on the environmental impact of the project, including the impact on animal and plant species, natural habitats, and forms of nature protection, specifies that the following scale of impacts was used:

Weak impacts - when periodic, disappearing, small-scale negative impacts are expected, which will not significantly affect the conservation status of conservation objects, the objectives of conservation objects, and the integrity of the form of nature conservation;

Moderate impacts - when medium-term, disappearing local impacts are expected, which will not significantly affect the conservation status of conservation objects, the objectives of conservation objects, and the integrity of the form of nature conservation;

Significant impacts - when medium- or long-term negative impacts are expected, which may periodically deteriorate the conservation status of conservation objects, periodically affect the process of achieving the conservation objectives and the integrity of the form of nature conservation;

Material impacts - when long-term or permanent negative impacts are expected, resulting in significant loss of resources of protected objects, inability to achieve conservation objectives and deterioration of the integrity of the form of nature conservation.

Cumulative impacts in the report on the environmental impact of the project submitted by the investor are the interactions occurring as a result of the implementation of the project and other investments carried out by both the investor and other entities.

As regards the issue of local impact of the modernised groynes, the investor indicated that the impact on the hydromorphological and hydrological conditions of river control structures, in particular the groynes, after the works are concluded, will be local, not going significantly beyond the river sections covered by the works. The reconstruction of river control structures on a given section of the watercourse will result in an increase of the current velocity over a length of about 200 m, and thus will have a local impact on the shape of the bottom. Nonetheless, the impact of the implementation of the entire project, i.e. the execution of the works on all the limiting sections intended for modernisation, will be supralocal, as indicated by the investor in the submitted explanations.

*The assumption that the implementation of the project will lead to a stabilisation of morphological processes on the bottom of the Odra was challenged by **Deutscher Naturschutzring (DNR)**. The sandy bottom of the Odra is characterized by formations such as ripple marks, underwater dunes, and shallows, which are unstable. The implementation of the project will result in an increase in shear stress, which will lead to a decrease in bottom stability.*

With regard to this comment, the investor presented the results of the calculations of tangent stress in the conditions of the Odra, which indicate the impossibility of increasing the steepness and height of the folds

(dunes) in the riverbed. It is anticipated that an increase in tangent stress impacting the bottom will cause a flattening of riverbed form and, consequently, levelling of the bottom, which is important from the point of view of the project objective - improving the conditions of ice run-off and the operation of icebreakers.

Deutscher Naturschutzring (DNR) raised *the issue of the negative impact of the project on the occurrence of benthic habitats in the Odra riverbed as a result of increased shear stress, increased dynamics of sediment transport, and increased erosion of the bottom as a result of modernisation works. These processes will lead to excessive homogenisation of the river bottom, which will result in impoverishment of this habitat.*

The documentation submitted by the investor shows that the increase in tangent stress and the associated bottom levelling will take place mainly in the middle zone of the riverbed, along the current line. Even at present, the zone with the highest biodiversity in the Odra riverbed, also in terms of benthic habitats, is the area of groyne fields, as indicated by the results of wildlife inventories carried out by the investor. This area will not be subject to the significant impacts indicated in this comment. In addition, the investor proposed the implementation of appropriate actions to minimise the impact of the project dedicated to benthic organisms.

*The issue of an infringement of Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy was raised by **Deutscher Naturschutzring (DNR)**. The comments indicate that the project will have a lasting negative impact on the bodies of surface water located in the Odra, which will result in their deterioration.*

The documentation submitted by the investor shows that in connection with the implementation of the proposed measures minimising the impact of the project, no threats to the achievement of the environmental objectives set for the bodies of surface water are identified. The Investor planned to carry out activities leading to the reconstruction of the river control structures, which will allow to minimise the negative impacts of the works on biological elements and maintain the maximum diversity of habitats currently existing in the controlled and partially naturalised riverbed. On the other hand, the aim of this work is to maintain the current nature of the Odra riverbed with groynes and to preserve and restore navigability of the waterway, to the parameters defined by the technical requirements of icebreakers. It should be noted that the valuable habitats of fish and other aquatic organisms currently found in the Odra riverbed are closely related to the existence of the system of groynes and groyne fields. When the planned investment commences, it will to some extent reverse the processes of spontaneous renaturalisation of the river that have been taking place for several decades and in the short term (10-20 years) will cause periodic deterioration of hydromorphological conditions and depletion of habitats. However, should the reconstruction works on the existing river control structures be abandoned, further progressive degradation of these structures within a few decades would lead to their disappearance and the transformation of the Odra riverbed into a fairly homogeneous channel with straight banks of little morphological diversity. This would result in significant long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity. Such an effect is clearly visible on sections of the Odra within which a degradation of groynes has already occurred, and on sections where there is no control with groynes, and the riverbed is straightened, with banks strengthened with riprap. The planned minimisation measures, introduced after taking into account the suggestions and comments submitted as part of public consultations, will allow to achieve the technical assumptions of the project while limiting the negative environmental impact to a moderate level, including the impact on species and habitats protected under national regulations and under the Natura 2000 network and also on biological elements of ecological capacity. Minimising activities include, among others, limiting to a minimum interference in groyne fields, leaving uninterrupted the sand deposits and aquatic vegetation and rushes growing in the fields, replanting vegetation patches endangered by works (especially nymphaeids) and leaving the developed habitats of aquatic organisms and habitat forming elements (boulders, woody debris) in them. Appropriate periods excluded from certain types of work were also

indicated, including those for the protection of fish during spawning, as were ways of reducing the negative impact of the work during the migration period of diadromous species. In addition, it should be emphasised that thanks to the applied technology of rebuilding the foot and the slope of groynes on the downstream side of the tops of reconstructed groynes, leaving the habitat elements uninterrupted and supplementing them (oversized boulders located in spaces behind longitudinal dams and in deeper groyne fields on the downstream side), the planned solutions related to the restoration of habitats in the form of riffles will ultimately contribute to maintaining the habitat potential of the Odra section covered by the works in a state not significantly different from the current one. The expected deterioration of habitats of aquatic organisms resulting from the works in the project will be reversible, and the indicated minimisation measures will reduce the regeneration time of habitats to 3-5 years. In addition, the implementation of modernisation works on the two banks of the Odra at different times will allow for partial regeneration of aquatic vegetation complexes and fish and aquatic invertebrate habitats and will allow them to be settled by organisms which use refugias on the side that is not currently a site of works.

Deutscher Naturschutzring (DNR) expressed concern *that the project poses a threat to the populations of rare and protected species in the Odra: the maraena whitfish*

Coregonus maraena, burbot *Lota Iota*, northern golden loach *Sabanejewia baltica*, Atlantic salmon *Salmo salar*, sea trout *Salmo trutta m. trutta*, vimba *Vimba vimba*, and Baltic sturgeon *Acipenser oxyrinchus* subject to restoring in the area. The issue of risks resulting from the implementation of the investment was also raised by **Brandenburg - Unteres Odertal National Park Administration** and by **the Unteres Odertal National Park Administration** through the Brandenburg Ministry of Rural Development, Environment and Agriculture, **Ländliche Entwicklung, Umwelt und Landwirtschaft des Landes Brandenburg**.

Referring to this comment, it should be pointed out that the potential risks associated with the implementation of the project have been analysed in the submitted report on the environmental impact of the project and taken into account when determining the minimisation actions dedicated to limiting the impact on the mentioned fish species and other protected species constituting the Odra ichthyofauna. In particular, the investor indicated the following mitigation measures:

Golden loach *Sabanajewia aurata*, northern golden loach *Sabanajewia baltica*

- minimisation measures: the principle of minimising interference in groyne fields (not removing deposits, leaving shallows and loose stones in groyne fields), limiting work in water during the spawning period (March-June);
- limiting measures: restoration of riffle habitats of on the downstream side of the tops of reconstructed groynes (every third reconstructed groyne), introduction of habitat elements (oversized boulders behind longitudinal dams), creation of flow habitats behind dams, connected with the current and enriched with habitat elements.

Atlantic salmon *Salmo salar* - the species uses the stretch of the border Odra as a migration route to spawning grounds in tributaries

- minimisation measures: during the period of intensified spawning migration (October-December) the area of particularly invasive works (e.g. demolition of damaged groynes, founding new structures at the bottom) is to be secured with curtains separating the work site from the current. The curtains will also reduce the impact of noise generated by heavy equipment; moreover, monitoring of suspension concentration and oxygenation of water 200 m below the place of work and pausing work in the event of exceeding hazardous values (suspension >200 mg/l, dissolved oxygen <5 mg O₂/l) is planned.

Atlantic sturgeon *Acipenser oxyrinchus* - the species may use the stretch of the border Odra as a migration route to spawning grounds in tributaries,

- minimisation measures: limiting work in the spring spawning period (March-April).

Whitefish - migratory species *Coregonus lavaretus*

- stocking during the period of works and for 5 years after the completion of works. Stocking with whitefish is currently carried out in the fishing district no. 3 of the Odra, which includes the Odra from the Myśla to the Widuchowa weir (in 2017 - min. 1 hatch) - yearly introduction the same amount of stocking material (min. 1 hatch) into the Odra section from the Warta to the Western Odra is planned.

Burbot *Lota lota*

- supplementary stocking, as compensation for losses during a given spawning period of the species. An annual stocking with 500,000 burbot hatchlings is planned - stocking material from spawners in the Odra catchment area (250,000 to each water body covered by the works) in agreement with fishing users, for the duration of the works and 3 years after their completion.

Spined loach *Cobitis taenia*

- minimisation measures: the principle of minimising interference in groyne fields (not removing deposits, leaving shallows and submerged vegetation), limiting work in water during the spawning period (March-June);
- limiting measures: creation of flow habitats behind dams, connected to the current and enriched with habitat elements (groups of boulders every 50 m of the length of the dam), creation of additional oxbow habitats (bays), replanting (into non-overgrown areas of selected groyne fields and bays where the works have already been completed) larger patches of aquatic vegetation, if they are located in the sites where groynes are reconstructed or constructed.

Amur bitterling *Rhodeus amarus*

- minimisation measures: the principle of minimising interference in groyne fields (not removing deposits, leaving shallows and submerged vegetation), limiting work in water during the spawning period (March-June), moving mussels from areas at risk of works along the reconstructed groynes to safe places (groyne fields where work has not yet been undertaken or has already been completed);
- limiting measures: creation of flow habitats behind dams, connected to the current and enriched with habitat elements (vegetation, groups of boulders every 50 m of the length of the dam), creation of additional oxbow habitats (bays), replanting (into non-overgrown areas of selected groyne fields and bays where the works have already been completed) larger patches of aquatic vegetation, if they are located in the sites where groynes are reconstructed or constructed.

White-finned gudgeon *Romanogobio belingi*, (*Gobio albipinnatus*)

- minimisation measures: the principle of minimising interference in groyne fields (not removing deposits, leaving shallows and loose stones in groyne fields), limiting work in water during the spawning period (March-June);
- limiting measures: restoration of riffle habitats of on the downstream side of the tops of reconstructed groynes (every third reconstructed groyne), introduction of habitat elements (oversized boulders behind longitudinal dams).

Asp *Aspius aspius* and barbell *Barbus barbus*

- minimisation measures: the principle of minimising interference in groyne fields (not removing deposits, leaving shallows - fry habitat, and loose stones in groyne fields), limiting work in water during the spawning period (March-June);
- limiting measures: reconstruction of habitats on the downstream side in the foot and slope construction of all reconstructed groynes - restoration of spawning grounds, introduction of

habitat-forming elements (oversized boulders behind longitudinal dams and in the groyne fields on the downstream side - all fields with a depth of about 1.5-2.0 m or more at SN W).

River lamprey *Lamptera fluviatilis* - the species uses the stretch of the border Odra as a migration route to spawning grounds in tributaries

- minimisation measures: limiting work in the spring spawning period (March-April).

The question of the material to be used for the reconstruction of groynes was raised by Deutscher Naturschutzring (DNR). Plans specify the use of riprap for rebuilding the groyne body, however, hydrotechnical stone is not a natural material occurring in the Odra riverbed, so it may facilitate the settlement of the river by non-native species of macrozoobenthos and fish.

Referring to this comment, it should be pointed out that the solution adopted by the investor will allow gradual overgrowing of the bodies of reconstructed groynes by vegetation and settlement by invertebrates and fish (creating hiding places between stones and spawning grounds of lithophilic species). The planned complementary introduction of a loose riprap of variable granulation, including on the foot of the groyne from the downstream side (restoration of shallow riffle habitats) will increase this effect and reduce the impact of removing loose stones from the area of the tops of damaged groynes. The used riprap of varied granulation (5-45 cm) will provide conditions more similar to natural riffles than homogeneous structures made of thick hydrotechnical stone. With regard to the problem of accelerated colonisation of the Odra by non-native species, it should be pointed out that at present the banks of the river are reinforced with riprap over a considerable length, which these organisms use. In addition, native species of invertebrates (e.g. caddisflies, mayflies) and fish (including protected fish and indicators of good water status: golden loach *Cobitis taenia*, white-finned gudgeon *Romanogobio belingi*, asp *Aspius aspius*, barbel *Barbus barbus*, stone loach *Barbatula barbatula*, burbot *Lota lota*) also use the stone substrate. Gradually degrading stone revetments therefore replace, in a controlled river, natural rock outcrops and riffles, characteristic of sections of large rivers in a state close to the natural one. The results of the wildlife surveys carried out by the investor showed the lack of invasive species of Gobiidae family in the border section of the Odra, which indicates that they probably have not yet inhabited this river, and certainly do not form numerous populations in it. The process of expansion of alien species will therefore not be inhibited by limiting the introduction of stone substrate into the Odra, because these species have high plasticity and use a variety of habitats, and their expansion is mainly conditioned by the availability of spreading routes.

Deutscher Naturschutzring (DNR) pointed out that the EIF+ method used to assess the condition of ichthyofauna is not a suitable method for large lowland rivers.

The report on the environmental impact of the project shows that the IBI PL method, used in the State Environmental Monitoring in Poland, was used to assess the ecological capacity of the water bodies on which modernisation works will be carried out, on the basis of the ichthyofauna. The IB1PL multimetric index used is a modification of the original American Index of Biotic Integrity and is adapted to the conditions of the large lowland rivers of Poland. The explanations provided by the investor show that references to the EIF+ method in the environmental impact report for the project concerned the method of data collection in the protocols, which is common for both methods.

Deutscher Naturschutzring (DNR) commented on the potential depletion of fish habitats as a result of the project. The modernisation works will contribute to a gradual unification of the sandy riverbed due to the disappearance of sandy point bars and shoals, which are important habitats for macrozoobenthos and such fish species as the maraena whiffish *Coregonus maraena*, white-finned gudgeon *Romanogobio belingi*, and the golden loach *Sabanajewia baltica*. Similarly, the wash-outs and hollows used by many fish species as winter habitats and hideouts, including the Atlantic sturgeon *Acipenser oxyrinchus*, are at

risk of disappearance. In addition, clamping of groyne heads indicated by the investor in the provided documentation will lower the number of replacement habitats in the riverbed important for fish spawning on gravel substrate, such as the barbel *Barbus barbus*, chub *Leuciscus cephalus*, dace *Leuciscus leuciscus*, and asp *Aspius aspius*. The association also proposed the demolition of revetments as an effective, environmentally friendly action.

It should be pointed out that in the updated report on the environmental impact of the project the investor took into account the submitted comments and proposed a catalogue of additional measures to minimise the impact of investments, dedicated to the preservation of the diversity of habitats in the Odra riverbed to the greatest possible extent. In particular, the following actions were proposed for implementation:

In places where river walls are to be constructed:

- using only natural materials and limiting the length of sections of the revetments to the necessary minimum,
- constructing the wall with an undulating line, i.e. constructing the wall in accordance with the existing terrain, without straightening the bank.
- demolition of existing revetments in places where they are not justified, i.e. behind the designed longitudinal dams in groyne fields cutting deeply into the bank, i.e. behind the designed longitudinal dam at groynes 12/675 - 16/675;

In the area of groyne fields adjacent to the reconstructed groynes:

- leaving oversized boulders and large woody debris in places that do not interfere with the designed works,
- introducing oversized boulders into selected groyne fields cutting deeply into the bank (all fields with a depth of approx. 1.5-2.0 m or more at MV W),
- reconstructing riffles of loose stones of various granulations (5-45 cm) on the downstream side of reconstructed or newly built groynes, as part of the stone structure of the groyne slope and foot - in each reconstructed or constructed groyne,
- creating 8 additional open oxbow habitats (bays with an area of 220-1320 m², a total of approx. 5300 m²) on sections of the surface water body of the Odra from the Nysa Łużycka to the Warta covered by works - in relation to the habitats of the spined loach *Cobitis taenia*, amur bitterling *Rhodeus amarus*, Unionidae mussels, and macrophytes,
- limiting the length of the wings at the reconstructed and built groynes (average length 11 m, maximum 30-35 m for approx. 5% of groynes) and the technology of wing construction limiting interference with the groyne field and the bank (construction from the edge towards the groyne, equipment moving along the belt of the bank intended to be occupied by the wing structure),
- replanting larger patches of vegetation (especially submerged vegetation and floating-leaved plants - nymphaeids, including all endangered patches of the fringed water lily *Nymphaoides peltata*) from the area of the works along the reconstructed groynes to the non-overgrown areas of selected groyne fields and space behind the dams - to ensure the maintenance of the diversity of macrophytes and habitats of the amur bitterling *Rhodeus amarus* and spawning grounds of phytophilic species, including the spined loach *Cobitis taenia*;

In places where longitudinal dams are to be constructed:

- planning and execution of overflows in the dam structure in the form of pipes integrated into the dam structure - 2 pipes of 1000 mm diameter for each groyne field behind the dam (one pipe positioned diagonally towards the bottom of the river and one pipe positioned towards the top of the river) and leaving oversized boulders and large woody debris (tree trunks and stumps) in spaces behind dams, as well as introducing a group of 4-5 oversized boulders into the spaces, every 50 m of the dam length.

The investor also abandoned the previously planned clamping of groynes with concrete, replacing this action with wedging the top layer of riprap with stone of a finer fraction. The expected deterioration in the quality of fish habitats as a result of the planned works will be reversible, and the additional minimisation measures will reduce the regeneration time of habitats from 10 years to 3-5 years. The anticipated loss of fish habitats will not result in a significant reduction in their overall numbers, as the most abundant species in the Odra are eurytopic species, which have high habitat plasticity. Temporary changes will concern the proportion of species and not the overall abundance of the fish community. It should be noted that the valuable habitats currently found in the Odra riverbed are closely related to the existence of the system of groynes and groyne fields. Should the reconstruction works on the existing river control structures be abandoned, further progressive degradation of these structures within a few decades would lead to their disappearance and the transformation of the Odra riverbed into a fairly homogeneous channel with straight banks of little morphological diversity. This would result in significant long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity. This is noticeable in the sections of the Odra, within which the groynes have degraded and in the sections where there river is not controlled with groynes. Therefore, reconstructing groynes is, in the long term, beneficial for the preservation of the habitat diversity of the section of the Odra in question, despite temporary and reversible loss of fish habitats as a result of modernisation works.

*The lack of precise quantification of the losses in the area of valuable habitats for fish such as spawning grounds, as well as habitats important for benthic invertebrates in the documentation provided was indicated by **Deutscher Naturschutzring (DNR)**. The issue of the loss of habitats in question was also raised by **Brandenburg - Unteres Odertal National Park Administration** and by **the Unteres Odertal National Park Administration** through the Brandenburg Ministry of Rural Development, Environment and Agriculture, **Ländliche Entwicklung, Umwelt und Landwirtschaft des Landes Brandenburg**.*

In the environmental impact report updated after the public consultation, the investor analysed the issue and estimated the extent of losses in habitats important for ichthyofauna resulting from the implementation of the investment. The documentation indicates the following predicted extent of habitat loss:

Within the surface water body of the Odra from the Nysa Łużycka to the Warta

*Riffles constituting a habitat for adult specimens of the golden loach *Sabanajewia aurata*, stone loach *Barbatula barbatula*, white-finned gudgeon *Romanogobio belingi*, and juvenile specimens of the *Leuciscus cephalus*, barbel *Barbus barbus*, burbot *Lota lota*, asp *Aspius aspius*, as well as the spawning grounds of lithiophilic fish - the estimated total area of losses in the habitat is 107 000 m², because riffles are present at one of the sides about 70% of the 205 groynes to be reconstructed;*

*Marginal lakes which are habitats and spawning grounds for phytophilic and pseudophilic fish such as the spined loach *Cobitis taenia*, amur bitterling *Rhodeus amarus*, and weatherfish *Misgurnus fossilis*, and habitats for economically important species such as the pike *Esox lucius*, tench *Tinca tinca*, European perch *Perca fluviatilis*, pike-perch *Sander lucioperca* - the estimated total area of habitat degradation is 61 500 m² because marginal lakes are present at one of the sides about 60% of the 205 groynes to be reconstructed;*

*Stream pools for adult specimens of species such as the asp *Aspius aspius*, chub *Leuciscus cephalus*, burbot *Lota lota*, barbel *Barbus barbus*, white-finned gudgeon *Romanogobio belingi*
- the estimated total area of losses in the habitat is 71 000 m² because stream pools are present at one of the sides of about 70% of 205 groynes to be reconstructed.*

Within the surface water body of the Odra from the Warta to the Western Odra

*Riffles constituting a habitat for adult specimens of the golden loach *Sabanajewia aurata*, stone loach*

Barbatula barbatula, white-finned gudgeon *Romanogobio belingi*, and juvenile specimens of the *Leuciscus cephalus*, barbel *Barbus barbus*, burbot *Lota lota*, asp *Aspius aspius*, as well as the spawning grounds of lithiophilic fish - the estimated total area of losses in the habitat is 47 300 m², because riffles are present at one of the sides about 50% of the 172 groynes intended for reconstruction;

Marginal lakes which are habitats and spawning grounds for phytophilic and pseudophilic fish such as the spined loach *Cobitis taenia*, amur bitterling *Rhodeus amarus*, and weatherfish *Misgurnus fossilis*, and habitats for economically important species such as the pike *Esox lucius*, tench *Tinca tinca*, European perch *Perca fluviatilis*, pike-perch *Sander lucioperca* - the estimated total area of habitat degradation is 36 050 m² because marginal lakes are present at one of the sides about 60% of the 172 groynes intended for the reconstruction;

Stream pools for adult specimens of species such as the asp *Aspius aspius*, chub *Leuciscus cephalus*, burbot *Lota lota*, barbel *Barbus barbus*, white-finned gudgeon *Romanogobio belingi*
- the estimated total area of losses in the habitat is 41 200 m² because stream pools are present at one of the sides of about 60% of 172 groynes to be reconstructed.

In addition, in connection with the planned construction of 27 new groynes, the total area of losses in habitats related to stream pools (10 500 m²) and marginal lakes (10 500 m²) was estimated.

In addition to their importance for fish fauna, these habitats also constitute sites for benthic macroinvertebrates.

However, it should be pointed out that the measures planned by the investor will allow the vast majority of lost habitats to be restored and even to increase their area. Riffles with a width of about 3 m will be reproduced in the structure of the foot and slope of each reconstructed or rebuilt groyne (half of the length of the downstream side of the groyne, in the middle region and closer to the groyne head). Oversized boulders will be introduced in each deep groyne field (1.5-2.0 m at SNQ) adjacent to a reconstructed groyne - plans provide for introducing groups of 4-5 boulders with approximate dimensions: height 120-150 cm, width - 80-120 cm, weight from 1.5 to 4.5 tonnes. Plans also provide for replanting endangered patches of vegetation (nymphaeids and submerged vegetation) - in the case of patches with an area of more than 10 m² and rush patches growing on the bottom (at the state for SNQ) (at least 50% of the area of the patch to be replanted) for each modernised or constructed groyne at which the patches occur. Plans also include the reconstruction of 8 oxbow habitats (bays) with the following parameters: length 50-100 m; irregular oval shape; average width 10-12 m; surface area 220-1320 m² (total 5300 m²); depth from 0.5 to 1.5-2.0 m; planned location: 1 - 582.4 km; 2 - 585.7 km; 3 - 602.3 km; 4 - 606.2 km; 5 - 606.6 km; 6 - 609.5 km; 7 - 616.5 km; 8 - 616.8 km. The documentation submitted by the investor shows that the highest possible rate of impact minimisation was applied, bearing in mind the limitations resulting from flood protection, shipping, and technical conditions, and the efficiency of activities will increase as the process of recovery of riverbed ecosystems progresses.

Deutscher Naturschutzring (DNR) raised the issue of *the impact of the project on the green snaketail Ophiogomphus cecilia*. A similar comment was submitted by **Brandenburg - Unteres Odertal National Park Administration** and by **the Unteres Odertal National Park Administration** through the Brandenburg Ministry of Rural Development, Environment and Agriculture, **Ländliche Entwicklung, Umwelt und Landwirtschaft des Landes Brandenburg**.

The report on the environmental impact of the project indicates that the investment will have a small, local impact on the populations of species in question. The highest concentration of specimens of the species is found in the shallowest places with relatively calm flow, located at the bank, while during the inventory it was found that the specimens of *Ophiogomphus cecilia* were not present on groyne heads. The species is widespread throughout the entire section of the border Odra Therefore, slight losses in the local population will not affect the condition of the supra-regional population and the local population will recover relatively quickly. The projected impact of the project on the population of the species will

have the form of scaring and disturbing of specimens and the local destruction of their habitats.

Deutscher Naturschutzring (DNR) raised the issue of *the assessment of the area of losses in natural habitat resources with code 3150 as a result of the implementation of the project and indicated the necessity to compensate for these losses.*

In accordance with the submitted material, the execution of modernisation works may cause deterioration of the habitat located by groynes no. 2/582 and 18/584. Direct destruction will concern 0.15 ha of habitat 3150 in Natura 2000 Słubice Riparian Forest PLH080013, which constitutes 0.94% of the resources in the abovementioned Natura 2000 site. Nevertheless, the authors of the report indicate that the expected amount of damage is an estimate and, as a result of detailed design data, this area may be significantly reduced. Nevertheless, the authors of the report indicate that the expected amount of damage is an estimate and, as a result of detailed design data, this area may be significantly reduced. The investor also indicated a catalogue of minimising measures in relation to the natural habitat in question. In order to reduce the risk of deterioration in the condition of patches of natural habitat, all earthworks, machine passage, storage of materials, etc. will be carried out taking into account the location of oxbows which are relatively permanent and often small in terms of the area, and their banks will not be strengthened or deformed, and vegetation will not be removed from them (among others, places where patches of natural habitat are located will be excluded as storage sites on sections of the Odra approx. 581.0-583.7 km; approx. 663.6 km; approx. 665.6 km; approx. 668.0-668.1 km; approx. 668.8-669.1 km; approx. 669.3-669.9 km; approx. 671.9-672.0 km). At the same time, as a consequence of the works, oxbows will not be excluded from the inter-embankment. In addition, the planning and execution of works in the riverbed in places of poorly flowing or standing waters (bays within groyne fields, stretches of weak current behind longitudinal dams) will take into account the need to protect populations of rare habitat species (e.g. water chestnut, fringed water lily, salvinia natans) and the work will be organised in such a way as not to endanger the conservation of these populations. In the event of an unavoidable conflict, diaspores of rare species shall be protected and moved by environmental supervision to a safe location, as close as possible, with similar habitat conditions, so as not to cause loss of their populations. Replanting vegetation patches characteristic of oxbows located in the Odra riverbed in the area of the works is also planned. This concerns endangered patches of vegetation (nymphaeids and submerged vegetation) - in the case of patches with an area of more than 10 m² and rush patches growing on the bottom (at the state for SNQ) (at least 50% of the area of the patch to be replanted) for each modernised or constructed groyne at which the patches occur. The patches will be replanted to new locations along the groynes that have already been reconstructed, from the downstream side (as an exception also the upstream side, if the groyne field is shallow - less than 1 m at SNQ). Due to the fact that shallow places occur on the downstream side more often, replanting plants at every second rebuilt groyne was suggested (alternately with the reconstructed riffles). All endangered patches of the fringed water lily *Nymphoides peltata* will also be replanted - regardless of their size.

The issue of threat to natural habitats with codes: 3150 and 3270 due to the long-term impact of the project on the morphological dynamics and the movement of sediments in the river was raised by Deutscher Naturschutzring (DNR). A similar comment was submitted by Brandenburg - Unteres Odertal National Park Administration and by the Unteres Odertal National Park Administration through the Brandenburg Ministry of Rural Development, Environment and Agriculture, Ländliche Entwicklung, Umwelt und Landwirtschaft des Landes Brandenburg.

Addressing the above remark, it should be pointed out that the oxbows constituting natural habitat code 3150 are habitats sensitive to accelerated sedimentation, leading to their shallowing and disappearance, and to eutrophication. The increase in anthropogenic pressure in the catchment area leads to an increased inflow of biogenic elements and allochthonous matter, which determines the increase in net primary production by phytoplankton and macrophytes present in these reservoirs. This results in an increase in water turbidity and a gradual disappearance of macrophytes. Intensive sedimentation of dead organic matter leads to the reservoir being filled by bottom sediments, which are formations classified as detritus

gytia. The decomposition of organic matter leads to depletion of oxygen dissolved in water and formation of anaerobic conditions, especially at low summer levels and in the winter. A key process for the functioning of oxbows is the periodic supply of fresh, oxygenated river waters. This occurs during water rises, when the water in the reservoir is replaced, and in some cases even when sediment is washed and washed out, which is understood as a “rejuvenation” of the reservoir. It is therefore extremely important to maintain the hydrological regime of the river with consecutive rises and lows, which will result in regular refreshment of the water in isolated water reservoirs located on the floodplain of the river. However, the regulation of water relations in the valley of the watercourse, leading to a gradual decrease in the water level, is dangerous for the existence of this natural habitat. This is because even a slight decrease in the groundwater table surrounding the oxbow causes, due to its small depth and volume, a lowering of the water level and its degradation.

In the conditions of the natural river valley, oxbows are formed as a result of the morphodynamic activity of the river, manifested in the ability to change the course of the riverbed, meandering, and cutting off its fragments. In the long term, the model of oxbow protection in such conditions assumes its dynamic durability, i.e. in parallel with the ageing and overgrowing of oxbows, the process of creating new ones takes place. Under the conditions of the controlled Odra, new oxbows no longer form, and the implementation of the project does not affect this. The result of the project will be an increasing morphological stabilisation of the river over time. Sections characterized by morphological imbalance occur in places of damage to river control structures, mainly where groynes are locally washed-out, and the dynamics of the river is too low to allow dynamic durability of oxbow habitats. In the current situation, it is therefore crucial to maintain a sufficiently high level of groundwater in the valley, which enables the reservoirs to last, and periodic contact (during overflows) with the river waters, rejuvenating the oxbow. Oxbows in the vicinity of the Odra bed are influenced by groundwater and river level, with the level the more variable the closer to the riverbed they are. As the investor pointed out, after the completion of the modernisation works, the level of the stabilised water table at medium flows will increase on average by several centimetres, which will slightly increase the level of groundwater in the littoral zone of the riverbed, and, consequently, the level of water in oxbows. This beneficial impact will decrease over the years as the riverbed deepens spontaneously. Deepening of the bottom at low water levels in the river is considered to be the cause of drying of areas adjacent to rivers. In this case, however, the expected changes will be smaller than those which occurred in the past few decades. Compared to the measurements from the 1960s the changes in the average levels of the Odra are usually about 10 cm, while above the mouth of the Nysa Łużycka to 590 km they are 10 cm lower, and at the mouth of the Warta – 10 cm higher. Below the Warta mouth, on long stretches, the average levels in the Odra are about 40 cm above the averages from the 1960s. Minor changes in groundwater level at the bed part of the valley bottom over a long period of time will not significantly affect the state of the natural habitat. The changes will be the result of long-term morphological processes caused by a slight correction of the parameters of the existing river control structures, which for natural habitats dependent on the dynamics of ecological conditions will constitute an impact of negligible significance. In addition, the long-term effect of the functioning of the modernised hydrotechnical structures in the form of groynes and longitudinal dams will be the formation of substitute habitats for oxbows, important for the maintenance and dispersion of species typical of the natural habitat with code 3150. These species are often found in side bays and branches of riverbeds. The overgrowing of groyne fields will result in the formation of standing water bays, which are already a habitat in the Odra valley, occupied by rare species characteristic of the natural habitat 3150, such as the fringed water lily *Nymphoides peltata* and water chestnut *Trapa natans*. Protected fish species characteristic of oxbows (spined loach *Cobitis taenia* and amur bitterling *Rhodeus amarus*) also find favourable living conditions in these alternative habitats. The planned longitudinal dams, which are designed to provide light rear flow even at low levels, will result in diversification of the current, creating conditions for slow-flowing or standing water zones. The habitats created behind the dams will therefore be similar in character to open oxbows. These impacts should be assessed as beneficial for the biodiversity of the natural habitat. Analysis of the planned scope of modernisation works indicates the possibility of factors unfavourable for macrophytes at the exploitation stage, requiring the application of minimisation

measures and compensatory actions within the meaning of the provisions of the *Act of 27 April 2001. Environmental Law* (Journal of Laws of 2001 No. 62, item 627, as amended). At the operation stage, there will be changes in the habitat conditions of macrophytes due to limiting the surface of shallow zones in groyne fields. This may cause disturbances and partial disappearance of macrophyte habitats of these environments. Also, a sectional change in sedimentation conditions and local elevation of the water table - accumulation of water within the reconstructed groynes may cause disturbances and partial disappearance of macrophyte complexes. The negative effects of the investment include the deterioration of the natural quality of the river habitat and the habitat of flora species in terms of hydromorphological criteria, the loss of structural elements important for the biodiversity of the natural habitat and the reversal of spontaneous renaturalisation processes - this impact will be reversible within a period of up to 10 years, and with the application of the planned minimisation measures, such as replanting patches of aquatic plants that works would interfere with into places where the works have already been completed, restoring open oxbow habitats in spaces behind dams and additional bays - within a period of 3-5 years. All found patches of the rare species *Nymphoides peltata* will be replanted. On the other hand, the sites of the fringed water lily *Nymphoides peltata* located on the German side of the Odra and on its potential sites outside the sections of the Odra where the investment will be carried out will not be significantly affected.

With regard to the natural habitat code 3270, it should be noted that a key determinant of the occurrence of the natural habitat in question is the occurrence of seasonal rises and drops of the water level. In the Odra conditions, following the control of the riverbed in past centuries, the habitat is rarely found on the banks of the river during summer water level drops. The most favourable substitute habitats in which the patches of the natural habitat in question are formed are related to the processes of accumulation of transported bed load in groyne fields. The functioning of the reconstructed river control structures at the stage of project operation will not result in the removal of shallows in groyne fields, however, it is to be expected that shallows will shift into areas with similar flow rates in groyne fields. The debris with larger fractions, moved by a slight increase in current velocity, will tend, among other things, to accumulate partially in groyne fields as well as in the inter-embankment area and will be discharged down the controlled riverbed. Groyne fields may become overgrown, but at the same time increased water velocity can flush material out of these areas and carry it down the river, resulting in typical groyne field dynamics of material accumulation and erosion processes. This will be conducive to the succession of vegetation, starting with pioneering communities typical of the natural habitat in question and ending with initial willow forests and thickets. During the operation of the river control structures, habitats associated with bars and silts will develop in similar conditions as at present. The difference will occur on sections where groynes will be rebuilt or where new ones will be constructed on sections which previously lacked them - the frequency of accumulation and erosion along the banks will increase, weakening their scale. Instead of rarely formed but extensive bars and silts, frequent deposits and silts will be formed, but with smaller surfaces. This has an impact on the indicator - the spatial structure of the habitat patches, on the one hand increasing the fragmentation of the habitat, on the other stabilising, disseminating, and increasing the frequency of habitat occurrence - so this impact will not be significant. The measures planned by the investor to minimise the impact of the investment will allow to limit the impact of the project on the natural habitat code 3270 at the stage of modernisation works.

Deutscher Naturschutzring (DNR) pointed out that *also the degraded, damaged groynes can have a hydraulic effect, and at the same time they are a valuable habitat element in the river.*

The explanations submitted by the investor show that in accordance with the results of physical modelling carried out for the purposes of *the Update of the concept of regulation of the Border Odra watercourse* constituting the basis of the project, the existing river control system insufficient to meet the assumed parameters and to compensate for shallows preventing effective icebreaking. Degraded groynes do not move the current towards the river axis or do not move it sufficiently.

The insufficient assessment of the long-term effects of the project was raised by **Deutscher Naturschutzring (DNR)**

The investment project is planned in accordance with the assumptions of the Polish-German *Update of the Concept of the Border Odra Watercourse*, prepared by the Federal Waterways Engineering and Research Institute in Karlsruhe (BAW) with the participation of German and Polish experts, developed in 2014, and the *Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015*. The aim of the BAW concept was to determine the scope of modernisation works necessary to achieve the river depth suitable for the operation of icebreakers at low and medium water levels, with minimal interference with the water level and the existing river control system. *The update of the concept of the Border Odra watercourse* contains a number of precise guidelines for the design of river control structures, which are binding for both Parties to the *Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015*.

Two different and complementary research methods were used for the purposes of the development of the *Update of the concept of the Border Odra Watercourse*:

- comprehensive one-dimensional hydrodynamic numerical model of the entire border section of the Odra (hereinafter: 1D-MTR model) - using this model, the water level at different flow rates, the balance of river load transport and resulting changes in the bottom and changes in the position of the water table over a simulated 40-year forecasting period were calculated. The geometry of the riverbed is described by cross-sections distributed in the longitudinal profile of the river at intervals of not less than 100 m. The model was verified and calibrated. Calibration was carried out with appropriate values of the Manning roughness coefficient selected. The verification was carried out by comparing the flow values calculated using the model and measured with an ADCP current meter. Comparison of water table elevations and flow rates shows a very good model performance;
- the physical model of sediment transport of the Odra section in the Hohenwutzen area, which made it possible to carry out a variant analysis of river control structures that differ in types and dimensions, as well as to choose the variant for implementation - this model allows very accurate mapping of the impact of the analysed variants of river control systems on the development of the average height of the river bottom, its form, as well as on the water table. The physical model made it possible to obtain an image of the formation of the river bottom deformations as regards mesoforms (bars and folds), as well as local deformations in the area of groyne heads and groyne fields.

A wide range of data and source materials were used for the construction of the model system, including natural data (probing results, data on the location of the water table, data on the distribution of bottom grain size and transport of solid bottom material), maps, result of the BAW studies on maintenance and regulatory projects from the years 1995-2012, reports and research results of the Water and Navigation Office in Eberswald, RZGW in Szczecin and third parties (including Warsaw University of Technology, Szczecin University of Technology, Federal Institute for Hydrology - Bundesanstalt für Gewässerkunde). A dense grid of cross-sections was used to construct the model (cross-sections every 100-200 m for the entire border section of the river and more dense in characteristic, hydraulically complicated places). In addition, bottom roughness and riverbed parameters were tested. The model was calibrated on the basis of characteristic flow values and known natural data (water table position, flow velocity and sedimentological parameters) from the previously agreed mean annual discharge for normal flow rates. The geometry of the model includes terrain obstacles in the form of river control structures.

On the basis of the modelling carried out as part of the preparation of the *Update of the concept of the border Odra watercourse*, a set of results was obtained for the whole section of the Border Odra with regard to both low and high flood flows.

The modelling results discussed in detail in *the Update of the concept of regulation of the Border Odra watercourse* and the inference based on these results formed the basis for the environmental impact

assessment of the project, including the assessment of the impact of the investment on the increase of flood risk and the assessment of the impact of the investment on elements of ecological status and the network of Natura 2000 sites.

According to the documentation attached to the application for issuing an environmental permit, in accordance with the results of modelling and assumptions of the *Updating the concept of regulation of the Border Odra watercourse*, an optimal variant was selected for implementation, which will allow to achieve the objective of the project, while minimally interfering with water levels.

On the basis of the modelling, results were obtained in relation to the raising and lowering of the water table both at low and high (flood) water levels, lowering and raising after the construction works, and the height of the bottom without the works conducted in relation to the current conditions, which was supplemented in the submitted documentation by appropriate graphs illustrating the results of the calculations.

Based on the results of the *Update of the concept of regulation of the Border Odra watercourse*, as well as other pre-design materials, such as bottom surveys and maps for design purposes with precisely marked terrestrial terrain elevations, conclusions were drawn regarding the predicted changes in groundwater level and the assessment of the potential increase in flood risk, which provided a sufficient basis for analysis, inference, as well as a comprehensive assessment of the impact of the investment on the environment, including on Natura 2000 sites. The level of groundwater in the areas adjacent to the riverbed is closely related to the level of water in the river, therefore knowledge of changes in this level caused by the construction works was the basis for the impact assessment of the project and gave the basis to the exclude significantly negative impacts.

In the course of the impact assessment of the project, on the basis of the results from the *Update of the concept of regulation of the Border Odra watercourse*, it was determined which changes in water levels will occur in the case of carrying out the construction works and in the case of abandoning the project. Comparison of these data allowed to determine the extent of the difference in water height in both cases. According to the submitted documentation, the scope of model works carried out for the purposes of the *Update of the concept of regulation of the Border Odra watercourse* took into account a 40-year period following the completion of construction works. As indicated in the project documentation, during this period the bottom of the watercourse will stabilise on the expected elevation without further significant erosion, and the changes in the height of the water table in subsequent years will be negligible and will depend virtually exclusively on the natural hydrological conditions in the river. In this way, the resulting data of physical modelling and calculations of the one-dimensional model allowed to draw conclusions exhaustively summarising the environmental impact assessment and the risk of flooding.

The above conclusions were supplemented with the results of the analysis carried out for the design works for the location with an extremely complex hydraulic situation, i.e. the Odra - Warta junction. In addition, model tests were carried out for this location using the 2D-MTR two-dimensional numerical model of solid material transport, which was properly calibrated. The two-dimensional model allowed to obtain the distribution of average velocities in the risers, determine the orientation of velocity vectors, and determine the deformations of the bottom caused by the influence of flowing water on river sediments. The obtained results allowed to determine the behaviour tendencies of the bottom of the watercourse after the works - they indicated that there would be no change in hydraulic conditions shaping the movement of riverbed mesoforms, and the transport of load will continue as a result of the movement of diagonal bars in the riverbed. The two-dimensional model was executed in accordance with the recommendations of the *Update of the concept of regulation of the Border Odra watercourse* only for locations with particularly complex hydraulic conditions, for which inference on the basis of the one-dimensional model had to be specified. Thus, the 2D model was not found necessary for the remaining parts of the riverbed. The use of two-dimensional modelling complements the data obtained in one-dimensional modelling. Due to the calculation time and the method of describing the riverbed geometry (digital bottom model), it is used only in places with complex morphometry, e.g. at riverbed bifurcations or connections with a large tributary.

The set of results obtained as part of the development of the *Update of the concept of regulation of the*

Border Odra watercourse and from the 2D modelling report made for the abovementioned location allowed to precisely determine the minimum scope of work for achieving the appropriate depth for icebreakers and the effect they will cause in the aquatic environment in terms of changing water levels and the state of the bottom. Model tests described in these documents are sufficient to determine the impact of the works on the environment and on the level of flood risk.

The environmental impact assessment for the planned modernisation was carried out on the basis of an analysis of the modelling results. Environmental surveys have shown that there are valuable elements of the natural environment in the vicinity of the Odra riverbed, in particular natural habitats dependent on waters. Therefore, the following problems were defined for analysis using the results of numerical modelling, taking into account the current state variant (WO) and the recommended variant (KRC-W5):

- impact on groundwater levels,
- change of the current hydrological system,
- changes in flows, length of stagnation of water after rises, dynamics of water levels - annual extreme lows and rises, deposition of material as a result of rises.

The research and calculations presented in the environmental impact report based on *the Update of the concept of regulation of the Border Odra watercourse* clearly show that the rise of the water table at high and flood levels, as well as its lowering in the case of lows (which is a natural consequence of the lowering of the bottom) will be small in relation to the conditions on the river in its current state, and the implementation of the investment does not increase the risk of flooding and will not lead to a significant lowering of the groundwater table, which could result in the drying of bank areas. The maximum predicted lowering of the bottom, and thus the estimated maximum predicted lowering of the groundwater table according to the results of the conducted analyses, could potentially range from a few to several centimetres, depending on the section of the river. However, the results of modelling carried out for the purposes of *the Update of the concept of the border Odra watercourse* indicate that during low water levels, the water table will rise on average by 15-20 cm on most sections, and by a maximum of 25 cm on the section located at approx. 585.0 km. In addition, the analysis of the results of the conducted tests and models indicates that the functioning of the reconstructed river control structures will not affect the current hydrological system of the Odra. The planned activities will not affect the way in which the river is fed, the volume of flows and the nature and course of lows or highs, and slight increases in the level of the water table can be expected in the long term. The results of the analyses carried out for *the Update of the concept of the border Odra watercourse* showed that the functioning of the reconstructed river control structures will not affect the volume of flows and the dynamics of highs and lows, or the lowering of the level of groundwater in the inter-embankment, which is also confirmed by the results of modelling carried out on the section of the free-flowing Odra, which were also taken into account in the project's environmental impact assessment.

On the basis of the results of the analyses presented above, long-term hydrological and hydromorphological effects of the project were determined, which was the starting point for carrying out the project's long-term environmental impact assessment, including the impact on animated nature and the objectives of nature conservation. On the basis of the submitted documents and in the light of the presented results of hydrodynamic modelling, it can be concluded that the implementation of the investment will not result in a deterioration of the conditions thanks to which valuable natural habitats providing the environment for protected animal species are maintained in the Odra valley.

Deutscher Naturschutzring (DNR) pointed out *errors in the project documentation provided, such as incorrect table captions.*

Having considered the comments submitted in the public consultation, the investor submitted an updated report on the environmental impact of the project, in which the indicated errors were corrected.

Only part of the original project documentation was translated into German and handed over to the German side - compared to the Polish-language version, some chapters and annexes of the environmental impact report were not made available, which hindered the correct assessment of the planned project. This issue was raised by the German water and shipping authority **Wasserstraßen- und Schifffahrtsverwaltung des Bundes (WSV)**, the Barnim district office **Amt für nachhaltige Entwicklung, Bau, Kataster und Vermessung Strukturentwicklung Landkreis Barnim**, the **Head of the Oder-Spree district**, the Brandenburg Ministry of Rural Development, Environment and Agriculture, **Ministerium für Ländliche Entwicklung, the Umwelt und Landwirtschaft des Landes Brandenburg**, **Frauke Bennett, Pia Isle, Matthias Dörr, Henrike Rieken, Nils Naber, Deutscher Naturschutzring (DNR)**.

In accordance with the requirements of the procedure for assessing the transboundary impact of the project on the environment, the investor is obliged to provide the relevant part of the environmental impact report translated into the language of the affected party, which will enable the country on whose territory the planned project may have an impact to assess the potential transboundary environmental impact - hence the lack of some elements of the report in the documentation submitted to the German side in relation to the original documentation submitted in Polish in the procedure for issuing an environmental permit. In view of the numerous references made to this issue during the cross-border consultations, the investor undertook to translate all the documentation in question into German. The German translation of the entire environmental impact report, including all annexes, was subsequently made available to the German side during the cross-border consultations held from 31.07.2019 to 29.08.2019.

The documents made available to the German side were of low quality, which made them difficult to understand and interpret and prevented a proper assessment of the project. This issue was raised by: **Frauke Bennett, Pia Isle, Matthias Dörr, Henrike Rieken, Nils Naber**, Barnim district office **Amt für nachhaltige Entwicklung, Bau, Kataster und Vermessung Strukturentwicklung Landkreis Barnim**, the **Head of the Oder-Spree district**, the **Regionale Planungsgemeinschaft Oderland-Spree Office**, Brandenburg Ministry of Rural Development, Environment and Agriculture **Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft des Landes Brandenburg** and **Deutscher Naturschutzring (DNR)**.

The investor apologized for the quality of the German translation and at the same time undertook to have the documentation translated again, by a different translation agency. The German translation of the entire environmental impact report, including all annexes, was subsequently made available to the German side during the cross-border consultations held from 31.07.2019 to 29.08.2019.

The issue of *no meeting with the participation of the public organised in the Federal Republic of Germany, during which the scope of the project could be discussed and questions from interested parties could be answered*, was raised by the following persons: **Frauke Bennett, Matthias Dörr, Pia Isle, Henrike Rieken, Nils Naber**

The investor organized an open meeting with the public on 26.08.2019 in Frankfurt (Oder) in the Federal Republic of Germany, in which he presented the scope of the project and its impact on the environment, where there was a possibility of asking questions and conducting a discussion. The meeting was not associated with any of the administrative procedures. It was an element of an information campaign conducted by the investor concerning the implementation of the Odra-Vistula Flood Management Project, of which the project to be implemented is part. The report from the meeting and all the presentations were additionally published on the publicly available website of the project:
<http://bs.rzgw.szczecin.pl/aktualnosci/14/sumsumnie-spotkania-we-frankfurcie-nad-odra-z-o/>

The documentation was made available for a period of 30 days, which was too short. This issue was raised by:

Frauke Bennett, Matthias Dörr, Pia Isle, Henrike Rieken, Nils Naber, Deutscher Naturschutzring (DNR).

The German side had the opportunity to read the documentation and to make comments for the same period of time as planned for the Polish public, i.e. the public of the party of origin. This is in accordance with the *Agreement between the Government of the Republic of Poland and the Government of the Federal Republic of Germany on the implementation of the Convention on Environmental Impact Assessment in a Transboundary Context of 25 February, 1991, signed in Neuhardenberg on 11 April 2006.*

The following entities expressed their support for the project: **Regionale Planungsgemeinschaft Oderland-Spree office**, Chamber of Commerce and Industry of East Brandenburg **Industrie- und Handelskammer Ostbrandenburg**.

During the consultations, the following parties indicated that they were not submitting comments or that the project in question did not affect their activities: Director of the **Amt Oder-Welse Office**, Office for the Conservation of Monuments and the National Archaeological Museum of the Federal State of Brandenburg **Land Brandenburg, Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum**, Director of the Office in Neuzelle (**Amt Neuzelle**), Regional Planning Office **Uckermark-Barnim Regionale Planungsgemeinschaft Uckermark-Barnim**, Director of the Brieskow-Finkenheerd Office (**Amt Brieskow-Finkenheerd**).

2. Forwarding comments and requests by the General Director for Environment Protection
by letter of 09.09.2019, ref. no.: DOOŚ- TSOOŚ.440.3.2018.PR.9), consultations
on 31.07.2019 -29.08.2019

The Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Brandenburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft** raised the *issue of the impact of the project noise emission on residential areas on the German side.*

In response to this comment, the investor added appropriate analyses to the project documentation. Acoustic analyses were carried out for two towns located on the German side, in the immediate vicinity of the Odra riverbed: Hohenwutzen and Frankfurt (Oder). In the submitted acoustic analysis, acoustically protected areas were specified in the local zoning plan VBP 08-004 “Residential development area Schulstraße/Odra bank” in Frankfurt (Oder). These areas are general residential areas (Allgemeines Wohngebiet). It is assumed that the remaining protected areas along the Odra in Frankfurt (Oder) and Hohenwutzen are also general residential areas. The general regulation AVV Baulärm was used to assess the impact on the sites, according to which in this case the limit value during the day is 55 dB (A) and the assessment period is 13 hours - from 7 a.m. to 8 p.m. It is assumed that the work will only take place at the time of day as defined in the German regulations, i.e. it will start after 7 am and end before 8 pm. According to the AVV Baulärm regulation, measures to reduce environmental noise should be ordered if the immission factor is exceeded by more than 5 dB, i.e. if the level of 60 dB is exceeded during the day. The investor presented the results of the calculations of receptors located on individual floors of residential buildings at Mühlengasse in Frankfurt (Oder) and Hohenwutzen. The conducted analysis shows that at no receptor was the level of 60 dB, which determines the need for protective measures,

exceed, and the isoline at this level is entirely within the Odra riverbed. Therefore, there is no need for additional acoustic protection to protect residential areas along the German side of the Odra.

The Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Brandenburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft** raised the issue of *the impact of the project on the integrity of Natura 2000 sites and their objects of protection, in particular on riparian forest vegetation due to the possibility of changes in water relations as a result of the works*. Similar comments were submitted by the Head of Oder-Spree district: Lower Office for Nature Conservation **Landkreis Oder-Spree Der Landrat: Unter Naturschutzbehörd.**

Addressing the above comment, it should be pointed out that the project involves the modernisation of existing hydrotechnical structures located on a river heavily transformed by human, which was already regulated in the 19th century. This is when the most significant changes in the longitudinal profile of the river occurred, resulting in a new level of its equilibrium being established. According to the explanations submitted by the investor, the modernisation of the existing structures will not affect the hydrological system of the Odra, which is dependent on the conditions of supply and drainage from the catchment area. The project will also not cause any significant changes in the location of the water table in the riverbed, the size, or dynamics of the flow and transport of river load, as discussed in the report on the environmental impact of the project. Taking into account the relatively small amounts of river load transported in the lower Odra riverbed, it is not expected that spaces between groynes will be overgrown, that the material already deposited on the new floodplain will be significantly eroded, or that the elevation of the floodplain will rise significantly. Nor will the project change the flow conditions at high waters, because the parameters of the river control structures to be modernised are optimised to regulate the hydraulic conditions of medium and low flows - according to the results of hydrodynamic modelling, the medium water level is expected to increase by about 20 cm, while the water levels at high flows above SWQ (>900 m³/s) as well as at low flows below SNQ (<100 m³/s) will increase by only 5-10 cm. Therefore, no significant changes in the conditions affecting the occurrence of natural habitats and associated animal species in the Odra and its valley are foreseen. In addition, the implementation of modernisation works on the two banks of the Odra at different times will allow for partial regeneration of aquatic vegetation complexes and fish and aquatic invertebrate habitats and will allow them to be settled by organisms which use refugias on the side that is not currently a site of works. According to the submitted documentation, there is no basis for forecasting that the permanent functions of the Natura 2000 sites on the German side could be impaired or that their integrity and coherence could be interrupted. The existing hydrotechnical structures of the border section of the Odra are aimed at regulating the water flows in the river within the range of low and medium levels. It does not affect high (including catastrophic) flows or the frequency, extent, or duration of flooding of river-dependent habitats. The planned modernisation of river control structures will not change this - this infrastructure will continue to regulate the river at its low and medium levels, without affecting high (including catastrophic) flows or the possibility of the inter-embankment area flooding. Initially a slight increase in the water level can be expected (due to the refocusing of the current by rebuilt groynes), which will, in time, return to the state before the modernisation works. There is therefore no reason to fear that the riparian forest habitat will be deprived of periodic flooding by high waters, which is a necessary (cardinal) factor for its preservation with a good conservation status in the long term. Following the modernisation works, a gradual lowering of the Odra bottom elevations on some parts of the river is expected, which may result in a lowering of the groundwater table. However, according to the documentation submitted by the investor, it will be on average a few, maximum 12 centimetres, and will not pose a significant threat to riparian forests. More broadly, with regard to the impact of the investment on the condition of riparian forests, it should be pointed out that riparian forests in a valley of a large river, such as the Odra require their habitat to be subject to periodic flooding by river waters and require fluvisol-forming processes or processes of black soil (or marshy soil) formation on low peats (maintained due to the adequate wetting of the habitat made possible by the occurrence of periodic flooding by river waters and/or horizontal movement of shallow

groundwater). Natural factors threatening the habitat of riparian forests and the forest stands themselves include: flooding by excessive accumulation of flood water, resulting in the extinction of stands, drying of the habitat as a result of a significant shifting of the meandering riverbed and destruction of the habitat and stand as a result of side erosion of the riverbed or washing out of the habitat by risen river waters. These natural factors are part of the ecology of riparian forests. The anthropogenic factors threatening riparian forests include, above all, intensive control of the river reducing the range and frequency of flooding by rising waters, cutting down stands from the river with flood embankments, permanently eliminating periodic flooding of riparian forests and drainage of the river valley leading to the drying of the habitat. The indicated factors will not occur as a result of the implementation of the project. The disappearance of periodical flooding by the river's rising waters, combined with the lowering of the groundwater table leads to the drying of riparian habitat, which facilitates the entry of undergrowth and ground cover plant species and trees typical of broadleaved forests. At the same time, the process of fluvisol browning or peat soil moorshification begins. The most important factor determining the good conservation status of riparian forests in the conditions of the valley of a large river is periodic flooding of the riparian forest habitats by high river waters. This flooding ensures the prevention of the process of riparian forests turning into broadleaved forests because species typical of broadleaved forests do not tolerate flooding, as well as the maintenance of the fluvisol-forming process. As indicated in the project documentation, the investment will not affect the regime of seasonal flooding of the river, and the changes in the groundwater table level will be small. In view of the above, there is no reason to fear that the implementation of the planned project will cause damage to the habitat of riverside riparian forests due to any changed to the hydrological regime of the river necessary for their functioning.

Comments submitted by **the Unteres Odertal National Park Board** via the Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Brandenburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft** indicate that *the implementation of the project will have a significant negative impact on the protected animal and plant species as well as on biodiversity, water, and landscape and the interactions between them. The objects of protection of Natura 2000 sites are under threat, including water-dependent natural habitats, fish species and species of invertebrates, water birds and mammals, and birds and dependent on waters. The results of the project are expected to include permanent changes in the flow, increase in the flow velocity, movement of the bottom substrate (movement of river load and disappearance of sandy and silt bars), release of toxic substances from the bottom substrate, deepening of the riverbed and lowering of the river and groundwater level in the adjacent areas, especially at low water levels. These changes will contribute to a significant, lasting deterioration in the status of natural habitats dependent on water.* Similar issues were also raised by the Head of Märkisch-Oderland district **Landkreis Markisch-Oderland Der Landrat** , Office for Sustainable Development, Construction, Cadastre and Geodesy of Barnim **Landkreis Barnim Amt für nachhaltige Entwicklung, Bau, Kataster und Vermessung**, National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)**

Addressing the above comments, it should be pointed out that the project involves the modernisation of existing hydrotechnical structures located on a river heavily transformed by human, which was already regulated in the 19th century. This is when the most significant changes in the longitudinal profile of the river occurred, resulting in a new level of its equilibrium being established. According to the explanations submitted by the investor, the modernisation of the existing structures will not affect the hydrological system of the Odra, which is dependent on the conditions of supply and drainage from the catchment area. The project will also not cause any significant changes in the location of the water table in the riverbed, the size, or dynamics of the flow and transport of river load, as discussed in the report on the environmental impact of the project. Taking into account the relatively small amounts of river load transported in the lower Odra riverbed, it is not expected that spaces between groynes will be overgrown, that the material already deposited on the new floodplain will be significantly eroded, or that the elevation of the floodplain will rise significantly. Nor will the project change the flow conditions at high waters,

because the parameters of the river control structures to be modernised are optimised to regulate the hydraulic conditions of medium and low flows - according to the results of hydrodynamic modelling, the medium water level is expected to increase by about 20 cm, while the water levels at high flows above SWQ ($>900 \text{ m}^3/\text{s}$) as well as at low flows below SNQ ($<100 \text{ m}^3/\text{s}$) will increase by only 5-10 cm. Therefore, no significant changes in the conditions affecting the occurrence of natural habitats and associated animal species in the Odra and its valley are foreseen. In addition, the implementation of modernisation works on the two banks of the Odra at different times will allow for partial regeneration of aquatic vegetation complexes and fish and aquatic invertebrate habitats and will allow them to be settled by organisms which use refugias on the side that is not currently a site of works. It should be noted that the valuable habitats currently found in the Odra riverbed are closely related to the existence of the system of groynes and groyne fields. Should the reconstruction works on the existing river control structures be abandoned, further progressive degradation of these structures within a few decades would lead to their disappearance and the transformation of the Odra riverbed into a fairly homogeneous channel with straight banks of little morphological diversity. This would result in significant long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity. This is noticeable in the sections of the Odra, within which the groynes have degraded and in the sections where there river is not controlled with groynes. Therefore, reconstructing groynes is, in the long term, beneficial for the preservation of the habitat diversity of the section of the Odra in question, despite temporary and reversible loss of fish habitats as a result of modernisation works. The anticipated loss of fish habitats will not result in a significant reduction in their overall numbers, as the most abundant species in the Odra are eurytopic species, which have high habitat plasticity. Temporary changes will affect the proportion of species and not the overall size of the community and will not significantly affect the availability of food for birds feeding on fish. The natural structure of the Odra valley area, in particular the floodplains, with its mosaic of habitats typical of natural valleys of large lowland rivers which are not intensively used, creates a valuable living environment for many groups of organisms, including in particular waterfowl, waders, and large predators. Due to the fact that the implementation of the investment will not significantly change the hydrological regime of the Odra, including the natural floods occurring in its valley during seasonal rises which ensure conditions for natural habitats constituting habitats for species of these groups of animals, it is not expected that any significant impacts will occur in relation to the population of these species. Furthermore, with regard to the issue of the project's impact on the preservation of biodiversity raised in the abovementioned comments, it should be pointed out that high biodiversity is fostered by a wide variety of environmental conditions manifested by a large number of microhabitats and, consequently, resources available to organisms of different species, with different ecological requirements. Large capacity habitats can accommodate a large number of specimens, which naturally increases the likelihood of finding more species. The local abundance of species is also proportional to regional abundance. The structure of complexes depends on the biological properties of the species and the interactions between them, and the composition of local complexes depends on exchanges with neighbouring complexes, which together form a species pool specific to the region. The project will be carried out on designated sections of the river, so migration of individuals along the entire border Odra will be possible. In addition, the exchange of specimens will be facilitated by the presence of large wildlife corridors within the investment area and in its vicinity, which increases the ability of organisms to spread and, consequently, their ability to colonise affected habitats. In each ecosystem, organisms of different species coexist, together forming a food chain. High mortality in the population of one species could therefore affect the other links of the food web. However, in the case of the analysed project, thanks to appropriate minimisation measures, no significant threat was found in relation to any ecological group of organisms. Therefore, no significant disturbances in the food chain are anticipated. According to the submitted documentation, there is no basis for forecasting that the permanent functions of the Natura 2000 sites on the German side could be impaired or that their integrity and coherence could be interrupted.

In order to assess the potential for increased release of pollutants from the mobilised bottom substrate, the investor conducted detailed analyses in this regard, the results of which were submitted to the authority

The basis for carrying out this analysis were the results of laboratory tests carried out on samples of bottom sediments taken from 5 points located on different sections of the Odra (assessment of sediment contamination) and the results of hydrological analysis carried out using the two-dimensional mathematical model DynaRICE, which gave values of unit flows and tangent stresses at the bottom, which in turn can be compared with the limit diameters of river load grain, which can be eroded as a result of the flowing water. The aim of the conducted analysis was to assess the increase of the erosion potential of the Odra after the modernisation works, to assess the contamination of bottom sediments, and to determine whether the load extracted from the bottom will be deposited in Lake Dąbie or transferred to the Szczecin Lagoon and further to the Baltic Sea. The results of the analysis showed that, as a result of the works, the erosion potential of the Odra will increase only on a part of the modernised sections of the river, and the increase in tangent stresses can be estimated at 10%, which means that the dynamics of river load traffic will increase locally, but no sudden increase in bottom erosion in a large area of the river bottom is expected. In addition, all bed load and most of the suspended load will accumulate in Lake Dąbie. The results showed that sediments from the bottom of the Odra are not contaminated or are only slightly contaminated. Therefore, it should be concluded that the planned works will not cause a risk of an increased inflow of pollution to waters.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs and Deutscher Naturschutzring (DNR)** referred to *the assessment of the project's impact on natural habitats presented by the investor - in their opinion, this assessment is limited to the results of the wildlife inventory carried out, and there no information on the conservation status of the natural habitats indicated, the potential impact of the project on their patches, and the minimising activities dedicated to them.*

The project documentation presents both the results of the field inventory of natural habitats, as well as the analysis of these results, data from the scientific literature, data from planning documents, such as plans of conservation tasks of Natura 2000 sites, it specifies the potential threats determined in relation to a given natural habitat, both indicated for a given form of nature conservation, within which this natural habitat occurs, as well as the threats identified as part of the assessment of the environmental impact of the investment. Direct conflicts of investments with patches of natural habitats were also indicated and minimisation actions were planned to limit the impact of the project on these elements of the environment. Although the field inventory carried out by the investor included only patches of natural habitats located on the Polish side of the Odra, the other elements of the assessment mentioned above were also taken into account in relation to natural habitats in the Federal Republic of Germany. The minimisation measures planned for natural habitats include:

- ban on locating material storage sites within patches of natural habitats;
- seasonal restrictions on the execution of works;
- using materials which facilitate vegetation growth, not clamping groynes with cement mortar;
- replanting patches of submerged plants, rushes, and nymphaeids associated with habitat code 3150 to sites where construction work has been completed;
- replanting rare species of plants characteristic of habitat code 3150 and preserving diaspores and reintroducing the species *Corrigiola litoralis* characteristic of habitat code 3270;
- creating additional bay - oxbow habitats, as substitute habitats that can be colonised by the vegetation characteristic of the natural habitat code 3150;
- removing invasive vegetation along the bank;
- conducting works with environmental supervision.

The Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Branderburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft** indicated that *the impact of the project, including in the transboundary dimension, is strongly negative, in particular with regard to*

the ban on deterioration of water status resulting from Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy and the predicted losses of natural habitats and species subject to protection in Natura 2000 sites. Similar comments were submitted by the National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR).**

Addressing the above, it should be pointed out that the border section of the Odra has undergone significant anthropogenic modifications related to flood protection (embankments), as well as the use of the river as a waterway. The river course was shortened, the meanders were cut off, numerous structures concentrating and directing the current - groyne and river walls - were constructed. Despite anthropogenic transformations, single oxbow lakes have been preserved within the floodplain - one-sided open and closed ones with no side arms or drainage oxbows. Significant sections of the river are embanked, however, usually the embankments are located at a distance of several dozen to several hundred meters from the riverbed, which allows to preserve some of the riverside environments typical of the floodplain area. Some of the closed oxbows, which lie in the inter-embankment, can periodically connect with the river at high water levels, but some of them are located outside the embankments and permanently cut off from the river. Almost the entire course of the Odra on the analysed section is subject to river control in the form of groyne located at both banks. These groyne are intended to maintain the concentration of the current in the central part of the riverbed and the required depth of the fairway, and to prevent erosion of the banks. A significant number of the groyne show signs of degradation of varying degrees - on these sections the current part of the riverbed expands significantly. Groyne fields are in many places covered with sand, and their fragments which are cut off from the stream - covered with submerged vegetation, floating-leaved vegetation, and rushes. The morphology of the border section of the Odra indicates a strong transformation of the course of the riverbed and the shape of its banks, while maintaining some of the riverside habitats and transverse communication within the floodplain between the embankments. There are no of riverbed forms typical for large rivers: sandy bars at the banks and in the middle of the riverbed, side arms, variable course of the current at one or the other bank. At the same time, the spaces between groyne form artificial habitats, creating convenient hiding places for fish and macroinvertebrates between larger stones. In addition, transverse connection with preserved oxbows, as well as the creation of substitute habitats of this type in the deeply indented groyne fields, ensures maintenance of habitat diversity, availability of spawning and fry growth sites for phytophilic species and habitats for protected small fish species. These transformations of the central and lower Odra riverbed are related to its adaptation to the function of a waterway. They originated mainly in the 19th and 20th centuries, when the river course was shortened, a number of bends were straightened, and the banks were strengthened with a system of groyne. As a result, the Odra lost its natural character, and the occurrence of riverbed forms typical of unregulated great lowland rivers was significantly reduced. The Odra is also currently a significant waterway of international importance, whose maintenance is one of the economic priorities. In addition, the ice phenomena in the Odra pose the risk of ice jam-related floods of significant size, when the accumulated ice in sections blocks the outflow of water, especially during spring water level rises. Effective prevention of such floods on the Odra requires ice breaking operations with the use of large size, powerful units. In order to ensure that such operations can be carried out, it is necessary to maintain the appropriate navigability parameters of the Odra for icebreakers, which is the overarching objective of the investment. It should be noted that, due to the transformations described above, the valuable habitats of fish and other aquatic organisms currently found in the Odra riverbed are closely related to the existence of the system of groyne and groyne fields. In the Odra, a controlled river, the distinguished hydromorphological units are of anthropogenic origin, showing characteristics similar to certain types of natural river habitats. This is due to their limited diversity and repeatability, associated with systematic location of control structures. However, clear preferences of different ichthyofauna groups for habitat types can be observed. Maintaining such a structure of riverbank control in a regulated river is necessary in order to maintain its natural functions. If reconstruction work on existing river control structures were to be abandoned, spontaneous habitat restoration would still occur, which in the near

future (10-30 years) would result in maintaining or increasing habitat diversity and diversity of aquatic organism communities. However, further progressive degradation of these structures within a few decades - or a few hundred years - would lead to their disappearance and the transformation of the Odra riverbed into a fairly homogeneous channel with straight banks of little morphological diversity. This would result in significant long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity. This is clearly visible on sections of the Odra within which an almost complete degradation of groynes has already occurred, and on sections where there is no control with groynes, and the riverbed is straightened, with banks strengthened with riprap. The presented conditions show that maintaining the existing control groynes on the banks of the Odra (and consequently their periodic reconstruction and reconstruction) is beneficial for maintaining the current diversity of habitats in the regulated riverbed, while maintaining its economic functions and the use of the areas by the river. Leaving the Odra control structures completely without interference and necessary repairs would lead to its gradual complete degradation. In the longer term, this would result in depletion of habitats in a straightened riverbed, while drastically worsening shipping conditions and increasing the risk of jam-related floods, given the impossibility of using icebreakers. Maintaining groynes in good condition, in addition to the tangible benefits of enabling effective icebreaking to prevent flooding, may also contribute in the longer term to maintaining the biodiversity of the controlled Odra. The principle of not disturbing groyne fields was adopted while planning the investment, so that the processes of spontaneous renaturalisation that occurred in them would not be significantly reversed. Works will include changing the profile of existing groynes and filling in the gaps in groynes. In addition, the system of minimisation measures adopted will ensure a balance between the need to maintain the control structures of the Odra and its economic function (in particular for the purposes of icebreaking and flood prevention) and the need to preserve and improve the diversity of river habitats. As a consequence, this will contribute to the achievement of social objectives pursued, while ensuring that the ecological capacity and the biological elements of the quality of the Odra waters are not impaired and that habitats and species under legal protection are preserved, including within the framework of the Natura 2000 network. The investor withdrew from the intention to implement certain elements of the project that may significantly affect the objectives of *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy* (OJ L 2000.327.1 of 2000.12.22) or reduced the spatial scale of these elements. The current extent of interference in the aquatic environment does not exceed the threshold values for significant impacts on biological elements in large lowland rivers, which were set for hydrotechnical investments in relation to biological and hydromorphological elements of water status. In addition, the project includes measures to minimise the negative impact of investments at the implementation stage, the role of which will be particularly important in the first years after the completion of the investment, i.e. during the period of habitat recovery. These measures will concern the maintenance of the necessary habitat conditions, including the appropriate hydromorphological variety. They will allow to achieve the technical assumptions of the project while limiting the negative environmental impact to a moderate level, including the impact on species and habitats protected under national regulations and under the Natura 2000 network and also on biological elements of ecological capacity. In addition, the planned activities related to the restoration of riffle habitats at the tops of modernised groynes and leaving habitat forming elements, as well as supplementing them (oversized boulders located in spaces behind longitudinal dams and groyne fields deeply cut into the banks), as well as the creation of additional oxbow habitats (bays) will ultimately contribute to maintaining the habitat potential of the Odra section in a state not significantly different from the current one.

The Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Brandenburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft** raised *the issue of insufficient justification for the impact of the investment on water status elements in the context of the objectives of Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy as indicated in the project documentation.*

The documentation submitted by the investor shows that in connection with the implementation of the proposed measures minimising the impact of the project, no threats to the achievement of the environmental objectives set for the bodies of surface water are identified. The Investor planned to carry out activities leading to the reconstruction of the river control structures, which will allow to minimise the negative impacts of the works on biological elements and maintain the maximum diversity of habitats currently existing in the controlled and partially naturalised riverbed. On the other hand, the aim of this work is to maintain the current nature of the Odra riverbed with groynes and to preserve and restore navigability of the waterway, to the parameters defined by the technical requirements of icebreakers. It should be noted that the valuable habitats of fish and other aquatic organisms currently found in the Odra riverbed are closely related to the existence of the system of groynes and groyne fields. When the planned investment commences, it will to some extent reverse the processes of spontaneous renaturalisation of the river that have been taking place for several decades and in the short term (10-20 years) will cause periodic deterioration of hydromorphological conditions and depletion of habitats. However, should the reconstruction works on the existing river control structures be abandoned, further progressive degradation of these structures within a few decades would lead to their disappearance and the transformation of the Odra riverbed into a fairly homogeneous channel with straight banks of little morphological diversity. This would result in significant long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity. Such an effect is clearly visible on sections of the Odra within which a degradation of groynes has already occurred, and on sections where there is no control with groynes, and the riverbed is straightened, with banks strengthened with riprap. The planned minimisation measures, introduced after taking into account the suggestions and comments submitted as part of public consultations, will allow to achieve the technical assumptions of the project while limiting the negative environmental impact to a moderate level, including the impact on species and habitats protected under national regulations and under the Natura 2000 network and also on biological elements of ecological capacity. Minimising activities include, among others, limiting to a minimum interference in groyne fields, leaving uninterrupted the sand deposits and aquatic vegetation and rushes growing in the fields, replanting vegetation patches endangered by works (especially nymphaeids) and leaving the developed habitats of aquatic organisms and habitat forming elements (boulders, woody debris) in them. Appropriate periods excluded from certain types of work were also indicated, including those for the protection of fish during spawning, as were ways of reducing the negative impact of the work during the migration period of diadromous species. In addition, it should be emphasised that thanks to the applied technology of rebuilding the foot and the slope of groynes on the downstream side of the tops of reconstructed groynes, leaving the habitat elements uninterrupted and supplementing them (oversized boulders located in spaces behind longitudinal dams and in deeper groyne fields on the downstream side), the planned solutions related to the restoration of habitats in the form of riffles will ultimately contribute to maintaining the habitat potential of the Odra section covered by the works in a state not significantly different from the current one. The expected deterioration of habitats of aquatic organisms resulting from the works in the project will be reversible, and the indicated minimisation measures will reduce the regeneration time of habitats to 3-5 years. In addition, the implementation of modernisation works on the two banks of the Odra at different times will allow for partial regeneration of aquatic vegetation complexes and fish and aquatic invertebrate habitats and will allow them to be settled by organisms which use refugias on the side that is not currently a site of works.

The Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Branderburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft** pointed out *different classifications of surface water bodies located in the Odra in Poland and in Germany - on the Polish side they are classified as heavily modified water bodies, on the German side - as natural water bodies.*

Addressing the above comment, it should be pointed out that the different classification of the surface water bodies in question on the Polish and German sides affects the differences in environmental objectives set for them - on the German side, the environmental objective set for the surface water bodies in question is to achieve good ecological status, while on the Polish side - to achieve good ecological

capacity. However, it should be noted that the assessment of impact on the achievement of the environmental objectives of *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy* (OJ L.2000.327.1 of 2000.12.22) for bodies of surface water used the same significance indicators, both with regard to the achievement of good ecological status and good ecological capacity. After taking into account the minimisation measures proposed by the investor, the impact of the works included in the scope of the project on the bodies of surface water was assessed as moderate.

The Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Branderburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft** challenged *the assessment of the chemical status of surface water bodies in the Odra presented in the project documentation, indicating high concentrations of benzo(a)pyrene in 2015.*

In relation to the above issue, it should be noted that the results of the State Environmental Monitoring were used in the project documentation. The assessment of the chemical status of waters from 2015 was carried out in accordance with *the Regulation of the Minister of Environment of 22 October 2014 on the method of classification of the status of surface water bodies and environmental quality standards for priority substances* (Journal of Laws of 2014, item 1482), according to which the standard for the average annual concentration of benzo(a)pyrene was 0.05 pg/1. According to these test results, the concentration of benzo(a)pyrene in the waters of the body of surface water of the Odra from the Nysa Łużycka to the Warta was 0.001 pg/1, and in the waters of the body of surface water of the Odra from the Warta to the West Odra - 0.0053 pg/1. It was therefore lower than the threshold indicated in the Regulation. The results of tests as part of the State Environment Monitoring from 2017 were based on *the Regulation of the Minister of Environment of 21 July 2016 on the method of classification of the status of surface water bodies and environmental quality standards for priority substances* (Journal of Laws of 2016, item 1187), according to which the standard for the average annual concentration of benzo(a)pyrene was set at $1.7 \cdot 10^{-4}$ pg/1 (0.00017 pg/1). They showed that the average concentration of benzo(a)pyrene in the waters of the body of surface water of the Odra from the Warta to the West Odra was 0,00072 pg/1, indicating that the threshold was exceeded. Similarly, the results of the research of the State Environmental Monitoring from 2018 in relation to the waters of the surface water body of the Odra from the Nysa Łużycka to the Warta indicate a slight exceeding of the applicable standard (average concentration of bezno(a)pyrene amounting to 0.00019 pg/1). Therefore, the results of the 2017 and 2018 tests correspond to the assessment of the chemical status of surface water bodies carried out on the German side, and the discrepancies in the results of the 2015 tests were due to different limit values adopted in both countries. In addition, it should be pointed out that according to the documentation submitted by the investor, the implementation of the project will not result in an increase in the level of chemical pollution of the Odra waters.

The Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Branderburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft** pointed out the *discrepancies between the submitted assessment of the physical-chemical elements supporting the assessment of the ecological status and the German results. It assessed, however, that the impact of the project on this element would be temporary and would not result in deterioration of the state of the physical-chemical elements of the water bodies covered by the works.*

It should be pointed out that the discrepancies in the assessment of the state of physical-chemical elements are caused by the adopted methods of assessment in Poland and Germany. The project documentation uses the results of the assessment carried out as part of the State Environmental Monitoring in Poland, which should be considered as official government data, and thus as reliable and sufficient data to be used in the assessment of the project's impact on the environment in relation to the element of the ecological capacity of waters in question. The forecast indicating the temporary and insignificant nature of the effects of the project on the physical-chemical elements of the bodies of water along the Odra is correct.

*The question of the impact of the investment on the underground water balance and on groundwater was raised by the Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Brandenburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft**, the National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)**.*

According to the explanations submitted by the investor, the modernisation of river control structures will not affect the hydrological system of the Odra, which is dependent on the conditions of supply and drainage from the catchment area. The groundwater level in the zone adjacent to the Odra will be affected more by regional hydrogeological conditions and the amount of recharge by precipitation under changed climate conditions than by changes in the water level in the Odra caused by the implementation of the project.

The Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Brandenburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft** raised *the issue of the impact of the project on the hydromorphological quality of the river habitat and its dependent groups of organisms - the implementation of the works will affect the dynamics of the watercourse, unification of the flow and structures of the Odra bottom, and the effects of the planned minimisation activities will be limited. It also indicated a lack of detailed inventory of hydromorphological elements in the available documentation and insufficient information on the amount and location of the expected minimisation activities.* The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** indicated *that in their view, the number of sections designated for assessing the condition of hydromorphological elements was too low.*

Addressing the above remarks, it should be pointed out that the inventory of hydromorphological elements of the river habitat and the assessment of the state of these elements was carried out by the investor using the method of *Assessment of flowing waters based on the Hydromorphological River Index (HIR)*, which is officially used in Poland as part of the State Environmental Monitoring to assess the state of hydromorphological elements in watercourses. This assessment took into account both the results of the field work and the results of indoor analyses. Surveys were carried out within two bodies of surface water, within which the implementation of the project is planned, and additionally - within the body of surface water located below the area of the works. In addition, to collect as much field data as possible, the investor increased the number of river sections subject to inventory in relation to the number required by the methodology, within each of the tested surface water bodies. The above method of conducting surveys allowed for a detailed inventory of hydromorphological elements and a reliable assessment of their condition, and then forecasting possible impacts related to the implementation of the investment.

The explanations provided by the investor show that due to the significant scope of the project and the expected scope of interference with the environment during the renovation, reconstruction, and construction of groynes, the construction of longitudinal dams and river walls, the execution of the planned activities would only technically result in a long-term significant negative impact of the investment on the environment and protected natural habitats and species. The investor indicated that the impact on the hydromorphological and hydrological conditions of river control structures, in particular the groynes, after the works are concluded, will be local, not going significantly beyond the river sections covered by the works. The reconstruction of river control structures on a given section of the watercourse will result in an increase of the current velocity over a length of about 200 m, and thus will have a local impact on the shape of the bottom. Nonetheless, the impact of the implementation of the entire project, i.e. the execution of the works on all the limiting sections intended for modernisation, will be supralocal, as indicated by the investor in the submitted explanations. Therefore, the report on the environmental impact of the project indicates numerous measures to minimise the impact of the investment, the consistent application of which will significantly reduce the potential negative impact of the works on the

environment - both short-term, related to the stage of project implementation, and long-term, related to the stage of investment operation. Taking into account the comments submitted during the public consultation, the investor indicated an additional catalogue of measures aimed at restoring the habitat elements that will be lost as a result of the works, as well as promoting the acceleration of the natural process of restoring the river ecosystem balance. The proposed measures limiting the impact of investments, such as the creation of artificial riffles, the creation of oxbow habitats (bays) or the introduction of oversized boulders into spaces behind dams and groyne fields, will contribute to the local heterogeneity of fish and invertebrate habitats. The proposed solutions will make it possible to achieve the planned effect of flood protection due to the improvement of icebreaking conditions on the section of the border Odra, while at the same time maintaining and restoring the ecological capacity. It should be noted that the valuable habitats currently found in the Odra riverbed are closely related to the existence of the system of groynes and groyne fields.

When the planned investment commences, it will to some extent reverse the processes of spontaneous renaturalisation of the river that have been taking place for several decades and in the short term (10-20 years) will cause periodic deterioration of hydromorphological conditions and depletion of habitats. However, should the reconstruction works on the existing river control structures be abandoned, further progressive degradation of these structures within a few decades would lead to their disappearance and the transformation of the Odra riverbed into a fairly homogeneous channel with straight banks of little morphological diversity. This would result in significant long-term depletion of existing vegetation, invertebrate and fish communities, due to the reduction of habitat diversity. This is clearly visible on sections of the Odra within which a degradation of groynes has already occurred, and on sections where there is no control with groynes, and the riverbed is straightened, with banks strengthened with riprap. In the longer term (more than 100-200 years), if river control work on the Odra was completely discontinued, there would be a gradual spontaneous renaturalisation of the morphology and course of the riverbed, with the restoration of bed forms typical of natural sections of large rivers. This would, however, involve the occupation of developed and built-up areas in the valley by the river and the total loss of its function as a waterway, which is unacceptable for social and economic reasons. The presented conditions show that maintaining the existing control groynes on the banks of the Odra (and consequently their periodic reconstruction and reconstruction) is beneficial for maintaining the current diversity of habitats in the regulated riverbed, while maintaining its economic functions and the use of the areas by the river.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** *expressed doubts as to the forecast of morphological changes in the Odra riverbed and the sedimentation of material in groyne fields.*

The project documentation shows that the control groynes have been present on the Odra for over 100 years and have been reconstructed several times during this period. The planned project involves the reconstruction of existing river control structures. The purpose of groynes is primarily to concentrate the river stream to its centre, which, by narrowing the bed, leads to an increase in the flow velocity and, consequently, to the movement of the bottom material and its deposition in groyne fields. The investment aims to bring this process about, which within the indicated period of time will lead to the watercourse deepening spontaneously and to a safe depth being reached, assumed by the project for the operation of icebreakers at low and medium water levels, and thus it will reduce the risk of so-called ice jam-related winter floods. The characteristics of the control structures on the Odra will not be changed as part of the construction works, as such structures exist along the entire length of the river and the works aim at upgrading it to the parameters required. In order to obtain the appropriate depth, *the Update of the concept of regulation of the border Odra watercourse* assumes a gradual lowering of the elevation of the watercourse bottom over a period of 40 years. However, according to the results of modelling carried out as part of the preparation of the concept, if no actions are taken, the elevation of the bottom will also change after 40 years, by a value in the range from about -45 cm to about +45 cm, depending on the section of the river, as a result of processes taking place in the river. The proposed solutions will not only

ensure a much smaller range of bottom level fluctuations over 40 years but will also make the process more stable and smoother. The bottom will be more continuous, and the spontaneous deepening will be less chaotic. According to the results of the conducted analyses, the maximum predicted lowering of the bottom could potentially range from a few to several centimetres, depending on the section of the river. The solutions do not pose a risk of erosion. *The Update of the concept of regulation of the border Odra watercourse* considered several variants of modernisation of the river control structures. Some of the rejected variants showed a much greater deepening of the bottom, and the resulting increase of the depth of the river to over two metres. The KRC-W5 variant was chosen for implementation, providing the minimum depth of 1.8 m, necessary for the operation of icebreakers, with the least impact on water relations and the environment. This variant assumes parameters of the river control structures that will ensure adequate deepening of the bottom through a very long, slow erosion process, which, after an initial deepening over time, stabilises at the desired bottom elevation without the risk of progression. According to the results of the model tests, the erosion of the bottom will be increased in relation to the current conditions only in the first period after the construction - then it will be significantly slowed down and stabilised.

The aim of the groynes is to narrow the water flow channel and to cause the overgrowing of groyne fields. Nevertheless, the differences between the designed reconstruction of the structures and the existing ones are small. The expected effects of this reconstruction will not result in significant changes in the overgrowing of groyne fields. The two-dimensional modelling of a section of the river with a total length of about 20 km in the area of the Odra-Warta junction, in which the parameters of the river load were taken into account, allowed for a precise analysis of the phenomenon of deposition in groyne fields on this section of the watercourse. The modelling results showed that the changes in the overgrowing of groyne fields will be small in relation to the existing state. On the basis of three-dimensional maps of the bottom and banks of the watercourse developed in the modelling, fragments of groyne fields in which there will be a greater accumulation of bottom material can be indicated. Comparison of these materials with the current reach of overgrowing, which was determined on the basis of geodetic and bathymetric measurements, showed that the modernisation works will in most cases result in a few, and in other cases several percent changes in the overgrown area of groyne fields, which is considered a satisfactory effect in the context of the concept objective, i.e. minimal interference in the existing aquatic environment. It should be noted that the increased overgrowing will be an expansion of the already existing bottom material bars in groyne fields. These will be slightly expanded under the influence of increased deposition of bottom load. Taking into account the relatively small amounts of river load transported in the lower Odra riverbed, it is not expected that spaces between groynes will be overgrown, that the material already deposited on the new floodplain will be significantly eroded, or that the elevation of the floodplain will rise significantly. The two-dimensional model takes into account the nature of the bottom material in an accurate and complex way and is an appropriate tool for the assessment of the scale of the accumulation of load in groyne fields. Its results were the basis for conclusions formulated in the project documentation. The obtained results also allowed to determine the behaviour tendencies of the bottom of the watercourse after the works - they indicated that there would be no change in hydraulic conditions shaping the movement of riverbed mesoforms, and the transport of load will continue as a result of the movement of diagonal bars in the riverbed.

According to the National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs and Deutscher Naturschutzring (DNR)**, *the implementation of the project may increase the steepness and height of dunes in the Odra bed, which, instead of improving the working conditions of icebreakers, will render them worse.*

Addressing this comment, the investor provided appropriate explanations, pointing out errors in the calculations indicated and correcting those calculations. The investor pointed out that the tangent stress calculated with the Du Boys formula for the data from the table, to which the contributors referred, is $T = 7.76 \text{ N m}^{-2}$. Critical stress, calculated with the Meyer-Peter and Müller equation, is $\tau_{cr} = 0.59 \text{ N m}^{-2}$. Ratio $T / \tau_{cr} = 7.76 / 0.59 = 13.2$, which according to Raudkivi means the dominance of transport in

suspension. Therefore, there can be no increase in the steepness and height of dunes, as the authors of the study wrote, but rather they will flatten.

The allegation of a purely technical approach to the planned work, without taking into account measures to improve the diversity of habitats in groyne fields was made by the National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)**.

In the opinion of the authority, the statement that the investor did not take into account the actions indicated in the comment cannot be accepted. The authority planned minimisation measures and proposed them after taking into account the suggestions and comments submitted as part of public consultations. Those measures will allow to achieve the technical assumptions of the project while limiting the negative environmental impact to a moderate level, including the impact on species and habitats protected under national regulations and under the Natura 2000 network and also on biological elements of ecological capacity. Minimising activities include, among others, limiting to a minimum interference in groyne fields, leaving uninterrupted the sand deposits and aquatic vegetation and rushes growing in the fields, replanting vegetation patches endangered by works (especially nymphaeids) and leaving the developed habitats of aquatic organisms and habitat forming elements (boulders, woody debris) in them. In addition, it should be emphasised that thanks to the applied technology of rebuilding the foot and the slope of groynes on the downstream side of the tops of reconstructed groynes, leaving the habitat elements uninterrupted and supplementing them (oversized boulders located in spaces behind longitudinal dams and in deeper groyne fields on the downstream side), the planned solutions related to the restoration of habitats in the form of riffles will ultimately contribute to maintaining the habitat potential of the Odra section covered by the works in a state not significantly different from the current one. The expected deterioration of habitats of aquatic organisms resulting from the works in the project will be reversible, and the indicated minimisation measures will reduce the regeneration time of habitats to 3-5 years. In addition, the implementation of modernisation works on the two banks of the Odra at different times will allow for partial regeneration of aquatic vegetation complexes and fish and aquatic invertebrate habitats and will allow them to be settled by organisms which use refugias on the side that is not currently a site of works.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** have indicated that the *project constitutes a significant interference in the Odra, which is a natural river and is characterised by the natural dynamics of hydrological phenomena.*

Addressing the above comments, it should be pointed out that the project involves the modernisation of existing hydrotechnical structures located on a river heavily transformed by human, which was already regulated in the 19th century. This is when the most significant changes in the longitudinal profile of the river occurred, resulting in a new level of its equilibrium being established. According to the explanations submitted by the investor, the modernisation of the existing structures will not affect the hydrological system of the Odra, which is dependent on the conditions of supply and drainage from the catchment area. The project will also not cause any significant changes in the location of the water table in the riverbed, the size, or dynamics of the flow and transport of river load, as discussed in the report on the environmental impact of the project.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** *questioned the usefulness of the compensatory measure proposed by the investor consisting in introducing oversized boulders into the bed because such elements are not typical for the section of the Odra in question - it would, however, be advisable to introduce woody debris. Likewise, transferring Unionidae mussels may not be effective due to the limited environmental resources available for these organisms in the Odra and the lack of precise guidelines for the implementation of the measure.*

The explanations submitted by the investor show that oversized boulders, although not typical of the lower Odra, are naturally found on the section of this river from the Nysa Łużycka to the Warta (above the area of the planned works). However, these elements will be substitute habitats because they cause variations in flow velocity and constitute hiding places for fish. The investor indicated that the introduction of large woody debris had been considered, but even if it were anchored in the bottom, it would be susceptible to movement under the influence of rising waters or ice run, and therefore would pose a threat to shipping. On the other hand, the transfer of Unionidae mussels was described in a relatively detailed manner in the submitted documentation. mussels will be moved up to a week before the reconstruction of groynes or the construction of longitudinal dams or new groynes or river walls begins. This will consist in dredge hauls (width up to 1.0 m, mesh 5 mm) along the sides of the groyne up to 3-5 m from the edge of the existing riprap on the side of the groyne (deeper places - with sandy or silt bottom, also in small clumps of submerged plants) and passing in waders and collecting, with a hand net (mesh 5 mm) visible mussels on shallows along the groyne (sand, silt, among loose vegetation or stones from the damaged riprap). Similarly, mussels will be collected from the area of the construction of new structures (groynes, longitudinal dams, or river walls) - from the zone of the bottom which is to be occupied by the structure and a 3-5 m zone from its edge. mussels collected in a water container shall be transported immediately after collecting to a safe place (depth approx. 1 m, slow current or stagnant waters, sandy or silt bottom, preferably vegetation in the vicinity) and released into the water. In the case of replanting vegetation patches, the mussels visible in the spoil will be collected and moved, along with the replanted vegetation, to the destination. No risk of over-concentration of Unionidae mussels in the places to which they are transferred is anticipated - they do not reach high densities in Odra and they feed by filtering suspension from water, so they do not compete to a significant extent for resources in a given area of the bottom.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** indicated that *using riprap for rebuilding the groyne body, which is not a natural material occurring in the Odra riverbed, may facilitate the settlement of the river by non-native species of macrozoobenthos and fish.*

Referring to this comment, it should be pointed out that the solution adopted by the investor will allow gradual overgrowing of the bodies of reconstructed groynes by vegetation and settlement by invertebrates and fish (creating hiding places between stones and spawning grounds of lithophilic species). The planned complementary introduction of a loose riprap of variable granulation, including on the foot of the groyne from the downstream side (restoration of shallow riffle habitats) will increase this effect and reduce the impact of removing loose stones from the area of the tops of damaged groynes. The used riprap of varied granulation (5-45 cm) will provide conditions more similar to natural riffles than homogeneous structures made of thick hydrotechnical stone. With regard to the problem of accelerated colonisation of the Odra by non-native species, it should be pointed out that at present the banks of the river are reinforced with riprap over a considerable length, which these organisms use. In addition, native species of invertebrates (e.g. caddisflies, mayflies) and fish (including protected fish and indicators of good water status: golden loach *Cobitis taenia*, white-finned gudgeon *Romanogobio belingi*, asp *Aspius aspius*, barbel *Barbus barbus*, stone loach *Barbatula barbatula*, burbot *Lota lota*) also use the stone substrate. Gradually degrading stone revetments therefore replace, in a controlled river, natural rock outcrops and riffles, characteristic of sections of large rivers in a state close to the natural one. The results of the wildlife surveys carried out by the investor showed the lack of invasive species of Gobiidae family in the border section of the Odra, which indicates that they probably have not yet inhabited this river, and certainly do not form numerous populations in it. The process of expansion of alien species will therefore not be inhibited by limiting the introduction of stone substrate into the Odra, because these species have high plasticity and use a variety of habitats, and their expansion is mainly conditioned by the availability of spreading routes.

The Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Brandenburg**

Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft indicated the *need to limit the use of unnatural building materials for the works, such as geotextile or hydro-technical stone, and to replace them with environmentally friendly materials, similar to natural ones.*

The submitted documentation shows that the investor analysed various variants of construction material selection, and then discarded the least environmentally friendly technical solutions, such as pile structures, reinforcement with concrete and reinforced concrete slabs, or asphalt coating. In addition, as a result of comments submitted during the public consultation, the investor also decided not to carry out the previously planned bonding of riprap with cement mix (so-called clamping). Geotextile will be used during the execution of the works, as the explanations provided by the investor show that this material is necessary to separate the new elements from the existing ones. It should also be emphasised that this type of separation material is water- and air-permeable and thus it is not a tight separation layer and is environmentally neutral.

According to the National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs and Deutscher Naturschutzring (DNR)**, *the investor did not provide detailed quantitative and location data for the proposed minimisation and compensatory measures dedicated to the conservation and restoration of the diversity of habitats in the riverbed.*

It should be pointed out that in the report on the environmental impact of the project the investor proposed a catalogue of measures to limit the impact of investments, dedicated to the preservation of the diversity of habitats in the Odra riverbed to the greatest possible extent, which were described in sufficient detail. In particular, the following actions were proposed for implementation:

In places where river walls are to be constructed:

- using only natural materials and limiting the length of sections of the revetments to the necessary minimum,
- constructing the wall with an undulating line, i.e. constructing the wall in accordance with the existing terrain, without straightening the bank.
- demolition of existing revetments in places where they are not justified, i.e. behind the designed longitudinal dams in groyne fields cutting deeply into the bank, i.e. behind the designed longitudinal dam at groynes 12/675 - 16/675;

In the area of groyne fields adjacent to the reconstructed groynes:

- leaving oversized boulders and large woody debris in places that do not interfere with the designed works,
- introducing oversized boulders into selected groyne fields cutting deeply into the bank (all fields with a depth of approx. 1.5-2.0 m or more at MV W),
- reconstructing riffles of loose stones of various granulations (5-45 cm) on the downstream side of reconstructed or newly built groynes, as part of the stone structure of the groyne slope and foot - in each reconstructed or constructed groyne,
- creating 8 additional open oxbow habitats (bays with an area of 220-1320 m², a total of approx. 5300 m²) on the sections of the body of water

of the Odra from the Nysa Łużycka to the Warta - for the habitats of the spined loach *Cobitis taenia*, amur bitterling *Rhodeus amarus*, Unionidae mussels, and macrophytes,

- limiting the length of the wings at the reconstructed and built groynes (average length 11 m, maximum 30-35 m for approx. 5% of groynes) and the technology of wing construction limiting interference with the groyne field and the bank (construction from the edge towards the groyne, equipment moving along the belt of the bank intended to be occupied by the wing structure),
- replanting larger patches of vegetation (especially submerged vegetation and floating-leaved

plants - nymphaeids, including all endangered patches of the fringed water lily *Nymphoides peltata*) from the area of the works along the reconstructed groynes to the non-overgrown areas of selected groyne fields and space behind the dams - to ensure the maintenance of the diversity of macrophytes and habitats of the amur bitterling *Rhodeus amarus* and spawning grounds of phytophilic species, including the spined loach *Cobitis taenia*;

In places where longitudinal dams are to be constructed:

- planning and execution of overflows in the dam structure in the form of pipes integrated into the dam structure - 2 pipes of 1000 mm diameter for each groyne field behind the dam (one pipe positioned diagonally towards the bottom of the river and one pipe positioned towards the top of the river) and leaving oversized boulders and large woody debris (tree trunks and stumps) in spaces behind dams, as well as introducing a group of 4-5 oversized boulders into the spaces, every 50 m of the dam length.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs and Deutscher Naturschutzring (DNR)** submitted **comments** on the investor's inventory of ichthyofauna, challenging the low number of white-finned gudgeon *Romanogobio belingi* indicated in the documentation and the insufficient number and length of fishing sections. Furthermore, it is not clear from the documentation whether the EIF+ or IBI PL method was applied, nor is there a description of the "D" indicator relating to the presence of migratory fish.

According to the explanations provided by the investor, the low number of specimens of the white-finned gudgeon *Romanogobio belingi*, as shown in the inventory report, was due to the fact that its catch in electro-fishing is limited due to the fact that this species inhabits the river's current zone. However, after analysing the available data, including literature, the investor described the species as numerous in the submitted documentation. The inventory of ichthyofauna was carried out on 15 sections of varying length, representing different habitat types occurring in the Odra. The report on the environmental impact of the project shows that the IBIPL method, used in the State Environmental Monitoring in Poland, was used to assess the ecological capacity of the water bodies on which modernisation works will be carried out, on the basis of the ichthyofauna. The IBIPL multimetric index used is a modification of the original American Index of Biotic Integrity and is adapted to the conditions of the large lowland rivers of Poland. The explanations provided by the investor show that references to the EIF+ method in the environmental impact report for the project concerned the method of data collection in the protocols, which is common for both methods. The Diadromous Indicator (D) applied supplements the assessment of the basic indicator (IBI PL for large lowland rivers) with a factor for the occurrence of diadromous fish. It is taken from the original EIF+ method and modified to adapt it to the conditions in Poland (e.g. the introduction of *Vimba vimba* as one of the diadromous species). The value of this indicator corresponds to the ratio of the number of diadromous species currently found in the studied river to their historically recorded number. This indicator takes values from 0 to 1. If the value of the indicator is less than 0.5 (i.e. less than half of the historically recorded species currently exist), the ecological status/capacity assessment should be adjusted by reducing the rating of the basic indicator by one class. This indicator is based only on information whether a given diadromous species is found in the surveyed surface water body, and data on the current occurrence of the species is obtained not only from catches, but also from other available sources - e.g. information obtained from the fishing user, including the passability of the migration route (presence and functionality of fish passes, if partitions are found). In the opinion of the authority, the inventory was carried out correctly and there is no reason to question the results obtained.

Head of Oder-Spree district: Lower Office for Nature Conservation **Landkreis Oder-Spree Der Landrat: Untere Naturschutzbehörde** requested that contradictory information in the available documentation be clarified, namely information relating to the abundance of the asp *Aspius aspius* in the

Odra and the threats to the common newt Lissotriton vulgaris and amphibian species in the river valley.

According to the explanations provided by the investor, during the wildlife inventory the asp *Aspius aspius* specimens were caught relatively rarely due to the fact that this species mainly inhabits the river's current zone. However, the expert assessment carried out as part of the environmental impact assessment of the project used both the data from the wildlife inventory as well as other data obtained, including data on the occurrence of the species in fishing or net fishing catch in the lower part of the Odra, which resulted in the species being classified as moderately numerous. As regards the impact of the project on the common newt *Lissotriton vulgaris*, the investor explained that the execution of the works would not affect the population of this species because its breeding habitats are located at a considerable distance from the construction sites. For amphibian group, direct destruction of habitats is also not expected, only local conflicts are possible.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** raised the issue of the *impact of the investment on the diversity of fish fauna in the Odra, in particular on species such as the Baltic sturgeon Acipenser oxyrinchus, Atlantic salmon Salmo salar, maraena whitfish Coregonus maraena, golden loach Sabanajewia aurata, white-finned gudgeon Romanogobio belingi, and burbot Lota lota. These species use habitats located in the stream zone of the riverbed as shelter, feeding, and wintering sites, as well as as a migration corridor.*

According to the project documentation, the Odra border section has been undergoing control work since the beginning of the 18th century, as a result of which its riverbed has now long homogeneous sections and has few typical habitat structures. The river has a uniform stream practically throughout its section, and the variability of both the longitudinal and transverse profile is small and practically limited to groyne fields. Within the homogeneous riverbed bottom there are few hiding places suitable for fish - the bottom is levelled and free of natural obstacles, such as sunken trees or boulders that constitute convenient places of refuge. For this reason, most of the habitats suitable for fish are found within groyne fields, along banks and in the few inter-embankment basins connected to the river - oxbows and artificial reservoirs. During rises, the Odra connects with the reservoirs located in the valley and the fish migrate, leading to the enrichment of both habitats. Oxbows are particularly important here – although highly influenced by the waters of the Odra, they nevertheless show predominantly the features of standing waters. They constitute spawning and fry growth sites for many species of phytophilic fish. Other significant habitats for fish in the large river include side branches and quiet spaces behind islands and behind artificial dams, where silt settles, forming a fertile ground. These habitats, overgrown with submerged vegetation, are used for breeding, rearing juvenile fish, and feeding on species such as the common bream *Abramis brama*, white bream *Blicca bjoerkna*, tench *Tinca tinca*, roach *Rutilus rutilus*, rudd *Scardinius erythrophthalmus*, crucian carp *Carassius carassius*, perch *Perca fluviatilis*, pike-perch *Sander lucioperca*, pike *Esox lucius*, and wels catfish *Silurus glanis*. At low waters, some of these habitats lose contact with the river stream, which creates specific conditions threatening even the existence of fish (overheating of water and severe oxygen depletion). For most species forming the river ichthyofauna complex, floodplains and the shallow zones of the river ecosystem abundantly overgrown with aquatic vegetation are of key importance. The maintenance of these environments, and thus the abundance of ichthyofauna, depends on the preservation of the natural hydrological cycle of the river, characterised by periodic outflow of water outside the riverbed.

The valuable habitats currently found in the Odra riverbed are closely related to the existence of the system of groynes and groyne fields. Should the reconstruction works on the existing river control structures be abandoned, further progressive degradation of these structures within a few decades would lead to their disappearance and the transformation of the Odra riverbed into a fairly homogeneous channel with straight banks of little morphological diversity. This would result in the long-term significant depletion of the existing vegetation complexes which constitute hiding places and breeding ground for fish, of invertebrates on which the fish feed, as well as of fish themselves, due to the loss of habitat

diversity. This is clearly visible on sections of the Odra within which a degradation of groynes has already occurred, and on sections where there is no control with groynes, and the riverbed is straightened, with banks strengthened with riprap. Maintaining the existing control groynes on the banks of the Odra (and consequently their periodic reconstruction and reconstruction) is beneficial for maintaining the current diversity of habitats in the regulated riverbed, while maintaining its economic functions and the use of the areas by the river.

This investment will have negative effects on fish and will cause depletion of habitats, but this will be mitigated by the spontaneous renaturalisation occurring most intensively in groyne fields. Renaturalisation processes lead to the formation of habitats with features similar to natural ones: riffles in the current, stream pools, and marginal lakes with the characteristics of oxbows. Damage to groynes allows riffles to form - valuable habitats of species preferring fast-flowing environments such as the barbel *Barbus barbus*, asp *Aspius aspius*, dace *Leuciscus leuciscus*, chub *Squalius cephalus*, and white-finned gudgeon *Romanogobio belingi*. Sand deposits in groyne fields determine the availability of juvenile fish habitats. The occurrence of marginal lakes cutting deeply into the bank, with aquatic vegetation, is of particular importance for the maintenance of numerous populations of phytophilic species, including the protected spined loach *Cobitis taenia* and amur bitterling *Rhodeus amarus*. The presence of Unionidae mussels is also crucial for the occurrence of the amur bitterling, due to the close relationship between the reproductive cycle of the amur bitterling *Rhodeus amarus* and these mussels.

The results of the submitted analyses carried out for the purpose of assessing the environmental impact of the project show that the planned modernisation of the hydrotechnical structures of the Odra will not significantly modify the processes of bottom erosion and river load transport, which affect the diversity of habitats in the Odra valley. It should be noted that the erosion of the bottom will initially lead to an intensified formation of deposits in groyne fields. In the long term, this process will slow down and ultimately have an intensity similar to the current one. However, the above processes will have a local reach and will be limited only to the sections of the Odra covered by the works.

During the execution of the works, there will be a periodic disturbance of the existing ecosystem balance. However, this impact will be temporary and reversible. During modernisation work, fish, which are mobile organisms, will have access to suitable habitats due to the possibility of using stretches of river not covered by the works.

Potential risks associated with the implementation of the project have been analysed in the submitted report on the environmental impact of the project and taken into account when determining the minimisation actions dedicated to limiting the impact on the mentioned fish species and other protected species constituting the Odra ichthyofauna. In particular, the investor indicated the following mitigation and limitation measures:

Golden loach *Sabanajewia aurata*, northern golden loach *Sabanajewia baltica*

- minimisation measures: the principle of minimising interference in groyne fields (not removing deposits, leaving shallows and loose stones in groyne fields), limiting work in water during the spawning period (March-June);
- limiting measures: restoration of riffle habitats of on the downstream side of the tops of reconstructed groynes (every third reconstructed groyne), introduction of habitat elements (oversized boulders behind longitudinal dams), creation of flow habitats behind dams, connected with the current and enriched with habitat elements.

Atlantic salmon *Salmo salar* - the species uses the stretch of the border Odra as a migration route to spawning grounds in tributaries

- minimisation measures: during the period of intensified spawning migration (October-December) the area of particularly invasive works (e.g. demolition of damaged groynes, founding new structures at the bottom) is to be secured with curtains separating the work site from the current. The curtains will also reduce the impact of noise generated by heavy equipment; moreover, monitoring of suspension concentration and oxygenation of water 200 m below the place of work

and pausing work in the event of exceeding hazardous values (suspension >200 mg/l, dissolved oxygen <5 mg O₂/l) is planned.

Atlantic sturgeon *Acipenser oxyrinchus* - the species may use the stretch of the border Odra as a migration route to spawning grounds in tributaries,

- minimisation measures: limiting work in the spring spawning period (March-April).

Whitefish - migratory species *Coregonus lavaretus*

- stocking during the period of works and for 5 years after the completion of works. Stocking with whitefish is currently carried out in the fishing district no. 3 of the Odra, which includes the Odra from the Myśła to the Widuchowa weir (in 2017 - min. 1 hatch) - yearly introduction the same amount of stocking material (min. 1 hatch) into the Odra section from the Warta to the Western Odra is planned.

Burbot *Lota lota*

- supplementary stocking, as compensation for losses during a given spawning period of the species. An annual stocking with at least 500,000 burbot hatchlings is planned - stocking material from spawners in the Odra catchment area (250,000 to each water body covered by the works) in agreement with fishing users, for the duration of the works and 3 years after their completion.

Spined loach *Cobitis taenia*

- minimisation measures: the principle of minimising interference in groyne fields (not removing deposits, leaving shallows and submerged vegetation), limiting work in water during the spawning period (March-June);
- limiting measures: creation of flow habitats behind dams, connected to the current and enriched with habitat elements (groups of boulders every 50 m of the length of the dam), creation of additional oxbow habitats (bays), replanting (into non-overgrown areas of selected groyne fields and bays where the works have already been completed) larger patches of aquatic vegetation, if they are located in the sites where groynes are reconstructed or constructed.

Amur bitterling *Rhodeus amarus*

- minimisation measures: the principle of minimising interference in groyne fields (not removing deposits, leaving shallows and submerged vegetation), limiting work in water during the spawning period (March-June), moving mussels from areas at risk of works along the reconstructed groynes to safe places (groyne fields where work has not yet been undertaken or has already been completed);
- limiting measures: creation of flow habitats behind dams, connected to the current and enriched with habitat elements (vegetation, groups of boulders every 50 m of the length of the dam), creation of additional oxbow habitats (bays), replanting (into non-overgrown areas of selected groyne fields and bays where the works have already been completed) larger patches of aquatic vegetation, if they are located in the sites where groynes are reconstructed or constructed.

White-finned gudgeon *Romanogobio belingi*, (*Gobio albipinnatus*)

- minimisation measures: the principle of minimising interference in groyne fields (not removing deposits, leaving shallows and loose stones in groyne fields), limiting work in water during the spawning period (March-June);
- limiting measures: restoration of riffle habitats of on the downstream side of the tops of reconstructed groynes (every third reconstructed groyne), introduction of habitat elements (oversized boulders behind longitudinal dams).

Asp *Aspius aspius* and barbell *Barbus barbus*

- minimisation measures: the principle of minimising interference in groyne fields (not removing deposits, leaving shallows - fry habitat, and loose stones in groyne fields), limiting work in water during the spawning period (March-June);
- limiting measures: reconstruction of habitats on the downstream side in the foot and slope construction of all reconstructed groynes - restoration of spawning grounds, introduction of habitat-forming elements (oversized boulders behind longitudinal dams and in the groyne fields on the downstream side - all fields with a depth of about 1.5-2.0 m or more at SN W).

River lamprey *Lamptera fluviatilis* - the species uses the stretch of the border Odra as a migration route to spawning grounds in tributaries

- minimisation measures: limiting work in the spring spawning period (March-April).

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** pointed out *that the investor had not provided a precise estimate of loss for the habitats important for ichthyofauna, and that the minimisation and compensation measures adopted only took into account the construction phase.*

In the documentation submitted to the authority, the investor estimated the size of losses in habitats important for ichthyofauna resulting from the implementation of the investment. The documentation indicates the following predicted extent of habitat loss:

Within the surface water body of the Odra from the Nysa Łużycka to the Warta

Riffles constituting a habitat for adult specimens of the golden loach *Sabanajewia aurata*, stone loach *Barbatula barbatula*, white-finned gudgeon *Romanogobio belingi*, and juvenile specimens of the *Leuciscus cephalus*, barbel *Barbus barbus*, burbot *Lota lota*, asp *Aspius aspius*, as well as the spawning grounds of lithiophilic fish - the estimated total area of losses in the habitat is 107 000 m², because riffles are present at one of the sides about 70% of the 205 groynes to be reconstructed;

Marginal lakes which are habitats and spawning grounds for phytophilic and pseudophilic fish such as the spined loach *Cobitis taenia*, amur bitterling *Rhodeus amarus*, and weatherfish *Misgurnus fossilis*, and habitats for economically important species such as the pike *Esox lucius*, tench *Tinca tinca*, European perch *Perca fluviatilis*, pike-perch *Sander lucioperca* - the estimated total area of habitat degradation is 61 500 m² because marginal lakes are present at one of the sides about 60% of the 205 groynes intended for the reconstruction;

Stream pools for adult specimens of species such as the asp *Aspius aspius*, chub *Leuciscus cephalus*, burbot *Lota lota*, barbel *Barbus barbus*, white-finned gudgeon *Romanogobio belingi* — the estimated total area of losses in the habitat is 71 000 m² because stream pools are present at one of the sides of about 70% of 205 groynes to be reconstructed.

Within the surface water body of the Odra from the Warta to the Western Odra

Riffles constituting a habitat for adult specimens of the golden loach *Sabanajewia aurata*, stone loach *Barbatula barbatula*, white-finned gudgeon *Romanogobio belingi*, and juvenile specimens of the *Leuciscus cephalus*, barbel *Barbus barbus*, burbot *Lota lota*, asp *Aspius aspius*, as well as the spawning grounds of lithiophilic fish - the estimated total area of losses in the habitat is 47 300 m², because riffles are present at one of the sides about 50% of the 172 groynes intended for reconstruction;

Marginal lakes which are habitats and spawning grounds for phytophilic and pseudophilic fish such as the spined loach *Cobitis taenia*, amur bitterling *Rhodeus amarus*, and weatherfish *Misgurnus fossilis*, and

habitats for economically important species such as the pike *Esox lucius*, tench *Tinca tinca*, European perch *Perca fluviatilis*, pike-perch *Sander lucioperca* - the estimated total area of habitat degradation is 36 050 m² because marginal lakes are present at one of the sides about 60% of the 172 groynes intended for the reconstruction;

Stream pools for adult specimens of species such as the asp *Aspius aspius*, chub *Leuciscus cephalus*, burbot *Lota lota*, barbel *Barbus barbus*, white-finned gudgeon *Romanogobio belingi*

- the estimated total area of losses in the habitat is 41 200 m² because stream pools are present at one of the sides of about 60% of 172 groynes to be reconstructed.

In addition, in connection with the planned construction of 27 new groynes, the total area of losses in habitats related to stream pools (10 500 m²) and marginal lakes (10 500 m²) was estimated.

In addition to their importance for fish fauna, these habitats also constitute sites for benthic macroinvertebrates.

However, it should be pointed out that the measures planned by the investor will allow the vast majority of lost habitats to be restored and even to increase their area. Riffles with a width of about 3 m will be reproduced in the structure of the foot and slope of each reconstructed or rebuilt groyne (half of the length of the downstream side of the groyne, in the middle region and closer to the groyne head). Oversized boulders will be introduced in each deep groyne field (1.5-2.0 m at SNQ) adjacent to a reconstructed groyne - plans provide for introducing groups of 4-5 boulders with approximate dimensions: height 120-150 cm, width - 80-120 cm, weight from 1.5 to 4.5 tonnes. Plans also provide for replanting endangered patches of vegetation (nymphaeids and submerged vegetation) - in the case of patches with an area of more than 10 m² and rush patches growing on the bottom (at the state for SNQ) (at least 50% of the area of the patch to be replanted) for each modernised or constructed groyne at which the patches occur. Plans also include the reconstruction of 8 oxbow habitats (bays) with the following parameters: length 50-100 m; irregular oval shape; average width 10-12 m; surface area 220-1320 m² (total 5300 m²); depth from 0.5 to 1.5-2.0 m; planned location: 1 - 582.4 km; 2 - 585.7 km; 3 - 602.3 km; 4 - 606.2 km; 5 - 606.6 km; 6 - 609.5 km; 7 - 616.5 km; 8 - 616.8 km. The documentation submitted by the investor shows that the highest possible rate of impact minimisation was applied, bearing in mind the limitations resulting from flood protection, shipping, and technical conditions, and the efficiency of activities will increase as the process of recovery of riverbed ecosystems progresses. The objectives of the planned habitat-forming activities include supporting the process of spontaneous regeneration of the river after construction works, while also limiting the impact of the project at the operation stage to a moderate level.

The Head of Uckermark district **Landkreis Uckermark - Die Landrätin** pointed out *that the Odra is important for fisheries and that possibility of fishing should therefore be ensured*. The question of fisheries was also addressed by the Head of Oder-Spree district **Landkreis Oder-Spree Der Landrat**.

Referring to this comment, it should be pointed out that the potential risks associated with the implementation of the project have been analysed in the submitted report on the environmental impact of the project and taken into account when determining the minimisation actions dedicated to limiting the impact on fish species constituting the Odra ichthyofauna. Consequently, the expected impacts on the fish stocks inhabiting the Odra resulting from the works will be moderate and reversible, and thus no lasting effects leading to a reduction in fishing opportunities are predicted.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** *asked for clarification of the inaccuracy regarding the expected period of 6-10 years indicated as the recovery time of aquatic organisms, while the documentation indicated that a delay of 3-5 years in the execution of the works on the two banks of the river would ensure the minimisation of the impact on these organisms*.

According to the investor's explanation, the recovery time for fish and invertebrate populations (6-10 years) takes into account both the degree of disturbance (there will be no complete degradation of these populations on the entire border section of the Odra), as well as the life cycles of the various species and the rate of recovery for their habitats. The period of delay for works on the opposite banks (3-5 years) was determined in relation to the estimated time of reconstruction of habitats which are refugia for the populations concerned.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs and Deutscher Naturschutzring (DNR)** questioned the results of the investor's inventory of benthic macroinvertebrates, indicating the lack of records of protected species, the late date of the surveys, and the low density of specimens the samples taken.

The project documentation shows that the inventory of benthic macroinvertebrates was carried out on two dates during the period of the greatest taxonomic diversity of macrobenthos: in June 2017 (10 survey stations) and in September 2017 (16 survey stations). At each survey station, sampling points were designated in accordance with the *Methodology of sampling for multi-habitat benthic macroinvertebrates (RIVECOmacro) in large rivers and rivers difficult to access for the purposes of ecological monitoring, in accordance with the provisions of the Water Framework Directive*, which is used in the State Environmental Monitoring in Poland. Samples were taken from the habitats characteristic of a given section of the river, at different distances from the bank, both by means of a hand net and by a diver, and using a Van Veen grab sampler. Most of the species were marked in the laboratory with the rank of species. The assessment of the ecological potential on the basis of benthic macroinvertebrates was carried out using the *Method of assessing the ecological status/potential on the basis of the macrozoobenthos MMI PL* used in the State Environmental Monitoring in Poland. The density of specimens recorded at different sampling points varied. As indicated by the investor, it depended on the location and habitat. The investor pointed out that there were no protected macroinvertebrate species other than the *Ophiogomphus cecilia*, whose larval stage is water-based. The correct methodology for conducting the inventory in question means that there are no grounds for questioning the obtained results.

The Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Brandenburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft** raised the *issue of the impact of the project on benthic invertebrates constituting one of the biological elements of the ecological status of waters. The Ministry also pointed out that the investment could contribute to the colonisation of the Odra waters by alien invertebrate species, and referred to the potential impact of future maintenance works related to the operation of modernised control structures on the ecological status of waters, in particular on one of its biological elements - benthic invertebrate fauna.* The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs and Deutscher Naturschutzring (DNR)** also asked about *the need for future maintenance work.*

According to the project documentation, if only technical measures were applied during its implementation, without actions mitigating the impact of the investment, due to the spatial scale of the project, the implementation of the works could have a material negative impact on the macroinvertebrate populations inhabiting the Odra waters. However, the investor planned numerous measures to minimise the impact of the project on invertebrate fauna, which will effectively limit the impact of the project on the group of organisms to a moderate and acceptable level. In particular, the following actions are planned:

- limiting work which interferes with the aquatic environment in the spring period (March-June) including the period of intensive development of invertebrates (including the departure of wintering larval stages and breeding of many species);

- no interference in groyne fields outside the immediate vicinity of the reconstructed groynes (up to 10 m-wide zone at the side of the groyne) and leaving uninterrupted the vegetation, sand deposits, and woody debris in groyne fields and oxbows connected with the current, which will contribute to the conservation of invertebrate habitats and populations on a significant area;
- collecting (in hand nets or with a dredge) and moving mussels (Unionidae) to safe places with appropriate habitat conditions from the sites of planned works in the vicinity of reconstructed or constructed groynes, planned longitudinal dams and river walls (this is to be carried out one week before the works commence);
- replanting patches of vegetation (especially nymphaeids) for the purpose of restoring invertebrate fauna habitats and transferring the organisms along with the plants;
- creating substitute habitats:
 - riffles along the reconstructed groynes with riprap of varying granulation (from 5 cm in diameter) instead of homogeneous revetments made of thick hydrotechnical stone;
 - open oxbow habitats (with water exchange, aquatic vegetation, and boulders as habitat-forming elements) in spaces behind longitudinal dams;
 - creating 8 artificial oxbow bays with a total area of 5300 m².

These measures, combined with the stage-by-stage execution of works on the Polish side and postponing works by at least 3 years on the German side, will allow to preserve invertebrate communities and, thanks to the measures applied, may even lead to a gradual improvement of the results of the ecological potential assessment for the bodies of surface water of the Odra in relation to this biological element.

With regard to the problem of accelerated colonisation of the Odra by non-native species, it should be pointed out that at present the banks of the river are reinforced with riprap over a considerable length, which these organisms use. In addition, native species of invertebrates (e.g. caddisflies, mayflies) and fish (including protected fish and indicators of good water status: golden loach *Cobitis taenia*, white-finned gudgeon *Romanogobio belingi*, asp *Aspius aspius*, barbel *Barbus barbus*, stone loach *Barbatula barbatula*, burbot *Lota lota*) also use the stone substrate. Gradually degrading stone revetments therefore replace, in a controlled river, natural rock outcrops and riffles, characteristic of sections of large rivers in a state close to the natural one.

The explanations provided in terms of the impact of future maintenance works on the ecological status of waters and the invertebrate fauna show that these works will mainly include the reconstruction of river control structures consisting in the supplementation of riprap in places of local cracks caused by ice run. In addition, there may be a need to remove river load locally deposited in excess due to the functioning of the modernised control structures. It should be emphasised that the works in question will be carried out only in justified cases, in a way that interferes as little as possible with the river environment, and the impact of the works in question will be local and insignificant. The processes of spontaneous renaturalisation taking place in the river will not be permanently interrupted and in the coming years they will lead to the restoration of the current diversity of organism complexes. This process is to be accelerated by measures adopted by the investor which limit the impact.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** raised the issue that *the available documentation does not take into account the ground beetle fauna as an ecological indicator. This indicator was used on the German side as part of the approval of the plan "Corrective actions on the Odra in Reitwein (from 604.6 to 605.5 km)".*

The investor submitted the results of the entomofauna inventory, which show that no species of ground beetles under legal protection were recorded in the places of planned works or in their vicinity. Although the investor did not use the ground beetle fauna as an ecological indicator, other methods of bio-indication of the state of the environment predestined for the assessment of the ecological capacity of waters were used, due to the fact that the project in question is of a hydrotechnical nature. They included indicators based on the species composition and abundance of ichthyofauna, benthic invertebrates fauna, or

phytobenthos, and the species composition and coverage of macrophyte flora.

The Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Brandenburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft** asked for clarification of the issue of the *2D model described in the documentation for the area of the mouth of the Warta to the Odra - it is not clear from the documentation whether the model was constructed and simulations were carried out.*

The explanations provided by the investor show that he executed a two-dimensional numerical model for the area in question and used it to simulate several scenarios based on different variants of river control structures. This model, in addition to the width of the control riverbed assumed in the one-dimensional model, also took into account the parameters of the bed load, therefore the results of the surveys carried out with its use allowed to determine the behaviour trends of the bottom of the watercourse after the works.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** concluded that *it would be advisable to carry out two-dimensional modelling for the purpose of assessing the impact of the project.*

The investment project is planned in accordance with the assumptions of the Polish-German *Update of the Concept of the Border Odra Watercourse*, prepared by the Federal Waterways Engineering and Research Institute in Karlsruhe (BAW) with the participation of German and Polish experts, developed in 2014, and the *Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015*. The aim of the BAW concept was to determine the scope of modernisation works necessary to achieve the river depth suitable for the operation of icebreakers at low and medium water levels, with minimal interference with the water level and the existing river control system. *The update of the concept of the Border Odra watercourse* contains a number of precise guidelines for the design of river control structures, which are binding for both Parties to the *Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015*.

Two different and complementary research methods were used for the purposes of the development of the *Update of the concept of the Border Odra Watercourse*:

- comprehensive one-dimensional hydrodynamic numerical model of the entire border section of the Odra (hereinafter: 1D-MTR model) - using this model, the water level at different flow rates, the balance of river load transport and resulting changes in the bottom and changes in the position of the water table

over a simulated 40-year forecasting period were calculated. The geometry of the riverbed is described by cross-sections distributed in the longitudinal profile of the river at intervals of not less than 100 m. The model was verified and calibrated. Calibration was carried out with appropriate values of the Manning roughness coefficient selected. The verification was carried out by comparing the flow values calculated using the model and measured with an ADCP current meter. Comparison of water table elevations and flow rates shows a very good model performance;

- the physical model of sediment transport of the Odra section in the Hohenwutzen area, which made it possible to carry out a variant analysis of river control structures that differ in types and dimensions, as well as to choose the variant for implementation - this model allows very accurate mapping of the impact of the analysed variants of river control systems on the development of

the average height of the river bottom, its form, as well as on the water table. The physical model made it possible to obtain an image of the formation of the river bottom deformations as regards mesoforms (bars and folds), as well as local deformations in the area of groyne heads and groyne fields.

A wide range of data and source materials were used for the construction of the model system, including natural data (probing results, data on the location of the water table, data on the distribution of bottom grain size and transport of solid bottom material), maps, result of the BAW studies on maintenance and regulatory projects from the years 1995-2012, reports and research results of the Water and Navigation Office in Eberswald, RZGW in Szczecin and third parties (including Warsaw University of Technology, Szczecin University of Technology, Federal Institute for Hydrology - Bundesanstalt für Gewässerkunde). A dense grid of cross-sections was used to construct the model (cross-sections every 100-200 m for the entire border section of the river and more dense in characteristic, hydraulically complicated places). In addition, bottom roughness and riverbed parameters were tested. The model was calibrated on the basis of characteristic flow values and known natural data (water table position, flow velocity and sedimentological parameters) from the previously agreed mean annual discharge for normal flow rates. The geometry of the model includes terrain obstacles in the form of river control structures.

On the basis of the modelling carried out as part of the preparation of the *Update of the concept of the border Odra watercourse*, a set of results was obtained for the whole section of the Border Odra with regard to both low and high flood flows.

The modelling results discussed in detail in the *Update of the concept of regulation of the Border Odra watercourse* and the inference based on these results formed the basis for the environmental impact assessment of the project, including the assessment of the impact of the investment on the increase of flood risk and the assessment of the impact of the investment on elements of ecological status and the network of Natura 2000 sites.

According to the documentation attached to the application for issuing an environmental permit, in accordance with the results of modelling and assumptions of the *Updating the concept of regulation of the Border Odra watercourse*, an optimal variant was selected for implementation, which will allow to achieve the objective of the project, while minimally interfering with water levels.

On the basis of the modelling, results were obtained in relation to the raising and lowering of the water table both at low and high (flood) water levels, lowering and raising after the construction works, and the height of the bottom without the works conducted in relation to the current conditions, which was supplemented in the submitted documentation by appropriate graphs illustrating the results of the calculations.

Based on the results of the *Update of the concept of regulation of the Border Odra watercourse*, as well as other pre-design materials, such as bottom surveys and maps for design purposes with precisely marked terrestrial terrain elevations, conclusions were drawn regarding the predicted changes in groundwater level and the assessment of the potential increase in flood risk, which provided a sufficient basis for analysis, inference, as well as a comprehensive assessment of the impact of the investment on the environment, including on Natura 2000 sites. The level of groundwater in the areas adjacent to the riverbed is closely related to the level of water in the river, therefore knowledge of changes in this level caused by the construction works was the basis for the impact assessment of the project and gave the basis to the exclude significantly negative impacts.

In the course of the impact assessment of the project, on the basis of the results from the *Update of the concept of regulation of the Border Odra watercourse*, it was determined which changes in water levels will occur in the case of carrying out the construction works and in the case of abandoning the project. Comparison of these data allowed to determine the extent of the difference in water height in both cases. According to the submitted documentation, the scope of model works carried out for the purposes of the *Update of the concept of regulation of the Border Odra watercourse* took into account a 40-year period following the completion of construction works. As indicated in the project documentation, during this period the bottom of the watercourse will stabilise on the expected elevation without further significant

erosion, and the changes in the height of the water table in subsequent years will be negligible and will depend virtually exclusively on the natural hydrological conditions in the river. In this way, the resulting data of physical modelling and calculations of the one-dimensional model allowed to draw conclusions exhaustively summarising the environmental impact assessment and the risk of flooding.

The above conclusions were supplemented with the results of the analysis carried out for the design works for the location with an extremely complex hydraulic situation, i.e. the Odra - Warta junction. In addition, model tests were carried out for this location using the 2D-MTR two-dimensional numerical model of solid material transport, which was properly calibrated. The two-dimensional model allowed to obtain the distribution of average velocities in the risers, determine the orientation of velocity vectors, and determine the deformations of the bottom caused by the influence of flowing water on river sediments. The obtained results allowed to determine the behaviour tendencies of the bottom of the watercourse after the works - they indicated that there would be no change in hydraulic conditions shaping the movement of riverbed mesoforms, and the transport of load will continue as a result of the movement of diagonal bars in the riverbed. The two-dimensional model was executed in accordance with the recommendations of the *Update of the concept of regulation of the Border Odra watercourse* only for locations with particularly complex hydraulic conditions, for which inference on the basis of the one-dimensional model had to be specified. Thus, the 2D model was not found necessary for the remaining parts of the riverbed. The use of two-dimensional modelling complements the data obtained in one-dimensional modelling. Due to the calculation time and the method of describing the riverbed geometry (digital bottom model), it is used only in places with complex morphometry, e.g. at riverbed bifurcations or connections with a large tributary.

The set of results obtained as part of the development of the *Update of the concept of regulation of the Border Odra watercourse* and from the 2D modelling report made for the abovementioned location allowed to precisely determine the minimum scope of work for achieving the appropriate depth for icebreakers and the effect they will cause in the aquatic environment in terms of changing water levels and the state of the bottom. Model tests described in these documents are sufficient to determine the impact of the works on the environment and on the level of flood risk.

The environmental impact assessment for the planned modernisation was carried out on the basis of an analysis of the modelling results. Environmental surveys have shown that there are valuable elements of the natural environment in the vicinity of the Odra riverbed, in particular natural habitats dependent on waters. Therefore, the following problems were defined for analysis using the results of numerical modelling, taking into account the current state variant (WO) and the recommended variant (KRC-W5):

- impact on groundwater levels,
- change of the current hydrological system,
- changes in flows, length of stagnation of water after rises, dynamics of water levels - annual extreme lows and rises, deposition of material as a result of rises.

The research and calculations presented in the environmental impact report based on *the Update of the concept of regulation of the Border Odra watercourse* clearly show that the rise of the water table at high and flood levels, as well as its lowering in the case of lows (which is a natural consequence of the lowering of the bottom) will be small in relation to the conditions on the river in its current state, and the implementation of the investment does not increase the risk of flooding and will not lead to a significant lowering of the groundwater table, which could result in the drying of bank areas. The maximum predicted lowering of the bottom, and thus the estimated maximum predicted lowering of the groundwater table according to the results of the conducted analyses, could potentially range from a few to several centimetres, depending on the section of the river. However, the results of modelling carried out for the purposes of *the Update of the concept of the border Odra watercourse* indicate that during low water levels, the water table will rise on average by 15-20 cm on most sections, and by a maximum of 25 cm on the section located at approx. 585.0 km. In addition, the analysis of the results of the conducted tests and models indicates that the functioning of the reconstructed river control structures will not affect the

current hydrological system of the Odra. The planned activities will not affect the way in which the river is fed, the volume of flows and the nature and course of lows or highs, and slight increases in the level of the water table can be expected in the long term. The results of the analyses carried out for *the Update of the concept of the border Odra watercourse* showed that the functioning of the reconstructed river control structures will not affect the volume of flows and the dynamics of highs and lows, or the lowering of the level of groundwater in the inter-embankment, which is also confirmed by the results of modelling carried out on the section of the free-flowing Odra, which were also taken into account in the project's environmental impact assessment.

Detailed two-dimensional models are suitable for the long-term assessment of hydromorphological changes in a river only if a sufficiently detailed database is available to calibrate the model and determine bank conditions - such a database is not available for the Odra, therefore using a one-dimensional model for this river is justified. The two-dimensional modelling carried out by the investor will not yield meaningful results in terms of assessing the long-term morphological effects. The above comment was submitted by the National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)**.

The explanations provided by the investor show that one-dimensional models are also used to simulate the development of the bottom in hydro-technical design for long periods of time - one example is the HEC-RAS ID model used in the United States, which is used to balance sediment transport. The two-dimensional model enables the analysis of local tangent stress, which allows for a detailed assessment of the impact of hydro-technical structures on the bottom and determining the places where bumps and significant deposits form. In the preparation of project documentation, the investor used both the results of comprehensive hydrodynamic numerical modelling of the one-dimensional border section of the Odra (1D-MTR model) - using this model, the water level was calculated at different flow rates, and the balance of river load transport and the resulting changes in the bottom and the position of the water table over the simulated 40-year forecasting period were calculated - and the results obtained using the physical model of transport of solid materials of the Odra section in the Hohenwutzen area, which enabled a variant analysis for the control structures differing as to their type and dimensions and a selection of the variant for implementation - this model allows for a very accurate mapping of the impact of the analysed variants of river control systems on the development of the average height of the river bottom, its form, and the position of the water table. Conclusions were supplemented with the results of the analysis carried out for the design works for the location with an extremely complex hydraulic situation, i.e. the Odra-Warta junction. In addition, model tests were carried out for this location using the 2D-MTR two-dimensional numerical model of solid material transport, which was properly calibrated. The two-dimensional model allowed to obtain the distribution of average velocities in the risers, determine the orientation of velocity vectors, and determine the deformations of the bottom caused by the influence of flowing water on river sediments. The obtained results allowed to determine the behaviour tendencies of the bottom of the watercourse after the works - they indicated that there would be no change in hydraulic conditions shaping the movement of riverbed mesoforms, and the transport of load will continue as a result of the movement of diagonal bars in the riverbed.

The town of Frankfurt (Oder) **Stadt Frankfurt (Oder)** raised the issue of the *effects of the project implementation on flood safety. As a result of the works, the section of the riverbed between Stubice and Frankfurt (Oder) will be narrowed, which may involve a change in water levels. It would be advisable to carry out 2D-HN modelling in order to exclude any possible damming in this area.*

The explanations indicate that in accordance with the assumptions of *the Update of the concept of regulation of the border Odra watercourse*, which is the basis for the execution of the works in question, the modernisation of the river control structures in the area in question will increase the level of the water table for high water ($Q=1300 \text{ m}^3/\text{s}$, i.e. p—5% water) by a maximum of 12 cm (in accordance with variant V5 of the concept, which is to be implemented). Modernisation of the control system in the medium water

riverbed is planned. Flood flows move across much larger sections - the high water riverbed includes the medium water riverbed, the bank riverbed, and the inter-embankment area. The higher the water level, the lower the impact of control structures. *The Update of the concept of regulation of the border Odra watercourse* describes the maximum increase in the water level for the water flow $p=5\%$ ($Q=1300 \text{ m}^3/\text{s}$) at the level of 12 cm. Meanwhile, for water $p=1\%$, the water table level in Słubice is 23.65 m Kr. Taking into account the increase of the water table by 12 cm (although the actual increase in the water level for 1% due to the modernisation of groynes will be lower), the expected elevation of the water table will be 23.77 m Kr. This level is significantly lower than the elevation of flood embankment crests - 25.0 m Kr. The impact of this investment on the level of the high water table is small. Additionally, it does not pose a threat to the existing flood embankments and allows to avoid winter floods by making icebreaking more efficient. The level of the high water table is influenced by many factors. The Manning roughness coefficient is very important. Elimination of high growths along the high water riverbed can increase this factor and significantly lower the high water table. In the area of Słubice and Frankfurt, an important element narrowing the cross-section of the riverbed and thus damming flood waters is the existing bridge, the pillars of which currently narrow the cross-section of the riverbed to a much greater extent than the proposed reconstruction of the river control structures. In addition, the investment in question provides for reconstruction by way of moving the existing lead-in pier towards the Polish bank at the entrance to the docking harbour in Słubice, just in front of the road bridge. The lead-in pier is intended to be directed towards the existing bridge pillar, now it ends between the pillars. This will widen the riverbed in front of the bridge by about 25-30 m, which will significantly improve the flow of flood waters. In conclusion, this investment will have a positive impact on flood protection in the winter in the areas in Słubice and Frankfurt (Oder) and is also likely to improve the conditions for flood water flow in the bottleneck of the existing road bridge by widening the riverbed in front of the bridge. In addition, during the expert meeting as part of the cross-border consultations on 17 January 2020, the investor said that he would prepare a two-dimensional model for the section limiting the Słubice area (at 581.0-585.7 km) and the results of the model tests would be communicated to the German side.

The Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Brandenburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft** pointed out that *the planned project would change flow dynamics, including changes in the flow section and the flow velocity, which could increase the risk of flooding. It also indicated the need to supplement the documentation with an assessment of the effects of the investments related to flood risk on the protection of persons / property and the functioning of existing flood protection structures.* The question of the impact of the *project on the functioning of flood protection systems* was also addressed by the Head of Uckermark district **Landkreis Uckermark - Die Landrätin** and the Office of Sustainable Development, Construction, Cadastre and Geodesy of the District of Barnim **Landkreis Barnim Amt für nachhaltige Entwicklung, Bau, Kataster und Vermessung**. The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs and Deutscher Naturschutzring (DNR)** also indicated *that the project would increase the risk of flooding in the event of summer floods.*

Documentation submitted by the investor shows that the project will not increase the risk of flooding in residential areas in the Odra valley. One of the key assumptions of the Update of the concept of regulation of the Border Odra Watercourse, which is the basis of the project, was to find such an option that would allow the least possible interference with the current water levels and would not increase the flood risk in the adjacent areas with the assumption of a spontaneous, slow lowering of the bottom. During the development of this concept, numerous variants for the modernisation of the river control structures were analysed. For most of the variants, the expected elevation of the water table at high levels was unacceptably high and these variants were therefore discarded. The KRC-W5 variant was selected for implementation. It involved a slight elevation of the water table at its high levels - the expected maximum elevation of the water table is about 12 cm in the vicinity of 660 km of the Odra. The investor carried out an additional analysis of the cross-section located on the section of the river in question, in which he took

into account the elevation of the crest of the flood embankment located on the German side, which is +9.00 m a.s.l. Kr and water levels from the nearest water gauge (Hohenwutzen water gauge). The highest water levels in the indicated location were recorded in the years: 1997 and 2010 during extreme floods on the Odra - these levels can be considered representative; they were: +7.13 m above the sea level Kr (1997) and +6.81 m a.s.l. Kr (2010). This indicates a considerable reserve of embankment height as regards any possible risk of water overflowing through the embankment crest at extremely high levels. This reserve is about 3 meters, so it is much larger than the projected 0.12 m rise of the water table as a result of the project. This shows that there is no flood risk associated with the implementation of the investment.

The explanations provided by the investor show that the parameters of the river control structures to be modernised ensure neutrality in relation to the flow of high waters, while being designed for medium waters. Thus, the change in the cross-sectional area of the riverbed in connection with the project in question will be negligible in relation to the surface of the riverbed for high water, therefore, the average increase of the water table by less than 5 cm during extreme flood phenomena after the execution of the works in relation to the state prior to the implementation of the investment is expected. In addition, the project includes plans to remove vegetation from the existing groynes, which will improve the conditions of flood water flow.

In a regulated river, the main problem is the migration of point bars, which causes the current to shift and causes the formation of milling. The higher tangent stress resulting from the modernisation of the river control structures and the transition in the transport of sediment from load to suspension transport will have a beneficial effect on the levelling of the bottom in the control route. Groynes maintained in good condition and modernised with the assumption of equalising the velocity distribution in the riverbed are important for maintaining transit depth in the riverbed (which is important for the operation of icebreakers), but also do not allow for large current deviations from the regulatory route, which threatens to erode the banks and form a secondary riverbed with water flowing at the base of embankments. This phenomenon seriously threatens the stability of embankments, because during floods a high-speed stream of water flows beneath their base, directed diagonally to the bank. Thus, it can be concluded that the project will not adversely affect the functioning of existing flood protection structures.

The Unteres Odertal National Park Board, via the Brandenburg Ministry of Rural Development, Environment and Agriculture **Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft**, raised the issue of *examining alternative variants for the project, including the use of icebreakers with smaller draught for icebreaking. The possibility of using the Canadian Amphibex floating excavators* was also indicated by the Lower Odra Valley National Park Foundation **Nationalparkstiftung Unteres Odertal**, Head of Oder-Spree district: Lower Office for Nature Conservation **Landkreis Oder-Spree Der Landrat: Untere Naturschutzbehörde**, the National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)**.

The investor indicated that he considered alternatives for conducting icebreaking, he also presented relevant expert opinions attached to the report on the environmental impact of the project: “Report summarising the conditions associated with conducting icebreaking on the border Odra” by dr hab. inż. T. Kolarski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, December 2018) and “Expert opinion on the use of AMPHIBEX type dredgers for icebreaking on the Odra” by dr hab. inż. T. Kolarski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, August 2018). These documents analysed the conditions of the occurrence of ice phenomena in the Odra, the conditions of conducting ice breaking, alternative methods of protection against jam-related floods and the possibility of using low-immersion Amphibex dredgers for conducting ice breaking operations in the Odra. The report on the environmental impact of the project submitted by the investor included the analysis of alternative variants both for the possibility of using other methods of

counteracting ice jams, including icebreakers with smaller draught and alternative construction of control structures which are to be modernised, as well as for a different technology of works, i.e. conducting works from the land. Addressing the proposed possibility of using Amphibex floating excavators for icebreaking in the Odra, the documentation submitted by the investor shows that these devices can be used in the Odra only as support for traditional icebreakers. Due to their technical parameters, these units are designed to operate in smaller watercourses with much smaller depth and flow. Using Amphibex excavators in the removal of ice jams in the border Odra would pose a danger to the operators of these units and the risk of damage to the unit or sinking under the influence of water and ice pressure, because the sudden movement of water trapped by the jam may lead to an increase in the flow rate to more than 3 m/s. These units have much lower efficiency and work at a slower speed than icebreakers. Because of their technical parameters, Amphibex excavators cannot replace linear icebreakers - they cannot be used to move quickly in the river to monitor the ice flow, and when used to widen the ice run-off channel, they are very slow and inefficient. Admittedly, Amphibex units can perform the work of front icebreakers by preparing a run-off channel for the ice, but the speed of their operation is almost 20 times slower than that of traditional front icebreakers.

The investor analysed the conditions of the occurrence of ice phenomena in the Odra, the conditions for conducting icebreaking, and the technical parameters of icebreakers and provided a summary of the results of these analyses in the investment documentation. The investor indicated the sections of the Odra where the smallest transit depths at medium flow occur (e.g. 0.95 m locally on the section from the mouth of the Nysa Łużycka to the mouth of the Warta, or 0.8-1.2 m on the section near Hohensaaten). Meanwhile, in the border Odra, the icebreakers currently used to carry out icebreaking operations and remove ice jams have parameters adapted to the ice conditions there. *The instructions for icebreaking on the border and the lower section of the Odra* in force during the Polish-German icebreaking operation assume that at least 10 Odra icebreakers with a capacity of 400-1000 hp are used. Maximum draught of high-power front icebreakers (Polish units: Dzik, Odyniec, Stanisław and German units: Frankfurt, Kietz, Schwedt) is up to 2.0 m. Smaller linear icebreakers operating on the border Odra have draughts from 1.44 m (the lowest average minimum draught) to 1.86 m (the maximum draught). As explained by the investor, the practice of using icebreakers has shown in previous years that linear icebreakers with a smaller draught do not have sufficient capacity to effectively remove ice jams in the Odra. Icebreakers with a draught of up to 1 m were used in the past on the Odra (e.g. the LR-400 Dolphin), however, due to the lack of sufficient power to work in difficult ice conditions they were directed to other tasks. Currently, such units have only auxiliary functions and are not used for frontal or linear operation for eliminating ice jams. German vessels with small draught were moved to the Elbe, which freezes occasionally, for the same reasons.

The need to clarify the need to ensure a year-round depth of 1.80 m in the Odra for the work of icebreakers was indicated by the Oderland-Spree Planning Community **Regionale Planungsgemeinschaft Oderland-Spree** and the Head of Oder-Spree district: Lower Office for Nature Conservation **Landkreis Oder-Spree Der Landrat: Unter Naturschutzbehörd.**

The explanations submitted by the investor show that, in accordance with the assumptions of *the Update of the concept of regulation of the border Odra watercourse*, the project will result in the depth in question on 80-90% of the days of the year, depending on the section of the river, so also in the summer and autumn months in addition to the time when there is need to conduct icebreaking. However, this is justified on hydraulic grounds. In addition, although the ice phenomena in the Odra occur from December to March, due to the difficulty in forecasting ice phenomena, a period of 6 “winter” months, i.e. November to April, should be taken into account in order to ensure safety in relation to winter floods. In the winter months, low water levels can be expected; often the flows in the winter season were lower than in the summer season.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** indicated

that *the construction of groynes is not a typical flood protection measure and that these structures are designed for navigation purposes.*

With regard to this comment, it should be noted that although the Odra is a navigable river on which an inland waterway has been designated, and therefore the river has a navigational function, this fact does not constitute a sufficient reason to undermine the objective of the project indicated by the investor, namely to strengthen the protection against winter floods for the towns located along the Odra. This objective is to be achieved both by improving the depth for the work of icebreakers and by opening up the riverbed to facilitate ice run-off and reduce the risk of ice jams. Operations for the prevention of winter floods in the Odra valley are carried out with the use of vessels – icebreakers – therefore, the effect of the planned works will be beneficial both for the improvement of icebreaking efficiency as well as for the improvement of the navigation conditions of the river, which is an additional benefit for shipping. The justification of the investment in question in the context of improving the working conditions for icebreakers and improving protection against winter floods was demonstrated by the investor in the expert opinion on the environmental impact of the project attached to the report entitled “Report summarising the conditions associated with conducting icebreaking on the border Odra” by dr hab. inż. T. Kolerski, (Faculty of Civil Engineering and the Environment, Gdańsk University of Technology, December 2018). In addition, the *Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015* indicated that the agreement was concluded for reasons related to flood protection, as well as that the joint implementation of icebreaking operations must be provided by both parties, and indicated that the condition of the river control structures of the border Odra is insufficient, which in recent decades had negative effects on the flow profile of large waters.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** requested *an in-depth analysis of the formation of ice jam phenomena, including model testing for this purpose: a one-dimensional model for the whole of the lower Odra, a two-dimensional model of Lake Dąbie, and two-dimensional models for particularly homogeneous sections of the lower Odra.*

The project documentation presents the results of analyses carried out using the two-dimensional DynaRICE model describing ice flow and the formation of ice jams on two representative sections of the Odra. These results indicate a high potential for jams forming on the Odra in the section located in the Ślubice region, caused, among other things, by local shallows. They also confirm the need to use high-power icebreakers to conduct winter operations in the Odra. In the opinion of the authority, additional model tests are not necessary to carry out an environmental impact assessment for the project.

The issue of taking into account climate change in the context of the project was raised by the National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)**.

The explanations provided by the investor show that the forecasts of climate change indicate a greater dynamics of weather phenomena, which will result in frequent air and water temperatures at around the freezing point. Under such conditions, ice phenomena will overlap in subsequent ice cycles, e.g. the influx of frazil ice to a section of the river that is not yet free from the ice from the previous freezing episode. Such overlapping of different phases of ice phenomena is dangerous. Increased air temperature will not compensate for the risk of ice jams when different phases of ice phenomena overlap. Comparative observations of the frequency of ice jam formation on the lower regulated Vistula and the middle Vistula show that river control reduces the risk of ice jam formation. A concentrated water stream with higher velocity facilitates the flow of frazil and ice. For this purpose, groyne modernisation works in the Odra are planned. They will improve the conditions for ice and frazil flow, as well as facilitate the work of icebreakers when their intervention is necessary to remove jams or facilitate the flow of ice to Lake Dąbie and the Szczecin Lagoon.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** commented on the *lack of a strategic environmental impact assessment for the Concept of regulation of the border Odra watercourse*.

Addressing the above issue, it should be pointed out that conducting a strategic environmental impact assessment for the *Update of the concept of regulation of the border Odra watercourse*, and then the environmental impact assessment of the project based on the concept would constitute a duplication of assessments, as indicated in the legal opinion submitted together with the investment documentation. Due to the level of detail of the Update of the concept of regulation of the border Odra watercourse, subjecting it to a strategic environmental impact assessment from a procedural point of view would not bring additional evidence in relation to the environmental impact assessment. Conceptual solutions are so precise that the appropriate instrument for preparing variants of design solutions and defining minimisation measures for the construction projects is the environmental impact assessment for the project. The planned activities in the scope of the project are included in the sector planning document, which sets the framework for the implementation of tasks aimed at limiting the risk of flooding, i.e. in the Flood Risk Management Plan for the Odra Basin Area adopted by the *Regulation of the Council of Ministers of 18 October 2016 on the adoption of the Flood Risk Management Plan for the Odra Basin Area* (Journal of Laws of 2016, item 1938), in which activities within the scope of modernisation and reconstruction of the river control structures of the border Odra for the purpose of icebreaking are part of the package of flood control measures in the problem area (Hot-spot) “Zatorowy”. At the stage of plan preparation, and before its adoption by means of a regulation, its draft was subjected to a strategic environmental impact assessment procedure.

The Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Brandenburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft** pointed out that *it was not clear from the project documentation whether the impact assessment of the investment concerned unilateral or bilateral implementation of works*. On the other hand, the National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** requested *a re-modelling of the one-dimensional section of the Odra, assuming unilateral implementation of works*.

The environmental impact assessment presented in the project documentation for impacts related to the implementation stage concerns the execution of construction works on the Polish bank, while for the effects resulting from the operation of the project - it takes into account the impact of bilaterally modernised structures, in accordance with *the Update of the concept of regulation of the border Odra watercourse*. Nevertheless, it should be noted that the governments of Poland and Germany undertook to implement *the Update of the concept of regulation of the border Odra watercourse*, and thus to modernise the control structures in accordance with the guidelines indicated therein, which was finalised by the conclusion of *the Polish-German agreement on joint efforts to improve the condition of waterways on the Polish-German border (flood protection, flow, and shipping conditions) signed in Warsaw on 27 April 2015* (Official Gazette of the Republic of Poland of 2015, item 1273). In order to jointly coordinate work, in accordance with Article 14 of the Agreement, the two Parties set up a Joint Committee and Working Party for the Implementation of the Polish-German agreement on joint efforts to improve the situation on waterways on the Polish-German border (flood protection, flow, and shipping conditions). The work is monitored and coordinated on an ongoing basis in accordance with a jointly developed and agreed material and time schedule. In addition, observing the provisions of the agreement, the German side already completed works on one section of the Odra - in Reitwein, the priority limiting place (604.6-605.5 km). Therefore, there is no reason to believe that the assumptions of *the Update of the concept of regulation of the Border Odra watercourse* will be implemented on only one bank of the Odra - both the Polish and the German side undertook to carry out modernisation works in accordance with the jointly

agreed concept. Therefore, the authority sees no need for model tests that would take into account only the unilateral modernisation of the regulatory development on the border section of the Odra.

The National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** indicated that *the proposed minimisation measures are voluntary in nature.*

In this environmental permit, the Regional Director for Environment Protection in Szczecin imposed an obligation on the investor to carry out actions minimising the negative impact on individual elements of the environment indicated in the submitted materials.

In the view of the National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)**, *the documentation submitted by the investor does not meet the minimum technical standards for assessing the environmental impact of the project, the overall environmental impact of the investment is not presented in a verifiable form.*

In accordance with the applicable regulations, the investor was obliged to translate into German the part of the environmental impact report which would enable the State whose territory the planned project may affect to assess the potential material transboundary impact on the environment, thereby fulfilling the obligation under the EIA Act.

The Öko Agrar Lower Odra Valley company **Nationalparkfleisch Eine Marke der Öko Agrar GmbH Unteres Odertal** indicated that, in its view, *there is no need for the reclamation of the Międzyodrze for agricultural purposes, as it currently provides conditions for the development of tourism.* A similar comment was made by the Lower Odra Valley National Park Foundation **Nationalparkstiftung Unteres Odertal**, the Society of Friends of the Polish-German European Lower Odra Valley National Park **Verein der Freunde des Deutsch-Polnischen - Europe - Nationalparks Unteres Odertal e.V** and by Międzynarodowy Park Dolina Dolnej Odry sp. z o.o. [International Lower Odra Valley Park] **International park Unteres Odertal GmbH.**

Due to the fact that the modernisation works will be carried out outside the area of Międzyodrze, at a significant distance from this area, in the opinion of the authority, the above remark is irrelevant in relation to the planned investment and does not affect the environmental impact assessment for the project.

During the consultations, the following parties indicated that they were not submitting comments or that the project in question did not affect their activities: Brandenburg Mining, Geology and Raw Materials Office **Landesamt für Bergbau, Geologie und Rohstoffe**, Brandenburg National Hunting Union

Landesjagdverband Brandenburg, Brandenburg National Monument Conservation Authority and the Brandenburg Archaeological Museum **Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum**, Oder-Welse Office **Amt Oder-Welse**, Regional Planning Community Uckermark - Barnim **Regionale Planungsgemeinschaft Uckermark - Barnim**, Federal Directorate for Waterways and Navigation **WSV.de - Wasserstraßen- und Schifffahrtsverwaltung des Bundes**,

The following parties indicated that they agreed with the view submitted by **Deutscher Naturschutzring (DNR)**: Öko Agrar Sp. z o.o. Lower Odra Valley **Nationalparkfleisch Eine Marke der Öko Agrar**

GmbH Unteres Odertal, Lower Odra Valley National Park Foundation **Nationalparkstiftung Unteres Odertal**, Międzynarodowy Park Dolina Dolnej Odry sp. z o.o. **Internationalpark Unteres Odertal GmbH**, Society of Friends of the Polish-German European Lower Odra Valley National Park **Verein der Freunde des Deutsch-Polnischen - Europe - Nationalparks Unteres Odertal e.V.**

These issues were addressed along with the comments of **Deutscher Naturschutzring (DNR)**.

The documentation was made available for a period of 30 days, which was too short. This issue was raised by the Head of Uckermark district **Landkreis Uckermark - Die Landrätin**.

The German side had the opportunity to read the documentation and to make comments for the same period of time as planned for the Polish public, i.e. the public of the party of origin. This is in accordance with the *Agreement between the Government of the Republic of Poland and the Government of the Federal Republic of Germany on the implementation of the Convention on Environmental Impact Assessment in a Transboundary Context of 25 February 1991, signed in Neuhardenberg on 11 April 2006.*

The following entities expressed their *support for the project*: Association for Water and Flood Embankments Freienwald Basin **Gewässer - und Deichverband Oderbruch**, Mayor of Eisenhüttenstadt **Stadt Eisenhüttenstadt Der Bürgermeister**, Chamber of Commerce and Industry of East Brandenburg **Industrie- und Handelskammer Ostbrandenburg**.

Comments on the quality of the translation of the documentation made available to the German side were submitted by the following parties: the Brandenburg Ministry of Rural Development, Environment and Agriculture **Land Brandenburg Ministerium für Ländliche Entwicklung, Umwelt und Landwirtschaft**, Regional Planning Community - Oderland-Spree **Regionale Planungsgemeinschaft Oderland-Spree**, Head of Oder-Spree district: Lower Office for Nature Conservation **Landkreis Oder-Spree Der Landrat: Untere Naturschutzbehörde**, the National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)**.

Taking into account the fact that comments on the quality of the translation were submitted by relatively few entities out of all those who submitted their views during the cross-border consultations held from 31.07.2019 to 29.08.2019, in the opinion of the authority, the quality of the translation of the documentation provided by the investor into the language of the affected party was sufficient for that party to learn of the scope of the project and its environmental impact assessment and to formulate conclusions and opinions in relation to the investment.

In the opinion submitted by the National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** and **Deutscher Naturschutzring (DNR)** it was indicated that the National Office of Brandenburg Nature Conservation Associations **Landesbüro vertretenen anerkannten Naturschutzverbände Brandenburgs** also represented the following registered associations: **BUND National Association, Grüne Liga Landesverband Brandenburg, NABU Landeverband Brandenburg, NaturFreunde Landesverband Brandenburg, Schutzgemeinschaft Deutscher Wald Landesverband Brandenburg**, while **Deutscher Naturschutzring (DNR)** represents the following registered associations: **Bund für Umwelt und Naturschutz (BUND), Deutsche Umwelthilfe (DUH), Naturschutzbund Deutschland (NABU), Society of Friends of the Polish-German European Lower Odra Valley National Park, and WWF Germany.**



p.o. REGIONALNEGO BIURA
OCHRONY ŚRODOWISKA
w Szczecinie

Aleksandra Stodulna

