MFW Bałtyk I S.A.

Project Information Card: Offshore Wind Farm MFW Bałtyk I prepared for MFW Bałtyk I S.A.

Final version

May 2022

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Equinor Project No. 465904

The business of sustainability

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Customer name	MFW Bałtyk I S.A.

May 2022

Project Information Card: Offshore Wind Farm MFW Bałtyk I prepared for

MFW Bałtyk I S.A.

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List of Abbreviations

Name	Description
Art.	Article
CLV	Cable Laying Vessel, a vessel used to lay submarine cables
DA BI (1NM)	MFW Bałtyk I development area, including a potential impact zone with a radius of at least 1 nautical mile
DA BI (2NM)	MFW Bałtyk I development area, including a potential impact zone with a radius of at least 2 nautical miles
ED	Environmental Decision (PL: *Decyzja o środowiskowych uwarunkowaniach*)
JoL	Journal of Laws (PL: *Dziennik Ustaw, Dz.U.*)
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment (PL: *Ocena oddziaływania na środowisko, OOŚ*)
EIA Act	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 (Journal of Laws of 2021, item 2373, as amended)
EIA Report	Environmental Impact Assessment Report
EPA	Act dated April 27, 2001. Environmental Protection Act (Journal of Laws 2021, item 1973, as amended)
Espoo Convention	Convention on Environmental Impact Assessment in a Transboundary Context, done at Espoo on February 25, 1991.
EU	European Union
GW	Gigawatt
GWh	Gigawatt hour
HELCOM	The Baltic Marine Environment Protection Commission – also known as the Helsinki Commission
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
ICES	International Council for the Exploration of the Sea
km	kilometre
kV	kilovolt
l	litre
m	metre
NPS	National Power System (PL: *Krajowy System Elektroenergetyczny, KSE*)
OWF	Offshore Wind Farm; (PL: *Morska farma wiatrowa, MFW),*
MFW BI/MFW Bałtyk I/Project	Offshore Wind Farm Bałtyk I (PL: *Morska farma wiatrowa MFW Bałtyk I*)
MFW BI area	maritime area designated for the development of MFW BI, according to the OLL
MES	Marine Electrical Substation
MSP	Maritime Spatial Plan
MW	Megawatt
MWh	Megawatt hour

Natura 2000	Programme of the network of nature conservation areas in the territory of the European Union
NM	Nautical mile
Offshore Wind Act	Act of 17 December 2020 on the promotion of electricity generation in offshore wind farms (Journal of Laws of 2021, item 234, as amended).
OGT	Macrozoobenthos indicator (presence of typical species)
OLL	Offshore Location Licence (PL: *Pozwolenie na wznoszenie i wykorzystywanie sztucznych wysp, konstrukcji i urządzeń w polskich obszarach morskich or* PSZW)
OSS	Offshore Substation
PL-1992	National Geodetic Coordinate System 1992 (also: PUWG 1992)
POM	Polish maritime areas (PL: *Polskie obszary morskie*)
POM.60.E	Area where the MFW BI is planned under the POM Plan
POM Plan	Spatial development plan for internal sea waters, territorial sea and the exclusive economic zone in the scale 1:200 000, adopted by the Ordinance of the Council of Ministers of 14 April 2021 (Journal of Laws 2021 item 935) - Maritime Spatial Plan (MSP)
RDOŚ	Regional Directorate for Environmental Protection
MSFD	Marine Strategy Framework Directive (PL: *Ramowa Dyrektywa Strategii Wodnej,* RDSM)
WFD	Water Framework Directive (PL: *Ramowa Dyrektywa Wodna,* RDW)
ROV	Remotely Operated Underwater Vehicle
TI	Technical Infrastructure (electric power infrastructure)
TI MFW BI	Electric power infrastructure connecting the MFW BI with the National Power System
WGS	World Geodetic System
WTG	Wind Turbine Generator

1 INTRODUCTION

MFW Bałtyk I S.A.is the SPV responsible for the preparation and implementation of the Offshore Wind Farm MFW Bałtyk I together with associated infrastructure, including equipment for power output to the National Power System ("Venture", "MFW Bałtyk I Venture"). This venture is being implemented jointly by Equinor and Polenergia.

MFW Bałtyk I S.A., i.e. the Investor, is applying for the determination of the scope of the Environmental Impact Assessment (EIA) Report for the issuance of the decision on environmental conditions (ED) for the Offshore Wind Farm MFW Bałtyk I in the area 60.E with a total maximum installed capacity of 1560 MW as well as the infrastructure, required for the implementation and operation of the farm ("Project", "MFW Bałtyk I"). Detailed information on the elements of the planned Project are presented in Sections **Błąd! Nie można odnaleźć źródła odwołania.- Błąd! Nie można odnaleźć źródła odwołania.** below.

2 CONTENTS OF THE PROJECT INFORMATION CARD

This Project Information Card was developed based on the requirements of Article 62a par. 1 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 (Journal of Laws 2021, item 2373, consolidated text); hereinafter referred to as the EIA Act. Table 2.1 below presents the location of the required elements in this Card..

Table 2.1 Content of the Project Information Card

No.	Topics of the Card	Location in the Card – Chapter no.
1	Type, scale and location of the project	Chapter 4
2	Area of occupied real estate, as well as building structure, their current use and vegetation cover	Chapter 6
3	Type of technology used	Chapter 8
4	Possible project alternatives	Chapter 9
5	Anticipated use of water, raw materials, fuels and energy	Chapter 10
6	Environmental protection solutions	Chapter 11
7	Types and predicted amounts of substances or energy released to the environment with the application of environmental protection solutions	Chapter 12
8	Possible transboundary environmental impacts	Chapter 16
9	Areas subject to protection under the Act on Nature Conservation of 16 April 2004	Chapter 14
10	Current and completed projects located in the area where the project is planned to be implemented and in the impact area of the project, or whose impacts fall within the impact area of the planned project - to the extent that their impacts can lead to accumulation of impacts with the planned project	Chapter 15
11	Risk of a major accident or natural and man-made disaster	Chapter 18
12	Anticipated quantities and types of waste disposed of and their impact on the environment	Chapter 13

3 IDENTIFICATION OF THE INVESTOR APPLYING FOR THE PERMIT, ITS REGISTERED OFFICE AND ADDRESS

Table 3.1 Investor's (applicant's) data

Name of the investor:	**MFW Bałtyk I S.A.**
Address:	Krucza St. 24/26, 00-526 Warsaw
Municipality:	M.St. Warszawa
County:	M.St. Warszawa
Voivodeship:	Mazowieckie
KRS:	0000335266
NIP:	5862243743
REGON:	220853643

4 TYPE, CHARACTERISTICS, SCALE AND LOCATION OF THE PROJECT

4.1 TYPE AND CHARACTERISTICS OF THE PROJECT

The planned Project covers the construction and operation of the offshore wind farm MFW Bałtyk I.

The Project will be carried out in the Polish Exclusive Economic Zone (EEZ), about 81 km from the mainland Łeba municipality.

The aim of the Project is to generate electricity using a non-carbon, renewable source of energy such as wind force. The kinetic energy of the wind is converted into mechanical energy by a revolving rotor. Next, the mechanical energy is converted in the generator to low-voltage alternating current, which is then transformed to medium- or high-voltage for transmission to the substation via internal electricity infrastructure. The operation of the wind farm is expected to last 25-35 years.

The applicant holds the permit to erect and exploit artificial islands, installations and equipment in Polish maritime areas for the Project "Morska Farma Wiatrowa Bałtyk Północny" (Offshore Wind Farm Bałtyk Północny) (hereinafter referred to as "OLL" or Offshore Location License) issued on 16 July 2012 by the Minister of Transport, Construction and Maritime Economy, no. GT7wp/62/1182060/MFW/1a/2012. In accordance with the Act of March 21, 1991 on maritime areas of the Republic of Poland and maritime administration (Journal of Laws 2022, item 457), the permit is valid for a period of 35 years with a possibility of extension at the operation stage.

The MFW Bałtyk I offshore wind farm will consist of:

- Maximum up to 104 wind turbine generators ("WTG"), the basic components of which are: foundation, tower, nacelle with a power generator and rotor,
- Maximum up to 2 internal offshore substations ("OSS"),
- Maximum up to 250 km of internal power and telecommunication cables connecting:
  - individual WTGs together (into cable circuits),
  - WTG groups with internal offshore substations,
  - internal offshore substations with one another.

The Project will also include all the necessary infrastructure for the construction and operation of the farm. The scope of the application for the decision on environmental conditions for MFW Bałtyk I **does not include the infrastructure"(within the meaning of the Act of 17 December 2020 on the promotion of electricity generation in offshore wind farms (Journal of Laws 2021, item 234,**

consolidated text) for the transmission of electricity generated by the farm to the mainland National Power System.

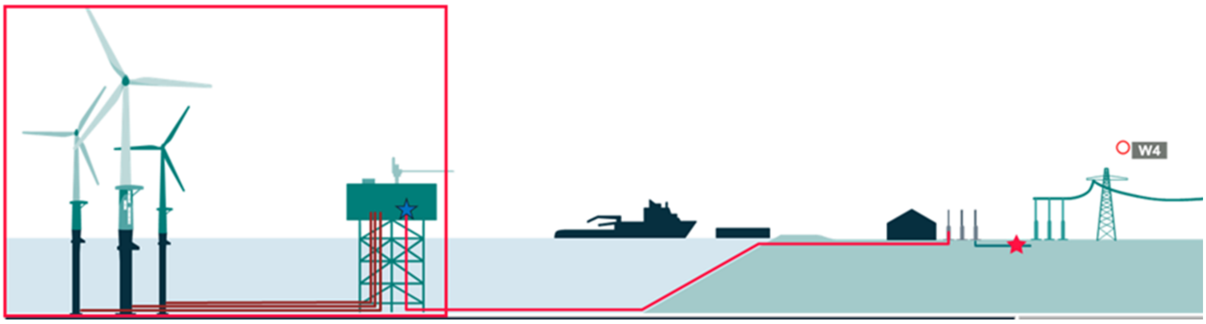
The infrastructure for the transmission of electricity generated by the farm to the mainland National Power System will be a part of a separate administrative procedure for the issuance of the environmental decision, but for this EIA will be assessed in regards of the cumulative impacts only and will cover the following elements:

- Export cables from the offshore substation constituting a part of the offshore wind farm MFW Bałtyk I (the Project covered by the application) to the landfall, or alternatively to an offshore substation forming part of the equipment for the power transmission and then from that substation to the landfall ,
- Onshore export cables from the transition bay to the onshore substation,
- Onshore substation including converter equipment,
- Onshore export cables from the onshore substation to the NPS station, from which electricity will be transmitted to Polish electricity grid.

In the area of MFW Bałtyk I about 10-15 km of corridors of export cables will be placed, which are excluded from the technical scope of MFW Bałtyk I and will be subject to a separate administrative procedure.

Figure 4.1 presents the elements of the MFW Bałtyk I, that are a part of the Project (marked with red rectangle) and the other elements of the Venture that will be considered only in regards of the cumulative impacts.

Figure 4.1 Illustration of the main components of the MFW Bałtyk I Venture



Source: Equinor / Polenergia

The maximum total capacity of the planned MFW Bałtyk I is 1 560 MW, however, the final installed capacity of the farm as well as the total electricity production will depend on the number and type of generators used and the meteorological conditions, however the installed capacity will not exceed the above mentioned maximum capacity.

The investor anticipates that the Project may be implemented in stages. The onshore product will be electrical energy, ultimately transmitted to the National Power System (KSE).

Table 4.1 below presents characteristic technical parameters of the planned Project.

Table 4.1 Characteristic technical parameters of the planned Project

Technical parameters of MFW Bałtyk I	
Distance of the MFW BI from the mainland	Approx. 81 km
Surface approved by OLL for the project execution	128,53 km^2
Depth range of the selected area	16 – 42 m

Technical parameters of MFW Bałtyk I	
Planned number of the WTG	Up to 104
Minimum WTG spacing	800 m
Predicted type of foundations	Gravity-based foundation, monopile, tripod or jacket
Total capacity	Not more than 1560 MW
Predicted annual energy production	6 864 000 MWh (assuming a power factor of 50%)
Total length of the power lines within MFW	250 km
Offshore substations	Maximum 2 OSSs

Source: Equinor / Polenergia

4.2 PROJECT CLASSIFICATION

The subject of the application to which this Project Information Card is attached is to determine the environmental conditions of the planned project involving the construction of a wind farm in the Baltic Sea.

The investor - MFW Bałtyk I S.A. - applies for a decision on environmental conditions.

The legal basis for the proceedings for the issuance of the environmental decision for the planned Project is the EIA Act. Moreover, the planned MFW may potentially require a conducting a transboundary procedure due to the potential transboundary impacts – area of the MFW Bałtyk I is adjacent to Swedish EEZ and is located about 47 km from Danish EEZ. Poland's obligations regarding the transboundary environmental impact assessment are also set out in the Espoo Convention.

The planned project will include the construction of an offshore wind farm, which will comprise of:

- WTGs,
- OSSs,
- internal power and telecommunication cables.

Within the scope of the Project all infrastructure necessary for the implementation and operation of the farm will be implemented. The said infrastructure may include, among others, helipads installed on the offshore substations.

According to the current qualification of projects based on the §2 (1) (5) of the *Regulation of the Council of Ministers on projects likely to have a significant impact on the environment*, projects likely to always have a significant impact on the environment, i.e. “group I projects” include *"installations using wind energy to generate electricity: a) with a total nominal capacity of the power plant not less than 100 MW, b) located in the maritime areas of the Republic of Poland",* i.e. offshore wind farms.

In addition, projects that may potentially have a significant impact on the environment include helipads (§3 (1) pt. 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 June 27, 2019 on the hospital emergency department (Journal of Laws 2021, item 2048)",* that might potentially be installed at the OSSs.

It follows that the construction of the MFW Bałtyk I will require the preparation of the Environmental Impact Report and obtaining the decision on environmental conditions (ED) before applying for the building permit.

In addition, it is planned for MFW Bałtyk I to comprise the construction of offshore substations and power lines. Power substations are not classified by the *Regulation on projects likely to significantly affect the environment* (Journal of Laws 2019 item1839) as group I or group II projects and similarly to offshore cables alone **are not subject to the procedure of obtaining environmental decision.**

Pursuant to Art. 75 of the EIA Act, the competent authority to issue the decision on environmental conditions for the planned offshore wind farm will be the Regional Director for Environmental Protection in Gdańsk. This authority carrying out the impact assessment procedure in accordance with Article 104 (1) item. 1 of the EIA Act will be obliged to conduct consultations with the affected countries through the General Director of Environmental Protection (GDOŚ). In accordance with the Espoo Convention, parties shall take, individually or jointly, all appropriate and effective measures to prevent, reduce and control significant adverse transboundary environmental impacts resulting from planned activities.

According to the Polish Classification of Economic Activities, the main activity planned by the investor in the area in question will be activities classified under the code 35.11.Z - generation of electricity.

4.3 SCALE, SCOPE AND LOCATION OF THE PROJECT

The Project will be located in the south-western area of the Baltic Sea in the Polish Exclusive Economic Zone (EEZ), within the area defined in the obtained permit to erect and exploit artificial islands, installations and equipment in Polish maritime areas. This permit defines the shape and the surface of the offshore area where the construction and operation of the farm may be conducted.

The Project will be implemented at a distance of about 80 km from the Polish seashore (municipalities of Smołdzino and Łeba in the Pomeranian Voivodeship). The shortest straight-line distance from the wind farm perimeter to the shore is 81 km.

Surface of the marine area designated for implementation of the offshore wind farm MFW Bałtyk I according to OLL is 128.53 km^2. It should be emphasized that the aforementioned area is not the same as the area where it will be possible to locate components of the Project, i.e. its development area. Restrictions on the Project development area result from the detailed provisions of the obtained OLL and the Maritime Spatial Plan ("POM Plan"), adopted by the Ordinance of the Council of Ministers of 14 April 2021 *on the adoption of the spatial development plan of internal sea waters, territorial sea and exclusive economic zone in the scale 1:200 000* (Journal of Laws 2021, item 935).

OLL obliges the Investor to develop the layout of the installation, so that none of the planned structures, i.e. WTGs, OSSs or internal cables, are located closer than 2 nautical miles from the existing navigation routes and closer than 500 m from the external border of the marine area intended for the implementation of the offshore wind farm MFW Bałtyk I.

Additional restrictions in this respect result from the provisions of the Maritime Spatial Plan, according to which in the body of water 60.E. (dedicated to the development of offshore wind energy) where MFW Bałtyk I will be located, it is prohibited to erect artificial islands and structures at a distance of less than 2 km from the border of the Natura 2000 area "Hoburgs bank och Midsjöbankarna" (SE0330308).

The planned Project will comply with the conditions of the POM Plan.

Geographical coordinates of the points delimiting the offshore wind farm MFW Bałtyk I area according to the permit are presented in the Table 4.2. Water depths in the area ranges from approximately 16 m to approximately 42 m.

Table 4.2 Geographical coordinates of the points delimiting the offshore wind farm MFW Bałtyk I area according to the OLL

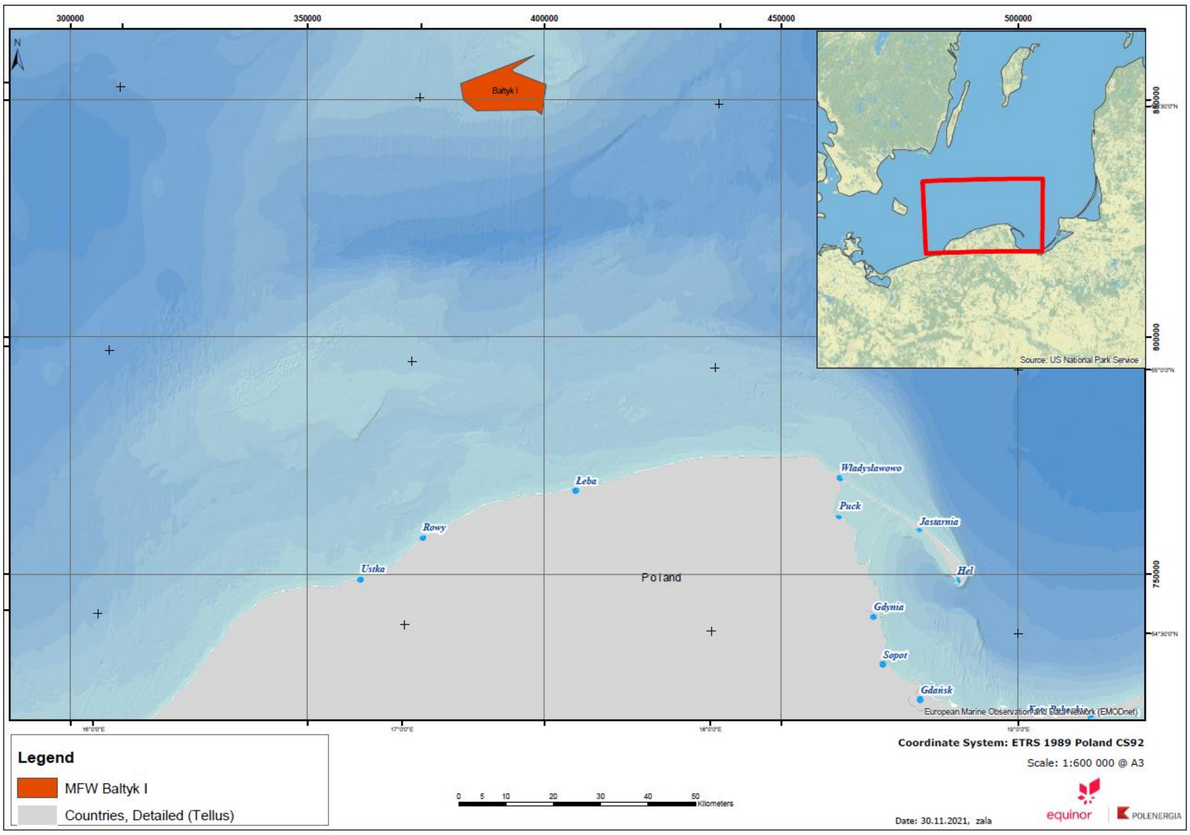
	Coordinate system WGS 84 DD°MM'SS.ss''	
Point no.	Longitude (E)	Latitude (N)
1	17°22'48.0842"	55°35'12.9062"
2	17°18'13.6818"	55°33'28.6638"
3	17°18'45.1652"	55°33'13.8068"
4	17°25'18.6708"	55°31'52.4230"

5	17°24’30.7190”	55°28’28.3090”
6	17°23’21.1507”	55°28’58.3008”
7	17°11’27.7087”	55°28’43.9310”
8	17°08’45.0747”	55°29’53.4755”
9	17°08’05.9219”	55°31’45.3848”

Source: OLL

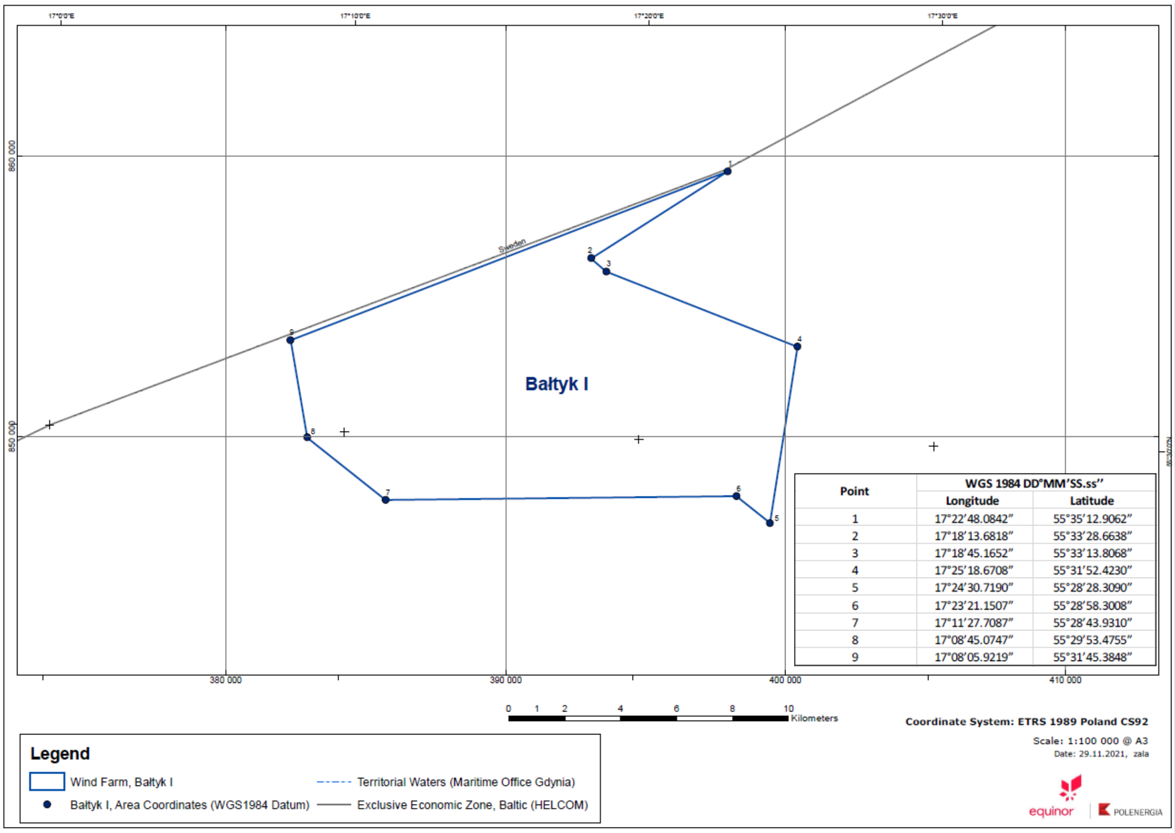
The MFW Bałtyk I location is shown at the overview map in Figure 4.2 Location of the planned offshore wind farm MFW Bałtyk I in the Baltic Sea areaFigure 4.2 and in the more detailed map in Figure 4.3.

Figure 4.2 Location of the planned offshore wind farm MFW Bałtyk I in the Baltic Sea area



Source: Equinor / Polenergia

Figure 4.3 Map with the coordinates of the planned MFW Bałtyk I



Point	WGS 1984 DD°MM'SS.ss''	
	Longitude	Latitude
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Source: Equinor / Polenergia

5 PROVISIONS OF STRATEGIC DOCUMENTS

5.1 DOCUMENTS ON INTERNATIONAL AND EUROPEAN LEVEL (HELCOM / BSAP / EUROPEAN GREEN DEAL)

5.1.1 United Nations Convention on the Law of the Sea

The United Nations Convention on the Law of the Sea, signed in Montego Bay on 10 December 1982 (UNCLOS) is one of the key documents regulating the use of marine waters. The provisions of the Convention emphasize the sovereignty of the territorial sea (Article 2). Article 60 of the aforementioned Convention specifies the conditions for the erection of artificial islands, installations and structures within exclusive economic zones.

According to the provisions of the Spatial Development Plan of the Internal Sea, Territorial Sea and the Exclusive Economic Zone in the scale 1: 200 000, hereinafter referred to as the "POM Plan" or MSP, and administrative decisions issued, the proposed Project **meets the conditions of UNCLOS**.

5.1.2 Convention on Environmental Impact Assessment in a Transboundary Context

The Convention on Environmental Impact Assessment in a Transboundary Context, drawn up in Espoo on 25 February 1991 ("Espoo Convention"), sets out the procedural framework for carrying out environmental impact assessments in a transboundary context for projects that are likely to result in significant adverse transboundary environmental impact from planned activities.

According to the Espoo Convention, a transboundary impact "means any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party ".

The Espoo Convention deals with "transboundary" issues, i.e. issues that transcend national boundaries, and identifies "Parties of Origin" and "Affected Parties". Parties of Origin are the - (and their exclusive economic zones) where construction will take place. Affected States are those that may be affected by the Project in one way or another, even though no construction activities will take place on their territory.

The planned Project is located entirely within the Exclusive Economic Zone of the Republic of Poland.

The Polish national legal basis for the proceedings on transboundary environmental impact is the EIA Act.

With regard to the proposed Project, as the first step, the Espoo Convention requires the Government of Poland to notify potentially Affected Parties, as early as practicable and no later than when informing its own public, that it is considering implementing activities listed in Appendix 1 to the Convention.

The proposed Project is listed in the revised, current Appendix 1 to the Convention, par. 22, under *"Large installations using wind energy to generate electricity (wind farms)"*. Potentially Affected Parties to be notified include **Sweden and Denmark.**

5.1.3 Convention on the Protection of the Marine Environment of the Baltic Sea Area

International cooperation on environmental protection in the Baltic Sea region has a nearly 50-year tradition and is carried out under the *Helsinki Convention* (Journal of Laws 2000, no. 28 item. 346). This Convention defines the principles of cooperation of all Baltic Sea states in the field of comprehensive protection of the Baltic Sea against all types of pollution and its implementing body is the Helsinki Commission (HELCOM) with headquarters in Helsinki. Actions undertaken within the framework of HELCOM, including Baltic Sea Action Plan (BSAP), concern both marine waters and the entire catchment area of the Baltic Sea.

The planned Project is in line with the concept of sustainable development and EU climate policy that determines the directions of HELCOM activities.

5.1.4 European Green Deal

The European Green Deal set out a transformational change plan to make the European Union climate-neutral by 2050. Member States have also set an interim target and committed themselves to reducing greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels. The use of renewable energy such as wind energy will contribute to achieving these objectives.

One of the actions planned under the European Green Deal is also to reduce the EU's dependence on external energy sources. The European Commission has identified wind power as the dominant generation technology by 2050, predicting the development of offshore wind farms with maximum installed capacity of up to 450 GW. Installations in the Baltic Sea region could reach 85 GW by 2050.

The proposed Project is consistent with the provisions of the document.

5.1.5 Other international documents and provisions

The European Union Strategy for the Baltic Sea Region Action Plan (EUSBSR, 2018) in the field of energy identifies among others sub-objectives:

- clean water in the sea;
- reliable energy markets;
- improving the global competitiveness of the Baltic Sea Region;
- climate change adaptation, risk prevention and management.

Another relevant European initiative is the Interreg South Baltic Programme 2021-2027. 4 priority axes have been identified in the Programme, with Axis 2 “Sustainable South Baltic - promoting sustainable development and blue and green economy" and measure 2.1 "2.1 Supporting transition towards green energy" are of particular importance for the development of offshore wind energy.

The proposed Project is consistent with the European Union Strategy for the Baltic Sea Region Action Plan and the Interreg South Baltic Programme 2021-2027.

5.2 DOCUMENTS ON THE NATIONAL LEVEL - POLAND (“OFFSHORE WIND ACT”, PEP 2040, MSP/POM PLAN)

5.2.1 Act on the promotion of electricity generation in offshore wind farms

Act of 17 December *2020 on the promotion of electricity generation in offshore wind farms* (Journal of Laws of 2021, item 234, as amended), hereinafter referred to as *the Offshore Wind Act* sets out, i.a., the principles and conditions for the preparation and execution of investments in the construction of offshore wind farms, as well as the principles for the disposal of an offshore wind farm. Furthermore, it specifies requirements concerning the construction, operation and decommissioning of offshore wind farms.

According to the provisions of the Act, an offshore wind farm must meet the requirements in terms of safety, protection of the marine environment, protection of the state border at sea and state defence specified in separate regulations.

An offshore wind farm is constructed and operated with due regard for the protection of the marine environment, navigation safety, compliance with the obtained offshore location licence or with the agreement or permit to lay cables or pipelines in Polish maritime areas and with the decision on environmental conditions. In accordance with the provisions of the Act, the investor obtained the Decision No. MFW/1a/12 dated July 16, 2012, the offshore location licence (OLL) for the project entitled "Morska Farma Wiatrowa Bałtyk Północny”, with a capacity of 1560 MW. The proposed Project is being developed under the aforementioned decision – the name of the Project has changed (to MFW Bałtyk I), while its parameters, including location, are consistent with the decision.

The proposed Project is compliant with Annex No. 2 of the Offshore Wind Act, defining the areas where offshore wind farms may be located.

Currently, the investor is conducting research to identify the marine environment in order to meet the environmental requirements, both in accordance with the Offshore Wind Act and the EIA Act.

5.2.2 Energy Policy of Poland until 2040 (PEP 2040)

The objective of Poland’s Energy Policy until 2040 (PEP 2040) is to create the conditions for ensuring energy security while simultaneously ensuring the competitiveness of the economy, energy efficiency and reducing the environmental impact of the energy sector. The specific objectives cover the entire energy supply chain – from its acquisition to its sale. Poland's energy transition will be based on three pillars, including Pillar II: *Zero-carbon energy system*, which also comprises offshore wind energy projects.

Within the Strategy, a specific objective was defined as follows: *6. Development of renewable energy sources*, for which the strategic project *6. Implementation of offshore wind energy was defined.*

According to the document adopted by the Council of Ministers, it is forecast that in 2040 more than half of the installed capacity will be zero-carbon sources. One of the key components of the transition, will be offshore wind energy as a strategic new industry. Offshore wind capacity is planned to reach about 5.9 GW in 2030 to about 11 GW in 2040.

The proposed Project is consistent with the goals and objectives of Poland's Energy Policy until 2040.

5.2.3 Spatial Development Plan for Polish Maritime Areas

The document, hereinafter referred to as the MSP (Maritime Spatial Plan) or POM Plan, was adopted by the Regulation of the Council of Ministers of 14 April 2021 on the adoption of a spatial development plan of internal sea waters, territorial sea and exclusive economic zone in the scale 1:200 000 (Journal of Laws 2021 item 935).

According to the general provisions of the POM Plan, the location of wind turbines should meet a number of conditions:

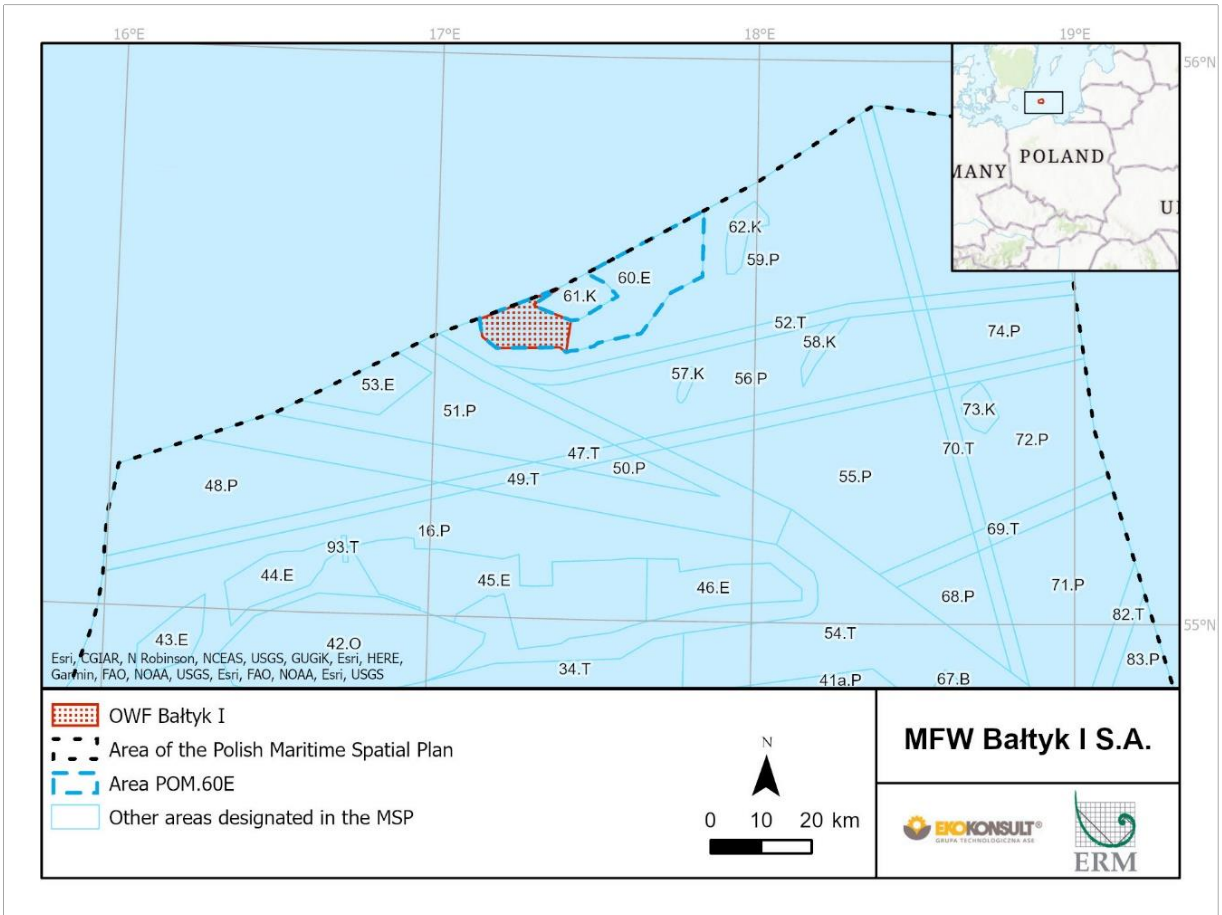
"§ 6. 1. The construction of offshore wind turbines is only permitted in areas with the primary function of generating renewable energy.

2. If a flight corridor for migratory birds needs to be established, its exact direction and size will be determined as part of the environmental impact assessment of individual projects. It is recommended that the width of such a corridor is not less than 4 km, and its axis is a straight line.

3. Artificial islands, structures and equipment of offshore wind farms, including offshore wind turbines, as well as internal connection infrastructure of offshore wind farms, shall not be located closer than 2 nautical miles from the boundary of bodies of water with the primary function of transport."

As shown in the Figure 5.1, the proposed project is located in the basin POM.60.E.

Figure 5.1 Location of the planned OWF in relation to the water bodies designated in the POM Plan



Source: Spatial Development Plan of Polish Maritime Areas

The POM Plan includes the issued OLL for MFW Bałtyk I. The shipping routes used were shifted in order to meet the conditions for safe operation of both the sailing routes and the offshore wind farms. In addition, detailed navigation guidelines for the project area will be developed as part of the navigation expertise, prior to the submission of the Environmental Impact Assessment Report for consultation with the relevant Maritime Office. According to the specific provisions of the POM Plan, the primary function of the basin POM.60.E is renewable energy generation (E). The functional definition of renewable energy generation (E) is as follows: "extraction, processing, transmission and storage in Polish maritime areas of energy from renewable sources, in particular wind, (...) including construction of structures necessary for the extraction and transmission of energy together with associated infrastructure and structures for the processing and storage of energy".

5.3 OTHER INITIATIVES AND DOCUMENTS RELATING TO MARITIME SPATIAL PLANNING

The Baltic Sea states have jointly implemented several projects to develop a common approach to maritime spatial planning. The following projects, which constitute only a fraction of long-term transboundary cooperation in the Baltic Sea region, have provided a wealth of information on approaches to planning, among other things, infrastructure for energy production from offshore wind farms:

- BaltSeaPlan | 2009 - 2012
- PartiSEApate | 2012 - 2014
- Baltic Scope | 2015 - 2017
- Pan Baltic Scope | 2015 - 2017
- BaltSpace | 2015 - 2017
- BalticLines | 2016 - 2019

6 THE AREA OF OCCUPIED REAL ESTATE, AS WELL AS BUILDING STRUCTURE, THEIR CURRENT USE AND VEGETATION COVER

6.1 THE AREA OF OCCUPIED WATER BODY, AS WELL AS BUILDING STRUCTURES

The surface of the area (body of water) designated for implementation of the offshore wind farm MFW Bałtyk I according to OLL, is 128.53 km^2, whereas it is the area of the offshore wind farm specified by the geographical coordinates.

It should be emphasised that the aforementioned area is not the same as the area where it will be possible to locate elements of the Project, i.e. its development area. Restrictions on the Project development area result from the detailed provisions of the obtained OLL and the POM Plan and their description can be found in Chapter 4.3 above.

The total area of the seabed occupied by the building structures i.e. their foundations, will depend on the final number of WTGs and type of foundations applied. At the current stage of the project, it is assumed that in the most far-reaching scenario 104 WTGs with foundations with a base diameter of 60 m (currently considered maximum diameter of the foundation, without scour protection) will be installed. If gravity-based foundations of polygonal cross-section are chosen, the occupied seabed area will not exceed the seabed occupation area by foundations with a base diameter of 60 m.

Implementation of the planned project will be consistent with the OLL provisions and the POM Plan conditions (Chapter 4.3).

6.2 CURRENT USE OF THE AREA

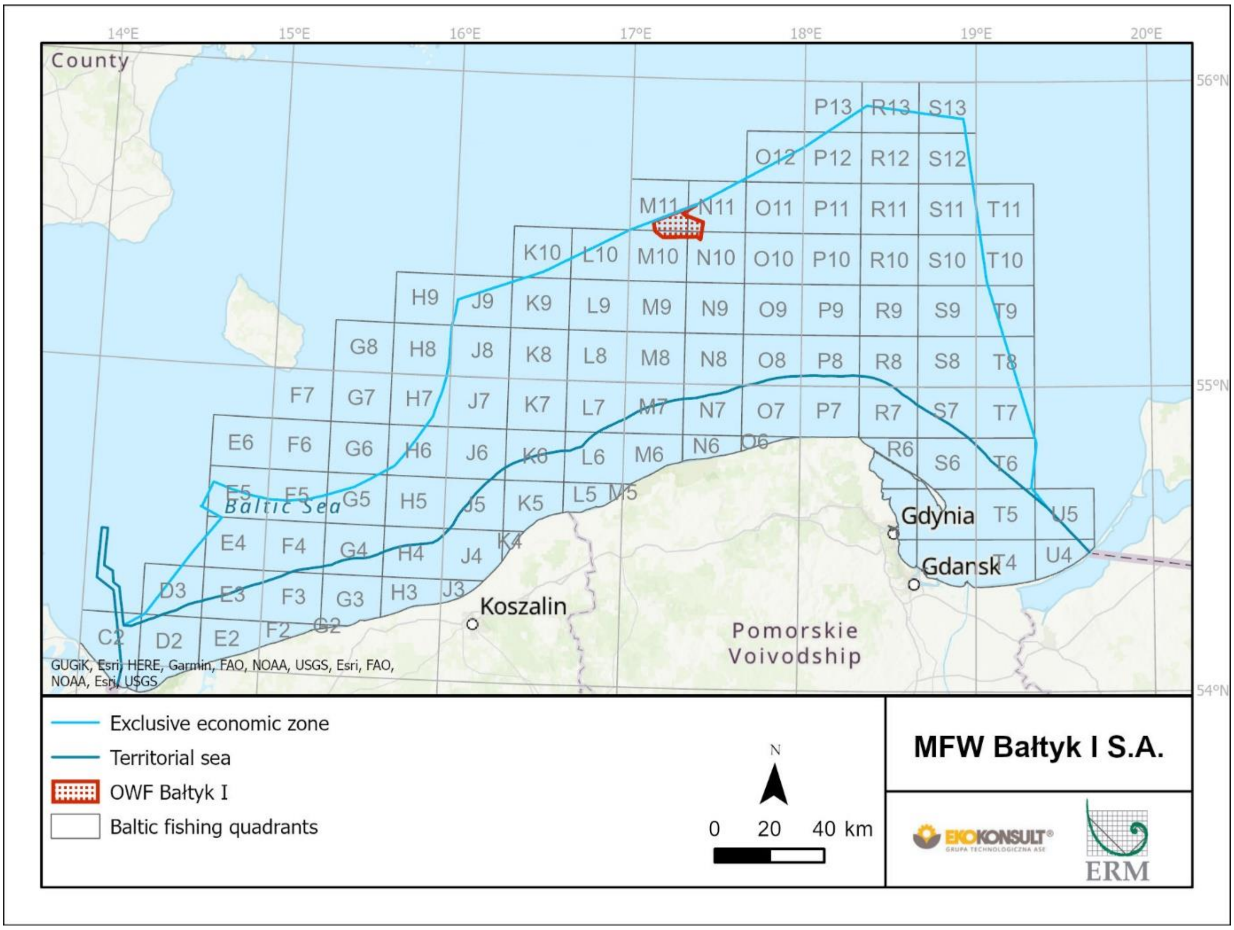
The body of water intended for the implementation of the Project is currently not covered by any buildings or technical installations. It is used to a small extent by the fishing industry and for maritime transport and tourism. The extent to which the basin is used for fishing, transport and tourism is discussed in the chapters below. This chapter also addresses the issue of technical infrastructure - its location in relation to the basin and the conditions for its construction in the basin.

6.2.1 Fishing

There is no intensive fishing activity in the area of the planned Project. The analyzed area is located within four Baltic Sea fishing quadrants - M10, M11, N10, N11 (Figure 6.1). However, it covers only a small percentage of the quadrants' area.

According to the data made available by the 2020 Department of Fisheries of the Ministry of Agriculture and Rural Development, the catch in live weight equivalent was as follows in each quadrant: M11 – 3,110 kg, N11 - 140,197 kg, M10 - 890,595 kg, N10 - 1,220,974 kg.

Figure 6.1 The area of the planned project against the background of the Baltic fishing quadrants

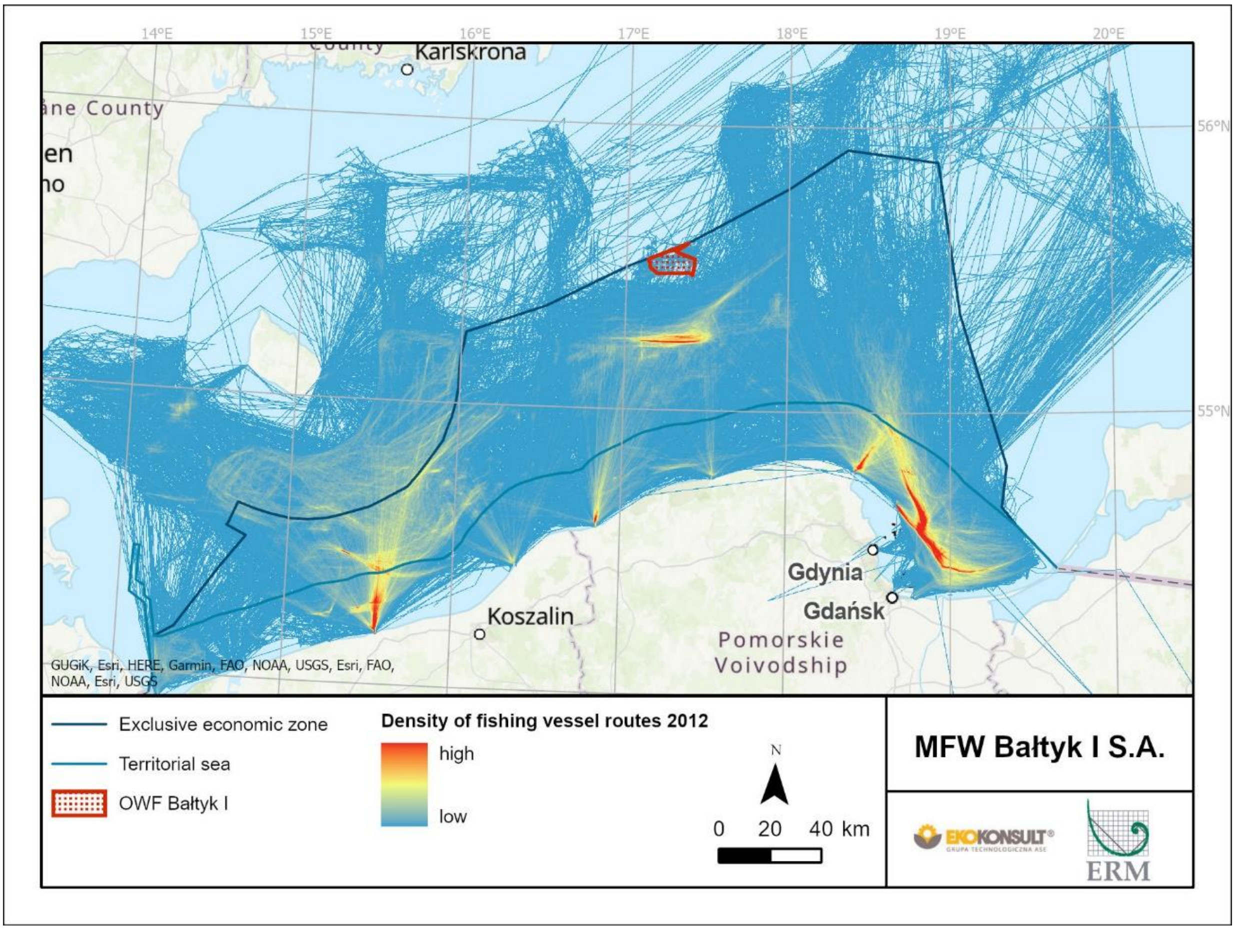


Source: Spatial Development Plan of Polish Maritime Areas

The number of Polish vessels fishing in 2020 by fishing quadrant was M11 - 1, N11 - 12 and N10 - 28, respectively: M11 - 1, N11 - 12, M10 - 28, N10 - 38. Fishing vessels above 12 m of length dominated.

The density of routes and the intensity of their use by fishing vessels is low. The area is crossed by fishing vessel routes from fishing ports, leading to the fisheries located north of the area.

Figure 6.2 Density of fishing vessel routes [n/km²] in 2012



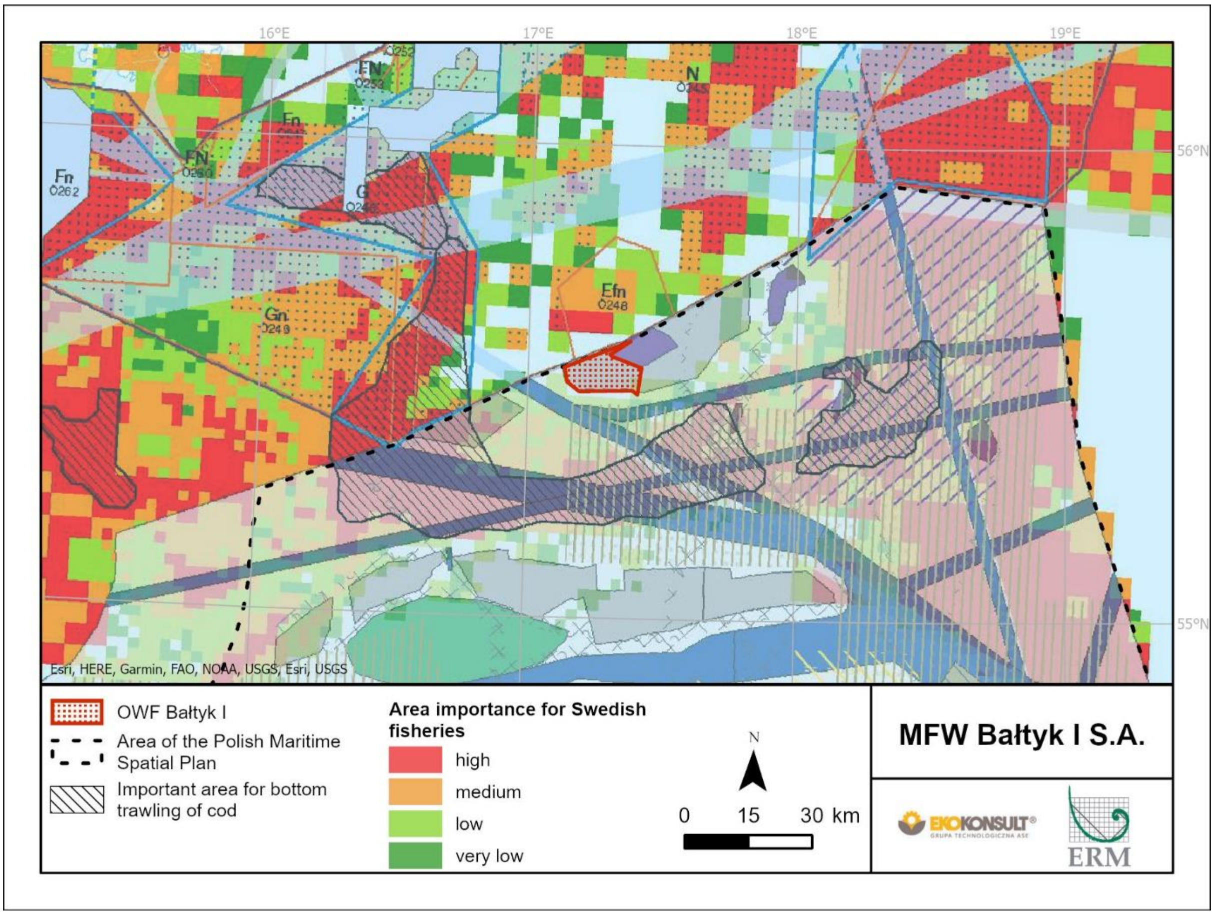
Source: Study of Spatial Development Conditions of Polish Maritime Areas together with spatial analyses. Maritime Institute, Gdańsk 2015.

For the area POM.60.E, where the planned Project is located, the POM Plan establishes no fishing restrictions until the start of the construction of offshore wind farms. However, during the construction and operation of the offshore wind farms, in the safety zones of the structures and in the areas threatening the safety of the inter-array connection infrastructure, it is required to introduce fishing restrictions by a decision of the relevant director of the maritime office.

During the public consultation on the draft POM Plan with the Environmental Impact Assessment, the Swedish side (Swedish Maritime and Water Agency) provided information on Swedish fisheries from 2019.

As shown in the figure below, **no bodies of water** important to Swedish fisheries have been identified in the immediate vicinity of the proposed Project area.

Figure 6.3 Swedish fishing in Polish waters from 2019 and the draft POM Plan of 2019.



Source: Appendix to letter of the Director General for Environmental Protection of 10-01-2022, ref. no. BP-UI.402.1806.2021.ID

According to Sweden, the overlap between the areas of interest for Swedish fisheries and the areas for which the primary function of generation of renewable energy has been designated in the Polish POM is limited, and therefore the potential impact on Swedish fisheries is likely to be minor.

As part of the pre-investment research, an analysis of the fishing fleet activity in the MFW Bałtyk I area was conducted. The results of the analysis indicate that between 10 and 23 fishing vessels (>12 m) were fishing in the MFW Bałtyk I area for an average of 37 days per year between 2015 and 2019. The vessels were registered in: Germany, Denmark, Estonia, Finland, Poland, Sweden and Lithuania and Latvia. The fishing effort in the investment area is very low, and for none of the countries does it exceed the threshold of 5% (share in total effort).

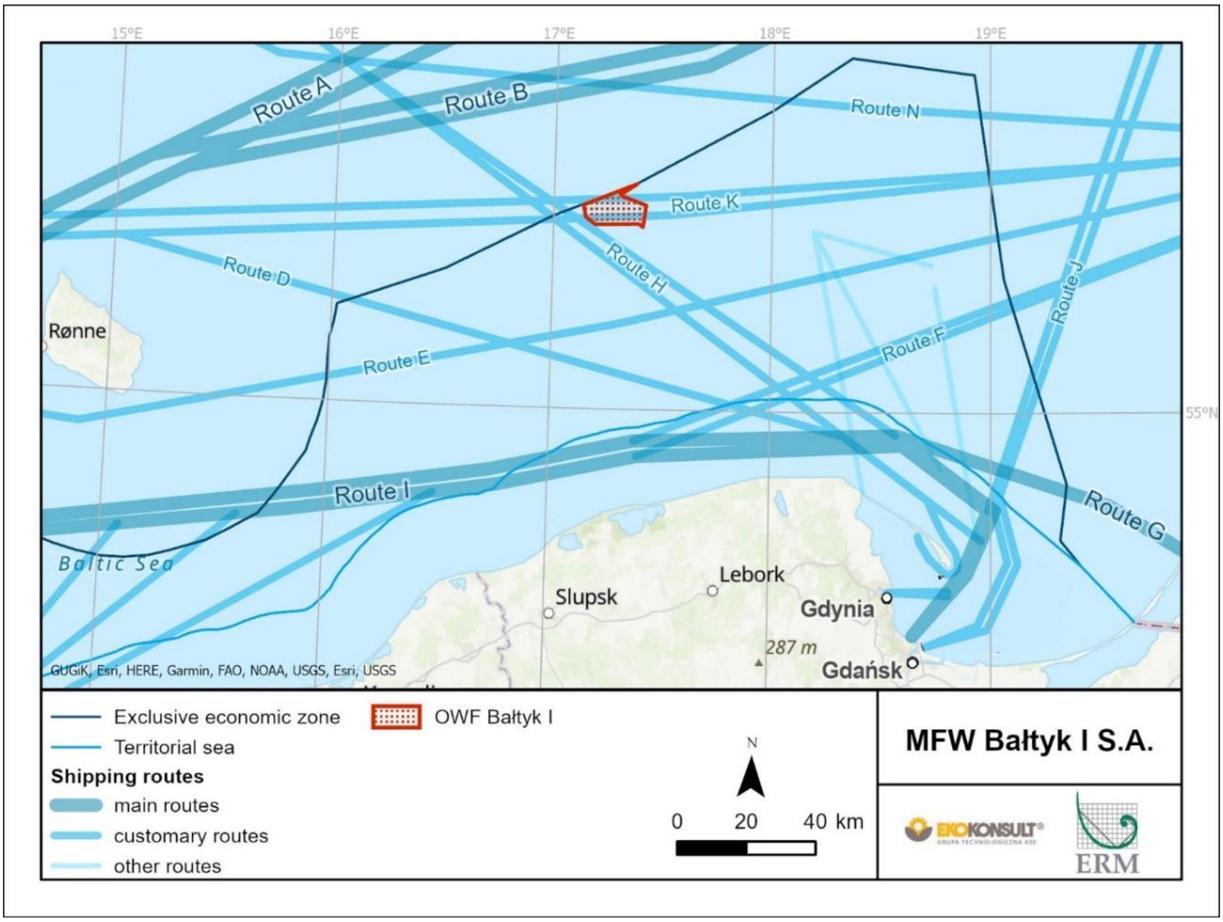
6.2.2 Maritime transport

In the area of the planned Project, based on vessel traffic monitoring data, two shipping routes have been identified: shipping route H with traffic of ships and ferries carrying cars and goods from the Gulf of Gdańsk towards Scandinavia and customary route K leaving the main shipping route for international traffic in the west and leading to ports of Lithuania and Latvia (Maritime Institute, 2015).

During the analysis of conditions for the POM Plan, a navigation analysis was conducted to determine the actual use of the area for transportation purposes.

The draft POM Plan indicated that a waterway ran through the proposed project area (Figure 6.4). After adoption of the POM Plan, the waterway has been moved to the south to avoid the proposed offshore wind farm location.

Figure 6.4 South Baltic main and customary shipping routes

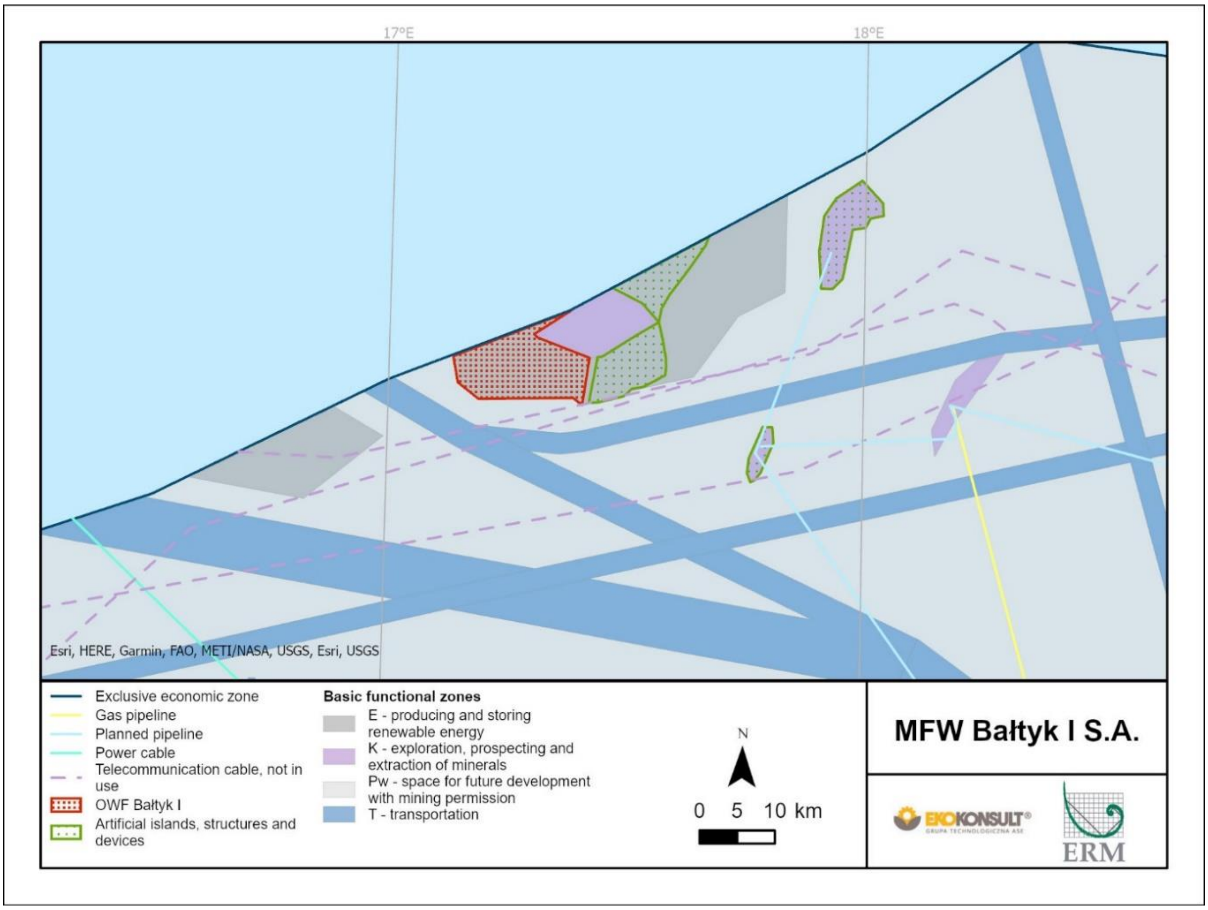


Source: Study of Spatial Development Conditions of Polish Maritime Areas together with spatial analyses, annex 13. Maritime Institute, Gdańsk 2015.

In

Figure 6.5 Planned offshore wind farms and existing submarine cables in the planned project area the course of the present shipping routes is presented - they avoid the area of the planned MFW Bałtyk I.

Figure 6.5 Planned offshore wind farms and existing submarine cables in the planned project area



Source: SIPAM (https://sipam.gov.pl/geoportal)

According to the provisions of the POM Plan, until the start of the construction of the offshore wind farms, no restrictions to the operation of transport are established. However, during the exploitation of the power plants, until the establishment of safety conditions for navigation with the decision of the appropriate territorial director of the maritime office, navigation is limited to vessels less than 50 m in length. The exception are the vessels connected with service and maintenance of structures and equipment of offshore wind farms and aquaculture. The conditions of the POM Plan will not influence the operations of the windfarm.

6.2.3 Technical infrastructure

According to the POM Plan, the technical infrastructure is understood as telecommunication cables, substation infrastructure and power cables, including internal and external connection infrastructure of offshore wind farms, pipelines, including discharge collectors and transmission/product pipelines and other facilities for: safety of navigation, exploration, prospecting of mineral deposits or extraction and transmission of minerals, acquisition and transmission of energy, defence, loading and unloading, not included in port and offshore peripheral infrastructure.

As shown in Figure 6.5 above, no elements of technical infrastructure, including linear infrastructure (cables, pipelines) are located in the area of the planned project. To the south of the analysed area there are unused telecommunication cables.

Other offshore wind farms are planned in the vicinity of the project site, both on the Polish and Swedish side, and they will require implementation of offshore connections.

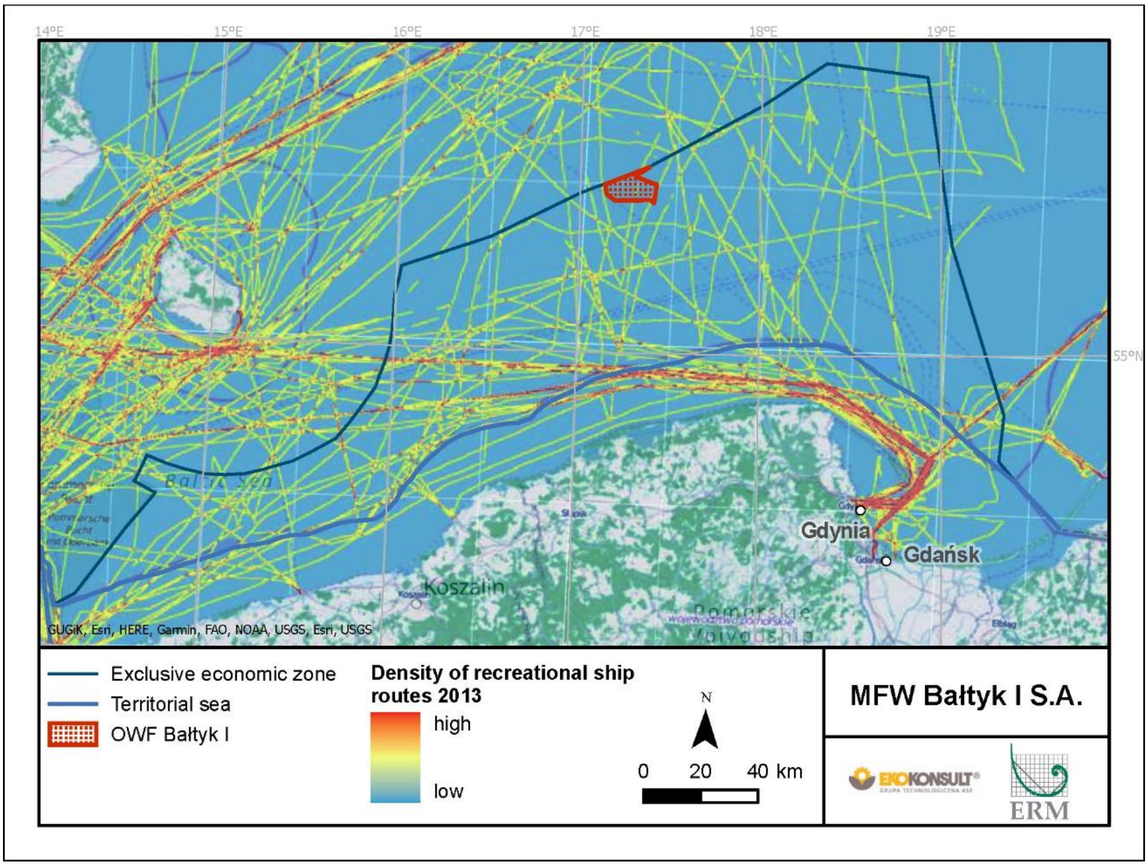
In the area of the proposed project, in accordance with the provisions of the POM Plan, the possibility of installing linear elements of technical infrastructure has been limited to the infrastructure necessary to perform the function of energy generation.

6.2.4 Tourism

The basis for determining the tourist use of the project area was the studies used in preparation of conditions for the POM. The area of the planned investment project is located in the open waters of the Baltic Sea, therefore coastal tourism is not possible in this area. However, marine tourism understood as activity on the high seas, i.e. on cruise ships, passenger liners, yachts or ferries is present in this area.

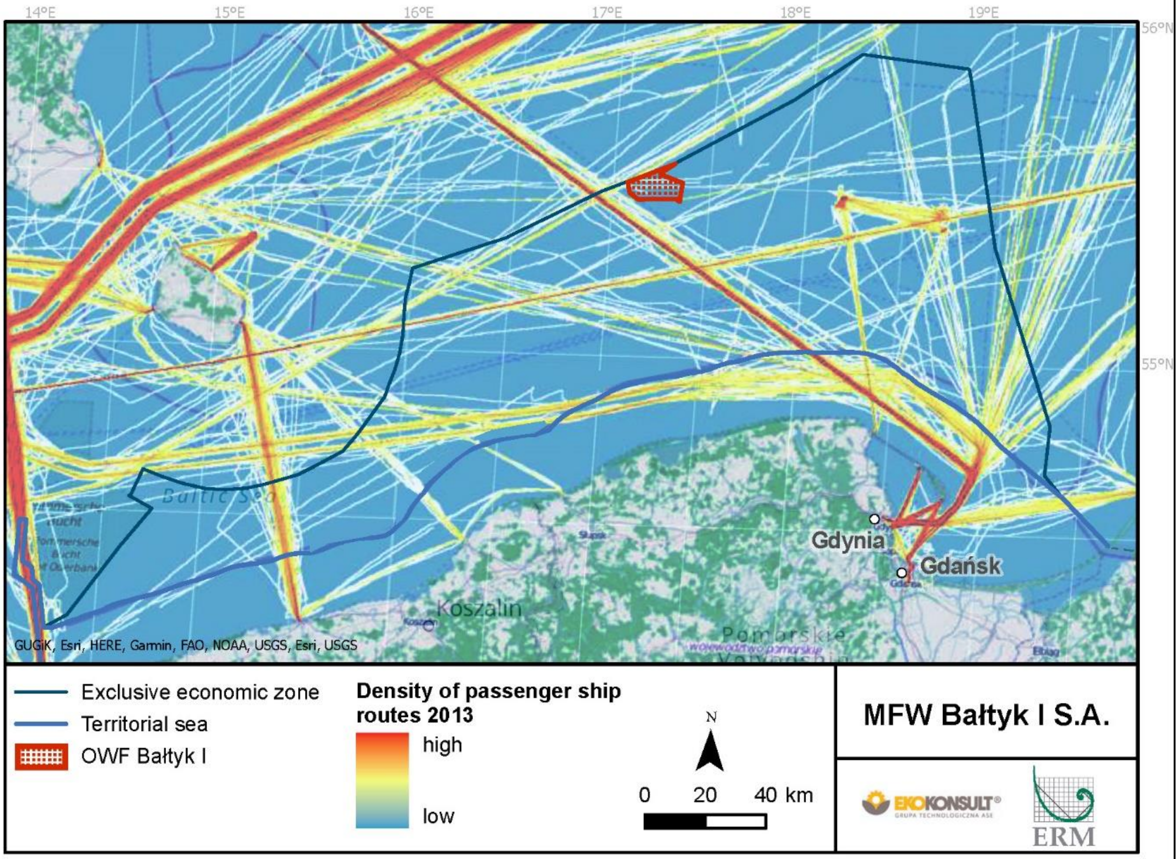
However, vessel monitoring (Maritime Institute, 2015) indicates that these areas are not heavily used by recreational and passenger vessels (Figure 6.6, Figure 6.7).

Figure 6.6 Route distribution and intensity of use by recreational vessels



Source: Study of Spatial Development Conditions of Polish Maritime Areas together with spatial analyses, annex 13. Maritime Institute, Gdańsk 2015.

Figure 6.7 Distribution of routes and intensity of their use by passenger ships

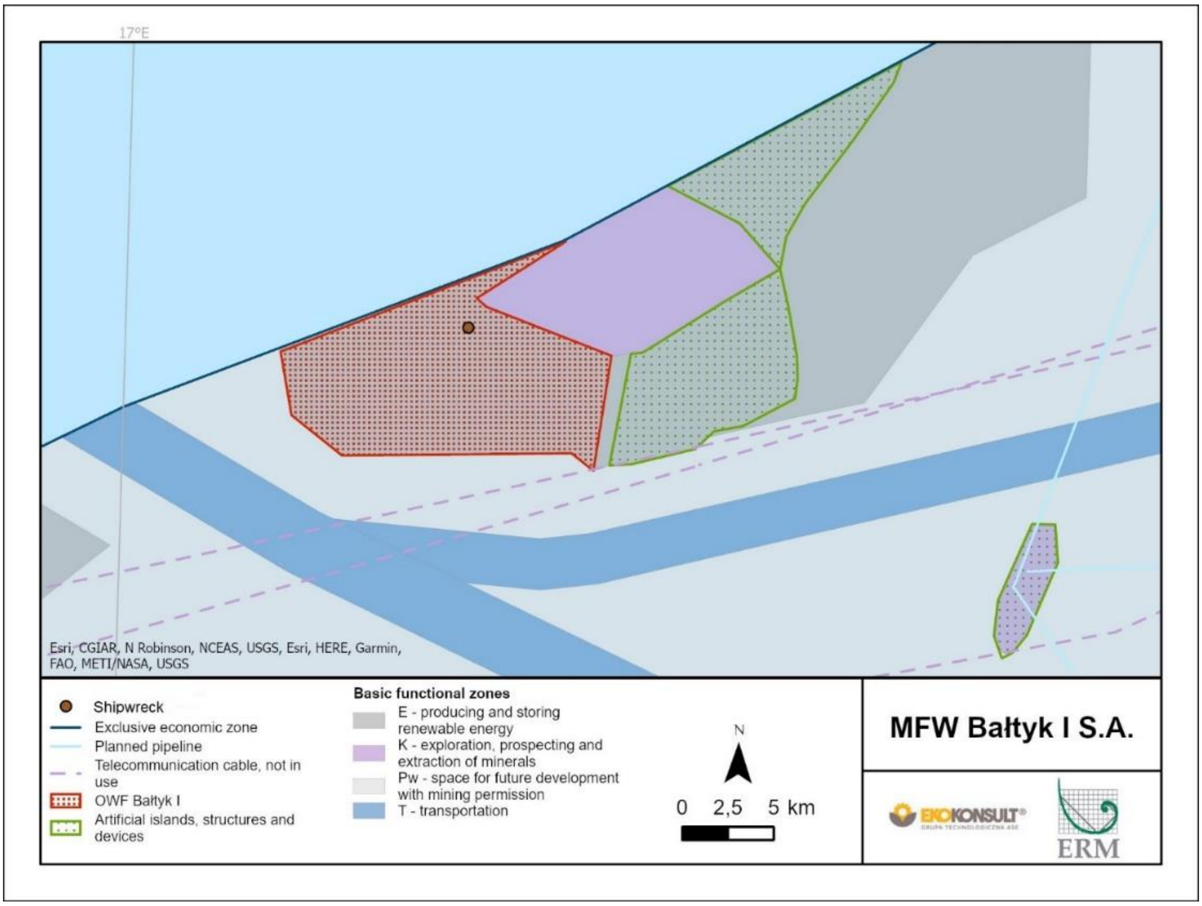


Source: Study of Spatial Development Conditions of Polish Maritime Areas together with spatial analyses, annex 13. Maritime Institute, Gdańsk 2015.

According to the Maritime Administration Portal (SIPAM) and the Study of Spatial Development Conditions for the draft POM, there is a wreck number WK-0042 (VIGGO;

Figure 6.8) in the area of the planned Project, however the pre-investment seabed surveys (bathymetric, sonar and seismic surveys; Chapter 7.4, Figure 7.27) conducted within the MFW Bałtyk I development area including the 1 nautical mile wide buffer zone (DA BI (1NM)) did not confirm the presence of the wreck.

Figure 6.8 **Location of wrecks available for diving in the area of the planned Project**

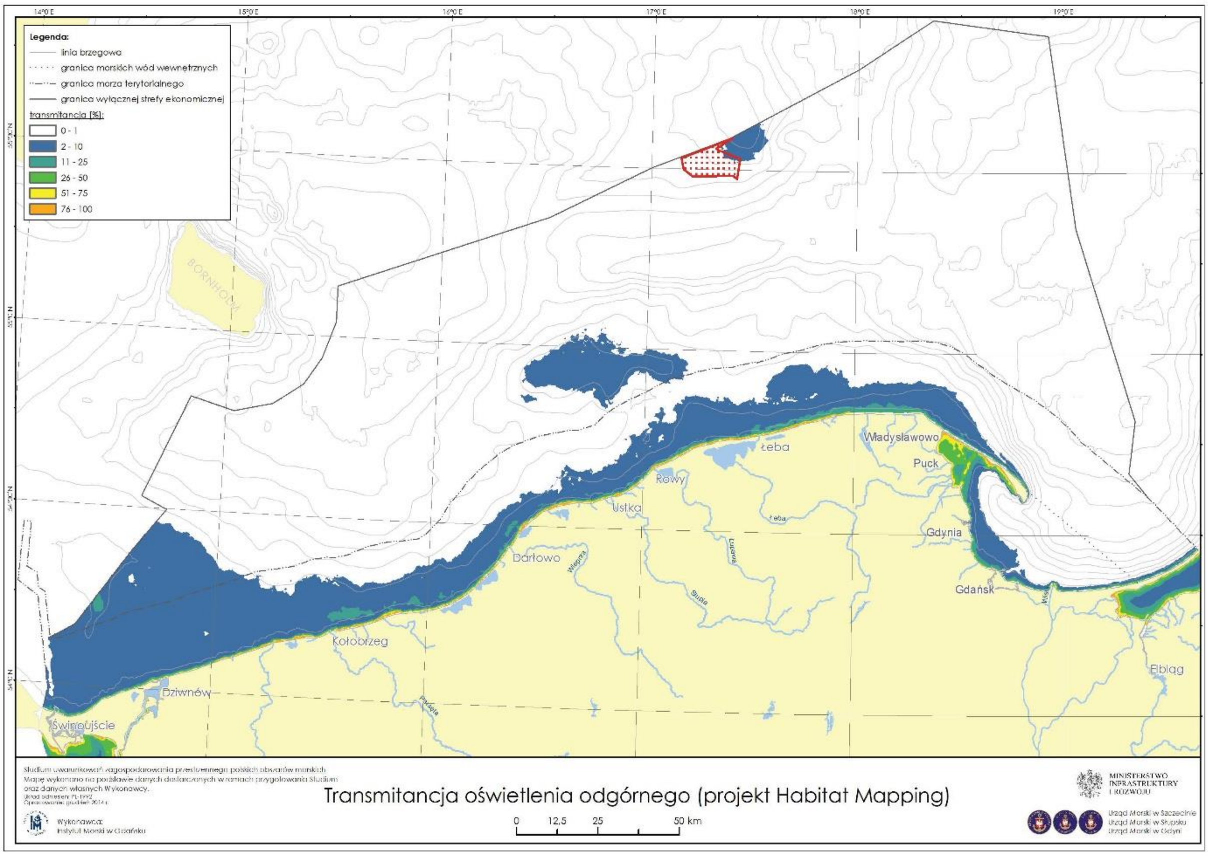


Source: SIPAM (https://sipam.gov.pl/geoportal)

6.3 OCCURRENCE OF FLORA (PHYTOBENTHOS) WITHIN THE WATER BODY

The occurrence of flora in the open sea is a direct result of the availability of solar radiation of 400-700 nm wavelength. The range of the photic zone in the area of the planned Project is presented in the Figure 6.9.

Figure 6.9 Photic zones in the Baltic Sea



Source: Maritime Institute in Gdańsk, Environmental impact assessment forecast for draft spatial development plan for internal maritime waters, territorial sea and exclusive economic zone, scale 1:200,000, draft forecast (Prognoza oddziaływania na środowisko projektu planu zagospodarowania przestrzennego morskich wód wewnętrznych, morza terytorialnego i wyłącznej strefy ekonomicznej w skali 1: 200 000 Projekt Prognozy) (v. 4), Gdańsk 2020

The developer is conducting pre-investment research to gather detailed information on the benthos and phytobenthos in the area of the planned Project and withing the extent of its potential impact, i.e. in the area of an offshore wind farm together with a buffer zone of the width of at least 1 nautical mile (DA BI (1 NM)). Environmental surveys of phytobenthos were conducted in June 2021.

In the area of DA BI (1NM) macroalgae were observed in small quantities at the depths ranging from 19.9 to 26.4 m. In the majority of the studied area, the seabed was formed by hard sediments - boulders and pebbles, on which phytobenthos – macroalgae – occurred in insignificant amounts: the coverage of the rocky bottom was less than 1%. In open water, low abundance of red algae *Rhodomela confervoides* (0,45 g s.m.·m-2) and brown algae *Sphacelaria cirrosa*, *Pylaiella littoralis* and/or *Ectocarpus siliculosus* was observed.

No species protected under the Regulation of the Minister of Environment of 9 October *2014 on the protection of plant species* (Journal of Laws 2014, item 1409) were found in the study area.

See Section 7.2.5.1 for more detailed information on phytobenthos.

7 ENVIRONMENTAL CONDITIONS

7.1 MARINE ENVIRONMENT SURVEYS

The state of environment in the area of the Project and its vicinity was examined and will be described in detail in the EIA report. Sources of data on the environment will include research conducted in the area of the Project, including the Investor's pre-investment marine environmental research programme, data from the state environmental monitoring and selected research conducted by other offshore wind farm investors, as well as other available environmental data.

7.1.1 Previous surveys conducted in the Project area

7.1.1.1 Environmental monitoring

The scope and conduct of marine environmental monitoring studies and the criteria for assessment of the state of the marine environment are defined, i.a., by:

- The Helsinki Convention *On the Protection of the Marine Environment of the Baltic Sea Area*, 1974
- New Convention *On the Protection of the Marine Environment of the Baltic Sea Area* of April 9, 1992 (Journal of Laws 2000 No. 28 item 346),
- Directive 2008/56/EC of 19 June 2008 of the European Parliament and of the Council establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive, MSFD),
- Act of 20 July 2017 – *Water Law Act* (Journal of Laws 2021 item 2233, as amended) along with implementing acts.

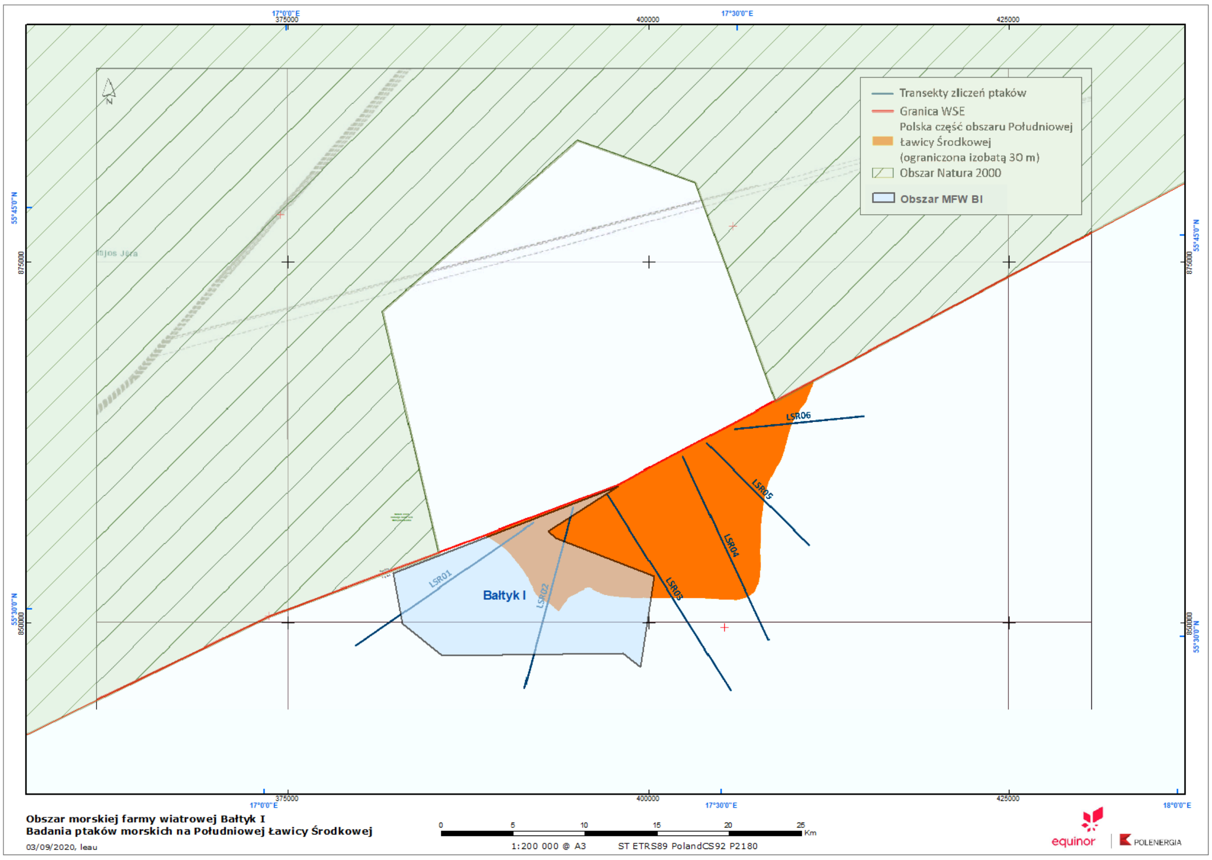
In the area of the planned investment there are no state environmental monitoring research stations, which would monitor particular elements of marine environment of the Polish part of the Baltic Sea within the scope of HELCOM COMBINE. However, the Chief Inspectorate for Environmental Protection (GIOŚ) conducts research on natural elements such as marine species and habitats in the Middle Bank area, so in the neighbourhood of the planned Project. The location of the MSFD stations is shown in Figure 7.13 in Chapter 7.2.3.

7.1.1.2 Research conducted by other offshore wind farm investors

For the purposes of the development of the offshore wind farm Baltic Power, marine avifauna surveys were conducted in the Polish part of the Southern Middle Bank between 2018 and 2019. The research covered the shoal area limited by the 30 m isobath and its vicinity, including the area of MFW Bałtyk I.

The aim of the study was to obtain data on the species composition, abundance and distribution of birds associated with the marine environment in the studied area. Surveys of marine avifauna in the Polish part of the Southern Middle Bank were carried out from October 2018 to April 2019, i.e. during the period of the most abundant annual occurrence of birds in the Baltic Sea away from the coast. Six transects with a total length of 77.0 km, covering an area of 46.2 km2, were mapped in the study area. The length of transects LSR01 and LSR02 running through the area of the MFW BI was 15.0 and 13.0 km respectively, and the area covered by them was 9.0 and 7.8 km^2 respectively. The location of the research transects in relation to the MFW Bałtyk I area is presented in Figure 7.1.

Figure 7.1 Scheme of distribution of research transects in the area of the Polish part of the Southern Middle Bank in the framework of marine avifauna surveys performed in 2018-2019 for the Baltic Power OWF project



Source: MFW Bałtyk I S.A. based on MEWO/IMUMG data, 2020

Detailed methodology of marine avifauna research and their results are described in the Report on the inventory of abiotic and biotic resources in the Baltic Power research area, attached as Annex 1 to the Report on the environmental impact of the offshore wind farm Baltic Power (MEWO/IMUMG, 2020). The results of the research conducted in the Polish part of the Southern Middle Bank will be used to further characterise the marine environment in the area of the planned Project and in the zone of its potential impact, for the purposes of the EIA report.

7.1.2 Research conducted in 2012-2013 for the Project

As part of the preparation of the investment the Investor conducted a number of environmental studies in 2012-2013. A summary of the studies conducted, along with the scope and timing of the studies, is included in Appendix 2.

7.1.3 Pre-investment marine environmental research for the Project – in progress

In order to prepare the documentation, including the environmental documentation, the Investor conducts the “Programme of pre-investment marine environmental research for the purposes of MFW Bałtyk I Environmental Impact Assessment” (“Research programme”). The aim of the programme is to identify environmental conditions in the Project area and in the area of its potential impact.

The programme covers the following issues:

- Hydrological, meteorological and hydrochemical conditions,
- Seabed,
- Physicochemical conditions of seabed sediments,

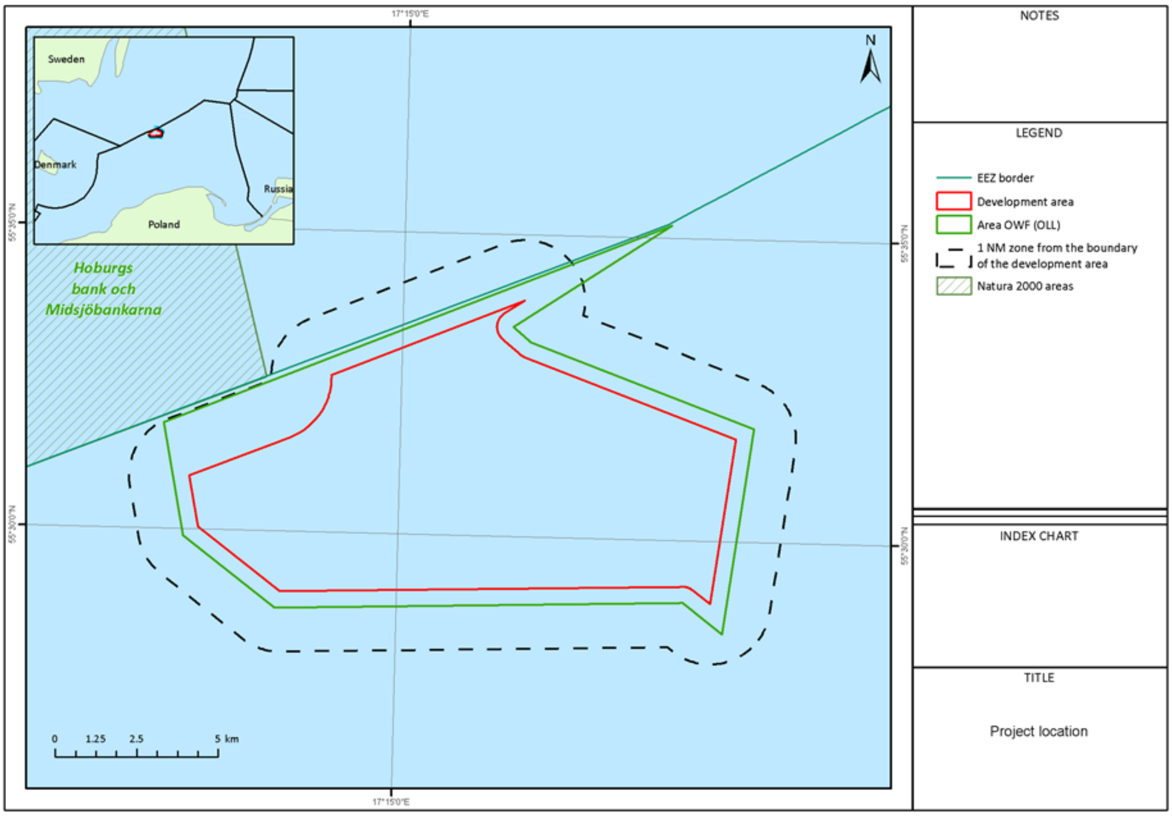
- Marine aggregate research,
- Underwater noise,
- Benthos,
- Ichthyofauna,
- Sea birds,
- Migratory birds,
- Marine mammals,
- Bats
- Cultural heritage, including archaeological research,
- Fisheries analysis.

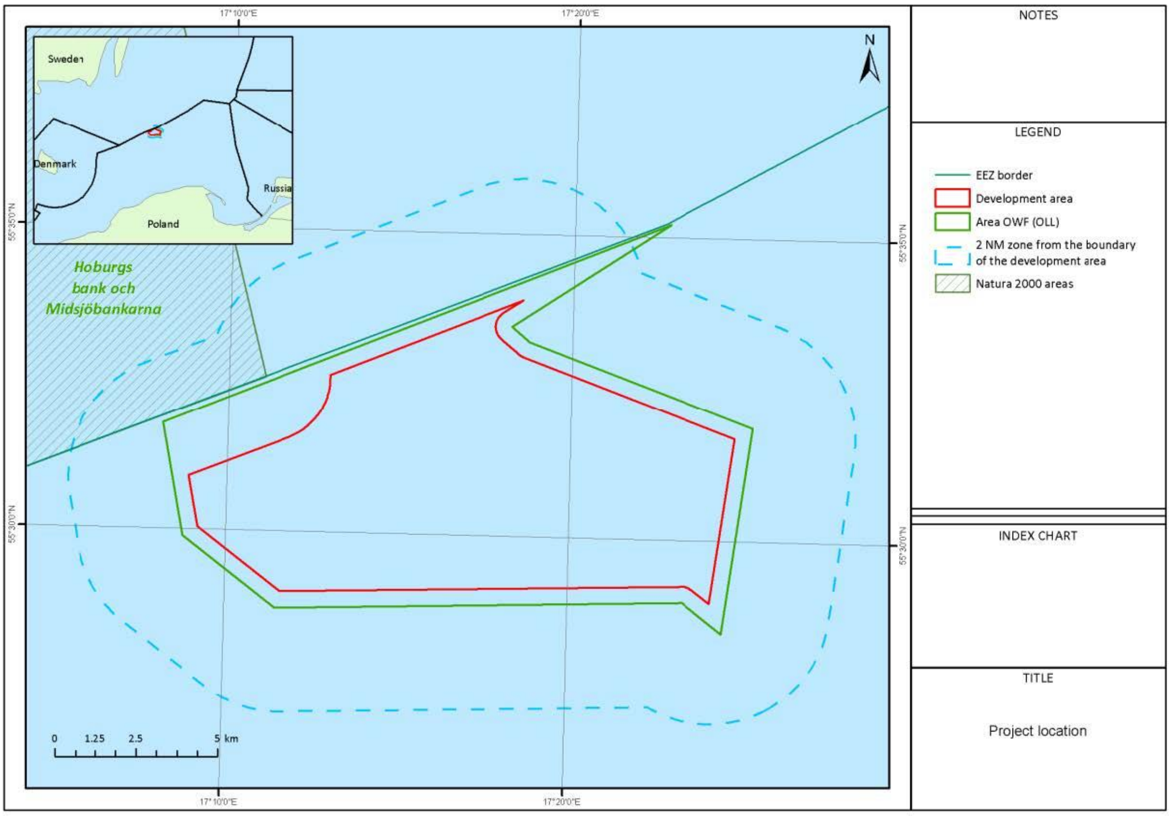
The spatial scope of the research includes the area of MFW Bałtyk I development, i.e. the area where according to:

- the offshore location licence may be located internal constructions and cables of the MFW Bałtyk I, i.e. the area located at least 2 nautical miles from the existing shipping lanes and no closer than 500 m from the external borders of the MFW Bałtyk I area;
- the draft Spatial Plan of Polish Maritime Areas for the area 60.E, in which the MFW BI will be located, it is allowed to erect artificial islands and structures, i.e. the area located not less than 2 km from the borders of the Natura 2000 area "Hoburgs bank och Midsjöbankarna (SE0330308);

together with an impact zone of a width of at least 1 nautical mile - DA BI (1NM), for research within the following scopes: hydrology, meteorology and hydrochemistry, seabed, physical and chemical properties of sediments, marine aggregates, benthos, ichthyofauna, cultural heritage, including archaeological research; and of a width of at least 2 nautical miles - DA BI (2NM) for research within the following scopes: acoustic background, sea birds, migrating birds, sea mammals and bats (Figure 7.2).

Figure 7.2 Location of DA BI (1 NM and 2 NM)





Source: Method statement, MEWO S.A.2021.

Research methodologies are presented in Appendix 1 to this report, and the research schedule – in Appendix 2.

According to the assumption, the Research programme covered a period of one year - four consecutive phenological periods (seasons). **The research programme started in December 2020. By the time of submitting the application for the environmental decision for the Project, most of the research and monitoring works were completed**[1]. Analytical work and final reports with research results are currently being compiled. The results of the conducted research along with the description of the methodology will be included in the EIA report.

7.2 BASIC ENVIRONMENTAL CONDITIONS

For the purpose of preparing the information on baseline environmental conditions, Marine Waters Monitoring Program materials, results of the pre-investment research conducted by the investor, and other environmental data were used.

7.2.1 Seabed (Geology and marine sediments)

7.2.1.1 Mineral and clastic materials

According to the literature data, there are sands, gravels and sand in the bottom sediments in the area of the planned project. Sands with heavy minerals, glass and molding sands, iron and manganese concretions and amber are also recorded in the southern Baltic Sea region. Under the seabed there are deposits of oil, natural gas and shale gas.

In the Polish economic zone of the Baltic Sea, natural gas is present in the following deposits (CBDG, 2022): B4, B6, B21 and together with crude oil in deposits B3 and B8. The B4 and B6 natural gas deposits have resources in the C[2] category and are ready for exploitation (CBDG, 2022). The fields are located at the following (estimated) distances from the limits of the proposed project:

- B4 – approximately 32 km in an east direction,
- B6 – approximately 23 km in a south-east direction,
- B3 – approximately 46 km in a south-east direction.

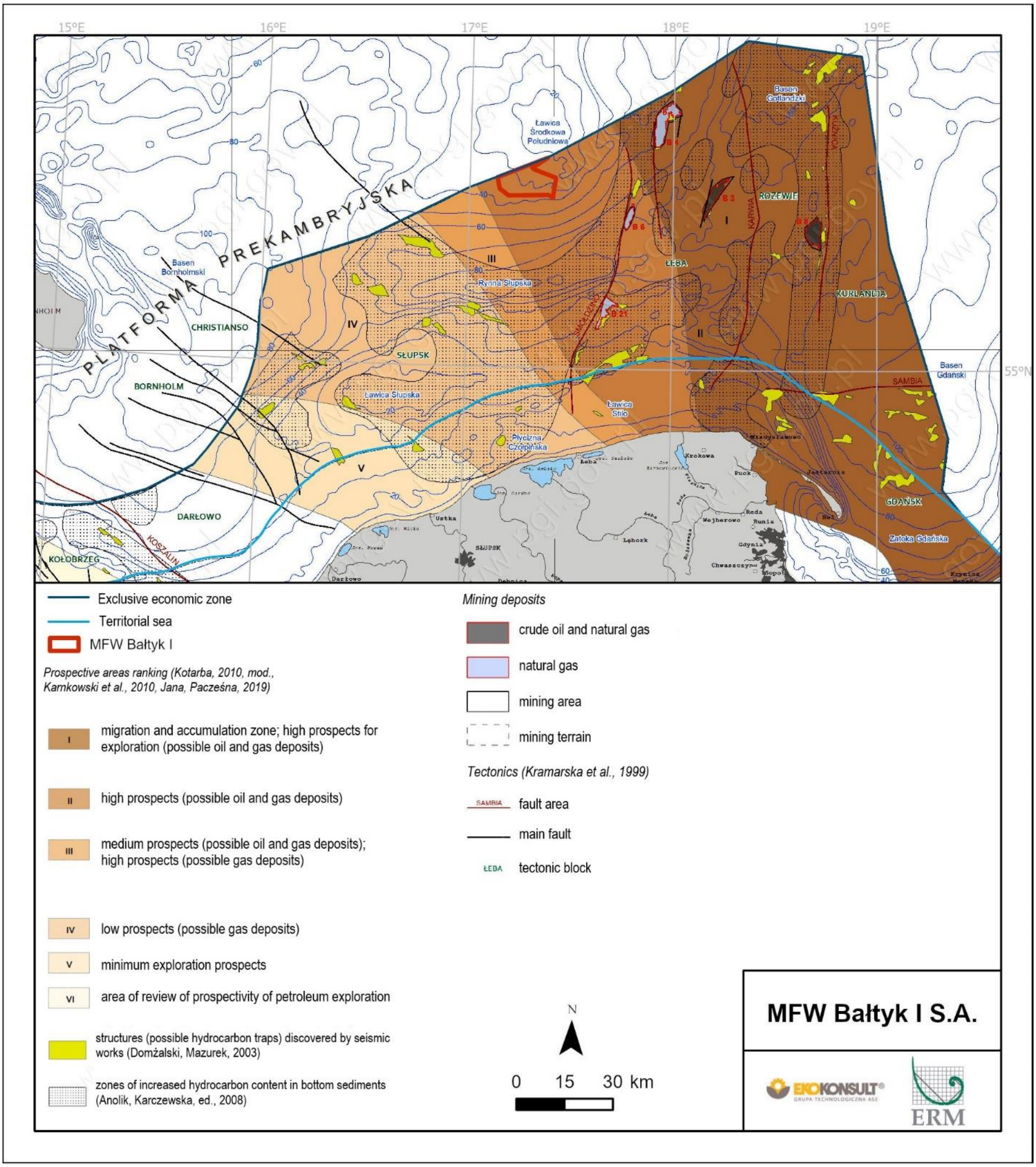
No oil or gas deposits have been documented in the project area (Kramarska, 1999), whereas the area of the proposed project is classified as an area with high prospects for oil and gas condensate exploration and high prospects for natural gas exploration (

[1] The Project is still awaiting permission to survey the seabed and benthos within the potential impact zone of the Project within the Swedish Exclusive Economic Zone.

[2] Recognition of a hydrocarbon deposit (excluding shale gas and oil shale deposits) in category C meets the following requirements - the boundaries of a hydrocarbon deposit are defined on the basis of geophysical research and geological interpretation; the obtained data included in the geological-investment documentation of a hydrocarbon deposit make it possible to design the works necessary for further exploration of the deposit or its development, after obtaining from at least one borehole a flow in an economically significant quantity or, in the case of multi-horizon deposits after determining the saturation of gas- and oil-bearing horizons with hydrocarbons on the basis of geophysical drilling profiling, with the existence of at least one borehole with industrial inflow of resources, while the error of estimating average values of deposit parameters and resources may not exceed 50%. (In accordance with: Journal of Laws 2015 item 968, of 2015.07.10)

Figure 7.3).

Figure 7.3 Mineral resources in the area of the planned Project

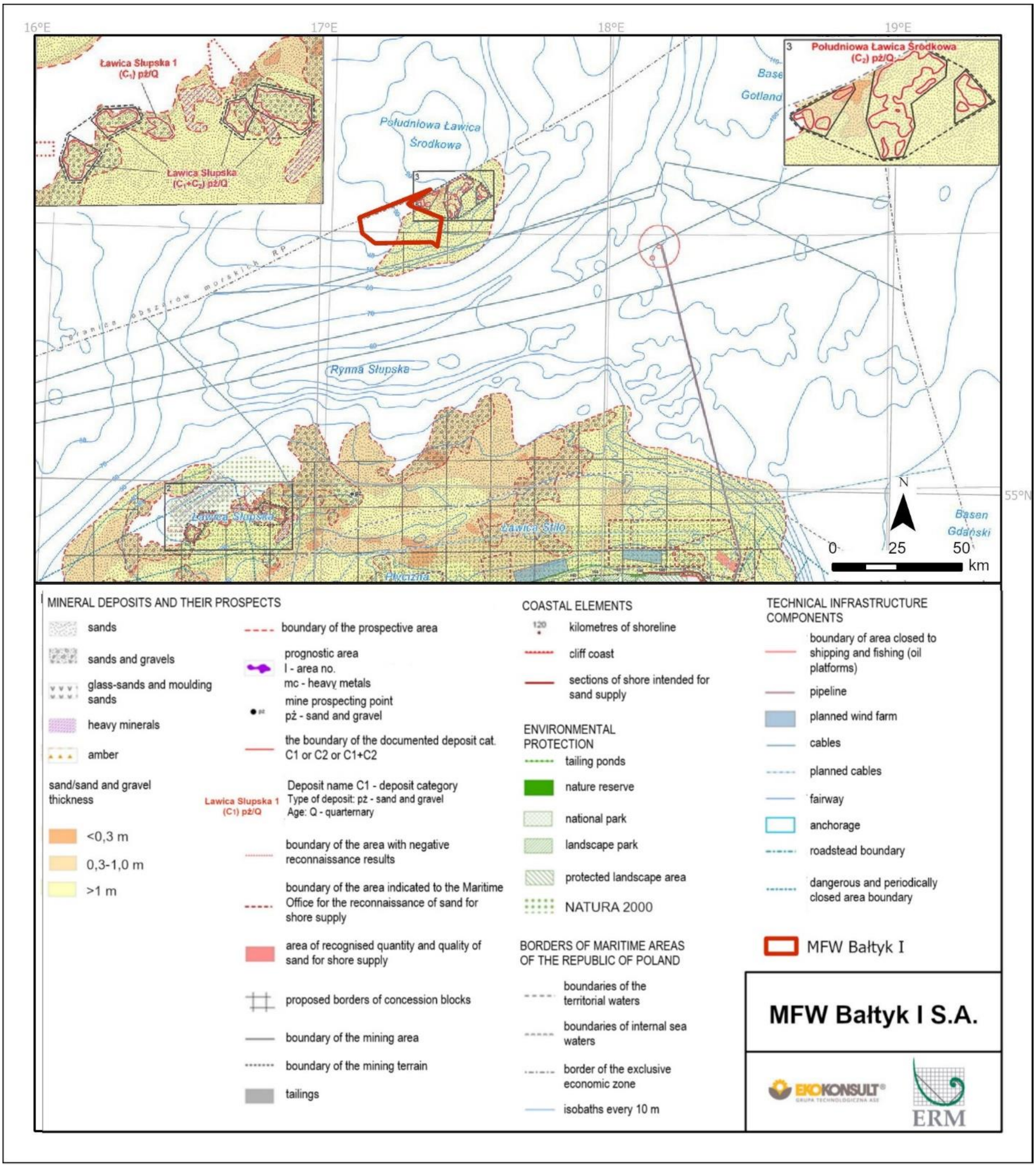


Source: Kramarska R., Szarafin T.: Geoenvironmental map of Polish marine areas, sheet B. Hydrocarbons - deposits and ranking of prospective areas, scale 1:1 000 000, Polish Geological Institute-PIB, 2019.

In addition, in the area of the planned project there is a possibility of prospective occurrence of unconventional hydrocarbon deposits under the seabed, including dry gas in the Upper Cambrian and Upper Ordovician shale formations, however at present it is not possible to determine the economically justified production.

To the east of the planned project there is a documented deposit of natural gravel-sand and sand-gravel aggregate "South Middle Bank" ("Południowa Ławica Środkowa"). The deposit is exploited under a concession issued by the Minister of Environment No. 3/2006 dated 15 November 2006. The concession is valid until 15 November 2031 (Figure 7.4Figure 7.4).

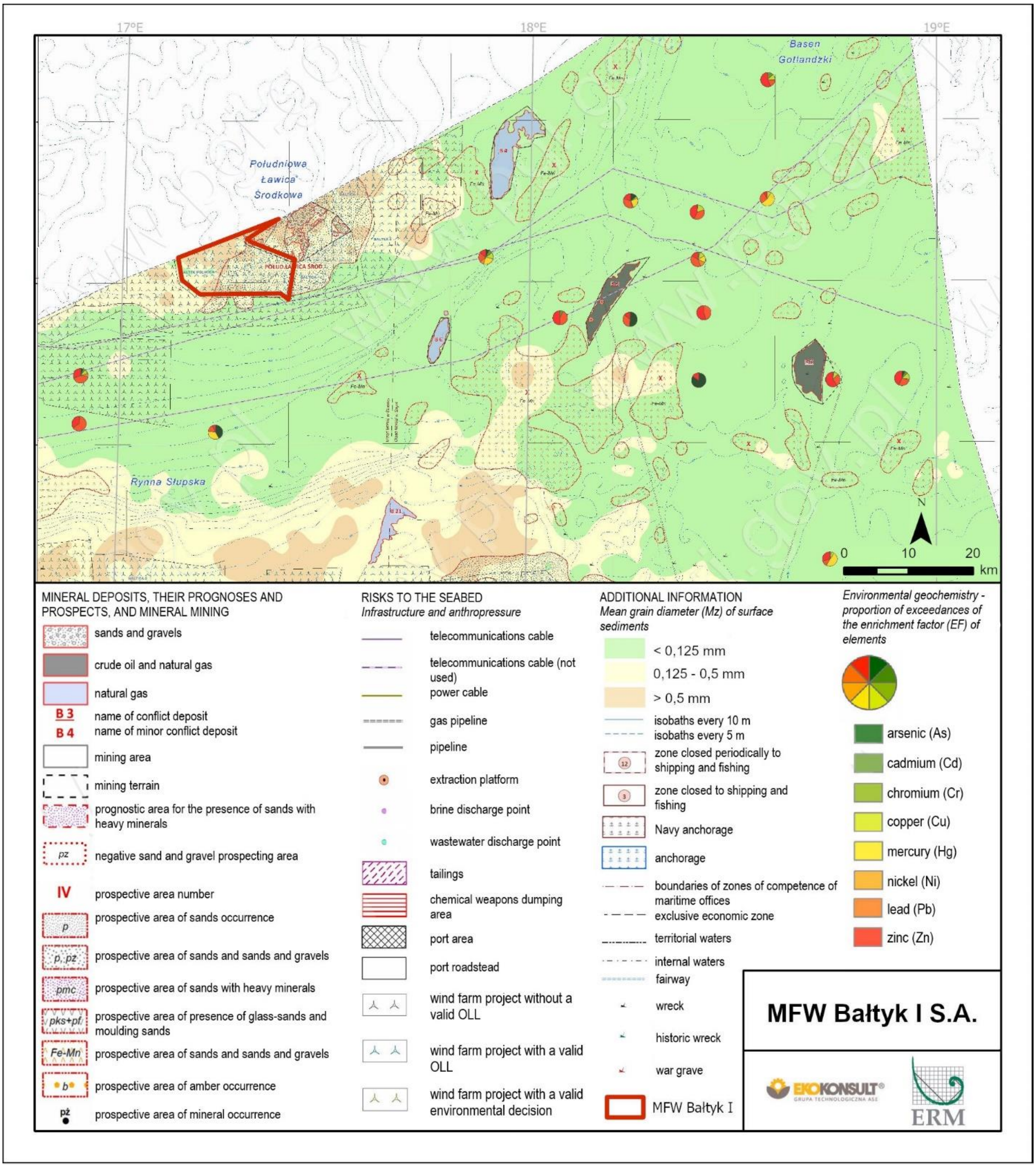
Figure 7.4 Planned Project in relation to prospective deposits of clastic materials



Source: Kramarska R. (ed.), Atlas of lithological parameters of surface sediments in the South Baltic, Table 17 - Deposits and prospective areas of raw materials, Polish Geological Institute-PIB, 2019.

In the area of the planned investment there is also a perspective zone of occurrence of rocks and liquids having mineral characteristics, where geological and mining conditions do not exclude the possibility of their exploitation (
Figure 7.4Figure 7.5).

Figure 7.5 Planned Project in the context of geo-environmental map



Source: Kramarska R.,(ed.) Geo-environmental map of Polish maritime areas (Mapa geośrodowiskowa polskich obszarów morskich), scale 1:250 000 Sheet A. PIG-PIB. CBDG.Map portal – Geology of the Baltic Sea, Polish Geological Institute – National Research Institute, 2019.

7.2.1.2 Physicochemical properties of sediments

Sediments are a very important element of the ecosystem of the Baltic Sea, which is a shallow sea with limited water exchange and an area approximately four times smaller than its drainage basin.

In order to obtain a comprehensive characteristic of the physicochemical properties of sediments from the area of the planned Project the following physicochemical parameters were selected for testing: humidity, loss on ignition, content of metals and of their labile forms (Pb, Cu, Zn, Ni, Cd, Cr, As, Hg), polycyclic aromatic hydrocarbons (16 PAH), polychlorinated biphenyls (7 PCB congeners: 28, 52, 101, 118, 138, 153, 180), mineral oils, ^{137}Cs radioactivity, organic tin compounds (TBT, DBT, MBT) and 2 times per year (due to seasonal variations) the content of biogenic substances (total nitrogen and total phosphorus). Additionally, granulometric analysis of sediment samples was performed once.

Two sediment sampling campaigns (winter- and summertime) were conducted. Sampling was carried out at 188 sampling stations distributed in a uniform grid of 1 sample per 1 km^2. No permission was obtained to conduct surveys in the potentially impacted area, located within the Swedish Exclusive Economic Zone. However, 11 survey stations previously planned on the Swedish side were relocated to the Polish EEZ.

The study showed that the dominant sediment type in DA BI (1NM) is coarse-grained sediment, dominated by fine sands with medium sand admixture. Only a few samples showed the presence of gravel. Physicochemical analyses showed the presence of organic carbon (TOC) at a maximum level of 2.2 g/kg, total nitrogen at a maximum level of 239 mg/kg, mercury - 0.03 mg/kg, aromatic hydrocarbons - 70 mg/kg, PCB (polychlorinated biphenyls) - 0.0012 mg/kg. No significantly contaminated sediments have been identified.

7.2.2 Weather conditions

7.2.2.1 Wind

The station in Łeba is the closest measuring station on the Polish coast in relation to the planned investment.

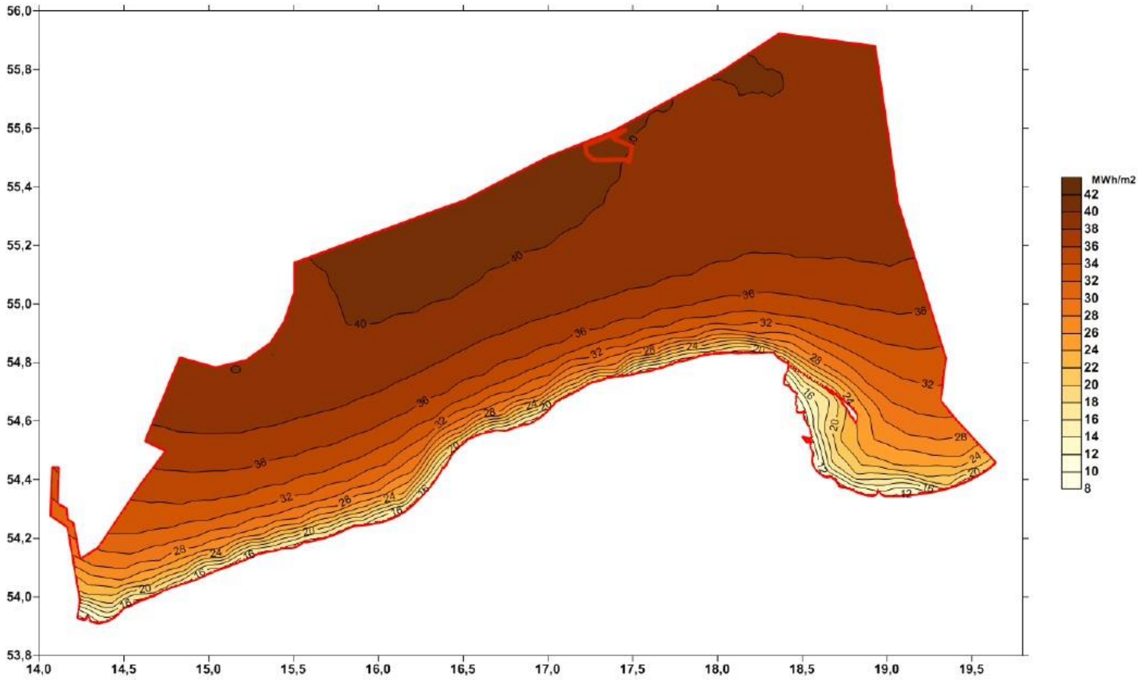
During the years 2010-2019, westerly winds dominated at the Łeba station. The average wind velocity at the station in Łeba for the years 2010-2019 was 4.9 m/s (GIOŚ, 2021a), while the average annual wind velocity in the Baltic Sea ranges from 6 to 8 m/s, values lower than 6 m/s are measured in the coastal zone, while values higher than 7 m/s are measured in the open sea (IMGW). The mean wind velocity at Łeba station in 2020 did not differ significantly from the multi-year mean values - the absolute differences were usually not greater than ±0.4 m/s.

For the operation of offshore wind farms the wind energy potential is an important parameter. An assessment of energy resources of the Polish Baltic Sea area, including among others an analysis of wind energy resources, was conducted during the preparation of conditions for the POM Plan.

Modelled average daily values of wind energy conducted by the Maritime Institute in Gdańsk in the area of the planned project range between 38-40 MWh/m^2 (

Figure 7.6)

Figure 7.6 Daily average values of wind energy over the Polish part of the Southern Baltic Sea calculated based on information from 2013.



Source: Study of Spatial Development Conditions of Polish Maritime Areas together with spatial analyses, annex 3: Assessment of energy resources of Polish areas. Maritime Institute, Gdańsk 2015.

7.2.2.2 Temperature

In 2020, the mean monthly temperature in the surface layer (0-10 m) in the Bornholm Basin, where the planned project is located, was ranging from 5.2 to 18.0°C. This range was narrower than that observed last year. This means that the surface layers had higher temperatures in winter than in 2019, while having lower values observed in summer.

In March, temperature values in the Bornholm Basin, in the Gdansk Basin, and in the Eastern Gotland Basin were very similar and remained within a relatively narrow range of 5.0 to 5.5°C and were noticeably higher than the values determined for the 2010-2019 period (3.3-3.8°C). Positive deviations from the average value for the decade also occurred in January and November for all basins listed above. This indicates a visibly warmer winter period. In all the other months, average temperatures were very close to or slightly lower than the averages for the preceding decade.

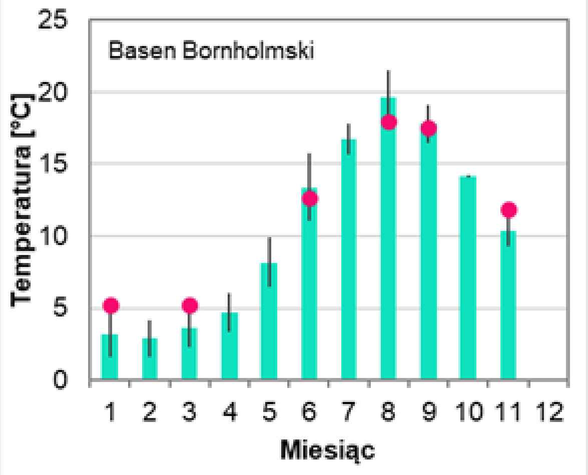
In January, the increase in mean temperature in open sea areas compared to the values determined for the reference period was at the level of 2°C. In March, the difference was between 1.6°C and 1.8°C. November also saw an increase of 1.5°C in the Bornholm Basin.

In June the temperature was 0.7 °C lower respectively compared to the decade. In the high seas, the greatest differences, excluding the winter period, between 2020 and the reference period occurred in August, when temperatures in the year in question were 1.7°C lower in the Bornholm Basin, respectively.

In the Bornholm Basin in 2020, the maximum temperature value was 19.0°C (

Figure 7.7), which was also lower than the values recorded in the area in August 2019, which equalled 22.3°C. The minimum temperature value in the Bornholm Basin was recorded in January and was 4.3°C, which is 2.5°C higher than the previous year.

Figure 7.7 Sea surface water temperature in 2020 in the Bornholm Basin



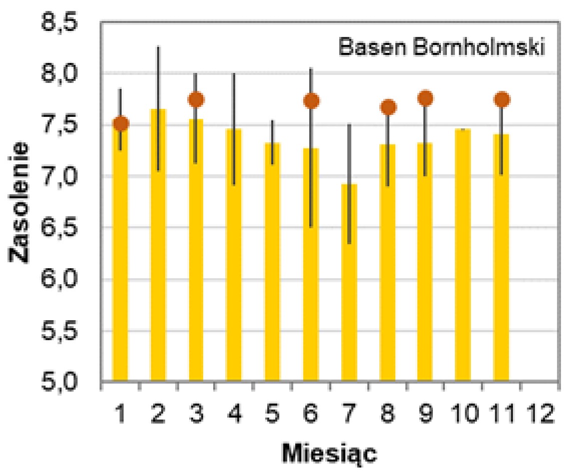
The graph shows data for months for which statistics could be calculated); bar - mean 2010-2019; whiskers - mean ± standard deviation 2010-2019; points - mean 2020.

Source: Assessment of the state of the environment of Polish marine areas of the Baltic Sea on the basis of monitoring data from the year 2020 against the background of the decade 2010-2019, Warsaw 2021

7.2.2.3 Salinity

According to Environmental Assessment of the Polish Marine Areas of the Baltic Sea, in 2020 in the Bornholm Basin where the proposed project is located the average salinity of the surface water layer ranged from 7.52 to 7.77‰, with January having the lowest average value and September having the highest (Figure 7.8). In most cases, the mean values of salinity measurements for 2020 were higher compared to the 2010-2019 decade.

Figure 7.8 Sea surface layer salinity in 2020 in the Bornholm Basin



Graph shows data for months for which statistics could be calculated; bar - mean 2010-2019; whiskers - mean ± standard deviation 2010-2019; points - mean 2020.
Source: Assessment of the state of the environment of Polish marine areas of the Baltic Sea on the basis of monitoring data from the year 2020 against the background of the decade 2010-2019, Warsaw 2021

7.2.2.4 Ice

One of the most important problems for the operation of shipping and water transport is the ice situation. During a harsh winter, ice builds up at a rate of 1.5 tonnes per hour on a vessel of approximately 300-500 tonnes of buoyancy, which can lead to instability (Rokiciński, 2007).

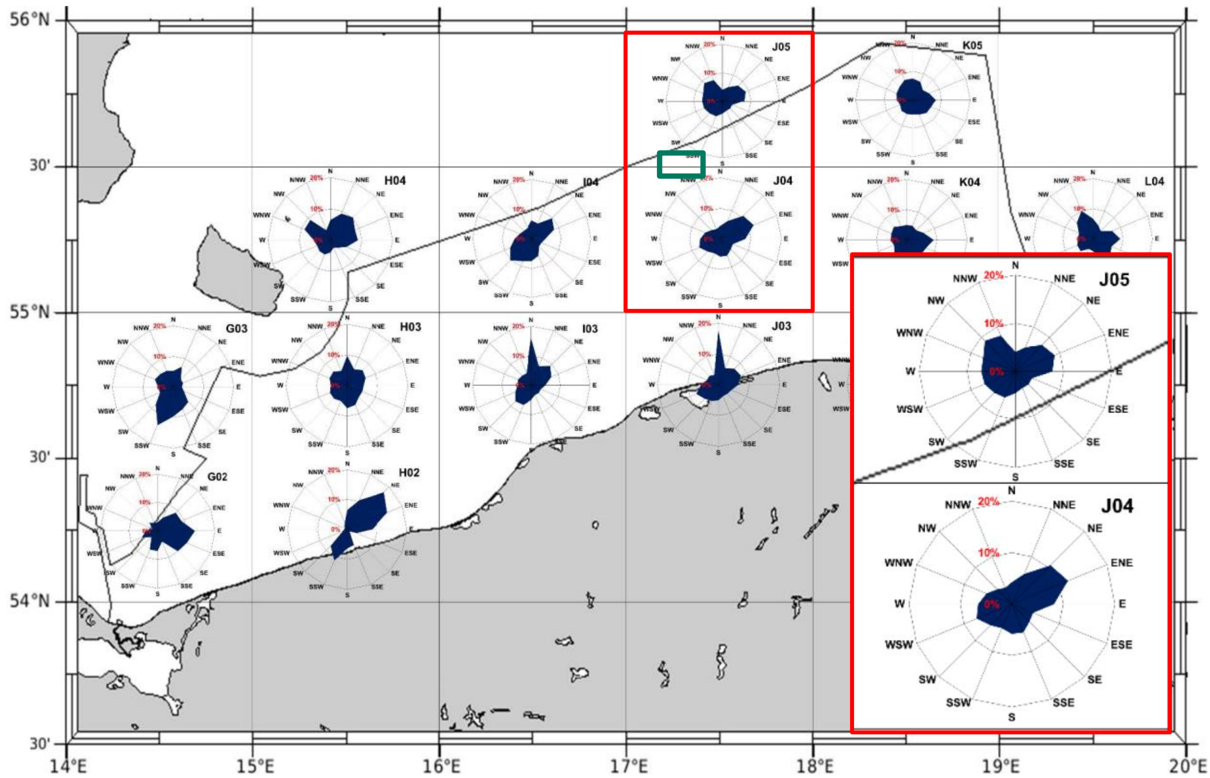
The occurrence of ice events in the central part of the southern Baltic Sea is small (number of ice days, length of ice season, dates of ice appearance and disappearance) in comparison to the rest of the Baltic Sea. Ice phenomena occur here only in severe and very severe winters, which, due to global warming observed during the last decades, did not occur in the Baltic Sea area. The winters 2020/2021 and 2021/2022 can be classified as mild winters, hence no ice phenomena occurred in the study area.

7.2.2.5 Currents and water exchange

Depending on depth, surface, subsurface and bottom currents are distinguished. Considering the short-term scale, the surface and subsurface currents of the Baltic Sea are mainly generated by the wind and determined by the morphology of the shores and the topography of the seabed. Hence, more dynamic changes of sea currents can be observed in the coastal zone than in the open sea.

The general characteristics of the current distribution are presented in the form of current roses determined for individual Baltic squares (Figure 7.9) and refer to the period from 2010 to 2020 (GIOŚ, 2021a). In the Bornholm Basin area, currents from the northeast dominated during 2010-2019.

Figure 7.9 Current roses in the 7.5-12.5 m subsurface layer based on measurements from 2010-2019 (green rectangle - area of the planned Project, red rectangle – magnified areas J04 and J05)

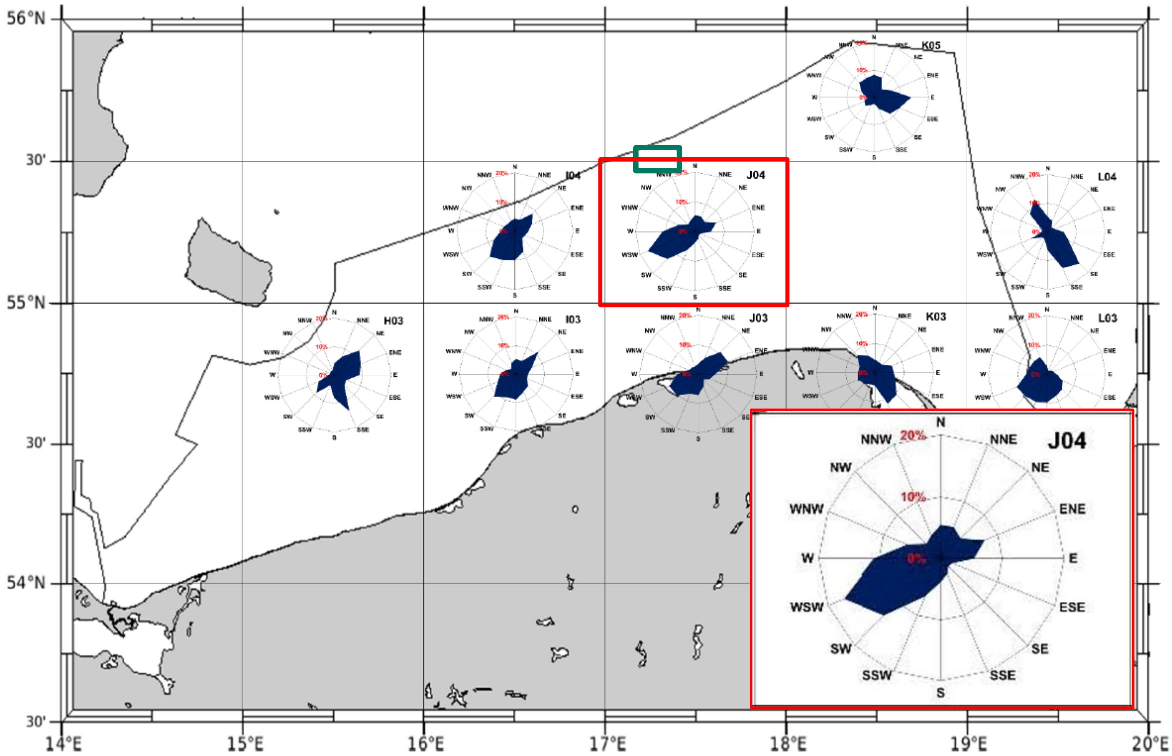


Source: Assessment of the state of the environment of Polish marine areas of the Baltic Sea on the basis of monitoring data from the year 2020 against the background of the decade 2010-2019, Warsaw 2021

A general characterisation of the current distribution in 2020 in the form of current roses for the individual Baltic quadrants shown in Figure 7.10 indicates that the Bornholm Basin experienced currents in the northeast and southeast directions (sector H03) and in the southwest directions (sectors I03, I04). Currents in southwest and northeast directions were observed in sectors along the coast (J03).

A comparison of the wind roses developed from the 2010-2019 multiyear data and the 2020 data indicates that the maximum scale range of the percentage of directions in the currents figures for the 2010 - 2019 multiyear and the 2020 data is 20%.

Figure 7.10 Current roses in the subsurface 7.5-12.5 m layer in 2020. (green rectangle – area of the planned Project, red rectangle – magnified area J04; no data for area J05).



Source: Assessment of the state of the environment of Polish marine areas of the Baltic Sea on the basis of monitoring data from the year 2020 against the background of the decade 2010-2019, Warsaw 2021

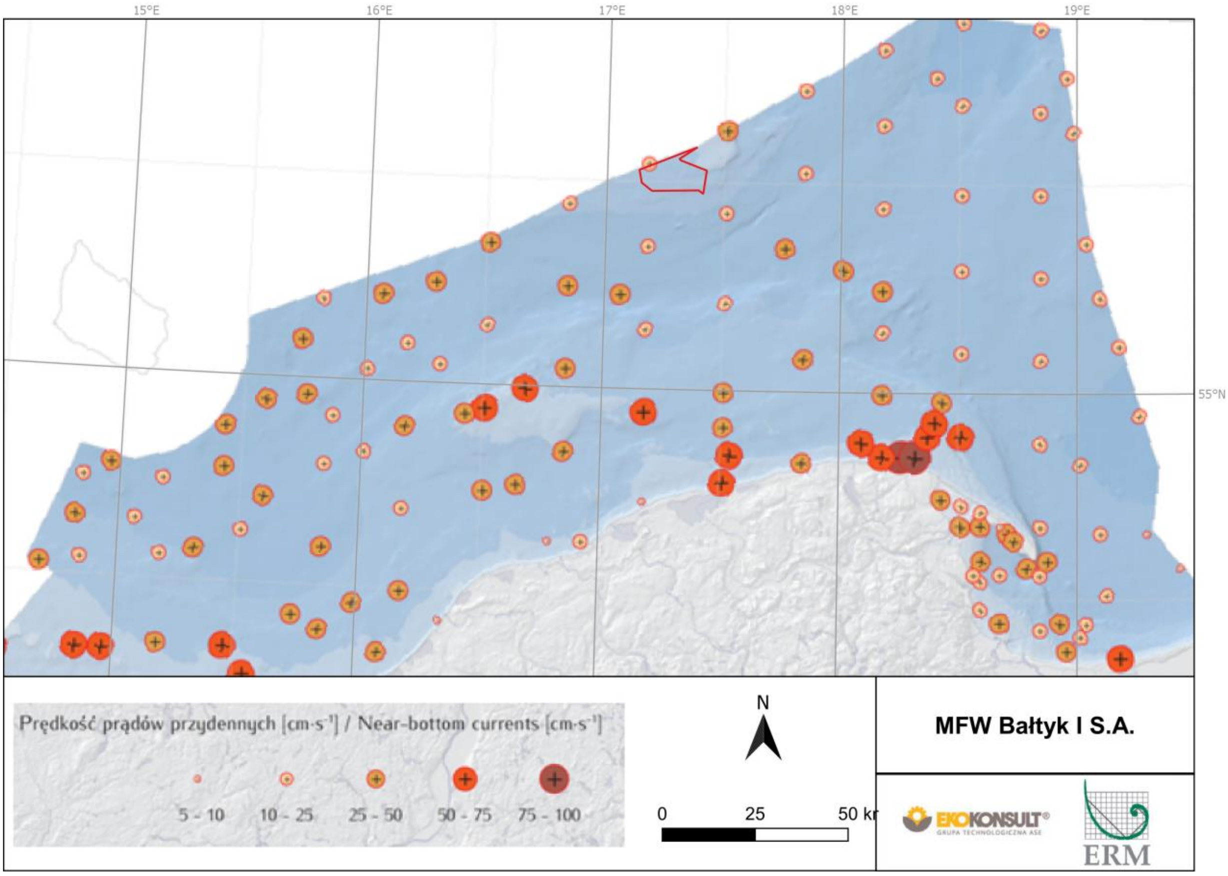
In the area of the planned project the water exchange is connected with irregular inflow of saltwater from the North Sea through Skattegat. This water exchange takes place over the underwater sills in Øresund (depth 8 m) and Great Belt (depth 15-16 m). Deep water renewal can only take place as a result of extreme inflows into the Baltic Sea.

In autumn 2014, one of the largest saltwater inflows from the North Sea took place. According to the Leibniz-Institut für Ostseeforschung Warnemünde (www.io-warnemuende.de), the inflow water volume was 198 km3, while the amount of salt transported was about 4 Gt. Salinity, oxygen and temperature conditions were affected. The effects of this inflow were evident the following year, and very high salinity values were recorded in the bottom layers of the Bornholm Basin waters during monitoring cruises.

The situation in the deep basins of the Baltic Sea was mainly shaped by the moderate Baltic Sea inflows that occurred in November 2015 and January-February 2016, and smaller ones in between. In 2016, three smaller inflows occurred between October and December with estimates ranging from 171 km^3 to 184 km^3. In 2017, there were inflows with an estimated volume of 210km^3. In 2018, there were two inflows with estimated volumes between 215 km^3 and 233 km^3. Weak barotropic inflows were recorded in late 2018 and early 2019 and in April, June, September, and December 2019. No significant inflows to the Baltic Sea were recorded in 2020.

The movement of water over the seafloor causes movement of bottom sediments, which limits the occurrence of fine sedentary organisms and allows filter feeding organisms to feed effectively. Areas of strong currents (above 50 cm-s-1) are characterized by a lack of fine sediments and the presence of deposits of hard clay with gravel and well-washed stones. The bottom current velocities in the area of the planned project are on average 10-25 cm-s-1 (Figure 7.11).

Figure 7.11 Velocities of bottom currents in the area of the planned Project



Source: Atlas siedlisk dna polskich obszarów morskich, Institute of Oceanology PAS, Gdynia 2009

7.2.2.6 Wave action

Waves in marine areas are an important element influencing water mixing, morphological variability of the seabed in the coastal zone and coastal erosion. The size and frequency of waves are strongly influenced by atmospheric conditions (wind direction and speed), seabed and coastal relief.

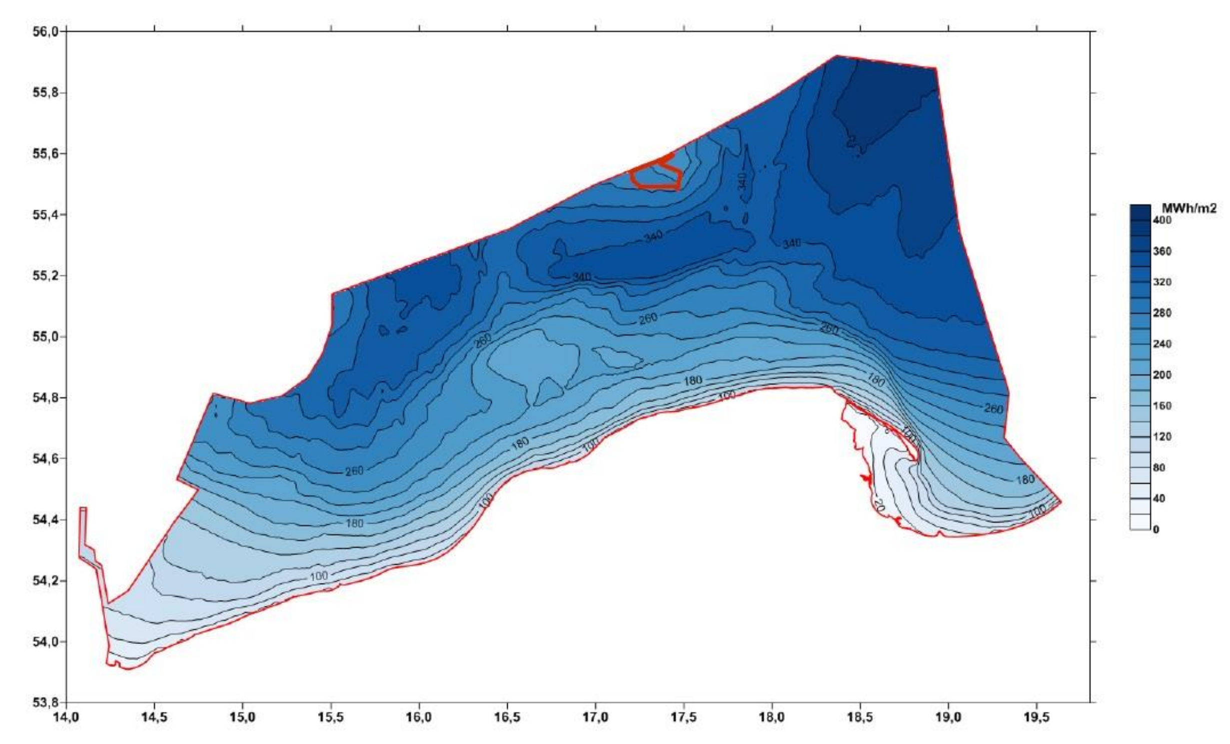
Significant wave height (Hs) and mean period describe the spatial-temporal dynamics of wave conditions. According to the study "Assessment of environmental state of Polish marine areas of the Baltic Sea on the basis of monitoring data from the year 2020 against the background of the decade 2010-2019" (GIOŚ, Warsaw 2021) (GIOŚ, Warsaw 2021), significant wave height is defined as the average wave height, from trough to crest, of the highest one-third of the waves.

Wave conditions, according to the Monitoring programme of the state of sea waters, are determined based on measurements recorded at the Petrobaltic platform, at a point representing open sea zone conditions. In 2020, significant waves with height of 0.2 -1.2 m and average period of 4-5 s (GIOŚ, 2021a) dominated. The distribution of significant wave height and mean wave period in 2020 was similar to that for the reference period 2010-2019, with dominant periods in the range 3.8-4.2 and dominant wave height in the range 0.4-1 m.

The highest value of total storm duration (sea state above 5 degrees on the Douglas scale corresponding to wave heights above 2.5 m) was recorded in 2020 with total of 1005 hours. The total duration of storms above the 2010-2020 multiyear average, apart from 2020, was also recorded in 2011 and 2015-2017. The lowest value was recorded in 2018 with 546 hours of storm duration.

The spatial distribution of the annual wind wave energy resources is shown in the Figure 7.12 below. The developer is conducting a pre-investment study that includes wave measurements.

Figure 7.12 Spatial distribution of annual wind wave energy resources in the area of the planned investment



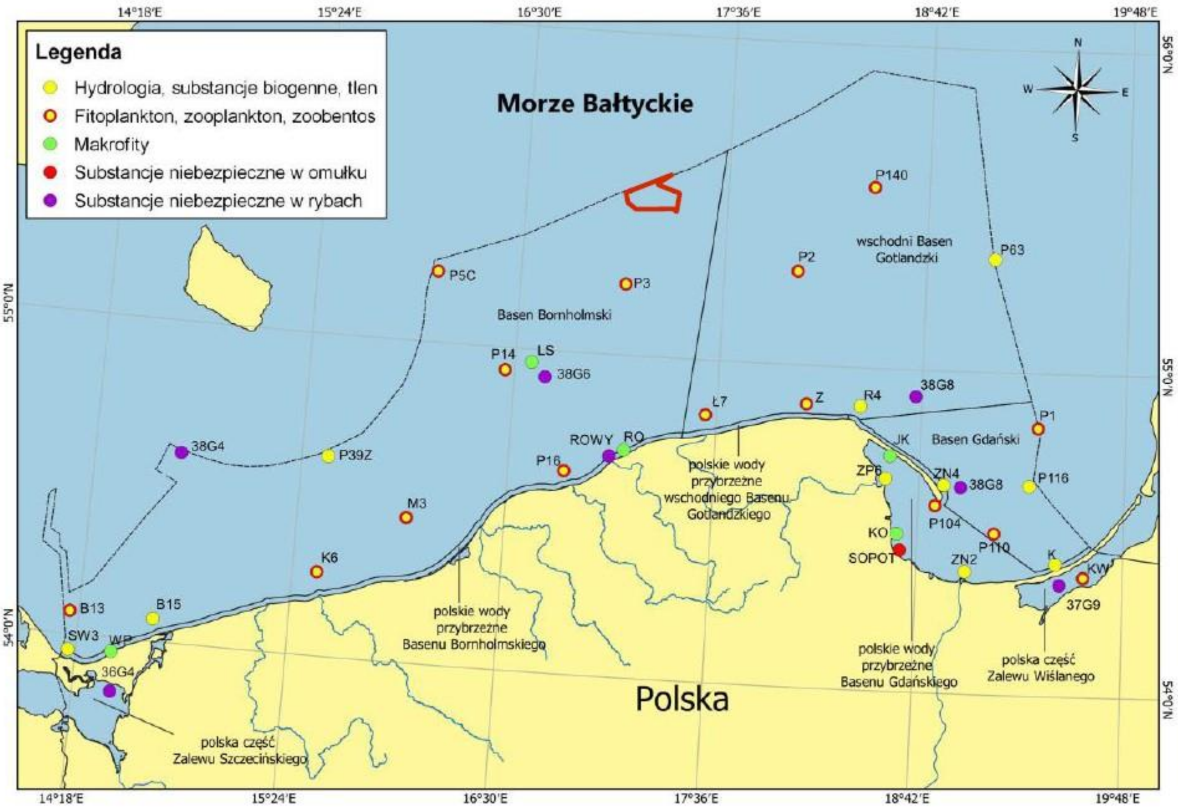
Source: Assessment of energy resources of the Polish Baltic Sea areas, Operational Oceanography Department, Gdańsk 2014

7.2.3 State of the sea waters

Assessment of the state of the marine environment is carried out within the framework of state environmental monitoring, in accordance with the provisions of the Water Law and executive acts, as well as the HELCOM COMBINE guidelines.

Monitoring of sea water status is conducted at measurement stations, the location of which is presented in the figure below. The proposed project is located in the area of the Middle Bank, surrounded by the Bornholm Basin, the Eastern Gotland Basin and the Słupsk Channel to the south (Figure 7.13). In terms of marine water monitoring (subdivision of the Baltic Sea into water bodies as per the MSFD), the proposed Project is located in the Bornholm Basin.

Figure 7.13 Baltic Sea sub-basins delineated in Polish marine areas according to HELCOM MAS with updates (HELCOM 2013) with location of MSFD monitoring measurement and research stations.



Source: Assessment of energy resources of the Polish Baltic Sea areas, Operational Oceanography Department, Gdańsk 2014

The measuring stations located in the Bornholm Basin and closest to the planned project are: P3, P5C, and the measuring station P2 located in the Eastern Gotland Basin. The following parameters are examined at the abovementioned stations: phytoplankton, zooplankton and zoobenthos, and P39Z, where nutrients, oxygen and hydrological parameters are examined.

Average concentrations of nutrients, nitrogen and phosphorus, in the Bornholm and Eastern Gotland Basins are as follows (Table 7.1):

Table 7.1 Average concentrations [mmol m^{-3}] in 2020 r. in the surface layer (0–10 m) of mineral phosphorous compounds (DIP) and nitrogen compounds (DIN) during the winter months (XII–II), and average concentrations of phosphorous (TP) and total nitrogen (TN) during the summer months (VI–IX) (2010–2019 decade averages) in the Bornholm and Eastern Gotland Basins.

Basin		DIP	DIN	TP	TN
Bornholm Basin	2020	0,61	3,48	0,66	21,48
	2010-2019	0,63	6,46	0,94	25,22
Eastern Gotland Basin	2020	0,64	0,64	0,64	0,64
	2010-2019	0,61	4,59	0,88	24,78

Source: Assessment of energy resources of the Polish Baltic Sea areas, Operational Oceanography Department, Gdańsk 2014

Phytoplankton blooms are a derivative of nutrient concentrations in marine waters. A measure of the intensity of phytoplankton blooms is the chlorophyll content of the seawater. In 2020, the Bornholm Basin had slightly lower summer concentrations of chlorophyll a than annual averages. The mean chlorophyll a content, both seasonally and for the whole year 2020, was lower compared to the survey results from the last decade.

Water transparency in the Bornholm Basin was on average 6.5 m, with an average of 5.1 m during the summer months.

Based on the above parameters, the marine water status of the Bornholm Basin was assessed as inadequate according to the MSFD.

In 2020, mean caesium ^{137}Cs concentration in the Bornholm Basin was approximately 19 Bq m-^{3}. The environmental status regarding radioactive contamination with ^{137}Cs is inadequate according to the requirements of the MSFD.

No limit values have been established for strontium ^{90}Sr. The average concentration of ^{90}Sr in the Bornholm Basin was 4,8 Bq m^{-3}.

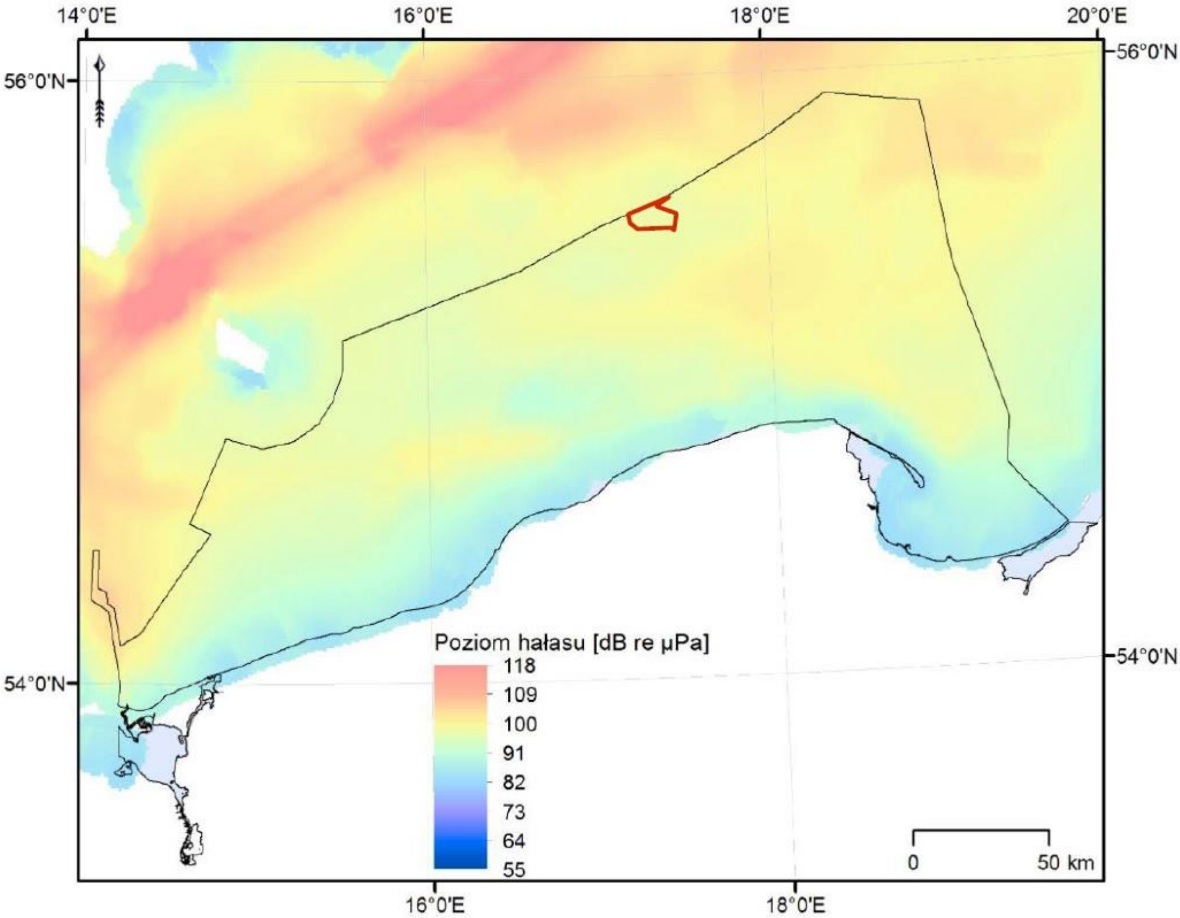
7.2.4 Acoustic background

Acoustic background in the marine environment may be determined by sources of natural or anthropogenic origin. Sources of natural continuous noise are e.g. wind, rainfall, wave action, while anthropogenic sources are maritime transport, bridges, offshore wind turbines, and mineral extraction. Impulse noise is primarily generated by the operation of sonars and echosounders, geological exploration explosions, practice detonations at offshore military training grounds, underwater explosions when destroying munitions, and marine animals. It is expected that at least part of the noise sources listed above will appear during implementation and operation of the planned project.

In accordance with the results of studies presented in the Update of the initial assessment of status of marine waters, the acoustic background in Polish sea areas does not exceed 75 dB re μPa along the coast (a zone of about 15 km width) and in the Gulf of Gdańsk. As shown in the

Figure 7.14, the noise level increases towards the north, but nowhere exceeds 90 dB re μPa.

Figure 7.14 Continuous noise level related to human activity



Source: Update of the initial assessment of the environmental status of marine waters, GIOŚ, Warszawa, 2018

As part of the pre-investment studies, background noise measurements are being conducted. Based on the studies conducted from December 2020 to January 2022, it was found that underwater noise levels of particular bands (and their ranges of variability) show characteristic values for the South Baltic area, observed in sound propagation conditions typical for the winter season and the transition season between the winter season and early spring.

7.2.5 Benthos

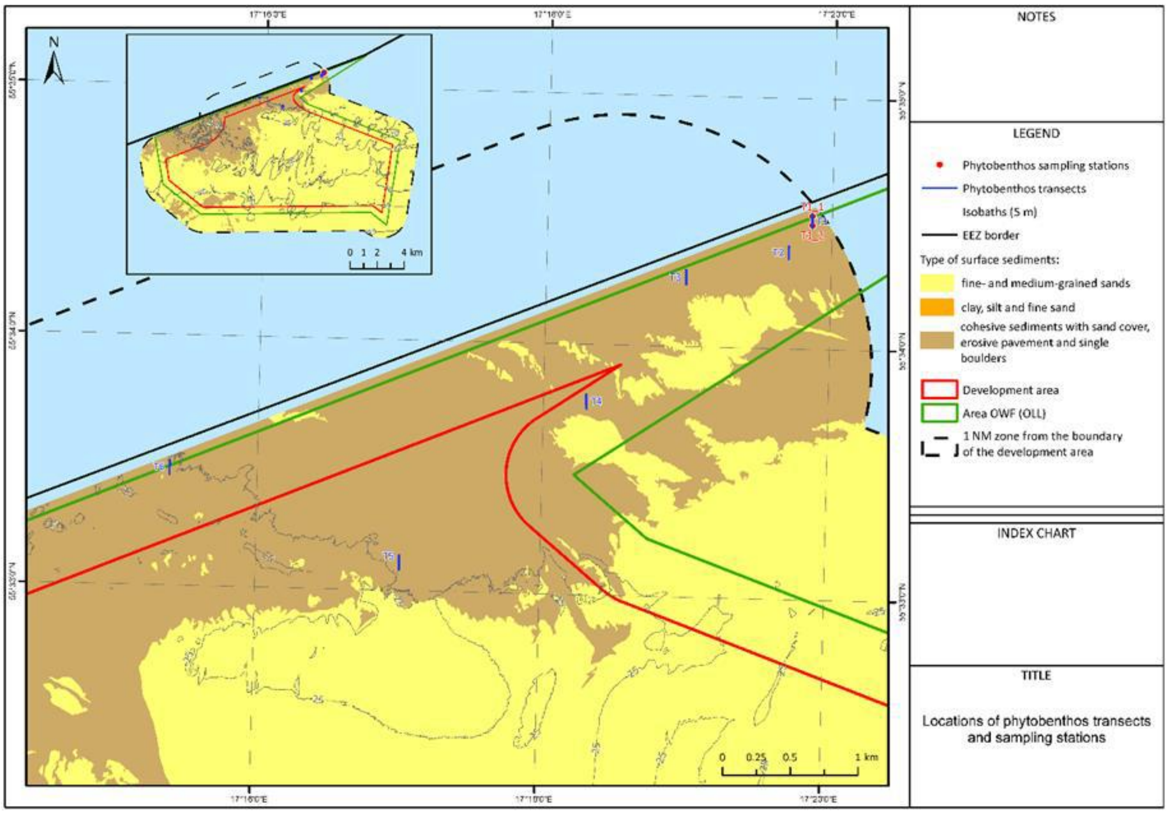
7.2.5.1 Phytobenthos

The occurrence of phytobenthos depends on the depth to which the minimum amount of light necessary for the photosynthesis can reach. Depth of occurrence of plants rooted in the bottom is up to about 8 metres (Kruk-Dowgiałło, 2000), and macroalgae associated with hard substrate up to approximately 21 metres (Kruk-Dowgiałło, 2011).

The qualitative and quantitative structure of phytobenthos in the Baltic Sea is shaped mainly by abiotic environmental factors, such as the type of substrate, light availability, or water dynamics (Erikson & Bergström, 2005; Snickars et al., 2014; Wallin et al., 2011). In the area of the OWF (

Figure 7.15), these conditions are unfavourable to the development of phytobenthos.

Figure 7.15 Location of phytobenthos transects in the MFW Bałtyk I development area with a potential impact zone of at least 1 nautical mile



Source: Final report – benthos, MEWO, 2022

As part of the environmental survey in the pre-investment phase, in June 2021 (MEWO, 2022), an underwater inspection was performed along the determined transects by means of filming the seabed with the ROV underwater vehicle in the area of MFW Bałtyk I development, including a buffer zone of 1 nautical mile. Sample research showed that the hard bottom, which is crucial for the development of macroalgae, occupies a small area, only 19.6% (i.e. 35 km²) of the MFW Bałtyk I development area (including an impact zone with a width of at least 1 nautical mile; DA BI (1NM)).

Hard bottom in the Project area is located at the depth of approx. 20 m, where the penetrating light necessary for photosynthesis is negligible. There are also strong bottom currents which limit the growth of macroalgae.

In the MFW Bałtyk I area, macroalgae were found within a depth range of 19.9–24.8 m, and in very low amounts, i.e. < 1%. Red algae *Rhodomela confervoides* (0.45 g DW·m^2) and brown algae *Sphacelaria cirrosa, Pylaiella littoralis* and/or *Ectocarpus siliculosus* were identified in the area. All species are recorded in the open waters in low abundance.

Since no protected species were found in the survey area (in accordance with the Regulation of the Minister of the Environment *on the protection of plant species* (Journal of Laws 2014, item 1409)), and the fact that macroalgae were present in negligible amounts, the area of the MFW Bałtyk I is considered devoid of natural values in terms of phytobenthos. This is typical of the seabed areas located at depths of approx. 20 m in the Polish marine areas.

7.2.5.2 Zoobenthos

The occurrence of zoobenthos is mainly dependent on physical and chemical factors such as sediment type, salinity, temperature and dissolved oxygen concentration, and biotic factors such as food availability, biotic potential of individual species and interspecies relationships. The shallow zone of the Baltic Sea (to the depth of approx. 40 metres) is richer in zoobenthic organisms than areas of greater depth due to, among other things, higher salinity, lower temperatures and periodic or permanent lack of oxygen in areas of considerable depth (e.g. Laine, 2003; Bonsdorff, 2006).

Macrozoobenthos research in the DA BI (1NM) was conducted in the pre-investment research phasebetween May and June 2021 (MEWO, 2022). For this purpose, 186 macrozoobenthos sampling stations were established, from where samples were taken with a van Veen grab sampler in case of soft seabed or with a remotely operated vehicle (ROV) equipped with a macrozoobenthos collection tube in case of hard seabed. Twenty of the sampling stations did not provide any results on macrozoobenthos due to technical issues with the van Veen grab sampler, therefore they were excluded from further analysis.

Details of the most important results from the surveys of macrozoobenthos inhabiting the soft and hard bottom in the DA BI (1NM) are presented in the table below (Table 7.2), while 4 identified macrobenthic communities are shown in Figure 7.16.

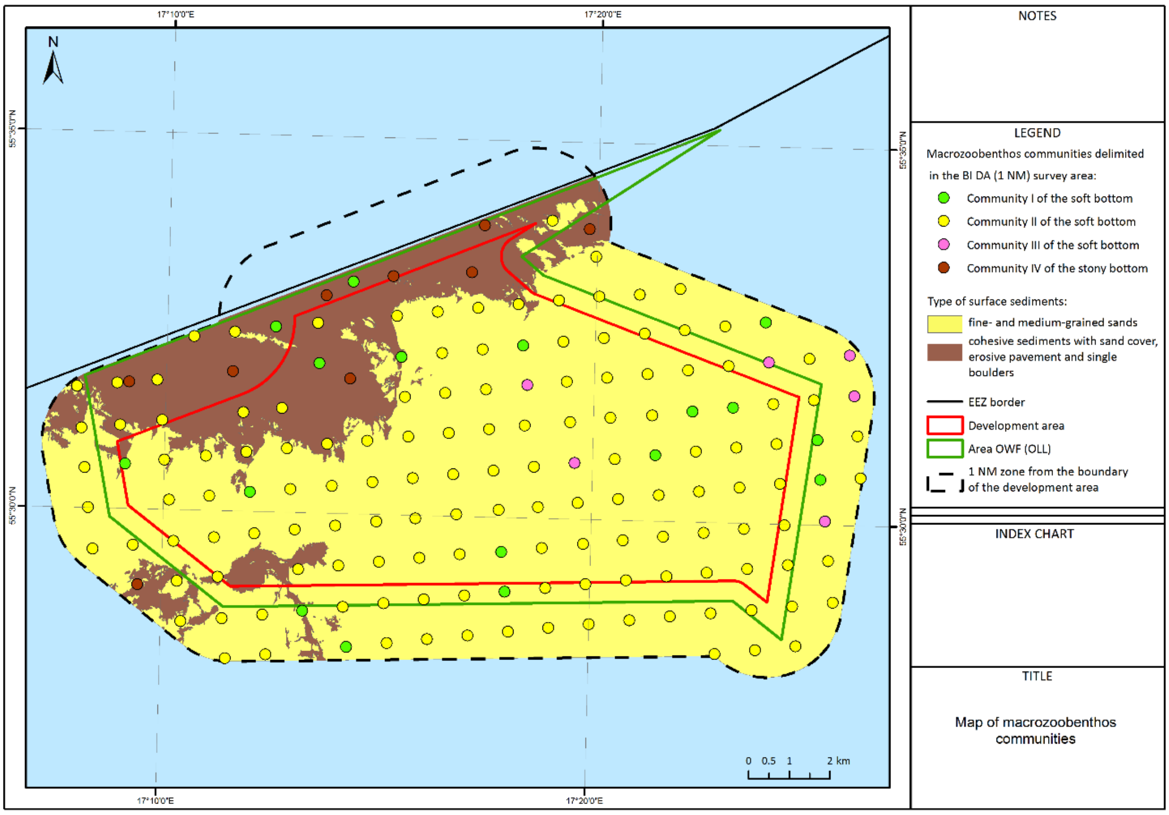
Table 7.2 Characteristics of the selected parameters of macrozoobenthos in the DA BI (1NM)

Parameter	Soft bottom	Hard bottom
Number of stations	157	9
Depth [m]	17,5–70	21,4–31
Number of taxa total: range on one station:	 25 2–12	 16 6–10
Abundance [ind.·m^{-2}] average: range:	 1526 40–7680	 49698 37891–65774
Biomass [g m.m.·m^{-2}] average: range:	 23,1 0,2–174,8	 1810,7 ±522,9 1216,9–2610,9
B index Average/ecological status on the basis of macrozoobenthos: range:	 2,77/moderate 1,55–4,29	 not applicable
TSO index average/ecological status based on macrozoobenthos: range:	 not applicable	 3/good 2–4
The most common species (absolutely constant)	*Pygospio elegans*	*Mytilus trossulus* *Bylgides sarsi* *Jaera (Jaera) albifrons* *Einhornia crustulenta* *Pygospio elegans*

Distinguished macrozoobenthos communities	3 communitites: Community I – Oligochaeta Community II – *Pygospio elegans* Community III – *Marenzelleria* sp.	1 community: Community IV – *Mytilus trossulus*
Dominant species of bivalves	*Limecola balthica*	*Mytilus trossulus*

Source: Final report – benthos, MEWO, 2022

Figure 7.16 Macrozoobenthos communities distinguished in the MFW Bałtyk I development area with a potential impact zone of at least 1 nautical mile



Source: Final report – benthos, MEWO, 2022.

The results of the qualitative structure of macrozoobenthos, i.e. the taxonomic composition and frequency of taxa at stations located on the soft bottom indicated that this area was inhabited by a relatively diversified benthic macrofauna. In the survey area, the occurrence of 25 macrozoobenthos taxa was found. Taxa typical of the medium-deep seabed (up to about 40 m below sea level) of the open waters of the Southern Baltic dominated.

Within the soft bottom, 3 macrozoobenthos communities, which differed in taxonomic composition and abundance, were distinguished. Community I, dominated by Oligochaeta, which is considered to be an indicator of the contaminated seabed, occurred mainly on a gravelly seabed located irregularly at single points in the entire survey area. Community II – the most characteristic for the investigated area – covered most of the sandy bottom, in which psammophylous polychaetes *Pygospio elegans* (an indicator of clean or moderately clean sediments with little additives of organic matter) dominated in terms of abundance. On the other hand, community III – *Marenzelleria* sp. occurred at points in the central and eastern parts of the DA BI (1NM) area on the sandy and gravelly seabed. This community was characterised by a very poor taxonomic composition (Table 7.2).

The community of macrozoobenthos living on the hard bottom (community IV) is located primarily in the northern part of the DA BI (1NM) area. It consisted of 16 taxa of the common fouling fauna (*Mytilus trossulus, Einhornia crustulenta, Gonothyraea loveni, Amphibalanus improvisus*) in the Southern Baltic, and accompanying fauna, i.e. small invertebrates inhabiting the spaces between shells of mussels and boulders that form the reef (mainly *Bylgides sarsi, Jaera (Jaera) albifrons* and *Gammaridae*). The mussel *Mytilus trossulus* growing on the surface of the stones dominated in the abundance and biomass structure (Table 7.2).

The ecological status of the macrozoobenthos community of the soft bottom was assessed as moderate and of the hard bottom as good. In DA BI (1NM), no protected species of macrozoobenthos were found, whereas 4 bivalve species (*Mytilus trossulus, Limecola balthica, Mya arenaria* i *Cerastoderma glaucum*) were observed. They constitute a potential food base for benthophagous birds, mainly ducks and fish.

7.2.6 Ichthyofauna and spawning grounds

According to the report "State of the Baltic fish stocks and ICES-recommended total acceptable catches (TAC) in 2022" (Maritime Institute of Fisheries - National Research Institute), the number of Eastern Baltic cod is decreasing all the time, therefore it is recommended to stop its fishing. The herring stock is threatened by an increased risk of losing its full recovery capacity, which is also connected with fishing restrictions. Sprats, on the other hand, are exploited sustainably (see Chapter 6.2.1).

To determine the diversity and abundance of ichthyofauna and the presence of spawning grounds in the area of the planned project, a comprehensive pre-investment survey was carried out, based on:

- catches of ichthyoplankton conducted at 7 stations from r/v BALTICA vessel (station locations are - Figure 7.17),

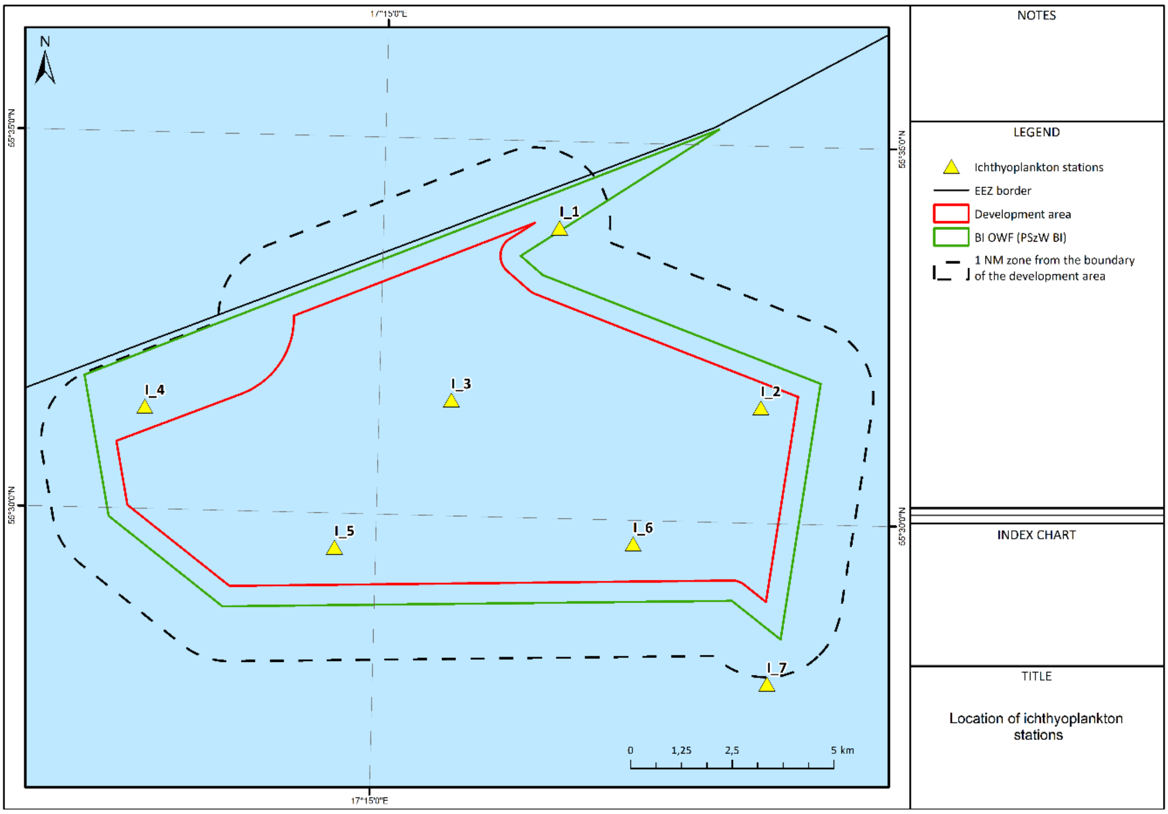
analysis of the density and characteristics of the pelagic fish community in the study area using complementary methods of hydroacoustic sounding and pelagic control hauls (

- Figure 7.18),
- demersal fishing with bottom gillnets from the fishing vessel UST-52 (Figure 7.19).

The work area included a 1 nautical mile buffer zone from the wind farm boundary. Surveys were conducted from December 2020 to November 2021, their results (MEWO, 2022) are presented below.

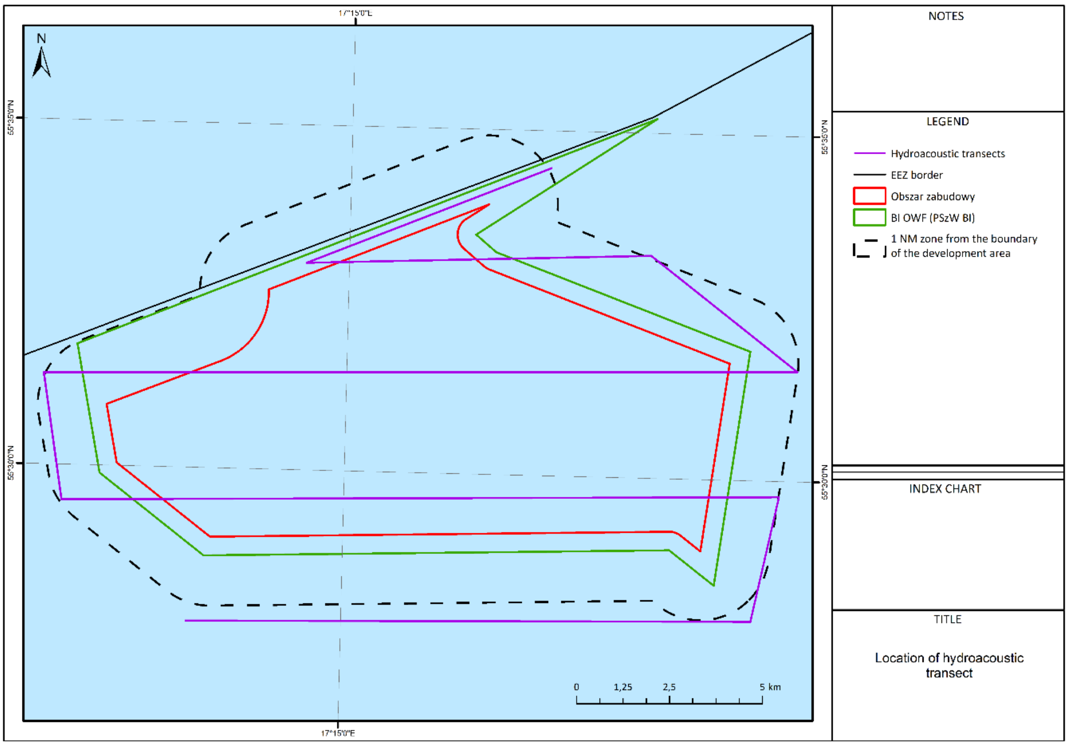
- Species diversity: the analysis of the catch results and the catch per unit effort of the fish occurring within the BI DA (1 NM) shows that the area is typical in terms of species diversity, with a clear predominance of cod (*Gadus morhua*) and flounder (*Platichthys flesus*) in demersal catches, and herring (*Clupea harengus*) and sprat (*Sprattus sprattus*) in pelagic catches, which is typical of southern Baltic waters. In case of ichthyoplankton catches, low taxonomic diversity was observed (eggs of 1 species and larvae of 11 fish taxa).
- Spawning grounds: Late spring and summer spawning of sprat was observed, but its intensity was relatively low compared to other shallow water areas. In addition, data indicate that sand lances (*Ammodytidae*) and turbot (*Scophthalmus maximus*) may also spawn here.
- The results of the herring control catches indicate that the DA BI (1 NM), only in autumn, was the site of a temporary, clear aggregation of part of the herring stock. In summer, typical intensive foraging of herring did not take place.
- For sprat, the DA BI (1 NM) in the four survey seasons in 2021 was a temporary residence and migration area. The spawning process and spawning migrations of sprat took place from March to July. The spawning fish were most abundant in the spring samples. The highest biomass surface density of sprat was estimated for the summer research campaign. The lowest value of surface biomass of sprat was recorded during the winter survey campaign. The results of the cod abundance surveys indicate that the DA BI (1 NM) was characterised by quite considerable quantitative variation in the abundance of these fish over the annual cycle. Cod were most abundant in summer and least abundant in winter. The study area was found to be an attractive feeding area for both small and larger cod, as both fish and crustaceans of different species were found in their diet.
- The area of the planned investment was a seasonal habitat for mainly adult flounder. Flounder were most abundant in spring and summer to feed after spawning in the deeps. Flounder do not spawn directly in the area because the salinity is too low to allow successful fertilisation.

Figure 7.17 Location of ichthyoplankton research stations in the MFW Bałtyk I development area with a potential impact zone of at least 1 nautical mile



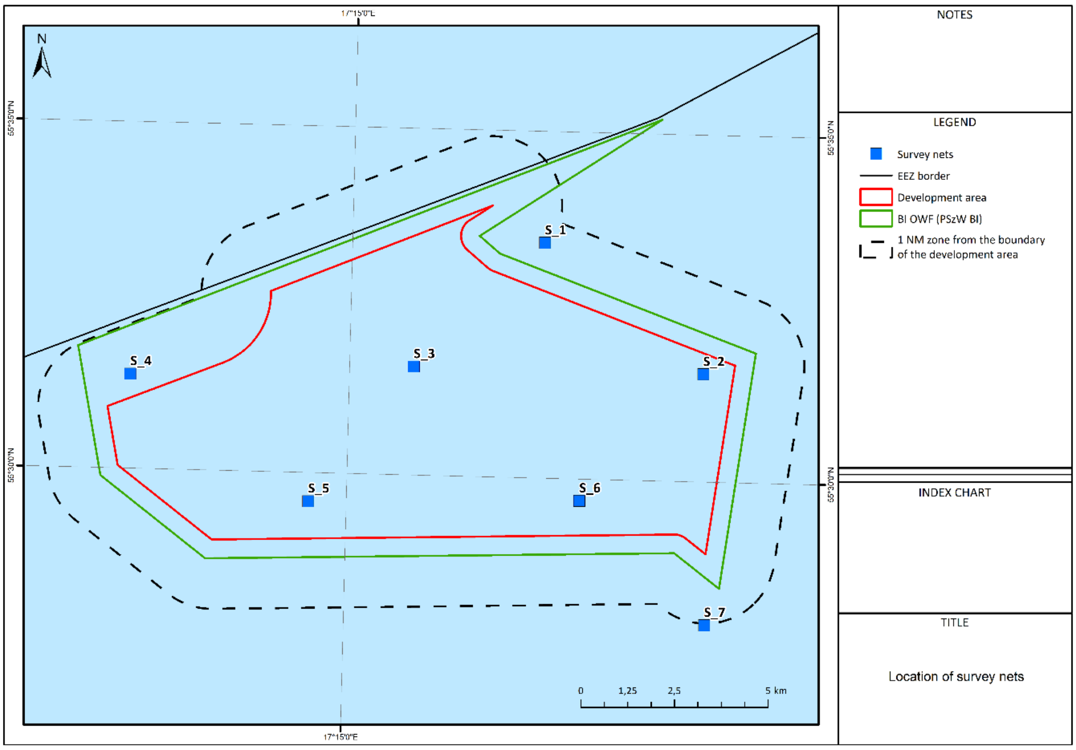
Source: Final report – ichthyofauna, MEWO, 2022.

Figure 7.18 Hydroacoustic survey route in the MFW Bałtyk I development area with a potential impact zone of at least 1 nautical mile



Source: Final report – ichthyofauna, MEWO, 2022.

Figure 7.19 Location of demersal survey nets in the MFW Bałtyk I development area with a potential impact zone of at least 1 nautical mile



Source: Final report – Ichthyofauna, MEWO, 2022.

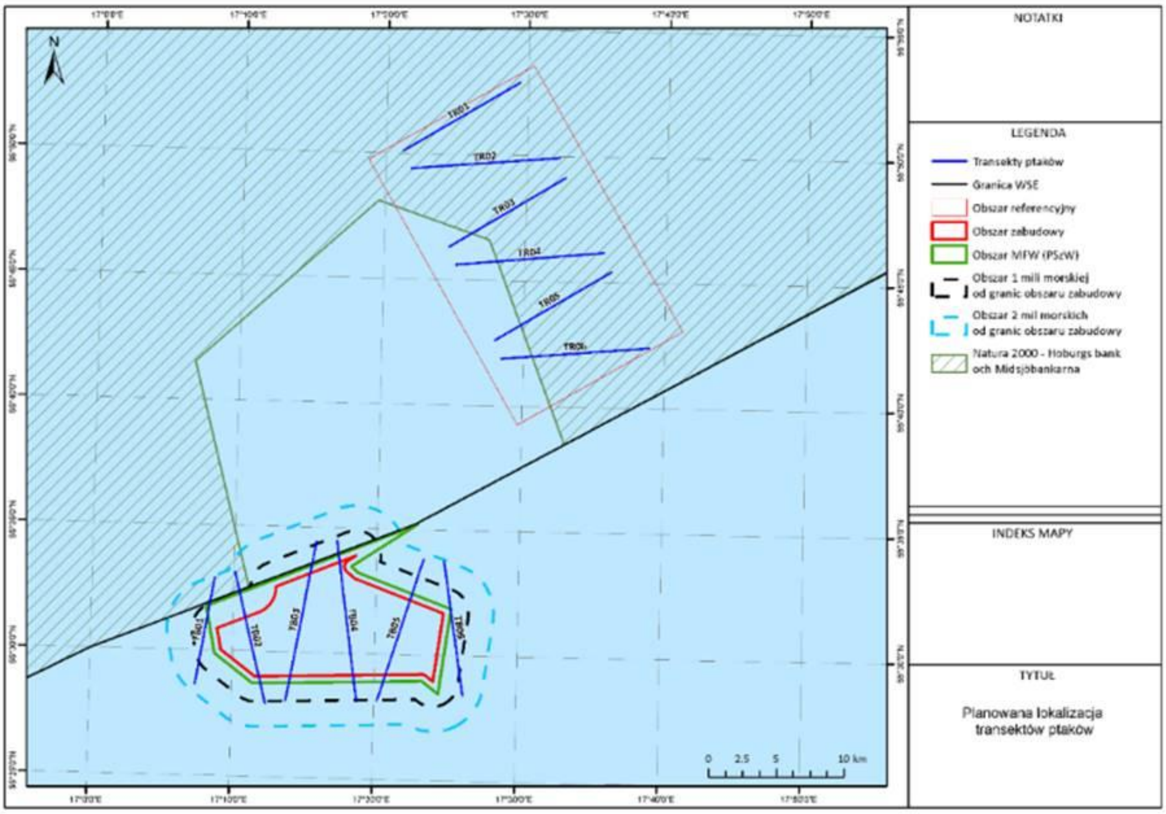
7.2.7 Seabirds

In recent years, a number of seabird surveys have been conducted near Southern Middle Bank due to the high importance of this area during wintering or as a stopover during migration. In addition to the surveys conducted by the Investor between 2012 and 2013, between October 2018 and November 2019 surveys were also conducted by Baltic Power Sp. z o.o., which carried out 13 campaigns in the area. During these studies, few birds were observed in the Southern Middle Bank area.

As part of the pre-investment survey (MEWO, 2022), observations of seabirds are also conducted in the DA BI (2NM) and in the reference area, located to the north-east of the planned location of the MFW Bałtyk I. (Please refer toFigure 7.20 and

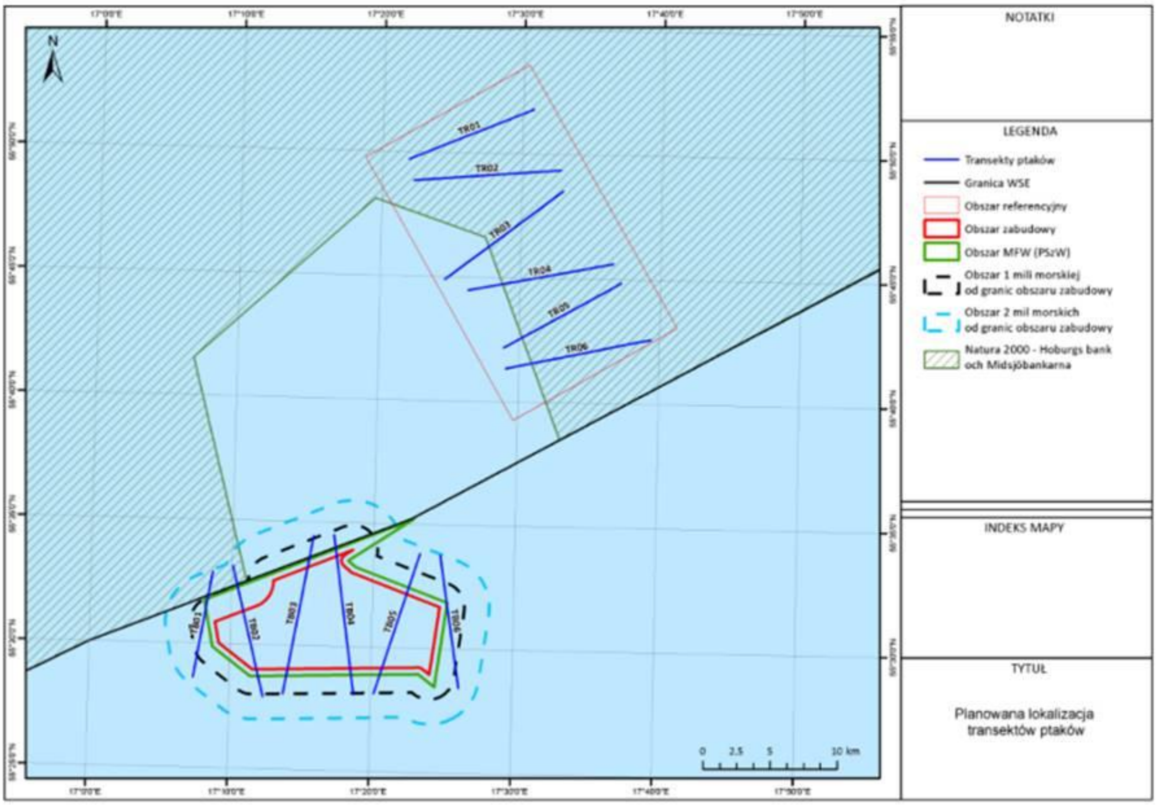
Figure 7.21; transects were adjusted to minimize navigational risk).

Figure 7.20 Location of transects within the DA BI (2NM) and reference area along which seabird observations were made during the survey campaign on 17-18 March 2021 and 28 April 2021.



Source: Final Report – birds, MEWO, 2022.

Figure 7.21 Location of transects after correction, along which seabird observations were made, during the survey campaign on 25-26 March, 14 and 22 May, 2021.



Source: Quarterly survey progress report, MEWO, 2022.

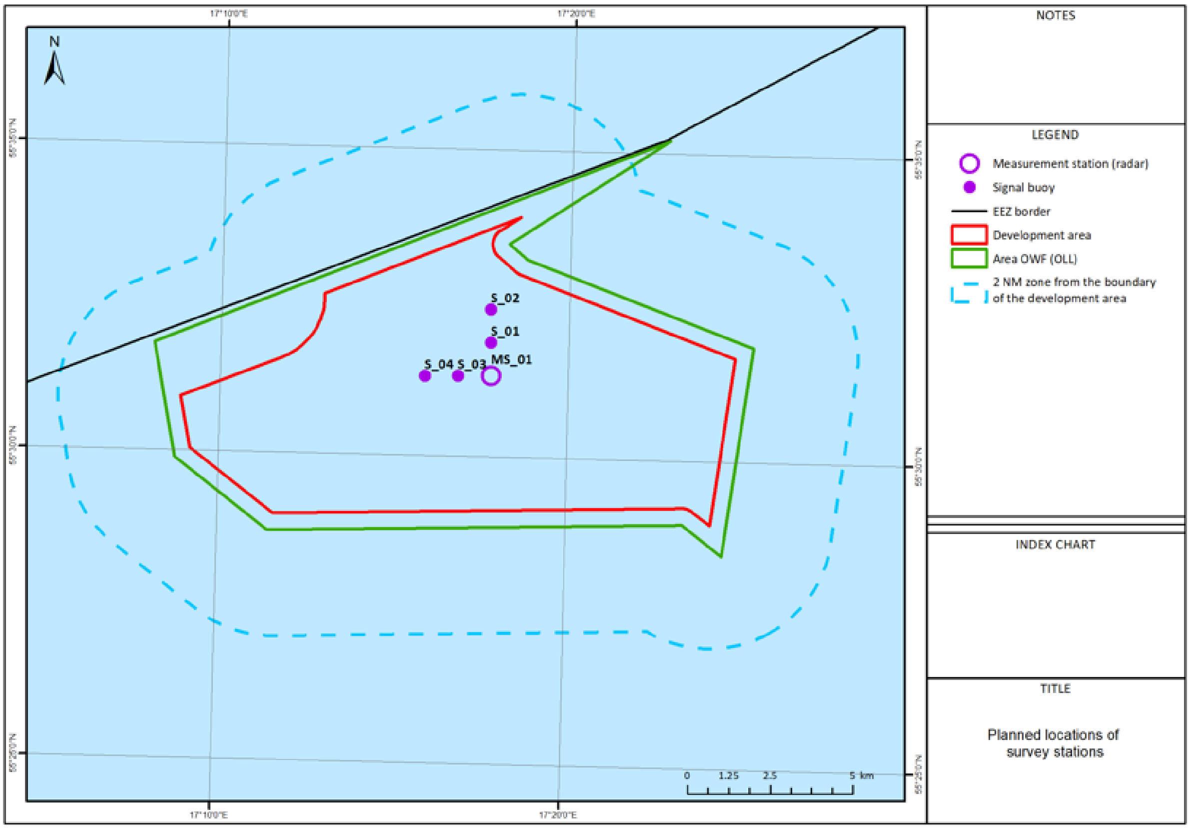
- During the spring migration period (March – May 2021), six survey campaigns were performed, covering all transects in the DA BI area (2NM) and the reference area each time. A total of 803 birds were observed perched along the survey route during the migration period in the DA BI (2NM). A total of 11 species were observed, of which the most numerous were long-tailed duck (*Clangula hyemalis*) - 72.7%, black-throated diver (*Gavia arctica*) - 9.6%, silver gull (*Larus argentatus*) - 8.7% and razorbill (*Alca torda*) - 5.4%. Flights observed over the DA BI area (2NM) were at low heights.
- Six survey campaigns were conducted between June and August (similarly to the spring campaign). During the summer, 297 birds were observed perched in the DA BI area (2NM) along the survey cruise route. The average number of birds observed per campaign along the cruise route was lower than in spring, at 49.5 individuals. Seven species were observed, with the most abundant species being common guillemot (*Uria aalge*) and silver gull (*Larus argentatus*), accounting for a total of 95.3% of all birds observed. Few flights over DA BI (2NM) were observed, in addition at low altitudes (<20 m).
- Six survey campaigns were also conducted during the fall migration period (September-November). A total of 639 birds were observed sitting on the water along the route followed by the research cruise. The average number of birds observed per campaign along the ship route was low at 106 individuals. The presence of 8 species was recorded, of which the most numerous were common guillemot and silver gull, representing a total of 69.8% of all birds found; lesser black-backed gull (*Larus fuscus*) - 14.2%, razorbill (*Alca torda*) - 7.7% and long-tailed duck (*Clangula hyemalis*) - 2.2%. The vast majority of flights took place at altitudes up to 20 m.

The research conducted so far it appears that the species composition of seabirds present in the DA BI (2NM) and in the reference area is typical for areas located on the Baltic Sea far from the coast.

7.2.8 Migratory birds

As part of the pre-investment monitoring (MEWO, 2022), observations of migratory birds are also conducted in the DA BI (2NM). Spring bird migration surveys were conducted from March to May 2021, while fall migration surveys were conducted from September to November 2021 (Figure 7.22).

Figure 7.22 Location of the observation point during bird spring migration studies



Source: Final report – migratory birds, MEWO, 2022.

7.2.8.1 Spring migration

Eight survey cruises were made between March and May 2021 during the spring migration. A total of 70 species were observed. The most numerous species observed were: sea ducks, geese, Anatini ducks (so called proper ducks, e.g. mallard, mewling, common pochard) and auks, which is consistent with previous available surveys conducted in this region of the Baltic Sea (DHI, 2015a, 2015b).

Monitoring with horizontal radar allowed to identify flight direction of 66 species. The most numerous flight traces were recorded for common scoter and long-tailed duck, common scoter, little gull and for categories of ducks and divers not identified to species. April had the highest number of recordings. The general direction of flight (for all recorded flight tracks) was mainly northeast and northwest. The direction of flight did not differ significantly between successive months of the study. The flight direction of sea ducks (common scoter, long-tailed duck, and velvet scoter) was similar to that of all birds.

The vertical radar data showed that migration was most intense in April and March, while in May the number of birds recorded by the radar decreased by more than half, which is related to reaching the northeastern and northern European breeding grounds at that time. Spring migration was more intense at night in each of the three months, which corresponds to the nocturnal mass migration of passerine birds migrating across the Baltic Sea.

Based on acoustic data, passerines (blackbirds, thrushes, songbirds, and redwings) dominate among the night migrating passerines.

7.2.8.2 Autumn migration

During fall migration surveys, nine survey cruises wereconducted in September, October, and November 2021. 46 bird species were observed. The most numerous birds were long-tailed ducks, unidentified passerines, geese and ducks, followed by white wagtails, starlings, auks (common guillemots and razorbills), rooks and wigeons, which are characteristic for the Baltic Sea region.

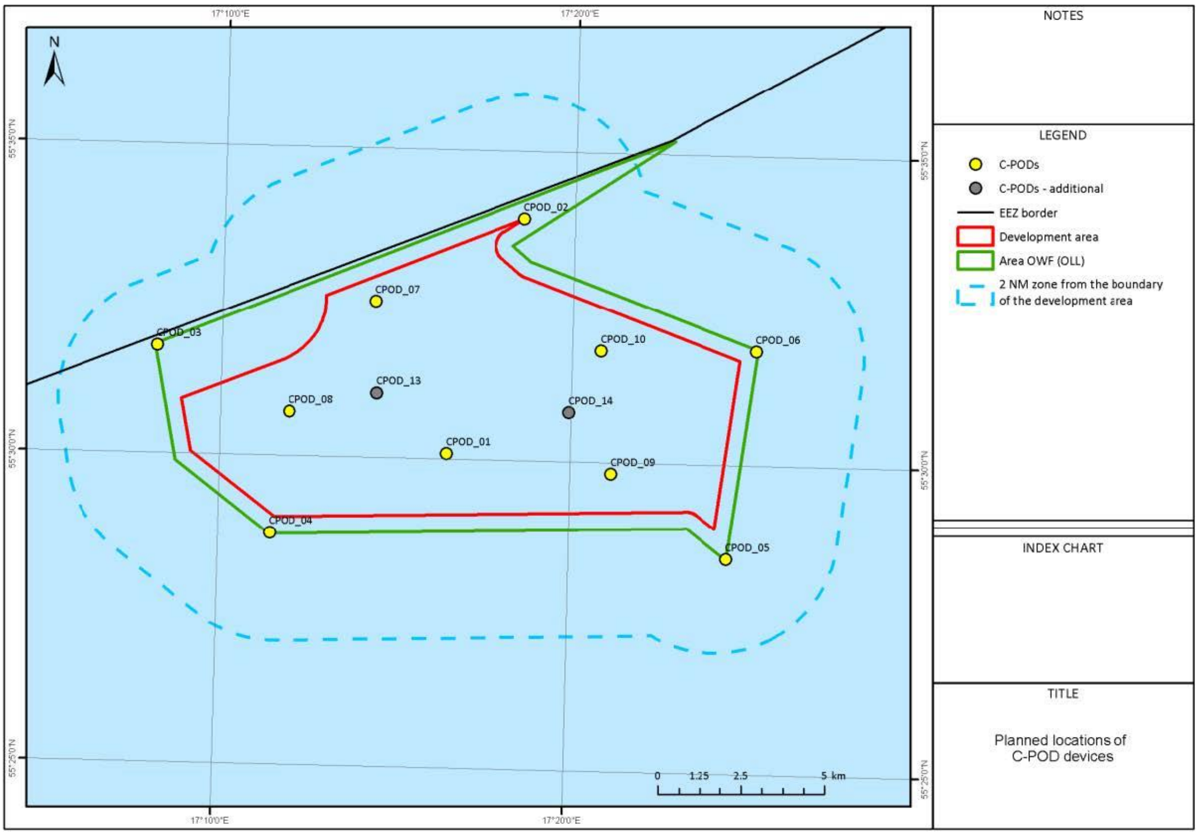
Monitoring with horizontal radar allowed to identify flight direction of 41 species. The most numerous flight footprints were recorded for long-tailed ducks, unidentified ducks, geese and passerines, auks (common guillemots and razorbills) and little gulls. The general direction of flight (for all recorded flight paths) was mainly southwest and west, while passerine birds headed mainly south.

The vertical radar data showed that autumn migration between September and November is particularly intense during the night hours, which is associated with mass migration of passerine birds moving over the Baltic Sea, which was also confirmed by the acoustic recordings.

7.2.9 Marine mammals

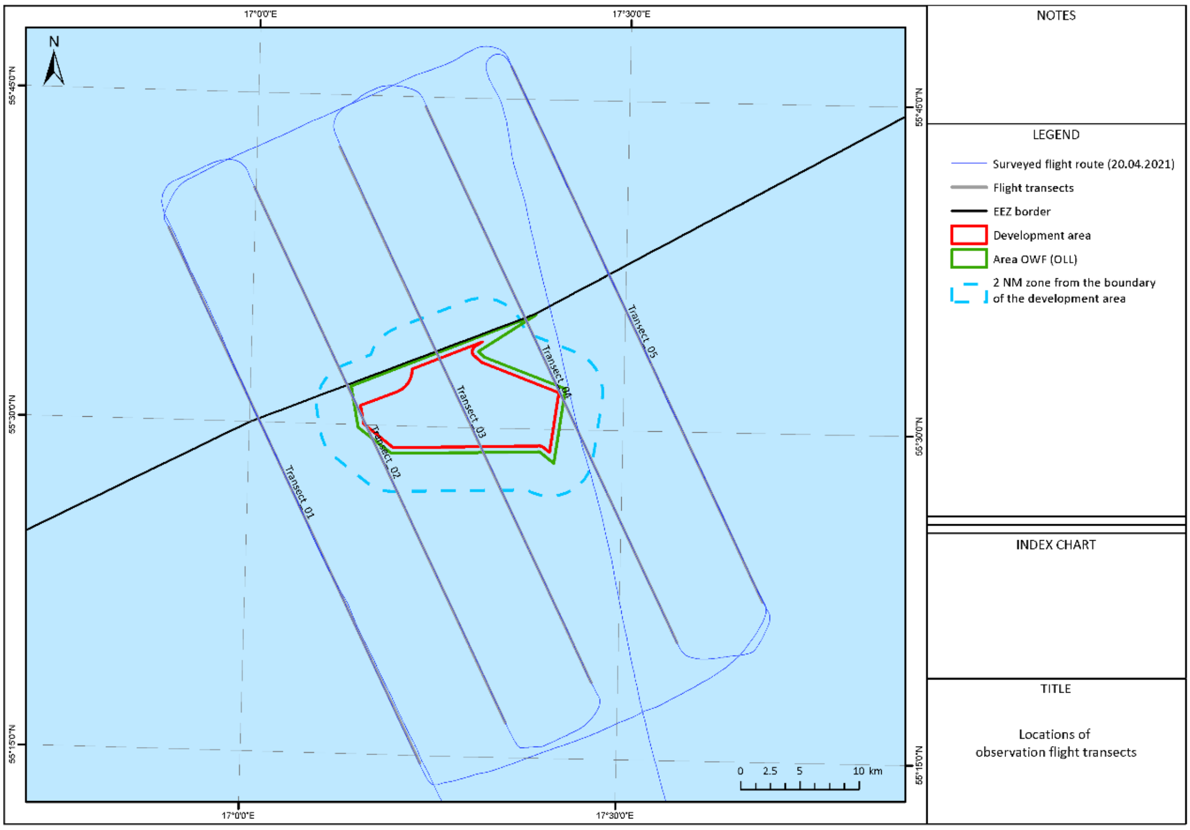
As part of the environmental studies, passive acoustic monitoring was conducted in the pre-investment phase between December 2020 and February 2022 in the MFW Bałtyk I development area DA BI (2NM)). C-POD equipment was used as monitoring system (Figure 7.23). Additionally, aerial observations were conducted in the DA BI area (2 NM) and adjacent waters to confirm the presence of porpoises and other marine mammal species (Figure 7.24). Furthermore, observations of marine mammals were conducted during cruises performed as part of seabird surveys.

Figure 7.23 Location of C-POD devices within the MFW Bałtyk I development area with a potential impact zone with a width of 2 NM



Source: Final report – marine mammals, MEWO, 2022.

Figure 7.24 Surveyed flight route during the first observation flight in the spring survey season



Source: Final report – marine mammals, MEWO, 2022.

Survey results were reported quarterly (MEWO, 2022) and are summarized below:

- Results of acoustic monitoring for harbour porpoise conducted between December 11, 2020 and February 24, 2021 in the DA BI (2NM) showed 9 days with harbour porpoise detections. Additionally, an observation flight was conducted during the winter season, during which no marine mammals were observed.
- There were 8 days with harbour porpoise detections within DA BI (2NM) between February 24, and May 14, 2021. No marine mammals were observed during observation flights or observations made during seabird surveys.
- There were 54 days with harbour porpoise detections within the DA BI (2NM) between May 14 and August 23, 2021. One gray seal sighting was made during observation flights on August 9, 2021. Additionally, five seal sightings were recorded during seabird survey cruises. The number of porpoise detections recorded during this period is higher compared to the results of previous monitoring campaigns. According to the results of SAMBAH (Static Acoustic Monitoring of the Baltic Sea Harbour Porpoise) project, an increased presence of harbour porpoises in the study area can be expected until the end of August, which is confirmed by the increased values of detections. The OWF area is located in the immediate vicinity of the Natura 2000 area Hoburgs bank och Midsjöbankarna, identified as an important habitat for harbour porpoises. According to the SAMBAH project, this area is used by harbour porpoises during calving and mating season between May and August.
- There were 31 days with harbour porpoise detections within the DA BI (2NM) between August 21, and November 30, 2021. No marine mammals were recorded during the observation flight, while thirteen grey seal sightings were made during the seabird observation cruises. According to the SAMBAH project results, an increased presence of harbour porpoises in the Project area can be

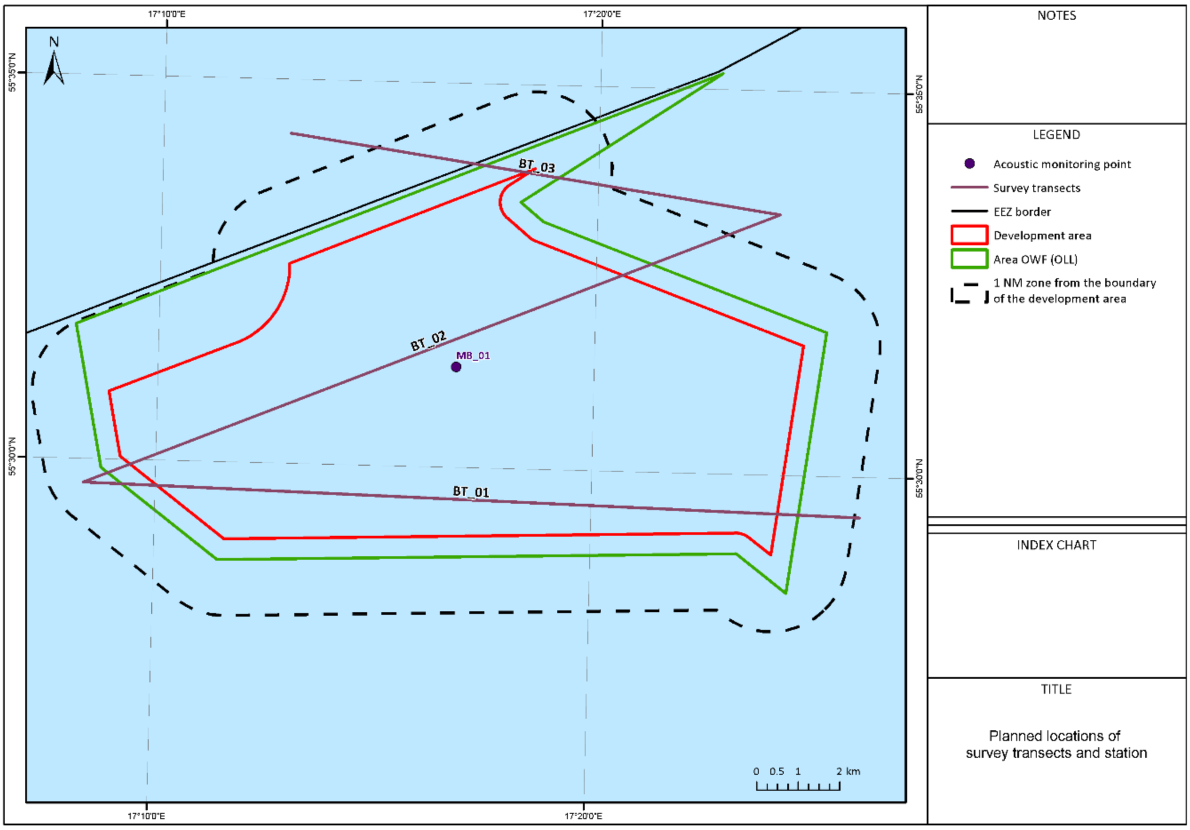
expected until the end of August, while a decrease in the number of porpoise detections is usually expected in the following months, which is related to the movement of the porpoise population westwards (towards the Danish straits) during winter season.

7.2.10 Bats

According to the guidelines, bat activity surveys in the DA BI (2NM) were conducted using the same methods as bat monitoring on land. However, monitoring in marine areas is limited to periods of expected seasonal bat migration – i.e. spring and autumn (MEWO, 2022).

Acoustic signals were recorded during cruises along the designated transect route with a total length of approximately 49 km and at a monitoring station (measurement buoy) (see Figure 7.25). To monitor bat activity, a system was used which records the acquired acoustic data on a memory device for future analysis. This system is designed for long-term surveys, allowing continuous assessment of bat activity at the same site throughout the night and along designated transects.

Figure 7.25 Location of survey transects and listening post



Source: Final report – bats, MEWO, 2022..

During the spring migration period, seven survey campaigns were conducted from the ship along designated transects (BT_01, BT_02, BT_03) from April, 20 to May 28, 2021 to record bat activity. Additionally, continuous recording of bat activity (every night from sunset to sunrise) was conducted at a monitoring station (measurement buoy) from 11 April to 2 June 2021.

During the autumn migration period, six survey campaigns were conducted from August 4 to November 13, 2021 from the research unit to record bat activity along the transects. In addition, from 1 August 1, 2021 to October 31, 2021 bat activity was recorded continuously (every night from sunset to sunrise) at the monitoring station located on the measurement buoy).

Throughout the survey of the Project area covering the spring and autumn migration period, bat activity indicators show very low bat activity in the area. According to the survey results, the area is not particularly important for bat migration.

During the spring campaign (surveys along the transects), only one bat species (Nathusius' pipistrelle) was detected, whereas during the surveys at the monitoring station, two recordings were made containing sequences of bat voices, assigned to a Nyctaloid individual and Nathusius' pipistrelle, respectively.

. During the autumn campaign (surveys along the transects), one bat species (Nathusius' pipistrelle; registered in multiple recordings) was detected, whereas seven recordings containing sequences of bat voices (Nathusius' pipistrelle and Nyctaloid individuals) were made at the monitoring station.

7.3 BIODIVERSITY

The Baltic Sea is one of the largest areas of brackish water in the world. It is also very shallow, with a maximum depth of 460 m and an average depth of 60 m. The rare brackish conditions ensure the presence of unique genetic lines of many species (Wennerström et al., 2017). The Baltic Sea (including the Kattegat Strait) provides habitats for at least 2700 macroscopic species, including 1907 species of invertebrates, 531 species of macrophytes, 230 species of fish and lampreys, 4 species of mammals and 57 species of birds. Additionally, numerous microscopic organisms are found in the Baltic Sea. In many taxa, the high sub-regional variation is related to salinity, which in the Baltic shows a significant gradient decreasing from southwest to northeast of the basin (Ojaveer et al., 2010).

According to Baltic Sea Action Plan (BSAP; HELCOM, 2021), biodiversity in the Baltic Sea is deteriorating due to threats from various human activities. The catchment area of the Baltic Sea includes 14 countries, which makes the sea strongly influenced by anthropogenic activities, including shipping and fishing (Heino et al., 2008). The effects of anthropogenic pressure are exacerbated by climate change. According to the BSAP, nearly 100 macro-species in the Baltic Sea (about 3.5% of all Baltic Sea macro-species) are threatened with regional extinction, while deterioration at the food web and ecosystem level is becoming more frequent.

Results for benthic and pelagic communities, fish and mammals were presented using a standardized Biological Quality Ratio (BQR), where values below 0.6 are considered as low, between 0.6 and 0.8 as high, above 0.8 as very high. In the case of birds, a threshold was used for the frequency of occurrence of given populations in and outside the breeding season; values above this threshold can be regarded as favorable for biodiversity. Below is an assessment of biodiversity according to BEAT system for the Bornholm Basin, where the MFW Bałtyk I area is located:

- Benthic environment (characterized by soft-bottom macrofauna, macrophytes, eutrophication indices, water clarity, and oxygenation): BQR = 0.00 (very low biodiversity);
- Pelagic environment (characterized by zooplankton size and quantity, eutrophication indices, and cyanobacterial blooms): BQR = 0.46 (low biodiversity level);
- Fish (characterized by frequency of pelagic and demersal species): BQR = 0.15 (pelagic), 0.68 (demersal); (low and high biodiversity levels, respectively);
- Mammals (characterized based on trends in abundance, distribution, and overall population status): BQR = 0.3 (low biodiversity);
- Waterbirds (characterized based on frequency of occurrence during and outside the breeding season): biodiversity outside the breeding season for all species scored positively, and negatively during the breeding season (except for grazing feeders).

The Southern Middle Bank, where the MFW Bałtyk I will be located, is a typical sand and gravel bottom habitat with relatively low zoo- and phytobenthic species diversity and low fish species diversity (See Sections 7.2.5, 7.2.6). Notably, the area of the Bank is important for wintering and feeding seabirds; Swedish part of the site is considered a Key Biodiversity Area (KBA, 2016) by the International Union for Conservation of Nature (IUCN). The site is also important for the conservation of the harbour porpoise *(Phocena phocena)* population in the southern Baltic Sea (Eisfeld-Pierantonio, 2014).

7.4 CULTURAL HERITAGE, INCLUDING ARCHAEOLOGICAL HERITAGE

A map of the wrecks identified for the development of the POM Plan is shown in Figure 7.26.

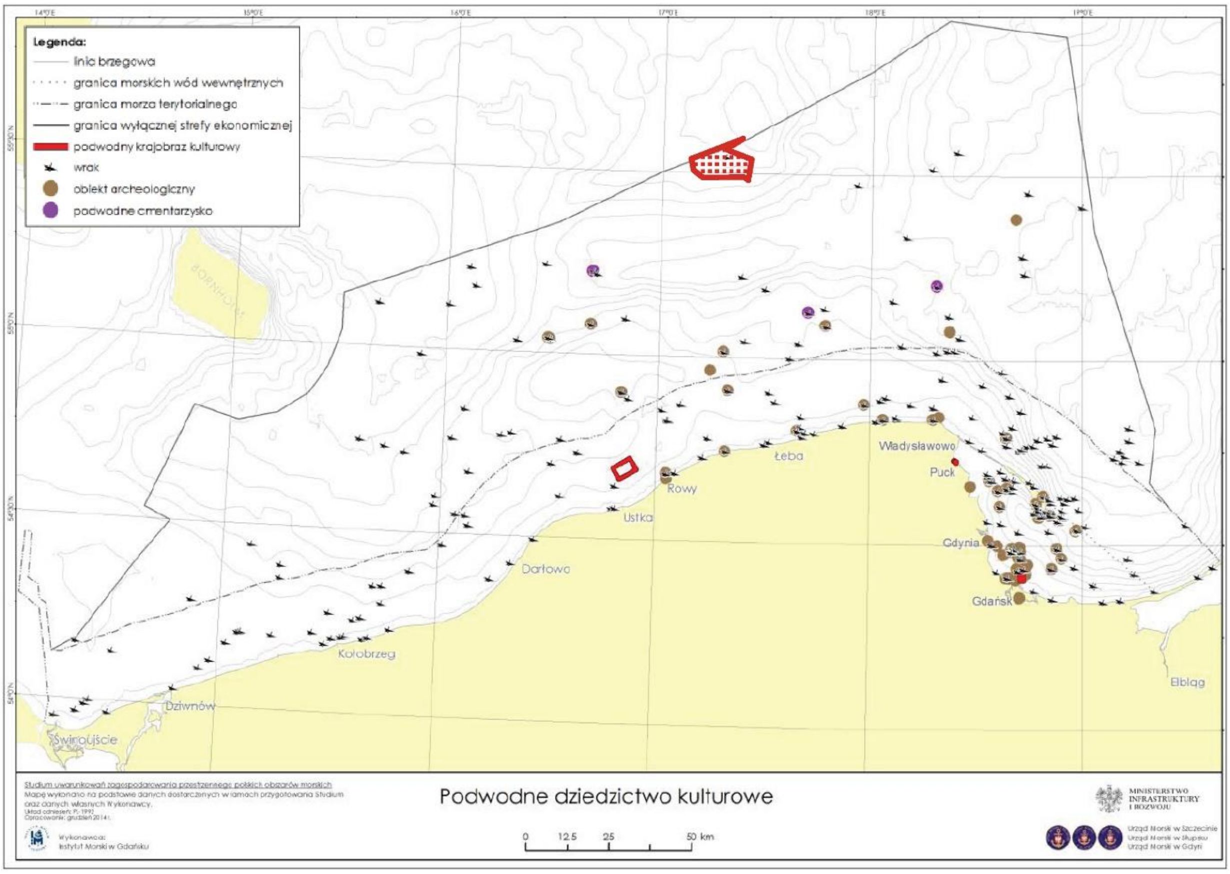
In the entire area there are no protected objects and areas established on the basis of regulations on the protection and care of historical monuments. According to the Maritime Spatial Plan for POM, the POM.60.E area, where the planned project is located, allows for the cultural heritage function, but no prohibitions or restrictions on the use and conditions of use of the basin are established due to this function.

The investor conducts pre-investment research of cultural heritage and archaeological objects.

During the reporting periods from December 2020 to February 2021 and from March to May 2021, the Maritime Institute in Gdańsk conducted a study of the archival and literature data in order to characterise the cultural changes that took place in the South Baltic area during the Stone Age and to locate shipwrecks lost in the area of the planned MFW Bałtyk I project.

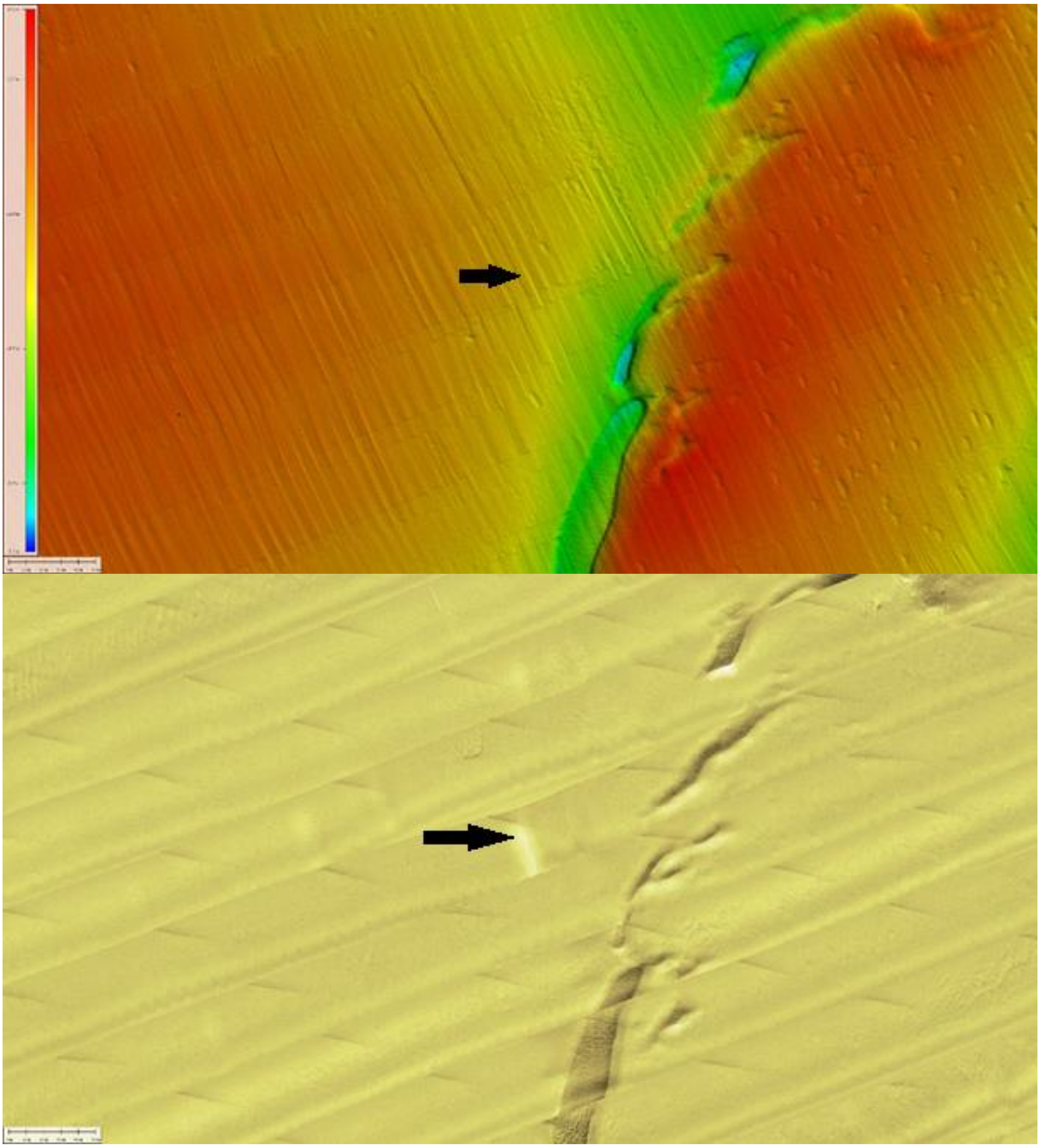
According to the portal of the Maritime Administration (SIPAM) and the Study of conditions for the draft POM, the VIGGO shipwreck (Wreck ID mgm.wre.0000162) is located in the area of the planned Project; however, it does not constitute a cultural heritage object. Importantly, bathymetric, sonar and seismic surveys conducted during the pre-investment phase to date have not confirmed, based on geophysical surveys, the occurrence of shipwrecks in the area of the planned MFW Bałtyk I, including the aforementioned VIGGO wreck (see Figure 7.27).

Figure 7.26 Objects of cultural heritage significance in Polish maritime areas



Source: Maritime Institute in Gdańsk, based on HELCOM MUNI data

Figure 7.27 Bathymetric and sonar images with indication of potential wreck location of the vessel indicated in the maritime administration's spatial information system



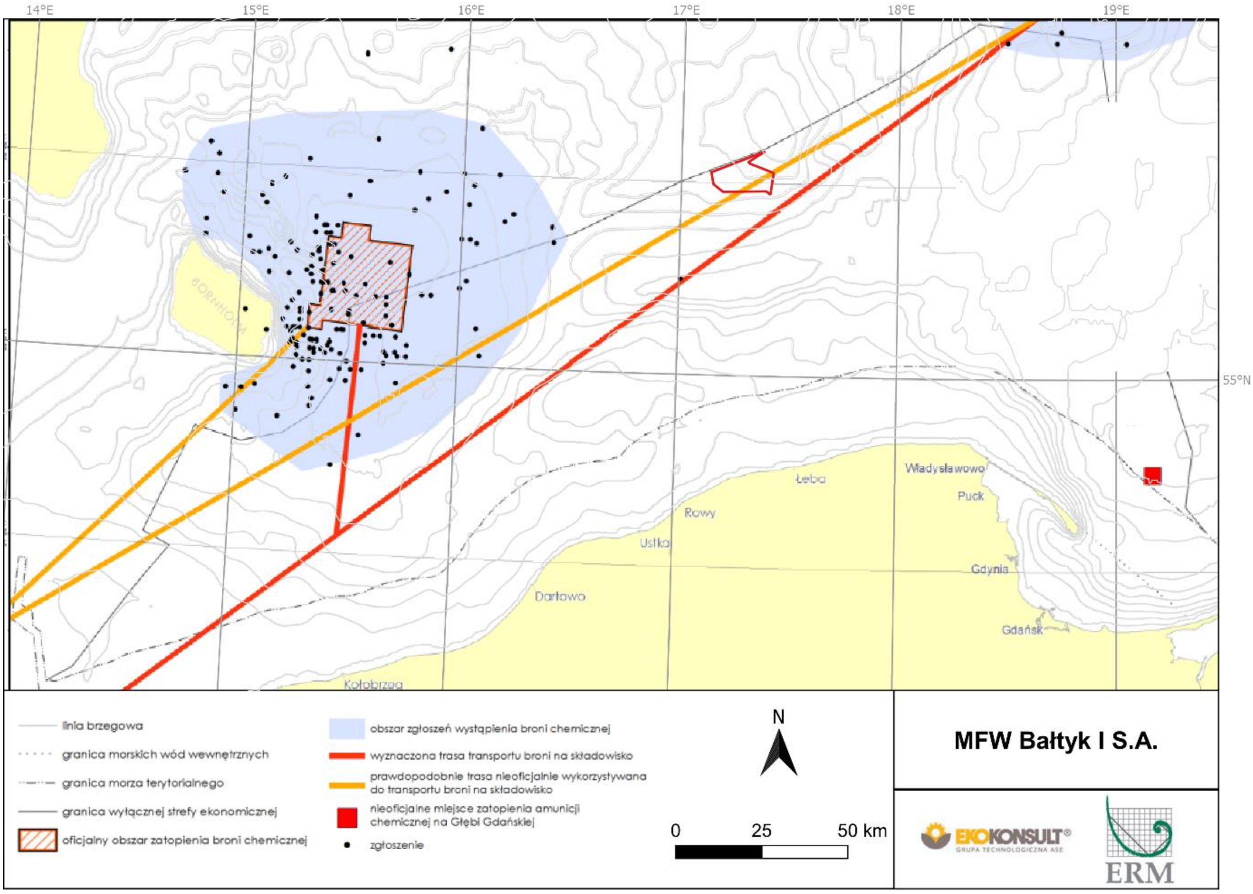
Source: MFW Bałtyk I S.A.

7.5 REMAINS OF WORLD WAR II

After World War II, munitions were dumped in the Baltic Sea in many places, which poses a significant problem for sea users and the environment. An additional hazard is the incidence of chemical weapons on the Baltic dumpsites. There are no documented reports of dumped chemical weapons in the area of the planned project and the nearest such location is approximately 28 km to the southwest (Figure 7.28).

There is an official chemical weapons dumping area to the east of Bornholm, to which there are specially designated routes for their transport. None of these exist in the planned Project area. According to HELCOM MUNI data, the area is crossed by a probable unofficial route used to transport weapons to a storage site in the Gotland Deep (Maritime Institute, 2015).

Figure 7.28 Proposed project in relation to the dumping sites of chemical weapons and their transportation routes



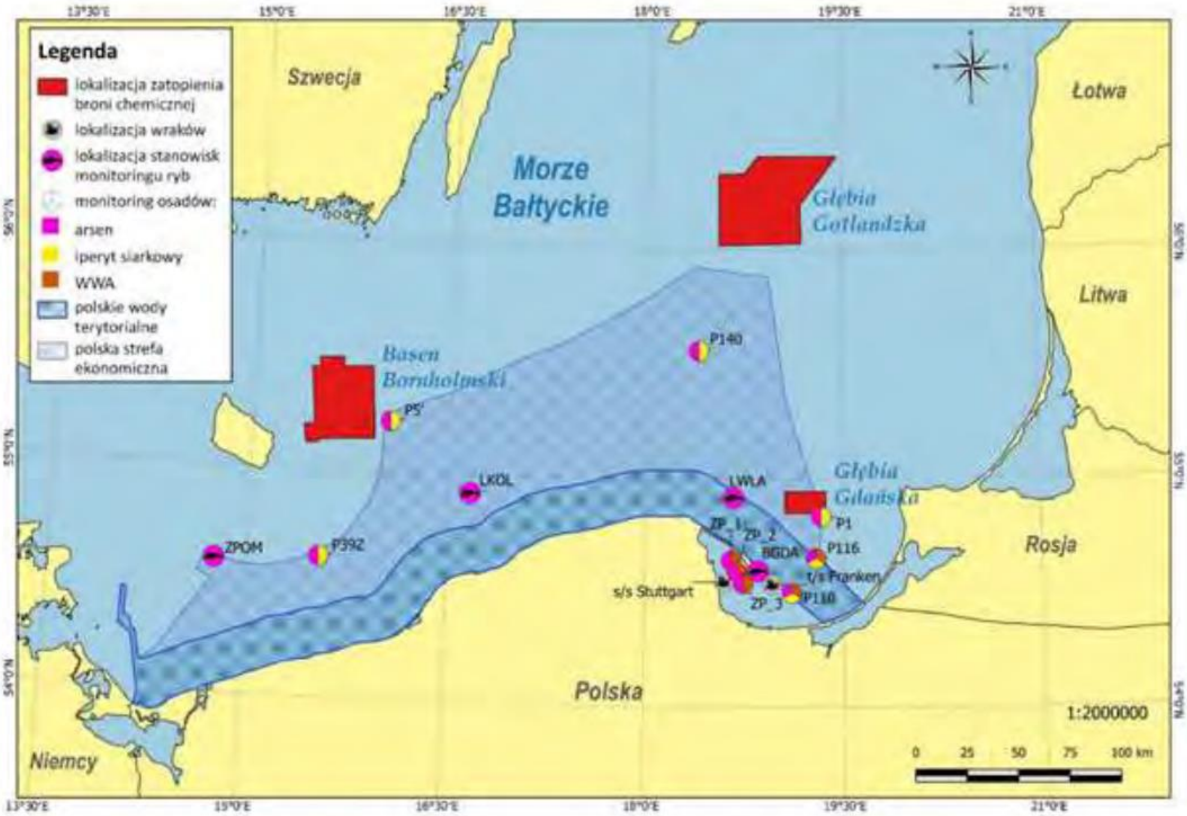
Source: Maritime Institute in Gdańsk, based on HELCOM MUNI data

Detailed spatial information on all dumpsites with dumped chemical weapons is lacking.

In 2020, a monitoring of arsenic,mustard gas, and polycyclic aromatic hydrocarbons began (within the framework of sea water monitoring; IMGW-PIB commissioned by GIOŚ), as these chemicals may originate from post-WWII sunken chemical warfare agents and shipwrecks (Figure 7.29). Polycyclic aromatic hydrocarbons were investigated in the waters of the Gulf of Gdańsk.

In the surface layers of sediments in the Bornholm Basin, arsenic concentrations ranged from 3.5 to 17.8 mg kg^{-1} s.m.

Figure 7.29 Location of bottom sediment sampling stations for arsenic, mustard gas and PAH testing and fish capture areas for arsenic testing



Source: GIOŚ, 2021; Update of the marine water monitoring program

8 TYPE OF TECHNOLOGY USED

8.1 OFFSHORE WIND TURBINE ELECTRICITY GENERATION TECHNOLOGY

Offshore WTGs are installations used to generate electricity using generators driven by the kinetic energy of the wind. In the turbine generator, the mechanical energy of the rotating rotor is converted into low-voltage alternating current, which is then transformed in the turbine, usually to high-voltage for further transmission via internal power cables to the offshore substations - transformer and/or converter, depending on the technical solution adopted, i.e. the voltage level and type of electric current transmitted onshore.

Electricity generation in wind turbines does not require combustion of fuel. Normal operation of offshore wind farms does not cause pollution of the marine environment, including emissions of greenhouse gases.

8.2 TECHNOLOGY OF INDIVIDUAL PROJECT COMPONENTS

Below are brief descriptions of possible technologies for: wind turbines, their foundations, internal power and communication cables and offshore substations. The basic elements of a wind turbine are the foundation, tower,nacelle and rotor assembly.

This chapter describes technical solutions, which may be applied in the construction of an OWF. Specific models will be selected later, at the stage of the Project execution, and the selection will be based mainly on technical and economic criteria and environmental conditions of the planned MFW Bałtyk I, which will be indicated in the decision on environmental conditions.

8.2.1 WTGs

A standard 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 which is transferred through a system of gears to a generator which converts it into electricity. Some turbine suppliers also use so-called direct drive technology, in which there are no gearboxes.

The transformer can be built inside the nacelle or inside the tower. Its task is to raise the voltage of the electricity generated before sending it to the offshore substation.

The tower is typically made of steel sections which are bolted together, but other connection technologies are being explored in the wind industry and may be widely used in future projects. The tower sections can either be pre-assembled onshore at assembly port or potentially also assembled directly by sequential stacking on the foundations in the wind farm area. The height of the tower depends on the turbine model chosen and the local wind and wave conditions. Inside the tower are cables transmitting electricity from the generator and other components necessary for the operation and functioning of the wind turbine.

The developer plans to install a maximum of 104 wind turbines.

At this stage of project advancement, it is assumed that 1-2 Heavy Lift Jack-Up Vessels or Dynamic Positioning (DP) Vessels, and support vessels and barges will be used to install the turbines. During operation, offshore wind turbines do not require permanent on-site personnel and are operated/monitored remotely from a control centre usually located at the same site as the maintenance and service base. Supervision and maintenance of turbine operation is carried out in accordance with operating procedures and instructions by a technical team that maintains the turbines.

8.2.2 Foundations

The type of foundation will be defined after geotechnical survey and will depend on, among other things, the selection of a specific wind turbine model and the structure of the seabed. The most commonly used foundations include, but are not limited to: monopile, tripod, jacket, gravity-based foundations.

The key parameter of the foundations, which is important for the environmental impact, is the area of the seabed occupied by the given foundation. At the stage of construction of the OWF an important parameter influencing the scale of environmental impact is the level and duration of noise emission in the process of preparing for the foundation. The noise is connected with driving into the bottom of the piles for fixing the jacket foundation, and the level of emission will depend on the type of foundation, its dimensions, the number of piles fixing the foundation and their diameter, the depth of driving into the bottom and soil conditions. Also, during the installation of the foundations, bottom sediments may be disturbed and suspended, which may cause a temporary an increase in point disturbance.

The final decision on the method of foundation will be taken at the stage of construction design based on geotechnical conditions and selected types of turbines and substations, as well as technical solutions available at this stage of the Project.

8.2.3 Internal power and communication cables

Individual WTGs will be connected by internal cables to form series and then groups of turbines will be connected to the marine substation. The design of the cable system will be based on radial cable routes leaving from the marine substation and connecting the turbines in series. It is planned to install internal AC cables of 66 kV or 132 kV. The total length of the internal cables and individual cables in the series will depend on the distance between the turbines and the distance between the first turbine in the series and the marine substation. The realistic maximum length of the internal cables will serve as the basis for the assessment.

The turbines will be connected to the offshore substation by internal cables, together with signal fibre optic cables. The cables will be buried in the seabed and will connect the first turbine in each row to the 66kV or 132kV switchgear at the offshore substation.

Alternative voltage levels and internal cable configurations are also permitted to ensure an optimal technical and economic solution.

The maximum total length of the internal cables will be 250 km. They will be buried at a maximum depth of 3 m below the seabed level or, in certain cases, left on the seabed and then properly secured by laying rock, concrete mattresses or other technological solutions providing permanent protection against damage. Cables will be secured with an appropriate protection system near the entrance hole to the WTG or OSS foundation. The cables will be monitored in real time using an appropriate system. In addition, periodic monitoring of cable exposures on the seabed may be performed by a Remotely Operated Vehicle (ROV).

Cable laying will be performed by a specialised CLV (Cable Laying Vessel).

8.2.4 Offshore substation

The cables connecting the wind turbines will be routed to an offshore substation suitably located to optimise the length of the internal and export cables. The offshore substation will receive AC power transmitted via 66 kV or 132 kV internal cables and, depending on the onshore power transmission technology, will raise the voltage to that required for the export cables or raise and convert it to high voltage direct current to reduce losses during onshore power transmission. The OSS will be located on the OWF site and its location and detailed technical data will be confirmed at the stage of construction design. It is foreseen to build one or two such offshore substations for the MFW Bałtyk I.

The installation of the offshore substation will be performed by heavy lift jack-up vessels, transport vessels and service vessels. The offshore substation will be a facility without permanent maintenance and service personnel.

The main elements of the electrical installation, which will be included in the application for the environmental decision for MFW Bałtyk I and not included in this application, are specified in Chapter 4.1.

9 ALTERNATIVES OF THE PLANNED PROJECT

The aim of the Project is to generate electricity using a renewable energy source - wind. In Polish legal order the first stage of development of the project of an offshore wind farm, is the selection of the location, confirmed by obtaining the permit to erect and exploit artificial islands, installations and equipment in Polish maritime areas (”OLL”).

The application for the environmental decision is submitted after obtaining the OLL. Such legal construction of the development process of the offshore wind farm causes that at the stage of the environmental impact assessment the location of the farm is determined by the borders defined in the obtained OLL. Therefore, at the current stage it is not rational and justified to consider any alternative locations for the MFW Bałtyk I. Due to the fact that in the OLL the location of particular wind turbines and other elements of the farm are not specified, neither are their specific number (only the maximum number of power plants is specified), and the type of turbines, nor the types of foundations selected, the subject of the effective and rational variants may be the technical parameters of the Project, that significantly affect the type and scale of the environmental impacts. Such parameters include e.g.: number of WTGs, rotor diameter, height of the structure. These parameters are directly connected with the power of the generators used.

Each year, new types of turbines enter the market. The power output of the turbines increases which is achieved by using larger rotors, mounted on new types of foundations and even taller towers. 3.6 MW turbines were commonly installed 10 years ago. Currently, turbines of 9-12 MW are being installed in OWFs and 12-15 MW turbines are likely to be installed in 2023-2025; 15-25 MW units can be expected after 2025. Each such change can reduce the number of WTGs required for achieving the maximum capacity of the farm, reducing the total seabed occupation, while increasing the height of the structure and the rotor diameter and increasing the distance between WTGs. These are key changes that determine the magnitude of impacts to the marine ecosystem.

As the construction phase of MFW Bałtyk I is due to start in 2027, the turbine models which could be used are still not available in the market. The selection of the wind turbine model will take place at later stage in the design phase and will be based primarily on technical and economic criteria and environmental conditions of the Project, indicated in the environmental decision.

Technical criteria for the selection of a specific turbine type are in particular: wind analysis, currents, waves, sea level, climatic conditions, temperature, ice cover, seabed conditions, as well as the target installed capacity of the farm, planned spacing of the turbine and existing environmental constraints.

Financial criteria are related, among others, to production optimization, construction and operation costs of the investment, and risk factors such as quality, acceptability by financial institutions, contractual conditions, conditions of the RES investment support system by the state, etc.

Key parameters of offshore wind turbines, which influence the scale and type of environmental impacts, are rotor diameter, rotor zone, rotor location in space, number of rotors and thus the total rotor zone and distances between individual rotors.

Taking into account the obligation to assess the environmental impact of the preferred variant and the rational alternative variant, as well as the significance of the potential environmental impact when selecting the variant, the investor plans to assess the variants defined on the basis of the boundary parameters.

10 ANTICIPATED USE OF WATER, RAW MATERIALS, FUELS AND ENERGY

10.1 PREPARATORY WORK

WTGs, offshore substation and cables will be transported from manufacturers as ready-to-install components. The types and quantities of materials from which they will be built will depend on the selected manufacturer and total number of WTGs. Nevertheless, it can already be pointed out that the main construction materials for towers of power plants include steel, plastic and aluminium, used e.g. in ladders, platforms, connectors, access systems, platforms, J-tubes, cranes; for foundations: steel (monopile, jacket, tripod) and concrete (gravity-based foundation), for blades: epoxy resins, polyester, carbon fibre, glass fibre, laminates, composites, metal lightning conductors; and for nacelles: steel, cast iron, copper, lead, glass-fibre reinforced plastics (GRP), epoxy, polyester, fibreglass. The materials specified above are for only reference and other materials may be selected for OWF structures and components.

It will be necessary to transport the above-said elements of the farm from the manufacturers to the assembly port or directly from manufacturer to farm. The transport of the individual components of the offshore wind farm will be carried out primarily by sea. Dozens of special vessels and land-based vehicles will be used to transport the elements of the power plant, but the transport route is currently not yet known. In the case of land vehicles, fuel consumption per vehicle per 100 km will be approximately 25 l of diesel fuel.

Moreover, it is likely that before the transport phase of large-scale elements of the power plant, construction or reconstruction of the existing access roads will be required. For example, it can be stated that the construction of 1 km of road with aggregate surface may require the use of approximately 700m^3 of sand or silt and approximately 1800 m^3 of aggregate. It can also be assumed that some of the plant components will be made by facilities located on the coast, with capabilities for loading these components onto ships for transport by sea.

For test drilling, a small drilling platform or a drilling vessel is required to survey the subsurface.

10.2 Construction phase

During the construction phase of the offshore wind farm there will be consumption of materials, fuels and energy. Construction works at this stage include:

- surveys and measurements,
- dredging sea bottom and cleaning of the substrate,
- levelling of seabed with rock/gravel pad in case of gravity-based foundations,
- erosion/scour protection of seabed around foundations with rock dumping,
- drilling or piling of foundation piles,
- installation of gravity-based foundations,
- securing cable conductors,
- cable installation and safe positioning,
- installation of wind turbines,
- installation of OSS.

All these activities require consumption of fuel.

Construction of the wind farm will begin with the installation of foundations or a first layer of scour protection/seabed levelling. Jack-up vessels or floating installation vessels will be required for drilling, pilling, driving and lifting the structural elements as well as for grouting or bolting of structural elements. Such vessels have their own drives for positioning and prepare the work front for assembly works.

In case of using concrete or steel gravity-based foundations, it will be necessary to add mass by internal ballasting using e. g. stones or gravel.

Cable laying will be carried out by a specialised Cable Laying Vessel (CLV). Cable burial may be carried out immediately after or at a later stage. The preferred method for burial are jetting and ploughing. It is typically carried out using a vessel and a ROV. In case of unfavourable ground conditions, it is also possible to use sectional mechanical methods or to lay rock or concrete mattresses to protect the cable.

Other vessels required during construction are:

- barges for transporting the elements of foundations and the power plant,
- auxiliary vessels (supply, transport and crew service, underwater work, noise mitigation deployment etc.).
- research vessels.

The amount of fuel consumed cannot be estimated at this stage of the Project.

10.3 Operational phase

The production of electricity by OWF does not require the supply of any raw materials or fuels, except in case of windless weather. In such case it is necessary to supply a small amount of electricity. The electricity demand includes powering the azimuth thruster, control system, lighting and hydraulic pumps, among others. The annual electricity demand for average wind conditions is typically between 4,000 and 10,000 kWh per power plant / WTG.

OSS, on the other hand, may require the intake and discharge of seawater for the cooling of the electrical system. . The OSS will be equipped with an emergency power generator with a Diesel engine. In addition, temporary power generators can be used during maintenance and service work and emergency repairs.

During the exploitation of the OWF the fuel consumption is related mainly to the operation of vessels and helicopters transporting the personnel operating and maintaining the power plant. This results from the fact that wind turbines are mostly unmanned objects, which do not use raw materials or fuels. At the stage of exploitation of the OWF maintenance and service works will be conducted.

10.4 Decommissioning phase

Activities at the decommissioning stage may be very similar to those at the construction stage. It will be necessary to dismantle at least parts of the OWF and transport its components onshore, and then to manage them according to the most environmentally beneficial scenarios, such as recovery of parts and their re-use. Consumption of raw materials at this stage will come primarily from fuel consumption by vessels used for farm dismantling and vessels transporting the components both at sea and on land.

11 ENVIRONMENTAL PROTECTION SOLUTIONS

The use of renewable energy sources in itself is a solution for environmental protection as it is an alternative to the production of electricity from conventional, fossil-fuel dependent sources. However, at all stages of the Project, the Investor will take measures to limit its impact on the environment.

The environmental protection solutions planned to be applied as part of the Project include the following:

- use for construction and maintenance works only materials with the required certificates, technical approvals and attestations,
- using for construction, operation and decommissioning only technically efficient equipment and vessels complying with the standards for noise and fume emissions,
- regular inspections of the technical condition and repairs of the equipment and vessels used, in order to protect sea waters against spills of hydrocarbons,
- supplying vessels with means for eliminating spills of hydrocarbons,
- carrying out proper waste management, in accordance with the provisions of the Waste Act, of waste generated at all stages of the Project, including among others transfer of waste to entities holding permits for transport or collection of waste,
- the inclusion, at all stages of the Project, of measures to prevent collision with ships, including the designation of safety zones around construction and demolition sites to reduce the risk of collision with other users of the sea area,
- notification to the competent authority for maritime affairs of the schedule of construction/ decommissioning works in order to adequately safeguard and reduce the impact of the investment on other sea users,
- the supervision and proper organisation of the work at all stages of the Project to prevent accidents or, if they can be avoided, to react immediately to emergencies in order to reduce their negative impact on the environment,
- appropriate organisation of works at the stage of construction and decommissioning of the Project in order to reduce as much as possible the period of installation and dismantling of farm elements,
- if monopile foundations are selected, the application during their driving of appropriate technical (e.g. bubble curtains) and organizational solutions (e.g. procedures of gradual increase of piling power in increments of time until the full operational power is reached, the so-called "soft start") aimed at limiting the emission of underwater noise and its impact on marine fauna.

Specific environmental protection solutions at all stages of the Project life cycle, including mitigation measures, will be analysed at the stage of the EIA report development.

12 TYPES AND PREDICTED AMOUNTS OF SUBSTANCES OR ENERGY RELEASED TO THE ENVIRONMENT WITH THE APPLICATION OF ENVIRONMENTAL PROTECTION SOLUTIONS

The following Sections describes the types of substances and energy introduced into the environment while using the predicted environmental protection solutions described in Chapter 11:

- during the construction phase,
- during the operational phase, and
- during possible decommissioning of the farm.

Specific protective measures for each stage of the development of MFW Bałtyk I will be analysed within the scope of the EIA procedure.

12.1 CONSTRUCTION PHASE

The sections below present the most important Project related activities during the implementation phase together with the associated direct emissions to environment.

12.1.1 Air emissions and methods to mitigate their impact

Emissions to air during the construction phase will be related to ship traffic and air traffic (helicopters) and will be assessed at the stage of the EIA report. They will depend on the construction time, i.e. the uninterrupted activity of construction units in the area.

Reduction of air emissions will be affected by such factors as: good planning and effective management of the supply chain of the OWF elements, use of low-emission fuels, monitoring of technical condition of ships, availability of specialist equipment, but also to a large extent by weather conditions during the installation.

12.1.2 Noise and vibration emissions and methods to mitigate their impact

The main source of noise at the stage of implementation of the Project will be the installation of foundations of power plants and substations, especially during the driving of foundation piles.

Similar to air emissions, during the construction phase noise and vibration emissions will also depend on ship traffic during installation of the farm, and during transport of workers by helicopter. The use of appropriate technical and organizational solutions to reduce noise emissions to the environment will be crucial in reducing underwater noise emissions.

12.1.3 Impact on water and bottom sediments and methods to mitigate it

Construction of the MFW Bałtyk I is preceded by the research of sediment properties and recognition of the condition and seasonal variability of macrofauna. Pre-investment monitoring makes it possible to properly plan methods of limiting the impact of the Project on the environment.

As a result of the construction and assembly works of the OWF elements, as well as the offshore station or submarine cables, bottom sediments might be agitated, which in turn could lead to the release of certain compounds and cause periodic and local changes of concentration of chemical elements or compounds in the water. Water turbidity will temporarily increase due to disturbance of sediments during seabed preparation for the installation of foundations and during driving of foundation piles and cable laying. Sediment resuspension will reduce the range of the photic zone, which may affect planktonic and benthic communities.

These impacts will be local in character and will cease after construction.

On the other hand, at exploitation stage wind farms can provide refuge for benthic organisms while increasing local biomass and biodiversity levels - offshore wind farms act as "artificial reefs", rapidly and intensively colonized by epibenthic species (Causon & Gill, 2018).

12.2 OPERATIONAL PHASE

These sections present Project related activities during the operation phase together with the associated emissions.

12.2.1 Noise and vibration emissions and methods to mitigate their impact

At the operation stage the primary source of noise will be the operation of the wind turbines i.e. noise from the rotating rotor and noise associated with air flow at the edge of the wind turbine blades.

In addition, maintenance work will be a source of noise and vibration emissions. These emissions will depend on the volume of ship traffic, the extent of maintenance work and the transport of workers by air or sea. In this case too, good work organization, efficient supply chain management as well as weather conditions during works will be crucial in reducing noise emissions.

12.2.2 Emissions of electromagnetic radiation and methods for their reduction

Within the framework of this Project only internal cables and power substations, which can be a potential source of electromagnetic radiation, are planned to be constructed within MFW Bałtyk I.

During operation of the proposed farm, electromagnetic fields will come from the following sources:

- up to 104 WTGs,
- internal connection infrastructure of the offshore wind farm - with voltage of 66 kV,
- offshore substations.

With regard to the source of occurrence, electromagnetic field of natural (such as geomagnetic field of the Earth) and anthropogenic origins are distinguished. The value of the intensity of the natural electric field of the Earth in the marine environment is about 120 V/m.

In the marine environment, the source of electromagnetic radiation are submarine cables and OSSs - primarily elements of the power grid. The change of electromagnetic field strength is significant in the vicinity of the cable, but at a distance of 20 m from the cable the field strength does not differ from that in natural conditions. The impact of electromagnetic field may have negative effects, although this depends, inter alia, on the distance from the source, the intensity or the time of staying near the source (GIOŚ, 2021b).

In 2017, in Polish maritime areas there were a total of about 350 km of telecommunication cables and elements of the electrical power network (HELCOM, 2018). In addition, there are also sections of cables, which are the result of unfinished investments (540 km), but there is no detailed information about them.

Currently, there are **no anthropogenic sources of electromagnetic fields in the area of the planned investment.**

12.2.3 Emissions to water and bottom sediments and methods to mitigate their impact

The operation of the offshore wind farm is not directly associated with the introduction of chemicals into the environment and will not significantly affect the hydrological and hydrochemical conditions in the area. At the stage of operation, emissions to water will be associated with wind farm maintenance. Waste and sewage will be generated as a result of operations carried out by vessels and workers operating the OWF. Waste management is discussed in detail below (Chapter 13). A waste management program will be implemented for the Project. Waste and wastewater will be hauled to shore at each stage of the Project and properly recycled or disposed of. In addition, the heated water in the cooling system of the offshore substation will be discharged into marine waters in accordance with applicable legal requirements.

When considering potential emissions, it is also necessary to take into account possible failures at the stage of operation of the farm. These failures can be related to oil spills from service vessels and leakage of lubricants and oils from damaged turbines. In case of an emergency, oil spills in the water are a potential threat to the environment. The investor will prepare an Emergency Action Plan and Oil Pollution Prevention Plan for the stage of construction, operation and liquidation of the OWF.

12.3 DECOMMISSIONING PHASE

Impacts at the stage of decommissioning can be very similar to those at the construction stage. They will be related to the movement of service and transport units between the port and the OWF and work in the area of the OWF, decommissioning of foundations, wind power plant and substation components, as well as submarine cables.

Due to the significant time perspective and probability of technological and regulatory changes at this stage it is difficult to predict what methods of decommissioning offshore wind farms will be used in 30-50 years. The most likely seems to be the complete removal of blades, nacelles and towers, their transport to shore and disposal or recycling. In terms of foundations, in the case of piles they will probably be cut 1-2 m below the seabed, while gravity foundations will remain in the seabed. However, a different approach for WTG and OSS foundations cannot be ruled out. Therefore, at the present stage, all methods of decommissioning of foundations seem possible, including: leaving the foundations in-situ, their partial or complete dismantling and transporting them onshore for management. The actual decommissioning method will depend on the applicable legislation and technical capabilities available at the time of decommissioning

13 ANTICIPATED QUANTITIES AND TYPES OF WASTE DISPOSED OF AND THEIR IMPACT ON THE ENVIRONMENT

Waste will be managed in accordance with the applicable law, in particular with the provisions of the Act of March 16, 1995 on prevention of marine pollution from ships (Journal of Laws 2020 item 1955) and the Act of December 14, 2012 on waste (Journal of Laws 2022 item 699).

Classification of waste produced in connection with the construction, exploitation and decommissioning of the OWF was performed according to the Regulation of the Minister of Climate of January 2, 2020 on the waste catalogue (Journal of Laws 2020 item 10).

The chapter was divided into three parts (subsectiond), corresponding to the stages of construction, operaration and decommissioning. Each of the following subsections describes the activities of the Project **leading to the generation of wastewater and waste.**

13.1 CONSTRUCTION PHASE

Waste and wastewater will be generated during loading, unloading and storage of materials in the construction and assembly port and during the construction process of power plants, substations and cable laying.

The types and quantities of waste envisaged for the construction phase are presented in the Table 13.1 below.

Table 13.1 Expected waste types and quantities at the stage of construction within a year

Code	Type of waste	Mass [Mg/year]
08 01 11*	Waste paint and varnish containing organic solvents or other dangerous substances	2,00
08 01 12	Waste paint and varnish other than those mentioned in 08 01 11	2,00
12 01 13	Welding waste	100
13 01 09*	Mineral hydraulic oils containing chloroorganic compounds	2,00
13 01 10*	Mineral hydraulic oils free of chloroorganic compounds	2,00
13 01 11*	Synthetic hydraulic oils	2,00
13 01 12*	Readily biodegradable hydraulic oils	2,00
13 01 13*	Other hydraulic oils	2,00
13 02 04*	Mineral engine, gear and lubricating oils containing chloroorganic compounds	20
13 02 05*	Mineral, non-chlorinated engine, gear and lubricating oils	20
13 02 06*	Synthetic engine, gear and lubricating oils	10
13 02 07*	Readily biodegradable engine, gear and lubricating oils	10
13 02 08*	Other engine, gear and lubricating oils	10
13 03 01*	Insulating or heat transmission oils and other liquids containing PCBs	50
13 04 03*	Bilge oils from seagoing vessels	100
13 05 02*	Oil/water separator sludges	50
13 05 06*	Oil from oil drain in separators	20
13 05 07*	Oiled water from oil dewatering in separators	20
13 07 01*	Fuel oil and diesel	5
13 07 02*	Petrol	10
13 08 80	Oiled solid waste from ships	50
14 06 01*	Freons, HCFC, HFC	10
14 06 02*	Other chloroorganic solvents and solvent mixtures	10
14 06 03*	Other solvents and solvent mixtures	5
15 01 01	Paper and cardboard packaging	10
15 01 02	Plastic packaging	10
15 01 03	Wood packaging	10
15 01 04	Metal packaging	10
15 01 05	Multi-material packaging	10
15 01 06	Mixed packaging waste	50
15 01 07	Glass packaging	10
15 01 09	Textile packaging	10

Code	Type of waste	Mass [Mg/year]
15 02 02*	Sorbents, filter materials (including oil filters not included in other groups), wiping cloths (e. g. rags, cloths) and protective clothing contaminated by hazardous substances (e. g. PCBs)	50
15 02 03	Sorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02	50
16 06 01*	Lead batteries and accumulators	50
16 06 02*	Nickel-cadmium batteries and accumulators	50
16 06 03*	Batteries containing mercury	40
16 06 04	Alkaline batteries (except 16 06 03)	10
16 06 05	Other batteries and accumulators	10
16 81 01*	Wastes with hazardous properties	50
16 81 02	Wastes other than those mentioned in 16 81 01	2
17 01 01	Concrete waste and concrete rubble from demolition and refurbishment	2
17 01 03	Waste of other ceramic materials and equipment	3
17 01 07	Mixed waste of concrete, brick rubble, ceramic materials and equipment other than those mentioned in 17 01 06	100
17 01 82	Other wastes not otherwise specified	50
17 02 01	Wood	10
17 02 02	Glass	1
17 02 03	Plastics	20
17 04 01	Copper, bronze, brass	2
17 04 02	Aluminium	2
17 04 04	Zinc	5
17 04 05	Iron & Steel	20
17 04 07	Mixed metals	5
17 04 11	Cables other than those mentioned in 17 04 10	20
17 09 03*	Other construction, repair and dismantling wastes (including mixed wastes) containing dangerous substances	20
17 09 04	Mixed construction, renovation and dismantling wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	20
19 08 05	Stabilised municipal sewage sludge	1
20 01 01	Paper and cardboard	1
20 01 02	Glass	1
20 01 08	Biodegradable kitchen waste	1
20 01 10	Clothing	1
20 01 21*	Fluorescent tubes and other waste containing mercury	2
20 01 23*	Equipment containing CFCs	2
20 01 29*	Detergents containing dangerous substances	2

Code	Type of waste	Mass [Mg/year]
20 01 30	Detergents other than those mentioned in 20 01 29	2
20 01 33*	Batteries and accumulators including those mentioned in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries	10
20 01 34	Batteries and accumulators other than those mentioned in 20 01 33	10
20 01 35*	Used electrical and electronic equipment other than listed in 20 01 21 and 20 01 23 containing dangerous components (1)	10
20 01 36	Used electrical and electronic equipment other than listed	10
20 03 01	Unsegregated (mixed) municipal waste	25

13.2 Operational Phase

Waste generated in connection with the functioning of the OWF is a result of technological processes and operation of equipment and machines.

The expected types and quantities of waste generated within one year at the operation stage are shown in Table 13.2 below.

Table 13.2 Expected types and quantities of waste at the operation stage

Code	Type of waste	Mass [Mg/year]
08 01 11*	Waste paint and varnish containing organic solvents or other dangerous substances	1
08 01 12	Waste paint and varnish other than those mentioned in 08 01 11	1
12 01 13	Welding waste	0,1
13 01 09*	Mineral hydraulic oils containing chloroorganic compounds	1
13 01 10*	Mineral hydraulic oils free of chloroorganic compounds	1
13 01 11*	Synthetic hydraulic oils	1
13 01 12*	Readily biodegradable hydraulic oils	1
13 01 13*	Other hydraulic oils	1
13 02 04*	Mineral engine, gear and lubricating oils containing chloroorganic compounds	1
13 02 05*	Mineral, non-chlorinated engine, gear and lubricating oils	1
13 02 06*	Synthetic engine, gear and lubricating oils	1
13 02 07*	Readily biodegradable engine, gear and lubricating oils	1
13 02 08*	Other engine, gear and lubricating oils	1
13 03 01*	Insulating or heat transmission oils and other liquids containing PCBs	1
13 04 03*	Bilge oils from seagoing vessels	1
13 05 02*	Oil/water separator sludges	1
13 05 06*	Oil from oil drain in separators	1

Code	Type of waste	Mass [Mg/year]
13 05 07*	Oiled water from oil dewatering in separators	3
13 07 01*	Fuel oil and diesel	3
13 07 02*	Petrol	0,05
13 08 80	Oiled solid waste from ships	4
14 06 01*	Freons, HCFC, HFC	0,05
14 06 02*	Other chloroorganic solvents and solvent mixtures	0,05
14 06 03*	Other solvents and solvent mixtures	0,05
15 01 01	Paper and cardboard packaging	0,1
15 01 02	Plastic packaging	0,1
15 01 03	Wood packaging	0,1
15 01 04	Metal packaging	0,1
15 01 05	Multi-material packaging	0,1
15 01 06	Mixed packaging waste	0,1
15 01 07	Glass packaging	0,1
15 01 09	Textile packaging	0,1
15 02 02*	Sorbents, filter materials (including oil filters not included in other groups), wiping cloths (e. g. rags, cloths) and protective clothing contaminated by hazardous substances (e. g. PCBs)	0,3
15 02 03	Sorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02	0,3
16 06 01*	Lead batteries and accumulators	0,1
16 06 02*	Nickel-cadmium batteries and accumulators	0,1
16 06 03*	Batteries containing mercury	0,01
16 06 04	Alkaline batteries (except 16 06 03)	0,01
16 06 05	Other batteries and accumulators	0,01
16 81 01*	Wastes with hazardous properties	0,3
16 81 02	Wastes other than those mentioned in 16 81 01	0,3
17 01 01	Concrete waste and concrete rubble from demolition and refurbishment	5
17 01 03	Waste of other ceramic materials and equipment	1
17 01 07	Mixed waste of concrete, brick rubble, ceramic materials and equipment other than those mentioned in 17 01 06	5
17 01 82	Other wastes not otherwise specified	5
17 02 01	Wood	0,2
17 02 02	Glass	0,1
17 02 03	Plastics	0,5
17 04 01	Copper, bronze, brass	0,05
17 04 02	Aluminium	0,05

Code	Type of waste	Mass [Mg/year]
17 04 04	Zinc	0,05
17 04 05	Iron & Steel	1
17 04 07	Mixed metals	0,05
17 04 11	Cables other than those mentioned in 17 04 10	5
17 09 03*	Other construction, repair and dismantling wastes (including mixed wastes) containing dangerous substances	2
17 09 04	Mixed construction, renovation and dismantling wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	2
19 08 05	Stabilised municipal sewage sludge	3
20 01 01	Paper and cardboard	2
20 01 02	Glass	2
20 01 08	Biodegradable kitchen waste	2
20 01 10	Clothing	2
20 01 21*	Fluorescent tubes and other waste containing mercury	0,1
20 01 23*	Equipment containing CFCs	0,1
20 01 29*	Detergents containing dangerous substances	0,1
20 01 30	Detergents other than those mentioned in 20 01 29	0,1
20 01 33*	Batteries and accumulators including those mentioned in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries	3
20 01 34	Batteries and accumulators other than those mentioned in 20 01 33	3
20 01 35*	Used electrical and electronic equipment other than listed in 20 01 21 and 20 01 23 containing dangerous components (1)	3
20 01 36	Used electrical and electronic equipment other than listed	3
20 03 01	Unsegregated (mixed) municipal waste	30

The generation of waste, especially hazardous waste will involve the development of internal procedures on how to transfer this waste to authorised entities. Vessels, due to the predicted amounts of generated hazardous waste, should transfer waste in accordance with the provisions of the Waste Act and not the port regulations. The waste generator should be registered with BDO (Baza Danych Odpadowych; waste register) and follow the applicable provisions of the Waste Act.

13.3 DECOMMISSIONING PHASE

During the decommissioning stage, significant amounts of waste will be generated, associated with the physical removal of farm facilities defined at the decommissioning stage. The most probable scenario assumes that the facilities will be decommissioned in the following way:

- power plants - removed in full;
- monopile foundations - removed to a depth of 1-2 m below the seabed level, gravity-based foundations – left in place;
- internal cables - removed or left in the seabed, covered by sediments;
- scour protection - left in place.

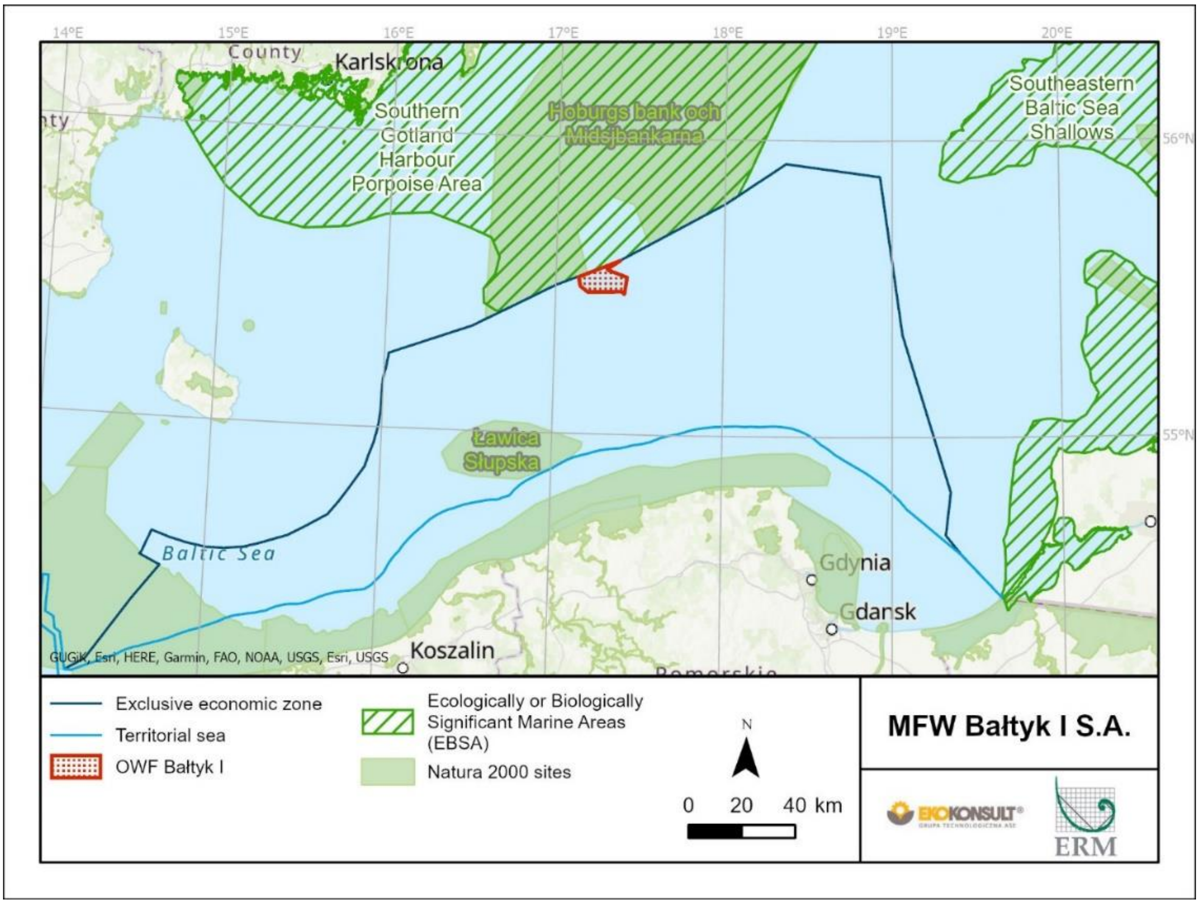
At this stage, the model of the WTG, the type of foundation or the length of cable sections between individual power plants are not known. It should also be emphasised that there is a very low probability of decommissioning of the entire farm. It is much more probable that individual devices will be replaced instead, and that the farm will continue functioning.

14 AREAS SUBJECT TO PROTECTION UNDER THE NATURE CONSERVATION ACT

14.1 PROTECTED AREAS

Proposed project is located **outside national forms of nature conservation and outside areas belonging to the European Natura 2000 network. The closest Natura 2000 protected area on the Swedish side is Hoburgs bank och Midsjöbankarna (SE0330308), which borders the project area to the north for approximately 3 km. The closest Polish protected area is the Natura 2000 Słupsk Bank area (PLC990001; Figure 14.1), which is located approximately 54 km from the planned Project.**

Figure 14.1 Protected areas in the vicinity of the planned investment



Source: HELCOM

Słupsk Bank

The Słupsk Bank Natura 2000 area (PLC990001) was designated to protect natural habitats (Habitats Directive) and bird species (Birds Directive). The area is characterised by a highly differentiated bottom with numerous depressions and elevations, with depths between 8 and 35 m. The shallows are inhabited by many invertebrates which constitute a food base for wintering and resting wetland birds in autumn.

The objects of protection of the Słupsk Bank are submarine sandbanks (code 1110), rocky and stony seabed, reefs (code 1170) and the following bird species: common guillemot (*Cepphus grille)*, long-tailed duck (*Clangula hyemalis)*, and velvet scoter (*Melanitta fusca*).

The site, at the time of application, does not have an approved conservation plan, and its list of objects of protection is still being consulted.

Hoburgs bank och Midsjöbankarna

The area is characterized by a mosaic of shallow sandbanks and reefs. The area is important for wintering and feeding seabirds and is important for the harbour porpoise population in the Baltic Sea.

The objects of protection of the Hoburgs bank och Midsjöbankarna are submarine sandbanks (code 1110), rocky and stony seabed, reefs (code 1170) and the following species: common guillemot (*Cepphus grille)*, long-tailed duck (*Clangula hyemalis)*, common eider (*Somateria mollissima)* and harbour porpoise (*Phocoena phocoena)*.

Basic information on natural habitats and animal species is presented in the Tables 14.1 and 14.2.

Table 14.1 Priority habitats of Hoburgs bank och Midsjöbankarna (SE0330308)

Habitat code	Name	Cover [ha]	Representativity	Relative surface	Conservation	Global
1110	Offshore sandbanks	220 000	B	B	B	B
1170	Rocky substrates, reefs	20 000	B	C	B	B

Source: http://natura2000.eea.europa.eu/

Legend:
Representativity: Ranking system for assessing representativeness: A: excellent, B: good, C: significant, D: not significant
Relative surface: A: 100 ⩾ p > 15%, B: 15 ⩾ p > 2%, C: 2 ⩾ p > 0%
Conservation: A – excellent, B – good, C – in average or poor condition
Global: A – excellent, B – good, C – significant

Table 14.2 Protected species of Hoburgs bank och Midsjöbankarna (SE0330308)

Species	Population type	Site assessment for the population*	Population size	
			minimum	maximum
Common guillemot *Cepphus grylle*	wintering	C	1000	5000
Long-tailed duck *Clangula hyemalis*	wintering	A	200 000	1 000 000
Common eider *Somateria mollissima*	staging	C	5 000	50 000
Harbour porpoise *Phocoena phocoena*	resident	A	100	100

Source: http://natura2000.eea.europa.eu/

Legend:
Population type: resident, i.e., to be found throughout the year on the site. This type includes non-migratory species, plants, resident populations of migratory species; breeding/reproducing, i.e., using the area for breeding and/or raising young; staging, i.e., using the area for resting or gathering during migration or for moulting outside the breeding grounds; wintering, i.e., using the site during the winter

Size and density of the population of the species in relation to the populations present within national territory; class intervals: A: 100 ⩾ p > 15%, B: 15 ⩾ p > 2%, C: 2 ⩾ p > 0%; D: non-significant

Significant threats to the conservation areas of Hoburgsbank och Midsjöbankarna are: shipping routes, active fisheries and oil spills at sea and, to a lesser extent, net fishing, surface water pollution, nitrogen inputs and invasive alien species. A conservation plan is in place for the area. Table 14.3 presents anthropogenic pressures.

Table 14.3 Selected pressures on habitats/species protected in the area Hoburgs bank och Midsjöbankarna (SE0330308)

Habitats/protected species	Selected pressures
1120 (offshore sandbanks)	• eutrophication, • construction of wind farms and gas pipelines that may alter hydrological conditions for natural habitats, • intersecting shipping routes with heavy traffic near the Natura 2000 site, which carry a high risk of oil spills/leaks, • invasive species that may affect the species composition of habitats.
1170 (rocky substrates, reefs)	• eutrophication, • construction of wind farms and gas pipelines that may alter hydrological conditions for natural habitats, • physical disturbance of habitats e.g.: trawling, dredging, backfilling, sand and gravel extraction, which adversely affect the reef (impact through increased sedimentation) • intersecting shipping routes with heavy traffic near the Natura 2000 site, which carry a high risk of oil spills/leaks, • elevated water temperature posing a threat to species composition, • invasive species that may affect the species composition of habitats.
Harbour porpoise, *Phocoena phocoena*	• passive fishing gear causing porpoise bycatch, • pollution of marine waters with toxins (PCBs) affecting reproduction and survival of porpoises, • underwater impulse noise, e.g. from sonar, seismic surveys (porpoises stop echolocating and feeding), • continuous underwater noise, e.g. shipping routes, construction works and OWF operations can cause behavioral impacts, • fishing and climate change causing changes in the quality and quantity of food, which in turn increases the risk of impaired reproductive capacity and feeding of offspring.
Long-tailed duck, *Clangula hyemalis*	• use of fishing nets on reefs, • wind energy production (population is excluded from important foraging habitats), • shipping routes established through or near important wintering areas for birds (potential accidents - oil spills).
Common guillemot, *Cepphus grylle*	• exploitation of offshore banks for wind energy production, which can adversely affect the species and its wintering survival by excluding populations from important habitats, • shipping routes established through or near important wintering areas for birds (increased vessel traffic and potential accidents - oil spills), • changes in fish stocks.

Source: Bevarandeplan för Natura 2000-området SE0330308 Hoburgs bank och Midsjöbankarna, Gotlands län, Kalmar län, 511-2908-2021

14.2 ECOLOGICAL CORRIDORS

According to the Nature Conservation Act of April 12, 2004 (Journal of Laws 2021, item 1098, consolidated text) an ecological corridor is defined as an area allowing migration of plants, animals or fungi.

No conception or documentation defining ecological corridors in the South Baltic area has been developed. The last strategic document in force within the administrative boundaries of the Exclusive Economic Zone of the Republic of Poland is the POM Plan, for which a prognosis of environmental impact was prepared as part of a strategic evaluation. This document does not analyse the ecological corridors.

Ecological corridors can be defined as interconnected and intertwined strips of land, which ensure the occurrence of functional natural processes due to the preserved conditions and natural land cover. Corridors enable the existence and exchange of the gene pool, numbers, and above all migration of species and individuals, conditioning the preservation of environmental biodiversity. Their borders include forest areas, surface waters, valuable natural habitats, as well as agricultural land, where a small share of communication and built-up areas is visible. Depending on the extent of space and the rank of influence, the terrestrial corridors can be divided into: supraregional, regional, subregional and local (PBPR, 2014). For the purposes of this study, this definition was extended to include maritime areas.

The most important groups of migratory organisms associated with the marine environment are: fish, mammals, birds and bats.

According to the general classification of the waterbird migratory system in Eurasia, the South Baltic Sea is located within the range of two migration corridors: Eastern Atlantic and Mediterranean/Black Sea.

Migration corridors of seabirds in the Baltic region are very poorly recognized (Maritime Institute, 2020). During summer (July-August), migrations of sea ducks (scoter) (*Melanitta nigra*) are observed from the Gulf of Finland towards the Danish Straits. Common eider (*Somateria mollissima*) and velvet scoter (*Melanitta fusca*) are also recorded among the ducks. Autumn migration of seabirds among some species starts already in August. Some species are migratory, others stay in Poland for the winter, e.g. *Sterna* and *Chlidonias* terns. Throughout the migration and wintering period the following are recorded: sea ducks (*Melanitta nigra*), auks (*Alcidae*), divers (*Gaviidae*), grebes (*Podicipedidae)* (Olenycz *et al*., 2017).

Harbour porpoise (*Phocoena phocoena*) is occasionally observed in Polish marine areas (HELCOM Map and Data Service). The results of the monitoring of marine mammals in the Polish marine areas showed that harbour porpoises occur continuously in the western part of the marine waters, in Pomeranian Bay. The Middle Bank may also be a site for porpoise reproduction and juvenile rearing; detailed studies of the Bank are important to verify porpoise intensity and its variability over time. If confirmed, the shoal should be protected from exploration in the area of porpoise reproduction and juvenile rearing (GDOŚ, 2022).

The south Gotland area has been designated as an area of ecological or biological importance for harbour porpoises (EBSA). It is a significant area for the critically endangered harbour porpoise (*Phocoena phocoena*) subpopulation in the Baltic Sea around the islands of Öland and Gotland, and serves as a key breeding area for the population. The population has been estimated at 497 individuals and has declined dramatically since the mid-20th century. The area also supports a vulnerable subpopulation of the Kalmarsund harbour seal (*Phoca vitulina vitulina*) and is the main wintering area for the endangered long-tailed duck (*Clangula hyemalis*).

In the southern Baltic Sea, fish, seals and harbour porpoises all migrate for food. Birds migrate in spring and autumn. There are also scientific publications about bats migrating over the Baltic Sea (Ahlén et al., 2009; Rydell et al., 2014).

A detailed analysis of the ecological corridors will be conducted during the Environmental Impact Assessment and will take into account the results of comprehensive, pre-investment environmental research programme, carried out for the Project development purposes.

15 ANALYSIS OF POTENTIAL CUMULATIVE IMPACTS

Emissions and disturbances as well as existing and planned projects, which may cause cumulative impacts with MFW Bałtyk I in the marine environment, are presented in the following chapters. The basic assumptions for the cumulative impact analysis will also be presented.

15.1 SPATIAL CONDITIONS COVERING ONGOING AND COMPLETED PROJECTS LOCATED WITHIN THE PROJECT AREA AND IN THE AREA OF INFLUENCE OF THE PROJECT OR WHOSE IMPACTS ARE WITHIN THE AREA OF INFLUENCE OF THE PLANNED PROJECT

A preliminary identification of projects, whose impacts may lead to the accumulation of impacts with the MFW Bałtyk I was made. At this stage only the spatial aspect of the possible cumulative impacts of the MFW BI with the impacts of other projects was analysed.

15.1.1 Offshore wind farms

So far, no offshore wind farm has been built in the Polish part of the Baltic Sea, however there are ten planned projects at the development stage. List of offshore wind farm projects with information on obtained OLL, environmental decision and information on Grid Connection Conditions to the National Power System (KSE) is presented in Table 15.1 and Figure 15.1.

Table 15.1 Offshore wind energy projects in the Baltic Sea

No.	Investor	Area (km^2)	Grid connection (OLL – obtained, GCC – Grid Connection Conditions)	Environmental decision (issue year)
1	Equinor/Polenergia - MFW Bałtyk I*	128	1560 MW(OLL/GCC)	-
2	Equinor/Polenergia – MFW Bałtyk II*	122	720 MW (OLL/GCC)	yes (2017)
3	Equinor/Polenergia - Bałtyk MFW III*	116	720 MW (OLL)	yes (2016)
4	PGE/Ørsted - Baltica 2**	189	1498 MW (OLL/GCC)	yes (2020)
5	PGE/Ørsted - Baltica 3**	131	1045,5 MW (OLL)	yes (2020)
6	PGE - Baltica 1**	108	896 MW (OLL/GCC)	-
7	RWE - FEW Baltic-II***	42	350 MW (OLL/GCC)	yes (2021)
8	PKN Orlen/Northland Power**** - Baltic Power	131	1200 MW (OLL/GCC)	-
9	Ocean Wind - C-Wind*****	42	399 MW (OLL)	-
10	Ocean Wind – B-Wind	49		-
	Total	**1058**	**11979,5MW**	

Source: PSEW Report Sept 2020; Hogan-Lovells, Offshore wind farms (OWF) – an update from Poland, 2020;; updated based on data made available to the public on investors' websitesand the list of companies applying for the connection of sources to *the National Power System (as of 31.01.2022)*

** SPVs of Equinor and Polenergia, which applied for grid connection conditions are, respectively, MFW Bałtyk I Sp. z o.o., MFW Bałtyk II Sp. z o.o. and MFW Bałtyk III Sp. z o.o.*

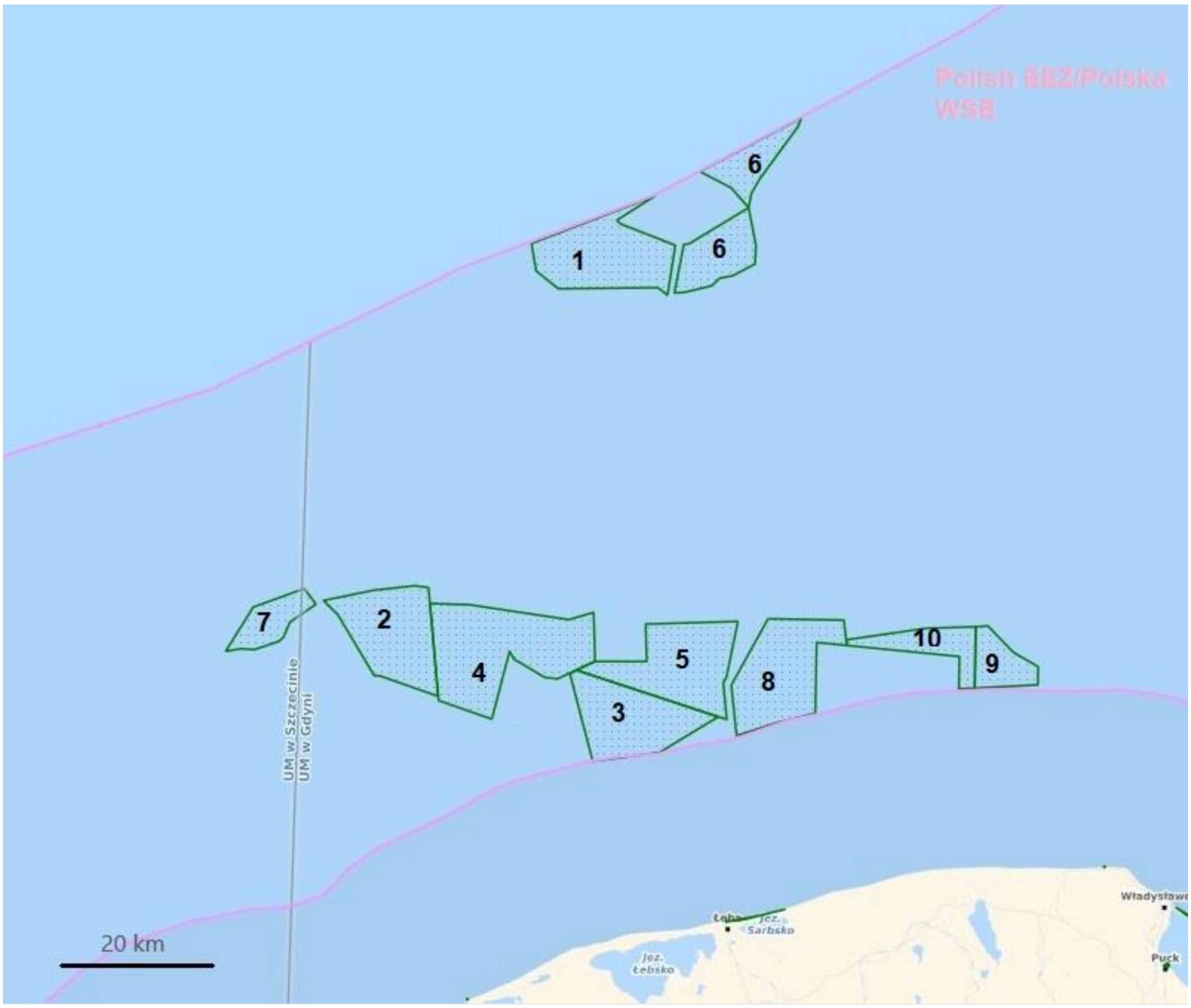
*** PGE/Ørsted owns Elektrownia Wiatrowa Baltica-2 Sp. z o.o. and Elektrownia Wiatrowa Baltica-3 Sp. z o.o. PGE owns Elektrownia Wiatrowa Baltica-1 Sp. z o.o.*

**** RWE Renewables GmbH owns Baltic Trade and Invest Sp. z o.o,*

***** PKN Orlen and Northland Power own Baltic Power Sp. z o.o.*

****** The investor holds the right to develop offshore wind farms in two adjacent locations designated as B-Wind and C-Wind (also known as B&C Wind Project), while their connection conditions are jointly determined by PSE S.A. The SPV, which has been granted connection conditions, is named C-Wind Polska Sp. z o.o.*

Figure 15.1 Offshore wind energy projects in the Polish EEZ*



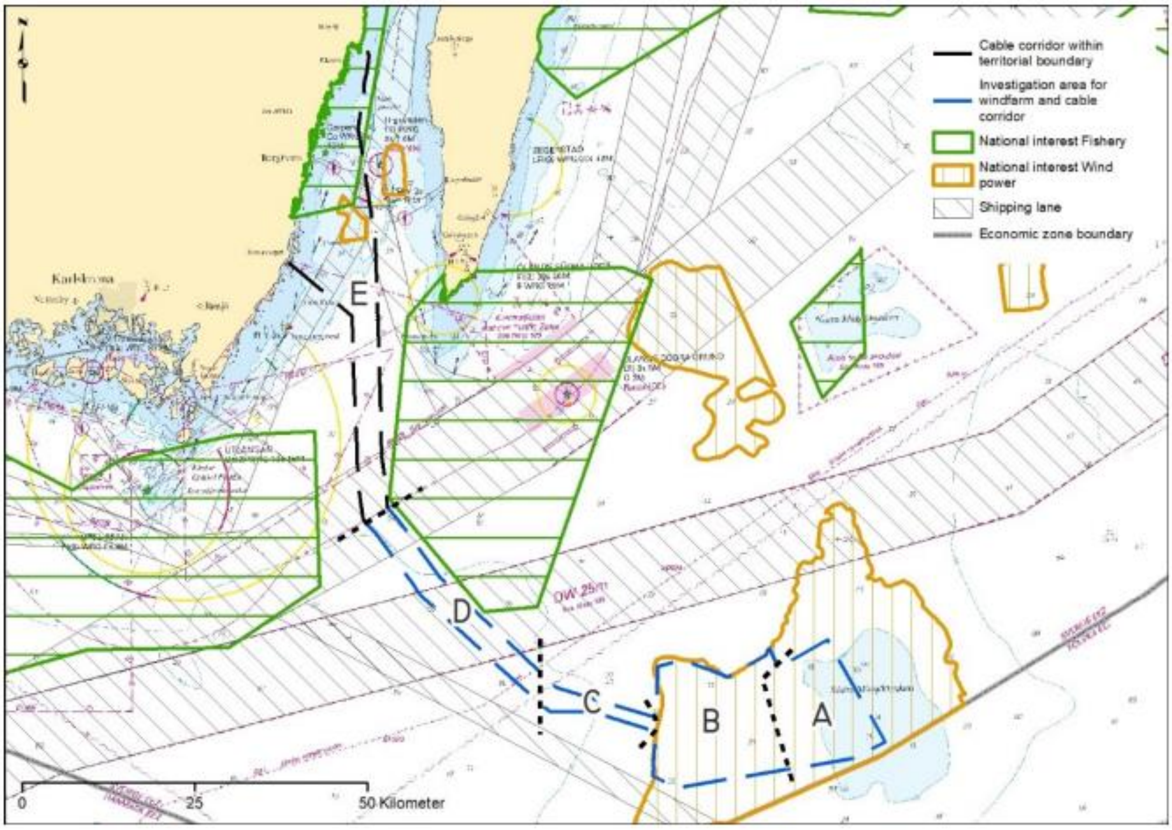
Source: PSEW Report Sept 2020

**numbering of projects according to Table 15.1 above*

Among all the above-mentioned offshore wind farm projects planned in the Polish part of the Baltic Sea, only the Baltica 1 project is located in the vicinity of the MFW Bałtyk I (in the area 60.E, as specified in the POM Plan). Other projects are located at a distance of more than 40 km from the area of the planned farm.

North of the MFW Bałtyk I area, in the area of the Southern Middle Bank located within the Swedish exclusive economic zone, the Södra Midsjöbanken offshore wind farm project is planned to be implemented (the shortest distance between the border of this farm and the borders of the MFW Bałtyk I is 1.85 km). An application for a permit to construct and operate the aforementioned farm was submitted in 2012 by E.ON Wind Sweden AB, currently RWE Renewables Sweden AB. Following the establishment of a Natura 2000 protection area in the Southern Middle Bank in the Swedish EEZ in 2016, the Swedish government in 2019 issued a statement that RWE's application must be accompanied by a so-called Natura 2000 permit. In 2020, The Swedish Environmental Protection Agency issued notifications to contact points in Poland, Finland, Denmark, Estonia, Latvia, Lithuania and Russia regarding the planned Södra Midsjöbanken offshore wind farm. The planned farm will be approximately 80 km from the Swedish mainland and will be located nearby the Polish EEZ and two areas designated in the POM Plan for the development of offshore wind energy, including the area POM.60.E. On 20 December 2021, the geophysical and environmental surveys for the Södra Midsjöbanken OWF project were completed, which included the farm site and the planned cable corridors. The investor assumes that the necessary permits will be obtained in 2024/2025 and the OWF operations can start in 2029.

Figure 15.2 Offshore wind energy projects in the Swedish EEZ in the area of Southern Baltic



Source: RWE consultation document by SWECO, 2020

In the context of the cumulative impact analysis, the impacts of the MFW Bałtyk I power output elements, not included in the scope of this document and environmental decision application for MFW Bałtyk I, will also be taken into account.

15.1.2 Aggregate Mining in the Southern Middle Bank

In the Southern Middle Bank, in the immediate vicinity of the Project area (NE border), there is an extraction of natural aggregate from the deposit "Południowa Ławica Środkowa - Bałtyk Południowy". This extraction is carried out on the basis of Concession No. 3/2006 dated 15.11.2006, issued by the Minister of Environment in accordance with the *Geological and Mining Law* of June 9, 2011 (Journal of Laws 2021, item 1420). The concession is valid until 2031.

The deposit is divided into 9 fields ranging in size from 0.5 to 16.9 km^2 (about 26 km^2 in total), with an average thickness of the deposit layer of 0.9 m (maximum > 5 m).

Proved balance resources in the C2 category amount 56.5 million tons, and industrial resources amount 56 million tons. The deposit consists of three mining areas: "Południowa Ławica Środkowa A", "Południowa Ławica Środkowa B", " Południowa Ławica Środkowa C" and one mining area " Południowa Ławica Środkowa" (IMG, 2015).

15.1.3 Cables, pipelines and other

Currently, in the area of the Project, there are no pipelines or cables that could directly affect the area of the planned MFW Bałtyk I project.

The nearest such installations in the Swedish EEZ are: (1) the NordBalt power cable located north of the Hoburgs bank och Midsjöbankarna Natura 2000 area, transferring electricity between Sweden and the Baltic countries; (2) the Nord Stream gas pipeline transporting gas from Russia to Germany; (3) SwePol Link - a high voltage direct current (HVDC) submarine cable between the Stärnö peninsula near Karlshamn in Sweden and Bruskow Wielki near Slupsk. It runs through the Swedish, Danish and Polish EEZs at a distance of approx. 60 km from the Baltic I offshore wind farm; (4) C-Lion 1 and Nordbalt HVDC are submarine communication cables between Finland and Germany (C-Lion) and Sweden and Lithuania (Nordbalt). Both run through the Swedish EEZ near Södra Midsjöbanken.

There is also intensive commercial shipping in the Swedish EEZ using the sea routes passing through the Natura 2000 area north of Södra Midsjöbanken, and outside the Natura 2000 area south of Södra Midsjöbanken (SVT, 2020) (See Figure 15.2).

15.2 POTENTIAL CUMULATIVE IMPACTS

Cumulative impacts will be analyzed at the stage of the Environmental Impact Assessment report for the planned Project.

They can be primarily associated with spatial disturbance by creating a barrier restricting the free movement of, among others, fisheries, transit and tourist traffic, radar interference, underwater noise and a temporary increase in suspended solids concentration and sedimentation at the construction stage. The creation of a physical barrier could potentially significantly impact migrating birds and their flyways and seabirds and their passage between resting and/or feeding areas.

In combination with other projects, MFW Bałtyk I may affect birds and marine mammals to a greater extent than individually.

The planned OWF may cumulatively affect other OWFs in terms of underwater noise, by spatially increasing the potential coverage of underwater noise emission. In case of choosing monopile foundations in order to limit noise emission to the environment during the construction phase of the Project appropriate technical (e.g. bubble curtains) and organizational solutions will be applied during driving of the foundations (e.g. procedure of gradual increase of piling power in increments of time until full operational power is reached, so called "soft start").

Table 15.2 presents the identification of potential cumulative impacts and accumulation zones. Actions aimed at avoiding negative cumulative impacts on the marine environment include creating methods for conducting environmental monitoring at the stage of construction and operation, e.g. with respect to underwater noise, fish spawning, fish migration, sediments and electromagnetic radiation. **All applicable minimizing measures will be analysed at the stage of environmental impact assessment.**

Table 15.2 Identification of potential cumulative impacts

Type of emission	Source of emissions	Type of impacts	Type of Project	Cumulation zone
Increase in underwater noise (construction phase)	- Foundation piling - Cable laying - Vessel traffic	- Displacement from habitats - Change in habitat - Injury - Mortality - Reduction in catches	- OWF - Mining industry - Transmission infrastructure	Around the investment in case of piling of foundations in the centre of the farm
Heat emission from cables	Cables	- Changes in oxidation-reduction potential - Changes in microbiological activity of sediments - The appearance of alien species	- OWF - Transmission infrastructure	On the spot investments
The emergence of new structures under the sea	- Foundations/ Tower - Pipelines	- Barrier effect - Changes (positive included, e.g. the “artificial reef” effect) in habitats - Difficulties for navigation and shipping	- OWF - Mining industry - Transmission infrastructure	In the investment site and in its immediate vicinity
Electromagnetic radiation	- Cables - OSS	- Orientation disorder - Changes in the use of space - Interference with radar systems - Disturbance to navigation and shipping	- OWF - Transmission infrastructure	In the investment area
The emergence of new structures above sea level	- Turbine - Tower	- Barrier effect - Displacement from habitats - Collision fatality rate - Landscape changes - Difficulties for navigation and shipping	- OWF - Mining industry	In the investment area and around the investment
Noise emission surface	- Turbine - Vessel traffic	- Scaring - Displacement from habitats	- OWF - Mining industry - Electricity substations	In the investment area
Air pollutant emissions	- Ships - Helicopters	- Deterioration of animal habitat	- OWF - Mining industry - Transmission infrastructure - Sailing	In the investment area
Water pollution emissions	- Ships - Ship leaks and pipelines - Protection from corrosion - Grouting	- Deterioration of living conditions	- OWF - Mining industry - Transmission infrastructure - Sailing	In the investment area and around it

Type of emission	Source of emissions	Type of impacts	Type of Project	Cumulation zone
Waste generation	- Construction process - Construction Ships servicing - Construction and service support	- Deterioration of living conditions in case of emergency release of waste to the environment	- OWF - Mining industry - Transmission infrastructure - Sailing	In the investment area

16 POSSIBLE TRANSBOUNDARY ENVIRONMENTAL IMPACTS

The area of the planned MFW Bałtyk I is located in the Polish Exclusive Economic Zone, at the border with the Swedish Exclusive Economic Zone, approximately 81 km north of the coastline at the level of the Łeba municipality.

Considering the location of the MFW Bałtyk I area, the current knowledge on the environmental impact of offshore wind farms and the results of the impact assessment of other offshore wind farm projects in Polish maritime areas, the planned Project may potentially require conducting a transboundary impact assessment procedure. Potential impact of the planned project must be considered in accordance with relevant EU regulations, in particular the Espoo Convention due to the direct border with Swedish EEZ and the distance of about 47 km of the planned OWF to Danish EEZ (please refer to Chapter 5.1.2).

The assessment of transboundary impacts will consider the results of the assessment of impacts on Natura 2000 sites, in particular the Swedish "Hoburgs bank och Midsjöbankarna" SE0330308 and the coherence of the Natura 2000 network in the vicinity of the planned MFW Bałtyk I

The planned OWF is located in the Polish EEZ and is directly adjacent to the Swedish EEZ. Most impacts are of local nature and will be restricted to the borders of the basin. However, a potentially significant transboundary impact of the planned wind farm cannot be excluded. The source of such impact may be e.g. the emission of underwater noise generated during the installation of foundations of WTGs and OSS with regard to marine mammals and fish.

The transboundary impact of the planned OWF will be analysed in detail during Environmental Impact Assessment and will also cover possible malfunctions at the stage of construction and exploitation.

17 ANALYSIS OF POTENTIAL SOCIAL CONFLICTS ASSOCIATED WITH THE PLANNED PROJECT

The establishment of wind energy in Poland, both onshore and offshore, has raised concerns among residents. An article published by Energy Research & Social Science (Walker *et al*., 2014) indicates that, typically, offshore wind farms receive higher levels of support than onshore wind farms.

A survey of environmental awareness regarding wind energy (onshore and offshore) conducted in November 2020 for the Ministry of Climate and Environment (MKiŚ, 2020) (n=1005) indicated that 83% of Polish residents support the development of offshore wind farms and 76% of respondents would like to use electricity from this source. 67% of respondents have a positive view of the environmental impact of offshore wind farms and 25% of them have no opinion. 71% of the people surveyed have negative or average opinion on their knowledge about offshore wind power. Despite that, an overwhelming majority (81%) of respondents believe that offshore wind farm development will increase Poland's energy security.

One initiative that required significant industry involvement was the Polish Offshore Wind Sector Deal, developed by six working groups as part of a wider process to support offshore wind energy development in Poland by the Ministry of Climate and Environment in collaboration with the Polish Wind Energy Association (PWEA) and the Polish Offshore Wind Energy Society (PTMEW). It was agreed in September 2021 to increase the participation of Polish entrepreneurs in the supply chain for offshore wind energy. All stakeholder groups were involved in the adoption of the Agreement, including fisheries organisations. Polenergia and Equinor were represented in all PWEA working groups, one of the groups (Gr. 6 - Cooperation with stakeholders) was moderated by Polenergia representation. Currently the Ministry is planning to continue this cooperation and has established the Offshore Wind Energy Coordination Council for this purpose, in which both companies are represented.

17.1 Pursuant to Art. 66 pt 15 of the EIA Act, a detailed analysis of potential public conflicts, presented below, will be conducted during the impact assessment phase.Potential conflicts with other users of the area in the pre-execution phase

17.1.1 Potential impact on fishing

The OWF will be designed, developed and operated taking into account the issues related to the possibility of conducting activities related to commercial fishing in this area to the extent permitted by the applicable regulations and permits.

The design works will follow the guidelines and solutions aimed at minimizing the impact of offshore wind farms on sea fishing. The detailed conditions for commercial fishing in the OWF will ensure safe navigation and transit with the necessary safety standards (concerning safety zones, maximum authorised length of vessels, etc.) described in separate regulations.

The fishing sector is a particularly important stakeholder associated with the development of OWF in Poland. The sector is under significant pressure from numerous regulations and fishing restrictions, such as the establishment of fishing quotas for Baltic cod (EU Council Regulation 2021/1888 of 27 October 2021) and other fish (herring, plaice, salmon, sprat). In response to the recreational fishing restrictions, there have been several protests by recreational fishermen who claim that offshore wind farm infrastructure in the Baltic Sea will harm fisheries (Rapacka, 2021).. On the other hand, there are no existing or planned additional fishing restrictions regarding the development of offshore wind farms. Moreover, the planned MFW Bałtyk I may also have a positive impact on the fisheries sector by creating new jobs for fishermen in, among other things, service ports.

In summary, the main issues and concerns identified by stakeholders during earlier engagement and consultation were as follows:

- there will be new potential and direct significant impacts on the marine environment that will have a direct negative impact on fishermen's income and the local economy: these include fishing restrictions and navigational barriers;
- potential harmful effects on the environment;
- social and distributive justice: uncertainty about compensation in the event of economic losses.

17.1.2 Potential impact on shipping operations

According to the POM, designated shipping routes avoid the area of the planned MFW Bałtyk I (Figure 6.5; details in Chapter 6.2.2). For the planned project a navigational expertise will be prepared, which results will be used when preparing the EIA report.

17.1.3 Potential impact on state defence operations

The conditions of its implementation of the MFW Bałtyk I project will have to be reviewed and agreed upon at the planning and construction stage by the relevant authorities competent for national defence.

A properly planned method of organization of the offshore wind farm will not deteriorate the operations of the Polish Navy in the OWF area. For the needs of the project, appropriate analyses will be prepared relating to the OWF impact on communication and radar systems of the Navy, Maritime Search and Rescue Service, Border Guard, etc.

17.1.4 Potential impact on cables and pipelines

No cables or pipelines running on the seabed were identified in the offshore wind farm area.

17.2 POTENTIAL CONFLICTS WITH OTHER USERS OF THE AREA AT THE CONSTRUCTION STAGE

17.2.1 Potential impact on fishing

For safety reasons, offshore wind farms limit or completely exclude the possibility of performing other functions in their area. Features of the OWF that significantly affect the functioning of fishing include:

- location of the farm in relation to the existing fishing grounds,
- total area of the farm, including development area,
- number of wind turbines and associated infrastructure elements with distances between them,
- route and length of cable sections being a part of the internal infrastructure of the offshore wind farm,
- number of vessels and intensity of traffic in the area and in the area of the offshore wind farm.

Close cooperation and dialogue with relevant authorities and the fishing community, while respecting the interests of both parties, is essential at the stage of the OWF construction.

17.2.2 Potential impact on shipping operations

At the construction stage, the area of the planned OWF will be excluded from regular shipping due to safety reasons. The traffic of vessels responsible for the construction of the wind farm will be permitted.

Excluding the offshore wind farm area from regular shipping traffic will result in extension of the route of offshore vessels.

The conditions of the OWF construction will have to be reviewed at the stage of the navigational expertise in regards of the impact of the OWF on the safety and efficiency of the shipping operations in the Polish maritime areas.

17.2.3 Potential impact on state defence operations

The conditions of the OWF construction will have to be reviewed at the stage of the technical expertise in regards of the impacts on the National Maritime Safety System.

17.3 POTENTIAL CONFLICTS WITH OTHER USERS OF THE AREA AT THE OPERATION STAGE

17.3.1 Potential impact on fishing

At the stage of operation of the offshore wind farm, until its decommissioning, the following restrictions to fishing are anticipated:

- partial exclusion of the OWF area from the possibility of fishing,

- increase in fishing intensity in other areas as a result of the relocation of vessels from the excluded area,
- potential destruction of fishing gear left in the area excluded from fishing,
- extending the route of fishing vessels to fishing grounds,
- disruption of fishing as a result of increased vessel traffic,
- temporary relocation of fish as a result of fish deterrence and habitat destruction,
- quantitative changes in stocks of caught fish species.

In the basin area, mainly cod, sprat and herring are caught, which are species commonly caught in the entire Baltic Sea area. The value of the resource in the basin should be considered low. The widespread use of these species makes it possible for fishing vessels to change their fishing grounds, but this may be related to the extension of the route to the fishing grounds and possible decrease in the fishing capacity of other fishing grounds.

Installed WTGs and the linear internal infrastructure of the offshore wind farm generally do not pose a risk to fish and marine mammals. A significant risk will be posed by lost or abandoned fishing gear, mooring lines and other artificial materials in which animals can become entangled. In order to reduce the risk and to resolve the issue of management of lost fishing gear, a discussion with fishermen should be undertaken, presenting not only the economic perspectives of the loss of fishing gear, but also the ecological perspectives of the issue.

17.3.2 Potential impact on shipping operations

The functioning of the OWF will require regular maintenance with the use of service vessels and specialized vessels. These vessels will move between the service ports and the OWF area. Regular maintenance of the wind farm will increase the intensity of shipping traffic between the farm and ports. After completion of the linear infrastructure, i.e. telecommunication and power networks, in the area of the offshore wind farm, due to the possibility of disturbing the infrastructure elements, emergency anchoring of vessels or the use of certain fishing gear may be impossible. The impact of the OWF on maritime shipping activities will be subject to arrangements and navigational expertise.

17.3.3 Potential impact on state defence operations

OWF area is not a place of naval manoeuvres. The OWF may affect military aviation due to its height (WTGs may constitute a physical obstacle), and the components of the OWF may cause disturbances in the operation of radar systems used in aviation, therefore the designed OWF needs to obtain appropriate opinions and approvals, i.a., of the Air Traffic Service of the Polish Armed Forces.

A properly planned method of organization of the offshore wind farm will not deteriorate the operations of the Polish Navy in the OWF area.

17.3.4 Potential impact on cables and pipelines

Submarine cables pose electric shock hazard in case of emergency anchor dropping by the vessel and cable damage. Such a hazard is minimized by the automatic protection system, which isolates the power to the cable in the event of a fault occurring.

17.4 POTENTIAL CONFLICTS WITH OTHER USERS OF THE AREA AT THE DECOMMISSIONING STAGE

The decommissioning of the wind farm will open the area to other users, which will involve the removal of existing conflicts. However, during the decommissioning stage, many disturbances and limitations will arise.

18 RISK OF A MAJOR ACCIDENT OR NATURAL AND MAN-MADE DISASTER

The following potential unplanned events or failures have been identified in relation to the planned Project:

- leakage of petroleum-resistant substances as a result of a collision, failure or construction disaster,
- accidental release of municipal waste or sewage,
- accidental release of building materials,
- release of impurities from anthropogenic objects at the bottom,
- explosions of unexploded ordnances (UXO), during deliberate bottom cleaning in preparation for construction or as a result of accidental damage to undetected ammunition during work.

It has been assessed that the main environmental hazards resulting from unplanned events associated with the offshore wind farm project are the spills of petroleum substances, including marine gas oils (MGO), machine oils (engine oils), hydraulic oils, transformer oils, gear oils and lubricating oils. Events that may cause the aforementioned spills during the construction and decommissioning stages of the project include:

- collision of two vessels,
- collision of a vessel with an object within the farm area,
- grounding of a vessel or its sinking,
- failure of the construction equipment (e.g. hose or coupling), and
- operational leaks and spills (minor oil spills during routine operations e.g. connecting or disconnecting hoses and couplings).

At the stage of operation of the offshore wind farm the release of oil substances may occur as a result of:

- collision of a vessel with an object within the area of the farm,
- oil leakage from the wind turbine transformer,
- leakage from the transformer at the offshore substation,
- incidental oil spill associated with inspections and repair works.

The possibility of the release of contaminants from anthropogenic objects lying on the seabed or the explosion of unexploded ordnance of military origin (UXO) during bottom clearance in preparation for construction or as a result of accidental damage to undetected munitions during the preparatory works cannot be completely excluded.

18.1 MAJOR INCIDENTS

Within the meaning of the *Act on Environmental Protection Law* a serious accident is an event, in particular an emission, fire or explosion, resulting from an industrial process, storage or transport, in which one or more dangerous substances are present, leading to an immediate threat to human life or health or to the environment, or to a delayed occurrence of such a threat. A major industrial accident means a major accident at an establishment. An establishment shall be understood as one or more installations together with the land to which the operator has legal title and the equipment on it. Therefore, also an offshore wind farm should be considered as a facility within the meaning of the provisions of the EPA.

The EPA qualifies the plants in terms of the risk of accidents into high or low risk plants, depending on the expected amount of hazardous substances, which are to be used. However, in case of the OWF, according to the provisions of the EPA, the rules protecting the sea against ship-pollution and administrative bodies competent in these matters specify separate regulations. Therefore, the OWF will not be qualified as a high risk or increased risk plant.

In case of possible consideration of the OWF in these categories, it will not be qualified to any of those categories due to the small quantities of applied hazardous substances. For the OWF area the probability of a ship-to-ship collision at the stage of construction/decommissioning is estimated as extremely rare and practically impossible. Other events, such as fires, explosions on ships, their collisions with installations at sea or shipwreck were also analysed, which show that they are much less likely.

Also, risk analysis of oil and hazardous substances spills in the Baltic Sea carried out by HELCOM between 2009 and 2012 under the BRISK project concluded that ship-to-ship collisions are the most likely type of incident leading to a major accident.

18.2 Natural disasters

A natural disaster in accordance with the *Act on the state of natural disasters* of April 18, 2002 (Journal of Laws 2017, item 1897) shall be understood as an event related to the operation of forces of nature, in particular lightning, seismic shocks, strong winds, intense precipitation, prolonged occurrence of extreme temperatures, landslides, fires, droughts, floods, ice phenomena on rivers and the sea as well as lakes and water reservoirs, mass occurrence of pests, plant or animal diseases or infectious diseases of humans or the action of another element.

The risk of a natural disaster is minimal. This is due to the fact that all OWF installations are designed to operate for many years under difficult conditions. The most serious risks are storms and lightning, which can weaken the turbine structure or parts of it and, in special circumstances, can lead to a fire.

18.3 Construction disasters

In accordance with the definition specified in the *Art. 73. of the Building Law* a construction disaster is an unintentional, sudden destruction of a construction object or its part, as well as structural elements of scaffolding, elements of forming devices, sheet piling and excavation lining.

The area subject to the risk of a construction disaster is primarily the assembly and construction ports and the locations of individual farm facilities. The risk of a construction breakdown of one of the farm facilities occurs mainly at the stage of construction or decommissioning, while at a stage of exploitation or maintenance works it is much smaller.

Events leading to construction disasters in the OWF area are:

- ship collisions with an object located within the farm,
- weakening of the structure of the object resulting from atmospheric conditions (e.g. lightning strikes).

It should be noted that the most environmentally significant effects of construction disasters will be mainly oil spills.

19 ANALYSES, STUDIES, ESTIMATIONS AND MODELLING PLANNED FOR THE NEEDS OF PREPARING THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

In addition, at the stage of preparation of the Environmental Impact Assessment report, the necessary analyses, studies and modelling will be prepared in accordance with Article 62 (1) and Article 66 of the EIA, including:

- numerical modelling of propagation of underwater noise generated during the construction phase,
- quantitative and qualitative analysis and significance of species and communities of marine benthos,

- expert opinion on the safety impact of the project related to research, recognition and exploitation of mineral resources of the seabed and the Earth's interior,
- hydrodynamic modelling of the spreading of sediments during the construction phase,
- navigational study regarding the assessment of the impact of the planned project on the safety of ships in Polish maritime areas and the efficiency of their navigation, taking into account existing navigation routes and traffic separation schemes,
- analysis of anticipated impacts on migrating avifauna, including the estimation of the so-called barrier effect and the risk of collisions of birds with wind turbines, including populations protected within the Natura 2000 areas, at all stages of the project,
- analysis of Project alternatives,
- analysis of transboundary impacts,
- analysis of cumulative impacts,
- analysis of potential emergency situations, and
- analysis of potential social conflicts.

Currently, the investor is already conducting pre-investment environmental research programme, which commenced already in December 2020. Research was conducted by MEWO S.A. The research covered the Project development area together with its potential impact zone. More information on the research programme is presented in Chapter 7.1.3 and Appendices 1 and 2.At the same time, the Environmental Impact Assessment will also be carried out using historical knowledge from reports prepared by DHI, among others:

- Ornithological monitoring of the area under construction of marine wind farms „Bałtyk Północny" and „Bałtyk Środkowy III" in 2012 (DHI, 2013a),
- Bird migration studies from 2013, prepared by DHI i IfAÖ (DHI & IfAÖ, 2013),
- EIA assessment on birds – final report for Bałtyk Północny S.A., v2 of 2013 (DHI, 2013e),
- Evaluation of the Interim Reports No. 2 Ornithological monitoring of the area under construction of marine wind farms „Bałtyk Północny" i „Bałtyk Środkowy III" and reference area „Ławica Słupska" (DHI, 2013b),
- Hydrographic conditions – final report for Bałtyk Północny S.A of June 2013 (DHI, 2013c), and
- EIA assessment on marine mammals – final report concerning research on underwater noise for Bałtyk Północny S.A. of July 2013 (DHI, 2013d).

When preparing the EIA report for the planned Project, the results of the research on the marine environment conducted in the area of the Project in 2012-2013 will be taken into account, including archaeological, hydrological, ichthyological, chiropterological and ornithological research.

An additional source of information on the state of the environment will be data from the State Environmental Monitoring and results of research on marine environment conducted by other offshore wind farm investors, including studies conducted in 2018-2019 for the MFW Baltic Power. Thanks to intensive research in recent years, the state of recognition of the environmental conditions of the southern Baltic Sea is very good.

20 EXECUTIVE SUMMARY

The subject of the application, to which this Project Information Card is an attachment, is to determine the environmental conditions of the planned project consisting in the construction of a wind farm in the Baltic Sea called MFW Bałtyk I. Due to the possibility of the Project's potential transboundary impact, it is necessary to determine the scope of the EIA report before issuing the decision on environmental conditions.

The planned project consists of the construction of the offshore wind farm Bałtyk I with a capacity of 1560 MW. The project will be implemented in the Polish exclusive economic zone, at a distance of approx. 81 km from the shore in the Łeba municipality (Pomeranian voivodeship). The investor, MFW Bałtyk I S.A., holds an offshore location licence. The licence is valid for 35 years.

The offshore wind farm MFW Bałtyk I will consist of:

- up to 104 wind turbine generators (WTGs), whose basic components are the foundation, tower, nacelle with power generator and rotor,
- up to 2 offshore substations (OSS),
- a maximum of 250 km of internal power and telecommunications cables connecting:
    - individual WTGs with each other (into cable circuits),
    - WTG groups with offshore substations,
    - offshore substations among themselves.

The Project also covers infrastructure necessary to construct and operate the offshore wind farm.

The Project aims to generate electricity from a renewable energy source such as wind power. The generated power will bethen transmitted via cables onshore, ultimately to the National Power System (KSE). **The scope of the MFW Bałtyk I, covered by this application for the issuance of environmental decision, does not include any infrastructure for the transmission of electricity generated by the farm to the shore.** External infrastructure, which will be subject to a separate administrative procedure and **will not be part of the offshore wind farm project MFW Bałtyk I**, will be included in the analysis of cumulative impacts.

MFW Bałtyk I will be designed in accordance with applicable regulations, international standards, engineering arts and environmental protection requirements. Technologies applied in wind energy are constantly improved, as well as technical equipment of wind turbines. This results in reduced environmental impact and increased production capacity. The developer will use the available state-of-the-art construction materials for the WTGs and foundations.

Since December 2020, the investor has been conducting a comprehensive, pre-investment marine environmental research programme or the environmental impact assessment of the MFW Bałtyk I project. The aim of the programme is to identify the environmental conditions in the area of the Project and its potential impact zone. **By the time of submitting the application for the decision on environmental conditions for the Project most of the research and monitoring works have been completed**. At the moment the analytical and final reports with the research results are being prepared. The results of the conducted research along with the description of the methodology will be included in the EIA report.

The area of the MFW Bałtyk I is located in the Polish EEZ, on the border with the Swedish EEZ and about 47 km from the Danish EEZ. Considering the location of the MFW Bałtyk I area, the current knowledge on the environmental impact of offshore wind farms and the results of impact assessments of other offshore wind farm projects in Polish maritime areas, the planned investment may potentially require the conduct of a procedure on transboundary environmental impact

Societal impact of the Project, including health and living conditions, and potential conflicts with other users of the area of the planned Project, especially fishermen, will be analysed in the EIA report.

They will be analysed and discussed in order to develop a comprehensive approach to the planned project, considering the interests of all stakeholders. Apart from the EIA report, in order to ensure Project bankability, a set of social communication documents will be developed: a Social Communication Plan (SCP), developed in order to (1) establish mechanisms and procedures for responding to stakeholders' concerns and expectations regarding the planned project and (2) to ensure that their views are taken into account during all phases of the project; Stakeholder Engagement Plan (SEP), which will present in detail the scope of stakeholder engagement activities, and Environmental and Social Action Plan (ESAP)..

LEGAL ACTS

Act of 21 March 1991 on on maritime areas of the Republic of Poland and maritime administration (Journal of Laws 2022, item 457, consolidated text)

Act of July 7, 1994 - Building Law (Journal of Laws 2021, item 2351 consolidated text)

Act on Prevention of Sea Pollution from Ships dated March 16, 1995 (Journal of Laws 2017, item 2000)

Act of 27 April 2001. Environmental Protection Act (Journal of Laws 2021, item 1973, as amended) (EPA)

Act of 18 April 2002 on the state of natural disaster (Journal of Laws 2017, item 1897, consolidated text)

Act of 16 April 2004 on nature protection (Journal of Laws 2021, item 1098, consolidated text)

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 (Journal of Laws 2021, item 2373, consolidated text) (EIA Act)

Act of 9 June 2011 – Geological and Mining Law (Journal of Laws 2021, item 1420, as amended)

Act of 14 December 2012 on waste (Journal of Laws 2022, item 699, consolidated text)

Act of 20 July 2017 - Water Law (Journal of Laws 2021, item 2233, consolidated text)

Act of 17 December 2020 on the promotion of electricity generation in offshore wind farms (Journal of Laws 2021, item 234, as amended)

United Nations Convention on the Law of the Sea, signed in Montego Bay on December 10, 1982. (UNCLOS)

Convention on Environmental Impact Assessment in a Transboundary Context, signed in Espoo on February 25, 1991, hereinafter referred to as the "Espoo Convention".

Helsinki Convention "On the Protection of the Marine Environment of the Baltic Sea Area" and the New Convention "On the Protection of the Marine Environment of the Baltic Sea Area" of April 9, 1992. (Journal of Laws 2000 No. 28 item 346)

Regulation of the Council of Ministers of 10 September 2019 on projects that may significantly affect the environment (Journal of Laws 2019 item 1839)

Regulation of the Council of Ministers of 14 April 2021 on the adoption of a spatial development plan of internal sea waters, territorial sea and exclusive economic zone in the scale 1:200 000 Journal of Laws 2021 item 935), referred to as "POM Plan"

Regulation of the Minister of Environment of 9 October 2014 on the protection of plant species (Journal of Laws 2014, item 1409)

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Regulation of the Minister of Infrastructure of 25 February 2021 on the Adoption of an updated set of properties typical for good environmental status of marine waters (Journal of Laws 2021, item 568)

EU Council Regulation 2021/1888 of 27 October 2021 fixing for 2022 the fishing opportunities for certain fish stocks and groups of fish stocks applicable in the Baltic Sea and amending Regulation (EU) 2021/92 as regards certain fishing opportunities in other waters

Announcement of the Minister of Climate and Environment of 2 March 2021 on the state energy policy until 2040. (M.P. 2021 item 264)

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Appendix 2 Review of comprehensive, pre-investment marine environmental studies

APPENDIX 1

Methodology for comprehensive, pre-investment studies of the marine environment carried out by the Investor

APPENDIX 2

REVIEW OF COMPREHENSIVE, PRE-INVESTMENT MARINE ENVIRONMENTAL STUDIES

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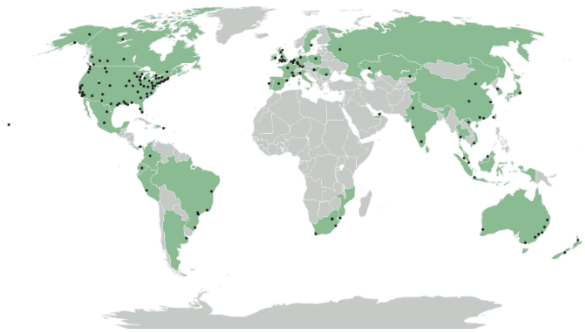

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