DUNAREA EAST WIND FARM

International Environmental and Social Impact Assessment (ESIA)

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Provide an International ESIA for the Dunarea East Wind Farm.

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ACRONYMS

Acronym	Meaning
A2	Highway A2 (Romania)
AA	Appropriate Assessment
AACR	Romanian Civil Aviation Authority
AI	Artifical Intelligence
AIDS	Acquired Immunodeficiency Syndrome
ANANP	Agenția Națională pentru Mediu și Arii Protejate (National Agency for Protected Natural Areas)
ANRE	Romanian Energy Regulatory Authority
AoI	Area of Influence
APIA	Agenția de Plăți și Intervenție pentru Agricultură (Romanian Agency for Payments and Intervention in Agriculture)
AQMS	Air Quality Monitoring Station
ARVI	Assessment of the Significance of Environmental Impacts (European multi-criteria tool)
As	Arsenic
asl	Above Sea Level
ATU	Territorial Administrative Unit
AZE	Alliance for Zero Extinction
BAP	Biodiversity Action Plan
BC	Black Carbon
BFD	Bird Flight Diverter
BM	Balancing Market
BoP	Balance of Plant
CCRA	Climate Change Risk Assessment
Cd	Cadmium
CFP	Chance Find Procedure
CGM	Community Grievance Mechanism
CH	Methane (CH_4)
CHA	Critical Habitat Assessment
CIA	Cumulative Impact Assessment
CLO	Community Liaison Officer
CNADNR	National Company for Motorways and National Roads
CNAIR	Compania Națională de Administrare a Infrastructurii Rutiere (Romanian National Road Infrastructure Company)
CNTEE	National Power Transmission Company (Transelectrica)
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
COM	European Commission legislative communication (e.g., COM (2015) 80)
COP	Conference of the Parties

Acronym	Meaning
CR	Critically Endangered (IUCN Red List)
Cr	Chromium
CT	Constanța air quality monitoring station code (CT1–CT8)
Cu	Copper
CWMP	Construction Waste Management Plan
DAM	Day-Ahead Market
dB(A)	A-weighted Decibel
DC	Drum Comunal (Communal Road)
DE	Drum de Exploatare / Agricultural Road
DJ	Drum Județean (County Road)
DN	Drum Național (National Road)
DN3	National Road 3
DRDP	Regional Directorate of Roads and Bridges
DSP	Public Health Directorate (Direcția de Sănătate Publică)
DTAC	Construction Technical Documentation for Building Permits
E&S	Environmental & Social
EAAA	Ecologically Appropriate Assessment Area
EBRD	European Bank for Reconstruction and Development
EC	European Commission
ECAs	Export Credit Agencies
EE	Energy Efficiency
EEA	European Environment Agency
EFDB	Emission Factor Database
EHS	Environment, Health, and Safety
EIA	Environmental Impact Assessment
EMEP	European Monitoring and Evaluation Programme
EN	Endangered (IUCN Red List)
EP4	Equator Principles version IV
EPA	Environmental Protection Agency
EPC	Engineering, Procurement, and Construction
ERP	Emergency Response Plan
ESG	Environmental, Social, and Governance
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESR	Environmental and Social Requirement (EBRD)
EU	European Union
FHWA	Federal Highway Administration

Acronym	Meaning
FWI	Fire Weather Index
GBVH	Gender-Based Violence and Harassment
GEO	Government Emergency Ordinance
GHG	Greenhouse Gas
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
GIIP	Good International Industry Practices
GW	Goldwind (wind turbine manufacturer)
GWh	Gigawatt-hour
H&S	Health and Safety
HC	Hydrocarbons
HD	High Definition
HG	Hotărâre de Guvern (Government Decision)
HIV	Human Immunodeficiency Virus
HR	Human Resources
HSE	Health, Safety, and Environment
HSES	Health, Safety, Environment, and Social
HV	High Voltage
Hz	Hertz
IAS	Invasive Alien Species
IBA	Important Bird Area
ICH	Intangible Cultural Heritage
IESC	International Environmental and Social Consultant
IFC	International Finance Corporation
ILO	International Labour Organization
INSSE	Institutul Național de Statistică al României (National Institute of Statistics, Romania)
ISO	International Organization for Standardization
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
KII	Key Informant Interview
kV	Kilovolt
kWh	Kilowatt-hour
LAeq	Equivalent Continuous Sound Level (A-weighted)
LARF	Land Acquisition and Resettlement Framework
LC	Least Concern (IUCN Red List)
LCA	Life Cycle Assessment
LEA	Overhead Electric Line (Linii Electrice Aeriene)
LEQ-A	Equivalent Continuous Sound Level, A-weighted
LEQ-C	Equivalent Continuous Sound Level, C-weighted
LPG	Liquefied Petroleum Gas

Acronym	Meaning
LPS	Lightning Protection System
LRP	Livelihood Restoration Plan
LTS	Long-Term Strategy
LVIA	Landscape and Visual Impact Assessment
m	Meter
m^3	Cubic meter
MAI	Ministry of Internal Affairs
MDB	Multilateral Development Bank
MINA	Muzeul Național de Arheologie (National Archaeology Museum, Constanța)
MV	Medium Voltage
MW	Megawatt
MWh	Megawatt-hour
NCC	National Climate Commitments
NECP	National Energy and Climate Plan
NG	Net Gain
Ni	Nickel
NMVOC	Non-Methane Volatile Organic Compounds
NNL	No Net Loss
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
N-SPT	Standard Penetration Test (Number of blows)
NSR	Noise Sensitive Receptor
NT	Near Threatened (IUCN Red List)
O&M	Operation and Maintenance
O_3	Ozone
OECD	Organisation for Economic Co-operation and Development
OHL/OHTL	Overhead Transmission Line
OHS	Occupational Health and Safety
OHSMP	Occupational Health and Safety Management Plan
OP/BP	Operational Policies / Bank Procedures
OPGW	Optical Ground Wire
OS	Site Office (Organizare de Șantier)
OSHA	Occupational Safety and Health Administration
OWMP	Operational Waste Management Plan
PA	Protected Area
PAHs	Polycyclic Aromatic Hydrocarbons
Pb	Lead
PBF	Priority Biodiversity Feature

Acronym	Meaning
PCFM	Post-construction Fatality Monitoring
PE	Romanian Technical Norms for Power Installations (Prescripții Energetice)
PECO	Fuel Distribution Station (Petrol Comercial)
PLC	Power Line Carrier
PM	Particulate Matter
PM10	Particulate Matter ≤10 µm
PM2.5	Particulate Matter ≤2.5 µm
PNIESC	National Integrated Energy and Climate Change Plan (Romania)
PPE	Personal Protective Equipment
PS	Performance Standard (IFC)
PSI	Fire Safety Post (Prevenirea și Stingerea Incendiilor)
PUZ	Urban Zoning Plan (Plan Urbanistic Zonal)
PV	Photovoltaic
RAJA	Regional Water and Sewerage Operator (Constanța)
RES	Renewable Energy Sources
RL	Red List
RNMCA	National Air Quality Monitoring Network (Romania)
RORMS	Ramsar Site code (Romania)
ROSCI	Site of Community Importance (Romanian Natura 2000 code)
ROSPA	Special Protection Area (Romania)
rpm	Revolutions per minute
RQD	Rock Quality Designation
RS	Renewable Sources
SARA	Superfund Amendments and Reauthorization Act
SCADA	Supervisory Control and Data Acquisition
SCI	Site of Community Importance
SDoD	Shut-down-on-Demand
SDS	Safety Data Sheet
Se	Selenium
SEA	Strategic Environmental Assessment
SEN	National Energy System (Romania)
SEP	Stakeholder Engagement Plan
SF_6	Sulfur Hexafluoride
SIA	Social Impact Assessment
SO_2	Sulfur Dioxide
SPA	Special Protection Area
SPL-A_max	Maximum Sound Pressure Level, A-weighted
SPL-A_min	Minimum Sound Pressure Level, A-weighted
SRI	Romanian Intelligence Service

Acronym	Meaning
SRL	Limited Liability Company (Societate cu Răspundere Limitată)
STAS	Romanian National Standard
TBC	The Biodiversity Consulting
tCO_2e	Tonnes of Carbon Dioxide Equivalent
TMP	Traffic Management Plan
TSI	Turbine Supply and Installation
TWh	Terawatt-hour
UNEP	United Nations Environment Programme
UNFCC	United Nations Framework Convention on Climate Change
UNGPs	United Nations Guiding Principles on Business and Human Rights
VEC	Valued Environmental Component
VIA	Visual Impact Assessment
VP	Vantage Point (used in bird surveys)
VP	Viewpoint (used in visual impact)
VU	Vulnerable (IUCN Red List)
WBG	World Bank Group
WECO	Wind Energy Production in Cold Climates
WEEE	Waste Electrical and Electronic Equipment
WGM	Workers' Grievance Mechanism
WGS84	World Geodetic System 1984 (coordinate system)
WHMIS	Workplace Hazardous Materials Information System
WHO	World Health Organization
WMP	Waste Management Plan
WT	Wind Turbine
WTG	Wind Turbine Generator
XPCC	Xinjiang Production and Construction Corps
Zn	Zinc
ZPVI	Zone of Potential Visual Influence
ZTV	Zone of Theoretical Visibility

1 EXECUTIVE SUMMARY

1.1 Project Overview

The Dunarea Wind Farm Project is among Romania's largest onshore renewable energy initiatives. Originally planned as a single 600 MW project in Constanța County, it is jointly developed by Consenswind, Midmar Callatis, and UK-based Rezolv Energy. The project was divided into Dunarea East (Deleni Commune) and Dunarea West (Adamclisi Commune), with this ESIA focusing on Dunarea East (hereafter "the Project"), which has an approved capacity of 300 MW and an expected annual electricity production of approximately 750 GWh. The project began in 2010 with wind assessments and preliminary designs. Environmental permitting evolved over time, culminating in a Revised Environmental Agreement in 2025 approving 45 turbines. The international Environmental Social Impact Assessment (ESIA) process, initially led by ERM in 2023, was resumed by DNV Italy in 2025 to reflect Dunarea East's ready-to-build status.

Dunarea East contributes to Romania's renewable energy expansion and EU climate objectives, directly supporting the National Integrated Energy and Climate Change Plan (PNIESC) 2020–2030 and European Union targets for renewable energy. The wind farm delivers significant environmental benefits by reducing greenhouse gas emissions, displacing fossil fuel generation, and avoiding millions of tonnes of CO_2, SO_2, and NO_x over its operational life. The Project enhances energy security, aligns with EU Energy Union priorities, and advances global objectives for climate mitigation, sustainable energy infrastructure, and clean technology adoption. Legally, renewable electricity production is recognized as a public interest activity, with full integration into the National Electricity System and required authorizations from ANRE.

1.2 Objectives of the ESIA

The ESIA assesses the environmental and social impacts of the Dunarea East Wind Farm in accordance with IFC Performance Standards (2012), EBRD Environmental and Social Policy (2025), and relevant EU directives. It evaluates project activities, existing environmental conditions, and sensitive receptors, and identifies potential impacts during construction and operation. The assessment proposes mitigation measures to minimize adverse effects and provides an Environmental and Social Management Plan (ESMP) for monitoring and implementation. The study leverages previous national permitting work and ERM's Draft International ESIA to ensure alignment with both Romanian regulations and international standards.

1.3 Project Permitting Overview and Scoping

The Project followed Romanian environmental and sectoral legislation, primarily Law No. 292/2018, which requires separate permitting for each territorial administrative unit. Dunarea East obtained Environmental Agreement No. 28/26.07.2011 and a Grid Connection Agreement with CNTEE Transelectrica S.A., ensuring connection to the National Electricity System. Design and layout modifications since the original 2011 authorization prompted a revised permitting process to incorporate technical, environmental, and legal updates, building on the original environmental approval from Constanța Environmental Protection Agency (APM Constanța).

In 2021, ERM conducted an Environmental and Social Gap Analysis, assessing compliance with IFC Performance Standards and EBRD requirements, highlighting the need for a full Category A ESIA. A Scoping Report in January 2023 identified key environmental and social sensitivities and defined the scope of specialist studies. The Draft International ESIA for the full Dunarea Wind Farm provided a foundational assessment. DNV's current ESIA consolidates and refines these data, focusing on Dunarea East to assess likely significant environmental and social impacts and meet international financing standards.

1.4 ESIA Limitations

This ESIA integrates multiple sources, including ERM's Draft International ESIA, national EIA and Appropriate Assessment studies, the revised environmental permit, and Project Companies' Q&A documentation. No additional field studies or stakeholder consultations were conducted. The final turbine model has not been selected, with four candidates under consideration. Conservative impact scenarios assume the Goldwind GW165 for visual and shadow flicker analyses, while Vestas V162 is referenced for noise, air quality, land, and water assessments. The ESIA will be updated upon final turbine selection to refine impact assessments further.

1.5 Project Location and Layout

The Dunarea East Wind Farm is situated in the extra-urban area of Deleni Commune, Constanța County, southeastern Romania, entirely outside built-up zones and covering agricultural land, pasture, and farm roads. The project consists of 45 wind turbines with a nominal capacity of up to 7 MW each, totaling up to 315 MW. The layout includes internal access roads and a substation connecting to the National Energy System (SEN). Land ownership is primarily private, with a small portion of communal pastureland, and the area remains designated for agricultural use. The site is bordered by Peștera, Independența, Cobadin, and Adamclisi Municipalities. Four turbine models are under consideration, with technical parameters varying slightly in hub height and rotor diameter.

1.5.1 Permanent Project Components

The Project's permanent infrastructure includes the 45 wind turbine generators (WTGs), turbine platforms, the 33/400 kV Deleni substation, underground and overhead cable lines, and access roads. Each WTG has a nominal output of 6–7 MW, a hub height between 121–128 m, and rotor diameters of 162–165 m. Turbine components—blades, nacelle, gearbox, generator, tower, yaw and braking systems—are designed with advanced materials and corrosion protection to ensure efficient, safe operation.

Turbines are controlled by automated systems that optimize orientation to wind conditions and include dual braking mechanisms, overspeed protection, and fire detection systems. Lightning protection and robust grounding safeguard against weather-related hazards. Electrical energy is transformed on-site to 33 kV and collected via underground cables to the Deleni 33/400 kV substation, where it is stepped up to 400 kV for injection into the SEN. Grid connection includes short overhead lines to existing transmission corridors, optical fiber communication, tele-protection systems, and metering infrastructure.

1.5.2 Temporary Project Components

Construction requires temporary facilities such as a 15,000 m² site for site management, equipment storage, and personnel operations, as well as crane and assembly platforms, laydown areas, water abstraction points, and power supply infrastructure. Temporary containers and sanitary facilities will be provided in compliance with Romanian regulations and international occupational health and safety standards. Workers will be accommodated in private residences nearby, with all necessary welfare and logistical support provided according to IFC and EBRD guidance. All temporary installations will be removed, and the land reinstated after construction.

1.6 Project Phases

The Dunarea East Wind Farm Project is structured into four main phases: planning, construction, operations, and decommissioning. The ESIA addresses all phases, providing guidance and recommendations for environmental and social management throughout the project lifecycle.

1.6.1 Construction Phase

The construction phase covers all activities from site preparation to final assembly and grid connection, divided into pre-construction and main construction periods. All works follow national legislation, technical standards, and the Environmental and Social Management Plan (ESMP).

Pre-construction activities include geotechnical and topographic surveys, selective vegetation clearance, installation of erosion and sediment controls, and setup of laydown areas, temporary offices, and fencing for safety and site management.

Access roads and internal road network comprise approximately 55.75 km of new permanent roads and upgrades to around 38 km of existing roads, including drainage infrastructure to support heavy transport and turbine installation.

Foundation and platform works involve excavation, reinforced concrete foundations adapted to site conditions, backfilling, and construction of crane hardstands and assembly platforms. Temporary and permanent platforms are designed to minimize land disturbance and environmental impacts.

Wind turbine installation follows the completion of roads and foundations, with towers, nacelles, rotors, and internal cabling assembled on-site using high-capacity cranes, adhering to strict safety standards.

Electrical infrastructure and grid connection include installation of medium-voltage underground cables, a 33/400 kV substation, and new overhead transmission lines to integrate the wind farm into the National Energy System. Works involve trenching, backfilling, installation of signal cables, and pylon erection, coordinated with energy authorities.

Site restoration ensures all temporary facilities are removed, disturbed land is regraded, native vegetation replanted, and permanent erosion control measures implemented. Only areas required for turbine bases and access roads remain permanently altered.

Construction site organization and temporary facilities include a 20,000 m² operational hub for equipment, materials, and administrative offices, along with sanitary facilities, potable water, fire safety posts, and secure storage. Workers will be accommodated in nearby residences as needed. Environmental protection, spill response, and hygiene measures are implemented throughout the construction phase.

Transportation concept involves upgrading existing roads and constructing new access routes to transport turbine components from the Port of Constanța to the Project site. Transport requires special permits due to oversized loads. Internal routes are designed for safe and efficient movement of heavy equipment, with traffic management plans ensuring operational safety and minimal disruption.

1.6.2 Operational Phase

The Operational Phase covers generation, transmission, monitoring, maintenance, and security over a 30–35 year lifespan.

Commissioning and Testing: Turbines and infrastructure undergo pre-commissioning inspections, functional tests, electrical/load testing, grid synchronization checks, and emergency system verification. Final acceptance is granted by a committee, after which full operation begins.

Wind farm operation: Turbines generate electricity autonomously, monitored via SCADA systems. Security is maintained with motion detectors, video surveillance, and controlled access. Daily operations focus on system monitoring, data analysis, and alert management.

Electricity transmission and grid integration: Electricity flows through underground medium-voltage cables to a 33/400 kV substation and is evacuated via two high-voltage transmission lines. The infrastructure meets Romanian standards and ensures reliable injection of renewable energy into the national grid.

Maintenance activities: Scheduled, unscheduled, and long-term overhaul maintenance is performed to ensure turbine efficiency, reduce downtime, and extend infrastructure life. All maintenance follows environmental and safety regulations, with proper storage and disposal of waste and hazardous materials.

Environmental protection: Measures include containment systems, routine monitoring, and rapid response protocols. Operations have minimal emissions and waste generation.

Security and site management: Implemented through fencing, controlled access points, video surveillance, and specialized security personnel.

1.6.3 Decommissioning Phase

The Decommissioning Phase is planned after at least 30 years of operation, involving either repowering or full dismantling of the wind farm.

Planning: A detailed decommissioning plan includes component inventory, dismantling technologies, step-by-step stages, waste management, and regulatory approvals.

Activities:

- Isolation of turbines from the substation.
- Dismantling of nacelles, rotors, and towers for recycling.
- Excavation and removal of foundations.
- Site rehabilitation and restoration to natural or previous land use.
- Temporary improvements to road infrastructure for component transport.

Environmental and traffic considerations: Similar to construction but shorter in duration, including temporary traffic, noise, and dust management.

Waste management and recycling: Metals, plastics, and turbine components are recycled wherever possible; non-recyclable materials are disposed of according to regulatory standards.

1.6.4 Project Schedule

Table 1-1 Project Timeline

Project Phase	Key Activities	Estimated Duration	Milestone / Target Date
Planning	This phase includes the preparation of technical documentation, permitting, land use planning, and environmental assessment activities. It lays the foundation for all future project activities. It also includes the financing period.	**4 months**	**March 2026**
Construction	This phase will start at the Notice to Proceed (NTP) date and will comprise: site preparation works, BoP Engineering, roads and Crane Pads, WTG foundations and soil improvement, Collector System, Substation, Execution of OHL, TSA Equipment Manufacturing,	**About 24 months**	**July 2028**

Project Phase	Key Activities	Estimated Duration	Milestone / Target Date
	anchor cages delivery to site, WTG Equipment delivery to site, turbine erection and mechanical completion in two stages and grid compliance.		
Operation	Commissioning, energy production, maintenance. COD is expected to start in a first stage in May 2028.	**30 years (up to 35 years)**	
Decommissioning	Turbine dismantling, removal of infrastructure, land restoration	**About 24 months**	

1.7 Resource Requirements

The Project will primarily require natural and manufactured resources during construction, with minimal resource use during operation. All materials will be sourced from authorized suppliers; no raw material extraction will occur within or near protected areas.

Land Requirements:

- The project area covers approximately 69.0 ha, predominantly agricultural land (95%) and pastureland (5%).
- Land acquisition was completed through voluntary agreements with private owners and usufruct contracts with the local commune, without displacing residents.
- Temporarily occupied areas (32.7 ha) include storage, assembly, and foundation excavation zones; permanently occupied land (36.3 ha) covers turbine foundations, roads, assembly platforms, and the transformer station.
- Existing roads will be rehabilitated, and temporary areas will be restored after construction to allow continued agricultural use.

Raw Materials:

- Construction relies on pre-processed materials: aggregates (ballast, sand, gravel, stone), concrete, mortar, geotextiles, prefabricated elements, wood formwork, fiber optic cables, and piping.
- Operational phase uses only wind energy, with periodic maintenance requiring lubricants and cooling oils.

Hazardous Substances and Chemicals:

- Construction uses fuels, lubricants, and greases for machinery; all handling, storage, and disposal follow regulatory requirements.
- Turbine operation involves dielectric fluids, hydraulic oils, synthetic oils, antifreeze, and encapsulated batteries; only qualified personnel perform maintenance.
- SF_6 is used as an electrical insulator in switchgear; safe recovery and reuse procedures are implemented.
- All chemicals are stored securely, documented, and handled according to Safety Data Sheets.

Water Use:

- Construction requires water for concrete, dust suppression, sanitation, and site organization, supplied externally; drinking water is provided via bottled water.
- No water is needed during operation; natural drainage manages rainwater flow, preserving local hydrology.

Wastewater:

- Construction generates domestic wastewater and washwater, stored and removed by licensed operators.
- Operational phase relies on natural drainage; rainwater management remains unaffected.

Waste:

- **Construction:** Both hazardous and non-hazardous waste is generated; recovery, recycling, and safe disposal are prioritized.
- **Operation:** Waste is limited to maintenance activities (used oils, packaging, filters, batteries, electronic equipment) and is managed by authorized operators.
- **Decommissioning:** Waste from dismantled turbines, foundations, and infrastructure will be segregated and recycled when possible; hazardous waste handled according to operational standards.
- A **Waste Management Plan (WMP)** covers all phases, emphasizing waste identification, minimization, reuse, recycling, and responsible disposal. Monitoring, documentation, and regulatory compliance are ensured.

Electricity Supply:

- Construction uses generators or temporary grid connections; machinery and site facilities require electricity and fossil fuels.
- Turbines are grid-connected for startup and during low-wind conditions; internal consumption is mainly for hydraulic motors, yaw motors, cooling fans, pumps, lubrication systems, and control systems.

1.8 Associated Facilities

Facilities essential to the operation but potentially funded externally are classified as associated facilities.

- Core project components include turbines, internal 33 kV cables, on-site 33/400 kV transformer station, temporary construction facilities, short 400 kV transmission lines and new or widened access roads extending beyond existing rights-of-way. These are fully assessed within the ESIA.
- Associated facilities: none identified.

1.9 Analysis of Alternatives

The assessment of project alternatives considered different ways to achieve the energy generation objectives while minimizing environmental impacts. The “no-project” option would preserve current land use but fail to contribute to renewable energy targets or greenhouse gas reductions. Conventional natural gas generation could supply the required energy but would produce substantial emissions and pollutants, making it environmentally undesirable. Solar photovoltaic energy is cleaner but offers lower, weather-dependent output. Wind energy emerged as the preferred solution, providing continuous electricity generation, minimal emissions, efficient land use, and strong alignment with national and EU renewable energy goals. Within this approach, a layout of 45 turbines was chosen over larger configurations to avoid protected areas, reduce construction and operational impacts, and maintain high energy output, achieving the best balance between sustainability, environmental protection, and energy efficiency.

1.10 Regulatory Framework

The Project will comply with all relevant Romanian and EU environmental, social, and health and safety legislation, including standards on air quality, noise, biodiversity, waste, water, and cultural heritage. In addition, it will adhere to the environmental and social requirements of international financial institutions, particularly the International Finance Corporation (IFC) Performance Standards and the European Bank for Reconstruction and Development (EBRD) Environmental and Social Requirements (ESR). This ensures that the Project meets both national legal obligations and internationally recognized best practices for environmental protection, community health, occupational safety, and sustainable development.

1.11 Stakeholder Engagement

Stakeholder engagement for the Project is implemented through a single, integrated framework covering all Project Companies, ensuring consistency, coordination and alignment across the shared project area and host communities. Overall responsibility for stakeholder engagement lies with the Project Companies, with day-to-day implementation led by a dedicated Community Liaison Officer (CLO), supported by a Grievance and Data Manager.

The stakeholder engagement approach is aligned with Romanian and European regulatory requirements and international best practice, in particular EBRD ESR 10 (2025), and supports the identification and management of environmental and social risks in line with ESR1. Engagement activities have been conducted since the early permitting stages and have continued through key project milestones, including ESIA scoping and baseline data collection, enabling early identification of stakeholder concerns and refinement of mitigation measures.

Stakeholders have been systematically identified and analysed, including affected communities, authorities and other interested parties. Particular attention is given to vulnerable groups, for whom tailored engagement measures are mapped to ensure inclusive and effective participation. Stakeholders are mapped according to their level of interest and influence, with engagement strategies proportionate to their role and relevance to the Project.

Stakeholder engagement is designed as a continuous process throughout pre-construction, construction and operation, supported by transparent information disclosure, regular consultation and accessible communication channels. A formal Community Grievance Mechanism is in place to allow stakeholders to raise concerns or complaints in a timely and transparent manner, including confidential channels for sensitive issues. Engagement activities, commitments and grievances are systematically documented, monitored and reviewed to ensure accountability and continuous improvement throughout the Project lifecycle.

1.12 Impact Assessment Methodology

The methodology used to assess the environmental, social, and economic impacts of the Project, based on the ARVI tool, evaluates:

- Receptor Sensitivity: Based on ecological sensitivity, societal value, and vulnerability to change (rated Low to Very High). Sensitivity is based solely on the receptor's baseline characteristics and is assessed independently of the Project's footprint or Area of Influence and prior any Project’s impacts.
- Magnitude of Change (MoC): Determined by direction (positive/negative), intensity, duration, and spatial extent.
- Significance of Impact (SoI): Derived from combining receptor sensitivity and magnitude of change, using a predefined matrix.
- Mitigation Measures: Required for impacts (in particular the ones rated Moderate to Very High), following a hierarchy: avoid, minimize, restore, compensate, and offset.

- Residual Significance of Impact: Final impact level after mitigation is applied, guiding final decisions.

The aim is to ensure impacts are reduced to ALARP (As Low As Reasonably Practicable).

1.13 Area of Influence

The Project's Area of Influence (AoI) defines the geographic extent within which environmental and social impacts may occur, in line with IFC Performance Standards and EBRD ESR1. It covers both the core project sites and a surrounding buffer including access routes, associated infrastructure, and nearby communities or natural areas potentially affected. The AoI distinguishes direct and indirect impacts: direct environmental impacts occur at project facilities and immediate surroundings, while indirect effects may extend beyond 2 km, including cumulative impacts with other developments. Social impacts are considered at the local level, within Deleni Commune, and at the broader regional level, encompassing Constanța County, to capture secondary socio-economic effects.

1.14 Environmental baseline context

According to AON National ESIA and ERM Draft ESIA, the Project is located in southeastern Romania, in Constanța County, approximately 50 km east-southeast of Constanța within the Southern Dobrogea Plateau, specifically in the subunit known as the Cobadin Plateau and is designed to have an approved injection capacity of 300 MW. The local topography can be described as gentle to moderately undulating, allowing good accessibility and stable ground conditions for construction activities. The landscape is highly dominated by agricultural use, with scattered natural and semi-natural elements and minimal urban or industrial development, indicating that human intervention is already the prevailing factor shaping the land cover. According to the AON National EIA, vegetation consists mainly of seasonal crops, with natural vegetation limited to the edges of river valleys and along roadsides.

From a biogeographical perspective, the Project lies within the Pontic Steppe Ecoregion (PA0814), historically characterized by steppe grasslands (*Stipa spp*., *Festuca spp*.) and forest-steppe mosaics. However, these natural habitats have been extensively converted into arable land and pasture, resulting in a highly modified and fragmented landscape, where remnants of natural habitats persist only in small, isolated patches.

The ecological baseline has been developed through a combination of desk studies and multi-season field surveys conducted in 2010–2011, 2021, and 2022–2023, with additional bat monitoring in 2024. These surveys covered habitats, flora, invertebrates, amphibians, reptiles, mammals, birds, and bats, providing a robust and updated characterization of biodiversity receptors within the Project Area of Influence (AoI).

The Project partially overlaps two Natura 2000 Sites of Community Importance (ROSCI0353 Peștera – Deleni and ROSCI0071 Dumbrăveni – Valea Urluia – Lacul Vederoasa), although the overlap occurs exclusively on intensively cultivated agricultural land of negligible ecological value, with no qualifying habitats or species recorded within the affected footprint. Additional nearby designated areas include ROSPA0001 Aliman – Adamclisi (SPA), also recognized as an Important Bird Area (IBA) and Key Biodiversity Area (KBA), and ROSPA0036 Dumbrăveni. The wider area also includes IBAs (Dumbrăveni-Plopeni and Aliman–Adamclisi) and the Ramsar site Ostroavele Dunării – Bugeac – Iortmac.

Habitat surveys identified a predominance of low ecological value habitats, including ruderal vegetation, anthropogenic herbaceous communities, and intensive agricultural land. However, three Annex I habitat types of conservation importance (Ponto-Sarmatic steppes – 62C0, Ponto-Sarmatic deciduous thickets – 40C0, and Euro-Siberian forest-steppe woods – 91I0) occur within the wider area, although they are not directly affected by Project infrastructure.

Flora surveys recorded 181 vascular plant species, of which eight are listed on the Romanian Red List. However, no plant species of conservation concern were confirmed within the Project footprint, which is dominated by ruderal and segetal species typical of agricultural environments. For invertebrates, only one species of conservation interest (Hyles hippophaes, Annex IV Habitats Directive) was recorded within the broader AoI.

Faunal surveys identified several species of conservation interest. Mammal surveys confirmed the presence of species such as Spermophilus citellus (Endangered), Mesocricetus newtoni (Near Threatened), and Testudo graeca (Vulnerable). Reptile surveys recorded common species of low conservation concern.

Ornithological surveys recorded high species richness, with 118 species historically and 126 species during 2022–2023 monitoring, including 40 Annex I species and 15 species listed as Near Threatened or higher on the IUCN Red List. The site is used by migratory, foraging, and locally breeding birds, although it does not support nesting populations of the most sensitive raptors. Bat surveys recorded 22 species or species groups (approximately 69% of Romania's bat fauna), all protected under Annex IV of the Habitats Directive. The species Miniopterus schreibersii is also listed under Annex II and classified as Vulnerable globally.

A total of 134 species have been identified as Priority Biodiversity Features (PBFs) in accordance with EBRD ESR6, including 115 migratory bird species regularly using the Project area and additional species of conservation concern across taxa.

The Critical Habitat Assessment (CHA) indicates that the Project does not meet IFC PS6 criteria for Critical Habitat. However, under EBRD ESR6, the presence of Annex I habitats (within the wider area) and qualifying species results in a precautionary classification of certain features as Critical Habitat and confirms the presence of Priority Biodiversity Features requiring specific mitigation and monitoring measures.

Baseline monitoring of physical environment conditions showed that the Project area has a markedly continental and arid climate, characterized by hot, dry summers, mild but windy winters, large temperature ranges, frequent strong winds, and prolonged droughts moderated slightly by the Black Sea during transitional seasons. Overall, both surface and groundwater resources are sparse and highly influenced by regional geological and climatic conditions. The Project area falls within two groundwater bodies which are publicly managed by the Constanta County – Dobrogea River Basin Administration, which monitors their quality regularly. According to the AON National EIA, Constanța County's air quality is tracked by the National Air Quality Monitoring Network (RNMCA). A noise baseline survey was conducted by ERM in 2023 at the Project area to characterize the existing environmental sound levels prior to any construction activities.

1.15 Social baseline context

The land plots required by the Project belong to the administrative territorial unit of Deleni Commune, which is part of Constanța County in Romania's South-East Development Region. The plots are primarily privately owned arable land (about 95%), with a smaller portion of pasture and communal roads under the ownership of the Deleni Local Council.

The settlements located within the 2 km buffer include: Deleni (administrative center of the commune), Petroșani, Pietreni and Șipotele. These are small rural villages with dispersed housing patterns, agricultural land use, and limited infrastructure. Therefore, residences within 2 km of certain turbines may experience temporary impacts during construction and Long-term operational impacts.

The local economy of Deleni Commune is primarily based on agriculture, with most households relying on crop cultivation, livestock husbandry, and small-scale farming for subsistence and income. The construction and operation of the Dunarea Wind Farm are expected to positively influence this rural economy by creating short-term employment opportunities, stimulating local services such as transport and supply chains, and improving road infrastructure through reinforcement works, which can facilitate better market access for agricultural products. Importantly, the project does not involve physical displacement and is unlikely to disrupt existing farming activities, meaning that while it introduces new economic benefits, it does so without significant adverse socio-economic effects on the community's primary livelihood.

The archaeological baseline confirms that the Project area is located within a landscape of high archaeological sensitivity, characterised by a long and continuous history of human occupation from prehistory to the modern period. Desktop studies and national inventories identified numerous recorded sites, including tumuli, settlements and Roman infrastructure, which were further investigated through a staged programme of field surveys, intrusive diagnostics and preventive excavations carried out between 2022 and 2025. These investigations confirmed the presence of Bronze Age funerary monuments, Roman settlements and road systems, Early Medieval reuse, and First World War defensive features, while also verifying the absence of remains in several planned infrastructure locations. The results enabled refinement of archaeological constraints, optimisation of the Project layout and the issuance of archaeological discharge certificates for investigated areas.

1.16 Impact Assessment

Aspect	Impact	Receptor	Significance before mitigation	Significance after mitigation
Construction Phase				
Land Preparation (site clearance, excavation and levelling), fencing, and civil works Construction of turbine foundations, transmission line pylons, internal road, auxiliary works and turbine installation Construction of associated 400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers Construction of associated additional access roads (new or widened roads inside project area) Equipment and material transport and supply	Degradation of air quality due to dust emission in the atmosphere	Air quality - residential	**Moderate**	**Negligible**
		Air quality - industrial	**Low**	**Negligible**
		Air quality - construction workers	**Moderate**	**Negligible**
		Air quality - protected areas	**Low**	**Negligible**
	Degradation of air quality due to pollutants emitted in the atmosphere from engines of vehicles and equipment	Air quality - residential	**Moderate**	**Negligible**
		Air quality - industrial	**Low**	**Negligible**
		Air quality - construction workers	**Low**	**Negligible**
		Air quality - protected areas	**Low**	**Negligible**
	Potential nuisance and annoyance for sensitive receptors caused by increased in noise levels due to machinery and vehicle movements.	Noise - residential	**Low**	**Negligible**
		Noise - industrial	**Low**	**Negligible**
		Noise - construction workers	**Low**	**Negligible**
		Noise - protected areas	**Low**	**Negligible**
	Soil compaction and erosion	Soil	**Moderate**	**Low**
	Increase turbidity in nearby rivers and streams due to suspended sediments	Surface waters	**Low**	**Negligible**
Land Preparation (site clearance, excavation and levelling), fencing, and civil works	Habitat Loss /Degradation / Fragmentation	Habitats and Ecosystems	**Low**	**Negligible**
		Protected Areas	**Low**	**Negligible**

Aspect	Impact	Receptor	Significance before mitigation	Significance after mitigation
Construction of turbine foundations, transmission line pylons, internal road, auxiliary works and turbine installation Construction of associated 400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers Construction of associated additional access roads (new or widened roads inside project area)	Loss or displacement of, or disturbance to, fauna species, due to clearance of vegetation for project infrastructure or access to infrastructure, noise, light and movement of vehicles	Terrestrial Fauna	**Low**	**Negligible**
		Birds and Bats	**Moderate**	**Negligible**
	Direct mortality to fauna	Terrestrial Fauna	**Low**	**Negligible**
		Birds and Bats	**Negligible**	**Negligible**
	Loss of vegetation/flora cover due to land excavation and movement.	Flora	**Low**	**Negligible**
	Introduction and spread of invasive species	Habitats and Ecosystems	**Low**	**Negligible**
		Flora	**Low**	**Negligible**
Land Acquisition / Land use	Temporary economic displacement caused by restricted access to agricultural land and pasture routes due to temporary land occupation and construction activities	Landowners and Land Users	**Low**	**Negligible**
		Vulnerable and Disadvantaged Groups	**Moderate**	**Negligible**
Workforce Mobilisation and Presence	Increase in direct employment opportunities within the Social AoI and Constanța County through the recruitment of local workers for construction activities.	Workforce	**Moderate**	**Moderate**
	Positive indirect and induced employment effects through increased worker spending and Project-related local procurement of goods and services	Local Businesses & Economic Activities	**Moderate**	**Moderate**
	Increased local skills and knowledge through training and on-the-job learning opportunities.	Workforce	**Low**	**Low**
	Increased pressure on local infrastructure and public services due to the influx of non-local workers.	Public Services & Local Institutions	**Moderate**	**Low**
	Pressure on local housing availability and affordability due to accommodation needs of non-local construction workers.	Local population and communities	**Moderate**	**Low**
	Increased security risks, including potential rise in crime, communicable diseases, and social issues due to the influx of non-local workers.	Local population and communities	**Moderate**	**Low**

Aspect	Impact	Receptor	Significance before mitigation	Significance after mitigation
		Vulnerable and Disadvantaged Groups	**Moderate**	**Moderate**
	Health and safety risks for workers due to inadequate accommodation, poor sanitation, and non-compliance with labour and safety standards.	Workforce	**Moderate**	**Low**
	Health and safety risks for supply chain workers due to inadequate labour conditions and limited oversight of global third-party suppliers.	Workforce	**Moderate**	**Low**
Construction of turbine foundations, transmission line pylons, internal road, auxiliary works and turbine installation Construction of associated 400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers Construction of associated additional access roads (new or widened roads inside project area)	Temporary alteration of landform and removal of vegetation may disrupt the visual cohesion of the agricultural landscape and create noticeable scars in otherwise open fields.	Landscape	**Low**	**Negligible**
		Settlements	**Low**	**Negligible**
		Road users	**Low**	**Negligible**
		Recreational sites	**Low**	**Negligible**
		Protected areas	**Low**	**Negligible**
Land Acquisition / Land use	Disruption of land-based ecosystem services due to land take, vegetation clearance and construction activities	Ecosystem Services	**Low**	**Low**
Equipment and material transport and supply	Temporary traffic congestion and slower travel speeds due to increased movement of heavy and oversized vehicles and daily worker commuting.	Local population and communities	**Moderate**	**Low**
		Road Infrastructure	**Low**	**Negligible**
	Deterioration of local and regional road surfaces from frequent heavy truck deliveries and transport of oversized loads.	Local population and communities	**Moderate**	**Low**
		Road Infrastructure	**Moderate**	**Negligible**
Land Preparation (site clearance, excavation and levelling), fencing, and civil works Construction of turbine foundations, transmission line pylons, internal road, auxiliary works and turbine installation	Direct physical impacts on cultural heritage due to ground disturbance and construction activities	Cultural Heritage	**High**	**Moderate**

Aspect	Impact	Receptor	Significance before mitigation	Significance after mitigation
Construction of associated 400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers Construction of associated additional access roads (new or widened roads inside project area)	Indirect impacts on cultural setting and access due to visual intrusion, dust deposition and temporary movement restrictions	Cultural Heritage	**Moderate**	**Negligible**
		Intangible Cultural Heritage	**Moderate**	**Negligible**
Operational phase				
WTG Operation	Potential nuisance and annoyance for sensitive receptors caused by increased noise levels due to wind turbines operations.	Noise - residential	**Low**	**Negligible**
		Noise - industrial	**Low**	**Negligible**
		Noise - construction workers	**Low**	**Negligible**
		Noise - protected areas	**Low**	**Negligible**
WTG Operation WTG Inspection and Maintenance	Mortality due to collision with wind turbines	Birds and Bats	**Moderate**	**Moderate**
	Mortality due to electrocution with overhead transmission line and pylons	Birds and Bats	**Moderate**	**Negligible**
	Disturbance to local wildlife due to noise, light and maintenance activities	Terrestrial Fauna	**Negligible**	**Negligible**
		Birds and Bats	**Negligible**	**Negligible**
	Permanent economic displacement due to loss of land access within the Project footprint and safety buffer zones	Landowners and Land Users	**Low**	**Negligible**
		Vulnerable and Disadvantaged Groups	**Moderate**	**Negligible**
WTG Operation	Risk of aircraft collisions with wind turbines due to their height and location.	Local population and communities	**Low**	**Negligible**
	Permanent vertical structures alter landscape character.	Landscape (VP39)	**Moderate**	**Low**
		Settlements	**Low**	**Negligible**
		Road users (along road DN3 – VP30)	**Moderate**	**Low**
		Recreational sites (VP25)	**Moderate**	**Low**

Aspect	Impact	Receptor	Significance before mitigation	Significance after mitigation
		Protected areas (VP49)	**Low**	**Negligible**
	Visual and health disturbance due to shadow flickering effects	Residential clusters – shadow flicker	**Moderate**	**Low**
	Minor injuries to people, damage to vehicles, or harm to nearby structures within the immediate rotor area due to ice throw effects	Residential clusters	**Low**	**Negligible**
	Indirect Impacts on Cultural Setting due to the Permanent Presence of Wind Turbines, Operational Noise and Access Restrictions	Cultural Heritage	**Negligible**	**Negligible**
WTG Inspection and Maintenance	Deterioration of road function, condition and safety due to operation activities	Local population and communities	**Low**	**Negligible**
		Road Infrastructure	**Low**	**Negligible**
Decommissioning				
Decommissioning activities	Disturbance to local wildlife due to noise, light, dust and machinery movement	Terrestrial Fauna	**Low**	**Negligible**
		Birds and Bats	**Negligible**	**Negligible**
	Temporary disturbance to habitats and protected areas	Habitats and Ecosystems	**Negligible**	**Negligible**
		Protected areas	**Negligible**	**Negligible**
	Habitat expansion and restauration	Habitats and Ecosystems	**Low**	**Low**
	Increased pressure on local infrastructure and public services due to the influx of non-local workers.	Public Services & Local Institutions	**Moderate**	**Low**
	Pressure on local housing availability and affordability due to accommodation needs of non-local construction workers.	Local population and communities	**Moderate**	**Low**
	Increased security risks, including potential rise in crime, communicable diseases, and social issues due to the influx of non-local workers.	Local population and communities	**Moderate**	**Low**
		Vulnerable and Disadvantaged Groups	**Moderate**	**Moderate**
	Health and safety risks for workers due to inadequate accommodation, poor sanitation, and non-compliance with labour and safety standards.	Workforce	**Moderate**	**Low**
	Health and safety risks for supply chain workers due to inadequate labour conditions and limited oversight of global third-party suppliers.	Workforce	**Moderate**	**Low**
	Temporary traffic congestion and slower travel speeds due to increased movement of heavy and oversized vehicles and daily worker commuting.	Local population and communities	**Moderate**	**Low**
		Road Infrastructure	**Low**	**Negligible**

Aspect	Impact	Receptor	Significance before mitigation	Significance after mitigation
	Deterioration of local and regional road surfaces from frequent heavy truck deliveries and transport of oversized loads.	Local population and communities	**Moderate**	**Low**

1.17 Unplanned events

Unplanned events are reasonably foreseeable incidents that are not part of normal operations, including accidents, emergencies, or non-routine incidents. The assessment focused on the construction and operational phases of the Project.

The risk evaluation was carried out using a combination of consequence and likelihood. The reported significance in the assessment tables reflects residual risk, meaning the expected impact after the implementation of preventive and mitigation measures.

Key findings:

- Most unplanned events, including minor spills, waste mismanagement, construction-related incidents, and operational maintenance events, are expected to result in minor to moderate residual significance due to the effectiveness of embedded design features, operational controls, and management procedures.
- Rare but high-consequence events, such as major fires, severe vehicle accidents, transmission line failures, blade throw, and natural hazard events, retain a moderate to major residual significance due to the severity of potential impacts, although their likelihood is very low.
- The Project incorporates a multi-layered risk management framework, including design-integrated safety systems (e.g. SCADA monitoring, fire detection and suppression systems, lightning protection), an Occupational Health and Safety Management Plan (OHSMP), an Emergency and Preparedness Response Plan (EPRP), and continuous inspection and maintenance programmes.

Overall, all identified unplanned events are effectively managed through preventive and mitigation measures consistent with IFC Performance Standard 1 and EBRD Environmental and Social Requirement 1. No residual risk is considered unacceptable or unmanageable. The ESMP ensures ongoing implementation, monitoring, and continuous improvement throughout the Project lifecycle.

1.18 Cumulative impacts

A Cumulative Impact Assessment (CIA) study has been performed for the Project in line with IFC's Cumulative Impact Assessment and Management. The CIA evaluated how the Project interacts with other existing, approved, and foreseeable developments in the wider area, with a focus on combined pressures affecting environmental and social receptors. It was prepared to meet international lender requirements, particularly the IFC Performance Standards and the IFC Good Practice Handbook on cumulative impacts. The study builds on the AON National EIA, complementing it with a structured, internationally aligned six-step methodology and updated project information. In particular, it examined whether the wind farm's incremental effects, when added to other regional developments, could influence the condition, trends, or resilience of specific Valued Environmental and Social Components (VECs). This approach goes beyond project-specific impacts and considers broader patterns such as regional land-use change, infrastructure expansion, ecological connectivity, and socio-economic dynamics.

The assessment is primarily qualitative due to the absence of regional datasets, ecological thresholds, or validated quantitative cumulative models. The IFC's six-step framework has been applied as follows:

1. Definition of spatial and temporal boundaries where cumulative pressures may arise.
2. Selection of VECs based on relevance and sensitivity.
3. Description of baseline conditions using available studies and datasets.
4. Identification of other projects and external drivers influencing the VECs.
5. Assessment of cumulative impacts and the project's incremental contribution.
6. Evaluation of significance and definition of management measures.

The Project is not expected to be a major driver of cumulative impacts in the region. However, certain VECs require precautionary management due to uncertainty or overlapping development footprints. Here below a summary of the results:

VEC 1 – Birds and Bats

- *Habitat loss*: Regional land conversion does not currently indicate a risk of functional habitat loss, though limited thresholds and future land-use uncertainties justify precautionary habitat management.
- *Collision risk*: Existing assessments predict low mortality levels. Population-level effects are unlikely, but uncertainties for certain species warrant continued monitoring and possible operational adjustments.

VEC 2 – Landscape and Visual

- The cumulative presence of multiple wind projects increases visual prominence but does not fundamentally alter the agricultural landscape's identity. Engagement with other developers and competent authorities is recommended during ESIA disclosure to promote alignment of turbine layout, colour schemes.

VEC 3 – Employment

- Cumulative construction activity may create temporary competition for labour and subcontractors, hence standard labour management are required.

VEC 4 – Traffic

- Cumulative traffic impacts may arise from overlapping construction phases along shared corridors (notably DN3, DJ307, DJ222 and connecting communal roads). A Traffic Management Plan (TMP) is implemented under the ESIA, covering routing, timing, and safety measures. Coordination with other developers is expected, including exchange of construction programmes and alignment of heavy transport schedules.

VEC 5 – Archaeology and Cultural Heritage

- Permanent loss of archaeological deposits is localised and limited primarily to areas around eight turbines. While irreversible at the site level, cumulative effects do not threaten the broader archaeological landscape.

VEC 6 – Climate

- Renewable energy generation provides a positive cumulative contribution to regional and national decarbonisation targets.

VEC 7 – Noise and Air Quality

- Cumulative effects arise from temporary overlap of construction activities across multiple projects. ESIA mitigation includes dust suppression, vehicle and equipment controls, timing restrictions, routing measures, and noise reduction practices near sensitive receptors. Coordination between developers is recommended to exchange construction schedules and reduce overlap of peak dust- and noise-generating activities, particularly near rural receptors.

The ESIA-level mitigation already proposed for the project is sufficient to keep its cumulative contribution at low or negligible levels. The CIA highlights additional regional or cross-project actions that, while not the sole responsibility of the project, would strengthen cumulative impact management, such as:

- harmonisation of ecological monitoring and data sharing (birds and bats).
- coordinated landscape and visual design approaches.
- exchange of construction schedules and workforce planning data;
- joint traffic management coordination with authorities and developers;
- archaeological communication protocols and Chance Find alignment;
- coordinated construction scheduling to reduce overlapping environmental pressures;
- engagement in regional planning and renewable energy coordination initiatives.

1.19 Human rights

The human rights review applied the UN Guiding Principles on Business and Human Rights and the Equator Principles framework to identify risks associated with labour conditions, community rights, supply-chain practices and security arrangements throughout construction and operation of the Project.

Most risks originate from broader national and sectoral conditions such as informal labour, discrimination, limited enforcement capacity and supply-chain vulnerabilities, rather than from project-specific practices. The Project Developer will establish policies and plans aligned with international standards (HR Policies, Labour Management Plan, OHS Plan, Security Management Plan, Contractor Management Plans and dedicated Grievance Mechanisms) that substantially reduce these risks.

Table below summarizes the Project's human right assessment:

Topic	Inherent Risk	Key Issues	Mitigation Measures	Residual Risk
Child Labour	Medium	Rural informal labour, risk of minors engaging in work through contractors.	HR Policies, Contractor Management, Labour Management Plan, age-verification procedures.	Low
Forced Labour	Medium	Vulnerable groups, risks in recruitment chains.	Transparent recruitment, supplier oversight, Code of Conduct, monitoring of third-party agencies.	Low
Occupational Health & Safety	High	Enforcement gaps, high-risk construction activities.	OHS Plan, PPE, training, monitoring, grievance mechanisms.	Low

Topic	Inherent Risk	Key Issues	Mitigation Measures	Residual Risk
Job Security / Right to Work	Medium	Potential informality, vulnerability of some groups.	HR Policies, clear contracts, communication on rights and obligations, contractor oversight.	Low
Freedom of Association	Low	Limited union representation in practice.	HR Policies ensuring non-retaliation and open communication; collective rights respected.	Low
Non-Discrimination	High	Persistent inequalities (gender, Roma, LGBTQI+, disability).	Non-discrimination clauses, training, inclusive Labour Management Plan, compliance with disability employment requirements.	Low
Working Hours	Medium	Overtime risks in construction.	Compliance with legal limits, contracts specifying hours/rest, WGM for reporting issues.	Low
Remuneration	Medium	Gender pay gap, transparency issues.	Fair wage structures, compliance with EU Pay Transparency Directive, monitoring, grievance channels.	Low
Supply-Chain Modern Slavery	High	Global risks in mineral sourcing and manufacturing; supplier dependence.	Supplier Code of Conduct, due diligence, contractual controls, monitoring, grievance access.	Medium
Freedom of Expression (Communities)	Medium	Inconsistent enforcement of protest and whistleblowing rights.	Stakeholder Engagement Plan (SEP), worker and community grievance mechanisms, confidentiality safeguards.	Low
Right to Land	— *(Covered in SIA)*	Land access and acquisition considerations.	Measures described in SIA Section 9.4.1.	—
Community Health & Safety	— *(Covered in SIA)*	Construction-phase risks and operational safety.	Measures described in SIA Section 9.4.5.	—
Indigenous Peoples	Not applicable	No Indigenous Peoples in Romania.	—	N/A
Cultural Heritage	— *(Covered in SIA)*	Chance finds and archaeological protection.	Mitigation described in SIA Section 9.4.9.	—
Security & Human Rights	High	Use of security personnel; national concerns around excessive force.	Security Management Plan, training on human rights and proportionate use of force.	Low
Grievance Mechanisms & Access to Remedy	Low	Need for accessible channels for internal/external stakeholders.	Worker and community GMs aligned with UNGP criteria; monitoring and reporting systems.	Low

1.20 CCRA

The Project is fully aligned with Romania’s climate commitments and EU decarbonisation targets, contributing significantly to emission reductions through renewable energy generation. Physical climate risks are considered material but manageable through reinforced foundations, geotechnical monitoring, vegetation control, and climate-adjusted energy planning, while other risks like heat stress and icing are not material. Transition risks are negligible, as the Project’s annual Scope 1 and Scope 2 emissions remain well below the Equator Principles IV threshold, confirming its intrinsic alignment with national and EU climate strategies. With these measures embedded in the ESMP and supported by a dedicated Climate Adaptation Plan, residual climate-related risks are expected to remain at acceptable levels.

1.21 Conclusions

In conclusion, the construction, operation and decommissioning of the Project and its associated facilities, with implementation of the mitigation measures, has *minor* or *negligible* impacts. To manage and mitigate such impacts, the ESMP is being prepared. The ESMP should be read with reference to this ESIA.

Three (3) impact areas retain moderate residual significance, despite the application of mitigations. In both cases, the residual magnitude of impact is reduced following mitigation. The remaining moderate significance is driven by the high sensitivity of the affected receptors, which is consistent with IFC/EBRD significance methodologies. These impacts are addressed through targeted management plans, which ensure that risks remain controlled, monitored and capable of further reduction through adaptive management.

Provided that all mitigation and management measures in this ESIA and associated ESMP are fully implemented, DNV considers that there are no environmental or social issues that would prevent the Project from meeting international lender requirements and progressing toward financing, especially in light of the Project’s substantial contribution to national renewable energy and decarbonisation targets.

2 INTRODUCTION

2.1 Project Background and Overview

2.1.1 Introduction

The Dunarea Wind Farm Project is one of Romania's largest onshore renewable energy initiatives, originally conceived as a single integrated project with a total capacity of 600 MW, located in Constanța County, southeast Romania. The Project was to be jointly implemented by Consenswind and Midmar Callatis (hereafter "the Company"), the Romanian-based project companies, with support from Rezolv Energy (hereafter "Project Sponsor/Owner"), as UK-based project sponsor.

Initially referred to as the "Adamdel" project, and later changed as "Dunarea Wind Farm", the project was later divided into two technically and geographically distinct components:

- Dunarea East Wind Farm, located in Deleni Commune, and
- Dunarea West Wind Farm, located in Adamclisi Commune.

While these two sub-projects share a common connection point to Romania's National Energy System (SEN), they were developed as standalone projects from the beginning, in line with national permitting requirements based on the territorial-administrative boundaries. The current Environmental and Social Impact Assessment (ESIA) report (the present "Report"). focuses exclusively on the **Dunarea East Wind Farm** component (hereafter "the Project"), due to its more advanced stage of development.

The Project is designed to have an approved injection capacity of 300 MW, resulting in an expected annual electricity production of approximately 750 GWh (P50), depending on the final turbine selection.

2.1.2 Historical context

The development of the wind farm project began in 2010, with early phases including wind resource assessments and initial design. The first Environmental Agreement (No. 28/26.07.2011) was issued for the Dunarea East Wind Farm, which at the time was planned to include 122 turbines from manufacturers such as Siemens, Enercon, and Vestas, with capacities ranging between 2.3 MW and 3 MW.

Following technical updates and optimizations to turbine selection and layout, a revision of the environmental permit was formally requested in 2021, reflecting changes in turbine technology and project scope. This led to the issuance of a Revised Environmental Agreement No. 1/28.02.2025, which approves 45 turbines with an approved injection capacity of 300 MW.

In parallel to the national permitting process, an international ESIA process was initiated to align with the environmental and social policies of international lenders, including those adhering to the Equator Principles, IFC Performance Standards (2012), and EBRD Performance Requirements (2019). The initial international ESIA was undertaken by ERM (Environmental Resources Management) in 2023, who were appointed by the project companies to prepare a comprehensive assessment of the overall Dunarea Wind Farm, in accordance with international best practices and the requirements of potential international lenders. ERM's work resulted in a Draft International ESIA, which served as a foundational study for assessing the project's environmental and social impacts at a broader level. **The current ESIA considers the most recent updates of EBRD requirements published in 2025.**

Due to changes in project planning and development timelines, the international ESIA process was paused. In 2025, DNV Italy S.r.l (hereafter "DNV" or "ESIA Team" or "International Environmental and Social Consultant - IESC") was appointed to resume and complete the international ESIA process, with a revised scope focused solely on the Dunarea East Wind Farm.

This approach is in line with the current project development status, as Dunarea East has reached a ready-to-build stage, while Dunarea West is still undergoing permitting and planning.

2.2 Project Rationale

The Dunarea East Wind Farm project is a strategic investment in Romania’s renewable energy sector, and it is aligned with both European and national strategic goals for sustainable energy development. This initiative is rooted in the objectives outlined in Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources, as well as in Romania’s transposing legislation and long-term energy strategies.

The project directly supports the implementation of Romania’s National Integrated Energy and Climate Change Plan (PNIESC) 2020–2030, which outlines the country’s commitment to expanding renewable energy capacity in line with European Union (EU) climate policies and international agreements, including the Paris Agreement. As a member of the EU, Romania has pledged to increase the share of renewable energy in its national mix to at least 34% by 2030 (PNIESC, p. 54), which requires the deployment of over 6,700 MW of new RES capacity. Should the EU-wide target increase to 40%, Romania’s commitment would rise further, potentially requiring over 8,300 MW of new capacity and investments exceeding €11 billion (PNIESC, p. 54; European Commission proposals on RED II revision, 2021). The Dunarea East Wind Farm represents a tangible step towards achieving these targets.

The development of this wind farm also falls within the framework of the European Energy Union Strategy, which prioritizes energy security, decarbonization, energy efficiency, market integration, and innovation (*Source: European Commission – Energy Union Strategy, COM (2015) 80 final*). Additionally, the project benefits from the provisions of Council Regulation (EU) 2022/2577, as amended by Regulation (EU) 2024/223, which establishes temporary measures to accelerate renewable energy deployment by recognizing such projects as being of overriding public interest, particularly in relation to public health and environmental protection.

From an environmental perspective, the operation of the Dunarea East Wind Farm will contribute significantly to greenhouse gas (GHG) emissions reduction, air quality improvement, and pollution prevention. According to a comprehensive review by Garvin A. Heath et al. (National Renewable Energy Laboratory, USA):

- Wind energy generates approximately 11 g CO_2/kWh
- Coal-based energy produces 980 g CO_2/kWh
- Natural gas generates 465 g CO_2/kWh

Thus, the carbon footprint of coal is nearly 90 times greater, and natural gas nearly 40 times greater than that of wind energy. For every kilowatt-hour (kWh) of electricity generated from wind, emissions avoided compared to coal and natural gas, include (Heath et al., *Life Cycle Greenhouse Gas Emissions from Electricity Generation*, NREL, 2012):

- CO_2: ~750 g
- SO_2: ~1.4 g
- NO_x: ~1.9 g

This translates into substantial environmental benefits and a strong contribution to national and EU-level decarbonization goals. Moreover, the use of wind turbines will displace a significant amount of fossil fuel-based electricity, thus reducing Romania’s dependence on imported fuels and enhancing national energy security.

From a legal and administrative standpoint, electricity production, especially from renewable sources, is recognized as a public interest activity under Romanian law. The project's connection to the National Electricity System (SEN) and the subsequent authorization and licensing by the Romanian Energy Regulatory Authority (ANRE) confirm its strategic importance.

Beyond its environmental and energy contributions, the Project also supports three major global objectives:

1. Combating climate change
2. Developing new, sustainable energy infrastructure
3. Promoting clean, resource-efficient technologies

Wind power generation produces no direct emissions during operation and has a significantly lower environmental impact compared to fossil fuel-based generation, make it an environmentally sustainable form of electricity production.

In conclusion, the Dunarea East Wind Farm is a critical infrastructure project that directly supports Romania’s energy transition, meets environmental protection goals, and contributes to the EU's climate and energy security priorities. It represents a significant step toward a sustainable, low-carbon future and plays an essential role in fulfilling both national and international commitments.

2.3 Objectives

The primary objective of this ESIA is to assess the environmental and social effects, both positive and negative, associated with the construction and operation of the Dunarea East Wind Farm, in line with internationally recognized standards and recommend measures to manage and monitor those effects. The Project is classified as a Category A project, due to its potential for significant adverse environmental and social impacts that are diverse, irreversible, or unprecedented, as per the definitions used by international financial institutions.

The main objectives of an ESIA are:

- To describe the proposed Project activities and the existing physical, biological, socio-economic environments that these activities may interact with.
- To identify the status of existing environmental conditions and the presence of sensitive receptors.
- To evaluate applicable national and international legislation, standards, and guidelines, ensuring that the Project aligns with national legislation and internationally accepted environmental guidelines such as:
    - IFC Performance Standards (2012),
    - EBRD Environmental and Social Policy (2025),
    - IFC and World Bank Environmental, Health and Safety Guidelines, including those specific to wind energy and transmission infrastructure,
    - EU Directives, including the EIA Directive, Habitats Directive, and Birds Directive.
- To assess the potential environmental and social impacts resulting from the Project activities during construction and operational phases and identify viable and practical mitigation measures and management actions designed to avoid, reduce, remedy, or compensate for any significant adverse impacts. Additionally, to maximize potential positive impacts and opportunities arising from the Project.

- To provide a framework for implementing mitigation measures and managing residual impacts through the provision of an Environmental and Social Management Plan (ESMP).

Leveraging existing environmental and social studies conducted for the national permitting process and information provided in the Draft International ESIA developed by ERM, DNV prepared this Report to meet international standard requirements and best industry practices.

2.4 Project Proponent and Key Entities

Different entities are involved in the planning and implementation of the Project. The responsibilities of key entities relevant to the Project are listed in the Table 2-1 below, along with a general description of their roles.

Table 2-1 Project key entities

Responsible Party	Role	Responsibilities
Rezolv Energy	Project Owner/Sponsor	• Development of Project Design • Procurement Project components • Construction of the Project • Operation of the Project
Nero 2	Development Phase Project Owner	Development of Project design.
Consenswind SA	Dunarea West Project Company	Local project developer for Dunarea West (Adamclisi).
Midmar Callatis SA	Dunarea East Project Company	Local project developer for Dunarea East (Deleni).
DNV	International Environmental and Social Consultant (IESC)	Development of this ESIA report.
Eco Green Consulting	Independent consulting firm from Romania sub-contracted by Low Carbon to develop permitting documents	Preparation of environmental permitting documents.
Tender ongoing	Turbine Supply and Installation (TSI) contractor	Manufacture, delivery to site, install, commission and testing of the wind turbines.
Tender ongoing	Balance of Plant (BoP) Contractor	Civil and electrical works, including the electrical substation

2.5 ESIA Team

The ESIA team who worked at this study is presented in the Table 2-2 below:

Table 2-2 Project ESIA team

Name and qualification	Designation
Chiara Gabba MSc in Environmental Sciences – University of Milano Bicocca, Italy BSc in Natural Sciences – University of Pavia, Italy	Project Manager Coordinator Senior Environmental Consultant
Luca Lisciotto MSc and BSc in Environmental Sciences – University of Milano Bicocca, Italy PhD in Climate Change (ongoing)	Deputy Project Manager Senior Environmental Consultant Climate Change Specialist
Margarida Nogueirinha MSc in Ecology & Environmental Management – University of Lisbon, Portugal BSc in Biology & Geology – University of Algarve, Portugal BSc in Biology – University of Algarve, Portugal	Environmental Consultant Biodiversity Expert
Nicolò Filipazzi MSc in Sustainability Law, Finance and Management - University of Milano Bicocca, Italy BSc in Administration Science - University of Milano Bicocca	ESG Consultant Social Expert
Sarah Methew MSc in Energy and Environmental Engineering - VIT University, India BSc in Civil Engineering - Mahatma Gandhi University, India	Environmental Consultant Physical Environment Expert
Giulia Giannelli MSc in Environmental Engineering – Politecnico di Torino, Italy Certified Expert in Climate and Renewable Energy Finance - Frankfurt School of Finance & Management	Senior Environmental Engineer and Sustainability Team Leader Quality Assurance
Alice Wong **MSc in Environmental Management – The University of Hong Kong, Hong Kong** **BEng in Chemical Engineering – The University of Science and Technology, Hong Kong**	Senior ESG Consultant Quality Assurance

2.6 Project Permitting Overview

The permitting process for the Dunarea East Wind Farm was carried out in accordance with the applicable Romanian environmental and sectoral legislation, primarily Law No. 292/2018 on Environmental Impact Assessment, and involved a comprehensive multi-stage procedure requiring coordination across several competent authorities. The law requires separate procedures for each territorial administrative unit (ATU). As such, although originally part of a single project, a distinct permitting track was pursued for the Deleni Commune component (meaning the Dunarea East Wind Farm).

Importantly, the project is located in an area dedicated to renewable energy development, as confirmed by the previously issued Environmental Agreement No. 28/26.07.2011 and the Grid Connection Agreement No. C 49/17.01.2024, concluded with CNTEE Transelectrica S.A., securing the project's integration into the National Electricity System (SEN).

Although originally authorized in 2011 for a larger configuration (122 turbines), the Project has since undergone significant design and layout modifications. As a result, a formal revision procedure was initiated based on the provisions of Law 292/2018, leading to an updated assessment process covering technical, environmental, and legal aspects. The permitting process is built upon and refers to the original Environmental Agreement No. 28/26.07.2011, issued by APM Constanța (Constanța Environmental Protection Agency), which served as the regulatory foundation for the Project.

Key milestones in the permitting process include:

- 26.07.2011 – Initial Environmental Agreement No. 28/2011 issued by APM Constanța, covering the full project area (122 turbines / 510 MW).
- 03.12.2021 – Formal request for permit revision submitted (Ref. No. 18353), following significant technical changes to the project design.
- 02.03.2022 – Updated Urban Planning Certificate No. 50 issued by Deleni Commune Municipality; later extended until 03.03.2025.
- 2022–2024 – Updated Environmental Impact Report and Appropriate Assessment Study prepared by a certified environmental consultant.
- 02.11.2023 – APM Constanța (Address No. 2261/02.11.2023) confirmed, following a C.AT. meeting, the need for updated EIA and AA documentation for the revised project configuration.
- 07.10.2024 – Public debate held as part of the EIA procedure; no substantiated objections were received.
- 28.02.2025 – Revised Environmental Agreement No. 1/2025 issued for the Dunarea East Wind Farm (48 turbines / ~300 MW).

The following opinions, clearances, and technical approvals were obtained as part of the comprehensive permitting process:

- Public Health Clearance – Constanța DSP Notice No. 8085R/26.04.2022
- Urban Planning and Utility Approvals – Including approvals from RAJA, ENEL, RAJDP Constanța, and major telecommunications providers (Orange, Digi, Vodafone)
- Water Management Permit – General Agreement No. 10/30.01.2025, issued in accordance with water law provisions
- Environmental Clearance from ANANP – Opinion No. 07/14.02.2025, ensuring project compatibility with protected natural areas
- Favorable Opinion from the Romanian Civil Aviation Authority (AACR) – Letter No. 40806/17.03.2023
- ANIF Approval – Authorization No. A15/15.03.2024
- Opinion from the Ministry of Internal Affairs (MAI) – No. 578.771/24.08.2022

- Defense Ministry Approval – General Staff Opinion DT/13855, No. DT.14215/29.11.2023
- Opinion from the Romanian Intelligence Service (SRI) – No. 798057/12.12.2023
- Grid Connection and Technical Approvals:
    - Transelectrica Approval No. 1/1523 of 26.01.2023
    - Site Approval No. 10/2022, issued by CNTEE Transelectrica S.A.
- Cultural Heritage Clearance – Notice from the Constanța County Directorate for Culture (currently pending)
- Agricultural Land Use Approval – DAJ Constanța Notice No. R 793/07.02.2024
- National Road Infrastructure Approvals – Issued by DRDP Constanța (CNADNR):
    - No. 54.7 to 58.7, all dated 17.10.2023
- Road Use and Crossing Rights – Decision No. 18/30.03.2022 of the Deleni Local Council, granting non-exclusive rights to place underground cables and networks across communal roads, ensuring interconnection of turbines and substations

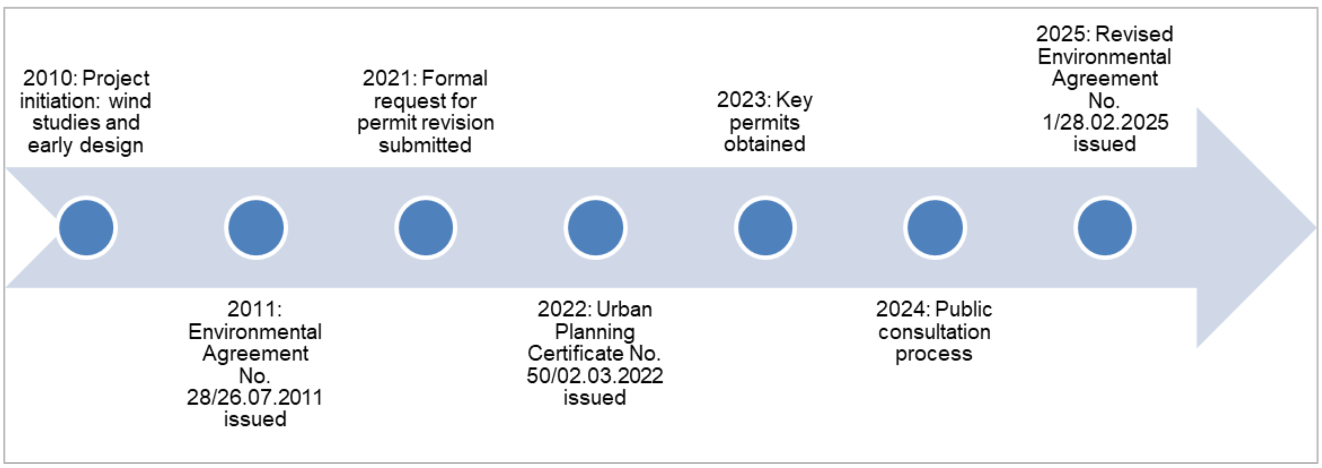

Figure 2-1 Key permitting steps of the Dunarea East Wind Farm

2.7 ESIA Scoping

In 2021, ERM conducted an Environmental and Social Gap Analysis ('the Gap Analysis') for the Dunarea Wind Farm. This analysis focused on reviewing the local permitting process, environmental and social assessment and management, health and safety, stakeholder engagement, labour and working conditions, land acquisition and compensation, biodiversity conservation, sustainable natural resource management, and cultural heritage. The Gap Analysis evaluated compliance against the IFC Performance Standards and EBRD Environmental and Social Performance Requirements. The results of the Gap Analysis highlighted the need to develop a full and comprehensive ESIA package to meet the disclosure requirements for a 'Category A' Project.

Building on this, ERM prepared a Scoping Report in January 2023 (see Appendix A) as part of their international ESIA process. The scoping phase aimed to identify key environmental and social sensitivities associated with the project's proposed location, as well as the activities that could generate significant impacts. The scoping report defined the scope of specialist studies needed to inform further assessment.

Following the scoping phase, ERM developed the Draft International ESIA for the entire Dunarea Wind Farm, which served as a foundational document assessing the broader environmental and social impacts.

Building on the Draft ESIA and scoping documentation prepared by ERM, as well as the outcomes of the national permitting process, DNV has prepared this ESIA report specific to the Dunarea East Wind Farm project area. This ESIA consolidates and refines information relevant to the Project, providing a detailed assessment of its likely significant environmental and social impacts. The assessment is aligned with IFC Performance Standards, and EBRD Environmental and Social Requirements (ESR), supporting the Project's international financing needs.

2.8 ESIA Structure

This ESIA report is structured as follows:

- Section 1: Executive Summary of the Project's ESIA as per IFC requirements
- Section 2: Introduction and Background on the Project for which the ESIA is developed as well as the objectives of the ESIA study.
- Section 3: Description of the Project components as well as Project construction and operational phases.
- Section 4: Discussion of alternatives for different Project components.
- Section 5: Discussion of the regulatory framework applicable to this Project.
- Section 6: Description of the ESIA approach and methodology.
- Section 7: Description of the baseline environment of the Project area.
- Section 8: Assessment of the potential environmental and social risks and impacts and their mitigation measures.
- Section 9: Summary of the environmental and social management and monitoring plan for the Project.
- Section 10: Conclusions of the ESIA outcomes.
- Appendices:
    - Appendix A: Scoping Report
    - Appendix B: Stakeholder Engagement Plan (SEP)
    - Appendix C: Noise baseline monitoring results
    - Appendix D: Biodiversity Baseline
    - Appendix E: Critical Habitat Assessment (CHA)
    - Appendix F: Archaeological diagnosis report
    - Appendix G: Preventive archaeological survey
    - Appendix H: Collision Risk Assessment (CRA)
    - Appendix I: Visual Impact Assessment (VIA)

- Appendix J: Shadow Flickering Assessment
- Appendix K: Cumulative Impact Assessment (CIA)
- Appendix L: Climate Change Risk Assessment (CCRA)
- Appendix M: Greenhouse Gas (GHG) Assessment
- Appendix N: Social Impact Assessment (SIA)

2.9 ESIA Limitations

This ESIA has been developed based on a thorough review and integration of multiple project documentation sources, including:

- The Draft International ESIA developed by ERM in 2023 (hereafter “ERM Draft ESIA”),
- The National Environmental Impact Assessment prepared by AON (hereafter “AON National EIA”),
- The National Appropriate Assessment Study prepared by AON (hereafter “AON Appropriate Assessment”)
- The revised Environmental Permit and associated supporting studies,
- The Q&A document maintained by the Project Companies, summarizing key permitting and design decisions.

These documents have been critically reviewed and harmonized to ensure consistency and accuracy across national and international requirements. No additional field assessments and stakeholder consultations have been undertaken by DNV to supplement existing information.

At the time of writing, the specific wind turbine model to be used for the Dunarea East Wind Farm has not been finalized, as the turbine supplier is yet to be determined. However, four (4) potential turbine models are under consideration:

- Vestas V162 EnVentus with a hub height of 125 m and a rotor diameter of 162 m;
- Goldwind GW165-6.0MW with a 121 m hub height and a rotor diameter of 165 m;
- Nordex N163-7.0MW with a max hub height of 124.5 m and a rotor diameter of 163 m;
- GE Vernova GE164-6.0MW with a maximum hub height of 128 m in some locations and 112 m for other locations where 128m exceeds the aviation threshold and a rotor diameter of 164 m.

All above-mentioned turbines are suitable for the planned capacity of the wind farm, and the final selection will depend on the contracting process and technical evaluation during the detailed design phase.

Given the uncertainty in turbine selection, the Goldwind GW165 model, with its larger rotor diameter, has been assumed in the conservative impact scenarios for the purposes of this assessment, particularly for critical factors such as:

- Visual Impact: The larger turbine with a 165 m rotor diameter may result in a more noticeable visual presence. The visual impact analysis has been conducted based on this scenario to ensure compliance with the IFC’s guidelines on landscape and visual amenity.
- Shadow Flicker: Larger turbines tend to have a wider area of shadow flicker. Therefore, this analysis assumes the Goldwind GW165 model to ensure that all potential impacts are considered, even if a smaller turbine is ultimately selected.

For other environmental aspects such as noise, air quality, land use, and water use, the Vestas V162 turbine has been the primary focus of the environmental studies conducted to date and mentioned above. The differences between the turbines for these impacts are minimal, meaning that the analysis based on the Vestas V162 remains valid for all models. Hence, for such aspects, the Vestas type has been considered in the current ESIA, considering also that this type was the object of the existing studies which the current Report is based on.

Upon final selection of the turbine model, the ESIA will be updated to incorporate more detailed data, enabling a more precise refinement of the impact assessments.

3 PROJECT DESCRIPTION

3.1 Project Location and Layout

The Project is located in the extra-urban area of Deleni Commune, within Constanța County, southeastern Romania. The project area is positioned entirely outside the built-up zone and spans agricultural land, pasture, and farm roads, as defined in Urban Planning Certificate No. 50/02.03.2022.

The wind farm will comprise 45 wind turbines, each with a nominal capacity of up to 7 MW, resulting in a total installed capacity of up to 315 MW. The project also includes internal access roads and an interconnection station connecting to the National Energy System (SEN). At the time of writing this Report, the specific wind turbine model to be used for the Dunarea East Wind Farm has not been finalized, as the turbine supplier is yet to be determined. However, four (4) potential turbine models are under consideration:

- Vestas V162 EnVentus with a hub height of 125 m and a rotor diameter of 162 m;
- Goldwind GW165-6.0MW with a 121 m hub height and a rotor diameter of 165 m;
- Nordex N163-7.0MW with a max hub height of 124.5 m and a rotor diameter of 163 m;
- GE Vernova GE164-6.0MW with a maximum hub height of 128 m in some locations and 112 m for other locations where 128m exceeds the aviation threshold and a rotor diameter of 164 m.

The area allocated for the project consists of approximately 95% privately owned land under surface rights agreements, and 5% communal pastureland under a joint-use agreement. The land's designated use remains agricultural, with no overlap with residential or industrial zones.

The Project is bordered by:

- North: Peștera Municipality
- South: Independența Municipality
- East: Cobadin Municipality
- West: Adamclisi Municipality

The spatial layout of the Project is illustrated in Figure 3-1, showing the turbine positions, internal cables and substation.

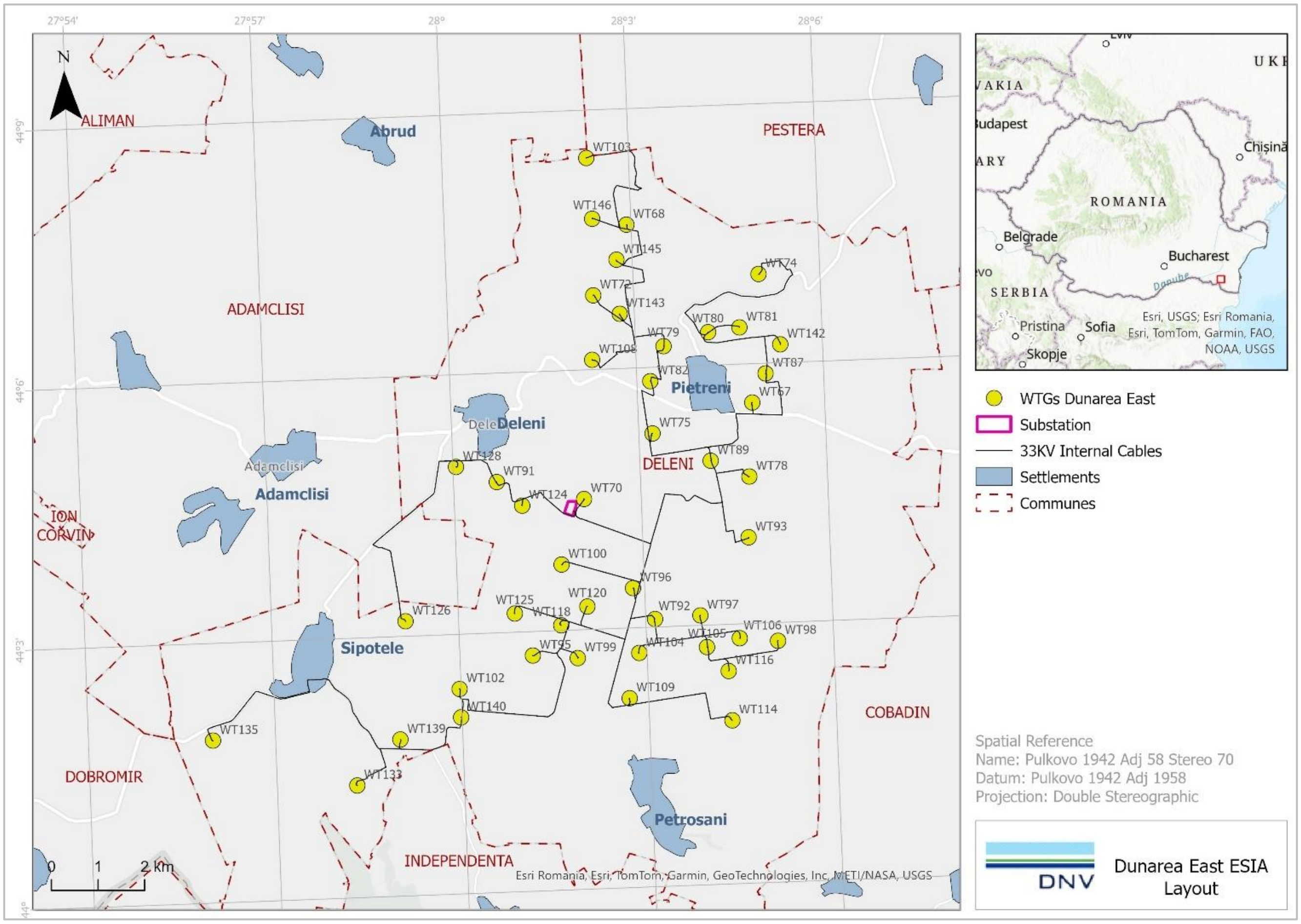

Figure 3-1 Project Layout

The coordinates of the proposed wind turbines and associated infrastructure are provided in Table 3-1 and Table 3-2 below.

Table 3-1 WTGs coordinates

Turbine	X	Y	Turbine	X	Y	Turbine	X	Y
WT67	746683.02	292744.63	**WT93**	746604.15	289859.64	**WT116**	746177.84	287002.11
WT68	743984.02	296553.24	**WT95**	741979.04	287327.3	**WT118**	742585.28	287974.14
WT70	743074.51	290684.63	**WT96**	744129.49	288772.64	**WT120**	743150.13	288378.15
WT72	743273.46	295041.44	**WT97**	745566.79	288189.66	**WT124**	741754.45	290539.73
WT74	746815.83	295496.49	**WT98**	747233.61	287649.18	**WT125**	741595.97	288226.66
WT75	744543.09	292084.22	**WT99**	742944.75	287273.37	**WT126**	739253.78	288061.57
WT78	746618.23	291163.49	**WT100**	742596.03	289275.52	**WT128**	740337.69	291367.79
WT79	744778	293954.99	**WT102**	740411.36	286615.88	**WT133**	738223.03	284547.01
WT80	745732.85	294254.46	**WT103**	743122.22	297981.49	**WT135**	735132.24	285504.72
WT81	746407.42	294357.88	**WT104**	744257.6	287381.87	**WT139**	739147.05	285529.93
WT82	744494.51	293207.17	**WT105**	745713.34	287510.26	**WT140**	740441.98	286006.05

WT87	746963.86	293367.47	**WT106**	746413.69	287698.99	**WT142**	747281.08	293992.12
WT89	745790.73	291499.81	**WT108**	743250.04	293664.15	**WT143**	743844	294649
WT91	741205.5	291047.32	**WT109**	744052.9	286414.29	**WT145**	743769.26	295802.51
WT92	744596.68	288113.91	**WT114**	746253	285944.08	**WT146**	743252.91	296678.33

Table 3-2 Coordinates of the project substation area vertices

X	Y
742739.667	290629.512
742918.0711	290568.9014
742901.2084	290519.163
742867.145	290418.689
742833.017	290318.241
742655.421	290381.548
742689.549	290481.996
742723.677	290582.447

3.2 Permanent Project Components

The major permanent facilities and components of the Project comprise the wind turbines, wind turbine platforms, the 33kv/400kv substation, underground cable lines and overhead lines, existing roads and additional access roads.

These permanent facilities and components are described in the following Chapters.

3.2.1 Wind Turbine Generators (WTGs)

3.2.1.1 Main Components

The main components of the wind farm are the 45 wind turbines generators (WTGs), each with a nominal power output ranging from 6 to 7 MW. Each WTG consists of a tower 121-125m and a rotor with a diameter of 162-165m, depending on the supplier considered.

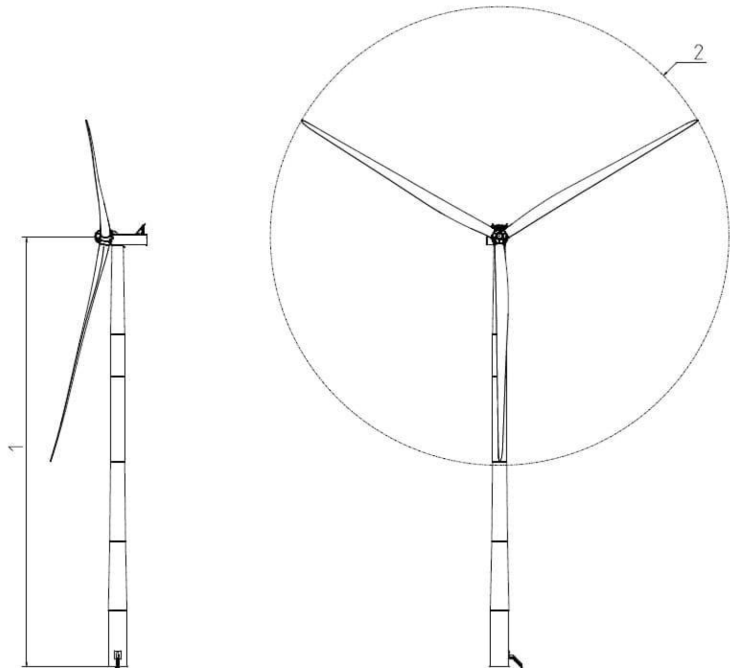

Figure 3-2 Dimensions of the proposed wind turbine

1. *Hub height – 121 - 128 m*
2. *Diameter – 162 - 165 m*

The main elements of each WTG include:

- **Rotor Hub:** Allows the attachment of the three turbine blades.
- **Blades:** Manufactured with advanced composite materials (epoxy resin reinforced with glass fiber and carbon fiber), similar to aerospace technology, providing strength, flexibility, elasticity, and low weight. The blade tips are reinforced with solid metal tips (SMT).
- **Nacelle:** Encloses critical turbine parts such as the main shaft, yaw system, gearbox, electric generator, and cooling system.
- **Tower:** Supports the turbine structure and provides internal access ladders and houses the turbine's electrical distribution network.
- **Main Shaft:** Operates at low rotational speeds (20–400 rpm) and transmits rotation from the rotor hub to the gearbox.
- **Gearbox:** A two-stage planetary gearbox that increases rotational speed to drive the electric generator.
- **Electric Generator:** Converts mechanical energy into electrical energy via electromagnetic induction.
- **Cooling System:** Removes excess heat from the generator during operation.
- **Yaw System:** Automatically orients the turbine to face the wind direction, consisting of a yaw motor and gear transmission.

All turbine components are protected against corrosion according to ISO 12944-2, class C5M.

3.2.1.2 Technical Specifications

Table 3-3 below summarizes main WTGs technical specifications. It is noted that those parameters might be different according to the chosen supplier.

Table 3-3 WTGs technical specifications

Parameter	Specification
Rotor Diameter	162 – 165 m
Swept Area	Approx. 20 600 m² – 21 400 m²
Rotor Orientation	Upwind
Number of Blades	3
Blade Length (Radius)	81 – 82.5 m
Blade Material	Blade materials depend on the supplier: some use glass-fiber reinforced resin, while others also incorporate carbon fiber or additional composite materials
Gearbox Type	Two-stage planetary
Gear Housing Material	Cast iron
Lubrication System	Pressure oil lubrication
Tower Height	121 - 128 m
Nominal Power	6 - 7 MW
Operating Frequency	50 Hz or 60 Hz
Operating Temperature Range	-40°C to +50°C
Normal Ambient Temperature	-20°C to +45°C
Low Temperature Operation	-30°C to +45°C
Wind Speed Range	3 m/s – 25 m/s
Carbon Footprint	6.1 g CO_2e/kWh
Energy Payback Period	6 months
Recycling Rate	88%

3.2.1.3 Operation and control

The wind turbines are equipped with a modern, automatic control system designed to ensure safe and efficient operation. This system uses advanced microprocessors to constantly monitor turbine performance and respond to changing conditions.

The control system continuously checks key operational parameters, such as wind speed, rotor speed, and system performance. Based on this information, the system:

- Automatically rotates the blades and rotor to face the direction of strongest wind, which helps maximize energy production.

- Stops the turbine if any safety limits are exceeded (for example, if the wind is too strong or a system fault is detected).
- Operates with minimal human intervention but allows for remote monitoring and control by technicians when needed.

To ensure safe operation, especially during extreme weather or technical faults, the turbines are equipped with two braking systems:

- Aerodynamic Brake (Main Brake): This system works by adjusting the angle of the blades (a process called "pitching") to reduce wind resistance and bring the rotor to a stop. Each blade can be adjusted individually and is powered by its own hydraulic accumulator (a type of energy storage device that operates even without external power).
- Mechanical Disc Brake (Backup): A secondary brake, similar to those used in vehicles, is installed inside the generator. It is only used as a hand brake or in emergencies, such as when the emergency stop button is activated.

Together, these braking systems ensure the turbine can be stopped quickly and safely when needed.

The turbine's overspeed protection system uses sensors in the turbine hub to detect the rotor's speed. If the rotor starts spinning too fast (known as an "overspeed" condition), the system automatically activates the blade-pitching mechanism to stop the turbine.

To measure wind conditions accurately, each turbine is fitted with:

- An ultrasonic wind sensor (which has no moving parts and works reliably even in harsh weather)
- A mechanical wind vane (which shows wind direction)

These sensors are equipped with heating elements to prevent ice or snow from affecting their function.

3.2.1.4 Fire Detection System

For safety against fire hazards, the turbines include a smoke detection system with multiple detectors installed in critical locations:

- Inside the main nacelle (the housing at the top of the tower)
- In side compartments and electrical cabinets
- In the transformer compartment
- At the base of the tower

If smoke is detected, the system is connected to the turbine's control system and will immediately disconnect high-voltage equipment to prevent further risk.

3.2.1.5 Lightning Protection System

As wind turbines are tall structures exposed to weather, they are equipped with a Lightning Protection System (LPS) to reduce the risk of lightning-related damage. This system includes:

- Lightning rods (installed on the blades and tower) that capture lightning strikes. Part of the rods are left unpainted to improve conductivity.
- Conductors that safely direct lightning energy down through the turbine structure.
- Overvoltage protection to prevent damage to sensitive electrical equipment.
- Electromagnetic shielding to protect against interference with electronic systems.

- A robust grounding system that safely discharges lightning into the earth.

This system is designed in line with international standards to ensure both equipment safety and the protection of personnel working on or near the turbines.

3.2.1.6 Electrical and Power System

Each wind turbine is equipped with a transformer located inside the nacelle. This transformer converts the low-voltage electricity generated by the turbine into medium-voltage power at 33 kV, making it suitable for transmission.

The medium-voltage electricity from each turbine is transmitted via a network of underground cables, which connect all turbines to the Deleni 33/400 kV transformer station. At this station, the voltage is stepped up to a higher level required for integration into the National Energy System (SEN). Further technical details regarding this connection are provided in Chapter 3.2.2 of this Report.

The underground cabling system has been designed to ensure reliability, operational safety, and minimal environmental impact, particularly with regard to landscape and land use. The entire electrical infrastructure will be built in compliance with the relevant national standards, specifically STAS 12604, and will include anti-seismic protection measures to maintain functionality in the event of seismic activity.

3.2.2 Grid Connection

The electrical energy generated by the 48 wind turbines will be collected and delivered to the National Energy System (SEN) through a multi-stage connection system, composed of the following:

- **Internal Connection System (33 kV)**: energy produced at each turbine will be collected via an underground cable network operating at 33 kV. These cables will converge at the Deleni 33/400 kV transformer station, located within the project area.

  Figure 3-1 above shows the schematic layout of the underground cable network connecting the turbines to the Deleni transformer station.

- **Substation**: the Deleni 33/400 kV transformer station will be equipped with two transformation units, converting 33 kV medium-voltage energy to 400 kV high-voltage for grid injection (see site plan in Figure 3-3 below). The substation will also function as a dispatchable node and communication hub for CNTEE Transelectrica S.A incorporating:
  - Mobile/radio communication infrastructures
  - Fiber-optic and TIF-based services
  - Integration with the Constanța ST Remote Operation Center, enabling real-time dispatch and monitoring

Figure 3-3 Site plan of the 33/400 kV Deleni transformer station

- **Grid Connection (400 kV Transmission Lines)**: the transformed energy will be injected into the SEN via two 400 kV double-circuit overhead lines (LEA – *Linii Electrice Aeriene*), each approximately 0.3 km in length. These lines connect to the following existing transmission corridors:
    - LEA 400 kV Isaccea – Medgidia Sud – Dobrudja
    - LEA 400 kV Isaccea – Varna

  The connection includes installation of eight (8) transmission towers (poles):
    - 4 × ICnY 400137
    - 2 × ICTn 750113
    - 2 × ITn 400239

  Figure below shows details of the project's connection to the national power grid.

Figure 3-4 Details of grid connection

- **Optical Communication**: approx. 2 × 32 km of optical fiber (OPGW) installed along LEA 400 kV lines for for high-speed communication and data transmission.
- **Tele-protection Systems**: to ensure real-time communication between substations, to detect and isolate faults on the 400 kV lines, the Project includes:
  - Relocation of tele-protection and PLC equipment (including blocking coils) from Medgidia Sud substation cells to corresponding cells at the new Deleni substation.
  - Implementation of teleprotection on separate communication media (optical fiber) for each of the two LEA 400 kV Medgidia Sud circuits, in line with NTI-TEL-S-014-2010 standards.
- **Metering**: a billing metering system for accurate energy accounting

3.3 Temporary Project Components

Construction of the Project requires several temporary facilities that will be removed after the construction phase, and affected areas will be reinstated to the original conditions. These temporary construction facilities include:

- **Project's construction site**: an area of 15,000 m², is available for construction sites which will serve as the operational hub for site management, equipment parking, material storage, and personnel facilities.

- **Crane, Mounting and Bearing Platforms**: a crane surface, a pre-assembly surface and a bearing surface must be installed for each of the WTGs. During the erection, these will serve as an installation area for the crane as well as an assembly and storage area for parts of the WTG to be installed.
- **Borrow and disposal areas, lay-down areas, water abstraction points**: at this stage the siting and volume / areas of these components are not yet known.
- **Power Supply during construction phase**: supply will be provided via an overhead line to site. Further details are not yet known at this stage.
- **Construction containers and sanitary facilities**: All temporary site offices, warehouses, workshops, surrounding fences around respective facilities will be constructed in accordance with relevant Romanian and international requirements of occupational health and safety.
- **Workers' accommodation**: No dedicated temporary worker accommodation camps will be constructed on-site, and no on-site accommodation facilities will be established. Non-local workers will be accommodated in existing off-site rental accommodation (e.g. private housing) in nearby villages, to be identified in coordination with the local commune and/or relevant local authorities. Accommodation arrangements will comply with applicable national requirements and will be managed in line with IFC Performance Standard 2 and EBRD ESR 2, including the IFC/EBRD Workers' Accommodation: Processes and Standards Guidance Note.
- **Concrete batching station (CBS)**: one CBS will be needed, however location and mixing capacity was not available at the time of writing the present report.

3.4 Project Phases

The implementation of the Dunarea Wind Farm Project is structured into four (4) main phases:

- Planning,
- Construction (including pre-construction activities),
- Operations (including commissioning), and
- Decommissioning

This section explains the main activities that are typically part of each Project phases described above. The ESIA covers all project phases and includes recommendations to be applied throughout.

3.4.1 Construction Phase

The construction phase of the Project encompasses all works required to physically establish the project infrastructures, from early site preparation to the final assembly and grid connection. This phase follows the planning and permitting stages and is structured into two distinct periods:

- Pre-construction activities: preparatory works necessary before full-scale construction begins.
- Main construction activities: execution of civil, mechanical, and electrical works leading to project completion and commissioning.

Each activity is performed in accordance with applicable national legislation, technical standards, and the Environmental and Social Management Plan (ESMP). These activities will be further described in detail in the following subchapters.

Typically, pre-construction activities on site comprise the following:

- Geotechnical surveys;
- Vegetation clearance;
- Installation of erosion and sediment controls;
- Ground levelling; and
- Construction of laydown areas and temporary office sites

Construction activities include the following:

- Preparation of the site and access roads
- Foundation and crane platform construction
- Delivery and assembly of wind turbine components
- Substation construction and cabling works
- Electrical connection to the National Energy System (SEN)
- Removal of temporary construction facilities

The illustration below and following chapters provide a general description for the typical establishment of wind farm projects. Installation methods may vary from what is presented below and will be dependent on the manufacturers and contractors ultimately contracted for the Project and site conditions at the time of installation.

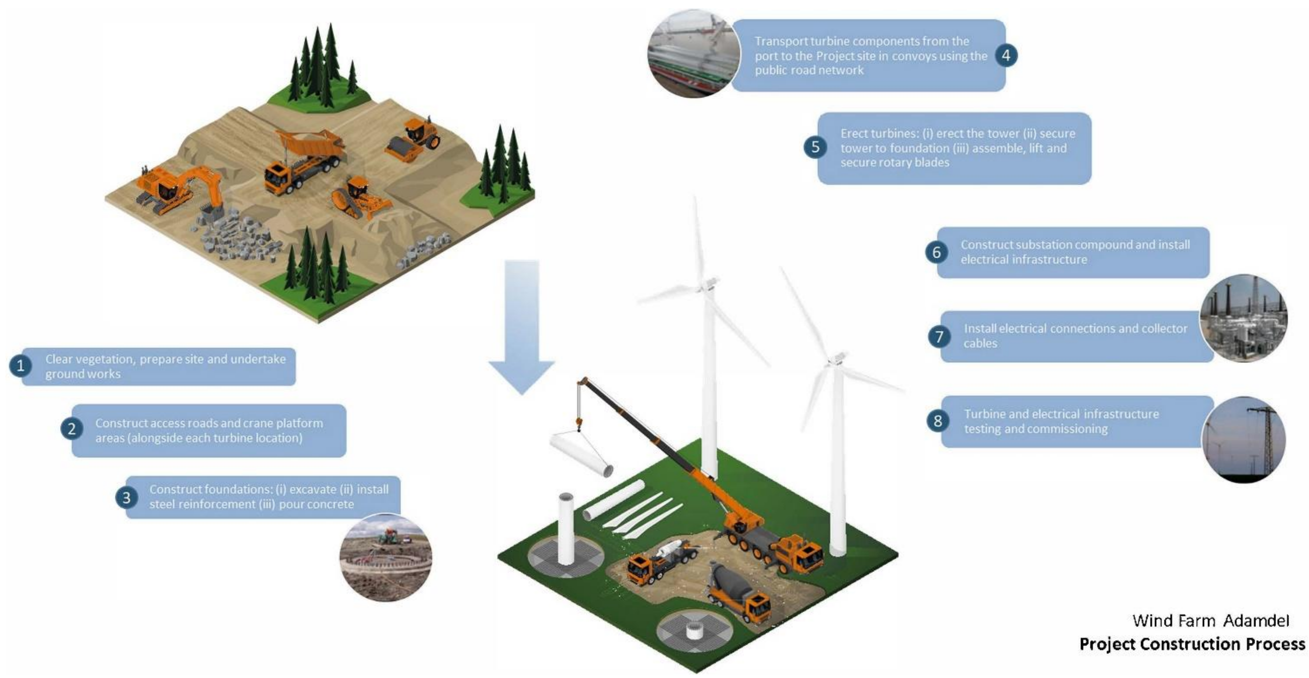

Figure 3-5 Typical wind farm construction process (Source: ERM Draft ESIA)

All work will be conducted in accordance with a detailed master construction schedule that will be provided by the EPC Contractor. All contractors would be required to provide detailed site-specific plans related to:

- Equipment use;
- Excavation and backfilling management;
- Soil erosion management;
- Storm water pollution prevention plan;
- Dust prevention plan;
- Environmental and Social Management Plan;
- Waste Management Plan; and
- Plan drawings of laydown, traffic flow, parking, trash storage, and recycling areas.

It is assumed that as a part of the mobilisation phase, the Project site including laydown areas, etc. will be fenced and the construction/management sites will be located inside the Project boundary.

3.4.1.1 Pre-construction

Pre-construction involves enabling works to prepare the site for the safe and efficient start of construction. These activities are limited in scope but essential for logistical setup and early environmental protection and are described as follows:

- **Geotechnical and Topographic Investigations:**
  - Soil surveys are conducted at turbine locations and along cable routes to assess ground conditions.
  - Data collected informs the detailed engineering design of foundations and access roads.
- **Vegetation Clearance**:
  - Local vegetation is selectively cleared to open areas for roads, turbine platforms, and temporary workspaces.
  - All clearance activities are done in line with environmental permits and ecological constraints.
- **Erosion and Sediment Control Measures: t**emporary drainage channels, silt fences, and sediment basins are installed to prevent soil erosion and runoff into water bodies during early earthworks.
- **Laydown Areas and Temporary Site Facilities:**
  - Construction of laydown yards, storage platforms, parking areas, and site offices.
  - Installation of portable toilets, potable water tanks, and fire safety signage.
  - Fencing of the site and access control are established for safety and security.

Once the pre-construction works are completed, the main Construction Phase begins. This includes all civil engineering, mechanical assembly, and electrical infrastructure installation necessary for the Project's operation.

3.4.1.2 Access Roads and Internal Road Network

The wind farm requires a robust internal road network to allow transport of heavy equipment and turbine components.

- **New Access Roads**: Approximately 55.75 km of permanent roads (4.5 m wide) will be constructed to connect the 45 turbine locations. Works include vegetation removal, grading, compaction, and paving with crushed stone or mixed gravel-concrete layers.

- **Upgrading Existing Roads**: Around 38 km of existing service roads will be reinforced to support heavy transport. Where necessary, 33 kV cables will be installed beneath the roads at a depth of 1.5–2 m prior to paving.

- **Drainage Infrastructure**: Concrete drainage channels and culverts will be installed alongside roads to manage stormwater and protect road integrity.

3.4.1.3 Foundation and Platform Works

At each turbine location, civil works will be carried out to support the turbine and associated equipment. Key activities include:

- Excavation works: the topsoil removed for the construction works will be transported within the wind farm site/construction site/locations indicated by the City Hall and subsequently used to restore the land temporarily occupied by the construction elements;

- Construction of reinforced concrete foundations, often built on piles, adapted to site-specific geotechnical conditions;

- Backfilling with compacted soil around the turbine base to restore natural ground levels and ensure stability;

- Construction of crane hardstands and assembly platforms, including areas for pre-assembly of components such as blades and rotor hubs.

These works are designed to minimize land movement, erosion and impact on vegetation, in line with best environmental practices.

The assembly platforms will be both temporary (areas that will be used during the construction of the wind farm) and permanent (areas permanently removed from agricultural use). Depending on the geotechnical conditions, the Project proposes platforms in accordance with the terrain configuration, project requirements, and geotechnical conditions of the project site.

3.4.1.4 Wind Turbine Installation

Once access roads and foundations are complete, delivery and assembly of wind turbine components begins. Assembly is carried out on site using high-capacity cranes.

The typical installation process includes:

- Erection of tower segments, lifted and bolted into place;

- Mounting of the nacelle, which houses the generator and mechanical systems;

- Assembly and installation of the rotor, comprising the hub and three blades, often lifted as a complete unit;

- Installation of internal cabling within the tower for electrical and signal transmission.

This phase requires precise coordination and adherence to safety standards, particularly during lifting operations and work at height.

3.4.1.5 Electrical Infrastructure and Grid Connection

The wind farm's electrical system is designed to collect, transform, and transmit the electricity generated by the turbines into the National Energy System (SEN). This involves both underground and overhead infrastructure.

Regarding underground cabling, main activities involve:

- Lay down of medium-voltage cables (33 kV) in trenches 1.3 meters deep, following internal road alignments;
- After installation, trenches are backfilled and compacted to restore land conditions;
- Signal and control cables are also installed as part of the internal network.

The construction of the substation includes also the installation of substation houses switchgear, protection equipment, and transformers required to step up the voltage for transmission.

To connect the wind farm to the SEN, a new Overhead Transmission Line (OHL) will be constructed. The process includes:

- Route surveying and land clearance;
- Excavation and construction of reinforced concrete pylon foundations;
- Erection of transmission towers, stringing of conductors, and installation of insulators;
- Final inspection, testing, and handover to the grid operator.

These works are conducted in coordination with relevant energy authorities to ensure safe and reliable integration into the national grid.

3.4.1.6 Site Restoration

After construction is complete, all temporary facilities and disturbed areas not required for the operational phase are dismantled and restored.

Site restoration includes:

- Clearing the site of all temporary facilities, construction materials, debris, and waste;
- Removal of temporary structures, fencing, laydown areas, and sanitary facilities;
- Regrading of disturbed land to match original contours;
- Seeding or planting with native vegetation to restore ecological functions;
- Installation of permanent erosion control structures where required.;
- Ensuring no residual pollution or material spread remains in the surrounding environment.

Only areas immediately surrounding turbine bases and access roads will remain permanently altered. All other areas will be rehabilitated in accordance with the environmental restoration plan.

3.4.1.7 Construction Site and Temporary Construction Facilities

As introduced in Section 3.3, Project's construction site will be composed of three (3) 100x50m sites with a total area of 15,000 m². This area will serve as the operational hub for site management, equipment parking, material storage, and personnel facilities.

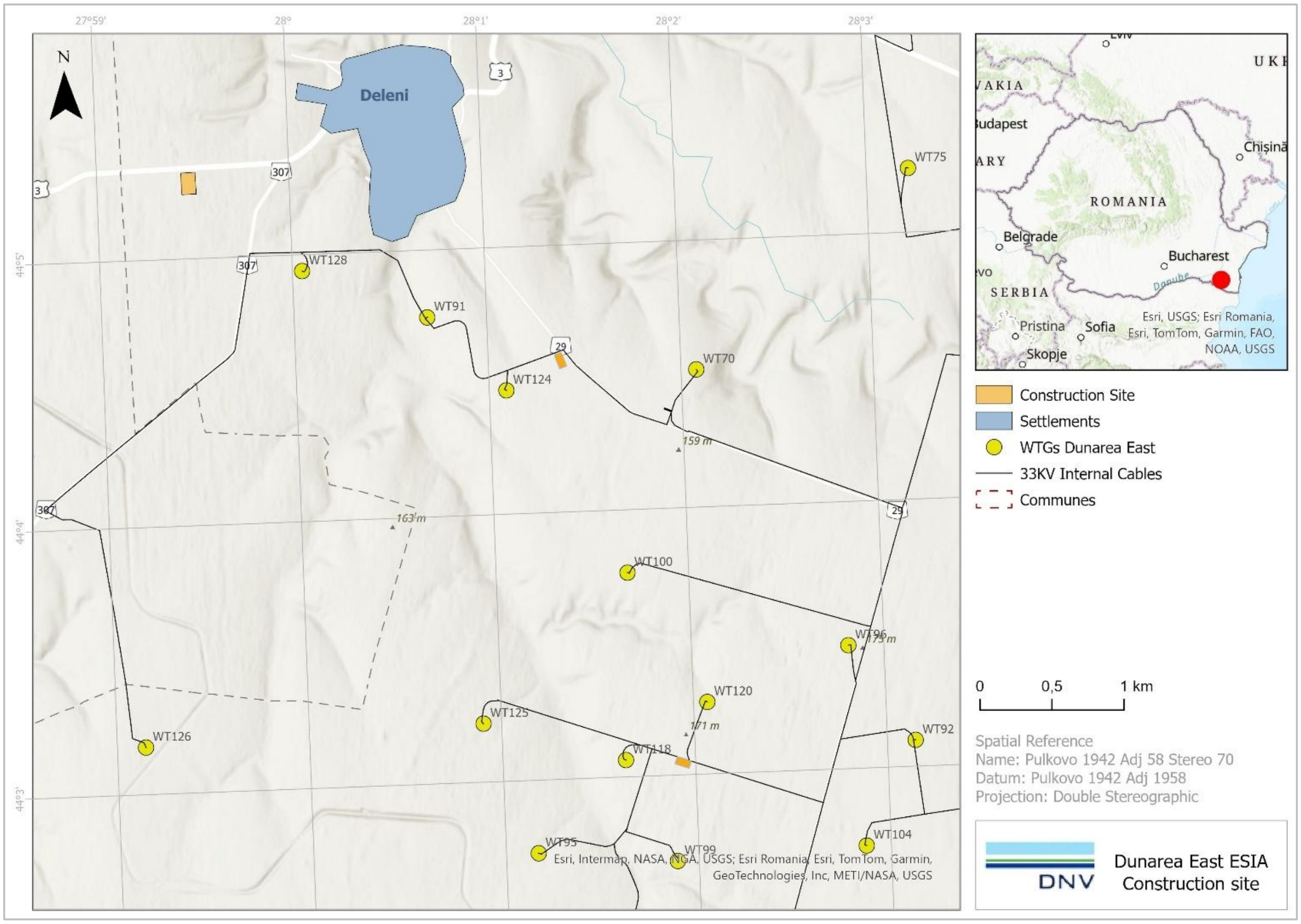

Figure 3-6 Construction site location

Construction Site Organization

The setup and management of the construction site will be conducted exclusively by qualified personnel within the designated project boundaries. During the construction period, both the project beneficiary and the contractor will implement all necessary measures to ensure compliance with occupational health and safety regulations, including provisions for work at height and safe handling of machinery and materials.

Importantly, the site organization works will not impact public land or require any demolition activities. Access to the construction site will be secured via existing roads, eliminating the need for constructing temporary access routes. Additionally, no network diversions or utility relocations are anticipated for site establishment. Upon project completion, the site area will be restored to its original condition, including any necessary soil stabilization or revegetation using native plant species to avoid introducing invasive vegetation.

Planned Temporary Facilities

The construction site will be equipped with several key temporary facilities to support ongoing works and maintain safety and hygiene standards:

- Parking areas for vehicles and equipment, constructed as stabilized gravel platforms;

- Fire safety posts (P.S.I.), clearly marked and strategically placed for rapid response;
- Site office barracks (OS) to accommodate administrative and supervisory staff;
- Portable toilets, with quantities adjusted according to workforce size and regularly serviced;
- Drinking water reservoirs, with potable water supplied primarily through bottled sources during construction;
- Material Storage and Handling.

Efficient management of construction materials is essential to avoid unnecessary handling, reduce costs, and minimize environmental impacts:

- Bulk mineral materials such as aggregates (stone, sand, ballast) will be transported directly to their application points on site, thereby avoiding extra loading/unloading steps. Temporary buffer storage areas for these materials will be established along the construction route on non-productive land allocated by the beneficiary. These areas will be carefully chosen for accessibility and will be fully restored after use.
- Materials such as cement will be stored following strict requirements, including consideration of appropriate storage conditions and duration to maintain quality.
- Excavated materials not reused in construction (including soil, stones, vegetation, and concrete debris) will be temporarily stockpiled near excavation zones. These stockpiles will be managed to prevent contamination and will be removed promptly for recycling or proper disposal.
- Equipment that is idle during downtime will be parked securely within the construction site or work front on ballasted surfaces to prevent soil degradation and ensure site orderliness.

There will be no worker accommodation camps established within the Project area. Non-resident workers will be accommodated in existing private housing in nearby villages, as required, with arrangements facilitated by the Contractor in coordination with the local municipality and relevant stakeholders to ensure access to suitable accommodation in the local area, in line with applicable national requirements and international good practice standards.

Environmental and Safety Considerations

To minimize environmental risks and maintain a safe working environment:

- The construction site will be enclosed by fencing, potentially made of galvanized mesh panels supported by wooden, concrete, or metal posts. The responsibility for site fencing lies with the contractor.
- Measures will be in place to prevent the spread of construction materials, waste, and accidental pollution beyond site boundaries.
- Absorbent materials will be readily available on-site for immediate response to any accidental spills of petroleum products or other hazardous substances caused by equipment failure, accidents, or improper handling.
- Ecological toilets will be installed and maintained throughout the construction phase to ensure proper sanitation and hygiene.
- Fire safety will be supported by the presence of fire safety signs and the fire safety post, with personnel trained to respond effectively in case of emergencies.

3.4.1.8 Transportation Concept

Transportation routes

An adaptation of the existing road network is necessary for the construction of the Project. Parts of the existing tracks in the wind park are to be upgraded while entrances to all WTGs must be newly constructed.

During the assembly stage, the following access roads are used:

- Public road DN 3 for the transport of turbine components
- Public road DC 56 for transporting turbine components to the northern area of the wind farm
- Public road DC 29 Deleni - Petrosani for transporting turbine components to the southern area of the wind farm
- Public road DJ 307 Deleni - Şipote - to the south-eastern part of the wind farm
- Existing agricultural access roads will be used, for which the execution of strengthening works (paving or mixed solutions with a mixture of binder cement and gravel) is foreseen, works that will be carried out after the placement of the underground cable routes under these roads (at a depth of approximately 1.5–2 m).

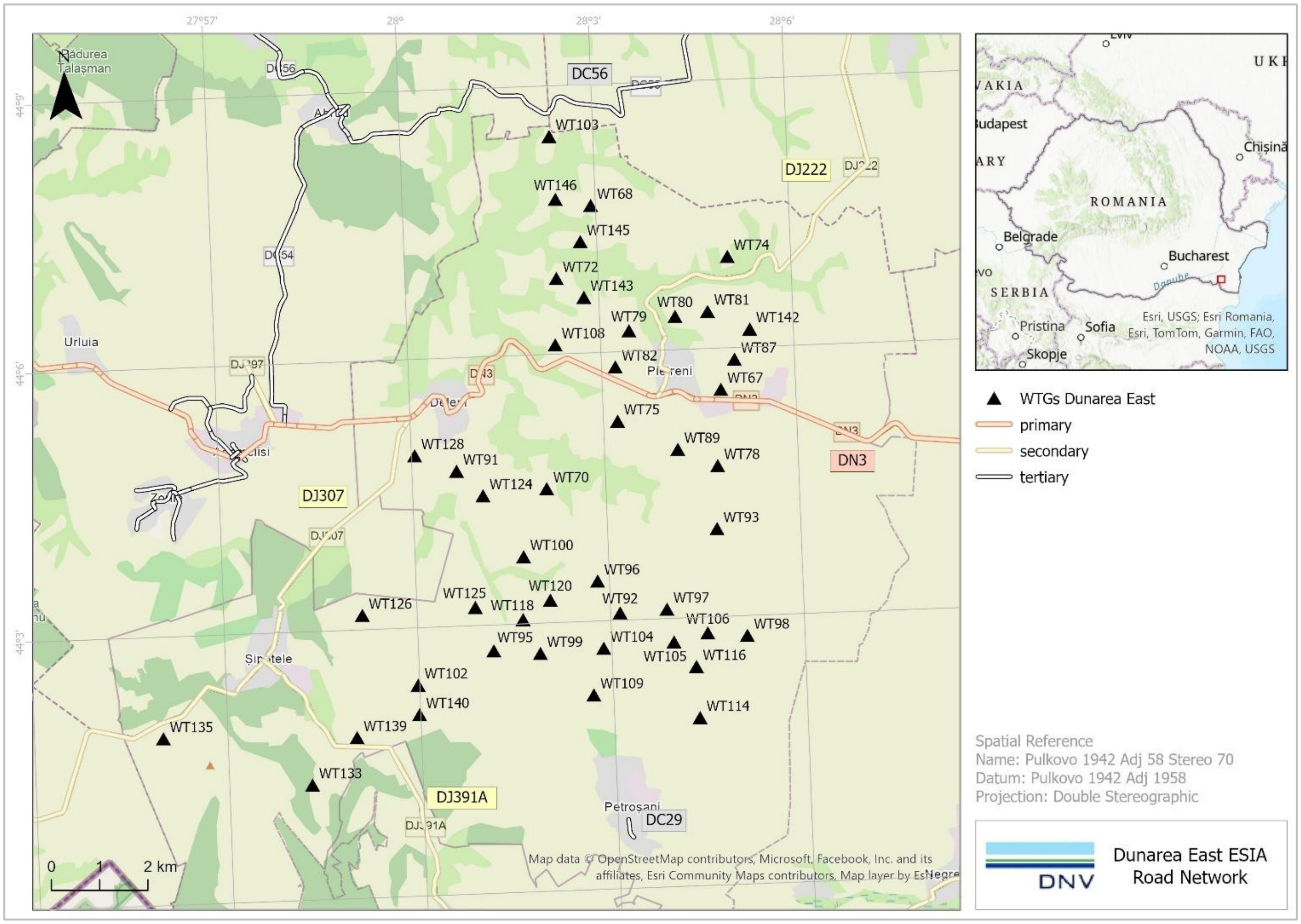

Figure 3-7 Road network in the Project area

As mentioned in Section 3.4.1.2, approximately 38.18 km of existing service roads will need to be upgraded. To use and modernize these existing roads, including service and municipal roads, Project Developer has obtained approval from the Local Council of Deleni Municipality. On March 30, 2022, the Council passed Decision No. 18, which authorized a non-exclusive contract allowing the use, upgrade, and strengthening of certain municipal roads. The contract also permits the installation and crossing of cables and electrical networks along these roads, without changing property ownership or the public road status. This is to ensure a connection between the wind turbines and the transformer station. Later, on September 8, 2023, the Local Council of Deleni amended the contract through an Additional Act that finalized the list of roads included in the agreement. Furthermore, approximately 55.75 km of new roads will be built, which will be permanent roads used during the construction of the wind farm for the transport of equipment and materials, and, upon completion of the wind farm, for repair and maintenance work, as well as vehicle access to the WTGs.

Regional Traffic Management

An updated Transportation Route Survey was carried out in 2025 by Holleman Special Transport & Project Cargo S.R.L. to reflect the final turbine model, component dimensions and weights, and current road conditions. The updated route survey accounts for the transport of Vestas V162 turbine components, including blades of approximately 80 m length and nacelles exceeding 85 tonnes, requiring exceptional transport permits and specific road adaptations. No further studies were available in relation to the other potential wind farm suppliers, however, the available study can be used as reference for traffic management.

The purpose of this updated road study is to confirm whether all wind turbine components can be transported along the chosen route safely and using adequate transport equipment, taking into account variable elements and conditions such as road modifications and current constraints, as well as the transport equipment configuration and component dimensions/weights applicable at the time of transport.

The transport of the wind turbine components from the respective Vestas production plants in Germany to Romania will take place by ship. The Port of *Constanta* (*Agigea*) is planned as possible harbor.

The updated survey provides the following overview route for all components and all entrances:

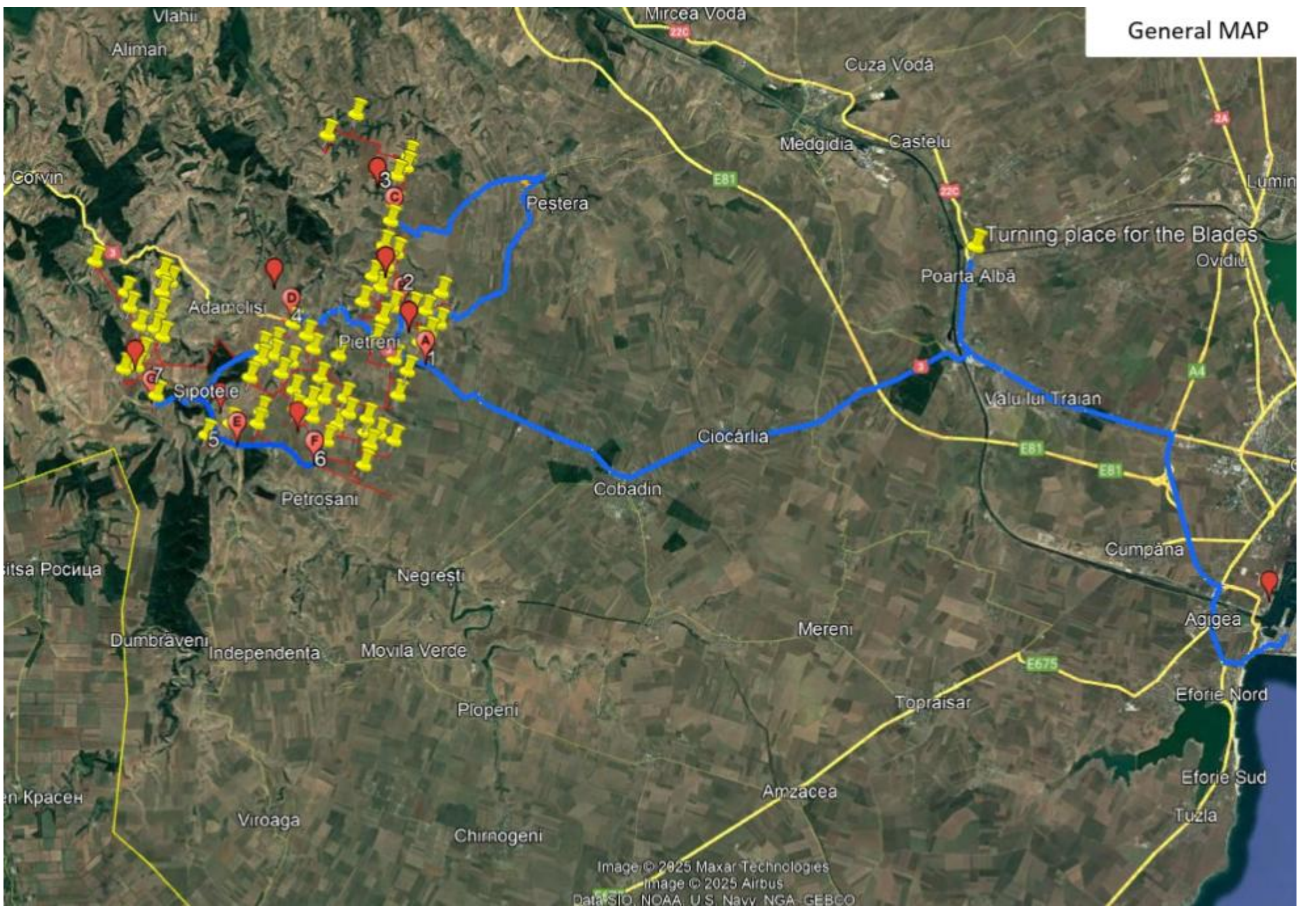

Figure 3-8 Transport Route from Port to Project Site (Source: Holleman Special Transport & Project Cargo S.R.L., 2025)

The survey also provides the following route envelope information:

Route for all components for all Entrances	Max. total Weight allowed	Max. length (m)	Max. Width (m)	Max. Height (m)	Km route
DN39A – DN39 – Highway A4 – DN3 Murfatlar – DN22C Poarta Alba (turning place) – DN3 Cobadin – DN3 Pietreni (E1) – DJ222 (E2) – DN222 – Local road 55 (E3) DN3 Pietreni (E4) – DJ307 (E7) – DJ391A (E5) – Bypass road (E6)		90.00	6.00	5.80	115

Based on the updated route survey and the Project transport concept, there are several access points to the Project site serving different turbine groupings. The primary access corridors to the Project area remain via the national and county road network connecting from the Port of Agigea to the Deleni–Pietreni–Șipotele area, and the selected route requires authorisations and, where applicable, road rehabilitation to accommodate heavy transports, including wide and long components such as turbine blades.

Within the Project area, access to individual WTGs will be provided via a combination of:

- upgraded existing service/municipal roads (approximately 38.18 km);
- strengthened agricultural tracks;
- newly constructed permanent access roads (approximately 55.75 km); and
- newly constructed entrances to WTGs, where required.

Access roads will require maintenance during the operational phase, since repairs may make the transport of specific wind turbine components necessary.

Furthermore, based on the route survey performed, the supply of major components can be ensured on the proposed transportation routes, on the condition that all necessary construction modifications are carried out as identified by the survey.

Traffic Management within the Project area

Within the Project area, routes for the heavy and special haulage will be planned specifically and categorized for laden and unladen journeys. The routes will be adapted to the requirements for special transport. In particular, the substructure and the curve radii will be constructed according to the load class specified by the manufacturer. The roads will be constructed with a lane width of min. 4.5 m, with some locations reaching up to 6-7 m. width due to the road curvature. A new access road will be built to each crane surface of the WTGs.

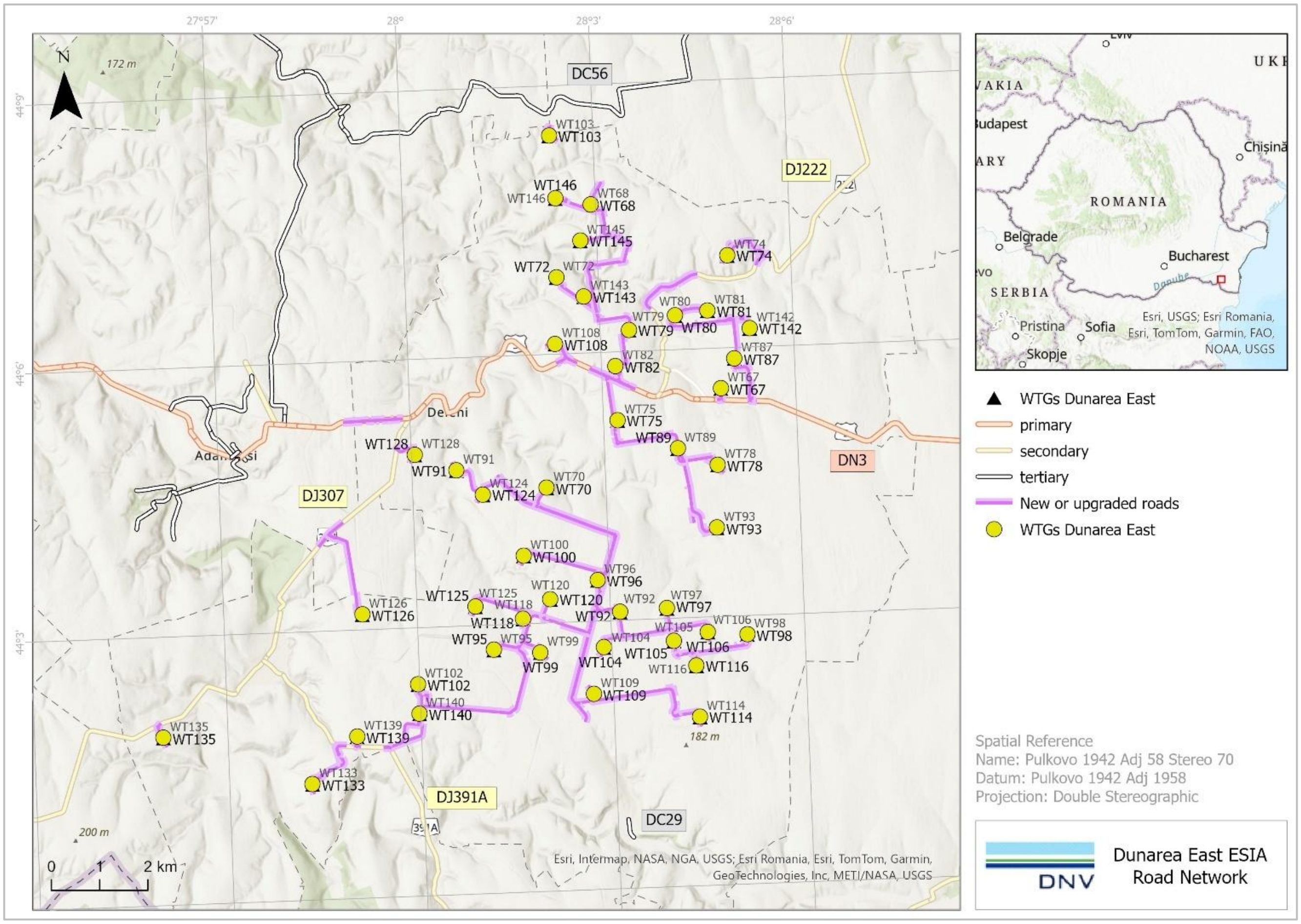

Figure 3-9 Site Access Roads and Internal Roadway for Construction

3.4.2 Operational Phase

The operational phase of the Project encompasses all activities associated with the generation, transmission, monitoring, maintenance, and security of the wind farm during its estimated 30-year technical and economic lifespan (up to 35 years).

3.4.2.1 Commissioning and Testing

The commissioning phase marks the transition from construction to operation for the Dunarea East Wind Farm. During this phase, the wind turbines and related infrastructure will undergo a series of tests to ensure everything is working as designed and meets operational standards.

Testing ensures that all components of the wind farm function properly. Key activities include:

- Pre-Commissioning Inspections: Checking that all components, both mechanical (blades, gearbox) and electrical (wiring, transformers), are installed according to specifications and regulations.
- Functional Testing: Each turbine will undergo tests to ensure proper operation of internal systems (e.g., pitch, yaw, generator) and blade rotation.

- Electrical and Load Testing: Verifying electrical connections and running turbines under different conditions to confirm they produce the expected energy.
- Grid Connection Tests: Ensuring the turbines can safely feed energy into the grid, including synchronization and protection system tests.
- Safety and Emergency Testing: Verifying emergency shutdown systems and safety mechanisms.

Once testing is complete, a final acceptance report will be prepared by a committee, including representatives from the State Construction Inspectorate, County Council, project designer, and site manager. Only after approval will the wind farm officially begin operations.

After commissioning, the wind farm will enter full operation.

3.4.2.2 Operation of the Wind Farm

The primary function during this phase is the automated generation of electricity from wind energy. The WTGs will operate autonomously under continuous remote monitoring via a Supervisory Control and Data Acquisition (SCADA) system, ensuring 24/7 performance tracking and fault detection. Given the automated nature of the facility, no permanent operating personnel will be stationed onsite; Instead, they will be present in the user substation, while some personnel might be present in the HV substation.

Each turbine site will be equipped with motion detectors and video surveillance systems connected to a central control hub, ensuring full situational awareness and security. Daily operations will primarily involve the surveillance of systems, data analysis, and management of alerts or anomalies flagged by the monitoring systems.

3.4.2.3 Electricity Transmission and Grid Integration

As briefly described in Section 3.2.2, electricity generated by the turbines will be transported through underground medium voltage (MV) cables, which connect each turbine to the wind farm’s central 33/400 kV transformer substation. The internal electrical infrastructure has been designed to ensure continuous route grounding for all turbines, in compliance with Romanian standard STAS 12604, and incorporates anti-seismic safety measures.

The substation will be fully compliant with the relevant technical standards (PE 101/85 and PE 107) and will serve as the interface point between the wind farm and the National Electricity System. Electrical energy will be evacuated via two 400 kV input-output circuits, integrated into two high-voltage transmission lines located approximately 300 meters from the substation (400 kV Isaccea–(Medgidia)–Dobrudja line and 400 kV Isaccea–Varna line).

This infrastructure ensures efficient and reliable injection of renewable energy into the national grid.

3.4.2.4 Maintenance Activities

All operation and maintenance (O&M) activities will be executed under a dedicated contract with a specialized service provider. Maintenance is essential for ensuring operational efficiency, reducing downtime, and extending the useful life of the turbines and supporting infrastructure.

Maintenance activities are categorized as follows:

- **Scheduled Maintenance**: performed at regular intervals, this includes:
    - Inspection and calibration of key systems (rotor blades, gearbox, brake systems, cooling systems, etc.)
    - Replacement of consumables (oils, lubricants, filters, light bulbs)
    - Preventive diagnostics and functional tests

Routine maintenance typically requires one day per turbine and may be scaled based on seasonal conditions and operational data.

- **Unscheduled Maintenance**: involves corrective action and repairs in response to equipment malfunctions or performance deviations detected via the SCADA system. Interventions are conducted as needed, based on real-time diagnostics.
- **Long-Term Overhauls:** major component replacements and system overhauls are anticipated at 5, 10, or 15-year intervals, depending on wear and manufacturer recommendations.

All maintenance activities will be carried out in compliance with environmental and occupational health and safety regulations. No long-term storage of hazardous materials or waste will occur on site. Any waste or wastewater generated during operations will be:

- Temporarily stored in compliance with legal requirements,
- Properly classified and documented,
- Disposed of by authorized waste management companies.

Details regarding waste types and management are found in Section 3.8.6.

3.4.2.5 Environmental Protection

Throughout the operational phase, strict measures will be applied to prevent environmental pollution, in line with Romanian environmental legislation and international best practices. These measures include:

- Containment systems for fluids to prevent soil or groundwater contamination
- Routine environmental monitoring (e.g., noise, biodiversity impact, water quality)
- Rapid response protocols in case of accidental spills or equipment failure

The operation of the wind farm is not expected to generate emissions or air pollutants, and no significant waste streams are foreseen. As such, the project maintains a low environmental footprint during its active lifecycle.

3.4.2.6 Security and Site Management

To ensure site integrity and safety, a comprehensive Security Management Plan will be implemented. This includes:

- Deployment of a specialized security company to patrol and monitor the site
- Installation of perimeter fencing and controlled access points
- Integration of surveillance systems (cameras, sensors) with the central SCADA platform
- Regular inspections to detect and deter unauthorized access or vandalism

These measures safeguard both the infrastructure and public safety, especially considering the remote and expansive nature of the wind farm.

3.4.3 Decommissioning

The decommissioning phase represents the final stage in the lifecycle of the Dunarea East Wind Farm. It is anticipated that after at least 30 years of operation, the wind farm will either be repowered or fully decommissioned. A detailed decommissioning or repowering plan, including provisions for site cleanup and restoration, will be prepared and submitted to the relevant authorities well in advance of initiating any decommissioning activities. Although the specific decommissioning plan will be developed much closer to the end of the operational life of the project, this chapter provides a general overview of the decommissioning process and the key steps involved.

The decommissioning timeline is estimated to span a period of approximately 24 months from the start of the dismantling activities. This timeline includes:

- Preparation and site mobilization
- Dismantling of turbines and removal of infrastructure
- Rehabilitation of the site
- Completion of waste disposal and recycling activities

3.4.3.1 Decommissioning Planning

A comprehensive decommissioning plan will be prepared to ensure that all decommissioning activities are carried out in compliance with environmental regulations, safety standards, and industry best practices. This plan will address the following elements:

- Inventory of Decommissioned Components: An assessment of all wind turbine components, including nacelles, rotor blades, towers, electrical systems, foundations, and transformer stations.
- Decommissioning Technology: Identification of the specific technologies and processes that will be used to dismantle, remove, and recycle or dispose of materials. This will include cranes for removing turbine components, cutting equipment for deconstructing metal structures, and appropriate waste management techniques.
- Decommissioning Stages: A step-by-step outline of the decommissioning process, including timelines, resource requirements, and safety measures. The process will be organized into clear stages to ensure minimal disruption to the environment.
- Waste Inventory and Management: Identification of materials for disposal or recycling, and preparation of a waste management plan that includes safe storage and transportation of waste to appropriate disposal or recycling facilities.
- Permits and Regulatory Approvals: All necessary permits and regulatory documents, including those for environmental clearance, waste disposal, and transport, will be obtained from the competent authorities.

3.4.3.2 Decommissioning Activities

The actual decommissioning of the wind farm will involve several key activities. While the detailed process will be refined closer to the decommissioning date, it is expected that the following steps will be taken:

1. Isolation of Turbines from the Substation: To begin the decommissioning process, the turbines will be disconnected from the grid. This involves isolating each wind turbine from the 33/400 kV Deleni transformer station, ensuring that no power is generated during the dismantling process. The disconnection from the power grid will be closely monitored to maintain safety throughout the operation.
2. Dismantling of the WTGs: The nacelles and rotors will be carefully lowered to the ground using large cranes. These components will be transported to specialized recycling centers or storage sites for further processing. As wind turbines are primarily made from recyclable materials, these parts will be dismantled and recycled, minimizing waste and maximizing the value of recovered materials.

3. Dismantling of Turbine Towers: This involves cutting the steel structures into smaller pieces or removing concrete sections. Once dismantled, the materials will be sorted for recycling. The remaining foundation structures will be carefully separated and disposed of according to environmental guidelines.

4. Rehabilitation of the Site and Foundation Removal: After the turbines, towers, and other equipment have been removed, the foundations of the wind turbines and the transformer station will be dismantled. In many cases, the foundations will be excavated and either recycled or disposed of in accordance with environmental standards. Following the removal of all infrastructure, the land will be restored to its natural state as much as possible, with soil remediation and re-vegetation activities, if necessary, to ensure the ecological integrity of the site.

5. Restoration of the Project Area: The land used for the wind turbines, access roads, and the transformer station will be fully rehabilitated. This involves the removal of any construction debris, the restoration of topsoil, and the replanting of vegetation, as appropriate. The goal is to return the site to its natural or previous land use condition, in compliance with environmental restoration standards.

6. Temporary or Permanent Road Infrastructure Improvements: As part of the decommissioning activities, certain road infrastructure may require temporary upgrades or improvements to facilitate the transportation of dismantled components from the site. These works will be designed to minimize environmental impact and ensure that no long-term disruptions to the surrounding area occur.

3.4.3.3 Environmental and Traffic Considerations

Decommissioning activities will likely result in some environmental and traffic impacts, which are expected to be similar to those associated with the construction phase but over a shorter duration (approximately 3 months). These impacts include:

- **Traffic Generation**: The dismantling of turbines and transport of materials from the site will result in increased traffic associated with worker movements, heavy machinery, and transport vehicles. While this is expected to be temporary, the traffic volume will be carefully managed to minimize disruptions to the surrounding community and the environment.

- **Noise and Dust**: Dismantling and transportation activities could generate noise and dust, particularly when heavy machinery is used. Appropriate mitigation measures, such as dust suppression techniques and noise management, will be implemented to reduce impacts on nearby residents and wildlife.

3.4.3.4 Waste Management and Recycling

A key consideration in the decommissioning process is the management of waste. As wind turbine components are primarily made from recyclable materials (such as metals, plastics, and composites), the project aims to maximize the recycling potential of these materials. The economic value of recyclable materials often offsets the costs associated with dismantling and waste disposal. Specific measures include:

- Recycling of Materials: Metals such as steel and copper, along with plastics and certain turbine components, will be sent to recycling centers for reuse. Rotor blades, which are often made from composite materials, may require specialized recycling processes.

- Disposal of Non-Recyclable Waste: Non-recyclable materials, such as certain plastics, oils, and lubricants, will be disposed of according to the regulatory standards set by local authorities. The disposal process will be managed to ensure minimal environmental impact.

3.5 Project Schedule

Each phase includes specific activities with estimated durations, as outlined in the Project timeline below.

Table 3-4 Project Timeline

Project Phase	Key Activities	Estimated Duration	Milestone / Target Date
Planning	This phase includes the preparation of technical documentation, permitting, land use planning, and environmental assessment activities. It lays the foundation for all future project activities. It also includes the financing period.	**4 months**	**March 2026**
Construction	This phase will start at the Notice to Proceed (NTP) date and will comprise: site preparation works, BoP Engineering, roads and Crane Pads, WTG foundations and soil improvement, Collector System, Substation, Execution of OHL, TSA Equipment Manufacturing, anchor cages delivery to site, WTG Equipment delivery to site, turbine erection and mechanical completion in two stages and grid compliance.	**About 24 months**	**July 2028**
Operation	Commissioning, energy production, maintenance. COD is expected to start in a first stage in May 2028.	**30 years (up to 35 years)**	
Decommissioning	Turbine dismantling, removal of infrastructure, land restoration	**About 24 months**	

3.6 Project Budget

The estimated Project value is within the range 450-500 million euros.

3.7 Employment

The Project's employment requirements will vary considerably across its construction and operational phases, reflecting the differing nature and intensity of activities.

During the construction phase, the workforce is expected to peak at approximately 100–150 workers, including security personnel. This phase will require a combination of general labour, skilled trades, supervisory staff, and specialised technical expertise. Employment levels will fluctuate over the construction schedule in line with the sequencing of works and contractor mobilisation.

In the operational phase, staffing requirements will reduce significantly. The transformer substation is expected to be operated by approximately 7–11 personnel from Transelectrica, complemented by around 20 maintenance staff responsible for routine inspections, servicing, and technical support. A limited number of security personnel will also be retained for site protection. Security staff will be unarmed and are expected to be recruited locally.

The proportion of local versus non-local workers has not yet been determined. However, it is anticipated that several roles will be predominantly filled by the local labour market, particularly positions such as security guards, drivers, maintenance operators, administrative staff, and service providers for ancillary activities (e.g. septic tank emptying and fuel transport for emergency generators).

Conversely, roles requiring specialised technical expertise—such as electrical and mechanical engineering, as well as certain construction supervision functions—are likely to be sourced from outside the immediate region, at least during the construction phase.

The Project is also exploring opportunities to engage with local vocational and technical education institutions to support workforce development and local employment. Initial discussions have identified potential collaboration with the "Nicolae Istrăţoiu" Technological High School in Deleni, which may provide a pipeline of technically trained graduates. Training activities are expected to focus on electrical systems and maintenance-related competencies.

Training requirements will generally be delivered in collaboration with equipment suppliers and contractors. However, the specific modalities, responsibilities, and contractual arrangements for such training programmes will be defined at a later stage as part of procurement and contracting processes.

3.8 Resource Requirements

The Project will require various natural and manufactured resources, primarily during the construction phase. Resource use during the operational phase is minimal. All materials and resources will be sourced from authorized suppliers and transported to the site; no extraction or processing of raw materials will take place within or near protected natural areas.

3.8.1 Land Requirements

3.8.1.1 Current Land Use

The land intended for the Dunarea East Wind Farm is primarily classified for agricultural and pastoral use, in line with the General Urban Plan of the Municipality of Deleni. The site consists of agricultural land, pastureland, and farm roads, as detailed in the Urban Planning Certificate No. 50/02.03.2022, valid until 03.03.2025.

The majority of the land (approximately 95%) is used for agriculture, including crop cultivation and grazing, while the remaining 5% is pastureland. These areas are actively managed for agricultural production, and the land is under intense agricultural use, with some plots being used for pastoral grazing. The surrounding landscape includes valleys, grass-covered slopes, shrubland, forests, and additional pastureland in areas not directly impacted by the wind farm infrastructure.

3.8.1.2 Land Acquisition

The land required for the Dunarea East Wind Farm has been acquired through voluntary agreements with both private landowners and local communes. The acquisition process can be broken down as follows:

- Private Land: Approximately 95% of the land needed for the project is privately owned. These lands were secured through voluntary lease agreements with individual landowners in the Deleni Commune. These agreements cover the land parcels required for the installation of wind turbines, access roads, and other project components.
- Pastureland: The remaining 5% of the required land consists of pastureland, which is owned by the local commune of Deleni. This land was secured through participation usufruct contracts with the Deleni Commune and involves an agreement where the commune retains ownership, but the project has the right to use the land for the duration of the wind farm's operation.

The land acquisition process was conducted without physical displacement of individuals, and the agreements were signed for the full land parcels required for the project.

3.8.1.3 Total area affected by the Project

The total area affected by the project amounts to approximately 690,098 m² (69.00 ha), of which 327,104 m² (32.71 ha) will be temporarily occupied and 362,994 m² (36.29 ha) will be permanently occupied.

The breakdown by land use is as follows:

- Temporarily Occupied Land – 327,104 m² (32.71 ha):

- Foundation excavation area (excluding exterior foundation areas): 46,704 m² (4.67 ha)
- Storage and assembly platform area: 260,400 m² (26.04 ha)
- Site organization platform area: 20,000 m² (2.00 ha)

- Permanently Occupied Land – 362,994 m² (36.29 ha):
  - Ground area occupied by wind turbine foundations (47.5 sqm/turbine): 2,280 m² (0.22 ha)
  - High-voltage pole area: 1,950 m² (0.19 ha)
  - 400 kV station area: 30,000 m² (3.00 ha)
  - Assembly platform area: 77,904 m² (7.79 ha)
  - Surface area of new exploitation roads (55.75 km × 4.5 m): 250,860 m² (25.08 ha)

The existing exploitation roads that provide access to the plots where project components are located will be rehabilitated, consolidated, and modernized to allow for the transport of heavy equipment.

It is foreseen to redevelop existing access roads on an area of approximately 152,720 m² (15.27 ha), corresponding to about 38.18 km of road with an average width of 4.0 m.

Upon completion of construction, all temporarily occupied areas will be restored to their original condition by the contractor. Restoration works will be conducted in accordance with environmental protection requirements to ensure that the land is suitable for continued agricultural use wherever applicable.

3.8.2 Raw materials

The project will use pre-processed materials for construction, which will be transported to the site in phases. These materials include:

- **Natural Aggregates**: Ballast, crushed stone, sand, gravel, and raw stone for foundations, roads, and other infrastructure. Wood will be also used for formwork.
- **Other Materials**:
  - Concrete (various types)
  - Mortar and primer coatings
  - Fiber optic cable
  - Prefabricated concrete slabs for floors, walkways, and platforms
  - Geotextiles for drainage separation
  - Various piping and formwork materials

All materials will be sourced from authorized suppliers, with temporary storage points established along access routes for efficient material use. None of the natural resources necessary for the implementation of the project will be exploited within the protected natural areas of community interest in the vicinity of the project. All these resources will be made available by the companies that carry out the construction works and by the suppliers of construction materials.

The operational phase will rely entirely on wind energy, requiring no raw materials for power generation. Periodic use of lubricating and cooling oils for turbine components will occur, as specified by the manufacturer's maintenance schedule.

3.8.3 Use of Hazardous Substances and Chemicals

3.8.3.1 General Overview

During the execution of the works, no hazardous substances or chemical preparations will be produced on the project site. However, achieving the project objectives requires the use of both hazardous and non-hazardous chemical substances and preparations.

The main categories of substances used during construction and operation include:

- Fuels (diesel and gasoline) for vehicles and equipment;
- Lubricating oils and greases for machinery;
- Chemical products associated with wind turbine operation (e.g., dielectric fluids, lubricants, hydraulic and synthetic oils);
- Electrolyte gel in encapsulated batteries used for backup power;
- Sulfur hexafluoride (SF_6) used as an electrical insulator in switchgear.

No hazardous substances are stored in quantities that would trigger the requirements of Law No. 59/2016 on the control of major accident hazards involving dangerous substances (SEVESO Directive). Specifically:

- The installation does not exceed the upper-tier threshold for requiring a Safety Report;
- The installation does not exceed the lower-tier threshold for requiring a Major Accident Prevention Policy.

3.8.3.2 Substances Used During Construction

During the construction phase, fuels (diesel and gasoline), lubricating oils, and greases will be used to operate construction machinery and vehicles such as excavators, milling machines, vibratory compactors, asphalt pavers, dump trucks, and concrete mixers.

Oil changes for machinery and transport vehicles will be carried out only in specially arranged areas by qualified personnel. Used oils will be fully recovered and handed over to authorized operators for collection, recovery, or disposal, in compliance with environmental legislation.

Fuel will be supplied from a standardized mobile fuel station refueled through authorized PECO stations. The quantities of fuels and oils will be determined during the execution project phase based on equipment, technology, and project duration.

All chemical substances used on site will be stored in their original labeled containers, in designated secured areas within the construction site, and handled according to their Safety Data Sheets (SDS). Hazardous product packaging will be returned to suppliers, and transport will be performed by authorized specialized companies.

3.8.3.3 Chemical Substances Used in Wind Turbines

The chemical substances used in the wind turbines are provided below.

Table 3-5 Main chemical substances used in wind turbines

Substance / Composition	Classification
Dielectric fluid (natural esters / vegetable oil) – ENVIROTEMP™ FR3™	Not a hazardous substance or mixture
Dielectric fluid – MIDEL® EN 1204	Not classified
Dielectric fluid – MIDEL® EN 1215	Not classified
Antifreeze / Coolant (heavy-duty engines) – Delo XLC Antifreeze	Reproductive toxicity (developmental): Category 2; Target organ toxicity (repeated exposure): Category 2
Lubricant – Klüberplex AG 11-462	SARA Hazard Class (311, 312); WHMIS Class: Uncontrolled
Lubricant – Klüberplex BEM 41-132	Not hazardous under OSHA (2012) / GHS
Lubricant – Shell Omala S4 WE 320	Not classified as hazardous (Reg. EC 1272/2008)
Hydraulic oil – MOBIL DTE 10 EXCEL	Not hazardous according to regulatory guidelines
Hydraulic oil – Rando WM 32	Not classified under EU Regulation (EC) No. 1272/2008
Synthetic oil – Optigear Synthetic CT 320	Not classified; no signal word; no significant hazards
Synthetic oil – MOBILGEAR SHC XMP 320	Not hazardous under GHS
Synthetic oil – MOBIL SHC 524	Not hazardous according to MSDS Section 15

3.8.3.4 Operation and Maintenance

Maintenance activities on turbines will be performed exclusively by qualified personnel from the turbine maintenance company, to prevent environmental pollution.

During the first 1–5 years of operation, no major maintenance activities are expected, as the turbines are new; therefore, only minimal quantities of waste are anticipated.

Oil replacement intervals are determined based on inspections and the manufacturer’s technical specifications:

- Gearbox oil: replacement every 3–5 years, or only when quality parameters change. Modern transmission oils have extended lifespans.
- Hydraulic oil: replacement approximately every 10 years.
- Grease: replenished annually up to the marked levels.

Predictive maintenance includes oil monitoring and laboratory analysis to detect quality changes. Packaging waste resulting from maintenance activities will be collected, transported, and handed over to authorized recycling operators.

3.8.3.5 Batteries and Electrolytes

Electrolyte substances are present in gel form in the batteries used to provide direct current for internal services (as an independent power source in case of failure).

These batteries are of the encapsulated type, installed in a dedicated room within the control building, and operate under controlled temperature conditions. The electrolyte is not replenished or stored on site.

3.8.3.6 Use of Sulfur Hexafluoride (SF_6)

During operation, sulfur hexafluoride (SF_6) is used as an electrical insulator in medium- and high-voltage switchgear within the wind turbines and associated circuit breakers.

SF_6 poses a potential environmental hazard only in the event of accidental release, such as an explosion — a highly unlikely occurrence. At the end of their service life, installations containing SF_6 are collected, and the gas is recovered for reuse in new equipment.

The turbine manufacturer has implemented procedures for the safe recovery and disposal of SF_6 in cooperation with suppliers and clients.

According to technical data provided by the manufacturer, each turbine contains approximately 2.2 kg of SF_6, resulting in a total of 105.6 kg for 48 turbines, equivalent to 0.0344 tonnes per 100 MW of installed capacity.

3.8.3.7 Storage, Transport, and Recordkeeping

All chemical substances and preparations used within the project will be:

- Kept in their original labeled containers;
- Stored in specially arranged, secured spaces;
- Handled according to the requirements of their Safety Data Sheets.

Diesel fuel for the emergency generator set (which operates only in case of system failure) will be stored in the generator's built-in tank, equipped with a retention basin to prevent accidental leaks.

All substances required for the proper functioning of the turbines and the transformer station will be sourced from authorized suppliers and stored appropriately. Records of all substances used, recovered, and disposed of will be maintained in accordance with current legislative and regulatory requirements.

3.8.4 Water use

Water will be required during construction for site organization, dust suppression, concrete preparation, and sanitation. Key aspects include:

- **Water Supply**: Water for the construction phase will be brought to the site by water tanker trucks or sourced externally. Groundwater extraction will not occur.
- **Drinking Water**: Bottled water will be supplied for workers during the construction period.

No water is required for the operation of the Project.

3.8.5 Wastewater

Wastewater generated on-site will consist of domestic wastewater from workers, vehicle and equipment washing, and potentially hazardous liquid waste (fuels, chemicals, lubricants, paints, etc.).

As part of the wastewater management plan, ecological toilets will be installed for the workers, and these will be emptied regularly by licensed contractors to ensure proper waste disposal. The wastewater generated from the sanitary facilities, concrete washout as well as from vehicle and equipment washing, will be stored in tanks and removed periodically for treatment and disposal by authorized waste management operators.

During the Operational Phase, the land's natural drainage system, aided by the terrain’s general slope, will ensure the proper management of rainwater. The layout of the wind turbines and related infrastructure has been designed to maintain this natural water flow, ensuring that the surrounding land's hydrology remains unchanged.

3.8.6 Waste

3.8.6.1 Construction phase

During the construction phase, a variety of waste types will be generated, including both hazardous and non-hazardous materials. The waste generated will depend on the specific activities being carried out, such as excavation, equipment installation, and material handling. The management of this waste will follow the principles outlined in the Government Decision No. 856/2002 and will focus on minimizing environmental impact by promoting waste recovery and recycling.

The table below outlines the types of waste expected during this phase, along with their respective waste codes.

Table 3-6 Waste produced during Project construction phase

Waste Name	Waste Code (HG 856/2002)
Chlorinated Mineral Hydraulic Oils	13 01 09
Non-Chlorinated Mineral Hydraulic Oils	13 01 10
Non-Chlorinated Mineral Engine, Gear and Lubricating Oils	13 02 05
Other Engine, Gear and Lubricating Oils	13 02 08
Other Hydraulic Oils	13 01 13
Paper and Cardboard Packaging	15 01
Plastic Packaging	15 01 02
Wooden Packaging	15 01 03
Metal Packaging	15 01 04
Mixed Packaging	15 01 06
Packaging Containing Residues or Contaminated with Hazardous Substances	15 01 10
Absorbent Materials	15 02 02
Concrete	17 01 01
Construction and Demolition Waste (including Excavated Soil from Contaminated Sites)	17
Mixtures of Concrete, Bricks, Tiles, and Ceramic Products (other than specified in 17 01 06)	17
Wood	17 02
Glass	17 02 03

Waste Name	Waste Code (HG 856/2002)
Plastics	17 02 03
Copper, Bronze, Brass (Copper)	17 04
Aluminum	17 04
Iron and Steel	17 04
Metal Mixtures	17 04
Cables Containing Oil, Tar, and Other Dangerous Substances	17 04 10
Cables (other than those specified in 17 04 10)	17 04
Soil and Stones (other than those specified in 17 05 03)	17 05 03
Paper and Cardboard	20 01
Textiles	20 01 11
Solvents	20 01 13
Plastics	20 01 39
Metals	20 01 40
Mixed Municipal Waste	20

3.8.6.2 Operational phase

Once the wind farm becomes operational, waste generation will primarily result from ongoing maintenance activities and routine operations, with the waste types expected to be more limited and specialized. The overall impact from waste in this phase is expected to be minimal compared to the construction phase.

The table below outlines the waste types and codes for the operational phase.

Table 3-7 Waste produced during Project operational phase

<table>
<tr><th>Waste Name</th><th>Waste Code (HG 856/2002)</th><th>Quantity (estimated)</th><th>Notes</th></tr>
<tr><td>Paint and Varnish Waste Containing Organic Solvents or Other Dangerous Substances</td><td>08 01 11</td><td>0.1 tons</td><td>Occasionally formed during maintenance operations; collected by the maintenance company for delivery to the authorized operator.</td></tr>
<tr><td>Non-Chlorinated Hydraulic Mineral Oils</td><td>13 01 10</td><td rowspan="3">6 tons</td><td rowspan="3">Waste oils come from the maintenance of turbines and the transformer station.
Oil replacement/refilling is carried out by a specialized company; used oil is not stored on site.
Used oils are handed over to the authorized operator.</td></tr>
<tr><td>Non-Chlorinated Mineral Engine, Transmission, and Lubricating Oils</td><td>13 02 05</td></tr>
<tr><td>Synthetic Engine, Transmission, and Lubricating Oils</td><td>13 02 06</td></tr>
</table>

Waste Name	Waste Code (HG 856/2002)	Quantity (estimated)	Notes
Non-Chlorinated Mineral Insulating and Heat Transmission Oils	13 03 07		
Paper and Cardboard Packaging	15 01 01	0.2 tons	These come from various spare parts or materials used in the maintenance of the wind farm. They are collected by category and handed over to the authorized operator.
Plastic Packaging	15		
Wood Packaging	15		
Metal Packaging	15 01		
Packaging Containing Residues or Contaminated with Dangerous Substances	15 01 10	0.2 tons	Packaging waste (containers for grease, other lubricants, oils) – to be handed over to the authorized operator.
Absorbents, Filter Materials (including Oil Filters), Polishing Materials, Protective Clothing Contaminated with Dangerous Substances	15 02 02	0.05 tons	Occasionally formed during maintenance operations; collected by the maintenance company for delivery to the authorized operator.
Oil Filters	16 01 07	0.1 tons	They are taken directly by the authorized operator.
Antifreeze Fluids (Other than those specified in 16 01 14)	16 01 14	0.1 tons	Normally used to top up the cooling system; the fluid is replaced only if it no longer meets the required specifications. Used antifreeze is collected by the maintenance company for delivery to the authorized operator.
Waste Electrical and Electronic Equipment (WEEE)	16 02	0.1 tons	Waste resulting from the maintenance of electrical and electronic systems – is handed over to the authorized operator.
Lead Batteries	16 06 01	0.4 tons	From the electrical station and turbines; replaced when exhausted, once every 5-8 years. Batteries are collected for recycling by the maintenance company – handed over to the authorized operator.
Alkaline Batteries	16 06		
Discarded Electrical and Electronic Equipment (containing hazardous components)	20 01 35	0.2 tons	Waste from the maintenance of electrical and electronic systems – handed over to an authorized operator.
Mixed Municipal Waste	20	1 ton	Temporary storage in Eurobins, collected by an authorized operator

In addition to the primary waste types generated during routine maintenance and operation of the wind turbines, there are also secondary types of waste that may arise from other activities, such as maintenance in the electrical and transformer stations.

Table 3-8 Secondary waste expected to be produced during Project operational phase

Waste Name	Waste Code (HG 856/2002)	Management
Used Oils and Fats (Used Grease)	12 01 12	Collected from turbine and transformer station maintenance. Sent to authorized operators for disposal or recycling.
Chlorinated Mineral Hydraulic Oils	13 01 09	Collected during turbine and transformer station maintenance. Replaced by specialized company, oil is not stored on-site.
Non-Chlorinated Mineral Engine, Transmission, and Lubricating Oils	13 02 05	Handed over to authorized operator after use in maintenance.
Other Hydraulic Oils	13 01 13	Handed over to authorized operator after use.
Chlorinated Mineral Engine, Transmission, and Lubricating Oils	13 02	Handled by specialized company, oil replacement/refilling.
Biodegradable Engine, Gear, and Lubricating Oils	13 02 07	Handed over to authorized operator for disposal or recycling.
Other Engine, Gear, and Lubricating Oils	13 02 08	Collected and handed over to authorized operators.
Mixed Packaging	15 01 05	Segregated and handed over to authorized operators for recycling.
Used Tires	16 01 03	Sent to authorized operators for recycling.
Copper, Bronze, Brass (Copper)	17 04	Segregated and handed over to authorized operators for recycling.
Aluminum	17 04	Segregated and handed over to authorized operators for recycling.
Metal Mixtures	17 04 07	Handed over to authorized operators for recycling.
Metal Waste Contaminated with Dangerous Substances	17 04	Collected and transported to authorized waste treatment facilities.
Cables Containing Oil, Tar, or Other Dangerous Substances	17 04 10	Transported to specialized operators for proper disposal or recycling.
Cables (Other Than Those Specified in 17 04 10)	17 04	Handed over to authorized recycling operators.
Solvents	20 01 13	Collected and handed over to an authorized operator.

3.8.6.3 Waste Management

Waste Management Approach

Waste generated during the Project will be carefully managed to ensure environmental protection:

- **Hazardous waste**, such as used oils, solvents, and chemicals, will be segregated from non-hazardous materials and stored in clearly marked, secure containers. Only licensed contractors will be responsible for handling and transporting hazardous materials, in full compliance with local regulations. These materials will either be recovered or disposed of properly to minimize environmental risks.

- **Non-hazardous waste**, including packaging materials, metals, wood, and concrete, will also be separated and stored according to their type. Recyclable items will be collected separately and sent to authorized recycling facilities, while non-recyclable waste will be disposed of in an environmentally responsible manner.

To support recycling efforts, selective collection points will be established at the site to encourage the sorting of materials such as paper, plastic, metals, and glass throughout both the construction and operational phases. This will help increase the recovery rate of materials and reduce waste sent to landfills.

Waste Transport

Waste will be transported by authorized waste management companies, ensuring compliance with Government Decision No. 1061/2008. All waste will be documented and tracked to guarantee that it is disposed of or recycled in accordance with environmental laws. This documentation will be maintained to meet regulatory requirements and ensure full traceability of waste management practices.

Monitoring and Reporting

The contractor will be responsible for keeping detailed records of all waste generated during both the construction and operational phases. Waste management practices will be monitored throughout the project, and regular progress reports will be submitted to the Environmental Protection Agency (EPA) to ensure ongoing compliance with local regulations and environmental standards.

Waste Management During Decommissioning

During the decommissioning phase, waste will primarily consist of materials resulting from the dismantling of turbines, foundations, and other infrastructure. Metals, concrete, and electrical components will be separated and recycled wherever possible. Hazardous waste generated during decommissioning will be managed according to the same standards as during the operational phase to prevent any environmental contamination.

Waste Management Plan (WMP)

A comprehensive Waste Management Plan (WMP) will be developed and implemented for the entire project lifecycle, including construction, operational, and decommissioning. The WMP will outline key strategies for efficient waste management and compliance with legal requirements, focusing on minimizing environmental impacts.

The plan will include:

- **Identification of Waste**: A thorough identification of all waste streams generated during each phase of the project.
- **Waste Minimization**: Strategies to reduce waste generation at the source, focusing on efficiency and resource conservation.
- **Reuse and Recycling**: Maximizing the reuse and recycling of materials to reduce landfill disposal and promote sustainable practices.
- **Disposal**: Ensuring that non-recyclable or non-reusable waste is disposed of in an environmentally responsible manner, following Romanian regulations.

The WMP will be continuously updated and adapted as the project progresses, ensuring that waste is managed efficiently, with a focus on reducing environmental impact at every stage of the project.

3.8.7 Electricity supply

During the Construction Phase, electricity and fossil fuels (gasoline and diesel) will be required for powering machinery, equipment, and temporary site facilities. Energy will be sourced from generators or temporary connections as needed.

Regarding Project operation, each wind turbine must be connected to the electricity grid to function properly. Although turbines are designed to generate power, they also need electricity from the grid during certain situations:

- At start-up, each turbine draws a small amount of energy to activate its systems.
- When the wind is not strong enough to generate electricity, the turbines need to receive power from the national grid to keep essential systems running.

To meet these needs, the wind farm will be connected to the electricity network operated by Enel, the local distribution company. This connection will be established under Connection Contract No. C 49/17.01.2024.

The main components that contribute to the turbine's internal electricity consumption include:

Table 3-9 Turbine's internal electricity consumption

Component	Maximum Power Usage
Hydraulic motors (used for blade movement)	3 × 18.5 kW
Yaw motors (for orienting the turbine)	35–42 kW (depending on grid frequency: 50/60 Hz)
Generator cooling fans	4 × 4 kW
Water pumps (for cooling systems)	Up to 15 kW
Gearbox lubrication oil pump	7.5 kW
Control system (including heaters and sensors)	Approximately 4 kW

These are maximum consumption values. Actual consumption will vary depending on the turbine's operating conditions, weather, efficiency, and downtime.

3.9 Associated facilities

Associated facilities are those facilities that are not funded as part of the Project (funding may be provided separately by the client or third parties including the government), and whose viability and existence depend exclusively on the Project and whose goods or services are essential for the successful operation of the Project (IFC Performance Standard 1, Social and Environmental Assessment and Management Systems).

DNV conducted a screening of Project components to determine whether it should be treated as:

- Part of the project core (included directly in the ESIA assessment), or
- An Associated Facility (included within the ESIA even if third-party financed).

The screening adopts a conservative approach: where an item is necessary for grid export or for project operation and would not exist without the wind farm, it is treated as "associated" and included in the main impact assessment. Table below shows the outcome of the screening.

Table 3-10 Associated Facilities

Component (from Section 3.2)	Associated facility (IFC)?	Rationale / Criterion applied	Recommended treatment in ESIA
Wind Turbine Generators	No — Core project component	Turbines are the primary project asset and are funded/constructed by the Project Owner. They are inside the project boundary.	Fully assessed in the present ESIA.
Internal 33 kV underground cable network	No — Core project component	Necessary to collect turbine output and located within project footprint; constructed by the project.	Fully assessed in the present ESIA (routing, trenching, soil disturbance, archaeology, contamination, reinstatement).
Deleni 33/400 kV transformer station (on-site)	No — Core project component	Substation is on-site and necessary for stepping up to 400 kV; built as part of the project scope.	Fully assessed in the present ESIA (land take, noise, oil containment, drainage, EMF, operations).
400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers	No — Core project component	Although short, these overhead lines and towers are physically connected to the wind farm and are necessary to evacuate power to the national grid. They are included within the overall project scope and will be developed as part of the Project.	Fully assessed in the present ESIA.
Additional access roads (new or widened roads inside project area)	No — Core project component	New permanent access roads constructed specifically for turbine delivery, construction and maintenance are integral parts of the Project and located within the project scope/footprint.	Fully assessed in the present ESIA.
Laydown areas, concrete batching, temporary offices / construction camps (on-site temporary works)	No — Core project temporary facilities	These are temporary, within project boundary and provided by project contractor/owner.	Assess in main ESIA (temporary impacts, waste, workers' health, sanitation, traffic).

4 ANALYSIS OF ALTERNATIVES

In accordance with best practices in ESIA, alternatives represent different ways of implementing a project to achieve its agreed objectives. Considering alternatives is an essential step in the ESIA process as it provides a concrete opportunity to adapt project design to minimize adverse environmental impacts and reduce the significance of potential effects. Moreover, early identification and thorough analysis of alternatives can prevent unnecessary delays in the EIA process, facilitate timely environmental permitting, and ensure efficient project implementation.

The purpose of this section is to present the alternatives studied for the proposed project, evaluate their feasibility, environmental impact, and socio-economic implications, and justify the selection of the preferred project solution.

The evaluation of alternatives was conducted using criteria that reflect the principles of sustainable development, including:

- Economic and social feasibility;
- Minimization of adverse effects on environmental factors;
- Compatibility with specific environmental conditions in the project area.

The alternatives were developed considering the project objectives, the geographic area, existing environmental conditions, potential environmental risks, and relevant national and European environmental targets.

The following chapter is based on the AON national EIA, which evaluated different options to achieve the project's objectives while minimizing environmental impacts. The alternatives assessment informed the selection of the preferred wind energy configuration. It should be noted that, following the EIA, the project layout was slightly adjusted to reach the current design of 45 wind turbines with a nominal capacity of up to 7 MW each, for a total installed capacity of up to 315 MW. These adjustments are minor and do not affect the validity of the alternatives analysis presented in this chapter.

4.1 Alternative "0" – Non-implementation of the Project

The first alternative, often referred to as the "zero" or no-project alternative, involves leaving the land and resources in their current state without implementing the Project. This approach provides a baseline against which other alternatives can be compared. Under this scenario, air quality would follow existing trends, with no indirect positive contribution from Project activities. The geological environment and water bodies, both surface and groundwater, would remain unchanged, while the current land use, predominantly agricultural and pastoral, would be maintained. Biodiversity would continue to experience anthropogenic pressure from ongoing farming activities, and the local population, heritage features, and landscape would not be altered.

Although this alternative avoids direct environmental impacts, it does not address the growing need for sustainable energy or contributes to the reduction of greenhouse gas emissions, limiting progress toward national and European energy and climate objectives.

4.2 Alternative "1" – Technology Alternatives for Electricity Generation

Alternative 1 examined three potential technological approaches to electricity generation:

- conventional fossil fuel-based generation,
- solar photovoltaic energy, and
- wind energy.

4.2.1 Conventional Energy – Natural Gas Combustion

The conventional energy option involves constructing a 307.2 MW thermal power plant using natural gas. The plant would operate for approximately 5,000 hours per year with variable load, comprising 3,333 hours at minimum power with all energy sold on the Day-Ahead Market (DAM) and 1,667 hours at maximum power, with energy supplied to both the Day-Ahead and Balancing Market (BM). The average net efficiency of the plant would be approximately 46%, resulting in an estimated annual electricity production of 920,220 MWh. Internal consumption of electricity would account for approximately 10% of production, with the remaining energy injected into the national electricity network via a new 110 kV substation.

The natural gas supply for the plant would be provided through a 100-meter connection to a new regulation and metering station capable of 100,000 Nm^3/h. The plant infrastructure includes thermal engines, water and compressed air supply systems, a cooling system, combustion gas exhaust systems, oil storage, and a central electrical room ventilation system.

Despite technical feasibility, this alternative generates significant environmental impacts. Greenhouse gas emissions are projected at 322,077 tons of CO_2 per year, amounting to over 6.4 million tons over 20 years of operation. In addition to CO_2, the combustion process produces nitrogen oxides, carbon monoxide, gaseous organic carbon, and particulate matter. These emissions contribute to air pollution, acidification, and tropospheric ozone formation. Other environmental considerations include noise, thermal impacts, and resource consumption. While the use of natural gas is cleaner than coal or oil, the emissions and operational impacts remain considerable.

4.2.2 Renewable Energy – Solar Photovoltaic (PV) Plant

The solar PV alternative involves the installation of a 310 MW-AC photovoltaic power plant on the same site as the proposed project. The infrastructure includes photovoltaic panels, a transformer station, underground power lines, access roads, and site facilities. Panels are installed at a height that allows tilting according to the sun’s position, while maintaining the ability to manage vegetation and perform soil maintenance beneath the panels. Although solar panels cover a significant portion of the land, their elevated installation ensures that most of the underlying ground can still be used for agricultural purposes.

The PV plant is estimated to produce 419,120 MWh of electricity annually, corresponding to a reduction of 258,890 tons of CO_2 per year compared to conventional fossil fuel energy production, or over 5 million tons over a 20-year operating period. Despite these benefits, solar energy is variable and dependent on weather conditions. Energy production ceases at night and decreases during cloudy or rainy days, limiting its capacity to reliably meet electricity demand. Additionally, large-scale solar installations reduce the area available for conventional agriculture, although dual-use options exist for certain crops.

Compared to wind energy, the PV option produces roughly half the electricity for the same installed capacity, highlighting its limitations in large-scale energy generation.

4.2.3 Renewable Energy – Wind Energy

The wind energy alternative proposes a wind farm with a total nominal capacity of up to 307 MW, consisting of 48 turbines, each with a capacity of 6.4 MW. This technology offers significant advantages in environmental performance, energy generation, and sustainability. The annual electricity production is estimated at 768,000 MWh, resulting in an annual reduction of approximately 474,394 tons of CO_2 compared to fossil fuel alternatives, and a cumulative reduction of nearly 11.86 million tons over a 25-year operating period.

Wind energy has several advantages over conventional energy, including zero direct greenhouse gas emissions, elimination of pollutant emissions into the atmosphere, and conservation of natural resources such as coal, gas, and oil. It also contributes to achieving national and EU renewable energy targets while minimizing risks to biodiversity and public health. Compared to solar energy, wind energy provides continuous electricity generation, higher annual output at equivalent installed capacity, and requires significantly less land per MW installed, making it more efficient in terms of land use.

Based on these assessments, the project owner selected wind energy as the preferred technological solution due to its minimal environmental impact, high energy efficiency, and alignment with sustainable development objectives.

It is noted that this alternative was further modified to reach the actual configuration of 45 wind turbines, each with a nominal capacity of up to 7 MW, resulting in a total installed capacity of up to 315 MW.

4.3 Design Alternatives

Within the selected wind energy technology, the following alternatives were considered.

4.3.1 Alternative 2 – 53 Wind Turbines (6 MW each)

This alternative involves the installation of 53 turbines, each with a capacity of 6 MW and a hub height of 206 meters. The configuration results in seven turbines located within or near protected natural areas, including ROSCI0071 Dumbraveni – Valea Urluia – Lacul Vederoasa, ROSPA0001 Aliman-Adamclisi, and ROSCI0353 Deleni Cave. Five of these turbines posed a risk to the integrity of grassland and scrub ecosystems and were eliminated in previous stages of environmental analysis.

Additional concerns with this alternative include increased risk of bird collisions due to turbine lighting, greater soil disturbance from the construction of more foundations, access roads, and assembly platforms, and higher operational emissions associated with maintenance activities. Although technically feasible, the environmental constraints associated with this layout made it less desirable.

4.3.2 Alternative 3 – 45 Wind Turbines (6.4 MW each)

The second design alternative consists of 45 turbines with 6.4 MW capacity and the same hub height of 206 meters. This configuration eliminates turbines in sensitive areas, preserving the integrity of protected ecosystems. Fewer turbines reduce the number of foundations, access roads, and assembly platforms, thereby minimizing the area permanently and temporarily occupied during construction. Consequently, soil disturbance is reduced, biodiversity impacts are minimized, and operational machinery usage is lower, resulting in fewer emissions.

Alternative 3 maintains a comparable energy output while significantly lowering environmental risks. By avoiding turbines in protected areas and reducing infrastructure needs, this design offers the optimal balance between technical feasibility, energy generation, and environmental protection.

It is noted that this alternative was further modified to reach the actual configuration of 45 wind turbines, each with a nominal capacity of up to 7 MW, resulting in a total installed capacity of up to 315 MW and dimensions ranging from 121 – 128 m hub height and 162 – 165 rotor diameter.

4.4 Comparative Assessment and Preferred Alternative

A comparative evaluation of all alternatives highlights that non-implementation avoids direct environmental impacts but fails to meet energy and climate objectives. Conventional thermal energy generation presents the highest environmental risk due to significant emissions and resource consumption. Solar photovoltaic energy offers a low-impact alternative but is limited by intermittent generation and land use constraints. Wind energy, particularly the design with 45 turbines, provides a balanced solution with continuous energy production, minimal land use, and reduced environmental impacts.

Based on this assessment, the preferred alternative for the project is the installation of a 45-turbine wind farm. This configuration achieves the project's energy objectives, minimizes impacts on the environment and biodiversity, aligns with sustainable development principles, and supports national and European renewable energy and greenhouse gas reduction targets.

5 REGULATORY AND POLICY FRAMEWORK

The objective of this Section is to highlight the political, legislative and administrative framework of the Project, including the social and environmental policy requirements of the lenders.

5.1 National regulatory framework

The environmental legal framework within Romania (Law 137/19954) includes overarching laws covering such areas as environmental protection, water, waste, nature protection, noise protection, air quality and cultural heritage, which transpose the main obligations of the specific EU Directives. With regards to social aspects, there are national laws covering health protection, occupational health & safety, labour relations, occupational safety, employment, social protection, land acquisition, cadastre etc. The main environmental regulatory instruments relevant to the proposed Project and that will need to be considered as part of the ESIA process for the Project are outlined in table below:

Table 5-1 Relevant National Legislation

Law	Number	Description	Relevance
Environmental			
Law on Environmental Protection	137/1995, *amended several times*	Makes a reference to the Environmental Impact Assessment (EIA) as a means for the protection of natural recourses.	EIA shall be an integral part of the technical documents; the Project execution cannot commence if the EIA procedure is not properly implemented.
Law on Environmental Impact Assessment	292/2018[1]	Defines the procedures for the identification, assessment, and reporting of the environmental impacts of certain proposed projects and associated administrative procedures, required for the decision-making process on *issuing the Environmental Consent by the Ministry of Environment*. The major provisions set out in the Law include: - Principles and strategic elements that are the basis of further environmental legislation. - Right to access information on environmental quality. - Right to information and consultation in decision-making of the public; - Establishment of liabilities regarding environmental quality rehabilitation. - Management regime for hazardous chemicals, wastes, fertilizers, and pesticides. - Protection of natural resources and biodiversity conservation. - Protection of water and aquatic ecosystems.	The Law defines the following EIA phase.

[1] Source: Romanian Legislative Portal [LEGE 292 03/12/2018 - Portal Legislativ (just.ro)]

Law	Number	Description	Relevance
		- Protection of the atmosphere, climate change, management of environmental noise. - Protection of soil, subsoil and terrestrial ecosystems - Protection of human settlements. - Prerogatives and responsibilities of the environmental protection authorities, central and local authorities, natural and legal persons. - Right to appeal to the administrative or judicial authorities.	
Law on Ambient Air Quality	104/2011	Transposes EU Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe into national law. The law aims to protect human health and the environment as a whole by regulating measures aimed at maintaining or improving ambient air quality.	Sets out methods and criteria, established at the European level, for the assessment of air quality and provides limit values for pollutants.
Law on Waters	107/1996[2]	Stipulates Good surface waters and Groundwater chemical status - the chemical status required to meet the environmental objectives for surface waters and does not exceed environmental quality standards. Sets a requirement for any interventions aimed to improve, rehabilitate, and maintain the water status to be aligned with plans for management of river basins.	Define the need for classification of surface and ground water.
Law on Nature Protection	49/2011 amending 57/2007[3]	Law on the regime of natural protected areas, the conservation of natural habitats, wild flora and fauna, amends the previous comprehensive Government Emergency Ordinance 57/2007. Establishes a national ecological network of protected areas.	Regulates that an assessment of impacts deriving from plans / measures / interventions on conservation goals and integrity of the ecological network is compulsory.
Methodological Guide on the appropriate assessment	- (June 14, 2023)	This methodological guide, published by the Ministry of Environment, Waters and Forests, establishes the steps to be taken in order to carry out the Appropriate Assessment, according to the provisions of art. 28 of Government Emergency Ordinance no. 57/2007 on the regime of protected natural areas, conservation of Natural Habitats, flora and fauna.	Regulates Appropriate Assessments
Law on Waste	92/2021[4]	Government Emergency Ordinance 92/2021 replaces Law 211/2011 on the waste regime (repealed) and ensured transposition into Romanian legislation of the new EU Waste Directive 2018/851.	Ensures a high level of protection of the environment and of the health of the population through the institution of measures: prevention and reduction of waste generation and management, reduction of the adverse effects and of the general effects determined by the use of resources.

[2] Source: Romanian Legislative Portal [LEGE 107 25/09/1996 - Portal Legislativ (just.ro)]
[3] Source: Romanian Legislative Portal [OUG 57 20/06/2007 - Portal Legislativ (just.ro)]
[4] Source: Romanian Legislative Portal [ORD DE URGENTA 92 19/08/2021 - Portal Legislativ (just.ro)]

Law	Number	Description	Relevance
Law on Noise Protection	121/2019[5]	Law on the assessment and management of ambient noise.	Sets obligation for developing measures to reduce noise emitted by the major sources, in particular road and rail traffic aircraft, outdoor and industrial equipment, mobile machinery and other sources of environmental noise pollution and annoyance.
Social			
Law on Road Traffic Safety	195/2002[6]	Government Emergency Ordinance 195/2002 on traffic on public roads, with several amendments and additions, was republished as Law 49/2006.	Regulates the rules and behaviour of participants in the traffic, signalisation, drivers` licensing, vehicles` public safety and maintenance etc.
Law on Cultural Heritage	422/2001[7] 26/2008[8] 451/2002[9]	Law 422/2001 amended several times, provides that historical monuments are immovable assets, constructions and lands located on the territory of Romania, significant for national and universal history, culture and civilization.	Regulates the scope of Cultural Heritage regarding preservation, protection, public access, communication, and provision of necessary resources in order that the heritage is enjoyed by current generations and forwarded to future generations.
Law on Labour	53/2003[10]	Partially amended by several laws and republished. Stipulates that: discrimination is prohibited in employment and occupation in respect of recruitment, training, promotion of employment, terms and conditions of employment, disciplinary measures, cancellation of the contract of employment or other matters arising out of the employment relationship and regulated by Law and other Laws into force.	Regulates the rights and obligations deriving from employment. Provisions of the Collective Contract, Employer’s Internal Act and Labour Contract shall be in compliance with the provisions of this Law.
Law on Occupational Safety and Health at Work	319/2006[11]	Law on Occupational Safety and Health at Work, amended by Law 198/2018 and Law 208/2021. The objective of the Law on Occupational Safety, Health and the Working Environment is to prevent occupational injuries and diseases at the workplace and to protect the working environment.	Sets measures for improving occupational the safety and health of employees. General principles for prevention of occupational hazards, elimination of hazardous and accidents factors, information, consultation, balanced participation in improving the occupational safety and health, treatment of employees, their representatives, and general guidelines for implementing such principles.

[5] Source: Romanian Legislative Portal LEGE 121 03/07/2019 - Portal Legislativ (just.ro)
[6] Source: Romanian Legislative Portal OUG (R) 195 12/12/2002 - Portal Legislativ (just.ro)
[7] Source: Romanian Legislative Portal LEGE 422 18/07/2001 - Portal Legislativ (just.ro)
[8] Source: Romanian Legislative Portal LEGE 26 29/02/2008 - Portal Legislativ (just.ro)
[9] Source: Romanian Legislative Portal LEGE 451 08/07/2002 - Portal Legislativ (just.ro)
[10] Source: Romanian Legislative Portal CODUL MUNCII (A) 24/01/2003 - Portal Legislativ (just.ro)
[11] Source: Romanian Legislative Portal LEGE 319 14/07/2006 - Portal Legislativ (just.ro)

5.1.1 Details of applicable Romanian Environmental Legislation

5.1.1.1 Engagement for the Environmental Impact Assessment in Romania

Following the approval of the Urban Zoning Plan and as a pre-condition to obtaining the Construction Permit for the Project, an Environmental Impact Assessment (EIA) needs to be undertaken in line with the requirements of Law 292/2018, which is aligned with the requirements of the EU EIA Directive 2014/52/EU.

The procedure is run by the central environmental authority (National Environmental Protection Agency) in line with article 19 of Government Emergency Ordinance no. 195/ 2005, approved with amendments by Law 265/ 2006, subsequently amended. The EIA procedure will require public participation similarly to the SEA procedure in alignment with the following requirements:

- The submission of the application documents (firstly, Notification and then, Presentation Memorandum) for Project approval by the owner needs to be disclosed publicly by the Project Developer through media (newspaper) announcement whose standard text is indicated by EPA;

The *screening decision* is to be published in local media and own website by the Project Developer as well as on the environmental authority's website;

- Following the submission of the EIA Report to competent environmental authority, this will be published on the environmental authority's webpage and on that of the Project developer, and this will issue a public announcement to communicate the details of the public hearing at least 30 days prior to the event;

Any relevant *comments received to the draft EIA* need to be incorporated in the final EIA Report;

- The decision made by the competent environmental authority to approve the Project and issue the regulatory approval document (Environmental Agreement) also needs to be subject to public commenting over a period of 10 days.

Figure below presents the process for securing the construction permit for the Project (left side) with an in-depth view of the stakeholder engagement milestones as part of the EIA procedure (right side), which is required to be completed prior to subsequently applying for the construction permit (left side).

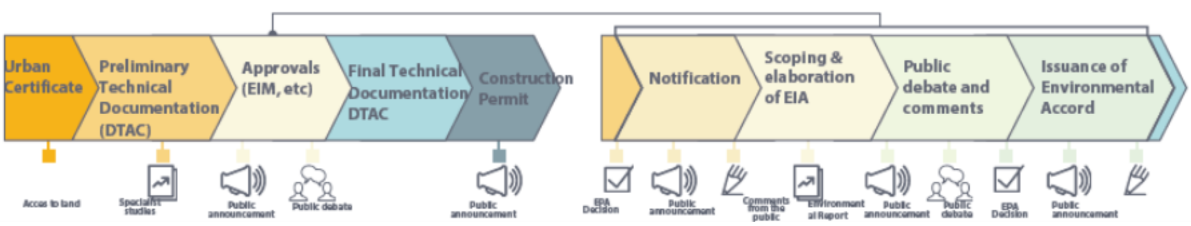

Figure 5-1 Stakeholder engagement milestones as part of the EIA Procedure

5.1.1.2 Strategic Environmental Assessment (SEA) Process in Romania

In Romania, according to article 14 of the Government Decision no. 1076/2004 (transposition of the SEA Directive) "the scope and level of detail of the information to be included in the environmental report, as well as the assessment of the significant effects of the plan or program on the environment" are established in an SEA Working Group, which is specially created for this purpose. The SEA Working Group shall include representatives of the program holder, competent authorities for the environment and public health and representatives of other authorities concerned with the program.

The information presented in the report is presented to the working group in one or more meetings, and the finalization of the environmental report begins only after all the issues presented have been agreed.

In addition, the SEA will comply with the following documents:

- EC Guideline on the implementation of Directive 2001/42 / EC on the assessment of the effects of certain plans and programs on the environment (Law no. 292/2018)

Directive 79/409/CEE on the conservation of wild birds and Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna (Government Emergency Ordinance 57/2007 on the regime of protected natural areas, conservation of natural habitats, wild flora and fauna);

- Assessment of plans and projects that significantly affect Nature 2000 sites - 2002, Methodological guide on the provisions of Article 6 (3) and (4) of the Habitats Directive 92/43/EEC;

Handbook on SEA for Cohesion Policy 2007-2013:

- Guidelines on the integration of climate change and biodiversity in the strategic environmental assessment - EU, 2013;

Convention on Environmental Impact Assessment in a Transboundary Context (EIA Convention), adopted at Espoo, Finland on 25 February 1991, ratified by Romania by Law no. 22 of 22 February 2001;

- Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context, adopted in Kiev, Ukraine, on May 21, 2003, ratified by Romania by Law no. 349 of 18 November 2009.

Also, the specific national legislation, manuals and guidelines developed by Romania are taken into account.

Romanian laws and regulations related to the SEA

- Government Decision 1076/2004 on the environmental assessment (SEA) procedure for plans and programs (transposition of Directive 2001/42/EC);
- Law 292/2018 on assessing the impact of certain public and private projects on the environment (transposition of Directive 2011/92/EU)
- Law on environmental protection – promulgated by Government Emergency Ordinance (GEO) 195/2005, approved and amended by Law 265/2006 and subsequently amended by GEO 57/2007; 114/2007 and 164/2008;
- Legislation on the regime of protected natural areas, conservation of natural habitats and wild flora and fauna (transposing Directive 92/43/EEC, as amended) – promulgated by Government Emergency Ordinance (GEO) 57/2007, approved and amended by Law 49/2011;
- Methodological guide regarding the adequate evaluation of the potential effects of the plans / programs and projects on the protected natural areas of community interest – approved by the Ministerial Order 19/2010, amended by Ministerial Order 262/2020;
- Manual on completing the environmental assessment for plans and programs – 2006, approved by Ministerial Order 117/2006;

- Generic guidance for strategic environmental assessment – 2007, finalized by the Ramboll Consortium team in the project "Strengthening institutional capacity to implement and implement SEA and reporting directives" – EuropeAid/121491/D/SER/RO (PHARE 2004/016 - 772.03 .03);
- Guidelines on strategic environmental assessment for sectors: land use planning; transport and energy – 2007, completed by the Ramboll Consortium team in the project "Strengthening the institutional capacity for the implementation and enforcement of SEA and reporting directives" – EuropeAid/121491/D/SER/RO (PHARE 2004/016 - 772.03.03);
- Generic Guide to Environmental Assessment for Plans and Programs- 2007, finalized by the Ramboll Denmark Consortium team in the framework of "Strengthening Institutional Capacity for Implementation and Implementation of the SEA Directive and the Reporting Directive" – EuropeAid/121491/D/SER/RO (PHARE 2004/016 - 772.03.03);
- Guide on environmental assessment for land use plans and programs and urbanism in Romania - 2007, finalized by the team of the Ramboll Denmark Consortium within the project "Strengthening the institutional capacity for the implementation and implementation of the SEA Directive and the Reporting Directive" – EuropeAid/121491/D/SER/RO (PHARE 2004/016 - 772.03.03).

The legislation on Strategic environmental assessment (SEA) requires the analysis of strategic documents that are relevant to the plan under assessment. These strategic documents may be relevant because they address conditions and issues that must be properly reflected in the evaluated plan as they may influence that plan.

The identification of the relationships between different relevant strategic documents and the plan subject to evaluation serves the following purposes:

- Identifying the existence of possible synergies or potential inconsistencies and constraints;
- Identification of issues that have already been addressed in other policies, plans, programs or projects;
- Verification of the environmental information collected for a strategic environmental assessment performed for other policies, plans, programs or projects, which can be used for the strategic environmental assessment of the evaluated plan; considering the cumulative effects on the key receivers following the implementation of several connected plans / programs, in order to substantiate the evaluation of the alternative options and the specific forms of impact of the evaluated plan.

In order to identify the strategic documents relevant for the evaluated plan, the following considerations were taken into account:

- EU industrial policy; Strategies / programs / policies in the same sector (economic) and in related sectors and objectives / measures established at national level regarding the evolution of the sector.

The methods and techniques considered for the environmental assessment and for completing the environmental report are those specified in the guidance documents and manuals listed in the previous section, in particular in the following documents:

- Handbook on SEA for Cohesion Policy 2007-2013" (SEA Handbook) - January 2006, Network "Greening Regional Development Programs";
- Guidelines on the integration of climate change and biodiversity in the strategic environmental assessment - EU, 2013.

The objectives of environmental protection at international / Community level are reflected in international conventions and EU policies on the environment and sustainable development. The SEA report will analyze the international environmental protection objectives related to the Vifor Wind Farm plan and how these objectives and any environmental considerations were considered during the preparation of the program. SEA reports were developed for each of the project locations in 2011.

5.1.2 Details of applicable Romanian Labour and Social Legislation

5.1.2.1 National legislation on Social Assessment

As per Law 292/2018, which is aligned with the requirements of the EU EIA Directive 2014/52/EU on the Environmental Impact Assessment (EIA), the contents of the EIA Study include requirements for the initial situation and the potential impact of the project/activity proposed, on:

- Demographic characteristics / local population;
- Local economic conditions, labour market, job growth; Local economic activities;
- Living conditions in the area.

Other relevant *regulatory instruments including social issues* are as follows:

- Romanian Civil Code establishing the basic rules on real estate transaction and contracts, usufruct rights, tenants' rights and obligations, landowners' rights and obligations towards tenants;
- Law on Cadastre 105/2019;
- Law 350/2001 on Urban Planning and Land Development, successively amended, last time by Law 151/2019; which establishes the objectives, competences and measures for urban and spatial planning;
- Law no. 247/2005 on property and justice reform and some accompanying measures, with special references on Legal circulation of land; amended by Decision 597/2020 on the exception of unconstitutionality conditioning the right to compensation of the holders of compensation titles, for his selection of a certain mode of compensation;
- Government Emergency Ordinance 34/2013 on the organization, management and operation of permanent grassland, and amending and supplementing Law 18/1991 on Land Reclamation.

Regarding the *regulatory framework of health and safety at work*, the main Romanian legal acts and regulations are:

- Law 53/2003 – the Labour Code;
- Law 319/2006 on health and safety at work, amended by Law 198/2018 and Law 208/2021;
- Government Decision 1425/2006 including the methodological norms for enforcement and implementation of Law 319/2006, amended.

5.1.2.2 National Legislation on Stakeholder Engagement

Law 137/1995 on environmental protection, with further amendments, and Law 292/2018 on environmental impact assessment, covers the stakeholder consultation and engagement, and stipulates that one of the main principles governing the environmental protection is "Right to information and consultation in decision-making of the public".

A key provision of the Environmental and Social Impact Assessment (ESIA) is to enable stakeholders to participate in environmental decision-making for projects. Thus, Government Decision 445/2009 on impact assessment of certain public and private projects on the environment – sets out the permitting competences as well as the list of projects subject to EIA, procedural stages and instructions, including the associated requirements for public consultation and involvement.

Law 292/2018 on environmental impact assessment of public and private projects – regulates the procedure for issuing the Environmental Agreement.

The Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, ratified by Law 86/2000, stipulates that the right of public participation is guaranteed by law.

Also, the Romania Social Inclusion Project – Operational Manual: Guidelines for Environmental Analysis of Sub-Projects (Report E1362, World Bank, 2006) outlines that "the Romanian system screening process is comprehensive and provides adequate procedural details. However, the differences in the Romanian EIA process and the Principles stated in the Bank's OP/BP 4.00 relate to: (a) continuing consultation throughout implementation of high-risk projects, and (b) use of independent advisory panels during the implementation of such projects".

5.2 International conventions

5.2.1 The Kyoto Protocol on Climate Change (UNFCC)

Romania became a signatory to the UNFCC in 1998 with a full ascension in 2002. This obligates Romania to assure that the future development in the country meets the conditions of the Convention.

Relevant to the present Project are the requirements associated with the potential generation of greenhouse gas. Further conditions of relevance include:

- Enhancement of energy efficiency in relevant sectors;
- Protection and enhancement of sinks and reservoirs of greenhouse gases;
- Promotion of sustainable forest management practices, afforestation and reforestation;
- Promotion of sustainable forms of agriculture;
- Implementation of measures to limit and/or reduce emissions of greenhouse gases; and
- Limitation and/or reduction in methane emissions.

5.2.2 The United Nations Convention on Biodiversity 1992

This Convention seeks to conserve biodiversity and promote its sustainable use. It requires the identification and monitoring of the biodiversity in an area and adopting the necessary conservation measure. Romania become party to this Convention in 1994.

5.2.3 The Basel Convention 1989

This was developed under the auspices of the United Nations Environmental Programme (UNEP) in response to the growing worldwide awareness of the problem of international traffic in hazardous waste.

The Basel Convention 1998 is the first and foremost global environmental treaty that strictly regulates the trans-boundary movement of hazardous wastes. It obligates parties to ensure environmentally sound management, especially during the disposal process.

The objectives of the Convention are to:

- Ensure that waste is disposed of as near as possible to the place or source of its generation;
- Reduce trans-boundary waste and where it cannot be avoided, to be disposed of in an environmentally sound and efficient manner; and
- Provide assistance to developing countries in the management of hazardous waste and the generation.

5.2.4 International Union for Conservation of Natural Resources Red List of Threatened Species

The IUCN Red List, in 1994, was founded in order to provide a comprehensive inventory of the global conservation status of biological species, and to set of precise criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are applicable to all species and all regions of the world.

5.3 Lender requirements

It is envisaged that the Project will be financed by international development banks, which in turn results in the need for the Project to be compliant with the following standards which were considered for this assessment:

- International Finance Corporation (IFC) Performance Standards (2012);
- World Bank Group Guidelines;
- European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy (2025).

5.3.1 IFC Performance standards

In April 2006, the IFC, a member of the World Bank Group, released a set of Performance Standards on Environmental and Social Sustainability (PS) based upon the original World Bank Group Safeguard Policies, which recognised further the specific issues associated with private sector projects. The IFC PS have been broadened to include issues such as greenhouse gases, human rights, community health, and safety and security.

A revised set of IFC PS came into force in January 2012. A summary of each PS and an indication of their applicability to the Project is provided in the table below, and more details can be found on the IFC website[12].

The Project will principally set out to comply with the requirements of the IFC Performance Standards 2012 (IFC PSs), including:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts.
- Performance Standard 2: Labour and Working Conditions
- Performance Standard 3: Resource Efficiency and Pollution Prevention.
- Performance Standard 4: Community Health, Safety, and Security
- Performance Standard 5: Land Acquisition and Involuntary Resettlement
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.
- Performance Standard 8: Cultural Heritage

The following PSs are not triggered for this Project (as described in subsequent sections).

[12] https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_handbook_pps

- Performance Standard 7: Indigenous Peoples

The Project is expected to be assigned a Category A under potential IFC Environmental and Social Policy i.e., *"Business activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented".*

5.3.2 World Bank Group guidelines

The World Bank Group (WBG) EHS Guidelines applicable to the Project are listed as follows:

- WBG General EHS Guidelines (April 2007): Supplementing the IFC PS are the General EHS Guidelines that were released in April 2007. The EHS Guidelines are the technical reference documents with general and industry-specific examples of Good International Industry Practices (GIIP). They are categorised by environment, occupational and community health and safety, and construction and decommissioning. The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines, which provide guidance to users on EHS issues within specific industry sectors.
- WBG EHS Guidelines for Wind Energy (August 2015): The EHS Guidelines for Wind Energy include information relevant to environmental, health and safety aspects of onshore and offshore wind energy facilities. It should be applied to wind energy facilities from the earliest feasibility assessments, as well as from the time of the environmental impact assessment, and continue to be applied throughout the construction and operational phase.

5.3.3 EBRD Environmental and Social Policy and E&S Requirements

The European Bank for Reconstruction and Development (EBRD) is committed to promoting environmentally sound and sustainable development across its full range of activities, in line with its Agreement Establishing the Bank. Environmental and social sustainability is a fundamental aspect of achieving outcomes consistent with the Bank's transition mandate, and projects that foster such sustainability are among its highest priorities.

The EBRD's Environmental and Social Policy (ESP) outlines how the Bank manages the sustainability of its operations, sets out its commitments, and defines the implementation arrangements for projects it finances. It specifies minimum requirements for managing environmental and social risks and impacts throughout the project lifecycle and defines the respective roles and responsibilities of both the EBRD and its clients. The current ESP (2024, with effected date 01/01/2025) supersedes the 2019 Environmental and Social Policy and its associated Performance Requirements (PRs).

The ESP is supported by a set of 10 Environmental and Social Requirements (ESRs), which projects financed by the Bank are required to meet. These ESRs cover:

1. Assessment and management of environmental and social risks and impacts
2. Labour and working conditions
3. Resource efficiency and pollution prevention and control
4. Health, safety and security
5. Land acquisition, restrictions on land use and involuntary resettlement
6. Biodiversity conservation and sustainable management of living natural resources
7. Indigenous Peoples (not triggered by the Project)
8. Cultural heritage

9. Financial intermediaries
10. Stakeholder engagement

Each ESR includes specific requirements for EBRD clients, whether implemented directly by the client or through third parties, including contractors, suppliers, or government agencies. Compliance with relevant national law is integral to all ESRs, and in cases where host-country regulations differ from ESRs, projects must meet the more stringent requirement.

The environmental and social assessment of a project considers both the risks and impacts of the project itself and associated facilities. Projects involving new facilities or business activities are expected to be designed to meet the ESRs from the outset. Where this is not possible, the client is required to adopt an Environmental and Social Action Plan (ESAP) to achieve compliance within a timeframe acceptable to the EBRD. The ESAP forms part of any financing agreements and may be updated over the project lifecycle.

It should be noted that the previous ESIA prepared by ERM was based on the 2019 EBRD Environmental and Social Policy and Performance Requirements, while this ESIA has been prepared in accordance with the latest 2024 ESP and 2025 ESRs, ensuring alignment with the Bank's updated requirements and international best practice.

At the current stage, the Project qualifies as Category A under the environmental and social policies of major international finance institutions and commercial banks signatory to the Equator Principles. Accordingly, the Project requires identification and assessment of environmental and social impacts through an ESIA, with outcomes subject to public disclosure according to the specific requirements of the financing institutions. In addition, the establishment of a project-specific Environmental and Social Management System (ESMS) is considered necessary, proportionate to the nature and scale of the Project and commensurate with its environmental and social risks and impacts.

5.3.4 OECD Common Approaches

The Recommendation of the Council on Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence ("Common Approaches") provide guidelines for addressing environmental and social aspects of officially supported export credit, applicable to Export Credit Agencies (ECAs) based in OECD countries. Adopted in 2012 and revised in 2016, it aims to ensure coherence among Adherents' policies, promote good practice in environmental and social review, and enhance efficiency in official support procedures.

Key objectives include promoting sustainable development, developing common procedures for environmental and social review, and fostering transparency and responsibility in decision-making. Adherents are required to screen all applications and classify them based on potential environmental and social risks. Classification involves identifying projects as Category A (significant adverse impacts), Category B (less adverse impacts), or Category C (minimal or no adverse impacts).

Adherents undertake environmental and social reviews of projects according to international standards World Bank Safeguard Policies, World Bank Environmental and Social Standards, IFC Performance Standards, World Bank Group EHS Guidelines. Reviews include benchmarking the project's performance against relevant standards and considering measures for mitigating adverse impacts. Projects classified as Category A (such as the Project object of this ESIA) may require an ESIA, while Category B projects need appropriate information addressing environmental and social impacts.

Once the review is complete, Adherents evaluate the information to decide whether to provide official support, subject to conditions for mitigating adverse impacts. Adherents must monitor projects to ensure compliance with conditions of official support and encourage public availability of ex post monitoring reports to enhance transparency and accountability.

5.3.5 Voluntary Principles on Security and Human Rights

The Voluntary Principles on Security and Human Rights (VPs) are a globally recognized framework established in 2000 to guide companies in the extractive sector on conducting their security operations while respecting human rights. These principles emphasize the importance of conducting comprehensive human rights risk assessments, engaging appropriately with public and private security providers, and implementing human rights screenings and training for security forces. By adhering to the VPs, companies can minimize security-related impacts on communities, align their policies with internationally recognized human rights standards, and contribute to operational stability and reputational integrity.

5.3.6 Lender standards on biodiversity

The objectives of IFC PS6 and EBRD ESR6 are to protect and conserve biodiversity, maintain benefits from ecosystem services and promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities. IFC PS6 requirements depend on the classification of Project area in three classes based on condition and significance for biodiversity. These three classes are:

- Modified Habitat
- Natural Habitat
- Critical Habitat

IFC PS6 defines Natural Habitats as “areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area’s primary ecological functions and species composition”. Monoculture plantations, intensive agricultural areas and urban areas show substantial modification and are classified as Modified Habitat.

Areas of “high biodiversity value” are termed Critical Habitat by IFC. Such a designation is based on the presence and/or quantity of significant types of biodiversity (e.g. threatened species, highly threatened ecosystems etc) and is independent of the condition of the habitat.

EBRD ESR6 also requires assessment of Critical Habitat. The criteria to consider when assessing the presence of Critical Habitat, according to IFC PS6 and EBRD ESR6, are:

1. **Globally and/or regionally threatened species** (IFC PS6 Criterion 1, EBRD ESR6 Criterion 2)
2. **Endemic and restricted range species** (IFC PS6 Criterion 2, EBRD ESR6 Criterion 3)
3. **Migratory and congregatory species** (IFC PS6 Criterion 3, EBRD ESR6 Criterion 4)
4. **Highly Threatened and/or Unique Ecosystems** (IFC PS6 Criterion 4, EBRD ESR6 Criterion 1)
5. **Key evolutionary processes** (IFC PS6 Criterion 5)

The criteria for defining Critical Habitat under IFC PS6 are slightly different to the criteria under EBRD PR6. For example, ESR6 includes habitats listed under Annex I of the EU Habitats Directive or Resolution 4 of the Bern Convention, as well as species listed in Annex II of Habitats Directive, whereas IFC PS6 does not.

In addition, IFC PS6 states that certain internationally recognised areas of high biodiversity value are likely to be classified as Critical Habitat.

IFC PS6 compliant projects must achieve No Net Loss (NNL) for Natural Habitats and Net Gain (NG) for Critical Habitat values. IFC PS6 also requires projects in Protected Areas and internationally recognized areas to be developed in line with any government recognized management plans, be legally permitted, and implement additional programs to promote and enhance the conservation aims and effective management of the area.

In addition to Critical Habitat values, EBRD ESR6 also considers a suite of Priority Biodiversity Features (PBFs) which are of lower concern, but still important for a project to consider. PBFs include: threatened ecosystems, threatened species, range-restricted species, and migratory species. It is good practice for Projects to aim for NNL of PBFs. The requirements of EBRD ESR6 when a project may have adverse impacts on PBFs are shown in Table 5-5.

The presence of critical habitat does not necessarily imply an impact from the project. Table 5-2 shows the requirements of IFC PS6 paragraph 17 and 18, with respect to critical habitat[13]. EBRD has similar requirements shown in

Table 5-3.

The projects will also need to meet the relevant IFC PS6 expectations for the management of impacts on modified and Natural Habitat. Table 5-4 shows the requirements of IFC PS6 paragraph 15 with respect to these.

Table 5-2 IFC PS6 paragraphs 17 & 18 on critical habitat

PS6 reference	PS6 text
PS6 paragraph 17	"In areas of critical habitat, the client will not implement any project activities unless all of the following are demonstrated: • No other viable alternatives in the region exist for development of the project on modified or natural habitats that are not critical; • The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values; • The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time; • A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program".
PS6 paragraph 18	"In such cases where a client is able to meet the requirements defined in paragraph 17, the project's mitigation strategy will be described in a Biodiversity Action Plan (BAP) and will be designed to achieve net gains of those biodiversity values for which the critical habitat was designated".

Table 5-3 EBRD ESR6 paragraph 15 on critical habitat

ESR6 reference	PS6 text
ESR6 paragraph 15	Critical habitat will not be further fragmented, converted or degraded to the extent that its ecological integrity or biodiversity importance is compromised. Consequently, in areas of critical habitat, the client will not implement any project activities unless the following conditions are met: • no other viable alternatives within the region exist for development of the project in habitats of lesser biodiversity value • stakeholders are consulted in accordance with ESR 10 • the project is permitted under applicable environmental laws, recognising the priority biodiversity features

[13] IFC is generally the most stringent of the lenders in regard to Critical Habitat.

ESR6 reference	PS6 text
	• the project does not lead to measurable adverse impacts87 on those biodiversity features for which the critical habitat was designated, as outlined in paragraph 14 • the project is designed to deliver net gains for the critical habitat impacted by the project, with monitoring systems to demonstrate them • the project is not anticipated to lead to a net reduction in the population of any endangered or critically endangered species, over a reasonable time period • a robust and appropriately designed, long-term biodiversity monitoring and evaluation programme aimed at assessing the status of critical habitat is integrated into the client's adaptive management programme.
ESR6 paragraph 16	In cases where a client is able to meet the requirements set out in paragraph 15, the project's mitigation strategy, including net gain, will be described in a biodiversity management plan and/or biodiversity action
Footnote 87	Measurable adverse impacts mean the project's direct and indirect impacts will jeopardise the persistence within the study area of any biodiversity value that triggers a critical habitat designation.

Table 5-4 IFC PS6 paragraphs related to requirements for projects in natural habitat and modified habitat that holds significant biodiversity value

PS6 reference	PS6 text
PS6 paragraph 12	This Performance Standard applies to those areas of modified habitat that include significant biodiversity value, as determined by the risks and impacts identification process required in Performance Standard 1. The client should minimize impacts on such biodiversity and implement mitigation measures as appropriate.'
PS6 paragraph 15	"In areas of natural habitat, mitigation measures will be designed to achieve no net loss of biodiversity where feasible".
PS6 footnote 9	"No net loss is defined as the point at which project-related impacts on biodiversity are balanced by measures taken to avoid and minimize the project's impacts, to undertake on-site restoration and finally to offset significant residual impacts, if any, on an appropriate geographic scale (e.g. local, landscape-level, national, regional)".

Table 5-5 EBRD PSR6 requirements where the project may have adverse impact on Priority Biodiversity Features

PS6 reference	PS6 text
ESR6 paragraph 13	Where the assessment has identified that the project could have significant, adverse and irreversible impacts on priority biodiversity features, the client will not implement any project-related activities unless: • The client can demonstrate that there are no technically and economically feasible alternatives. • Stakeholders are consulted in accordance with ESR 10. • The project is permitted under applicable environmental laws, recognizing the priority biodiversity features. • Appropriate mitigation measures are put in place, in accordance with the mitigation hierarchy, to ensure no net loss and preferably a net gain of priority biodiversity features

PS6 reference	PS6 text
	and the habitats and ecological functions that support them over the long term to achieve measurable conservation outcomes.
Footnote 85	"No net loss" is defined as the point at which project-related biodiversity losses are balanced by gains resulting from measures taken to avoid and minimise these impacts, to undertake on-site restoration and to offset significant residual impacts, if any, on an appropriate geographic scale.

It should be noted that, according to IFC PS6 and EBRD ESR6, areas not acceptable for financing (with the possible exception of projects specifically designed to contribute to the conservation of the area) include UNESCO World Heritage Sites and Alliance for Zero Extinction (AZE) Sites.

5.4 Project standards

For this project, both Romanian/EU legislation and international standards (IFC Performance Standards, EBRD E&S Requirements, and World Bank Group EHS Guidelines) are applicable. In line with international good practice and lender requirements, the project will adopt the most stringent standard among national and international benchmarks. This approach ensures full legal compliance while also meeting the expectations of international financial institutions and best practice in environmental and social management.

Table 5-6 National and International Environmental Standards

Parameter	Romanian/EU Standards	IFC/EBRD / WBG EHS Guidelines	Application to the Project
Noise (outdoor, residential dwellings)	Romanian legislation follows EU Directive 2002/49/EC; 55 dB(A) day and 45 dB(A) night	IFC/WBG General EHS guidelines: 55 dB(A) day, 45 dB(A) night. WHO guidelines: < 45 dB(A) L_den	Noise modeling will be carried out; the most stringent national or international standards will be applied.
Air quality (Ambient concentrations)	EU / Romania limit values (Directive 2008/50/EC): PM10 = 40 µg/m³ annual mean, 50 µg/m³ daily; PM2.5 = 25 µg/m³ annual mean; NO_2 = 40 µg/m³ annual mean.	WHO guidelines: PM2.5 = 5 µg/m³ annual mean, PM10 = 15 µg/m³ annual mean, NO_2 = 10 µg/m³ annual mean.	Construction-phase dust and emissions will be controlled; monitoring against the stricter WHO/IFC values will be adopted where relevant.
Shadow flicker	No specific Romanian or EU binding limit; guidance typically applied through planning/zoning regulations.	WBG EHS Wind Energy: 30 hours per year or ⩽30 minutes per day at sensitive receptors.	Layout and turbine operations will be adjusted to respect IFC/EHS guidance at nearby dwellings.
Occupational health & safety (workers' exposure)	Romanian legislation aligned with EU directives and ILO conventions (Directive 2003/10/EC: 85 dB(A) daily exposure limit for noise).	WBG General EHS: exposure limits based on international standards (ACGIH, OSHA, EU).	Contractor and operator will implement OHS plans consistent with IFC/EBRD requirements.
Biodiversity	National / EU Habitats and Birds Directives apply (Natura 2000 sites, protected species, Annex II/IV habitats).	IFC PS6 / EBRD ESR6: require a Critical Habitat Assessment, application of the mitigation hierarchy, and demonstration of no net loss for Priority Biodiversity Features and net gain where Critical Habitat is triggered	Baseline surveys and biodiversity monitoring plan will be implemented to ensure compliance with PS6/PR6.

Parameter	Romanian/EU Standards	IFC/EBRD / WBG EHS Guidelines	Application to the Project
		in accordance with the updated ESR6 criteria and thresholds.	

5.4.1 Air quality

5.4.1.1 National Environmental Standard

Ambient Air Quality Standards (AAQS) are standards or guidelines setting the maximum permissible concentrations of pollutants in air, for the purposes of protecting human health and sensitive vegetation.

In Romania these are derived from the following sources:

- AAQSs derived from the European Union Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe.
- Guidelines set on a national basis, referred to as Maximum Allowable Concentrations (MACs). These MACs are generally more relaxed than the standards set forth by the EU.
- The AAQS in force in Romania are set out in Table 5.3 Pollutants unlikely to be emitted by the project are not considered and have been excluded from the table

Table 5-7 National and International Environmental Standards

Pollutant	Averaging period	Value (µg/m3)	Reference
Human Health Criteria			
SO_2	1-hour mean	350	L 104/2011
SO_2	24-hour mean	125	L 104/2011
SO_2	Annual mean	60	STAS 12574-87
NO_2	1-hour mean	200	L 104/2011
NO_2	Annual mean	40	L 104/2011
PM_{10}	24-hour mean	50	L 104/2011
PM_{10}	Annual mean	40	L 104/2011
$PM_{2.5}$	Annual mean	25	L 104/2011
CO	8-hour maximum daily mean	10,000	L 104/2011
Benzene	Annual average	5	L 104/2011
Dust deposition	Month mean	17 g/m2/day	STAS 12574-87
Vegetation criteria			
SO_2	Annual mean	20	L 104/2011
NO_x	Annual mean	30	L 104/2011

Source: L 104/2011, STAS 12574-87

5.4.1.2 World Bank EHS Guidelines

The International Finance Corporation (IFC) in its General Environmental, Health, and Safety (EHS) Guidelines requires to apply national legislated standards, or in their absence, the current World Health Organization's (WHO) Air Quality Guidelines, which have been updated in 2021. The table below lists the ambient air quality guidelines established by these organizations.

Table 5-8 IFC/WHO Guidelines on Ambient Air Quality

Pollutant	Averaging Period	Value (µg/m3)
NO_2	Annual mean	10
NO_2	24-hour mean	25
NO_2	1 hour mean	45
SO_2	24-hour mean	40
SO_2	10 minutes mean	500
PM_{10}	Annual mean	15
PM_{10}	24-hour mean	45
$PM_{2.5}$	Annual mean	5
$PM_{2.5}$	24-hour mean	15
O_3	Peak season*	60
O_3	8 hours mean	100
CO	24-hour mean	4000
CO	8 hours mean	10000
CO	1 hour mean	35000
CO	15 minutes mean	100000

*Average of daily maximum 8-hours mean concentration in the six consecutive months with the highest six-month running-average concentration

5.4.1.3 Project Ambient Air Quality Standard

IFC requires that when host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. Table 5-9 below defines the standards which have been considered for the Project. The selected values represent only the most stringent criteria from the range presented above, in order to provide highly precautionary standards for the protection of human health and the environment.

Table 5-9 Pollutants most stringent criteria

Pollutant	Averaging Period	Value (µg/m3)
Human Health Criteria		
SO_2	1-hour mean	350
SO_2	24-hour mean	40

Pollutant	Averaging Period	Value (µg/m3)
NO_2	Annual mean	10
NO_2	24-hour mean	25
NO_2	1 hour mean	45
PM_{10}	Annual mean	15
PM_{10}	24-hour mean	45
$PM_{2.5}$	Annual mean	5
$PM_{2.5}$	24-hour mean	15
O_3	Peak season*	60
O_3	8 hours mean	100
CO	24-hour mean	4000
CO	8 hours mean	10000
CO	1 hour mean	35000
CO	15 minutes mean	100000
Benzene	Annual average	5
Dust deposition	Month mean	17 g/m^2/day
Vegetation Criteria		
SO_2	Annual mean	20
NO_x	Annual mean	30

*Average of daily maximum 8-hours mean concentration in the six consecutive months with the highest six-month running-average concentration

5.4.2 Noise

5.4.2.1 National Environmental Standards

In Romania, the admissible noise limits within urban areas, differentiated by zones and areas of specific use, and categories of streets are detailed below;

- Category III (collector) streets have a maximum admissible equivalent level of noise of 65 dB(A).
- Category II (connector) streets have a maximum admissible noise equivalent of 70 dB(A).

The maximum admissible level of noise, LAeq, at the limit of industrial zones in urban areas is 65 dB(A). Dwellings can be built on streets of different technical categories, or at the limit of zones or areas of a certain use, as long as the maximum noise value is 50 dB(A), measured 2 meters away from the building façade.

Order No. 119/2014 of the Ministry of Health establish that in protected areas the following maximum limits for noise will be assured:

- During the day, between the hours of 07:00 – 23:00, the outdoor level of continuous sound pressure weighted equivalent A (LAeq) must not exceed 55 dB(A);
- During the night, between the hours of 23:00-7:00, the outdoor level of continuous sound pressure weighted equivalent A (LAeq) must not exceed 45 dB(A).

5.4.2.2 World Bank EHS Guidelines

Based on the WBG General EHS Guidelines, noise impacts should not exceed the levels presented in table below, or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site. These limits are based on the Guidelines for Community Noise (WHO, 1999).

Table 5-10 Noise level guidelines

Receptor	One Hour LAeq (dBA)	
	Daytime (07:00 – 22:00)	Nighttime (22:00 – 07:00)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

5.4.2.3 Project Ambient Noise Standard

IFC requires that when host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. Table 5-11 below defines the standards which have been considered for the Project. The selected values represent only the most stringent criteria from the range presented above, in order to provide highly precautionary standards for the protection of human health and the environment.

Table 5-11 Most stringent noise criteria

Receptor	LAeq (dBA)	
	Daytime (07:00 – 22:00)	Nighttime (22:00 – 07:00)
Residential, institutional, educational	55	45
Industrial, commercial	65	65

The Project will enforce the above maximum continuous noise levels, which are based on the stricter of Romanian national limits and IFC/WBG EHS guideline values for each category of receptor. Daytime is typically defined as 07:00–22:00 (per IFC, or 07:00–23:00 per Romanian decree), and nighttime as 22:00–07:00.

The IFC guidelines also include a relative criterion: project noise should not induce an increase of more than 3 dB over existing background noise at the nearest off-site receptor.

5.5 Climate Policy

The European Union (EU) aims to be a global leader in the fight against climate change and is therefore striving to achieve the targets set in Paris Agreement reached by the Conference of the Parties (COP 21) to the United Nations Framework

Convention on Climate Change while simultaneously ensuring clean energy across the Union. In order to fulfil this commitment, the Union has set the following binding targets for climate and energy to be achieved by 2030:

- reducing greenhouse gas emissions (GHG) by at least 40 % compared with 1990;
- increasing energy efficiency (EE) to at least 32.5 %;
- increasing the share of energy from renewable sources (RS) in gross final energy consumption in the EU to at least 32 %;
- ensuring a level of electricity interconnection between Member States equivalent to at least 15 %.

To implement these objectives, each Member State was required to submit an Integrated National Energy and Climate Plan (NECP) to the European Commission. Romania's NECP aligns with these EU targets and includes measures to promote renewable energy development, improve energy efficiency, and reduce GHG emissions, supporting the transition to a low-carbon economy.

6 ESIA APPROACH AND METHODOLOGY

6.1 Introduction

As mentioned in Section 5, the ESIA process for the Project has been undertaken in compliance with the Romanian legislative requirements described in Section 5. In addition to the applicable regulations and norms of Romania, the Project should comply with the requirements of IFC Performance Standards on Environmental and Social Sustainability, 2012, and additional EBRD E&S Requirements, 2025.

The purpose of this ESIA is to examine how the Project will lead to a measurable difference in the quality of the environment, and the quality of life of impacted individuals and communities. Thus, the key objectives of the ESIA are to assess the potential environmental and social impacts associated with the planning, construction, operation and, where possible, decommissioning and closure phases of the Project and, to identify measures that can be adopted to avoid, minimise or offset adverse impacts and enhance beneficial impacts.

The key stages for the ESIA process of the present Project are highlighted in Figure 6-1, and include:

- Scoping;
- Baseline data collection;
- Assessment of impacts and mitigation;
- Interaction with design and decision-making processes;
- Management system integration; and
- Change management.

It must be noted that these key stages do not follow a linear process, but several stages are carried out in parallel. Many assumptions are revisited and modified as data becomes available and as the Project and ESIA progresses.

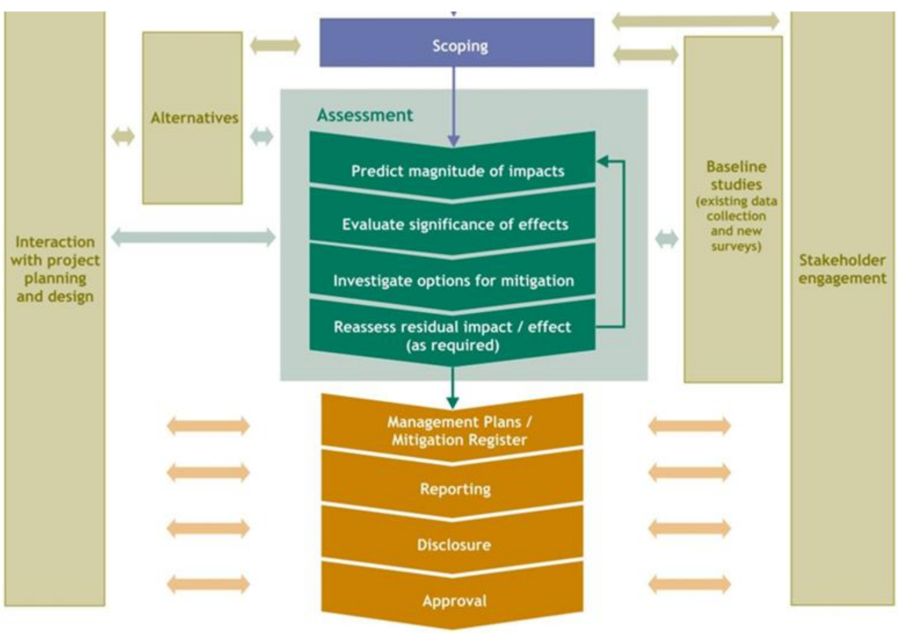

Figure 6-1 Overview of the ESIA Process (Source: ERM Draft ESIA)

6.2 Scoping Findings

As introduced in Section 2.7, a Scoping Report under PS1 requirements, has been provided by ERM in 2023 prior to the development of methodologies for baseline data collection across all environmental and social topics.

The purpose of this stage was to identify the project's key sensitivities and potential interactions between planned activities and environmental or socio-economic receptors. It also aimed to provide an early understanding of the scale and nature of potential impacts, to evaluate possible siting and layout alternatives, and to establish a clear framework for the subsequent assessment stages.

By identifying and prioritizing the most significant issues, the scoping phase allows the ESIA to be both focused and effective, avoiding unnecessary assessment of issues with minimal or no relevance while ensuring that all potentially significant impacts are thoroughly addressed

During the scoping stage, key potential environmental and social-economic impacts and sensitive receptors were identified, with consideration of the issues that were raised by stakeholders during the previous interactions with local communities.

For the purpose of this ESIA, "scoped out" topics refer to environmental and social aspects that were initially considered during the scoping phase but were not taken forward for detailed assessment. These topics were excluded on the basis that they are not expected to result in significant impacts, due to factors such as the absence of relevant receptors, the limited scale or duration of Project activities, or the negligible magnitude of potential effects. The scoping process applied a precautionary approach, whereby all potential interactions were initially identified and subsequently screened based on their likelihood and significance. Topics were only scoped out where sufficient evidence indicated that potential impacts would be negligible or not material in the context of the ESIA.

A summary of the key topics scoped out of the ESIA, together with the rationale for their exclusion, is provided in the Table 6-1, while a summary of the findings of the scoping stage are reported in the following Table 6-2, highlighting the resources/ receptors considered during scoping and the potential impact prediction.

Table 6-1 Scoped out aspects and deviations from scoping report vs current ESIA

Environmental / Social Topic	Potential Source of Impact	Key Receptors	Potential Impact Considered	Scoping Report Outcome	Deviation from Previous Scoping / Current ESIA Justification	Current ESIA scope
Air Quality	Construction activities	Construction workers; local communities; natural habitats	Dust generation and exhaust emissions during construction from unpaved roads and concrete batching activities	Scoped Out	Air quality was scoped out at the scoping stage **with specific reference to dust emissions from unpaved roads and concrete batching activities**, and exhaust emissions from emergency generators and vehicular traffic. In the current ESIA, the original scoping conclusions were retained: no concrete batch plant is included in the Project design, emissions from emergency generators were not assessed, and traffic-related emissions remain scoped out. However, during the current ESIA construction-phase assessment, dust generation was confirmed as a relevant environmental aspect and, for completeness and a precautionary approach, all realistic sources of construction-related dust were considered, including earthworks, site preparation activities and movement of construction machinery on unpaved surfaces, rather than limiting the assessment strictly to unpaved roads.	Scoped Out – construction dust from unpaved road assessed in the current ESIA as a precautionary manner.
	Operations of wind turbines	Local communities; natural habitats	Impacts to ambient air quality from wind turbine operations and from vehicle use due to	Not assessed	This topic has been clarified in the current ESIA. Wind power plants convert wind energy directly into electrical energy through mechanical-electrical transformation processes and do not involve the combustion of fossil fuels	Scoped Out

Environmental / Social Topic	Potential Source of Impact	Key Receptors	Potential Impact Considered	Scoping Report Outcome	Deviation from Previous Scoping / Current ESIA Justification	Current ESIA scope
			maintenance activities		during operation. Consequently, no combustion-related emissions (e.g., NOx, SO_2, PM or CO_2 from fuel burning) are generated, nor are there any emissions associated with industrial heating or process-related activities. Therefore, the operational phase of the Dunarea Wind Project is not expected to result in any direct emissions to air and is not anticipated to have any adverse impact on ambient air quality. With regard to maintenance activities, any potential air emissions would be limited to those associated with occasional access by light-duty maintenance vehicles. These emissions are considered negligible in the context of the Project due to their low frequency, short duration, and limited number of vehicle movements. Maintenance activities are typically scheduled intermittently (preventive and corrective maintenance rather than continuous operation), resulting in minimal traffic generation. Furthermore, these emissions are dispersed, short-term, and comparable to existing background traffic levels in the surrounding road network, and therefore are not expected to cause any measurable deterioration in local air quality.	
Greenhouse Gas (GHG) Emissions	Construction activities; construction materials;	Climate	Release of greenhouse gases	Scoped Out	GHG emissions were scoped out at the scoping stage from a significance perspective, as operational emissions were expected to remain	High-level assessment

Environmental / Social Topic	Potential Source of Impact	Key Receptors	Potential Impact Considered	Scoping Report Outcome	Deviation from Previous Scoping / Current ESIA Justification	Current ESIA scope
	emergency generator				below relevant materiality thresholds. In the current ESIA, a high-level quantitative GHG assessment was undertaken for confirmation and lender assurance purposes. The assessment includes construction-phase emissions, estimated using a life-cycle and scaling approach based on a comparable wind project, reflecting the early stage of project definition. The results confirm that Project emissions are temporary or immaterial and fully support the original scoping conclusions.	undertaken for lender assurance.
Topography	Construction activities	Topography	Cut and fill operations during excavation causing topography alteration	Not assessed	This topic has been clarified in the current ESIA. During the construction phase, localised cut and fill activities will be required for turbine foundations, crane pads and access tracks. These activities will result in minor and site-specific alterations to the existing landform. However, such modifications are spatially limited, engineered to design specifications, and confined to the immediate footprint of project components. At the project scale, the overall topographic setting will remain largely unchanged, as no large-scale terrain reconfiguration, ridgeline modification, or valley infilling is envisaged. Potential effects arising from cut and fill operations are more appropriately captured under other environmental receptors, including soil disturbance	Scoped Out

Environmental / Social Topic	Potential Source of Impact	Key Receptors	Potential Impact Considered	Scoping Report Outcome	Deviation from Previous Scoping / Current ESIA Justification	Current ESIA scope
					and erosion, habitat loss and fragmentation, landscape and visual impacts.	
Aquatic Biodiversity	Construction activities; accidental events (e.g. spills)	Aquatic habitats, fauna and flora	Disturbance or loss of aquatic biodiversity	Scoped Out	No deviation from scoping. The Project Area of Influence does not include any wetlands, rivers, streams or lakes. No aquatic receptors are present and no impacts are anticipated.	Scoped Out
Education and Training Services	Temporary influx of construction workers	Existing school population	Reduced availability or accessibility of services	Scoped Out	No deviation from scoping. Any pressure on education services would be indirect and minor. Worker influx is expected to be temporary and predominantly non-local, with a very low likelihood of workers relocating with families.	Scoped Out
Land Take and Physical Resettlement	Land acquisition	Local population within AoI	Physical displacement of households or assets	Scoped Out	No deviation from scoping. No households or structures are located on Project land parcels and no physical displacement or resettlement is required.	Scoped Out
Blade and Ice Throw	Wind turbine operation in cold weather conditions	Project workers; nearby residents; fauna	Risk of injury from ice or blade throw	Scoped Out	Blade throw and ice throw were originally screened out from detailed assessment due to the very low likelihood of occurrence and compliance with international design and safety standards. In the current ESIA, these risks were nevertheless considered within the assessment of unplanned events, health and safety, and social impacts, in order to confirm their relevance and manageability. Blade throw is addressed as a highly unlikely catastrophic failure, with modern turbine design, structural standards,	Scoped In: risks considered under unplanned events and SIA for confirmation purposes only.

Environmental / Social Topic	Potential Source of Impact	Key Receptors	Potential Impact Considered	Scoping Report Outcome	Deviation from Previous Scoping / Current ESIA Justification	Current ESIA scope
					overspeed protection and continuous monitoring systems significantly reducing the probability of occurrence. Ice throw has been considered under specific seasonal and meteorological conditions and assessed in the Social Impact Assessment, taking into account the use of cold-climate turbines equipped with ice detection and de-icing systems.	
Security and Conflict	Community opposition leading to security intervention	Local communities, including vulnerable groups	Risk to personal safety and property	Scoped Out	No deviation from scoping. No history of community conflict or opposition related to wind farm development has been identified, and stakeholder engagement activities have not indicated risks related to security or use of force.	Scoped Out
Aviation Safety, Radar and Communication Systems	Wind turbine height and operation	Air traffic; defence and communication systems	Aircraft collision risk and signal interference (radar / EMI)	Scoped In	Deviation from earlier scoping. Aviation safety and radar interference were originally scoped in; however, the Project has obtained all required aviation and defence approvals. These approval processes typically include detailed assessment of aircraft safety, radar interference and potential electromagnetic compatibility issues. No residual aviation or defence-related risks requiring further ESIA assessment have been identified.	Scoped Out following permitting and approvals.
Electromagnetic Fields (EMF) – Community Health and Safety	400 kV overhead grid connection; MV underground	Local communities	Potential health effects associated with EMF exposure	Not assessed	This topic has been clarified in the current ESIA. A short section (approximately 0.3 km) of the Project's grid connection consists of a 400 kV double-circuit overhead line. EMF associated with high-	Scoped Out

Environmental / Social Topic	Potential Source of Impact	Key Receptors	Potential Impact Considered	Scoping Report Outcome	Deviation from Previous Scoping / Current ESIA Justification	Current ESIA scope
	cables; wind turbines				voltage transmission lines decrease rapidly with distance and, when assessed against ICNIRP public exposure limits (100 µT at 50 Hz), typical magnetic field intensities at ground level and standard setback distances remain well below acceptable thresholds. No residential receptors or community facilities are located within or adjacent to the right-of-way, and the connection follows existing transmission corridors. EMF emissions from underground MV cables and from wind turbines are negligible. Based on international guidance (ICNIRP, WHO) and the absence of sensitive receptors, EMF does not represent a material Community Health and Safety risk and has therefore been screened out from detailed assessment.	

Table 6-2 Resources/receptors considered during Scoping

Resources / Receptors	Impact prediction
Environmental	
Air	Emissions of NO_x, SO_x, PM, CO, VOC, greenhouse gases (CO_2, CH_4, N_2O), ozone and total suspended particulate (TSP).
Noise	Change in noise levels.
Geology	Changes to geology, geomorphology, topography.
Soil	Changes to physical and chemical properties and soil ecology.
Surface water	Changes to physical, chemical or biological quality of surface water bodies (rivers, ponds) etc.
Groundwater	Contamination of phreatic and groundwater resources. Change in groundwater resources.
Flora and Vegetation	Changes to vegetation population, health, species abundance and diversity, and impact on endangered and economic species. Food chain effects.
Fauna - Wildlife	Changes to wildlife distribution, impact on endangered and economic species. Food chain effects.
Visuals/Aesthetics	Physical presence of facilities, increased night-time light.
Waste	Generation of wastes – hazardous and non-hazardous.
Social / Socio-Economic	
Population	Changes in total population, gender ratio, age distribution as a result of Project land acquisition or activities.
Social and cultural structure	Disruption in local authority and governance structure, change in social behaviours, alterations to social and cultural networks, intra and inter-ethnic conflict
Economy and employment	Changes in national/local economy, employment, standard of living, occupations.
Resource ownership and use	Temporary or permanent restriction for accessing or using land or water resources; Changes in livelihood activities based on natural resources; Changes in ownership of such resources.
Cultural resources	Physical disturbance of places of worship, burial grounds, archaeological resources; or change in access to cultural resources, rituals or celebrations carried out in their premises.
Education and skills	Change in availability or quality of education or skills provision, supply and demand of certain skill sets, etc.
Infrastructure and public services	Improvement or pressure on existing urban/rural infrastructure or services including transportation, power, water, sanitation, security, waste handling facilities, etc.
Community Health	
Environmental change	Potential degradation in air quality (e.g. NO_x, SO_x, VOC, CO, PM), contamination of surface water and potable ground water, increased vibration and noise, increased night time light beyond acceptable limits, changes to the visual environment.

Resources / Receptors	Impact prediction
Communicable or non-communicable diseases	Change in incidence and/or prevalence of communicable and non-communicable diseases or disease-causing factors.
Vector borne diseases	Changes in the incidence and/or prevalence of vector borne diseases, the density of these vectors and their breeding grounds.

6.3 ESIA Methodology

The assessment aimed at predicting the potential environmental and social risks and impacts of the Project was conducted through four key steps:

1) Identification of the project's environmental and social aspects, along with their potential risks and impacts.
2) Assessment of impacts' significance based on the sensitivity of environmental receptors and impacts magnitude of change.
3) Identification and recommendation of mitigation measures to avoid, prevent, or minimize significant risks and impacts.
4) Evaluation of residual risks and impacts after applying mitigation measures.

6.3.1 Aspects, receptors and impacts identification

Aspects

The first step in assessing potential changes to the baseline conditions (impacts) resulting from the proposed Project was to identify **environmental and social aspects**. Environmental aspects are defined in ISO 14001:2015 as: "*An element of an organization's activities, products or services which can interact with the environment*"; by analogy, social aspects are similarly defined as those components of the project's activities, products or services which can interact and have an effect upon the socio-economic context in which the project operates.

The identification of aspects for this assessment was informed by the Scoping Matrix developed in the ERM Draft ESIA. This list has been reviewed, validated, and updated as part of the present ESIA process. It includes aspects that were scoped out during the scoping phase conducted by ERM, as well as those that were scoped in and therefore subject to detailed assessment in this ESIA.

In the ERM Draft ESIA, entries in the Scoping Matrix were colour-coded to indicate the outcome of the scoping process, as summarized below:

Table 6-3 Scoping Matrix Legend (source ERM Draft ESIA)

Scope in/out	Description
Scoped Out	Interaction is not reasonably expected.
Scoped Out or integrated with other major interactions	Interaction is reasonably possible but none of the resulting impacts are likely to lead to significant effects.
Further Consideration in Impact Assessment	The interaction is reasonably possible, and at least one of the resulting impacts is likely to lead to a significant effect.

Interaction likely to lead to Positive Impacts	An interaction with positive effects is expected.

The aspects identified cover both the construction phase (e.g., site clearing, excavation, construction of facilities, equipment use, waste management, and natural resource consumption) and the operational phase (e.g., atmospheric emissions, maintenance activities, and operation of the facilities). The list also considers aspects associated with both planned activities and potential unplanned events, such as accidents, leaks, or emergencies (the latter addressed separately in Section 9.5).

The full list of Project activities and their associated environmental and social aspects is presented in Table 6-4, which indicates the specific environmental or social receptors with which each aspect interacts.

Table 6-4 Project's aspects identification from scoping report

Project Activities and Aspects	Environment							Social							
	Ambient Air Quality	Noise and Vibration	Soil Quality	Hydrology	Protected Areas	Terrestrial Fauna and Flora	Avifauna & Bats	Ecosystem Services	Economy & Employment	Livelihood	Visual Amenity	Infrastructure/Public Service	Occupational Health and Safety	Community Health, Safety and Security	Archaeology and Cultural heritage
Pre-construction															
Land Acquisition / Land use															
Workforce Mobilisation and Presence															
Land Preparation (site clearance, excavation and levelling), fencing, and civil works															
Construction															
Equipment and material transport and supply															
Construction of turbine foundations, transmission line pylons, internal road, auxiliary works and turbine installation															
Construction of associated 400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers															
Construction of associated additional access roads (new or widened roads inside project area)															

	Environment							Social							
Project Activities and Aspects	Ambient Air Quality	Noise and Vibration	Soil Quality	Hydrology	Protected Areas	Terrestrial Fauna and Flora	Avifauna & Bats	Ecosystem Services	Economy & Employment	Livelihood	Visual Amenity	Infrastructure/Public Service	Occupational Health and Safety	Community Health, Safety and Security	Archaeology and Cultural heritage
Wastes, emissions and discharges generation, handling and disposal															
Workforce Presence															
Operation and Maintenance															
WTG Operation															
WTG Inspection and Maintenance															
Waste, emissions and discharge generation, handling and disposal															
Unplanned events															
Leakage and spill incident															
Fire and explosion															
Vehicle collision															
Blade throw															
Transmission line snapping															
Natural Hazards (Flood, Storm, etc.)															
Decommissioning															

Project Activities and Aspects	Environment							Social								
	Ambient Air Quality	Noise and Vibration	Soil Quality	Hydrology	Protected Areas	Terrestrial Fauna and Flora	Avifauna & Bats	Ecosystem Services	Economy & Employment	Livelihood	Visual Amenity	Infrastructure/Public Service	Occupational Health and Safety	Community Health, Safety and Security	Archaeology and Cultural heritage
Workforce influx															
Equipment and material transport and supply															
Decommissioning works															
Wastes, emissions and discharges generation, handling and disposal															

Receptors

The interactions of an organisation's activities, products or services with the environment may "*cause changes, whether negative or beneficial, caused totally or partially by the environmental aspects of an organisation"* are environmental impacts, according to the definition in ISO 14001:2015. The intensity or severity of those impacts are the object of the impact assessment process. In order to estimate or calculate the effects of impacts, it is necessary to identify those components of the environment which may feel those effects: these are the **receptors** of the impacts. An environmental receptor can be defined as "*an entity that receives a contaminant or pollutant and which can be subject to an environmental impact. It can be a body of water, air, parcel of land, community, ecosystem or individual organism, human being or property*" (IFC, 2012). Section 9.1 will provide a description of receptors' sensitivity.

Impacts

Once the activities/aspects and receptors were identified, the interactions occurring between the individual aspects and receptors that might lead to potential impacts of the proposed activities were defined as impacts, whether positive or negative. These impacts were also assessed along with measures to manage risks and respond to unplanned events. Although the likelihood of unplanned events is low, appropriate management plans shall be developed and implemented to ensure that impacts are avoided, minimised and contained. Because of their special nature, unplanned events have been evaluated separately and are always subjected to mitigation measures (see in Section 9.5).

Impacts can be characterised by the following descriptors:

- **Direct** – impacts that may result from a direct interaction between a planned Project activity and the receiving environment (e.g., atmospheric emissions from heating plant);
- **Indirect** – impacts that may follow on from the primary interactions between the Project and its environment because of subsequent interactions in the environment (e.g., loss of part of a habitat could affect the population of a species over a wider area);
- **Induced** – impacts that may result from other knock-on activities that may happen as a consequence of the Project (e.g., these tend to be social in nature, such as in-migration, new businesses set up to cater for increased traffic on roads);
- **Transboundary** – impacts that may extend or occur across a national boundary;
- **Cumulative** – impacts that may result from the incremental impact, on areas or resources used or directly affected by the Project, from other existing, planned or reasonably defined developments. Cumulative impacts have been defined as "the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted". Such impacts are described and assessed separately in Section 9.4.

Next Section 6.3.2 will explain the methodology used for the assessment of impact significance.

6.3.2 Impact Assessment Methodology

Impacts are assessed through a systematic approach called "ARVI" which is a recognised European multi-criteria approach tool which has been used in order to assess the **significance** of the expected impacts of the proposed Project. The fundamental principle of the ARVI approach is that for each impact, firstly the **sensitivity of the target receptor** in its baseline state has to be assessed, and then the **magnitude of the change**, which would probably affect the target receptor as a result of the proposed project. An overall estimate of the significance of an impact is derived from these judgments.

6.3.2.1 Assessment of the Sensitivity of the Receptor

The sensitivity of a receptor is estimated in its current state prior to any change implied by the Project and is determined by three sub-criteria, each one rated on a scale of *Low*, *Moderate*, *High*, and *Very high*.

These sub-criteria are:

1) Ecological sensitivity: it refers to the inherent characteristics of the environmental receptor that determine its ecological importance, including factors such as biodiversity, rarity, the presence of protected or endangered species, and legal protections for sensitive areas such as national parks or nature reserves.

2) Societal value: it describes the value of the receptor to the society and depending on the type of impact may be related to economic values (e.g. water supply), social values (e.g. landscape or recreation) or environmental values (e.g. natural habitat); and

3) Vulnerability to changes: how liable the receptor is to be influenced or harmed by pollution or other changes to its environment.

A description of the sensitivity for each sub-criteria is reported in Table 6-5.

Table 6-5 Receptor's sensitivity description

Sensitivity	SC*	Description
Very high	SC1	The receptor has very high biodiversity, includes critical habitats for rare or endangered species, and is under strict legal protections. It is extremely sensitive to any environmental changes and requires stringent protection measures.
	SC2	The receptor has very high value, being crucial for economic, social, or environmental reasons. Its loss or degradation would have a profound and potentially irreversible impact on society.
	SC3	The receptor is extremely vulnerable to changes, with little to no ability to recover. It can be severely and irreversibly harmed by pollution or environmental changes.
High	SC1	The receptor has high biodiversity, includes several rare or endangered species, and has significant legal protections. It is sensitive to environmental changes and requires careful management.
	SC2	The receptor has high value, offering significant economic, social, or environmental benefits. Its loss or degradation would have a substantial impact on societal well-being.
	SC3	The receptor is highly vulnerable to changes, with limited ability to recover. It can be significantly harmed by pollution or environmental changes.
Moderate	SC1	The receptor has moderate biodiversity, may include some rare species, and has limited legal protections. It shows some resilience but can be affected by significant changes.
	SC2	The receptor has moderate value, providing some economic, social, or environmental benefits. Its loss or degradation would have a noticeable but manageable impact on society.

Sensitivity	SC*	Description
	SC3	The receptor shows some vulnerability to changes, with a moderate ability to recover. It may be affected by significant pollution or environmental changes.
Low	SC1	The receptor has low biodiversity, no rare or endangered species, and no legal protections. It is resilient to environmental changes.
	SC2	The receptor has minimal economic, social, or environmental value to society. Its loss or degradation would have little impact on societal well-being.
	SC3	The receptor is highly resilient to pollution or other environmental changes. It can recover quickly and maintain its functions.
* SC1 = Ecological sensitivity; SC2 = Societal value; SC3 = Vulnerability to changes		

6.3.2.2 Assessing the Magnitude of the Change

Magnitude of the change describes the characteristics of changes the planned Project is likely to cause. The direction of change is either positive (green) or negative (red). Magnitude is a combination of:

1) intensity and direction,
2) spatial extent, and
3) duration.

Table 6-6 provide description of the possible values for these sub-criteria.

Table 6-6 Values description for direction, intensity, duration and spatial extent

Sub-criteria	Value	Description
Direction	Positive	The Project's impact has positive consequences
	Negative	The Project's impact has negative consequences
Intensity	None	The Project causes no noticeable change
	Low	The Project causes minor changes that are barely perceptible
	Moderate	The Project causes noticeable changes that are moderate in scale
	High	The Project causes significant changes that area substantial in scale
	Very high	The Project causes extreme changes that are profound and extensive
Duration	None	Negligible duration
	Low	Short-term impacts lasting for a brief period (e.g. months to a few years)

Sub-criteria	Value	Description
	Moderate	Medium-term impacts lasting for a moderate period (e.g. months to a few years)
	High	Long-term impacts lasting for an extended period (e.g. several years to decades)
	Very high	Permanent impacts with no foreseeable end
Spatial extent	None	No spatial impact
	Low	Impacts are localized to a small area within the project site
	Moderate	Impacts extend to the immediate surroundings of the project site
	High	Impacts extend to a broader regional area beyond the immediate surroundings
	Very high	Impacts have a widespread effect, potentially at a national or international level

On duration, the timing of the impact should also be considered for impacts which are not observable all the time such as periodic impacts. Assessment of magnitude should evaluate the probable changes affecting the receptor without taking into account the receptor's sensitivity to those changes.

Based on the evaluation of the above sub-criteria, DNV will determine the overall magnitude of change score according to Table 6-7. The descriptions in the table for the magnitude of change scores are illustrative examples; other combinations of the sub-criteria may also result in the same scores.

Table 6-7 Magnitude of change scores with example descriptions

Very high ++++	The proposal has beneficial effects of very high intensity and the extent and the duration of the effects are at least high.
High +++	The proposal has beneficial effects of high intensity and the extent and the duration of the effects are high.
Moderate ++	The proposal has clearly observable positive effects on nature or people's daily lives, and the extent and the duration of the effects are moderate.
Low +	An effect is positive and observable, but the change to environmental conditions or on people is small.
Negligible	Negligible change is noticeable in practice. Any benefit or harm is negligible.
Low -	An effect is negative and observable, but the change to environmental conditions or on people is small.
Moderate - -	The proposal has clearly observable negative effects on nature or people's daily lives, and the extent and the duration of the effects are moderate.
High - - -	The proposal has harmful effects of high intensity and the extent and the duration of the effects are high.
Very high - - - -	The proposal has harmful effects of very high intensity and the extent and the duration of the effects are at least high.

6.3.2.3 Assessing the significance of an impact

The assessment of significance is based on the magnitude of the change affecting a receptor and on the sensitivity of the receptor to those changes. Table 6-8 shows the matrix for the assessment of the impact significance.

Table 6-8 Impact significance matrix

Impact significance		Magnitude of change								
		Very high	**High**	**Moderate**	**Low**	**Negligible**	**Low**	**Moderate**	**High**	**Very high**
Sensitivity of the receptor	**Low**	High	Moderate	Low	Low	Negligible	Low	Low	Moderate	High
	Moderate	High	Moderate	Moderate	Low	Negligible	Low	Moderate	Moderate	High
	High	Very high	High	Moderate	Moderate	Negligible	Moderate	Moderate	High	Very high
	Very high	Very high	Very high	High	High	Negligible	High	High	Very high	Very high

It is possible that an impact cannot be evaluated due to lack of data at this stage of the project. In this case, the value "unknown" will be assigned and specific assessment/investigation or further data are required to assess its effect as part of the ESIA.

6.3.3 Mitigation Measures

Mitigation measures are evaluated on the basis of how effective they are in reducing potentially significant environmental impacts. Each impact can be mitigated to a certain extent, specifying what measures are included in the assessment.

6.3.4 Residual Impacts

If mitigation measures are implemented, it is essential to evaluate the residual significance of the impacts after mitigation has been applied. This involves reassessing the project's impacts while considering the effectiveness of the proposed mitigation measures to determine the significance of any remaining effects. Residual effects are analysed for each environmental and social (E&S) aspect to ensure comprehensive impact management.

6.3.5 Cumulative Impact Assessment

According to the IFC (IFC 2013, Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets), the assessment and management of cumulative impacts is necessary when the Project and other developments under consideration could contribute to generating cumulative impacts on valued environmental and social component.

Assessment of cumulative effects is an integral part of the ESIA process and ensures that all aspects of potential effects from the Project have been, or will be, addressed. Cumulative effects result from incremental changes caused by other past, present or reasonably foreseeable developments together with those from the construction and operation of the Project.

In most instances, past and present developments will have been captured in the baseline for the Project (for example, through noise measurements, traffic counts) and the normal practice of 'adding' impacts from the Project to the baseline will assess the cumulative effect.

The cumulative assessment approach is based on a consideration of the approval status or existence of the 'other' activity and the nature of information available to aid in predicting the magnitude of impact from the other activity.

The ESIA and CIA are prepared based on similar logical framework, analytical process and tools. Unlike the ESIA that centres on the Project as a source of impacts, the CIA focuses on Valuable Environmental Components (VECs) under influence from different projects. In a CIA, the overall resulting condition of the VEC and its related viability are assessed.

6.3.6 Risk assessment for unplanned events

Unplanned events are reasonably foreseeable incidents that are not anticipated as part of the normal operation of a project. Therefore, an "Unplanned" impact has been indicated when caused by external force majeure or in case of emergency scenarios. Activities which might generate unplanned events are emergencies, accidents, and non-routine incidents.

It should be noted that, because of the uncertainty around future decisions and contexts, potentially more than 25 years from the time of writing, it is not possible to identify potential unplanned events of the decommissioning phase, therefore, this Report is limited to the consideration of foreseeable construction and operations unplanned events only.

To evaluate potential impacts from unplanned events, a risk-based approach is used to define:

- the most likely unplanned events leading to environmental, social and/or community health impacts; and
- those unplanned events with the most significant potential environmental, social and/or community health impacts overall.

Impact significance for unplanned events is therefore determined by evaluating the combination of likelihood and consequence.

Indicative *levels of consequence* for potential impacts from unplanned events can be defined for the physical, biological, and social environment as provided in Table 6-9.

Table 6-9 Indicative Levels of Consequence for Potential Impacts from Unplanned Events

	Incidental	Minor	Moderate	Major	Severe
Physical Environment	Impacts such as localised or short-term effects or environmental media, meeting all environmental standards	Impacts such as widespread, short-term impacts to environmental media, meeting all environmental standards	Impacts such as widespread, long-term effects on environmental media, meeting all environmental standards	Impacts such as significant, widespread and persistent changes in environmental media OR Exceedance of environmental standards	Exceedance of environmental standards and fine/ prosecution.
Biological Environment	Impacts such as localised or short-term effects on habitat or species	Impacts such as localised, long-term degradation of sensitive habitat or widespread, short-term impacts to habitat or species	Impacts such a localised but irreversible habitat loss or widespread, long-term effects on habitat or species	Impacts such as significant, widespread and persistent changes in habitat or species	Impacts such as persistent reduction in ecosystem function on a landscape scale or significant disruption of a sensitive species.
Social Environment	Slight, temporary, adverse impact on a few individuals	Temporary (<1 year), adverse impacts on community which are within international health standards	Adverse specific impacts on multiple individuals that can be restored in <1 year OR	Adverse long-term, multiple impacts at a community level, but restoration possible. OR	Adverse long-term, varied and diverse impacts at a community level or higher – restoration unlikely.

	Incidental	Minor	Moderate	Major	Severe
			One or more injuries, not lost work injuries.	One or more lost work injuries to a member of the public including permanently disabling injuries.	OR Fatalities of public.

For the purposes of assessment, the *likelihood of an unplanned event* occurring can be classified as follows:

1) Remote – not known in the industry;
2) Very unlikely – known of in the industry;
3) Unlikely – may occur once or more in life of the Project;
4) Likely – may occur once or twice per year;
5) Expected – may occur more than twice per year.

The consequences and likelihood of potential unplanned events are combined to determine the overall *impact significance* using the risk matrix shown in Table 6-10.

For potential impacts that are determined to have an impact significance of Moderate or Major, risk reduction measures are identified; these can include measures that reduce the likelihood of the event from occurring (i.e., preventive barriers), those that reduce the consequences on sensitive receptors/ resources if the event were to occur (i.e. mitigation or recovery measures), and those that affect the likelihood and consequence.

Table 6-10 Risk matrix for potential unplanned events

CONSEQUENCE \ LIKELIHOOD OF OCCURRENCE	Remote	Very unlikely	Unlikely	Likely	Expected
Incidental	Negligible	Negligible	Negligible	Negligible	Negligible
Minor	Negligible	Minor	Minor	Minor	Moderate
Moderate	Minor	Minor	Moderate	Moderate	Major
Major	Moderate	Moderate	Major	Major	Major
Severe	Major	Major	Major	Major	Major

6.4 Area of Influence

6.4.1 Purpose and Basis for Defining the AoI

According to the IFC Performance Standards and the EBRD ESR1, Project developers must identify and manage all potential environmental and social risks and impacts within the Area of Influence (AoI) of a project.

For the Project, the AoI was defined based on guidance from the EBRD ESR1, relevant aspects of ESRs 2–8, and the IFC Environmental, Health and Safety (EHS) Guidelines for Wind Energy (2015). In addition to these international standards, the delineation process incorporated the findings and methodologies used in the existing environmental documentation for the wider development, specifically the ERM Draft ESIA and the AON National EIA, ensuring continuity with previously established study boundaries and allowing refinement where necessary based on updated data and the current Project configuration.

The AoI therefore includes:

- The **physical boundaries** of all project components and activities (core area), and
- A **wider buffer zone** covering access routes, associated facilities, and any natural or community receptors that may be affected by project activities.

In particular, the Project's Area of Influence consists of two main dimensions:

Table 6-11 Components of the Project's Area of Influence

AoI Category	Definition	Examples / Considerations
Area likely to be affected	Areas where direct or indirect impacts may occur due to project activities.	Project sites, construction areas, or surrounding zones potentially affected by air, noise, water, or biodiversity impacts. Additionally, it includes access roads, transmission lines, or utility connections built specifically to support the project.
Cumulative impacts	Areas affected by combined effects from other existing, planned, or foreseeable developments.	Adjacent energy projects, agricultural expansion, or infrastructure developments in Constanța County.

6.4.2 Environmental and Social Areas of Influence

The AoI for the Project is divided into two main domains, **Environmental AoI** and **Social AoI**, each with a **direct** and **indirect** component. In addition to these international standards, the delineation process incorporated the findings and methodologies used in the existing environmental documentation for the wider development—specifically the ERM Draft ESIA and the AON National EIA—ensuring continuity with previously established study boundaries and allowing refinement where necessary based on updated data and the current Project configuration.

Table 6-12 Environmental and Social Areas of Influence

Type	Description	Extent / Buffer
Direct Environmental AoI	Includes the locations of all primary and secondary project facilities directly controlled. In line with the ERM Draft ESIA, this includes all temporary and permanent Project components within Deleni Commune (wind turbines, substation, access and internal roads, underground and overhead cables, crane pads, construction platforms, lay-down areas, and any temporary land-take).	Up to **2 km buffer** around wind turbines, substation, access roads, and transmission line. This buffer also incorporates the Biodiversity AoI used to characterise habitats and species expected to occur regularly in the immediate Project surroundings.
Indirect Environmental AoI	Covers additional areas that could experience indirect or unplanned but predictable impacts. The extent mirrors the broader zone adopted in previous assessments (ERM Draft ESIA and AON National EIA), reflecting where indirect or cumulative effects from other planned or foreseeable developments may arise.	Areas **beyond 2 km** where ecological or physical impacts may occur (e.g. drainage, fauna movement).

Direct Social AoI	Includes all settlements affected by land acquisition or exposed to temporary or long-term project-related impacts (e.g. noise, shadow flicker). Based on the ERM Draft ESIA, this includes settlements within Deleni Commune where land take for Project components occurs, as well as those within 2 km of WTGs potentially exposed to temporary construction impacts (e.g. traffic) and operational effects such as shadow flicker.	Settlements within Deleni Commune directly affected by land take and all settlements within a **2 km** radius of turbines.
Indirect Social AoI	Broader regional context where secondary socio-economic effects may occur. Consistent with previous assessments, the indirect AoI corresponds to Constanța County, reflecting potential regional-scale impacts such as workforce-related economic activity, increased demand for goods and services, and wider development dynamics.	**Constanța County** — considered for desktop review of socio-economic trends and cumulative effects.

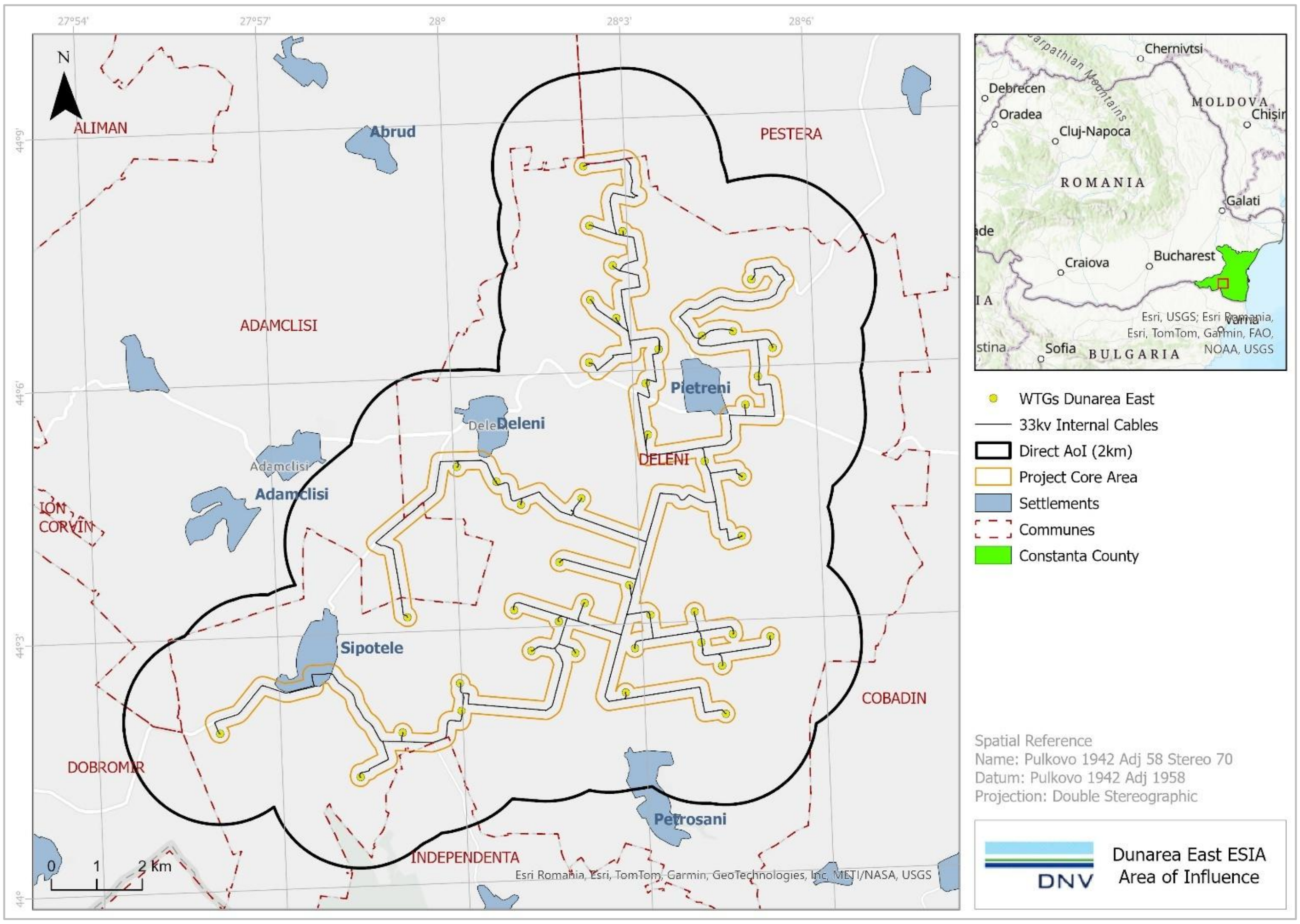

Figure 6-2 Area of Influence

6.4.3 Topic-Specific AoIs

In line with good international practice, specific AoIs have been defined for key environmental and social factors based on the characteristics of wind energy projects. These topic-specific AoIs ensure that the assessment focuses on receptors most likely to experience measurable effects from the Project's construction and operation. The AoIs presented below were compared against those adopted in the ERM Draft ESIA and AON National EIA to maintain alignment where still applicable and updated where necessary.

Table 6-13 Topic-specific AoIs

Environmental / Social Topic	AoI Definition	Reference / Rationale
Air quality	**500 m** radius around each wind turbine location and access routes for construction phase. No AoI for operational phase.	Dust is known to settle at distances up to approximately 500 meters from the emission source. Wind farms at operational stage are typically not associated with significant air quality impacts.
Noise	**2 km** radius around each wind turbine location (operation). **500 m** radius from construction sites (construction).	IFC EHS Guidelines for Wind Energy (2015). Construction Noise Handbook (US FHWA and the EPA)
Shadow Flicker	10 × (hub height + rotor radius) (approx. **2035 m**) from each turbine.	Industry standard practice for modelling shadow flicker exposure.
Ice Throw	1.5 × × (Hub Height + Rotor Diameter) (approx. **440 m**) from each turbine.	Conservative estimate according to the Wind Energy Production in Cold Climates (WECO).
Biodiversity	**2 km** radius around each turbine to identify habitat and species presence.	Reflects mobility and habitat use patterns of sensitive fauna.
Visual Impact	The visual influence area was defined within a **20 km** radius from each turbine	LVIA guidelines

Further detailed justification and the methodological approach used to define each topic-specific AoI will be presented in Section 8 Baseline Characterisation of this ESIA, where the spatial extent of data collection, receptor sensitivity, and impact pathways are described for each environmental and social component.

7 STAKEHOLDER ENGAGEMENT

This section provides a description of the main stakeholders of relevance to the Project and a summary of previous stakeholder engagement activities undertaken, as well as the strategy, methods, and implementation framework for engaging stakeholders throughout the project lifecycle. The external stakeholder grievance mechanism's purpose and procedure is also summarized. This section is complemented by the ERM Stakeholder Engagement Plan (SEP) for the Dunarea Wind Farm (Appendix B).

Stakeholder engagement for the Project will be managed through a single, integrated framework, rather than through separate processes for each Project Company. This approach is intended to ensure consistency and coordination between Midmar Callatis SRL and Consenswind SRL, which share the same grid connection, overall project area and host communities.

The overall responsibility for effective stakeholder engagement lies with the Project Companies. A key role is played by the Community Liaison Officer (CLO). A CLO was appointed in December 2025 and serves as the primary link between the Project Companies and local stakeholders across both sub-projects, maintaining regular contact with affected communities and vulnerable groups. Moreover, it oversees the day-to-day implementation of the Stakeholder Engagement Plan (SEP) and the Grievance Mechanism, including grievance resolution, communication, monitoring and reporting. Another important role is covered by the Grievance and Data Manager who, once the grievance is received, registered and deemed admissible, is responsible for identifying the people and the corresponding departments that will provide a timely response to the interested stakeholder, along with monitoring their follow-up within the deadlines stipulated by the procedure.

As described in chapter 5.1.2.2, the Project's overall stakeholder engagement strategy, including both past and planned activities, is guided by a three-level framework that encompasses Romania national requirements, relevant European legislation, and international best practice, in particular EBRD ESR 10 (2025). Stakeholder engagement activities are designed to support the assessment and management of environmental and social risks in line with ESR 1, ensuring that concerns raised by stakeholders inform risk mitigation and project design.

7.1 Summary of Previous Engagement Activities

The ERM Stakeholder Engagement Plan (SEP) describes the stakeholder engagement activities conducted and the feedback collected up to the time of its preparation.

Communication and consultation activities with stakeholders have been conducted at different stages since the Dunarea Wind Farm's inception in 2011, following its various phases of development and periods of break. As the Dunarea Wind Farm Project extends across the communes of Deleni and Adamclisi, the subsequent engagement activities were carried out in both locations. However, for the purpose of this report, only the engagement activities conducted within the commune of Deleni are described below.

The first round of information disclosure and consultation on the Dunarea Wind Farm's environmental and social impacts was carried out between 2010 and 2011 as part of the national permitting process. In relation to the zoning stage of the permitting process, a public meeting was held at Deleni City Hall on 1 February 2011. The announcement for the public debate had been posted at Deleni City Hall and published in a local newspaper on 10 and 13 December 2010. As part of the EIA process, the following consultationactivities were included:

- the decision of the Constanta Environmental Protection Agency was published on the local media on 4 April 2011.
- information regarding the public hearing of the EIA report and the opportunity to consult the documentation both in the local media and at the Commune Hall of Deleni was published on 9 May 2011.
- a public meeting took place at Deleni Commune Hall in 1 June 2011, where a representative of the local NGO Oceanic Club raised questions regarding the Project's potential impacts on certain rodents and bird species, which were clarified by the environmental consultant and deemed satisfactory.

- the confirmation issuance of the environmental agreement was published in local media and at the Deleni City Hall on 19 of July 2011.

After this first period of engagement, the Project Developer resumed a public meeting in 2019 with local authorities and stakeholders, including 50 landowners. Overall feedback was positive towards the Project, despite some gap-years from the last rounds of engagement in the permitting process.

The most recent rounds of engagement were conducted as part of the ESIA process and were divided into two distinct sub-activities:

- **Scoping process, during November 2022**. Key stakeholders were engaged with the purpose of sharing relevant information about the Project and the ESIA process, establishing communication channels, understanding stakeholders' concerns and grievances and validating the Social AOI of the Dunarea Wind Farm Project. During this scoping phase engagement, a meeting was held in the Deleni Commune between the Project Developer and the Commune's Mayor and Hall Secretary. Local authorities raised concerns about the project's potential impact on the road network during construction; nevertheless, the Project's contribution to local community development, as well as the proposed land-use mitigation measures, were perceived positively and adequately.

  Detailed overview of the scoping engagement phase with all received feedback is provided in the SEP (Appendix B).

- **Socio-economic and health baseline data collection, conducted by ERM between March and April 2023** in the Project area, with the aim of gathering baseline insights on socioeconomic and health aspects and discussing key Project-related risks and opportunities. During this phase meetings took place, organized in collaboration with the CLO appointed in April 2023, and consisted of key Informant Interview (KII) with relevant stakeholders and focus groups discussions with farmers in Deleni Commune. Additionally, a Community Grievance Mechanism (CGM) was established in cooperation with local authorities' representatives, with grievance boxes installed at Deleni Community Hall (see more detailed in chapter 7.1.5). Lastly, this phase of engagement played a key role in refining and integrating the stakeholder identification list.

  Detailed overview of the interviewed stakeholder during this engagement phase is provided in the SIA (Appendix N).

The CLO will support the next phases of engagement with local authorities, landowners and affected communities.

7.2 Stakeholder Identification and Analysis

According to EBRD ESR 10 (2025), *the client will identify and document stakeholders, defined as (i) the various individuals or groups (or their legitimate representatives) who are affected or are likely to be affected (directly or indirectly) by the project's activities and operations, (affected parties), or (ii) individuals or groups who may have an interest in the project (other interested parties)*.

As mentioned in the previous paragraph, the various stakeholder engagement activities carried out in the Dunarea Wind Farm area over the years have made it possible to identify all individuals and groups who may be directly or indirectly affected, or who have an interest in the Project.

The ERM SEP presented the full list of stakeholders identified till then (table 5-1, Appendix B). It should be noted that stakeholders identified in the ERM SEP refer to the Dunarea Wind Farm Project; however, all stakeholders identified (except for those specifically listed as belonging to the Commune of Adamclisi) are applicable to the Project. The table lists, in the first column, the stakeholder macro-categories, namely: National and County Government, Local Public Administration, Parastatals (State-Owned Enterprises), Communities/Settlements, Vulnerable Persons/Groups, Non-Governmental Organizations

(NGOs), Other Interest Groups, and Potential Partners. The table is then completed by associating each of the identified categories with the corresponding stakeholder groups and individual stakeholders.

Moreover, as stated in the EBRD ESR 10 (2025), where stakeholder groups are identified as disadvantaged or vulnerable, dedicated approaches and an increased level of resources may be needed for communication with such stakeholders so that they fully understand the issues that are potentially affecting them. In relation to this aspect, in addition to the comprehensive list of stakeholders, the SEP provides a detailed analysis of those falling under the category of vulnerable groups and/or individuals, explaining the rationale behind their classification. The stakeholders considered vulnerable are:

- Elderly/retired: due to low income, limited access to health care and dependence on substance farming.
- Youth: due to limited land ownership, unemployment and lack of skills and experience.
- Ethnic minority groups – Roma communities: due to limited access to education, health care, financial resources and higher risk of marginalization.
- Children: due to limited care, exposure to hazardous work and limited access to education and healthcare.
- Physical / mental health and disability: due to limited participation in decision-making, restricted employment opportunities and varying levels of social exclusion.
- Women, including female-headed households: due to fewer employment opportunities than men and a higher risk of exploitation.
- Individuals with pre-existing health conditions: due to a more vulnerability to health complications and communicable disease.

To ensure an effective engagement process tailored to each previously identified stakeholder category, and as described in the SEP, the Project Developer will map the stakeholders by assessing their respective levels of influence and interest in the Project, as shown in the following figure:

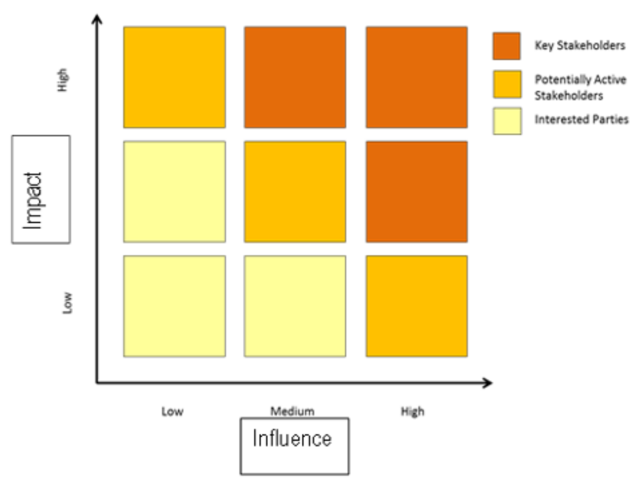

Figure 7-1 Stakeholder Mapping Matrix *(Source: ERM SEP)*

It is further emphasized that stakeholder mapping is an ongoing exercise throughout the Project lifecycle. The Project Company will regularly update the mapping matrix during the various phases and add new stakeholders as they emerge.

Based on each stakeholder's position within the mapping matrix, a corresponding level of engagement tactic will be assigned. For Key Stakeholders, a "Manage Closely" engagement tactic will be applied, whereas for Potentially Active Stakeholders the approach to be adopted is "Keep Informed/Satisfied". Lastly, for "Interested Parties", the tactic assigned is "Monitor".

7.3 Stakeholder Engagement and Engagement Tools

The ERM SEP outlines the engagement strategy to be implemented across all Project phases as part of the ESIA disclosure. Specific Engagement Action Plans will be prepared for each phase and appended to the SEP before the start of related activities.

Engagement will be a continuous process throughout the Project life cycle, supported by regular communication and feedback mechanisms. Moreover, the SEP itself is a living document that will be regularly revised to reflect Project's developments and changes in design or implementation, with specific updates foreseen prior to the construction and operational stages.

7.3.1 Pre-construction

During this phase, stakeholder engagement will be coordinated by the CLO, who will act as the main interface between the Project and stakeholders and will oversee the implementation of the grievance mechanism (which will be disseminated across affected communities and integrated into consultation processes to ensure stakeholder familiarity and accessibility).

Engagement activities will focus on the disclosure of the Draft ESIA to all stakeholders identified, with the final objective to incorporate received feedback into the final ESIA. The Company will present information on project characteristics and potential impacts in a clear and accessible manner, particularly for local communities.

7.3.2 Construction phase engagement

During the construction phase, the Company will maintain continuous engagement with stakeholders, in coordination with the EPC contractor and subcontractor. A Stakeholder Engagement Plan will guide activities to ensure effective, culturally appropriate and transparent communication with affected parties.

Regular consultations will be conducted to inform stakeholders about project progress, upcoming works, workforce influx and any significant changes in planning. The grievance mechanism will be active throughout the entire phase and will be managed jointly by the CLO and appointed contractors.

7.3.3 Operational phase engagement

During operational phase, the Company will retain continuous engagement with stakeholders through the dedicated SEP and corresponding Engagement Action Plan, to be updated to reflect any significant project changes. Regular communication with stakeholders will cover Project performance and annual maintenance plans, results of environmental and workforce monitoring and community investment activities.

The grievance mechanism will also be reviewed and, if necessary, adjusted to ensure it remains appropriate for the operational context.

The Project applies a comprehensive set of communication and engagement tools designed to ensure transparent, accessible and two-way interaction with stakeholders across all phases of development (all of them will be presented in Romanian).

Throughout the Project life cycle, information will be disseminated through various means, including printed and digital materials, direct communication channels and public information points (such as a local project office or a community information desk). Mechanisms such as the project information leaflets, hotline, notice boards, and dedicated website will be utilised to facilitate regular updates on Project activities, timelines and environmental and social performance. In parallel, internal and external reporting systems managed by the CLO will ensure that engagement outcomes, feedback and commitments are properly recorded, tracked and acted upon (see Chapter 7.1.5). These tools collectively enable the Company to maintain ongoing dialogue with stakeholders, promote accountability, and adapt engagement approaches as the Project progresses.

7.4 Stakeholder Monitoring

All stakeholder engagement activities will be systematically documented to ensure transparency and accountability in meeting commitments made to stakeholders. The Company will maintain a structured set of records, including:

- a stakeholder dialogue log to track engagement activities, topics discussed, questions raised and Company responses
- a commitments register to record and monitor all commitments made to stakeholders
- meeting minutes archived within the stakeholder database and reflected in SEP updates
- an updated Stakeholder List with contact details and newly identified stakeholders
- a grievance log documenting all received complaints, actions taken and closure status.
- Media monitoring records tracking relevant press and radio coverage.

These records will be reviewed quarterly to verify proper use and maintenance. Commitments and actions arising from engagement activities will also be regularly monitored to ensure timely implementation and follow-up.

7.5 External Stakeholder Grievance Mechanism

The Project's Community Grievance Mechanism (CGM) allows any stakeholder to raise concerns or complaints regarding the Project's design or implementation. It provides an accessible and formalized process for receiving, recording and resolving grievances, serving as an alternative to external dispute resolution while preserving the right of stakeholders to seek recourse through national authorities or the legal system, in accordance with the existing legislation in Romania.

The mechanism is founded on key principles: accessibility without barriers, early establishment, transparency and predictability of the process, legitimacy and fairness, adequate organizational capacity, and inclusion of confidential channels for reporting Gender-Based Violence and Harassment (GBVH). Together, these principles ensure that the CGM remains credible, equitable and responsive throughout the Project lifecycle.

The Company has established a Grievance Handling Procedure to manage all grievances efficiently and effectively, as shown in the figure below:

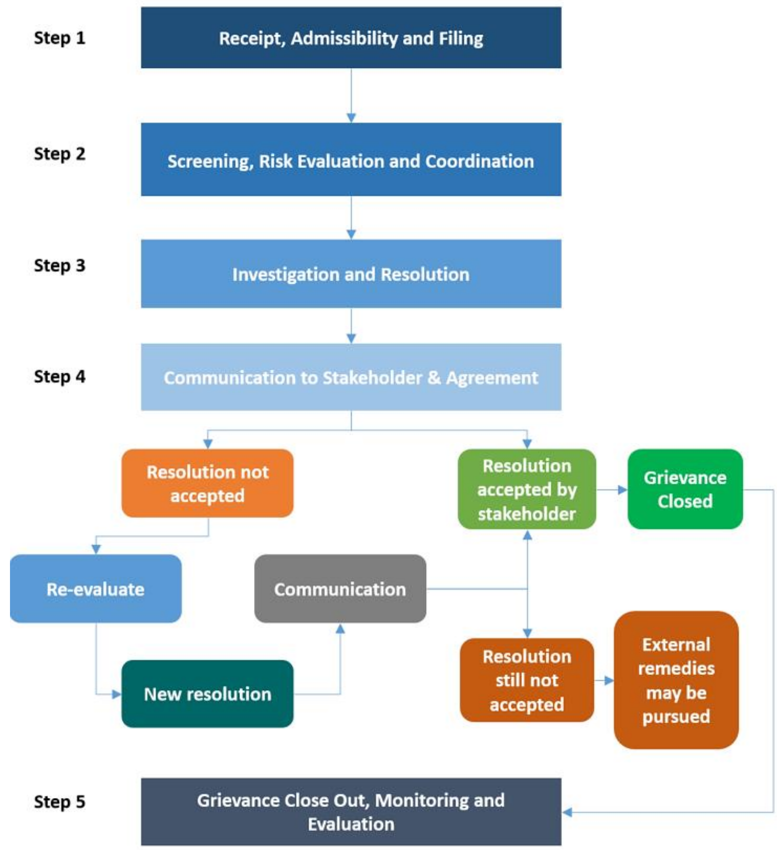

Figure 7-2 Grievance Handling Procedure diagram *(Source: ERM SEP)*

Regarding Step 1, grievances can be submitted verbally or in writing through multiple channels, including the CLO, contractors, hotline, website, or grievances boxes in local mayoralty offices. All complaints, including anonymous ones, are registered by the CLO within the day of receipt and entered into the grievance database. The Grievance and Data Manager reviews each submission, verifies its admissibility and ensures acknowledgement is provided to the complainant within a defined timeframe. Non-admissible grievances are recorded and redirected to the appropriate institutions.

During Step 2, each grievance is screened and assessed for admissibility, risk and complexity to define the appropriate investigation process and timeframe. Risk levels determine response times: low-risk cases are resolved within 30 days, medium-risk within 15 days, and high-risk or urgent cases immediately or within five days. Complex issues involving human rights or environmental concerns may require up to 30+ days and senior management involvement. The CLO coordinates all parties involved and ensure staff are trained on the CGM and risk categorization.

In Step 3, the Company will investigate each grievance through direct communication with the complainant, including phone or face-to-face meetings, and, when relevant, site inspections with local authorities. The investigation aims to verify the validity and severity of the issue and to identify appropriate corrective or preventive measures to ensure the grievance is effectively addressed.

After completing the investigation, in Step 4, the CLO formally communicates the findings and proposed resolutions to the complainant. The Company seeks agreement on the corrective actions, while anonymous cases are disclosed publicly through notice boards or the Project website. If the complainant disagrees with the outcome, the case may be reviewed or referred to external dispute mechanisms, including legal actions. Resolutions may be unilateral, bilateral or mediated by a third party. All actions, evidence and outcomes are documented and signed off, ensuring that each grievance is formally closed once the complainant confirms satisfaction with the resolution.

Lastly, grievances are formally closed once the complainant confirms satisfaction with the resolution, and the database is updated within 72 hours. All records and corrective actions are filed for traceability, while unresolved or ongoing cases remain open until completion. If the complainant disagrees with the outcome, they may pursue external remedies such as the Romanian Ombudsman (the People’s Advocate Institution), arbitration or legal action. The Grievance and Data Manager monitors the implementation of resolutions, and the CLO coordinates with contractors and HSES staff to track progress.

As mentioned before, to address GBVH risks, which may increase with the influx of non-local male workers, the Company will establish safe, confidential and accessible grievance support systems for both workers and communities. Mandatory GBVH training will be provided to all personnel and contractors, and contractual clauses on prevention and response will be included.

8 BASELINE CHARACTERISATION

8.1 Overview of baseline data collection activities

The environmental and social baseline describes the environmental and social conditions that will prevail in the absence of the Project, and against which the potential impacts of the Project will be assessed in Section 9. For the majority of the environmental components the baseline will be the condition at the present time.

The baseline environment has been determined through desktop studies and detailed site visits and site-specific data collection that was carried out as part of the ERM Draft ESIA and the AON National EIA.

It is to be noted that, in the context of preparing the current baseline description for the Project, DNV did not perform any field work. The baseline information retrieved from the existing studies have been considered sufficient and recent enough to provide a clear representation of the current environmental and social status of the area, being most of them collected in from 2021 to 2023.

8.2 Physical Environment

This chapter provides an overview of the environmental (physical) baseline conditions within the Project area and its surroundings (the Project AoI) including topography and land cover, geology and soil condition, climate, air quality, noise, hydrology and water quality.

The Project AoI encompasses the physical boundaries of the Project‘s components and activities as the core area/s, plus a wider buffer zone covering access to the Project, and any natural or community receptors which may be affected by the Project (direct Environment AoI), as well as any additional areas where impacts from unplanned but predictable developments caused by the Project may occur later or at a different location (indirect Environment AoI).

The objective is to outline the existing environmental conditions in the Project area (Project AoI), so as to understand what receptors and resources can be significantly affected by the Project. This information is further used in Chapter 9 Impact Assessment to assess potential impacts caused by the Project at the construction, operation and decommissioning phases and provide mitigation measures and/or monitoring programs to reduce adverse impacts.

Information in this chapter is primarily based on the technical studies undertaken by the Project developer in relation to obtaining the Urban certificates at commune/town level in the Project area (Adamdel and Deleni municipalities). These studies involved the PUZ Technical Memoranda and Geotechnical Survey Studies, and the studies used for the environmental permitting of the Project, including the Presentation Memorandum on the environment, and Appropriate assessment studies developed also at commune/town level.

To obtain suitable and credible information, an additional desktop review of reliable information sources, as well as additional baseline surveys for ambient noise were conducted in the Project area in March and April 2023 by ERM.

8.2.1 Climate

The baseline conditions described in this chapter refer to the Project Area of Influence, as defined in Chapter 6.4, reflect the broader characteristics of Constanța County, which is shaped both by its continental position between the Danube and the Black Sea and by the physical features of the Southern Dobrogea plateau. The region is dominated by a temperate-continental climate with strong continental influences inland and moderate maritime influences closer to the coast. These elements combine to produce a dry, highly variable climate with pronounced seasonal and daily contrasts.

8.2.1.1 Regional Climatic Setting

Most of Constanța County lies within the continental climate sector, with approximately one-fifth influenced by maritime conditions. The Project area falls within a continental climate zone with “excessive nuances,” characteristic of lowland sectors (0–200 m). This topoclimate is typically dry, with large temperature ranges, low humidity in summer, and frequent strong winds throughout the year.

Air circulation is determined largely by seasonal pressure systems: in winter, the Siberian anticyclone reduces precipitation and brings cold, dry air, while in summer the Azores anticyclone contributes to high temperatures and prolonged droughts. The Black Sea moderates transitional seasons, producing long and warm autumns and late, cool springs.

Overall, the climate of Southern Dobrogea stands out as one of the most arid and markedly continental climatic regions in Romania, where early and extended summers, dry conditions, and strong winter winds are defining elements.

8.2.1.2 Temperature Regime

Temperature trends in the Project area were characterised using data from the Cernavodă and Adamclisi weather stations. Average annual temperatures range from 11.0 to 11.2 °C. Summers are typically hot or very hot, with average July temperatures above 22 °C and absolute maxima exceeding 40 °C (42.2 °C recorded at Cernavodă). Winters are generally mild but windy, though cold spells can occur, with temperatures dropping to –10 °C or –15 °C under the influence of the Crivăț wind. The coldest month is January, with average temperatures around –1 °C and absolute minima approaching –25 °C. See Figure 8-1 showing average temperatures.

Daily and annual temperature amplitudes are high, reflecting the continental nature of the climate, with annual ranges of 23–25 °C. Frost occurs on more than 90 days per year, while the frost-free period extends for 200–220 days. These features contribute to a climate marked by abrupt thermal contrasts and strong seasonality.

8.2.1.3 Precipitation regime

Constanța County is among the driest regions of Romania, with annual precipitation generally between 350 mm and 475 mm. Low values result from the continentalised air masses travelling west to east and the low elevation of the region. Precipitation is unevenly distributed throughout the year, with May and June providing the highest monthly averages (around 63 mm).

The area experiences frequent droughts, especially in the southern part of the county. These conditions occur under high atmospheric pressure, reduced cloud cover, light winds, and high temperatures. Winters are influenced by the Siberian anticyclone, which suppresses precipitation and results in the lowest annual number of snowy days in the country. Snow cover is short-lived and irregular, lasting on average 24 days in coastal areas and around 28 days further inland. The maximum snow depth is usually reached towards late February.

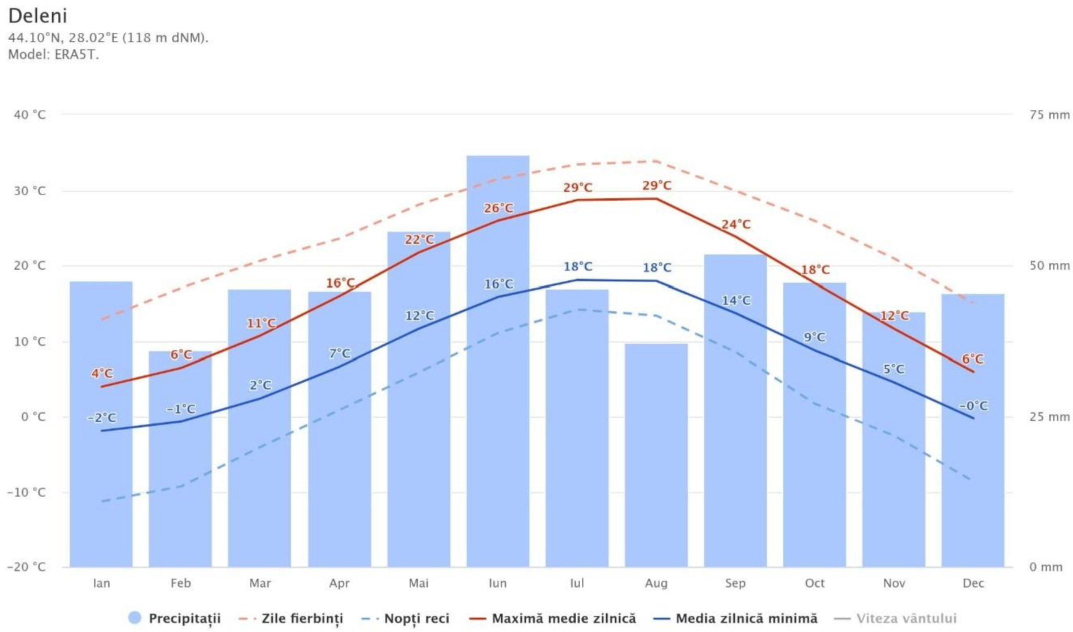

Figure 8-1 Average temperature and precipitation – Deleni (Source: meteoblue.com)

8.2.1.4 Wind Regime

Wind is a defining climatic element in the Project area. Prevailing winds blow from the north-east and east, bringing dry conditions in summer and blizzards or frost during winter. Measurements from the Adamclisi station show that winds are frequent and strong enough to provide reliable wind energy potential.

The most frequent wind direction is from the north (13.3%), followed by southeast, west, and northwest. Calm conditions represent less than one-fifth of the annual record. Average wind speeds typically range between 4 and 6 m/s depending on direction, with the strongest annual mean velocity coming from the north (5.6 m/s). Over a 10-year period, more than half of all winds fell within the 2–5 m/s interval, and nearly one-quarter ranged from 6–10 m/s, indicating exploitable energy potential for wind turbines.

Table 8-1 Average annual frequency (%) by direction

Direction	N	NE	E	SE	S	SW	W	NW	Calm
Value	13.3	7.7	8.1	12.6	10.3	5.9	11.9	10.7	19.5

Table 8-2 Average annual speed (m/sec) by direction

Direction	N	NE	E	SE	S	SW	W	NW
Speed (m/s)	5.6	4.9	4.1	4.5	4.0	3.6	4.4	4.8

The maximum frost depth in the area is approximately 0.80 m, which is important for construction planning and infrastructure stability.

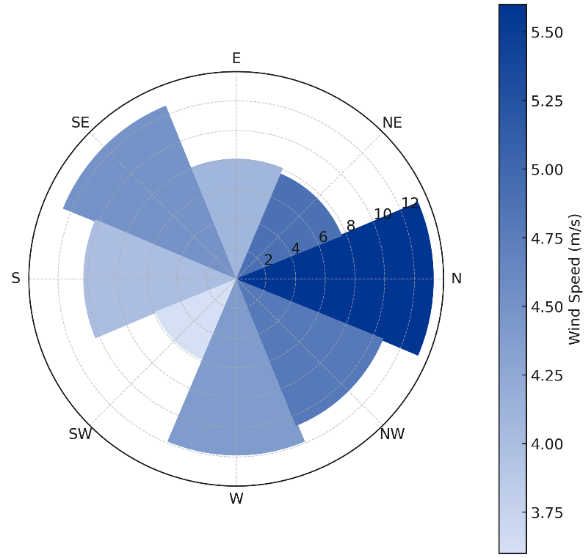

Figure 8-2 Wind rose

8.2.1.5 Solar radiation

Romania benefits from substantial solar radiation, and the Project area falls within the country's highest-potential zone. Southern and south-eastern regions, including Dobrogea, receive approximately 1,387 kWh/m²/year of global horizontal irradiance, making this one of the most favourable regions for solar energy development.

Solar radiation varies seasonally due to the changing angle of the Sun, especially in mid-latitude regions such as Romania. The country enjoys around 210 sunny days per year, with energy availability influenced by local conditions, including humidity, wind, and surface characteristics. Urban areas may experience higher temperatures and altered radiation patterns due to the urban heat island effect, though this is less relevant for the rural setting of the Project.

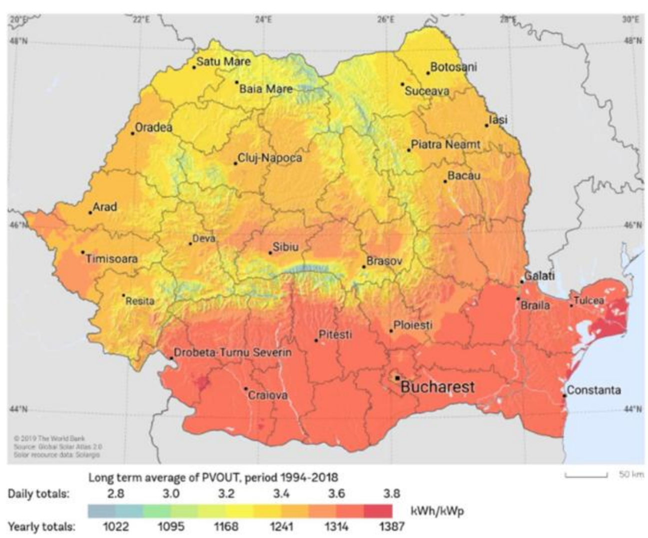

Figure 8-3 Global horizontal radiation level in Romania - Average annual sum 1994-2018 Source: http://solargis.info/doc/free-solar-radiation-maps-GHI

8.2.2 Ambient air quality

The air quality baseline has been identified within the Project's Area of Influence defined in Chapter 6.4.

Wind farms at operational stage are typically not associated with significant air quality impacts. Therefore, the AoI has not been defined for the operational stage of the wind farm. However, this does not mean that there will be no emissions or air quality impacts during the operational stage. Instead, the anticipated emissions and impacts are not expected to be significant enough to warrant a defined area of influence.

8.2.2.1 Constanța County

According to the AON National EIA, Constanța County's air quality is tracked by the National Air Quality Monitoring Network (RNMCA) through 8 automated stations distributed in the area, located in accordance with the "Criteria for EUROAIRNET, 1999," as follows:

- Constanța City – Traffic (CT1): Urban traffic station in central Constanța (1 Decembrie 1918 Blvd).
  - assesses the influence of traffic emissions
  - monitors pollutants: sulfur dioxide (SO2), nitrogen oxides (NOx/NO/NO2), carbon monoxide (CO), benzene, particulate matter (PM10)
- Constanța City – Urban Background (CT2): Urban background station in Constanța (Mihai Viteazu St.).
  - monitors average pollution levels within a large urban area, due to phenomena occurring within the city, with possible significant contributions from transport phenomena originating outside the city
  - the radius of the representative area is 100 m - 1 km
  - monitors pollutants: sulfur dioxide (SO2), nitrogen oxides (NOx/NO/NO2), carbon monoxide (CO), ozone (O3), benzene, particulate matter (PM10 and PM2.5) and meteorological parameters (wind direction and speed, pressure, temperature, solar radiation, relative humidity, precipitation);
- Năvodari – Suburban (CT3): Suburban background station near Năvodari (Tabăra Victoria).
  - monitors average pollution levels within a suburban area due to transport phenomena originating outside the city and phenomena occurring within the city
  - the radius of the representative area is 1–5 km
  - monitors pollutants: sulfur dioxide (SO2), nitrogen oxides (NOx/NO/NO2), carbon monoxide (CO), ozone (O3), benzene, particulate matter (PM10) and meteorological parameters (wind direction and speed, pressure, temperature, solar radiation, relative humidity, precipitation);
- Mangalia – Traffic (CT4): Urban traffic station in Mangalia (Șos. Constanței).
  - assesses the influence of traffic emissions
  - monitors pollutants: sulfur dioxide (SO2), nitrogen oxides (NOx/NO/NO2), carbon monoxide (CO), benzene, particulate matter (PM10).
- Constanța City – Industrial (CT5): Industrial area station in Constanța (Prel. Liliacului St.).
  - assesses the influence of industrial sources on air quality
  - representative area radius is 10–100 m

- monitors pollutants: sulfur dioxide (SO2), nitrogen oxides (NOx/NO/NO2), carbon monoxide (CO), ozone (O3), particulate matter (PM10) and weather parameters (wind direction and speed, pressure, temperature, solar radiation, relative humidity, precipitation)

- Năvodari – Industrial (CT6): Industrial area station near the Năvodari petrochemical zone (Sănătății St.).
    - assesses the influence of industrial sources on air quality
    - The representative area radius is 10–100 m.
    - monitors pollutants: sulfur dioxide (SO2), nitrogen oxides (NOx/NO/NO2), carbon monoxide (CO), ozone (O3), benzene, particulate matter (PM10) and weather parameters (wind direction and speed, pressure, temperature, solar radiation, relative humidity, precipitation);
- Medgidia – Industrial (CT7): Industrial area station in Medgidia (Decebal St.).
    - assesses the influence of industrial sources on air quality
    - the radius of the representative area is 10–100 m
    - monitors pollutants: sulfur dioxide (SO2), nitrogen oxides (NOx/NO/NO2), carbon monoxide (CO), ozone (O3), particulate matter (PM10) and meteorological parameters (wind direction and speed, pressure, temperature, solar radiation, humidity, precipitation)
    - monitors pollutants: sulfur dioxide (SO2), nitrogen oxides (NOx/NO/NO2), carbon monoxide (CO), ozone (O3), particulate matter (PM10) and weather parameters (wind direction and speed, pressure, temperature, solar radiation, relative humidity, precipitation);
- Mangalia – Urban Background (CT8): Urban background station in Mangalia (Crișanei St.).
    - monitors average pollution levels within a large urban area, caused by phenomena occurring within the city, with possible significant contributions from transport phenomena originating outside the city
    - the radius of the representative area is 100 m - 1 km
    - monitors pollutants: nitrogen oxides (NOx/NO/NO2), particulate matter (PM10) and meteorological parameters (wind direction and speed, pressure, temperature, solar radiation, relative humidity, precipitation);

The pollutants monitored are those specified in Romanian legislation, transposed from European legislation, with the limit values imposed by the Air Quality Law 104/2011, as amended and supplemented, with the aim of avoiding, preventing, and reducing harmful effects on human health and the environment. As can be seen from Figure 8-4, those monitoring stations are relatively far from Project's AoI and will serve only to describe the regional ambient air quality characteristics.

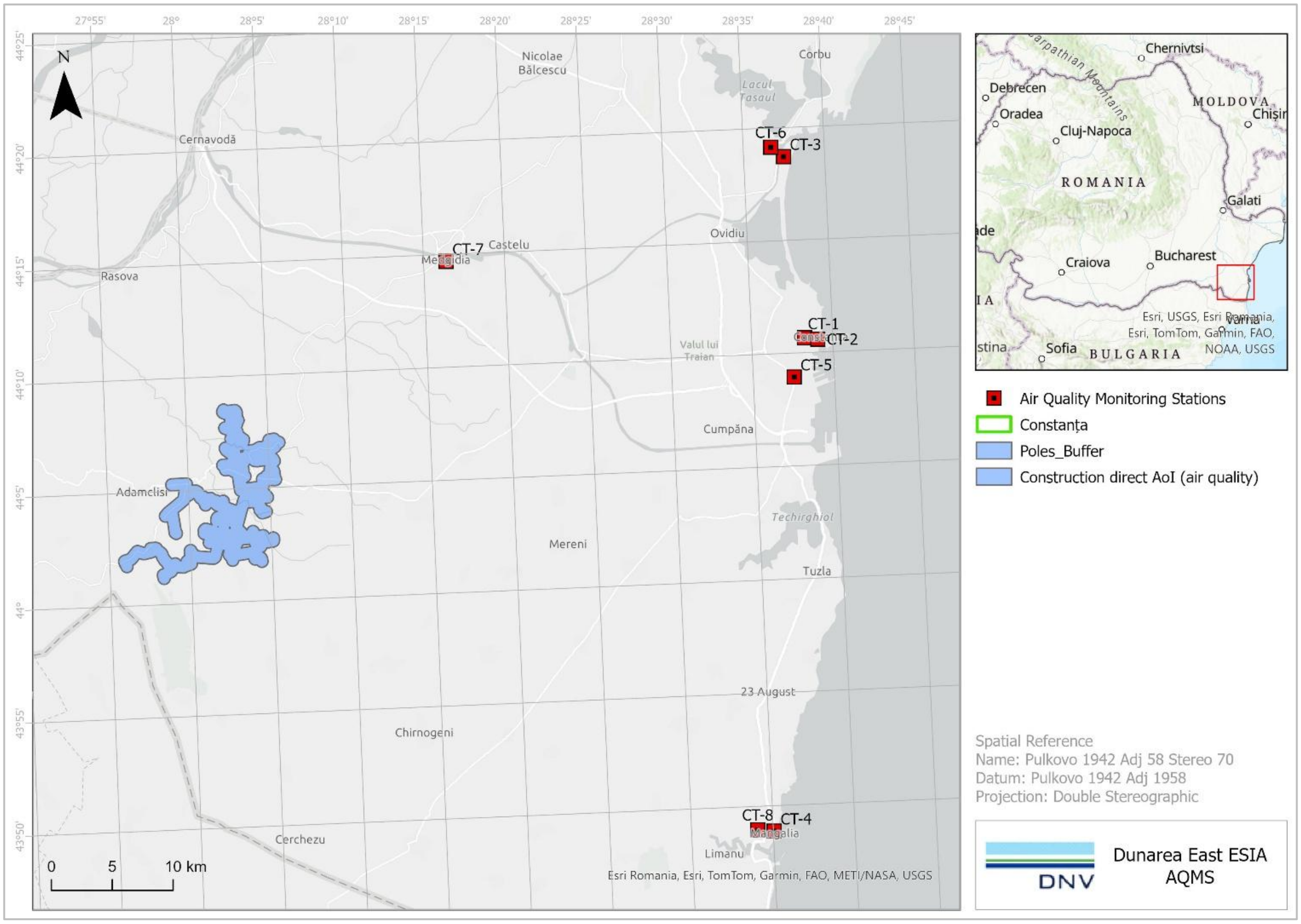

Figure 8-4 Composition of the automatic air quality monitoring network

Table 8-3 presents the state of ambient air quality according to the Plan for maintaining air quality in Constanța County, period 2024–2028, which includes 2022 averages data for all the air quality monitoring stations (AQMS). Considering the annual averages, the reported values are all in compliance with the national air quality standards.

Table 8-3 Average annual concentrations of atmospheric pollutants in ambient air at the AQMS

Station	Type	NO_2	NO_x	PM_{10}	$PM_{2.5}$	Benzene	Ni	CO*	Pb	As	Cd
Unit of measure		µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	ng/m^3	mg/m^3	µg/m^3	ng/m^3	ng/m^3
CT1	Traffic	n/a	n/a	n/a	14.207	1.717	2.878	1.489	0.007	0.578	0.335
CT2	Urban background	n/a	n/a	n/a	13.480	1.609	2.797	1.461	0.006	0.475	0.329
CT3	Suburban	13.51	19.215	16.862	13.844	1.634	2.911	1.473	0.006	0.473	0.354
CT4	Traffic	16.519	25.684	17.611	14.467	1.746	2.953	1.473	9.997	9.488	9.345
CT5	Industrial	n/a	n/a	n/a	13.757	1.802	2.909	1.471	0.008	0.486	0.331

Station	Type	NO_2	NO_x	PM_{10}	$PM_{2.5}$	Benzene	Ni	CO*	Pb	As	Cd
Unit of measure		µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	ng/m³	mg/m³	µg/m³	ng/m³	ng/m³
CT6	Industrial	14.393	20.670	16.934	13.291	1.634	2.929	1.475	0.006	0.479	0.363
CT7	Industrial	12.658	19.702	16.668	13.763	1.633	2.894	1.463	0.006	0.470	0.346
CT8	Urban background	13.185	19,04	16,754	13.817	1.643	2.876	1.459	0.006	0.466	0.336
National Limits (L 104/2011)		40	30	40	25	5	20	10	0.5	6	5

n/a – information was not evaluated for the respective stations

* the presented value represents the maximum daily value of the 8-hour averages

8.2.2.2 Project area

The Project site is relatively far from major urban areas and significant industrial pollution sources. For rural areas, as also described in the ERM ESIA, the existing air quality impact is due to agricultural activities (the use of agricultural machinery, pesticides) carried out on neighboring agricultural lands.

The nearest industrial facility (Sipotele Quarry) is located 1.4 km west-southwest of wind turbine WTG 126, in Sipotele. The main industrial areas are located in Medgidia and Calarasi cities, located approximately 22 km northeast (Medgidia) and approximately 40 km northwest (Calarasi) of the Project footprint. The approximate footprints of the main industrial and commercial areas in the area of the Project are shown in Figure 8-5, below.

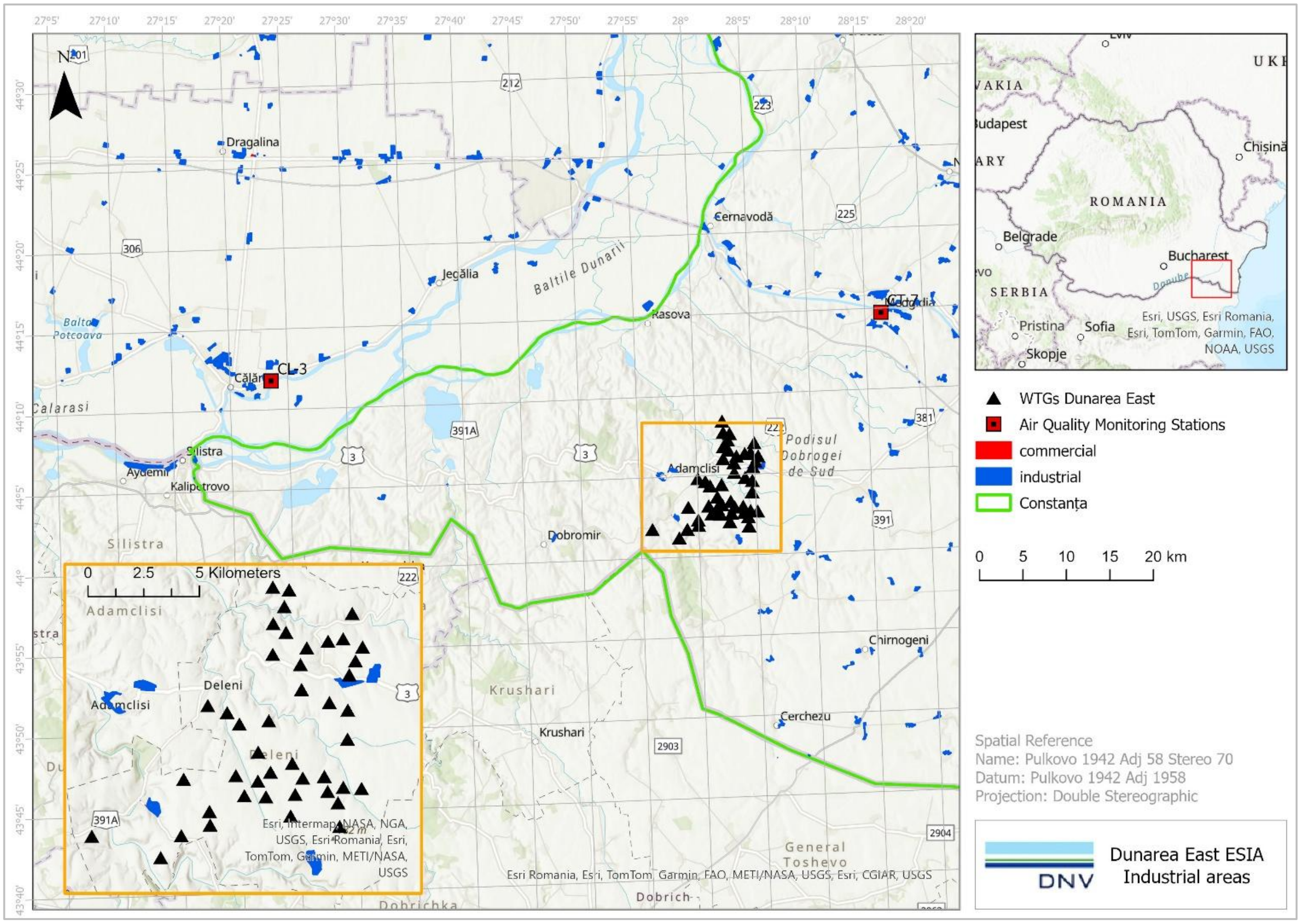

Figure 8-5 Industrial areas

No ambient air quality monitoring is currently undertaken in the vicinity of the Project, based on publicly available information. The nearest stations of the AQMN are CT-7 in Medgidia (approximately 20 km northeast of the Project) and CL-3 in Calarasi (approximately 50 km northwest of the Project). While these stations provide useful information on regional background air quality, their distance from the Project site and potential differences in local emission sources, land use, and meteorological conditions mean they are not fully representative of site-specific baseline conditions. In fact, those monitoring stations are located in urban areas, while the project surrounding areas are mostly rural.

The European Environment Agency (EEA) produces annual concentration maps of different air pollutant using a Regression-Interpolation method. Essentially, this takes the official station data (like those of the Romanian AQMN), and overlays a chemical transport model, then does statistical interpolation to predict concentrations in between stations. Given the absence of nearby AQMS for the Project, these will serve as baseline value.

Modelled values have been retrieved from EEA Data Hub[14], which included the following pollutants:

- NO_2: annual average concentration, in a 1 km^2 grid for year 2024 (interim dataset).
- NO_x: annual average concentration, in a 2 km^2 grid for year 2023.
- O_3: peak season of maximum daily 8-hour means for year 2024 (interim dataset).

[14] https://www.eea.europa.eu/en/datahub

- PM_{10}: annual average concentration and 90.4 percentile of daily means, in a 1 km^2 grid for year 2023.
- $PM_{2.5}$: annual average concentration, in a 1 km^2 grid for year 2024 (interim dataset).

Some of these sets are “interim”, meaning that they are provisional, spatially continuous estimates for key pollutants. They provide timely exposure assessments ahead of final validated versions, which for 2024 is expected in 2026.

Given the uncertainties related to modelling, the baseline values are considered within a range. Table 8-4 compares the pollutants’ concentration ranges in the Project area with the Project air quality standards.

Table 8-4 Project area air quality

Pollutant	Range	Applicable limit	Exceedances
NO_2	Lower than 10 µg/m^3 in the whole region, except for some localized areas between 10 and 20 µg/m^3, corresponding mainly to small urban areas such as Deleni and Adamclisi.	10 µg/m^3	Expected small exceedances only in the small urban areas.
NO_x	Between 10 and 20 µg/m^3 in the whole region	30 µg/m^3	No exceedance.
O_3	Between 90 and 100 µg/m^3 in the whole region, except for some localized areas between 80 and 90 µg/m^3 or lower than 60 µg/m^3 in the small urban areas such as Deleni and Adamclisi, due to the detrimental action of NOx.	60 µg/m^3	Exceedances in the countryside, within limits in the small urban centers.
PM_{10} (annual)	Between 15 and 20 µg/m^3 in the whole region, except for some localized areas lower than 15 µg/m^3, corresponding to forested areas.	15 µg/m^3	Small exceedances in the whole region, except for some forested areas.
PM_{10} (daily)	Between 20 and 30 µg/m^3 in the whole region	45 µg/m^3	No exceedance.
$PM_{2.5}$	The Project area is mostly between 5 and 10 µg/m^3 with sparse areas between 10 and 15 µg/m^3 mostly corresponding to small urban center such as Deleni, Adamclisi, Pietreni and the northern part of the site, probably due to a more intense traffic and industrial presence.	5 µg/m^3	Small exceedances in the whole region, with higher exceedances in the small urban center and in the northern part of the site.

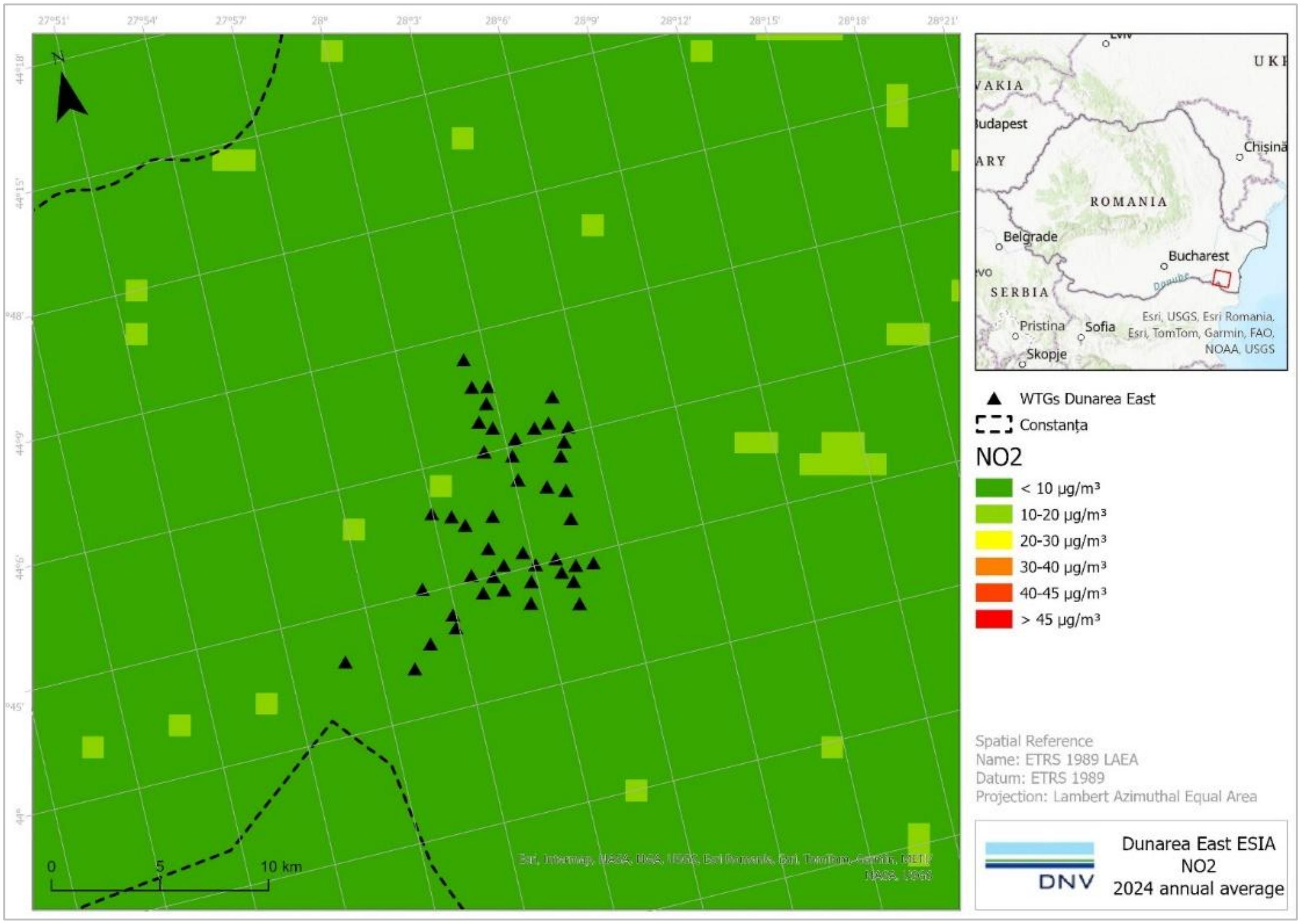

Figure 8-6 NO2 annual average (2024)

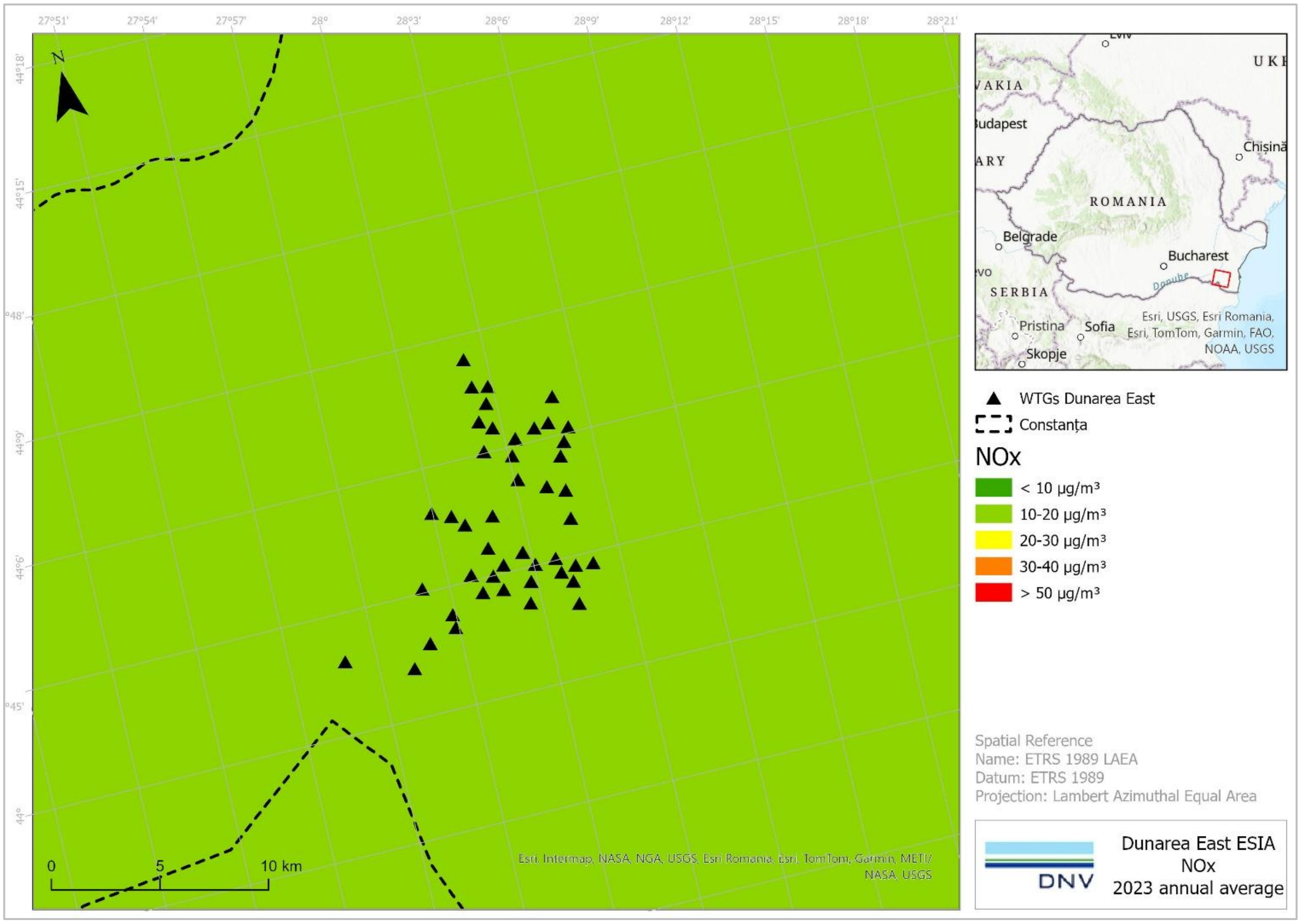

Figure 8-7 NOx annual average (2023)

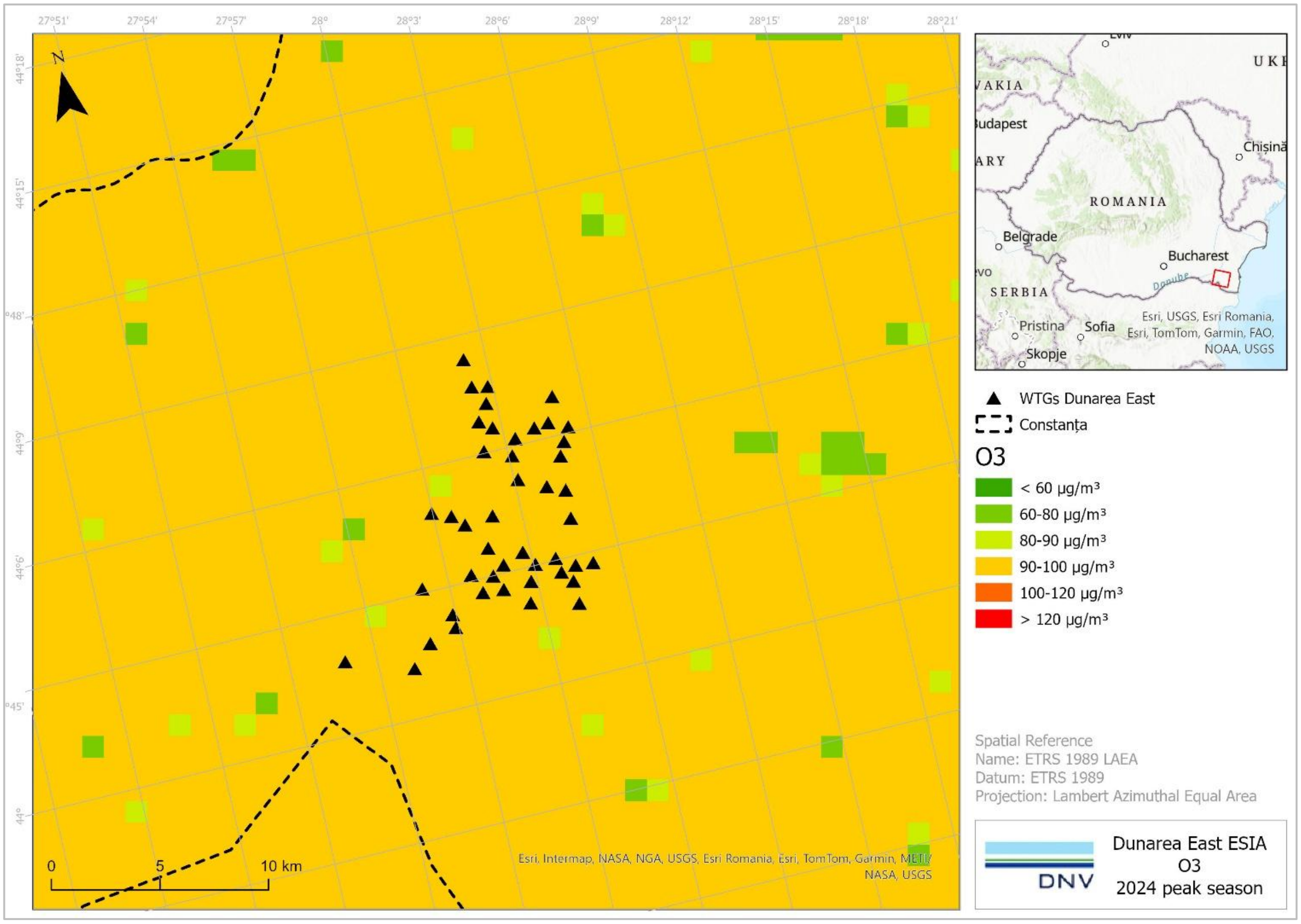

Figure 8-8 O3 peak (2024)

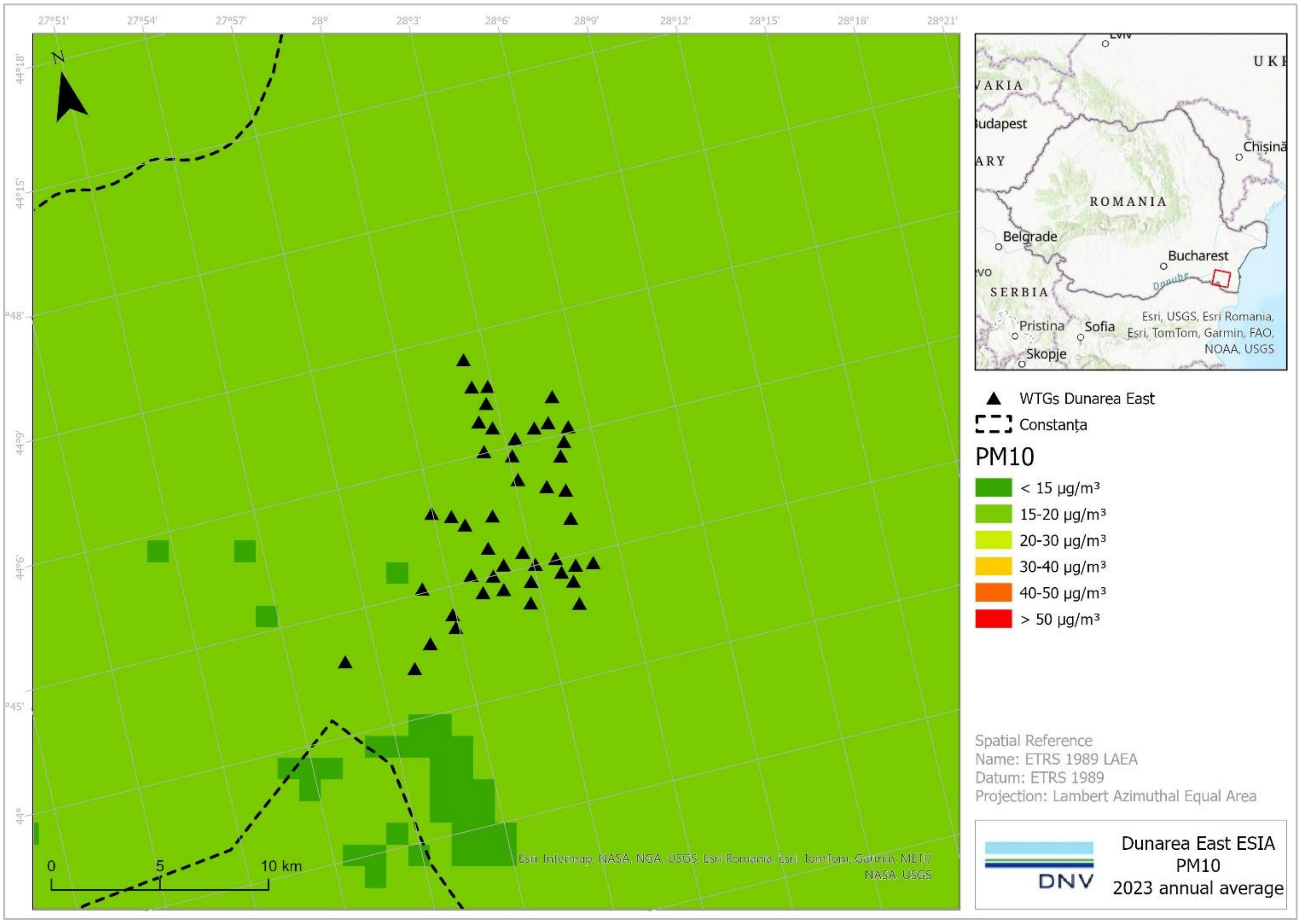

Figure 8-9 PM10 annual average (2023)

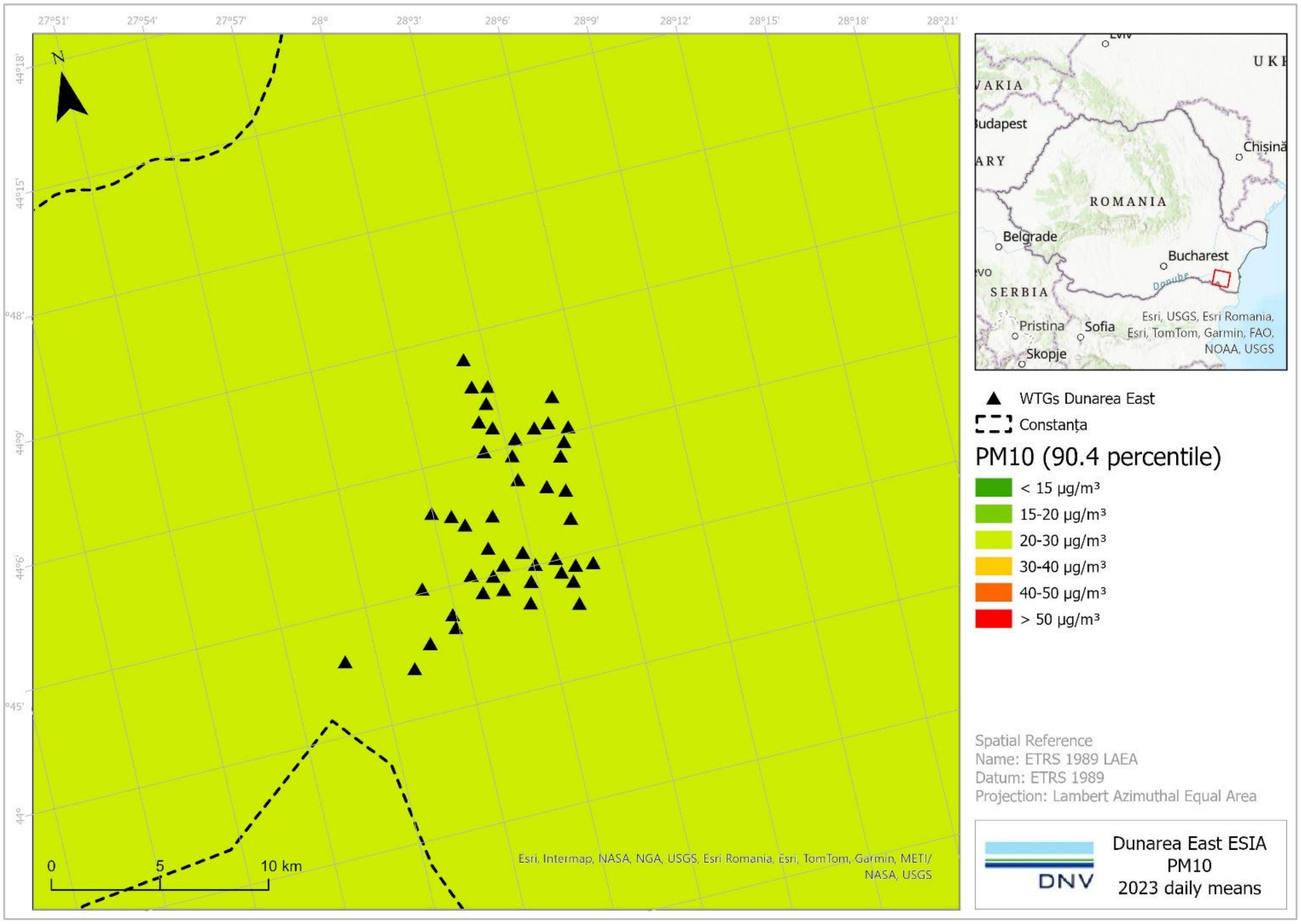

Figure 8-10 PM10 2023 daily means

![DNV logo]

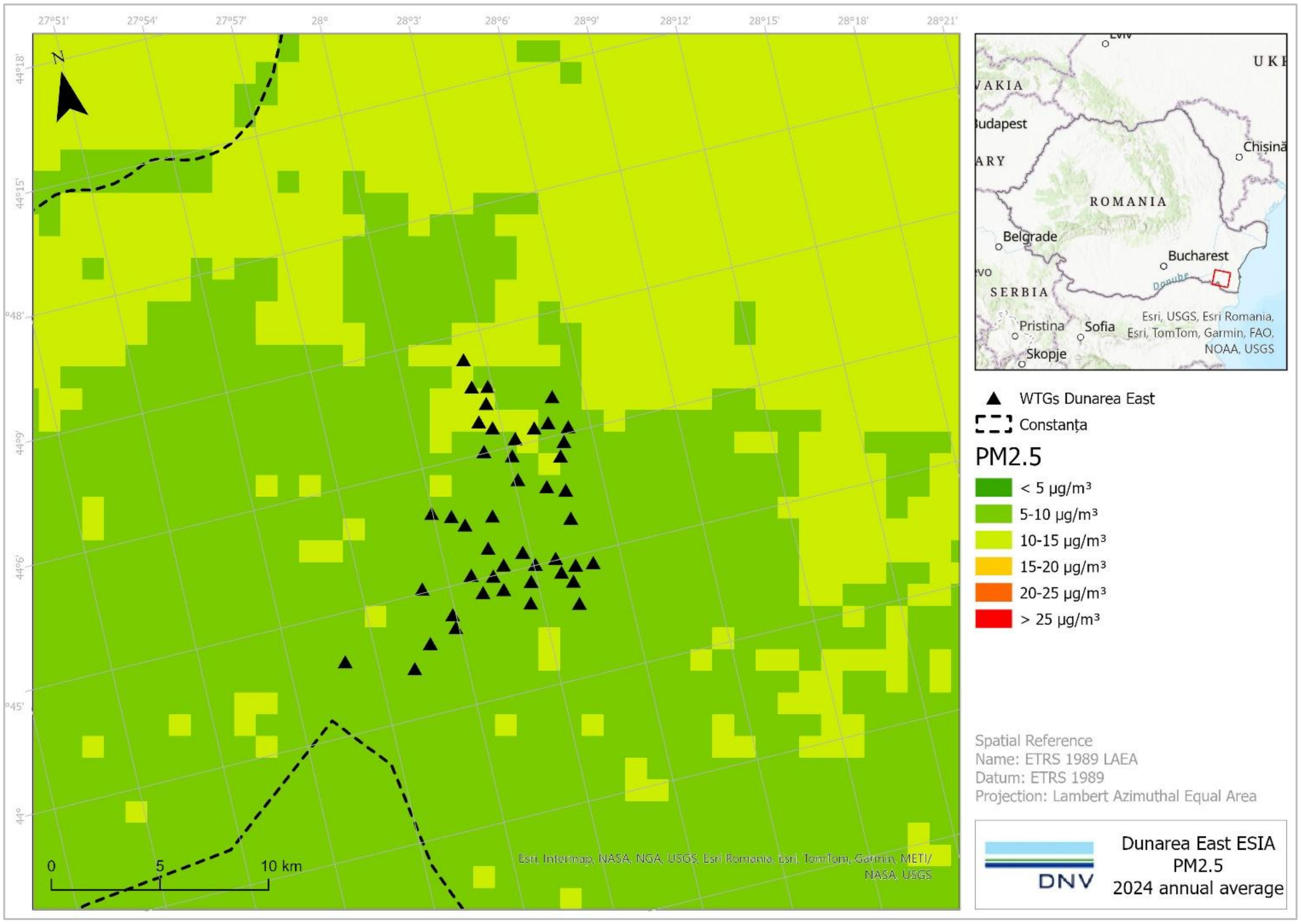

Figure 8-11 PM2.5 annual average (2024)

8.2.3 Ambient noise

An essential part of the noise impact assessment is the accurate measurement and comprehension of the existing acoustic environment in the absence of the Project, and specifically the identification of the baseline noise levels at the potentially Noise Sensitive Receptors (NSRs).

A noise baseline survey was conducted by ERM in 2023 (see Appendix C) at the Project area to characterize the existing environmental sound levels prior to any construction activities. Measurements were performed over a period of nine consecutive days, from 7 July 2023 to 15 July 2023, and continuous hourly data were collected. The parameters recorded included LEQ-A, LEQ-C, and peak sound pressure levels (SPL-A_max, SPL-A_min). Among them the key parameters are:

- **LEQ-A (Equivalent Continuous Sound Level, A-weighted):** Represents the average energy of sound over a given period (hourly or daily), accounting for human hearing sensitivity. It is the standard metric used to assess compliance with noise guidelines.
- **SPL-A max (Maximum Sound Pressure Level, A-weighted):** Represents the highest instantaneous noise level recorded. While LEQ-A captures overall exposure, SPL-A max highlights peak events that could be disturbing even if average levels are within limits.

The purpose of the baseline study is to provide a reference for the existing noise environment and to identify typical daytime and nighttime conditions, to be used then as a reference for the impact assessment of the Project.

Two sets of noise criteria were considered to contextualize the measured levels:

1. **IFC General EHS Guidelines** (2007)
    - Daytime (07:00–22:00): 55 dB(A)
    - Nighttime (22:00–07:00): 45 dB(A)
2. **Romanian national legislation** (Order No. 119/2014, Ministry of Health)
    - Daytime (07:00–23:00): 55 dB(A)
    - Nighttime (23:00–07:00): 45 dB(A)

For baseline reporting, the more stringent IFC night limit (45 dB(A), 22:00–07:00) was considered for comparison. Daytime limits are effectively the same for both IFC and Romanian legislation. This ensures a conservative approach when assessing compliance and provides a consistent benchmark for future project-related assessments.

A summary table of daily average LEQ-A levels is presented below (all values correspond to dB):

Table 8-5 Daily average LEQ-A compared to IFC and Romanian limits

Date	LEQ-A day mean	LEQ-A day limit	LEQ-A night mean	LEQ-A night limit
2023 07 07	45.98	55	38.74	45
2023 07 08	48.36	55	39.05	45
2023 07 09	46.9	55	42.38	45
2023 07 10	43.56	55	36.93	45
2023 07 11	41.33	55	39.02	45
2023 07 12	41.12	55	34.87	45
2023 07 13	41.07	55	39.49	45
2023 07 14	42.2	55	39.56	45
2023 07 15	41.5	55	35.24	45

Across all measurement days, daytime SPL-A maxima consistently exceeded 70 dB(A), while nighttime SPL-A maxima consistently exceeded 60 dB(A). This indicates that although the average continuous noise (LEQ-A) may remain within the legal thresholds, short-term noise peaks are significant, likely due to local traffic, industrial activity, or other transient sources. According to AON National EIA in fact, noise on the site is caused by ambient noise, activities carried out in the area, agricultural and community activities, as well as transport on public roads and noise emitted by projects under construction or in operation.

The baseline noise survey confirms that the study area experiences:

- Moderate continuous noise levels (LEQ-A) generally below the IFC and Romanian daytime limits, indicating a relatively quiet ambient environment in terms of average exposure.
- High instantaneous noise peaks (SPL-A), which could cause temporary disturbance, especially at night.

8.2.4 Topography

The baseline conditions described in this chapter refer to the Project Area of Influence defined in Chapter 6.4.

According to ERM Draft ESIA, the project area is situated within the Southern Dobrogea Plateau (Figure 8-12), specifically in the subunit known as the Cobadin Plateau. This plateau is part of a broader geomorphological system that includes several relief subunits: Medgidia, Cobadin, Oltina, and Mangalia Plateaus.

The Southern Dobrogea Plateau has a generally undulating topography, with altitudes ranging between 60 and 200 m above sea level (asl). The region displays the following characteristics:

- Higher elevations (160–200 m) occur in the south-central areas, associated with the wider interfluvial plateaus.
- Lower altitudes (60–150 m) are found toward the Carasu Valley, the Danube, and the maritime sides, where the plateau becomes more fragmented.
- The Cobadin Plateau, in particular, lies between the Carasu Valley (north) and the Oltina, Topraisar, and Negru Vodă plateaus (south), opening widely toward the Danube Valley.

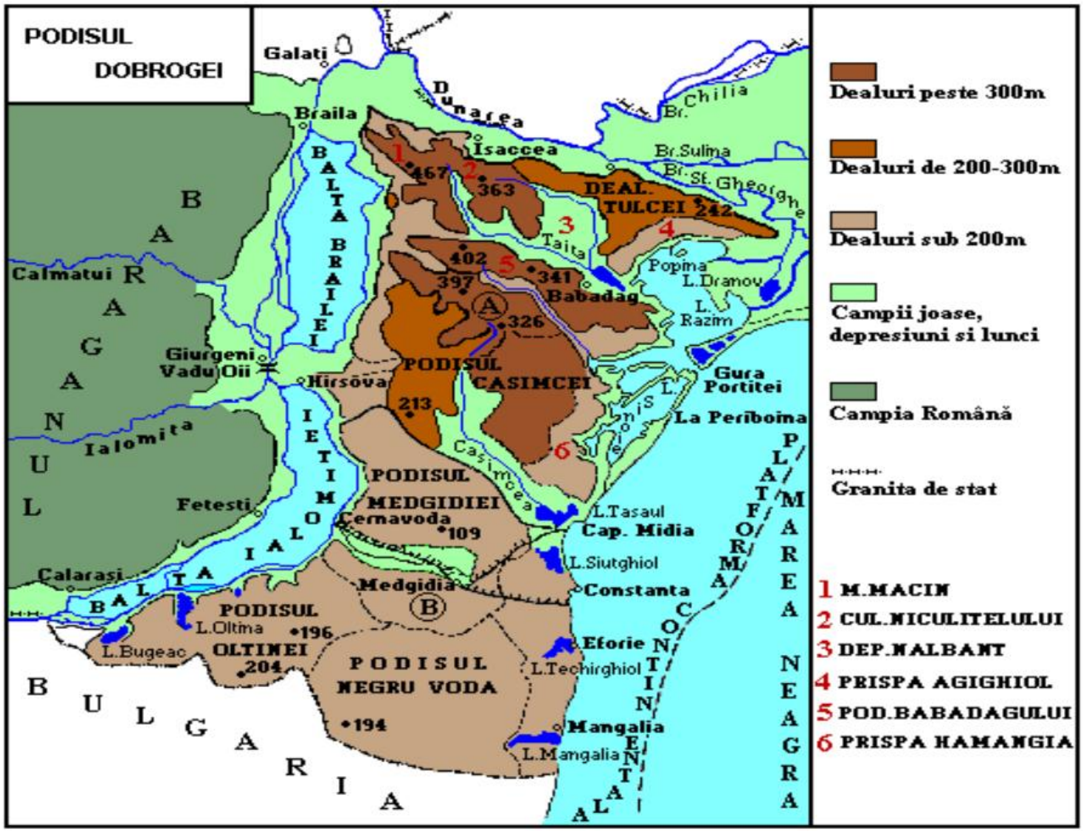

Figure 8-12 Dobrogea plateau topographical map [15]

In the Project area, the plateau exhibits a tabular and slightly hilly aspect, fragmented by the valleys of the Urluia, Deleni, and Baciu rivers (Figure 8-13). Most of the wind turbines are located at altitudes between 107 m and 158 m asl (Figure 8-14). Settlements in the central area are situated at 50–120 m asl, generally occupying lower interfluvial zones.

Overall, the local topography can be described as gentle to moderately undulating, typical of the South Dobrogea plateau system, allowing good accessibility and stable ground conditions for construction activities.

15 ANTETUL LOCALITĂŢII (isudobrogea.ro)

Figure 8-13 Valleys and hills in the area of Adamclisi and Deleni

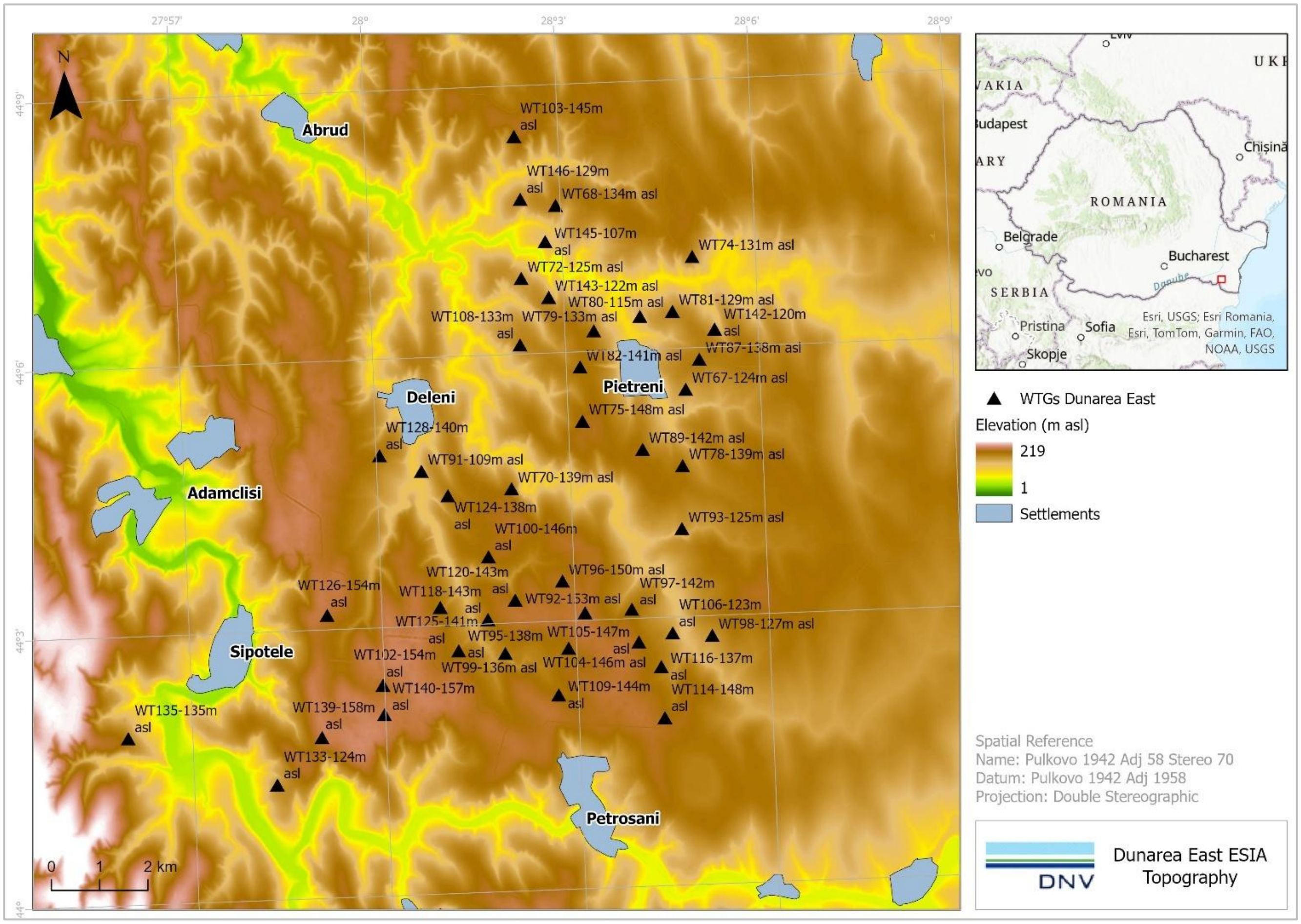

Figure 8-14 Topography

8.2.5 Land Cover

The baseline conditions described in this chapter refer to the Project Area of Influence defined in Chapter 6.4.

The land cover assessment of the Project AoI was developed using a Geographical Information System (GIS) dataset derived from OpenStreetMap (OSM) land use data, subsequently harmonised and processed for ESIA purposes. This dataset provides a spatial representation of the main land use categories within the study area and supports the characterization of the physical environment.

The Southern Dobrogea Plateau is dominated by agricultural and semi-natural land cover. Within the AoI, the area is predominantly agricultural, with farmland covering about 79% of the total area (Table 8-6, Figure 8-15). The second largest land cover type is meadow, which occupies 10%. Forest represents 6% of the area, providing a significant natural component.

Smaller proportions of land cover include grasslands (2%), residential areas (2%), and minor portions of vineyards (1%), and industrial zones (1%). Commercial areas, cemeteries and farmyards are almost negligible, each making up less than 1% of the area.

Overall, the landscape is strongly dominated by agricultural use, with limited semi-natural and artificial land cover elements. This indicates that the current landscape structure is largely shaped by long-standing human land management practices, with natural vegetation restricted mainly to linear features such as river valleys, field margins, and roadside verges, as also provided in the AON National EIA.

Table 8-6 Distribution of land cover types within the direct AoI

Land cover type	Area (ha)	Percentage (%)
Farmland	13,748.5	79.2%
Meadow	1,665.4	9.6%
Forest	1,029.4	5.9%
Grass	279.6	1.6%
Residential	376.2	2.2%
Industrial	126.1	0.7%
Vineyard	121.8	0.7%
Cemetery	0.8	<0.1%
Commercial	0.0	0.0%
Farmyard	0.1	<0.1%
Total	**17,348.0**	**100%**

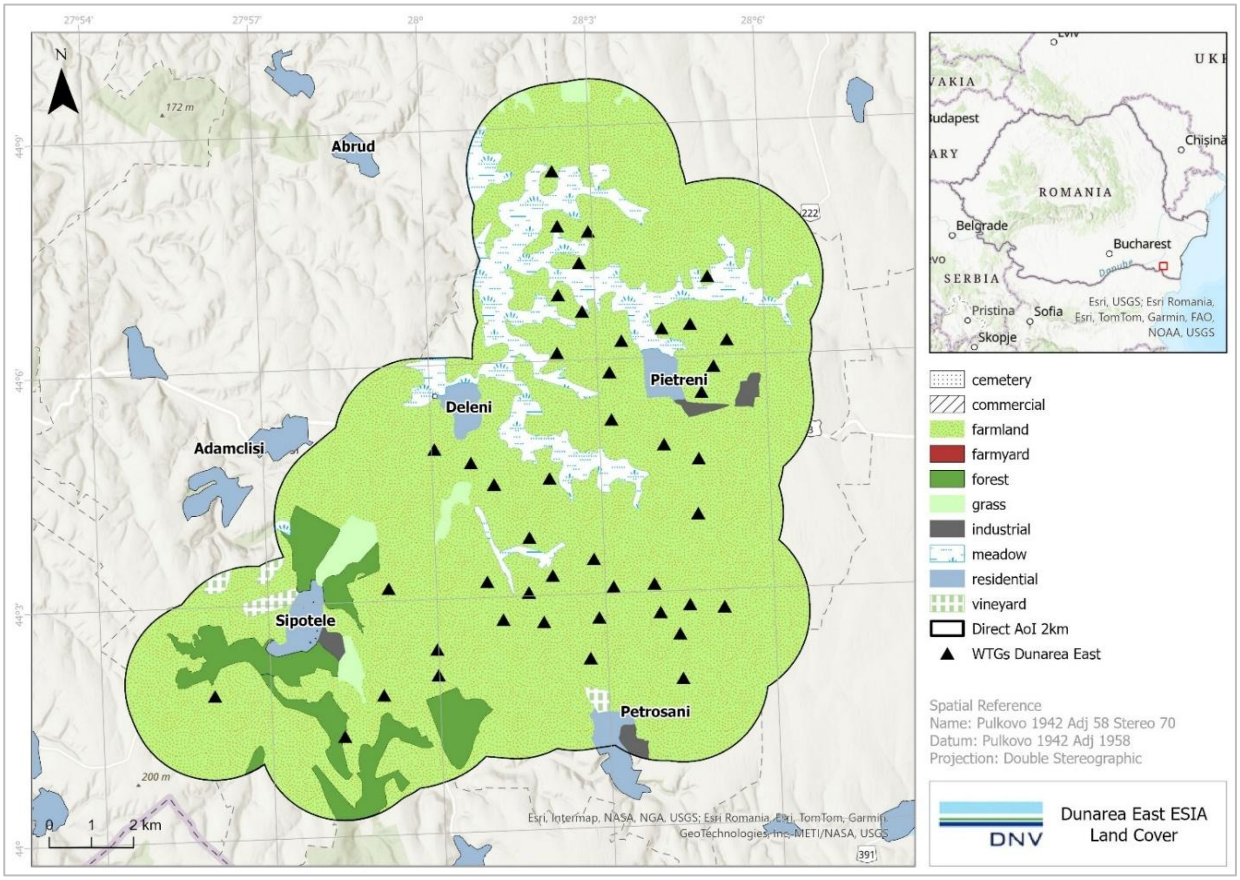

Figure 8-15 Land Cover

As part of the broader environmental baseline characterisation of the study area, an additional land cover assessment was undertaken using the CORINE Land Cover (CLC) dataset, a standardised European classification system that maps land cover based on physical and functional land use across 44 categories.

This complementary analysis provides a wider-scale perspective on land cover distribution within the Ecologically Appropriate Area of Analysis (EAAA), allowing comparison with the local OSM-based land use mapping presented above. The results indicate that the wider landscape is predominantly composed of **modified habitats associated with agricultural land use**, while natural and semi-natural habitats are present in smaller and spatially fragmented proportions.

At the scale of the EAAA, the distribution of natural and modified habitats is summarised below:

Table 8-7 Distribution of Modified and Natural Habitats

EAAA Scale	Modified Habitats (%)	Natural & Semi-natural Habitats (%)
Terrestrial EAAA	89%	11%
Avian EAAA	79%	21%

Natural habitat components include broad-leaved forest, transitional woodland-shrub, natural grasslands, wetlands, and water bodies, all of which occur in limited and discontinuous patches. Agricultural land remains the dominant land cover class across both EAAAs, while artificial surfaces represent a minor proportion of the landscape.

Although parts of the wider study area overlap with designated ecological sites supporting Annex I habitat types, all Project infrastructure, including turbine locations, is situated within agricultural land classified as modified habitat. Where overlaps occur with designated areas, these are limited to cultivated fields and do not affect qualifying habitat features.

This broader land cover interpretation is derived from the Critical Habitat Assessment (CHA) prepared by TBC (2026), as further described in Section 8.3, and provides contextual ecological information supporting the baseline characterisation of habitat conditions within the study area.

8.2.6 Geology and Soil

This chapter provides review of the existing baseline conditions in the Project area in relation to geology, soils, geotechnical conditions and natural hazards within the Project Area of Influence defined in Chapter 6.4.

8.2.6.1 Regional geological framework

According to AON National ESIA, the project is located in southeastern Romania, in Constanța County, approximately 50 km east-southeast of Constanța. From a geological and tectonic point of view, this region belongs to the Dobrogea sector of the Moesian Platform.

The Moesian Platform is a major unit of the Carpathian-Balkan promontory, located between the Carpathians to the north and west, the Balkan space to the south, and the western Black Sea to the east. The northeastern border—the Peceneaga-Camena fault—separates the platform from the North Dobrogea Orogen. The Intramoesian fault divides the platform into eastern and western Moesia, two major units that differ in crustal thickness, lithostratigraphy of the covering rock layers, orientation of major fault systems, etc.

The exposed parts of both Northern Dobrogea and Eastern Moesia belong to Dobrogea, an area bounded by the Black Sea and the Danube to the north and west. Eastern Moesia is divided into two tectonic blocks: Central Dobrogea, raised between the Peceneaga-Camena (PCF) and Capidava-Ovidiu (COF) faults, and Southern Dobrogea (the lowered block) between the Capidava-Ovidiu fault and the Intra-Moesian fault.

![DNV logo]

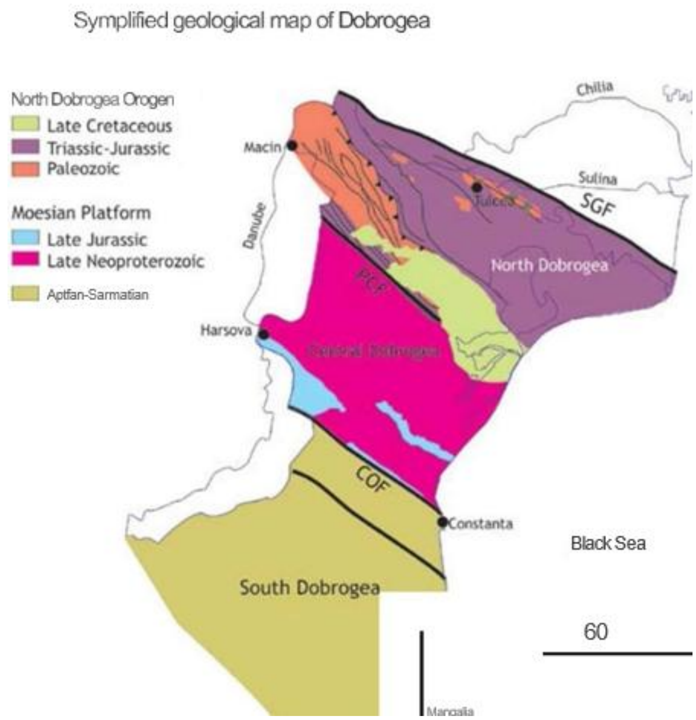

Figure 8-16 Simplified geological map of Dobrogea (after Seghedi, 1999)

Dobrogea is characterised by a complex geological structure, which includes orogenic belts and ancient platforms and contains formations from the Neoproterozoic to the Holocene.

The common feature of the three units of Dobrogea is the large Quaternary cover, formed by a layer of reddish clays from the Lower Pleistocene and continuing into the Holocene, with a layer of sediments of varying thickness (2-20 m) comprising up to 6 pairs of loess- paleosol layers.

8.2.6.2 Local geological framework

The main geological-geotechnical feature of the project area is a thick layer of Quaternary sediments extending over Sarmatian limestones.

Sarmatian deposits (Upper Middle Miocene) are well developed in the region and in the project area. Two main layers have been identified: Basarabean - composed of 4 horizons (mainly green clay-yellow with lenticular deposits of clayey sand alternating with limestone, bentonitic clay and lenticular deposits of limestone) and Kersonian layers composed mainly of lumazel or oolitic limestone and secondarily of calcareous conglomerate sandstone, sand and clay intercalations in limestone layers. This Sarmatian formation was encountered in several boreholes in the form of eroded limestone fragments (iron oxidation) in a heterogeneous matrix of yellowish- grayish clay.

The Sarmatian was formed approximately 13 to 6.5 million years ago. After the deposition of the Sarmatian limestone layer, Southern Dobrogea became a developed area and was covered by thick layers of continental sediments. The deposition of continental sediments by winds continued during the Quaternary glaciation periods characterized by a cold climate (from 1.8 million years ago to the present).

The stratigraphy of the Quaternary comprises the following layers, from bottom to top:

- **Red clays from the Lower Pleistocene**: Red eluvial clays are usually found under loess and on various pre- Quaternary formations.

This formation includes red, reddish-yellow, and reddish-brown clays, which extend over variable areas and have variable thicknesses. Depending on the extent of the topographic surface of the Dobrogea paleorelief and the erosion after the Lower Pleistocene, the thickness of the reddish clays is highly variable, from 0.1 m (western shore of Lake Oltina) or 0.5 m (north of Cernavoda) to 6 m (southeast of Capidava, Seimenii Mari) or almost 8 m (both shores of the central part of the Poarta Albă-Midia-Năvodari channel).

In general, red clays have a firm-hard consistency and usually have superior physical and mechanical characteristics compared to loess-loessoid soils in the associated Middle-Upper Pleistocene layers.

- **Middle Pleistocene – Upper Pleistocene. Loess**: The sedimentary layers of loess deposits are characterized by the intercalation of loess and paleosol units. The number of loess-paleosol units varies from no paleosol intercalations to seven or eight units (Rădan et al., 2013).

In general, the loess in Southern Dobrogea is characterized by its yellowish color, variable thickness (depending on the pre-Quaternary relief morphology and the processes that affected the primary eolian material), lack of stratification, high porosity, and typical alluvium content of approximately 70%.

8.2.6.3 Regional geomorphology

According to ERM Draft ESIA, from a geomorphological point of view, the Project is located in the Southern Dobrogea Plateau. The Southern Dobrogea Plateau, with its subdivisions (Carasu Plateau, Oltina Plateau, and Cobadin Plateau), is a plateau with altitudes ranging from 100 to 200 m, formed by thick layers of loess deposits that give it a quasi- tabular structure, but with broad waves (due to the of the pre-existing Sarmatian limestone), sloping from the Black Sea towards the Danube.

In the wind farm project area, the flatness is interrupted only by a network of valleys with flat thalwegs and steep slopes in the loess layers. The valleys have a depth that increases progressively from east to west. Two geomorphological subunits can be distinguished: interfluvial plateaus and sloping terrain on the sides of the valley.

The predominant landforms are plateaus, with the largest extension at the upper level, with a height ranging from 146 m in the north to 180 m in the south, with long eroded slopes between 5-10% for arable land and 10-15% for pastures.

8.2.6.4 Geological hazards

According to AON National ESIA, geological and seismic hazards are hazards that can affect a location due to the surrounding geological and seismic conditions.

Landslides: The potential for landslides in the investigated area is low due to the generally flat topography of the GTE sites.

Flooding: According to information provided by Vestas, no flooding due to groundwater has been reported in the vicinity of the project, and no flooding is expected to adversely affect the proposed development.

Frost depth: According to STAS 6054/77 (Foundation soil. Maximum frost depths. Mapping of the territory of Romania), the maximum frost depth in the study area is 90–100 cm. Design code NP 112-2004 adds an additional 10 cm to this value to achieve the minimum foundation depth.

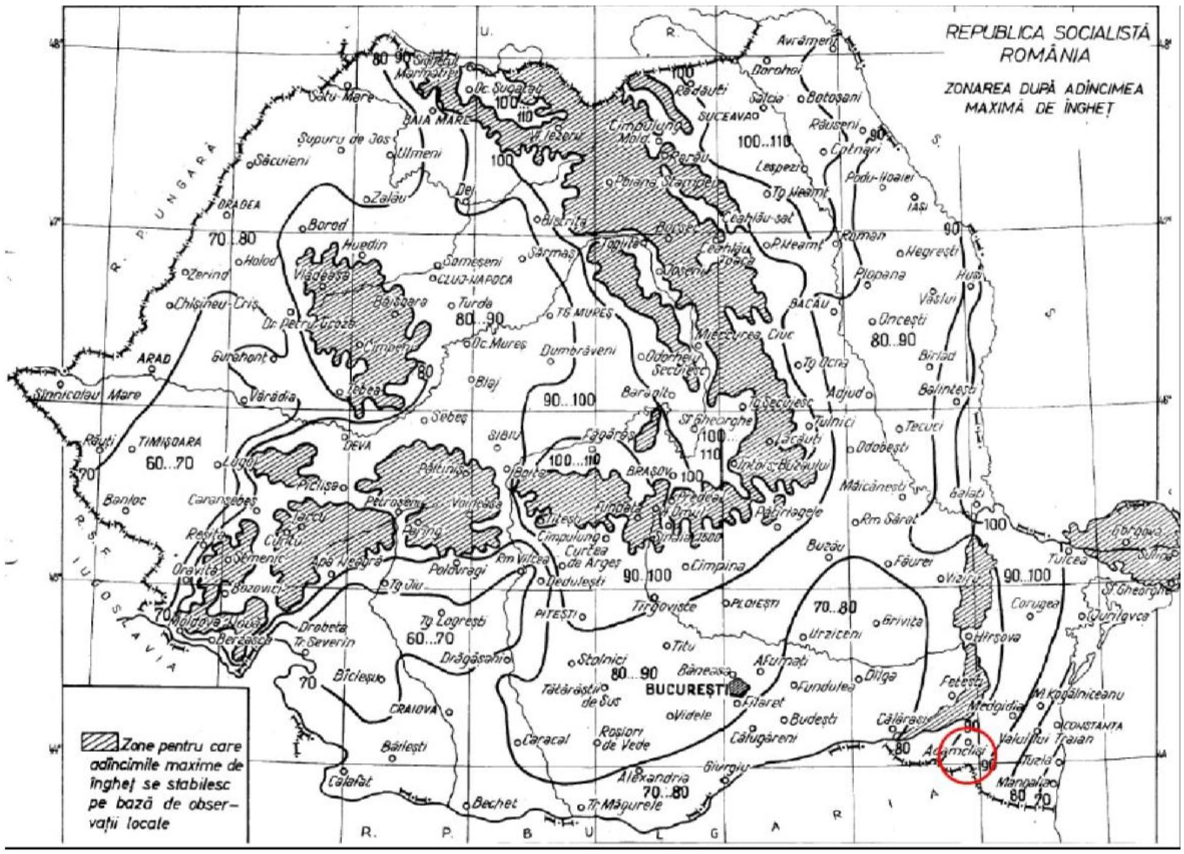

Figure 8-17 Maximum frost depth according to Romanian state standard STAS 6054-77

8.2.6.5 Seismic data

Seismically, Romania belongs to a moderate to high seismic zone. However, the project site is located in a seismically calm area, outside active zones. This region can only be affected by events occurring at a distance of approx. 150–200 km.

The return periods in Vrancea are 6 years for M = 6, 30 years for M = 7, and 120 years for M = 7.5.

The territory of Romania is divided into seismic zones according to local seismic hazard, which, in simplified terms, is considered constant in each seismic zone. The seismic hazard for design is expressed by the peak value of the horizontal ground acceleration ag determined for the reference mean recurrence interval (IMR) corresponding to the ultimate limit state.

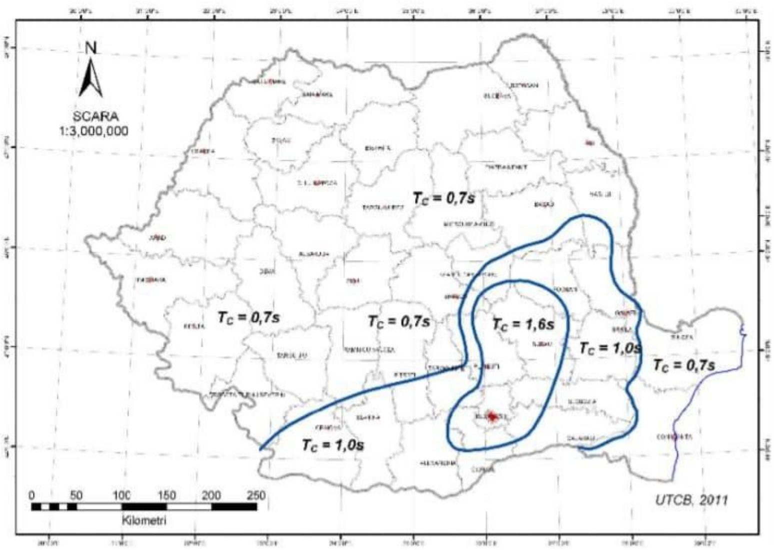

Figure 8-18 Zoning of Romania in terms of the control period TC of the response spectrum (P100-1, 2013) - Source: Dynamics of Structures and Seismic Engineering. [v.2014]

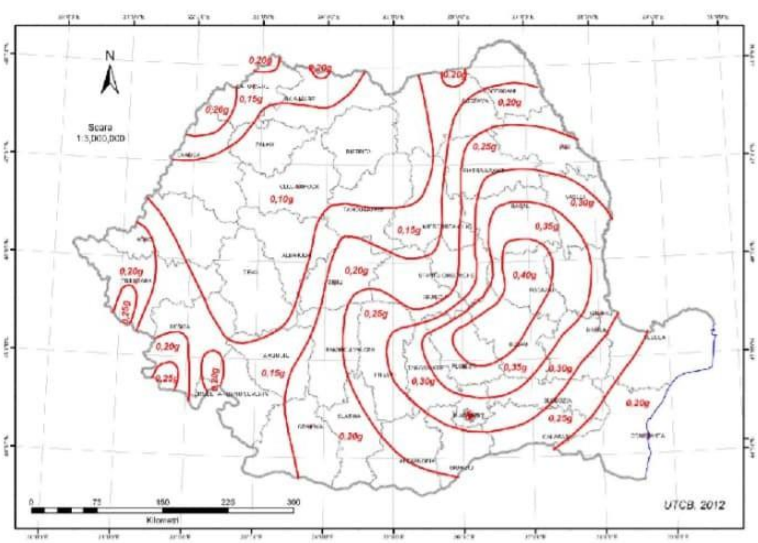

Figure 8-19 Zoning of Romania in terms of the control period TC of the response spectrum (P100-1, 2013) - Source: Dynamics of Structures and Seismic Engineering. [v.2014]

According to Standard P100-1/2013 (in force for new constructions), the project site is located in an area characterized by the following values:

- control period (corner) for design TC= 0.7 sec.
- horizontal ground acceleration for design (peak value PGA) ag = 0.20 g, for an average recurrence interval IMR = 225 years and 20% probability of exceedance in 50 years;

The seismicity of the area is mainly determined by earthquakes occurring in the Vrancea region - the Vrancea earthquakes, which, due to their characteristics and the response of different areas of the country, form the basis for the seismic zoning of Romania, as well as those on the Black Sea coast - The Sabla seismic zone - Pontic earthquakes at the intersection of two tectonic crustal faults: the Intramoesica fault and the Black Sea fault, which occur in the southeastern areas of Romania, especially in Dobrogea.

According to the Geotechnical Study prepared for the project, there are no known active faults crossing the property, and the location is not situated in a special study area for earthquake faults. Regarding the seismic context of the location and considering that the high risk of fault rupture can be associated with earthquakes of magnitude 5 and above on active faults, no fault rupture hazard is assigned, with a low potential for strong ground motion in the wind farm area.

With regard to the liquefaction potential of loess soils, it is generally known that liquefaction occurs in saturated or nearly saturated soils with no cohesion at depths of less than approximately 15 m. The natural groundwater level appears to be particularly deep, as it was not encountered during any drilling (30 m depth), which means that the liquefaction potential of the existing soils is zero during seismic motion (if it occurred).

8.2.6.6 Soil

Soil data derived from ERM Draft ESIA which sourced information from the DTAC Studies (Construction Technical Documentation for Building Permits, 2022) and from the Geotechnical Survey Studies developed for each of the two sub-projects (2011 by MS ENERTECH S.L and 2022 by ERM).

Constanta County

According to the AON National EIA, soils in Constanța County exhibit a wide diversity of genetic and environmental characteristics. Under natural conditions, these soils are generally fertile and suitable for a broad range of crops. However, their production potential has been declining in recent decades due to both climate pressures and anthropogenic factors. The parent material is largely loess, a characteristic that contributes to the susceptibility of local soils to rapid degradation.

Soil productivity in the county is assessed through a rating system that incorporates climatic variables, chemical and physical soil properties, hydrological conditions, and agronomic factors. These ratings, expressed in points (1–100), form the basis for Romanian soil quality classes.

Table 8-8 Soil Quality classes and grading points

Quality class	Grading points
Class I	81-100 rating points
Class II	61-80 rating points
Class III	41-60 credit points
Class IV	21-40 points
Class V	1-20 points

According to the AON National EIA classification system, land is not only assigned a general quality class on the basis of natural rating points, but is also evaluated in terms of suitability classes which indicate the intensity of limiting factors for a given agricultural use. The suitability classes provide a practical framework to interpret how restrictive conditions — such as slope, groundwater depth, salinization, erosion, or soil texture — affect the feasibility of specific land uses (for example arable crops, orchards, vineyards or pasture).

From a practical perspective, suitability classes guide land management decisions and inform mitigation or improvement measures. For example, land assigned to Suitability Class II typically requires relatively simple corrective measures (such as controlled drainage or modest erosion control) to enable the proposed use, whereas land in Suitability Class IV–VI would require substantial remediation works or would be considered unsuitable for certain intensive uses.

Table 8-9 Suitability classes

Suitability class	Type of land
Class	Land without limitations or restrictions (no problems with use)
Class II	Land with minor limitations or restrictions (raises relatively simple problems in use, generally related to the prevention of degradation processes or phenomena)
Class III	Land with moderate limitations or restrictions (raises more complicated issues in terms of use, development, improvement)
Class IV	Land with severe limitations or restrictions (raises relatively difficult problems of development, improvement, exploitation)
Class V	Land with very severe limitations or restrictions that can be partially corrected
Class VI	Land with extremely severe limitations or restrictions that cannot be corrected (and therefore unsuitable for use for a specific purpose)

Based on these criteria, according to the Constanța County Report on the State of the Environment 2022, no agricultural land in the county meets the conditions for Classes I or II. Most agricultural land falls into Class III, reflecting moderate limitations for agricultural production.

A major limiting factor is the low organic carbon (humus) content. According to *OSPA Constanța*, 70.87% of the mapped area presents low humus levels, affecting soil fertility, structure, and water retention. Other widespread degradation processes include gleying (about 13,600 ha) and salinization (over 20,000 ha), with intensities ranging from moderate to severe.

Soil pH is generally slightly alkaline. This, combined with declining phosphorus and humus levels, reflects historical agricultural practices including intensive irrigation before 1989, inadequate agricultural methods during the 1990–2000 transition period, and subsequent improvements after 2000.

Erosion continues to be a significant pressure. Large areas are affected by low to moderate erosion, while severe erosion remains more localized (*Constanța County Environmental Datasets*).

Pressures on soil quality from agricultural practices

According to the *Constanța County Directorate for Agriculture*, chemical fertilizers and plant protection products represent some of the main pressures on soil quality. Fertilizers support productivity but, if misapplied, may increase nutrient leaching and soil degradation. In 2022, total fertilizer use reached 1,277 tonnes, with annual fluctuations linked to crop cycles and climatic variability.

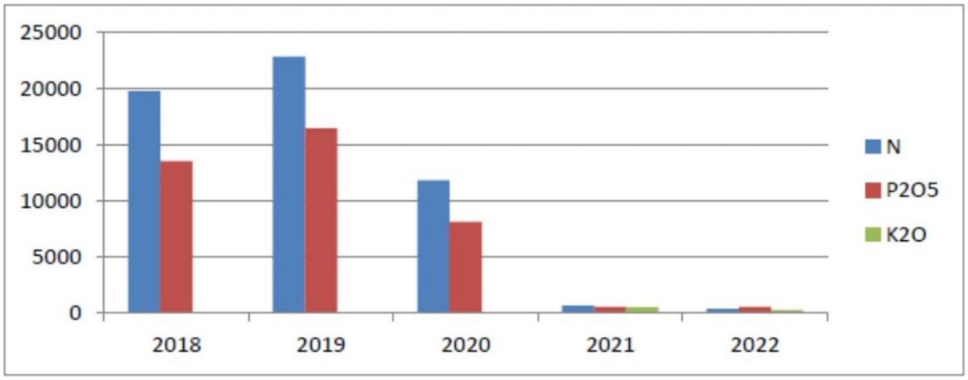

Figure 8-20 Quantities of chemical fertilizers used, Source: Constanța County Directorate for Agriculture

Pesticide consumption, including herbicides, insecticides, fungicides, and other categories, is similarly substantial. These substances can accumulate in soil layers and remain for extended periods, contributing to pollution and affecting soil biodiversity.

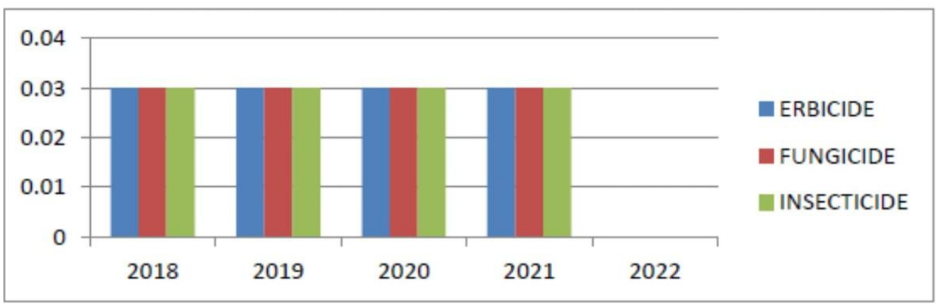

Figure 8-21 The situation regarding the use of plant protection products, Source: Constanța County Directorate for Agriculture

Land Improvement and Irrigation Practices

Land improvement works, irrigation, drainage, erosion control, and flood protection, play a central role in shaping soil conditions. According to the *Constanța County Directorate for Agriculture*, irrigation is particularly important in the region, where natural precipitation covers only around 30% of crop water needs. Efficient irrigation also helps reduce salinization risks and stabilizes root-zone temperatures.

Between 2019 and 2022, the proportion of land equipped for irrigation reached 75%, while drainage and erosion control systems remained stable.

Table 8-8 Areas Developed by Land Improvement Category (2018–2022)

Year	Share of areas developed for irrigation (%)	Share of areas developed with drainage works (%)	Share of areas developed with soil erosion control works (%)
2018	7	2.5	5.95

2019	75	2.56	5.95
2020	75	2.56	5.95
2021	75	2.56	5.95
2022	75	2.56	5.95

Project area

Topsoil

According to ERM Draft ESIA, and Geotechnical Survey Studies (2022), across the area, the uppermost soil layer is a thin horizon of topsoil, generally between 0.10 m and 0.50 m thick (average around 0.17 m in Adamclisi). This layer includes organic matter and is typically underlain by a darker clayey horizon.

According to the geotechnical reports, this topsoil is not suitable for reuse in engineering applications, although it can be reused for general landscaping within the site.

Loess and Paleosols (Layer A)

Beneath the topsoil lies a thick sequence of yellowish loess, occasionally interlayered with darker paleosol horizons. This loess is the most characteristic geological material in the area and forms the majority of the soil profile down to depths of approximately 19–23 m.

The loess deposits are described as:

- Highly porous, with porosity often exceeding 40%.
- Silty, with more than 60% silt content (average 71.86% based on 290 tested samples).
- Unsaturated under natural conditions, which gives them temporary mechanical strength due to partial cementation by calcium carbonate.
- Sensitive to water, meaning that when moisture enters the pores, the cementation is weakened and the material becomes less stable.

Because of these characteristics, the loess in the Project area is classified as collapsible loess (Type II according to the Geotechnical Survey Studies). This means that, although it is relatively stable when dry, it can undergo significant additional settlement when it becomes wetter, especially under load. The geotechnical studies indicate that collapse could occur mainly in the upper 11 m of the profile, where water infiltration from rainfall or irrigation is most likely.

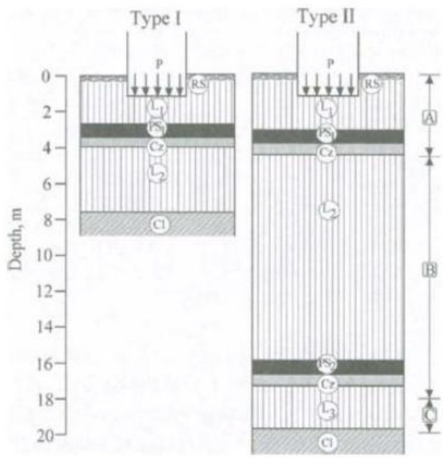

Figure 8-22 Type of collapsible loess

Reddish Clay Formation (Layer B)

Below the loess, at depths between 19 m and 23 m, the boreholes encounter a formation of reddish to reddish-yellowish clay. The clay layers are thick and continuous but can vary in thickness across the area.

Key characteristics include:

- High plasticity, with plasticity index values of 23–43%.
- High consistency, meaning these clays are stiff to very stiff, often with N-SPT values greater than 40 blows/foot.
- Their mechanical behaviour is more stable compared to the loess above, but they still show variability depending on the proportion of silt present.

Sarmatian Limestone (Layer C)

In both Adamclisi and Deleni, the deepest material encountered is Sarmatian limestone, present from approximately 10.75 m below ground level in Deleni and around 15 m in Adamclisi. The limestone is generally described as:

- Weathered,
- Poorly recovered during drilling,
- With low rock quality designation (RQD <25%).

Despite its low recovery, the presence of limestone marks the transition from soft, collapsible soils to a more competent geological formation.

Geotechnical characteristics

The geotechnical analyses show that the soils in the Project area present several constraints that are relevant for construction and general land stability. The most important issue is the collapsibility of the thick loess deposits, which can undergo sudden settlement when they become wet. In dry conditions, the soil structure is held together by weak cementation, but when moisture enters the pores, this structure breaks down, allowing the ground to compress under load. This behaviour is particularly relevant for elements such as turbine foundations, access roads, and buried cables.

The surface soils are also highly sensitive to frost, meaning they expand and contract during freeze–thaw cycles. Repeated cycles weaken the upper layers, and even small variations in moisture can change their consistency. This sensitivity makes the shallow soils more prone to instability in winter conditions.

From a chemical point of view, the tests carried out as part of the geotechnical investigations show low concentrations of chlorides and sulphates, indicating that the soils do not present a corrosion risk for reinforced concrete or steel structures.

Finally, although the groundwater table is located at significant depth (see Chapter 8.2.7.2 below), infiltration from the surface, especially due to rainfall or irrigation, can still reach the upper loess layers and trigger collapsibility. For this reason, careful consideration of drainage, site levelling, and foundation design is required to minimise the risk of water accumulation within the soil profile.

8.2.7 Hydrology

This chapter presents the hydrological conditions of the Dunarea East Wind Farm project area, including both groundwater and surface water characteristics. The analysis is based on the ERM Draft ESIA and the AON National EIA. Overall, both surface and groundwater resources are sparse and highly influenced by the regional geological and climatic conditions.

8.2.7.1 Surface Water

At the Adamclisi site, Zorile represents the only permanent watercourse. Additional non-permanent streams include Valea Jijoaica and Valea Misilic, while Valea Adâncata, situated further away, connects with Balta Vederoasa. The Deleni site lacks permanent watercourses, hosting only ephemeral streams such as Valea Pietreni, with the Viisoara Basin located outside the project boundary.

The rivers in the area, including Urluia, Valea Baciului, and Deleni, are small and situated in basins with medium altitudes rarely exceeding 200 meters. The hydrographic network of southern Dobrogea exhibits low density, with short rivers and a torrential flow regime. Surface waters are generally temporary, often flowing only after intense precipitation or snowmelt. The majority of streams terminate in lakes, fluvial estuaries, or lagoons, and the flow direction may lead either to the Danube River or the Black Sea.

The Urluia River basin (Figure 8-23), with its tributary Ceair, is the most extensive in southern Dobrogea, covering approximately 1,346 km² and extending into Bulgaria. The Valea Baciului River, known as Iris in its upper sector, is a tributary of Baciu port. According to the National Flood Risk Management Database, the Urluia River presents a significant potential risk of flooding in certain segments, affecting both urban and rural areas along its course, including settlements such as Credința, Conacu, Negrești, Petroșani, and Sipoțele. Roads crossing these areas, including DC29, DC16, DC25, and DJ391A, are also potentially affected.

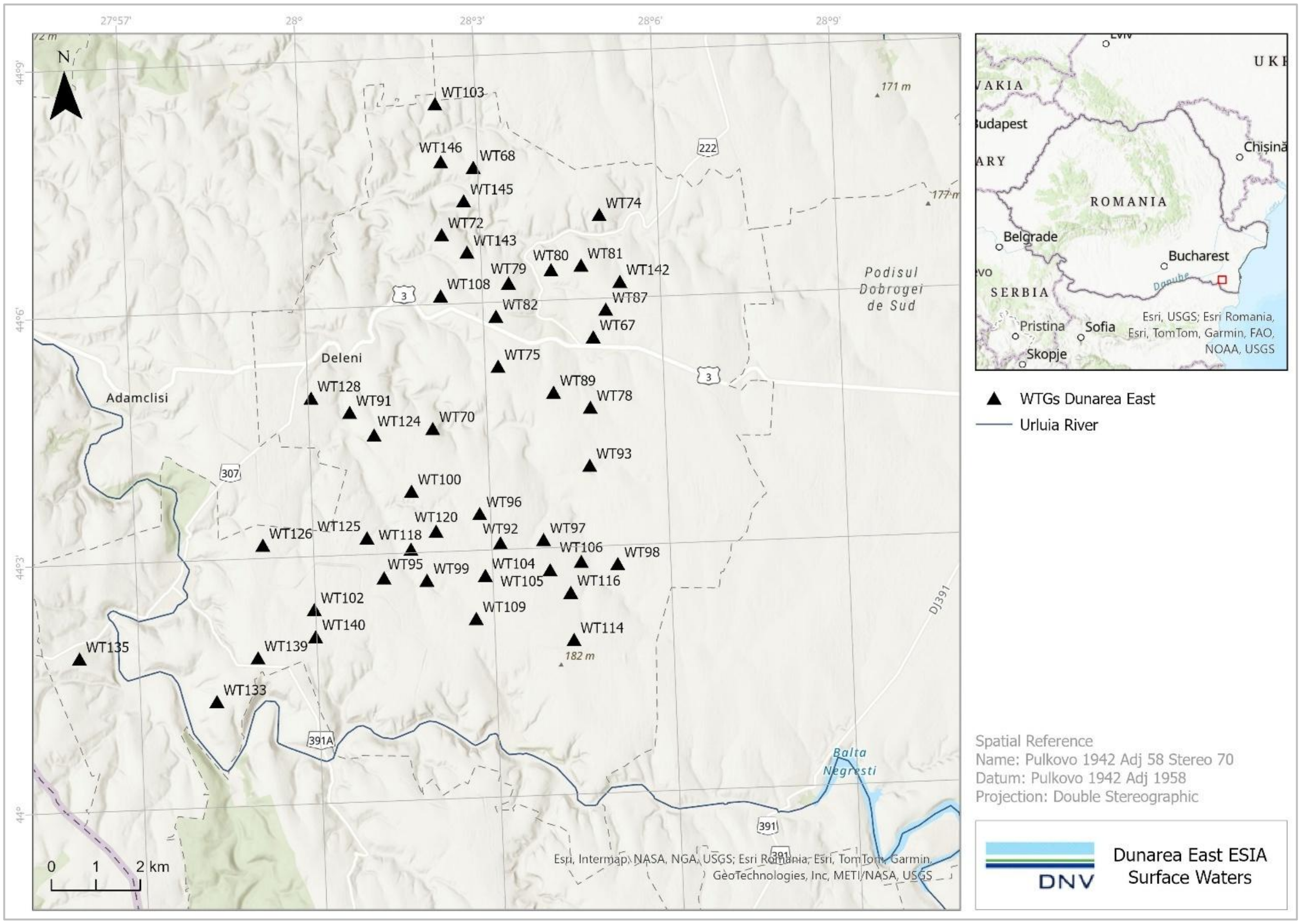

Figure 8-23 Hydrographic map of Adamclisi and Deleni illustrating the courses of Urluia river

8.2.7.2 Groundwater

The project area falls within the following groundwater bodies (Figure 8-24):

- RODL10 – South Dobrogea, Quaternary, is a porous-permeable body occurring in Upper Pleistocene-Holocene loess deposits and in Middle to Upper Pleistocene loess. Its lithological composition, geomorphological characteristics, and structural-tectonic context lead to significant variations in both the quantity and quality of groundwater, both horizontally across the area and vertically with depth.
- RODL04 – Cobadin-Mangalia groundwater body represents deep groundwater accumulated in Sarmatian oolitic and lumaselic limestone deposits located in the southeastern extremity of Dobrogea. These deposits form a plate ranging from 10 to 150 meters thick, slightly inclined eastward, containing free water that serves as the primary supply source for coastal areas south of Eforie Nord. The aquifer is underlain by an impermeable package of Senonian chalk, while its top is generally covered by permeable loess deposits, locally interspersed with impermeable clayey layers of Lower Pleistocene age.

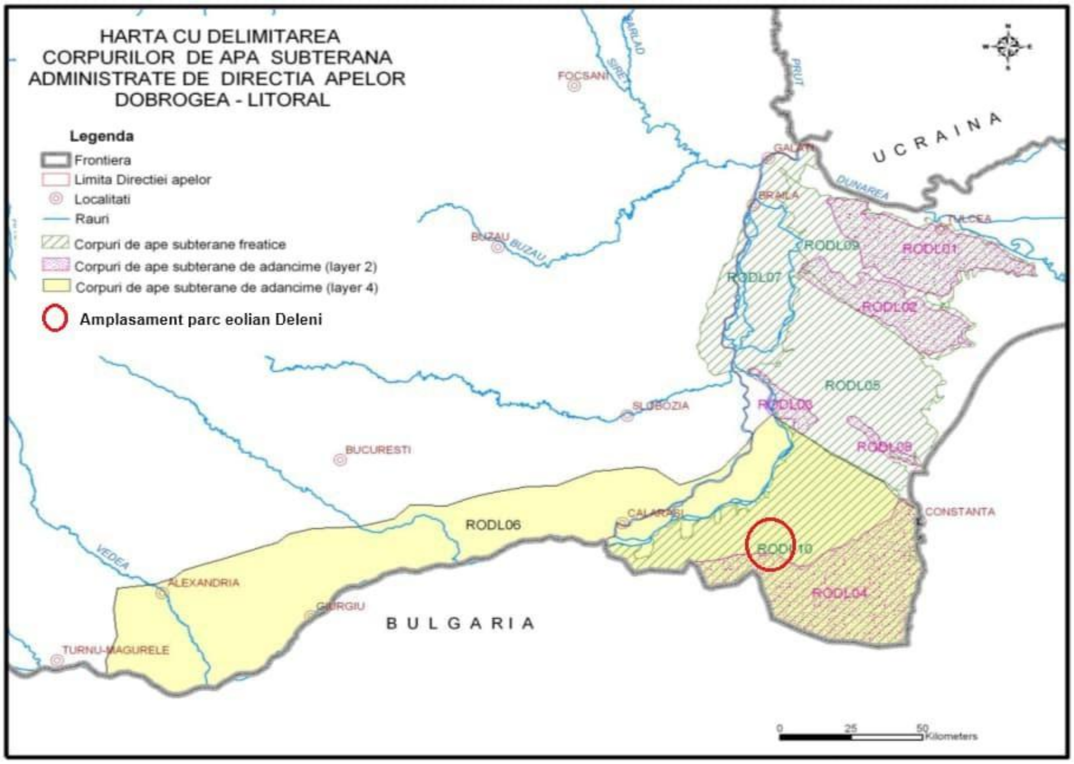

Figure 8-24 Project location in relation to groundwater bodies

Groundwater investigations, done as part of the geotechnical study of the AON National EIA, indicate that water tables are generally deep (it was not encountered during any drilling up to 30 m depth), and in some cases artesian conditions may occur. Borehole data at Adamclisi report groundwater at depths between 25 and 35 meters. The chemical quality is generally good, with low contamination from nitrates, reflecting moderate influence from human settlements and agricultural activity.

Groundwater bodies are publicly managed by the Constanta County – Dobrogea River Basin Administration, which monitors their quality regularly.

8.3 Biological Environment

Baseline ecological data for the project area was developed through a combination of desk-based research and multi-season field surveys performed. The objective of the baseline program was to characterize the ecological conditions and biodiversity receptors within the Project's Area of Influence (AoI) (as defined in Chapter 6.4.) and to provide a robust basis for assessing potential impacts and defining appropriate mitigation and monitoring measures.

An initial year-long baseline study was undertaken during 2010-2011, covering an AoI of approximately 33,000 hectares. Given the time elapsed, those data were considered outdated and not fully representative of current site conditions.

To update the ecological baseline and reassess receptor sensitivity, additional fieldwork campaigns were implemented as follows:

1) 2010-2011: Original ecological baseline surveys and sensitivity assessment for biodiversity receptors within the defined AoI;

2) 2021 (January-December): Second monitoring campaign to verify species presence and habitat conditions, and to identify any changes since the initial surveys;

3) 2022-2023 (March 2022 - February 2023): biodiversity baseline survey conducted by ERM for the overall Dunarea Wind Farm project provided in a draft report (see Appendix D) and covering:

    a) Habitat and flora surveys (May - June 2022);

    b) Bird surveys across all seasons, including vantage-point surveys for flight activity of target species;

    c) Bat surveys (April - October 2022); and

    d) Other fauna surveys for mammals, reptiles, and amphibians (April-July 2022).

The 2010/2011 and 2022/2023 datasets, including those produced by AOM and ERM, were jointly reviewed, interpreted, and analyzed to ensure consistency and completeness. The surveys covered vascular plants, invertebrates, amphibians, reptiles, mammals, birds, and bats, along with detailed habitat mapping. The project site land is currently used for agriculture, with the intended use of arable land, pasture, and land for special purposes - road communication (service road). The natural vegetation in the area proposed for the project is dominated by ruderal and segetal species.

The methodology for the biodiversity field surveys, including specific sampling techniques and monitoring approaches, is detailed in the present ESIA.

In parallel, the interpretation of habitat types and biodiversity sensitivity within the study area has been informed by dedicated Critical Habitat Assessments (CHA) prepared for the Project:

- An initial rapid CHA was undertaken in 2023 as part of the ERM Draft ESIA for the overall Dunarea Wind Farm Project, assessing potential Critical Habitat conditions in accordance with EBRD Guidance Note 6: *Biodiversity Conservation and Sustainable Management of Living Natural Resources* (EBRD, September 2022), including identification of habitat importance thresholds relevant to species and ecosystems.
- More recently, a comprehensive CHA has been prepared by The Biodiversity Consultancy (TBC) specifically for the Dunarea East Wind Farm (Appendix E). This assessment provides an updated interpretation of habitat sensitivity and Critical Habitat eligibility in line with IFC PS6 and the updated EBRD ESR6 framework (including the 2025 Guidance Note). It refines the ecological context through updated consideration of the ecologically appropriate area of analysis (EAAA), Natural and Modified Habitat classification, Critical Habitat criteria, and Priority Biodiversity Features (PBFs), and is used as a key reference for the characterization of biodiversity receptors within the Project AoI.

8.3.1 Ecological Context

According to ERM Biodiversity Baseline (Appendix D), the Project site land is currently used for agriculture, with the intended use of arable land, pasture, and land for special purposes - road communication (service road). The Project area is located within the Pontic Steppe Ecoregion (PA0814)[16]. This region is characterized by a temperate climate with appreciable winter rain, generating characteristic European steppe vegetation, dominated by feather grasses (Stipa spp.) and fescues (Festuca spp.). The major habitats in the area are the Ponto-Sarmatic steppes and Ponto-Sarmatic deciduous thickets or oak dominated steppe woods. However, the area occupied by the Project has been progressively transformed into arable land and pastures, with a floristic composition that is strongly modified due to agriculture and cattle and sheep grazing, to a point where very little

[16] Joint Research Centre of the European Commission. 2019. The Digital Observatory for Protected Areas (DOPA) Explorer 3.1: Pontic Steppe Ecoregion. [Online]. [Accessed 06 October 2023]. Available from: https://dopa-explorer.jrc.ec.europa.eu/ecoregion/80404

of these natural habitats are found today. And what remains is highly fragmented, occurring only in isolated pockets within the mosaic of pastures and farmland (ERM, 2023).

8.3.2 Protected Areas and Internationally Recognized Areas

Within Project's Environmental AoI, sites of notable biodiversity value encompass both legally designated Protected Areas (PAs) and Internationally Recognized Areas. Many of these areas are distinguished for their ecological relevance and role in maintaining habitat integrity at the regional scale.

The Project partially overlaps the following protected areas:

- **Natura 2000 site ROSCI0353 Pestera – Deleni** (Site of Community Importance): the Project overlap on an area of 0.89 ha (0.3253 ha permanently occupied and 0.5618 ha temporarily occupied) with WT74 turbine, access road, foundation and platform.

  This area is represented by arable land with no conservation value, with no individuals of *Mesocricetus newtoni*, *Spermophilus citellus*, species for which the site was declared.

- **Natura 2000 site ROSCI0071 Dumbraveni – Valea Urluia Natural Area - Lacul Vederoasa** (Site of Community Importance): the Project overlaps on an area of 0.94 ha (0.3739 ha permanently occupied area and 0.5618 ha temporarily occupied area) with turbine WT133, access road, foundation and platform.

  This area is represented by arable land with no conservation value, with no habitats, flora or fauna species subject to protection in the site identified.

Furthermore, the nearest protect natural areas of community interest are:

- **Natura 2000 site ROSPA0001 Aliman – Adamclisi** (Special Protection Area) which is located very close to different turbines located in the northern half of the wind farm.
- Natura 2000 site ROSPA0036 Dumbraveni with the northern part located about 900m from WT133, excluded from any potential adverse impact.

Table below provides a description of the above-mentioned protected areas, while more detailed qualifying features are reported in Appendix D.

Table 8-9 Description of affected protected areas

Protected Area	Description
Aliman – Adamclisi Special Protection Area (SPA) (ROSPA0001)	This Natura 2000 site is designated under the European Union (EU) Birds Directive, as it protects 62 species of birds from the above directive. The site also supports 17 species of rare plants and rare species of mammals and herpetofauna. This area is also recognised as a Key Biodiversity Area (KBA) and Important Bird Area (IBA). The site comprises a mosaic of habitats dominated by arable areas and steppe grasslands interspersed with scattered patches of shale forest. It does not have an IUCN management category and it is designated at a regional level. The management authority is the Agentia Nationala pentru Mediu si Arii Protejate (ANMAP). A management plan has been prepared for several Natura 2000 sites including this one.

Protected Area	Description
Dumbrăveni - Valea Urluia - Lacul Vederoasa Site of Community Importance (SCI) (ROSCI0071)	This site is designated under the Habitats Directive, as it protects 23 non-bird species (including mammals, reptiles, amphibians, fish and terrestrial invertebrates) and eight habitat types from the Habitats Directive. This includes the Annex I priority habitats Ponto-Sarmatic steppes (62C0), Euro-Siberian forest-steppe with *Quercus spp*. (91I0) and Ponto-Sarmatic scrub (40C0). Fifty-eight species of rare plants protected at national level have been recorded on this site. It does not have an IUCN management category and it is designated at a regional level. The management authority is the Agentia Nationala pentru Mediu si Arii Protejate. A management plan has been prepared for several Natura 2000 sites including this one.
Peştera - Deleni SCI (ROSCI0353)	This site is designated under the Habitats Directive, as it protects two mammal species of the EU Nature Directives (*Mesocricetus newtoni* and *Spermophilus citellus*). It does not have an IUCN management category and it is designated at a regional level. The management authority is the Agentia Nationala pentru Mediu si Arii Protejate, but no management plan is in place.

Additionally, the following Important Bird Areas (IBAs) were also identified:

- IBA Dumbrăveni Plopeni,
- IBA Aliman - Adamclisi
- RORMS0017 Ostroavele Dunării - Bugeac – Iortmac (Ramsar Site)

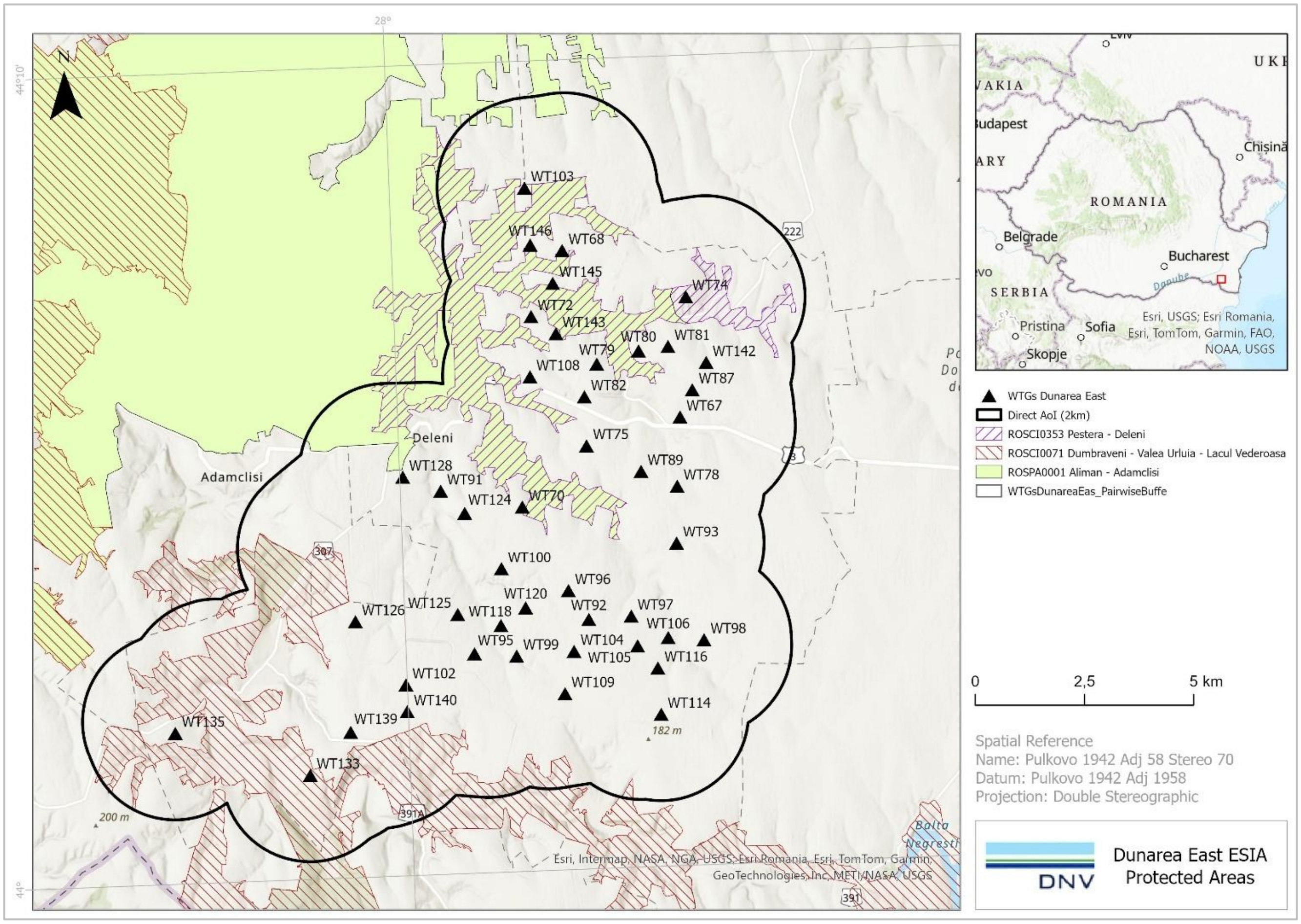

Figure 8-25 Protected Areas

8.3.3 Habitats

Field surveys conducted between May and July 2022, as part of ERM's Draft Biodiversity Baseline Report, identified six (6) habitat types within the project area are represented mainly by communities of xeric meadows, meadows of low conservation importance, acacia plantations in depression areas near cultivated areas, ruderal plant communities developed along roads and uncultivated lands. The referred habitats are identified in 2023's ERM scoping report and were classified according to the European Nature Information System (EUNIS) codes (EUNIS Terrestrial Habitat Classification 2021) habitat classification system:

1. Ruderal communities (87.2);
2. Anthropogenic herb stands, identified within *Veronoico- Euphorbion* plant associations (E5.1);
3. Hedgerows;
4. Medium-scale intensive unmixed crops (1-25 ha) (I1.11);
5. 40C0 Ponto-Sarmatic deciduous thickets, with *Pruno spninosae-Crataegetum* plant associations, along the access road to WTG127 proposed site;
6. 62C0 Ponto-Sarmatic steppes with *Stipion lessingianae* plant associations, near access road and WTG 91 site and

7. 91I0 Euro-Siberian steppic woods with Quercus spp. along the access road to WTG127 proposed site and north of WTG135.

According to the Critical Habitat Assessment (TBC, 2026), no habitats or species within the Project's EAAA meet the thresholds required to qualify as Critical Habitat under IFC PS6 or EBRD ESR6. However, **three (3) habitat** types among the ones recorded above, listed as priority habitats under Annex I of the EU Habitats Directive, are considered of high biodiversity value and have been identified within the CHA as **likely to qualify as Critical Habitat under EBRD ESR6** on a precautionary basis, pending further confirmation of their extent and ecological condition:

- 62C0 Ponto-Sarmatic steppes with *Stipion lessingianae* plant associations
- 91I0 Euro-siberian forest-steppe with *Quercus* spp.
- 40C0 Ponto-Sarmatic deciduous thickets, with *Pruno spinosae-Crataegetum* plant associations.

These habitat types are associated with the Natura 2000 site ROSCI0071 Dumbrăveni – Valea Urluia – Lacul Vederoasa (SCI), which falls within the wider EAAA. Within the Project footprint, only one turbine (WTG133) is located within the boundaries of this SCI; however, this turbine is situated on arable land of no conservation value, and no priority habitat patches are directly affected by the Project infrastructure.

8.3.4 Flora

First flora surveys performed in 2010, as part of the AON EIA's report, identified *Potentilla emilii – popii* (species listed on Annex II of Habitat Directive and mentioned as qualifying feature of ROSCI0353) within the study area. However, 2021 studies done as part of the ERM biodiversity baseline monitoring did not mention presence of this specie within the proposed Dunărea Wind Farm or its AoI, indicating that within the study area there were recorded plant species without conservation value.

In ERM's Draft Biodiversity Baseline Report, based on field surveys conducted between May and July 2022, a total of 181 species of vascular plants were identified within the direct AoI, of which eight (8) are of conservation importance, being listed on the National Red List (Oltean et al., 1994):

- *Minuartia mesogitana subsp. bilykiana,*
- *Neotinea tridentata,*
- *Orchis morio,*
- *Paliurus spina-christi,*
- *Silene exaltata,*
- *Echinops ritro,*
- *Caragana frutex,*
- *Centaurea thirkei.*

In the areas of overlap with the two sites ROSCI0353 and ROSCI0071, the qualifying plant species (*Potenchium maculatum subsp. maculatum, Centaurea jankae, Himantoglossum jankae* and *Potentilla emili-popii)* of the two designated areas were not recorded.

Figure 8-26 below shows the distribution of plant species of conservation interest recorded during the ERM biodiversity baseline surveys across the wider Dunarea Wind Farm area. The figure is reproduced from the original ERM study and reflects the full survey extent, as shapefiles for individual records were not available for this ESIA. Therefore, it includes observations beyond the Dunarea East Project footprint. The figure should be interpreted as providing broader ecological context, noting that the Project area itself is mainly agricultural land where no plant species of conservation concern were confirmed within the directly affected areas.

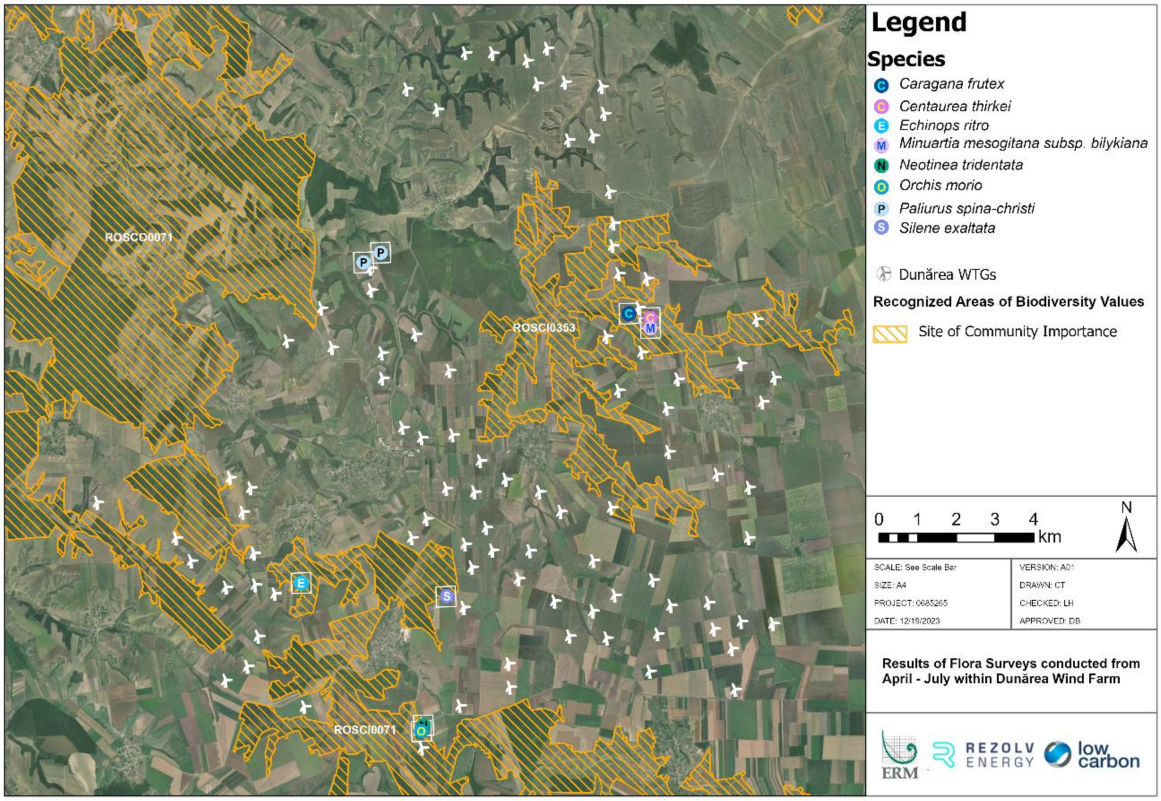

Figure 8-26 Flora species of conservation interest recorded within the overall project AoI (Source: ERM's Appendix D Biodiversity Baseline)

Given that the wind turbines will be located only on agricultural land intended for arable farming, the natural vegetation in the area proposed for the project is dominated by ruderal species, characteristic of roadside verges, and segetal species, weeds found in agricultural crops.

8.3.5 Invertebrates

In 2021 (March-October) surveys, numerous *taxa* were recorded (*Insecta, Lepodoptera, Heteroptera*, *Gastropoda, Orthoptera* and *Miriapoda*), no conservation interest species were observed. During the survey conducted in June 2022, 14 invertebrate species were recorded, with the large majority being butterflies. The only species of conservation value was recorded at Point 9, North to Adamclisi settlement, within the 200m buffer area, around the Project site, is *Hyles hippophaes*, the seathorn hawk-moth, which is listed on Annex IV of the Habitats Directive.

Figure 8-27 shows the recorded presence of *Hyles hippophaes* within the wider AoI based on ERM baseline surveys, and should be interpreted as providing broader ecological context beyond the Project footprint.

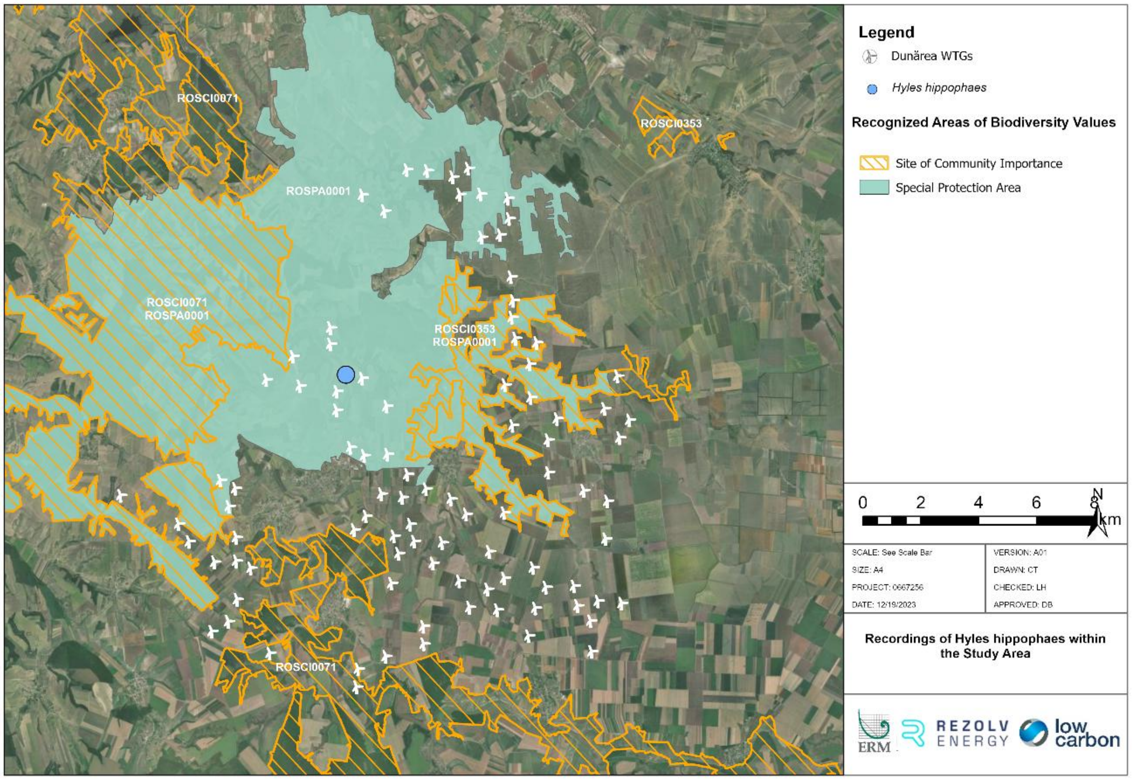

Figure 8-27 Documented presence of *Hyles hippophaes* within the overall project AoI *(Source: ERM's Appendix D_ Biodiversity Baseline)*

8.3.6 Amphibians and Reptiles

Herpetofauna species were surveyed between April-October 2021, and only four (4) reptiles' species of conservation interest were recorded and all listed in Annex IV and 1 also listed in the Annex II of Habitats Directive. No amphibian species were recorded. New Herpetofauna surveys occurred during May 2023 and recorded three (3) reptile species (*Podarcis taurica, Lacerta viridis* and *Dolichophis caspius*), all of them being common species, and classified as Least Concern (LC) by the IUCN.

8.3.7 Birds

Surveys were carried out during 2010/2021, and 118 species of birds were observed passing through, foraging or breeding on the project site. The ERM's biodiversity monitoring reports (2022-2023), provided in Appendix D, indicate presence of bird species listed on Annex I of Birds Directive which were also confirmed during the 2022 surveys.

A total of 126 bird's species were observed during a Vantage point survey conducted from March 2022 - February 2023 with different protection statuses, from which:

- 40 species are listed in the Annex I of Birds Directive;
- 15 species are listed as Near Threatened (NT) or higher on the IUCN global or European list, including:
    - Saker falcon (*Falco cherrug*) - Endangered (EN): a single observation was made; the species does not use the project area for nesting or foraging;
    - Greater spotted eagle (*Clanga clanga*) - Vulnerable (VU): a single observation was recorded;

- Red-footed Falcon (*Falco vespertinus*) - Vulnerable (VU): 15 observations were recorded;
- European turtle dove (*Streptopelia turtur*) - Vulnerable (VU): 42 observations were recorded;

- 31 species are listed in the Romanian Red Book of Vertebrates as Vulnerable or higher;
- No endemic bird species were recorded.

According to ERM's 2023 Biodiversity Monitoring Report, Vantage Point (VP) surveys were conducted to collect sufficient data on the number, height, and duration of flights of target species across the proposed wind farm. These data were used to assess potential impacts through both movement analysis and collision risk modelling, applying the Band collision model. Given the scale of the development, 13 VP locations were strategically selected to ensure full coverage of the wind farm area, providing representative samples of activity across all 13 turbine clusters *i.e*. including also Dunarea West Wind Farm, located in the Adamclisi Commune, out of the scope of this ESIA.

In terms of abundance, according to the data gathered, Vantage point 1 recorded the most birds, with 3163 individuals, followed by VP11 with 2558 and VP2 with 1867 (Figure 8-28). Other observed bird species are classified as Least Concern (LC) by the IUCN and are not subject to additional protection measures.

The following figure is reproduced from ERM baseline studies for the wider Dunarea Wind Farm project and should be interpreted as providing context at the project-wide scale rather than being specific to the Dunarea East footprint.

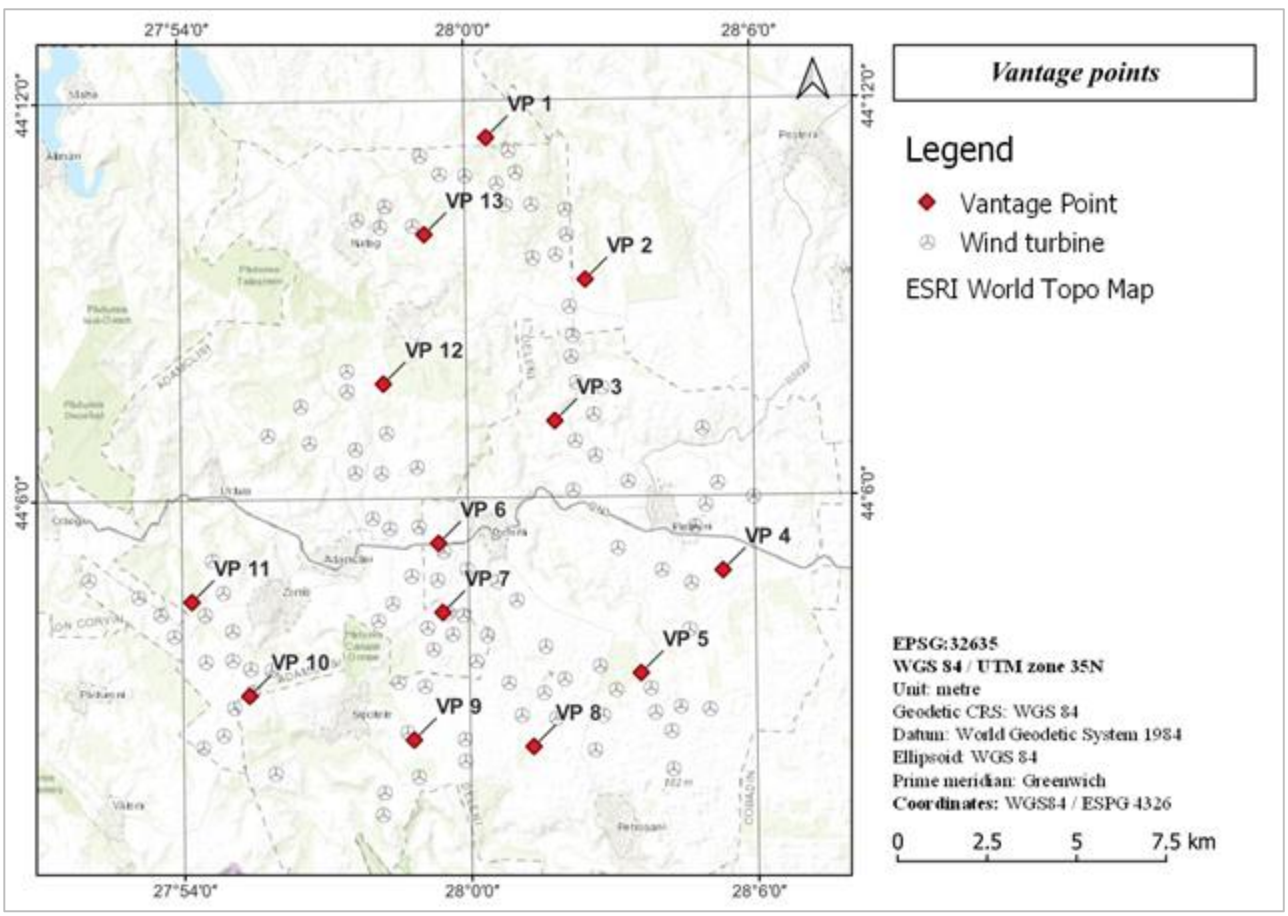

Figure 8-28 Vantage Points Map (Source: ERM's Biodiversity Monitoring Reports August, 2022)

8.3.8 Bats

Bat surveys were first conducted by AON for one (1) year (2009-2010), recording 20 bats species. A second campaign was undertaken in 2021 (April-October) registering 14 species. On a more recent basis, bat monitoring studies were carried out as part of the baseline assessment for the whole Deleni Wind Farm between April 2022 and October 2022, and March and April 2024, with monthly visits comprising four days of fieldwork per month (28 days of fieldwork).

A total of 22 species or species groups of bats were recorded during the survey period, representing 68.75% of the total bat species (32 species) found in Romania. The most frequently detected species were the Kuhl's pipistrelle (*Pipistrellus nathusii/kuhlii*) with 454 contracts, followed by common pipistrelle (*Pipistrellus pipistrellus*) with 52 contacts and noctule (*Nyctalus noctule*) with 26 contacts. All species are listed in Annex IV (strictly protected species), and one of them, *Miniopterus schirebersii,* is listed in Annex II (species that member states are required to designate sites for) of the Habitat Directive, as well as assessed as Vulnerable (VU) by IUCN Red List. The Site of Community Importance ROSCI0071 Dumbrăveni - Valea Uruia - Lacul Vederoasa lists *Miniopterus schreibersii* as qualifying features and according to IUCN Red list, this species assessed globally as Vulnerable.

The following figure is reproduced from ERM baseline studies for the wider Dunarea Wind Farm project and should be interpreted as providing context at the project-wide scale rather than being specific to the Dunarea East footprint.

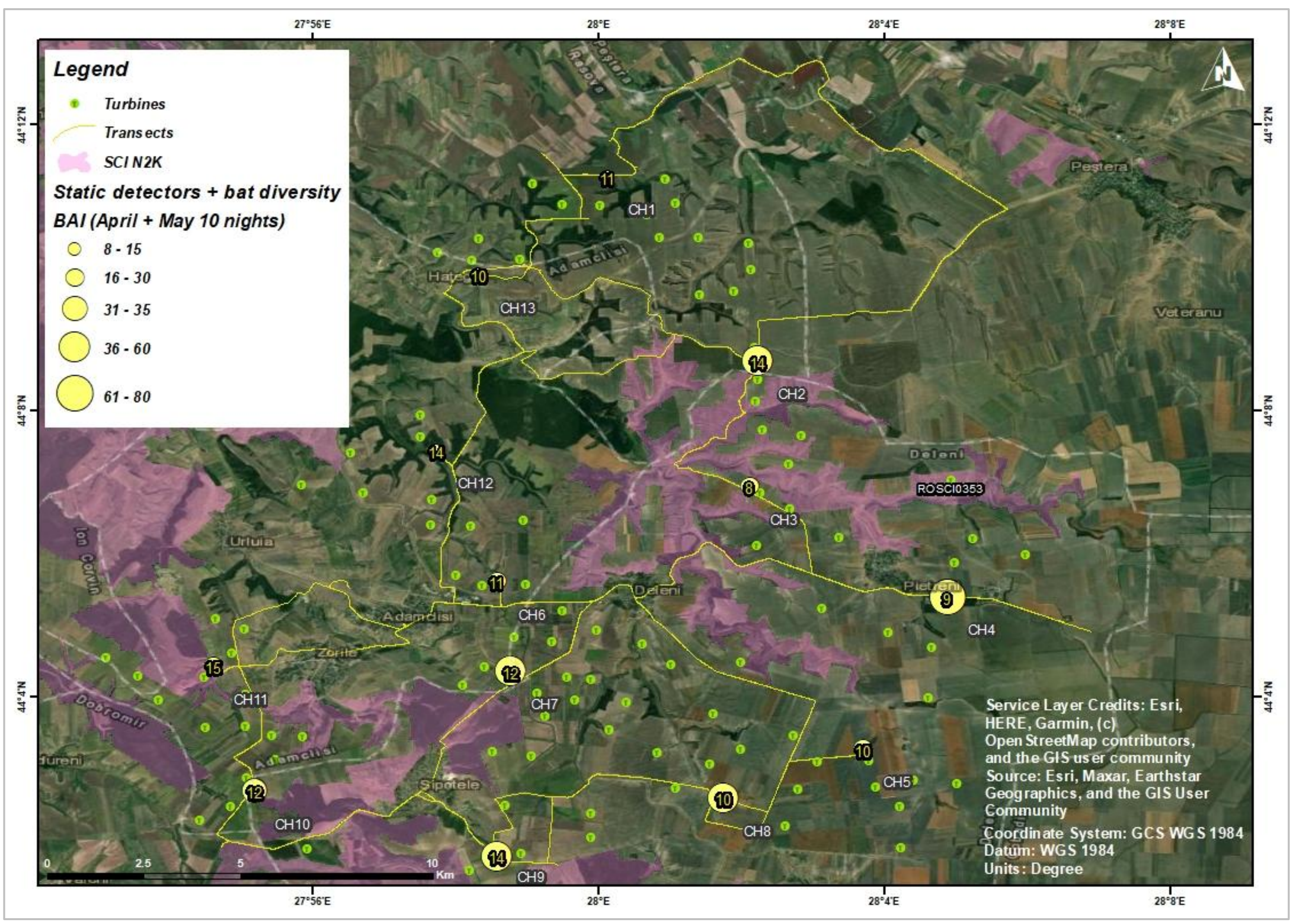

Figure 8-29 Static Detectors (Bat Activity Index) and Diversity of Species per Location *(Source: ERM Biodiversity Monitoring Report August, 2022)*

8.3.9 Mammals

Mammal surveys were conducted in 2021, recording eight (8) mammal species within the Project site. Three of the species were identified are listed on Annex II and IV of Habitat Directive and according to the IUCN these are threatened at international level:

- European Ground Squirrel (*Spermophilus citellus*) assessed globally as Endangered (EN);
- Romanian Hamster (*Mesocricetus newtoni*) assessed globally as Near Threatened (NT);
- Common Tortoise (*Testudo graeca) -* assessed globally as Vulnerable (VU).

Following the initial surveys results in 2021, a subsequent investigation was conducted in 2022 to delve deeper into the distribution of the threatened mammal species within the study area confirming the presence of *Spermophilus citellus* and *Mesocricetus newtoni*.

8.3.10 Priority Biodiversity Features (PBFs)

A total of 134 species have been identified as PBFs for the Project, in alignment with EBRD ERS6 criteria (see Appendix E).

According to the assessment on qualifying species for critical habitats definition (TBC, 2026), nineteen (19) species were identified that, while not meeting the criteria for critical habitat, do qualify as PBFs. These consists of eleven bird species, one reptile species, and seven mammals (Table 8-10).

As per the update of CHA by TBC according to EBRD ESR6 and in particular, Criterion 4.a, all migratory species regularly occurring in the area of impact that are not CH-qualifying are classified as PBFs. One hundred and fifteen (115) avian species have potential to use the airspace in the impact area of the Project and are likely to use the terrestrial habitats associated with the EAAA. Thus, the avian species migrating through the Project's Impact Area and using associated terrestrial habitats qualify as PBFs. Therefore, in addition to the 19 species, 115 avian species that qualify as PBFs have been considered.

Table 8-10 Priority Biodiversity Features, as per EBRD ESR6

Scientific name	Common name	Global RL status	Nat/reg RL status	PBF Criteria
Mammals				
Cricetus cricetus	Common Hamster	CR	CR (Europe)	Species in the area of impact with IUCN global Red List status of VU, EN or CR
Mesocricetus newtoni	Romanian Hamster	VU	VU (Europe)	EAAA supports VU species
				All range-restricted species in the area of impact
Spermophilus citellus	European Ground Squirrel	EN	EN (Europe)	Species in the area of impact listed in Annex II of Habitats Directive, Annex I of Birds Directive or Resolution 6 of Bern Convention
				Species in the area of impact with IUCN global Red List status of VU, EN or CR
				Species in the area of impact with national or regional status of EN or CR
Reptiles				

Scientific name	Common name	Global RL status	Nat/reg RL status	PBF Criteria
Testudo graeca	Common Tortoise	VU	-	EAAA supports VU species
Birds				
Falco cherrug	Saker Falcon	EN	EN (Europe)	Species in the area of impact with IUCN global Red List status of VU, EN or CR Species in the area of impact with national or regional status of EN or CR
Buteo buteo	Eurasian Buzzard	LC	LC (Europe)	All migratory species in the area of impact
Ciconia ciconia	White Stork	LC	LC (Europe), VU (Romania).	All migratory species in the area of impact
Falco tinnunculus	Common Kestrel	LC	LC (Europe)	All migratory species in the area of impact
Circus aeruginosus	Western Marsh-harrier	LC	LC (Europe)	All migratory species in the area of impact
Aquila heliaca	Eastern Imperial Eagle	VU	LC (Europe)	Species in the area of impact with IUCN global Red List status of VU, EN or CR
Aquila pomarina	Lesser Spotted Eagle	LC	LC (Europe)	All migratory species in the area of impact
Circus pygargus	Montagu's Harrier	LC	EN (Romania)	All migratory species in the area of impact
Clanga clanga	Greater Spotted Eagle	VU	VU (Europe)	Species in the area of impact with IUCN global Red List status of VU, EN or CR
Falco vespertinus	Red-footed Falcon	VU	VU (Europe VU (Romania)	Species in the area of impact with IUCN global Red List status of VU, EN or CR
Streptopelia turtur	European Turtle Dove	VU	VU (Europe)	Species in the area of impact with IUCN global Red List status of VU, EN or CR
Bats				
Nyctalus lasiopterus	Giant Noctule	VU	VU (Europe)	Species in the area of impact with IUCN global Red List status of VU, EN or CR
Miniopterus schreibersii	Schreiber's Bent-winged Bat	VU	VU (Europe)	Species in the area of impact with IUCN global Red List status of VU, EN or CR
Myotis myotis	Greater Mouse-eared Bat	LC	LC (Europe)	Species in the area of impact listed in Annex II of Habitats Directive, Annex I of Birds Directive or Resolution 6 of Bern Convention

Scientific name	Common name	Global RL status	Nat/reg RL status	PBF Criteria
Rhinolophus ferrumequinum	Greater Horseshoe Bat	LC	LC (Europe)	Species in the area of impact listed in Annex II of Habitats Directive, Annex I of Birds Directive or Resolution 6 of Bern Convention

8.4 Socioeconomic and Community Environment

8.4.1 Administrative and Governance Context

Romania's Government is organized into central and local administrations. The President, elected for a five-year term (renewable once), and a bicameral Parliament together represent the national authority. Executive power is held by the Government, led by the Prime Minister and appointed by the President with Parliament's confidence, overseeing domestic and foreign policy implementation.

Administratively, the country is divided into 41 counties and the city of Bucharest with a special status (the national capital), with communes, towns and municipalities that form the local governance level. Constanța County, located in the south-eastern part of Romania, comprises 59 communes, 8 towns, 3 municipalities (including Constanța City, the county seat), and approximately 190 villages.

It should be noted that, in 1998, 8 regions (the so-called Development Regions) have been established to coordinate regional developments and EU funds. These regions are non-administrative units and do not possess legislative or executive councils. The Constanta County lies in the South-East Development Region.

The rural commune of Deleni, in whose land the Project is planned to be built, includes the villages of Deleni (administrative center), Petroșani, Pietreni, and Șipotele. The commune is located in the southern part of Constanta County, 59 km from the county seat of Constanta, covering an area of 17,983 ha.

Figure 8-30 Regional Location of the Project in Romania (*Source: ERM Scoping Report*)

Historically known as Ienidja, the commune of Deleni is noted in archeological literature because its stone quarries were exploited by the Romans in the early 2nd century AD to supply material for the Tropaeum Traiani Monument in neighboring Adamclisi (see sub-chapter 8.4.11 for more detailed info on local's Cultural Heritage).

At municipality and commune level, the government structure consists of elected Mayors and Local Councils. There is no further representation at village level, all executive decisions are taken at commune level. Local Councils and Mayors for municipalities and communes are elected for a four-year term.

8.4.2 Demographics

According to national statistics, as of 2025, Romania's population is around 19 million, continuing a downward trend driven by low fertility rates and outward migration.

As described in the AON National EIA, according to the 2021 census, the Deleni Commune had a population of 2,223 inhabitants, with a downward trend from the last census in 2011. 47,7% of the population were female and 52,3% male (*Constanța County Statistical Yearbook, 2021*).

In terms of ethnicity, the local population is predominantly Romanian (90,55%). The rest is either unknown or other ethnicities (Figure 8-31). Religion-wide, the majority of the inhabitants of Deleni are Orthodox Christians (88,62%), with a minority of Muslims (1,93%), and 9,22% of the population's religious affiliation is unknown (Figure 8-31).

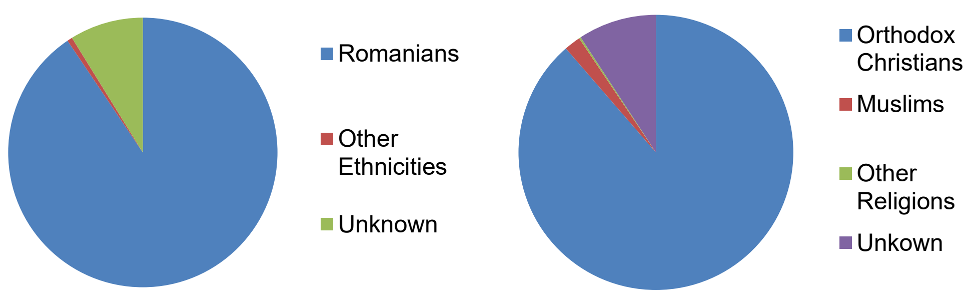

Figure 8-31 Ethnic and religious composition of the commune of Deleni (*Source: AON National EIA*)

In recent years, the total population of Deleni Commune has continued to decline, reflecting typical rural demographic trends observed across Romania – namely population ageing and youth migration toward urban centres or abroad.

8.4.3 Education and Skills

Romania has a high adult literacy rate (almost 99%), yet persistent challenges remain in terms of education quality and access. Educational constraints largely stem from low public expenditure on education, a high share of early school leavers, and unequal access to quality schooling between urban and rural areas.

The commune of Deleni's educational network is coordinated by the "Nicolae Istratoiu High School", located in Deleni village. The institution provides education from preschool to year 12 and oversees additional units offering pre-school, primary and secondary education in the other three villages of the commune.

Overall, as described in the AON National EIA, there are four schools and four kindergartens within the commune:

- Deleni School (grades I–VIII),
- Pietreni Coordinating School (grades I–VIII),
- Petroșani School (grades I–IV), and
- Șipotele School (grades I–IV).

The education sector employs around 30 teachers across all levels, including 16 for primary and secondary education and 14 for the high school level.

As of 2021, number of students per education level in the Deleni Commune was as follows:

Table 8-11 Number of students per education level (Source: Constanta County Statistical Yearbook, 2021)

Level	Deleni Commune
Pre-school education in each village	73
Primary and secondary education	253
High school	312

As indicated previously, early school leaving remains a concern in Romania (in 2021, 15% of young people aged 18-24 had not completed upper secondary education). In rural areas, early school leaving reaches 23,2% indicating that communes such as Deleni are likely affected by similar challenges linked to limited access to higher education and socio-economic vulnerability.

8.4.4 Economy, Employment and Livelihoods

Romania has experienced steady economic growth in recent years, although the relative contribution of agriculture and industry to the national GDP has been declining. The secondary sector accounted for approximately 27% of GDP in 2021, mainly driven by energy, manufacturing and construction activities, and the service sector remains the largest contributor to the economy. Despite this growth, government revenues remain below 30% of GDP, reflecting a relatively low tax burden on labour. Inflation has been high, reaching 16,4% in December, as described in the ERM Draft ESIA.

As of 2021, the employment rate for Romania's working – age population was 61,9%, with significantly higher participation among men (71.1%) than women (52.5%). The national unemployment rate stood at 5.6%, with youth (15–24 years old) in rural areas most affected (23.8%).

Within the Deleni Commune, unemployment reflects the national trends and is decreasing year on year following 2022. According to the Constanta County Statistical Yearbook (2021), as described in the ERM Scoping Report, the Commune had 112 registered unemployment persons (73 men and 39 women), representing a small portion of the active population. Employment in Deleni is primarily concentrated in agriculture, which represents the main livelihood activity both at subsistence and small-scale economic levels. Many residents are self-employed farmers or unpaid domestic workers, and only a small portion of the population is formally employed in agriculture – related enterprises.

Deleni has an agricultural economy, and the main activities correspond to land cultivation and growing different cereal crops (e.g. wheat, rye, barley, oats, corn grains and more), technical plants (e.g. hemp for fiber, sunflower, flax for oil and more), fruits and vegetables, vines, beekeeping and husbandry. The most common animals raised in the Deleni Commune are cattle, pigs, cows, sheep and goats.

Other key employment sectors, within the Social AOI, include construction, public administration, education, and health, as well as commerce and transport. Construction activities - particularly civil works such as road rehabilitation and water or gas network expansion - provide temporary employment opportunities, often involving local companies. A portion of the working population also commutes daily to Constanța City or nearby towns for employment in manufacturing, trade, and services.

8.4.5 Ecosystem Services

Ecosystem services, as per EBRD ESR6 and IFC PS6 refer to the benefits that people, including businesses, derive from ecosystems.

Moreover, the IFC PS6 organizes the ecosystem services into 4 broad categories of services as follows:

- Provisioning services: products obtained from ecosystems, such as food, freshwater, timber, fiber, and fuel
- Regulating services: benefits obtained from the regulation of ecosystem processes, such as climate regulation, flood control, water purification, and disease regulation
- Cultural services: non-material benefits obtained from ecosystems, such as spiritual values, recreation, and aesthetic enjoyment
- Supporting services: ecosystem functions that underpin the other services, such as nutrient cycling, soil formation, and primary production

As part of the Social Baseline Study conducted for the overall Dunarea Wind Farm Project, as described in the ERM Draft ESIA, several ecosystem services were identified through field observations and community consultations. The assessment aimed to understand how local communities use and depend on ecosystem services within the Dunarea Wind Farm 's Area of Influence, applying the following table:

Table 8-12 Simple matrix used for rating ecosystem services assessment based on level of demand and supply (Source: ERM Draft ESIA)

		Supply Level				
		Very High	High	Moderate	Low	None/Negligible
Demand Level	Very High	Very High	Very High	Moderate	Low	None
	High	Very High	High	Moderate	Low	None
	Moderate	Moderate	Moderate	Moderate	Low	None
	Low	Low	Low	Low	Low	None
	None/Negligible	None	None	None	None	None

The Study showed that the Dunarea Wind Farm's AOI provides limited ecosystem services, as most habitats have been heavily modified by agricultural activities such as crop cultivation and livestock grazing. Aquatic ecosystems are scarce and play a negligible role, while forests and cultural sites represent the only notable sources of ecosystem value. The reason behind the latter being the most notable ecosystem service is due to the presence of recognized national historical, cultural, and religious sites. However, their use for tourism and recreation remains modest, given the rural setting and limited infrastructure. The local demand for ecosystem services is also low, reflecting the agricultural profile of nearby communities and the absence of major infrastructure requiring hydrological or regulating services.

The full list of ecosystem services and their overall perceived level of importance is presented in the ERM Draft ESIA .

The baseline analysis indicates a limited diversity of ecosystem services within the Project Area (biodiversity study area). Approximately 53% of the land cover consists of primary and secondary vegetation - mainly mixed forest and steppe ecosystems - which are already managed and used for productive purposes. As a result, local communities are not significantly reliant on the Project Area for provisioning, regulating, cultural, or supporting ecosystem services. **Overall, in line with the definitions of EBRD ESR6 and IFC PS6, no priority ecosystem services have been identified within the Project Area.**

8.4.6 Land Ownership and Use

As described in the ERM Draft ESIA, land in Romania is predominantly privately owned, with more than 90% of the total land under private ownership. Nationally, arable land accounts for the largest share of land use (around 42%), followed by forested areas (27%) and pastures (15%).

Within Deleni commune, approximately 71.3% of the total surface area is arable land, 11.0% is pasture, and 9.9% is forested. The remaining land includes built-up areas, transport infrastructure, and unproductive zones (*INSSE Tempo Online, 2014*).

Out of a total of 12,269 ha of arable land in the Deleni Commune, as reported in the ERM Scoping Report, about 90.6% is privately owned. For pasture areas (1,899 ha), approximately 54.4% is under private ownership, while the remainder is managed by local authorities or communal entities.

The Project does not involve any physical displacement. Most of the required land comprises privately owned arable plots (95%), obtained through voluntary lease agreements with individual landowners. A smaller portion includes pastureland and special-use areas (5%) - such as communal roads and agricultural access routes - which are under the ownership of the Deleni Commune Local Council and have been secured through association-in-participation (usufruct) arrangements.

8.4.7 Transport, Infrastructure and Public Services

8.4.7.1 Road network

As described in the ERM Scoping Report, road transport is the only available option to travel to and from Deleni Commune.

Within the Social AoI, the road structure is developed as follows:

Table 8-13 Main Road network within the Social AoI

Road Name	Road Type	Route
DN3	National road	National road which connects Bucharest to Constanta City, passing through the Deleni Commune.
DJ 307	County road	County road linking Deleni village to Sipotele.
DJ 391A	County road	County road in the southern area of the Project.
DC	Communal roads	Network of local communal roads connecting the villages of the Commune (e.g. DC 29, DC 56)
DE	Agricultural roads	Network of agricultural and farm access roads providing access to fields and supporting farming activities

As analysed in the AON National EIA, access to the plots where the wind turbines are to be installed is ensured through the existing network of agricultural and communal roads crossing the project area. These roads will be used during both the construction and O&M phases of the wind farm. In certain locations, direct access from national or county is also available.

During the construction phase, the following main routes will be used for the transport of turbine components and construction materials:

- DN3: main public road used for long-distance transport of turbine components.
- DC 56: provides access to the northern section of the wind farm
- DC 29: provides access to the southern section of the wind farm
- DJ 307: provides access to the southern-eastern section of the wind farm
- Network of communal and agricultural roads (full list in the AON National EIA): provide internal connections between turbine locations and construction areas. For agricultural access roads already built, reinforcement works are planned (paving or mixed solutions with concrete and gravel).

8.4.7.2 Energy Supply and Public Lighting

Most of the households in the Social AoI are connected to the centralised power supply. Energy supply relies primarily on solid, liquid, and gas fuels, with wood and coal commonly used for heating and liquefied petroleum gas (LPG) for cooking. Public lighting is available in all villages of the commune.

8.4.7.3 Solid Waste and Wastewater Management

As described in the ERM Draft ESIA, in Deleni Commune, solid waste collection and transportation are provided by *Iridex Grup Salubrizare SRL*, which collects and transfers waste from the commune to the *Costinești Integrated Waste Management Center* on a weekly basis, every Monday. The facility, located approximately 80 km east of the area, includes a landfill as well as waste sorting and recycling infrastructure. Although solid waste collection services are provided in Deleni Commune, the system appears to face operational limitations, with occasional waste accumulation observed along streets and near collection points.

As for hazardous waste, there are no licensed hazardous waste disposal facilities currently available in the Project area.

Water and wastewater services are managed by the Intercommunity Development Association *ADI Apa-Canal Constanta* and operated by *RAJA SA Constanta – West Zonal Centre*. The local water system consists of deep wells (approximately 150 m), treatment units, and distribution networks for each village. A centralized sewage network has not yet been established, and households rely primarily on septic tanks. In some cases, untreated wastewater is discharged into local water courses, contributing to the degradation of aquatic environment. Hand-dug wells are also common and are used mainly for garden and crop irrigation. Water shortages during summer months were reported by local residents during Key Informant Interviews (KII).

Overall, the local infrastructure remains limited, particularly in relation to water quality and wastewater management, reflecting broader rural development constraints observed across the region.

8.4.8 Community Health and Safety

As described in the ERM Draft ESIA, access to healthcare services in Romania is universal and free of charge. Although public spending on health services has increased in recent years, it remains below the EU average, resulting in persistent disparities between urban and rural healthcare access and quality.

At the Constanta County level, there were 32.7 specialist doctors per 10,000 inhabitants in 2019. The main cause of death in the county were circulatory system diseases, while respiratory illnesses have shown an increasing trend in recent years. The number of occupational accidents has also slightly increased - from 167 cases in 2017 (including 10 fatalities) to 172 cases in 2021 (including 5 fatalities). In terms of infectious diseases, the most frequently reported in 2020 were varicella (383 cases) and acute diarrhoea (346 cases), followed by viral hepatitis (86 cases) and Streptococcal Angina (65 cases). Moreover, according to the ERM Scoping Report, the county's healthcare network includes 21 public hospitals and five hospitals with ambulatory care, concentrated mainly in the cities of Constanța and Medgidia.

Within the direct Social Area of Influence (AoI), which includes Deleni Commune, healthcare access faces significant challenges. There are no hospitals in Deleni; the nearest hospitals are located in Medgidia and Constanța. Deleni Commune hosts a family doctor, a dental office, and a pharmacy, but the availability of specialized care and emergency services remains limited.

Overall, healthcare infrastructure in the AoI is understaffed and undersupplied, particularly relative to the number of villages served. The absence of emergency medical units limited preventive health programs, and the lack of home-care services for elderly or dependent residents contribute to local vulnerability. Despite the commitment of local health professionals, additional resources are required to ensure adequate medical coverage and improve community health resilience.

8.4.9 Landscape and Visual

8.4.9.1 Landscape

The landscape represents a key component of both natural and cultural heritage, encompassing environmental, historical, and agricultural values that shape local and regional identity. As defined by the European Landscape Convention (Florence, 2000), a landscape is "*an area, as perceived by people, whose character results from the interaction of natural and human factors*". The Centre for Environmental Research and Impact Studies (University of Bucharest, 1996) further defines landscape as *a portion of space perceived by the population, whose appearance results from the interaction between the physical environment, biological activity, and anthropogenic factors over time.*

This means that both natural processes and human activities, such as agriculture, infrastructure development, and settlement patterns, shape the identity of the landscape.

As described in the ERM Draft ESIA, the Project area is set within a rural landscape dominated by agroecosystems. The visual and physical character of the land is influenced by a combination of natural and anthropogenic features, including:

- extensive agricultural fields;
- scattered rural settlements;
- linear infrastructure such as power lines, roads, and irrigation channels;
- occasional livestock farms and land improvement works.

These existing elements have already introduced a significant degree of human modification into the landscape.

The project site partially overlaps with two protected natural areas:

- ROSCI0353 Peștera Deleni (WT74 location);
- ROSCI0071 Dumbrăveni – Valea Urluia – Lacul Vederoasa (WT133 location). In addition, ROSPA0001 Aliman–Adamclisi and ROSPA0036 Dumbrăveni are located nearby.

Landscape characteristics in the study area are determined by:

- Natural factors: the undulating plateau relief, moderate continental climate, soils, and the presence of river valleys (Urluia, Deleni, Baciu);
- Cultural and social factors: agricultural land use, the pattern of villages and infrastructure networks;

- Aesthetic and perceptual factors: simple, open horizons, earthy tones from cultivated fields, and the geometric structure typical of large-scale farming.

Overall, the landscape character is rural-agricultural, with limited natural vegetation, broad visual openness, and anthropogenic elements that already influence the visual perception of the area (see examples of landscape views in Figure 8-32.

Figure 8-32 Landscape aspects of the project study area (original photo SCBIM AON)

8.4.9.2 Visual

Visual character refers to the way in which people perceive the landscape, depending on topography, land cover, colors, forms, and human structures visible in the area. While landscape describes the physical and cultural attributes of an area, the visual environment relates to how these attributes are experienced and interpreted by observers.

The visual field of the study area is defined by the open, flat to gently rolling topography of the South Dobrogea Plateau, providing long viewing distances and wide horizons. The visual environment includes:

- Agricultural plains with limited vertical elements;
- Existing linear infrastructure, such as overhead power lines and rural roads, which are visible but not visually dominant;
- Scattered settlements located primarily along road networks and valleys, often at lower elevations (50–120 m asl).

The area lacks dense vegetation, allowing high visibility across the plateau. The open visual field contributes to a sense of vastness and uniformity, with limited variation in texture or color throughout much of the year.

Existing anthropogenic elements, transmission lines, access roads, and agricultural structures, already contribute to a semi-industrialized rural appearance, reducing overall landscape sensitivity to further visual changes.

8.4.10 Shadow Flicker

Shadow flicker and blade flickering can potentially cause nuisance and, in some cases, adverse effects on human well-being. Flickering occurs when rotating turbine blades periodically obstruct sunlight, creating a strobing effect that may be perceived by nearby residents. Based on international practice, the shadow flicker effect is generally perceptible up to approximately 500 – 600 metres from a turbine.

As described in the AON National EIA, limited effects could therefore occur in certain neighbouring residential areas, particularly within the village of Pietreni. A shadow flicker modelling assessment has been undertaken to evaluate the potential extent and duration of the phenomenon within the area of influence (see Appendix J).

Furthermore, the terrain within the Project site is slightly undulating, characterized by shrubland vegetation, and lacks forested areas or natural barriers that could screen receptors from the wind turbine generators (WTGs), potentially increasing the visual exposure of nearby dwellings to shadow flicker effects.

8.4.11 Archaeological and Cultural Heritage

8.4.11.1 Regulatory and institutional context

The archaeological baseline for the Dunărea East Wind Farm has been developed in accordance with the Romanian framework for the protection of archaeological heritage and the official national inventories used for cultural heritage screening and management. These include the List of Historical Monuments (including the 2015 update referenced in project documentation) and the National Archaeological Register (RAN; ran.cimec.ro), established under Government Ordinance No. 43/2000.

Archaeological management for the project was regulated through the Ministry of Culture and implemented by the National History and Archaeology Museum of Constanța (MINAC), which acted as the specialist institution responsible for successive stages of evaluation, intrusive investigation, reporting and coordination with competent authorities. Requirements for archaeological works were formalised through Ministry review no. 426/2023 (March 2023) and were subsequently implemented through intrusive diagnostics and preventive excavations, culminating in CNA approvals and an archaeological discharge certificate for defined areas (Archaeological Discharge Certificate no. 40/11.06.2025).

8.4.11.2 Archaeological management phases undertaken (2022–2025)

A multi-staged approach was applied to establish and refine the archaeological baseline and to support permitting and design optimisation:

- **Initial field evaluation (Nov–Dec 2022):** A commune-wide field survey ("perieghează") was undertaken across the 5,918 ha study area, targeting both mapped anomalies and the planned locations of turbines, access roads, cable routes, and transformer stations. Surface finds (e.g., ceramic fragments and construction materials) and anomaly confirmation supported chronological attribution where possible. Historical topographic maps (including master plans from the first half of the 20th century) were also reviewed to identify burial mound patterns, particularly on dominant heights.
- **Archaeological Study (issued 30 Jan 2023):** A formal Archaeological Study for the 318 MW wind farm was prepared by MINAC and issued on 30 January 2023. Its purpose was to consolidate desk-based evidence and field survey results, identify visible or suspected sites, and delineate site locations and protection zones in the Stereo 70 coordinate system. This study confirmed 50 archaeological sites within the project study area and defined the constraint framework for subsequent works.
- **Intrusive diagnostics (Sept–Dec 2024; report signed 23 Dec 2024):** An intrusive archaeological diagnosis was implemented under contract no. 34/D/2024 between MINAC and Midmar Callatis SRL and under Ministry of Culture authorisation no. 657/05.11.2024. The diagnostic report is dated 23.12.2024. The purpose was to clarify archaeological potential through intrusive investigations, refine the boundaries of sites identified by field evaluation, and define appropriate protection regimes. The approach included remote-sensing review (satellite/orthophotos), topographic map review (including military/ANCPI mapping), phased fieldwork and trenching, and integration of results into GIS/CAD applications (QuantumGIS, Global Mapper)[17].
- **Preventive archaeological research / excavations (Sept–Dec 2024; report completed May 2025):** Preventive archaeological research was undertaken under contract no. 99/C/2024, with Ministry authorisation no. 40/14.02.2025. Fieldwork took place from September 2024 to December 2024, and the report technical sheet was completed on 20.05.2025. The purpose was targeted excavation of areas directly affected by construction (turbines and associated infrastructure), including full excavation of selected tumuli and verification of the WT81 footprint[17].
- **Approvals and discharge (2025):** Technical reports were approved by the National Commission of Archaeology (CNA) in early 2025, resulting in the issuance of Archaeological Discharge Certificate no. 40/11.06.2025 for specified investigated areas.

8.4.11.3 Desktop archaeological baseline

According to national archaeological records and previous national EIA documentation, further refined by project-specific studies undertaken between 2022 and 2025, the area covered by the Dunărea East Wind Farm lies within a region of exceptional archaeological density in central-southern Dobruja. The landscape is defined by low limestone plateaus, rolling hills and depressions, which historically attracted long-term human occupation from prehistory through the Roman and medieval periods and into the modern era.

[17] Note that: intrusive diagnostics and preventive excavations were implemented in parallel during the same fieldwork window (September–December 2024)

The territory surrounding the villages of Deleni, Pietreni, Petroșani and Șipotele has long been recognised for the presence of funerary mounds (tumuli), Roman rural settlements, ancient road systems, and features associated with the First World War defensive lines, forming a complex and stratified archaeological landscape.

In particular, the area of Deleni Commune is historically connected to the neighbouring Adamclisi Commune, both forming part of the wider cultural landscape surrounding the **Tropaeum Traiani** and its surrounding Roman settlement, constructed around 109 AD to commemorate Emperor Trajan's victory over the Dacians. Historical sources indicate that the monument and related Roman structures were built using stone materials extracted from ancient quarries located within the territory of Deleni, reinforcing the archaeological and historical significance of the area at a regional scale.

Desktop-based analysis indicates that numerous archaeological sites are present within the Project area, many of which are buried and not immediately visible at the surface, while others—such as tumuli and remnants of modern military earthworks—remain partially visible above ground or detectable through aerial and satellite imagery. Previous documentation identified a concentration of sites primarily associated with the Roman period; however, more recent investigations have demonstrated a broader chronological range, including prehistoric (Bronze Age) funerary landscapes, Roman occupation, Early Medieval reuse, and modern (First World War, 1916) military features.

The following archaeological sites are recorded in both national databases of historical monuments and archaeological sites, namely the List of Historical Monuments (2015) and the National Archaeological Register (RAN), and form the core of the desktop-based archaeological baseline for Deleni Commune.

Table 8-14 Archaeological Sites Recorded in the National Databases within Deleni Commune

Site's name	RAN Code	Description
Archeological site of Deleni	61684.01	Stone quarry and a group of tumuli
Archeological site of Pietreni	61700.01	Inhumation tomb and villa rustica
Tumuli de la Pietreni	61700.02	Tumuli
Roman rural settlement of Petrosani	61693.01	Tomb and rural settlement
Hallstattian necropolis at Petroșani	61693.02	Burial necropolis
Archaeological site of Petroșani - La Furci	61693.03	Prehistoric to medieval habitation
Archaeological site of Petroșani - Valea Cișmelei	61693.04	Roman settlement, Neolithic settlement
The stone quarry at Sipote	61728.01	Stone quarry
The Dridu settlement of Yippotele	61728.02	Early medieval settlement
Hellenistic settlement at Hippotele	61728.03	Hellenistic-period settlement
The Roman settlement of Yippotele	61728.04	Roman settlement
Archaeological site of Yippotele	61728.05	Tomb and ancient aqueduct

Recorded archaeological sites (exact and approximate locations) and tumuli identified from the national archaeological map service are shown in relation to the Project Area of Influence (2 km), the latest wind farm layout (WTGs, internal 33 kV cables, and new or upgraded access roads). Figure 8-33 below illustrates the high density and spatial distribution of known archaeological receptors within and around the Project area.

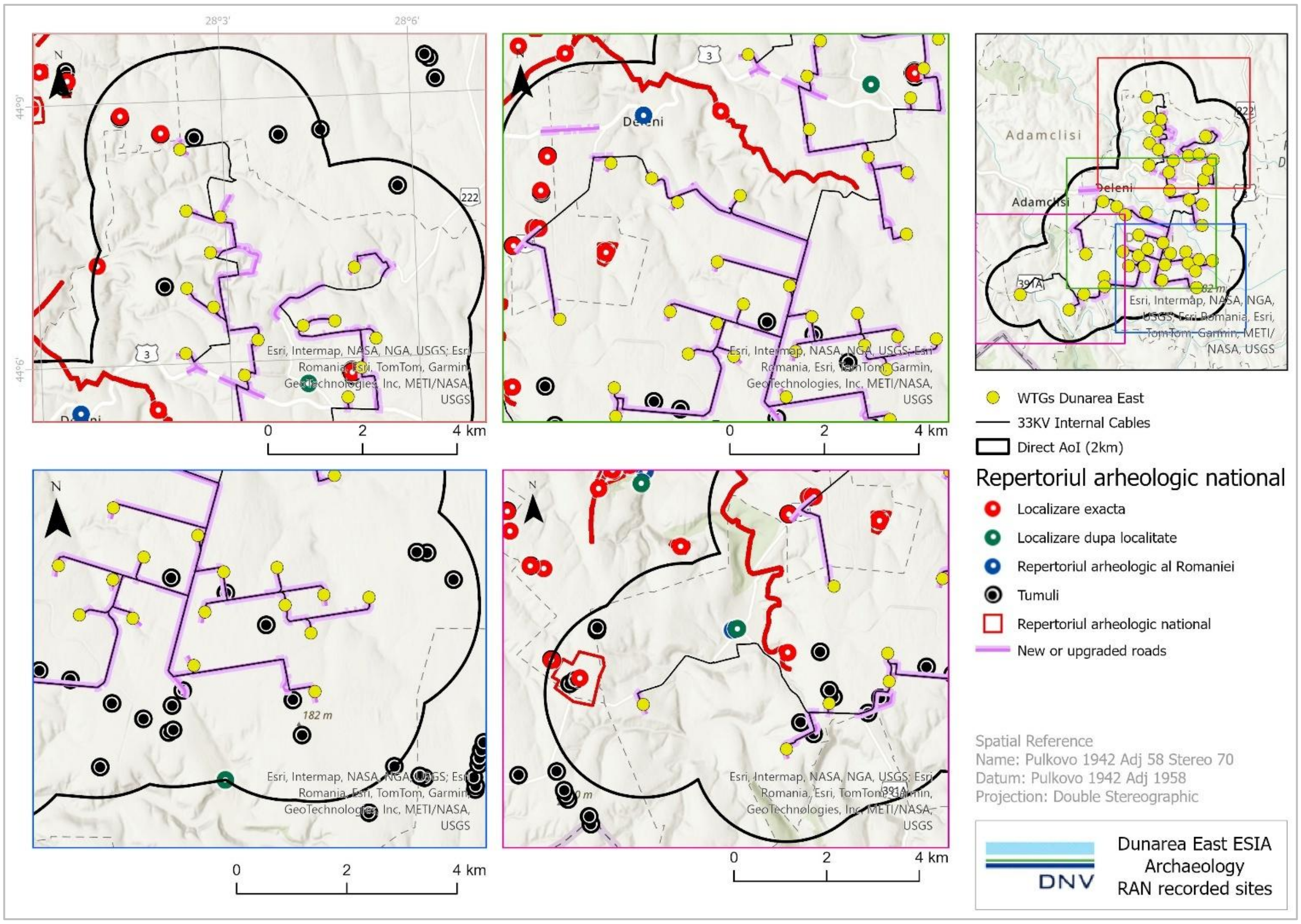

Figure 8-33 Desktop-based archaeological baseline derived from the National Archaeological Register (RAN)

These nationally recorded sites provided the initial framework for assessing archaeological sensitivity within the Project area and informed the subsequent field-based investigations and delineation of archaeological constraints undertaken between 2022 and 2025.

8.4.11.4 Field-work archaeological baseline

Building on the archaeological management framework and investigation phases described in Section 8.4.11.2, this section summarises the key baseline findings derived from field-based investigations undertaken within the Project area between 2022 and 2025. The information presented below is derived from:

- the Archaeological Study conducted as part of the AON National EIA (2023),
- the Intrusive Diagnostic Report (2024) (Appendix F), and
- the Preventive Archaeological Research Report (2025) (Appendix G).

Field-based investigations have confirmed that the Project area is characterised by a high density and diversity of archaeological remains, consistent with the expectations established through desktop-based screening. Archaeological features are not isolated occurrences but form part of a continuous and stratified cultural landscape extending across the administrative territory of Deleni Commune, particularly in the areas of Deleni, Pietreni, Petroșani and Șipotele.

A total of 50 archaeological sites were identified and delineated through field evaluation and subsequent investigations carried out in 2022–2023. These include funerary monuments, settlement remains, linear infrastructure features (such as ancient roads), and military structures. Site boundaries and protection zones were refined through intrusive diagnostics, enabling a clear distinction between areas of confirmed archaeological sensitivity and areas where no remains were identified.

Archaeological sites identified through project-specific field investigations and delineated in the 2023 Archaeological Study are shown together with their protection zones, overlaid on the latest wind farm layout (WTGs, access roads and cable routes) within the Project Area of Influence in Figure 8-34 below.

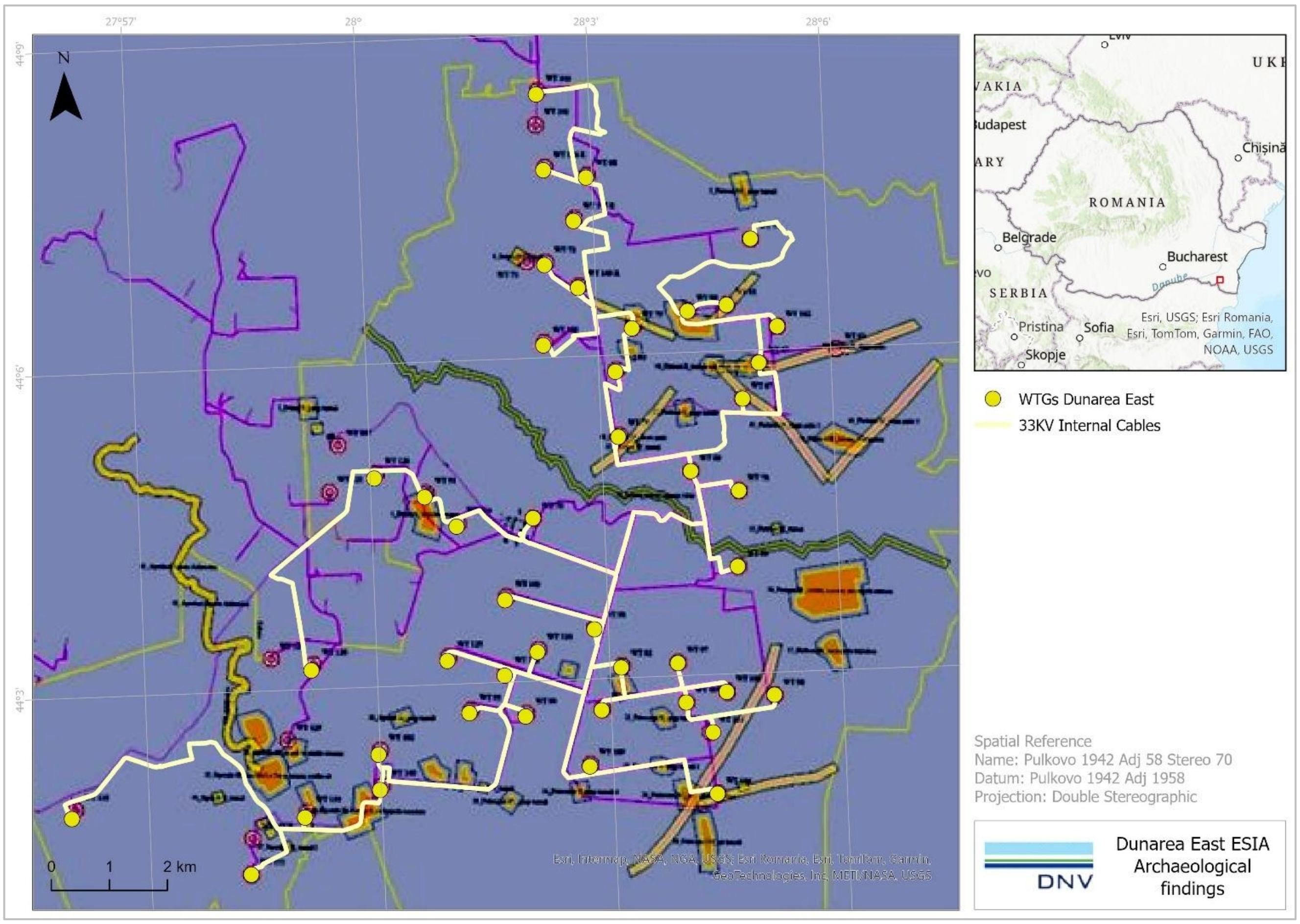

Figure 8-34 Archaeological sites and protection zones marked within the study area (*Source: AON National EIA overlaid with the current Project layout*)

Intrusive diagnostic investigations undertaken in 2024 (Appendix F) refined the archaeological baseline by confirming the presence of archaeological remains in a limited number of previously identified sites and by verifying the absence of remains in several other tested locations. These investigations were particularly important in clarifying the archaeological character of areas intersecting planned turbines, access roads and cable routes.

Archaeological remains were confirmed in four principal locations:

- **Pietreni**, where ancient road alignments and Roman settlement-related features were identified;
- **Șipotele**, where a tumular funerary complex was confirmed;
- **Deleni**, where elements of the First World War (1916) defensive system were recorded.

Conversely, several investigated turbine locations and infrastructure corridors showed no archaeological features, providing certainty that construction in those areas would not affect buried archaeological heritage.

The spatial extent of the intrusive diagnostic investigations undertaken in 2024 is presented in Figure 8-35. The figure illustrates the locations where intrusive investigations were carried out in relation to the Project components and known archaeological constraints. The mapped areas represent the footprint of investigated project components rather than the exact trench geometries.

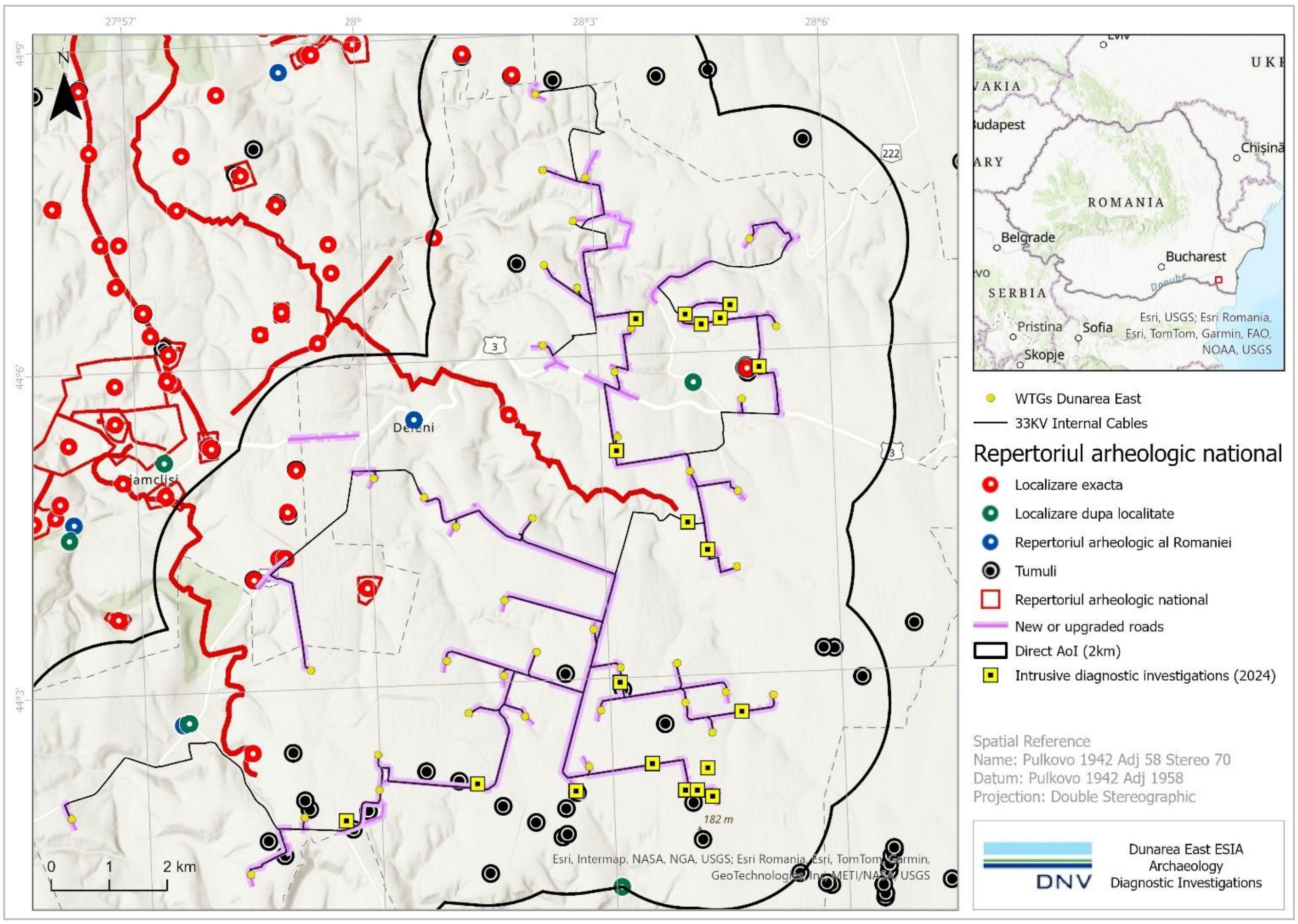

Figure 8-35 Areas subject to intrusive diagnostic investigations (2024)

Preventive archaeological excavations carried out during 2024, with reporting finalised in 2025 (Appendix G), significantly enhanced the understanding of the archaeological baseline in areas subject to direct Project impacts. Three tumuli were fully excavated, and the footprint of one turbine location (WT81) was investigated in detail. The excavations documented a multi-period archaeological sequence, reflecting the long-term use and reuse of the landscape. The main categories of remains identified are summarised in Table 8-15.

Table 8-15 Summary of key field-based archaeological findings

Period	Principal confirmed remains
Prehistoric	Two integral tumuli at Petroșani and Șipotele, identified as Bronze Age burial mounds, including inhumation graves and mound construction features.
Roman	Extensive habitation features and cremation/incineration contexts dating to the 2nd–3rd centuries AD, including the Roman settlement at Pietreni (Site 7) and an associated ritual incineration area (Site 6); ancient road alignments and Roman-period artefacts.
Early Medieval	Secondary burials implanted into earlier tumuli, likely dating to the 9th–11th centuries AD.
Modern (WWI)	Remains of the 1916 defensive line, including zig-zag trenches, military shelters (cazemates), mass graves of soldiers, and associated artefacts such as bayonets, cartridges and iodine ampoules.

The tumuli at Petroșani and Șipotele represent rare, fully excavated examples of Bronze Age funerary monuments in the Dobruja region. At Pietreni, the investigated mound and associated features were interpreted as a funerary and ritual complex closely linked to nearby Roman rural occupation, including cremation and incineration practices characteristic of the Roman period. Evidence of Early Medieval reuse further illustrates the long-term cultural significance of these locations.

The investigation of the WT81 turbine footprint confirmed the absence of archaeological remains within that specific construction area. The locations of the areas subject to preventive archaeological excavation and for which archaeological discharge was issued in 2025 are shown in Figure 8-36.

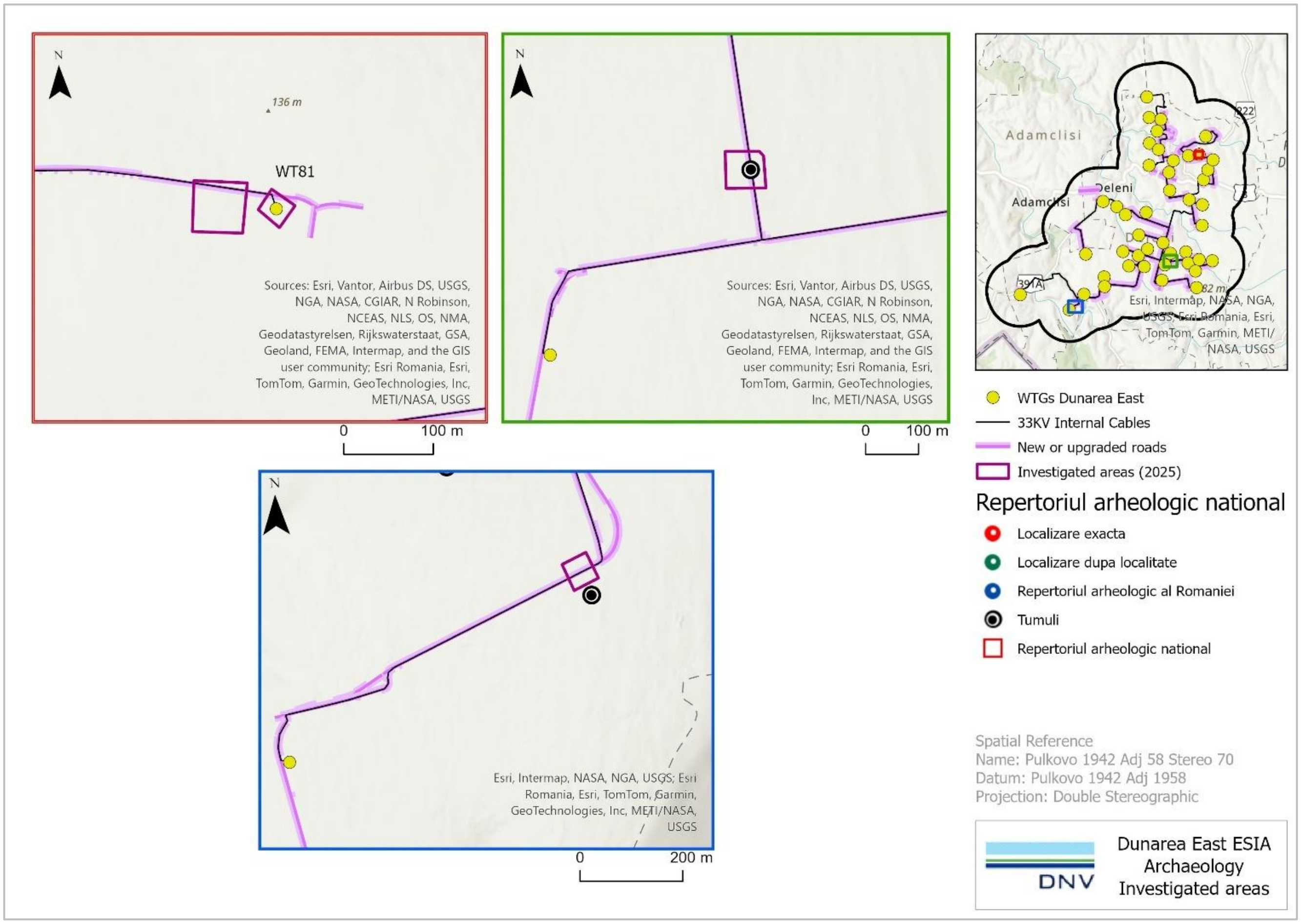

Figure 8-36 Preventive archaeological excavation areas and archaeological discharge zones (2025)

The archaeological baseline and field-based investigations informed both the refinement of the Project design and the definition of legally binding construction-phase requirements, as set out in Culture Permit no. 46/Z/05.02.2025 and described in Chapter 9.3.12.4.

8.4.11.5 Intangible Cultural Heritage (ICH)

In addition to tangible archaeological resources, the Project AoI includes a number of receptors associated with intangible cultural heritage (ICH), understood as living cultural practices, traditions, and uses linked to specific locations.

The following ICH receptors have been identified within or in proximity to the Project Area:

- Mănăstirea Nașterea Maicii Domnului
- Orthodox churches and associated cemeteries located within the villages of Pietreni, Petroșani, and Șipotele
- Local cemeteries, including the Turkish cemetery and the Adamclisi community cemetery
- Nationally significant heritage sites such as Monumentul Tropaeum Traiani and the associated Civitas Tropaensium

These receptors are associated with ongoing cultural, religious, and social practices, including:

- daily religious services and spiritual activities

- monastic life and retreat functions
- funerary and commemorative practices within active cemeteries
- religious festivals, pilgrimages, and community gatherings
- tourism and educational activities associated with nationally important heritage sites

The identified intangible cultural heritage receptors are spatially distributed both within and in proximity to the Project AoI (2 km), with varying degrees of interaction with Project infrastructure.

The spatial distribution of identified receptors in relation to the Project layout is presented in Figure 8-37 below.

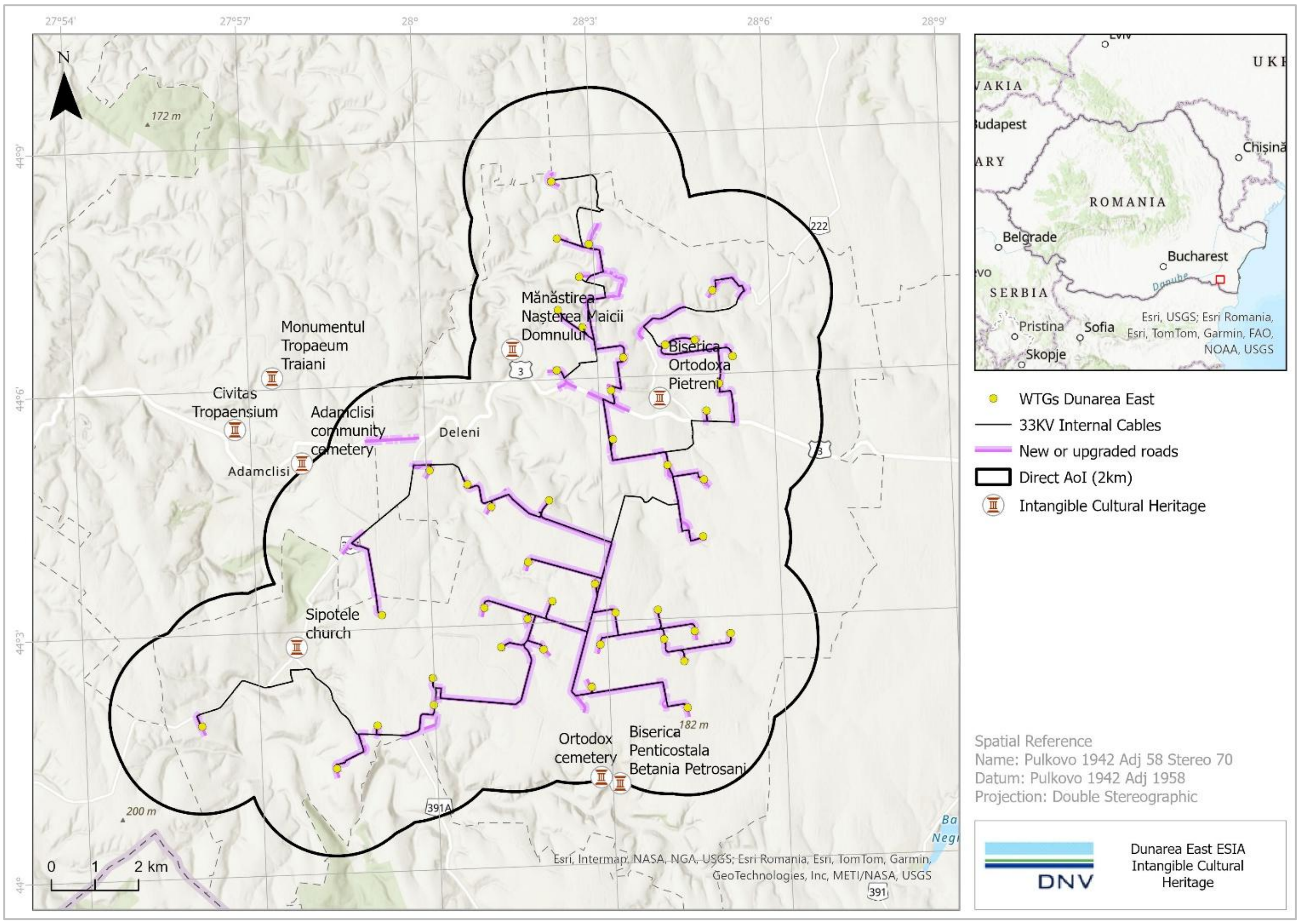

Figure 8-37 Intangible Cultural Heritage spatial distribution in relation to the AoI

The spatial distribution of intangible cultural heritage (ICH) receptors within the Project AoI indicates a dispersed pattern, with receptors located both within and in proximity to Project infrastructure, although no direct overlap with turbine footprints is present.

The nearest receptors to the Project infrastructure are located in the central and southern portions of the AoI:

- The Mănăstirea Nașterea Maicii Domnului is located approximately 1.2–1.3 km from the nearest wind turbines. Interaction with Project infrastructure is therefore limited to indirect effects, primarily associated with construction-phase traffic along nearby access roads.
- The Orthodox church in Pietreni is located approximately ~1.0 km from the nearest turbines and in proximity to upgraded access roads. No direct physical interaction with Project infrastructure is anticipated; however, temporary exposure to construction-related activities along transport routes cannot be excluded.
- The church in Șipotele is located in the southern part of the AoI at a distance of approximately 500 m from the nearest internal underground cable corridor. Potential interaction is limited to short-term construction-phase disturbances, such as temporary access restrictions or localised noise and dust emissions during trenching activities.

Other receptors, including cemeteries and churches in Petroșani and the wider Adamclisi area, are located at greater distances from Project infrastructure and are generally outside the zone of direct construction influence. These receptors remain part of the wider cultural landscape context but are not expected to experience direct interaction with construction activities.

The nationally significant heritage sites Monumentul Tropaeum Traiani and Civitas Tropaensium are located outside the Project AoI. No physical interaction is anticipated, although they remain relevant in terms of broader landscape and cultural perception.

Overall, the spatial analysis indicates that:

- no ICH receptors are located within turbine footprints or permanent above-ground infrastructure zones;
- the closest interaction occurs at Șipotele, due to proximity (~500 m) to an underground cable corridor;
- other receptors are located at distances of approximately 1.0–1.3 km or greater from turbine locations;
- interaction pathways are therefore predominantly indirect and construction-phase related.

8.4.12 Human Rights Baseline

As indicated in the ERM Draft ESIA, Romania has ratified most of the main international instruments for the protection of human rights, including eight of the ten fundamental Conventions and all priority governance Conventions of the International Labour Organization (ILO), as well as most of the International Human Rights Treties. Romania has actively engaged at the international level in promoting the establishment of strong institutions to protect and uphold human rights. Together with other EU member states, Romania contributed in 2006 to the creation of the United Nations Human Rights Council.

Nonetheless, several structural challenges persist in practice. Child labour remains a concern in rural areas, especially within agricultural households where enforcement is weak. Instances of forced labour and human trafficking continue to occur, particularly effecting vulnerable groups such as Roma communities, migrants, women and persons with disabilities.

Occupational health and safety enforcement is generally weak, with limited inspection capacity and underreporting of workplace accidents, especially in high-risk sectors. Informal employment remains widespread, especially in construction, agriculture, hospitality sectors, exposing workers to unsafe conditions and lack of social protection.

Discrimination on the basis of ethnicity, gender, sexual orientation, or disability persists despite legal prohibitions, with the Roma community facing significant social exclusions and barriers to access employment, education and services. Moreover, migrant workers and refugees face risks of exploitation and inadequate protection mechanisms.

Women in Romania continue to face unequal treatment in the workplace, including disparities in pay, representation in decision-making positions, and exposure to sexual harassment. Domestic and intimate-partner violence remain concerns, although national strategies and updated legal provisions have strengthened protection and support mechanisms for victims. Within the Project's area of influence, the influx of a largely male non-local workforce may heighten the risk of gender-based violence and harassment (GBVH), requiring adequate prevention and mitigation measures.

In relation to supply chains, the renewable energy sector depends on the extraction and processing of critical minerals such as copper, nickel, manganese and rare earth elements, where adverse human rights risks are well-documented. Global supply chains linked to wind turbine manufacturing have faced allegations of forced labour, unsafe working conditions, and weak traceability mechanisms. These risks are often rooted in mining operations in third countries with limited labour oversight. As such, project developers and investors are expected to apply robust due diligence practices and use their leverage to promote respect for human rights throughout the supply chain, in line with international best practice and emerging EU legislation on corporate sustainability due diligence.

Indigenous people are not present in Romania.

Overall, while Romania maintains a solid legal framework for the protection of human rights, the implementation and enforcement of these rights remain uneven. Persistent challenges - particularly those related to corruption, gender-based violence, Roma inclusion, disability rights, and civic freedoms - underscore the need for continued institutional strengthening and effective local-level application of human rights standards.

9 IMPACT ASSESSMENT

9.1 Environmental and Social Sensitivities

The aim of this section is to determine the overall sensitivity of each receptor, based on the evaluation of how vulnerable these ecosystems and communities in the project area are to potential impacts from the proposed development. It highlights particularly sensitive areas or aspects that demand special attention/mitigation during the impact assessment process.

Aspects that have been scoped out in the baseline section will not be included in the sensitivity table below.

Table 9-1 Summary of the environmental and social receptor sensitivities

Receptor	Sensitivity		Justification
Air quality - residential	SC1	N/A	/
	SC2	Moderate	The receptor has been assigned a Moderate societal value as the AoI interest only small portion of urban areas and there is no major urban center included.
	SC3	High	Air quality estimates in the residential area show already some low exceedance for PM and NO_2, and residential receptors include vulnerable population. Nevertheless, the most sensitive receptors locations such as schools, places of worship and health centers are outside the AoI.
	OVERALL SENSITIVITY	**High**	**An overall High sensitivity is assigned for the above reasons.**
Air quality - industrial	SC1	N/A	/
	SC2	Moderate	Industrial zones have an economic and societal value for the local residents. However, air quality degradation consequences would be manageable.
	SC3	Low	Industrial zones generally have existing emissions and lower sensitivity to air quality changes.
	OVERALL SENSITIVITY	**Low**	**An overall Low sensitivity is assigned for the above reasons.**
Air quality – Construction workers	SC1	N/A	/
	SC2	N/A	/
	SC3	Moderate	The sensitivity to change of the Project staff to impacts on atmospheric air quality is average, taking into account their coming of age and health compliance with selection criteria.
	OVERALL SENSITIVITY	**Moderate**	**An overall Moderate sensitivity is assigned for the above reasons.**
Air quality – protected areas	SC1	Moderate	Although classified as Natura 2000 sites, the directly affected portions of the protected areas are limited to small, already cultivated plots with no qualifying habitats or species.
	SC2	Low	The receptor provides minimal societal or cultural benefits. The affected land is primarily agricultural with low ecological and recreational value. Loss or degradation would have negligible impact on societal well-being.
	SC3	Low	Vulnerability to change due to deterioration of air quality with dust and combustion will have limited ecological consequences on the limited areas affected, which correspond mostly to cultivated plots.

Receptor	Sensitivity		Justification
	OVERALL SENSITIVITY	**Low**	**An overall Low sensitivity is assigned for the above reasons.**
Noise - residential	SC1	N/A	/
	SC2	Moderate	The receptor has been assigned a Moderate societal value as the AoI interest only small portion of urban areas and there is no major urban center included.
	SC3	Moderate	Based on the noise context, the receptor shows some vulnerability to variations in noise levels but possesses a reasonable ability to accommodate change due to the already variable acoustic environment and its capacity to recover once disturbance ceases.
	OVERALL SENSITIVITY	**Moderate**	**An overall Moderate sensitivity is assigned for the above reasons.**
Noise - industrial	SC1	N/A	/
	SC2	Moderate	Industrial zones have an economic and societal value for the local residents. However, noise emissions consequences would be manageable.
	SC3	Low	Industrial zones generally have existing noise emissions and lower sensitivity to noise level changes.
	OVERALL SENSITIVITY	**Low**	**An overall Low sensitivity is assigned for the above reasons.**
Noise – Construction workers	SC1	N/A	/
	SC2	N/A	/
	SC3	Moderate	The sensitivity to change of the Project staff to impacts on noise is average, taking into account their coming of age and health compliance with selection criteria.
	OVERALL SENSITIVITY	**Moderate**	**An overall Moderate sensitivity is assigned for the above reasons.**
Noise – protected areas	SC1	Moderate	Although classified as Natura 2000 sites, the directly affected portions of the protected areas are limited to small, already cultivated plots with no qualifying habitats or species.
	SC2	Low	The receptor provides minimal societal or cultural benefits. The affected land is primarily agricultural with low ecological and recreational value. Loss or degradation would have negligible impact on societal well-being.
	SC3	Low	Vulnerability to change due to noise level changes will have limited ecological consequences on the limited areas affected, which correspond mostly to cultivated plots.
	OVERALL SENSITIVITY	**Low**	**An overall Low sensitivity is assigned for the above reasons.**
Soil	SC1	Low	The ecological sensitivity of soils in the project area is low, because they are widespread, not rare or unique, and the site does not support high biodiversity or critical soil-dependent ecosystems.
	SC2	Low	The societal value of soil in the project area is low due to limited agricultural potential and the need for engineering measures for construction.
	SC3	Moderate	Soil in the Project area is moderately vulnerable to changes due to collapsible loess, frost sensitivity, and

Receptor	Sensitivity		Justification
			low shear strength, making them easily destabilized by moisture or construction.
	OVERALL SENSITIVITY	**Moderate**	**An overall High sensitivity is assigned for the above reasons.**
Surface water	SC1	Low	The ecological sensitivity of the project area is assessed as low due to the poorly developed hydrological network and the absence of permanent watercourses within or near the site. Limited surface water reduces the availability of habitats for aquatic and riparian species, which are often key indicators of ecological sensitivity.
	SC2	Low	The hydrological network in the Deleni area is poorly developed, and no permanent watercourses are present within or near the project site. Given the absence of any known water use, aquatic ecosystems, or community dependence, the surface water receptor is assessed as having a low societal value
	SC3	Low	Given the absence of permanent channels, aquatic habitats, or downstream water users, the surface water environment is assessed as having low vulnerability to changes.
	OVERALL SENSITIVITY	**Low**	**An overall Low sensitivity is assigned for the above reasons.**
Groundwater	SC1	N/A	Those receptors do not concern any biological receptor.
	SC2	High	The receptor has been identified as a High societal value as the RODL10 South Dobrogea groundwater body in the Project area serves as a source of water supply for local communities.
	SC3	High	The RODL10 South Dobrogea groundwater body is characterized by permeable and fissured formations with limited protective cover. Given the existing contamination pressures from settlements and agricultural sources, the groundwater system is considered to have high vulnerability to change.
	OVERALL SENSITIVITY	**High**	**An overall High sensitivity is assigned for the above reasons.**
Habitats and ecosystems	SC1	Moderate	The project area is dominated by modified agricultural land, with limited presence of Annex I priority habitats (62C0, 91I0, 40C0) located mainly within wider EAAA and Natura 2000 boundaries. No Critical Habitat triggered.
	SC2	Low	The receptor provides minimal societal or cultural benefits. The affected land is primarily agricultural with low ecological and recreational value. Loss or degradation would have negligible impact on societal well-being.
	SC3	Moderate	Semi-natural fragments (steppe and woodland edges) show some sensitivity to habitat loss and fragmentation, but overall resilience is high due to dominance of agricultural systems.
	OVERALL SENSITIVITY	**Moderate**	**An overall Moderate sensitivity is assigned for the above reasons.**
Protected areas	SC1	Moderate	Protected Areas within and around the AoI include Natura 2000 sites designated for habitats and species of EU conservation importance. These areas retain ecological value at landscape scale but are

Receptor	Sensitivity		Justification
			characterised by a mosaic of natural, semi-natural and agricultural land, with limited continuity of high-integrity habitats.
	SC2	High	The receptor has high societal and regulatory importance as part of the Natura 2000 network and other internationally recognised sites (IBAs/Ramsar).
	SC3	Moderate	The receptor has high societal and regulatory importance as part of the Natura 2000 network and other internationally recognised sites (IBAs/Ramsar).
	OVERALL SENSITIVITY	**Moderate**	**Moderate sensitivity is assigned as the Protected Areas within the AoI are of high conservation and regulatory importance but are embedded in a largely agricultural and fragmented landscape, with no direct presence of qualifying habitats or critical ecological features within the Project footprint.**
Terrestrial fauna (invertebrates, reptiles, mammals)	SC1	Moderate	The Project area includes Annex II/IV species and nationally threatened taxa (e.g. *Spermophilus citellus*, *Mesocricetus newtoni*), but populations are generally dispersed and not forming critical habitat.
	SC2	Low	Limited direct societal dependence; species have minimal direct socio-economic value except indirect ecosystem role.
	SC3	Moderate	Species show varying adaptability to agricultural mosaics; some sensitivity to habitat loss and disturbance, but overall moderate recovery potential.
	OVERALL SENSITIVITY	**Moderate**	**An overall Moderate sensitivity is assigned for the above reasons.**
Flora	SC1	Low	Majority of recorded species are common agricultural/ruderal taxa; only a small number of species listed on national Red List, with no qualifying species from Natura 2000 confirmed within Project footprint.
	SC2	Low	Limited direct societal, cultural or economic dependence on plant assemblages within the AoI.
	SC3	Low	Vegetation communities are highly resilient to disturbance due to dominance of segetal and ruderal species in agricultural matrix.
	OVERALL SENSITIVITY	**Low**	**An overall Low sensitivity is assigned for the above reasons.**
Birds and bats	SC1	High	Includes Annex I Birds Directive species, multiple VU/EN taxa (e.g. raptors and steppe birds), plus Annex II/IV bat species including *Miniopterus schreibersii*. High ecological importance due to migratory corridor and roosting/foraging use of wider EAAA.
	SC2	Moderate	Birds provide cultural and ecological value (e.g. flagship raptors, ecosystem services), while bats contribute to ecosystem regulation; no direct socio-economic dependence.
	SC3	High	High vulnerability to wind farm projects.
	OVERALL SENSITIVITY	**High**	**An overall High sensitivity is assigned for the above reasons.**
Local population and communities	SC1	N/A	Those receptors do not concern any biological receptor

Receptor	Sensitivity		Justification
	SC2	High	The societal value of the local population is high, as it represents the core socio-economic structure of the Project AoI. The community sustains local livelihoods, provides the labour base, and maintains the social identity and functioning of Deleni Commune.
	SC3	Moderate	The population may be vulnerable to changes due to limited alternative livelihoods, constrained public services, and sensitivity to temporary disturbances such as noise, dust, traffic and workforce influx. These factors reduce the community's capacity to absorb Project-induced changes.
	OVERALL SENSITIVITY	**Moderate**	**An overall Moderate sensitivity is assigned for the above reasons.**
Landowners and Land Users	SC1	N/A	Those receptors do not concern any biological receptor
	SC2	High	The societal value of farmers and landowners is high because agricultural activities represent the main livelihood in Deleni Commune and rely on privately owned arable and pastureland. This group is central to local food production, income generation and land management, so any long-term loss or degradation of land use would have a substantial impact on local socio-economic conditions.
	SC3	Moderate	Farmers and landowners depend on land-based livelihoods, but the Project does not involve physical displacement and land is primarily acquired through voluntary lease agreements. While reduced access or temporary disturbance can affect incomes, the possibility of lease payments and continued agricultural use on non-affected plots provides some capacity to recover.
	OVERALL SENSITIVITY	**Moderate**	**An overall Moderate sensitivity is assigned for the above reasons**
Workforce	SC1	N/A	Those receptors do not concern any biological receptor
	SC2	Moderate	The societal value of the workforce is moderate, as employment contributes to the local economy and supports livelihoods, but workers do not represent a critical socio-economic pillar in the same way as land-dependent households or the broader community.
	SC3	Moderate	Local workers may face temporary variations in employment or income but generally have alternative livelihood options in agriculture or other sectors in nearby towns, while non-local workers are less dependent on local conditions. Potential impacts are temporary and manageable through standard labour management measures.
	OVERALL SENSITIVITY	**Moderate**	**An overall Moderate sensitivity is assigned for the above reasons.**
Local Businesses & Economic Activities	SC1	N/A	Those receptors do not concern any biological receptor
	SC2	Moderate	Local businesses and economic activities have a moderate societal value: they contribute to local livelihoods and services, but the economic structure of Deleni remains small – scale, with limited diversification and modest influence on the broader socio-economic functioning of the commune.

Receptor	Sensitivity		Justification
	SC3	Moderate	Vulnerability to changes is moderate, as local businesses may experience temporary disruptions from construction activities or increased competition from non-local contractors, but overall impacts are limited in scale and duration, and recovery is generally feasible.
	OVERALL SENSITIVITY	**Moderate**	**An overall Moderate sensitivity is assigned for the above reasons.**
Vulnerable and Disadvantaged Groups	SC1	N/A	Those receptors do not concern any biological receptor
	SC2	Moderate	Vulnerable groups hold a moderate societal value: while their protection is socially important, they represent a numerically limited portion of the population and are not structurally central to the local economy or service provision of the commune.
	SC3	High	Vulnerable groups have a high susceptibility to changes due to limited livelihood options, reduced access to essential services, and low adaptive capacity. Weak healthcare availability, reliance on limited infrastructure, and socio-economic fragility increase their exposure to Project-related disturbances.
	OVERALL SENSITIVITY	**High**	**An overall High sensitivity is assigned for the above reasons.**
Public Services & Local Institutions	SC1	N/A	Those receptors do not concern any biological receptor
	SC2	High	Public services and local institutions have a high societal value, as they provide essential functions such as water supply, waste management, healthcare, education, and road infrastructure. Any reduction in their performance would significantly affect community well-being and daily functioning.
	SC3	Moderate	Vulnerability to changes is moderate due to existing system fragilities, including limited healthcare capacity, absence of centralized wastewater treatment, seasonal water shortages, constrained waste services, and low institutional resources. These characteristics reduce the ability to absorb additional pressure generated by the Project.
	OVERALL SENSITIVITY	**Moderate**	**An overall Moderate sensitivity is assigned for the above reasons.**
Landscape	SC1	N/A	/
	SC2	High	The landscape is rural-agricultural with open horizons and existing anthropogenic elements (roads, power lines, settlements). It has high cultural and perceptual value
	SC3	Low	Landscape is already highly modified, reducing vulnerability to change.
	OVERALL SENSITIVITY	**Moderate**	**An overall Moderate sensitivity is assigned for the above reasons.**
Settlement – visual	SC1	N/A	/
	SC2	Moderate	Rural settlements have cultural and social value. Visual changes may affect residents' perception of landscape character.

Receptor	Sensitivity		Justification
	SC3	Moderate	Moderate vulnerability to change is considered.
	OVERALL SENSITIVITY	**Moderate**	**An overall Moderate sensitivity is assigned for the above reasons**
Residential clusters – shadow ficker	SC1	N/A	/
	SC2	High	High, because the well-being of residents is directly influenced by their built environment (light exposure, comfort, perceived health).
	SC3	Moderate	Residents may adapt to the phenomenon, but repeated exposure to shadow flicker may cause discomfort or visual stress.
	OVERALL SENSITIVITY	**Moderate**	**An overall Moderate sensitivity is assigned for the above reasons**
Recreational areas - visual	SC1	N/A	/
	SC2	Low	Road corridors are functional transport routes with limited scenic value.
	SC3	Low	Users experience transient views and have low susceptibility to visual change.
	OVERALL SENSITIVITY	**Low**	**An overall Low sensitivity is assigned for the above reasons**
Cultural Heritage	SC1	N/A	Those receptors do not concern any biological receptor
	SC2	Moderate	The archaeological sites within the AoI have a recognised cultural value and are legally protected; however, they do not play a central role in local social identity, community life, or tourism.
	SC3	High	The receptor is highly vulnerable to ground disturbance, with limited ability to recover once damaged. Many sites are subsurface and sensitive to excavation, and additional studies were required by the cultural authorities due to the sensitivity of the area.
	OVERALL SENSITIVITY	**High**	**An overall High sensitivity is assigned for the above reasons**
Intangible Cultural Heritage	SC1	N/A	Those receptors do not concern any biological receptor
	SC2	High	The intangible cultural heritage receptors within the AoI, including religious institutions (monastery and Orthodox churches), cemeteries, and nationally significant cultural heritage sites, have high social and cultural value. These receptors are actively used for religious worship, funerary practices, community gatherings, and cultural identity reinforcement. As such, they play an important role in maintaining local social cohesion, spiritual practices, and cultural continuity.
	SC3	High	The receptors are moderately to highly vulnerable to changes in their surrounding environment, particularly temporary disturbances such as construction-related noise, dust, traffic, and access restrictions. Religious and funerary practices are sensitive to disruption of tranquillity and accessibility, and even short-term disturbances may temporarily affect the quality of use and experience of these sites. Although no permanent physical alteration is expected, their functional and

Receptor	Sensitivity		Justification
			experiential value makes them sensitive to external disturbance.
	OVERALL SENSITIVITY	**High**	**An overall High sensitivity is assigned for the above reasons**
Ecosystem Services	SC1	Moderate	The project area overlaps partially with Natura 2000 sites but consists mainly of agricultural land with low ecological value. No critical habitats or populations of endangered species are present, though some protected species (e.g., bats, raptors) may occur in the wider area.
	SC2	Low	Ecosystem services in the Project Area have low societal value, as habitats are already highly modified by agriculture and communities have limited reliance on provisioning, regulating or cultural services within the Area of Influence. No priority ecosystem services are present.
	SC3	Low	Vulnerability to change is low, given the degraded baseline conditions, limited dependence of communities on local ecosystem services, and the absence of critical services (e.g., water regulation, pollution control, forest products).
	OVERALL SENSITIVITY	**Low**	**An overall Low sensitivity is assigned for the above reasons**
Road Infrastructure	**SC1**	N/A	Those receptors do not concern any biological receptor
	SC2	Moderate	Road infrastructure provides an essential service for daily mobility, agricultural transport and access to public services. Its proper functioning supports local livelihoods and ensures the overall accessibility of Deleni Commune. Any deterioration, restricted access or increased pressure on the network could affect community well-being and local economic activities, which justifies assigning a Moderate societal value to this receptor.
	SC3	Low	Vulnerability to change is low because the expected Project-induced pressures are limited in duration and can be effectively managed through standard traffic and road-safety measures. The existing network has sufficient capacity to absorb these changes without long-term impacts.
	OVERALL SENSITIVITY	**Low**	**An overall Low sensitivity is assigned for the above reasons**

9.2 Environmental Impact Assessment

9.2.1 Air quality

9.2.1.1 Area of Influence

The assessment focuses on dust and pollutant emissions generated during the construction phase, including those from construction traffic, vehicle exhaust, and earthworks. As explained in Chapter 1306.4.3, the AoI for construction is defined as a 500-meter radius around the site and access routes. No significant air quality impacts are anticipated during the operational phase of the wind farm. Similar impacts are expected during decommissioning, but with much lower intensity than for construction.

9.2.1.2 Air Quality Sensitive Receptors

Air quality sensitive receptors are individuals or groups who are more vulnerable to the adverse effects of air pollution due to their age, health status, or the nature of their activities. These typically include:

- Children, whose respiratory systems are still developing and who breathe more air per body weight than adults.
- Elderly individuals, who may have weakened immune systems or pre-existing health conditions.
- People with chronic respiratory or cardiovascular diseases, such as asthma, chronic obstructive pulmonary disease (COPD), or heart disease.
- Pregnant women, as exposure to pollutants can affect both maternal and fetal health.
- Outdoor workers and athletes, who may inhale more pollutants due to increased physical activity.
- Residents of areas near major roads, industrial zones, or other pollution sources, who may experience prolonged exposure.

Figure 9-1 shows the Project's air quality AoI (for construction phase) and the possible receptors, including:

- Schools
- Places of worship
- Health centers
- Settlements (residential areas)
- Industrial areas
- Protected areas
- Sparse rural houses

The list of possible receptors included in the AoI is reported in Table 9-2. In addition to these, also construction workers should be considered. No schools, health centers nor places of worship are within the AoI.

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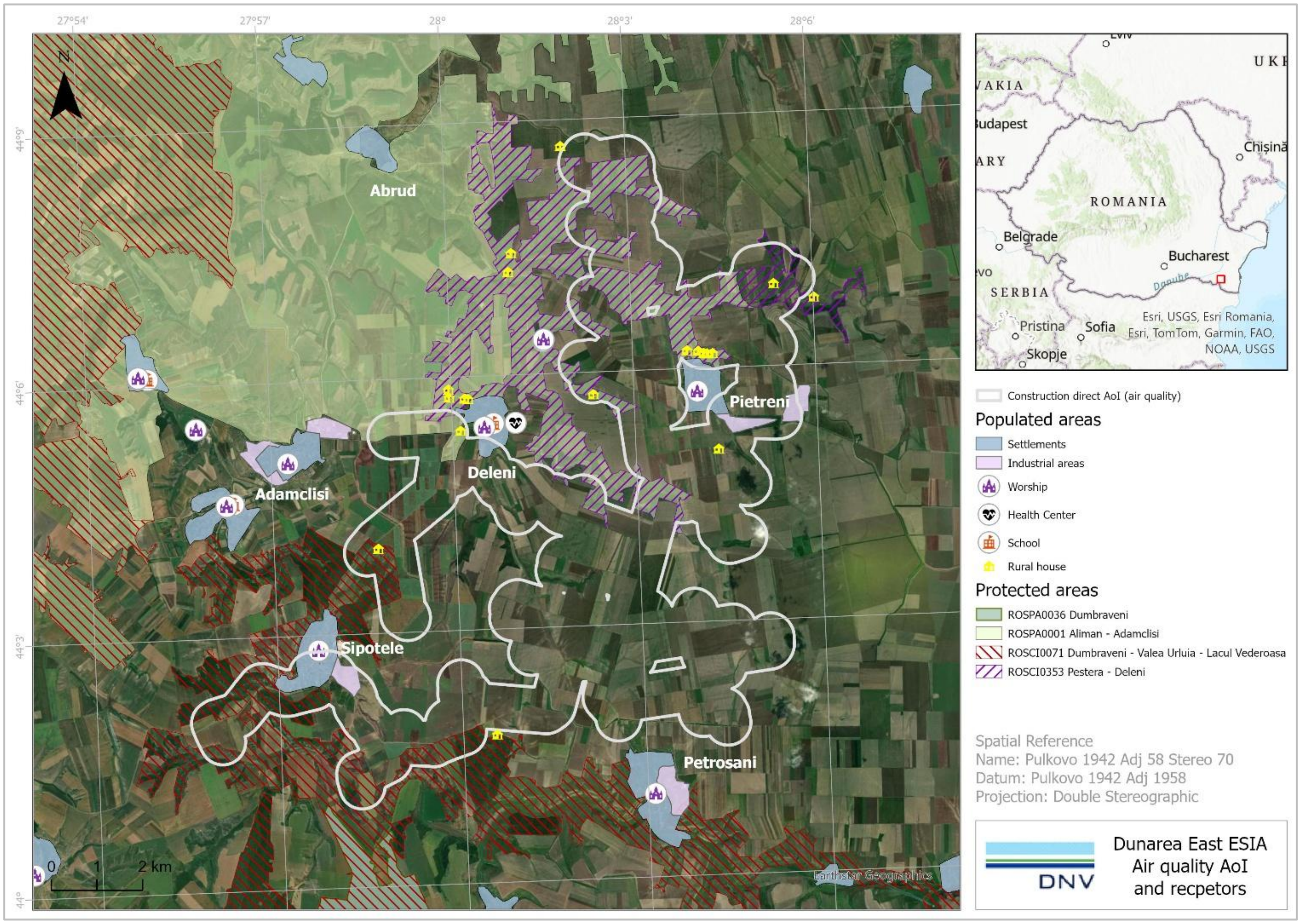

Figure 9-1 Air Quality AoI and Receptors

Table 9-2 Air quality receptors

Type	Description	Quantification
Industrial area	Pietreni industrial area	About 45.12 ha
Industrial area	Sipotele industrial area	About 29.97 ha
Residential	Deleni	About 14.34 ha
Residential	Pietreni	About 21.41 ha
Residential	Sipotele	About 72.92 ha
Protected area	ROSCI0353 Pestera - Deleni	About 797.75 ha, most of it overlapping with ROSPA0001
Protected area	ROSCI0071 Dumbraveni - Valea Urluia - Lacul Vederoasa	About 483.07 ha
Protected area	ROSPA0001 Aliman - Adamclisi	About 787.01 ha, most of it overlapping with ROSCI0353
Rural houses	Sparse rural houses, either residential or agricultural	About 20 buildings

9.2.1.3 Inventory of air emissions during Construction Phase

As outlined in the AON National EIA, an inventory of air emissions during the Construction Phase was prepared. Estimates of ambient air pollution levels generated by all construction-related sources were based on the EMEP/EEA Air Pollutant Emission Inventory Guidebook (2016, updated 2019) and the Emission Factor Database (EFDB, 2019).

For on-site equipment, emissions were calculated under category 1.A.2.g.vii – Non-mobile road and machinery, assuming a consumption of approximately 7 tonnes of diesel fuel per two-week period.

Table 9-3 Estimated quantities of pollutants for on-site equipment

Pollutant	Emission factor		Quantity of pollutants emitted into atmosphere			
	Value	UM	Value every 14 days	UM	Value daily	UM
Ni	0.07	mg/kg fuel	490	mg	35	mg
TSP	2104	g/t fuel	1472	g	1052	g
PM_{10}	2104	g/t fuel	147	g	105	g
NH	8	g/t fuel	56	g	4	g
N	135	g/t fuel	945	g	67.5	g
CO	10774	g/t fuel	7541	g	538	g
CH	8	g/t fuel	581	g	41	g
Zn	1	mg/kg fuel	7000	mg	mg	mg
NMVOC	337	g/t fuel	236	g	1688.5	g
CO	316	mg/kg fuel	221	kg	158	kg
BC	130	g/t fuel	914	g	653	g
Benzo(a)pyrene	30	ug/kg fuel	210	µgl	15	µgl
Benzo(b)fluoranthene	5	ug/kg fuel	350	µg	25	µg
NOx	32629	g/t fuel	22840	g	1631	g
Se	0.01	mg/kg fuel	70	mg	5	mg
Cr	0	mg/kg fuel	35	mg	Mg	mg
Cu	1.7	mg/kg fuel	1190	mgl	85	mgl
Cd	0.01	mg/kg fuel	70	mg	5	mg
$PM_{2.5}$	210	g/t fuel	147	g	105	g

In addition, emissions from transport activities were estimated using the EMEP/EEA/CORINAIR methodology, specifically category 1.A.3.b.iii – Road transport, heavy-duty vehicles, with an assumed consumption of 8 tonnes of diesel fuel per two-week period.

Table 9-4 Estimated quantities of pollutants for means of transport

Pollutant	Emission factor		Quantity of pollutants emitted into atmosphere			
	Value	UM	Value every 14 days	UM	Value daily	UM
CO	7.5	g/kg fuel	60640	g	4331.429	g
TSP	0.9	g/kg fuel	7520	g	537.1429	g
CO	3.14	kg/kg fuel	251	kg	1794.286	kg
Benzo(a)pyrene	5.10	g/kg fuel	0.04	g	0.00291	g
NMVOC	1.9	g/kg fuel	1536	g	1097.143	g
NH	0.01	g/kg fuel	10	g	7.428571	g
Pb	5.20*10^-5	g/kg fuel	0.416	g	0.029714	g
N	0.05	g/kg fuel	408	g	29.142	g
Indeno(1,2,3-cd)pyrene	7.90	g/kg fuel	0.06	g	0	g
Benzo(b)fluoranthene	3.08*10^-5	g/kg fuel	0.246	g	0	g
Benzo(k(fluoranthene	3.44*10^-5	g/kg fuel	0.275	g	0.019657	g
NOx	33.37	g/kg fuel	266960	g	19068.57	g

Table 9-5 Total estimated quantities of pollutants for on-site equipment and means of transport (for 2 weeks)

Pollutant	Quantity of pollutants emitted into atmosphere			
	Value every 14 days	UM	Value daily	UM
Ni	490	mg	35	mg
TSP	22248	g	1589.1429	g
PM_{10}	14728.00	g	1052	g
NH	160	g	11.4286	g
N	1353.00	g	96.6429	g
CO	136,058	g	9718.4286	g
CH	581	g	41.50	g
Zn	7000	mg	500	mg
NMVOC	38,999	g	2785.6429	g
CO	47,240	kg	3374.2857	kg
BC	9,142	g	653.00	g

Pollutant	Quantity of pollutants emitted into atmosphere			
	Value every 14 days	UM	Value daily	UM
Benzo(a)pyrene	0.250	g	0.0179	g
Benzo(b)fluoranthene	0.5964	g	0.0426	g
NOx	495,363	g	35383.0714	g
Se	70	mg	5.0	mg
Cr	350	mg	25.00	mg
Cu	11,900	mg	850	mg
C	70	mg	5	mg
$PM_{2.5}$	14,728	g	1,052	g
P	0.4160	g	0.0297	g
Indeno(1,2,3-cd)pyrene	0.0632	g	0.0045	g
Benzo(k)fluoranthene	0.2752	g	0.0197	g

It is important to note that these estimates represent a worst-case scenario, assuming all equipment and vehicles operate simultaneously and continuously. In practice, emissions are expected to be lower due to the phased nature of construction activities.

9.2.1.4 Impact assessment during Construction Phase

The Project will primarily impact air quality during the Construction Phase. The main sources of atmospheric emissions during the construction will be associated with:

- Site preparation and earthworks
- Vehicle movement on unpaved surfaces
- Exhaust emissions from machinery and vehicles

The soils in the Project area, having been subjected to prolonged cultivation, are particularly susceptible to wind and water erosion, increasing the risk of dust generation.

Dust emissions are expected to arise mainly from earthworks, site preparation, and the movement of vehicles and machinery over unpaved surfaces. The soils in the project area, having been subjected to prolonged agricultural use, are particularly vulnerable to wind and water erosion. This increases the likelihood of dust generation, especially during dry periods or when vegetation cover is removed.

Key characteristics of dust emissions during construction include:

- Sources: Excavation, digging, leveling, sloping, and the movement of heavy vehicles on unpaved roads.
- Nature: Dust emissions are typically local and temporary, with the highest concentrations occurring close to the source and decreasing rapidly with distance. For example, at 100 meters from the site, dust concentrations are expected to fall below 10% of their maximum values.

- Temporal Variation: Dust generation is most significant during dry weather and periods of intense construction activity, such as site clearance and material delivery. During rainy periods, dust emissions are naturally suppressed.

In addition to dust, the operation of construction machinery and transport vehicles powered by diesel engines will result in the emission of various atmospheric pollutants. These include:

- Nitrogen oxides (NO_x)
- Carbon monoxide (CO)
- Non-methane volatile organic compounds (NMVOC)
- Particulate matter (PM_{10}, $PM_{2.5}$)
- Heavy metals (e.g., Cd, Cu, Cr, Ni, Se, Zn)
- Polycyclic aromatic hydrocarbons (PAHs)

Key aspects of pollutant emissions during construction:

- Sources: Exhaust from diesel-powered machinery and vehicles, as well as any on-site power generation using fossil fuels.
- Nature: These emissions are also localized and temporary, with concentrations decreasing rapidly with distance from the source.
- Magnitude: The estimated quantities of pollutants are based on worst-case assumptions (all equipment operating simultaneously), but actual emissions are expected to be lower due to the phased nature of construction.

While the health risks associated with these pollutants are generally lower than those from dust (given the temporary and localized nature of the emissions), they can still contribute to short-term air quality degradation, especially for sensitive individuals.

Table 9-6 Air quality impacts during construction phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Degradation of air quality due to dust emission in the atmosphere	Air quality - residential	High	Moderate	**Moderate**
	Air quality - industrial	Low	Moderate	**Low**
	Air quality - construction workers	Moderate	Moderate	**Moderate**
	Air quality - protected areas	Low	Moderate	**Low**
Degradation of air quality due to pollutants emitted in the atmosphere from engines of vehicles and equipment	Air quality - residential	High	Low	**Moderate**
	Air quality - industrial	Low	Low	**Low**
	Air quality - construction workers	Moderate	Low	**Low**

Impact	Receptor	Sensitivity	Magnitude	Significance
	Air quality - protected areas	Low	Low	**Low**

9.2.1.5 Impact assessment during Operational Phase

Scoped Out, see Section 6.2.

9.2.1.6 Impact assessment during Decommissioning Phase

During the closure phase, potential sources of emissions are expected to be similar to those associated with construction, but generally less intensive. Decommissioning activities include dismantling turbines, removing foundations, and restoring land. These works involve limited soil movement (foundations may be left in place or partially removed) and no large-scale earthworks such as grading or road building. Consequently, dust generation will occur during dismantling and transport, but at levels significantly lower than during construction. Combustion emissions from machinery and transport vehicles will also be present; however, their scale and duration are limited. Overall, emissions during the closure phase will be localized and temporary, with no significant cumulative effect. After applying standard mitigation measures (e.g., dust suppression, equipment maintenance), the impact on local air quality is anticipated to be negligible, and the closure phase is not expected to result in any adverse effects.

9.2.1.7 Management and Mitigations Measures

The residual significance of air quality impacts during the construction phase will ultimately depend on the effective implementation of mitigation and control measures, as well as the overall scale and intensity of construction activities. To address potential impacts, a comprehensive suite of mitigation measures is recommended for adoption at the construction stage. These measures are designed to minimize both nuisance dust and particulate emissions, and will be implemented by the EPC Contractor as part of standard site management practices.

The following mitigation strategies will be applied to control dust and particulate emissions:

- Restricting the removal of vegetation and soil cover strictly to areas necessary for project activities, thereby minimizing exposed surfaces susceptible to wind erosion.
- Sequencing land clearance and earthworks to ensure that only the smallest possible area is exposed at any given time.
- Maintaining existing vegetation cover for as long as possible, and delaying topsoil stripping until immediately before construction, to reduce the risk of erosion.
- Regularly wetting access roads, particularly during dry periods and in areas close to residential properties, to suppress dust generation.
- Ensuring that all transported bulk materials are covered with tarpaulins to prevent fugitive dust emissions during transit.
- Vegetating stockpiles that will be stored for more than six weeks, and locating them as far as practicable from sensitive receptors.
- Promptly addressing any air quality-related grievances received from neighboring communities through the established Community Grievance Mechanism.
- Grievance mechanism to be implemented also for operation and decommissioning phase.

- Enforce a strict speed limit of 30 km/h on all unpaved surfaces, particularly on the access road to the site. National speed limits must also be observed on public roads to minimize dust and exhaust emissions.
- Ensure that all construction vehicles and machinery are subject to regular maintenance schedules. Well-maintained engines operate more efficiently and emit fewer pollutants.
- Require that vehicles and equipment are switched off when not in use, except where continuous operation is necessary for health and safety reasons (e.g., maintaining air conditioning during extreme temperatures).
- Implement effective traffic management strategies to avoid unnecessary travel through settlements and residential areas. Careful planning should also aim to minimize congestion and optimize travel routes.
- Prioritize the use of modern vehicles and equipment that comply with up-to-date emission standards. Routine maintenance and the use of low-sulphur fuels should be standard practice to further reduce emissions.

These measures are also applicable during the decommissioning phase.

9.2.1.8 Residual impacts

After the implementation of mitigation measures, the residual significance of air quality impacts is expected to be negligible for all receptors. The impacts are temporary, localized, and fully controllable through the measures outlined above.

Table 9-7 Air quality residual impacts during construction phase

Impact	Receptor	Significance before mitigations	Sensitivity of receptor	Residual Magnitude	Residual Significance
Degradation of air quality due to dust emission in the atmosphere	Air quality - residential	Moderate	High	Negligible	**Negligible**
	Air quality - industrial	Moderate	Low	Negligible	**Negligible**
	Air quality - construction workers	Moderate	Moderate	Negligible	**Negligible**
	Air quality - protected areas	Moderate	Low	Negligible	**Negligible**
Degradation of air quality due to pollutants emitted in the atmosphere from engines of vehicles and equipment	Air quality - residential	Low	High	Negligible	**Negligible**
	Air quality - industrial	Low	Low	Negligible	**Negligible**
	Air quality - construction workers	Low	Moderate	Negligible	**Negligible**
	Air quality - protected areas	Low	Low	Negligible	**Negligible**

9.2.2 Ambient Noise

9.2.2.1 Area of Influence

As detailed in Chapter 6.4.3, the AoI for ambient noise is defined as a 2 km radius around each wind turbine, in line with the recommendations of the IFC EHS Guidelines for Wind Energy (2015). During the construction phase, a 500-meter buffer zone will be applied around all construction activities, including wind turbines, access roads, substations, and OHLs, following the approach suggested by the US Federal Highway Administration (FHWA) and the EPA in their Construction Noise Handbook.

9.2.2.2 Noise Sensitive Receptors

Noise Sensitive Receptors (NSR) are locations or facilities where human activities or ecological functions may be adversely affected by elevated noise levels. These typically include residential dwellings, schools, hospitals, places of worship, and other community facilities where occupants may be particularly vulnerable to noise disturbance. In addition, certain outdoor areas such as parks, recreational spaces, and areas with ecological sensitivity (e.g., wildlife habitats) are also considered noise sensitive.

Figure 9-2 and Figure 9-3 show the Project's construction and operation noise AoI respectively, and the possible receptors, including:

- Schools
- Places of worship
- Health centers
- Settlements (residential areas)
- Industrial areas
- Protected areas
- Sparse rural houses

The list of possible receptors included in the AoI is reported in Table 9-8. In addition to these, also construction workers should be considered. No schools, health centers nor places of worship are present within the construction AoI.

Table 9-8 Noise sensitive receptors for construction and operation

Type	Description	Construction	Operation
Industrial area	Pietreni industrial area	X	X
Industrial area	Sipotele industrial area	X	X
Residential	Deleni	X	X
Residential	Pietreni	X	X
Residential	Sipotele	X	X
Protected area	ROSCI0353 Pestera - Deleni	X	X
Protected area	ROSCI0071 Dumbraveni - Valea Urluia - Lacul Vederoasa	X	X
Protected area	ROSPA0001 Aliman - Adamclisi	X	X
Protected area	ROSPA0036 Dumbraveni		X

Type	Description	Construction	Operation
Industrial area	Petrosani industrial area		X
Residential	Petrosani		X
Place of worship	Deleni Monastere (*Mănăstirea Nașterea Maicii Domnului*)		X
Place of worship	Church in Pietreni (*Biserica "Sfânta Treime"*)		X
Place of worship	Church in Deleni (*Biserica "Sfântul Dimitrie Izvorâtorul de Mir"*)		X
School	Deleni High School "Nicolae Istratoiu"		X
Health Center	Deleni Primary Health Center		X
Rural houses	Sparse rural houses, either residential or agricultural	X	X

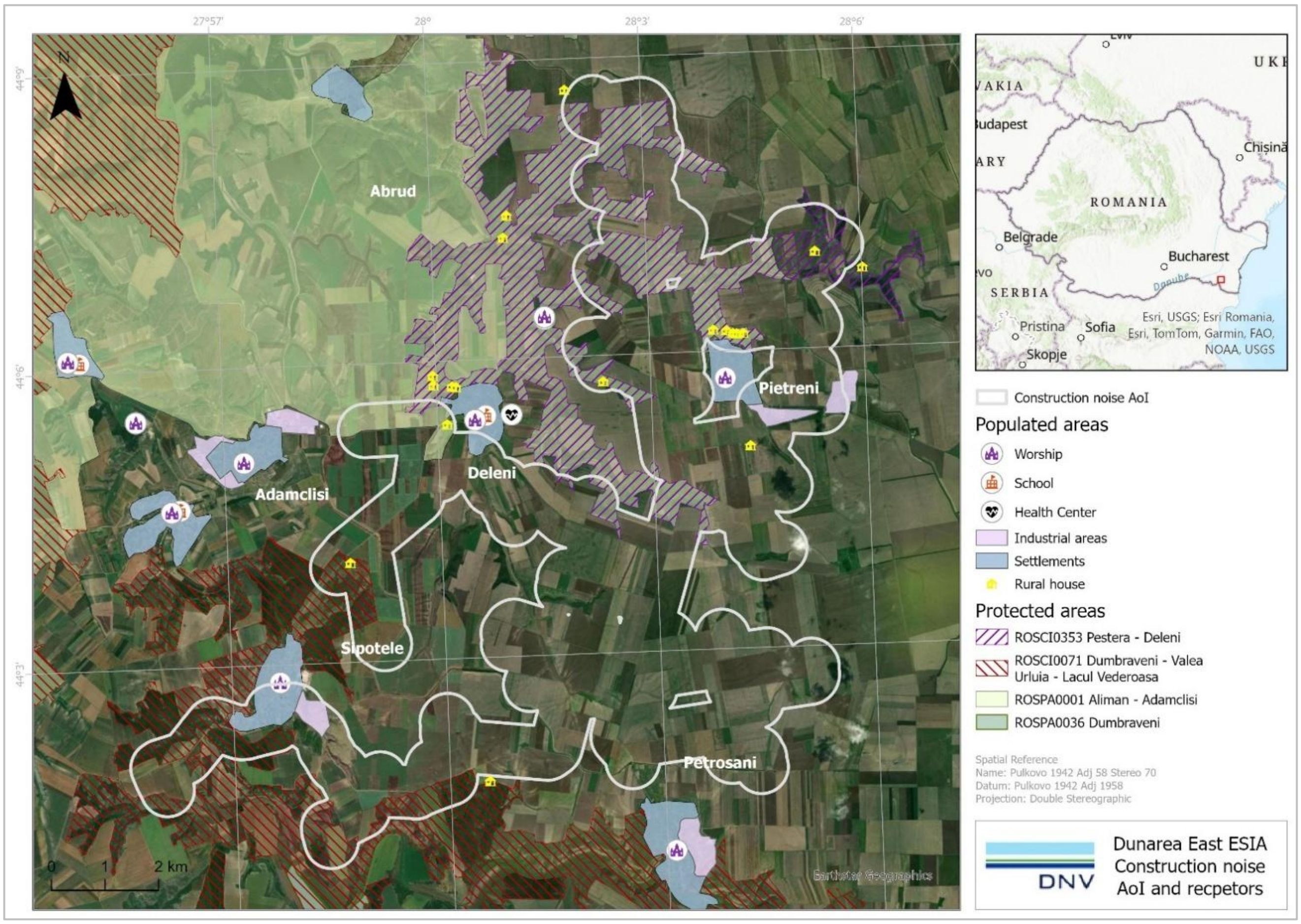

Figure 9-2 Noise AoI (construction) and Receptors

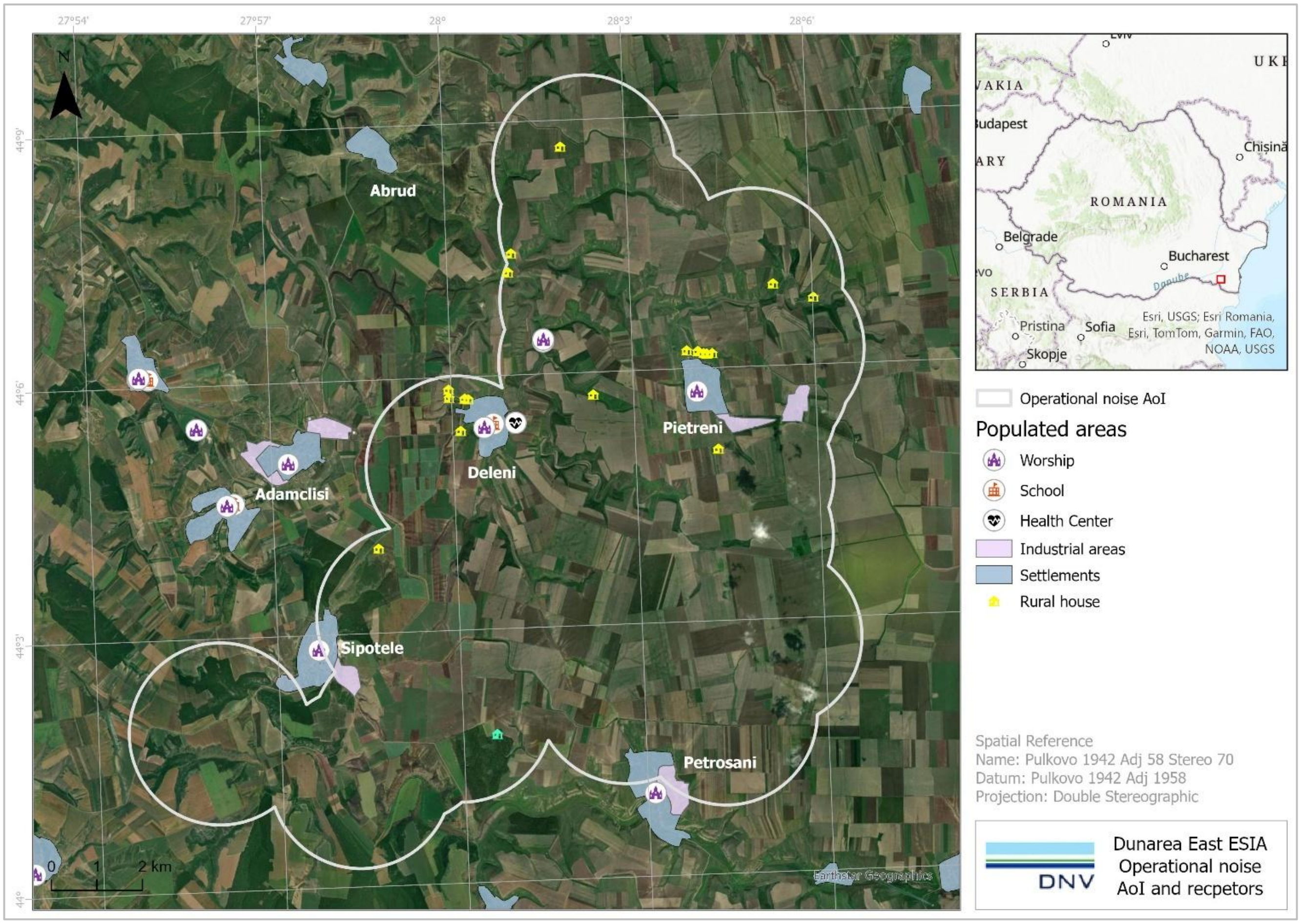

Figure 9-3 Noise AoI (operations) and Receptors

9.2.2.3 Impact Assessment during Construction Phase

During construction phase, noise and vibrations will be generated by construction machinery, in particular from the operation of equipment such as excavators, bulldozers, jackhammers, drills, compactors, and diesel-powered engines. Vehicles delivering materials do not remain on site for extended periods, staying only as long as required for unloading. Consequently, their contribution to the overall acoustic impact is limited.

Construction and land-development works inherently produce noise and minimal vibrations. Noise is typically assessed at three distances:

- At the source
- In the near field
- In the far field

Far-field noise levels depend on external factors such as weather conditions, ground effects, air absorption, topography, and vegetation. All machinery in operation functions as a noise source, and estimates of noise propagation can be made using the acoustic power levels of the main equipment types and the number of machines active at a given work front.

Diesel engines usually dominate the overall sound profile on site. The contractor is required to ensure that all equipment is properly maintained, including with respect to noise emissions. Noise levels related to site preparation, foundation construction, structure erection, cable installation, and access road construction are temporary and therefore not expected to result in significant impacts for nearby receptors.

As reported in AON National EIA, typical sound levels for representative construction equipment include:

Table 9-9 Typical sound levels of construction equipment (AON National EIA)

Equipment Description	Sound Level at 15 m (dB(A))	*Maximum Estimated Level at 15 m (dB(A)) **	Maximum Sound Level at 500 m (dB(A))
Leveler, 250–700 hp	88	92	55
Front loader, 300–750 hp	88	92	55
Motor grader, 5 m blade	85	92	55
Excavator	88	92	55
Drill	88	88	55
Concrete pump	84	88	55
Trailer, 115 t	90	90	56
Truck, 50 t	87	90	56
Mobile crane, 75 t	85	85	51

**Not all vehicles operate simultaneously; the maximum level refers to the highest possible sound at any given moment.*

In general, construction noise fluctuates around 90 dB(A) at the source, with higher values recorded for excavators, bulldozers, finishers, wheel loaders, and graders. Dump trucks operating in or passing through localities may generate equivalent continuous noise levels of approximately 50 dB(A) over a 24-hour reference period.

As reported in the AON National EIA, construction-related noise becomes insignificant beyond approximately 500 m, depending on the specific activity. Noise intensity decreases with distance and with increasing terrain roughness (e.g., buildings, uneven ground, vegetation). As shown in Figure 9-2, only sparse rural house, few houses of Deleni, Pietreni and Sipotele villages and the industrial area of Pietreni fall within the 500m buffer, having a limited number of receptors being impacted during this period.

Furthermore, it is assumed that all equipment will be powered by approved combustion engines, hence noise emissions will remain within applicable standards. While noise levels may be disturbing for workers and individuals in the immediate vicinity, these effects are temporary and they will be also confined to legally permitted working hours (daytime periods).

Considering the available information, the noise and vibration impacts during the construction phase are temporary and localized, primarily affecting workers on site and a small number of nearby residents. Noise levels decrease rapidly with distance, becoming negligible beyond approximately 500 meters, and all equipment will comply with applicable standards. Given that these impacts are negative but limited in intensity, duration, and spatial extent, they are assessed as *Low* magnitude.

Table 9-10 Noise impacts during construction phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Potential nuisance and annoyance for sensitive receptors caused by increased in noise levels due to machinery and vehicle movements.	Noise - residential	Moderate	Low	**Low**
	Noise - industrial	Low	Low	**Low**
	Noise - construction workers	Moderate	Low	**Low**
	Noise - protected areas	Low	Low	**Low**

9.2.2.4 Impact assessment during Operational Phase

During the operational phase, the main sources of noise will be:

- Stationary sources: due to the wind turbine operations;
- Mobile sources: mobile sources such as employee vehicles, emergency response teams, etc.

Increase in noise levels generates two potential impacts:

- Potential nuisance and annoyance for sensitive receptors caused by increased noise levels due to wind turbines operations
- Potential nuisance and annoyance for sensitive receptors caused by increased noise levels due to vehicle movements.

1. Potential nuisance and annoyance for sensitive receptors caused by increased noise levels due to wind turbines operations

The wind farm will generate noise primarily through the functioning of its wind turbines, with additional minor contributions from occasional maintenance traffic. The assessment presented here draws entirely on the AON National EIA, which carried out a dedicated noise modelling, performed using the Vestas PO6800 turbine series as the reference technology. Additional stationary sources include transformer stations, whose operational noise is intermittent or permanent but remains low and insignificant at receptor distances.

The turbines considered exhibit sound power levels ranging, depending on wind speed and operating configuration, between roughly 94 and 104.6 dB(A) for the standard PO6800 model equipped with serrated trailing edges. The less favourable variant without serrations (PO6800-0S) reaches up to 107.8 dB(A), although it is not recommended and was not used for compliance conclusions. Furthermore, Vestas sound-optimisation mode SO6, also assessed in the EIA, keeps the sound power level in the range of 94–98 dB(A) for wind speeds between 3 and 15 m/s, which correspond to typical operating conditions of the site. These values ensure that the modelling reflects realistic maximum exposures.

Noise during operation originates from two physical mechanisms:

- mechanical noise and
- aerodynamic noise.

The AON National EIA provides a detailed account of both. Mechanical noise is produced inside the nacelle by the generator, cooling system and other auxiliary components. In modern turbines such as the Vestas series, these contributions are inherently low because the generator and nacelle are built as a compact, direct-drive assembly, with no gearbox and very few slow-moving friction interfaces. The absence of high-speed mechanical components drastically reduces vibrational emissions and ensures that the mechanical contribution remains a minor component of the overall acoustic signature.

By contrast, aerodynamic noise is the dominant source and results from the interaction between the rotating blades and the surrounding airflow. As blades move through the air, turbulence and pressure differences are generated along their surface, particularly near the trailing edge and at the blade tips. These effects give rise to the characteristic “swish” or “whooshing” sound commonly associated with wind turbines. The AON National EIA notes that Vestas uses serrated trailing edges precisely to reduce this phenomenon: the serrations promote a smoother airflow separation, dissipate vortices more efficiently and limit high-frequency turbulence. As a result, aerodynamic noise, though still the primary source, remains within values consistent with modern low-noise wind turbine design.

Noise modelling methodology

The noise impact was modeled using the WINDPRO software, calculated using the ISO 9613-2:1996 “Attenuation of sound during propagation outdoors” methodology, which is the recognised international standard for wind farm noise prediction. The national EIA followed the standard rigorously, applying conservative assumptions on meteorology, ground absorption, and turbine directivity.

The model computes the sound pressure level $L_p$at any receptor point using the general equation:

$$L_p = L_w + D_c - A_{div} - A_{atm} - A_{gr} - A_{misc}$$

where:

- $L_w$is the turbine sound power level (manufacturer data).
- $D_c$is the source directivity correction. For elevated sources such as wind turbines, the AON National EIA assumed $D_{(c)}$ = 0 (i.e., directivity factor Q = 1).
- $A_{div}$is geometric divergence attenuation, calculated as:

$$A_{div} = 20\log_{10}(r) + 11$$

with $r$being the distance (m) between turbine and receptor.

- $A_{atm}$is atmospheric absorption, defined by ISO 9613-1:

$$A_{atm} = \alpha \cdot r$$

where $\alpha$is the frequency-dependent absorption coefficient. The AON National EIA used standard values for 10°C and 70% relative humidity.

- A_{gr}accounts for ground attenuation. The AON National EIA applied neutral ground (G = 0.5) as a conservative assumption.

- A_{misc} represents obstacle screening, vegetation, and topographic attenuation. Since the terrain is open and the model requires conservative inputs, this was set to zero unless specific terrain shielding applied.

The modelling grid incorporated all turbines, their hub heights, and their spatial geometry. A cumulative sum of contributions from all turbines was computed for each receptor point following logarithmic addition:

$$L_{tot} = 10\log_{10}\left(\sum_{i=1}^{n} 10^{L_{p,i}/10}\right)$$

where n is the number of turbines contributing to the sound field.

Noise modelling results

The AON National EIA evaluated six (6) sensitive receptor points located around the Project area (Figure 9-4). The receptors are located at distances that vary between approximately 430 m and 950 m from the nearest wind turbine, depending on elevation and spatial layout. For each receptor, the national EIA computed the cumulative sound pressure level resulting from the contribution of all turbines acting together. Because ISO 9613 uses logarithmic addition, and because geometric divergence strongly attenuates sound with distance, the total noise at each receptor is not equal to the arithmetical sum of each turbine's contribution. The model correctly predicts that the highest acoustic levels occur in the immediate vicinity of each turbine tower, decreasing rapidly as the distance increases.

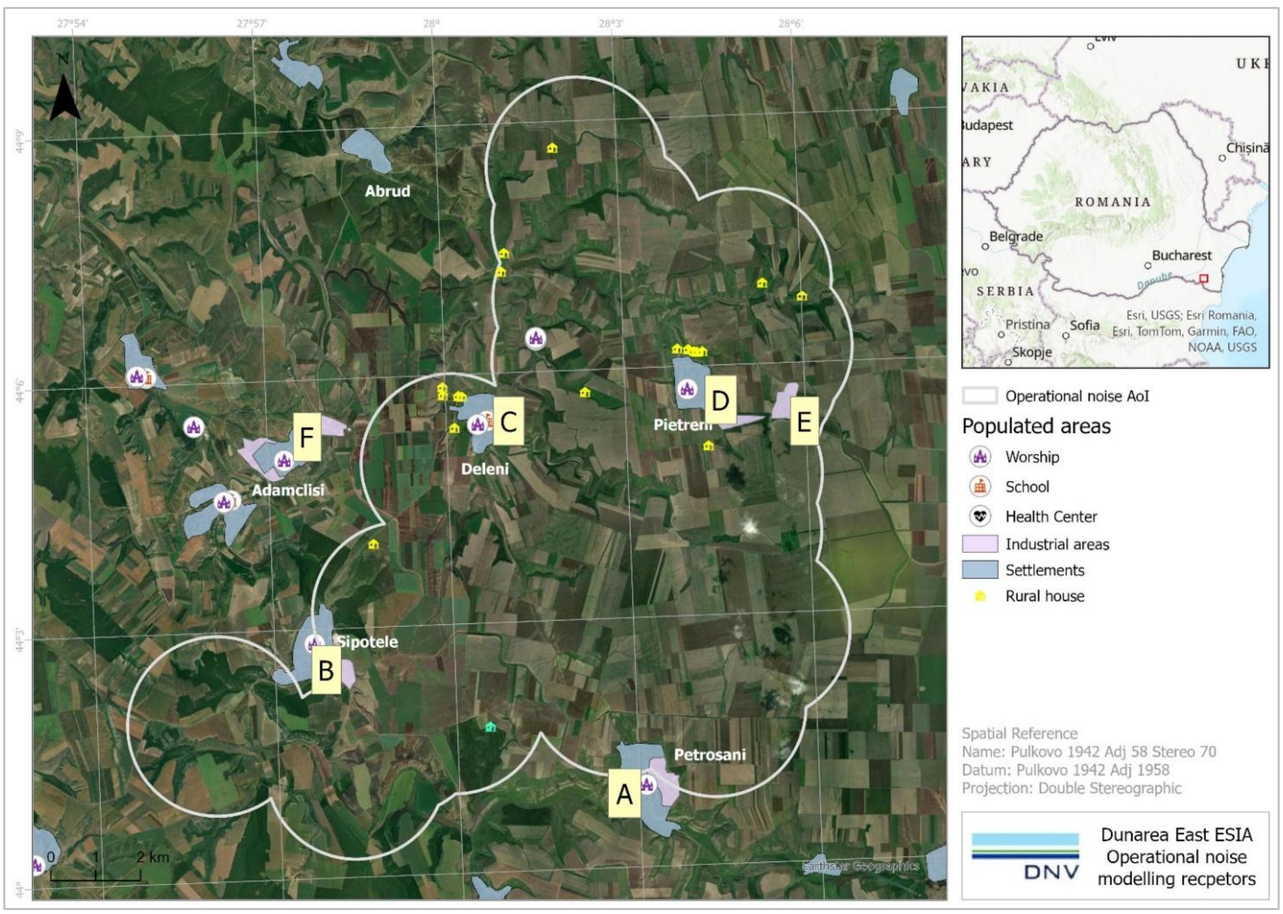

Figure 9-4 Noise modelling receptors' location according to AON National EIA

The results of the AON National EIA modelling are summarised below (Table 9-11). Values correspond to full operational conditions for the Vestas model under the national EIA settings. Noise contour map is shown in Figure 9-5 below.

Table 9-11 Noise modelling results (AON National EIA) – WGS84 coordinates

Receptor	X	Y	Modelled Noise Level(dB(A))	IFC – Residential Limits (Day / Night) (dB(A))	IFC – Industrial Limits (Day / Night) (dB(A))
A	44.025162	28.043375	32.9	55 / 45	65 / 65
B	44.039232	27.971020	32.2	55 / 45	65 / 65
C	44.084171	28.005652	40.2	55 / 45	65 / 65
D	44.091105	28.074359	41.4	55 / 45	65 / 65
E	44.093996	28.090711	37.9	55 / 45	65 / 65
F	44.089866	27.970977	30.0	55 / 45	65 / 65

Notes:

- *Romanian limits refer to maximum permitted noise at residential facades under national legislation.*
- *IFC/World Bank values refer to the "Environmental, Health, and Safety (EHS) Guidelines – Noise Management" for residential receptors.*

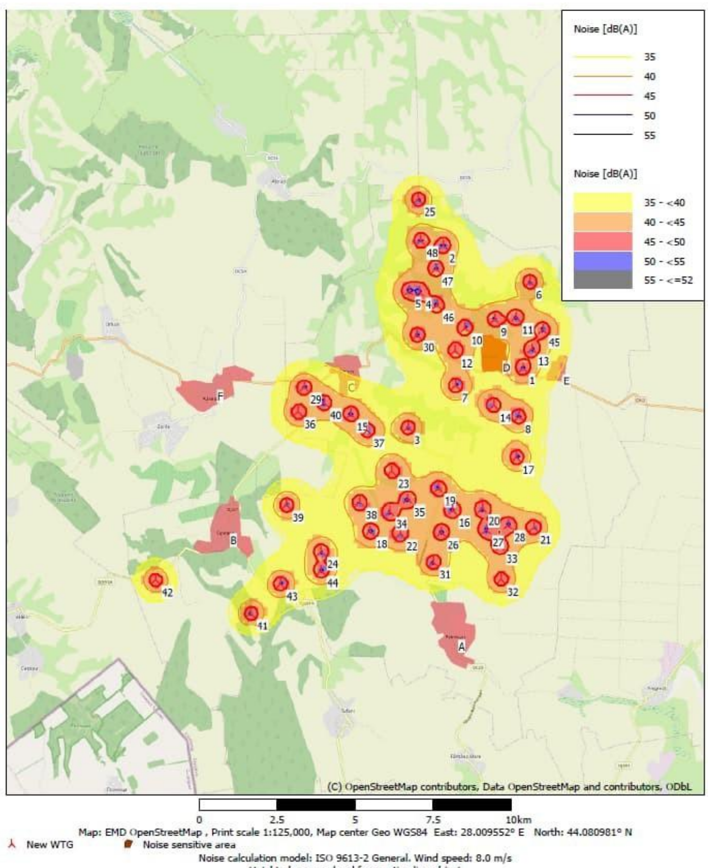

Figure 9-5 Noise contour map (AON National EIA)

All predicted values fall well below:

- the Romanian legal limits and World Bank/IFC limits (55 dB(A) day / 45 dB(A) night),
- the stricter low-noise rural thresholds (50 dB(A) day / 40 dB(A) night),
- the WHO guideline recommending that wind turbine noise should not exceed 45 dB(A) at night.

Receptor D represents the most exposed position, with 41.4 dB(A), yet it remains compliant with all regulatory and health benchmarks.

Overall, the AON national EIA concludes, and this ESIA confirms, that the operational noise of the Project under the modelling conditions is compliant with the applicable regulatory framework. The sound levels expected at all sensitive receptors remain below both national and international guidance values. The combination of modern Vestas low-noise blade technology, the distance between turbines and dwellings, and the natural masking effect of wind ensures that noise during operation will not give rise to adverse effects on human health, comfort or environmental quality. The impact is therefore low in intensity, limited in spatial extent to a small number of nearby residences, and continuous over the long-term during turbine operation. Considering these factors together, the operational noise is assessed as having a *Low* magnitude of change.

2. Potential nuisance and annoyance for sensitive receptors caused by increased noise levels due to vehicle movements.

According to AON National EIA, during the operational phase, vehicle noise is expected to be limited and regulated. Noise generated by vehicles during acceleration or while stationary with the engine running shall not exceed the limits established by Regulation (EU) No. 540/2014 of the European Parliament and of the Council, except in cases of technical malfunction.

The main sources of traffic noise are:

- Rolling noise from the interaction between tires and the road surface, which dominates at speeds above 50 km/h.
- Propulsion noise from the engine and drivetrain, which dominates at speeds below 15 km/h.

Vehicles act as mobile noise sources, and their movement along access roads can be considered as a linear source. Noise levels decrease with distance, typically reducing by about 3 dB when the distance from the source is doubled, although reductions of 1–2 dB may occur depending on terrain and obstacles.

The overall noise level on access roads depends on multiple factors, including vehicle speed, travel distance, road condition, and topographical or structural obstacles between the source and the receptors.

Based on information provided by the project proponent and established best practices, it is estimated that during operation, the access roads will carry an average of 50 light vehicles per day with a maximum of 10 passes per hour (primarily for employee transport) in the first year. Given this limited traffic volume and the expected adherence to noise regulations, the noise impact from operational vehicles is anticipated to be minor and localized.

Table 9-12 Noise impacts during operational phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Potential nuisance and annoyance for sensitive receptors caused by	Noise - residential	Moderate	Low	**Low**
	Noise - industrial	Low	Low	**Low**

Impact	Receptor	Sensitivity	Magnitude	Significance
increased noise levels due to wind turbines operations.	Noise - construction workers	Moderate	Low	**Low**
	Noise - protected areas	Low	Low	**Low**
Potential nuisance and annoyance for sensitive receptors caused by increased noise levels due to vehicle movements	Noise - residential	Moderate	Negligible	**Negligible**
	Noise - industrial	Low	Negligible	**Negligible**
	Noise - construction workers	Moderate	Negligible	**Negligible**
	Noise - protected areas	Low	Negligible	**Negligible**

9.2.2.5 Impact assessment during Decommissioning Phase

During the closure phase, potential sources of noise emissions are expected to be similar to those associated with construction, but generally less intensive. Decommissioning activities include dismantling turbines, removing foundations, and restoring land. These works involve limited use of machinery and minimal soil movement, with no large-scale earthworks such as grading or road construction. Consequently, noise generated during dismantling and transport will be present but at levels lower than during the construction phase. The duration of these activities is also limited, and noise will primarily affect workers on site and nearby receptors in close proximity. Overall, noise emissions during the closure phase are expected to be localized, temporary, and low in intensity. After applying standard mitigation measures (e.g., properly maintained equipment and restricted working hours), the impact on surrounding communities is anticipated to be negligible, and the closure phase is not expected to result in any significant adverse effects.

9.2.2.6 Management and Mitigations Measures

Although construction noise impacts have been assessed as Low magnitude and Low significance, best-practice mitigation measures are recommended to minimize potential nuisance for sensitive receptors and ensure compliance with applicable standards. These measures are intended to reduce noise levels wherever reasonably practicable and to manage residual impacts effectively. Potential measures include:

- Minimize unnecessary engine noise: Ensure diesel engines are switched off when not in use, and operate at the lowest possible speed consistent with task requirements.
- Equipment maintenance and selection: Maintain all machinery in good condition, paying particular attention to exhaust silencers, engine and transmission covers, and any squeaking or rattling components. Excessively noisy machines should be repaired or removed from the site. Where feasible, select the quietest equipment available for each task.
- Optimized vehicle movements: Plan plant, equipment, and vehicle movements to avoid excessive use of motion alarms (e.g., when reversing) and reduce peak noise emissions. Drivers should be instructed to travel directly to and from the site, avoid unnecessary idling, and maintain quiet operation near sensitive receptors, particularly during early mornings or evenings.
- Efficient work practices: Adopt work methods that minimize the total duration of high-noise activities and the number of active noise sources on site. Schedule tasks in a way that reduces overlapping high-noise operations.

- Scheduling of noisy activities: Limit high-noise construction works to daytime hours (typically 07:00–22:00) and, where possible, avoid work on Sundays or public holidays.
- For works in close proximity to sensitive receptors (e.g., transmission line or access road construction), apply additional noise-reducing measures such as temporary acoustic barriers, careful sequencing of operations, or temporary rescheduling of particularly noisy tasks.
- If any validated noise complaints are received, identify the source and implement additional noise control measures as appropriate. Maintain ongoing monitoring and proactive management to address potential concerns quickly.

Although operational noise from turbines and associated vehicle movements has been assessed as Low magnitude and Low significance, the following measures can help maintain good acoustic conditions for nearby receptors and ensure compliance with standards:

1. Wind Turbine Noise Mitigation:

- Ensure that turbines installed comply with modern low-noise designs, such as serrated trailing edges and aerodynamic optimization systems.
- Consider periodic monitoring of turbine noise emissions to confirm compliance with national and EU standards, particularly in locations closest to residential areas.
- Where feasible, utilize turbine control strategies that reduce sound emissions during nighttime or periods of low wind speed when background noise is minimal.

2. Vehicle Noise Mitigation:

- Restrict operational traffic to essential trips only, particularly during night-time hours, to reduce potential disturbance.
- Ensure that all vehicles are in good mechanical condition to minimize engine and exhaust noise.
- Instruct drivers to avoid unnecessary idling and to drive at moderate speeds on site access roads. Minimize the use of horns and avoid revving engines near sensitive receptors.

3. Stakeholder Engagement:

- Implement a system to register and address any noise complaints from local residents promptly. Adjust operational procedures as necessary to mitigate verified concerns.

9.2.2.7 Residual Impacts

After the implementation of mitigation measures, the residual significance of air quality impacts is expected to be negligible for all receptors. The impacts are temporary, localized, and fully controllable through the measures outlined above.

Table 9-13 Noise residual impacts during construction phase

Impact	Receptor	Significance before mitigations	Sensitivity of receptor	Residual Magnitude	Residual Significance
Potential nuisance and annoyance for sensitive receptors caused by	Noise - residential	Low	Moderate	Negligible	**Negligible**
	Noise - industrial	Low	Low	Negligible	**Negligible**

Impact	Receptor	Significance before mitigations	Sensitivity of receptor	Residual Magnitude	Residual Significance
increased in noise levels due to machinery and vehicle movements.	Noise - construction workers	Low	Moderate	Negligible	**Negligible**
	Noise - protected areas	Low	Low	Negligible	**Negligible**

Table 9-14 Noise residual impacts during operational phase

Impact	Receptor	Significance before mitigations	Sensitivity of receptor	Residual Magnitude	Residual Significance
Potential nuisance and annoyance for sensitive receptors caused by increased noise levels due to wind turbines operations.	Noise - residential	Low	Moderate	Negligible	**Negligible**
	Noise - industrial	Low	Low	Negligible	**Negligible**
	Noise - construction workers	Low	Moderate	Negligible	**Negligible**
	Noise - protected areas	Low	Low	Negligible	**Negligible**

9.2.3 Soil

9.2.3.1 Area of Influence

The AoI for geology/subsoil and land/soil topics include the temporary and permanent areas considered for Project sites, components and facilities, as well as any other areas in which the geology and land/soil could experience significant impacts. As defined in Chapter 6.4, an area of up to 2 km applied around the Project components and facilities as the geology/subsoil and land/soil AoI.

9.2.3.2 Impact assessment during Construction Phase

Construction activities for the Project, scheduled over approximately 24 months, involve vegetation clearance, site preparation, excavation, installation of concrete foundations, and heavy vehicle movement over unpaved roads. These activities are likely to cause soil compaction and erosion due to groundworks and machinery traffic, as well as soil contamination from accidental spills or leaks of fuel, oil, and other hazardous materials (see Chapter 9.5 Unplanned Events). Impacts will occur on both temporary and permanent sites, including areas excavated for foundations.

The magnitude of soil compaction and erosion is considered *Moderate*. This assessment reflects a combination of moderate intensity, due to noticeable changes in soil structure and erosion risk; moderate duration, as impacts persist throughout the 18-month construction period; and moderate spatial extent, limited to construction sites and access roads. While the effects are significant within the Project footprint, they are reversible following restoration.

Table 9-15 Soil impacts during construction phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Soil compaction and erosion	Soil	Moderate	Moderate	**Moderate**

9.2.3.3 Impact assessment during Operational Phase

During operation, the Project sites will be accessed for inspections, maintenance, and repair (O&M activities). No major earthworks occur, but occasional spills of fuel, oil, chemicals, or minor operational waste may cause localized soil contamination. Those impacts are assessed in Chapter 9.5 Unplanned Events.

9.2.3.4 Impact assessment during Decommissioning Phase

Decommissioning involves dismantling the turbines and infrastructure and carrying out land restoration. Activities are similar to construction but smaller in scale. Soil compaction and erosion may occur from vehicle movement and land disturbance, while accidental leaks of fuel, oil, or other hazardous materials could cause localized soil contamination. Impacts are concentrated on permanent facilities.

The intensity is low due to the smaller scale of operations compared to construction, the duration is short-term, and the spatial extent is limited to the dismantled facilities and restoration areas. After applying same mitigations as the construction, the impacts on soil are anticipated to be negligible, and the closure phase is not expected to result in any adverse effects.

9.2.3.5 Management and Mitigations Measures

The following mitigation measures are based on ESIA requirements to minimise impacts during construction phase:

- Implementation of soil protection and erosion control measures within the Project Pollution Prevention and Control Plan (PPCP), including dust suppression, temporary soil stabilisation, and storm-water and sediment management during construction,
- Sites/vegetation clearance, sites preparation, excavations, and improvement of existing roads and construction of additional access roads should not be carried out during periods of torrential rains or storms and heavy wind, to minimize compaction and erosion,
- Rehabilitation interventions in the priority areas (i.e. areas where there is a low likelihood of natural revegetation or where areas are prone to compaction and erosion from surface runoff) should be prioritised,
- Should compaction and erosion events be identified, appropriate remedial actions, including restoration of the compacted and/or eroded areas, and where necessary, the relocation of the paths causing the compaction and/or erosion, should be undertaken,
- Land/vegetation clearance should only be undertaken immediately prior to construction activities taken place there,
- Unnecessary land/vegetation clearance should be avoided,
- The footprints for all construction sites and areas for infrastructure (e.g. borrow and disposal areas, lay-down areas, construction/management sites and temporary offices) should be restricted to minimum feasible extent with measures implemented to avoid footprint creep,

- Unless foreign material, such as aggregate (e.g. crushed stone, ballast, gravel, sand), needs to be inserted, after the installation of features requiring the excavation of a deep holes, soil should be replaced in the holes so as to mimic the pre-construction profile.

9.2.3.6 Residual impacts

The significance of the impacts has been assessed after the application of mitigation measures in order to obtain the residual impact significance. The significance of the impacts after the application of mitigation measures is expected to be reduced to acceptable levels.

Table 9-16 Soil residual impacts during construction phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Soil compaction and erosion	Soil	Moderate	Moderate	Low	**Low**

9.2.4 Hydrology

9.2.4.1 Area of Influence

As defined in Chapter 6.4, hydrology/water direct AoI is represented by the primary Project sites, components and facilities that may interact with the groundwater and surface water resources, together with any additional areas in which the water resources could experience significant impacts (2km).

Indirect Environment AoI is represented by any additional areas where impacts on underground and surface water resources, from unplanned but predictable developments caused by the Project, may occur later or at a different location.

Surface water resources included in the Project's direct AoI are represented by Urluia river course and tributaries. In the entire area the rivers are dammed to prevent flooding, and excepting Urluia river, which is permanent, all tributaries are dry for most of the year. Groundwater resources in the Project area are found in large aquifer layers, represented by the existing groundwater bodies RODL04 - Cobadin Mangalia and RODL10 - South Dobrogea are mainly used for water supply, livestock, and secondary for farming and industry, having as major contamination sources the industry and human settlements (ammonia, sulphates and chlorides).

9.2.4.2 Impact assessment during Construction Phase

Impacts derived from construction activities are primarily related to water quality and water quantity, affecting both surface water and groundwater.

Surface Water Impacts

Construction activities, including land preparation, excavation, road construction, temporary facility setup, and handling of hazardous materials, can increase turbidity in nearby rivers and streams due to suspended sediments.

Accidental spills of fuel, oil, lubricants, and other hazardous chemicals from machinery or improper waste management from workers can further degrade surface water quality. Domestic wastewater and solid waste generated on site may also contribute to contamination if not properly contained. Such impacts will be addressed in Chapter 9.5 Unplanned Events.

The magnitude of these impacts is assessed as *Low*. Intensity is low because the sediments are localized to the immediate Project area and minor in relation to the total water body. Duration is low to moderate, as impacts occur intermittently throughout the construction phase. Spatial extent is low, restricted to construction sites and the nearby surface watercourses. Overall, while these impacts are observable, they are limited in scale and manageable through good construction and waste management practices.

Table 9-17 Surface water impacts during construction phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Increase turbidity in nearby rivers and streams due to suspended sediments	Surface waters	Low	Low	**Low**

Groundwater Impacts

No groundwater abstraction is planned for the Project; water for concrete production, dust suppression, and domestic use will be supplied by water tanker trucks or sourced externally. As a result, there is no direct impact on groundwater quantity. The only potential groundwater-related impact could be minor contamination from accidental spills or leaks of hazardous materials that percolate into the subsurface which are assessed in Chapter 9.5 Unplanned Events.

9.2.4.3 Impact assessment during Operational Phase

Impacts derived from operation activities are negligible but may include localized contamination from accidental spills of fuel, lubricants, or chemicals during inspections and maintenance. Those impacts are assessed in Chapter 9.5 Unplanned Events. No water abstraction occurs.

9.2.4.4 Impact assessment during Decommissioning Phase

Impacts derived from decommissioning activities include surface water sedimentation and contamination, as well as potential localized groundwater contamination from accidental spills of oils, lubricants, and other hazardous materials during dismantling and land restoration. Applying the same mitigation measures as during construction, such as containment of hazardous materials and controlled wastewater management, minimizes potential impacts, keeping them minor and manageable.

9.2.4.5 Management and Mitigations Measures

The potential impacts on water resources identified in the assessment will be managed through general good practice measures to be implemented by the EPC/contractor. Key measures include:

- Sediment traps, culverts, and ditches will be installed around Project sites and along access roads to prevent runoff. Exposed surfaces and friable materials will be covered where possible.
- A Spill Prevention, Control, and Containment procedure will be in place.
- Adequate toilets will be provided for workers, regularly serviced. Sewage and wastewater will be managed by licensed contractors or treatment systems to ensure no raw discharge into the environment.
- Washing of vehicles in surface water bodies is prohibited. Designated wash bays with oil, grease, and sediment traps will be used, and all maintenance will be performed in workshops with appropriate containment.
- All work areas will be kept tidy, with debris and waste contained to prevent runoff during rain events. Vegetation will be maintained around facilities during operation to reduce runoff.

9.2.4.6 Residual impacts

The significance of the impacts has been assessed after the application of mitigation measures in order to obtain the residual impact significance. The significance of the impacts after the application of mitigation measures is expected to be reduced to acceptable levels.

Table 9-18 Surface water residual impacts during construction phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Increase turbidity in nearby rivers and streams due to suspended sediments	Surface water	Low	Low	Negligible	**Negligible**

9.2.5 Waste and Wastewater

This chapter addresses the expected generation of solid waste and wastewater at the Project during the construction, operational, and decommissioning phases. Unlike a traditional impact assessment for a specific receptor (e.g., soil or groundwater), this assessment focuses on potential consequences of improper waste management and identifies mitigation and management measures to prevent environmental, health, and safety issues.

As described in the Section 3 Project Description, quantities of solid waste are not yet fully defined, although the types of waste are known. Therefore, a more complex or quantitative assessment is not possible at this stage.

The primary purpose of this chapter is to identify specific management measures in regard to solid waste and wastewater generation as result of the Project, that can be adopted in the construction and operation phases ESMS' in order to ensure compliance with applicable regulations and standards.

Risks to receptors due to waste improper management are also assessed in the chapter 9.5 Unplanned Events.

9.2.5.1 Impact assessment during Construction Phase

Solid waste

During the construction of the Project waste will be generated during earthworks, concrete foundation works, construction of the fences, paths, arrangement of existing roads and construction of new access roads, buildings, electro-mechanical works, tower installation, underground power lines / cable installation, etc.

Typical construction waste include concrete, asphalt, scrap metal, glass, plastic, wood, packaging materials, excess cables, and domestic waste from construction workers (i.e. relating to food consumption). Concrete may be found in two forms on the construction sites: structural elements containing reinforced concrete, and non-reinforced concrete found in foundations (such as surface level concrete slabs).

Solid waste generated from construction activities of the Project is described in chapter 3.8.6.1. Given the windfarm footprint, the amount of solid waste generated may be potentially of considerable size. Inappropriate handling, storage, transport and/or disposal of these solid wastes during construction might pose the potential to pollute the surrounding environment (i.e. soil and groundwater resources), cause odour and visual nuisance, encourage pests or result in occupational health and safety issues.

Non-hazardous waste

Non-Hazardous Solid Waste is typically inert and does not pose a threat to human health or the environment. However, proper management is required in order to reduce associated secondary impacts such as unnecessary resource use, dust emissions, etc. Non-hazardous waste generated by the Project will be collected by a licensed waste contractor and transported to a licensed waste management facility.

Hazardous waste

Hazardous Solid Waste will be limited and may result in fuel containers waste, oily residues, paints, paint cans and wastes from chemical cleaning products. Although the hazardous fraction of construction waste is expected to represent a relatively small portion of the total amount of construction waste likely to be generated, its management requires careful consideration as the impacts associated with hazardous waste can potentially result in contamination to soils and potentially groundwater. Inappropriate management, storage, handling, transfer or transportation through lack of personnel training on site may lead to accidental spills or leaks to the soil or groundwater resulting in environmental impacts and potential health risk to workers. Contamination events may also arise as a result of transportation by unlicensed waste contractors or disposal to unlicensed/unauthorised landfills. Waste management strategy and planning is therefore critical in order to minimise potential significant effects on sensitive receptors such as soil and groundwater.

There are no licensed hazardous waste disposal facilities currently available in the Project area. Therefore, waste generated by the Project will most likely be transported by road vehicles to a licensed hazardous waste facility outside the project Area. Therefore, it will be particularly important to properly store the hazardous waste in designated and secured hazardous waste storage areas at the site/s until collection to final disposal. These areas will include bunds to contain spillages, secure fencing to control access, proper safety signage, a roof structure to prevent rainwater entering, etc.

In addition, the EPC Contractor will be required to coordinate with the local government and the EPA Constanta to identify licensed waste disposal sites and licensed waste collectors.

Wastewater

Wastewater generated from construction activities will include the following:

- Sanitary and domestic wastewater generation;
- Wastewater from any vehicles or equipment washing/cleaning;
- Liquid hazardous waste such as fuels, chemicals, paints, lubricants, solvents, waste oil, hydraulic fluid, resins, waste solvents and thinners, etc.;
- Concrete washout.

For sanitary and domestic wastewater, it is anticipated that there will be a significant number of workers at the peak period of construction. Wastewater generated on-site will be stored within tanks for removal by a licensed wastewater contractor. The quantities of sanitary and domestic wastewater can be estimated as an average of 0.1 m^3/person/day (100 litres). Assuming an estimated number of construction workers at the windfarm during peak periods approx. 100-150 people, sanitary wastewater is estimated to total of approx. 15 m^3/day at peak periods of construction.

Improper handling, storage and transportation of sanitary and domestic wastewater could potentially cause contamination to soil or groundwater resources.

It is understood that licensed waste management operators will be engaged for the collection, transportation and disposal of wastes generated at the site/s. At this stage, the licensed facilities where solid and liquid waste will be disposed of by licensed contractor has not yet been determined. This will be determined by the EPC Contractor prior to commencement of construction activities.

9.2.5.2 Impact assessment during Operational phase

The operational phase will result in the production of few waste streams from the maintenance activities, with the vast majority of these streams being non-hazardous, and such waste will be generated in minimal quantity. The Project will require approximately 27–38 personnel during the operation and maintenance phase, including Transelectrica staff, maintenance personnel, and security staff, during a period of about 30-35 years.

Nevertheless, if these waste streams are not managed and disposed of effectively, they could result in significant impacts upon the surrounding environment (i.e. impact on soil and groundwater resources).

Solid Waste

Solid waste is not expected to be generated in significant quantities during the operational phase of the windfarm besides maintenance for transformers, and general day-to-day maintenance activities of administration facilities.

Non-Hazardous solid waste

The operation of the proposed Project will generate small amounts of non-hazardous domestic waste from the operation of the administration facilities and from activities of the employees.

This waste can be classified as both recyclable and non-recyclable. Recyclable waste includes paper, tin cans, plastics, cartons, rubber, and glass, while non-recyclables will consist mainly of food residues and other organic wastes. The quantity of domestic waste will be small given the few anticipated personnel required to operate the wind farm. Other solid non-hazardous waste generated during operation will be landscaping waste and uncontaminated replacement parts and packaging. Replacement of significant component of the wind turbines such as blades, nacelle and associated electrical components may be required in the event of major failure. However, such components are expected to be given to the turbine supplier for repair or recycling.

The type of non-hazardous solid waste that will be generated by O&M personnel include packaging waste (plastics, cardboard) and domestic wastes mainly food residues and other organic wastes.

Hazardous solid waste

This fraction of the waste streams can potentially cause significant adverse impacts on human health and the environment if inadequately managed. However, only very small quantities of hazardous materials (and waste) are expected during the operational phase of the Project.

Examples of possible hazardous waste streams that may arise during the operation of the Project include the following:

- Used chemical containers and drums;
- Soil contaminated by potential spills and leaks of hazardous materials/liquids and used spill kits and clean up materials;
- Miscellaneous wastes such as waste cables, oily rags, etc.;
- General clean-up materials and solvents from general maintenance of on-site plant and machinery;
- Electrical waste (spare parts, obsolete equipment).

Inappropriate handling of hazardous waste streams through lack of personnel training on site may lead to accidental release of hazardous waste contaminating soil or groundwater. Contamination may also arise as a result of poor-quality waste transporters and waste management facilities, or lacking capacity of these services locally. These risks may consequently result in illicit waste disposals (e.g. fly-tipping, or waste disposal at unlicensed locations), or the engagement of unlicensed contractors/facilities.

Wastewater

Wastewater (liquid waste) generated from operational activities at the windfarm site/s will include the following:

- Sanitary and domestic wastewater generation from operation and maintenance staff working in the windfarm;
- Oily wastes / oily water (to collect spills/leaks from transformer areas) will be in very small quantities;
- Liquid hazardous waste (if any) such as fuels, chemicals, paints, lubricants, solvents, waste oil, hydraulic fluid, resins, waste solvents and thinners, etc.

Sanitary and domestic wastewater will be generated from toilets and kitchen facilities in the administrative area. Any oily wastes from the transformer area, or other floor drains in oily areas, will collect oily water in a sump and will be treated in an oil separator for settlement of solids. The residual oil and solids will be collected for recycling and/or disposal by a licensed contractor.

The improper handling, transport and disposal of hazardous wastes could lead to potential localised contamination of soil and groundwater resources.

9.2.5.3 Impact assessment during Decommissioning Phase

During decommissioning of the wind farm, for a period of approx. 24 months, there is a potential for inert demolition waste and materials such as steel reinforced bars, broken concrete, cabling, transformer oils etc. to contaminate soils.

Prior to decommissioning, it is expected that all oils will be drained. This will minimize the risk for accidental spills and leaks during removal from equipment from the site. As transformer oil & other oils are classified as hazardous liquid waste they will be collected for recycling and/or disposal by a licensed contractor.

The decommissioning of the windfarm provides significant opportunity for resource efficiency and material reuse/recycling. All demolition work will be carried out with reference to IFC EHS Guidelines 1.6 Waste Management, IFC EHS Guidelines 1.5 Hazardous Materials Management, IFC PS3 on Resource Efficiency and Pollution Prevention, and EBRD ESR3 on Resource Efficiency and Pollution Prevention and Control.

9.2.5.4 Management and Mitigation Measures

The major waste and wastewater mitigation and management approach considered for the Project is focused on:

- Waste Characterization management measure,
- Waste Management Hierarchy measure,
- Construction Phase mitigation and management measures,
- Operation Phase mitigation and management measures.

Waste Characterization for Waste Management

Different types of waste require different management and disposal techniques according to the potential risk that the material poses to human health or the environment.

For the Project, waste has been classified into 3 main categories, as defined in table below.

Table 9-19 Waste Characterization

Waste Classification	Description
Domestic Waste	Household, commercial, agricultural, governmental, industrial and institutional waste, which have chemical and physical characteristics similar to those of household such as garbage, paper, cardboard, plastic, cans, etc. Disposal of such waste can generally be routed to municipal recycling or disposal facilities.
Industrial Waste	Non-hazardous waste that have physical and chemical characteristics that are different from domestic waste such as construction waste, glass, scrap metal, wood, used containers, tyres etc. This waste generally poses little risk to the environment and can be disposed to normal municipal facilities after waste minimisation options are exhausted and before obtaining approval.
Hazardous Waste	Hazardous waste is classified because of its concentration; physical, chemical or infectious characteristics, which may pose a present or potential threat to human health or the environment and/or may cause an increase in serious irreversible or incapacitating reversible illness or contribute to an increase in mortality. Under the Basel Convention, hazardous waste is as any waste (i.e. solid, liquid or gaseous) having the following properties: Explosive; Radioactive; Ignitable or flammable substances; Poisons with acute and chronic (delayed) toxicity; or Substances that by interaction with water might become spontaneously flammable or give off flammable gases. Hazardous waste must be segregated, stored, transported and ultimately treated and disposed of by a certified waste services provider.

Waste Management Hierarchy for Waste Management

The waste hierarchy illustrates good practice for waste management by ensuring consideration of the most sustainable available application for waste management in preference of disposal and eventual contribution to adverse environmental and economic impacts associated with landfill.

The hierarchy as illustrated in the figure below should form a key element of the waste management strategy, and if implemented effectively will achieve maximum reduction on waste quantities combined with the limited use of resources and fill space. The waste management hierarchy also has the potential to reduce costs that may be incurred by the main contractor or the proponent for handling, transportation and the disposal of waste.

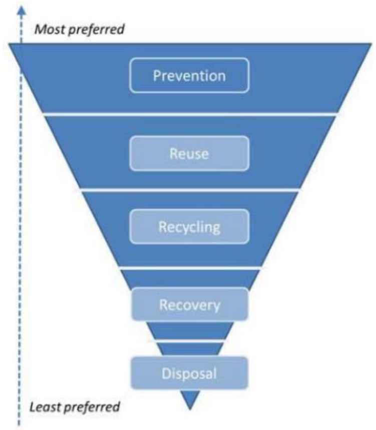

Figure 9-6 Waste Hierarchy (*Source: United Nations Environment Programme, UNEP 2019)*

Initially, options to prevent or reduce waste should be considered. Where waste generation cannot be avoided or further reduced at source, opportunities for reuse of materials should be explored, either for use for the same or a different purpose. Disposal to landfill is the least favoured option in the waste hierarchy and is the last resort after all other options have been considered.

Construction Phase Mitigation and Management Measures

Table 9-20 Waste & Wastewater Mitigation and Management Measures – Construction Phase

Impact/Source	Mitigation and Management Measures
Inappropriate handling, storage, transport and disposal of solid non-hazardous waste	- The project will develop and implement a Project specific Construction Waste Management Plan (WMP) in line with committed mitigation measures in this ESIA report. - Domestic solid waste to be segregated and identified from the other waste streams into separate waste containers/skips clearly to facilitate recycling and reuse. - Waste containers/skips will be clearly labelled and placed in designated waste storage locations. Labels will be waterproof, securely attached, and written in Romanian. - For litter (food waste, domestic waste), an adequate number of covered bins will be strategically placed throughout the sites at locations where staff consume food. These will be regularly collected and taken to the waste storage area / landfill. - Food waste must be stored within a sealed metal or plastic skip or bin, in order to prevent pests gaining access. - Heavy waste may be contained within an open skip, provided that segregation occurs effectively enough to remove all lightweight material that could be blown away. - Waste generated during construction will be recycled and reused until reduced to as low as practicable, prior to collection for disposal by an appropriately licensed waste contractor. - Only licensed waste transporters and waste management facilities will be engaged.

Impact/Source	Mitigation and Management Measures
	- Develop and maintain a waste inventory to document and track domestic solid waste generated, segregated, reused and consignments. - Completed waste record reports are required to show the chain of custody of the waste generated on site, its transportation and treatment/disposal. All records will be maintained on site. - Mandatory training program for employees to increase their awareness of waste management protocols including proper handling and storage of waste, recycling waste, reusing plastics, wood & other reusable non-hazardous materials. - EPC Contractor will identify recycling companies in Constanta County or in the region in order to implement the recycling of waste.
Inappropriate/uncontrolled handling, storage, transport and/or disposal of solid hazardous waste	- Develop and maintain a hazardous waste inventory to document and track hazardous waste generated, segregated, reused and consignments. - Segregate and identify hazardous waste from the other waste streams into separate signed and labelled waste containers/skips. - Store hazardous waste in allocated hard standing areas in sealed containers stored with impermeable bases, sufficient containment and separation capacity, sun/rain shelter, separate drainage system, good ventilation and equipped with spill kits & spill response procedures. This area must be placed away from any sources of ignition. - Hazardous waste storage area will be constructed away from drainage system and a rain shelter will be provided to avoid any potential instance of runoff, or leakage of runoff. - Waste containers will be clearly marked with appropriate warning labels to accurately describe their contents and safety precautions. Labels will be waterproof, securely attached, and written in Romanian. Wherever possible, chemicals will be kept in their original container. - Hazardous waste storage areas will be located away from any ignition sources or fire hazards.
Inappropriate/uncontrolled handling, storage, transport and/or disposal of sanitary wastewater	- Contractor to develop and implement a Project specific Construction Waste Management Plan (WMP) in accordance with committed mitigations measures in this ESIA report. - Develop and maintain a hazardous waste inventory to document and track sanitary waste generated and segregated. - Sanitary wastewater tanks to be properly maintained and inspected to ensure tanks do not overflow. - Site inspections will be carried out regularly by the EPC Contractor to ensure that all wastewater generated is properly managed, and no leakages or spill occur. In the event of a spill or overflow, immediate action will be taken in accordance with spill containment procedures and clean up procedures. - Engage a licensed waste/wastewater contractor for the periodic removal of septic tanks. - In common with the IFC EHS Guidelines, effort will be made in training construction personnel to minimise water consumption for hand washing or showering and to ensure an understanding of water resource and wastewater issues.

Impact/Source	Mitigation and Management Measures
Inappropriate handling and disposal of contaminated soil from clearing and excavation works causing cross-contamination of soils	- In-situ testing of soil to ensure it is not contaminated and can be reused or disposed into land. - Training –Contractor staff to be able to identify signs of potential contamination (smell of HC, staining). - If contamination is found, develop and implement a Contaminated Soil Management Plan for appropriate handling, treatment and disposal of soil.
Inappropriate handling of concrete washout	- Concrete washout will only be undertaken in designated and signed areas to prevent leaks or spread of wastewater. - The concrete washout area will be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations. - The concrete washout area will have an impermeable surface with dedicated drainage systems. - The removal of any sludge residues as solid hazardous waste will be undertaken by a licensed waste/wastewater contractor and handled as a hazardous waste.
Medical Waste	- Any generated medical waste will be stored in appropriate medical waste containers. - All medical waste will only be handled by trained personnel. - Removal of any medical waste from the site for appropriate treatment, disposal/incineration will only be conducted by a licensed contractor.

<u>Operation Phase Mitigation and Management Measures</u>

Table 9-21 Waste & Wastewater Mitigation and Management Measures – Operation Phase

Impact/Source	Mitigation and Management Measures
Inappropriate handling, storage, transport and disposal of non-hazardous solid waste	- Contractor to develop and implement a Project specific Operational Waste Management Plan (WMP) in line with committed mitigation measures in this ESIA report. - Domestic solid waste to be segregated and identified from the other waste streams into separate waste containers clearly to facilitate recycling. - Waste containers will be clearly labelled and placed in designated waste storage locations. Labels will be waterproof, securely attached, and written in Romanian. - For litter (food waste, domestic waste), an adequate number of covered bins will be strategically placed throughout the sites at locations where staff consume food. These will be regularly collected and taken to the waste storage area / landfill. - Food waste will be stored within a sealed metal or plastic bin, in order to prevent pests gaining access. - Heavy waste may be contained within an open skip, provided that segregation occurs effectively enough to remove all lightweight material that could be blown away.

Impact/Source	Mitigation and Management Measures
	- Paper cardboard, metal cans, plastic, glass to be collected for recycling by a licensed waste contractor. - Only licensed waste transporters and waste management facilities will be engaged. - The Contractor will maintain copies of the waste management licensed on site. - Develop and maintain a waste inventory to document and track domestic solid wastes generated, segregated, reused and consignments. - Completed waste record reports are required to show the chain of custody of the waste generated on site, its transportation and treatment/disposal. All records will be maintained on site.
Inappropriate/uncontrolled handling, storage, transport and/or disposal of sanitary wastewater	- Sanitary facilities will be provided with adequately designed underground wastewater storage tanks. - Sanitary wastewater tanks to be properly maintained and inspected to ensure tanks do not overflow. - A licensed waste/wastewater contractor will be engaged for the periodic removal of wastewater tanks.
Inappropriate/uncontrolled handling, storage, transport and/or disposal of solid hazardous waste	- Develop and maintain a hazardous waste inventory to document and track hazardous wastes generated, segregated, reused and consignments. - Segregate and identify hazardous waste from the other waste streams into separate waste containers/skips clearly signed and labelled. - Store hazardous waste in allocated hard standing areas in sealed containers stored with impermeable bases, sufficient containment and separation capacity, sun/rain shelter, separate drainage system, good ventilation and equipped with spill kits & spill response procedures. This area must be placed away from any sources of ignition. - Waste containers will be clearly marked with appropriate warning labels to accurately describe their contents and safety precautions. - Labels will be waterproof, securely attached, and written in Romanian. Wherever possible, chemicals will be kept in their original container.

9.2.5.5 Residual Impacts

The residual adverse impacts on Solid Waste and Wastewater Management, after application of mitigation and management measures, are anticipated to be reduced to acceptable levels (*Low* significance).

9.2.6 Biodiversity and Protected Areas

9.2.6.1 Impact assessment during Construction Phase

During the construction phase, potential impacts on biodiversity receptors may arise from site preparation activities, including earthworks, vegetation clearance for the turbines, transmission line and associated buildings and access roads and movement of machineries. These impacts include:

- Habitat Loss / Degradation / Fragmentation

- Loss or displacement of, or disturbance to, fauna species, due to clearance of vegetation for project infrastructure or access to infrastructure, noise, light and movement of vehicles
- Loss of vegetation/flora cover due to land excavation and movement
- Introduction of invasive species.

Habitat Loss / Degradation / Fragmentation

As discussed in Section 8.3, the Project footprint lies almost entirely on modified habitat, dominated by arable and agricultural land, ruderal and segetal plant communities of low ecological value. Natural and semi-natural habitats of higher ecological importance (including Annex I habitats such as 62C0, 91I0 and 40C0) are present only as fragmented patches within the wider EAAA and are not directly affected by Project infrastructure. In addition, the Critical Habitat Assessment confirms that no Critical Habitat is present within the Project footprint.

With respect to Protected Areas, the Project overlaps only marginally with Natura 2000 sites and exclusively on cultivated land lacking qualifying habitats or species, therefore no impacts on the conservation objectives of these sites are expected.

Therefore, the impact is evaluated as follows:

- Intensity: Low
- Spatial extent: Low (limited to the Project footprint)
- Duration: Very High (for infrastructure footprint), Low (construction areas)

Loss or displacement of, or disturbance to, fauna species, due to clearance of vegetation for project infrastructure or access to infrastructure, noise, light and movement of vehicles

Construction activities (noise, vibration, lighting, vehicle movement and human presence) may cause temporary disturbance and displacement of fauna.

For terrestrial fauna (invertebrates, reptiles, mammals), impacts are expected to affect mainly common species associated with agricultural landscapes. Although species of conservation interest (e.g. *Spermophilus citellus*, *Mesocricetus newtoni*) are present within the wider AoI and identified as PBFs, no key populations or critical habitats are located within the active construction areas, limiting potential effects.

For birds and bats, disturbance may affect individuals using the area for foraging or movement within the broader ecological corridor (EAAA). However:

- no nesting or roosting sites of high importance are located within the footprint;
- disturbance will be temporary and reversible;
- alternative habitats are widely available in the surrounding agricultural landscape.

Therefore, the impact is evaluated as follows:

- Intensity: Low
- Spatial extent: Low (limited to the Project footprint)
- Duration: Low (construction areas)

Direct mortality of fauna

Construction activities may result in occasional accidental mortality due to vehicle movement, soil stripping, or machinery operation. This risk primarily concerns reptiles and small mammals, due to limited mobility and invertebrates, at a very local scale. Given the low ecological value of affected habitats, the absence of key populations within the footprint, and the limited spatial extent of works, no significant effects on population viability, including PBFs, are expected.

Therefore, the impact is evaluated as follows:

- Intensity: Low
- Spatial extent: Low (limited to the Project footprint)
- Duration: Low (construction areas)

Loss of vegetation / flora cover

Vegetation clearance will be required for construction activities. The affected vegetation is predominantly composed of common ruderal and segetal species, typical of agricultural land with no confirmed presence of species of conservation concern within the Project footprint. Plant species of conservation interest recorded within the wider AoI are not located within areas directly affected by construction.

Therefore, the impact is evaluated as follows:

- Intensity: Low
- Spatial extent: Low (limited to the Project footprint)
- Duration: Very High (for infrastructure footprint), Low (construction areas)

Introduction and spread of invasive species

Construction activities may facilitate the introduction or spread of invasive species through soil disturbance, machinery movement, and material transport. However, the Project area is already characterised by highly modified agricultural conditions and disturbed and opportunistic plant communities, which are inherently resilient to such pressures.

Therefore, the impact is evaluated as follows:

- Intensity: Low
- Spatial extent: Low (limited to the Project footprint)
- Duration: Low (construction areas)

Table 9-22 Biodiversity and protected areas impacts during construction phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Habitat Loss /Degradation / Fragmentation	Habitats and ecosystems	Moderate	Low	**Low**
	Protected Areas	Moderate	Low	**Low**
Loss or displacement of, or disturbance to, fauna species, due to clearance of vegetation for project infrastructure or access to infrastructure, noise, light and movement of vehicles	Terrestrial Fauna	Moderate	Low	**Low**
	Birds and Bats	High	Low	**Moderate**
Direct mortality of fauna	Terrestrial Fauna	Moderate	Low	**Low**

Impact	Receptor	Sensitivity	Magnitude	Significance
	Birds and Bats	High	Negligible	**Negligible**
Loss of vegetation/flora cover	Flora	Low	Low	**Low**
Introduction and spread of invasive species	Habitats and Ecosystems	Moderate	Low	**Low**
	Flora	Low	Low	**Low**

9.2.6.2 Impact assessment during Operational phase

Impacts on biodiversity during Operational phase include the following:

- Mortality for birds and bats due to collision with wind turbines
- Mortality for birds and bats due to electrocution with overhead transmission line and pylons
- Disturbance to local wildlife due to noise, light and maintenance activities as well as barriers to the movement of fauna.

Collision Risk Assessment

A Collision Risk Assessment (CRA) for birds within the overall Dunarea Wind Farm array was undertaken by ERM in 2023 to quantify potential mortality resulting from turbine collisions (see Appendix H). The assessment focused on 29 bird species selected from a total of 60 recorded during field surveys conducted between March 2022 and February 2023. The species were chosen based on local Special Protection Area (SPA) qualifying status, flight activity, sensitivity to collision risk, and IUCN European Red List categorization (Near Threatened or above) and/or inclusion on Annex I of the EU Birds Directive.

The collision risk modelling followed the Band onshore model (NatureScot, 2000), employing a two-stage approach:

1. **Collision Probability:** Calculated the probability of a bird being struck when passing through the turbine rotor, based on bird morphology, flight speed, and turbine specifications. A precautionary approach was applied, assuming worst-case rotor dimensions, blade pitch, and maximum rotational speed.
2. **Annual Transit Calculation:** Estimated the number of transits through rotors using observed flight activity adjusted for array size, rotor swept volume, and daylight hours.

Species-specific avoidance rates recommended by Scottish Natural Heritage (SNH) (NatureScot, 2000) were applied to account for behavioral avoidance. For species deemed sensitive or locally significant, Potential Biological Removal (PBR) calculations were conducted (Dillingham & Fletcher, 2008; Wade, 1998) to assess sustainable human-induced mortality in both local SPA populations and European populations.

The model estimated annual collision mortalities with SNH avoidance rates applied. The highest estimated mortalities were for:

- *Ciconia ciconia* (White Stork): 4.78 birds/year
- *Buteo buteo* (Common Buzzard): 2.01 birds/year
- *Sturnus vulgaris* (Common Starling): 1.28 birds/year

The PBR analysis indicated negligible impacts on European populations, with project-related mortality representing <0.05% of assessed PBR for all species. For local SPA populations, the largest impact was on *Buteo rufinus* (Long-legged Buzzard), with mortality representing 32.4% of the SPA PBR, suggesting potential local sensitivity, while *Aquila pomarina* (Lesser Spotted Eagle) is likely to be significantly impacted due to the small number of breeding pairs within the Aliman-Adamclisi SPA.

Overall, it is noted that avifauna surveys identified moderate flight activity, primarily involving common and migratory species. the CRA supports a conclusion of low-to-moderate operational impacts for most species, given turbine siting away from major flyways and roosting areas. For bats, potential impacts are linked to nocturnal activity near turbine blades, particularly for high-flying species such as *Nyctalus noctule* and *Miniopterus schreibersii*.

The risk of bird collisions with wind turbine blades will also be local in extent, mainly affecting species that migrate or move through the area within the height range of the rotor blades. Although the project area overlaps with certain Natura 2000 sites, baseline studies indicate that bird densities are moderate and that most migration routes occur above turbine height. The duration of this impact will be long-term, as turbines will operate continuously over the lifespan of the project. The intensity is considered moderate, as isolated collision events may occur, but these are unlikely to affect regional population trends. The potential for bat collisions will similarly be local in extent, concentrated around turbines and particularly relevant during warm seasons when insect activity is high. The duration will be long-term, as turbine operation coincides with bat activity periods each year. The intensity is assessed as moderate, reflecting the potential for repeated seasonal interactions, though the overall magnitude of change to bat populations is expected to be moderate.

Electrocution risks

Electrocution risks from the overhead transmission lines and pylons will be localized along the power corridor. Larger bird species, particularly raptors, are more vulnerable to this impact. The duration will be long-term, persisting for the entire operational period. The intensity is assessed as low, as the new transmission lines will be very limited while most of the line is already existing. Electrocution events are expected to occur occasionally due to the presence of some categorized species using these structures and the linear extent of the lines within the project area.

For the above reasons, the impacts on biodiversity and protected areas during the operational phase will be Negative, with Low intensity, High duration, and Low to Moderate spatial extent, resulting in a magnitude of change considered Low.

Disturbance to local wildlife

During operation, disturbance to wildlife from noise and lighting will be local in extent, limited to the area immediately surrounding the turbines and access roads. The project area is predominantly agricultural land with limited natural habitats, and faunal presence is already reduced due to ongoing human activities. Disturbance may cause temporary displacement or changes in movement and foraging patterns of some species, but these effects are expected to remain confined to the project's immediate footprint. The duration of this impact will be long-term, persisting throughout the operational life of the wind farm, with low intensity due to the already modified character of the landscape.

Table 9-23 Biodiversity and protected areas impacts during operational phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Mortality due to collision with wind turbines	Birds and Bats	High	Moderate	**Moderate**

Impact	Receptor	Sensitivity	Magnitude	Significance
Mortality due to electrocution with overhead transmission line and pylons	Birds and Bats	High	Low	**Moderate**
Disturbance to local wildlife due to noise, light and maintenance activities	Terrestrial Fauna	Moderate	Negligible	**Negligible**
	Birds and Bats	High	Negligible	**Negligible**

9.2.6.3 Impact assessment during Decommissioning Phase

The decommissioning phase will involve the dismantling and removal of wind turbines, overhead and underground electrical infrastructure, access routes, and auxiliary facilities, followed by general site clearance and reinstatement activities. These works will require the use of heavy machinery, excavation, transportation of dismantled components, and vegetation or soil disturbance within localized areas. Similar to the construction phase, decommissioning activities have the potential to generate short-term impacts on biodiversity and protected areas due to increased noise, dust, vibration, human presence, and temporary habitat disturbance. Potential impacts include disturbance or displacement of fauna, limited vegetation removal, surface compaction, minor risks of accidental mortality of small fauna, and low-level risks of accidental pollution.

The project area is dominated by agricultural land and already-modified terrestrial habitats of low ecological value, and no critical habitats or significant populations of protected species are located within the decommissioning footprint. As such, the sensitivity of ecological receptors is generally low, and the magnitude of expected impacts is assessed as negligible to low. These impacts are anticipated to be short-term and localized, restricted primarily to the immediate worksites and access routes.

In addition to temporary disturbances, the removal of infrastructure will also create opportunities for natural habitat recovery and expansion, particularly in areas where turbine foundations, hardstandings, or linear infrastructure are removed, allowing vegetation to re-establish.

For the above reasons, the impacts will be Negative, with Low intensity, Low duration and Low spatial extent, with a magnitude of change considered Low/negligible.

Table 9-24 Biodiversity and Protected areas impacts during decommissioning phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Disturbance to local wildlife due to noise, light, dust and machinery movement	Terrestrial Fauna	Moderate	Low	**Low**
	Birds and Bats	High	Negligible	**Negligible**
Temporary disturbance to habitats and protected areas	Habitats and Ecosystems	Moderate	Negligible	**Negligible**
	Protected areas	Moderate	Negligible	**Negligible**
Habitat expansion and restauration	Habitats and Ecosystems	Moderate	Low	**Low**

9.2.6.4 Management and Mitigation Measures

Impacts shall be managed through the preparation of a dedicated Biodiversity and Monitoring Management Plan (BMP) which will contain provisions reported below.

In addition, the Critical Habitat Assessment (TBC, 2026) concludes that the development of a Biodiversity Action Plan (BAP) is necessary to ensure that Net Gain (NG) and No Net Loss (NNL) are achieved for the relevant biodiversity values, in line with IFC PS6 and EBRD ESR6.

The following mitigation measures are proposed for the Construction Phase:

For the construction/decommissioning phase impacts the following mitigation measures are proposed: **Requirement**	**Mitigation measure(s)**

Minimise earthworks and the clearing, stripping and/or removal of vegetation	• Restrict earthworks and the removal of vegetation to agricultural and pasture habitats only (i.e. modified habitat), and to the areas strictly necessary for the execution of the works. Avoid the removal of any trees or shrubs.
	• Although the Project footprint does not directly overlap with any priority habitats listed in Annex I of the EU Habitats Directive, some of these habitats are in close proximity to the site. These areas should be mapped and protected by employing appropriate barrier fencing and/or other forms of demarcations, within which any access or work is prohibited. Habitats for protection include:
	  ○ 62C0* Ponto-Sarmatic steppes with *Stipion lessingianae* plant associations
	  ○ 91I0* Euro-siberian forest-steppe with *Quercus* spp.
	  ○ 40C0* Ponto-Sarmatic deciduous thickets, with *Pruno spinosae-Crataegetum* plant associations.
	• Demarcate the construction zone on a map and on the ground clearly using high visibility tape for instance, to avoid impacting on sensitive areas outside of the permitted construction area.
	• Promote awareness-raising among workers not to harvest or damage plant specimens and address the ecological value of flora, vegetation and natural habitats and train them in environmentally-appropriate procedures to be followed on site.
	• Vegetation clearing and stripping, and exposure of bare soil should, where possible, be reduced during periods when heavy rainfall is most likely to occur to minimise erosion.
	• Work should not be carried out when the ground is waterlogged (i.e. during periods of heavy rainfall and immediately after rainfall, until the ground has dried out), as per the Project environmental permit.
	• Where possible, employ manual methods (e.g. hoeing or hand-pulling) to clear the ground of vegetation to limit soil and fauna disturbance.
	• Use existing access roads or upgrade existing roads wherever possible before considering new access road construction. Prohibit travel on unauthorised roads/land to protect existing vegetation and minimise soil inversion.

Restore cleared / stripped / removed vegetation	• Prepare and implement a Landscape Restoration Plan that includes the use of native, site-specific and non-invasive species. This plan will outline the timing of

For the construction/decommissioning phase impacts the following mitigation measures are proposed: **Requirement**	**Mitigation measure(s)**
	restoration activities, methods to be employed, responsible parties, and monitoring protocols to assess restoration success. • Prior to earthmoving works, topsoil should be removed and stockpiled for later re-use in areas affected by the works. • After the works, adequate decompaction of soils that have been compacted by the movement of machinery and vehicles is necessary, thus facilitating the recovery of habitats. • Carry out landscape restoration, using native vegetation, as soon as possible after the end of construction on temporarily-impacted land and other areas that have been affected by the work (e.g., construction site area, substation surroundings). The timing of restoration should be ecologically informed and should follow the suggested timings in the Landscape Restoration Plan. • Use soil, mulch and vegetation debris (that contains natural seed stock) to facilitate natural revegetation of disturbed areas where reasonably practicable. • Develop maintenance actions in the areas under restoration to ensure that conditions are created for the normal development of natural habitats. • As per the Project environmental permit, in the unlikely event of accidents or interventions that cause damage to conservation measures or the integrity of the protected natural area, Peștera - Deleni SCI (ROSCI0353), Aliman – Adamclisi Special Protection Area (SPA) (ROSPA0001) or Dumbrăveni - Valea Urluia - Lacul Vederoasa Site of Community Importance (SCI) (ROSCI0071), the ANMAP shall be notified within a maximum of 24 hours, and approved restoration shall be carried out.
Minimise emissions of dust	• Vegetation clearing and earthworks should be minimised as much as possible and limited to the strictly needed areas. • All the unpaved surfaces where vehicle movement is to be expected should be kept moist (e.g., through a water sprinkler truck), in particular during dry and windy conditions, to minimize the dust emitted by vehicle entrainment. • Speed limits for construction heavy vehicles should not exceed 30 km/h. • Trucks transporting granular/dusty construction materials should not be loaded to full capacity, and should have the load adequately covered. • Stockpiles of granular materials should be protected with a waterproof cover, or alternatively regularly sprinkled with water.
Avoid pollution and contamination of soil and water	• Implement the Waste Management Plan and the respective minimisation measures contained therein. • Ensure the correct temporary storage and disposal of the waste produced, according to its typology and in accordance with the legislation in force. Provision must be made for the containment/retention of any run-off/spillages. It is not permissible to deposit waste, even temporarily, on the banks, beds of water lines and areas of maximum infiltration. • Implement the control, containment, and clean-up protocols for any spills of hazardous materials or other pollutants as defined in the Pollution Prevention and Control Plan and Emergency Preparedness Response Plan. Whenever a

For the construction/decommissioning phase impacts the following mitigation measures are proposed: Requirement	Mitigation measure(s)
	chemical spill occurs on the ground, the contaminated soil should be collected, stored and sent for final disposal or collection by a licensed operator. • Adequate portable sanitation facilities serving all workers should be provided at construction sites. • The storage of fuels and/or other polluting substances is only permitted in labelled, secured and watertight containers, within the site area prepared for that purpose. • Maintenance and washing of machinery and vehicles should not be carried out in the project area. If indispensable, conditions must be created to ensure that the soil is not contaminated. • Follow all requirements in the Pollution Prevention and Control Plan (PPCP), and Emergency Preparedness Response Plan (EPRP).
Minimise direct impacts to, and disturbance of, priority fauna species	• Vegetation clearing areas will be scouted in advance of construction by a suitably trained professional with the aim of locating animals or roosting and nesting sites close to the construction area. If any animal is identified, it should be removed and relocated under licence outside the area to be disturbed, unless they are nesting, in which case a 300-meter buffer zone around nests near project structures will be established in which construction is banned between March 15–August 15, as per the Project environmental permit issued in February 2025. Prepare a detailed Wildlife Rescue Protocol before the start of the works which focuses on the priority species identified for this Project. • As stated in the Project environmental permit, works will be carried out primarily outside the breeding and rearing seasons for the species of terrestrial fauna for which the Natura 2000 sites have been designated. This requirement should also be extended to other less-mobile priority species. A good understanding of the seasonal patterns and ecology of the priority species is required to identify key periods and areas to avoid, therefore, collaboration with biodiversity specialists is required. Sensitivity/exclusion maps should be developed for these species, informed by pre-clearance surveys. • Minimise impacts by concentrating works in time, especially those that cause the greatest disruption, and avoid conducting construction activities in the evening and at night (i.e. after 22:00). • Implement noise control measures at the source, such as the use of temporary noise barriers and deflectors. Structural and construction solutions for bodies and buildings, and installation of soundproofing systems for equipment or buildings housing the noisiest equipment, should be adopted to ensure compliance with the limits set out in the IFC standards. • Perform noise monitoring campaigns, conducted by trained specialists, during the construction phase. See World Bank Group (2007) for guidance on acceptable noise levels. • Limit the use of security fencing to laydown areas and site offices only, to limit barriers to movement of the priority mammals and reptile. Avoid placing impermeable fences that could interfere with species movement. Use fences with regular passages (e.g. culverts) or larger mesh sizes, and a ground clearance under the fence that will allow the small priority mammals and reptile to pass. • As per the Project environmental permit, barracks, containers, tanks, eco-toilets, etc. shall be placed on metal beams, wooden planks, bricks, etc., to allow the free

For the construction/decommissioning phase impacts the following mitigation measures are proposed: Requirement	Mitigation measure(s)
	movement of small priority mammals and reptiles; and these facilities should be locked when workers are absent to prevent animals from seeking shelter inside them. • Limit illumination in the construction areas as much as practical. Appropriate types of lighting are to be used to avoid attracting insects, and hence, bats. • Avoid attracting birds to predictable food sources, such as on-site or off-site waste disposal areas, or landfills; this is especially relevant for the priority raptors. • Train staff and contractors in environmentally-appropriate procedures to be followed on site. • Enforce good behaviour by construction workers, including prohibition of hunting, poisoning, trapping and general harassment of wild animals. In the event of the capture of killing of specimens of protected wildlife species, the ANMAP and the competent environmental protection authorities shall be notified immediately. • Vehicle traffic in pre-approved construction routes and at low speed (20km/h) in the Project site to reduce the likelihood of road kills of fauna (and to minimise noise disturbance). • Burning of any green or dry vegetation, stubble, or pasture is prohibited year-round during construction. • No stray dogs will be sheltered at the site, as they may disturb or harm priority mammal species. • Define a monitoring program during construction, focusing on the priority species for this Project.
Avoid and minimise the introduction and spread of Invasive Alien Species (IAS)	• Develop an Invasive Species Management Plan that outlines how to identify, prevent, control, and monitor IAS in the construction area. • Forbid vegetation disturbance outside the set boundaries for each construction site. Limit vegetation clearance to the construction footprint. Avoid clearing any further vegetation in the project boundary as far as possible. • Restrict people and vehicle movements outside project accesses, especially in natural habitat areas. • Limit non-Project vehicles entrance in the construction area to avoid invasive and ruderal species dispersion. • Wash vehicles before they enter site. • Whenever possible, new and temporary access points should be created based in existent access points/routes. • Ensure awareness of staff and workers regarding invasive flora species. • Regularly monitor (at least quarterly) the presence and expansion of invasive flora species in the Project area during construction. This monitoring should be conducted by a qualified local botanist. In case of detection of invasive species, they will be removed mechanically or by hand. • Update relevant plans (e.g. Invasive alien plant species control plan and programme) if IAS are found to be a problem in the Project area.

The following mitigation measures are proposed for the Operational Phase:

Requirement	Mitigation measure(s)
Restore cleared, stripped, removed or degraded vegetation	• Any post-construction restoration of affected areas should be continued into operation. Implement restoration according to the Landscape Restoration Plan, and using native, site-specific and non-invasive species. • Develop maintenance and monitoring actions in any areas under restoration to ensure that conditions are created for the normal development of natural habitats.
Minimise further clearing, stripping, removal and/or degradation of vegetation	• Limit the removal of additional vegetation to the designated maintenance areas, and avoid vegetation removal or disturbance in areas of natural habitat. • Promote awareness-raising among workers not to harvest or damage plant specimens and address the ecological value of flora, vegetation and natural habitats and train them in environmentally-appropriate procedures to be followed on site.
Avoid pollution and contamination of soil and water	• Ensure the correct temporary storage and disposal of the any waste produced during maintenance activities, according to its typology and in accordance with the legislation in force. Provision must be made for the containment/retention of any run-off/spillages. • Implement the control, containment, and clean-up protocols for any spills of hazardous materials or other pollutants as defined in the Pollution Prevention and Control Plan and Emergency Preparedness Response Plan. Whenever a chemical spill occurs on the ground, the contaminated soil should be collected, stored and sent for final disposal or collection by a licensed operator. • Adequate portable sanitation facilities serving all workers should be provided at maintenance sites. • The storage of fuels and/or other polluting substances is only permitted in labelled, secured and watertight containers, within the site area prepared for that purpose. • Maintenance and washing of machinery and vehicles should not be carried out in the project area. If indispensable, conditions must be created to ensure that the soil is not contaminated. • Follow all requirements in the Project Pollution Prevention and Control Plan (PPCP), and Emergency Preparedness Response Plan.
Avoid and minimise the introduction and spread of Invasive Alien Species (IAS)	• Forbid vegetation disturbance outside the designated maintenance boundary. • Restrict people and vehicle movements outside project accesses, and forbid movement in areas of natural habitat. • Limit non-Project vehicles entrance into the site, through the use of signage, to avoid invasive and ruderal species dispersion. • Whenever possible, new and temporary access points should be created based in existent access points/routes. • Existing access roads will be used as much as possible to avoid additional vegetation disturbance. • Ensure awareness of staff and workers regarding invasive flora species. • Update the Invasive alien plant species control plan and programme if invasive species are found to be a problem in the Project area. Regularly monitor the presence and expansion of invasive flora species in the Project area during operation. This monitoring should be conducted by a qualified local botanist.

Requirement	Mitigation measure(s)
Minimise direct impacts to, and disturbance of, priority fauna species	• Avoid conducting maintenance activities in the evening and at night (i.e. after 22:00). • Lighting of wind turbines should be reduced to the minimum recommended for aviation safety. Appropriate types of lighting are to be used to avoid attracting insects, and hence, bats. • Avoid attracting birds to predictable food sources, such as on-site or off-site waste disposal areas, or landfills; this is especially relevant for the priority raptors. • Train maintenance staff and contractors in environmentally-appropriate procedures to be followed on site. • Enforcing good behaviour by maintenance workers, including prohibition of hunting, poisoning, trapping and general harassment of wild animals. In the event of the capture of killing of specimens of protected wildlife species, the ANMAP and the competent environmental protection authorities shall be notified immediately. • Vehicle traffic in pre-approved maintenance routes and at low speed (20km/h) in the Project site to reduce the likelihood of road kills of fauna (and to minimise noise disturbance). • Burning of any green or dry vegetation, stubble, or pasture is prohibited year-round throughout operations.
Minimise collision of priority bird species	• Lighting of wind turbines should be reduced to the minimum recommended for aviation safety to avoid attracting birds. • Implement an Automated Shut-down-on-Demand (SDoD) system for turbines using the camera system, such as IdentiFflight®. • A software system with integrated high-performance 4K Ultra HD and thermal cameras must be used. The software should include sophisticated algorithms to detect bird movements, communicate with the cameras, and provide instructions to record and indicate bird movement direction. It should also allow for controlled/automated rotor speed reduction via turbine interface and issue stop or slow rotation signals to certain turbines to avoid bird collisions. The software must also identify bird species using AI algorithms trained on photo/video data collected on-site. The benefit of controlled solutions is minimizing unnecessary stops and enhancing protection for sensitive species identified and learned by AI; This system will be implemented from the first year of operation for all wind turbines; • All wind turbines should have one blade painted according to a local civil aviation authority approved pattern (if available), recognising that evidence of blade painting as an effective collision minimisation measure is limited. • Bird flight diverters (BFDs) should be installed on all the overhead line sections for the full span length and on guyed meteorological masts according to the applicable International Best Practice standards at the time (e.g., Martín Martín et al. 2022; McGowan 2024; IFC & EBRD 2026). BFDs should be checked and replaced, if needed, throughout the entire lifetime of the Project. • An Avifaunal Specialist must be consulted timeously to ensure that a raptor friendly pole design is used (e.g. Martín Martín et al. 2022), and that appropriate mitigation is implemented pro-actively for complicated pole structures. The final design must be approved by an avian specialist. • The OHTL must be insulated to avoid bird electrocution. Insulating materials will be installed near supports and conductors on poles to reduce electrocution risk. • Implement bird Post-construction Fatality Monitoring (PCFM) throughout entire lifetime of the Project. • An adaptive management process should be implemented.

Requirement	Mitigation measure(s)
Minimise collision of priority bat species	• Lighting of wind turbines should be reduced to the minimum recommended for aviation safety to avoid attracting bats. Minimise other light sources as far as possible. • Use appropriate types of lighting to avoid attracting insects, and hence bats. • All wind turbines are to be subjected to standard blade feathering, throughout the lifespan of the project. • Turbines will be shut down during periods of low wind speeds (<6 m/s) and high bat activity (spring migration, juvenile emergence, fall migration), as per the Project environmental permit issued in February 2025. • Conduct bat activity monitoring in the wind farm site at least once every five years, using acoustic detection devices installed on the turbines. • Implement bat Post-construction Fatality Monitoring (PCFM) throughout entire lifetime of the Project. • An adaptive management process should be implemented.

9.2.6.5 Residual Impacts

The significance of the impacts has been assessed after the application of mitigation measures in order to obtain the residual impact significance. The significance of the impacts after the application of mitigation measures is expected to be reduced to acceptable levels (*Low* significance).

Table 9-25 Biodiversity and Protected areas residual impacts during construction phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Habitat Loss /Degradation / Fragmentation	Habitats and ecosystems	Low	Moderate	Negligible	**Negligible**
	Protected Areas	Low	Moderate	Negligible	**Negligible**
Loss or displacement of, or disturbance to, fauna species, due to clearance of vegetation for project infrastructure or access to infrastructure, noise, light and movement of vehicles	Terrestrial Fauna	Low	Moderate	Negligible	**Negligible**
	Birds and Bats	Moderate	High	Negligible	**Negligible**
Direct mortality of fauna	Terrestrial Fauna	Low	Moderate	Negligible	**Negligible**
Loss of vegetation/flora cover	Flora	Low	Low	Negligible	**Negligible**
Introduction and spread of invasive species	Habitats and Ecosystems	Low	Moderate	Negligible	**Negligible**
	Flora	Low	Low	Negligible	**Negligible**

Table 9-26 Biodiversity and Protected areas residual impacts during operational phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Mortality due to collision with wind turbines	Birds and Bats	Moderate	High	Low	**Moderate**
Mortality due to electrocution with overhead transmission line and pylons	Birds and Bats	Moderate	High	Negligible	**Negligible**

9.3 Social Impact Assessment

9.3.1 Livelihood

According to ERM SIA (Appendix N), the Project has the potential to generate economic displacement impacts due to temporary and permanent land occupation, which may reduce access to agricultural land, pastureland, and agricultural roads. Economic displacement occurs when project-related land acquisition or restriction of access to natural resources results in loss of assets or access to assets, thereby affecting income sources or means of livelihood, regardless of whether the affected people are physically displaced (IFC PS5).

Land-based livelihoods, including agriculture and grazing, represent the main source of income and subsistence for rural communities in the wider project area.

The total area affected by the Project is approximately 690,098 m² (69.00 ha), of which 327,104 m² (32.71 ha) will be temporarily occupied and 362,994 m² (36.29 ha) permanently occupied (as described in Section 3). Temporary land occupation will primarily include foundation excavation areas, storage and assembly platforms, and site organization areas. Permanent occupation will include wind turbine foundations, high-voltage poles, the 400 kV station, assembly platforms, and new exploitation roads.

9.3.1.1 Impact assessment during Construction Phase

During the construction phase, Project activities give rise to several project aspects, including the temporary and permanent occupation of land and the restriction of access to agricultural and grazing areas.

One of the key impacts arising from these activities is:

- Temporary economic displacement caused by restricted access to agricultural land and pasture routes due to temporary land occupation and construction activities

As described in Chapter 8.4.6, livelihoods in Deleni Commune are closely connected to land-based activities, with most of the territory consisting of arable land and smaller portions of pasture and forest. Arable land is predominantly privately owned, while pastureland shows a mixed ownership structure between private users and local authorities.

Temporary occupation of land for construction platforms, warehouses, storage areas, and turbine foundation sites means that farmers and herders will be unable to use these areas for a period of time, limiting their access to essential livelihood resources. Vulnerable groups, such as small-scale farmers or herders who rely heavily on land for subsistence, will be the most affected.

The magnitude of this impact is assessed as **Low**, because although it is noticeable at the household and community level, the reduction in access affects only specific portions of land and does not irreversibly compromise the overall productivity of the wider agricultural area. The negative impact is short-term for temporarily occupied land and medium-term for areas affected by construction activities. The impact is localized to the project area. Considering these factors, the reduction of access to land is considered a manageable negative impact that requires targeted mitigation measures for the most vulnerable groups.

Table 9-27 Livelihoods impacts during construction phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Temporary economic displacement caused by restricted access to agricultural land and pasture routes due to temporary land occupation and construction activities	Landowners and Land Users	Moderate	Low	**Low**
	Vulnerable and Disadvantaged Groups	High	Low	**Moderate**

9.3.1.2 Impact assessment during Operational phase

During the operational phase, associated project aspects include the permanent occupation of land by turbines, substations, and roads, and the permanent restriction of access to these areas and their safety buffers.

The main impact is:

- Permanent economic displacement due to loss of land access within the Project footprint and safety buffer zones

This impact will prevent local land users from utilizing the occupied areas for agriculture or livestock grazing. During operation, no additional land will be required and any land temporarily used during construction will be restored to its prior use, meaning that access restrictions will be limited to the permanent Project footprint. The Project's land impacts will therefore be limited to the infrastructure footprint and safety buffers, leaving surrounding land available for other agricultural and grazing activities. Herders or farmers with higher dependency on the land may be more affected, whereas other users can continue their activities on remaining land.

The impact is negative, constant (high duration), with an overall magnitude considered to be **Low**, as it only affects the portion of land occupied by project infrastructure and does not cause significant changes to overall regional productivity.

Table 9-28 Livelihoods impacts during operational phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Permanent economic displacement due to loss of land access within the Project footprint and safety buffer zones	Landowners and Land Users	Moderate	Low	**Low**
	Vulnerable and Disadvantaged Groups	High	Low	**Moderate**

9.3.1.3 Impact assessment during Decommissioning Phase

No impacts are envisaged during this phase in relation to livelihood.

9.3.1.4 Management and Mitigation Measures

For the Construction phase impacts the following mitigation measures are proposed:

- Develop and implement a Livelihood Restoration Plan (LRP) aligned with IFC PS5/EBRD ESR5.
- Ensure appropriate disclosure of information and consultation with affected people, including advance notice of construction activities and temporary access restrictions.
- Identify and agree alternative access routes with affected land users and minimize the duration of any blockage.
- Identify all formal and informal land users prior to land entry and ensure compensation for any temporary loss of land use or agricultural subsidies.
- Compensate crop damage caused by construction activities or access tracks, based on the value of crops and duration of impact.
- Operate the Community Grievance Mechanism to address accidental damage claims and access-related issues during construction.
- Restore, at a minimum, the livelihoods and standards of living of affected persons to pre-project levels, in accordance with the LRP.
- Restore temporarily occupied land to its original agricultural condition after construction activities.
- Pay particular attention to vulnerable groups and provide special or supplementary assistance where required.
- Ensure the LRP includes an Accidental Damage Compensation Procedure to guide compensation for accidental damage during construction
- Coordinate with relevant authorities (e.g., APIA) to ensure temporary land use restrictions do not lead to penalties or loss of agricultural subsidies.

For the operational phase impacts the following mitigation measures are proposed:

- Maintain physical and administrative demarcation of the permanent footprint and safety buffer zones to avoid unnecessary access restrictions.
- Ensure long-term communication with landowners and land users on any operational activities that may affect access or land use
- Monitor the status of affected livelihoods during operation and implement corrective measures if negative trends or access constraints are identified.
- Provide continued support to vulnerable households identified through the LRP where long-term impacts persist
- Ensure the Community Grievance Mechanism remains accessible for land and livelihood-related concerns during operation.

- Apply the compensation provisions defined in the LRP (including the Accidental Damage Compensation Procedure) whenever the eligibility criteria are met.
- Support programs to enhance productivity of residual land for affected households, in line with livelihood restoration objectives.
- Conduct periodic monitoring and evaluation of operational impacts and mitigation effectiveness to ensure ongoing protection of livelihoods.

9.3.1.5 Residual Impacts

The significance of the impacts has been assessed after the application of mitigation measures in order to obtain the residual impact significance. The significance of the impacts after the application of mitigation measures is expected to be reduced to acceptable levels (*Low* significance).

Table 9-29 Livelihoods residual impacts during construction phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Temporary economic displacement caused by restricted access to agricultural land and pasture routes due to temporary land occupation and construction activities	Landowners and Land Users	Low	Moderate	Negligible	**Negligible**
	Vulnerable and Disadvantaged Groups	Moderate	High	Negligible	**Negligible**

Table 9-30 Livelihoods residual impacts during operational phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Permanent economic displacement due to loss of land access within the Project footprint and safety buffer zones	Landowners and Land Users	Low	Moderate	Negligible	**Negligible**
	Vulnerable and Disadvantaged Groups	Moderate	High	Negligible	**Negligible**

9.3.2 Economy, Employment, and Income

9.3.2.1 Impact assessment during Construction and Decommissioning Phase

Economy, Employment and Income impacts during Construction Phase include the following:

- Increase in direct employment opportunities within the Social AoI and Constanța County through the recruitment of local workers for construction activities.

- Positive indirect and induced employment effects through increased worker spending and Project-related local procurement of goods and services

Increase in direct employment opportunities

During the construction/decommissioning phase, the Project is expected to employ up to 100-150 workers over an estimated 24-month period. A significant share of low-skilled labour demand can be met through the local workforce available in the Social AoI and the wider Constanța County, where agricultural skills are widespread and unemployment levels remain relatively high. Local hiring can be increased by means of previous training of local workforce for, e.g., civil works.

Opportunities for medium and high-skilled positions may, however, be more limited for local residents due to a mismatch between the required technical competencies and the qualifications or experience typically found in the area. As a result, some specialised roles may need to be filled by workers from other parts of Romania, particularly during the early construction stages and the transition to operation.

For the above reasons, the impacts will be *Positive*, with *Moderate* intensity, *Moderate* duration and *Low* spatial extent, with a magnitude of change considered ***Moderate.***

Positive indirect and induced employment effects

The indirect and induced employment impact will extend from the local to the regional and potentially national level, as worker spending and the Project's procurement activities are expected to support businesses not only within the Social AoI and Constanța County but also across Romania.

The duration of the impact will be medium-term and concentrated during the construction/decommissioning phase, when workforce presence and procurement needs are highest, before declining significantly once works are completed. The intensity is assessed as moderate, driven by increased demand for hospitality, logistics, and supply services, and by the potential for local SMEs to benefit from higher consumption and procurement. Overall, the Project will generate positive spill-over effects for the local and regional economy, including increased service use, temporary job creation, and additional opportunities for women employed in service-related sectors

For the above reasons, the impacts will be *Positive*, with *Moderate* intensity, *Moderate* duration and *Low* spatial extent, with a magnitude of change considered ***Moderate.***

Table 9-31 Economy, Employment and Income impacts during construction/decommissioning phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Increase in direct employment opportunities within the Social AoI and Constanța County through the recruitment of local workers for construction activities.	Workforce	Moderate	Moderate	**Moderate**
Positive indirect and induced employment effects through increased worker spending and Project-related local procurement of goods and services	Local Businesses & Economic Activities	Moderate	Moderate	**Moderate**

9.3.2.2 Impact assessment during Operational Phase

Economy, Employment and Income impacts during operational phase include the following:

- Increase in local councils' revenue from payment of taxes by the Project

During operation, the Investor will pay taxes associated with the renewable energy facilities, increasing the revenue available to local councils. These funds can support improvements to public services, education, and other community needs, generating benefits that will be directly felt by residents in the Social AoI. However, the overall effect may be partly limited by Romania's fiscal framework, where local authorities have restricted autonomy over the allocation of revenues collected on behalf of the central government.

The fiscal impact of the Project will be local in extent, as tax revenues will primarily benefit municipal budgets within the Project area. The duration of this impact will be long-term, continuing throughout the operational phase and ensuring a steady flow of financial resources. The intensity of the impact is assessed as moderate, driven by relative high income due fees for building permit and regular taxes on economic activities.

For the above reasons, the impacts will be *Positive*, with *Moderate* intensity, *High* duration and *Moderate* spatial extent, with a magnitude of change considered ***Moderate.***

Table 9-32 Economy, Employment and Income impacts during operational phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Increase in local councils' revenue from payment of taxes by the Project	Public Services & Local Institutions	Moderate	Moderate	**Moderate**

9.3.2.3 Management and Enhancement Measures

For the Construction/decommissioning phase impacts the following enhancement measures are proposed:

1. Increase in direct employment opportunities:
    - Implement transparent recruitment procedures, clearly disclosing job profiles, selection criteria, and qualification requirements.
    - Provide workers with written documentation of labour rights, including hours, overtime, and benefits.
    - Prioritize local hiring by advertising job opportunities widely within the Social AoI.
    - Provide vocational and on-the-job training to strengthen local workforce skills.
    - Promote inclusive hiring, ensuring access for women, youth, and vulnerable groups.
    - Implement the Construction Labour Management Plan, covering workforce needs, labour rights, and the Worker's Code of Conduct.
    - Ensure regular communication with communities, providing clear information on employment opportunities and timelines through the SEP.
    - Maintain an accessible Workers' Grievance Mechanism throughout recruitment and employment.
2. Positive indirect and induced employment effects:
    - Encourage local procurement by contractors, prioritizing SMEs and women-led businesses.
    - Disclose procurement opportunities early within the AoI and provide clear information on requirements
    - Engage with local suppliers to identify capacity needs and support their participation where feasible.

- Promote the use of local services (e.g., catering and transport) and support the use of existing local accommodation within nearby communities during construction if needed.
- Maintain a grievance mechanism accessible for procurement and economic related concerns.

For the operational phase impacts the following mitigation measures are proposed:

1. Increase in local council revenues:
    - Ensure transparent and timely payment of all applicable local taxes and operational fees to the relevant councils
    - Maintain regular communication with local authorities regarding expected annual contributions and operational milestones
    - Engage local councils through the SEP to explain the nature and predictability of tax-related revenues during operation
    - Maintain a responsive communication channel for local authorities regarding administrative or fiscal queries related to the Project.

9.3.2.4 Residual Impacts

No significant residual impacts associated with the economy and employment are expected.

9.3.3 Education and Training

9.3.3.1 Impact assessment during Construction/Decommissioning and Operational phases

Education and Training impacts during Construction/decommissioning and Operational phases include the following:

- Increased local skills and knowledge through training and on-the-job learning opportunities.

The Project will contribute to strengthening the skills and professional capacity of the local workforce, particularly during the construction phase, when on-the-job learning and formal technical and HSE training will be provided. These opportunities will enhance workers' qualifications, improve their competitiveness for future employment in the renewable energy sector, and broaden access to similar job opportunities beyond the Project. Given the limited availability of specialised training programmes in the region, any training delivered by the Investor will provide significant added value to the local community and support long-term workforce development.

The impact on education and training will be regional in extent, as capacity – building and skills development are expected to benefit workers across both the Social AoI and the wider Constanta County. The duration of the impact will be long – term, since the knowledge and competencies acquired during the Project will remain with workers and support their employability in future renewable energy developments.

The intensity will be low, given the relatively limited number of beneficiaries and the absence of a formalised, large-scale training programme. Overall, the Project will strengthen the local skills base and enhance long-term employment prospects in the region.

For the above reasons, the impacts will be *Positive*, with *Low* intensity, *Very High* duration and *Low* spatial extent, with a magnitude of change considered ***Low.***

Table 9-33 Education and Training impacts during construction/decommissioning and operational phases

Impact	Receptor	Sensitivity	Magnitude	Significance
Increased local skills and knowledge through training and on-the-job learning opportunities.	Workforce	Moderate	Low	**Low**

9.3.3.2 Management and Mitigation Measures

For the Construction/decommissioning and operational phase impacts the following enhancement measures are proposed:

- Develop a targeted training program based on project needs and workforce skill gaps
- Provide technical, H&S and environmental training to all workers
- Promote on-the-job learning and knowledge transfer from experienced staff
- Prioritize training opportunities for local workers and vulnerable groups.
- Monitor and document training delivered by the Project and its contractors

9.3.3.3 Residual Impacts

No significant residual impacts associated with the education and training are expected.

9.3.4 Infrastructure and public services

9.3.4.1 Impact assessment during Construction/decommissioning Phase

Infrastructure and public services impacts during Construction/decommissioning Phase include the following:

- Increased pressure on local infrastructure and public services due to the influx of non-local workers.
- Pressure on local housing availability and affordability due to accommodation needs of non-local construction workers.

Increased pressure on local infrastructure and public services

The influx of non-local workers during construction/decommissioning may increase pressure on public services such as healthcare, local administration, and essential utilities, as workers will be accommodated in existing housing within nearby communities rather than in dedicated project accommodation facilities. Given existing gaps in waste collection and wastewater management in the Social AoI, a rapid rise in service demand could temporarily exacerbate waste and sanitation challenges.

The impact on public services due to the influx of non-local workers will be local in extent, as pressures on healthcare, administration, waste management, and other essential services will be primarily experienced within the municipalities surrounding the Project site. The duration will be medium term, occurring throughout the construction phase and particularly noticeable at its onset and during emergency situations. The intensity of the impact is expected to be moderate; as the availability of different types of local public services is limited, the impact of any additional users will be noticeable by the local citizens

For the above reasons, the impacts will be *Negative*, with *Moderate* intensity, *Moderate* duration and *Moderate* spatial extent, with a magnitude of change considered ***Moderate.***

Pressure on local housing availability and affordability

The expected influx of non-workers during the construction/decommissioning phase will have an effect on the local housing stock as accommodation will be based on the use of existing private rental housing in nearby villages, supported through coordination with the local commune and relevant authorities. Although some of the short-term workers may be placed in available hotels, the majority of non-local construction workers will look for long-term rentals.

The impact on housing availability and affordability due to the influx of non-local workers will be local in extent, primarily affecting communities in proximity to the construction sites. The duration will be medium term, occurring throughout the construction phase as workers compete with residents for rental properties. The intensity of the impact is assessed as moderate, given the relatively high number of workers expected to seek housing at the same time and the potential for temporary rental price increases, which may benefit property owners but adversely affect low-income tenants.

For the above reasons, the impacts will be *Negative*, with *Moderate* intensity, *Moderate* duration and *Moderate* spatial extent, with a magnitude of change considered ***Moderate.***

Table 9-34 Infrastructure and public services impacts during construction/decommissioning phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Increased pressure on local infrastructure and public services due to the influx of non-local workers.	Public Services & Local Institutions	Moderate	Moderate	**Moderate**
Pressure on local housing availability and affordability due to accommodation needs of non-local construction workers.	Local population and communities	Moderate	Moderate	**Moderate**

9.3.4.2 Impact assessment during Operational phase

Infrastructure and public impacts during operational phase include the following:

- Alteration of the local landscape and visual aesthetics due to the presence of wind turbines.

This impact is assessed in chapter 9.3.7.

9.3.4.3 Management and Mitigation Measures

For the Construction phase impacts the following mitigation measures are proposed:

1. Increased pressure on local infrastructure and public services:
    - Assess the capacity of local public services (healthcare, waste management, water supply, transport) prior to construction
    - Coordinate with relevant local authorities to manage potential pressure on public services generated by the incoming workforce
    - Ensure workers are housed without affecting local community access to services
    - Ensure that accommodation arrangements do not place additional pressure on municipal utilities or services, in line with the use of existing off-site housing solutions

- Develop and enforce a Traffic Management Plan to minimize pressure on local roads and transport infrastructure
- Provide on-site facilities (e.g., first aid, sanitation, drinking water, waste disposal) to reduce reliance on local services.
- Establish site rules and conduct training to ensure responsible use of local infrastructure by non-local workers
- Maintaining engagement with local councils and service providers throughout construction to monitor emerging pressures and adjust measures as needed.

2. Pressure on local housing availability and affordability:

- Minimize pressure on local housing through workforce planning and coordination with local authorities and the commune
- Ensure non-local workers are accommodated in existing off-site housing within nearby communities; in line with GIIP, worker accommodation shall meet minimum standards for space, ventilation, sanitation, potable water, waste management, and overall welfare. Appropriate management, monitoring, and communication procedures will be implemented to mitigate potential social, health, and safety impacts on workers associated with off-site accommodation arrangements
- Monitor local rental markets to detect price increases or displacement risks during construction
- Coordinate with contractors and the local commune to identify suitable accommodation options and support orderly use of existing rental housing where needed.

9.3.4.4 Residual Impacts

The significance of the impacts has been assessed after the application of mitigation measures in order to obtain the residual impact significance. The significance of the impacts after the application of mitigation measures is expected to be reduced to acceptable levels (*Low* significance).

Table 9-35 Infrastructure and public services residual impacts during construction phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Increased pressure on local infrastructure and public services due to the influx of non-local workers.	Public Services & Local Institutions	Moderate	Moderate	Low	**Low**
Pressure on local housing availability and affordability due to accommodation needs of non-local construction workers.	Local population and communities	Moderate	Moderate	Low	**Low**

9.3.5 Community health and safety

This chapter examines the potential effects of the Project on the health, safety, and overall well-being of communities located within the Social Area of Influence. The overarching objective is to prevent harm arising from Project activities, ensure that risks are managed responsibly, and promote a safe interaction between the Project and local residents. Community health and safety considerations are particularly relevant in the context of rural settlements where daily life intersects with agricultural land, local transport routes, and public services. Healthcare access within the Social AoI is generally adequate, with family doctors and community nurses operating in each commune, and this context informs the sensitivity of local receptors.

A wind farm development may generate a broad range of community health and safety risks throughout its lifecycle; however, not all such risks are addressed within this chapter. Several pathways, particularly those linked to environmental emissions or physical project infrastructure are assessed comprehensively in dedicated ESIA sections. To avoid duplication and ensure that each topic is treated with the appropriate level of technical depth, this chapter focuses specifically on those community-related risks that are inherently social in nature or that arise from the interaction between people and the Project workforce or facilities.

Accordingly, the following impacts are assessed in this chapter:

- Risks associated with workforce influx during construction and the resulting pressures on community health, safety, and social cohesion.
- Risks to aviation safety related to the presence of turbines and temporary tall structures.

The following community health and safety–related aspects are not assessed here, as they are covered in the following ESIA chapters:

- Air quality impacts (see Section 9.2.1)
- Noise impacts (see Section 9.2.2)
- Landscape and visual impacts (see Section 0)
- Shadow flicker and ice throw impacts (see Section 9.3.8)

9.3.5.1 Impact assessment during Construction/decommissioning Phase

Community health and safety impacts during Construction/decommissioning Phase include the following:

- Increased security risks, including potential rise in crime, communicable diseases, and social issues due to the influx of non-local workers.

During the Construction/decommissioning Phase, the Project will require a non-local workforce, comprising skilled and semi-skilled personnel, who will temporarily reside within or near the Social Area of Influence (AoI). The presence of a temporary external workforce can influence community health, safety, and social stability through several pathways.

The influx of non-local workers and their interaction with host population during the construction/decommissioning phase may lead to negative social and health impacts, including a higher risk of respiratory infectious or sexually transmitted diseases (such as HIV and AIDS), which could further strain local medical services. Healthcare infrastructure in the Social AoI is already limited, making the community more vulnerable to potential outbreaks. Additionally, the arrival of newcomers could contribute to higher crime levels and social tensions, especially if workers face unemployment after their contracts end or are perceived by residents as competitors for project-related job opportunities.

The impact will be local in extent, affecting settlements and residents situated near construction areas and accessed roads. The duration of this impact will be medium term, limited to the construction/decommissioning period, with a steep declining at the operation stage. The intensity is considered moderate as, although only a portion of the local population is likely to be directly affected, even a limited number of incidents related to crime or disease transmission can quickly influence community perceptions and strain the county's already limited emergency healthcare capacity.

For the above reasons, the impacts will be *Negative*, with *Moderate* intensity, *Moderate* duration and *Moderate* spatial extent, with a magnitude of change considered ***Moderate.***

Table 9-36 Community health and safety impacts during construction/decommissioning phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Increased security risks, including potential rise in crime, communicable diseases, and social issues due to the influx of non-local workers.	Local population and communities	Moderate	Moderate	**Moderate**
	Vulnerable and Disadvantaged Groups	High	Moderate	**Moderate**

9.3.5.2 Impact assessment during Operational phase

During the Operational phase, the workforce reduces significantly and consists primarily of specialised technicians and maintenance teams. The number of non-local workers is minimal, typically rotating on short maintenance cycles. As a result, the potential for interaction with communities decreases substantially.

Community health and safety risks during operation are therefore greatly reduced. Pressure on health services is negligible, and the risk of communicable disease introduction or social tensions becomes very low. Occasional contractor presence may still occur but remains predictable and limited in scale.

For the above reasons, main community health and safety impacts during Operational phase include the following:

- Risk of aircraft collisions with wind turbines due to their height and location.

Due to their height, the wind turbine generators may pose a risk of collision to passing by aircrafts – either civil or military. The possible exclusion of the Project area from the use by aviation will depend on the decision of the relevant authority.

The risk of aircraft collisions with wind turbine generators will be local in extent, limited to the immediate area surrounding the Project's wind turbine sites. The duration of this impact will be long term, persisting throughout the operational life of the turbines. The intensity is assessed as low, as no airports are located nearby, and aviation does not currently use the area, therefore the scale of the impact will be limited. Local communities are considered the relevant social receptor, as any aviation incident would ultimately pose risks to people and assets on the ground, rather than to aviation operators themselves.

For the above reasons, the impacts will be *Negative*, with *Low* intensity, *High* duration and *Low* spatial extent, with a magnitude of change considered ***Low***, reflecting very low probability due to the fact that turbines are fixed, illuminated structures.

Table 9-37 Community health and safety impacts during operational phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Risk of aircraft collisions with wind turbines due to their height and location.	Local population and communities	Moderate	Low	**Low**

9.3.5.3 Management and Mitigation Measures

For the Construction phase impacts the following mitigation measures are proposed:

- Prioritize local hiring to limit the number of non-local workers entering the Social AoI.
- Enforce a Workers' Code of Conduct covering behavioral expectations, cultural sensitivity and zero tolerance for violence or harassment.
- Implement a Community Health, Safety and Security Management Plan including measures to prevent the spread of communicable diseases (e.g., hygiene, sanitation, health education, infection control protocols).
- Ensure proper waste management and sanitation in worker accommodation to prevent disease transmission
- Maintain a grievance mechanism accessible to community members to report concerns related to workers behaviour or influx impacts.
- Establish dedicated safeguards for Vulnerable Groups, including tailored awareness and a confidential reporting channel.

For the Operational phase impacts the following mitigation measures are proposed:

- Consult and coordinate with relevant civil and military aviation authorities to ensure compliance with air traffic safety regulations.
- Equip all WTGs with aviation-compliant anti-collision lighting and marking systems
- Regularly inspect and maintain anti-collision lighting to ensure continuous functionality
- Ensure turbine locations and heights are registered and communicated through official aviation channels

9.3.5.4 Residual Impacts

The significance of the impacts has been assessed after the application of mitigation measures in order to obtain the residual impact significance. The significance of the impacts after the application of mitigation measures is expected to be reduced to acceptable levels (*Low* significance), however, residual significance for Vulnerable Groups is assessed as moderate.

Table 9-38 Community health and safety residual impacts during construction/decommissioning phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Increased security risks, including potential rise in crime, communicable diseases, and social issues due to the influx of non-local workers.	Local population and communities	Moderate	Moderate	Low	**Low**
	Vulnerable and Disadvantaged Groups	Moderate	High	Low	**Moderate**

Table 9-39 Community health and safety residual impacts during operational phase

Impact	Receptor	Significance before mitigation	Receptor sensitivity	Residual Magnitude	Residual Significance
Risk of aircraft collisions with wind turbines due to their height and location.	Local population and communities	Low	Moderate	Negligible	**Negligible**

9.3.6 Labour and working conditions

9.3.6.1 Impact assessment during Construction/decommissioning Phase

Labour and working conditions impacts during Construction/decommissioning Phase include the following:

- Health and safety risks for workers due to inadequate accommodation and working conditions.
- Potential health and safety risks for supply chain workers due to inadequate labour conditions and limited oversight of global third-party suppliers.
- Health and safety risks for workers due to hazardous construction activities, including working at height, excavations, and handling of electrical and hazardous materials.

Health and safety risks for workers due to inadequate accommodation and working conditions

If adequate accommodation and working conditions are not ensured, the workforce may face various health and safety risks, including fire hazards, electrical risks, theft, crime, poor sanitation, and low food quality. Migrant workers hired through third-party contractors, and less familiar with national and international standards, may be particularly vulnerable to excessive working hours and insufficient safety equipment or procedures.

The risk of inadequate working and accommodation conditions will be local in extent, limited to the Project's construction sites and workers' living facilities. The duration of this impact will be medium to long term, as exposure will occur throughout the construction period and serious incidents could lead to permanent effects on worker health and wellbeing. The intensity is assessed as moderate, as the potential changes are noticeable but limited to the workforce.

For the above reasons, the impacts will be *Negative*, with *Moderate* intensity, *Moderate* duration and *Low* spatial extent, with a magnitude of change considered ***Moderate.***

Potential health and safety risks for supply chain workers

Supply-chain workers involved in Project-related production may face inadequate occupational health and safety conditions, particularly given the global and third-party nature of supply chains. Migrant workers are especially vulnerable, as they may have limited awareness of their labour rights and be exposed to long working hours and unsafe conditions, increasing the risk of overexploitation.

The potential for adverse working conditions and health and safety risks among supply chain workers will be global in extent, as materials and services for the Project will be sourced internationally through third – party suppliers. The duration of this impact will be short-term, occurring only during the period when suppliers are engaged in Project-related production and logistics activities. The intensity is assessed as high, given the significant number of workers involved across various supply chain tiers.

For the above reasons, the impacts will be *Negative*, with *High* intensity, *Low* duration and *Very High* spatial extent, with a magnitude of change considered ***High.***

Health and safety risks for workers due to hazardous construction activities

Wind farm construction activities (such as working at height, excavations, operating near power lines, and handling hazardous substances) entail notable health and safety risks for workers. While proper H&S management should prevent injuries or fatalities, the presence of a diverse workforce hired through multiple third-party contractors increases the likelihood of accidents. As incidents and injuries fall under the category of unplanned events, a dedicated assessment using the unplanned-events methodology is provided in chapter 9.5.

Table 9-40 Labour and working conditions impacts during construction/decommissioning phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Health and safety risks for workers due to inadequate accommodation, poor sanitation, and non-compliance with labour and safety standards.	Workforce	Moderate	Moderate	**Moderate**
Health and safety risks for supply chain workers due to inadequate labour conditions and limited oversight of global third-party suppliers.	Workforce	Moderate	High	**Moderate**

9.3.6.2 Impact assessment during Operational phase

Labour and working conditions impacts during Operational phase include the following:

- Health and safety risks for workers during maintenance activities, including potential incidents such as electrocution and falls from height.

Although the operational phase typically involves activities that are less hazardous than those of construction, incidents may still occur during servicing and maintenance tasks, for example due to risks of electrocution or working at height.

As incidents and injuries fall under the category of unplanned events, a dedicated assessment using the unplanned-events methodology is provided in chapter 9.5.

9.3.6.3 Management and Mitigation Measures

For the Construction/decommissioning phase impacts the following mitigation measures are proposed:

1. Health and safety risks for workers due to inadequate accommodation and working conditions:
    - Provide worker accommodation that meets the IFC PS2 and national standards (space, ventilation, sanitation, potable water, waste management, food safety)
    - Ensure defining minimum living standards, hygiene requirements and maintenance procedures)
    - Conduct regular inspections of all accommodation facilities, including those managed by subcontractors.
    - Guarantee equal accommodation standards for migrant and subcontracted workers
    - Maintain a confidential workers’ grievance mechanism for accommodation-related concerns.
2. Supply chain H&S:

- Implement the Project's Human Resources Policy, which will outline the Project Developer's commitment to ensuring labour rights, good working conditions and equal treatment for all individuals.
- Require all supply chain partners to comply with a Supplier Code of Conduct, including prohibitions on forced, compulsory, or exploitative labour practices.
- Screen contractors and suppliers through pre-contract due diligence, focusing on H&S performance, labour practices, and compliance with international standards.
- Include specific H&S and labour obligations in all procurement contracts, supported by regular monitoring and performance checks.
- Ensure indirectly employed workers have access to the Workers' Grievance Mechanism to safely and confidentially report health, safety, or labour-related concerns.

9.3.6.4 Residual Impacts

The significance of the impacts has been assessed after the application of mitigation measures in order to obtain the residual impact significance. The significance of the impacts after the application of mitigation measures is expected to be reduced to acceptable levels (*Low* significance).

Table 9-41 Labour and working conditions residual impacts during construction phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Health and safety risks for workers due to inadequate accommodation, poor sanitation, and non-compliance with labour and safety standards.	Workforce	Moderate	Moderate	Low	**Low**
Health and safety risks for supply chain workers due to inadequate labour conditions and limited oversight of global third-party suppliers.	Workforce	Moderate	Moderate	Low	**Low**

9.3.7 Landscape and Visual

A dedicated Landscape and Visual Impact Assessment (VIA) has been undertaken for the Project, and the complete study is provided in Appendix I of this ESIA. The purpose of this chapter is to summarise the main findings relevant to the ESIA, focusing on the visibility of the proposed turbines, the sensitivity of visual receptors, and the nature of changes expected during construction and operation. The assessment follows internationally recognised landscape and visual assessment practice (such as the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition - IEMA, 2013) and integrates GIS-based visibility modelling and representative photomontages.

9.3.7.1 Summary of Methodology

The VIA relies on a spatially driven approach tailored to wind-energy developments. The analysis begins with the delineation of a 20 km Zone of Potential Visual Influence (ZPVI), identified as the maximum distance at which turbines may be perceptible under normal atmospheric conditions. Within this area, three Zones of Theoretical Visibility (ZTVs) were generated to capture visibility of different turbine components: the lower sweep (39 m), the hub (121 m), and the blade tip (203 m). These layers provide a nuanced understanding of how much of each turbine may be visible and how visually prominent it may appear.

To translate theoretical visibility into realistic perceptual conditions, the three ZTV layers were combined through a weighted analysis reflecting their differing visual salience. A subsequent refinement focused on locations where substantial turbine components (sweep and hub) would be clearly visible, producing a perceptual visibility raster. This allowed the identification of areas where turbines are expected to appear distinctly and dominantly in the landscape.

A comprehensive set of 70 viewpoints was established to cover settlements, transport corridors, cultural sites, protected areas, and recreational locations across the ZPVI. From these, five viewpoints were selected for detailed photomontage analysis, chosen to illustrate the full gradient of visibility—from immediate proximity to distant background views—and to represent the receptor groups most likely to experience visual change.

9.3.7.2 Key Outcomes of the Viewshed Analysis

The combined theoretical and perceptual visibility modelling shows that the turbines will be visible from a wide area, but their perceptual intensity varies significantly with distance and local topography. Visibility is highest within the first few kilometres of the turbines, where they appear as dominant vertical elements in an open agricultural setting. Beyond this range, topographic screening and distance reduce their prominence.

Quantitative zonal analysis confirms a consistent reduction in high-impact visibility with distance:

- Immediate / Near Zone (0–0.8 km): approx. 25% of the area presents clear, high-prominence turbine visibility.
- Near / Foreground (0.8–3.2 km): visibility remains notable (approx. 20%), though turbines begin to integrate with other landscape elements.
- Midground (3.2–8.1 km): high-impact visibility drops to approx. 11%, with turbines perceived as smaller, grouped elements.
- Distant / Background (8.1–20 km): high-impact visibility drops to approx. 7%, with turbines appearing subordinate to the wider landscape.

This pattern demonstrates that the perceptual dominance of the turbines is generally limited to areas closest to the Project, while more distant receptors experience a significantly reduced visual effect.

The photomontages further validate these findings, showing strong visibility from near-view road corridors, moderate effects from cultural and recreational sites in the midground, and negligible prominence from distant receptors.

9.3.7.3 Impact assessment during Construction Phase

Construction activities will introduce temporary but noticeable changes to the landscape through vegetation clearance, ground disturbance, movement of heavy machinery, and installation of ancillary infrastructure such as access roads and laydown areas. These elements will locally reduce landscape coherence and increase visual clutter within an otherwise open and rural setting. In addition, construction will result in temporary visual changes perceived by residents, road users, and recreational receptors. Visible elements include cranes, machinery, stockpiles, temporary lighting, and vehicle movement. These effects are most pronounced in close proximity to turbine sites and along new or upgraded access roads.

The magnitude of change during construction is assessed as **Low**, concentrated around turbine locations, access routes, and construction compounds. The impact decreases with distance and is limited in duration.

Table 9-42 Landscape and visual impacts during construction phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Temporary alteration of landform and removal of vegetation may disrupt the visual cohesion of the agricultural landscape and create noticeable scars in otherwise open fields.	Landscape	Moderate	Low	**Low**
	Settlements	Moderate	Low	**Low**
	Road users	Low	Low	**Low**
	Recreational sites	Moderate	Low	**Low**
	Protected areas	Moderate	Low	**Low**

9.3.7.4 Impact assessment during Operational phase

The operational wind farm introduces tall, moving vertical structures within a predominantly open agrarian landscape. Turbines will form a new, permanent landscape feature and will alter perceptual attributes such as scale, movement, and horizon line composition. Operational turbines will be visible from numerous receptors, with perceptual prominence highest at short distances. Key effects relate to turbine scale, blade movement, shadow flicker, and alteration of the horizon line.

Table 9-43 Landscape and visual impacts during operational phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Permanent vertical structures alter landscape character.	Landscape (VP39)	Moderate	Moderate	**Moderate**
	Settlements	Moderate	Low	**Low**
	Road users (along road DN3 – VP30)	Low	High	**Moderate**
	Road users (along road A2 – VP1)	Low	Negligible	**Negligible**
	Recreational sites (VP25)	Moderate	Moderate	**Moderate**
	Protected areas (VP49)	Moderate	Low	**Low**

9.3.7.5 Management and Mitigation Measures

The residual significance of the impact will be dependent on the implementation of mitigation/control measures and the scale of activities.

For Construction Phase impacts the following mitigation measures are proposed:

- Limit vegetation clearance and topsoil removal strictly to the required work footprint.
- Shape temporary earthworks with smooth, natural profiles to reduce noticeable edges or scars.

- Restore vegetation immediately after construction activities.

For Operational Phase impacts the following mitigation measures are proposed:

- Consider implementing small-scale landscape compensation projects such as green areas, scenic paths or upgraded public spaces, prioritising locations with highest significance visual exposure.
- Engage with local communities through clear communication and agreed local benefits, supporting minor infrastructure or public services.

9.3.7.6 Residual Impacts

The significance of the impacts has been assessed after the application of mitigation measures in order to obtain the residual impact significance. The significance of the impacts after the application of mitigation measures is expected to be reduced to acceptable levels (*Low* significance).

Table 9-44 Landscape and visual residual impacts during operational phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Permanent vertical structures alter landscape character.	Landscape and visual receptors	Low/moderate	Low/moderate	Low/negligible	**Low/negligible**

9.3.8 Shadow flicker

Shadow flicker is a visual phenomenon occurring when rotating turbine blades intermittently obstruct direct sunlight, producing alternating changes in light intensity at a receptor. This effect arises only under specific conditions: the sun must be unobstructed, the turbine operational, and the geometric alignment between sun, turbine, and receptor must be suitable for shadow casting. As such, shadow flicker is an intermittent and predictable effect, typically restricted to early morning and late afternoon hours when the sun is at a low angle.

During operation, shadow flicker may affect residential receptors located within the theoretical influence zone, generally up to 1–1.5 km from a turbine. Actual perceptibility, however, depends on meteorological conditions, turbine availability, and local topography. The impact does not occur during cloudy conditions, when the rotor is not operating, or when the blade plane is not aligned with the observer.

For this ESIA, shadow flicker has been assessed using updated modelling undertaken by DNV (Appendix J – Shadow Flicker Assessment), representing the most robust and realistic dataset available. These results constitute the basis for this impact assessment. Relevant information from the AON national EIA has been incorporated only where consistent with the updated modelling.

9.3.8.1 Receptors

The receptors considered in this assessment correspond to those used in the AON national EIA shadow-flicker modelling, and have been validated by the Project Sponsor for the purposes of this ESIA. They represent indicative points for clusters of residential areas located in the vicinity of the proposed turbines (see image below).

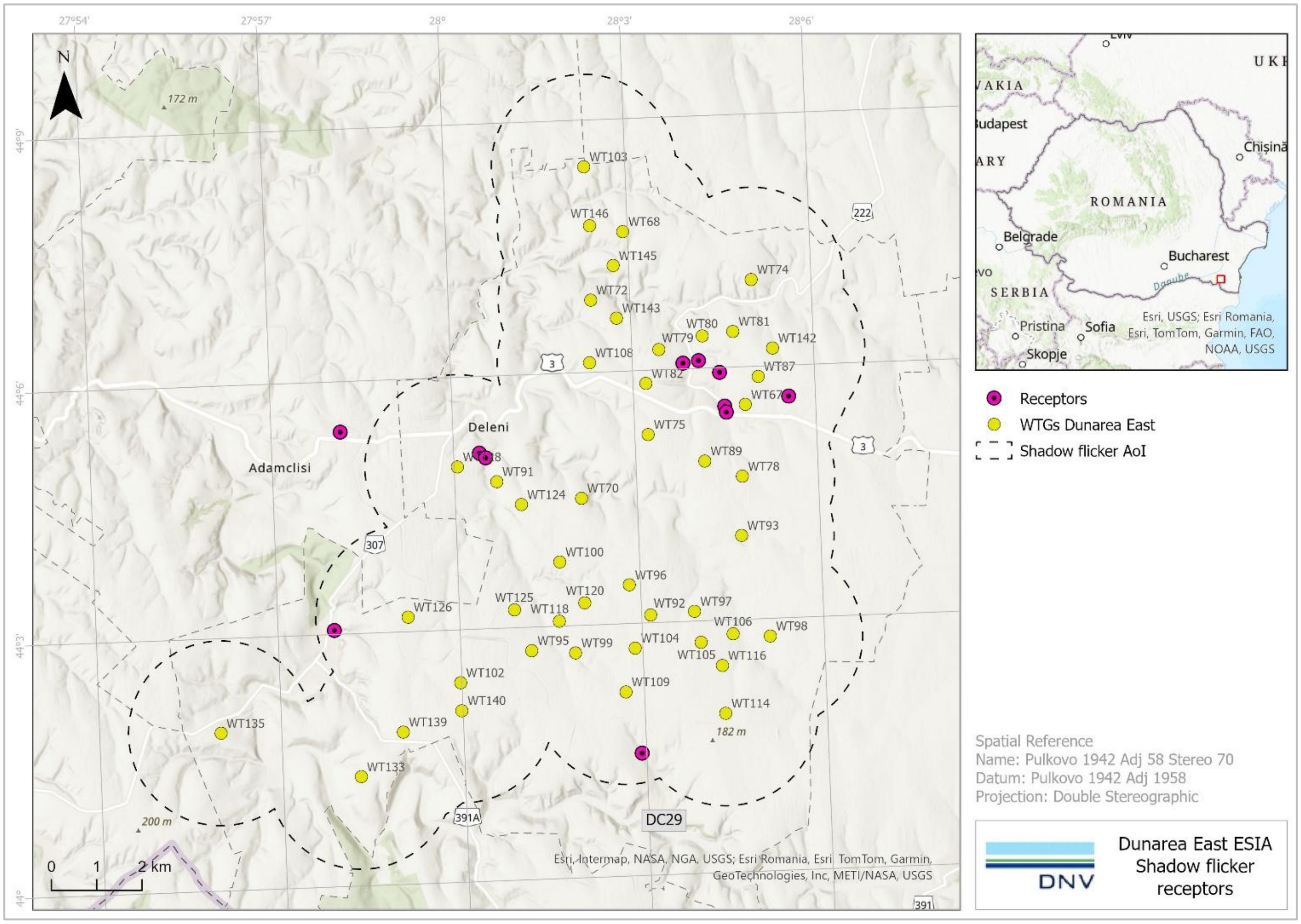

Figure 9-7 Shadow flicker receptors (location sourced from AON National EIA)

9.3.8.2 Modelling

Shadow flicker modelling for the Project was carried out by DNV using a geometric assessment approach based on the relative position of the sun, turbine dimensions, topography, and the spatial relationship between turbines and receptors. The analysis considers the potential maximum duration of shadow flicker events over a full year, using conservative assumptions including: turbines always operating when meteorologically possible, rotors always oriented perpendicular to the sun–turbine vector, receptors represented as 360° horizontal planes, and no shielding from vegetation, buildings, or cloud cover.

The modelling was performed using the 45 × Goldwind GW165-6.0 MW turbines with a hub height of 121 m, as requested by the Customer. This configuration provides a conservative scenario in line with IFC with regard to the potential extent and duration of shadow flicker effects.

The detailed modelling approach, assumptions, input data and full results are included in Appendix J – Shadow Flicker Assessment, which is based on the standalone technical report prepared by DNV. It is noted that the present assessment updates the model done in the AON National EIA.

9.3.8.3 Impact assessment during Construction Phase

During the construction phase, no operational wind turbines will be active; therefore, no rotating blades will be present and no shadow flicker phenomenon can occur.

9.3.8.4 Impact assessment during Operational Phase

During the operational phase, rotating turbine blades may periodically obstruct sunlight and generate intermittent shadows at surrounding locations. Shadow flickering can occur only under specific geometric and meteorological conditions, including clear skies, low solar altitude angles, and turbine orientation facing the sun.

The modelling undertaken for this assessment adopts a deliberately conservative (worst-case) approach. This includes assumptions of continuous sunshine, permanent turbine operation, rotor orientation always perpendicular to the sun, and receptors with full 360° exposure. In addition, no account has been taken of cloud cover, turbine downtime, wind direction frequency, vegetation, or building orientation. As such, the results represent an upper-bound estimate of potential shadow flicker exposure (astronomical maximum), rather than realistic conditions.

The potential impact associated with shadow flicker is a visual disturbance that may be experienced intermittently by residential receptors located within the shadow path. This disturbance does not lead to physical health impacts but may cause nuisance or discomfort.

The modelling results presented in Appendix J indicate that, under worst-case assumptions, some receptors would exceed commonly referenced advisory thresholds (e.g. 30 minutes per day and 30 hours per year). Specifically, 7 receptors (R61–R67) exceed both the daily and annual thresholds, while 1 additional receptor (R68) exceeds the daily threshold only. The highest exposure is predicted at receptor R63 (up to 99 minutes/day and 165 hours/year).

However, these results are considered to substantially overestimate actual exposure. In practice, shadow flicker occurrence is significantly reduced due to:

- Cloud cover, which limits direct sunlight
- Turbine downtime due to low/high wind speeds and maintenance
- Wind direction variability, meaning turbines are not continuously oriented to produce shadow towards a given receptor
- Screening effects from buildings, vegetation and local topography
- The orientation of windows, which limits actual indoor exposure.

In light of the above, while shadow flicker effects are expected to be limited in extent and intermittent in nature, the worst-case modelling indicates that a small number of receptors may remain subject to exceedances of commonly referenced advisory thresholds even when considering more realistic conditions. These receptors are primarily those located in closest proximity to the turbines and within the main shadow path (notably R63 and, to a lesser extent, R64, R66, R67, which are peripheric residential houses of the Pietreni municipality).

Therefore, adopting a precautionary approach, the magnitude of the impact is conservatively assessed as Moderate.

Table 9-45 Shadow flickering impacts during operational phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Visual and health disturbance due to shadow flickering effects	Residential clusters – shadow flicker	Moderate	Moderate	**Moderate**

DNV

9.3.8.5 Management and Mitigation Measures

In order to be sure that shadow flickering impacts will be maintained at acceptable levels, the following mitigations shall be considered:

- A refined shadow flicker assessment shall be undertaken for the most exposed receptors (e.g. R63, R64 and nearby receptors), incorporating more realistic input parameters such as site-specific meteorological data (including cloud cover), wind direction frequency, turbine operational characteristics, and receptor-specific factors (e.g. window orientation and local screening).
- Provide a dedicated grievance mechanism and reporting system able to monitor closely through engagement with residents during the operational phase, where there are predicted impacts from shadow flickers.
- Based on the type of grievances that will be collected, specific on-site verification of the occurrence of shadow flickering will be managed and tailored mitigation measures shall be adopted as follows:
    - Assessment and optimisation of natural visual screening (e.g. vegetation, existing structures)
    - Installation of additional screening measures where natural barriers are not sufficient
    - Implementation of turbine control strategies (e.g. temporary shutdown during critical periods) to prevent exceedance of applicable thresholds.

9.3.8.6 Residual Impacts

The significance of the impacts has been assessed after the application of mitigation measures in order to obtain the residual impact significance. The significance of the impacts after the application of mitigation measures is expected to be reduced to acceptable levels.

Table 9-46 Shadow flickering residual impacts during operational phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Visual and health disturbance due to shadow flickering effects	Residential clusters – shadow flicker	Moderate	Moderate	Low	**Low**

9.3.9 Ice Throwing

Wind turbines, like any tall structures, can accumulate ice under specific atmospheric conditions. These conditions typically include ambient temperatures around 0°C, combined with high relative humidity, freezing rain, or sleet. The extent of ice accumulation depends on local weather patterns and the operational status of the turbine.

Accumulated ice may detach from the turbine due to gravity and the mechanical forces generated by the rotating blades. Factors such as rising ambient temperatures, wind, or solar radiation can cause ice sheets or fragments to loosen, creating a hazard in the area directly beneath the rotor. Additionally, rotating blades can propel ice fragments over considerable distances, potentially reaching several hundred meters from the turbine.

According to the CCRA (Appendix L), climate projections for the Project area indicate a significant reduction in the number of annual icing days over the coming decades, which is expected to further decrease the overall likelihood of ice accretion and subsequent ice throw events.

9.3.9.1 Impact assessment during Construction Phase

During the construction phase, no operational wind turbines will be active; therefore, no ice throwing phenomenon can occur.

9.3.9.2 Impact assessment during Operational Phase

Ice throw represents a safety concern when turbines are located near public roads, residential areas, or infrastructure such as power lines. To mitigate this risk, safe setback distances are recommended. According to the Wind Energy Production in Cold Climates (WECO), a conservative estimate of the minimum safe distance can be calculated using the formula:

Safe Distance = 1.5 × (Hub Height + Rotor Diameter)

This distance should be used as a reference in site planning to minimize potential hazards to people, property, and infrastructure.

Based on the Project turbine specifications (hub height: 128 m; rotor diameter: 165 m), the conservative ice throw distance is approximately 439.5 m. The Project layout has been developed to comply with these setback requirements. The majority of turbines do not have any identified receptors within or close to this distance. However, for two turbines (WT80 and WT67), existing buildings are located close to the boundary of the calculated setback distance. These buildings are understood to be of likely industrial/agricultural or non-residential use, and no confirmed sensitive (e.g. residential) receptors are located within the core risk area.

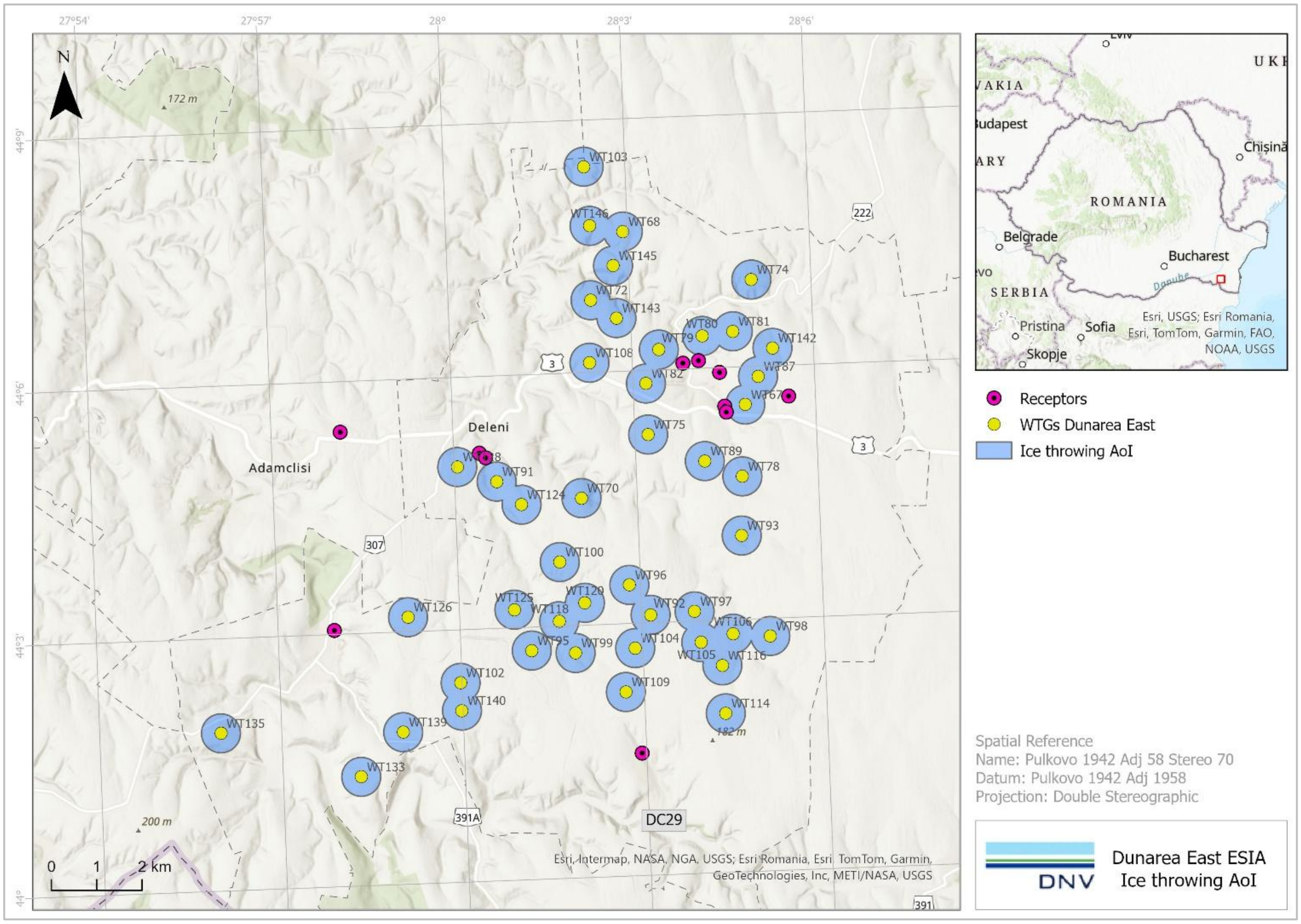

Figure 9-8 Ice Throw Hazard Map (example representation of potential impact zones based on turbine geometry)

Potential impacts include minor injuries to people, damage to vehicles, or harm to nearby structures within the immediate rotor area, as well as the possibility of ice fragments being projected a short distance beyond the turbine. These events are seasonal and intermittent, typically limited to periods of cold weather and specific atmospheric conditions. Intensity can vary from Low to Moderate.

Considering the limited presence of receptors within the potential impact area, and their location at or beyond the outer boundary of the calculated setback distance, the overall consequence is expected to remain minor to moderate at Project level, with impacts being localized and of limited duration.

Moreover, as also specified in the CCRA, the wind turbine models currently considered for the Project are engineered for cold-climate operation, with minimum operating temperatures down to –30 °C when equipped with their respective cold-climate packages. These configurations include blade ice detection systems and active anti-icing or de-icing solutions that significantly reduce the probability of hazardous ice accumulation during sub-zero conditions.

Given that the projected number of icing days is expected to decrease by mid-century across all climatic clusters of the Project area, the frequency of conditions conducive to ice accretion, and therefore to ice throw, is anticipated to diminish over the operational lifetime of the wind farm.

For such reasons, an overall low magnitude can be considered.

Table 9-47 Ice throw impacts during operational phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Minor injuries to people, damage to vehicles, or harm to nearby structures within the immediate rotor area due to ice throw effects	Residential clusters	Moderate	Low	**Low**

9.3.9.3 Management and Mitigation Measures

In order to be sure that ice throw impacts will be maintained at acceptable levels, the following mitigations shall be considered:

- Provide a dedicated grievance mechanism and reporting system able to monitor closely through engagement with residents during the operational phase, where there are predicted impacts from ice throw.
- In a situation where a risk to the public or operational staff due to ice throw is believed to exist, the following measures are suggested:
  - Maintain adequate setback distances.
  - Physical and visual warnings: placing fences and warning signs as appropriate for the protection of site personnel and the public at least one rotor diameter from the wind turbine in all directions and at entrance points to the wind energy facility (to be included in the Project Emergency Preparedness and Response Plan).
  - Modern turbine control systems for cold-climate configurations, such as Smart Icing detection or automated operational adjustments, mitigate risks by allowing the turbine to pause or modify rotor speed when ice accretion is detected (to be included in the Project Emergency Preparedness and Response Plan).
  - Consider to include cold-climate and anti-icing features, such us heated wind sensors and active de-icing systems, to help preventing ice formation and ensures reliable operation of critical components.

9.3.9.4 Residual Impacts

The significance of the impacts has been assessed after the application of mitigation measures in order to obtain the residual impact significance. The significance of the impacts after the application of mitigation measures is expected to be reduced to acceptable levels.

In addition, the long-term climatic trend toward fewer icing days contributes to a progressive reduction of the underlying risk factors, reinforcing the conclusion that residual impacts will remain negligible.

Table 9-48 Ice throw residual impacts during operational phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Minor injuries to people, damage to vehicles, or harm to nearby structures within the immediate rotor area due to ice throw effects	Residential clusters	Low	Moderate	Negligible	**Negligible**

9.3.10 Ecosystem Services

9.3.10.1 Impact assessment during Construction Phase

Ecosystem services impacts during Construction Phase include the following:

- Disruption of land-based ecosystem services due to land take, vegetation clearance and construction activities

As described in Chapter 8.4.5, the Social Baseline Study determined that the Project Area provides limited ecosystem services, as most habitats are already highly modified by agricultural activities. Semi-natural areas such as steppe patches and small woodlands offer only minor provisioning or cultural value, and local communities are not significantly dependent on them; no priority ecosystem services have been identified. During the construction phase, land occupation for turbine foundations, access roads, and other infrastructures will further reduce these limited services, including small areas use for crop production, grazing or occasional firewood collection. Construction activities may also disturb residual ecosystem functions and cause temporary, minor disruption to cultural ecosystem services linked to nearby historical or religious sites.

The impacts will be localized and restricted to the areas directly affected by land take and construction works. Given the already modified condition of habitats and the low reliance of communities on ecosystem services, the effects are expected to have low intensity. Disruptions may be long term where land conversion is permanent (e.g., turbine platforms and access roads), but the overall magnitude remains low due to the limited baseline value of ecosystem services.

For the above reasons, the impacts will be *Negative*, with *Low* intensity, *High* duration, and *Low* spatial extent, resulting in a ***Low*** magnitude of change.

Table 9-49 Ecosystem services impacts during construction phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Disruption of land-based ecosystem services due to land take, vegetation clearance and construction activities	Ecosystem Services	Low	Low	**Low**

9.3.10.2 Impact assessment during operational phase

No operational impacts are expected, as all ecosystem-service effects arise solely from land take and vegetation clearance during construction in already highly modified habitats. The operational phase involves no further land conversion or restriction of remaining provisioning.

9.3.10.3 Impact assessment during decommissioning phase

No impacts are envisaged during this phase considering that the situation will be converted to natural baseline status.

9.3.10.4 Management and Mitigation Measures

For the Construction phase impacts the following mitigation measures are proposed:

- Rehabilitate all temporarily disturbed areas (e.g., temporary access tracks, laydown areas, work zones) immediately after construction, using methods that support natural vegetation regeneration and soil stabilization.
- Maintain ongoing engagement between the Project and local communities, with communities informed in advance of any vegetation clearing to allow pre-harvesting of resources such as building materials or other useable resources.
- Apply livelihood-related mitigation measures (see Chapter 9.9.1), including preparation of the Livelihood Restoration Plan (LRP)

- The LRP will include an entitlement matrix for all affected land users and an Accidental Damage Compensation Procedure to address unintentional damage during construction and operation.

9.3.10.5 Residual Impacts

The significance of the impacts has been assessed after the application of mitigation measures in order to obtain the residual impact significance. The significance of the impacts after the application of mitigation measures is expected to remain *Low*, since the ecosystems needs long-term to recover.

Table 9-50 Ecosystem services residual impacts during construction phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Disruption of land-based ecosystem services due to land take, vegetation clearance and construction activities	Ecosystem Services	Low	Low	Low	**Low**

9.3.11 Traffic

9.3.11.1 Impact assessment during Construction Phase

Traffic impacts during Construction Phase include the following:

1. **Temporary traffic congestion and slower travel speeds due to increased movement of heavy and oversized vehicles and daily worker commuting:**

During construction, the movement of turbine components, heavy machinery and materials along DN3, DJ 391, DC 56, DC 29 and agricultural/communal roads will temporarily increase traffic in the AoI. Oversized transports arriving from the Port of Constanta qualify as exceptional loads and will require specific permits, creating short term slowdowns at intersections, village crossings and sections with tighter curves.

Traffic constraints may also occur on agricultural roads undergoing reinforcement works and along newly built permanent access roads, especially during underground cable installation. While DN3 and DJ 391 can accommodate additional traffic without major congestion, narrower DC and agricultural roads will experience more noticeable delays due to reduced speed and maneuvering requirements for oversized convoys. Daily commuting by construction workers will add further traffic, but it is not expected to create peak-hour congestion. Within the Project area, heavy construction traffic may cause temporary delays for local users, although road upgrades will ultimately improve long-term access.

For the above reasons, the impacts will be *Negative*, with *Moderate* intensity, *Moderate* duration, and *High* spatial extent, resulting in a ***Moderate*** magnitude of change.

2. **Deterioration of local and regional road surfaces from frequent heavy truck deliveries and transport of oversized loads:**

The movement of heavy and oversized vehicles transporting turbine components, concrete and construction materials is expected to increase wear on public and local roads within the AoI. While DN3 is built to a higher standard and can better withstand heavy loads, county and communal roads as well as agricultural roads (many of which are unpaved or lightly reinforced) are considerably more vulnerable to deterioration such as cracking, rutting and surface erosion.

Oversized transport may require temporary interventions (e.g., shoulder reinforcement, curve widening or removal of street furniture), generating short-term disruptions but carried out in coordination with road authorities. Additional localized impacts may occur during the reinforcement of approximately 38,18 km of existing agricultural/service roads and the construction of 55,75 km of new permanent access roads, particularly while underground cables are installed beneath these routes. In the medium and long term, the upgraded and newly constructed internal roads will improve access within the Project area and enhance overall road quality for local users beyond the construction phase.

For the above reasons, the impacts will be *Negative*, with *High* intensity, *Moderate* duration, and *High* spatial extent, resulting in a ***High*** magnitude of change.

3. **Increased risk of traffic accidents and property damage due to higher traffic volumes and circulation of heavy and oversized vehicles on local roads:**

During the construction phase, the increased movement of heavy and oversized vehicles transporting turbine components will temporarily elevate road safety risks within the Social AoI. Local drivers (accustomed to low-volume traffic on DN3, county roads and communal/agricultural roads) may be unfamiliar with the reduced speeds, wide turning radii and maneuvering constraints of oversized convoys, increasing the likelihood of collisions or minor property damage.

Safety risks are higher along narrower county and communal roads, village crossings and sections with sharp curves or limited clearance, where oversized vehicles may struggle to manoeuvre. Until the final exceptional-transport routes are confirmed, several pinch points remain potentially critical for road-user safety.

Traffic accidents are by nature unplanned events, hence they have been assessed with the proposed methodology in chapter 9.5*.*

Table 9-51 Traffic impacts during construction phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Temporary traffic congestion and slower travel speeds due to increased movement of heavy and oversized vehicles and daily worker commuting.	Local population and communities	Moderate	Moderate	**Moderate**
	Road Infrastructure	Low	Moderate	**Low**
Deterioration of local and regional road surfaces from frequent heavy truck deliveries and transport of oversized loads.	Local population and communities	Moderate	High	**Moderate**
	Road Infrastructure	Low	High	**Moderate**

9.3.11.2 Impact assessment during Operational phase

Traffic impacts during Operational phase include the following:

- Deterioration of road function, condition and safety due to operation activities

During the operational phase, the Project site will receive regular visits from a small maintenance team for inspections, routine servicing and minor repairs. These activities involve light vehicles and will generate very limited traffic, with no noticeable effect on local traffic flow. Only major maintenance events (such as turbine component replacement) may require the sporadic use of heavy or oversized trucks, resulting in short-term and infrequent increases in traffic.

The internal road network (comprising 55,75 km of newly constructed permanent access roads and 38,18 km of upgraded agricultural/service roads) will continue to provide safe, reliable access to all WTGs. These upgraded and newly built roads will also enhance long-term connectivity for agricultural users and local residents within the AoI.

Occasional movement of heavy vehicles for major repairs may cause some localised wear on unpaved or lightly reinforced communal and agricultural roads. However, such effects are expected to remain limited and can be addressed through periodic maintenance and coordination with local authorities.

For the above reasons, the impacts will be *Negative*, with *Low* intensity, *High* duration and *Low* spatial extent, with a magnitude of change considered ***Low.***

Table 9-52 Traffic impacts during operational phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Deterioration of road function, condition and safety due to operation activities	Local population and communities	Moderate	Low	**Low**
	Road Infrastructure	Low	Low	**Low**

9.3.11.3 Impact assessment during Decommissioning phase

Traffic impacts during Decommissioning Phase include the following:

1. Temporary traffic congestion and slower travel speeds due to removal of turbine components and worker commuting

During decommissioning, an increase in traffic will occur due to the movement of cranes, dismantling equipment, waste containers and transport vehicles carrying turbine components off-site. Although the number of oversized loads will be substantially lower than during construction, certain turbine parts (e.g. tower sections or nacelles) may still require special-transport arrangements, creating short periods of reduced speeds at intersections, village crossings and narrow road sections.

Localised slowdowns may also arise on agricultural and communal roads that connect the turbines to the public network, particularly during component removal or cable decommissioning works. Worker commuting will remain significantly lower than during construction but will nonetheless contribute to short-term traffic increases within the AoI.

Given the more limited fleet size, shorter programme and lower overall traffic intensity compared to construction, congestion effects will be intermittent and manageable, though still noticeable during peak dismantling activities.

For these reasons, the impact will be Negative, with Moderate intensity, Short duration and Medium spatial extent, resulting in a Moderate magnitude of change.

2. Localised deterioration of access roads due to heavy vehicle movements during dismantling activities

The decommissioning process requires the use of cranes, flatbed trucks, waste haulers and heavy machinery for dismantling and transporting turbine components, which may cause limited wear on internal access roads and, to a lesser degree, on nearby communal roads. Since many permanent access roads will remain functional and reinforced from the operational period, and because traffic volumes are significantly lower than during construction, the potential for deterioration is reduced.

Minor degradation (e.g., rutting, gravel displacement, or erosion on unpaved segments) may occur during the removal of components or during excavation works associated with foundation breakup or underground cable decommissioning. Any temporary road widening or surface reinstatement needs will be minimal compared to the construction phase and can be addressed through routine maintenance obligations.

For the above reasons, the impacts will be Negative, with Moderate intensity, Short duration, and Low spatial extent, leading to a Moderate magnitude of change.

3. Increased risk of traffic accidents due to movement of dismantling equipment and heavy vehicles

Decommissioning activities will temporarily increase the circulation of trucks and machinery on access routes, generating short-term safety risks for road users. Although some vehicles transporting turbine sections may have reduced manoeuvrability, the number of such movements will be far lower than during construction and limited to specific periods. Risks may occur at tight curves, village crossings and narrow communal roads, but these will be infrequent and can be effectively managed through traffic control measures.

Local drivers may experience occasional interactions with slow-moving vehicles or crane convoys, but the reduced volume of oversized loads and the shorter duration of works substantially limit accident potential. Standard safety measures such as escort vehicles, signage, speed regulation and coordination with authorities will contribute to keeping risk levels low.

Road accidents have been assessed in chapter 9.5.

Table 9-53 Traffic impacts during decommissioning phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Temporary traffic congestion and slower travel speeds due to increased movement of heavy and oversized vehicles and daily worker commuting.	Local population and communities	Moderate	Moderate	**Moderate**
	Road Infrastructure	Low	Moderate	**Low**
Deterioration of local and regional road surfaces from frequent heavy truck deliveries and transport of oversized loads.	Local population and communities	Moderate	Moderate	**Moderate**
	Road Infrastructure	Low	Moderate	**Low**

9.3.11.4 Management and Mitigation Measures

For the Construction/decommissioning phase impacts the following mitigation measures are proposed:

1. Road function and congestion:
    - Implement a Traffic Management Plan (TMP) defining routing, scheduling, speed limits and safety procedures for all construction traffic
    - Coordinate delivery schedules with local authorities and plan oversized shipments during non-peak hours or at night where safe
    - Communicate regularly with communities about expected traffic levels and timing of oversized deliveries
    - Train drivers on safe driving and project-specific traffic rules along community routes
    - Deploy traffic control measures such as signage, warning signals and marshals at critical points

- Stagger truck movements and avoid queuing on public roads near site access points
- Monitor traffic conditions during construction and adjust TMP measures as needed.

2. Road conditions:
    - Obtain all required road permits and complete any temporary road adjustments or reinforcements needed for oversized deliveries before use.
    - Survey the condition of all planned haul routes prior to construction and share findings with the relevant road authorities.
    - Implement temporary road improvements where needed (e.g., shoulder reinforcement, temporary surface protection, widening for turning radii) in coordination with authorities
    - Coordinate with national road authorities (the Romanian National Road Infrastructure Company, or CNAIR) to identify and restore damage to national, county and communal roads used for heavy deliveries.
    - Install road signage for new or upgraded public-access roads built for the Project, as required by local road authorities
    - Restore all street furniture (signs, lights, barriers) removed or affected by oversized load movements.
    - Develop a post-construction road maintenance schedule (together with local authorities) for roads within and around the Project area during wind farm operation.
3. Road safety:
    - Include road safety measures within the Traffic Management Plan (TMP), covering truck routes, transport hours, signage, community notification and safety communication.
    - Obtain all required road permits and complete any road alterations, bypasses or temporary reinforcements needed for oversized load movements before construction traffic begins.
    - Select safe routes for both oversized and standard loads, prioritizing roads with adequate width, turning radii and load-bearing capacity
    - Schedule heavy and oversized vehicle movements outside school hours, community events and peak traffic periods
    - Implement community information campaigns to announce oversized deliveries, road closures, safety risks and traffic timing
    - Establish and enforce driver and vehicle safety standards, including:
        - Mandatory training and accreditation for project and contractor drivers
        - Driver fitness requirements (rest periods. Zero alcohol/drug tolerance)
        - Use of in-vehicle monitoring systems for speed and location tracking
        - Vehicle maintenance and safety checks
        - Load stability requirements for oversized cargo

For the Operational phase impacts the following mitigation measures are proposed:

1. Road function, condition and safety

   - Maintain and implement a simplified Traffic Management Plan for routine O&M visits and occasional heavy-truck movements.
   - Carry out regular inspections and maintenance of internal Project roads and any improved local agricultural roads used during operations.
   - Coordinate with local authorities when exceptional heavy deliveries or major component replacements require temporary traffic control measures

9.3.11.5 Residual Impacts

The significance of the impacts has been assessed after the application of mitigation measures in order to obtain the residual impact significance. The significance of the impacts after the application of mitigation measures is expected to be reduced to acceptable levels (*Low* significance).

Table 9-54 Traffic residual impacts during construction phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Temporary traffic congestion and slower travel speeds due to increased movement of heavy and oversized vehicles and daily worker commuting	Local population and communities	Moderate	Moderate	Low	**Low**
	Road Infrastructure	Low	Low	Negligible	**Negligible**
Deterioration of local and regional road surfaces from frequent heavy truck deliveries and transport of oversized loads	Local population and communities	Moderate	Moderate	Low	**Low**
	Road Infrastructure	Moderate	Low	Negligible	**Negligible**

Table 9-55 Traffic residual impacts during operational phase

Impact	Receptor	Significance before mitigation	Sensitivity of receptor	Residual Magnitude	Residual Significance
Deterioration of road function, condition and safety due to operation activities	Local population and communities	Low	Moderate	Negligible	**Negligible**
	Road Infrastructure	**Low**	**Low**	Negligible	**Negligible**

9.3.12 Archeological and Cultural Heritage

This section presents the predicted impacts of the Project on Cultural Heritage resources. The assessment considers both tangible and intangible heritage:

- Tangible Cultural Heritage includes, but is not limited to, archaeological sites, historic or culturally significant buildings and structures, places of worship, historic enclosures, and potential settlements.
- Intangible Cultural Heritage encompasses sites and practices of cultural, artistic, or religious significance, traditional knowledge, innovations, and living heritage resources such as shrines, cemeteries, and ritual or religious sites.

At the time of writing, specific project details regarding the width of the construction corridor, safety buffers, or the potential removal of any remaining Cultural Heritage resources prior to construction were not available. Consequently, the assessment considers potential impacts based on the known locations and sensitivities of heritage resources identified through baseline studies.

It is noted that the Project design has been refined following the results of archaeological investigations undertaken between 2022 and 2025, including the abandonment or relocation of certain turbines and access roads to avoid direct interaction with sensitive archaeological sites. The impact assessment presented below is based on the current Project layout.

9.3.12.1 Impact assessment during Construction Phase

Cultural Heritage impacts during Construction Phase include the following:

1. **Direct physical impacts on cultural heritage due to ground disturbance and construction activities**

During the construction phase, ground-disturbing activities (including excavation for turbine foundations, crane pads, underground cable tranches, grading for access roads, and earthworks for laydown areas) have the potential to cause direct, physical impacts on archaeological resources located within the construction footprint.

Given the high archaeological sensitivity of Deleni Commune, the Project Area contains numerous registered archaeological sites and areas with confirmed buried remains (e.g, tumuli, necropolis, Roman rural settlement, prehistoric occupation layers, ancient quarries). Despite preventive archaeological investigations conducted in 2023-2025, undiscovered archaeological deposits may still be present below the ground.

Direct physical impacts may therefore include:

- Partial or complete removal of subsurface archaeological layers
- disturbance of tombs, burial mounds and funerary contexts
- damage to structural features of ancient settlements
- unintentional damage to shallow or surface-visible archaeological features caused by machinery movement or road widening

These impacts are typically permanent, irreversible, and non-recoverable, as physical excavation or removal destroys the scientific, cultural and contextual value of archaeological sites.

For the above reasons, the impacts will be *Negative*, with *High* intensity, *Very High* duration, and *Low* spatial extent. Despite the limited spatial extent, the irreversible and permanent loss of archaeological material results in a ***High*** magnitude of change.

2. **Indirect impacts on cultural setting and access due to visual intrusion, dust deposition and temporary movement restrictions**

During the construction phase, activities associated with turbine installation, road upgrades, cable trenching and general civil works may generate indirect impacts on nearby cultural heritage resources. These impacts do not physically disturb the archaeological sites themselves but may alter their setting, ambience, visibility or accessibility, which are integral components of their cultural heritage value.

Indirect impacts may arise from:

- Visual Intrusion: temporary presence of cranes, machinery and construction structures may alter the visual setting of nearby archaeological sites, tumuli and historic features (this impact is assessed in Section 9.3.7 and not repeated here).
- Dust deposition: earthworks and vehicle movements may deposit dust on exposed archaeological features, affecting their visibility and condition.
- Temporary access restrictions: traffic management and road closures may limit public or researcher access to cultural heritage sites located near construction routes.

These impacts are expected to be minimal because most archaeological sites identified in the baseline are not publicly accessible or designated for tourism, and the Adamclisi Museum, the only nearby public heritage facility, will remain fully accessible throughout construction. Dust deposition may occur only at a few exposed archaeological features already identified, and any temporary access restrictions are expected to be minimal.

In addition to archaeological receptors, these effects may also extend to intangible cultural heritage (ICH) receptors, including active religious and community-based sites such as monasteries, churches, and cemeteries identified within the AoI.

As described in Section 8.4.11.5, these receptors support ongoing religious, funerary and cultural practices that may be sensitive to temporary disruptions in accessibility, tranquillity, and surrounding environmental conditions. However, given the separation distances between most receptors (approximately 1.0–1.3 km from turbine locations) and the absence of direct construction works at these sites, impacts are expected to remain indirect and temporary in nature.

The exception is Șipotele, where underground cable works occur at closer proximity (~500 m), although no direct interaction with the receptor is anticipated.

These impacts are expected to be limited because:

- most archaeological sites are not publicly accessible or tourism-driven
- cultural and religious sites remain operational throughout construction
- any disturbances are short-term and reversible after completion of works

Importantly, while these receptors maintain active cultural and religious functions, the Project is not expected to interfere with the continuity of such practices, but may temporarily affect their perceived tranquillity and accessibility during peak construction activity periods.

For the above reasons, the impacts will be *Negative*, with *Low* intensity, *Moderate* duration, and *Low* spatial extent, resulting in a ***Low*** magnitude of change.

Table 9-56 Archaeological and Cultural Heritage impacts during construction phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Direct physical impacts on cultural heritage due to ground disturbance and construction activities	Cultural Heritage	High	High	**High**
Indirect impacts on cultural setting and access due to visual intrusion, dust deposition and temporary movement restrictions	Cultural Heritage	High	Low	**Moderate**
	Intangible Cultural Heritage	High	Low	**Moderate**

9.3.12.2 Impact assessment during Operational phase

Cultural Heritage impacts during Operational phase include the following:

- Indirect impacts on cultural setting due to the visual intrusion of permanent presence of wind turbines, operational noise and access restrictions

During the operational phase, the Project may generate indirect impacts on cultural heritage resources located within Deleni Commune. Although no ground disturbance occurs during operation, the presence and functioning of wind turbines may influence the visual setting, acoustic environment, or access conditions around cultural heritage sites located in the vicinity of the Project Area.

Indirect impacts within Deleni may arise from:

- Permanent visual alteration: Turbines introduce tall, permanent elements into the landscape of Deleni, modifying the visual setting of the archaeological sites recorded in the National Register (this impact is assessed in Section 9.3.7 and not repeated here).
- Operational noise: Continuous low-level turbine noise may slightly affect the surrounding ambience or perceived tranquillity of sensitive archaeological areas within Deleni (this impact is assessed in Section 9.2.2 and not repeated here).
- Occasional access disruptions: maintenance operations may temporarily influence movement along communal or agricultural roads within Deleni that also serve as access points to local archaeological sites.

As provided above, archaeological sites identified in the baseline are not publicly accessible or designated for tourism, and the Adamclisi Museum, the only nearby public heritage facility, will remain fully accessible throughout the operations.

Intangible cultural heritage receptors identified within the AoI are not expected to experience significant impacts during the operational phase, as no construction activities, access restrictions, or changes to physical accessibility occur. The nearest receptors are located at sufficient distance ($\geqslant$1.0 km) from operational turbines to avoid functional interference with religious, funerary or cultural practices.

For the above reasons, the impacts will be *Negative*, with *Negligible* intensity, *High* duration, and *Low* spatial extent, resulting in a ***Negligible*** magnitude of change.

Table 9-57 Archaeological and Cultural Heritage impacts during operational phase

Impact	Receptor	Sensitivity	Magnitude	Significance
Indirect Impacts on Cultural Setting due to the Permanent Presence of Wind Turbines, Operational Noise and Access Restrictions	Cultural Heritage	High	Negligible	**Negligible**

9.3.12.3 Impact assessment during decommissioning phase

No impacts are envisaged during this phase.

9.3.12.4 Management and Mitigation Measures

Archaeological management for the Dunărea East Wind Farm is based on a comprehensive and phased approach implemented throughout Project development, from early design to construction permitting. Archaeological risk has been addressed through a combination of avoidance by design, preventive archaeological investigation, and continuous monitoring, in accordance with Romanian cultural heritage legislation and good international practice.

The results of the archaeological studies undertaken between 2022 and 2025 directly informed Project design decisions, leading to the cancellation or rerouting of several turbines and access roads in order to avoid interaction with the 50 identified archaeological sites and their associated protection zones. Where avoidance was not feasible, preventive archaeological research, including full excavation and scientific documentation, was carried out prior to construction, resulting in the issuance of archaeological discharge certificates for the investigated areas. Remaining and residual archaeological risks are addressed through legally mandated archaeological supervision during construction, supported by clear stop-work and escalation procedures.

On this basis, the mitigation measures set out below have been defined to avoid, minimise and manage potential impacts on archaeological and cultural heritage resources during the construction phase. These measures are aligned with good international practice and incorporate the mandatory requirements of Culture Permit no. 46/Z/05.02.2025, issued by the Constanța County Directorate for Culture.

The following good-practice mitigation measures will be applied across all construction activities to reduce the risk of impacts on cultural heritage resources:

- A Chance Find Procedure (CFP) will be implemented for unexpected discoveries occurring outside formally supervised areas
- All contractors involved in excavation, grading or trenching will receive induction on cultural heritage sensitivity, legal obligations and reporting requirements.
- Regular communication will be maintained with cultural authorities and affected landowners regarding supervised excavation areas, archaeological sensitivities and procedures to follow in case of finds.
- Dust control: apply water spraying and enforce low-speed limits on unpaved roads to reduce dust deposition on exposed heritage features.
- Access management: maintain access routes to cultural heritage sites; provide temporary detours only when essential.

In addition to the general measures above, the following mandatory mitigation and management measures shall be implemented in full compliance with Culture Permit no. 46/Z/05.02.2025:

- Archaeological supervision: Continuous archaeological supervision shall be ensured for all soil-disturbing activities, including excavations for turbine foundations, access roads, cable trenches, grading and earthworks, where these activities intersect archaeological sites or their protection zones. Archaeological supervision shall be carried out by a certified archaeological institution under a valid supervision contract.
- Contractual requirement: Prior to the commencement of construction works, the developer shall maintain a valid contract with a certified archaeological institution for archaeological supervision and, where required, further preventive archaeological research.
- Execution-phase preventive archaeological research: Preventive archaeological investigations shall be undertaken during the execution phase for Turbine WT80 and for access roads and infrastructure corridors that could not be investigated during previous phases due to active agricultural use, in accordance with the Culture Permit requirements.
- In situ preservation and design adaptation: In the event that significant archaeological complexes or structures are discovered during construction monitoring, works shall immediately cease in the affected area. The Project design shall be adapted, in consultation with the competent cultural heritage authorities, to ensure the preservation of archaeological remains in situ wherever feasible.
- Conversion of supervision to preventive research: Where construction monitoring identifies significant archaeological remains, the archaeological supervision contract shall be immediately converted into a preventive archaeological research contract, allowing systematic excavation, documentation and salvage, as required by national legislation.
- Reporting obligations: Upon completion of construction works, a final archaeological supervision report shall be submitted to the Constanța County Directorate for Culture, documenting all findings, compliance actions and outcomes.

Regarding Intangible Cultural Heritage (ICH) management measures, the following shall be considered:

- Construction planning shall take into account sensitive periods associated with religious activities (e.g., major religious holidays, funerary events, and local commemorative practices) where feasible, in coordination with local stakeholders.
- Temporary construction-related disturbances will be managed with the standard mitigation measures for noise, dust, and traffic to avoid unnecessary disruption to access routes serving active religious and cultural sites, particularly during peak visitation periods.
- Construction contractors will be required to respect the cultural and social function of these receptors and to avoid obstruction of access to cemeteries, churches, and places of worship.
- Structured stakeholder engagement shall be implemented with custodians and users of intangible cultural heritage receptors identified within the AoI, including representatives of monasteries, parish churches, and cemetery administrations.

9.3.12.5 Residual Impacts

The significance of the impacts has been assessed after the application of mitigation measures in order to obtain the residual impact significance. The significance of the impacts after the application of mitigation measures is expected to be reduced to *Moderate* significance.

Table 9-58 Cultural Heritage residual impacts during construction phase

Impact	Receptor	Significance before mitigation	Significance of receptor	Residual Magnitude	Residual Significance
Direct physical impacts on cultural heritage due to ground disturbance and construction activities	Cultural Heritage	High	High	Low	**Moderate**
Indirect impacts on cultural setting and access due to visual intrusion, dust deposition and temporary movement restrictions	Cultural Heritage	Moderate	High	Negligible	**Negligible**
	Intangible Cultural Heritage	Moderate	High	Negligible	**Negligible**

9.4 Cumulative Impact Assessment

A Cumulative Impact Assessment (CIA) study has been performed for the Project in line with IFC's Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets Good Practice Handbook (IFC, 2013). The CIA considered the relative contribution of the Project in terms of impacts to five VECs (Valued Social and Environmental Components) that included:

- Avifauna (birds and bats)
- Landscape and visual;
- Traffic;
- Employment;
- Archaeology and Cultural Heritage;
- Climate.

As part of the Cumulative Impact Mitigation Strategy, several broad mitigation measures to assist with informing the mitigation strategies for similar planned wind energy developments in the region that may pose a risk of cumulatively affecting the VECs identified.

The CIA is presented in Appendix K.

9.5 Unplanned events

Unplanned events are defined as reasonably foreseeable incidents not anticipated during normal project operations. These can arise from emergencies, accidents, or non-routine incidents. In this assessment, only construction and operational phase events are considered, as potential decommissioning-phase unplanned events are uncertain over the long-term (>30 years). The assessment evaluates the most likely unplanned events leading to environmental, social, and community health impacts, as well as those with the highest potential significance. Significance is determined through a combination of likelihood and consequence, using the risk matrix in Table 6-10.

9.5.1 Identification of unplanned events

The following tables summarize the potential unplanned events during the construction and operational phases of the Project.

Table 9-59 Unplanned events identification during the construction phase

Impact	Description
Fuel, Oil, and Chemical Spills	Accidental leakage of diesel, hydraulic fluids, lubricants, or concrete additives during refuelling, equipment maintenance, material handling or damages to construction equipment. May affect soil, surface water, and groundwater.
Improper Waste Management	Mismanagement of construction waste, hazardous waste, or packaging materials leading to localized contamination, odour, or aesthetic nuisance.
Construction Accidents	Unplanned events during construction may arise from interactions with heavy machinery, lifting operations, working at heights, excavation activities, and construction traffic. In the context of a wind farm, these risks are associated in particular with crane operations for turbine installation, transport of oversized components (e.g. blades), open excavations for foundations and cabling, and temporary storage areas. In addition, there is a potential for unauthorized access to construction areas by local land users (e.g. farmers, shepherds, or recreational users), especially where the site overlaps with existing land uses. Such access may result in exposure to hazardous conditions, including moving equipment, falling objects, unstable ground, or energized systems.
Vehicle Collisions	Vehicle collisions may occur during the construction phase as a result of increased traffic associated with the transport of wind turbine components (e.g. blades, tower sections), construction materials, and workforce movements. Key contributing factors may include driver fatigue, inadequate driving behaviour, limited experience in handling oversized or heavy vehicles, poor vehicle maintenance, and challenging road or weather conditions. In addition, rural or semi-rural project areas may be characterized by mixed traffic conditions, including agricultural vehicles, cyclists, pedestrians, and animals crossing roads, which further increases collision risks.
Fire and Explosions	Fire hazards during the construction of the wind farm are primarily associated with the presence and use of fuels, lubricants, and electrical equipment. Potential ignition scenarios include leakage of flammable substances (e.g. diesel) from construction vehicles, generators, or storage areas, as well as overheating or malfunctioning of machinery. Additional risks may arise from hot works (e.g. welding, cutting), improper storage of flammable materials, or the presence of ignition sources in proximity to dry vegetation. Explosion risks are generally limited, as fuels are typically stored and handled in controlled conditions; however, localized explosions may occur in case of confined fuel vapour ignition or equipment failure.
Natural Hazards Affecting the Site	Storms, flash floods, or extreme winds affecting partially built structures, cranes, or temporary installations.

Table 9-60 Unplanned events identification during the operational phase

Impact	Description
Fuel or Oil Spills During Maintenance	During the operational phase, minor spills of fuel, lubricants, or hydraulic oils may occur in the course of routine or corrective maintenance activities on wind turbines, transformers, or auxiliary equipment. These may result from accidental leaks during refuelling, handling of containers, or failure of hoses and connections.
Improper Waste Management	Improper handling, storage, or disposal of waste generated during operation and maintenance activities (e.g. used oils, filters, packaging materials, or small quantities of hazardous waste) may occur due to procedural failures or human error. Such situations may involve temporary accumulation of waste in non-designated areas or inadequate segregation of hazardous and non-hazardous materials.
Fire and Explosions in Turbines or Substation	Fire incidents during operation may result from equipment malfunction, overheating of mechanical or electrical components, short circuits, or failure of electrical systems within turbines or substations. Additional causes may include leakage of flammable materials (e.g. transformer oil or lubricants) combined with ignition sources, as well as external factors such as lightning strikes or damage to transmission infrastructure.
Natural Hazards	Extreme winds, storms, floods, or lightning causing turbine or substation damage.
Transmission Line Snapping	During the operational phase, there is a potential risk of transmission line failure (e.g. snapping or collapse of conductors), which may occur due to extreme weather conditions (e.g. high winds, storms), mechanical failure, material fatigue, or external factors such as accidental impact or falling vegetation. The Project involves only a limited section of new transmission line to connect the wind farm to the substation, while the majority of the transmission infrastructure consists of existing lines. As such, potential failure events would be associated with a relatively small portion of new infrastructure.
Blade Throw	During the operational phase, there is a potential risk of blade throw from wind turbines. Blade throw may occur due to structural failure, material fatigue, or extreme mechanical malfunction, resulting in the detachment of a blade or blade fragment. The extent of potential impact is influenced by turbine characteristics (e.g. rotor diameter, hub height, rotational speed) and environmental conditions. In line with international good practice, setback distances are used as the primary mitigation measure. According to international guidance (e.g. WBG EHS Guidelines and IEA recommendations), the maximum throw distance can be conservatively estimated as: $d = 1.5 \times (\text{Rotor Diameter} + \text{Hub Height})$ Based on the worst-case Project turbine specifications (rotor diameter: 165 m; hub height: 128 m), the maximum theoretical throw distance is approximately: $d = 1.5 \times (165 + 128) = 439.5$ m The Project layout has been designed to respect appropriate setback distances. The large majority of turbines have no residential or other sensitive receptors within or near this distance. Only two turbines (WT80 and WT67) present buildings located close to the boundary of the calculated setback distance; these are understood to be of likely industrial or non-residential use.

9.5.2 Risk assessment

The risk of each unplanned event has been assessed using the risk-based methodology combining **consequence** and **likelihood** as described in chapter 6.3.6. The significance reported in the tables below reflects the residual risk, i.e., the expected level of impact after implementation of the preventive and mitigation measures described in chapter 9.5.3 below.

This approach ensures that the assessment accounts for the planned management measures, while providing a clear overview of which events remain of moderate or major significance despite mitigation. The tables distinguish between construction and operational phases and summarize the potential impacts, likelihood of occurrence, and residual significance for each identified unplanned event.

It is noted that all mitigation measures referenced are further detailed in chapter 9.5.3 and will be implemented and monitored through the Project's Environmental and Social Management Plan (ESMP).

Table 9-61 Risk assessment for unplanned events during the construction phase

Impact	Consequence	Likelihood	Significance
Fuel, Oil, and Chemical Spills	**Incidental – Physical/Social Environment** Consequences are limited to the construction site and the potential spills will be limited to the capacity of the containers or fuel tanks of the vehicles. Potential localized and short-term effects with impacts remaining within environmental standards after containment.	**Unlikely** Such spills may occur once during the project lifecycle but are mitigated by bunded storage, trained personnel, and spill response kits.	**Negligible**
Improper Waste Management	**Minor – Physical/Biological/Social Environment** Accidental dispersion of solid waste (plastic, organic or hazardous waste) has the potential to pollute the environment. It is expected that environmental effects will remain localised without exceedance of environmental standards.	**Unlikely** Errors in waste handling can occur but are minimized through waste management plans and authorized contractors.	**Minor**
Construction Accidents	**Moderate/Major – Social Environment** The consequences of such events may include physical injuries to workers or third parties, ranging from minor trauma to more serious injuries requiring medical treatment and recovery periods. In most credible scenarios, impacts would affect a limited number of individuals and are expected to be reversible over time with appropriate medical care. However, in more severe but less frequent cases (e.g. failure during heavy lifting operations, interaction with high-voltage equipment, or major traffic incidents), outcomes could involve	**Unlikely** Construction activities will be managed under established health and safety procedures and access controls. Nevertheless, such incidents are recognized within the construction industry, particularly in large infrastructure projects involving heavy equipment and open sites. Where unauthorized access occurs, the likelihood may increase in areas with active surrounding land use, although it remains low provided that appropriate preventive measures (e.g. access restrictions, signage, and	**Moderate (Major)**

Impact	Consequence	Likelihood	Significance
	severe or long-term injuries, with recovery requiring extended periods.	stakeholder communication) are implemented.	
Vehicle Collisions	**Moderate/Major – Social Environment** Vehicle collisions may result in injuries or fatalities involving drivers, workers, or third-party road users (e.g. pedestrians, cyclists, local residents). In most foreseeable scenarios, impacts are expected to involve a limited number of individuals, with injuries that can be treated and resolved over time. However, more severe cases may occur, particularly in incidents involving heavy vehicles or abnormal loads, potentially resulting in serious or long-term injuries, or fatalities.	**Very Unlikely / Unlikely** Traffic will be managed through established procedures, including driver training, route planning, and vehicle maintenance requirements. Nevertheless, such incidents are documented in infrastructure and construction projects, particularly where there is a temporary increase in heavy traffic interacting with existing road users. Also, Romania has a comparatively high baseline road-safety risk. The likelihood may be influenced by local road conditions and traffic composition, but remains low provided that appropriate traffic and safety management measures are implemented.	**Moderate (Major)**
Fire and Explosions	**Moderate/Major – Social/Physical Environment** In most scenarios, fire events are expected to remain localized and may result in limited damage to equipment or minor injuries to workers, with recovery achievable in a relatively short timeframe. However, under less frequent but more severe conditions—such as fires occurring during dry periods or involving multiple fuel sources—there is potential for fire spread to surrounding vegetation. In such cases, impacts may extend beyond the immediate construction site, potentially affecting workers, nearby land users, or environmental receptors, and leading to more serious or longer-term consequences. In worst-case scenarios, injuries could be severe, particularly if individuals are exposed to flames, smoke inhalation, or secondary effects (e.g. reduced visibility, panic situations).	**Very Unlikely** Fuel storage and handling, equipment maintenance, and hot works will be managed under established safety procedures, such us strict hot-work permits, controlled fuel handling, trained personnel, and readily available firefighting equipment. In addition, typical environmental conditions (e.g. humidity, vegetation management) are expected to limit fire propagation for most of the year.	**Moderate (Major)**
Natural Hazards	**Major – Physical Environment** Subsidence due to loessic soils and extreme weather could cause significant, widespread, and persistent effects on turbine foundations, hardstands, and access roads.	**Unlikely** Gradual ground settlement is possible, and extreme weather/fire events are rare; may occur once or more over the project lifetime,	**Major**

Impact	Consequence	Likelihood	Significance
		mitigated by monitoring and geotechnical management.	

Table 9-62 Risk assessment for unplanned events during the operational phase

Impact	Consequence (with explanation)	Likelihood (with explanation)	Significance
Fuel or Oil Spills During Maintenance	**Incidental – Physical Environment** Given the nature of wind farm infrastructure, such events are typically localized and occur at turbine bases, substations, or maintenance areas. The consequences of such spills are generally limited in extent and duration, potentially resulting in localized soil contamination or minor exposure risks for workers. Impacts are typically contained on-site and can be effectively managed through standard clean-up procedures, with no long-term effects expected.	**Unlikely** Maintenance activities will follow established procedures for handling fuels and oils, and equipment will be regularly inspected. Nevertheless, minor spills are recognized as occasional occurrences in similar operational contexts; standardized maintenance procedures will also limit spill probability.	**Negligible**
Improper Waste Management	**Minor – Physical Environment** Potential impacts are expected to be minor and localized, including limited soil or surface contamination, visual disturbance, and minor health and safety risks for workers. These impacts are typically short-term and reversible, as they can be effectively addressed through corrective actions such as proper waste collection, removal, and site clean-up.	**Very Unlikely** Maintenance waste streams are limited and well-controlled through routine procedures.	**Minor**
Fire and Explosions (Turbines/Substation)	**Moderate/Major – Social/Physical Environment** In most cases, fire events are expected to be contained within the affected equipment, resulting primarily in damage to assets and limited safety risks for maintenance personnel. Due to the typical setback distance between turbines and residential receptors (generally in the order of several hundred meters), impacts on local communities are expected to be minimal. However, in more severe but rare scenarios there may be localized environmental impacts (e.g. small-scale vegetation damage) and potential risks to nearby land users or emergency responders.	**Very Unlikely** Wind turbines and substations are designed, installed, and operated in accordance with stringent technical and safety standards, including fire protection systems and lightning protection measures. Preventive maintenance and monitoring further reduce the probability of such events, although they remain documented, albeit rare, within the wind energy sector.	**Moderate**

Impact	Consequence (with explanation)	Likelihood (with explanation)	Significance
Natural Hazards	**Major – Physical Environment** Extreme fire days or subsidence may affect turbine stability, substation integrity, or overhead line foundations.	**Unlikely** Rare high-FWI days and slow-developing subsidence events make occurrence unlikely but possible once or more over the project life; mitigated through monitoring and emergency protocols.	**Major**
Transmission Line Snapping	**Major – Social/Physical Environment** Limited spatial extent of new infrastructure and the absence of sensitive receptors or regular human presence in the immediate vicinity of the line corridor. In the unlikely event of conductor failure, potential impacts would be localized and may include temporary ground contact of the line, minor vegetation disturbance, or short-term service interruption. Risks to human health and safety are expected to be minimal due to the low level of exposure.	**Very Unlikely** Transmission infrastructure is designed and maintained in accordance with applicable engineering and safety standards, including resistance to environmental loads and regular inspection regimes.	**Moderate**
Blade Throw	**Minor/Moderate – Social Environment** Very limited exposure of receptors within the potential impact zone. In most foreseeable scenarios, impacts would be confined to the immediate vicinity of the turbine and may include localized damage to equipment or ground. Given that no confirmed residential receptors are located within the setback distance, and that only a very limited number of buildings are present at the outer boundary (with likely non-sensitive use), the potential for injury to third parties is low. Although blade throw events can theoretically result in severe outcomes, the absence of receptors within the core risk area and the very limited presence at the boundary significantly reduce the overall consequence at Project level. As such, impacts are expected to be localized and not associated with widespread or long-term effects.	**Very Unlikely** Modern wind turbines are designed, manufactured, and operated in accordance with stringent international standards, including structural integrity requirements, condition monitoring systems, and automatic shutdown mechanisms in case of abnormal operation. Compliance with established setback distances further reduces the probability of interaction with external receptors.	**Minor**

9.5.3 Management and mitigation of unplanned events

The Project implements a comprehensive and layered framework to prevent, manage and respond to unplanned events during both the construction and operational phases. This framework combines design-based preventive measures, operational and procedural controls, training and supervision, and emergency preparedness and response, in line with the requirements of IFC Performance Standard 1 and EBRD Environmental and Social Requirement 1.

Design-based prevention of unplanned events

A first level of risk prevention is embedded directly into the technical design of the Project infrastructure and wind turbine systems, with the objective of reducing the likelihood and severity of unplanned events before operational controls are applied. These design-level measures reflect established industry practice and manufacturer specifications and are intended to address technical failures, fire and explosion risks, environmental releases and weather-related hazards.

Key design measures already integrated into the Project include:

- Redundant turbine safety systems, including aerodynamic blade pitching and mechanical braking systems, to ensure controlled shutdown during extreme weather events or technical faults;
- SCADA-based real-time monitoring, enabling automated shutdowns in response to abnormal operating conditions, extreme winds or hazardous icing;
- Fire detection and suppression systems installed in critical turbine and electrical components (e.g. nacelles, transformers and electrical cabinets), designed to automatically disconnect high-voltage equipment if smoke or overheating is detected;
- Lightning Protection Systems (LPS) and grounding systems designed in accordance with international standards to safely dissipate electrical energy and reduce fire and equipment damage risks;
- Design-compliant storage and containment arrangements for fuels, oils and hazardous materials, including impermeable bases and bunding, to prevent accidental releases to soil or groundwater.

These embedded design measures form the first layer of protection within the Project's unplanned events management framework. The operational and procedural measures described below provide additional layers of risk reduction and consequence management during construction and operation.

Health & Safety

Provisions will be made as part of an Occupational Health and Safety Management Plan (OHSMP). The document will outline the Project's safety philosophy and core H&S principles, define policies, commitments, objectives and key challenges, and describe the structure of the H&S management system. It will detail roles, leadership, competence and communication arrangements; contractor management requirements; PPE standards and enforcement; procedures for incident reporting, investigation and non-conformance follow-up; risk profiling, emergency preparedness and response planning; as well as audit, review, and continuous performance monitoring and improvement measures.

In particular, preventive mitigation shall also include:

- Provide task-specific H&S training (e.g., working at heights, lifting operations, electrical safety), including first aid and emergency response.
- Enforce correct and consistent use of appropriate PPE for all construction activities.
- Conduct daily safety briefings and toolbox talks to communicate work-related hazards.

- Ensure competent supervision for all high-risk activities, including turbine erection and heavy lifting.
- Establish a clear system for incident and near-miss reporting, investigation, and corrective action.
- Monitor contractor and subcontractor compliance with H&S standards and site rules.

Vehicle collision and road accidents

Traffic safety should be promoted by all project personnel during displacement to and from the workplace, and during transportation of project equipment and materials on private or public roads. Prevention of traffic related injuries, fatalities or materials dispersion should include the adoption of safety measures that are protective of project workers and of road users, including those who are most vulnerable to road traffic accidents.

Road safety initiatives proportional to the scope and nature of project activities should include:

- Adoption of best transport safety practices with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. Measures should include:
  - Emphasizing safety aspects among drivers;
  - Improving driving skills and requiring licensing of drivers;
  - Adopting limits for trip duration and arranging driver rosters to avoid overtiredness;
  - Avoiding dangerous routes and times of day to reduce the risk of accidents; and
  - Use of speed control devices (governors) on trucks, and remote monitoring of driver actions.
- Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.

Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, recommended measures include:

- Minimizing pedestrian interaction with construction vehicles.
- Collaboration with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present. Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaigns).
- Using locally sourced materials, whenever possible, to minimize transport distances.
- Planning worker bus transport for personnel to the construction site to minimize external traffic.
- Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions.

When the transportation involves heavy equipment loads, preventive measure to minimize the risks of accidents should include:

- Training and licensing industrial vehicle operators in the safe operation of specialized vehicles such as forklifts, including safe loading/unloading, load limits.
- Ensuring drivers undergo medical surveillance.
- Ensuring moving equipment with restricted rear visibility is outfitted with audible back-up alarms.

- Establishing rights-of-way, site speed limits, vehicle inspection requirements, operating rules and procedures (e.g. prohibiting operation of forklifts with forks in down position), and control of traffic patterns or direction.

If the preventive measures are put in place and well followed, the likelihood that a traffic accident or incident along the transportation routes is very low. In the unlikely event that an accident occurs, the project should ensure to have in place such mitigation measures to control the impacts. Those measures should include:

- Compensation of damage to third parties or third-party assets through insurance policies.
- First aid kits among drivers.
- An Emergency Preparedness and Response Plan (EPRP) to be activated, for any traffic-related incidents, including first aid, compensation mechanisms, and coordination with local responders.
- Emergency response measures should be coordinated with emergency responders to ensure that in the event of accidents, prompt interventions are put in place.

Waste

Preventive mitigation measures include:

- Adoption of the Waste Management Plan (WMP) which will address the preventive measures to be followed in order to avoid the risk of waste dispersion;
- good waste management practices should be put in place from the identification of waste (with indication of hazards in case of hazardous waste) and their storage;
- container should be labelled and covered;
- Waste should be disposed of by authorised Subcontractors;
- all workers and Subcontractors should be trained and aware of the good waste management practices.

Hazardous substances release

Preventive measures in order to avoid possible spillages or leakages of fuels in the environment can be summarised as follows:

- Store fuels and chemicals in bunded, labelled, and regularly inspected areas.
- Apply controlled refuelling and fluid-handling procedures.
- Train staff in spill prevention and response.
- Keep spill kits, absorbents, and containment materials readily available at work areas.
- Report and clean up any spill following the spill response protocol.

The potential impact will be managed by the implementation of measures in the ERP where specific procedures will be in place to take specific action in the event of an unplanned release of fuel.

Fire and explosions

Fire risk associated with project activities will be minimised through the definition and enforcement of strict control measures. Fire prevention measure should address the identification of fire risks and ignition sources, and measures needed to limit fast fire and smoke development.

Typical preventive measures include:

- Have a trained emergency squad available 24h/day;
- Have emergency intervention equipment regularly maintained;
- Have an evacuation plan.

Workers who are required to manipulate flammable materials, should be provided with specialized training and provided with, and wear, appropriate PPE (gloves, apron, splash suits, face shield or goggles, etc).

In the construction sites, smoking shall be strictly controlled by providing designated smoking areas for workers.

If the preventive measures are put in place and well followed, the likelihood that a fire occurs is very low. An Emergency and Preparedness Response Plan (EPRP) should be in place in order to manage the consequence of a fire and limit the duration and magnitude of impacts. In particular, the Project should consider the level of local firefighting capacity and whether equipment is available for use at the facility in the event of a major fire. Moreover, appropriately equipped first-aid stations should be easily accessible throughout the place of work.

In case of any damages due to the occurrence of a fire, compensation to individuals or goods through insurance policies should be adopted.

Natural Hazards

- Monitor meteorological alerts and suspend operations during extreme events (high winds, storms).
- Implement erosion- and drainage-control measures to reduce flooding risks.
- Apply geotechnical monitoring where necessary and stabilize vulnerable excavation areas.
- Inspect foundations, access roads, and overhead lines for signs of settlement, erosion, or wind damage.
- Apply shutdown procedures during severe weather forecasts.
- Maintain vegetation management around turbines and OHLs to reduce fire risk.
- Use meteorological and structural monitoring data to inform maintenance planning.

Transmission Line Snapping

- Conduct periodic inspections of poles/towers, conductors, insulators, and hardware.
- Maintain vegetation clearance beneath and around the line to reduce external interference.
- Record and address any corrosion, wear, or abnormal vibration.
- Prepare contingency plans for outages, including rapid isolation and repair procedures.

Blade Throw

- Implement predictive maintenance, vibration monitoring, and routine blade inspections.
- Maintain SCADA systems for continuous performance and overspeed monitoring.
- Define and enforce safety buffer zones around turbines consistent with regulatory requirements and international good practice (e.g. setback distances).

- Install warning signage around turbines highlighting potential risks.
- Apply emergency shutdown procedures in case of abnormal turbine behavior.
- Include the above measures within the Emergency and Preparedness Response Plan (EPRP), ensuring also coordination with local emergency services where relevant and provide training to operational personnel on incident response and site evacuation procedures.

9.5.4 Conclusions on unplanned events assessment

Following the implementation of the above preventive and mitigation measures, the likelihood of most unplanned events is reduced to **Unlikely** or **Very Unlikely**, and their residual significance is Minor to Moderate. However, for certain rare, high-consequence events, such as catastrophic fire events, vehicle accidents or natural disasters, the residual significance remains Major, reflecting the severity of potential impacts rather than the absence of management measures.

For these events, the Project has robust mitigation and response mechanisms in place, including:

- Emergency and Preparedness Response Plan (EPRP) covering all construction and operational scenarios.
- Health and Safety Management System with defined roles, procedures, and reporting lines.
- Continuous monitoring, inspections, and predictive maintenance to reduce the likelihood of occurrence.
- Communication and coordination with local authorities, emergency responders, and affected communities.

In line with IFC PS1 and EBRD ESR1, the ESIA concludes that all unplanned events are being adequately managed, and no residual risk represents a fatal issue for the Project. The ESMP will ensure the continuous implementation, monitoring, and improvement of these measures throughout the Project lifecycle.

9.6 Summary of Impacts and Mitigations

Below is a summary of the negative and positive impacts assessed in the sections above prior to mitigations.

Table 9-63 Impact assessment prior to mitigations

Aspect	Impact	Receptor	Sensitivity of receptor	Magnitude of impact	Significance
Construction Phase					
Land Preparation (site clearance, excavation and levelling), fencing, and civil works Construction of turbine foundations, transmission line pylons, internal road, auxiliary works and turbine installation Construction of associated 400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers Construction of associated additional access roads (new or widened roads inside project area) Equipment and material transport and supply	Degradation of air quality due to dust emission in the atmosphere	Air quality - residential	High	Moderate	**Moderate**
		Air quality - industrial	Low	Moderate	**Low**
		Air quality - construction workers	Moderate	Moderate	**Moderate**
		Air quality - protected areas	Low	Moderate	**Low**
	Degradation of air quality due to pollutants emitted in the atmosphere from engines of vehicles and equipment	Air quality - residential	High	Low	**Moderate**
		Air quality - industrial	Low	Low	**Low**
		Air quality - construction workers	Moderate	Low	**Low**
		Air quality - protected areas	Low	Low	**Low**
	Potential nuisance and annoyance for sensitive receptors caused by increased in noise levels due to machinery and vehicle movements.	Noise - residential	Moderate	Low	**Low**
		Noise - industrial	Low	Low	**Low**
		Noise - construction workers	Moderate	Low	**Low**
		Noise - protected areas	Low	Low	**Low**
	Soil compaction and erosion	Soil	Moderate	Moderate	**Moderate**
	Increase turbidity in nearby rivers and streams due to suspended sediments	Surface waters	Low	Low	**Low**
Land Preparation (site clearance, excavation and levelling), fencing, and civil works	Habitat Loss /Degradation / Fragmentation	Habitats and ecosystems	Moderate	Low	**Low**
		Protected Areas	Moderate	Low	**Low**

Aspect	Impact	Receptor	Sensitivity of receptor	Magnitude of impact	Significance
Construction of turbine foundations, transmission line pylons, internal road, auxiliary works and turbine installation Construction of associated 400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers Construction of associated additional access roads (new or widened roads inside project area)	Loss or displacement of, or disturbance to, fauna species, due to clearance of vegetation for project infrastructure or access to infrastructure, noise, light and movement of vehicles	Terrestrial Fauna	Moderate	Low	**Low**
		Birds and Bats	High	Low	**Moderate**
	Direct mortality of fauna	Terrestrial Fauna	Moderate	Low	**Low**
		Birds and Bats	High	Negligible	**Negligible**
	Loss of vegetation/flora cover	Flora	Low	Low	**Low**
	Introduction and spread of invasive species	Habitats and Ecosystems	Moderate	Low	**Low**
Land Acquisition / Land use	Temporary economic displacement caused by restricted access to agricultural land and pasture routes due to temporary land occupation and construction activities	Landowners and Land Users	Moderate	Low	**Low**
		Vulnerable and Disadvantaged Groups	High	Low	**Moderate**
Workforce Mobilisation and Presence	Increase in direct employment opportunities within the Social AoI and Constanța County through the recruitment of local workers for construction activities.	Workforce	Moderate	Moderate	**Moderate**
	Positive indirect and induced employment effects through increased worker spending and Project-related local procurement of goods and services	Local Businesses & Economic Activities	Moderate	Moderate	**Moderate**

Aspect	Impact	Receptor	Sensitivity of receptor	Magnitude of impact	Significance
	Increased local skills and knowledge through training and on-the-job learning opportunities.	Workforce	Moderate	Low	**Low**
	Increased pressure on local infrastructure and public services due to the influx of non-local workers.	Public Services & Local Institutions	Moderate	Moderate	**Moderate**
	Pressure on local housing availability and affordability due to accommodation needs of non-local construction workers.	Local population and communities	Moderate	Moderate	**Moderate**
	Increased security risks, including potential rise in crime, communicable diseases, and social issues due to the influx of non-local workers.	Local population and communities	Moderate	Moderate	**Moderate**
		Vulnerable and Disadvantaged Groups	High	Moderate	**Moderate**
	Health and safety risks for workers due to inadequate accommodation, poor sanitation, and non-compliance with labour and safety standards.	Workforce	Moderate	Moderate	**Moderate**
	Health and safety risks for supply chain workers due to inadequate labour conditions and limited oversight of global third-party suppliers.	Workforce	Moderate	High	**Moderate**
Construction of turbine foundations, transmission line pylons, internal road, auxiliary works and turbine installation	Temporary alteration of landform and removal of vegetation may disrupt the visual cohesion of the agricultural landscape and create noticeable scars in otherwise open fields.	Landscape	Moderate	Low	**Low**
		Settlements	Moderate	Low	**Low**

Aspect	Impact	Receptor	Sensitivity of receptor	Magnitude of impact	Significance
Construction of associated 400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers Construction of associated additional access roads (new or widened roads inside project area)		Road users	Low	Low	**Low**
		Recreational sites	Moderate	Low	**Low**
		Protected areas	Moderate	Low	**Low**
Land Acquisition / Land use	Disruption of land-based ecosystem services due to land take, vegetation clearance and construction activities	Ecosystem Services	Low	Low	**Low**
Equipment and material transport and supply	Temporary traffic congestion and slower travel speeds due to increased movement of heavy and oversized vehicles and daily worker commuting.	Local population and communities	Moderate	Moderate	**Moderate**
		Road Infrastructure	Low	Moderate	**Low**
	Deterioration of local and regional road surfaces from frequent heavy truck deliveries and transport of oversized loads.	Local population and communities	Moderate	High	**Moderate**
		Road Infrastructure	Low	High	**Moderate**
Land Preparation (site clearance, excavation and levelling), fencing, and civil works Construction of turbine foundations, transmission	Direct physical impacts on cultural heritage due to ground disturbance and construction activities	Cultural Heritage	High	High	**High**

Aspect	Impact	Receptor	Sensitivity of receptor	Magnitude of impact	Significance
line pylons, internal road, auxiliary works and turbine installation Construction of associated 400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers Construction of associated additional access roads (new or widened roads inside project area)	Indirect impacts on cultural setting and access due to visual intrusion, dust deposition and temporary movement restrictions	Cultural Heritage	High	Low	**Moderate**
		Intangible Cultural Heritage	High	Low	**Moderate**
Operational Phase					
WTG Operation	Potential nuisance and annoyance for sensitive receptors caused by increased noise levels due to wind turbines operations.	Noise - residential	Moderate	Low	**Low**
		Noise - industrial	Low	Low	**Low**
		Noise - construction workers	Moderate	Low	**Low**
		Noise - protected areas	Low	Low	**Low**
WTG Inspection and Maintenance	Potential nuisance and annoyance for sensitive receptors caused by increased noise levels due to vehicle movements	Noise - residential	Moderate	Negligible	**Negligible**
		Noise - industrial	Low	Negligible	**Negligible**
		Noise - construction workers	Moderate	Negligible	**Negligible**
		Noise - protected areas	Low	Negligible	**Negligible**
WTG Operation WTG Inspection and Maintenance	Mortality due to collision with wind turbines	Birds and Bats	High	Moderate	**Moderate**
	Mortality due to electrocution with overhead transmission line and pylons	Birds and Bats	High	Low	**Moderate**
	Disturbance to local wildlife due to noise, light and maintenance activities	Terrestrial Fauna	Moderate	Negligible	**Negligible**
		Birds and Bats	High	Negligible	**Negligible**
	Permanent economic displacement due to loss of land access within the Project footprint and safety buffer zones	Landowners and Land Users	Moderate	Low	**Low**
		Vulnerable and Disadvantaged Groups	High	Low	**Moderate**

Aspect	Impact	Receptor	Sensitivity of receptor	Magnitude of impact	Significance
	Increase in local councils' revenue from payment of taxes by the Project	Public Services & Local Institutions	Moderate	Moderate	**Moderate**
WTG Operation	Risk of aircraft collisions with wind turbines due to their height and location.	Local population and communities	Moderate	Low	**Low**
	Permanent vertical structures alter landscape character.	Landscape (VP39)	Moderate	Moderate	**Moderate**
		Settlements	Moderate	Low	**Low**
		Road users (along road DN3 – VP30)	Low	High	**Moderate**
		Road users (along road A2 – VP1)	Low	Negligible	**Negligible**
		Recreational sites (VP25)	Moderate	Moderate	**Moderate**
		Protected areas (VP49(	Moderate	Low	**Low**
	Visual and health disturbance due to shadow flickering effects	Residential clusters – shadow flicker	Moderate	Moderate	**Moderate**
	Minor injuries to people, damage to vehicles, or harm to nearby structures within the immediate rotor area due to ice throw effects	Residential clusters	Moderate	Low	**Low**
WTG Inspection and Maintenance	Deterioration of road function, condition and safety due to operation activities	Local population and communities	Moderate	Low	**Low**
		Road Infrastructure	Low	Low	**Low**
	Indirect Impacts on Cultural Setting due to the Permanent Presence of Wind Turbines, Operational Noise and Access Restrictions	Cultural Heritage	High	Negligible	**Negligible**
Decommissioning					
Decommissioning activities	Disturbance to local wildlife due to noise, light, dust and machinery movement	Terrestrial Fauna	Moderate	Low	**Low**
		Birds and Bats	High	Negligible	**Negligible**
	Temporary disturbance to habitats and protected areas	Habitats and Ecosystems	Moderate	Negligible	**Negligible**
		Protected areas	Moderate	Negligible	**Negligible**
	Habitat expansion and restauration	Habitats and Ecosystems	Moderate	Low	**Low**

Aspect	Impact	Receptor	Sensitivity of receptor	Magnitude of impact	Significance
	Increase in direct employment opportunities within the Social AoI and Constanța County through the recruitment of local workers for construction activities.	Workforce	Moderate	High	**Moderate**
	Positive indirect and induced employment effects through increased worker spending and Project-related local procurement of goods and services	Local Businesses & Economic Activities	Moderate	High	**Moderate**
	Increased local skills and knowledge through training and on-the-job learning opportunities.	Workforce	Moderate	High	**Moderate**
	Increased pressure on local infrastructure and public services due to the influx of non-local workers.	Public Services & Local Institutions	Moderate	Moderate	**Moderate**
	Pressure on local housing availability and affordability due to accommodation needs of non-local construction workers.	Local population and communities	Moderate	Moderate	**Moderate**
	Increased security risks, including potential rise in crime, communicable diseases, and social issues due to the influx of non-local workers.	Local population and communities	Moderate	Moderate	**Moderate**
		Vulnerable and Disadvantaged Groups	High	Moderate	**Moderate**
	Health and safety risks for workers due to inadequate accommodation, poor sanitation, and non-compliance with labour and safety standards.	Workforce	Moderate	Moderate	**Moderate**
	Health and safety risks for supply chain workers due to inadequate labour	Workforce	Moderate	High	**Moderate**

Aspect	Impact	Receptor	Sensitivity of receptor	Magnitude of impact	Significance
	conditions and limited oversight of global third-party suppliers.				
	Temporary traffic congestion and slower travel speeds due to increased movement of heavy and oversized vehicles and daily worker commuting.	Local population and communities	Moderate	Moderate	**Moderate**
		Road Infrastructure	Low	Moderate	**Low**
	Deterioration of local and regional road surfaces from frequent heavy truck deliveries and transport of oversized loads.	Local population and communities	Moderate	Moderate	**Moderate**

Below is a summary of the negative and positive residual impacts assessed in the sections above post mitigations.

Table 9-64 Residual impact assessment post mitigations

Aspect	Impact	Receptor	Sensitivity of receptor	Sensitivity before mitigation	Residual Magnitude	Residual Significance
Construction Phase						
Land Preparation (site clearance, excavation and levelling), fencing, and civil works Construction of turbine foundations, transmission line pylons, internal road, auxiliary works and turbine installation Construction of associated 400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers	Degradation of air quality due to dust emission in the atmosphere	Air quality - residential	High	**Moderate**	Negligible	**Negligible**
		Air quality - industrial	Low	**Low**	Negligible	**Negligible**
		Air quality - construction workers	Moderate	**Moderate**	Negligible	**Negligible**
		Air quality - protected areas	Low	**Low**	Negligible	**Negligible**
	Degradation of air quality due to pollutants emitted in the atmosphere from engines of vehicles and equipment	Air quality - residential	High	**Moderate**	Negligible	**Negligible**
		Air quality - industrial	Low	**Low**	Negligible	**Negligible**
		Air quality - construction workers	Moderate	**Low**	Negligible	**Negligible**

Aspect	Impact	Receptor	Sensitivity of receptor	Sensitivity before mitigation	Residual Magnitude	Residual Significance
Construction of associated additional access roads (new or widened roads inside project area) Equipment and material transport and supply		Air quality - protected areas	Low	**Low**	Negligible	**Negligible**
	Potential nuisance and annoyance for sensitive receptors caused by increased in noise levels due to machinery and vehicle movements.	Noise - residential	Moderate	**Low**	Negligible	**Negligible**
		Noise - industrial	Low	**Low**	Negligible	**Negligible**
		Noise - construction workers	Moderate	**Low**	Negligible	**Negligible**
		Noise - protected areas	Low	**Low**	Negligible	**Negligible**
	Soil compaction and erosion	Soil	Moderate	**Moderate**	Low	**Low**
	Increase turbidity in nearby rivers and streams due to suspended sediments	Surface waters	Low	**Low**	Negligible	**Negligible**
Land Preparation (site clearance, excavation and levelling), fencing, and civil works Construction of turbine foundations, transmission line pylons, internal road, auxiliary works and turbine installation Construction of associated 400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers Construction of associated additional access roads (new or widened roads inside project area)	Habitat Loss /Degradation / Fragmentation	Habitats and ecosystems	Moderate	Low	Negligible	**Negligible**
		Protected Areas	Moderate	Low	Negligible	**Negligible**
	Loss or displacement of, or disturbance to, fauna species, due to clearance of vegetation for project infrastructure or access to infrastructure, noise, light and movement of vehicles	Terrestrial Fauna	Moderate	Low	Negligible	**Negligible**
		Birds and Bats	High	Moderate	Negligible	**Negligible**
	Direct mortality of fauna	Terrestrial Fauna	Moderate	Low	Negligible	**Negligible**

Aspect	Impact	Receptor	Sensitivity of receptor	Sensitivity before mitigation	Residual Magnitude	Residual Significance
	Loss of vegetation/flora cover	Flora	Low	Low	Negligible	**Negligible**
	Introduction and spread of invasive species	Habitats and Ecosystems	Moderate	Low	Negligible	**Negligible**
		Flora	Low	Low	Negligible	**Negligible**
Land Acquisition / Land use	Temporary economic displacement caused by restricted access to agricultural land and pasture routes due to temporary land occupation and construction activities	Landowners and Land Users	Moderate	**Low**	Negligible	**Negligible**
		Vulnerable and Disadvantaged Groups	High	**Moderate**	Negligible	**Negligible**
Workforce Mobilisation and Presence	Increased pressure on local infrastructure and public services due to the influx of non-local workers.	Public Services & Local Institutions	Moderate	**Moderate**	Low	**Low**
	Pressure on local housing availability and affordability due to accommodation needs of non-local construction workers.	Local population and communities	Moderate	**Moderate**	Low	**Low**
	Increased security risks, including potential rise in crime, communicable diseases, and social issues due to the influx of non-local workers.	Local population and communities	Moderate	**Moderate**	Low	**Low**
		Vulnerable and Disadvantaged Groups	High	**Moderate**	Low	**Moderate**

Aspect	Impact	Receptor	Sensitivity of receptor	Sensitivity before mitigation	Residual Magnitude	Residual Significance
	Health and safety risks for workers due to inadequate accommodation, poor sanitation, and non-compliance with labour and safety standards.	Workforce	Moderate	**Moderate**	Low	**Low**
	Health and safety risks for supply chain workers due to inadequate labour conditions and limited oversight of global third-party suppliers.	Workforce	Moderate	**Moderate**	Low	**Low**
Construction of turbine foundations, transmission line pylons, internal road, auxiliary works and turbine installation Construction of associated 400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers Construction of associated additional access roads (new or widened roads inside project area)	Temporary alteration of landform and removal of vegetation may disrupt the visual cohesion of the agricultural landscape and create noticeable scars in otherwise open fields.	Landscape	Moderate	**Low**	Negligible	**Negligible**
		Settlements	Moderate	**Low**	Negligible	**Negligible**
		Road users	Low	**Low**	Negligible	**Negligible**
		Recreational sites	Moderate	**Low**	Negligible	**Negligible**
		Protected areas	Moderate	**Low**	Negligible	**Negligible**
Land Acquisition / Land use	Disruption of land-based ecosystem services due to land take, vegetation clearance and construction activities	Ecosystem Services	Low	**Low**	Low	**Low**
Equipment and material transport and supply	Temporary traffic congestion and slower travel speeds due to increased movement of heavy and oversized vehicles and daily worker commuting.	Local population and communities	Moderate	**Moderate**	Low	**Low**
		Road Infrastructure	Low	**Low**	Negligible	**Negligible**
	Deterioration of local and regional road surfaces from frequent heavy truck deliveries and transport of oversized loads.	Local population and communities	Moderate	**Moderate**	Low	**Low**
		Road Infrastructure	Low	**Moderate**	Negligible	**Negligible**

Aspect	Impact	Receptor	Sensitivity of receptor	Sensitivity before mitigation	Residual Magnitude	Residual Significance
Land Preparation (site clearance, excavation and levelling), fencing, and civil works Construction of turbine foundations, transmission line pylons, internal road, auxiliary works and turbine installation Construction of associated 400 kV transmission lines – two double-circuit LEA lines (~0.3 km) and 8 towers Construction of associated additional access roads (new or widened roads inside project area)	Direct physical impacts on cultural heritage due to ground disturbance and construction activities	Cultural Heritage	High	**High**	Low	**Moderate**
	Indirect impacts on cultural setting and access due to visual intrusion, dust deposition and temporary movement restrictions	Cultural Heritage	High	**Moderate**	Negligible	**Negligible**
		Intangible Cultural Heritage	High	**Moderate**	Negligible	**Negligible**
Operational Phase						
WTG Operation	Potential nuisance and annoyance for sensitive receptors caused by increased noise levels due to wind turbines operations.	Noise - residential	Moderate	**Low**	Negligible	**Negligible**
		Noise - industrial	Low	**Low**	Negligible	**Negligible**
		Noise - construction workers	Moderate	**Low**	Negligible	**Negligible**

Aspect	Impact	Receptor	Sensitivity of receptor	Sensitivity before mitigation	Residual Magnitude	Residual Significance
		Noise - protected areas	Low	**Low**	Negligible	**Negligible**
WTG Operation WTG Inspection and Maintenance	Mortality due to collision with wind turbines	Birds and Bats	High	**Moderate**	Low	**Moderate**
	Mortality due to electrocution with overhead transmission line and pylons	Birds and Bats	High	**Moderate**	Negligible	**Negligible**
	Permanent economic displacement due to loss of land access within the Project footprint and safety buffer zones	Landowners and Land Users	Moderate	**Low**	Negligible	**Negligible**
		Vulnerable and Disadvantaged Groups	High	**Moderate**	Negligible	**Negligible**
WTG Operation	Risk of aircraft collisions with wind turbines due to their height and location.	Local population and communities	Moderate	**Low**	Negligible	**Negligible**
	Permanent vertical structures alter landscape character.	Landscape (VP39)	Moderate	**Moderate**	Low	**Low**
		Settlements	Moderate	**Low**	Negligible	**Negligible**
		Road users (along road DN3 – VP30)	Low	**Moderate**	Low	**Low**
		Recreational sites (VP25)	Moderate	**Moderate**	Low	**Low**
		Protected areas (VP49)	Moderate	**Low**	Negligible	**Negligible**
	Visual and health disturbance due to shadow flickering effects	Residential clusters – shadow flicker	Moderate	**Moderate**	Low	**Low**
	Minor injuries to people, damage to vehicles, or harm to nearby structures within the immediate rotor area due to ice throw effects	Residential clusters	Moderate	**Low**	Negligible	**Negligible**
WTG Inspection and Maintenance	Deterioration of road function, condition and safety due to operation activities	Local population and communities	Moderate	**Low**	Negligible	**Negligible**
		Road Infrastructure	Low	**Low**	Negligible	**Negligible**
Decommissioning						

Aspect	Impact	Receptor	Sensitivity of receptor	Sensitivity before mitigation	Residual Magnitude	Residual Significance
Decommissioning activities	Increased pressure on local infrastructure and public services due to the influx of non-local workers.	Public Services & Local Institutions	Moderate	**Moderate**	Low	**Low**
	Pressure on local housing availability and affordability due to accommodation needs of non-local construction workers.	Local population and communities	Moderate	**Moderate**	Low	**Low**
	Increased security risks, including potential rise in crime, communicable diseases, and social issues due to the influx of non-local workers.	Local population and communities	Moderate	**Moderate**	Low	**Low**
		Vulnerable and Disadvantaged Groups	High	**Moderate**	Low	**Moderate**
	Health and safety risks for workers due to inadequate accommodation, poor sanitation, and non-compliance with labour and safety standards.	Workforce	Moderate	**Moderate**	Low	**Low**
	Health and safety risks for supply chain workers due to inadequate labour conditions and limited oversight of global third-party suppliers.	Workforce	Moderate	**Moderate**	Low	**Low**
	Temporary traffic congestion and slower travel speeds due to increased movement of heavy and oversized vehicles and daily worker commuting.	Local population and communities	Moderate	**Moderate**	Low	**Low**
		Road Infrastructure	Low	**Low**	Negligible	**Negligible**
	Deterioration of local and regional road surfaces from frequent heavy truck deliveries and transport of oversized loads.	Local population and communities	Moderate	**Moderate**	Low	**Low**

10 HUMAN RIGHTS

The Equator Principles Association recognises that financial institutions and their clients have a responsibility to respect Human Rights in line with the United Nations Guiding Principles on Business and Human Rights (UNGPs) by carrying out human rights due diligence on the projects.

The following human rights assessment methodology is fully consistent with the one presented in the ERM Draft ESIA, which closely references the UNGPs and the Guidance Note on Implementation of Human Rights Assessments under the Equator Principles.

10.1 Risk Evaluation Criteria

Risks were assessed based on two key dimensions:

- **Severity**, determined by:
    - *Scale* -> how serious the impact is for the affected person or group
    - *Irremediability* -> the extent to which harm can be restored
    - *Scope* -> how many people may be affected
- **Likelihood**, or the probability that an impact will occur.

By combining severity and likelihood, an inherent risk level was defined (Low, Medium or High).

The residual risk was then calculated assuming the Project Developer's mitigation measures are effectively implemented, presenting the following level of risk:

- **Low Risk:** Project and local context pose minimal risk; standard ESMS measures are sufficient.
- **Medium Risk:** Risks are present, and the ESMS standard measures may not be fully adequate for complete mitigation or remedy. Additional targeted actions may be required.
- **High Risk:** ESMS standard measures are insufficient to ensure mitigation and remedy. Further assessment and enhanced management measures are necessary, as these risks could lead to delays, reputational impacts, or non-compliance with national or lender requirements.

10.2 Labour Rights and Working Conditions

The following section identifies the labour rights which can be potentially impacted by the Project during construction and Operational Phase, as well as Project Developer's mitigation measures, as described in the ERM Draft ESIA:

10.2.1 Child Labour

Romania's legislation prohibits the employment or exploitation of minors, allowing limited work only for individuals aged 15-18 under strict conditions. Nonetheless, cases of child labour persist in rural areas, mainly linked to informal agricultural activities and weak enforcement.

Based on contextual conditions and the assessment of potential impacts, the inherent risk level is considered medium.

The Project Developer will implement Human Resources Policies aligned with national law, as well as Contractor and Supplier Management Plans and a Construction Labour Management Plan, including a Workers' Code of Conduct. These measures will ensure that all workers meet the minimum legal working-age requirements and that contractors maintain effective controls to prevent the involvement of minors in any project-related activities.

Considering the implementation of the identified mitigation measures, the residual risk is classified as low.

10.2.2 Forced Labour

Romania's Constitution and Labour Code prohibit all forms of forced or compulsory labour, criminalizing any act of compelling a person to work against their will or under threat. However, reports indicate that cases of forced labour and human trafficking continue to occur, particularly among vulnerable groups such as Roma communities, persons with disabilities and individuals in rural areas.

Based on contextual conditions and the assessment of potential impacts, the inherent risk level is considered medium.

To address potential risks. The Project Developer will implement Human Resources Policies and Procedures ensuring transparent recruitment practices, fair employment conditions, and the mandatory adoption of a Workers' Code of Conduct. In addition, monitoring mechanisms will be established to oversee the performance of third-party recruitment agencies and ensure that all workers, including non-local and seasonal personnel, are employed voluntarily and under conditions consistent with national labour legislation and international human rights standards.

Considering the implementation of the identified mitigation measures, the residual risk is classified as low.

10.2.3 Occupational Health and Safety

Romania's legislation provides a solid framework for occupational health and safety; however, enforcement challenges and limited inspection capacity continue to affect compliance, especially in high-risk sectors such as construction, agriculture, and small manufacturing. Although the Labour Inspectorate is responsible for monitoring compliance, inspections and sanctions remain insufficient to ensure consistent application of safety standards. As a result, workplace accidents are still reported, and underreporting of incidents persists in several sectors.

Based on contextual conditions and the assessment of potential impacts, the inherent risk level is considered high.

To ensure safe and healthy working conditions throughout all project phases, the Project Developer will implement a comprehensive Health and Safety Policy supported by an Occupational Health and Safety Plan applicable to all contractors. Workers will receive appropriate training on OHS requirements, including first aid and emergency response, with a focus on high-risk activities such as working at heights during wind turbine construction. The Project Developer will provide all personnel with adequate protective equipment and ensure regular monitoring to reduce accident risks. These measures will be complemented by Human Resources Policies and a Workers' Grievance Mechanism, enabling safe reporting of incidents and continuous improvement of occupational health and safety performance.

Considering the implementation of the identified mitigation measures, the residual risk is classified as low.

10.2.4 Job Security/Right to work

Romania's legislation guarantees the righty to work and to freely choose one's occupation, while ensuring fair and non-discriminatory working conditions. However, informal employment remains a persistent issue, particularly in sectors such as agriculture, construction, retail and hospitality, with vulnerable groups like Roma communities being more exposed due to limited access to identification documents and social protection.

Based on contextual conditions and the assessment of potential impacts, the inherent risk level is considered medium.

To ensure transparent and fair employment practices, the Project Developer will apply Human Resources Policies and Procedures and a Contractor and Supplier Management Plan. The Project's Human Resources Department will also ensure that all workers fully understand the terms and conditions of their employment through clear communication and regular information on contract duration, rights and obligations.

Considering the implementation of the identified mitigation measures, the residual risk is classified as low.

10.2.5 Freedom of association & Right to Collective Bargaining

Romania's legislation protects workers' rights to form and join trade unions and to engage in collective bargaining. Despite this, enforcement is limited, and unions have reported difficulties in ensuring effective representation and protection from retaliation.

Based on contextual conditions and the assessment of potential impacts, the inherent risk level is considered low.

The Project Developer will apply Human Resources Policies and Procedures to guarantee workers' freedom of association and prevent any form of discrimination or reprisal related to union activities. These provisions are reinforced through the Construction Labour Management Plan, which promotes open communication, fair treatment and respect for workers' collective rights. Regular engagement with workforce representatives will also be encouraged to ensure that concerns are addressed in a transparent and timely manner.

Considering the implementation of the identified mitigation measures, the residual risk is classified as low.

10.2.6 Discrimination

Although Romania has a strong legal framework prohibiting discrimination, inequalities persist in practice, particularly affecting women, Roma Communities, LGBTQI+ persons, refugees and migrants, and people with disabilities. Reports from NGOs indicate recurring barriers in access to services, underreporting hate crimes, and ongoing social stigma, highlighting a discrepancy between legal provisions and their effective implementation

Based on contextual conditions and the assessment of potential impacts, the inherent risk level is considered high.

The Project Developer will implement Human Resources Policies and Procedures that explicitly prohibit any form of discrimination in recruitment, employment or workplace practices. All employment contracts will include a non-discrimination clause, and period training will be provided to both Project management and workers to raise awareness and promote inclusive behaviour. A Labour Management Plan will ensure equal opportunities and transparent procedures in all stages of employment. Where applicable, the Project Developer will also comply with the national quota on the employment of persons with disabilities in accordance with Romanian legislation (Law no. 448/2006).

Considering the implementation of the identified mitigation measures, the residual risk is classified as low.

10.2.7 Working hours

Romanian legislation limits working hours to eight per day and forty per week, with shorter limits for young workers, and provides employees with daily and weekly rest periods, lunch breaks, and public holidays.

Based on contextual conditions and the assessment of potential impacts, the inherent risk level is considered medium.

The Project will implement Human Resources Policies and Procedures to ensure compliance with national labour standards on working time and rest periods. All employment contracts will specify maximum working hours, overtime provisions, and rest entitlements. The Labour Management Plan and Workers' Grievance Mechanism will support transparent monitoring conditions and allow workers to report any deviation from agreed schedules or excessive workloads.

Considering the implementation of the identified mitigation measures, the residual risk is classified as low.

10.2.8 Remuneration

Romanian law guarantees equal pay for equal work and prohibits gender-based discrimination in remuneration. Despite recent improvements, some pay disparities between men and women persist, particularly for workers returning from maternity leave or employed in lower-paid sectors.

Based on contextual conditions and the assessment of potential impacts, the inherent risk level is considered medium.

The Project Developer will apply Human Resources Policies and Procedures and clear employment contracts ensuring transparent and fair wage structures in line with national legislation and the EU Pay Transparency Directive. The Labour Management Plan and Workers' Grievance Mechanism will support consistent monitoring of pay conditions and enable workers to raise concerns confidentially. The Project will also aim to ensure that the gender pay gap does not exceed 5% between male and female employees performing equivalent roles.

Considering the implementation of the identified mitigation measures, the residual risk is classified as low.

10.3 Supply Chain and Modern Slavery

Based on the information provided by the company, two wind turbine manufacturers (Vestas and Goldwind) are being considered for selection as potential suppliers for the Project. DNV has conducted an independent review focused on the human rights management performance of both companies.

In the event that a supplier different from the one currently considered is selected, the human rights screening will be updated to reflect the characteristics and risk profile of the selected supplier.

10.3.1 Vestas

Vestas is a Danish wind turbine manufacturer with production facilities in Europe, Taiwan, India, China and Brazil. According to the 2025 Renewable Energy & Human Rights Benchmark, the company demonstrates a strong and structured approach to human rights management, scoring 82% on the UNGP Core Indicators, with well-defined commitments aligned with the ILO Core Conventions and supported by comprehensive policies covering both employees and suppliers. Vestas conducts regular corporate-wide Human Rights Assessments (most recently in 2022) and applies a Social Due Diligence tool in high-risk projects to identify, prevent and mitigate potential impacts on workers, communities and Indigenous Peoples. It also operates accessible grievance mechanisms (EthicsLine and project-level Operational Grievance Mechanisms) and commits to remedying adverse impacts on workers and external stakeholders, including through documented investigation and follow-up procedures.

While Vestas shows a mature governance structure and a well-developed upstream due diligence framework (conducting more than 2,900 supplier assessments and 109 sustainability audits in 2023) the benchmark identifies several areas where further progress is needed. These include improving the tracking and evaluation of the effectiveness of mitigation measures, strengthening expectations toward clients regarding land and resource rights (including alignment with international standards such as IFC PS5), and advancing benefit-sharing practices with affected communities. The company is also encouraged to expand responsible mineral sourcing requirements beyond Tier-1 suppliers and increase transparency on smelters and refiners. Overall, Vestas performs among the most advanced companies in the wind manufacturing sector in embedding human rights into its operations and supply-chain management, but continued improvements in implementation depth and downstream leverage remain necessary.

10.3.2 Goldwind

Goldwind Science & Technology Co., Ltd is a major Chinese wind turbine manufacturer headquartered in Beijing, with production facilities across China, including in the Xinjiang Uyghur Autonomous Region, and international operations in Asia, Europe, the Americas and Australia. Despite its global footprint, Goldwind performs poorly in the 2025 Renewable Energy & Human Rights Benchmark of the Business & Human Rights Resource Centre, scoring 4% on the UNGP Core Indicators. The company has issued a general Commitment to Human Rights (2021) and makes high-level references to international standards; however, it does not demonstrate explicit alignment with the UN Guiding Principles or the ILO Core Conventions. The benchmark also found no evidence of clear board-level responsibility for human rights or of a structured, group-wide human rights due diligence process.

Goldwind reports conducting supplier social responsibility audits in China (covering around 85 - 100% of major suppliers) but the benchmark did not identify evidence that these assessments form part of a broader human rights due diligence system or that they involve engagement with affected stakeholders. The report highlights heightened exposure to forced labour risks arising from Goldwind's operational and commercial links in Xinjiang, including a partnership with the Xinjiang Production and Construction Corps (XPCC), an entity sanctioned for human rights abuses. In addition, the benchmark associates Goldwind with allegations related to rare-earth mineral sourcing in Myanmar, including land expropriation, health and environmental concerns, and the repression of local activists, to which no public response has been provided.

Further gaps were identified regarding Indigenous Peoples' rights, land and resource rights, benefit-sharing, grievance mechanisms and responsible mineral sourcing, as the company does not disclose policies or procedures addressing these areas. Overall, Goldwind's human rights management framework appears limited, with significant gaps in governance, risk assessment, remedy and transparency. Its exposure to high-risk geographies and critical-mineral supply chains underscores the need for strengthening its human rights policies and due diligence systems.

10.3.3 Human Rights in the supply chain assessment

As described in the ERM Draft ESIA, in alignment with the above two suppliers' deep dive analysis, modern slavery risks in global renewable energy supply chains remain a significant concern, particularly in the extraction and processing of raw materials and in manufacturing stages located in high-risk countries.

Based on contextual conditions and the assessment of potential impacts, the inherent risk level is considered high.

To mitigate such risks, the Project Developer will apply Human Resources Policies and Procedures and require contractors and suppliers to adhere to a Supplier Code of Conduct prohibiting any form of forced or compulsory labour. Moreover, Project Developer shall ensure that supply chain partners will be screened through contractual clauses, due diligence checks, and regular monitoring to ensure compliance with international labour standards. The Workers' Grievance Mechanism will also remain accessible to indirectly employed workers to report any related concerns safely and confidentially.

Considering the implementation of the identified mitigation measures, the residual risk is classified as medium.

10.4 Community Rights and Social Impacts

This section identifies and analyzes the potential impacts of the Project on surrounding local communities' rights, paying attention to health and safety issues, land rights, indigenous groups and cultural heritage.

10.4.1 Freedom of expression

Romania guarantees freedom of expression and peaceful assembly, but enforcement remains uneven. A 2021 European Court of Human Rights ruling highlighted disproportionate restrictions on spontaneous protests, indicating practical limitations despite the legal framework. Recent updates to the whistleblowing legislation strengthened protections, though effective implementation is still developing.

Based on contextual conditions and the assessment of potential impacts, the inherent risk level is considered medium.

The Project Developer will implement Human Resources Policies and Procedures, the Stakeholder Engagement Plan, and both Community and Workers' Grievance Mechanisms, ensuring that workers and community members can safely raise concerns without fear of retaliation. Clear internal communication channels and confidentiality safeguards will support the Project's commitment to respecting freedom of expression and enabling constructive dialogue throughout construction and operation.

Considering the implementation of the identified mitigation measures, the residual risk is classified as low.

10.4.2 Right to land

See section 9.4.1 of the Social Impact Assessment.

10.4.3 Community Health and Safety

See section 9.4.5 of the Social Impact Assessment.

10.4.4 Indigenous People

Not applicable, since Indigenous People are not present in Romania.

10.4.5 Cultural Heritage

See section 9.4.9 of the Social Impact Assessment.

10.5 Security and Human Rights

This section identifies and assesses the potential impacts on workers and local communities from the public and private security forces used by the Project.

Impunity among security forces, particularly within the police and gendarmerie, has been a concern in the country, with reported cases of excessive use of force and limited accountability for abuses.

Based on contextual conditions and the assessment of potential impacts, the inherent risk level is considered high.

In the context of the Project, security personnel may be engaged to protect construction areas, equipment and workers. To minimize potential risks to risks and nearby communities, the Project will ensure that security personnel receive training on the proportionate use of force and human rights, in line with the Voluntary Principles on Security and Human Rights. Furthermore, a Security Management Plan will be drafted. These measures will help ensure respect for human rights and avoid potential incidents of intimidation, abuse or discrimination.

Considering the implementation of the identified mitigation measures, the residual risk is classified as low.

10.6 Grievance Mechanism and Access to Remedy

The last chapter assesses how the project allows workers, community members and other stakeholders to raise concerns and questions, including human rights issues, about the impacts of the project.

As per the "United Nations Guiding Principles on Business and Human Rights", which will be taken as the reference guideline to assess this topic, "the grievance mechanism should be legitimate, accessible, predictable, equitable, transparent, rights-compatible and a source of continuous learning".

As for External Stakeholders Grievance Mechanism, please refer to Section 7.1.5.

Concerning Internal Stakeholders Grievance Mechanism, the national legal framework includes provisions for workers to safely report workplace grievances or misconduct, reinforced by the 2022 Whistle-blowers Protection Law aligned with the EU Whistleblowing Directive.

Based on contextual conditions and the assessment of potential impacts, the inherent risk level is considered low.

As for the Project Developer's mitigation measures, during the development of the Project, the Company will establish and implement a Worker's Grievance Mechanism (WGM) as part of its ESMS. The WGM will provide all workers, including those employed by contractors and subcontractors, with a clear and accessible channel to raise concerns and complaints related to their employment conditions, workplace treatment, health and safety, or other labour-related issues. Details on the WGM procedures, points of contact, and submission methods will be disclosed during the recruitment and employment process, ensuring that all workers are aware of their rights and the available reporting channels. The mechanism will be designed to ensure confidentiality, non-retaliation and timely resolution of grievances.

Throughout Project implementation, the Company will regularly monitor and assess the effectiveness of the WGM, keeping systematic records and submissions, investigations and resolutions.

The mechanism will be aligned with the UN Guiding Principles on Business and Human Rights (UNGPs), Principles 29 and 31, as well as with Equator Principles 4 Guidance, ensuring legitimacy, accessibility, predictability, transparency and rights-compatibility.

Considering the implementation of the identified mitigation measures, the residual risk is classified as low.

11 CLIMATE CHANGE RISK ASSESSMENT

This section focuses on greenhouse gas (GHG) emissions associated with the Dunărea East Wind Farm. It presents the results of the Climate Change Risk Assessment (CCRA), which is provided in full in Appendix L, in accordance with the requirements of the International Finance Corporation (IFC) Performance Standards and the European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy.

Both IFC and EBRD emphasize that projects should:

- Assess the GHG emissions associated with project activities, including construction, operation, and decommissioning.
- Evaluate opportunities for emissions reduction and climate change mitigation, including energy efficiency and low-carbon technologies.
- Account for avoided emissions where renewable energy displaces fossil fuel-based electricity generation.
- Identify practical measures to minimize emissions during construction and operation.

11.1 Greenhouse Gas Assessment

A greenhouse gas (GHG) assessment was carried out in March 2025 by ERM (Appendix M). The GHG emissions forecast was carried out for the Dunarea East & West wind plant together and was developed using life cycle assessment (LCA) principles to estimate lifetime emissions across all major phases: product, construction, use, and end-of-life. Given the early stage of planning and limited site-specific data, the methodology involved scaling emissions from the VIFOR wind plant, whose technical specifications and life cycle emissions were more fully characterised by the relative capacity of Dunarea East & West (approx. 600 MW vs. VIFOR's 460.8 MW). This approach assumes that Dunarea's structure, construction process, and logistics will be similar to VIFOR, with comparable transportation distances and supplier engagement. Emissions factors were drawn from manufacturer LCAs, ESIA reports, academic research, and public databases such as EcoInvent and DEFRA.

Limitations of the methodology include:

- High-level approximation due to missing supplier-specific data and confirmed logistics.
- Uncertainty in operational emissions, as the actual turbine performance and maintenance may differ from assumptions.
- End-of-life emissions are based on standard recycling rates (85% for metals, 100% landfill for turbine blades).

Given that the Project has been divided into Dunarea East and Dunarea West, the same scaling process will be applied to estimate the emissions for the East part only (up to 315 MW) (the Project).

11.1.1 Estimated LCA emissions for the Project

The emissions in ERM's GHG assessment have been divided into:

- Product: Raw material extraction and processing for turbines, foundations, and site parts.
- Construction: Transport of wind plant components to site and installation and erection of the wind power plant.
- Use: Maintenance of the plant as it generates electricity, including emissions associated with part failure.
- End-of-life: Treatment and disposal of the wind turbines at the end of their life cycle.

Table 11-1 reports the estimated Project's emissions scaled from those provided by ERM for Dunarea East & West.

Table 11-1 Project's estimated LCA emissions

Emissions ($tCO2e$)	Dunarea East&West (600 MW)	Dunarea East (315 MW)	% of Total	Description
Product	372,553.00	**195,590.33**	**53%**	Emissions from extraction, processing, and manufacture of turbines, foundations, and other components. This stage accounts for the majority of embedded carbon due to materials like steel and concrete.
Construction	22,423.00	**11,772.08**	**3%**	Emissions from transporting components to site, on-site logistics, and installation of turbines. Includes fuel for long-haul trucks and worker commuting.
Use	245,550.00	**128,913.75**	**35%**	Emissions from operation and maintenance over 35 years, including part replacements and associated material processing. Commuting emissions of maintenance staff are included.
End-of-life	60,955.00	**32,001.38**	**9%**	Emissions from decommissioning, recycling of metals, and disposal of components (including blades in landfill).
Total	701,481.00	**368,277.54**	**100%**	-

This breakdown highlights that the majority of emissions arise from manufacturing and operation, while construction and end-of-life phases contribute less but remain relevant for mitigation planning.

Based on this, estimated annual total GHG emissions (Scope 1, 2 and 3) during operational stage are about 3,683 tCO2e which is below the IFC threshold of 25,000 tCO2e and EP4 of 100,000 tCO2e applicable to annual total Scope 1 and Scope 2 emissions.

11.1.2 Avoided emissions

According to AON National EIA, by generating clean electricity, the Project avoids the release of GHGs that would otherwise result from fossil fuel-based generation. According to a comprehensive review by Garvin A. Heath et al. (National Renewable Energy Laboratory, USA):

- Wind energy generates approximately 11 g CO_2/kWh
- Coal-based energy produces 980 g CO_2/kWh
- Natural gas generates 465 g CO_2/kWh

Thus, the carbon footprint of coal is nearly 90 times greater, and natural gas nearly 40 times greater than that of wind energy. For every kilowatt-hour (kWh) of electricity generated from wind, emissions avoided include (Heath et al., Life Cycle Greenhouse Gas Emissions from Electricity Generation, NREL, 2012):

- CO_2: ~750 g
- SO_2: ~1.4 g
- NO_x: ~1.9 g

Over its estimated 30-year operating life (as per Project base-case scenario), the wind farm is expected to generate approximately 23 TWh of electricity, thereby avoiding:

- 17.25 million tonnes of CO_2
- 32,200 tonnes of SO_2
- 43,700 tonnes of NO_2

In particular, the Project, with an installed capacity of 315 MW, will generate clean electricity that displaces energy otherwise produced from fossil fuels. Using a nationally weighted emission factor of 0.6177 tCO_2/MWh and assuming a minimum annual operation of 2,500 hours at nominal capacity, Dunărea East is projected to generate 787,500 MWh/year. Applying the emission factor, the annual avoided emissions are estimated at 486,320 tCO_2e per year. Over a 25-year operational lifespan (as per ERM study base-case scenario), this corresponds to a total of approximately 12,158,000 tCO_2e avoided, while over a 35 years maximum operational lifetime (as per Project most recent design data) avoided emissions correspond to 17,020,000 tCO_2. Here below a summary:

Table 11-2 Estimated Project avoided emissions

Parameter / Assumption	Value
Installed capacity	315 MW
Annual operation	2,500 hours/year
Annual electricity generation	787,500 MWh/year
Nationally weighted emission factor	0.6177 tCO_2/MWh
Annual avoided CO_2 emissions	486,320 tCO_2e/year
Avoided emissions over 25 years	12,158,000 tCO_2e
Avoided emissions over 35 years	17,020,000 tCO_2e

It should be noted that these estimates assume consistent operation at nominal capacity and a nationally weighted average emission factor. Actual avoided emissions may vary depending on future grid mix, operational conditions, and wind resource variability. Nonetheless, these figures demonstrate the substantial GHG mitigation potential of the Project.

11.1.3 Mitigation measures

In order to minimize GHG emissions during construction and operational phases, the following measures are suggested:

1. Construction Phase:
    - Optimize logistic transport as much as possible by using full truck load, planning delivery routes to minimize fuel consumptions and number of trips
    - Deploy low-emission construction equipment including high-efficiency diesel, hybrid, or electric machinery where feasible

- Implement energy-efficient site operations by using energy-saving lighting, temporary power, and minimizing idle times
- Minimize material waste by careful planning, efficient storage, and reusing/recycling construction materials.
- Reduce commuting emissions by encouraging carpooling, shuttle services, or public transport for construction staff

2. Operational Phase:

- Reduce operational energy use by monitoring energy consumption for on-site systems and implementing energy-saving measures.
- Plan for end-of-life recycling by recovering metals and other materials, and disposing of turbine blades responsibly.

11.2 Climate Change Risk Assessment

DNV has developed a CCRA in line with Equator Principles' (EP4) Principle 2 and Annex A, which require assessing climate-related risks (physical and transition) for Category A projects and applicable Category B projects, and evaluating the project's compatibility with host country climate commitments. Although being a renewable energy project, this wind farm is expected to be classified as a Category A project, due to its potential for significant adverse environmental and social impacts that are diverse, irreversible, or unprecedented, as per the definitions used by international financial institutions. The full assessment is found in Appendix L.

The objective of a CCRA is to identify and evaluate material climate-related risks to a project, and consequently to the financial institutions involved in its financing, from the earliest stages of development. This proactive approach enables effective mitigation and management of potential impacts, risks, and opportunities throughout the project's lifecycle, from feasibility through implementation to decommissioning.

11.2.1 Romania's National Climate Commitments (NCC) compliance

Romania's climate strategy is fully embedded within the broader EU framework. As part of the European Union's joint Nationally Determined Contribution under the Paris Agreement, the country is bound by legally established emission-reduction targets, including a 55% cut in GHG emissions by 2030 compared to 1990 levels, a 90% reduction by 2040, and climate neutrality by 2050. These commitments translate into national policies through Romania's updated National Energy and Climate Plan (NECP 2021–2030), which sets the direction for decarbonisation, renewable energy expansion and energy system resilience, and through the Long-Term Strategy (LTS 2050), which outlines pathways for achieving net-zero emissions.

In parallel, the national adaptation framework (updated in 2024) sets out strategic objectives to enhance climate resilience across key sectors, including energy. This framework requires the identification of climate risks for critical infrastructure and the implementation of measures that strengthen resilience to extreme events, temperature increases, wildfires, and other hazards.

11.2.1.1 NCC Compatibility Assessment – Summary of Results

The Project has been assessed against both mitigation (transition) and adaptation (physical climate risk) components of Romania's NCC. The conclusions reflect whether the Project aligns with national climate strategies and contributes to or potentially hinders Romania's progress toward its climate objectives.

11.2.1.2 Adaptation / Physical Climate Risk Compatibility

The CCRA confirms that the Project is consistent with Romania's national adaptation policies. It responds directly to the requirements of the 2024–2030 National Strategy on Adaptation to Climate Change, which calls for risk identification and resilience measures for critical energy infrastructure. All relevant physical climate risks, such as subsidence, wildfires, and projected reductions in wind speed, have been assessed, and specific management and monitoring measures are incorporated into the ESMS/ESMP to ensure that the Project remains resilient over its lifetime. As a result, the Project satisfies the NCC requirement to identify, assess and address its climate-related physical risks.

11.2.1.3 Mitigation / Transition Risk Compatibility

From a mitigation perspective, the Project qualifies as intrinsically aligned with Romania's decarbonisation pathway. As a renewable energy generation investment with negligible lifecycle emissions, it falls under the "universally aligned" category defined by the Joint MDB Paris Alignment Framework. The wind farm contributes directly to national and EU emission-reduction targets by increasing the share of renewable electricity and displacing fossil fuel generation. It does not introduce carbon-intensive lock-ins, nor does it depend on fossil-fuel-related operations or subsidies.

The Project supports Romania's commitments under the NECP, which requires substantial new renewable capacity over the next decade, and aligns with EU policies aimed at accelerating renewable deployment, such as the European Energy Union Strategy and temporary permitting acceleration measures under Regulation (EU) 2022/2577. The expected avoided emissions over the operational lifetime—amounting to tens of millions of tonnes of CO_2—represent a significant contribution to Romania's national climate targets and EU-wide decarbonisation goals.

11.2.2 Summary of Physical Climate-Risk Assessment

The climate-risk screening indicates that the Project is exposed to a limited number of potentially material physical climate hazards under future climate conditions. The assessment considers how the Project's location, geotechnical context and asset characteristics interact with projected changes in temperature, precipitation, wind and fire-weather indicators. For each hazard, the analysis evaluates the likelihood of climate-driven changes, their implications for the performance and integrity of the Project assets, and whether any residual risks are material given the current design.

Local climate change modelling data have been used to determine the potential physical climate risks to the Project. The modelling has been carried out for three representative points, dividing the Project in three clusters as reported in Figure 11-1.

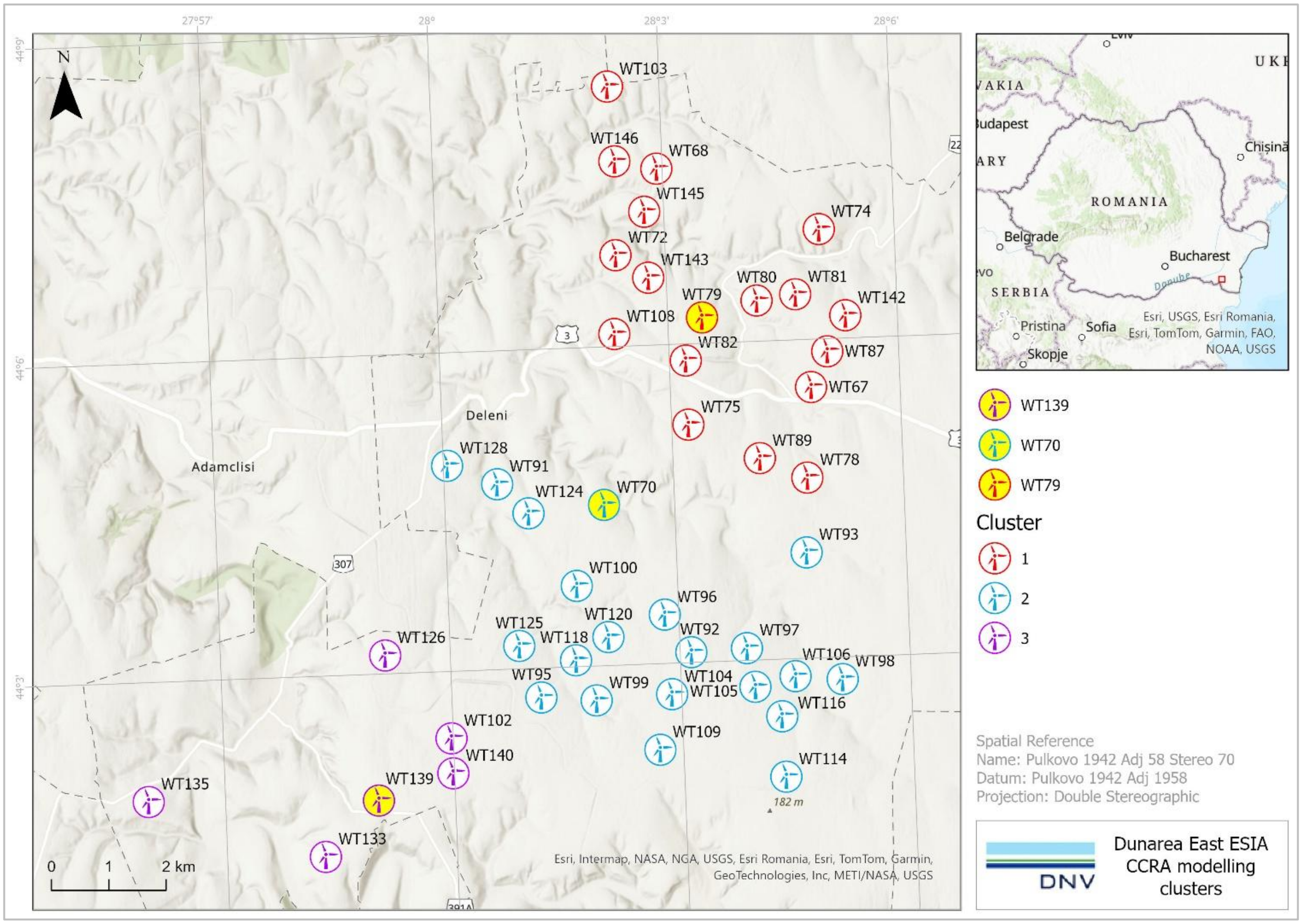

Figure 11-1 Physical climate risk modelling clusters

11.2.2.1 Subsidence

Subsidence emerges as the most relevant risk for the Project due to the presence of deep, highly porous loessic soils that are known to be sensitive to moisture fluctuations. Climate projections show an increase in prolonged drought periods followed by intense precipitation events, conditions that amplify shrink–swell cycles, rapid rewetting and potential collapse of loess layers. These effects are expected to intensify over the coming decades, especially in the Southwest cluster, where drought duration and hydrological stress are most pronounced.

For wind-turbine foundations, hardstands and access roads, these processes can lead to differential settlement, cracking and localised deformation, which may in turn affect turbine alignment, platform stability and road functionality. Financial implications include increased O&M costs, more frequent monitoring, and in extreme cases remedial foundation works. Substations share a similar exposure profile, although the engineered platform offers slightly more resilience. The risk is not considered material for overhead lines, which have smaller and deeper foundations. Overall, subsidence is classified as **material** for major civil assets and worker safety, warranting targeted monitoring and geotechnical management measures.

11.2.2.2 Extreme Heat Stress (Human)

Heat stress risk for workers was assessed using Wet Bulb Globe Temperature (WBGT) projections. Climate models indicate that days exceeding the internationally recognised risk threshold of 28 °C WBGT remain essentially absent across all scenarios and timeframes for the Project area. This means that maintenance crews, construction teams and local supply-chain operations are not expected to face significant heat-exposure hazards. Consequently, heat stress is assessed as **not material** for the Project's workforce or assets.

11.2.2.3 Extreme Fire Conditions

Rising temperatures, longer dry spells and more frequent heatwaves are projected to increase the likelihood of fire-prone weather conditions in the region. The Fire Weather Index (FWI) suggests that days with "Very High" fire danger (FWI > 38) will remain low but will increase gradually through mid-century, reaching roughly 1-2 days per year in the Central and North clusters and up to about 2.5 days per year in the Southwest cluster under the most extreme scenario. Although the absolute number of days remains limited, even short periods of high fire danger could affect wind turbines, substations and overhead lines, where ignition sources, electrical equipment and vegetation interfaces make exposure more consequential.

Potential impacts include equipment damage, unplanned outages, and O&M interruptions, with associated financial consequences. Worker safety considerations relate mainly to emergency response and operational constraints during high-risk periods. Because even isolated fire events could have high consequences, wildfire risk is considered **material** for electrical infrastructure. Existing national-level fire-safety measures will need to be integrated into the international ESMP, together with enhanced vegetation management, monitoring and emergency response protocols.

11.2.2.4 Icing Days

Icing conditions are projected to decrease significantly across all clusters, reducing operational and mechanical risks typically associated with ice accretion on turbine blades or overhead lines. Turbine technologies under consideration can operate safely at very low temperatures when equipped with appropriate cold-climate packages. The declining frequency of icing days therefore translates into reduced downtime risk, lower maintenance costs and improved operational continuity. Icing is therefore assessed as **not material** for the Project.

11.2.2.5 Average Wind-Speed Reduction

Medium-confidence climate projections indicate a modest decline in mean wind speed at 100 m across all clusters by mid-century, with reductions in the order of 0.2–0.5 m/s. While small in absolute terms, this change may have implications for long-term energy yields and revenue. Given the inherent uncertainties in long-term climate modelling, the results should not be used as a standalone basis for financial planning; however, they highlight the need to incorporate climate-adjusted wind-resource scenarios into the Energy Production Assessment, and to test the project's financial resilience to lower wind regimes. This risk is therefore considered **material** for energy generation and revenue planning, though not for physical integrity of assets.

11.2.2.6 Governance and Management

Responsibility for climate risk management rests with the Project's asset management team, supported by the Health, Safety, and Environment (HSE) and operations departments. Senior management provides oversight, with regular reporting to the Board and lenders in line with EP4 requirements.

Physical climate risks will be systematically embedded within the project's Environmental and Social Management System (ESMS) and Environmental and Social Management Plan (ESMP). A dedicated Climate Adaptation Plan will be developed prior to construction to address any necessary design adaptations, and will be reviewed and confirmed before the start of operations.

Table 11-3 summarizes the management measures required to address the material risks identified in this assessment. For risks assessed as non-material, such as flooding, standard construction and operational practices, as described in the ESMS, will be considered sufficient. Existing mitigations already incorporated into the project design (i.e. the selection of wind turbine type for icing risk) are not repeated here, as these risks are already addressed. Only those measures specific to the identified material risks will be explicitly detailed in the ESMP.

Implementation of the recommended mitigation measures is expected to reduce physical climate risks to acceptable levels.

Table 11-3 Management measures to be included in the Project's ESMP

#	Management measure	Referred risk
1	Regular reporting on climate risk to the Board and Lenders during operations	General
2	Include climate-related risks in the H&S plans.	General
3	Include climate-related risks in the Emergency and Preparedness Response Plan.	General
4	Use reinforced concrete foundations for turbines to bridge weak or variable soil layers and minimize differential settlement.	Subsidence
5	Periodic inspection of foundation movement, cable trench settlement and access roads during operation. If settlement occurs, proceed with remedial works or soil improvement as required.	Subsidence
6	For access roads, implement gravel surfacing, periodic grading, and drainage culverts as specified in the national EIA ESMP.	Subsidence
7	Integrate ground condition checks into routine H&S inspections.	Subsidence
8	Train workers to recognize and report subsidence-related hazards.	Subsidence
9	Wind turbines and associated infrastructure should be sited and designed to minimize fire risk, including maintaining adequate separation distances from combustible vegetation and structures.	Extreme fire conditions
10	Access roads should be designed to allow emergency vehicles to reach turbines and substations.	Extreme fire conditions
11	Regularly clear and manage vegetation around turbines, substations, and overhead lines to reduce fuel for wildfires.	Extreme fire conditions
12	Maintain firebreaks and ensure that grass and brush are kept below specified heights.	Extreme fire conditions
13	Ensure that electrical systems are designed and maintained to prevent overheating, arcing, or short circuits that could ignite fires.	Extreme fire conditions
14	Implement procedures for hot work (e.g., welding, grinding) to prevent accidental ignition.	Extreme fire conditions
15	Prohibit open flames and smoking in and around turbines and substations.	Extreme fire conditions
16	Provide and maintain firefighting equipment (e.g., extinguishers, hoses) at key locations.	Extreme fire conditions
17	Conduct regular inspections and maintenance of electrical and mechanical systems to identify and address fire hazards.	Extreme fire conditions
18	Monitor weather conditions (e.g., high winds, drought) that may elevate fire risk and adjust operations accordingly.	Extreme fire conditions
19	Perform an EPA taking into account climate change effect on the wind resource and use it as a stress test for the financial model	Wind speed reduction

11.3 Transition Risk Assessment

Under Equator Principles version IV (EP4), a Transition Risk Assessment is required if a project's combined annual Scope 1 and Scope 2 greenhouse gas emissions exceed 100,000 tCO_2e, as calculated according to the GHG Protocol. The GHG Protocol defines:

- Scope 1: Direct emissions from sources owned or controlled by the project (such as on-site fuel combustion and process emissions).
- Scope 2: Indirect emissions from the generation of purchased electricity, steam, heat, or cooling consumed by the project.

- Scope 3: Other indirect emissions, including those from the supply chain, manufacturing, transport, and end-of-life, are not required for EP4 due diligence and fall outside the mandatory reporting boundary.

In this assessment, emissions attributed to the “Use” phase in Chapter 11.1.1, are considered representative of Scope 1 and Scope 2. Based on the 35-year operational lifetime used in ERM’s calculations, the project’s annual Scope 1 and Scope 2 emissions remain below the 100,000 tCO_2e threshold for both construction and operational phases.

As the project does not exceed the Equator Principles IV threshold for annual CO_2 emissions, a Transition Risk Assessment is not required.

12 CONCLUSIONS

The Dunarea Wind Farm Project is among Romania’s largest onshore renewable energy initiatives. Originally planned as a single 600 MW project in Constanța County, it is jointly developed by Consenswind, Midmar Callatis, and UK-based Rezolv Energy. The project was divided into Dunarea East (Deleni Commune) and Dunarea West (Adamclisi Commune), with this ESIA focusing on Dunarea East (hereafter “the Project”), which has an approved capacity of 300 MW and an expected annual electricity production of approximately 750 GWh.

The project began in 2010 with wind assessments and preliminary designs. Environmental permitting evolved over time, culminating in a Revised Environmental Agreement in 2025 approving 45 turbines. The international Environmental Social Impact Assessment (ESIA) process, initially led by ERM in 2023, was resumed by DNV in 2025 to reflect Dunarea East’s ready-to-build status, and ensure the compliance against the standards and guidelines of international finance institutions, most commonly the IFC’s Performance Standards (PS, 2012) and EBRD’s E&S Requirements (2025), together with the Romanian and EU Law and Regulations relevant for the Project.

This ESIA has identified and assessed a wide range of potential impacts on the physical, biological and social environments. Where impacts were identified, appropriate mitigation measures have been proposed. For the majority of impact areas, implementation of the recommended mitigation reduces the significance of residual effects to *minor* or *negligible*. These measures, and the management of all residual impacts, are detailed in the standalone Environmental and Social Management Plan (ESMP), which consolidates the Project’s future environmental and social commitments.

ESMP implementation will be the responsibility of the EPC Contractor, who is required to apply the relevant mitigation and monitoring measures defined in the ESIA. The Project Company will appoint qualified staff (e.g. HR Manager, HSSE Officer and Community Liaison Officer) to ensure adequate oversight and effective implementation.

Three (3) impact areas retain moderate residual significance, despite the application of mitigations:

- Community exposure to security-related risks affecting Vulnerable and Disadvantaged Groups, due to the presence of non-local workers during both construction and operational phases (residual significance: *moderate*).
- Potential direct physical impacts on cultural heritage, associated with ground disturbance during construction (residual significance: *moderate*).
- Potential mortality of birds and bats due to collision with wind turbines (residual significance: *moderate*).

In such cases, the residual magnitude of impact is reduced following mitigation. The remaining moderate significance is driven by the high sensitivity of the affected receptors, which is consistent with IFC/EBRD significance methodologies. These impacts are addressed through targeted management plans (as outlined in the ESMP), which ensure that risks remain controlled, monitored and capable of further reduction through adaptive management.

Provided that all mitigation and management measures in this ESIA and associated ESMP are fully implemented, DNV considers that there are no environmental or social issues that would prevent the Project from meeting international lender requirements and progressing toward financing, especially in light of the Project's substantial contribution to national renewable energy and decarbonisation targets.

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