Certified Translation of a Polish Document into English

REGIONAL DIRECTOR FOR ENVIRONMENTAL PROTECTION in GDAŃSK

Gdańsk, 17 October 2025

RDOŚ-Gd-WOO.420.59.2023.AM.42.
Zpo/ePUAP

DECISION

Pursuant to:

– Article 104 of the Act of 14 June 1960 – Code of Administrative Procedure (consolidated text, Journal of Laws of 2024, item 572, as amended), hereinafter referred to as CAP;
- Article 75(1)(1)(c), Article 82 and Article 85 of the Act of 3 October 2008 on the provision of information on the environment, public participation in environmental protection and environmental impact assessments (consolidated text, Journal of Laws of 2024, item 1112, as amended), hereinafter the EIA Act,
– Article 76(1) of the Act of 17 December 2020 on the on the promotion of electricity generation in offshore wind farms (consolidated text, Journal of Laws of 2025, item 498),
– § 2(1)(5) and § 3(1)(61) of the Regulation of the Council of Ministers of 10 September 2019 on projects likely to have a significant impact on the environment (Journal of Laws of 2019, item 1839, as amended);

having considered a request from

– the Investor: Elektrownia Wiatrowa Baltica-1 Sp. z o. o., represented by its attorney, Ms. Natalia Kaczmarek, Maritime Institute of Gdynia Maritime University, letter ref. EWB1-RDOS-0061 of 24 July 2023, for the issuance of an environmental permit decision for the project titled **“Baltica-1 Offshore Wind Farm”** (hereinafter: “Baltica-1 OWF”),

having considered the information contained in:

– the environmental impact report for the project titled “Baltica-1 Offshore Wind Farm” – consolidated version, prepared by the Consortium of the Maritime University of Gdynia with MEWO S.A. together with subcontractors under the management of Mr. Radoslaw Opioła, Gdansk, May 2025 (hereinafter referred to as the EIA report), as well as additions and clarifications to the EIA report,
– opinion of the State Border Sanitary Inspector in Gdynia, ref. SE.ZNS.80.4912.6.24 of 9 September 2024, upheld in letter ref. ZNS.491.2.10.2025 of 16 June 2025 and letter

ref. ZNS.491.2.10.2025.1 of 30 September 2025
- approval by the Director of the Maritime Office in Gdynia, order ref. INZ.9202.117.4.2024.AD. of 1 October 2025

and having carried out the environmental impact assessment of the project and the transboundary impact procedure,

I hereby decide to

A) Determine the type and place of project implementation.

The planned Project involves the construction, operation and decommissioning of an Offshore Wind Farm with a maximum total capacity of 900 MW. The aim of the Project is to generate electricity using a renewable energy source, i.e. wind power. The scope of the environmental permit application for the Baltica-1 OWF offshore wind farm does not include the power evacuation facilities (within the meaning of the Act of 17 December 2020 on the promotion of electricity generation in offshore wind farms from the planned farm to the National Power System (hereinafter: “NPS”)).

The Baltica-1 offshore wind farm is located in the Exclusive Economic Zone (EEZ) of the Republic of Poland, on the eastern side of the Central Bank, in the depth range from approx. 16 m to approx. 50 m, at a distance of approx. 75 km north of the shoreline, off the Smołdzino commune and the Leba commune (Pomeranian voivodeship) and at a distance of 550 m from the border of the EEZs of Poland and Sweden.

The surface area of the site (basin) within which, according to the permit from the Minister of Transport, Construction and Maritime Economy of 16 April 2012. (Decision No. MFW/3/12, ref. GT7/62/1157763/decyzja/2012) for the erection and use of artificial islands, structures and facilities in Polish maritime areas, as amended by decision of the Minister of Infrastructure of 21 October 2021, ref. DGM-3.530.1.2021 (OLL or “location decision”), the construction of the Baltica-1 OWF is possible, is 108.19 km^2. The Baltica -1 offshore wind farm area will cover a surface area of 85.53 km^2.

Under the investor's variant, the planned Project consists of:

– offshore wind turbines,
– an offshore substation or offshore substations, which will include offshore transformer stations and, in the case of an HVDC solution, also an offshore converter station,
– marine medium or high-voltage power cable lines with associated infrastructure.

Table 1. Range of parameters that characterise the Baltica-1 OWF.

Name of facility or definition of parameter	Unit	Value
Maximum capacity of the offshore wind farm	MW	900
Maximum capacity of a single wind turbine	MW	25
Maximum number of wind turbines with the smallest unit turbine capacity (15 MW)	units	60
Maximum number of wind turbines with the smallest turbine unit capacity (25 MW)	units	36
Minimum distance between wind turbines	-	3.5 RDs
Maximum distance between wind turbines	-	12 RDs
Maximum total sweep area of all rotors	m^2	2,750,000
Minimum number of offshore substations	units	1
Maximum number of offshore substations	units	4

Name of facility or definition of parameter	Unit	Value
Maximum length of cable routes of systems inside the OWF	km	140
Maximum width of the seabed strip covered by construction works for one cable line	m	16

RD – rotor diameter

Table 2. Geocentric coordinates of the boundary angle points of the Baltica-1 OWF area

Boundary point symbol	Geocentric geodetic coordinates in the ETRS89 reference system	
	Geodetic latitude Φ	Geodetic longitude λ
1	55°38’16.206” N	17’38’03.776” E
2	55’36’16.018” N	17’35’40.167” E
3	55’33’43.771” N	17’34’46.304” E
4	55’32’09.162” N	17’35’21.458” E
5	55’32’03.321” N	17’35’23.627” E
6	55’31’56.204" N	17’35’26.269" E
7	55’31’19.695” N	17’35'29.710” E
8	55’31’17.057" N	17’35’29.579” E
9	55’31’01.612” N	17’35’26.574" E
10	55’30’53.163" N	17’35’24.930” E
11	55’30'42.510” N	17’34’50.515” E
12	55’29’53.123” N	17’32’14.175” E
13	55’29'43.030" N	17’30’45.137" E
14	55’29’36.940” N	17’29’52.854" E
15	55’29'25.168” N	17’29’31.287” E
16	55’28’57.603" N	17’26’25.966” E
17	55’28'56.144" N	17’25’54.331” E
18	55’31’42.251" N	17’26’44.303” E
19	55’31’43.594" N	17’27’00.863” E
20	55°31'46.079” N	17’27’12.463” E
21	55°33'19.449” N	17’31’23.992” E
22	55’34’06.850" N	17’33’40.983” E
23	55’34'32.229” N	17’33’59.580" E
24	55’35’07.555” N	17’33’41.076” E
25	55’36'02.838” N	17’32’11.364” E
26	55’36'06.396" N	17’32’02.976” E
27	55’36'56.064” N	17’29’05.042" E
28	55’37’24.525" N	17’30’35.467” E
29	55’37'45.553” N	17’31’42.228” E
30	55’37’34.673” N	17’32’05.771” E
31	55’37’27.287” N	17’32’42.422” E
32	55’37’27.289” N	17’33’21.362” E
33	55’37’34.677” N	17’33’58.079” E
34	55’38'41.045” N	17’37’26.888” E
35	55’38’33.742" N	17’37’18.176” E

Table 3. Geocentric coordinates of the boundary angle points of the Baltica-1 OWF area – construction area of wind turbines, offshore substations and inter-array cable lines.

Boundary point symbol	Geocentric geodetic coordinates in the ETRS89 reference system	
	Geodetic latitude Φ	Geodetic longitude λ
1	55’35’07.555” N	17’ 33’41.076” E

Boundary point symbol	Geocentric geodetic coordinates in the ETRS89 reference system	
	Geodetic latitude Φ	Geodetic longitude λ
2	55’36'02.838” N	17° 32’11.364” E
3	55’36'06.396" N	17° 32'02.976” E
4	55’36'56.064" N	17° 29’05.042” E
5	55’37’24.525" N	17’ 30’35.467” E
6	55’37'45.553” N	17’ 31’42.228" E
7	55’37’34.673" N	17° 32'05.771” E
8	55°37'27.287" N	17° 32’42.422" E
9	55’37’27.289" N	17° 33’21.362" E
10	55’37’34.677” N	17° 33’58.079” E
11	55’38’41.045’’ N	17° 37’26.888” E
12	55’38’31.390” N	17° 37’15.371” E
13	55’36’39.919" N	17’ 34’51.822" E
14	55’36’38.132” N	17° 34’49.825” E
15	55’35’37.494” N	17° 33’51.521” E
16	55’35’32.435” N	17° 33’48.439” E
17	55’34’06.850” N	17° 33’40.983” E
18	55’33’18.564" N	17° 34’01.464" E
19	55’31’58.034” N	17’ 34’28.954" E
20	55’31’19.286" N	17’ 34’32.633" E
21	55’30’53.817” N	17’ 34’27.689” E
22	55’30’08.491" N	17’ 32’04.213” E
23	55’29’58.893” N	17° 30’39.551” E
24	55’29’57.369" N	17° 30’31.942” E
25	55’29’54.694” N	17° 30’25.390" E
26	55’29’25.168” N	17’ 29’31.287” E
27	55’28’57.603” N	17’ 26’25.966" E
28	55’28’56.144” N	17’ 25’54.331” E
29	55’31’42.251" N	17’ 26’44.303" E
30	55’31’43.594" N	17’ 27’00.863" E
31	55’31’46.079” N	17’ 27’12.463” E
32	55’33’19.449" N	17’ 31’23.992” E

Table 4. Geocentric coordinates of the boundary angle points of the Baltica-1 OWF area – construction area of inter-array cable lines.

Boundary point symbol	Geocentric geodetic coordinates in the ETRS89 reference system	
	Geodetic latitude Φ	Geodetic longitude λ
1	55’34’06.850” N	17’33’40.983" E
2	55’34’32.229" N	17’33’59.580” E
3	55’35’07.555” N	17’33’41.076” E
4	55’35’32.435” N	17’33’48.439” E
5	55’35’37.494” N	17’33'51.521" E
6	55’36’29.199” N	17’34’41.668" E
7	55’36’38.132” N	17’34’49.825” E

Boundary point symbol	Geocentric geodetic coordinates in the ETRS89 reference system	
	Geodetic latitude Φ	Geodetic longitude λ
8	55’36’39.919" N	17’34’51.822" E
9	55’38’31.390" N	17’37'15.371” E
10	55’38'33.742" N	17’37’18.176” E
11	55’38'33.742” N	17’37’18.176” E
12	55’38’16.206” N	17’38’03.776” E
13	55’36’16.018” N	17’35’40.167” E
14	55’33’43.771" N	17’34’46.304” E
15	55’32’09.162” N	17’35’21.458" E
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31	55’31’19.286” N	17’34’32.633” E
32	55’31’58.034” N	17’34’28.954" E
33	55’33’18.564” N	17’34’01.464” E

B. Determine the environmental conditions for the planned project involving the construction of the Baltica-1 OWF as well as determine the following conditions for the implementation of the project.

I. Conditions for the use of the site during the implementation and operation or use of the project, with particular regard to the need to protect high-value natural assets, natural resources and cultural heritage assets, and to limit the burden on neighbouring areas.

1. With regard to all phases of the project:

1.1. The technologies adopted for carrying out any work should include procedures for dealing with the transfer of possible pollutants into marine waters; this applies in particular to safeguards against solid and liquid waste pollution. Provide the project site with oil pollution control measures. In the event of a spill of petroleum substances, they should be removed from the water surface immediately and on an ongoing basis.

1.2. Carry out all work related to the project in accordance with the provisions of the spatial development plan(s) for the Polish maritime areas in force in the project area.

1.3. In the event new archaeological objects are found that have not yet been identified, do not allow them to be damaged as a result of the work being carried out and notify the relevant administrative authorities of the find.

1.4. At nighttime, on ships and farm structures, limit the use of strong light sources and do not direct light upwards, except for the need to provide lighting for safety, including regulations on occupational safety and health (OSH).

1.5. Provide a coordination centre for the supervision of the construction, operation and decommissioning of the Baltica-1 OWF.

1. Develop plans for the safe construction, operation and decommissioning of the Baltica-1 OWF.

1.7. Conduct the construction, operation and decommissioning of the project in a manner that does not pose a threat to people and the environment.

1.8. Designate safety zones and appropriately mark and secure areas temporarily or permanently closed to use.

1.9 Provide appropriate, regular training to vessel crews and employees and subcontractors involved in the construction, operation and decommissioning of the Baltica OWF.

1.10. Ensure the operation of machinery and equipment by personnel duly trained in general and specific occupational health and safety rules.

1.11. Reduce, through adequate mitigation measures, exposure to noise, vibration and the effects of exhaust fumes and dust and electromagnetic fields generated by contractors and service technicians.

1.12. Carry out work with the use of equipment in good working order, ensure proper maintenance of construction machinery and equipment and maintain the appropriate state of repair of equipment during operation.

1.13. Ensure that sanitary sewage is collected and disposed of in a manner appropriate to the place where it is generated.

1.14. Develop procedures for the handling and storage of substances that may be a source of pollution.

1.15. Ensure separate collection of waste (including bilge and other hazardous oils) during construction and maintenance works, operation and decommissioning of the project.

1.16. Develop marine operations plans and search and rescue plans, as well as evacuation and safety plans, and strategies to address hazards, including construction disasters.

1.17. Equip vessels and substations with means to eliminate spills of petroleum substances or released waste.

1.18. Ensure an appropriate level of treatment and method of disposal of oil-polluted water.

1.19. Use materials and equipment that meet relevant standards and are certified for use in the relevant type of environment;

2. With regard to the project construction stage:

2.1. Do not exceed the maximum underwater noise level at the boundary of the Natura 2000 site Hoburgs bank och Midsjöbankarna (SE0330308) throughout the year, i.e. 140 dB re: 1 $\mu Pa^2 s$ SEL_{cum} HF-weighted (HF weighting function for marine mammals with high sensitivity to high frequency sounds - porpoise).

2.2. Regardless of the use of underwater noise suppression technology, each time precede the piling process by a soft-start procedure.

2.3. Insofar as possible, build successive elements of the offshore wind farm in such a way as to populate the area designated for investment with structures in stages, so as to build-up the flushing effect and thus gradually displace fish, birds and marine mammals from the area designated for the project. It is permissible to use animal deterrent devices during piling operations

2.4. Carry out all work under the supervision of a naturalist, who will be responsible for the control and supervision of the construction work performed, so that the task is carried out in accordance with environmental and nature protection laws and relevant administrative decisions. The supervision should be carried out by experts with expertise in conducting surveillance in the fields of ichthyology, ornithology and marine mammals.

2.0.5. To minimise the risk of collision during bird migration, at night time on vessels involved in construction and on structures, limit the use of strong light sources and do not direct light upwards, except for the need to provide lighting for safety, including regulations on occupational safety and health (OSH).

2.6. Pile driving in areas to a depth of 25 m shall be carried out from 1 May to 30 November, i.e. during the period of the lowest bird activity in these areas, or during the remaining period when ornithological supervision confirms the absence of contraindications to carry out such work.

2.7. Upon completion of construction work, remove from the seabed all debris from the construction process and any pollutants.

2.8. Prior to the start of the construction phase, develop and implement appropriate procedures to prevent accidents related to unexploded ordnance, especially chemical warfare agents. In the event unexploded ordnance or toxic warfare agents are found, provide information about the finding to the Director of the Maritime Office in Gdynia and to the Navy Hydrographic Office.

2.9. The sinking of any dredged material excavated to the surface from the work site shall require an appropriate permit in accordance with the Regulation of the Minister of Transport and Construction of 26 January 2006 on the procedure for issuing permits for the disposal into the sea of dredged material and for the dumping into the sea of waste or other substances (Journal of Laws 22, item 166).

2.10. Ensure proper organisation and schedule of the construction process.

2.11. Provide adequate facilities and social conditions for workers with proper sanitary facilities.

2.12. Carry out construction work using contractors with appropriate experience and qualifications and trained employees.

2.13. Carry out construction works in atmospheric conditions that allow them to be performed precisely and in accordance with the selected method.

2.14. Apply systems for warning vessels unrelated to the construction of the Baltica-1 OWF, provide navigational surveillance and use a system of navigational warnings and messages, and conduct continuous monitoring of vessel traffic.

2.15. Check the seabed in order to accurately determine the location of objects that could pose a threat in the course of works to other users of maritime areas and inform the relevant services about the existing threat and act in accordance with relevant guidelines;

2.16. Ensure appropriate storage and transport conditions for the project components.
2.17. Conduct information campaigns on the nature and extent of investments and related nuisances and ways to mitigate them.
2.18. Publish information on the planned scope of works, traffic volume and the need to exercise caution in the construction area.
2.19. Carry out equipment process start-up and hand-over for operational use after obtaining all required acceptance certificates and permits.

3. With regard to the project operation stage:

3.1. Equip Baltica-1 OWF components with elements that minimise the risk of oil entering the marine environment, including but not limited to oil trays and drip pans.
3.2. Equip offshore substations with drip pans with a capacity of about 110% of the amount of oil in transformers, capable of containing a complete spill in case of leakage.
3.3. Under night conditions, use turbine lighting that will not attract migrating birds. Bring its emissions to the minimum level required by applicable laws and regulations and safety standards.
3.4. Conduct maintenance and direct operation work in weather conditions that allow such work to be performed in a safe and accurate manner.
3.5. Perform periodic inspections of the various components and keep the infrastructure in good working order.
3.6. Develop emergency response plans for incidents occurring during project operation.

4. With regard to the project decommissioning stage:

4.1 After the completion of the operation of the project in question, remove all above-water elements of the Baltica-1 OWF and other components of the offshore wind farm in a way that allows possible future extraction of aggregate in the POM.60.E basin area. Prior to the start of the decommissioning process, conduct a natural environment inventory of the objects founded in or on the seabed. It is allowed to leave some of the structures founded on the seabed if they are going to become a habitat for valuable communities of marine organisms subject to prior agreement with the Director of the Maritime Office in Gdynia.
4.2 Start the removal of offshore wind farm components from one place, so that the basin occupied by the structures is released gradually.
4.3 Carry out all work under the supervision of a naturalist, who will be responsible for the control and supervision of the decommissioning work performed, so that the task is carried out in accordance with environmental and nature protection laws and relevant administrative decisions. The supervision should be carried out by experts with expertise in conducting surveillance in the fields of ichthyology, ornithology and marine mammals.
4.4 To minimise the risk of collision during bird migration, at night time on vessels and on farm structures, limit the use of strong light sources and do not direct light upwards, except for the need to provide lighting for safety, including regulations on occupational safety and health (OSH).
4.5 Upon completion of decommissioning work, remove all residues from the decommissioning process and any contamination from the seabed.

II. Environmental requirements necessary to be provided for in the construction design:

1. Design a maximum of 60 offshore wind turbines, with a minimum clearance between the lower position of the rotor blade and the sea surface of not less than 20 m, a maximum rotor diameter of not more than 310 m, and a maximum total height of the wind turbine of not more than 330 m above sea level.
2. Design up to 4 offshore substations marine substations (OSSs) and up to 140 km of inter-array power and telecommunication cable sections.
3. The maximum area of the seabed occupied by one turbine foundation should not exceed 14,300 m^2, and the total maximum seabed area occupied by all foundations should not exceed 735,500 m^2.
4. To minimise the risk of collision during bird migration, at night time on vessels and on farm structures, limit the use of strong light sources and do not direct light upwards, except for the need to provide lighting for safety, including regulations on occupational safety and health (OSH).
5. Lay inter-array power cables in the Baltica-1 OWF area in a space-saving manner, under the surface of the seabed, and if this is not possible, use other permanent safeguards to enable the safe use of anchored gill nets.
6. Lay power cables at a depth of up to 3 m below the surface of the seabed. The minimum burial depth should be determined on the basis of the seabed characteristics, the type of sediment (its thermal conductivity) and the type of power network (amount and type of loads, thermal specifications). Where it is technically impossible to bury the cable, it should be laid on the seabed surface. Protect cables laid on the seabed surface by laying rock material, concrete mattresses, or other engineering solutions that provide permanent protection from damage.
7. Design infrastructure taking into account the principles of minimising environmental impacts, in particular due to the principles of safety, noise emission, electromagnetic radiation, emissions of substances into the air, and ensuring proper hygienic and fire safety conditions.
8. Equip the OWF with a system that allows short duration stopping/speed reduction of selected wind turbine generators during bird migration periods. Activate the system when the results of operational monitoring indicate that there is an intensive migration of cranes over the OWF area at collision height and in situations where this is required.

III. Environmental requirements for reducing transboundary environmental impact:

1. Implement a Noise Reduction System to ensure that underwater noise levels resulting from construction do not exceed the weighted level of 140 dB re 1 $\mu Pa^2 s$ (SEL_{cum}) for porpoises within the boundaries of the Natura 2000 site Hoburgs bank och Midsjöbankarna.
2. Conduct underwater noise measurements at the boundary of the Natura 2000 site Hoburgs bank och Midsjöbankarna (SE0330308) during foundation piling to monitor compliance with the imposed noise limit.
3. Other planned piling operations conducted within 50 km of the site should be taken into account when planning piling work. Simultaneous piling at the specified distance is allowed only under the condition that the permitted noise levels are not exceeded.

C. Impose the following obligations on the applicant:

1. **Obligations of the applicant for measures to minimise and mitigate negative environmental impacts related to the need to reduce noise from piling and related to the need to reduce impacts on birds, fish and marine mammals:**
   a) Insofar as possible, build successive elements of the offshore wind farm in such a way as to populate the area designated for investment with structures in stages, so as to build-up the flushing effect and thus gradually displace fish, birds and marine mammals from the area designated for the project.
   b) Pile driving in areas to a depth of 25 m shall be carried out from 1 May to 30 November, i.e. during the period of the lowest bird activity in these areas, or during the remaining period when ornithological supervision confirms the absence of contraindications to carry out such work.
   c) At nighttime, on ships and farm structures, limit the use of strong light sources and do not direct light upwards, except for the need to provide lighting for safety, including regulations on occupational safety and health (OSH).
   d) In order to reduce the impact of noise on ichthyofauna, ornithofauna and marine mammals, start piling using the so-called soft-start procedure to allow fish, birds and marine mammals to leave and move away from the work area.
   e) When planning piling work, consideration should be given to other operations planned or underway within 50 kilometres of the site. Simultaneous piling at the specified distance is allowed only under the condition that the permitted noise levels are not exceeded, so as to prevent the cumulation of adverse environmental impacts, and so that the number of simultaneous piling operations is not more than two.
   f) Conduct visual observations by qualified marine mammal observers (MMOs) from aboard the vessel in accordance with the methodology defined by the JNCC combined with Passive Acoustic Monitoring (PAM, or Passive Acoustic Monitoring) based on the use of a set of hydrophones (PAM detectors) placed in the water depths. The duration of the search for mammals before piling should be at least 30 minutes.
   g) During piling, use noise reduction systems that limit noise emissions, for example, air/bubble curtains or other technologies that ensure that the noise level that can induce a hearing temporary threshold shift (TTS) in porpoise, i.e., a level of 140 dB re 1 $\mu Pa^2 s$ (SEL_{cum}), HF-weighted (HF weighting function for marine mammals with high sensitivity to high-frequency sounds - porpoise), is not exceeded at the boundary of the Natura 2000 site Hoburgs bank och Midsjöbankarna. In the event that noise measurements indicate that the aforementioned threshold is exceeded, pile driving should be stopped, and additional minimisation measures should be taken to achieve the limiting noise level specified above. Immediately inform the Regional Director for Environmental Protection in Gdańsk about such a situation and further measures applied, no later than 7 days from the occurrence of the event.

2. **The applicant’s obligations to monitor the environmental impact of the project:**

2.1. <u>Scope of pre-project (pre-construction) monitoring.</u>

1) Seabird survey monitoring should include the counting of birds staying in the planned OWF area and in the reference area, performed at daytime.
   a. The route of the survey session should be marked out so as to include a 4-kilometre

zone around the OWF boundaries in the counting, and so that changes in the density of birds staying at different distances from the future wind turbine generators can be assessed. It is permissible not to carry out the survey in the aforementioned zone, in case of closure of basins by other users.

   b. These surveys must primarily cover the period of the most numerous occurrences of birds in the southern Baltic Sea, that is, they should continue from October to May with a frequency of no less than 1 survey session per month. In the remaining months, the abundance of bird grouping in the OWF area is low, so during the summer it is sufficient to carry out two survey sessions, one each in August and September.
   c. Synchronise the timing of survey sessions so that counts on both basins are performed, if possible, in a single survey session, to ensure comparability of results. These surveys should be conducted for one year before the OWF construction work start.

2.2. <u>Scope of monitoring at the construction stage.</u>

1) Underwater noise monitoring:
   a. Carry out the monitoring at the boundary of the Natura 2000 site Hoburgs Bank och Midsjöbankarna (SE0330308), where, due to the occurrence of the harbour porpoise, which is a qualifying feature, the permissible underwater noise level must not exceed 140 dB re 1 μPa2s (VHF-weighted SELcum).
   b. Designate the location of the noise measurement station to assess underwater noise levels at the boundary of the Natura 2000 site Hoburgs Bank och Midsjöbankarna (SE0330308) for work carried out in the Baltica-1 OWF area.
   c. Perform noise measurements using calibrated omnidirectional hydrophones with a sensitivity deviation of less than ±2 dB up to 40 kHz in the horizontal plane and less than ±3 dB up to 40 kHz in the vertical plane and record the calibration signal.
2) Carry out the monitoring of the occurrence of the harbour porpoise using C-POD/F-POD equipment or equivalent monitoring technology available at the time of surveys throughout the construction phase using the same/comparable methods as during the surveys conducted for the EIA report, with equipment placement, where possible, at the same stations.
3) Carry out the monitoring of the extent of dispersion and concentration of suspended matter in the water as a result of ongoing work disturbing bottom sediments.

2.3. <u>Scope of post-project monitoring:</u>

1. Carry out the monitoring of ichthyofauna both during the operation of the Baltica-1 OWF and after its decommissioning. Carry out surveys in spring and summer – during 1 year after the completion of construction and one year after the decommissioning phase.
   a. As part of the monitoring, use a set of survey tools in the form of multi-panel bottom-set nets, and for early development stages, a Bongo ichthyoplankton net.
   b. Designate survey stations in the Baltica-1 OWF area in the same number as during the survey for the purposes of the EIA report.
2. Monitor migratory birds including both flight observations with radar and counts of birds staying in the OWF area performed during the day.
   a. Target radar surveys on the trajectory of birds flying towards the Baltica-1 OWF and their reaction to the barriers encountered in the form of the Baltica-1 OWF, as well as to determine the intensity of migration in the Baltica-1 OWF Area and in its immediate vicinity, to enable compatibility analysis with other available surveys in this regard, and

to provide new data for the analysis of the barrier effect and frequency of avoidance (birds bypassing).

b. Carry out radar surveys during the migration period, in the months from March to May and from August to mid-November.
c. The monitoring should consist of simultaneous visual and radar and acoustic observations (at night, in order to identify species), allowing identification not only of the flight direction and response but also of the species. As an alternative to acoustic observations, the farm could be equipped with a system for identification not only of the direction of flight but also of the species of migratory birds.
d. Locate the survey stations on a permanent platform (e.g. OWF substation) or on an anchored vessel so as to allow observation of the Baltica-1 OWF from the direction from which birds arrive at a given migration stage (on the south-western side of the Baltica-1 OWF in spring and on the north-eastern side of the Baltica-1 OWF in autumn).
e. In each migration season, carry out observations for not less than 20 days in 2–5-day sessions, distributed evenly throughout the migration season.
f. Perform the monitoring in two cycles per year, resulting from two birds migration periods, i.e. from March to May and from August to November, in 4 monitoring blocks : 2 survey cycles each (spring and autumn) during migration periods for 2 years after the commencement of the farm operation.

3. The monitoring of seabirds should include counting of birds staying in the OWF area and in the reference area during the day. The route of the survey cruise should be the same or very similar as in the pre-project monitoring (prior to the commencement of construction).
   a. These surveys must primarily cover the period of the most numerous occurrences of birds in the southern Baltic Sea, i.e. they should continue from October to May with a frequency of no less than 1 survey session per month. In the remaining months, the abundance of bird grouping in the Baltica-1 OWF area is low, so during the summer it is sufficient to carry out two survey sessions, one each in August and September.
   c. The timing of survey sessions should be synchronised so that counts on both basins are performed, if possible, in a single survey session, to ensure comparability of results.
   c. Conduct these surveys for 2 consecutive years (the first 2 years of the OWF operation stage) in case the construction process is not phased. Otherwise, carry out these surveys after the completion of the first phase of construction and after the completion of the entire Baltica-1 OWF.
4. Conduct monitoring of porpoise occurrence for at least 2 years after completion of construction of the planned project using the same/comparable methods as during the surveys conducted for the EIA report.
5. Conduct monitoring of benthic organisms aimed at studying colonisation of artificial hard substrates by animal and epiphytic plant communities.
   a. Benthos monitoring surveys:
      - Conduct the benthos monitoring survey programme in the Baltica-1 OWF Area involving surveys of flora and epiphytic fauna on 5 underwater structural elements of wind turbine generators and associated infrastructure.
      - At each site surveyed, take samples of epiphytic organisms and make video and photographic documentation of the entire riser overgrown by macroalgae and epiphytic fauna.
      - Perform the surveys once a year in June. For the first time, the surveys should be

carried out after the first year following the launch of the Project. Subsequent surveys should be performed after 5 and 10 years. Perform the last survey one year before the planned dismantling of the wind farm.

b. Macrozoobenthos monitoring surveys:
   - Perform surveys within 5 foundations or support structures of wind turbine generators selected so as to represent possible phasing of the construction process (structures built at different stages) and to be located in different parts of the Baltica-1 OWF area.
   - In the vicinity of a single foundation or support structure, designate 6 stations, including 3 stations on the transect of the main profile (in the near-bed current axis) at distances of 20, 50 and 100 m from the foundation, support structure or erosion protection area, and 3 stations on the transect perpendicular to the main profile (reference profile) at the same distances. In addition, for each of the foundations included in the survey, designate 1 station located at a central point (outside the cable route) between adjacent foundations/support structures.
   - Carry out surveys after completion of the construction of the structures selected for monitoring, once during a period similar to that of the inventory surveys (May–June). Perform the first survey in the specified period after the completion of construction, and subsequent surveys 2 and 4 years after the first survey. Perform the last survey one year before the planned dismantling of the wind farm.

6. Bat monitoring aimed at determining species composition and abundance.
   a. The equipment used is to enable automatic recording and meet the minimum equipment requirements used in the surveys performed at the natural environment inventory stage.
   b. Post-project monitoring is to cover a period of 3 years, in the first year after the commissioning of the offshore wind farm and in the 2nd and 3rd years of operation of the OWF. The monitoring must cover the spring (April-May) and autumn (August-October) migration periods.

2. 4 The monitoring programme, together with an indication of the methodology for its conduct and the deadlines for submission of its results to the local authority, should be submitted to the Regional Director for Environmental Protection in Gdańsk for approval prior to its commencement. When determining the scope of monitoring, it is necessary to take into account the assumptions contained in the statement of reasons for this Decision, the information collected during the work on the environmental impact report for the project and other data on the natural environment of the area under consideration.

2. 5 Provide the Regional Director for Environmental Protection in Gdańsk with the results of monitoring, together with a proposal for preventive or minimising measures, if necessary, in the form of:

– periodic reports, within 3 months of the end of the survey year concerned;
– final reports (summarising the entire survey cycle) – within 6 months after the completion of the survey for a given environmental resource.

In order to allow verification of the results of the analyses and their possible recalculation (in accordance with the principle of repeatability of results used in scientific research), the raw data on the basis of which the analyses were performed (e.g. tables of field observation results, radar data, acoustic data) should also be attached along with the annual reports.

2. 6 If significant negative impacts on a given environmental resource are demonstrated in the interim or final report, or other significant environmental risks are identified, propose preventive or minimising measures (e.g. turbine outages due to bat activity) in the monitoring report, the proposed method of implementation and control of the results. On the other hand, in the case of unexpected, uncontrolled occurrence of significant changes in the state of conservation of natural habitats as well as habitats of protected plant and animal species, including those which are qualifying features in Natura 2000 sites, which may have a significant impact on the elements of the natural environment, it is necessary to immediately notify the Regional Director for Environmental Protection in Gdańsk and provide a professional assessment of the causes of the changes observed, including the presentation of measures to remedy and prevent adverse phenomena: perform the professional assessment with conclusions and recommendations within one month of the date on which the adverse phenomena were observed and (in each case) send them to the Regional Director for Environmental Protection in Gdańsk immediately after its preparation, but no later than one month from the preparation of the assessment.

2. 7 The Regional Director for Environmental Protection in Gdańsk, on the basis of the monitoring results provided, may decide, for example, to extend the monitoring deadline, change its scope or apply other minimising measures.

D. Provide environmental supervision of the project:

1. Carry out the project under naturalist supervision, led by a person or persons with knowledge and experience in ichthyology, ornithology, and marine mammal biology and ecology. This supervision should include:
   a) training for construction supervisory personnel;
   b) protective indications during the execution of the work;
   c) supervision of the implementation of the provisions of the environmental permit in terms of compliance with the Nature Conservation Act;
   d) supervision of the implementation of the provisions of the environmental permit decision on underwater noise emissions.
2. An environmental protection specialist responsible for developing and applying a rapid response procedure for emergency situations (e.g. contamination of marine waters with oil substances from transformers and ships) in the farm area and training those involved in rescuing animals that come into contact with oily waters.

E. Find it unnecessary to create an area of limited use.

Wind turbine generators are not listed in the catalogue of projects for which it is possible to create an area of limited use. Offshore power lines and substations for which regulations provide for the possibility of creating such an area shall also be provided under the project. However, it is not anticipated that any environmental quality standards may not be met by these facilities, and therefore there is no need to create a limited use area for the Project.

F. Find it necessary to carry out a reassessment of the environmental impact as part of the procedure for issuing the building permit decision, with particular emphasis on the following:

1. Determination of the methods of foundation and accurate determination of the areas permanently occupied by foundations and, based on this, assessment of the impact of this stage of the project on various components of the natural environment, along with an

analysis of how to maintain the structural components of the Baltica-1 OWF.

2. Determination of the location and parameters of individual turbines and platforms and the impact of the aforementioned elements on the accessibility of the area for animals, especially seabirds and marine mammals, and determination of the impact on the long-distance migration routes of birds and local flights.
3. Determination of key parameters of wind turbine generators.
4. Indication of the exact location and parameters of offshore substations, as well as the type and size of foundations on which they will be placed.
5. Model calculations for bird collisions, which will be based on the parameters of wind turbine generators of the Baltica-1 OWF area.
6. Proposed solutions to minimise the impact of noise and reduce the extent of its impact, appropriate to the foundation methods adopted.
7. Analyses of the appropriateness of using a system of temporary shutdown of individual wind turbine generators or groups of wind turbine generators during periods of intense migration for a larger number of bird species flying at collision height.

As part of the environmental impact reassessment, there is no obligation to conduct a transboundary environmental impact procedure under Article 104 of the EIA Act.

G. Post-project analysis.

Provide a post-project analysis with conclusions from the project and post-project monitoring conducted within 6 months after the end of the last season of the post-project surveys. In addition, after each partial monitoring year, within 3 months, reports on the individual stages of monitoring carried out should be submitted to the Regional Director for Environmental Protection in Gdańsk.

H. Attach a description of the project as Appendix 1 to this Decision.

I. This Decision is immediately enforceable, pursuant to Article 76 (1)(1) of the Act of 17 December 2020 on promoting electricity generation in offshore wind farms *(Journal of Laws of 2025, item 498).*

In the context of the comments from the affected countries, the conditions for minimising negative environmental impacts within the borders of the Republic of Poland are included in the most far-reaching way in the conditions of this Decision. Section III contains only conditions for the area extending beyond the borders of the Republic of Poland.

STATEMENT OF REASONS

On 24 July 2023, the Regional Director for Environmental Protection in Gdańsk received an application from the Investor: Elektrownia Wiatrowa Baltica-1 Sp. z o. o., represented by its attorney, Ms. Natalia Kaczmarek, Maritime Institute of Gdynia Maritime University, letter ref. EWB1-RDOS-0061 of 24 July 2023, for the issuance of an environmental permit decision for the project titled “Baltica-1 OWF Offshore Wind Farm”. The following have been attached to the above application:

1) Project Information Sheet, hereinafter: “PIS” (4 copies + CD versions),
2) A map in paper and electronic form, at a scale that ensures legibility of the data presented, showing the proposed area where the project will be implemented, and showing the proposed area referred to in the second sentence of paragraph 3a,

3) powers of attorney for: Ms. Natalia Kaczmarek, Mr. Radoslaw Opioła and Mr. Juliusz Gajewski to represent the company,
4) proof of payment of the stamp duty for issuing the decision (PLN 205) and power of attorney (PLN 51).

In connection with the above, by a notice dated 27 July 2023, ref. RDOŚ-Gd-WOO.420.59.2023.AM.1, this authority informed the parties of the initiation of a procedure in the case and the opportunity to review the documents and submit any comments and proposals. Information on the application was posted in the publicly available Ekoportal data registry (www.ekoportal.pl) under number 472/2023, maintained pursuant to Article 21 of the EIA Act.

According to Article 74(3a) of the EIA Act, the parties to the environmental permit procedure are the applicant and the entity vested with the right in rem to real property situated in the area that will be affected by the project variant proposed by the applicant, subject to Article 81(1) of the EIA Act. The area is understood as the planned area where the project will be implemented, as well as the area within 100 m of the boundaries thereof; plots of land where environmental quality standards would be exceeded as a result of the construction, operation or use of the project, or plots of land within the range of significant impact of the project, which may impose restrictions on the development of the property in accordance with its current use. It follows from the environmental impact report for the project, submitted in the case in question, that the project will be implemented in the maritime area at a distance of about 75 km north of the coastline, off the Smołdzino commune and the Łeba commune (Pomorskie voivodeship). According to Article 2(2) of the Act of 21 March 1991 on maritime areas of the Republic of Poland and maritime administration (*consolidated text, Journal of Laws of 2024, item 1125, as amended*), the exclusive economic zone is part of the territory of the Republic of Poland. It is clear from a well-established line of jurisprudence that no entity can hold property rights to the waters, the airspace above those waters, and the seabed of the waters of the exclusive economic zone, or the interior of the earth. In addition, the project in question will be implemented within the boundaries of the Development Area, and the impacts of the project in question will not cause environmental quality standards to be exceeded either within or outside the boundaries of its implementation area. Therefore, the only entity as at the date of initiation of the procedure that may have party rights in the procedure in question is the Investor, i.e. Elektrownia Wiatrowa Baltica-1 Sp. z o.o.

On 3 June 2025, by letter without ref. number, dated 23 May 2025, Grand Agro Fundacja Ochrony Środowiska Naturalnego applied for admission as a party to participate in the administrative procedure for issuing an environmental permit for the Baltica-1 OWF project. By letter ref. RDOŚ-Gd-W00.420.59.2023.AM.34 of 18 June 2025, this authority stated that, in accordance with Article 44(1) of the EIA Act, an environmental organisation which, citing its statutory objectives, declares their willingness to participate in a procedure that required public participation, participates in the procedure as a party. Considering the application submitted on 3 June 2025, having examined the objectives of the association and taking into account that its statutory activities in the field for Environmental Protection or nature protection have been carried out for a minimum of 12 months prior to the date of initiation of the procedure, this authority found that the statutory objectives mandate the organisation's participation in the procedure in question.

In a letter dated 23.06.2025, the Verde Vita foundation requested to be admitted as a party to the administrative procedure for issuing an environmental permit for the aforementioned project. After analysing the aforementioned application, this local authority, by order ref. RDOŚ-Gd-WOO.420.59.2023.AM.37, dated 24 July 2025, concluded that the prerequisite for acquiring a mandate to participate in the procedure is not only to indicate in the statutory objectives an activity for environmental protection (which the "Verde Vita" foundation indicated in the attached articles of association) but also to document that activity for environmental protection or nature protection is carried out by the foundation a minimum of 12 months before the date of initiation of the procedure. In the present case, the Verde Vita foundation presented a printout from the National Court Register, according to which the registration of the foundation took place on 6 February 2025, while the procedure in which it expressed its desire to participate has been pending since 27 July 2023. In view of the above, it was concluded that the Verde Vita Foundation is not entitled to the status of a party in the procedure in question.

In accordance with § 2(1)(5) of the Regulation of the Council of Ministers of 10 September 2019 on projects likely to have a significant impact on the environment (*Journal of Laws of 2019, item 1839, as amended*), the planned project is qualified as *"installations using wind energy for electricity generation with a total nominal capacity of the plant of not less than 100 MW, located in the maritime areas of the Republic of Poland'.* In addition, heliports qualify as projects with a potentially significant impact on the environment (§ 3(1)(61) "*airports other than those listed in § 2(1)(30) or helipads, excluding helipads referred to in the Regulation of the Minister of Health of 27 June 2019 on the hospital emergency department (Journal of Laws of 2021, item 2048)"),* which could potentially be installed at offshore substations. In view of the above, pursuant to Article 71(2)(1) of the EIA Act, the implementation of the project requires an environmental permit.

The planned project will involve the construction, operation and decommissioning of the Baltica-1 Offshore Wind Farm (OWF) Complex with a maximum total capacity of 900 MW. The Baltica-1 OWF area is located in EEZ of the Republic of Poland, on the eastern side of the Central Bank, in the depth range from approx. 16 m to approx. 50 m, at a distance of approx. 75 km north of the shoreline, off the Smołdzino commune and the Leba commune (Pomeranian voivodeship). Having regard to the fact that the project belongs to those likely to always have a significant environmental impact and due to the fact that it is situated in the offshore area, pursuant to the provision of Article 75(1)(1)(c) of the EIA Act, the authority competent to examine the case in question is the Regional Director for Environmental Protection in Gdańsk.

Pursuant to Article 6 of the EIA Act, the approval or opinion requirement shall not apply if the authority in charge of the procedure is at the same time the authority responsible for such approval or opinion.

In the present case, the authorities competent to issue an opinion/approval are: the State Border Sanitary Inspector in Gdynia and Director of the Maritime Office in Gdynia.

In view of the above, this authority, acting pursuant to Article 69 and Article 70 in conjunction with Article 71(1) and (2)(2), by letter ref. RDOŚ-Gd-WOO.420.59.2023.AM.4. of 4 August 2023, requested the State Border Sanitary Inspector in Gdynia and the Director of the Maritime Office in Gdynia to determine the scope of the environmental impact report for the above project.

The State Border Sanitary Inspector in Gdynia, by letter ref. SE.ZNS.80.4910.27.23 of 16 August 2023 (received 23 August 2023), expressed the opinion that, quote*: "an* *environmental impact assessment should be carried out and a report should be prepared within the statutory scope".*

The Director of the Maritime Authority in Gdynia, by letter ref. INZ.8103.129.2021.AD of 25 October 2021 (date received 23 August 2023), decided to: "*express the opinion that the scope of the environmental impact assessment report for the project in question should meet the conditions specified in Article 66 of the EIA Act"* and pointed out the need to include detailed information in the report. Subsequently, by letter ref. INZ.9202.117.2.2023.AD EZD: INZ1.9202.104.2023.AD of 30 August 2023 (date received 6 September 2023), the Director of the Maritime Office in Gdynia clarified and provided the interpretation of the provisions of the aforementioned order of 21 August 2023.

The opinion of the Director of the Maritime Office in Gdynia and the State Border Sanitary Inspector in Gdynia was taken into account in full in the decision determining the scope of the environmental impact report for the project, ref. RDOŚ-Gd-W00.420.59.2023.AM.13. of 16 February 2024. Information on the above order was posted in the publicly available Ekoportal data registry (www.ekoportal.pl) under number 48/2024.

In accordance with Article 69(1) of the aforementioned EIA Act, the applicant may, when applying for an environmental permit for projects likely to always have a significant environmental impact, submit a project information sheet along with an application for determining the scope of the report. According to paragraph 2 of this provision, the determination of the scope of the report is mandatory if the project may have a transboundary environmental impact.

The planned Baltica-1 OWF required a transboundary environmental impact procedure due to the possibility of impacts crossing the state borders of Poland – the Baltica-1 OWF area directly (about 550 m) borders the Swedish EEZ and is about 60 km from the Danish EEZ. Poland's obligations to conduct transboundary environmental impact assessments are also defined by the Convention on Environmental Impact Assessments in a Transboundary Context done at Espoo on 25 February 1991 (Espoo Convention).

Acting on the basis of Article 108(1)(2) of the EIA Act, this authority, by letter ref. RDOŚ-Gd-WOO.420.59.2023.AM.2 of 27 July 2023, informed the General Director for Environmental Protection (hereinafter: GDOŚ) of the possibility of transboundary environmental impact of the planned project and provided him with the project information sheet.

Acting pursuant to Article 108(1)(1) of the EIA Act, the Regional Director for Environmental Protection in Gdańsk, by order ref. RDOŚ-Gd-WOO.420.59.2023.AM.3 of 4 August 2023 stated the necessity to conduct transboundary environmental impact procedure for the aforementioned project, and imposed on the Investor the obligation to prepare and submit the appropriate documentation specified by the provisions of the EIA Act. On 4 September 2023, the Investor, by letter ref. EWB1-RDOS-0068 of 4 September 2023, submitted to this office an environmental permit application and a project information sheet prepared in Swedish and Danish in paper and electronic form. In addition, the Investor attached the above documentation in English.

By letter ref. RDOŚ-Gd-WOO.420.59.2023.AM.5 of 7 September 2023, the Regional Director for Environmental Protection in Gdańsk forwarded the documents submitted by the Investor to the General Director for Environmental Protection, as the body responsible for coordinating the environmental impact assessment procedure in a transboundary context.

By letter ref. DOOŚ-TSOOŚ.440.6.2023.MJ.1 of 5 September 2023, the General Director for Environmental Protection notified, under Article 3 of the Espoo Convention and

Article 7 of Directive 2011/92/EU, the Environmental Protection Agency of the Ministry of Environment of Denmark and the Swedish Environmental Protection Agency of the planned project.

In addition, by letter ref. DOOŚ-TSOOŚ.440.6.2023.MJ.2. of 5 September 2023, the General Director for Environmental Protection, in order to maintain the transparency of the environmental impact assessment procedure, notified the Ministries of Environment of Estonia, Finland, Lithuania and Latvia about the planned project.

Subsequently, by letter ref. DOOŚ-TSOOŚ.440.6.2023.MJ.3 of 10 October 2023, the General Director for Environmental Protection provided information that on 25 September 2023 GDOŚ received, by email, a request from the Republic of Finland for notification as a potentially affected party under the transboundary procedure for the project titled "Baltica-1 Offshore Wind Farm".

By letter ref. RDOŚ-Gd-WOO.420.59.2023.AM.6 of 16 October 2023, the Regional Director for Environmental Protection in Gdańsk provided the Applicant with information on the declaration of participation of the Republic of Finland as an Affected Party in the transboundary environmental impact procedure for the planned projects titled "Baltica-1 OWF Offshore Wind Farm".

On 19 October 2023 (letter ref. EWB1-RDOS-0076 of 19 October 2023), the Applicant submitted the application and the project information sheet translated into Finnish. This authority, by letter ref. RDOŚ-Gd-WOO.420.59.2023.AM.7 of 19 October 2023, forwarded to GDOŚ the application and information sheet of the project in question, drawn up in Finnish (in electronic form).

On 20 October 2023, the General Director for Environmental Protection advised that, by letter ref. DOOŚ-TSOOŚ.440.6.2023.MJ.4 of 11 September 2023, he had notified the Institute for Environmental Protection of Finland of the planned project in accordance with Article 3 of the Espoo Convention and Article 7 of Directive 2011/92/EU.

Subsequently, by letter ref. DOOŚ-TSOOŚ.440.6.2023. MJ.5 of 6 December 2023, the General Director for Environmental Protection notified this authority that the Swedish Environmental Protection Agency, by letter of 11 October 2023, ref. NV-06364-23, and the Environmental Protection Agency of the Ministry of Environment of Denmark, by letter of 6 October 2023, expressed interest in participating as an Affected Party in the transboundary environmental impact procedure for the project in question. The Swedish and Danish parties provided the relevant comments on the Project Information Sheet. The Ministry of Environment of the Republic of Lithuania, by letter of 9 October 2023, the State Environmental Protection Bureau of the Republic of Latvia, by letter of 13 October 2023, ref. 5-05/1251/2023, and the Ministry of Climate of the Republic of Estonia, by letter of 17 October 2023, submitted information on lack of interest in participation in the transboundary procedure for this project, submitting recommendations on the scope of the report, based on expert knowledge. By letter of 4 December 2023, ref. SYKE/2023/1637, the Finnish Environmental Institute forwarded to the GDOŚ Finland's position with attachments, in which comments were made on the scope of the environmental impact report for the project in question.

At the same time, by the aforementioned letter of 6 December 2023, GDOŚ forwarded to this authority the positions of the Affected Parties with appendices in English, Swedish, Danish and Finnish, with a request to forward them to the investor for translation into Polish. This authority, by letter ref. RDOŚ-Gd-WOO.420.59.2023.AM. 11 of 13 December 2023, requested the Investor to translate the aforementioned documents. The Investor submitted the translations on 21 December 2023 (letter ref. EWB-RDOS-0094 of 21

December 2023).

The Swedish party, the Danish party and the Finnish party provided relevant comments for the Project Information Sheet, which this authority took into account when determining the scope of the environmental impact report. Key topics raised by the affected parties during consultations on the Espoo report included but were not limited to: cumulative impacts including on Natura 2000 sites; noise emissions and their impact on marine mammals and fish; impacts on migratory and wintering birds; shipping routes.

On 15 February 2024, the Regional Director for Environmental Protection in Gdańsk, taking into account the above, by order ref. RDOŚ-Gd-WOO.420.59.2023.AM.13. *(Ekoportal,* under number 48/2024) determined the scope of the environmental impact report for the project titled "Baltica-1 OWF Offshore Wind Farm".

Acting pursuant to Article 69(4) of the EIA Act, this authority, by decision ref. RDOŚ-Gd-WOO.420.59.2023.AM.14. of 19 February 2024, suspended the procedure in the case in question, until the applicant submits an environmental impact report for the project (under number 1/2024).

On 5 August 2024, the investor, by letter ref. EWB1-RDOS-0142 of 5 August 2024, submitted to the authority an environmental impact report for the project titled "Baltica-1 OWF Offshore Wind Farm" with appendices in paper and electronic versions. On this basis, on 8 September 2024, the Regional Director for Environmental Protection in Gdansk issued decision ref. RDOŚ-Gd-WOO.420.59.2023.AM.15 (under number 28/2025) by virtue of which he resumed the suspended procedure.

Pursuant to Article 62 of the EIA Act, the following are determined, analysed and assessed in the environmental impact assessment process:

1) direct and indirect impact of the project concerned on:
   a) the environment and population, including human health and living conditions,
   b) material assets,
   c) cultural heritage assets,
   ca) landscape, including cultural landscape,
   d) interaction between the elements referred to in items a to ca,
   e) availability of mineral deposits;

1a) the risk of major accidents and natural and construction disasters;

2) possibilities and methods of preventing and reducing negative environmental impacts of the project;
3) required scope of monitoring.

As part of the assessment of the impact of the project on the Natura 2000 site, impacts of the project on Natura 2000 sites are identified, analysed and assessed, also taking into account the cumulative impact of the project with other project in progress, completed or planned.

Pursuant to the definition provided in Article 3(1)(8) of the EIA Act, such assessment includes, in particular:

1) verification of the environmental impact assessment report;
2) obtaining opinions and approvals required by law;
3) ensuring the possibility of public participation in the procedure.

These activities constitute the main determinants of the evidentiary process in the present case.

The Regional Director for Environmental Protection, by letter ref. RDOŚ-Gd-W00.420.59.2023.AM.16 of 8 August 2025, requested, pursuant to Article 77(1)(1) and (2) of the Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and environmental impact assessment, the Director of the Maritime Office in Gdynia and the State Border Sanitary Inspector for an opinion on the conditions for the implementation of the project.

On 23 August 2024 (letter ref. EWB1-RDOS-0145 of 23 August 2024), the Investor, through its attorney, Mr. Radoslaw Opioła, submitted a corrigendum to the content of the aforementioned report. This authority, by letter ref. RDOŚ-Gd-WOO.420.59.2023.AM.18 of 29 August 2024, forwarded the above investor's letter with the corrigendum to the Director of the Maritime Office in Gdynia and the State Border Sanitary Inspector.

The State Border Sanitary Inspector in Gdynia, by letter SE.ZNS.80.4912.6.24 of 9 September 2024, gave an opinion on the conditions for the implementation of the project.

The Director of the Maritime Office in Gdynia (hereinafter: Director of MO), by letter ref. INZ.9202.117.1.2024.AD of 8 October 2024, approved the conditions of implementation for the project in question.

In connection with the application of the company PGE Elektrownia Wiatrowa Baltica-1 Sp. z o. o (letter ref. EWB1-RDOŚ-0154 of 10 December 2024) submitted to this authority on 10 December 2024 with a request to address the issues contained in the above-mentioned decision of the Maritime Office in Gdynia dated 8 October 2024, the Regional Director for Environmental Protection in Gdańsk wrote to the Maritime Office in Gdynia on 17 December 2024 requesting clarification. On 17 January 2025, the Director of UM explained and clarified the conditions of the aforementioned order of 8 October 2024 (letter ref. INZ1.9202.117.2.2024.AD of 10 January 2025).

In connection with the submission by the Applicant on 16 May 2025 (ref. EWB1-RDOS-0169) of a consolidated version of the EIA report containing corrections of errors and clarification of content, including information from the supplements to the EIA report, the Regional Director for Environmental Protection in Gdańsk, by letter ref. RDOŚ-Gd-W00.420.59.2023.AM.30 of 20 May 2025, while conducting the environmental permit procedure, again requested an opinion on the conditions for implementation of the aforementioned project from the State Border Sanitary Inspector in Gdynia and the Director of the Maritime Office in Gdynia.

The State Border Sanitary Inspector in Gdynia, by letter of 16 June 2025, ref. ZNS.491.2.10.2025, upheld the position contained in opinion ref. SE.ZNS.80.4912.6.24 of 9 September 2024.

The Director of the Maritime Office in Gdynia, by letter ref. INZ.9202.117.3.2024.AD of 10 June 2025, again approved the conditions for the implementation of the project in question.

By letters ref. EWB1-RDOS-0190 of 29 September 2025, ref. EWB1-RDOS-0192 of 30 September 2025 and ref. EWB1-RDOS-0193 of 1 October 2025, the investor submitted explanations concerning a clerical error in the documentation.

After reviewing the content of the aforementioned letters, the Director of the Maritime Office in Gdynia again approved on the conditions for the implementation of the project by order ref. INZ.9202.117.4.2024.AD of 1 October 2025. The State Border Sanitary Inspector in Gdynia, by letter of 30 September 2025, upheld the position contained in the opinion ref. SE.ZNS.80.4912.6.24 of 9 September 2024, and the sustaining opinion ref. ZNS.491.2.10.2025 of 16 June 2025.

This authority has considered the position of the State Border Sanitary Inspector in

Gdynia, taking this into account in the content of this Decision in Conditions No. **I.1.4,1.1.5, I.1.6, I.1.7, I.1.8, I.1.9, I.1.10, I.1.11, I.1.12, I.1.13, I.1.14, I.1.15, I.1.16, I.1.17, I.1.18, I.1.19, I.2.10, I.2.11, I.2.12, I.2.13, I.2.14,1.2.15,1.2.16, I.2.17, I.2.18,1.2.19, I.3.4, I.3.5, I.3.6.**

This authority has taken into account the position of the Director of the Maritime Office in Gdynia, taking this into account in the content of this Decision in Conditions No. **I.1.1, I.1.2, I.1.3, I.2.1, I.2.2, I.2.3, I.2.4, I.2.5, I.2.6, I.2.7, I.2.8, I.2.9,1.3.1, I.3.3,1.4.1, I.4.5, II.1, II.2, II.5, II.6.**

By letter ref. RDOŚ-Gd-WOO.420.59.2023.AM.17 of 8 August 2025, the Regional Director for Environmental Protection in Gdańsk called on the applicant to submit copies of those parts of the environmental impact report that will enable the countries the territory of which may be affected by the project to assess possible significant transboundary environmental impact, i.e. translations of the report into Swedish, Danish, Finnish and English.

On 21 October 2024, the Investor submitted to the Regional Director for Environmental Protection in Gdańsk, in response to the request from this authority dated 8 August 2024, translations into English, Danish, Finnish and Swedish of parts of the environmental impact report (hereinafter: Espoo Report) and the translation of the entire environmental impact report into English as necessary for transmission to the affected countries.

On 24 October 2024, the Regional Director for Environmental Protection in Gdansk, by letter ref. RDOŚ-Gd-WOO.420.59.2023.AM.19 submitted to the General Director for Environmental Protection the Espoo report on environmental impact prepared in Polish, Swedish, Danish, Finnish and English for the "Offshore Wind Farm OWF Baltica -1".

The entire EIA Report, along with a summary, has been posted on the publicly available Ekoportal registry *(http://www.ekoportal.pl),* under number 333/2025.

By letter of 31 October 2024, ref. DOOŚ-TSOOŚ.440.6.2023.MJ.7, the General Director for Environmental Protection requested the Finnish party (Finnish Environment Institute (Syke)), the Danish party (Environmental Protection Agency Ministry of the Environment), and the Swedish party (Swedish Environmental Protection Agency) to provide an official position within the framework of transboundary consultations in accordance with Articles 4 and 5 of the Espoo Convention. With this letter, the Polish party has submitted, in accordance with Article 4(2) of the Espoo Convention, documentation including:

- the environmental impact assessment report for the project in Polish and English;
- attachments to the report – in Polish and English;
- the so-called Espoo report – in Polish, English, Danish, Finnish and Swedish;
- the GDPR clause to be published to citizens of countries participating in the transboundary procedure in Polish, Danish, Finnish and Swedish.

In his letter, the General Director for Environmental Protection also included a request to the relevant authorities of the affected parties to ensure public participation for their citizens, including the opportunity to familiarise themselves with the documentation submitted, as well as to submit comments and requests relating to it.

On 15 January 2025, the General Director for Environmental Protection informed this authority, by letter ref. DOOŚ-TSOOŚ.440.6.2023.MJ.8 of 14 January 2025, about the positions of the affected parties received from Denmark, Sweden and Finland regarding the documentation provided to them. Following the above, the Regional Director for Environmental Protection in Gdańsk, by letter ref. RDOŚ-Gd-WOO.420.59.2023.AM.21 of 21

January 2025, forwarded the received positions of the affected parties for translation into Polish. In response to the above, relevant translations were submitted on 29 January 2025, from which it appeared that on 6 January 2026 the Danish party had sent electronically to the General Directorate for Environmental Protection information that was still interested in participating in the procedure, while at the present stage it did not make any comments on the environmental impact assessment documentation.

In connection with the Danish party's position of 6 January 2025, the General Directorate for Environmental Protection, by letter ref. DOOŚ-TSOOŚ.440.6.2023.MJ.9 of 17 March 2025, advised that the Polish party considered the stage of consultations under Articles 4 and 5 of the Espoo Convention with the Danish party to be completed.

This authority, by letter ref. RDOŚ-Gd-WOO.420.59.2023.AM.23 of 6 February 2025, requested the Investor to address the issues contained in the comments of the Swedish party and the Finnish party.

On 19 March 2025 and 26 March 2025, the Investor submitted explanations on the issues contained in the aforementioned comments of the Swedish and Finnish parties. This authority forwarded the entire supplemented documentation to GDOŚ by letter ref. RDOŚ-Gd-WOO.420.59.2023.AM.25 of 9 April 2025. Referring to the comments submitted, the Polish party forwarded letter ref. DOOŚ-TSOOŚ.440.6.2023.MJ.11 of 15 April 2025 to the representatives of the Swedish party and the Finnish party.

On 21 May 2025, the General Director for Environmental Protection, by letter ref. DOOŚ-TSOOŚ.440.6.2023.MJ.12 of 20 May 2025, provided this authority with information on the positions of the affected States, i.e.

– The Finnish Environmental Institute sent a position paper to the General Directorate for Environmental Protection in Warsaw on 15 May 2025, finding the investor's explanations provided by the Polish party satisfactory. In connection with the above, the General Directorate for Environmental Protection, by letter ref. DOOŚ-TSOOŚ.440.6.2023.MJ.13 of 12 June 2025, advised that the Polish party considered the stage of consultations under Articles 4 and 5 of the Espoo Convention with the Finnish party to be completed;
- The Swedish Environmental Protection Agency, by letter dated 15 May 2025, advised that it found the explanations received from the investor unsatisfactory and therefore reported the need for a meeting of experts.

On 23 June 2025, the General Directorate for Environmental Protection, by letter ref. DOOŚ-TSOOŚ.440.6.2023.MJ.14 of 13.06.2025, forwarded the Swedish party's position under the transboundary environmental impact procedure for the Baltica-1 OWF project. This authority, by letter ref. RDOŚ-Gd-W00.420.59.2023.AM.35 of 24 June 2025, forwarded the above position to the Investor for translation. The translation was provided by letter ref. EWB1-RDOS-0173 of 1 July 2025. It appears from the position of the Swedish party, expressed by the Swedish Environmental Protection Agency (letter ref. NV-06364-23 of 11 June 2025), that the Swedish party, despite their earlier declaration of willingness to participate, decided to waive the meeting of experts. At the same time, in that letter, the Swedish party made a statement with concluding remarks, requesting that the issues presented in its letter be taken into account accordingly by the Polish party. The Swedish party pointed out that the aforementioned issues concerned claims from the Kalmar Regional Council and BirdLife Sweden, referring to the Investors' response, that their previous comments had not been sufficiently taken into account. As stated in the letter: Concerns remain about the possible impact of the wind farm in question on the natural assets under protection in the Natura 2000 sites Hoburgs bank och Midsjöbankarna. In this context, the position points out that submarine banks play an important ecological role in the marine ecosystem, including as areas of intensive growth for organisms that form the basis of many food webs. Due to their importance, submarine banks should be excluded from exploitation. The letter also indicated that Birdlife Sweden did not find the Investor's explanations sufficient and continues to believe that their comments on the assessment of the project's potential impact on the Natura 2000 site for the long-tailed duck remain unanswered, and that the assessment ignores the risks associated with mass collisions posed by the wind farm. In this regard, BirdLife Sweden strongly emphasises the need to develop and implement techniques that use both weather and radar data and enable turbines to be stopped immediately in high collision risk conditions. The authority has herewith analysed the objections indicated and taken them into account in determining the conditions of this decision.

Referring to the Swedish Party's position in which the opinion of the Kalmar Regional Council is cited, it should be pointed out that the authority has taken this position into account as expected by the Swedish Party in making a substantive assessment of it within the limits of the procedure and based on the information and documents in its possession and submitted in the case. The report analyses and assesses the impacts on the objectives and qualifying features of Natura 2000 sites, taking into account the links between these areas. In order to carry out this assessment, the Investor gathered information on natural conditions, including those related to the presence of marine mammals, based on its research. The assessment shows that the Baltica-1 OWF area is not a significant site for these mammals as indicated by the analysis of porpoise detection rates obtained from the two-year passive monitoring. Data from two years of observations indicate that detection rates are significantly higher in Swedish waters compared to Polish waters. Detection rates in the Baltica-1 area remain low, and the presence of porpoises increases only in summer and autumn. This pattern is consistent with observations made in both 2023 and 2024. By comparison, the Swedish buffer zone is characterised by higher porpoise activity, especially in the northwest direction. Observations in the Natura 2000 site Hoburgs bank och Midsjöbankarna indicate significantly higher porpoise activity than in the Baltica-1 wind farm development area. In addition, the issue commented on by the Kalmar Regional Council was assessed differently by the Swedish Maritime and Water Agency (SwAM), which can be considered the Swedish expert body on water and marine biodiversity issues and the body with national responsibility in these areas (including conducting and coordinating research and monitoring of porpoises), accepting the Investor's revised permissible noise level determined at 140 dB re 1 $\mu Pa^2 s$ (SEL_{cum}) weighted by the HF function (HF weighting function for marine mammals with high sensitivity to high-frequency sounds – the harbour porpoise (including measures under the Noise Reduction System), which will not be exceeded in the Natura 2000 site Hoburgs bank och Midsjöbankarna as appropriate. In its position, SwAM stated that the Investor had provided sufficient explanations to the authority's previously raised objections. In addition, SwAM has issued a general statement regarding the risk of exceeding behavioural response levels in the Natura 2000 site Hoburgs bank och Midsjöbankarna, indicating that according to the acoustic analysis performed by the Investor, the area of potential noise impact causing behavioural response is limited to the southern part of the Natura 2000 site, Hoburgs bank och Midsjöbankarna. In this area, porpoise activity is lower than further north in the two-year surveys conducted by the Investor. Given the limited impact area and low population density, the overall impact on porpoises is likely to be minor, according to the Investor. SwAM pointed out that it understood this conclusion but would still like to emphasise that piling that may affect the Natura 2000 site should be avoided as much as possible during the breeding season. Having regard to the aforesaid, by this decision, the authority has imposed conditions on the applicant with a view to reducing possible adverse impacts of the project and ensure an adequate level of protection for the porpoise, i.e. **Conditions No. I.2.1, I.2.2, I.2.3, C.1.a, C.1.d, C.1.e, C.1.f, C.1.g, III.1, III.2, III.3.** It can be assumed that the tightening of underwater noise protection requirements indicated by the Investor in its explanations to the Swedish party, extended from three months (June – August) to a year-round obligation to meet the HF-weighted level of 140 dB re 1 $\mu Pa^2 sSEL_{cum}$ HF-weighted (HF weighting function for marine mammals with high sensitivity to high-frequency sounds - porpoise)at the boundary of the Natura 2000 site Hoburgs bank och Midsjöbankarna and at the boundary of the Swedish exclusive economic zone, and taking into account that the impact of noise during piling with a level likely to cause a behavioural response affects only a small part of the protected area, indicate that an adequate level for environmental protection is provided.

Subsequently, the Regional Director for Environmental Protection in Gdańsk also considered and took into account the comment of the Kalmar Regional Council and BirdLife Sweden indicating the need to exclude the area of underwater banks from exploitation due to their role for the marine ecosystem. In this regard, it should be pointed out that the project is sited in accordance with the applicable laws, including being located in accordance with the Regulation of the Council of Ministers of 14 April 2021 on the adoption of the spatial development plan for internal sea waters, territorial sea and exclusive economic zone at a scale of 1:200,000 (Journal of Laws of 2021, item 935). In addition, according to its provisions, the project will be located within 2 km of the Natura 2000 site Hoburgs bank och Midsjöbankarna. The project itself is located outside the South Central Bank. In addition, surveys show that the highest densities of long-tailed duck are observed during spring migration, mainly in areas not covered by the project. Detailed surveys of seabirds in the Polish part of the South Central Bank have been carried out three times as part of projects: Bałtycka Farma Morska (2018–2019), Bałtyk I (2021–2022) and Baltica-1 (2022–2023). The surveys showed that the density of long-tailed ducks in these wintering areas was less than 50 individuals per square kilometre. This is much lower than the typical density observed at key wintering grounds, where it is more than twice as high. In addition, in all survey cycles, the highest densities of the long-tailed duck were observed during the spring migration period, rather than during its wintering period. Moreover, long-tailed ducks gathered almost exclusively in the northern, shallowest part of the survey area. This part is located outside the development area of the Baltica-1 OWF, so there are grounds for assuming that the implementation of the project will not have a significant impact on the long-tailed duck. It should also be noted that the Swedish Environmental Protection Agency (hereinafter: SEPA), which is the expert body in Sweden on environmental issues, including bird protection, has not commented on or identified as issues of concern in the context of the planned Project those, or similar ones, raised by the Kalmar Regional Council or BirdLife Sweden. At the same time, the Swedish party pointed out objections raised by BirdLife Sweden relating to the risk of massive bird collisions with the offshore wind farm. With regard to the issue of minimising or mitigating the effects of possible collisions indicated by BirdLife Sweden, it should be noted that appropriate measures in this regard have been taken on the basis of the results of surveys of migratory birds, and Investor has already proposed a system of temporary shutdowns (rotor slowdowns) due to crane overflights. According to the collision assessment performed, it was shown for this species that the impact of collisions may be moderate due to its significantly lower collision avoidance rate compared to other species determined during the survey. Accordingly, it is reasonable to introduce appropriate measures – **Condition No. B.II.8, B.II.4.**

In conclusion, in the context of the results of the submitted environmental surveys and the analyses performed in accordance with the order on the scope of the report, the conditions for the implementation of the project imposed on the Investor in the operative part of this Decision allow the impact of the project on marine mammals and avifauna and the possibility of significant transboundary impacts to be minimised. Having regard to the aforesaid, on 4 July 2025, the General Director for Environmental Protection, by letter ref. DOOŚ-TSOOŚ.440.6.2023.MJ.15, informed the Swedish party that the next stage of the procedure would be the issuing of an environmental permit decision.

Pursuant to Article 79(1) of the EIA Act, before issuing an environmental permit decision, the authority competent to issue the permit shall enable public participation in the procedure under which it conducts the environmental impact assessment of the project. On 29 April 2025, by notice ref. RDOŚ-Gd-W00.420.59.2023.AM.27, the Regional Director for Environmental Protection in Gdańsk announced information about the submission of the EIA report, along with information about the possibility of becoming familiar with the EIA report and the right to submit comments and requests at the office of the authority within 30 days, i.e. from 6 May 2025 to 4 June 2025 inclusive. By the deadline, interest in the EIA report was shown, i.e. requests for were made for the opportunity to read the report, which this authority made available, and an email was received from RDOŚ in Gdansk, but it not contain any comments.

In connection with the submission by the Applicant on 16 May 2025 (ref. EWB1-RDOS-0169) of a consolidated version of the EIA report containing corrections of errors and clarification of content, including information from the supplements to the EIA report, the Regional Director for Environmental Protection in Gdańsk, by letter ref. RDOŚ-Gd-WOO.420 .59.2023.AM.31 of 29 May 2025, again made public information about the submission of the EIA report, along with information about the possibility of familiarising oneself with the EIA report and the right to submit comments and requests at the office of the authority within 30 days, i.e. from 9 June 2025 to 8 July 2025 inclusive.

Both of the aforementioned notices were posted on the authority's website(www.rdos.gdansk.gov.pl) and on the bulletin board at the headquarters of the RDOŚ authority in Gdańsk. In addition, the aforementioned notice was forwarded for public announcement to: Director of the Maritime Office in Gdynia, Mayor of the City of Gdańsk, Mayor of the City of Gdynia, Mayor of the City of Sopot, Head of the Commune of Ustka, Mayor of the Town of Ustka, Head of the Commune of Smoldzino, Mayor of the Town of Łeba, Head of the Commune of Wicko, Head of the Commune of Choczewo, Head of the Commune of Krokowa, Mayor of the Town of Władyslawowo, Mayor of the Town of Jastarnia, Mayor of the Town of Hel, Head of the Commune of Puck, Mayor of the Town of Puck, Head of the Commune of Kosakowo, Head of the Commune of Stegna, Head of the Commune of Sztutowo, Mayor of the Town of Krynica Morska. No comments or applications were submitted within the stipulated period.

When assessing all evidence gathered in the present case, the Regional Director for Environmental Protection in Gdańsk has determined as follows:

The planned project involves the construction and operation of the Baltica-1 Offshore Wind Farm with a maximum installed capacity of 900 MW. The wind turbines will be located in the Polish exclusive economic zone. The planned project is located in the EEZ of the

Republic of Poland, on the eastern side of the Central Bank, in the depth range from approx. 16 m to approx. 50 m, at a distance of approx. 75 km north of the shoreline, off the Smołdzino commune and the Leba commune (Pomeranian voivodeship) and at a distance of 550 m from the border of the EEZs of Poland and Sweden. The Baltica-1 OWF occupies an area of 85.53 km^2.

The Project is aimed to generate electricity from a renewable energy source – wind power. The kinetic energy of wind is converted into mechanical energy of the rotating rotor. It is then converted in a generator to low-voltage alternating current, which is then transformed to medium or high voltage for further transmission to the substation via the inter-array power infrastructure. After the voltage is stepped-up in the transformers, the energy is carried via a transmission cable ashore, ultimately to the National Power System (NPS).

The Baltica-1 Offshore Wind Farm will comprise:
offshore wind turbine generators – up to 60 units, whose basic components are the foundation, tower, and the nacelle and rotor assembly;

- offshore substations – up to 4 units;
- inter-array power and telecommunication network, which will be consist of submarine cables connecting wind turbine generators with each other and groups of wind turbine generators with the offshore substations, with a maximum length of 140 km;

The Baltica-1 OWF offshore wind farm does not include infrastructure for the transmission of electricity generated by the farm ashore. The connection infrastructure project will be covered by a separate administrative procedure.

Table 1 Summary of specific parameters of the Baltica-1 OWF

Name of facility or definition of parameter	**Unit**	**Value**
Maximum capacity of the offshore wind farm	MW	900
Maximum capacity of a single wind turbine	MW	25
Maximum number of wind turbines with the smallest unit turbine capacity (15 MW)	units	60
Maximum number of wind turbines with the smallest turbine unit capacity (25 MW)	units	36
Maximum rotor diameter for a 25 MW wind turbine	m	310
Minimum clearance between the lower position of the rotor blade and the sea surface [m]	m	20
Maximum total height of a wind turbine with a capacity of up to 25 MW including the rotor, asl [m]	m	330
Maximum rotor sweep area for a wind turbine with a capacity of up to 25 MW	m^2	75,500
Maximum total rotor sweep area for wind turbines with a capacity of up to 25 MW	m^2	2,750,000
Considered types of foundation of turbines and offshore substations	Foundation type: monopile, truss (pile or suction bucket jacket – SBJ), gravitational foundation	
Maximum diameter of wind turbine generator foundation	m	55
Seabed area occupied by the wind turbine generator foundation (maximum)	m^2	2,400
Minimum distance between wind turbines	RD	3.5

Name of facility or definition of parameter	Unit	Value
Maximum distance between wind turbines	RD	12
Minimum number of offshore substations	units	1
Maximum number of offshore substations	units	4
Maximum length of cable routes of systems inside the OWF	km	140
Maximum width of the seabed strip covered by construction works for one cable line	m	16

The offshore wind turbine has a rotor consisting of three blades and a hub located at the front of the nacelle. The rotor is attached to a main shaft supported by bearings, which generates rotational energy that is transferred through a system of gears to a generator that converts it into electricity. Some turbine suppliers also use so-called direct drive technology, in which there is no gearbox. The nacelle is placed on top of the tower, which is mounted directly on the foundations. Inside the tower, there are cables that transmit electricity from the generator and other components necessary for the wind turbine's operation and functioning.
The maximum number of offshore wind turbines forming part of the Baltica-1 OWF will depend on the nominal capacity of the selected units and will be up to 36 units of 25 MW and up to 60 units of 15 MW, or a correspondingly different number of units if turbines of less than 25 MW and more than 15 MW are selected.

The types of foundations considered for the foundation of the turbine and offshore substations for the project in question are as follows:

- monopile foundation;
- jacket foundation (pile or suction bucket jacket – SBJ type);
- gravitational.

The choice of wind turbine generator foundations will depend on the technology available during the construction phase, the depth of the foundation and the geotechnical conditions of the seabed.
Monopiles are usually fabricated from welded steel tubular sections and driven vertically into the seabed using pile drivers. Monopiles are the most commonly used foundations for wind farms currently in operation.
A jacket-type truss foundation usually consists of three or four main legs that rest on a truss, i.e. a system made up of bars that are articulated together at nodes. Jacket-type foundations are anchored to the seabed with individual piles or suction caissons on each leg. Jacket pile foundations are currently the preferred foundation solution for larger turbines in deeper water. When boulders are present on the seabed, the seabed may need to be cleaned and reinforced by dredging and rock dumping if a jack-up vessel is used to install the foundation. The monopiles and jacket piles are either driven, vibration-driven or bored.
Gravitational foundations on the seabed are usually heavy ballast structures made of steel and/or concrete. They can vary in shape, and their base diameter can be up to 55 m. The structure is placed on a pre-prepared seabed area. The preparation of the seabed involves possible removal of boulders from the foundation site, excavation to remove the top non-bearing layer of sediment, and levelling of the subgrade. The diameter of the levelled seabed area can reach up to 75 meters. In order to prepare the subgrade for gravitational foundations and jackup spudcan foundations of installation vessels and to provide erosion protection, support vessels are used – dredgers, rock dumping vessels, enabling the transport of sediments and the transport and placement of rip-rap (rock dumping).

Depending on the depth of the basin and the anticipated weather conditions, it may be necessary to provide scour protection. At locations where the seabed is subject to hydrodynamic processes, i.e. shallow areas and near-bed current areas, and there is a danger of sediment leaching around the foundations, it is necessary to protect the seabed surface around the foundation with a protective layer, such as rip-rap (scour protection). Protective coatings and a passive or active anti-corrosion system will be applied to the surface of the foundation to protect it from corrosion.

The Noise Reduction System is also a component of the project. The purpose of its application is to minimise the negative impact of underwater noise during the installation of pile foundations and to comply with the permissible noise levels indicated in this environmental permit decision. The Noise Reduction System encompasses the use of various types of noise reduction solutions, which together will constitute the Noise Reduction System. In particular, the following will be considered in selecting the underwater Noise Reduction System:

- piling locations, including piling locations on neighbouring projects (within a 50 km radius),
- work schedule, including work on other projects (piling within a 50 km radius),
- parameters of the pile driver (type, maximum energy and values during the cycle of use, frequency and number of strikes) or other technical solution used, used to sink the pile into the seabed,
- geotechnical parameters of sediment,
- parameters of piles driven (geometry and materials),
- seasonal variability of environmental conditions (including periods of particular importance for animals and parameters of underwater noise propagation).

The inter-array cable system of the Baltica-1 OWF will be made up of offshore MV (medium-voltage) or HV (high-voltage) cables connecting wind turbine into clusters (circuits/sections) that are then connected to one or more WV/HV or HV/EHV OSSs, as well as the necessary data communication and telecommunication links in the form of fibre-optic cables integrated into power cables or separate data communication cables laid in parallel with power cables. Depending on the wind turbines used, as well as their location and the power collection solutions adopted, marine multicore AC power cables may be used, with cross sections depending on the designed load, of up to the maximum of 2500 mm^2, with voltage rating of 66 kV or 132 kV. The maximum operating temperature of the main conductors of power cables will be 90^oC.

The burial depth of power cables in the seabed along most of the cable line route will be up to 3 m bsbl. Due to local conditions related to the structure of the seabed, the cables may be buried up to 6 m bsbl. If it will be impossible to reroute the cable line to avoid an obstacle located on or under the seabed, e.g. in the event foreign line infrastructure is present, it will be necessary to lay cable line sections on the surface of the seabed and protect them appropriately, e.g. with rip-rap, rip-rap wire mesh, concrete covers, reinforced concrete half-shells, conduits and protection devices made of HDPE fittings **(Condition B II 6)**. The maximum total length of cable lines within the OWF will be up to 140 km.

The laying of MV or HV power cables on the seabed is performed by a specialised cable laying vessel (CLV). Burying the cable can be done immediately after it is laid or at a later stage. For this type of work, trenching equipment, lowered to the seabed from the deck of a cable laying vessel, is used. The technology used will depend on the characteristics of the seabed and may vary within the Project.

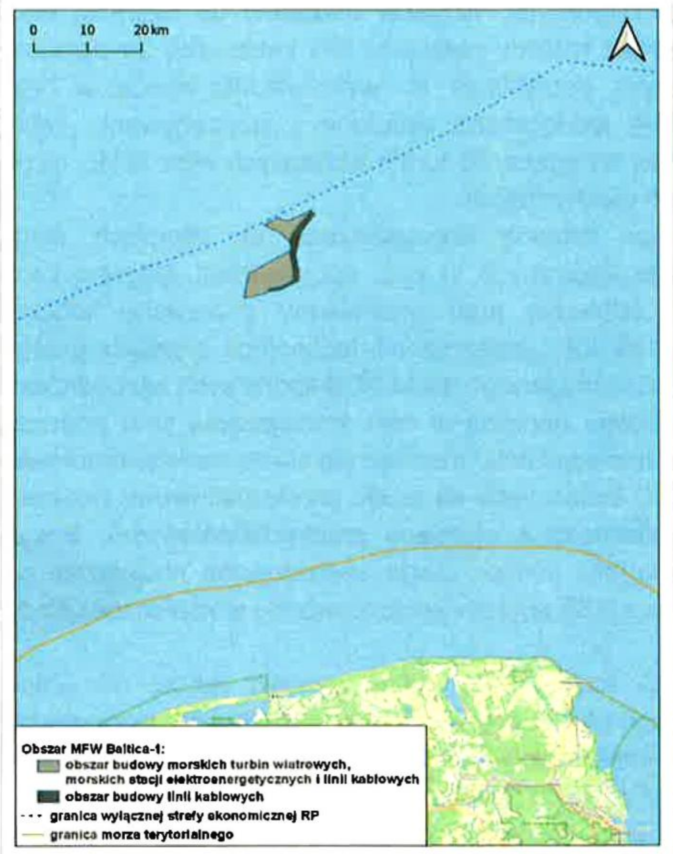
Depending on the geological conditions, the length of the sections to be laid and the parameters of the cable, the developer may use methods of laying cable lines using: jetting equipment, mechanical dredgers for making trenches in the seabed, cable ploughs for simultaneous laying and burial of the cable in the seabed sediment. Once laid, the cables are pulled into the wind turbines and the offshore substation, where they are then attached to electrical switchboards.

Cables connecting the wind turbines will be routed to offshore substations, appropriately located to optimise inter-array and export cable lengths. The OSSs receive alternating current transmitted via 66 kV or 132 kV inter-array cables and, depending on the technology for power transmission shore, raise the voltage to that required for export cables or raise and convert it to high-voltage direct current to reduce losses during power transmission ashore. In the case of HVAC technology, transformer substations are installed, while in the case of HVDC technology, converter substations (also equipped with transformers, but additionally with converter systems) are installed. The converter substation can be implemented as a separate substation, built independently of the OSS, but can also be integrated into the OSS by retrofitting it with the necessary voltage conversion systems.

For HVAC technology, the number of OSSs can be more than one (maximum 4). For HVDC technology, a maximum of one converter substation is envisaged, with the option to provide up to three transformer substations. The OSSs will be located on the OWF site, and their location and required technical data will be confirmed at the construction design stage. Up to four offshore substations are planned for the Baltica-1 OWF. The OSSs can be provided with the option to install a helipad on the platform. Jack-up or other high-capacity vessels, transport vessels and service operations vessels will be used to install the offshore substation.

The Baltica-1 OWF area is located in the EEZ of the Republic of Poland, on the eastern side of the Central Bank, in the depth range from approx. 16 m to approx. 50 m, at a distance of approx. 75 km north of the shoreline, off the Smołdzino commune and the Leba commune (Pomeranian voivodeship) and at a distance of 550 m from the border of the EEZs of Poland and Sweden (Figure 1). The Baltica-1 OWF occupies an area of 85.53 km^2. The operative part of this Decision, **Section A** and the characteristics **(Appendix 1)** include the geocentric coordinates of the boundary angle points of the Baltica-1 OWF area, as well as the geocentric coordinates of the boundary angle points of the construction area of wind turbines, offshore substations and inter-array cable lines.

According to the Regulation of the Council of Ministers of 14 April 2021 *on the adoption of a spatial development plan for internal maritime waters, territorial sea and exclusive economic zone on the scale of 1:200 000, hereinafter referred to as the “Plan”* (Journal of Laws of 2021, item 935, as amended), the planned project site is situated in basin POM.60.E. Having regard to § 69(5) of the *Plan*, the primary function of basin POM.60.E is *"renewable energy generation (E)".* The planned project covers the area specified in the permit for the erection and use of artificial islands, structures and devices in Polish maritime areas obtained by the Applicant (Decision of the Minister of Transport, Construction and Maritime Economy of 16 April 2012, ref. MFW/3/12).



Obszar MFW Baltlca-1:	Baltica-1 OWF area:
obszar budowy morskich turbin wiatrowych, morskich stacji elektroenergetycznych i linii kablowych obszar budowy linii kablowych	construction area of wind turbines, offshore substations and cable lines construction area of cable lines
granica wyłącznej strefy ekonomicznej RP	boundary of Polish exclusive economic zone
granica morza terytorialnego	territorial sea boundary

Figure 1 – Baltica-1 OWF (source: EIA report)

The impact assessment in the EIA report was based on the envelope concept with the assessment of the farthest-reaching scenario in terms of impact on the individual analysed environmental components, i.e. taking for assessment only those of the considered technological solutions and parameters of the project in the analysed variants that may cause the greatest impact on a given environmental component. The enveloping concept means that in the case of the evaluation of the chosen parameter and the possibility of applying different technical solutions, the environmental impact assessment was carried out for the solution potentially most burdensome to the environment. It was assumed that if the most burdensome solution would not have a significantly negative impact on the environment, the remaining, less burdensome solutions would also be acceptable.

One of the mandatory elements of the EIA report is a variant analysis. Since it is not possible to consider location variants of the Project, as its location has already been determined in the permit for the erection and use of artificial islands, the main components subject to variant analysis for the Baltica-1 OWF include:

- the maximum number of wind turbines – a parameter derived from the nominal capacity of a single turbine. The nominal capacity of a single turbine determines parameters that are crucial from the point of view of the project's environmental

impact, i.e.:
- wind turbine height,
- diameter of the wind turbine rotor,
- wind turbine rotor swept area (zone),
– number of support structures and the area they occupy within the OWF,
– length of cable lines within the OWF;

• maximum number of OSS – this parameter depends on technological and economic considerations, the principle of redundancy and the target number of wind turbines.

Two basic feasible variants of the project were considered – the Investor's preferred variant, ensuring the most efficient use of the Project area and, as the impact analysis has shown, also the variant most beneficial for the environment, called the Applicant-Proposed Variant (APV), and the Rational Alternative Variant (RAV), with both the APV and the RAV being feasible, according to the EIA report. For the APV, it was assumed that turbines with unit rated capacity of 15 to 25 MW could be used. The APV provides for the construction of 1 to 4 offshore substations. According to the EIA report, the final number of substations will depend on the selected technology of power transmission ashore, as well as economic analysis, availability of production supply chains, and technological considerations, including redundancy of transmission system components. The Rational Alternative Variant (RAV) provides for the use of wind turbines with a nominal capacity of 14 MW. Taking into account the fact that the maximum capacity of the Baltica-1 OWF will be 900 MW, construction of a maximum of 64 wind turbines is assumed. The RAV will be implemented in the same area, but due to the larger number of wind turbines to ensure that the farm's capacity reaches 900 MW, it will require a different layout within its boundaries. The inter-array cable system of the Baltica-1 OWF will be made up of offshore MV (medium-voltage) or HV (high-voltage) cables connecting wind turbine into clusters, as well as the necessary data communication and telecommunication links in the form of fibre-optic cables integrated into power cables or separate data communication cables laid in parallel with power cables. The maximum total length of the linear infrastructure will be between 120 and 140 kilometres.

Table 2 Comparison of basic technical parameters of Baltica-1 OWF in APV and RAV

Parameter	**APV**		**RAV**
Unit capacity of a wind turbine [MW]	from 15	to 25	14
Maximum number of wind turbines [units]	36–60		64
Minimum and maximum distance between wind turbines	3.5 RD – 12 RD		3.5 RD – 12 RD
Maximum total height of turbine asl [m]	330		266
Maximum rotor diameter [m]	236	310	236
Maximum sweep area of a single rotor [m^2]	44,000	75,500	44,000
Maximum total sweep area of rotors [m^2]	2,650,000	2,750,000	2,800,000
Maximum seabed area occupied by one gravitational foundation, including scour protection [m^2]	11,300	14,300	11,300
Maximum seabed area occupied by all gravitational foundations, including scour protection [m^2]	735,000	575,000	800,000
Maximum length of OWF cable infrastructure [km]	140	120	150
Number of OSSs	1–4		5

APV is a variant that assumes the use, to the greatest extent possible, of the latest technologies available at the time of preparing the construction design for the various stages of the Project, including, in particular, wind turbines larger than those available on the market at the time of submitting the Baltica-1 OWF environmental impact assessment report. For the

APV, it was assumed that turbines with unit rated capacity of 15 to 25 MW could be used. Although turbines of the specified capacity are not yet available in the market, this variant should be considered reasonable, since turbines of 15 MW and above are already in the certification phase and will be available at the stage of obtaining a construction permit. This variant provides for the possibility of using turbines with higher capacity, according to current knowledge of the technology development plans of leading manufacturers and an analysis of the capacity development of individual units over the past decade. APV takes into account the fact that continuous development of offshore wind turbine technologies is to be expected, leading not only to increased rotor, generator and tower dimensions, but also to improved efficiency of the engineering solutions used. This will allow the Project to be implemented with parameters that cause a smaller environmental impact, in particular due to the following:

- fewer wind turbines,
- smaller seabed surface occupied by foundations of wind turbines and OSSs along with scour protection systems,
- fewer cable lines with a smaller total length within the OWF.

The RAV was selected as a variant based on technologies that are currently used in offshore wind power and available in the market with a nominal capacity of 14 MW. More efficient designs envisaged for use in the RAV, i.e. with a capacity from 15–25 MW, are currently in the certification or design phase. Given the pace of development of wind turbine technology and the time horizon for the commencement of the construction phase, the availability of units with a capacity of even 25 MW in the market is highly probable. Providing for 14 MW units, given that the maximum capacity of the Baltica-1 OWF will be 900 MW, translates into the construction of a maximum of 64 wind turbines. The RAV will be implemented in the same area, but due to the larger number of wind turbines to ensure that the farm's capacity reaches 900 MW, it will require a different layout within its boundaries. The RAV provides for the installation of 5 OSSs, which arises from conservative assumptions to ensure the security of electricity transmission. A larger number of substations provides greater redundancy and reduces the impact of a single substation failure. The selected variant proposed by the Applicant will reduce the environmental impact of the project and, according to further analysis, is the most beneficial for the environment.

In this procedure, the impact of the project on all elements of the environment was analysed, and then, based on the results of the analysis, measures were identified to minimise the negative impact of the project on the various elements of the environment, which are specified in the operative part of this Decision.

The construction phase will require the use of vessels and helicopters to transport materials and personnel to and from the Baltica-1 OWF and to conduct work on site. The construction phase will include four main areas of activity related to:

- the preparation of the seabed prior to the installation of foundations or support structures for wind turbines and OSSs. The type of preparatory work will be determined by the geological conditions at the foundation sites and the type of foundation used;
- transport and installation of foundations or support structures of OWF elements in the seabed;
- transport and installation of wind turbine and OSS components;
- construction of inter-array cable lines connecting wind turbines and wind turbines to OSSs

The exact number of vessels that will operate at any one time during the construction phase is unknown, as is the frequency and duration of their operations. Potentially, the operations may require the use of more than 6 vessels at any given time; fewer ships may be required for particular construction work. For example, the installation of foundations will require only 1-2 jack-up vessels and 1-2 support vessels (CTVs, guard vessels, tugs). Other vessels needed during construction are as follows:

- support vessels (supply, crew transfer and service, underwater work, noise reduction, etc.), e.g. SOVs,
- specialised vessels, cable laying vessels; HLCV, HLJV, dredgers, rock dumping vessels,
- survey vessels.

It is assumed that the OWF construction phase will be completed in the shortest possible time and will last about 2 years.

As can be seen from the materials submitted, the planned project, during the construction phase, will be the source of the following types of emissions, disturbances and impacts:

a) Interference with the seabed, which will be related to:
   - preparation of the seabed prior to foundation placement; boulder removal, relocation, seabed levelling, or other activities related to cables, foundations, or installation work on the seabed, laying a rock layer for scour protection;
   - placement on the seabed, e.g. gravitational foundations or drilling/driving foundation piles (depending on the technology adopted);
   - transporting and assembling offshore wind turbine (OWT) and offshore substation (OSS) components using high-capacity jack-up vessels;
   - cable installation;
   - cable protection work, such as installing a layer of rock material and cable route preparation work.

   The degree of interference of the Project with the seabed will depend largely on the foundation technology adopted, the number of wind turbines to be installed, the final route of the cables, and geological conditions at specific locations.
b) Sediment mobilisation and redeposition. The disturbance of the seabed structure during construction work through seabed levelling, substrate clearing and installation work will cause mobilisation of the top layer of seabed sediment, which will float in water for some time, but this is nevertheless a local and short-lived phenomenon,

of a point nature in the case of foundations and linear in the case of inter-array cables. The degree of water turbidity will depend on the type of sediment mobilised and the length of time the suspended matter remain in water. The duration of suspension in the water column will depend mainly on the sediment fraction: the grains of the sandy fraction will be suspended for a shorter time, while dusty fractions will be suspended for a longer time. Sediment disturbance can release contaminants into the water, the environmental impact of which strongly depends on the depth and fraction of the sediment. In the case of the Baltica-1 OWF, no significant risk of pollution of the water column is expected.

c) Emission of underwater noise and vibrations. The work that will generate the most underwater noise will be mainly related to the preparation of the construction area, as well as the installation of the foundations themselves.
d) Overwater noise emissions. Noise will be emitted during construction work, the source of which will be vessels involved in installation work and machinery and equipment used during installation. This will result in a temporary increase in background noise levels at the site and along shipping routes. In addition, noise will be emitted from helicopters that may be used during construction.
e) Emissions of pollutants into the air, resulting from transport of farm components, operation of construction equipment. The impact on air quality will be of temporary nature and will disappear after the completion of construction and erection works. Concentration of pollutants will not persist permanently, as construction work will be carried out in an open, highly “ventilated” area.
f) Light pollution. Lighting of the project site during the construction phase will have a direct impact on seabirds, of a local range for gulls, a regional range for ichthyophages, and a transboundary range for the long-tailed duck (due to the possible impact on the species' biogeographic population); it will be a medium-term and reversible impact.
g) During the construction phase of the Baltica-1 offshore wind farm, power cables will not yet be active, which eliminates EMF and heat emissions.
h) In the construction phase, water will also be used for the welfare needs of the crews of the ships involved in the construction work. Total water demand is expected to be about 10,000 m^3 throughout the construction phase. Drinking water tanks will be filled during port calls. After use, the water will be stored in sewage tanks and delivered for treatment upon the next call at port.
i) Waste generation. During the implementation of the Project, construction waste and municipal waste will be generated. The industrial waste and wastewater generated will not be discharged into the environment but will be secured (with waste sorted) and transferred to the ports for disposal in accordance with applicable laws.

Table No. 3 Estimated types and mass of waste generated during the construction phase.

Anticipated types and quantities of waste during the OWF construction phase	**APV**		**RAV**
	36 turbines with a capacity of 25 MW	**60 turbines with a capacity of 15 MW**	**64 turbines with a capacity of 15 MW**

Waste code (*hazardous waste)	Waste type	Estimated maximum amount of waste [Mg/year]		
08	Wastes from manufacture, formulation, supply and use of coatings (paints, varnishes and vitreous enamels), adhesives, sealants and printing inks			
08 01	Wastes from manufacture, formulation, supply and use (MFSU) and removal of paint and varnish			
08 01 11*	Waste paint and varnish containing organic solvents or other dangerous substances	0.2	0.5	0.5
08 01 12	Waste paint and varnish other than those mentioned in 08 01 11	0.1	0.2	0.2
12	Wastes from shaping and physical and mechanical surface treatment of metals and plastics			
12 01	Wastes from shaping and physical and mechanical surface treatment of metals and plastics			
12 01 13	Welding wastes	2.0	5.0	5.0
13	Waste oils and waste of liquid fuels (excluding edible oils and groups 05, 12 and 19)			
13 01	Waste hydraulic oils			
13 01 09*	Mineral based chlorinated hydraulic oils	0.5	0.7	0.7
13 01 10*	Mineral-based non-chlorinated hydraulic oils	0.1	0.2	0.2
13 01 11*	Synthetic hydraulic oils	2.0	3.0	3.0
13 01 12*	Readily biodegradable hydraulic oils	1.0	1.5	1.5
13 01 13*	Other hydraulic oils	0.5	1.0	1.0
13 02	Waste engine, gear and lubricating oils			
13 02 04*	Mineral-based non-chlorinated engine, gear and lubricating oils	1.0	2.0	2.0
13 02 05*	Mineral-based non-chlorinated engine, gear and lubricating oils	1.0	2.0	2.0
13 02 06*	Synthetic engine, gear and lubricating oils	1.5	2.0	2.0
13 02 07*	Readily biodegradable engine, gear and lubricating oils	1.0	1.5	1.5
13 02 08*	Other engine, gear and lubricating oils	0.5	1.0	1.0
13 03	Mineral-based non-chlorinated insulating and heat transmission oils and fluids			
13 03 01*	Insulating or heat transmission oils containing PCBs	1.0	1.5	1.5
13 04	Bilge oils			
13 04 03*	Bilge oils from other navigation	5.0	6.0	6.0
13 05	Oil/water separator contents			
13 05 02*	Sludges from oil/water separators	10.0	12.0	12.0
13 05 06*	Oil from oil/water separators	10.0	12.0	12.0
13 05 07*	Oily water from oil/water separators	5.0	6.0	6.0
13 07	Wastes of liquid fuels			
13 07 01*	Fuel oil and diesel	10.0	15.0	15.0
13 07 02*	Petrol	0.5	0.6	0.6
13 08	Oil wastes not otherwise specified			
13 08 80	Oily solid waste from ships	2.0	3.0	3.0
14	Wastes of organic solvents, refrigerants and propellants (except 07 and 08)			
14 06	Waste organic solvents, refrigerants and foam/aerosol propellants			
14 06 01*	Freons, HCFCs, HFCs	0.1	0.1	0.1
14 06 02*	Other halogenated solvents and solvent mixtures	1.0	1.2	1.2
14 06 03*	Other solvents and solvent mixtures	1.0	1.2	1.2
15	Packaging waste; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified			

Anticipated types and quantities of waste during the OWF construction phase		APV		RAV
		36 turbines with a capacity of 25 MW	**60 turbines with a capacity of 15 MW**	**64 turbines with a capacity of 15 MW**
Waste code (*hazardous waste)	**Waste type**	**Estimated maximum amount of waste [Mg/year]**		
15 01	Packaging (including separately collected municipal packaging waste)			
15 01 01	Waste paper and cardboard packaging	10.0	12.0	12.0
15 01 02	Plastic packaging	15.0	20.0	20.0
15 01 03	Wooden packaging	40.0	50.0	50.0
15 01 04	Metal packaging	20.0	30.0	30.0
15 01 05	Composite packaging	20.0	30.0	30.0
15 01 06	Mixed packaging	20.0	30.0	30.0
15 01 07	Glass packaging	10.0	12.0	12.0
15 01 09	Textile packaging	5.0	8.0	8.0
15 02	Absorbents, filter materials, wiping cloths and protective clothing			
15 02 02*	Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths (e.g. rags), protective clothing contaminated by hazardous substances (e.g. PCB)	2.0	3.0	3.0
15 02 03*	Absorbents, filter materials, wiping cloths (e.g. rags) and protective clothing, other than those mentioned in 15 02 02	5.0	7.0	7.0
16	Wastes not included in other groups			
16 01	End-of-life or unserviceable vehicles (including off-highway machinery), waste from dismantling, inspection and maintenance of vehicles (excluding groups 13 and 14 and subgroups 16 06 and 16 08)			
16 01 14	Antifreeze liquids containing hazardous substances	70.0	80.0	80.0
16 06	Batteries and accumulators			
16 06 01*	Lead batteries and accumulators	1.0	1.2	1.2
16 06 02*	Nickel–cadmium batteries and accumulators	10.0	12.0	12.0
16 06 04	Alkaline batteries (except 16 06 03)	0.5	1.0	1.0
16 81	Waste resulting from accidents and unplanned even			
16 81 01*	Wastes exhibiting hazardous properties	0.1	0.2	0.2
17	Construction, renovation and demolition wastes from buildings and road infrastructure (including excavated soil from contaminated sites)			
17 01	Waste construction materials and elements of buildings and road infrastructure (e.g. concrete, bricks, tiles, ceramics)			
17 01 82	Other waste not otherwise specified	2.0	4.0	4.0
17 02	Wood, glass and plastic waste			
17 02 01	Wood	2.0	3.0	3.0
17 02 02	Glass	0.5	1.0	1.0
17 02 03	Plastic	2.0	4.0	4.0
17 04	Metallic and metal alloy waste and scrap			
17 04 01	Copper, bronze, brass	5.0	8.0	8.0

Anticipated types and quantities of waste during the OWF construction phase		APV		RAV
		36 turbines with a capacity of 25 MW	60 turbines with a capacity of 15 MW	64 turbines with a capacity of 15 MW
Waste code (*hazardous waste)	**Waste type**	**Estimated maximum amount of waste [Mg/year]**		
17 04 02	Aluminium	10.0	12.0	12.0
17 04 04	Zinc	1.0	1.2	1.2
17 04 05	Iron and steel	20.0	25.0	25.0
17 04 07	Mixed metals	1.0	1.2	1.2
17 04 11	Cables other than those mentioned in 17 04 10	1.0	2.0	2.0
17 09	Other construction and demolition wastes			
17 09 03*	Other construction and demolition wastes (including mixed wastes) containing hazardous substances	0.5	1.0	1.0
17 09 04	Mixed construction, renovation and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	20.0	25.0	25.0
19	Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use			
19 08	Wastes from waste water treatment plants not otherwise specified			
19 08 05	Stabilised municipal sewage sludge	25.0	40.0	40.0
20	Municipal wastes including separately collected fractions			
20 01	Separately collected fractions (except 15 01)			
20 01 01	Paper and cardboard	15.0	20.0	20.0
20 01 02	Glass	10.0	15.0	15.0
20 01 08	Biodegradable kitchen and canteen waste	25.0	40.0	40.0
20 01 10	Clothing	10.0	15.0	15.0
20 01 21*	Fluorescent tubes and other mercury-containing waste	0.1	0.1	0.1
20 01 29*	Detergents containing hazardous substances	0.5	0.6	0.6
20 01 30	Detergents other than those mentioned in 20 01 29	0.5	0.6	0.6
20 01 33*	Batteries and accumulators included in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries	10.0	12.0	12.0
20 01 34	Batteries and accumulators other than those mentioned in 20 01 33	1.0	2.0	2.0
20 01 36	Discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	1.0	1.2	1.2
20 03	Other municipal wastes			
20 03 01	Unsorted (mixed) municipal waste	20.0	20.0	20.0

The operation phase will begin with the commissioning of the Baltica-1 OWF – the start of electricity generation by wind turbines. The operation phase will be characterised primarily by taking scheduled maintenance actions and replacing/repairing components. Offshore installations are typically monitored/operated unmanned and remotely from an onshore control centre. Inspections and servicing operations can be divided into those carried out on facilities above sea level and below sea level. These are carried out annually by personnel trained to carry out maintenance and, if necessary, repairs as well. For routine maintenance, personnel and equipment are transported to offshore wind turbine and OSS locations by SOVs and CTVs. For ad hoc repairs/replacement of larger components, a jack-up vessel, or other large vessels such as those used for installation work, is required. In special situations, a helicopter can be used to transport parts and service technicians. Typical maintenance activities will include general wind turbine maintenance, OSS maintenance, oil sampling/replacement, battery replacement in emergency power supply units, maintenance and inspection of wind turbine safety equipment, nacelle crane, service lift, high-voltage system, blades, major overhaul and repair and restart of the wind turbine. Repairs to cable lines and their periodic inspections may be required during the operating period of the Project. Scheduled inspections will also be required to ensure that the cables remain buried, and if exposed, work will be undertaken to re-bury them or secure them on the seabed surface. Cables can also be exposed by the movement of sand or erosion of other soft/mobile sediments. The wind farm is expected to operate for up to 35 years.

At the operation stage, the project will be the source of the following types of emissions, disturbances and impacts:

a) Interference with the seabed, which will be related to:
   – foundation settlement;
   – use of service operations vessels requiring anchorage;
   – maintenance work on the seabed (e.g., replacing faulty cables).

   During the operation stage, there will be much less interference with the seabed than during the construction stage. The process of foundation settlement, which occurs most intensively immediately after its installation, begins to stabilise over time with increasing soil compaction. No changes in the structure of the seabed are expected to occur during the operation phase of the project. The overall impact of the project at the operation phase can be assessed as negligible.
b) Sediment mobilisation and redeposition. Short-term and local mobilisation of sediments due to maintenance work and ship anchoring is possible. In addition to the wind turbine generators themselves, maintenance work can also be carried out around power cable networks. Interference with the seabed may then occur when faulty cables are replaced. It is then possible for the substrate to be re-penetrated to a shallow depth and sediments to be locally scoured, resulting in temporary water turbidity. Sediment mobilisation can also facilitate the passage of contaminants and nutrients from the sediment into the water column.
c) Heat emission from electromagnetic cables. Electric current, flowing through the cable, causes it to heat up. After the cable is heated above ambient temperature, heat starts to be transferred to the environment surrounding the cable. Sediment heating can lead to changes in the taxonomic composition of benthos living on and in the seabed in the immediate vicinity of cables. The depth of burial will be determined based on the type of sediment (type, characteristics, including its thermal conductivity) and the type of power grid (size and type of loads, thermal characteristics).
c) Emission of underwater noise and vibrations. Underwater noise, which is generated during the operation of an offshore wind farm (OWF), is the result of the transmission of vibrations from the mechanical parts of the nacelle, through the tower, to the components situated underwater. The sounds of a wind farm in operation can be heard miles away by both marine mammals and fish.
e) Surface noise emission. Depending on the technology chosen, the dimensions of wind

turbine components may vary, but the mechanism of noise generation will be similar. Sources of noise that will be carried through the air can be divided into two groups:

– mechanical noise – generated by the movement of the mechanical parts of the nacelle;
– aerodynamic noise – generated by air flow between turbine blades.

In accordance with the Regulation of the Minister of the Environment of 14 June 2007 on the permissible noise levels in the environment *(consolidated text, Journal of Laws of 2014, item 112*), the sea area is not subject to noise protection, and the area of the developed offshore wind farm will be located at a considerable distance from areas protected from noise (residential, recreational and other land/coastal areas). In addition, during the operation phase, maintenance of offshore wind turbines as well as associated equipment will be performed by crews using ships and helicopters as means of transport, but these will be short-term activities and can be considered of little significance.

f) Presence of vessels. The operation of the OWF and the location of its supply port will increase the traffic of service operations vessels and intensify the existing traffic flow in a given direction.
g) Air emissions associated with the movement of service operations vessels or supply vessels. As a result, [emissions of]* chemical compounds and dusts will follow, i.e.: NO, NLZO, CO, SO_2, HC, etc.
h) In addition to vessels operating during the operation phase, helicopters may be used, e.g. for transporting ship crew members. It is expected that in one year the total flight time of helicopters will not exceed 400 hours.
i) Electromagnetic radiation. During the operation phase of the Baltica-1 OWF, operating power cables will emit EMF into the environment. The electric field, being dependent on the magnetic field, will similarly weaken with distance from the cable. The power cables will be buried at a depth of 3 to 6 meters, so there will be no or negligible changes in EMF on the sediment surface and in the water column, according to the data in the EIA report.
j) Light emission. Illumination of the Baltica-1 OWF may hinder navigation of seabirds and increase the risk of their collision with the turbines. This is especially true for migratory species that exhibit nocturnal activity.
k) Waste and wastewater will be generated by people on service operations vessels, periodically performing inspections of OWF structures, and vessels involved in work to rectify potential failures. Water management will involve the generation of domestic wastewater. The wastewater generated will be collected, treated and discharged into the sea or transported to land, in accordance with MARPOL 73/78. The industrial waste and wastewater generated will not be discharged into the environment but will be secured (with waste sorted) and transferred to the ports for disposal in accordance with applicable laws.

Table 4 Summary of maximum estimated amounts of waste generated in one year of the operation phase of the Baltica-1 OWF

Types and quantities of waste expected in the OWF operation phase	APV	RAV

		36 turbines with a capacity of 25 MW	60 turbines with a capacity of 15 MW	64 turbines with a capacity of 14 MW
Waste code (*hazardous waste)	**Waste type**	**Estimated maximum amount of waste [Mg/year]**		
08	Wastes from manufacture, formulation, supply and use of coatings (paints, varnishes and vitreous enamels), adhesives, sealants and printing inks			
08 01	Wastes from manufacture, formulation, supply and use (MFSU) and removal of paint and varnish			
08 01 11*	Waste paint and varnish containing organic solvents or other dangerous substances	1.0	2.0	2.0
08 01 12	Waste paint and varnish other than those mentioned in 08 01 11	1.0	2.0	2.0
12	Wastes from shaping and physical and mechanical surface treatment of metals and plastics			
12 01	Wastes from shaping and physical and mechanical surface treatment of metals and plastics			
12 01 13	Welding wastes	1.0	2.0	2.0
13	Waste oils and waste of liquid fuels (excluding edible oils and groups 05, 12 and 19)			
13 01	Waste hydraulic oils			
13 01 09*	Mineral based chlorinated hydraulic oils	5.0	7.0	7.0
13 01 10*	Mineral-based non-chlorinated hydraulic oils	5.0	7.0	7.0
13 01 11*	Synthetic hydraulic oils	8.0	10.0	10.0
13 01 12*	Readily biodegradable hydraulic oils	5.0	7.0	7.0
13 01 13*	Other hydraulic oils	5.0	7.0	7.0
13 02	Waste engine, gear and lubricating oils			
13 02 04*	Mineral-based non-chlorinated engine, gear and lubricating oils	1.0	2.0	2.0
13 02 05*	Mineral-based non-chlorinated engine, gear and lubricating oils	1.0	2.0	2.0
13 02 06*	Synthetic engine, gear and lubricating oils	24.0	32.0	32.0
13 02 07*	Readily biodegradable engine, gear and lubricating oils	1.0	2.0	2.0
13 02 08*	Other engine, gear and lubricating oils	1.0	2.0	2.0
13 03	Mineral-based non-chlorinated insulating and heat transmission oils and fluids			
13 03 06*	Mineral-based chlorinated insulating and heat transmission oils and fluids other than those mentioned in 13 03 01	5.0	5.0	5.0
13 03 07*	Mineral-based non-chlorinated insulating and heat transmission oils and fluids	5.0	5.0	5.0
13 03 08*	Synthetic insulating and heat transmission oils and fluids other than those mentioned in 13 03 01	5.0	5.0	5.0
13 03 09*	Readily biodegradable insulating and heat transmission oils and fluids	5.0	5.0	5.0
13 04	Bilge oils			
13 04 03*	Bilge oils from other navigation	1.0	2.0	2.0
13 05	Oil/water separator contents			
13 05 02*	Sludges from oil/water separators	5.0	7.0	7.0
13 05 06*	Oil from oil/water separators	5.0	7.0	7.0
13 05 07*	Oily water from oil/water separators	5.0	7.0	7.0
13 07	Wastes of liquid fuels			

Types and quantities of waste expected in the OWF operation phase		APV		RAV
		36 turbines with a capacity of 25 MW	60 turbines with a capacity of 15 MW	64 turbines with a capacity of 14 MW
Waste code (*hazardous waste)	**Waste type**	**Estimated maximum amount of waste [Mg/year]**		
13 07 01*	Fuel oil and diesel	1.0	1.0	1.0
13 07 02*	Petrol	1.0	1.0	1.0
13 08	Oil wastes not otherwise specified			
13 08 80	Oily solid waste from ships	1.0	2.0	2.0
14	Wastes of organic solvents, refrigerants and propellants (except 07 and 08)			
14 06	Waste organic solvents, refrigerants and foam/aerosol propellants			
14 06 01*	Freons, HCFCs, HFCs	0.1	0.2	0.2
14 06 02*	Other halogenated solvents and solvent mixtures	0.7	1.0	1.0
14 06 03*	Other solvents and solvent mixtures	0.5	1.0	1.0
15	Packaging waste; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified			
15 01	Packaging (including separately collected municipal packaging waste)			
15 01 01	Waste paper and cardboard packaging	5.0	7.0	7.0
15 01 02	Plastic packaging	10.0	15.0	15.0
15 01 03	Wooden packaging	20.0	25.0	25.0
15 01 04	Metal packaging	15.0	20.0	20.0
15 01 05	Composite packaging	15.0	25.0	25.0
15 01 06	Mixed packaging	15.0	25.0	25.0
15 01 07	Glass packaging	10.0	15.0	15.0
15 01 09	Textile packaging	5.0	7.0	7.0
15 02	Absorbents, filter materials, wiping cloths and protective clothing			
15 02 02*	Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths (e.g. rags), protective clothing contaminated by hazardous substances (e.g. PCB)	4.0	6.0	6.0
15 02 03*	Absorbents, filter materials, wiping cloths (e.g. rags) and protective clothing, other than those mentioned in 15 02 02	4.0	6.0	6.0
16	Wastes not included in other groups			
16 01	End-of-life or unserviceable vehicles (including off-highway machinery), waste from dismantling, inspection and maintenance of vehicles (excluding groups 13 and 14 and subgroups 16 06 and 16 08)			
16 01 14	Antifreeze liquids containing hazardous substances	70.0	80.0	80.0
16 06	Batteries and accumulators			
16 06 02*	Nickel–cadmium batteries and accumulators	3.0	5.0	5.0
16 06 04	Alkaline batteries (except 16 06 03)	1.0	2.0	2.0
16 06 05	Other batteries and accumulators	3.0	5.0	5.0
16 81	Waste resulting from accidents and unplanned even			
16 81 01*	Wastes exhibiting hazardous properties	0.1	0.2	0.2
16 81 02	Wastes other than those mentioned in 16 81 01	0.05	0.1	0.1
17	Construction, renovation and demolition wastes from buildings and road infrastructure			

Types and quantities of waste expected in the OWF operation phase		APV		RAV
		36 turbines with a capacity of 25 MW	**60 turbines with a capacity of 15 MW**	**64 turbines with a capacity of 14 MW**
Waste code (*hazardous waste)	**Waste type**	**Estimated maximum amount of waste [Mg/year]**		
	(including excavated soil from contaminated sites)			
17 01	Waste construction materials and elements of buildings and road infrastructure (e.g. concrete, bricks, tiles, ceramics)			
17 01 01	Waste concrete and concrete rubble from demolitions and renovations	0.5	0.7	0.7
17 01 03	Waste tiles and ceramics	0.5	0.7	0.7
17 01 07	Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06	0.5	0.7	0.7
17 01 82	Other waste not otherwise specified	1.5	3.0	3.0
17 02	Wood, glass and plastic waste			
17 02 01	Wood	1.5	3.0	3.0
17 02 02	Glass	0.5	0.7	0.7
17 02 03	Plastic	1.5	3.0	3.0
17 04	Metallic and metal alloy waste and scrap			
17 04 01	Copper, bronze, brass	2.5	3.0	3.0
17 04 02	Aluminium	5.0	7.0	7.0
17 04 04	Zinc	0.1	0.2	0.2
17 04 05	Iron and steel	15.0	20.0	20.0
17 04 07	Mixed metals	1.0	1.5	1.5
17 04 11	Cables other than those mentioned in 17 04 10	1.0	1.5	1.5
17 09	Other construction and demolition wastes			
17 09 03*	Other construction and demolition wastes (including mixed wastes) containing hazardous substances	0.2	0.5	0.5
17 09 04	Mixed construction, renovation and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	5.0	7.0	7.0
19	Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use			
19 08	Wastes from waste water treatment plants not otherwise specified			
19 08 05	Stabilised municipal sewage sludge	15.0	20.0	20.0
20	Municipal wastes including separately collected fractions			
20 01	Separately collected fractions (except 15 01)			
20 01 01	Paper and cardboard	10.0	15.0	15.0
20 01 02	Glass	7.0	4.0	4.0
20 01 08	Biodegradable kitchen and canteen waste	2.0	5.0	5.0
20 01 10	Clothing	2.5	5.0	5.0
20 01 21*	Fluorescent tubes and other mercury-containing waste	0.05	0.1	0.1

Types and quantities of waste expected in the OWF operation phase		APV		RAV
		36 turbines with a capacity of 25 MW	**60 turbines with a capacity of 15 MW**	**64 turbines with a capacity of 14 MW**
Waste code (*hazardous waste)	**Waste type**	**Estimated maximum amount of waste [Mg/year]**		
20 01 23*	Discarded equipment containing chlorofluorocarbons	0.05	0.1	0.1
20 01 29*	Detergents containing hazardous substances	0.05	0.1	0.1
20 01 30	Detergents other than those mentioned in 20 01 29	0.1	0.5	0.5
20 01 33*	Batteries and accumulators included in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries	5.0	10.0	10.0
20 01 34	Batteries and accumulators other than those mentioned in 20 01 33	0.5	0.7	0.7
20 01 35*	Discarded electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components	0.1	0.2	0.2
20 01 36	Discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	0.5	0.7	0.7
20 03	Other municipal wastes			
20 03 01	Unsorted (mixed) municipal waste	20.0	30.0	30.0

In each phase of the Project, waste management will be carried out in accordance with applicable rules, in particular, MARPOL 73/78 convention and the Waste Act of 14 December 2012 *(consolidated text, Journal of Laws of 2023, item 1587).* Production and waste management systems will be developed and implemented to prevent and minimise waste generation. In order to control the types and quantities of waste generated, *a database on products and packaging and waste management* (BDO) will be maintained as required by the Waste Act. The waste generated will be collected separately and transferred onshore to specialised entities for recovery of the raw materials from which it was made. The general approach in this respect will be to minimise the types and amount of waste generated and recycle it where possible.

After the end of the Baltica-1 OWF operation phase, two possible options are considered: continued operation with the possibility of upgrading the OWF infrastructure or decommissioning of the Project. Decommissioning involves dismantling the farm's structures and leaving in the environment those components that would be too costly to remove and/or could cause heavier negative environmental impacts than leaving them in place. This applies especially to parts of foundations below seabed level and buried cable lines. The process of decommissioning an offshore wind farm is a complex one and is a reverse of its construction. It is estimated that the decommissioning time for the Baltica-1 OWF structures will be about 2 to 3 years. This estimate takes into account the time needed to secure items left in the seabed.

The construction, operation and decommissioning phases may involve unplanned events and failures, such as:

- spillage of petroleum substances as a result of a collision, failure or construction disaster;
- accidental release of municipal waste or domestic sewage [or] building materials;
- release of hazardous substances from anthropogenic objects located on the surface of the seabed or deposited in the seabed sediment.
- explosions of unexploded ordnance (UXO).

It is expected that the greatest risk of a major accident will be in the construction and eventual decommissioning phases, where there will be the greatest volume of work and the largest share of vessels in the project. What should be considered the greatest risk of a major accident is a spill of petroleum substances – mainly diesel fuel from a ship or ships into the environment, as a result of a collision with another ship or with OWF structures. Although the risk of such an event is very low, it cannot be ruled out completely. The number of potential spills is proportional to the number of vessels used in each Project implementation stage. The magnitude of pollution with petroleum substances can be classified as follows:

- Tier 1 (small spill) – minor leaks of petroleum substances, not requiring the intervention of external forces and resources, which can be removed with the operator's own resources. These spills are local in nature, and their clean-up does not pose any particular technical difficulties.
- Tier 2 (medium spill) – spills of petroleum substances whose scale requires coordinated response within the maritime area managed by the territorially competent maritime office director, who takes a decision on the required scale of response;
- Tier 3 (catastrophic spill) – spills of petroleum substances having the character of an extraordinary environmental hazard, the combatting of which requires the involvement of response forces and resources managed by more than one maritime office director.

During the normal operation of vessels, small spills of petroleum substances, i.e. diesel fuel, lubricants and petrol, may occur. In most cases, the released petroleum substances will cause a Tier I spill. The largest spills of petroleum substances can occur as a result of major accidents or collisions of vessels with each other and with OWF structures. In order to minimise the probability of such a situation, **Condition B.2.2.14., B. 2.2.18.** has been imposed. In the worst-case scenario, there will be Tier III spills (catastrophic spills) during the construction and decommissioning phases. The risk of a major accident resulting in emissions of hazardous substances is minimal. The probability of events such as vessel collisions falls into the category of very rare (once in 100 years) incidents.

Unplanned incidents or accidents may occur in connection with the implementation of the project. As a result of a collision, accident, construction disaster, or in the course of normal operations, there may be a leakage of petroleum substances or accidental release of waste into the environment. As a result of unplanned incidents, the abiotic environment, primarily marine waters and, to a lesser extent, seabed sediment, may be directly polluted. However, indirectly, these incidents may also affect living organisms that inhabit or otherwise use the seabed, the water column and the sea surface. In view of potential risks, it was recommended, among other things, to equip the farm with features that minimise the risk of oil entering the marine environment, including sealed turbine casings and oil trays. In addition, the project site should be equipped with oil pollution control measures, and in the event of a spill of a petroleum substance, it should be removed from the water surface immediately and on an ongoing basis. In addition, this authority notes that, in accordance with the regulations, a plan for countering hazards and pollution in marine waters must be developed and updated on an ongoing basis, in which the potential area at risk for the occurrence of spills of various magnitudes, the methods for countering oil spills, and the equipment planned to be used to combat oil spills described as Tier I spills, sufficient to eliminate such spills using the party's own resources. **Conditions B.1.2.12 to B.1.1.19.**

It cannot be ruled out that in the course of preparatory work for the Baltica OWF construction process, including in particular the seabed cleanliness examination for the presence of unexploded ordnance and chemical weapons, anthropogenic objects may be discovered, the disturbance of which would cause the release of contaminants contained in them (e.g. containers with chemical substances or unexploded ordnance). As part of the preparation of the EIA Report for the Baltica-1 OWF, geophysical surveys were carried out, which allowed preliminary identification of the presence of anthropogenic objects on/in the seabed. According to the EIA report, no cultural heritage sites, including wrecks, have been identified so far within the boundaries of the Baltica-1 OWF area. The results of seabed surveys carried out in the project area revealed the presence of several hundred objects of potential anthropogenic origin, of which more than a hundred were selected for video inspection by an ROV. Most of them were geomorphological formations and anthropogenic waste, as well as other objects – tires, fishing nets and ropes, tree branches and logs. Among the objects included in the video inspection, fragments of shipwrecks and aircraft elements were also found on the seabed. During the construction phase, new, previously unidentified objects may be discovered that are believed to be cultural heritage assets, which, due to the lack of knowledge of their existence, were not included in the environmental impact report. In the event of new, previously unidentified archaeological objects are discovered, it is necessary to prevent damage to them as a result of the work being carried out, and to notify the relevant administrative authorities of the finding, and to proceed in accordance with the provisions of Articles 32 and 33 of the Act of 23 July 2003 *on the protection and conservation of cultural heritage assets* and the provisions of the Plan. According to the EIA report, no conventional warfare agents from the period of the two world wars were found in the project area. However, their presence on the seabed cannot be ruled out. In keeping with the precautionary approach, it is appropriate to assume that conventional and non-conventional warfare agents from war periods may be deposited on the seabed in the Baltica OWF area and pose a potential safety hazard to the project. Accordingly, it was recommended that procedures be developed and implemented to prevent accidents involving unexploded ordnance, especially chemical warfare agents – **Condition No. B.2.2.8.**

According to the Construction Law, a construction disaster is *"the unintentional, violent destruction of a built structure or part thereof, as well as structural elements of scaffolding, elements of forming equipment, sheet piling and excavation shoring."* In the case of the Baltica-1 OWF, a construction disaster – destruction of wind turbines and/or associated infrastructure – could occur following an emergency, in this case only as a result of a serious collision with a vessel or the occurrence of extreme weather events. The occurrence of such situations will be very rare and additionally eliminated and minimised by design solutions developed for the safe conduct of work at sea. OWF structures, by virtue of their purpose, are designed and built to withstand extremely harsh environmental conditions. All components, despite being subjected to extremely high loads, are designed for many years of service. All equipment is subjected to continuous monitoring, and any signal of the appearance of deviations from the situation classified as safe operation automatically triggers remote maintenance interventions or changes in operating parameters, up to and including equipment shutdown. The rotor is stopped automatically when the wind speed exceeds operational conditions that are safe for a wind turbine. A maintenance plan will be developed, the implementation of which will ensure trouble-free operation of the Baltica-1 OWF throughout the operation phase. The above was taken into account under Conditions No. **B.I.1.16 and B.II.7.**

According to Article 3(23) of *the Act of 18 April 2001 – Environmental Protection Law (consolidated text, Journal of Laws of 2025, item 647, as amended, hereinafter: EPL*), a major accident is defined as an event, in particular emission, fire or explosion, occurring in the course of an industrial process, storage or transport where one or more hazardous substances are present, causing an immediate hazard to human life or health or the environment or resulting in a delayed hazard of the same nature. According to Article 3(4) of the EPL, a major industrial accident is defined as a major accident at a plant. According to Article 3(48), a plant is one or several installations along with the land to which the entity operating the installations holds legal right, together with the facilities located thereon. According to Article 248(1) of the EPL, a plant posing a risk of a major industrial accident, depending on the type, category and quantity of a hazardous substance present at the plant, is considered as a plant with an increased risk of an accident or as a plant with a high risk of an accident, depending on the expected quantity of the hazardous substance that may be present at the plant. The criteria for the classification of a plant into one of those categories are set forth in the Regulation of the Minister of Development of 29 January 2016 on the types and quantities of hazardous substances present at a plant which determine the classification of the plant as a plant with an increased risk or a plant with a high risk of occurrence of a major industrial accident (Journal of Laws of 2016, item 138).

According to the EIA report, the Baltica OWF will not be a place of storing substances determining the classification of the project as a plant with an increased or high risk of a major industrial accident in accordance with § 1 of the aforementioned Regulation. At the same time, it should be noted that, in accordance with Article 2 (4) of the EPL, the principles of sea protection against pollution from ships and the authorities responsible for such protection are laid down in separate provisions. However, given the relatively small quantities of hazardous substances, the farm is not included in any of the above categories.

Climate impact of the project. Environmental surveys in the area of the planned Baltica-1 OWF, including monitoring of meteorological conditions of the near-water atmospheric layer (pressure, temperature, air humidity and wind parameters), dynamic conditions of the sea (surface waves, flows across the whole depth of the water column and changes in the height of the free surface of the water) and hydrophysical conditions of the sea (temperature, electrolytic conductivity and salinity of the water) were conducted for a period of one year: from 1 December 2022 to 30 November 2023. The survey results presented provided up-to-date information on the climatic conditions of the sea areas associated with the planned wind farm. Linked to similar recorded observations made in recent years by neighbouring Baltic states, they make it possible to determine current trends and predicted directions of change in the basic climatic parameters of the Baltic Sea, especially its southern areas. In addition, information from climatological simulation calculations of the numerical global atmospheric circulation models, available, among other studies, from surveys carried out as part of the BALTEX Assessment of Climate Change for the Baltic Sea Basin. Based on the available climatological data and analyses, the most important forecasts of changes in individual atmospheric and water parameters in the project area are presented in the EIA report.

The Project area is located in the waters of the Southern Baltic, located in the humid moderate climate belt, where the influence of atmospheric circulation and winds from the

North and Central Atlantic remains important. The proximity of the Atlantic Ocean, due to the influx of large air masses, largely determines the climate of the Baltic Sea. This results in milder and warmer winters and cooler summers. In addition, it is characterized by a predominance of winds from westerly and south-westerly directions, and during storms by strong winds from the northern, northwestern and northeastern sectors, as well as large fluctuations in humidity. Taking into account the conclusions and recommendations relating to the coast and adjacent areas of the Baltic Sea, it has been concluded that the observed and predicted climate changes will have a negative impact on the functioning of coastal zones. The negative impact of periodic sea level rises, resulting primarily from an increase in the frequency and intensity of strong storms is expected, especially in the autumn and winter season. For the Baltic, this refers to a possible increase in the number, intensity and duration of these events, with an increase in the irregularity of the occurrence of these events, i.e. long periods of relative calm may be followed by a series of rapidly succeeding storms of high strength.

At the farm construction stage, an increased emission of pollutants into the atmosphere (including greenhouse gases) can be expected, which will be associated with an increased traffic of vessels involved in the execution of the project. The estimation of the magnitude of this emission into the atmosphere is impossible at the present stage, as the number, type and time of deployment of specialised vessels will only be specified in the detailed design. It has been assumed that only vessels complying with national standards and standards resulting from international agreements relating to pollutant emissions will be used. It is expected that, in the construction phase, the significance of the impact of the planned project on climate and greenhouse gases will be insignificant, as no factors will occur that could have any noticeable impact on their change. The impact on air quality during the construction phase will be of temporary nature and will disappear after the works have ceased. Moreover, due to the open area without obstacles, the concentration of pollutants will quickly disperse. Therefore, the significance of the impact will be negligible.

Wind turbine generators will locally reduce wind energy and disturb the atmospheric pressure directly in the rotor area. Wind turbine generator towers can locally disturb the velocities and directions of water flows and locally dampen the energy of sea waves, which manifests itself in a decrease in their height. Since the emissions generated during the operation of the OWF will be minimal, it can be assumed that there will be no significant emissions of dust pollutants, with only minor emissions of gaseous pollutants, including carbon dioxide, which is a greenhouse gas. Hence, no deterioration in air purity and reduction of its purity class is expected. In the operation phase, the planned project will have both negative and positive impacts on the climate. Negative impacts are related to greenhouse gas emissions caused by the burning of fuels by service operations vessels. A positive impact on the climate will be the generation of 900 MW of renewable electricity by the OWF, which will lead to a noticeable reduction in the country's CO_2 emissions.

Climatic conditions of the southern Baltic area related to the development of weather phenomena (mainly temperature, precipitation and wind) in a multi-annual period are subject to constant changes, which, although related to global climatic changes, are generally of a regional nature. Because the projected scope and scale of these changes over the several decades for which the Baltica-1 OWF is expected to operate is relatively small, the projected climate changes in the Baltic Sea region will have little impact on the area of the proposed OWF, as well as little impact on the operating conditions and safety of wind turbine generators. However, it should be borne in mind that in order to ensure proper operation of the Baltica-1 OWF, it is necessary to take into account the possibility of extreme weather conditions occurring on a larger scale than currently observed, as well as the fact that the range of their variability during the year and in individual years will increase, taking into account the expected trends of changes over several decades. Progressive eutrophication of marine waters may cause some difficulties in the operation of the proposed OWF, especially during the summer. An increase in winter temperatures can cause the disappearance of species typical of cold water and the appearance of species found in warmer waters. During the operation phase, the direct and local impact of the planned project (related to the use of vessels and their fuel consumption) will not have a significant impact on changing climatic conditions. Despite the long-term impact, its scope will be local. On the other hand, indirectly, the operation of the OWF will reduce greenhouse gas emissions into the atmosphere. Therefore, despite the high importance of climate and air quality and the small scale of the OWF's impact during the operation phase, the impact in terms of ship emissions of greenhouse gases into the atmosphere can be considered negligible.

Due to the significant remoteness of the Baltica-1 OWF Area from land, it should be assumed that the planned project will not affect the climate and state of air cleanliness in the decommissioning phase. Since the emissions generated during the decommissioning of the OWF will be minimal (coming mainly from vessels carrying out dismantling work), it can be assumed that there will be no emissions of dust pollutants and only minor emissions of gaseous pollutants, and therefore the situation is not expected to change. During the decommissioning phase, there may be a slight increase in greenhouse gas emissions due to the burning of fuels by ships supporting the OSS dismantling process. During the decommissioning phase, the significance of the planned project's impact on climate and greenhouse gas emissions will be negligible, as there will be no factors that could have a noticeable impact on its change. The impact of the planned project on air quality in the decommissioning phase will be of temporary nature and will disappear after the works have ceased. Moreover, due to the open area without obstacles, the concentration of pollutants will quickly diminish. Having regard to the aforesaid, the significance of impact on air quality is expected to be negligible.

The implementation of the Baltica-1 OWF project will involve the emission of noise into the atmosphere and water column in each phase of the project. Due to the type and scope of activities, the highest noise levels will be generated during the construction phase, and the main sources will be the piling of foundations in the seabed (underwater noise) and vessels supporting construction activities (underwater and airborne noise). In the construction phase, if large-diameter piles need to be driven into the seabed, underwater noise can reach instantaneous values of more than 230 dB at a distance of 1 m from the source. Piling without noise mitigation measures will cause negative impacts on the marine environment, mainly marine mammals and fish. Accordingly, noise mitigation systems will be used to effectively minimise the intensity and spatial extent of noise. Air curtains are a common means of reducing underwater noise levels. The method involves pumping air through diffusers installed on the seabed. The resulting curtain of air bubbles rising toward the surface of the sea effectively diffuses the sound generated by piling. It is also common to use a soft-start procedure, i.e. gradually increasing the energy of piling, which allows marine mammals and fish to move away from the zone of greatest noise impact **(Conditions No. B.I.2.1, B.I.2.2. and B.I.2.3.).**

During the operation phase, the main sources of underwater noise will be vessels performing inspection and maintenance of the OWF and possible repair and overhaul work, as well as sounds generated by the rotor and nacelle in operation, transmitted to the water column in the form of vibrations of the wind turbine support structure. Noise generated by ships, mainly small and medium-sized, will be comparable to the levels of its emissions estimated for the construction phase.

Sound emitted by vessels and helicopters. The intensity and frequency of underwater noise generated by ships depends primarily on the size and speed of the vessel. Larger, slow-moving ships generate lower-frequency noise, while smaller and faster vessels generate more energy-intensive, higher-frequency noise. Noise emitted by ships affects marine animals – mainly mammals and fish, causing behavioural changes and interference with communication between individuals. The results of the international project BIAS (Baltic Sea Information on the Acoustic Soundscape) showed that noise levels in the Baltic Sea near major shipping lanes are 100–130 dB re 1 μPa, while away from these lanes they range at 60–100 dB re 1 μPa. Ships and other vessels and equipment used during construction also generate noise into the air. Due to the large distance from the shore (more than 70 km) and the fact that the sea area is not subject to noise protection in accordance with the Regulation of the Minister of Environment of 14 June 2007 *on permissible noise levels in the environment (Journal of Laws 2014, item 112, consolidated text*), it is assumed that there will be no impact on people, except for construction personnel. Construction personnel will be subject to health and safety rules, which include the use of appropriate personal protective equipment and limiting exposure to noise, **Conditions No. B.I.: 1.9, 1.10, 1.11, 1.12.** Impacts associated with noise emissions on biotic elements of the environment are described further on in the statement of reasons for this Decision. In addition, during the construction, operation and decommissioning phases, helicopters performing, e.g., transfer of people to vessels may also be a source of airborne noise. Helicopter sound power should not exceed 107 dB re 1 μPa at a distance of 1 m from the source.

Electromagnetic fields present in the environment may be divided into natural fields and those of anthropogenic origin (referred to as artificial fields). The geomagnetic field of the Earth, whose intensity ranges from 16 to 56 $A \cdot m^{-1}$, is the most recognisable among natural fields. The value of the Earth's natural electric field strength is about 120 $V \cdot m^{-1}$ under moderate weather conditions. In the marine environment, electric field and geomagnetic field values follow a similar pattern. There are no artificial sources of electromagnetic fields in the survey area in the form of, e.g., active power cables.

Electromagnetic fields created by the flow of electric current can alter the natural migratory behaviour of marine mammals and can also be a source of thermal energy introduced into the seabed. Burying power cables in the seabed sediment is the simplest and most effective method of eliminating the impact of EMF on the marine environment. As studies have shown, burying cable lines more than 1 m below the sediment surface effectively eliminates the impact of EMF on organisms at the seabed surface (Tricas and Gili 2011). For power cables laid on the seabed surface and covered with protective structures, the impact of EMF emissions on benthic and benthopelagic fauna (including demersal fish) may be greater. However, surveys have shown that even for those organisms that are sensitive to changes in the electromagnetic field within the seafloor, the negative impact of EMF emissions from operating power cables can only manifest itself in the case of their long sections laid on the seabed, which can pose an obstacle to the movement of these organisms (Chapman et al. 2023; SunCable 2023). In the case of the Baltica-1 OWF, such a situation will not occur, as the cables will be buried below the seabed surface and only in exceptional situations, over short sections, laid on its surface. The results of the environmental surveys included in the EIA report did not show the presence of, e.g., other linear facilities in the OWF construction area that would make it necessary to lay new cable lines on the seabed surface. Nevertheless, it cannot be ruled out that there will be other reasons that will prevent the power cables from being buried along their entire length. However, it is anticipated (according to the EIA report) that such cases are likely to be sporadic and will involve laying cables on the seabed surface in sections not exceeding several meters in length. The above was taken into account in **Condition B.II.6.**

For the purpose of assessing the Project's impact on cultural heritage and archaeological sites, the Maritime Administration Spatial Information System (SIPAM) was used. Based on SIPAM data, no cultural heritage sites, including wrecks, have been identified so far within the boundaries of the Baltica-1 OWF area. The results of seabed surveys carried out in the project area revealed the presence of several hundred objects of potential anthropogenic origin, of which more than a hundred were selected for video inspection by an ROV. Most of them were geomorphological formations and anthropogenic waste, as well as other objects. Among the objects included in the video inspection, fragments of shipwrecks and aircraft elements were also found on the seabed. However, the anthropogenic objects identified in the survey were not found to be cultural heritage assets.

Of the identified impacts that extend beyond the Project area, only the re-sedimentation of seabed sediment lifted to the water surface during construction activities could affect cultural heritage sites located outside the construction area, including in another country's territory. The results of modelling of suspended matter spread and sedimentation showed that the highest levels of sedimentation will be found within about 0.2 km from the boundaries of the Baltica-1 OWF. The nearest shipwreck in Polish maritime areas is located 9.5 kilometres west of the boundaries of the Project area, and in Swedish waters at a distance of 13.1 kilometres. Both wrecks are not cultural heritage sites. Nor have any conventional warfare agents from the period of the two world wars been found in the project area, either. However, their presence on the seabed of the area under consideration cannot be ruled out. A similar approach should be taken to the potential presence of containers with chemical weapons which, after the Second World War, were mainly dumped in the Baltic deep-sea areas. In keeping with the precautionary approach, it is thus appropriate to assume that conventional and non-conventional warfare agents from war periods may also be deposited on the seabed in the Baltica OWF area and pose a potential safety hazard to the project. Prior to commencement of construction, the Investor will conduct a survey for the presence of unexploded ordnance (UXO) on the seabed. If any munitions/UXO are found during these surveys, the Investor shall inform the relevant authorities and institutions and comply with the instructions issued by them. In view of the above, **Condition No. B.I.2.8** was imposed on the applicant**.**

Potential impacts on human health and living conditions and an analysis of possible social conflicts associated with offshore wind farms are determined by factors including:

- shipping:

Construction of the Baltica-1 OWF may disrupt existing maritime traffic and will likely involve shipping restrictions. The area of the planned Baltica-1 OWF is outside the main shipping lanes in the Baltic, but the customary route leading to the port of Klaipeda passes through its southern part. It is assumed that the construction of the planned project will involve increased vessel traffic. The following are expected to be used during the construction phase: up to four installation vessels of up to about 250 m in length and up to two jack-up vessels; up to two cable laying vessels (CLVs) of up to about 180 m in length; up to three barges of up to about 120 m each; up to three tugboats of up to 75 m in length; up to four crew transfer vessels (CTVs) of up to 50 m in length and support vessels. Transport of Baltica-1 OWF structural components will be carried out from ports with ample storage and warehousing space for materials and components. According to the EIA report, at the current stage of project development, ports such as the following are being considered as installation ports: Gdynia, Gdańsk, Sassnitz-Mukran, Szczecin, Świnoujście, Ronne, Rostock, Aalborg, Karlskrona and Klaipeda. The closest port with complete and operational infrastructure for offshore wind power activities is the port of Renne on the island of Bornholm (Denmark). The closest ports in Poland that can serve as installation ports are the ports of Gdańsk and Gdynia.

The operation phase of the project will involve frequent voyages of service operations vessels and specialised ships from/to the service port for regular maintenance of project components. It should be noted that ship traffic during the operation stage will be much lower than during the construction stage, which reduces the probability of potential collision risks.

With the commencement of work during the construction phase, restrictions on vessel traffic unrelated to the construction of the offshore wind farm may be implemented by decision of the territorially competent director of the maritime office and the provisions of the Plan. In accordance with *§ 69(9)(5)(b) and (c)* of the Plan, the conditions of use of the basin provide that "*at the time of commencement of the project of erecting artificial islands and structures, it is required to introduce, by decision of the territorially competent director of the maritime office, a ban on fishing and navigation in the basin occupied by the construction works, together with a 500-metre safety zone around the basin, for the duration of construction"* and *"during the operation of offshore wind turbine generators, it is required to introduce, by decision of the territorially competent director of the maritime office, restrictions on fishing and navigation in the safety zones established for each structure and in places that pose a threat to the safety of the internal technical infrastructure."* According to *Article 24 of the Act on maritime areas,* around artificial islands, structures and facilities or their complexes, the competent director of the maritime office may, by order, establish safety zones extending no further than 500 metres from any point of their outer edge, unless a different extent of the zone is permitted by generally accepted international standards or recommended by a competent international organisation. According to the EIA report, however, the impact on shipping will not be significant. It should be noted that navigation restrictions under the aforementioned regulations will help reduce the risk of ship collisions and increase navigational safety in the project area. In addition, according to the EIA report, the Baltica-1 OWF will be designed and constructed with special attention to safety issues: construction, operation and decommissioning of the OWF, ship navigation and protection of the marine environment, including the need to ensure free passage through the OWF area in accordance with applicable laws and administrative decisions, and the need carry out rescue operations;

➢ prospecting and extraction of minerals:

An analysis of the data made available in the Central Geological Database has shown that there are no licensed mining areas, mining impact areas or mineral deposits within the boundaries of the area of the planned Project. On the western side of its boundary, at a distance of about 60 metres, is the "South Central Bank – South Baltic" sand and gravel deposit, whose resources have been developed through the designation of three licensed mining areas covered by a single mining impact area. The deposit development licence is valid until 15 November 2031. No areas designated for prospecting for sand for artificial beach nourishment are situated in area. On the Swedish party, a natural aggregate prospective area is located on the Central Bank. So far, it has not been exploited and there are currently no plans to develop it in the future (source: Geological Survey of Sweden);

- national defence:

According to the EIA report, the planned project area is not located within the boundaries of zones permanently or periodically closed to navigation and fishing, established by the Minister of National Defence by regulation in accordance with the Act of 21 March 1991 *on maritime areas of the Republic of Poland and maritime administration (consolidated text, Journal of Laws of 2023, item 960).* Nor does the area intersect the Navy's water lanes;

- fisheries:

In order to determine the potential impact of the wind farm on fisheries, an analysis of the volume and value of catches and fishing effort (number of days and fishing vessels) was conducted based on data collected by the National Fisheries Data Collection Program (npzdr.pl) based on source data from fishing vessel catch reports taking into account the fishing location (fishing square or geographic position), fish species, month of catch, and vessel type (vessels up to 12 m and over 12 m). The analysis considers fishing data for the years 2018–2022. The value of the catch was estimated based on the average annual first-sale prices of each fish species and the volume of catch. Summing up the analysis of the impact on fisheries, it can be said that the construction of the Baltica-1 OWF will exclude a certain part of the area from fishing opportunities and restrict the use of certain fishing gear. The construction of offshore wind farms in the Baltic is in the pre-project phase, and cooperation with fishing communities to date has been based mainly on meetings and consultations initiated by Investors or representatives of the fishing industry. To date, issues of maritime space occupation have been the subject of dialogue and joint development of mutually beneficial solutions.

The primary national document that addresses the sharing of maritime space by the fisheries and offshore wind energy sectors is the *spatial development plan for internal sea waters, territorial sea and exclusive economic zone at a scale of 1:200,000* (PZPPOM). Its adoption allowed, for the first time in Polish legislation, general legal solutions to be adopted, relating to the possibility of implementing various forms of use of maritime space by establishing a hierarchy of functions in basins and defining the principles and conditions under which they can be carried out. In the POM.60.E basin, in which the Project area is located, fishing may be carried out without changes until the erection of offshore wind turbine generators begins, and during their operation fishing is prohibited in the safety zones of each structure and in areas that pose a threat the safety of the inter-array connection infrastructure until the rules for fishing in the basin are worked out. Another document raising the issue of sharing the maritime area between fisheries and offshore wind energy is the *Polish Offshore Wind Sector Deal* (Sector Deal) signed on 15 September 2021. The overarching goal of this document is to support the development of the offshore sector in Poland and to ensure the greatest possible participation of Polish entrepreneurs in the supply chain of offshore wind farms. Pursuant to Article § 4.3(8), signatories to the Deal are required to develop a *Code of Good Practice for the Coexistence of Offshore Wind Farms and Fisheries*, which will include recommendations, rules and conditions for conducting fishing activities in the area of OWF projects and within the export infrastructure, including:

– description of the method of verifying potential losses and possible and adequate methods and scale of their compensation for documented lost fishing opportunities for owners and operators of fishing vessels,

- potential use of fishing vessels for the purposes of construction or operation of OWF projects,
- potential opportunities for fish stocking and farming in selected and agreed areas of OWF projects,
- insurance conditions for fishing vessel owners;
- description of communication methods between investors and the fishing community.

The impact of the Baltica-1 OWF on fisheries in its construction area may include:

- reduction in the area of the fishing grounds due to the physical exclusion of some space from fishing and restrictions due to the establishment of safety zones;
- change in commercial fish stocks due to impacts of the Project;
- change of shipping routes to the fishing grounds that passed through the area where the Project will be located.

Surveys performed for existing offshore wind farms have shown that reducing fishing space can have a twofold effect. One is the decline in demersal fish catch, since within the OWF the greatest use restrictions concern bottom fishing gear. The other reverse effect is an increase in pelagic fish catches, which may be due to the so-called “artificial reef” effect. This phenomenon is due to the appearance of artificial hard-surface objects in the environment, which can be overgrown by epiphytes. Submerged objects populated by plant and animal communities provide feeding and rearing sites for fry and shelter for fish, providing them with a favourable habitat affecting the development of their populations. In the case of the Baltica-1 OWF, these will mainly be submerged structures of wind turbines and OSSs, as well as scour protection around foundations constructed of natural aggregate. The Baltica-1 OWF area may therefore become a refuge for many species of fish, including commercially fished species. Favourable environmental conditions for the development of ichthyofauna can contribute to the development of Baltic fish populations through increased recruitment of fry and thus increase fishing resources outside the Baltica-1 OWF. However, such an effect of the construction of the farm will be measurable only at the operational stage after at least a few years of operation, when the qualitative and quantitative structure of the epiphytic organisms has stabilized and the fish have adapted to the new environmental conditions;

➢ Formal public consultation was conducted during this environmental assessment procedure. There were no comments or requests from the public during the consultation.

<u>Landscape impact assessment.</u> The Baltica-1 OWF area is located in the open waters of the Baltic Sea at a considerable distance from the shore. The distance makes it not visible from land. The landscape is typical of open sea waters and can be considered as not very diversified and plain, shaped almost exclusively by natural factors – changes in the sea surface caused by winds and some atmospheric conditions – cloud cover and precipitation. To date, the human impact on the landscape of the area is minor and is mainly due to temporary presence of ships travelling along shipping routes (one of the routes to the port of Klaipeda passes through the OWF area) and fishing vessels.

Given the spatial layout of the Project – the construction of structures founded on the seabed and the construction of cable lines, it is also necessary to characterise the underwater landscape. In this case, too, it can be said that it is not very diversified – the seabed is mainly covered with sandy sediments and rare pebbles, with seawater overlying it. There are no plant communities on the seabed, which could give a greater value to the landscape. There has been no intensive human activity in the Project area to date that could change its natural form. Environmental surveys have shown that there are traces of furrows on the seabed indicative of past aggregate mining.

Given the distance from the seashore of at least 75 kilometres, the construction of wind turbines of even 330 meters above sea level will not disturb the perception of the landscape by people on the seashore. From this distance, even the tallest planned turbine structures will not be visible to the human eye. The physical presence of marine infrastructure above sea level will have a direct impact on the seascape. The greatest impact on the character of the seascape would occur within or immediately adjacent to offshore wind turbine installations, in the open sea area. The project in question is not expected to affect the seascape along the Pomeranian coast and will not cause any noticeable improvement or deterioration of the existing character of the seascape.

Impact of the planned project on the natural environment.

Phytobenthos inventory surveys in the survey area were conducted in June 2023. Filming of the seabed was carried out using an underwater Falcon ROV remotely operated from the deck of a vessel, along 2 transects of at least 100 m in length. In the survey area, the inspection was performed on 2 transects on rocky bottom in the depth range from 24.4 to 27.5 m. No macroalgae were found. Analysis of film documentation showed that boulders and pebbles on the seabed were only overgrown with dense colonies of mussels of the species *Mytilus trossulus*.

The results of macrozoobenthos surveys on both soft and hard seabed in the survey area presented in the EIA report showed that: On the soft seabed in the survey area, based on data from 168 analysed samples, 29 taxa of macrozoobenthos were found. The most common taxa (absolutely constant – present at more than 75% of the stations surveyed) were the small, sandy polychaete *Pygospio elegans* and one species of bivalve mollusk, *Macoma balthica.* The polychaete *Pygospio elegans* had the largest share (58.72%) of the dominance structure of soft seabed macrozoobenthos. The average abundance of macrozoobenthos from the analysed samples was 2388±1815 individuals m^{-2}, and the average biomass was 26.8±38.6 g m.m.·m^{-2}. The species that achieved the largest share of the total macrozoobenthos biomass in the survey area was the Baltic clam *Macoma balthica* (72.51%). In addition to this species, 3 more species of mussels were found in the samples: the mussel *Mytilus trossulus,* the sand gaper *Mya arenaria*, and the lagoon cockle *Cerastoderma glaucum*. In the case of *Macoma balthica*, juveniles (1–5 mm) were the most numerous group, and adults were the least numerous, reaching a maximum size in the 21–25 mm length class. On the other hand, the distribution of biomass in the 5 mm length classes of *Macoma balthica* clearly indicates that individuals from 11 to 15 mm in length (more than 1,800 g m.m.·m^{-2}) dominated in terms of biomass. The largest sizes of few specimens of *Mya arenaria* and *Mytilus trossulus* were 31–35 mm, and the lagoon cockle *Cerastoderma glaucum* reached maximum sizes in the 16–20 mm length class. The highest biomass of *Cerastoderma glaucum* in the 11–15 mm length class (more than 100 g m.m.·m^{-2}) was 5 times higher than the highest biomass for *Mytilus trossulus* (in the 1–5 mm class) or *Mya arenaria* (in the 6–10 class). The determined taxonomic composition, abundance and biomass of the macrozoobenthos in the area prove that the area is inhabited by a fairly diverse benthic macrofauna, consisting of taxa characteristic of this depth range. In the analysed samples of macrozoobenthos (epiphytic fauna and associated fauna assemblage) taken from the hard bottom (stone surface) of the survey area, only 7 taxa were found, indicating the poor qualitative and quantitative composition of this community. Sandy and gravelly sediments dominate the bulk of the survey area. In the southern part of the survey area, the total abundance of macrozoobenthos was slightly higher than in the northern part, where it did not exceed 2,000 individuals m^{-2}. Only in the northwestern part of the survey area and in the northeastern part of the area of construction of wind turbines, OSSs and cable lines, in a small area relative to the soft seabed, was the abundance of macrozoobenthos significantly higher (from about 7,300 to 25,500 individuals m^{-2}), which was related to the aggregations of the mussel *Mytilus trossulus* on the rocky seabed. For the southern part of the survey area, macrozoobenthos abundance values were up to a maximum of 6,000 individuals m^{-2}. The total biomass of macrozoobenthos was low and uniform throughout the survey area, not exceeding about 80 g m.m. m^{-2}, except for point locations in the northeastern part (the area of construction of wind turbines, OSSs and cable lines – the so-called Area A) and northwestern part of the survey area, where there was a rocky seabed and therefore the biomass of macrozoobenthos there amounted from more than 200 to about 14,000 g m.m. m^{-2}.

The areal distribution of ecological quality status as determined by macrozoobenthos within the survey area is mosaic in nature. Most of the area in question is occupied by sandy and sandy-gravel seabed populated by macrozoobenthos representing poor and moderate status. Regions with higher values (good status) are found primarily in the southern band of the survey area, including the area of wind turbine construction, OSSs and cable lines (Area A). The natural value assessment at the point locations of the rock seabed indicates that it is not a valuable area of the habitat, as the quality status of the macrozoobenthos assemblage inhabiting the parts of the rock-covered seabed was determined to be poor at one location and good at another. In addition, it should be noted that no protected macrozoobenthos species were found throughout the survey area.

The impact assessment carried out showed that the overall impact of the planned wind farm on plants and animals living on the seabed (benthos), alone and together with other offshore wind farms, is small and insignificant.

Construction activities that may affect the seabed include seabed preparation, installation of offshore wind turbine foundations, cables and OSSs, and operation of construction-related vessels. An analysis showed that the most adverse impact would be the disturbance of seabed sediment structure in areas currently occupied by seabed plant and animal species.

The day-to-day operation of the farm and related maintenance work will affect the benthos in its survey area. During the operation stage, the most important impacts will include the loss of natural habitats and the creation of new artificial ones, as the foundations of offshore wind turbines can provide settlement, sheltering and foraging space for some species (the so-called artificial reef).

During the decommissioning stage, seabed disturbance will be comparable to that at the construction stage, although the intensity of activities will be lower. With the exception of the removal of the artificial reef, all impacts during the decommissioning phase for each plant and animal receptor on the seabed are expected to be small and insignificant.

This authority has indicated in the operative part of this Decision the requirement to conduct benthic monitoring after construction. Monitoring is aimed at assessing the impact of the construction of underwater structures on the conservation status of habitats and the preservation of biodiversity in the wind farm area by monitoring surface colonisation, determining the species composition of epiphytes and other organisms colonising the surfaces. In addition, this authority indicated in the operative part of this Decision the requirement to conduct pre- and post-decommissioning surveys of the OWF to assess the impact of habitat disturbance by removing components of the offshore wind farm and associated infrastructure – **Conditions No. B.I.: 4.1, 4.2, 4.3, 4.5; C.1.a), C. 2.3.5 a and b**

and D.

Studies of ichthyofauna were conducted on an annual basis with 4 study cycles covering all seasons. The spatial extent of the ichthyofauna survey was the survey area, which included the Baltica-1 OWF construction area representing the wind turbine, OSS and cable line construction area (Area A) and the cable line construction area (Area B), together with a zone of not less than 4 km from the boundary of Area A. Based on the results of the above surveys and literature knowledge, the following have also been determined: potential spawning sites, foraging sites, migration routes and distribution of fry/parr in the survey area.

The yield of bottom fishing with set nets for surveys is 1421.9 kg of fish representing 14 taxa. Cod and flounder prevailed. The remaining species were by-catches (great sand eel, plaice, bull-rout, hooknoses, mackerel, twait shad, turbot, sprat, herring, lumpfish, lesser sand eel, viviparous eelpout). Fishing with bottom-set nets targeting herring found the same taxonomic composition (in addition, fourhorn sculpin was noted) as with multi-panel nets.

An analysis of set survey gear performance showed that the peak of fish densities fell during the summer and autumn seasons due to the fact that the shallower waters of the OWF survey area provide foraging grounds during these seasons. During the other periods, fish densities were similar, while the lowest yields were recorded in winter.

The taxonomic diversity of ichthyoplankton in the survey area (larvae of 8 fish taxa) was low compared to that usually observed in southern Baltic surveys. Due to the area's excessively low salinity, early spring sprat spawning does not occur in the area. The larvae caught during this period probably came from reproduction taking place in the Słupsk Trough. The absence of larvae in summer may have been due to the sampling date falling during the final period of summer shallow-water spawning.

The salinity of the survey area is too low for flounder and four-bearded rockling reproduction. The larvae caught in the survey area came from spawning in the Słupsk Trough. The sand lance larvae caught in the survey area probably came from spawning in shallow areas of the Central Bank, including the shallowest part of the survey area located within the South Central Bank.

The excessive depth of the survey area precludes the goby larvae caught from having come from spawning in the area. Reproduction probably took place in nearshore waters, in the area of the Stilo Bank, the Czołpino Shoal, on the Słupsk Bank or in the shallowest part of the Central Bank. Autumn spawning herring larvae caught in October and March may have originated from spawning runs in the Słupsk Bank and Central Bank regions, including within the survey area in the shallowest part of the South Central Bank. The few common sea bream and mackerel larvae caught in the survey area may have come from spawning both in the shallowest part of the survey area and on the Słupsk Bank or in in nearshore areas.

The survey area is typical in terms of species diversity for waters of similar depth, with a clear predominance of cod and flounder in bottom fishing and herring and sprat in pelagic fishing. The highest surface density of sprat biomass was estimated for the spring survey campaign, but it was nevertheless more than twice as low as the average value of this parameter determined from May SPRAS cruises in 2017–2021. The highest surface density of herring biomass was estimated for the summer survey campaign and was more than twice as high as the average value of this parameter determined from the spring SPRAS cruises and more than twice as low as the average from the 2017–2021 BIAS cruises. In February 2023, as in previous years, the sprats began their first spawning phase in the water column of the Baltic Sea in areas deeper than the depth of the survey area. This process intensified on a large scale in May, before gradually dying out in the latter part of the summer. The results indicate that the area of the planned project was the herring's habitat during the survey period, as well as the area through which herring migrations to wintering grounds, reproductive (likely) migrations and foraging migrations pass. The survey area is not a significant herring spawning ground due to its depth, lack of suitable substrate and distance from the shore. The observed concentrations of spring schools represent fish that have already finished spawning in nearshore areas. The area of the planned project was part of a basin in which temporary migrations of both spawning and foraging sprats took place. Taking into account the literature information and the results of the surveys performed, it can be assumed that no sprat spawn in the survey area. The results of cod abundance surveys indicate that the area of the planned project is a much less important habitat for fish of this species during the winter-spring season than during the summer and autumn seasons. The survey area was home to mainly adult flounder. Flounder were most abundant in summer and least abundant in autumn. Taking into account the prevailing hydrological conditions unfavourable for European flounder reproduction, it can be assumed that the fish from the survey area moved to the nearby Słupsk Trough or Gdańsk Deep to spawn. Four of the taxa occurring in the survey area – gobies, common sea bream, fourhorn sculpin and twait shad – belong to species that are partially protected in accordance with the Regulation of the Minister of Environment of 16 December 2016 on the protection of animal species.

The works carried out on the seabed during the Baltica-1 OWF construction phase will cause the following impacts affecting ichthyofauna:
noise and vibration.

- increase in suspended matter concentration in water;
- change of habitat;
- emission of pollutants;
- physical barrier.

The most important technical parameters of the Baltica-1 OWF which are relevant for assessing the impact of the project on ichthyofauna in the construction phases include:

- the surface area of the Baltica-1 OWF;
- type and number of wind turbine and OSS foundations, installation technology;
- length of power cables, laying technology and seabed surface disturbed during laying;
- number of ships involved in construction.

The main source of noise during the construction phase will be the installation of turbine and OSS foundations by piling. According to Popper and Hastings (2009), this is the only noise impact besides underwater explosions that can cause fish deaths. The sound produced by piling is pulsatile in nature, characterized by a short duration (<1sek) and a wide bandwidth of between 100 and 1,000 Hz, with most of the energy falling in the range up to 500 Hz (Dahl et al. 2015). The level of noise emitted during piling depends primarily on the technical parameters of the process (pile diameter, driving technology, strength and frequency of pile driver strikes). Some of the technological requirements, in turn, are dependent on environmental conditions (depth, sediment type). Noise emissions during piling depend on the diameter of the pile being driven and can range from about 230 dB re 1 μPa^2s (pile diameter 1.5m) (Thomsen et al. 2006) to nearly 260 (pile diameter 4.5m) (OSPAR Commission 2009). Slightly lower noise levels are expected during cable-laying operations (178 dB re 1 μPa^2s (Wilhelmsson et al. 2010). The source of noise present at all stages is vessel traffic reaching, depending on the size and speed of the vessel, from 160 to 190 dB re 1 μPa m (OSPAR Commission 2009). The ability of fish to register sound enables them to orient themselves in the environment, and the range of this orientation is much greater than with sight. Sound is a source of directional information for fish, providing quick information about environmental events even at relatively long distances (Popper and Schilt 2008). Hearing allows fish to communicate with each other, detect prey and predators, or select habitats. It is also an important part of mating behaviour and orientation during migration. Thus, anything that interferes with the ability of fish to detect and respond to biologically relevant sounds can negatively affect the survival and fitness of individuals and populations (Popper and Hawkins 2019).

Sounds coming from the environment are perceived by fish as movement of water particles and/or a change in pressure. For most fish, the perceived frequency range is from below 50 Hz to about 300–500 Hz, though some species can register sounds between 3 and 4,000 Hz (Ladich and Fay 2014; Popper and Hawkins 2019). The sensitivity of fish to sound is dependent on the sound receptor structure. The receptor common to all species is the inner ear, where particle movement is processed via otoliths and sensory hairs into nerve impulses. An additional element that can enhance hearing ability is the swim bladder, which converts sound-induced pressure changes into particle motion, thereby amplifying the strength of the acoustic stimulus. The mechanism of sound perception in fish without a swim bladder (e.g. adult flatfish) or in fish in which the bladder is located at a great distance from the ear (e.g. salmon) is limited to sensing the movement of water molecules. This is due to the narrow range of frequencies heard (usually up to about 500 Hz) and a higher hearing threshold. The range of sound sensitivity for plaice and dab is from 30 to 250 Hz, and the lowest hearing threshold of about 90 dB re 1 µPa was observed at frequencies of 100–160 Hz (Popper and Hawkins 2019). In salmon, the lowest hearing threshold was recorded at frequencies from 100 to 200 Hz (93.5 dB re 1 µPa). In contrast, fish with a swim bladder located near or directly connected to the ear (e.g. clupideids, cod) sense sound over a wider range of frequencies, and their threshold of sensitivity to sound is lower. For the herring, the sensed frequency range is 30 Hz to 4 kHz, and the lowest hearing threshold of 75 dB re 1 µPa occurs at 100 Hz. A similar hearing threshold was found in cod (75 dB re 1 µPa at 160 Hz), but this species perceives sounds in a narrower frequency range (18–470 Hz) (Popper and Hawkins 2019). Depending on noise intensity and distance from the source, a range of effects may occur, from behavioural changes to the death of fish. Studies of the response of foraging herring schools to impulse sounds (air gun) during underwater seismic surveys showed no change in fish behaviour. No effect of noise in the 125 to 155 dB SEL_{ss} range was found on the speed and direction of fish movement or on school size (Peña et al. 2013). The authors of the study attribute the lack of response to the prevailing motivation to acquire food as well as a gradual increase in tolerance to the stimulus. Similar studies conducted using sound sources that mimic piling showed that the intensity of the response of sprat and mackerel schools depended on the sound level. As sound levels increased, sprat schools were more likely to change density and/or disperse, while mackerel schools responded by moving toward greater depth. Such a response occurred 50% of the time with a pressure level of 163 dBpp (both species) and a sound exposure level (SEL) of 135 dB SEL_{ss} and 142 dB SEL_{ss} (sprat and mackerel, respectively).

Differences in response between day and night were also found in sprat. Unlike daytime, at night, when schooling do not form, individuals did not respond to sound. The authors attribute such a reaction to the suppression of the response to sound by behaviour aimed at food acquisition (Hawkins et al. 2014). The range of the effect (the distance or area where the noise level reaches the value causing the effect) depends on both abiotic conditions (seabed shape, salinity, temperature) and technical conditions (pile diameter, number of strikes needed to install one component, pile driver power). The sensitivity of a species/group of fish to sound levels, resulting from the structure of the auditory senses, is also a primary factor. Therefore, the determination of range should be based on modelling studies determining the ranges of the various levels taking into account the local conditions of the location concerned and the levels of noise generated. The ability of fish to escape from the area of greatest noise intensity is an important factor determining the impact range. Using a soft-start procedure involving a gradual increase in the strength and frequency of pile driver strikes during the first phase of piling, it is possible for individuals present in the affected area to leave the area **(Condition No. B.I.2.2.2).** The impact of noise and vibration for adult fish will be: negative, direct, short-term and exceeding beyond the Baltica-1 area (transboundary impact) Noise and vibration will affect the spawning grounds of cod, flounder and sprat, which are in deeper waters. However, the area of impact is small in terms of the total spawning area of the listed species. The sensitivity to the impact for cod, herring, sprat and sand goby has been assessed to be very high; for European flounder, common sea bream and twait shad the sensitivity to the impact has been assessed to be high.

During the construction of turbine foundations and the laying of inter-array cables between turbines, it is necessary to carry out dredging operations leading to an increase in the concentration of suspended matter in the water.

The significance of the impact of suspended matter on fish depends on both physical factors arising from local abiotic environmental conditions and those related to the biology of the ichthyofauna.

The first group of factors includes sediment characteristics such as grain size, mineral composition, adsorption and absorption capacity, hydrological parameters (salinity, temperature, oxygen concentration), bottom morphology or hydrodynamics of the region (direction of currents, undulation) (Engell-Sørensen and Skyt 2001). The impact of suspended matter on fish also depends on the concentration of suspended sediment and the exposure time of the organism (Newcombe and MacDonald 1991). It should be noted that the type of sediment is a very important factor affecting the intensity of the impact. In the case of sandy sediments, especially those of coarser grain size, both the spatial range and duration of impact will be much smaller than in the case of silty or silty-sandy sediments.

The effects of increased concentration of suspended matter on fish can be classified into three categories (Newcombe and MacDonald 1991):

– lethal effect,
– sub-lethal effect: tissue injury, disturbance of physiological processes, reduced growth rate, increased susceptibility to disease,
– behavioural effect: changes in behaviour and reproductive performance, avoidance response, decreased foraging efficiency.

High concentrations of suspended matter can also limit visibility. Given the larvae's small range of vision, often reaching only body length (Bona et al. 1987), this can negatively affect both the effectiveness of spotting and acquiring food and the ability to avoid predation. According to Utne-Palm (2004), high turbidity (80 IUU) has a negative effect on the food acquisition ability of herring larvae. However, on the other hand, the same mechanism may indirectly positively affect larval survival by reducing the predator's field of view (Gregory and Northcote 1993). Increased concentrations of suspended matter can adversely affect egg development and survival. Sediment particles adhering to egg casings can restrict gas exchange and metabolite removal (Chapmann 1988; Argent and Flebbe 1999). Suspended matter concentrations in excess of 100 mg dm^{-3} can cause increased mortality of cod roe (Rónnback and Westerberg 1996). Pelagic eggs may also experience a reduction in buoyancy due to sediment particles adhering to their surface. This results in the eggs sinking to lower layers of water or to the seabed. This can cause not only deterioration of aerobic conditions but also an increase in predation pressure on benthic organisms as well as mechanical and physiological stress. According to Rónnback and Westerberg (1996), suspended matter concentrations of 5 $mg \cdot dm^{-3}$ occurring for 4 days can cause cod eggs to sink to the seabed. The results of suspended matter spread modelling carried out for the Baltica-1 OWF area indicate that the highest increase in suspended matter concentration will be caused by excavation work for the ship supports (spudcans) and the discharge of dredged material by pipeline. The maximum instantaneous suspended matter concentrations of 1,500 $mg \cdot l^{-3}$ at a distance of 150 m from the work site and 850 $mg \cdot l^{-3}$ at a distance of 500 m from the work site exceed the limits at which fish death can occur. In the case of adult fish, it can be assumed that their escape from the impact area is likely, but fish larvae will not be able to leave the area where concentrations causing a lethal effect will be present. There may also be an increase in pelagic egg mortality. A thick layer of new sediment deposited on the seabed (a maximum of 35 mm and 9 mm at 150 m and 500 m from the work site, respectively) can cover eggs deposited on the seabed. However, the depth range of the survey area precludes the occurrence of gobies (a protected species) spawning on the seabed. It is also unlikely to have a significant impact on herring eggs. Negative impacts on the eggs of this species could occur only in a small, shallowest part of the Baltica-1 OWF area. On the other hand, there may be an increase in mortality caused by the backfilling of demersal eggs of the second protected species found in the project area: the common sea bream. The predicted range of concentrations caused by these works in most of the area will be in the range of 10 to 60 $mg \cdot l^{-1}$, so it can be assumed that they will trigger a short-term avoidance response in the area.

Maximum instantaneous concentrations of suspended matter during foundation excavation can reach 250 $mg \cdot l^{-1}$ at a distance of 150 m from the site, and 95 $mg \cdot l^{-1}$ at a distance of 500 m. Over most of the impact area, the predicted concentration ranges at 6–20 mg l^{-1}.

The maximum thickness of the new layer of sediment resulting from sedimentation after the work is completed will reach 5.6 mm at a distance of 150 m from the site and 2.4 mm at a distance of 500 m.

For cable burying, the maximum concentrations will be slightly lower (160 $mg \cdot l^{-1}$ at a distance of 150 m and 65 $mg \cdot l^{-1}$ at a distance of 500 m) while the range of concentrations over the predominantly disturbed area will be between 7-25 $mg \cdot l^{-1}$. The maximum thickness of the new sediment layer after cable burying works may reach 1.0 mm at a distance of 150 m from the vessel travel route and 1.9 mm at a distance of 500 m. Concentrations of suspended matter occurring during cable burying and foundation construction activities may cause increased mortality of larvae, while mortality impacts are not expected for adult fish. A reaction of avoidance of most of the area by pelagic fish and, to a lesser extent, demersal fish is likely. However, this reaction will be short-lived. The impact from the increase in suspended matter will be negative, direct, localised, short-term. The sensitivity of impact on cod, flounder, common sea bream, gobies, sprat and herring is assessed to be high. Impact significance is assessed to be moderate for all the fish species studied.

During the course of work in the construction phase, the habitat may be significantly altered, both through changes in seabed morphology, the nature of the sediment and the exclusion of certain parts of the habitat due to the impact of a number of adverse factors (noise, increased concentration of suspended matter, increased vessel traffic). These changes may not only cause fish to leave the area but also disrupt reproductive processes. Dredging can lead to the destruction of benthic organisms inhabiting the area where dredging is carried out, thus negatively affecting the food base of fish such as cod and flatfish. The scale of this loss depends on the number of wind turbines and the type of foundations, as well as the length of the cable lines. It is assumed that the maximum area of the seabed covered by underwater works that will cause destruction of macrozoobenthos will be about 3.57 km^2 – the total surface area of 64 gravitational foundations (for a maximum of 60 wind turbines and a maximum of 4 OSSs) together with the area of the anti-erosion layer and the area of the seabed prepared for the installation of jack-up vessels and the area of excavation for cable lines with a total length of 140 km). The seabed area accounts for about 4.17% of the total Project area. Given the active movement of fish in search of food, such a loss of organisms included in the diet of benthophagous fish can be considered insignificant.

The sensitivity of ichthyofauna to habitat loss, which can occur during the construction of hard substrate elements on the bottom, is specific to the species and life stage of the fish. This is due to the different habitat requirements of a given developmental stage and a given species (Wilson et al. 2010). The magnitude of the impact is influenced by the size of the area lost, the duration and season of the works. It should be noted that when a habitat change results in the cessation of spawning even in a small area that is an important spawning ground, the effect of its exclusion from reproductive processes can be seen in a much larger basin.

Emissions of harmful substances during the construction phase can occur as a result of unplanned incidents such as ship collisions, improperly conducted disconnections and connections of equipment, errors in their operation, or spills of domestic waste from vessels. Toxic chemicals can also be released from sediments during dredging operations. According to the Helsinki Commission, these can include heavy metals (cadmium, chromium, copper, lead, mercury, nickel, zinc, arsenic), chlorinated biphenyls, organochlorine and organophosphate pesticides, tributltin (TBT) and its breakdown products, total petroleum hydrocarbons (TPHs), polychlorinated dibenzodioxins (PCDDs), polychlorinated dibenzofurans and PCBs. The effect of harmful chemicals on ichthyofauna can be cancerous changes, hormonal disorders affecting reproductive processes or morphological changes. Sensitivity to this impact depends on the developmental and physiological stage of the fish. Heavy metals penetrate from the water into the fish's body mainly through the gills and to a lesser extent through the body surface. According to Garai et al. (2021), the most common sources of toxic effects in fish are cadmium, chromium, nickel, arsenic, copper, mercury, lead and zinc. They cause oxidative stress responsible for weakening the immune system, tissue and organ damage, growth defects and reduced reproductive ability.

It can be assumed that the risk of chemical emissions into the environment due to unintentional activities is relatively low and can be reduced by following a detailed hazard and pollution prevention plan that includes a description of procedures and mitigation measures for such events **(Condition No. B.I.1. 1.14, 1.16).**

The construction of underwater structures can act as a migration barrier for fish whose routes may pass through the site. Intense maritime traffic during the construction period can also enhance this effect. Studies conducted during the operation of Danish OWFs found no significant disruption of fish migration processes caused by vessel traffic. It can be assumed that despite the potentially higher volume of vessel traffic during the construction period, the possibility of active fish movement should limit the impact of this factor. In the event that similar impacts from neighbouring areas do not cumulate during the same period, it can be assumed that the scale of the impact is likely to be local and short-lived, causing only temporary avoidance of the area during the course of the work.

The operation of the Baltica-1 OWF may cause the following impacts affecting

ichthyofauna:
- noise and vibration,
- electromagnetic fields,
- change of habitat,
- physical barrier.

The most important technical parameters of the Baltica-1 OWF which are relevant for assessing the impact of the project on ichthyofauna in the construction phases include:
- developed surface area of the Baltica-1 OWF,
- type and number of wind turbine and OSS foundations,
- size of turbines,
- length and type of power cables, technical solutions used (transmission technology),
- number of service vessels.

Noise impacts at the farm operation stage should be much lower than those observed during construction and decommissioning. Noise generated by wind turbines is produced by the gearbox and generator and transmitted to the water and sediment through the tower and foundation (Betke et al. 2004). Its level will depend on environmental conditions (depth, sediment type, seabed morphology) type and size of turbines and wind speed. The average turbine noise value calculated from the model based on data for 14 wind farms, after normalising for a measurement distance of 100 m from the source, turbine capacity of 1 MW and wind speed of $10 m \cdot s^{-1}$, 109 dB re 1 μPa, was 109 dB re 1 μPa. According to Tougaard (2020), underwater noise emitted by individual wind turbines is about 10–20 dB lower than that emitted by cargo ships. The total source level of a large wind farm is less than or comparable to that of a large commercial ship. However, the cumulative impact of wind farms resulting from their occupation of an increasing portion of nearshore and shelf waters may be large enough to raise concerns about a negative impact on fish, especially in areas with low natural ambient noise and low vessel traffic (Tougaard 2020). According to the information in Chapter 3, it is estimated that the sound power of a single wind turbine will not exceed 120 dB. According to Anderson (2011), fish without a swim bladder or other acoustic pressure detector, such as gobies and flatfish, will only pick up noise from offshore wind farms close (less than 10 m) to the foundations. Fish with a swim bladder not connected to the hearing organs, such as salmon, trout, eel, perch and sander are likely to detect noise at distances of up to 1 km. In contrast, such species as cod, haddock and herring will sense the sound of a wind farm at a distance of several to tens of kilometres. According to Thomsen et al. (2006), the sound generated by operating turbines will be audible to salmon and dab from a distance of about 1 km, while it will be audible to cod and herring from up to 4-5 km away. Masking sounds related to reproduction and warning made by fish can occur in the immediate vicinity of turbines. For example, the loudness of reproduction-related sounds made by codfish is in the range of 120–133 dB re 1 μPa (Nordeide and Kjellsby, 1999; Wahlberg and Westerberg 2005), which corresponds to the noise level occurring about 10 m from an operating turbine (Andersson 2011). According to Wahlberg and Westerberg (2005), a reduction can be assumed in the detection of the sound produced by haddock as a result of noise emissions from the operating turbine, but it will still be detectable from a distance of 4 metres. During the operation of the wind farm, routine and unforeseen maintenance and repair work will be carried out. This will involve periodically increased vessel traffic. The effect of this interaction can be both an avoidance response and a temporary threshold shift (TTS) in hearing. According to a report by the International Council for the Exploration of the Sea (ICES 1995) on the impact of sound emitted by survey vessels, an avoidance response can occur when noise levels exceed a species' hearing threshold by 30 dB and the range of impact typically reaches 100–200 m. Experimental surveys have also found a temporary threshold shift (TTS) in hearing in freshwater fathead minnows subjected to the sound produced by a boat outboard engine (Scholik and Yan 2002). According to Thomsen et al. (2006), however, there is no scientific basis for determining the level of noise emitted by ships that would be harmful to fish. Bergstrom et al. (2014) assess the impact of noise on fish during the operation phase as moderate for both the Baltic Proper, the Danish Straits and the Gulf of Bothnia. The results of operation noise modelling conducted for the Baltica-1 OWF area indicate that the possible range of impact on fish at the TTS level should not exceed 100 m from the sound source. The Baltica-1 OWF area is not an important spawning site for ichthyofauna at the population level. Noise and vibration emissions generated during operation of the Project may have a direct negative impact on fish living in the area. This will be negative, direct, local, long-term and permanent impact. Sensitivity to impact for cod, sprat, herring, sand goby and twait shad was assessed as high, and for flounder and common sea bream as moderate. Impact significance is assessed to be negligible for all the fish species studied.

The spatial range of the induced electric field usually reaches up to several metres from its source (Orbicon 2014; Engell-Sorensen 2002).

The sensitivity of ichthyofauna to EMF depends on:

– the species-specific detection threshold,
– the type of sensor possessed by the fish (magnetic, electric),
- lifestyle (demersal, pelagic) – fish with a demersal lifestyle are exposed to a higher EMF (Engell-Sorensen 2002).

Magnetic fields can affect both the physiology and behaviour of fish and their orientation in the environment. Impacts at the physiological level may involve, for example, changing hormone levels in brook trout (Lerchl et al. 1998). In sea trout and rainbow trout, slower embryonic development has been observed (Formicki and Winnicki 1998). Laboratory studies conducted by Fey et al. [97] do not confirm a direct effect of magnetic field (10 mT) on mortality and growth in the latter species. However, during the experiment, a faster absorption of the roe sac has been observed in larvae which may negatively affect their condition. Krzemieniewski et al. (2004) has observed increased mortality of European catfish larvae exposed to a magnetic field of 0.4-0.6 T. Still, no effect of long-term magnetic field exposure (3.7 mT) has been found on young flounder (Bochert and Zettlwer 2004). A comparison of the values of magnetic induction at which the above-mentioned reactions were observed with the values given in the table above indicates that no effect of the magnetic field generated inside the wind farm on ichthyofauna is expected at the physiological level. Disturbance of natural fields can cause orientation problems for migratory fish such as European eel. However, field studies to date do not indicate a significant effect of cable-induced electromagnetic field interference on the migratory abilities of this species. In a survey conducted in the southern Baltic Sea, no interference with the migration of eels passing within 500 m of a wind turbine has been observed (Ohman et al. 2007). Also, experimental studies on the response of halibut to electromagnetic fields found no significant change in the behaviour of these fish (Woodruff et al. 2012). Extensive research on the impact of cables running in the area of the Nysted OWF (Danish Straits) on ichthyofauna has shown that although they are not a barrier to fish, they can be an impediment to fish movements, especially eel migration. The authors of EIA report state that although changes in fish behaviour along the cable route have been reported, their causal relationship with the EMF is unclear (DONG 2006). According to Poleo et al. (2001), bony fish show a physiological response to an electric field of 7 $mV \cdot m^{-1}$, and a behavioural response from 0.5

to 7.5 V·m^{-1}. Studies on the effects of electric fields on salmonid fish and eels indicate that responses such as accelerated heart rate (field strength 0.007–0.07 V·m-1) and trembling of gills and fins (field strength 0.5–7.5 V·m-1) may occur (Marino and Becker 1977). Harmful effects such as paralysis and temporary unconsciousness have been observed in fish exposed to electric field strengths above 15 V·m^{-1} (Fisher and Slater 2010), i.e. at values far exceeding those generated by submarine cables. The electric field strengths shown above at which the physiological response was observed are several orders of magnitude greater than those generated by the offshore wind farm inter-array cables. Depending on the distance from a cable buried 1 m below the seabed, the intensity of the field's electric component is up to 8·10-4·m^{-1} on the seabed, 3.4·10-5 V·m^{-1} 5 m above the seabed, and 1.24·10-5 V·m^{-1} 10 m above the seabed. Thus, it can be assumed that the response of fish to the electric field in the farm area will not be significant, especially since the strength of the electromagnetic field in the water observed in the water column decreases with the depth at which the cable is buried. In an OWF environmental impact assessment conducted by Bergstróm et al. (2014), the impact of electromagnetic fields was assessed as low. Also in the environmental impact assessment of the Horns Rev 2 OWF the impact was classified as low or negligible (Spanggaard 2006). According to Taormina et al. (2018) the significance of this impact has been classified as low for cables buried in sediment and medium for cables lying on the sediment surface.

During the construction phase, power cables are planned to be buried at depths of up to 6 m. For this reason, the sensitivity of ichthyofauna to EMF emitted by power cables was assessed as negligible. The sensitivity to the impact is assessed to be moderate for all fish species examined. The significance of impact is assessed to be low for all the fish species studied.

The introduction of foundations and scour protection structures into the environment promotes the creation of a new habitat characterised by hard substrate. Such artificial structures form what is called an "artificial reef" – a new habitat. At the first stage, the reef is colonised by epiphytic organisms, macrophytes and invertebrates (Feger 1971). After just a few months, numerous fish populations appear in the reef area (Turner 1969; Stone et al. 1979; Bohnsack and Tolbot 1980), both those returning after construction-related disturbances ceased (Relini et al. 1994) and those hitherto absent from the area (increased biodiversity). According to Bohnsack and Sutherland (1985), the process of creating a stable artificial reef system usually takes 1–5 years. The scale of this phenomenon depends on both the size of the reef and the complexity of its structures, and on the environmental conditions in which it was formed and the composition of the ichthyofauna in its area (Hammar et al. 2016). The artificial reef provides an attractive habitat that can offer a rich food base, shelter, and create favourable conditions for reproduction for many fish species of both adult and roe stages, larvae, and juvenile individuals. Submerged structural elements of turbines and corrosion protection structures provide attractive hiding places for young, 2–3 year old cod (Reubens et al. 2011). They provide shelter from ocean currents, predators (Bohnsack and Sutherland 1985; Wilhelmsson et al. 2006) and from fishing pressure. Artificial reefs may also provide favourable breeding conditions for a number of fish: herring, hooknose, garfish, lumpfish. butterfish and turbot (Zucco et al. 2006). According to Spanggaard (2006), the artificial reef area also provides preferred spawning conditions for gobies, which include species protected in Poland. If restrictions are imposed on fishing and shipping in the areas occupied by development projects (e.g. wind farms), anthropogenic pressure will decrease, and the artificial reef regions may provide a specific refuge for fish, both adults and their early life stages – larvae and fry, becoming the equivalent of protected areas (Degraer and Brabant 2009). It is worth mentioning, however, that not all studies carried out in OWF areas unequivocally point to their role as a factor in increasing the abundance and diversity of ichthyofauna in these areas. Hydroacoustic surveys conducted in the area of the Nysted (Baltic) and Horns Rev (North Sea) OWFs did not show statistically significant effects of new habitat elements on fish distribution either locally or regionally (Hvidt et al. 2005).

The erection of submarine structures could be a migration barrier for economically important fish whose routes pass through the site. However, observations in Danish OWF indicate that due to the possibility of active movement of fish, the factors mentioned do not significantly interfere with migration processes (Stenberg et al. 2011). The Baltica-1 OWF area probably lies on the breeding and feeding migration route of cod. However, it can be assumed that due to the ability of fish to avoid the potential impact area, the impact on migration will not be significant. The impact associated with the formation of a mechanical barrier will be a negative, direct, local, simple, long-term, permanent and reversible. The resistance of all analysed ichthyofauna species to the impact associated with the formation of a mechanical barrier is high. Sensitivity to impact was assessed to be low for all fish species studied. Impact significance is assessed to be negligible for all the fish species studied.

The Regional Director for Environmental Protection in Gdańsk has obliged the Investor to perform post-project monitoring of ichthyofauna – **Condition No. C.2 2.3 1.** It will be conducted during the operation of the OWF and after its decommissioning. The monitoring programme is intended to enable the identification of noticeable changes occurring locally around the Project infrastructure, as well as to identify potential indirect changes further away from the infrastructure location, and so that the results can be compared with the data collected during the pre-project surveys. Surveys should be carried out in spring and summer – one year after the completion of construction and one year after the decommissioning phase. A set of survey tools should be used in the form of multi-panel bottom-set nets, and for early development stages, a Bongo ichthyoplankton net. It is necessary to designate survey stations both in the OWF Area and at some distance from it, in a basin not intended for offshore energy, but characterised by similar parameters of the marine environment (depth, distance from the shore, etc.). The result of the monitoring will be important in determining possible preventive or minimising measures for impacts, mainly anthropogenic impact (commercial and recreational fishing).

Surveys of marine mammals revealed the presence of porpoises (audio detections) and grey seals (visual observations), as well as several seals not identified to species. The highest number of porpoise detections was recorded during summer and early autumn, while seal sightings were most frequent during autumn and winter. All species of marine mammals are under strict protection. Marine mammals, both porpoises and seals, respond to elevated noise levels in the environment. Underwater noise is detected by animals when its values exceed the level of naturally occurring background noise. Because of the vital importance of sounds to the biology of porpoises and seals, noise can significantly affect their behaviour and physiological condition. In general, the effects of noise on animals can be divided into several categories, which include detection, masking, behavioural changes, hearing damage (permanent and temporary), and physiological damage, which can even lead to death of an organism (Thomsen et al. 2021). With marine mammals relying primarily on the sense of hearing, impacts of this nature have a very significant negative impact and can result in population-level impacts. Noise-induced physiological changes involve damage to tissue or entire organs, which can even lead to death of an organism in extreme cases.

Porpoises rely on sound for most aspects of their lives, and hearing is their most important sense. These mammals can hear over a wide range of frequencies – from well below 1 to 180 kHz, with the highest sensitivity in the ultrasonic range of about 50–130 KHz (Andersen 1970; Popov et al. 1986: Kastelein et al. 2002 and 2010). They also use echolocation signals, with frequencies centred around 130 kHz (Villadsgaard et al. 2007). Seals are anadromous animals with good hearing, both in the air and in the water. Underwater vocalisations of grey seals and common seals are characterised by low frequencies. In the case of the grey seal, the mating sounds studied were in the frequency range of 100 Hz to 1.3 kHz, while in common seals they were around 250 Hz to 1.4 kHz (Asselin et al. 1993; Van Parijs 2003 and Van Parijs et al. 2003).

The wind turbines will be founded on large-diameter piles driven into the seabed. The process of pile driving during construction work will be associated with the generation of underwater noise, which can significantly increase the level of background noise around the construction area and at large distances from it. One common method of pile foundation is impact driving, during which a hydraulic hammer repeatedly strikes the top of the pile, about once per second. The sounds generated during piling are of high intensity and a wide range of frequencies, including in bands relevant to both porpoises and seals, and can significantly affect both groups of marine mammals.

The manner in which sounds from piling propagate depends on a number of factors, such as the type of seabed, depth of seabed penetration, water depth and hydrological conditions. Therefore, the degree of impact of generated noise on marine organisms is strongly dependent on the location of the work, among other factors. Numerical modelling of noise propagation was performed to estimate the potential impact of sounds from piling during construction of the Baltica-1 OWF on marine mammals. With its help, distance ranges and areas of potential impact on animals were calculated. As preliminary analyses of sound propagation during piling in the Baltica-1 OWF area showed very large noise propagation ranges, calculations for the environmental impact assessment were carried out with the assumption of using mitigation measures. Three mitigation scenarios were considered – with a bubble curtain (BBC), with the simultaneous use of a double bubble curtain DBBC and HSD (hydro sound damper), and with the simultaneous use of the IQIP system along with the DBBC. The analysis was performed for two seasons – summer and winter. The summer season was considered the worst-case scenario from an environmental point of view (based on the results of marine mammal monitoring, the period of greatest porpoise activity), while the winter season was considered the worst-case scenario from a physical point of view (the best conditions for sound propagation). According to the EIA report relating to porpoises, based on the results obtained, it can be assumed that the use of noise mitigation measures during piling at a single location will effectively mitigate noise impacts associated with hearing damage (TTS, PTS). This is true for all the mitigation methods analysed. In the case of behavioural response, the area of impact on porpoise may include about 0.2% in summer and about 1% of the population in winter. In both the summer and winter scenarios, the impact ranges associated with behavioural change reach values indicating that the impact would extend to the Hoburgs bank Midsjöbankarna Natura 2000 area, where harbour porpoises are protected. The impact decreases with the distance of the piling location from the area and piling in the southern part of the Baltica-1 OWF area may not affect this Natura 2000 site. Given that the results of modelling for the behavioural effect are for a single pile impact, it can be assumed that the entire OWF construction process may affect the behaviour of porpoises around the work area. This effect is particularly relevant to the summer season, as this is an important period for the population of the Baltic Proper, as well as a time when animal activity is highest in the analysed area. This is indicated both by literature data (SAMBAH 2016, Carlen et al. 2018) and by the results of acoustic monitoring conducted for the Baltica-1 OWF. Its results also indicate that lower porpoise activity was recorded within the Baltica-1 OWF and in the Natura 2000 area adjacent to the farm area and exhibiting behavioural response than in the remaining, more remote part of the N2000 area. This means that a small number of porpoises will fall within the behavioural response range.

With regard to seals, the analyses conducted indicated that with noise mitigation measures applied during piling at a single location, the effect in terms of hearing damage may be negligible. Meeting the cumulative TTS level condition will require proper planning of noise mitigation measures. The ranges of impact in the form of behavioural response are limited, especially with the assumption of dual mitigation. Given the low frequency of seals in the analysed area, it is presumed that the effect associated with the change in behaviour will not significantly affect the animals.

It is assumed that the construction of the planned project will be associated with increased vessel traffic, which may increase the level of acoustic background naturally occurring in the Baltica-1 OWF area and adjacent waters. Sounds generated by ships have a large range of frequencies that can coincide with frequencies important to marine organisms. Since the main noise energy from vessels is generally below 1 kHz (e.g. Richardson 1995; OSPAR 2009), the most affected organisms are those for which low frequencies are most important (e.g. fish). However, an important part of the noise energy generated by ships is in the high frequency band (tens of kHz), which is very important e.g. for porpoises. Regarding the wind farm construction process, it is assumed that vessels that generate low-frequency sounds with less impact on porpoises will be used primarily. In the case of seals, studies indicate that low-frequency sounds generated by watercraft can interfere with the vocalisations of these animals (Erbe et al. 2019). However, it should be taken into account that in the planned wind farm area, seals are unlikely to appear in larger groups or for mating purposes, that is, in situations where they use vocalisations. Therefore, it can be suspected that sounds generated from ships used for construction should not interfere with the behaviour of animals appearing.

Wind farm construction may have an impact on changing the chemical parameters of seawater due to, among other things, the floating of disturbed suspended matter from the seabed. Such fluctuations in the environment may affect marine mammals indirectly, mainly in terms of the impact on the food base, i.e. fish populations. Changes in water parameters associated with the construction process can negatively affect populations of plankton and benthic organisms on which fish feed. As a result, there may be a temporary decline in the numbers of these animals, and thus a loss of a potential food source and foraging habitat for marine mammals.

The main source of underwater noise during the wind farm operation phase will be operating turbines. Its sources are the moving mechanical parts of the nacelle – the generator and gearbox, as well as the tower's vibration caused by the wind. Sound is transmitted into the water through the turbine base and supporting structures. The noise generated is in the low-frequency spectrum, with most of the energy below 1 kHz (Madsen et al. 2006; Thomsen et al. 2006). The sounds produced are continuous, and over the life of the wind farm (up to 35 years) they are almost constantly present in the environment and can contribute to an increase of local background sound levels. Currently available results of studies on the effects of noise from operating wind turbines on marine mammals come mainly from European waters. Analyses were conducted around farms located in the North

Sea, including three species – the harbour porpoise and the grey and common seals.

In contrast to the studies described above, more recent analyses of the potential noise impact from planned wind farms have raised increasing concerns. Tougaard et al. (2020) pointed to possible negative impacts associated with the cumulative sound generated by all turbines within the OWF. The above results indicate that the cumulative impact of noise from operating wind turbines may be noticeable. Numerical modelling of noise propagation was performed to estimate the potential impact of sounds generated during the operation of the Baltica-1 offshore wind farm on marine mammals.

The operation of the wind farm will be associated with the movement of service operations vessels, probably of large and medium size. Such vessels have the potential to increase environmental noise levels, including frequencies relevant to marine mammals. However, it is expected that both the number of maintenance operations and vessels moving at the same time will be low, thus having little impact on marine mammals.

It is presumed that there will be a gradual process of restoration once the construction work, which is the cause of environmental disturbance and potential loss of foraging sites for marine mammals, has ceased. Habitat for benthic organisms are likely to form around the wind farm area to attract fish again, while restoring the availability of food for porpoises and seals. The concrete piles on which the turbines will be set may also result in the so-called reef effect. Benthic organisms often settle in large numbers on additional underwater structures placed on the seabed. This increases local populations and biodiversity of fish, often attracting marine mammals as well. This type of environmental remodelling has been found in areas around offshore wind turbines. The effect of attracting organisms to wind farm areas is further enhanced by the fact that these are areas excluded from fishing (Degraer et al. 2020).

With a view to protecting marine mammals, this authority has imposed Conditions No. B.I.2.1, B.I.2.2, B.I.2.3, B.I.2.4, C.2.2.2, C.2.2.3.4, D.

Surveys of migratory bird flights during spring migration (March–May) and autumn migration (July–December) were conducted at two survey stations: MB_01 and MB_02. During the spring migration period, from March to the end of May 2023, 22 days of observations were carried out at survey station MB_01 and 20 days of observations at station MB_02. The inspections included visual observations, horizontal and vertical radar tracking, and acoustic monitoring. During the autumn migration period, from July to the beginning of December 2023, 22 days of observations were carried out at survey station MB_01 and 20 days of observations at station MB_02. The inspections included visual observations, horizontal and vertical radar tracking, and acoustic monitoring. Among the most abundant migratory birds observed during the survey were sea ducks (long-tailed duck and common scoter) and razor bill, as well as ducks, geese, alcids and passerines not identified to species. The migratory birds observed were assigned to 105 categories, 89 of which being birds identified to species. The most numerous migration flows were determined for the long-tailed duck, common scoter, passerines including pigeons, alcids, geese, shorebirds, dabbling ducks and common gulls. Among gull species, the highest migration fluxes were obtained in April for the common gull, lesser black-backed gull, little gull and herring gull. Based on the aggregate estimation of flight volumes, it can be concluded that spring migration was more prominent in the survey area than autumn migration. Autumn migration was more numerous only for the common scoter, passerine birds with pigeons, dabbling ducks, herring gulls, terns, cormorants and common gulls. The visual observations made indicate that the vast majority of the analysed groups of birds and species flew at heights up to 20 m above sea level. Only in the case of cranes all observed flights were recorded above 20 m above sea level, while in the case of geese it was nearly 75%. A significant difference in the share of birds flying below and above 20 meters above sea level was not found for shorebirds and swans. Based on the acoustic recordings collected, 9,331 voices were identified in spring and 11,456 were identified for 41 bird species and categories. Of the passerines, blackbird, redwing, robins and song thrush were most frequently identified during the night hours, while white wagtail, goldcrest, Eurasian blue tit, great tit and chaffinch were identified during the daylight hours. Three species of shorebirds were also identified – the common snipe during nighttime hours, the green sandpiper during the day, and the common curlew during both day and night. In spring, as in autumn, the voices of seagulls dominated. The vast majority of voices recorded in both spring and autumn were for daylight hours.

Tracking individual birds in flight and recording their flyways has made it possible to determine the direction of flight during migration for individual species or groups of species. In spring, a total of 9,214 flight paths were recorded for 88 species and 23 categories of birds not identified to species, and in autumn, 2,968 flight paths were recorded for 81 species and 15 systematic categories in cases where identification to species was impossible. Analyses using horizontal radar indicate fairly homogeneous directions for migratory birds in both spring (N-E direction) and autumn (W-S direction). Some of the tracked groups and species of birds flew in the direction opposite to the main direction of flight. This situation was observed in the case of gulls, alcids and gaviiforms, which may be related to the fact that not all radar-tracked birds from these groups were migrating at the moment. In the case of alcids and gaviiforms, it is possible that some of the birds had already completed their migration and the paths referred to birds moving locally within the wintering grounds. In the case of gulls, it is probable that paths have been recorded for local gulls residing in the Baltic coastal waters throughout the year.

During surveys of migratory birds in spring and autumn 2023, the most abundant species observed were common scoters and long-tailed ducks. Based on migration flow analyses, in spring 7.51% and in autumn 15.48% of the biogeographic scoter population can fly over the OWF area. For the long-tailed duck, these values represent 7.12% in spring and 1.46% of the biogeographic population in autumn. This relatively intense migration of scoters in the early autumn months (July) is related to moulting. Shortly after breeding, males head to resting places, where they become flightless during moulting. Since the monitoring of autumn migratory birds in other OWF areas mostly began in August, it is not possible to compare the high flight values obtained for the common scoter in July in the survey area. While the long-tailed duck was present in large numbers during both the spring and autumn surveys, the common scoter was observed in greater numbers only during the spring months (with the exception of observations made in July). The low abundance of common scoters during autumn migration surveys may be related to different migration routes to wintering grounds in the Kattegat Strait, the Pomeranian Bay and the Gulf of Gdańsk. Common scoters nesting on the coast of Sweden and Finland follow the coast in a westerly direction before crossing the Baltic Sea and reaching the Pomeranian Bay. The long-tailed duck was observed in large numbers in both spring and autumn, but significantly higher numbers were recorded in spring. Such movement patterns (high intensity in spring, lower in autumn) are similar to the results of other OWF surveys in the area, but the estimated intensity of spring migration in the survey area is mostly 40–60% higher than in more southern locations near the Słupsk Bank. The largest concentrations of long-tailed ducks in the Baltic Sea are found in the sandy shallows: Hoburgs Bank, northern and southern Midsjo Bank, and Słupsk Bank. The OWF site is in close proximity to Midsjo Bank and the Swedish Natura 2000 site Hoburgs bank och Midsjöbankarna SE0330308, hence the constant presence of birds during the survey. Relatively high values of migration flow were obtained for the little gull, in spring at 4.47% of the biogeographic population, in autumn at 3.77%. The estimated migration intensity of alcids represents 0.68% of the biogeographic population in spring and 0.34% in autumn, but in relation to the local Baltic population abundance, these values represent more than 100% in spring and 73.41% in autumn. Since there are no data on razorbill movements outside the breeding season (which could only be investigated using telemetry), it is estimated that a large proportion of the estimated number of razorbills flying over the wind farm area involves local overflights of individuals inhabiting nearby areas, rather than overflights associated with the species' migrations. This thesis is supported by the fact that no clearly dominant direction of bird flight was recorded in spring or autumn. It can be inferred from the above that the survey area is not on a major razorbill migration route but is an area of great importance for birds living in nearby areas and flying locally.

During the construction phase, there will be impacts on migratory birds due to the barrier effect and the risk of collision with Baltica-1 OWF installation vessels. Underwater and surface noise is not considered a potential impact on migratory birds.

The presence of installation vessels in the Baltic survey area creates a physical barrier, which may affect the way migrating birds move. The magnitude of the impact will depend on the number of vessels, their size, operating time, as well as the time of year (season). Migratory birds that are sensitive to ship-generated interference may change their trajectory vertically or horizontally, which can lengthen their flight and thus also increase the energy costs of migration. Analysis of the change in the length of the migration route during the operation phase indicates that the route has lengthened slightly (about 0.02%). Changes of this magnitude have minimal impact on the length of the entire migration route. Since the distance travelled by birds of the same species is not the same (due to different resting places, nesting sites, differences in the flyway taken, etc.) the significance of the impact also during the construction phase was assessed to be negligible for all analysed species and species groups.

Migratory birds, especially some terrestrial species, may be attracted to lights used at night on ships or during bad weather conditions (heavy rainfall, fog). The magnitude of this impact is as yet poorly understood, and the current state of knowledge does not allow this impact to be quantified. However, in accordance with the precautionary principle, in order to minimise negative impacts, **Condition No. B.I.1. 1.4** has been imposed.

Barrier effects and collisions with vessels have been classified as direct impacts, due to the fact that the presence of elevated structures as well as construction vessels can directly alter the flight trajectory of migratory birds or cause collisions. The extent of these impacts was considered local because, if impacts do occur, they will be limited to a small area where construction work is currently underway. The temporal extent of both impacts was considered temporary. The barrier effect has reversible characteristics, disappearing with the cessation of construction work, while collisions, due to the 100% mortality rate of birds in the event of a collision, were considered irreversible. Based on the analysis of impacts during the construction phase, the magnitude of the barrier effect was considered small, and collisions with ships were considered moderate.

During the operation phase, there will be impacts on migratory birds due to the barrier effect and the risk of collision with Baltica-1 OWF structures. Underwater and surface noise is not considered a potential impact on migratory birds. The presence of the OWF creates a barrier effect affecting the behaviour (movement) of migratory birds. The magnitude of the impact will depend on the number of wind turbines, their size and distribution in the Baltica-1 OWF area. Birds may have to divert flight path horizontally or vertically, which can slightly lengthen the migration route and increase energy requirements. Research to date on the subject indicates that bypassing even a few OWFs adds negligibly to both the total length of the migratory flyway and the energy expenditure associated with the migration. As in the construction and decommissioning phases, the impact is direct, but the extent, due to possible changes in flight trajectory by some migratory birds was considered in the report to be regional. Due to the length of the operation phase (a maximum of 35 years), the temporal extent was set to be long-term.

The changed route necessary to avoid the Baltica-1 OWF is extended by an average of 21 kilometres, which makes migration routes longer by an average of 1.25%, and by 0.25% for cranes. The 21-kilometre route extension associated with the barrier effect of the

Baltica-1 OWF will increase energy expenditure to cover the route by a negligible amount. The impact in the form of collision risk, i.e. bird mortality resulting from collisions with OWF components, is presented in the form of the total number of collisions of a given species during the spring and autumn migration period in Appendix 1 to the EIA Report. The risk of collision depends on the parameters of the OWF, such as the number of wind turbines, rotor diameter, the clearance between the lower tip of the rotor and the water surface, on biological parameters and individual species – body size, flight speed, flight height, collision avoidance rate, but also on weather parameters. In case of limited visibility (low clouds, night, dense fog), birds are able to spot the OWF from a much shorter distance, which results in a higher risk of collision **(Condition No. B.II.8).**

The Baltic Sea basin is used by seabirds as a wintering site or as a stopover during migration. There is no monitoring of seabirds in the aforementioned area as part of State Environmental Monitoring. Observations of seabirds were carried out in the Baltica-1 offshore wind farm construction area, including a 4-kilometre buffer zone, and in a reference area with similar environmental conditions. The surveys took place between December 2022 and the end of November 2023. 24 species of birds were found in the two basins surveyed, including 13 marine species and 11 aquatic species rarely found at sea far from the coast. Of these, 16 were extremely sparse, at less than 1% of the grouping, throughout the annual monitoring period. Thus, it can be assumed that neither the survey area nor the reference area are important foraging and/or resting places for them. Of the 8 most numerous species, 7 are under strict and 1 is under partial species protection in Poland (herring gull) in accordance with the Regulation of the Minister of Environment of 16 December 2016 on the protection of animal species. Two species are listed in Annex I of the EU Birds Directive: the black-throated loon and the little gull. 4 species appear on the Red List of Polish Birds (Wilk et al. 2020): herring gull with the LC category (least-concern species), common gull with the VU category (vulnerable), and black-throated loon and little gull with the RE category (regionally extinct). The International Union for Conservation of Nature classifies seven species as least concern (LC) and one, the long-tailed duck, as a vulnerable (VU) species (IUCN 2024). On the Red List of Birds (wintering populations) compiled by the HELCOM Baltic Marine Environment Protection Commission, 4 species have an elevated threat category, i.e.: little gull (NT), long-tailed duck and scoter (EN), and black-throated loon (CR) (HELCOM 2013).

22 species of water-dwelling birds were found in the survey area, including 13 species of seabirds. A total of 1,7420 individuals were found during the entire survey cycle, of which as many as 13,737 were long-tailed ducks (80.0% of the grouping). Also numerous were the herring gull (11.4%), the razorbill and the common murre (2.6% each). The remaining species were less abundant, not exceeding a share of 1% in the grouping. In addition, 13 individuals were found that could not be identified to species (unidentified gaviiforms, gulls and ducks. During the wintering period, the most abundant species residing in the survey area were the long-tailed duck and the herring gull, which jointly accounted for 82.8% of all birds observed. The remaining species appeared in the basin in question in small numbers, not exceeding 100 individuals found during a single survey campaign. The numerous appearances of herring gulls in offshore areas far from the coast is a typical phenomenon, as they accompany fishing boats, congregating in areas of fishing activity. During the spring migration period, among the species found, the long-tailed duck was also the most numerous, accounting for as much as 96.3% of all birds found. This result was mainly influenced by the April 2023 observation, when more than 11,000 individuals of the species were recorded. A very abundant appearance of long-tailed ducks meant that none of

the other species exceeded 1% in the grouping during this period. Nevertheless, despite its small share in the grouping, the black-throated loon (101 individuals) reached relatively high numbers during the period.

The most numerous species was the long-tailed duck, representing 53% of all the birds found. In August, birds of this species begin to appear on basins far from the shore, as they follow schools of fish with their large chicks and young birds after they finish breeding. The herring gull was also relatively numerous (over 100 individuals) during this period, accounting for 43.1% of the total grouping. Nevertheless, the abundance of the entire grouping of birds staying in the survey area in summer was low.

During the autumn migration period, three species were observed in greatest numbers: the herring gull (32.8% of the grouping), long-tailed duck (26.2%), and common murre (25.8%). They accounted for as much as 84.7% of the grouping staying in the basin surveyed. The 1% level of participation in the grouping was also reached by the lesser black-backed gull (5.3%), razorbill (3.7), common scoter (2.5%) and common gull (1.0%). The abundance of birds during the autumn migration period was low, and the total abundance of none of these species exceeded 200 individuals.

Very high numbers of the long-tailed duck and black-throated loon indicate the basin's very high importance for these species during the spring migration period. Conducting avifauna surveys for only one season, it is not possible to determine whether such high concentrations occur every year, which would indicate that this basin is regularly used as a stopover on their migration route towards the eastern Baltic and farther breeding grounds. The low abundance of the long-tailed duck in winter and at the beginning of the spring migration period shows that the planned project area does not play an important role for this species, which gathered here in great numbers only during a later phase of the spring migration (April 2023). Nor can it be ruled out that the appearance may have been related to movements of a local nature, unrelated to access to rich foraging grounds. Without additional survey campaigns during the spring migration period, it cannot be fully determined whether this appearance was a one-time occurrence and was due, e.g., to a sharp deterioration in weather conditions during migration, which may have forced the migrating birds to stop flying, or whether the birds regularly use the survey area as a stopover on their migration route. In the same way, it would be necessary to confirm whether the nesting concentrations of the common murre observed in the area in summer and autumn are a recurring phenomenon, or the grouping of these birds appeared there once.

In the reference area during the wintering period, the most abundant species was the long-tailed duck, accounting for 80.6% of the total grouping. The herring gull and razorbill appeared in large numbers (8.7% and 6.5% of the grouping, respectively). Other species were less abundant. During the spring migration period, long-tailed ducks were by far the most numerously observed. They accounted for as much as 91.6% of the grouping residing in the basin surveyed. More than 1% of the abundance of all observed birds was reached by the razorbill (3.1%) and the common scoter (1.2%). The abundance of the remaining species was very low and for none of them exceeded 30 individuals.

During the summer, 4 species of birds strongly associated with the marine environment were found, as well as 1 species among the rarer ones found at sea away from the coast. As in the survey area, common murres were observed in the greatest numbers, accounting for 61% of the grouping staying in the basin surveyed. The herring gull was also found in fairly high numbers (32.6% of the grouping), but its high proportion was due to the low abundance of the entire grouping of birds. The abundance of the remaining species was very low.

During the autumn migration period, the most abundant sightings were of the common murre (26.3%), herring gull (20.4%) and razorbill (19.0%). In total, they accounted for more than half (65.7%) of the grouping of birds observed in the basin. The abundance of birds in the period in question was very low and for none of the species exceeded 50 individuals.

The construction of foundations or support structures and cable lines will cause disturbance of bottom communities in the Baltica-1 OWF area. This process will directly affect the seabed and the water column above it. Due to the above, some of the natural benthic habitats used by seabirds and retained during migration will be lost, but most probably new ones will develop in their place (artificial reef effect). The scale of the impact will mainly depend on the number of offshore wind turbine foundations or support structures and their technical characteristics. As a result of construction activities, there will be seabed sediment mobilisation and an increase in suspended matter in the water. Direct sediment transport and resuspension will result in reduced water clarity. If it exceeded naturally occurring levels, then it could cause difficulties for birds that use their sight to hunt while searching for food, i.e. ichthyophages and benthophages, and thus result in the movement of birds to clearer waters. Bird species affected by seabed disturbance impacts are mainly benthophages and ichthyophages. However, they are very sensitive to disturbance by the presence of boats and other human activities at sea. Hence, it is estimated that the impact from disturbance due to the presence of installation vessels will be the main impact in the area, resulting in the displacement of sensitive species to other areas. Therefore, these birds will not experience additional impacts related to the reduction of their foraging base during the construction phase. Destruction of benthic habitat and water turbidity during construction activities are direct impacts on benthophages and ichthyophages, local in scope, medium-term and reversible.

Offshore wind turbine structures protruding from the water, gradually appearing during the construction phase, can deter birds. The effect of this impact depends mainly on the pace of construction of the OWF. At first, individual offshore wind turbines will have a small impact, but gradually the deterrent effect will increase. Literature data clearly indicate that birds avoid areas occupied by OWFs and note a decrease in their numbers within a radius of up to 2 and even up to 4 km from the OWF (Christensen 2003; Petersen 2006; Krijgsveld 2011, Leopold 2011). Birds are likely to be able to get used to the presence of wind farms to some extent. However, individuals undertaking migration toward the wintering grounds for the first time in their lives may have trouble getting past the extensive barrier posed by the cluster of wind farms. This may be due to their lesser experience. It is the cause of higher mortality of birds in the first year of life. It should be noted that the number of offshore wind turbines under construction is a parameter affecting the level of impact. The distance between individual offshore wind turbines on the farm and neighbouring OWFs is also important (Stewart et al. 2005). Both the construction and operation of OWFs located in close proximity to OWF Baltica-1 may cause a cumulative barrier effect for birds.

Construction activities will require the presence of various types of vessels that will disturb seabirds through physical presence, noise (including noise generated by pile driving if such foundations are chosen) and light emissions. The first two factors should not affect changes in the flight path of those bird species that do not use the area but only fly over it. However, it cannot be ruled out that such an impact will occur at night or during adverse weather conditions, especially if the construction site is heavily lit. Birds navigate during migration relative to natural light sources, such as stars and the sun. The duration of construction and the location of the offshore wind turbines within the Baltica-1 OWF area, where there will be increased vessel traffic, also have an impact. The period in which the work will take place is important, as most seabird species, including the long-tailed duck, exhibit very large differences in abundance between phenological periods. The flushing effect will increase with the progressive development of the OWF area. Initially, it will be local in nature, but at the final stage of construction, the extent of this impact will clearly increase, strongly limiting birds' feeding and resting opportunities in the Baltica-1 OWF area, resulting in their relocation probably to the nearby Natura 2000 site Hoburgs bank och Midsjöbankarna. The presence of ships and immovable structures protruding from the water, on the other hand, will result in more numerous occurrences of seagulls, which use these elements as resting places and seek food near ships. Four species of large gulls, including the most abundant species in the Baltica-1 OWF area – the herring gull – congregate in the open sea around fishing boats. If commercial fishing is restricted during the construction of the OWF, these birds will most likely move to other fishing locations.

The appearance of new structures at sea and the associated increased vessel traffic are direct, long-term and reversible impacts on benthophages and ichthyophages. In the case of gulls, this will be an indirect, short-term and reversible impact.

Birds navigate during migration relative to natural light sources, such as stars and the sun. It has been noted that at night they also head for lighthouses, oil rigs and other structures illuminated by artificial light. Migrating at night, the birds use the stars to help them navigate and maintain their direction of flight. The magnitude of the impact will depend on the number of turbines and vessels involved, their size, the method of illumination and intensity of light sources, the configuration of lights, the duration of the construction phase and the phenological period during which the work will be carried out. Lighting of the project site during the construction phase will have a direct impact on seabirds, of a local range for gulls, a regional range for ichthyophages, and a transboundary range for the long-tailed duck (due to the possible impact on the species' biogeographic population); it will be a medium-term and reversible impact.

Construction work in the Baltica-1 offshore development area, especially piling, will be a source of underwater noise. Noise propagation modelling for the planned Project, as well as previous studies for other OWFs in Polish maritime areas, have shown the possibility of a significant impact of underwater noise on fish, which are the food base of ichthyophages. Mitigation by means of a soft-start procedure for piling will ensure that this negative impact is minimised.

Surface noise emission along with the movement and operation of construction vessels will be one of the main causes of seabird disturbance in the Baltica-1 OWF construction area. The noise phenomenon in the scenario under consideration is a typically anthropogenic impact which does not occur at sea without the presence of vessels. This impact will be more significant for seabirds than underwater noise. Seabirds are very sensitive to disturbance by the presence of boats and other human activities at sea. Hence, it is estimated that the impact from disturbance due to the presence of construction vessels will be the main impact in the area, resulting in the displacement of sensitive species to other areas. For the purpose of preparing the EIA report for the Baltica-1 offshore wind farm, modelling noise generated by piling was carried out. A simulation was performed to define the most negative scenario for up to four piling sites, which were independent of the distance between sources and specific locations in the OWF areas: Bałtyk I, Kriegers Flak I, Kriegers Flak II Nord, Kriegers Flak II Syd, Energy Island Bornholm, Njord, Öland-Hoburg I, Baltic Central, Baltic Offshore Beta, Virrus, Neptunus, Sódra Victoria, Bornholm Bassin Ost and Baltic Edge. Noise modelling has confirmed that the planned piling in the Baltica-1 offshore wind farm area could lead to significant ranges and associated impacts to fish, which are food for birds (ichthyophages). This is especially true for the results obtained for the winter season, where the ranges of the behavioural response and the cumulative temporary threshold shift (TTS) in hearing for fish, remain high. It should be noted that there is considerable uncertainty about the effects of cumulative sound exposure level (SEL). The analysis also shows that the use of a mitigation measure in the form of an air curtain is likely to lead to insufficient reduction of noise emitted during piling in the southern and central parts of the planned project area, especially during the winter season. Only the use of high-efficiency noise mitigation measures leads to a significant reduction in impact ranges. Pile driving should be limited to the period from May to the end of November, when bird abundance in this basin is at its lowest. During the remaining period, avoid piling or provide nature conservation supervision. In addition, suitably effective noise mitigation measures and environmental surveillance should be applied. In the central part of the area, carry out the work using a combination of the aforementioned mitigation systems, and in the southern part – a single noise mitigation system, under environmental supervision.

The operation of the Baltica-1 OWF will result in the flushing and displacement from habitat of some of the seabirds staying in the basin occupied by the wind turbines and the adjacent 2 to 4 km wide strip of water. The degree and area of displacement of birds from this body of water and its surroundings will depend on their species. A single offshore wind farm is a barrier to birds, which overwhelmingly avoid basins with turbines. This behaviour minimises the risk of collision, especially during the day when visibility is good. However, the farm area will be excluded for a long time for a large proportion of individuals as a foraging ground, which may have a negative impact on the biogeographic populations of some species.

Habitat changes caused by the creation of an artificial reef (underwater part of the OWF) may have a beneficial effect on the development of benthic invertebrate macrofauna. Rich benthic communities will develop on the underwater parts of the structure and on the seabed of the basin occupied by the Baltica-1 OWF, which may translate into increased fish abundance. In the course of benthic habitat restoration, both the original species structure may be restored, and changes may take place caused by biological factors (e.g. invasive species) and physical factors (electromagnetic radiation, heat emission). However, these changes are difficult to predict, and these resources will nevertheless be of little or no use to birds in general (Vicinanza 2012). The effect of birds being deterred by ships and structures protruding high out of the water will prevail. The most important parameters affecting the level of impact are the shape, diameter of the base and the number of foundations or support structures. Habitat occupation during the operation phase will result in a direct, long-term and reversible impact on seabirds of local range (transboundary range for the long-tailed duck due to the possible impact on the biogeographic population of the species). Impacts on gulls were classified in the lowest category – insignificant.

Offshore wind turbine structures will occupy part of the Baltica-1 OWF basin, forming a barrier for seabirds moving between feeding or resting areas. In addition, as the construction of the Baltica-1 OWF progresses, the risk of bird collisions with offshore wind turbines will increase, reaching its maximum during its operation. The scale of the impact is influenced by the number and density of wind turbines, the clearance between the sea surface and the lower level of the rotor blade, the diameter of the rotor and the distance from neighbouring OWFs. Neighbouring wind farms intensify the barrier effect. This is because there is a noticeable avoidance by seabirds of the area occupied by the OWF and a decrease in their numbers in its vicinity – e.g., according to the Baltica-1 OWF environmental impact report, affecting the long-tailed duck within a radius of up to 2 and even up to 4 km. The exceptions are gulls and cormorants, which often use structures protruding above water as resting places, so their numbers may even increase.

The risk of collision also depends on the bird species. Large waterbird species, such as swans, are more likely to collide with wind turbines because of the difficulty in making sudden manoeuvres in the air. Most seabird species travel low over the water, and when they are between turbines, they lower their flight and maintain equal distances from obstacles. This means that the risk of collision is affected by the clearance between the lower position of the rotor blade and the sea surface. The smaller it is, the greater the chance of a bird colliding with a moving rotor.

The barrier effect that will be created by the Baltica-1 OWF primarily affects migratory birds. However, some of the seabirds migrating through the Baltica-1 OWF area may be heading to nearby Natura 2000 sites, where they may have their stopover, wintering or breeding grounds. The creation of a barrier in the area may also impede the movement of these populations between the wintering areas of the Słupsk Bank, the Central Bank and the Hoburgs Bank. At present, there is no scientific data on the relevance of links between these areas, but they cannot be ruled out. Modelling the impact of the barrier effect on birds was preceded by the creation of hypothetical bird migration routes, determined from radar data. All migration routes have been simplified to represent the shortest routes between breeding and wintering grounds, taking into account the habitats (e.g. sea ducks mainly fly above water), and cross the Baltica-1 OWF Area. The same routes were assumed for spring and autumn migrations, as there are no studies proving that this is not the case for the analysed species. Migration routes were then modified, assuming that birds perceive the Baltica-1 OWF area as a barrier and avoid the farm at a distance of 1–2 km. Calculations of energy expenditure by birds as a result of the extension of the migration route, associated with the barrier effect of the OWF, indicate a slight increase (max. 3.84% for the black guillemot). In addition, in the case of passerine birds, which travel the migration route mainly at night and at high altitudes (above the rotor range), the barrier effect will not occur, as the birds will fly over the OWF. Accordingly, the magnitude of the impact associated with the barrier effect for all groups of birds included in the analysis was considered insignificant. In the case of the cumulative impact of wind fields, for which very distant OWFs are taken into account, the theoretical route bypassing the OWF results in a fairly significant increase in energy expenditure for the black guillemot (+24.61%). However, using expert knowledge, a situation in which this species would choose such a route is unlikely, due to the large areas of open, undeveloped Baltic waters between OWF groups. For other species, the increase in energy expenditure due to the cumulative barrier effect will be small at most.

The operation of the Bałtyk I OWF will involve the movement of various types of vessels (and helicopters). Since it is currently difficult to separate their impacts (unknown number of equipment that may be used), they will be assessed together. Collisions of seabirds with ships are possible at this stage of the Project. It was assumed that the highest intensity of ship traffic in the Baltica-1 OWF area will occur during construction and decommissioning, while the impact will be the lowest at the operation stage. The presence of ships will result in more numerous occurrences of seagulls and cormorants that seek food near ships. Four species of large gulls, including the most abundant species in the Baltica-1 OWF area – the herring gull – congregate in the open sea around fishing boats. The Baltica-1 OWF area may be a basin closed completely or partially to commercial fishing in the operation stage. Therefore, it can be expected that in the OWF area fish will find very good living conditions (no fishing, rich benthic communities). However, birds will make limited use of the food base created in this way, due to the predominant deterrent effect of structures protruding high above the water surface.

The presence of ships will result in more numerous occurrences of seagulls and cormorants that seek food near ships. Four species of large gulls, including the most abundant species in the Baltica-1 OWF area – the herring gull – congregate in the open sea around fishing boats. The Baltica-1 OWF area may be a basin closed completely or partially to commercial fishing in the operation stage. Therefore, it can be expected that in the OWF area fish will find very good living conditions (no fishing, rich benthic communities). However, birds will make limited use of the food base created in this way, due to the predominant deterrent effect of structures protruding high above the water surface.

During the operation phase, the primary source of noise will be the operation of wind turbines, i.e. noise from the rotating rotor and noise from air flow at the edge of the wind turbine blades. Given the high sensitivity of seabirds to disturbance, the main effect of wind turbines will be the flushing and displacement of birds from their habitats, which will mask the effect of noise impacts as less significant. After the construction of the Baltica-1 OWF, most bird species will avoid staying in its area and the adjacent 2 to 4 km wide strip of water, due to the mere presence of offshore wind turbines. The area will be excluded for the duration of the farm's operation for some individuals as a foraging ground, which may have a negative impact on seabirds. The degree and area of their displacement from this basin and its surroundings will depend on the species and technical parameters of the OWF (number of turbines, density, rotor diameter).

The flushing and displacement from habitat as a result of noise emissions from the planned Project at the operation stage will cause direct, local and reversible impacts on seabirds. For ichthyophages and benthophages, this is a long-term impact. Gulls are birds that benefit from human activities and are much less sensitive to noise impacts. Therefore, the impact on the aforementioned group of seabirds will be temporary.

Illumination of the Baltica-1 OWF may hinder navigation by seabirds and increase the risk of their collision with the turbines. This is especially true for migratory species that exhibit nocturnal activity (ichthyophages and benthophages). Birds navigate during migration relative to natural light sources, such as stars and the sun.

In order to minimise the impact of the project concerned on birds, conditions were imposed, including but not limited to the following:

- each start of work should be preceded by a soft-start procedure to allow birds to move away from the work area; **(Condition No. B.I.2. 2.2)**
- at nighttime, on ships and farm structures, limit the use of strong light sources and do not direct light upwards; **(Condition No. B.I.1.1.4)**
- equip the OWF with a designed crane overflight monitoring system, consisting of a radar and camera system, as well as a system of shutdowns (slowdowns) of individual wind turbine generators or their groups, triggered in the event of crane overflight detected by the monitoring system, **(Condition No. B.II.8).**

Recordings of <u>bat</u> activity were made in 2023 during 35 overnight inspections in two bat migration periods (April–May and August–October). The inspections covered a transect with four-line segments within the area surveyed and a buffer strip of 1 nautical mile and listening in at four fixed points. The presence of bats was checked on the basis of recordings using specialised recording equipment under favourable weather conditions.

During field surveys – detector listening on transects and listening points – four species of bats were recorded in flight and identified: the common noctule *Nyctalus noctula,* the northern bat *Eptesicus nilssonii,* the parti-coloured bat *Vespertilio murinus* and the Nathusius' pipistrelle *Pipistrellus nathusii*. All identified bat species are strictly protected under the provisions of the Bern Convention, the Bonn Convention and the Agreement on the Conservation of Bats in Europe (EUROBATS). The species are also listed in Annex IV of the EU Habitats Directive. The species found in the survey area are common and frequent on a national scale and are listed under the LC (Least Concern) category by the IUCN (International Union for Conservation of Nature and Natural Resources). The northern bat is noteworthy, occurring in the northern lake belt, found only in winter (Sachanowicz et al. 2006, Zapart et al. 2022). The finding of these species is consistent with the data obtained from the literature on the occurrence of chiropterofauna in maritime areas. No rare species or species with the highest protection status under Annex II of the Habitats Directive were found.

Potential impacts during the construction phase may come from works and activities conducted on the sea surface. The construction of the wind farm will certainly involve the increased presence of vessels, but also helicopter flights, which will present an additional and unusual source of noise that may flush bats. When assessing the potential bat flushing as a result of noise associated with wind farm installation, it should be assumed with high probability that the work will take place mainly during the daytime and will be carried out successively (not all wind turbine generators will be built at the same time). Any modification of the bat migration route should not have a major impact. When assessing the potential impact of the construction phase on bats, the results of the monitoring carried out should be taken into account. [It] showed that the area of the planned offshore wind farm is used by bats to a limited extent, especially during the spring migration period. On the other hand, ships anchored and illuminated by intense light during night work, as well as while stationary, can attract many nocturnal insects, which will provide an opportunity for migrating bats to replenish their energy as they migrate across the sea. The ships will also provide a resting opportunity for the animals as a daytime hideout with numerous nooks and crannies, but also as a short-term nighttime hideout. Taking the above into account, it can be assessed that the construction phase of the Baltica-1 OWF will have no significant impact on bats.

At the operation stage, offshore wind turbines, like their onshore counterparts, pose a potential threat to migrating bats. This danger is mainly due to the possibility of direct collision, as well as barotrauma. Operating offshore wind turbines will form a physical barrier along the bat migration route. Collision with a moving rotor is the main cause of their mortality (Kunz et al. 2007; Sáez, S. et al. 2011 Animals struck by rotor blades die from fractures, open wounds, multi-organ injuries or wing amputations. The significant height of wind turbine towers does not protect them against collisions.

It should be noted that collision mortality is further compounded by unusual bat behaviour. During migration, the common noctule flight altitude of about 10 meters above the water surface was confirmed by radar method. However, each time the bats approached an obstacle (buoy, ship, mast) the flight height increased rapidly, up to 100 m. The use of offshore wind turbine towers as a resting place has also been confirmed, with bats found on the turbine nacelles, which has never been recorded on onshore turbines (Ahlen et al. 2007; Ahlen et al. 2009). Newly erected wind turbines can attract migrating bats in the open sea, providing a convenient resting place during migration, especially in adverse weather conditions. Excessively strong and white light used for lighting will attract nocturnal insects, creating foraging sites, which may result in cases of mortality of these mammals even in areas not used by them before the project.

In addition to the immediate threat of collisions, actively flying up to the rotor blades and dying from external impact injuries, danger is also posed by the phenomenon of barotrauma – pressure shock resulting in alveoli rupture, with no external injuries in dead bats. The rotating blades of offshore wind turbines cause large differences in pressure. The result is a decompression phenomenon causing barotrauma in bats getting into the area of reduced air pressure behind the rotor. This risk tends to increase in late summer and early autumn, and the bat activity (and thus the increased risk of collisions with turbines) in the area surveyed is found mainly in the second half of August.

It cannot be ruled out that the migration routes of any of the identified species do not pass through the planned offshore farm area. Previous surveys for the other planned areas, monitoring bat migration over Polish maritime areas, have not shown the existence of bat migration corridors within these basins. There are also no surveys to identify bat departure points along the Polish coast. However, it should not be taken for granted that no such corridors exist.

In view of the above, by this Decision, this authority has imposed the obligation to perform bat monitoring (Condition No. C.I.2.3. 6) aimed at determining the species composition and abundance. The equipment used is to enable automatic recording and meet the minimum equipment requirements used in the surveys performed at the pre-project survey stage.

There are no <u>protected areas</u> in the Baltica-1 OWF area. The Natura 2000 site Hoburgs bank och Midsjöbankarna (SE0330308) is located in Swedish waters within 2 km of the planned project. In relation to the area covered by the aforementioned plans, the closest Natura 2000 site in Poland is Słupsk Bank PLC990001, at a distance of about 59 km.

According to the Regulation of the Minister of Climate and Environment of 9 October 2023 on the special area of habitat protection Słupsk Bank (PLC990001) *(Journal of Laws of 2023, item 2347)*, the qualifying features in the Natura 2000 site Słupsk Bank PLC990001 are natural habitats: 1110 – sandbanks which are slightly covered by sea water all the time and 1170 - reefs. According to the Standard Data Form (update: March 2024), the qualifying features are also the following species: black guillemot *(Cepphus grylle),* long-tailed duck *(Clangula hyemalis)* and velvet scoter *(Melanitta fusca).* Threats to the area include sand and gravel mining, wind energy production, passive fishing, active fishing, shipping lanes and military training grounds. No conservation task plan has been established for the Natura 2000 site Słupsk Bank PLC990001.

According to *the "Report on the Environmental Impact of the Baltica-1 Offshore Wind Farm"* (the report), the transport of suspended matter associated with underwater work in connection with the foundation of offshore wind turbine generators and the burying of power and data communication cables, with concentrations exceeding 5 mg* dm^3 does not last longer than 14 hours, measured from the start of the work during which the source of suspended matter is mobile, and 26 hours from the end of the work in which the source of suspended matter is stationary. The maximum range of suspended matter can be from 2.7 to 8.2 kilometres from the source. In the case of jack-up installation vessel support foundation work using a suction reclamation dredger, suspended matter reach the greatest ranges, with concentrations exceeding 5 mg*l^{-1} extending over a distance of about 12 km. The cloud of suspended matter generated by such works remains in the water for up to 72 hours. Due to the distance (about 59 km) from the Słupsk Bank PLC990001 Natura 2000 area, the implementation of the project will not directly or indirectly deteriorate the condition of natural habitats with codes: 1110 – sandbanks which are slightly covered by sea water all the time and 1170 - reefs.

In addition, the report indicates that the total number of bird individuals recorded during visual observations in spring and autumn 2023 in the project implementation area, and constituting qualifying features of the Natura 2000 site Słupsk Bank PLC990001 was as follows: long-tailed duck – 9,539, velvet scoter – 230 and black guillemot – 35 (p. 210). In the analyses of the impact of the planned project on migratory birds, which are qualifying features in the aforementioned Natura 2000 site, such as the barrier effect and the risk of collision during the operation phase was determined to be negligible. The report identifies a number of measures to avoid, prevent and mitigate or compensate for negative environmental impacts, including impact on avifauna.

Due to the distance of the area covered by the planned project from the Natura 2000 site Słupsk Bank PLC990001, the planned activities are not expected to have a significant direct or indirect impact on the species and their habitats, which are qualifying features in the Natura 2000 site Słupsk Bank PLC990001, i.e. the black guillemot *(Cepphus grylle),* the long-tailed duck *(Clangula hyemalis)* and the velvet scoter *(Melanitta fusca)*. In addition, in the opinion of this department, the project will not result in the loss or fragmentation of natural habitats and habitats of species for which the aforementioned Natura 2000 site was designed. The project will also not result in a change of habitat conditions in this Natura 2000 site, which could have a possible indirect significant impact on species and their habitats and natural habitats that are qualifying features within the boundaries of the aforementioned Natura 2000 site. Thus, the planned project will not deteriorate the conservation status of the qualifying features of the Natura 2000 site and will not disturb the integrity of Natura 2000 sites.

Therefore, due to the distance and location of the area covered by the above project in relation to the nearest natural habitats, species habitats and the species themselves, which are qualifying features, within the boundaries of the Polish Natura 2000 site Słupsk Bank, as a result of the implementation of the planned project, there is no risk of significant negative impact on the above qualifying features.

Transboundary and cumulative impacts of the Baltica-1 OWF with other projects.

Three groups of impacts have been identified that, with their spatial extent, may cross the boundary of the Project area and potentially, in synergy with the impacts of other projects in the Baltic Sea, cause cumulative environmental impacts. These include an increase in suspended matter and its sedimentation; underwater noise; disturbance of space, including a barrier to the free movement of birds and bats, and obstructions to fishing and shipping.

For most offshore projects, the impact is assessed of underwater noise on porpoises and swim bladder fish, which are the most sensitive to sound levels in the water among marine organisms. The negative impact on porpoises and fish manifests itself through a change in their behaviour (behavioural response), a temporary threshold shift (TTS) or a permanent threshold shift (PTS) in hearing, also causing injury and, in extreme cases, death. In the analysis in question, the ranges of occurrence of TTS and PTS, as well as the range of occurrence of behavioural responses, were used to determine the range of cumulative impacts, due to the close proximity of the Project area to the Natura 2000 site Hoburgs bank och Midsjöbankarna (SE0330308), where harbour porpoise is one of the qualifying features.

The use of noise mitigation measures (NMMs) significantly reduces its levels in the environment and spatial range. NMMs are commonly used for piling in offshore areas. The analysis of the range of cumulative impacts was based on the results of noise propagation modelling with the use of NMMs.

The analysis also assumed the condition that the connection infrastructure, the implementation of which will be associated with the occurrence of impacts of suspended matter, must be at most 3 km away from the boundary of the Baltica-1 OWF area, because, according to the modelling performed for the Baltica-1 OWF and other projects, this is the maximum range of its impact in the context of significant water turbidity and, importantly, applies only to its formation due to the disturbance of cohesive sediments with fine grain size (e.g. clays, silts and aggregate muds). The significant range of impact of sedimentation of suspended matter is much weaker and reaches up to a maximum of several hundred meters from the source of seabed sediment mobilisation.
In the analysis of the cumulative impact of suspended matter, the exploitation of the natural aggregate deposit "South Central Bank – South Baltic" located in the Polish part of the Central Bank was also taken into account.

The implementation of the project may result in impacts that may manifest themselves in the Baltica-1 OWF area or overlap with the range of impacts of this project in the maritime area of Poland and Sweden. In the Polish maritime areas, these are:

- Baltica-1 OWF Connection Infrastructure;
- Bałtyk I Offshore Wind Farm;
- Baltica 2 and 3 Offshore Wind Farm;
- Bałtyk II Offshore Wind Farm;
- Bałtyk III Offshore Wind Farm;
- Baltic Power Offshore Wind Farm;
- BC-Wind Offshore Wind Farm;
- FEW Baltic II Offshore Wind Farm.

In the Swedish maritime area, these are:

- Sódra Victoria Offshore Wind Farm;
- Offshore Beta Offshore Wind Farm.

There are also other areas of planned offshore wind farms on the Swedish party that have the potential to create cumulative impacts from underwater noise. These include the Cirrus OWF, Neptunus OWF, Ymer OWF (the areas of these three farms largely overlap with the Baltic Offshore Beta OWF), the Baltic Edge OWF and Öland-Hoburg OWF, and Baltica 1+ OWF on the Polish party.

Cumulative impact of suspended matter
Suspended matter is generated by underwater work and the seabed sediment uplift during the clearing and dredging of the seabed and the construction of cable lines. As the modelling results showed, the extent of suspended matter, in the context of water turbidity, under the worst environmental conditions, will be exhibited most strongly at a distance of up to 1 km (concentration of suspended matter in water up to 30 mg/L) from the site of underwater work, and the extent of its sedimentation will mainly cover the nearest region of underwater work, i.e. at a distance of up to 200 m (increase in the thickness of the new sediment layer exceeding 5 mm) from the work site. Three potential projects causing the formation of suspended matter were found to be within the suspended matter impact range:

- construction area of the Farm Baltica-1 OWF Connection Infrastructure;
- construction area of the project titled Bałtyk I Offshore Wind Farm;
- natural aggregate deposit “South Central Bank – South Baltic”.

The cumulative impacts of suspended matter from seabed sediment uplift will most likely result from the construction of the connection infrastructure of the Baltica-1 OWF (Baltica-1 OWF CI). It is envisaged that this project may be carried out in parallel with the construction of the Baltica-1 OWF, so it is possible to carry out simultaneous underwater work resulting in suspended matter being mobilised in the area of the farm and its power connection. The Baltica-1 OWF CI area is located, among others, in the same area where the Baltica-1 OWF cable line construction area is located. Export cables will also be located in the farm area to evacuate the electricity produced to the onshore area. In the Baltica-1 offshore wind farm area, a maximum of three interlink cables under the applicant-proposed variant (APV) (assuming the construction of a maximum of four OSSs, and in the event only one OSS is constructed, there will be no links between substations) and a maximum of four interlinks if the rational alternative variant (RAV) is implemented, for which the construction of five OSSs is envisaged. It is expected that the maximum length of interlinks under the APV will be 22 km, and under the RAV – 25 km. The maximum number of export cable lines in and around the southern part of the farm area will be four for the APV and five for the RAV. Their length in the farm area is not known at this stage but should not exceed 22 km for the APV and 25 km for the RAV. Taking into account the results of the modelling of suspended matter spread for the Baltica-1 OWF and the Baltica-1 OWF CI, it should be assumed that even in the case of simultaneous construction of the elements of the farm and the connection, the total impact on the environment will not be significantly higher than the impact of suspended matter generated only during the farm construction phase.

Another project whose impacts related to the formation of suspended matter may cause cumulative impacts on the environment is the Baltic I Offshore Wind Farm. However, according to the impact analysis, the impact of suspended matter and its sedimentation on various elements of the environment will be small/negligible.

Cumulative impact of underwater noise

The sound emitted during the piling of wind turbine support structures during the construction phase can propagate in the water columns over considerable distances and negatively affect marine mammals and ichthyofauna, especially swim bladder fish.

In order to conduct a cumulative assessment of underwater noise on marine mammals, the results of modelling noise propagation during piling at several locations simultaneously were analysed first. Then, it was checked whether the predicted impact ranges might overlap with the area of other planned or existing OWFs. The analysis focused primarily on the harbour porpoise as the species most sensitive to noise impacts and endangered in the Baltic Sea. As the harbour porpoise is a qualifying feature in the Swedish Natura 2000 site Hoburgs bank och Midsjöbankarna, bordering the Baltica-1 OWF, the estimation of cumulative impacts also takes into account possible noise exceedances in the area. In addition, the study takes into account modelling results obtained for seals to verify that the cumulative effects of piling noise may also affect other marine mammals found in the Baltic Sea. The results of the analyses attached in the EIA report indicate that carrying out piling at two or more sites at the same time could have significantly negative impacts on marine mammals. This is especially important for porpoises, which congregate in large numbers in the summer season in the Natura 2000 site Hoburgs bank och Midsjöbankarna. The results of noise propagation modelling indicate that even with dual mitigation, the extent of noise impacts from simultaneous piling at several locations will extend into the Natura 2000 site, potentially resulting in behavioural changes and even hearing damage to porpoises. The escape response caused by the presence of noise can lead to the avoidance of a biologically important area by this endangered species. As a result, there may be impacts at the population level. In order to reduce cumulative impacts from underwater noise, the NMMs provided for, in piling planning, for other piling processes within 50 km of the Baltica-1 OWF, **Condition No. B.III.1.**

It is also important to note the results of the analysis of noise exceedances in the Swedish Natura 2000 site in terms of the occurrence of TTS and PTS in harbour porpoise. Calculations have shown that for both summer and winter seasons, simultaneous piling at two or more locations will lead to significant exceedances of noise limits associated with hearing damage, even if dual mitigation (HSD+DBBC, IQIP+DBBC) is provided. In the scenario for the winter season, this applies to both TTS and PTS.

Referring the results described to a scenario in which simultaneous piling is carried out at different OWF locations, it was analysed in which cases cumulative noise effects on marine mammals may occur. The acoustic modelling performed assumed, among other things, that the sound source located outside the Baltica-1 OWF is within 20 km. This means that the impact ranges obtained can be referred to the case where simultaneous piling takes place within the nearby Bałtyk I OWF (west of the Baltica-1 OWF) or the Swedish Sódra Victoria OWF (northwest of the Baltica-1 OWF). It can be assumed that if construction work on the listed planned wind farms were carried out at the same time as the project in question, the negative impacts on marine mammals would be significant. In view of the above, by this Decision, **Condition No. B.I.2.3 and 2.4** has been imposed**.**

In addition, an important region of the Polish part of the Baltic Sea in the context of investment processes for the OWF, is the belt of open water in the central part of the EEZ. The area is assumed to be home to neighbouring offshore wind farms, most of which already hold approved investment plans.

In order to mitigate cumulative impacts from underwater noise, the NMMs provide for including other piling processes within 50 km of the Baltica-1 OWF in piling planning, as a result of which the impact of cumulative noise from piling in several locations at the same time is assessed as insignificant for marine mammals. The analyses conducted have shown that even with dual mitigation in the form of HSD+DBBC, the ranges of impacts are large for both porpoises and seals.

The impact of cumulative noise from piling may also affect swim bladder fish populations, as confirmed by numerical modelling results obtained in the Baltica-1 OWF project.

During the operation and decommissioning phase (the designs of all OWFs included in the analysis assume that foundations and cable lines will be left in the seabed), underwater noise levels will be significantly lower than during the construction phase. For this reason, the cumulative impact during the operation and decommissioning phases will be negligible.

Impact of space disturbance on avifauna (barrier effect)

The possibility of cumulative impacts occurring during the construction phase, can arise only if simultaneous or consecutive works generating similar impacts are carried out in close succession. Assuming that the stages of construction of nearby OWFs will last several years, it is not possible to clearly indicate which activities will be carried out at a similar or the same time. Moreover, following the rule that each Investor will seek to maximise the power and efficiency of their OWF, it should be assumed that they will be built using similar or the same technology. If the nearest OWFs are implemented, due to the analogous nature of the projects and their impacts on birds, cumulative impacts may occur. The airspace over maritime areas is used regularly by birds, including migratory birds in particular. Space disturbance by creating a physical barrier will result in the need to avoid it, both during wintering flights and spring and autumn migration. As construction progresses and more offshore wind turbines are built, the barrier effect will gradually increase, reaching its maximum at the operation stage. Cumulative impacts of the above phenomenon on birds can be minimised at this stage **(Condition No. B.I.2. 2.3).**

Cumulative risk of avifauna collision

The calculation of the cumulative collision risk for the Baltica-1 OWF was made by extrapolating the values obtained in the modelling of collision risk in relation to the capacity of individual projects expressed by the aggregate value of an indicator or taking into account the values reported in the EIA Reports. For the Bałtyk I, Bałtyk II, Bałtyk III, Baltic Power, Baltica 2, Baltica 3, BC-Wind, 44.E.1, FEW Baltic II areas, the predicted mortality data were used (for the species/groups in question) contained in the environmental documents. However, for other OWFs, predicted mortality rates for individual species and species groups were calculated based on the results of collision modelling for the Baltic-1 OWF, taking into account the proportion of installed or planned capacity. The results of the calculations are presented in Appendix 5 of the EIA Report as cumulative collision risk with an avoidance rate of 99% for all species and groups except the crane, for which an avoidance rate of 83% was applied. The presence of construction vessels also poses a risk of increased bird mortality from collisions. This is an impact on birds that may be cumulative if other offshore OWFs are implemented at the same time, or if extraction and transport of material is carried out at a nearby natural aggregate mine (South Central Bank deposit – South Baltic 3/2006). The effect will have at most of small relevance to birds. Due to the proximity of shipping lanes, traffic in the basins will not differ significantly from the standard vessel traffic within the Central Baltic. In addition, the luring effect of light generated by ship traffic, can be minimised by refraining from using light directed directly upward **(Condition No. B.I.1.4).**

The impacts associated with the operation of the Baltica-1 OWF, which may cumulate with other projects of a similar nature, are those associated with the barrier effect and increased risk of collision. The disturbance of space created by the OWF is due to the presence of structures above the water surface, in basins previously free of any physical obstructions. The effectiveness of the barrier effect and the frequency of collisions will depend on the occupation of nearby water bodies by projects of a similar nature. The development of adjacent basins by OWFs may cause obstruction or even prevent the migration of seabirds and migratory birds between wintering grounds and breeding sites. In the context of preserving the continuity of bird migration routes, it is primarily important to maintain the possibility of their movement without the threat of significant depletion of their population or significant energy expenditure that may affect the ecology and biology, including the survival of individuals from these populations. This is because there is a noticeable avoidance by seabirds of the area occupied by offshore wind turbines and a decrease in their numbers in their vicinity – e.g. for the long-tailed duck, within a radius of up to 2 and even up to 4 km (Christensen 2003; Petersen 2006; Leopold 2011).

On the other hand, during unfavourable weather conditions with low visibility (night migration, in haze and/or cloudy conditions), birds may change their flight trajectory by adjusting their flight direction to a source of artificial light, which they misinterpret as stars (Atchoi et al. 2020). The cumulative effect of this impact can be minimised by limiting sources of strong light at night, especially light directed upwards, especially in bird migration periods. Instead, the OWF should be illuminated at night with small, weak and blinking light sources. It is also helpful to change the lighting in poor visibility periods from continuous to long-interval blinking lights. In order to improve the visibility of offshore wind turbines during the day, it is recommended to paint the tips of the blades in bright colours to increase the visibility of an operating offshore wind turbine. By ensuring that OWF visibility is increased during the day and light pollution is reduced during the night, the possible cumulative barrier effect will be minimised.

The development of several OWFs in the Polish and Swedish EEZs will have a cumulative effect of losing long-tailed duck habitats. The seabird inventory for the purposes of the EIA Report for the Baltica-1 OWF confirms the low attractiveness of the OWF development area for birds during the winter period, autumn migration and post-breeding dispersion. However, due to the uncertainty associated with the discovery of a large flock of long-tailed ducks (more than 11,000 individuals) during spring migration after one cycle of seabird surveys, it is not possible to conclude whether the planned Project area is attractive to long-tailed ducks, or whether a one-time concentration of them was observed, resulting from weather factors that forced the birds to temporarily stop migrating.

Vessel traffic in the OWF area during the operation stage will be maintained mainly to ensure the continuity of its operation. Therefore, the significance of impacts associated with the presence of ships during this period, will be smaller than during the construction phase. There will also be less likelihood of cumulative impacts with other OWFs and vessels conducting extraction and transport of material from a nearby natural aggregate mine.

The impact of the Baltica-1 OWF on seabirds and migratory birds, at the stage of its decommissioning, will be similar to that during the construction of the planned Project. With the gradual removal of offshore wind turbine masts, the negative impact of deterring birds away from the area occupied by structures that protrude high out of the water will decrease. Increased traffic of vessels and noise associated with the dismantling of the OWF will still scare birds, but the intensity of this factor will decrease over time. Therefore, even if decommissioning is carried out simultaneously at several sites within one or more OWFs, there will be no cumulative impacts.

Having analysed the scope of the planned project and identified its impact on the environment and its scale, it has been concluded that the planned project may have a potential transboundary environmental impact.

The closest protected area Natura 2000 is Sweden's Hoburgs bank och Midsjöbankarna (SE0330308), located 2,000 meters from the construction area of the turbines, offshore substations and inter-array cable lines. The qualifying features of the said area include the harbour porpoise, a critically endangered species of marine mammal. In order to ensure, in accordance with the precautionary principle, that the impact of the Project on the harbour porpoise *(Phocoena phocoena)* in the Natura 2000 protected area Hoburgs bank och Midsjöbankarna (SE0330308), the Project will develop and implement appropriate impact mitigation measures during the construction phase, so that underwater noise resulting from construction does not exceed inside the Natura 2000 site a certain level causing damage to the hearing organs of these mammals.

The comments and proposals submitted during the transboundary procedure by the affected countries have been analysed in the course of the procedure in question. The process of the transboundary procedure is cited in the statement of reasons for this Decision, and the environmental requirements for reducing transboundary environmental impact are taken into account in the operative part of this Decision, i.e. **Condition No. B.lll**.

Having analysed the EIA report, taking into account the specificities of the place where the project will be implemented, the scope of the planned works, the presence of protected areas, guided by the precautionary principle, the Authority has defined by this Decision the conditions to be applied at the stage of implementation and operation of the project.

The conditions and obligations set out in **Section B.I of this Decision** are imposed on the basis of the conclusions and recommendations of the report submitted and the opinions of the collaborating bodies. The conditions defined for the project implementation phase have been defined taking into account, *inter alia*, the obligations to:

- ensure the economical use of the land during the preparation and implementation of the project – Article 74(1) of the *Act of 18 April 2001 – Environmental Protection Law (Journal of Laws of 2025, item 647, as amended*, hereinafter referred to as “EPL”),
- take into account environmental protection in the work area, in particular the protection of soil, vegetation, natural landform and the groundwater/surface water system – Article 75(1) of the EPL,
- use and transform natural elements while carrying out construction works only to the extent necessary in connection with the implementation of the project concerned – Article 75(2) of the EPL,
- perform waste management in such a manner as to ensure the protection of human life and health and the environment, in particular so that waste management does not pose a risk to water, air, soil, plants or animals (Article 16 of the Waste Act).

These requirements have been defined having in mind the most relevant emissions identified, lack of management that could give rise to negative environmental impacts, including human health or, in an extreme case, lead to a state of environmental hazard. These conditions include both preventive, supervisory and technical emission management measures. The conditions defined for the construction design are a direct guideline for the designer and are aimed to ensure the economical use of environmental resources, minimise emissions, and manage emissions accordingly. The above guidelines are based, *inter alia*, on:

- the prevention, precaution and “polluter pays” principles arising from Articles 6 and 7 of the EPL;
- prohibition of causing substantial deterioration of the environment or a threat to human life or health (Article 141(2) of the EPL);
- the obligation to comply with standards of environmental quality and emission standards (Articles 141(1) and 144(1) of the EPL);
- prohibition of the operation of an installation causing the release of gases or dust into the air, noise emissions and generation of electromagnetic fields to an extent that results in exceeding environmental quality standards beyond the area to which the operator has a legal right (Article 144(2) of the EPL);
- prohibition of taking actions that may, individually or in combination with other actions, have a significant negative impact on the purposes of the conservation objectives of a Natura 2000 site (Article 33(1) of the Nature Conservation Act).

Due to the lengthy process of preparing the project for its physical implementation phase, and in view of the possibility of changes occurring in the environment in the meantime, it was found necessary to obtain additional inventory data documenting the most up-to-date state of the environment as far as possible before the start of the project. The results of this study will be taken into account in the assessment of the impacts caused by the implementation of the project performed at the post-project analysis stage. Due to the need to assess the effectiveness of the preventive and mitigating measures applied, the applicant has been obliged to monitor environmental changes caused by the implementation of the project and the operation of the installation, to the extent indicated in **Section C.2 of this Decision**. Pursuant to Article 82(1)(5) of the EIA Act, the Applicant has been obliged to present a post-project analysis. The post-project analysis will make it possible to confront, on the basis of monitoring results, of the environmental impacts, including in protected habitats and for protected species in the Natura 2000 site, with the findings and recommendations contained in the report prepared under this procedure. The timing and scope of the post-project analysis was linked to the obligations imposed on the Applicant with regard to environmental monitoring, while providing for a period necessary to collect reliable data so as to allow any further actions to be planned to reduce negative environmental impact.

By virtue of this decision, an obligation was imposed on the applicant to prepare documentation for the re-assessment of the project's environmental impact, in the operative part **of this Decision, in Section F.** The basis for conducting a reassessment of environmental impact is Article 82(2) of the EIA. Taking into account its content in the case under review, it is found necessary to carry out a reassessment taking into account that:

- the project data held at the environmental permit stage are insufficient to assess its environmental impact and determine the conditions for the implementation of the project, taking into account the envelope description of the project established by the Investor;
- due to the nature and characteristics of the project and its relationship with other projects, there is a possibility of cumulative impacts of projects located in the area that will be affected by the project. Situated within the cumulative impact range is the construction area of the planned Baltica-1+ OWF and Bałtyk OWF; due to the lack of detailed information on the extent of their impacts, they were not sufficiently precisely described in the EIA report.

According to the guidelines for environmental impact assessment for offshore wind farms (study under the direction of Maciej Stryjecki, Warsaw 2025), Chapter 10.3, quote: *“If the so-called envelope description of the project (a description covering the widest possible range of potential variants for project implementation) is used, impact reassessment should be a standard part of the OWF project management. The envelope description assumes that at the early analysis and planning stage of the project, not all technical details are fully defined (...)*

- *Technological variability: The envelope description of the project, which provides for different technological options (e.g. different types of turbines or foundations), may require a reassessment of the impact when the developer makes a final engineering decision. A subsequent EIA then allows the environmental decision to be fine-tuned to the specific technology, which prevents the risk of having to make later changes or inadequate restrictions specified in the environmental permit.*
- *Locational variability In the case of OWF projects, the exact location of turbines, transformer substations or cable routes is not known until the project development stage. The reassessment allows a thorough analysis of the environmental impact of the new locations and enables minimisation measures to be taken in line with current conditions.*

The imposition of an impact reassessment for the project in question stems from the concept of envelope description of the project. This solution gives investors greater flexibility, while minimising the risk of unforeseen environmental and legal consequences by providing for the most far-reaching and possible impact-related scenarios in the assessment. Reassessment *based on the assumption of the most far-reaching impact assessment provides the opportunity to determine modifications to the conditions set forth in the environmental permit according to the final and ultimately adopted technical parameters of the project, consistent with the construction design, which minimises the risk of unforeseen environmental and legal consequences.”*

In the opinion of the Regional Director for Environmental Protection in Gdańsk, the factual circumstances supporting the reassessment in the present case are both the above-cited technological and locational variability of the project in question, and therefore the need to confirm the conclusions regarding the scale and intensity of the environmental impact, as well as the lack of significant negative impacts of the project on Natura 2000 sites, based on the final solutions adopted in the construction design.

In addition, it should be pointed out that the role of the reassessment is to remove the risk of redundant environmental conditions constraining the project, so the reassessment will remove/change over-dimensioned limitations in terms of area and schedule, redundant protective measures and monitoring activities, which have an adverse effect on the development of the project.

Pursuant to Article 135(1) of the EPL, the creation of a restricted use area is permissible if the following are met jointly: 1) the project concerns or concerned sewage treatment plants, municipal waste storage facilities, composting facilities, a communication route, airport, power line or substation, and radio communication, radio navigation and radiolocation installations; this list is exhaustive; 2) the ecological review or environmental impact assessment of the project or the post-project analysis shows that despite the application of available technical, technological and organizational solutions, environmental quality standards outside the premises of the plant or other facility cannot be observed.

Wind turbine generators are not included in the catalogue of installations for which a limited use area may be established. This means that the investor's legal right should cover an area that guarantees compliance with environmental quality standards at the boundary of the area. A restricted use area may only be created for power lines and substations if standards for electromagnetic fields or environmental noise are exceeded. It is not anticipated that any environmental quality standards may not be met by these facilities, and therefore there is no need to create a limited use area for the Project. According to the attached documentation, at the current stage of project preparation, there are no grounds for determining the possibility of exceeding environmental quality standards with regard to both air, noise, wastewater, as well as magnetic field strength and electric field. Impacts will not exceed permissible values outside the area in which the Applicant has legal interest. The closest areas for which environmental quality standards have been set in the aforementioned range are located on land, i.e. about 75 km away. Thus, it is not anticipated that any environmental quality standards may not be met by these facilities, and therefore there is no need to create a limited use area for the Project. The above is reflected in the operative part of this Decision in **Section E.**

Prior to issuing the Decision, by letter ref. RDOŚ-Gd-WOO.420.59.2023.AM.38 of 24 July 2025, the Regional Director for Environmental Protection in Gdańsk notified parties to the procedure, in accordance with Article 10 of the CAP, of the completion of the collection of evidence and of the possibility to consult the case file and to comment on the collected evidence and materials. No comments or requests were received within the deadline.

On 30 September 2025 and 1 October 2025, the Investor submitted clarifications of the contents of the EIA report to this authority. Having regard to the aforesaid, the Regional Director for Environmental Protection in Gdansk, by letter ref. RDOŚ-Gd-WOO.59.2023.AM.41 of 2 October 2025, again notified the parties to the procedure, in accordance with Article 10 of the Code of Administrative Procedure, of the completion of the collection of evidence and the opportunity to consult the case file and comment on the collected evidence and materials. No comments or requests were received within the deadline.

The implementation of the project on the basis of this Decision, as well as subsequent operation of the facilities created as a result of the project, shall not release the Investor, notwithstanding the provisions of this Decision, from the obligation:

- to apply the provisions on technical conditions established pursuant to Article 7 of the Act of 7 July 1994 – Construction Law *(consolidated text, Journal of Laws of 2025, item 418);*
- to obtain permits, opinions and approvals required by law;
- with regard to the proper operation of equipment, as specified in the provisions of the Act of 27 April 2001 – Environmental Protection Law (*consolidated text, Journal of Laws of 2025, item 647);*
- waste management, as specified in the provisions of the Act of 14 December 2012 on waste (Journal of Laws of 2023, item 1587, as amended).

Such obligations, as existing and legally binding, are not required to be re-imposed and disclosed in the Decision.
Having regard to the aforesaid, it has been decided as set forth at the outset.

Stamp duty in the amount of PLN 205 was paid for the issuing of this Decision (Appendix 1, Part I, item 45 of the Act of 16 November 2006 on the stamp duty *(consolidated text, Journal of Laws of 2025, item 1154)*.

This decision shall be disclosed in a publicly available data registry.

INSTRUCTION

The party has the right to appeal against this decision to the General Director for Environmental Protection through the Regional Director for Environmental Protection in Gdańsk, ul. Chmielna 54/57, 80-748 Gdańsk, within 14 days from the date of delivery of the decision to the party or within 30 days from the date of notification or delivery of the notification of the decision, in accordance with Article 76(1) of the Act of 17 December 2020 on the promotion of electricity generation in offshore wind farms (*Journal of Laws of 2025, item 498*).
The environmental permit does not replace a permit issued pursuant to Article 56 of the Act on nature protection. A permit pursuant to Article 56 of the Act of 16 April 2004 on nature protection (*consolidated text, Journal of Laws of 2024, item 1478, as amended*) should be obtained for the potential destruction of habitats of species or the flushing or transfer of protected species.

Regional Director for Environmental Protection in Gdańsk Anna Tchórzewska
/signed electronically/

C.c.:

1. Elektrownia Wiatrowa Baltica-1 Sp. z o. o., through Attorney: Natalia Kaczmarek/ Juliusz Gajewski/ Radosław Opioła, ul. Roberta de Pielo 20, 80-548 Gdańsk
2. Grand Agro – Kazimierz Mroczkowski Grand Agro Fundacja Ochrony Środowiska Naturalnego, ul. Władysława Pytlasińskiego 16/13, 00-777 Warsaw – ePUAP
3. file

For information:

1. Director of the Maritime Office in Gdynia, ul. Chrzanowskiego 10, 81-338 Gdynia
2. State Border Sanitary Inspector in Gdynia, ul. Kontenerowa 69, 81-155 Gdynia
3. General Director for Environmental Protection, Al. Jerozolimskie 136, 02-305 Watt - ePUAP

REGIONAL DIRECTOR FOR ENVIRONMENTAL PROTECTION in GDAŃSK

APPENDIX 1
To Decision No. RDOŚ-Gd-WOO.420.59.2023.AM.42

according to Article 62a of the Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and environmental impact assessments (consolidated text, Journal of Laws of 2024, item 1112, as amended).

The planned project involves the construction and operation of the Baltica-1 Offshore Wind Farm (hereinafter: Baltica-1 OWF or Project) with a maximum installed capacity of 900 MW. The wind turbines will be located in the Polish exclusive economic zone. The planned project is located in the EEZ of the Republic of Poland, on the eastern side of the Central Bank, in the depth range from approx. 16 m to approx. 50 m, at a distance of approx. 75 km north of the shoreline, off the Smołdzino commune and the Leba commune (Pomeranian voivodeship) and at a distance of 550 m from the border of the EEZs of Poland and Sweden. The Baltica-1 OWF occupies an area of 85.53 km^2.

The Project is aimed to generate electricity from a renewable energy source – wind power. The kinetic energy of wind is converted into mechanical energy of the rotating rotor. It is then converted in a generator to low-voltage alternating current, which is then transformed to medium or high voltage for further transmission to the substation via the inter-array power infrastructure. After the voltage is stepped-up in the transformers, the energy is carried via a transmission cable ashore, ultimately to the National Power System (NPS).

Table 1. Geocentric coordinates of the boundary angle points of the Baltica-1 OWF area

Boundary point symbol	**Geocentric geodetic coordinates in the ETRS89 reference system**	
	Geodetic latitude Φ	**Geodetic longitude λ**
1	55’38'16.206” N	17’38’03.776" E
2	55’36’16.018" N	17’35’40.167” E
3	55’33’43.771" N	17’34'46.304" E
4	55’32’09.162" N	17’35’21.458” E
5	55’32'03.321” N	17’35’23.627” E
6	55’31’56.204” N	17’35’26.269" E
7	55’31’19.695" N	17’35’29.710” E
8	55’31’17.057" N	17’35’29.579" E
9	55’31'01.612" N	17’35’26.574" E
10	55’30’53.163” N	17’35’24.930" E
11	55’30’42.510" N	17’34’50.515” E
12	55’29'53.123" N	17’32’14.175” E
13	55’29’43.030” N	17’30’45.137" E

Boundary point symbol	Geocentric geodetic coordinates in the ETRS89 reference system	
	Geodetic latitude Φ	Geodetic longitude λ
14	55’29’36.940" N	17’29’52.854” E
15	55’29’25.168" N	17’29’31.287" E
16	55’28’57.603" N	17’26’25.966" E
17	55’28’56.144" N	17’25’54.331” E
18	55’31’42.251" N	17’26’44.303" E
19	55’31’43.594" N	17’27’00.863” E
20	55’31’46.079" N	17’27’12.463" E
21	55’33’19.449" N	17’31’23.992” E
22	55’34’06.850" N	17’33’40.983” E
23	55’34’32.229" N	17’33’59.580" E
24	55’35’07.555” N	17’33’41.076" E
25	55’36’02.838” N	17’32’11.364” E
26	55’36’06.396" N	17’32’02.976" E
27	55’36’56.064" N	17’29’05.042” E
28	55’37’24.525" N	17’30’35.467" E
29	55’37’45.553" N	17’31’42.228" E
30	55’37’34.673" N	17’32’05.771” E
31	55’37’27.287" N	17’32’42.422” E
32	55’37’27.289" N	17’33’21.362" E
33	55’37’34.677” N	17’33'58.079" E
34	55’38’41.045” N	17’37’26.888" E
35	55’38’33.742” N	17’37’18.176" E

Table 2 Geocentric coordinates of the boundary angle points of the Baltica-1 OWF area – construction area of wind turbines, offshore substations and inter-array cable lines.

Boundary point symbol	Geocentric geodetic coordinates in the ETRS89 reference system	
	Geodetic latitude Φ	Geodetic longitude λ
1	55’35’07.555" N	17’ 33’41.076" E
2	55’36’02.838" N	17“ 32’11.364” E
3	55’36’06.396” N	17 ° 32’02.976" E
4	55’36’56.064” N	17’ 29’05.042” E
5	55’37’24.525" N	17 ° 30’35.467” E
6	55’37’45.553" N	17 ° 31’42.228" E
7	55’37’34.673" N	17’32’05.771 "E
8	55’37’27.287" N	17’32’42.422” E
9	55’37’27.289" N	17’ 33’21.362” E
10	55’37’34.677” N	17’ 33’58.079” E
11	55’38’41.045” N	17’37’26.888” E
12	55’38’31.390" N	17’ 37’15.371" E
13	55’36’39.919” N	17 ° 34’51.822" E
14	55’36'38.132" N	17 ° 34'49.825” E
15	55’35’37.494" N	17° 33’51.521” E
16	55’35'32.435" N	17 ° 33’48.439" E
17	55’34’06.850" N	17 ° 33'40.983" E
18	55’33'18.564” N	17’ 34'01.464" E
19	55’31’58.034” N	17’ 34’28.954” E

Boundary point symbol	Geocentric geodetic coordinates in the ETRS89 reference system	
	Geodetic latitude Φ	Geodetic longitude λ
20	55’31’19.286” N	17 ° 34’32.633” E
21	55’30’53.817” N	17’ 34’27.689" E
22	55’30'08.491” N	17’32’04.213" E
23	55’29’58.893" N	17’30’39.551” E
24	55’29’57.369" N	17’ 30’31.942" E
25	55’29’54.694” N	17’ 30’25.390" E
26	55’29’25.168" N	17 ° 29'31.287” E
27	55’28'57.603" N	17’ 26’25.966" E
28	55’28'56.144" N	17 ° 25’54.331" E
29	55’31’42.251" N	17’ 26’44.303" E
30	55’31’43.594” N	17’27’00.863" E
31	55’31’46.079” N	17’ 27’12.463" E
32	55’33’19.449" N	17’ 31’23.992” E

Table 3 Geocentric coordinates of the boundary angle points of the Baltica-1 OWF area – construction area of inter-array cable lines

Boundary point symbol	Geocentric geodetic coordinates in the ETRS89 reference system	
	Geodetic latitude Φ	Geodetic longitude λ
1	55’34’06.850” N	17’33’40.983" E
2	55’34’32.229" N	17’33'59.580" E
3	55’35’07.555” N	17’33’41.076" E
4	55’35’32.435” N	17’33’48.439" E
5	55’35’37.494" N	17’33’51.521" E
6	55’36’29.199” N	17’34’41.668" E
7	55’36’38.132" N	17’34’49.825” E
8	55’36’39.919" N	17’34'51.822" E
9	55’38’31.390" N	17’37’15.371” E
10	55’38’33.742" N	17’37’18.176" E
11	55’38'33.742” N	17’37'18.176" E
12	55’38’16.206” N	17’38’03.776” E
13	55’36'16.018” N	17’35’40.167" E
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21	55’30’53.163” N	17’35’24.930" E
22	55’30'42.510” N	17’34’50.515” E
23	55’29’53.123” N	17’32’14.175" E
24	55’29’43.030" N	17’30’45.137” E
25	55’29’36.940" N	17’29’52.854” E
26	55’29’54.694" N	17’30’25.390" E
27	55’29’57.369" N	17’30’31.942" E
28	55’29'58.893" N	17’30’39.551” E

Boundary point symbol	Geocentric geodetic coordinates in the ETRS89 reference system	
	Geodetic latitude Φ	**Geodetic longitude λ**
29	55'30'08.491" N	17'32'04.213" E
30	55'30'53.817" N	17'34'27.689" E
31	55'31'19.286" N	17'34'32.633" E
32	55'31'58.034" N	17'34'28.954" E
33	55'33'18.564" N	17'34'01.464" E

The Baltica-1 Offshore Wind Farm will comprise:

- offshore wind turbine generators – up to 60 units, whose basic components are the foundation, tower, and the nacelle and rotor assembly;
- offshore substations – up to 4 units;
- inter-array power and telecommunications network, which will be consist of submarine cables connecting the wind turbine generators with each other and groups of wind turbine generators with the offshore substations, with a maximum length of 140 km;

The Baltica-1 OWF offshore wind farm does not include infrastructure for the transmission of electricity generated by the farm ashore. The connection infrastructure project will be covered by a separate administrative procedure.

The start of the construction phase will be preceded by the preparation of the seabed prior to the installation of foundations or support structures for individual OWF structures, i.e. wind turbines and offshore substation platforms (hereinafter: OSSs), as well as the preparation of the seabed, if necessary, at the location of the jackup spudcan foundations of installation vessels.

Table 4 Summary of detailed parameters of the Baltica-1 OWF

Name of facility or definition of parameter	Unit	Value
Maximum capacity of the offshore wind farm	MW	900
Maximum capacity of a single wind turbine	MW	25
Maximum number of wind turbines with the smallest unit turbine capacity (15 MW)	units	60
Maximum number of wind turbines with the smallest turbine unit capacity (25 MW)	units	36
Maximum rotor diameter for a 25 MW wind turbine	m	310
Minimum clearance between the lower position of the rotor blade and the sea surface [m]	m	20
Maximum total height of a wind turbine with a capacity of up to 25 MW including the rotor, asl [m]	m	330
Maximum rotor sweep area for a wind turbine with a capacity of up to 25 MW	m^2	75,500
Maximum total rotor sweep area for wind turbines with a capacity of up to 25 MW	m^2	2,750,000
Considered types of foundation of turbines and offshore substations	Foundation type: monopile, truss (pile or suction bucket jacket – SBJ), gravitational foundation	
Maximum diameter of wind turbine generator foundation	m	55
Seabed area occupied by the wind turbine generator foundation (maximum)	m^2	2,400
Minimum distance between wind turbines	RD	3.5
Maximum distance between wind turbines	RD	12
Minimum number of offshore substations	units	1

Name of facility or definition of parameter	Unit	Value
Maximum number of offshore substations	units	4
Maximum length of cable routes of systems inside the OWF	km	140
Maximum width of the seabed strip covered by construction works for one cable line	m	16

*RD – Rotor Diameter

The maximum number of offshore wind turbines forming part of the Baltica-1 OWF will depend on the nominal capacity of the selected units and will be up to 36 units of 25 MW and up to 60 units of 15 MW, or a correspondingly different number of units if turbines of less than 25 MW and more than 15 MW are selected.

The types of foundations considered for the foundation of the turbine and offshore substations for the project in question are as follows:

- monopile foundation;
- truss foundation (type: pile or suction bucket jacket – SBJ);
- gravitational.

The choice of wind turbine generator foundations will depend on the technology available during the construction phase, the depth of the foundation and the geotechnical conditions of the seabed.

Monopiles are usually fabricated from welded steel tubular sections and driven vertically into the seabed using pile drivers. Monopiles are the most commonly used foundations for wind farms currently in operation.

A jacket-type truss foundation usually consists of three or four main legs that rest on a truss, i.e. a system made up of bars that are articulated together at nodes. Jacket-type foundations are anchored to the seabed with individual piles or suction caissons on each leg. Jacket pile foundations are currently the preferred foundation solution for larger turbines in deeper water.

When boulders are present on the seabed, the seabed may need to be cleaned and reinforced by dredging and rock dumping if a jack-up vessel is used to install the foundation.

The monopiles and jacket piles are either driven, vibration-driven or bored.

Gravitational foundations on the seabed are usually heavy ballast structures made of steel and/or concrete. They can vary in shape, and their base diameter can be up to 55 m. The structure is placed on a pre-prepared seabed area. The preparation of the seabed involves possible removal of boulders from the foundation site, excavation to remove the top non-bearing layer of sediment, and levelling of the subgrade. The diameter of the levelled seabed area can reach up to 75 meters. In order to prepare the subgrade for gravitational foundations and jackup spudcan foundations of installation vessels and to provide erosion protection, support vessels are used – dredgers, rock dumping vessels, enabling the transport of sediments and the transport and placement of rip-rap (rock dumping).

Depending on the depth of the basin and the anticipated weather conditions, it may be necessary to provide scour protection. At locations where the seabed is subject to hydrodynamic processes, i.e. shallow areas and near-bed current areas, and there is a danger of sediment leaching around the foundations, it is necessary to protect the seabed surface around the foundation with a protective layer, such as rip-rap (scour protection).

Protective coatings and a passive or active anti-corrosion system will be applied to the surface of the foundation to protect it from corrosion.

The Noise Reduction System is a component of the project. The purpose of its application is to minimise the negative impact of underwater noise during the installation of pile foundations and to comply with the permissible noise levels indicated in this environmental permit decision. The Noise Reduction System encompasses the use of various types of noise reduction solutions, which together will constitute the Noise Reduction System. In particular, the following will be considered in selecting the underwater Noise Reduction System:

- piling locations, including piling locations on neighbouring projects (within a 50 km radius),
- work schedule, including work on other projects (piling within a 50 km radius),
- parameters of the pile driver (type, maximum energy and values during the cycle of use, frequency and number of strikes) or other technical solution used, used to sink the pile into the seabed,
- geotechnical parameters of sediment,
- parameters of piles driven (geometry and materials),
- seasonal variability of environmental conditions (including periods of particular importance for animals and parameters of underwater noise propagation).

The inter-array cable system of the Baltica-1 OWF will be made up of offshore MV (medium-voltage) or HV (high-voltage) cables connecting wind turbine into clusters (circuits/sections) that are then connected to one or more WV/HV or HV/EHV OSSs, as well as the necessary data communication and telecommunication links in the form of fibre-optic cables integrated into power cables or separate data communication cables laid in parallel with power cables. Depending on the wind turbines used, as well as their location and the power collection solutions adopted, marine multicore AC power cables may be used, with cross sections depending on the designed load, with voltage rating of 66 kV or 132 kV. The maximum operating temperature of the main conductors of power cables will be 90^{o}C.

The burial depth of power cables in the seabed along most of the cable line route will be up to 3 m bsbl. Due to local conditions related to the structure of the seabed, the cables may be buried up to 6 m bsbl. If it will be impossible to reroute the cable line to avoid an obstacle located on or under the seabed, e.g. in the event foreign line infrastructure is present, it will be necessary to lay cable line sections on the surface of the seabed and protect them appropriately, e.g. with rip-rap, rip-rap wire mesh, concrete covers, reinforced concrete half-shells, conduits and protection devices made of HDPE fittings. The maximum total length of cable lines within the OWF will be up to 140 km.

The laying of MV or HV power cables on the seabed will be carried out by a specialised cable laying vessel (CLV). Burying the cable can be done immediately after it is laid or at a later stage. The technology used will depend on the characteristics of the seabed and may vary within the Project.

Depending on the geological conditions, the length of the sections to be laid and the parameters of the cable, the developer may use methods of laying cable lines using: jetting equipment, mechanical dredgers for making trenches in the seabed, cable ploughs for simultaneous laying and burial of the cable in the seabed sediment. Once laid, the cables are pulled into the wind turbines and the offshore substation, where they are then attached to electrical switchboards.

Cables connecting the wind turbines will be routed to offshore substations, appropriately located to optimise inter-array and export cable lengths. The OSSs receive alternating current transmitted via 66 kV or 132 kV inter-array cables and, depending on the technology for power transmission shore, raise the voltage to that required for export cables or raise and convert it to high-voltage direct current to reduce losses during power transmission ashore. In the case of HVAC technology, transformer substations are installed, while in the case of HVDC technology, converter substations (also equipped with transformers, but additionally with converter systems) are installed. The converter substation can be implemented as a separate substation, built independently of the OSS, but can also be integrated into the OSS by retrofitting it with the necessary voltage conversion systems.

For HVAC technology, the number of OSSs can be more than one (maximum 4). For HVDC technology, a maximum of one converter substation is envisaged, with the option to provide up to three transformer substations. The OSSs will be located on the OWF site, and their location and required technical data will be confirmed at the construction design stage. Up to four offshore substations are planned for the Baltica-1 OWF. The OSSs can be provided with the option to install a helipad on the platform. Jack-up or other high-capacity vessels, transport vessels and service operations vessels will be used to install the offshore substation.

The construction phase will require the use of vessels and helicopters to transport materials and personnel to and from the Baltica-1 OWF and to conduct work on site. The construction phase will include four main areas of activity related to:

- the preparation of the seabed prior to the installation of foundations or support structures for wind turbines and OSSs. The type of preparatory work will be determined by the geological conditions at the foundation sites and the type of foundation used;
- transport and installation of foundations or support structures of OWF elements in the seabed;
- transport and installation of wind turbine and OSS components;
- construction of inter-array cable lines connecting wind turbines and wind turbines to OSSs.

The exact number of vessels that will operate at any one time during the construction phase is unknown, as is the frequency and duration of their operations. Potentially, the operations may require the use of more than 6 vessels at any given time; fewer ships may be required for particular construction work. For example, the installation of foundations will require only 1-2 jack-up vessels and 1-2 support vessels (CTVs, guard vessels, tugs). Other vessels needed during construction are as follows:

- support vessels (supply, crew transfer and service, underwater work, noise reduction, etc.), e.g. SOVs,
- specialised vessels, cable laying vessels; HLCV, HLJV, dredgers, rock dumping vessels;
- survey vessels.

It is assumed that the OWF construction phase will be completed in the shortest possible time and will last about 2 years. The operation phase will begin with the commissioning of the Baltica-1 OWF – the start of electricity generation by wind turbines. The operating period of the OWF is expected to be up to 35 years. It is estimated that the decommissioning time for the Baltica-1 OWF structures will be about 2 to 3 years. This estimate takes into account the time needed to secure items left in the seabed.

The operation phase will be characterised primarily by taking scheduled maintenance actions and replacing/repairing components. Offshore installations are typically monitored/operated unmanned and remotely from an onshore control centre. Inspections and servicing operations can be divided into those carried out on facilities above sea level and below sea level. These are carried out annually by personnel trained to carry out maintenance and, if necessary, repairs as well. For routine maintenance, personnel and equipment are transported to offshore wind turbine and OSS locations by SOVs and CTVs. For ad hoc repairs/replacement of larger components, a jack-up vessel, or other large vessels such as those used for installation work, is required. In special situations, a helicopter can be used to transport parts and service technicians.

Typical maintenance activities will include general wind turbine maintenance, OSS maintenance, oil sampling/replacement, battery replacement in emergency power supply units, maintenance and inspection of wind turbine safety equipment, nacelle crane, service lift, high-voltage system, blades, major overhaul and repair and restart of the wind turbine.

Repairs to cable lines and their periodic inspections may be required during the operating period of the Project. Scheduled inspections will also be required to ensure that the cables remain buried, and if exposed, work will be undertaken to re-bury them or secure them on the seabed surface. Cables can also be exposed by the movement of sand or erosion of other soft/mobile sediments. The wind farm is expected to operate for up to 35 years.

After the end of the Baltica-1 OWF operation phase, two possible options are considered: continued operation with the possibility of upgrading the OWF infrastructure or decommissioning of the Project. Decommissioning involves dismantling the farm's structures and leaving in the environment those components that would be too costly to remove and/or could cause heavier negative environmental impacts than leaving them in place. This applies especially to parts of foundations below seabed level and buried cable lines. The process of decommissioning an offshore wind farm is a complex one and is a reverse of its construction. It is estimated that the decommissioning time for the Baltica-1 OWF structures will be about 2 to 3 years. This estimate takes into account the time needed to secure items left in the seabed.

Regional Director for Environmental Protection in Gdańsk Anna Tchorzewska
/signed electronically/

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I, Agnieszka Jurewicz, a sworn translator of English, entered into the register of sworn translators kept by the Minister of Justice under a registration number TP/1569/06, hereby certify that the foregoing is an accurate translation of a presented original document.

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