



First Look Solutions S.A.

Environmental and Social Impact Assessment Report

460.8 MW Vifor Wind Farm, Buzau
County, Romania

15 November 2023

Project No.: 066726

Document details	The details entered below are automatically shown on the cover and the main page footer. PLEASE NOTE: This table must NOT be removed from this document.
Document title	Environmental and Social Impact Assessment Report
Document subtitle	460.8 MW Vifor Wind Farm, Buzau County, Romania
Project No.	066726
Date	15 November 2023
Version	03
Author	ERM Team: Magdalena Burlacu, Silvia Timu, Laura Ghenu, Claudia Tomescu, Rusalina Lupu, Oana Ciobanu, Catalina Rotaru, Sylwia Lyskawka, Sonia Gonzalez, Adam Teixeira-Leite, Kirill Shurshin, Horia Herta, Virgil Predescu, George Chatzigiannidis, Bruno Javier Diaz, Aurora Finiguerra, Simone Poli, Jessica McIver, David O'Connor, Vedra Korobar, Raquel Althoff, Nehir Yildiz, Ben Sussman, Jenifer Huff, A.J. Durham, Sebastian Ellis
Client Name	First Look Solutions S.A.
Sponsors	Low Carbon and Rezolv Energy

Document history

Version	Revision	Author	Reviewed by	ERM approval to issue		Comments
				Name	Date	
Draft	01	ERM Team	Dana Bratu Raquel Althoff	Dana Bratu	26.05.2023	Preliminary draft excluding Noise baseline and IA, Biodiversity and Protected Areas IA, Human Rights, Ecosystem services and Cumulative Impact Assessment
Draft	02	ERM Team	Dana Bratu	Dana Bratu	06.10.2023	Final draft
Final	03	ERM Team	Dana Bratu	Dana Bratu	15.11.2023	Final ESIA report

Signature Page

15 November 2023

Environmental and Social Impact Assessment Report

460.8 MW Vifor Wind Farm, Buzau County, Romania

Magdalena Burlacu

Project Manager

Dana Bratu

Associate Partner

ERM Environmental Resources Management S.R.L.
145 Calea Victoriei, 8th Floor,
Victoria Center, Sector 1
RO-010072 Bucharest

Tel.: +40 (0) 31 405 1680

Fax: +40 (0) 31 405 1681

CONTENTS

CONTENTS	I
List of Tables	iii
List of Figures	viii
Acronyms and Abbreviations	xi
EXECUTIVE SUMMARY	13
1. INTRODUCTION AND CONTEXT	1
1.1 Background	1
1.2 Project Overview	2
1.3 Project Parties	2
1.4 The Environmental and Social Impact Assessment (ESIA)	3
1.4.1 Purpose of the ESIA	3
1.4.2 Objectives and Scope of the ESIA	3
1.4.3 ESIA Process to Date	5
1.4.4 Assumptions and Limitations of the ESIA	6
1.4.5 Structure of the ESIA Report	7
2. PROJECT DESCRIPTION	8
2.1 Project Overview	8
2.2 Project Location	9
2.2.1 Project locations	9
2.2.2 Project sites access	13
2.3 Project Area of Influence	13
2.4 Project Components	16
2.4.1 Permanent Facilities and Components of the Wind Farm	16
2.4.2 Temporary Construction Facilities of the Wind Farm	19
2.5 Project Schedule	22
2.6 Project Phases	23
2.6.1 Pre-construction Activities	23
2.6.2 Construction Phase	24
2.6.3 Operational Phase	28
2.6.4 Decommissioning Phase	28
2.7 Resource Requirement	29
2.7.1 Land requirements	29
2.7.2 Water use and management	31
2.7.3 Raw materials	31
2.7.4 Power requirements	31
2.7.5 Workforce and workers' accommodation	31
2.8 Project alternatives	31
2.8.1 No Project alternative	32
2.8.2 Location selection and alternatives / Project layout	32
2.8.3 Technology alternatives	33
2.8.4 Transport alternatives / Transport routes	34
3. ADMINISTRATIVE FRAMEWORK	35
3.1 National Policy, Legal and Administrative Framework	35
3.1.1 Institutional Framework	35
3.1.2 National Regulatory Framework	36
3.2 International Legislation, Guidelines and Standards for the ESIA	44
3.2.1 International Conventions	44
3.2.2 International Lender Standards and Guidelines	45

3.3	Developer's Policies and Standards	51
3.4	Licenses and Permits	51
4.	ESIA APPROACH AND METHODOLOGY	63
4.1	Introduction	63
4.2	Impact Assessment Approach	64
4.2.1	Scoping Stage.....	64
4.2.2	Scope of the Assessment	66
4.2.3	Defining Area of Influence (Aoi)	66
4.2.4	ESIA Scoping Matrix	68
4.2.5	Baseline Data Collection.....	72
4.2.6	Stakeholder Engagement	72
4.3	Impact Assessment and Mitigation Methodology	72
4.3.1	Introduction	72
4.3.2	Identification and Assessment of Impacts	73
4.3.3	Identification of Mitigation and Enhancement Measures	80
4.3.4	Residual Impact Evaluation	81
4.3.5	Cumulative Impact Assessment.....	81
4.3.6	Management Plans	81
4.3.7	Risk Assessment for Unplanned Events	82
4.4	Alternatives and Interaction with Design and Planning Process	84
5.	STAKEHOLDER ENGAGEMENT	85
5.1	Stakeholder identification.....	85
5.2	Stakeholder engagement to date	86
5.2.1	ESIA Engagement	87
6.	PROJECT BASELINE CONDITIONS	93
6.1	Physical and Biological Environment	93
6.1.1	Climate and Climate Change	93
6.1.2	Air quality	95
6.1.3	Ambient noise	101
6.1.4	Topography and Land Cover	107
6.1.5	Geology and Soil.....	108
6.1.6	Hydrology (Groundwater and Surface water).....	118
6.1.7	Biodiversity and Protected areas	123
6.2	Socio-Economic Environment.....	125
6.2.1	Socio-economic baseline conditions	125
6.2.2	Landscape and Visual.....	129
6.2.3	Shadow flicker, Ice/Blade throwing	144
6.2.4	Ecosystem Services.....	150
6.2.5	Traffic.....	158
6.2.6	Archaeology and Cultural Heritage	164
6.2.7	Palaeolithic to Mesolithic (2,601,950 BCE to 6,200 BCE).....	175
6.2.8	Neolithic (6200 BCE – 5000 BCE)	175
6.2.9	Eneolithic (4600 BCE – 3700 BCE) and Bronze Age (3200 BCE – 1125 BCE).....	176
6.2.10	Iron Age (1125 BCE- 600 AD).....	176
6.2.11	Medieval Period to Modern Period (600 AD – Present)	176
7.	ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT	193
7.1	Environmental Impact Assessment.....	193
7.1.1	Climate change (Climate Risk and Adaptation)	193
7.1.2	Air Quality	259
7.1.3	Noise and Vibrations	266
7.1.4	Geology and Soil.....	275
7.1.5	Groundwater and Surface Water	284

7.1.6	Solid Waste and Wastewater Management	294
7.1.7	Biodiversity and Protected Areas	307
7.2	Social Impact Assessment.....	327
7.2.1	Livelihood.....	327
7.2.2	Economy, Employment, and Income	330
7.2.3	Education and Training.....	336
7.2.4	Infrastructure and Public Services	338
7.2.5	Community Health and Safety	341
7.2.6	Labour and working conditions	346
7.2.7	Human rights.....	351
7.2.8	Landscape and Visual.....	370
7.2.9	Shadow flicker, Ice throwing	404
7.2.10	Ecosystem services	439
7.2.11	Traffic.....	442
7.2.12	Archaeology and Cultural Heritage	454
8.	CUMULATIVE IMPACT ASSESSMENT	461
9.	SUMMARY OF IMPACTS	462
10.	CONCLUSION	466
11.	REFERENCES	467
	APPENDIX A CULTURAL HERITAGE BASELINE GAZETTEER.....	474
	APPENDIX B CLIMATE CHANGE SUPPORTING MATERIALS	475
	APPENDIX C SOCIO-ECONOMIC ENVIRONMENT	476
	APPENDIX D BIODIVERSITY AND PROTECTED AREAS.....	477
	APPENDIX E CRITICAL HABITATS RISK ASSESSMENT	478
	APPENDIX F COLLISION RISK MODELLING	479
	APPENDIX G CUMULATIVE IMPACT ASSESSMENT.....	480

List of Tables

Table 0-1	Impact assessment for each environmental and social aspect/topic related to the Project	16
Table 0-2	Risk assessment for unplanned events related to the Project.....	18
Table 1-1	Project Parties	2
Table 1-2	Scope of Baseline and Impact Assessment.....	4
Table 1-3	ESIA Report Structure	7
Table 2-1	Location of the Vifor WTGs (as per the up-to-date Project design)	11
Table 2-2	Technical Specifications of the WTGs.....	16
Table 2-3	Vifor Wind Farm Project Schedule	22
Table 2-4	Permanent and temporary land required for WTGs by subproject (ha).....	30
Table 3-1	Relevant National Legislation	36
Table 3-2	Romanian legal framework and relevant documents related to SEA process	41
Table 3-3	Summary of IFC Performance Standards and an Indicator of their Applicability to the Project	46
Table 3-4	Romanian E&S Permits and Main Permitting Requirements for Vifor WF Project	52
Table 4-1	Resources/receptors considered during Scoping	65
Table 4-2	Understanding the Impacts within the Scoping Matrix	68
Table 4-3	Scoping Matrix for ESIA.....	69
Table 4-4	Impact Characteristics Terminology	75

Table 4-5	Designation Definitions	76
Table 4-6	Designation of Likelihood Designations	77
Table 4-7	Impact Significance	79
Table 4-8	Significance Definitions	80
Table 4-9	Indicative Levels of Consequence for Potential Impacts from	82
Table 4-10	Risk Matrix for Potential Unplanned Events	83
Table 5-1	Stakeholder Identification	85
Table 5-2	Overview of scoping phase engagement	88
Table 5-3	List of stakeholders interviewed	90
Table 5-4	Overview of engagement for socio-economic data collection	91
Table 6-1	Romanian Ambient Air Quality Standards	95
Table 6-2	IFC/WHO Guidelines on Ambient Air Quality	96
Table 6-3	Project Ambient Air Quality Standards	97
Table 6-4	IFC/ World Bank Noise Level Guidelines	102
Table 6-5	Description of Long-Term Unattended Noise Monitoring Location	104
Table 6-6	Time Periods for Noise Measurements Occurred Every 60-Min	107
Table 6-7	Geological sequence – geotechnical conditions in drillings in the direct Project AoI, according to the Geotechnical Survey Studies, 2011 and 2022	112
Table 6-8	Characterization of groundwater bodies in the Project area	119
Table 6-9	Characterization of surface water bodies in the Project area	123
Table 6-10	Field of View	137
Table 6-11	Horizontal field of view	137
Table 6-12	Vertical field of view	138
Table 6-13	Mapping Turbine Visibility Elements	139
Table 6-14	Location of the proposed VSRs	143
Table 6-15	Wind Turbine Coordinates	146
Table 6-16	Specification of wind turbine characteristics	148
Table 6-17	Land cover/habitat mapped in the study area	152
Table 6-18	Simple matrix used for rating ecosystem services importance based on level of demand and supply	154
Table 6-19	Results of the rapid qualitative ecosystem services assessment for the Project area	155
Table 6-20	Proportion of roads per type of surfacing (%), 2020	160
Table 6-21	Road Accident Data, 2021	164
Table 6-22	International Treaties relating to the protection of cultural heritage in Romania	168
Table 6-23	Scope of the Assessment and Project Area of Influence	171
Table 6-24	Criteria for Cultural Heritage Impact Significance (a guide)	190
Table 7-1	Risk materiality categories and associated definitions	196
Table 7-2	Next step categories and their associated definitions.	196
Table 7-3	Climate Scenarios used in this physical CCRA Assessment	198
Table 7-4	Time Horizons included within this Physical CCRA	199
Table 7-5	Characteristics for Assessing Magnitude	200
Table 7-6	Frequency and Likelihood Definitions for Extreme Event Effects	201
Table 7-7	Impact Vulnerability Rating Matrix	202
Table 7-8	Risk Significance Ratings Matrix	202
Table 7-9	Site Receptors at the Operational phase	204
Table 7-10	Site Receptors at the Decommissioning phase	204
Table 7-11	Baseline Prominent Hazards	206
Table 7-12	Summary of Material Hazards for baseline and projections	210
Table 7-13	Table showing the rationale for Hazard inclusion	212
Table 7-14	Data snapshots: summary statistics	214
Table 7-15	Baseline and projected Extreme Heat climate data	218
Table 7-16	Potential impacts from Extreme Heat to Site Receptors for Operations phase on the Vifor Wind Farm Project	219

Table 7-17	Potential impacts from Extreme Heat to Site Receptors for Decommissioning phase on the Vifor Wind Farm Project	219
Table 7-18	Operational phase risk rating, based on current conditions (baseline) and future climate for Extreme Heat	221
Table 7-19	Decommissioning phase risk rating, based on current conditions (baseline) and future climate for Extreme Heat	222
Table 7-20	Potential High-Level Mitigation/Adaptation Measures or Recommended Next Steps for each risk area identified as being 'Likely Material' for the Extreme Heat Hazard grouping for Operational phase	224
Table 7-21	Potential High-Level Mitigation/Adaptation Measures or Recommended Next Steps for each risk area identified as being 'Likely Material' for the Extreme Heat Hazard grouping for Decommissioning phase	226
Table 7-22	Operational phase Risk Rating for Extreme Heat, based on current conditions (baseline) and future climate after implementation of High-Level Mitigation/Adaptation Measures and / or Recommended Appropriate Next Steps/Considerations	228
Table 7-23	Decommissioning phase Risk Rating for Extreme Heat, based on current conditions (baseline) and future climate after implementation of High-Level Mitigation/Adaptation Measures and / or Recommended Appropriate Next Steps/Considerations	229
Table 7-24	Baseline and projected Wildfires climate data	231
Table 7-25	Potential Impacts from Wildfires to Site Receptors for Operations phase on the Vifor Wind Farm Project	232
Table 7-26	Potential Impacts from Wildfires to Site Receptors for Decommissioning phase on Vifor Wind Farm Project	232
Table 7-27	Operational phase risk rating, based on current conditions (baseline) and future climate for Wildfires	234
Table 7-28	Decommissioning phase risk rating, based on current conditions (baseline) and future climate for Wildfires	235
Table 7-29	Potential High-Level Mitigation/Adaptation Measures or Recommended Next Steps for each risk area identified as being 'Likely Material' for the Wildfires Hazard Grouping for Operational phase	237
Table 7-30	Potential High-Level Mitigation/Adaptation Measures or Recommended Next Steps for each risk area identified as being 'Likely Material' for the Wildfires Hazard Grouping for Decommissioning phase	239
Table 7-31	Operational phase Risk Rating for Wildfires, based on current conditions (baseline) and future climate after implementation of High-Level Mitigation/Adaptation Measures and / or Recommended Appropriate Next Steps/Considerations	243
Table 7-32	Decommissioning phase Risk Rating for Wildfires, based on current conditions (baseline) and future climate after implementation of High-Level Mitigation/Adaptation Measures and / or Recommended Appropriate Next Steps/Considerations	244
Table 7-33	Water Risk Data for Vifor Wind Farm	246
Table 7-34	Projected Water Stress for Vifor Wind Farm	247
Table 7-35	Baseline and projected Water Stress and Drought climate data	247
Table 7-36	Potential Impacts from Water Stress & Drought to Site Receptors for Operations phase on the Vifor Wind Farm Project	248
Table 7-37	Potential Impacts from Water Stress & Drought to Site Receptors for Decommissioning phase on Vifor Wind Farm Project	249
Table 7-38	Operational phase risk rating, based on current conditions (baseline) and future climate for Water Stress & Drought	250
Table 7-39	Decommissioning phase risk rating, based on current conditions (baseline) and future climate for Water Stress & Drought	251
Table 7-40	Potential High-Level Mitigation/Adaptation Measures or Recommended Next Steps for each risk area identified as being 'Likely Material' for the Water Stress & Drought Hazard Grouping for Operational phase	253

Table 7-41	Potential High-Level Mitigation/Adaptation Measures or Recommended Next Steps for each risk area identified as being 'Likely Material' for the Water Stress & Drought Hazard Grouping Decommissioning Phases.....	255
Table 7-42	Operational phase Risk Rating for Water Stress & Drought, based on current conditions (baseline) and future climate after implementation of High-Level Mitigation/Adaptation Measures and / or Recommended Appropriate Next Steps/Considerations	257
Table 7-43	Decommissioning phase Risk Rating for Water Stress & Drought, based on current conditions (baseline) and future climate after implementation of High-Level Mitigation/Adaptation Measures and / or Recommended Appropriate Next Steps/Considerations	258
Table 7-44	Responsivity of Receptors to air quality impacts	260
Table 7-45	Impact Assessment: Air Quality – Dust Emissions during Construction.....	261
Table 7-46	Estimated Truck Traffic for Project Construction	262
Table 7-47	Impact Assessment: Air Quality – Traffic during Construction	263
Table 7-48	Pre and Post Mitigation: Air Quality Impacts	265
Table 7-49	Magnitude and Significance of Noise Effects	268
Table 7-50	Technical Specifications of the Vestas V162-6.4 MW (WTGs)	269
Table 7-51	Sound Power Level at Hub Height, Mode PO6400	269
Table 7-52	Predicted Operational Noise Levels at Monitoring Location	270
Table 7-53	Predicted Operational Noise Levels at all receptors at 17 m/s wind speed (highest SWL)	271
Table 7-54	Impact Assessment: Noise – Operation	274
Table 7-55	Summary of permanent and temporary land required for the Project (ha)	275
Table 7-56	Land/Soil Impacts by Project Phase	276
Table 7-57	Impact Assessment: Soil Compaction and Erosion (Construction).....	278
Table 7-58	Impact Assessment: Soil Contamination (Construction)	278
Table 7-59	Impact Assessment: Soil Contamination (Operation)	279
Table 7-60	Impact Assessment: Soil Compaction and Erosion (Decommissioning)	281
Table 7-61	Impact Assessment: Soil Contamination (Decommissioning)	281
Table 7-62	Pre- and Post-mitigation: Soil Compaction and Erosion, and Soil contamination	284
Table 7-63	Water Resource Impacts by Project Phase	285
Table 7-64	Water Resource Impacts by Project Phase	286
Table 7-65	Criteria for Impact Magnitude for Water Resource Impact Assessment.....	287
Table 7-66	Impact on Water Quantity (groundwater and surface water resources) – during Construction	289
Table 7-67	Impact on Water Quality (groundwater and surface water resources) – during Construction	290
Table 7-68	Pre- and Post-mitigation: Construction impacts on water resources (groundwater and surface water).....	293
Table 7-69	Solid Waste and Wastewater Management Impacts by Project Phase.....	295
Table 7-70	Anticipated Solid Waste types associated with the Construction Phase	298
Table 7-71	Waste Characterization.....	301
Table 7-72	Biodiversity Impacts - Construction.....	307
Table 7-73	Biodiversity Impacts – Operation	311
Table 7-74	Biodiversity Impact Assessment – Decommissioning.....	313
Table 7-75	Estimated Annual Mortality of Species in the Vifor Wind Farm Array	315
Table 7-76	Potential biological removal results	316
Table 7-77	Cumulative Impact Assessment Summary	324
Table 7-78	Potential impacts land-related impacts by Project's phase	327
Table 7-79	Impact Assessment: Loss of income for farmers (construction)	328
Table 7-80	Potential impacts on economy, employment, and income by Project's phase	331
Table 7-81	Increase in direct employment levels – Impact Assessment	332

Table 7-82	Impact Assessment: Economic benefits of indirect and induced employment, and Project procurement.....	333
Table 7-83	Impact Assessment: Increase in local council's revenue from Project's taxes.....	334
Table 7-84	Potential impacts on education and training by Project's phase	336
Table 7-85	Impact Assessment: Increased level of education and skills.....	337
Table 7-86	Potential impacts on infrastructure and public services.....	338
Table 7-87	Impact Assessment: Increased demand on public services	339
Table 7-88	Impact Assessment: Pressure on housing stock through the influx of non-local workers 340	
Table 7-89	Potential impacts on community health and safety by project's phase	342
Table 7-90	Impact Assessment: Impact on air quality and noise.....	342
Table 7-91	Impact Assessment: Impacts related to workforce influx.....	343
Table 7-92	Impact Assessment: Risk of aircrafts collisions with wind turbines	344
Table 7-93	Potential impacts on labour and working conditions by project's phase.....	346
Table 7-94	Impact Assessment: Inadequate working and/or workforce accommodation conditions 347	
Table 7-95	Impact Assessment: Impact on the health and safety of supply chain workers	348
Table 7-96	Impact Assessment: Impact on workers' health and safety associated with incidents during construction activities	349
Table 7-97	Impact Assessment: Impact on workers' health and safety associated with incidents during operation activities	349
Table 7-98	Impact Assessment: Landscape Value (Construction)	370
Table 7-99	Impact Assessment: Landscape Value (Decommissioning)	371
Table 7-100	Impact Assessment: Visual (Construction)	372
Table 7-101	Impact Assessment: Visual (Operational)	373
Table 7-102	Summary of Visual Impact	374
Table 7-103	Impact Assessment: Visual (Decommissioning)	403
Table 7-104	Pre- and Post-mitigation: Landscape and visual	404
Table 7-105	Relevant National Standards	405
Table 7-106:	Comparison Worst Case to real case	414
Table 7-107	Cluster Sensitivity and Magnitude.....	437
Table 7-108	Impact of Shadow Flicker (Operation)	438
Table 7-109	Impact assessment: Disruption of Ecosystem Services – during Construction.....	440
Table 7-110	Pre- and Post-mitigation: Disruption of Ecosystem Services	441
Table 7-111	Traffic Impacts by Project Phase	442
Table 7-112	Component Transport Routes from Constanța	443
Table 7-113	Estimated Truck Traffic for Project Construction	445
Table 7-114	Impact Assessment: Traffic – Road Function (Construction)	446
Table 7-115	Impact Assessment: Traffic – Road Condition (Construction).....	447
Table 7-116	Impact Assessment: Traffic – Road Safety (Construction)	449
Table 7-117	Impact Assessment: Traffic—Road Function, Condition and Safety (Operations).....	450
Table 7-118	Impact Assessment: Traffic – Road Function, Condition and Safety (Decommissioning) 451	
Table 7-119	Pre and Post Mitigation: Impacts on Road Function, Condition and Safety	453
Table 7-120	Scope of the Impact Assessment and Area of Influence	455
Table 7-121	Impact Magnitude definitions for Cultural Heritage	455
Table 7-122	Direct impacts PI1 Physical ground disturbance activities (earthworks) on High sensitivity Cultural Heritage Resources (Pre-Mitigation)	457
Table 7-123	Direct impacts PI1 Physical ground disturbance activities (earthworks) on Medium sensitivity Cultural Heritage Resources (Pre-Mitigation)	458
Table 7-124	Direct impacts PI1 Physical ground disturbance activities (earthworks) on Low sensitivity Cultural Heritage Resources (Pre-Mitigation)	458

List of Figures

Figure 2-1	Project Layout	10
Figure 2-2	Project's Area of Influence	15
Figure 2-3	Wind turbine technical drawing.....	17
Figure 2-4	Typical WTG and Associated Working Platforms	18
Figure 2-5	Transformer Station Location and OHL Connection to the 400kV OHL Cernavoda - Stâlpu Line	19
Figure 2-6	General Concrete Batching Station Operation Scheme	21
Figure 2-7	Vifor WF Project Construction Process	26
Figure 2-8	Changes in the Project layout (2023)	33
Figure 3-1	Stakeholder engagement milestones as part of the EIA Procedure	40
Figure 4-1	Overview of the ESIA Process.....	64
Figure 4-2	ESIA Methodology	74
Figure 5-1	Photos during the ESIA scoping engagement meetings held in.....	89
Figure 5-2	Stakeholder meetings during the baseline phase	92
Figure 6-1	Map of Romania's climate classification	94
Figure 6-2	Surrounding industrial and commercial areas	98
Figure 6-3	Location of nearest air quality monitoring station	98
Figure 6-4	National Database Air Quality Index.....	99
Figure 6-5	Average annual values of monitored parameters at BZ-1 station	100
Figure 6-6	Noise Monitoring Location	103
Figure 6-7	Noise Monitoring Setup	104
Figure 6-8	Noise Monitoring Results at R1	106
Figure 6-9	Correlation Between Background Noise Levels (LA90) and Wind Speed at Hub Height .	106
Figure 6-10	VisViva Project Area Topography and Landcover	108
Figure 6-11	Geological features and subunits of the Romanian Plain, and location of Vifor Project	110
Figure 6-12	Geotechnical drillings at WTG03 and WTG04 locations, Costești sub-project area ...	110
Figure 6-13	Distribution of saline soils by degree of salinity in Romania and Project area, 2008 .	116
Figure 6-14	Soil and vegetation in Călmățui River meadow: WTG18 (left) and WTG26 (right) locations, Smeeni sub-project area, September 2022	117
Figure 6-15	Călmățui River and tributaries (Negreasca, Rușavăț, Strâmbu, Buzoel) in the Project area	121
Figure 6-16	Călmățui River passing north of Smeeni village, north view to pastureland and future location of WTG22, March 2023	122
Figure 6-17	Landscape Study Area.....	129
Figure 6-18:	Topography of Project Area.....	130
Figure 6-19:	Landscape Characteristic Unit map	131
Figure 6-20:	Land Cover Map	133
Figure 6-21:	Photos of Nearby Landscape	134
Figure 6-22:	Protected Areas	135
Figure 6-23:	Turbine Visibility Elements	139
Figure 6-24:	View shed Zone A: One or more wind turbines in their entirety	140
Figure 6-25:	View shed Zone B: The entire path of the blades for one or more wind turbines	141
Figure 6-26:	View shed Zone C: At least half of the path of one or more wind turbines	142
Figure 6-27:	Location of the proposed VSRs.....	144
Figure 6-28	Layout of the Project	145
Figure 6-29	Location of Dwellings/Group of Dwellings	148
Figure 6-30	Local Dwelling	149
Figure 6-31	Local Dwelling	149
Figure 6-32	Local Dwelling	149
Figure 6-33	Ecosystem services categorised.....	151
Figure 6-34:	CORINE Land cover types mapped in the study area	153

Figure 6-35	Map showing the extent and distribution of Natural vs Modified Habitat in the study area	153
Figure 6-36	Map of roads in the Project area	159
Figure 6-37	Details of local roads (pavement width of approx. 6 m) in the Călmățui meadow area, Direct Project Aol	161
Figure 6-38:	Project Location and Layout	164
Figure 6-39:	Geological map of the area	174
Figure 6-40	Skull identified at Baia de Fier	175
Figure 6-41	1897 Map of Buzeu and surrounding area	178
Figure 6-42:	VV_CH_007 (BZ-I-s-B-02287) archaeological site of Smeeni	181
Figure 6-43:	VV_CH_009 BZ-I-s-B-02295 Ulmeni - Movila lui Reteșan	183
Figure 6-44:	VV_CH_036 (BZ-I-s-B-02192) archaeological site from Albești	184
Figure 6-45:	VV_CH_036 (BZ-I-s-B-02192) ceramics discovered during field survey at Albesti	184
Figure 6-46:	VV_CH_043 (BZ-I-s-B-02294) archaeological site from Udați-Lucieni - La Pascali	185
Figure 6-47:	VV_CH_043 (BZ-I-s-B-02294) archaeological material discovered through walkover survey at La Pascali	186
Figure 6-48:	VV_CH_043 (BZ-I-s-B-02249) archaeological site of Moisica	186
Figure 6-49:	BZ-I-s-B-02249 Ceramic objects from the collection of the Buzay County Museum discovered in 1978	187
Figure 6-50:	VV_CH_048 (BZ-II-m-B-02474) 'Sf. Nicolae' Church.....	187
Figure 7-1	Project categories as defined by EP4 and TCFD guidelines	194
Figure 7-2:	Physical CCRA process steps	195
Figure 7-3	Risk Magnitude Scoring Approach.....	201
Figure 7-4	Baseline Asset Risk Score	206
Figure 7-5	Baseline Risk Score Composition.....	206
Figure 7-6	Asset Risk Score, SSP1-2.6	207
Figure 7-7	Asset Risk Score, SSP5-8.5	207
Figure 7-8	Projection Risk Score Composition: SSP1-2.6, 2030	208
Figure 7-9	Projection Risk Score Composition: SSP1-2.6, 2050	208
Figure 7-10	Projection Risk Score Composition: SSP5-8.5, 2030	209
Figure 7-11	Projection Risk Score Composition: SSP5-8.5, 2050	209
Figure 7-12	Monthly Minimum, Mean and Maximum Temperature and Rainfall for Romania, 1991–2020	214
Figure 7-13	Observed Average Annual Mean Temperature for Romania, 1901–2021	215
Figure 7-14	Observed Annual Mean Temperature for Romania, 1901–2021	215
Figure 7-15	Projected Mean Temperature for Romania for 2040-2059 at SSP1-2.6	216
Figure 7-16	Projected Mean Temperature for Romania for 2040-2059 at SSP5-8.5	217
Figure 7-17	Burnt area (a), number of fires (b) and average fire size (c) in Romania from 1986 to 2021	230
Figure 7-18	Overall Water Risk Data for Vifor Wind Farm	246
Figure 7-19	Projected Water Stress for Vifor Wind Farm.....	247
Figure 7-20	Construction traffic impacts screening process	263
Figure 7-21	Area of Influence and Noise Sensitive Receptors	267
Figure 7-22	Predicted Noise Levels at Monitoring Location	270
Figure 7-23	Predicted Noise Levels at All Receptors	273
Figure 7-24	Waste Hierarchy.....	302
Figure 7-25	Waste & Wastewater Mitigation and Management Measures – Construction Phase .	302
Figure 7-26	Waste & Wastewater Mitigation and Management Measures – Operational Phase ..	304
Figure 7-27	Pre- and Post-mitigation: Inadequate Waste and Wastewater Management during Construction, Operation and Decommissioning Phases	306
Figure 7-28	IFC's Six Step Approach to CIA.....	319
Figure 7-29	Legend of Visual Graphic Sheets	375
Figure 7-30	Photomontage for VSR1	376

Figure 7-31	Photomontage for VSR4	378
Figure 7-32	Photomontage for VSR5	384
Figure 7-33	Photomontage for VSR10	385
Figure 7-34	Photomontage for VSR12	387
Figure 7-35	Photomontage for VSR14	388
Figure 7-36	Photomontage for VSR18	389
Figure 7-37	Photomontage for VSR21	390
Figure 7-38	Photomontage for VSR21	392
Figure 7-39	Photomontage for VSR23	397
Figure 7-40	Photomontage for VSR24	398
Figure 7-41:	Photomontage for VSR26	402
Figure 7-42	Shadow Flickering Theory	409
Figure 7-43	Operational hours by sector for every site areas	410
Figure 7-44	WindPro Shadow Module Inputs (in bold the differences among Worst Case and Real Case Scenario)	411
Figure 7-45	Map of Predicted shadow flicker (hours/year) – Worst Case Scenario	412
Figure 7-46	Map of Predicted shadow flicker (minutes/day) - Worst Case Scenario	413
Figure 7-47	Map of Predicted shadow flicker (hours/year) – Real Case Scenario	414
Figure 7-48	Clusters location	415
Figure 7-49	Cluster graphic sheets - legend	417
Figure 7-50	Cluster A - graphic sheets	418
Figure 7-51	Cluster B - graphic sheets	419
Figure 7-52	Cluster C - graphic sheets	420
Figure 7-53	Cluster D - graphic sheets	421
Figure 7-54	Cluster E - graphic sheets	422
Figure 7-55	Cluster F - graphic sheets	423
Figure 7-56	Cluster G - graphic sheets	424
Figure 7-57	Cluster H - graphic sheets	425
Figure 7-58	Cluster I - graphic sheets	426
Figure 7-59	Cluster J - graphic sheets	427
Figure 7-60	Cluster K - graphic sheets	428
Figure 7-61	Cluster L - graphic sheets	429
Figure 7-62	Cluster M - graphic sheets	430
Figure 7-63	Cluster N - graphic sheets	431
Figure 7-64	Cluster O - graphic sheets	432
Figure 7-65	Cluster P - graphic sheets	433
Figure 7-66	Cluster Q - graphic sheets	434
Figure 7-67	Cluster R - graphic sheets	435
Figure 7-68	Cluster S - graphic sheets	436
Figure 7-69	Component Transport Routes from Constanța	443

Acronyms and Abbreviations

Name	Description
AD	Anno Domini
AoI	Area of Influence
AP	Angle Point
AR	Assessment Reports
BC	Before Christ
CCRA	Climate Change Risk Assessment
CFP	Chance Finds Procedure
CHA	Critical Habitat Assessment
CHMP	Cultural Heritage Management Plan
CIA	Cumulative Impact Assessment
CMIP	Coupled Model Intercomparison Project
CRA	Climate Risk Assessment
CR	Critically Endangered (IUCN Red Data List Threat Status)
DD	Data Deficient (IUCN Red Data List Threat Status)
EBRD	European Bank for Reconstruction and Development
EOO	Extent of Occurrence
EN	Endangered (IUCN Red Data List Threat Status)
EP4	Equator Principles
E&S	Environmental and Social
ESIA	Environmental Social Impact Assessment
ESA	European Space Agency
GCM	Global Climate Models
GHG	Greenhouse Gas
GIS	Geographical Information System
ICH	Intangible Cultural Heritage
IBA	Important Bird Area
IBTrACS	International Best Track Archive for Climate Stewardship
ICOMOS	International Council on Monuments and Sites
IFC	International Finance Corporation
IPCM	Institutes for Protection of Cultural Monuments
IPCC	The Inter-Governmental Panel on Climate Change
ITCZ	Intertropical Convergence Zone
IUCN	International Union for the Conservation of Nature
KBA	Key Biodiversity Area
LCP	Law on Cultural Property
LC	Least Concern (IUCN Red Data List Threat Status)
NASA	National Aeronautics and Space Administration
NT	Near Threatened (IUCN Red Data List Threat Status)
PA	Protected Area

PS	Performance Standard
REA	Rapid Ecological Assessment
RCP	Representative Concentration Pathways
RoW	Right of Way
SSP	Shared Socioeconomic Pathways
S/S	Substation
TCFD	Task Force on Climate-related Financial Disclosures
TL	Transmission Line
TCH	Tangible Cultural Heritage
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
VU	Vulnerable (IUCN Red Data List Threat Status)
WRI	World Resources Institute
WHS	World Heritage Site
WTG	Wind Turbine Generator

EXECUTIVE SUMMARY

ERM was appointed by First Look Solutions S.A. (the Client) to provide the Environmental and Social Impact Assessment (ESIA) Study for Vifor (previously called Vis Viva) Wind Farm (the Project), in southeast Romania.

The Project will be implemented by First Look Solutions S.A. as the Project Company (development, construction and operation of the Project) with Low Carbon and Rezolv Energy contributing to the Project development, finance, construction and operation, as Projects' Sponsors (hereafter collectively referred to as the Client).

The Project is located in Buzau County, south-east of Buzau City, on the administrative areas of Costești, Gherăseni, Smeeni, Țintești and Luciu communes, being located mainly in Călmățui River meadows. The site is in an area of dry and salt steppes and pastures, partially overlapping the Natura 2000 sites ROSCI0259 Valea Călmățuiului and ROSPA0145 Valea Călmățuiului.

The Project will be constructed on leased public land, owned by the Local Councils of the above-mentioned administrative areas, and currently being leased to local farmers who use and maintain the pasture, benefiting from agricultural subsidies from the state.

The Project development started with wind assessment and first design of the wind farm, in 2010.

The Project include 72 wind turbine generators (WTGs) type 6.4 MW EnVentus Vestas V162 WTGs, resulting in a total capacity of 460.8 MW. All WTGs are proposed to be connected via underground cable lines to a single transformer station, and from there through a short overhead transmission line (OHL) to the national grid (National Energy System - SEN). The wind farm (WF) will be served by a network of existing agricultural roads and new built access roads, along which will be installed the underground cable lines, and which will include as the main road artery an East-West construction corridor.

The construction phase is scheduled to begin in October 2023 and to last approximate 18 months, with the start of operation in April 2025; the estimated Project operation period is up to 35 years.

The Project comprises of five sub-projects, one for each administrative area, which have separately followed the national urban planning and environmental permitting procedures. Permitting of each of the five sub-projects was initially done in 2010-2012, with updates in 2017. The Project re-permitting has been initiated in 2021 and is currently ongoing.

The Client is seeking to finance the Project based on international loans. At current stage of development, the Project qualifies as 'Category A' according to the Environmental and Social (E&S) policies of major international finance institutions (IFC, EBRD), commercial banks and export credit agencies signatory to Equator Principles¹. The 'Category A' Projects are characterized by potential significant adverse environmental and social risks and / or impacts that are diverse, irreversible, or unprecedented.

This ESIA presents information on the identification and assessment of the likely significant environmental and social effects of the Project and its ancillary infrastructure against the Equator Principles IV (2020), EBRD Performance Requirements (PR), 2019, set out in the EBRD's Environmental and Social Policy, and International Financing Corporation (IFC) Performance Standards (PS) (2012), including the IFC Environmental, Health and Safety Guidelines for Wind Energy (2015), IFC Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007), and associated World Bank General Environmental, Health and Safety (EHS) Guidelines (2007).

¹ The Equator Principles represents a risk management framework adopted by financial institutions, for determining, assessing and managing environmental and social risks in project finance.
<https://equator-principles.com/>

The document has been prepared by ERM based on:

- Information provided by Client, such as the DTAC Construction Technical Documentations and Geotechnical Survey studies for each sub-project, and the Urban planning and Environmental permitting studies for each sub-project;
- Desktop review of reliable information by ERM Team;
- Site visits and site investigations by ERM Team, including additional primary Baseline survey to collect data, and Socio-economic surveys of affected communities, including Stakeholder and community consultation activities,
- Noise monitoring within and around the Project area and Biodiversity surveys (including specialist ecological and ornithological monitoring).

This ESIA sets out an introduction to the Project and includes the following main aspects:

- Describes the Project, realistic alternatives, proposed layout and an outline of the proposed construction, operational and decommissioning works required;
- Describes the legal and institutional framework and context in which the Project is being proposed and developed;
- Demonstrates the general assessment methodology applied for this ESIA;
- Describe the baseline environmental and socio-economic conditions of the Project area, potential impacts that may result from construction, operation, and decommissioning, proposed mitigation measures and residual impacts;
- Provides a summary of impacts that can be expected during construction, operation and decommissioning of the Project including associated sites and facilities. This includes measures that are needed to prevent, mitigate, or otherwise address potentially significant impacts;
- Sets out the proposed environmental and social management and monitoring measures that will be implemented during the construction and/or operation as appropriate.

The outcomes of this ESIA, including mitigation measures and monitoring are summarized in the standalone Environmental and Social Management Plan (ESMP) of the Project, that combine the mitigation and monitoring requirements identified in the ESIA to provide an overview of future environmental and social commitments of the Project.

A summary of key impacts and mitigation measures that have been identified by the ESIA process are outlined within the standalone Non-Technical Summary (NTS), which accompanies this ESIA. Also, a standalone Stakeholder Engagement Plan (SEP) for the Project was developed, defining the program for stakeholder engagement, including public information disclosure and consultation, throughout the entire project cycle, outlining the ways in which the Project team will communicate with stakeholders, and including a grievance mechanism by which people can raise concerns, provide feedback, or make complaints about the project and any activities related to the Project. An Environmental and Social Action (ESAP) was developed for the Project outlining the specific actions and measures that the project developer will take to mitigate, manage, and monitor the identified environmental and social risks and impacts.

Environmental Context

Vifor Wind Farm Project is located in south-eastern Romania, in Bărăgan Plain, in the Călmățui river floodplain/meadow, a flat area that underwent extensive drainage works of the old swamps and overflow areas, so that at present the land is covered by meadows and pastures along the river, and agricultural lands in the higher tabular fields. At present, only a relatively small part remains as pasture, with floristic composition strongly modified due to excessive grazing and human intervention. 64 WTGs and ancillary facilities, out of a total number of 72 WTGs of the Project, will be located in the

pasture area. This is public land, owned by the Local Councils and currently leased to local farmers (agricultural companies, associations, etc.) to use and maintain the pasture, for this activity the farmers also benefitting from farming subsidies from the state side.

Within a radius of 20 km of the Project there are two Natura 2000 sites ROSCI0259 Valea Călmățuiului and ROSPA0145 Valea Călmățuiului, that overlaps partially with the Project area.

The results of habitats and vegetation survey developed by ERM (March 2022 - February 2023) show that the Project area are dominant by dry and salty pastures, such as the Pannonian and West-Pontic salt steppes with feather grasses and fescues, located in the flat/tabular fields, and aquatic habitats, with swamps and marshes, located only along the Călmățui River; trees here are almost completely absent, except some areas along Călmățui River watercourse, and the landscape is dominated by grasses and other drought resistant plants. The results of habitats and vegetation survey showed that there is one habitat: 1530* Pannonic salt steppes and salt marshes, listed in Annex I of the EU Habitats Directive.

As of fauna species, the screening assessment showed two mammal species included in Annex II and IV of the Habitats Directive, one species assessed as Endangered and one species as Near Threatened globally and at European level included in IUCN Red List. Also, a number of 16 species of bats (chiropteran) were recorded during the site visits, mainly in the villages, with most species as common resident species of Least Concern in terms of IUCN, and with stable population trends.

As part of the avifauna species survey, 95 species of birds have been recorded during spring migration and the beginning of the breeding season, of which 42 species are confirmed breeders. During autumn migration and the last month of breeding season, 25 species of birds were recorded, of which 5 are confirmed breeders. Based on their conservation statuses a total of 57 species are included in Annex 1 of EU Birds Directive, and 6 species are assessed as Globally or European Near Threatened included in IUCN Red List.

Separately from the Biodiversity Impact Assessment a Critical Habitat Assessment was made to identify critical and natural habitat requirements for net gain and no net loss, based on IFC PS6 2012 as updated in 2019. It was determined that the study area and associated habitats do not qualify as critical habitat, as the criteria and thresholds have not been met.

Baseline monitoring of physical environment condition showed that ambient environmental quality (air quality, noise, surface and underground water, soil) is monitored by EPA Buzau and Buzau - Ialomița River Basin Administration and shows an average quality.

Social Context

The Social Direct Area of Influence of Vifor Wind Farm Project has a strong rural character and include all settlements impacted by land take for the Project development, and the settlements located in a 2 km buffer from the WTGs and ancillary facilities, that could be affected by potential temporary environmental and social impacts during the construction phase, and long-term impacts during operations, such as noise, visual impacts and shadow flicker, road traffic, influx of construction workers etc. All land plots required by the Project belong to the administrative territorial units of Costești, Gherăseni, Smeeni, Țintești and Luciu communes.

The Project is mainly located in the lower area of Călmățui river, where at present the land is covered by meadows and pastures along the river, and agricultural lands in the higher tabular fields. Major activities in the area are represented almost entirely by agricultural activities – mainly arable/agricultural crops and animal husbandry.

64 WTGs and ancillary facilities will be located in the pasture areas along Călmățui river owned by the Local Councils and leased to local farmers.

A larger area, represented by the Social Indirect AoI, could be experiencing positive economic and employment impacts as a result of the Project implementation, through improvements to the local economy and livelihoods, employment of workforce, supply of goods and services for the Project as

well as experiencing potential influx-related impacts – this can include county, regional, and international potential impact scales.

Positive impacts of the Vifor Project will be represented by delivery of electricity to local communities, the right for use of the wind farm plots for continued agricultural activities by current landowners and users, as long as the operation and maintenance of the wind farm is not affected, and free and unrestricted use of upgraded agricultural roads and new access roads, as long as it does not interfere with the functioning of the wind farm (as stipulated in the superficies contracts with the Local Councils of the administrative areas of Costești, Gherăseni, Smeeni, Țintești and Luciu communes).

Impact and Risk Assessment

The ESIA identified both potential positive and adverse impacts as a result of the Project. The summary of impacts provided in the Table below, describes the potential impacts of the Project phases (construction and operation) for each environmental and social aspect/topic, before and after mitigation measures. A brief description of the main topics is provided hereafter:

Table 0-1 Impact assessment for each environmental and social aspect/topic related to the Project

Key impacts	Applicable IFC PS/ EBRD PR	Project Phase	Significance of impact	
			Before mitigation	With mitigation
Environmental impacts				
Project activities on climate change	-	Construction	Negligible-Minor	Negligible
		Operation	Positive	Positive
Climate change to the Project	-	Operation	Moderate	Minor
Air quality - construction dust	IFC PS3	Construction	Moderate-Major	Minor
Air quality - construction traffic		Construction	Minor-Moderate	Minor
Noise emissions	IFC PS3 EBRD PR4	Operation	Minor	Negligible
Soil compaction and erosion	IFC PS3	Construction	Moderate	Minor
Soil contamination	IFC PS3	Construction	Minor	Minor
		Operation	Minor	Negligible
Water resources - water quantity	IFC PS3 EBRD PR3	Construction	Moderate	Minor
Water resources - water quality	IFC PS3 EBRD PR3	Construction	Moderate	Minor
		Operation	Minor	Negligible
Solid waste and wastewater generation	IFC PS3 EBRD PR3	Construction	Moderate	Minor
		Operation	Minor	Negligible
Habitat Loss / Degradation/ Fragmentation	IFC PS6 EBRD PR6	Construction	Major	Minor
		Operation	Moderate	Negligible
Introduction/Spread of Invasive Species	IFC PS6	Construction	Moderate	Negligible

				EBRD PR6	Operation	Moderate	Negligible
Noise and Vibration Disturbance of Fauna species				IFC PS6 EBRD PR6	Construction	Moderate	Negligible
					Operation	Moderate	Negligible
Direct Mortality of Fauna Species				IFC PS6 EBRD PR6	Construction	Major	Negligible
					Operation	Major	Negligible
Displacement of Fauna Species				IFC PS6 EBRD PR6	Operation	Moderate	Negligible
Species Collision with Wind Turbines				IFC PS6 EBRD PR6	Operation	Major	Negligible
Mortality through electrocution of Fauna Species				IFC PS6 EBRD PR6	Construction	Moderate	Negligible
					Operation	Major	Negligible
Social Impacts							
Land acquisition				IFC PS5 EBRD PR5	Construction	Moderate	Minor
Visual impact				IFC PS4 EBRD PR4	Operation		Moderate
Shadow flicker				IFC PS4 EBRD PR4	Operation	Moderate	Minor
Ice/Blade throwing				IFC PS4 EBRD PR4	Operation		Minor-Moderate
Traffic - Road Function				IFC PS4 EBRD PR4	Construction	Moderate	Minor
					Operation	Minor	Positive
Traffic - Road Condition				IFC PS4 EBRD PR4	Construction	Major	Minor
					Operation	Minor	Positive
Traffic - Road Safety				IFC PS4 EBRD PR4	Construction	Major	Minor
					Operation	Minor	Minor
Cultural Heritage Direct Impacts Physical ground disturbance activities (earthworks) on High sensitivity Cultural Heritage Resources				IFC PS8 EBRD PR8	Construction	Moderate	Moderate
Cultural Heritage Direct Impacts Physical ground disturbance activities (earthworks) on Medium sensitivity Cultural Heritage Resources				IFC PS8 EBRD PR8	Construction	Minor	Minor
Cultural Heritage Direct impacts Physical ground disturbance activities (earthworks) on Low sensitivity Cultural Heritage Resources				IFC PS8 EBRD PR8	Construction	Negligible	Negligible

Livelihood - Loss of farming income	IFC PS5 EBRD PR5	Construction	Moderate	Minor
Economy, Employment, and Income - Increase in direct employment levels in the Social Aol and the wider Buzău County	IFC PS5 EBRD PR5	Construction	Positive	Positive
Economy, Employment, and Income - Economic benefits on indirect and induced employment, and Project procurement	IFC PS5 EBRD PR5	Construction	Positive	Positive
Economy, Employment, and Income - Increase in local councils' revenue from payment of taxes by the Investor	IFC PS4 EBRD PR4	Operation	Positive	Positive
Education and Training - Improved levels of education and skills which can be transferred to future employment opportunities	IFC PS4 EBRD PR4	Construction	Positive	Positive
		Operation	Positive	Positive
Infrastructure and public services - Increased demand on public services, potentially reducing availability for existing local users	IFC PS4 EBRD PR4	Construction	Minor	Minor
Infrastructure and public services - Pressure on housing stock through the influx of non-local workers	IFC PS4 EBRD PR4	Construction	Moderate	Minor
Community health and safety - Impacts related to workforce influx	IFC PS4 EBRD PR4	Construction	Moderate	Negligible
Labour and working conditions - Inadequate working and/or workforce accommodation conditions	IFC PS4 EBRD PR4	Construction	Moderate	Minor
Labour and working conditions - Indirect impacts on the health and safety of supply chain workers	IFC PS4 EBRD PR4	Construction	Moderate	Minor
Labour and working conditions - Worker's health and safety impacts due to incidents during construction activities	IFC PS4 EBRD PR4	Construction	Moderate	Minor
Labour and working conditions - Worker's health and safety impacts due to incidents during operation activities	IFC PS4 EBRD PR4	Operation	Moderate	Minor

Table 0-2 Risk assessment for unplanned events related to the Project

Key Risks	Applicable IFC PS/ EBRD PR	Project Phase	Risk ranking	
			Before mitigation	With mitigation
Unplanned events				
	IFC PS3/	Construction	Moderate	Minor

Key Risks	Applicable IFC PS/ EBRD PR	Project Phase	Risk ranking	
			Before mitigation	With mitigation
Small scale leakage and spill incident	EBRD PR3 IFC PS4/ EBRD PR4	Operation	Moderate	Minor
Road traffic transporting personnel or materials involved in a collision	IFC PS4 EBRD PR4	Construction	Moderate-Major	Moderate
Fire and explosion	IFC PS3/ EBRD PR3 IFC PS4/ EBRD PR4	Construction	Major	Moderate
		Operation	Moderate	Minor
Blade ejection failure	IFC PS4 EBRD PR4	Operation	Moderate	Minor
Accidental transmission line snapping and tower swaying/ collapsing	IFC PS4 EBRD PR4	Operation	Moderate	Minor
Natural hazards	-	Operation	Major	Major

Positive Impacts:

Positive impacts to local communities, associated with the Project, are primarily connected to improvements to the local economy and livelihoods, through both the provision of energy, and the creation of approximately 500-600 jobs during construction (at its peak), to 40-50 jobs during operations and maintenance (O&M), excluding security.

Other opportunities for social benefit include investments in the local communities, and on-the-job training and capacity development opportunities; and also, delivery of electricity to local communities (as stipulated in the superficies contracts with the Local Councils of the administrative areas of Costești, Gherăseni, Smeeni, Luciu and Țintești communes).

Negative Impacts:■ **Ambient Air:**

Air emission from land clearing and preparation, construction of substation, generator/s and material transporting during construction phase have minor impact on the Project area and surrounding area. With mitigation measures, air emission impacts will be reduced to Minor.

■ **Noise:**

Noise levels are predicted to comply with the relevant criteria at all assessment locations, with predicted levels anticipated to be more than 5 dB below the specified criteria, resulting in a Negligible impact.

■ **Soils/Impacts on Soils during Construction:**

Site preparation and construction activities will include earthworks and sites clearance (sites/vegetation clearance, land levelling, excavations, construction of new access roads). The soil is of poor quality and is only considered suitable for levelling the land and general landscaping of the sites. The construction activities could lead to various effects on soil resources within and surrounding the Project sites, including loss of topsoil; soil compaction; and soil erosion from wind and water runoff (leading to sediment release to land and water, and increased dust levels). Soil impacts during construction were considered of Minor significance after mitigation measures were applied.

■ Water resources:

Impacts will occur largely during the construction phase and primarily relate to a potential reduction in groundwater availability and potential contamination (in the case of underground water abstraction and use for concrete preparation and dust suppression). Impacts of quantity and quality of water resources during construction phase were considered of Minor significance after applying the mitigation measures.

■ Generation of Waste and Wastewater:

During the construction phase, the Project will generate commercial waste of which a portion will be diverted for reuse or recycling.

The Project will also require the storage, handling and use of some hazardous materials, particularly during the site/s preparation and construction phase. Hazardous materials include hydrocarbons (including diesel, petrol, greases, oils and other lubricants); hazardous chemicals (i.e. paints, etc.); and wastewater.

The presence and use of hazardous materials increase the probability of accidental spills or releases of minor quantities of these materials into the receiving hydrological and geo-hydrological environments. In addition, the washing of equipment and vehicles, as well as dirty water run-off from different Project components (i.e. active construction sites) has the potential to contaminate surface and groundwater resources if not managed appropriately.

Impacts of solid waste and wastewater generation and improper management were considered of Minor significance after applying the mitigation measures during the construction phase, and of Negligible significance during the operation phase.

■ Biodiversity

The most significant impacts relate to habitat loss during construction, direct mortality of fauna during construction and operation, and mortality through electrocution during operation. Of these all are expected to be reduced to negligible or minor providing mitigation including adaptive management based on monitoring is effective.

After the application of mitigation, and subject to verification through a programme of post construction fatality monitoring and adaptive management plans for birds and bats, no significant residual impacts for biodiversity are anticipated.

■ Land Acquisition and Economic Displacement:

Vifor Wind Farm is to be constructed on public land, secured via voluntary agreements with the Local Councils of each administrative territorial unit Gherăseni, Smeeni, Luciu and Costești communes and Pogoanele town. No relocation of built structures will be required for the construction of the wind farm and the nearest habitable buildings are located at about 600 m from the WTGs. Economic impact on the farming activity is considered Minor after mitigation measures will be applied during the construction and operations phases.

■ Economic Impacts and local employment:

Economic impacts are one of the Positive impacts. The Project was identified to create a variety of employment, including direct and indirect that brings positive economic impacts on local economy. These indirect and induced employment opportunities include employment through supply chains, and development of additional businesses to provide services to construction works.

■ Unplanned Events:

Unplanned events will have Major/Moderate impact on the environment and communities as they are unlikely to occur. While these events are infrequent, mitigation measures have been identified.

■ Cumulative Impacts:

Cumulative impacts associated with the Project will likely be experienced during the construction and operation phases, including avifauna (birds and bats), small mammals (European Souslik), traffic, employment, climate.

In conclusion, the construction and operation of Vifor WF Project will have impacts of Medium to Negligible significance prior to mitigation. With implementation of the mitigation measures, the residual impacts are considered to be reduced to Minor to Negligible.

To manage and mitigate such impacts, the ESMP is being prepared. The ESMP should be read with reference to this ESIA. As part of this report, a range of measures have been developed to reduce the overall impacts to acceptable levels and as low as reasonably practicable. The effective implementation of the ESMP and adherence with the EBRD PRs, IFC PSs and WB Group's Guidelines, and Equator Principles IV, will assist in managing the environmental and social impacts to acceptable levels.

1. INTRODUCTION AND CONTEXT

1.1 Background

ERM Environmental Resources Management SRL (ERM) was contracted by First Look Solutions S.A. (FLS, the Client, the Project Company), as independent environmental and social practitioners to undertake an Environmental and Social Impact Assessment (ESIA) for the 460 MW Vifor Wind (former Vis Viva) Farm (the Project), one of the larger wind farm in Romania, located in Buzau County, southeast Romania.

The Project will be implemented by First Look Solutions S.A. as the Project Company (registered in Romania) for development, construction and operation of the Project, with Low Carbon and Rezolv Energy contribute to the Project development, finance, construction and operation, as Project Sponsors/Project Owners (both registered in the UK).

The Project include 72 wind turbine generators (WTGs) type 6.4 MW EnVentus Vestas V162 WTGs and will be constructed on approximately 2,869 hectares of leased public land, on the administrative areas of Costești, Gherăseni, Smeeni, Luciu and Țintești communes, 6.5 km southeast of the outskirts of Buzau City, the residency of Buzau County. The Project will distribute electricity to the national grid (SEN) through a short overhead transmission line (OHL) from the WF transformer station to the 400 kV Cernavoda – Stâlpu Line.

The objective of the ESIA is to assess the potential environmental and social impacts (both positive and negative) associated with the planning, construction and operation of the Project.

The Client is seeking to finance the Project based on international loans, and the ESIA Report has been produced specifically for the potential Lenders of the Project that may be providing funds/financial support.

At current stage of development, the Project qualifies 'Category A' according to the Environmental and Social (E&S) policies of major international finance institutions (IFC, EBRD), commercial banks and export credit agencies signatory to Equator Principles. The 'Category A' Projects are characterized by potential significant adverse environmental and social risks and / or impacts that are diverse, irreversible, or unprecedented.

The report focuses on an assessment of the environmental and social performance of the Project against the following major requirements:

- IFC International Financing Corporation (IFC) Performance Standards (PS) (2012), including the IFC Environmental, Health and Safety Guidelines for Wind Energy (2015), IFC Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007), and associated World Bank General Environmental, Health and Safety (EHS) Guidelines (2007),
- EBRD Performance Requirements (PR), 2019, set out in the EBRD's Environmental and Social Policy,
- EU Law and Regulations relevant for the Project, including but not limited to EU EIA Directive and EU Habitats and Birds Directives.

Within this context ERM has assessed the Project in terms of the extent to which the Project's assessments, proposed mitigation measures and management plans meet these requirements.

In undertaking this E&S assessment, ERM has determined for each identified issue:

- The relevant requirements to which the issue relates,

- An assessment of impacts (both positive and negative) to the physical, biological and socio-economic environments related to the different phases (pre-construction, construction and operational phases) of the Project, in a manner consistent with the IFC PSs and EBRD PRs;
- Mitigation measures to anticipate and avoid risks and impacts, and associated management plans that aim to enhance positive impacts and to avoid/minimize/manage the severity of any negative identified impacts;
- An assessment of cumulative impacts associated with other planned, existing or Project-related developments in the broader Aol of the Project.

1.2 Project Overview

The Project will be developed in Buzau County, south-east of Buzau City, on the administrative areas of Costești, Gherăseni, Smeeni, Luciu and Țintești communes, being located mainly in Călmățui River meadows, partially overlapping the Natura 2000 sites ROSCI0259 Valea Călmățuiului and ROSPA0145 Valea Călmățuiului.

The Project will be constructed on leased public land, owned by the Local Councils of the above-mentioned administrative areas, and currently being leased to local farmers who use and maintain the pasture, benefiting from agricultural subsidies from the state.

The Project development started with wind assessment and first design of the wind farm, in 2010. Based on the latest design update (March 2023), Vifor Wind Farm has a total area of 2,869 ha and comprises five sub-projects, which have separately followed the national urban planning and environmental permitting procedures. The Project include 72 wind turbine generators (WTGs) type 6.4 MW EnVentus Vestas V162 WTGs, resulting in a total capacity of 460.8 MW. All WTGs are proposed to be connected via underground cable lines to a single transformer station, and from there through a short overhead transmission line (OHL) to the national grid (National Energy System - SEN). The wind farm (WF) will be served by a network of existing agricultural roads and new built access roads, along which will be installed the underground cable lines, and which will include as the main road artery an East-West construction corridor. The construction phase is scheduled to begin in October 2023 and to last approx. 18 months, with the start of operation in April 2025. Estimated Project operation period is up to 35 years.

According to the Romanian regulations, environmental permitting is required for the Project. Permitting of each of the sub-projects was initially done in 2010-2012, with updates in 2017. The Project re-permitting has been initiated in 2021.

1.3 Project Parties

The parties involved in Vifor WF Project, their role and responsibilities are listed in Table 1-1 below.

Table 1-1 Project Parties

Responsible Party	Role	Responsibilities
Low Carbon	Project Owner	<ul style="list-style-type: none"> • Development of Project Design • Procurement of Project components • Construction of the Project • Operation of the Project
Rezolv Energy	Project Owner	<ul style="list-style-type: none"> • Development of Project Design • Procurement of Project components • Construction of the Project • Operation of the Project

Responsible Party	Role	Responsibilities
Nero 1	Development Phase Project Owner	<ul style="list-style-type: none"> Development of Project design
First Look Solutions S.A.	Vifor Project Company	<ul style="list-style-type: none"> Local project developer
ERM	Independent international sustainability consulting firms engaged by Low Carbon	<ul style="list-style-type: none"> Development of Scoping Report Development of ESIA package Development of Biodiversity Monitoring Reports
Eco Green Consulting	Independent consulting firm from Romania sub-contracted by Low Carbon to develop permitting documents	<ul style="list-style-type: none"> Preparation of environmental permitting documents
Vestas	EPC Contractor	<ul style="list-style-type: none"> Coordination of the project's commissioning, design, procurement, and construction process to ensure quality and timely completion.

1.4 The Environmental and Social Impact Assessment (ESIA)

1.4.1 Purpose of the ESIA

ERM was commissioned by Low Carbon and Rezolv Energy (the Client) to undertake an ESIA of the Vifor Wind Farm located in Buzau County, Romania.

The purpose of the ESIA is to inform the Client and their Project partners about the environmental and social impacts associated with the Project and in particular the extent to which the Project complies with the Equator Principles IV (2020), and aligns with the expectations of International Finance Corporation (IFC) Performance Standards (PSs, 2012) and associated World Bank Group Environmental, Health and Safety (EHS) Guidelines, and with EBRD Performance Requirements (PRs, 2019) set out in the EBRD's Environmental and Social Policy.

The ESIA will be prepared on the agreed scope of baseline data collection and impact assessment methodology and will result in the preparation of an Environmental and Social Management Plan (ESMP).

1.4.2 Objectives and Scope of the ESIA

The main objectives of the ESIA are to:

- Identify Key Environmental and Social Impacts of the Project, including:
 - A detailed description of the Project and relevant Project alternatives;
 - The ESIA process and an outline register of legislation, guidelines and strategies (both national and international) pertinent to the Project and associated ESIA;
 - A detailed baseline review of the physical, biological and socio-economic and cultural environments of the AoI and its surrounds;
 - The outcomes associated with stakeholder engagement activities carried out to date;
 - An assessment of impacts (both positive and negative) to the physical, biological and socio-economic environments related to the different phases (pre-construction,

- construction and operational phases) of the Project, in a manner consistent with the IFC PSs and EBRD PRs;
- Mitigation measures to anticipate and avoid risks and impacts, and associated management plans that aim to enhance positive impacts and to avoid / minimise / manage the severity of any negative identified impacts;
- An assessment of cumulative impacts associated with other planned, existing or Project-related developments in the broader Aol;
- Develop an Environmental and Social Management Plan (ESMP) that will be put forward to avoid, minimize or compensate the negative aspects and enhance the positive aspects of the Project, as well as mechanisms for their implementation in the Project process, and to incorporate this ESMP into a workable Environmental and Social Management System (ESMS) for the Project,
- Ensure that ESIA documentation is aligned with the expectations of both national and EU legislation, the EBRD E&S Policy (2019) and the incorporated Performance Requirements (PRs), IFC Performance Standards (PSs) (2012), and the World Bank Group's Environmental, Health and Safety (EHS) Guidelines.

The ESIA has been developed based on the latest design update (March 2023), in addition to the collection of available data at the regional and local levels resulting from field visits and consultations with stakeholders, including local communities.

The scope of the baseline and impact assessment for Vifor Wind Farm Project are summarized in table below. Further details of impact assessment are identified and presented in Chapter 7 Environmental and Social Impact Assessment.

Table 1-2 Scope of Baseline and Impact Assessment

Topic	Scope of Work
Baseline Survey	
Environmental Baseline Studies	Obtain the physical environmental baseline information (e.g. air quality, underground and surface water quality, soil) from the water and environmental authorities, for the Aol and its surrounds
Flora and Fauna Species Survey	Undertake a comprehensive field monitoring survey of the likely presence, abundance and distribution of flora and fauna species in the Project area
Seasonal Vantage Point Survey for Avifauna	Undertake two seasonal land-based vantage point bird surveys within the Project area
Bat Screening	Undertake a comprehensive field monitoring survey of the likely presence, abundance, and distribution of bat species to systematically assess the information on chiropteran fauna in the study area
Biodiversity Assessment	Determine the presence of IUCN Endangered or Critical Endangered species and endemic or restricted range species, Undertake an assessment of natural and modified habitats, Determine key biodiversity values, and Note any existing key threats to habitats and species
Noise Screening and Assessment	Develop project-specific operational noise models to calculate ISO9613:2 wind farm noise levels,

	Compare resultant noise levels with project-specific criteria, identify any levels that exceed thresholds and limits and qualify the magnitude and extent of any impacts
Socio-Economic Baseline Studies	Undertake stakeholder engagement, Complete a community survey, collect secondary and primary data for project baseline analysis
Stakeholder Engagement Plan	Determine any stakeholder identification and mapping previously undertaken, Determine stakeholder engagement/disclosure activities to date, including nature of information and the medium of disclosure, Establish how findings of stakeholder engagement have been included in the decision-making process, Establish any ongoing issues identified during stakeholder engagement that might have relevance for the Project.

Impact Assessment

Air Quality	Emissions of NO _x , SO _x , PM, CO
Water resources - Surface and Groundwater Quantity	Assess impacts on changes in groundwater levels and water availability, in the case of groundwater resources used for the Project
Water resources - Surface and Groundwater Quality	Assess impacts on changes to physical, chemical or biological quality of surface water bodies and groundwater resources and changes in habitat quality, abundance, diversity
Soil Environment	Assess impacts on changes to soil properties
Shadow Flicker	Potential impacts on health of project-affected people and vegetation growth
Social Impact Assessment	Assess impacts on physical/economical displacement, economy and employment, occupational and community health and safety, infrastructure and public services, cultural resources
Mitigation measures	Mitigation measures that aim to enhance positive impacts and to avoid / minimise / manage the severity of any negative identified impacts
Cumulative Impact	An assessment of cumulative impacts associated with other planned, existing or Project-related developments in the broader AoI

1.4.3 ESIA Process to Date

The project, named at that time of project initiation - VisViva Wind Farm, went through the Romanian permitting process, having a slightly different design configuration than the one considered currently and divided for permitting purposes in sub-projects/communes (i.e. Costeşti, Gherăseni, Smeeni, Pogoanele, Luciu and also Țintești).

During the permitting process, each sub-project benefitted from an assessment. All the permits including the environmental ones were issued considering each of the sub-projects as standalone projects.

Initial environmental permitting of the sub-projects was done in 2010-2012, with updates in 2017. Based on 2020 Project design, new Urban Certificates (UC) have been issued in January 2021 for all sub-projects mentioned above. Re-permitting has been initiated in January-February 2021 based on

information included in Urban Certificates, with Favorable Environmental Final Decision for all sub-projects issued by Environmental Protection Agency in Buzau (EPA Buzau) in August 2021.

The Project changes its name in Vifor WF and underwent a final modification in 2022, due to increasing the turbine power from 6 to 6.2 MW. Based on the technical updates of the Project in 2022, which may affect the validity of previously issued permits, EPA Buzău will decide whether the environmental procedures would have to be completely redone, or whether the Client could follow a simplified procedure to reconfirm the validity of the existing permits.

An Environmental and Social Gap Analysis was undertaken in 2021 for the Project, with assessment focusing on the local permitting underwent for the project; the environmental and social assessment and management, and health and safety assessment for the project; stakeholder engagement; labour and working conditions; land acquisition and compensation; biodiversity conservation and sustainable natural resource management; and cultural heritage assessment of compliance against IFC and EBRD E&S performance standards and requirements.

The Gap Analysis results highlighted the necessity to develop a full and comprehensive Environmental and Social Impact Assessment (ESIA) Package for the Project, to be disclosed to the public as required for a Category A Project.

A Scoping Report was prepared for the Project in January 2023, and summarized the outcomes of the initial stage of the ESIA process. The purpose of the scoping phase was to identify key sensitivities in relation to the Project's proposed location and the activities that have the potential to contribute to, or cause, significant impacts to environmental and social receptors and resources. The output of the Scoping stage was the identification of specialist studies that will have to inform the later stages of the ESIA process.

Based on the Scoping results, the current ESIA Report has been prepared for the Project. This presents details on the identification and assessment of the likely significant environmental and social effects of the Project against the Equator Principles, IFC and EBRD E&S performance standards and requirements, to support the Project for international finance.

1.4.4 Assumptions and Limitations of the ESIA

This ESIA Report has been prepared by ERM with all reasonable skill, care, and diligence within the terms of the Contract with the Client and taking account of the resources devoted to it by agreement with the Client.

At the time preparing this ESIA, Project details are not fully available. Therefore, Cumulative Impact Assessment was conducted based on assumption of 'worst-case' estimates and assumption that Project sites, components and facilities are the latest design update.

Specific limitations and assumptions on this assessment are as follows:

- Environmental and social baseline data was collected from both desktop study and field observations during the time of writing this ESIA;
- ERM's findings are accurate and complete only to the extent that information provided to ERM was itself accurate and complete;
- The information provided in this Report is not to be construed as legal advice.

For this ESIA Study the Project consists of:

- Project facilities: wind turbines, central power collection station/substation, underground cable lines and overhead line, existing roads and additional access roads, culverts and small bridges;
- Ancillary facilities: borrow and disposal areas, lay-down areas, concrete batching station, temporary offices, construction/ management sites, etc. within the wind farm development area.

1.4.5 Structure of the ESIA Report

The structure of this ESIA Report is outlined in table below.

Table 1-3 ESIA Report Structure

Section	Contents
Section 1. Introduction	Presents a brief background to the Project, the ESIA process and the purpose and structure of the ESIA Report (this Report).
Section 2. Project Description	Describes the Project and associated activities during the pre-construction, construction, operation, and decommissioning phases. This section also discusses Project alternatives.
Section 3. Administrative Framework	Identifies and briefly describes the administrative and legal regulatory framework of the ESIA including the national Romanian environmental and social legislative requirements, as well as International best practice applicable to the Project. Also refer to licenses and permits already obtained for the Project.
Section 4. The ESIA Process	Describes the ESIA approach and associated impact assessment methodology to be followed for the Project.
Section 5. Stakeholder Engagement	Summarises the Stakeholder engagement plan for the Project and outcomes associated with ESIA engagement.
Section 6. Baseline Conditions	Presents a brief overview of the receiving physical, biological and socio-economic environments of the Project Area and surrounds.
Section 7. Environmental and Social Impact Assessment	Describes the potential environmental and social impacts that have been identified as part of the ESIA Study.
Section 8. Cumulative Impact Assessment	Determine if the cumulative impacts caused by the Project and other existing of predictable future projects would threaten the sustainability of valuable environmental component (VEC) in the area and presents mitigation measures to prevent unacceptable conditions of VECs.
Section 9. Summary of Anticipated Impacts	Presents a brief overview of the interactions between the Project activities and various resources/receptors that could result in significant impacts
Section 10. ESIA Conclusion	Describes the potential impacts to the physical, biological and social environments as a result of the Project, and the mitigation measures to manage these impacts and reduce the significance of the impacts to a minor or negligible level.
Appendix A	Cultural Heritage Baseline Gazetteer
Appendix B	Climate Change Baseline Supporting Materials
Appendix C	Socio-Economic Environment
Appendix D	Biodiversity and Protected Areas Baseline
Appendix E	Critical Habitats Risk Assessment
Appendix F	Collision Risk Modelling
Appendix G	Cumulative Impact Assessment

Appendix H

Environmental and Social Management Plan for construction

2. PROJECT DESCRIPTION

This Section provides a general description of the Project and associated phases, related activities, and ancillary infrastructure. The information here was largely received from the Project Developer/Client, the available Environmental and Social Gap Analysis Report for 450 MW VisViva/Vifor Wind Farm (April 2021), from the Scoping site visit held on 23-24 of November 2022 and Scoping Report (December 2022), and the Socio-economic and health baseline qualitative data collection field survey held on 16 March – 27 July 2023.

2.1 Project Overview

Project Sponsors (Low Carbon and Rezolv Energy) through the Project Company (First Look Solutions S.A.) intend to develop an approx. 460 MW Vifor Wind Farm in Buzău County, Romania.

Vifor Wind Farm will be developed in the administrative territory of Costești, Gherăseni, Smeeni, Luciu and Țintești communes in Buzău County, being located mainly along the Călmățui River meadows on an area of dry and salt steppes and pastures, partially overlapping the Natura 2000 sites ROSCI0259 Valea Călmățuiului and ROSPA0145 Valea Călmățuiului. The Project will be constructed on leased public land, owned by the Local Councils of the above-mentioned administrative areas, and secured for 30 years via voluntary lease (superficies contracts) and purchase agreements concluded with public and private landowners for development and operation of the wind farm.

The Project development started with wind assessment and first design of the wind farm, in 2010. Before the Client acquired back in July 2020 the development rights to the Project, Vifor Wind Farm comprised seven sub-projects, which separately followed the national permitting procedures.

Based on the latest design update (May 2023), Vifor Wind Farm comprises only five sub-projects, which have separately followed the national urban planning and environmental permitting procedures.

The Project include 72 wind turbine generators (WTGs) type 6.4 MW EnVentus Vestas V162 WTGs, with a tower height of 166 m and a rotor diameter of 162 m, resulting in a total capacity of 460.8 MW. All WTGs are proposed to be connected via underground cable lines to a single transformer station, and from there through a short overhead transmission line (OHL) to the national grid (National Energy System - SEN). The wind farm (WF) will be served by a network of existing agricultural roads and new built access roads, along which will be installed the underground cable lines, and which will include as the main road artery an East-West construction corridor.

More specific characteristics of the Project components are described in Chapter 2.3 Project Components of this Report.

The construction phase is scheduled to begin in October 2023 and to last approx. 18 months, with the start of operation in April 2025; the estimated Project operation period is up to 35 years.

The five sub-projects, as they were considered in this ESIA comprise the following:

- *Costești* WF with 7 wind turbines resulting in a total capacity of 44.8 MW, located in *Costești* commune;
- *Gherăseni* WF with 7 wind turbines resulting in a total capacity of 44.8 MW, located in *Gherăseni* commune;
- *Smeeni* WF with 21 wind turbine resulting in a total capacity of 134.4 MW, located in *Smeeni* commune;
- *Luciu* WF with 30 wind turbines resulting in a total capacity of 192 MW located in *Luciu* commune;

- *Țintești* sub-project, consisting of 7 wind turbines resulting in a total capacity 44.8 MW.

2.2 Project Location

2.2.1 Project locations

The Vifor Wind Farm Project, organized in five sub-projects, is located within the administrative territory of Costești, Gherăseni, Smeeni, Luciu and Țintești communes in Buzău County, in South-East Romania. The substation area of the wind farm (central area of the wind farm) is located approx. 85 km north-east of Bucharest outskirts, and the and the north-western end of the wind farm (WTG03) is located at approx. 6 km of Buzau city outskirts.

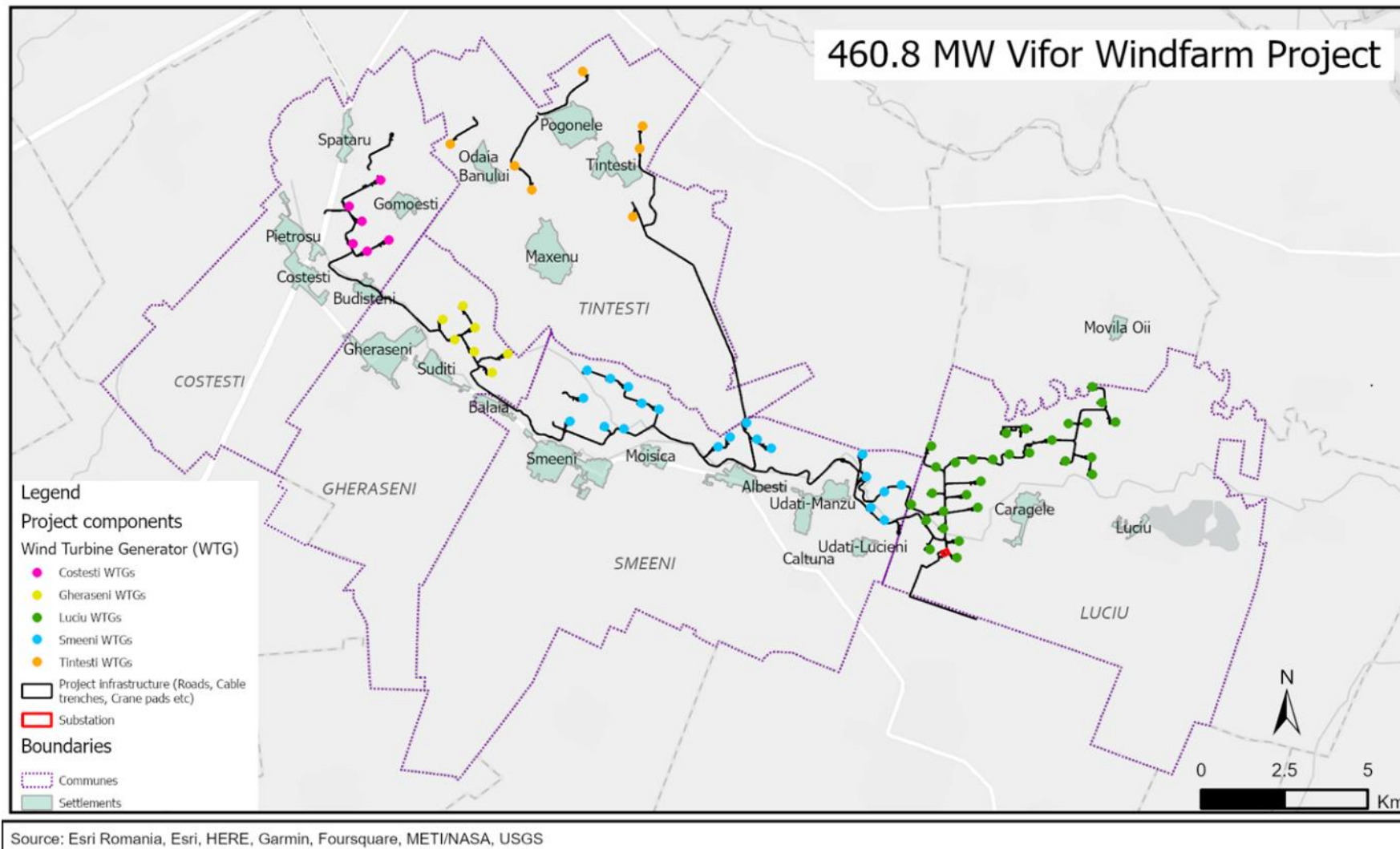
The Project is located approx. 1.3 km north of the 400kV OHL Cernavoda – Stâlpu Line, belonging to CNTEE Transelectrica S.A.

Vifor Wind Farm Project location in relation to the administrative areas of Costești, Gherăseni, Smeeni, Luciu and Țintești communes is illustrated in Figure 2-1 below.

The Project, including 72 wind turbine generators (WTG) and the ancillary infrastructure, is not associated with any physical displacement of people or built structures. The Project will be constructed on public land, owned by the Local Councils of the above-mentioned administrative areas, and secured for 30 years via voluntary lease (superficies contracts) and purchase agreements concluded with public and private landowners for development and operation of the wind farm. The lease and purchase agreements include the possibility of a 15-year extension, by the decision of both Parties.

The Project will be developed mainly along the Călmățui River meadows, where 64 WTGs out of a total number of 72 WTGs of the Project will be located, partially overlapping the Natura 2000 sites ROSCI0259 Valea Călmățuiului and ROSPA0145 Valea Călmățuiului.

Figure 2-1 Project Layout



The WGS 1984 coordinates of each location's WTGs, as currently proposed, are presented in Table 2-1.

Table 2-1 Location of the Vifor WTGs (as per the up-to-date Project design)

Wind Turbine No.	Coordinates		Wind Turbine No.	Coordinates	
	Easting	Northing		Easting	Northing
Costești sub-project – 7 WTGs			WTG 39	500529.275	4982186.755
WTG 1	483967.318	4991087.964	WTG 40	501038.694	4982264.328
WTG 3	483490.172	4990316.167	WTG 41	501644.224	4982241.11
WTG 4	482531.562	4989859.725	WTG 42	499800.37	4981272.509
WTG 5	482898.61	4989200.897	WTG 44	500830.885	4981201.636
WTG 6	482611.217	4989270.117	WTG 45	499178.962	4980950.001
WTG 7	483686.91	4988951.39	WTG 46	500133.837	4980736.456
WTG 8	483035.232	4991087.964	WTG 47	499616.18	4980467.722
Gherăseni sub-project – 7 WTGs			WTG 48	500128.227	4980211.14
WTG 9	485257.85	4986854.999	WTG 49	500575.249	4979830.313
WTG 10	485876.194	4987251.947	WTG 50	498910.107	4980120.544
WTG 11	485584.409	4986233.446	WTG 51	499699.76	4979600.848
WTG 12	486202.184	4986581.235	WTG 52	500509.909	4979329.791
WTG 13	486170.097	4985868.419	WTG 53	502074.416	4983025.386
WTG 14	487171.423	4985778.849	WTG 54	502667.875	4983147.392
WTG 15	486704.4	4985227.541	WTG 55	503430.474	4982777.323
Smeeni sub-project – 21 WTGs			WTG 56	503956.357	4983276.859
WTG 16	485257.85	4986854.999	WTG 57	504680.528	4984345.979
WTG 17	485876.194	4987251.947	WTG 58	504964.227	4983880.956
WTG 18	485584.409	4986233.446	WTG 59	504505.126	4983266.638
WTG 19	486202.184	4986581.235	WTG 60	505355.68	4983274.318

Wind Turbine No.	Coordinates		Wind Turbine No.	Coordinates	
	Easting	Northing		Easting	Northing
WTG 20	486170.097	4985868.419	WTG 61	502142.877	4982396.799
WTG 21	487171.423	4985778.849	WTG 62	502750.351	4982427.54
WTG 22	486704.4	4985227.541	WTG 63	503817.925	4982147.55
WTG 23	485257.85	4986854.999	WTG 64	504619.123	4982237.349
WTG 24	485876.194	4987251.947	WTG 65	504619.539	4981714.731
WTG 25	485584.409	4986233.446	WTG 66	501275.084	4981612.543
WTG 26	486202.184	4986581.235	WTG 67	501172.608	4980830.155
WTG 27	486170.097	4985868.419	Țintești sub-project – 7 WTGs		
WTG 28	487171.423	4985778.849	WTG 68	489756.716	4994212.603
WTG 29	486704.4	4985227.541	WTG 69	485718.184	4992133.05
WTG 30	497223.944	4982358.372	WTG 70	487642.442	4991434.506
WTG 31	485257.85	4986854.999	WTG 71	488135.198	4990701.887
WTG 32	485876.194	4987251.947	WTG 73	491407.813	4991847.689
WTG 33	485584.409	4986233.446	WTG 74	491513.699	4992523.847
WTG 34	486202.184	4986581.235	WTG 75	491146.806	4989815.675
WTG 35	486170.097	4985868.419			
WTG 36	487171.423	4985778.849			
Luciu sub-project – 30 WTGs					
WTG 37	499823.485	4982697.519			
WTG 38	499945.283	4982070.854			

Source: ERM, using Client information

2.2.2 Project sites access

Vifor Wind Farm sites and facilities will be reached via a network of existing roads and additional roads to be built for the Project. Additional roads are referred to as “internal Project roads;” however, upon completion of Project construction, internal Project roads will be available to the public for travel in addition to providing access to the Project’s wind turbine locations.

The all-existing roads are public roads connected to the internal Project roads **Figure 6-36** including:

- E85 (also called National Road DN2): one Project access point north of Costești;
- County Road DJ203D: four Project access points north of Smeeni;
- County Road DJ 203I: two Project access points north of Caragele;
- Communal Road DC37: one Project access point between Spătaru and Gomoești;
- Local road Str. Călmățui, within Budișteni village: one Project access point.

Internal Project roads include the East-West Construction Corridor, as a main road artery, starting with the western-end access point to the Project (E85, north of Costești), along the Călmățui river, to the eastern-end (north of Caragele). This internal Project main road artery, located north of Călmățui river, will bypass the entire cluster of rural settlements located south of Călmățui river, and will help to prevent traffic congestion on existing public roads in the Project area.

As per information provided by the Client, internal Project roads (existing roads and new access roads), together with small bridges and culverts along the roads, including the East-West Construction Corridor, have a total length of approx. 70 km (4.5 m wide).

2.3 Project Area of Influence

The Project’s Area of Influence (AoI) encompasses physical boundaries of Project’s components and activities as core areas, plus a wider buffer zone covering access to the Project, and any natural or community receptors which may be affected by the Project.

The Project’s AoI is divided into an Environmental AoI and Social AoI according to the environmental and social implications of the Project. Details on this division are presented in Chapter 4.2.3 Defining Area of Influence (AoI).

Further, for each Environmental & Social topic, separate Aols are identified, depending on the specifics of the respective aspect/topic, Project phase and predicted impacts. These separate Aols are identified and described within the baseline and impact assessment chapters of this report.

The Project’s Direct Environmental and Social Area of Influence (AoI), with the buffer zone of 2 km around the Project components is illustrated in Figure 2-2 below.

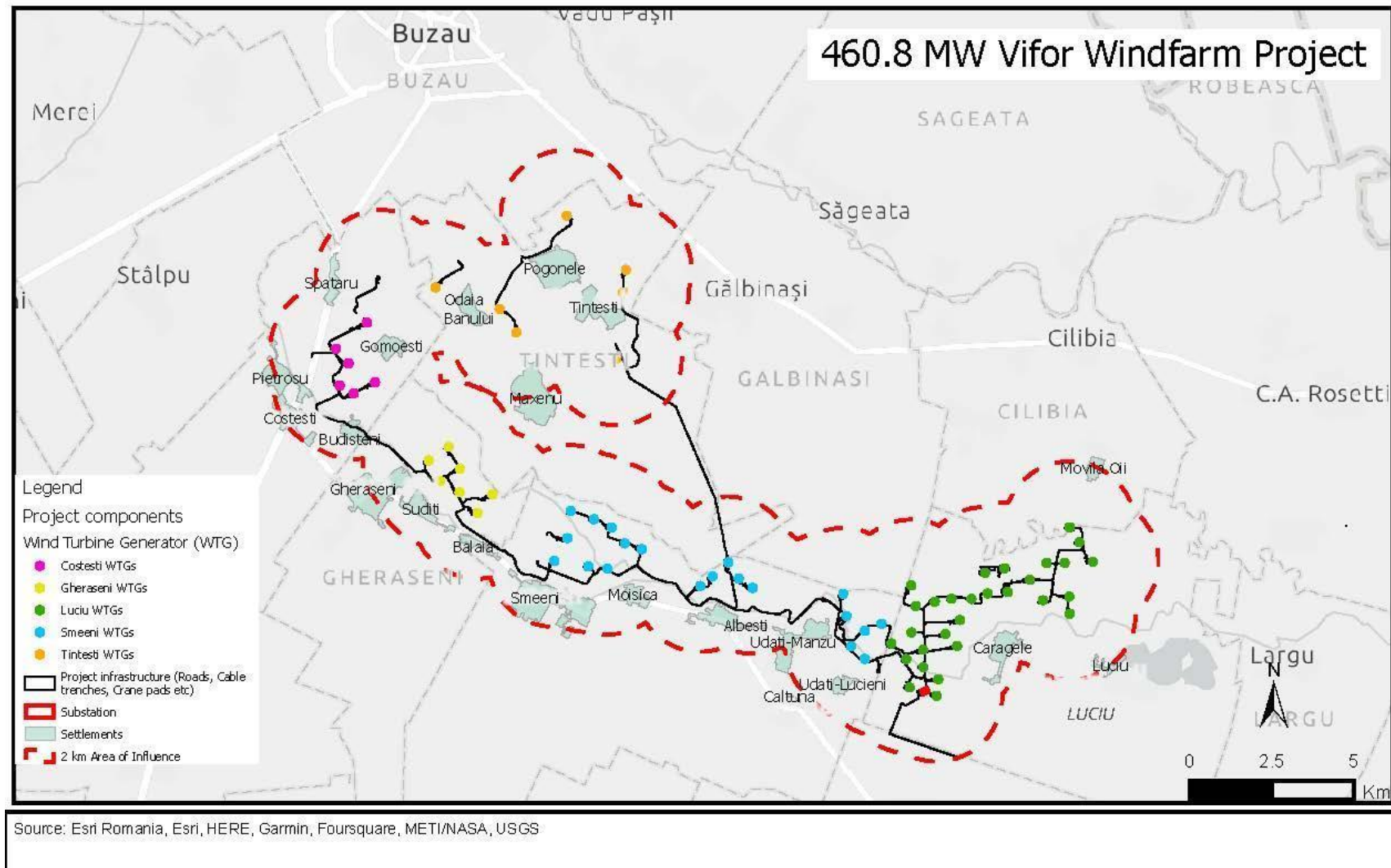
The social AoI was established considering the expected impacts on the local residents, i.e. noise, shadow flicker, traffic, etc. It is considered that 2 km represents a reasonable radius of the social area to be directly affected by these impacts.

Area of Influence (AoI) of the Project comprises:

- Environmental AoI that includes Project components and environmental receptors which may be affected by the Project:
 - direct Environmental AoI, which comprises the:
 - permanent sites and facilities (wind turbines, central power collection station, underground cable lines and overhead lines, existing roads and additional access roads including the construction corridor, culverts); and

- temporary sites and facilities (borrow and disposal areas, lay-down areas, concrete batching station, temporary offices, construction/ management sites, etc);
 - additional areas, up to 2 km around the Project sites and facilities, where environmental receptors may experience significant impacts,
- indirect Environmental Aol, including any other additional areas where impacts from unplanned but predictable developments caused by the Project may occur later or at a different location.
- Social Aol that includes the area surrounding the Project, where various social interactions will take place:
 - direct Social Aol, also understood as the study area for the socio-economic qualitative baseline data collection field survey, which comprises:
 - all settlements impacted by land take for the Project components – all land plots required by the Project belong to the administrative territorial units of Costești, Gherăseni, Smeeni, Luciu and Țintești communes;
 - settlements that could be affected by potential temporary environmental impacts during the construction phase and long-term impacts during operations, such as noise, shadow flicker, visual impacts, etc. located in a 2 km buffer zone from the WTGs,
 - indirect Social Aol (considered as study area for the desktop data review), including the entire Buzau County, where the Project site is located.

Figure 2-2 Project's Area of Influence



Source: ERM

2.4 Project Components

2.4.1 Permanent Facilities and Components of the Wind Farm

The major permanent facilities and components of the Vifor Wind Farm Project comprises the wind turbines, central power collection station/substation, underground cable lines and overhead lines, existing roads and additional access roads including the construction corridor, culverts and small bridges.

These permanent facilities and components are shortly described in the following sections.

2.4.1.1 Wind turbine generators (WTGs)

Vestas Company produces the wind turbines selected for the Project, type 6.4 MW EnVentus Vestas V162 WTGs, with a tower height of 166 m and a rotor diameter of 162 m. A total of 72 WTGs will be used for the Project resulting in a total installed power of 460.8 MW.

Table below lists the technical specifications of the selected Vestas turbines, as follows:

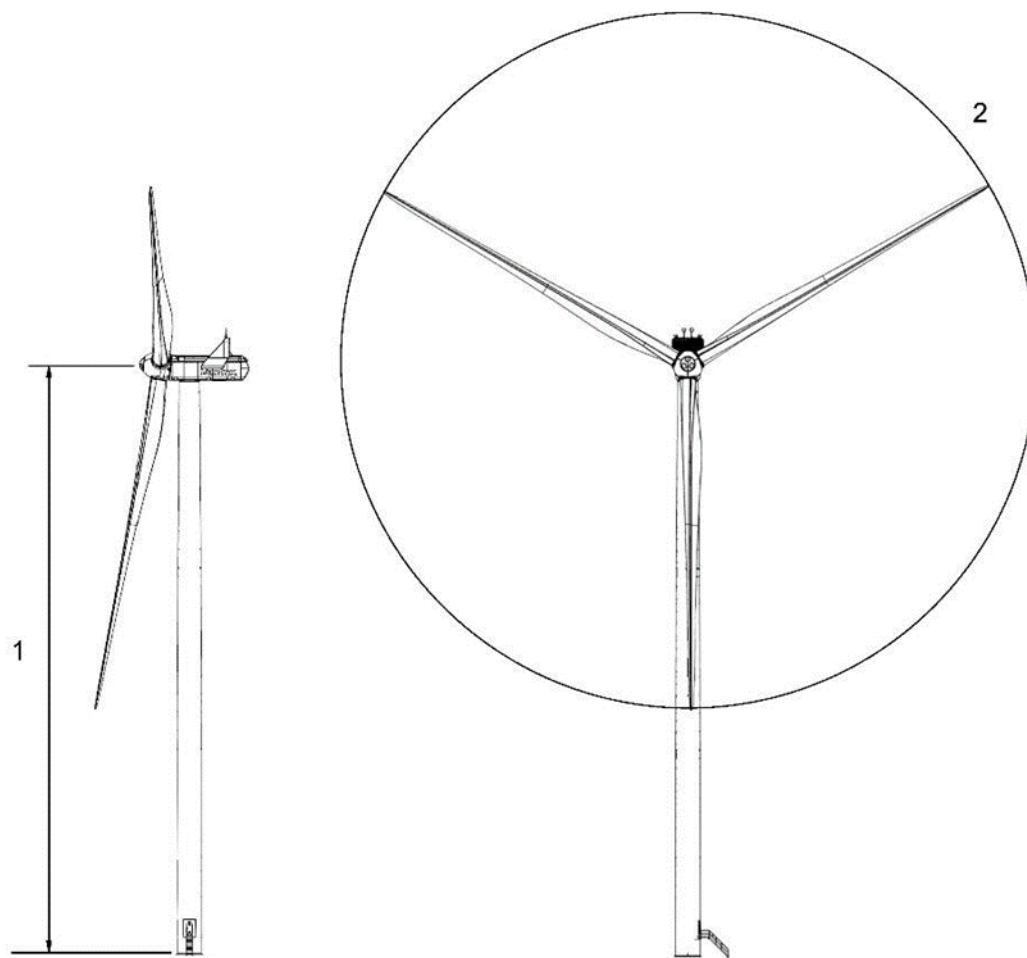
Table 2-2 Technical Specifications of the WTGs

Technical Concept	
Operating temperature range Normal Climate version	-20 °C to +45 °C
Operating temperature range Cold Climate version	-30 °C to +45 °C
Max. altitude above sea level	2,000 m
Certificate	according to IEC 61400-22 and DIBt 2012
Type	3-blade horizontal axis rotor upwind runner
Power control	active single blade adjustment
Rated capacity	Up to 6450 kW
Operating speed range of the rotor	4.3 -12.1 rpm
Cut-in wind speed	3 m/s
Cut-out wind speed	24 m/s
Re cut-in wind speed	22 m/s
Calculated lifetime	25 years
Tower	
Hub height	166 m
Tower type	Tubular steel tower
Surface texture	Paint system coating
Rotor	
Rotor diameter	162 m
Swept area	20,612 m ²
Blades	
Material	Fiberglass reinforced epoxy, carbon fibers and Solid Metal Tip (SMT)
Blade length	79.35 m

Source: EnVentus_0081-5017_V08 General Description and Performance Specification, 2022

Following figure shows the technical dimensions of the WTG:

Figure 2-3 Wind turbine technical drawing



Source: *EnVentus_0081-5017_V08 General Description and Performance Specification, 2022*

1 - Hub height = 166 m; 2 - Rotor diameter = 162 m.

2.4.1.2 Foundations and sites for crane placement

The construction of each wind turbine (WTG) will require a permanent WTG foundation with a hardstand having approx. 855 m². Total surface of the reinforced concrete foundations for the Project's 72 WTGs, will be 6.15 ha.

The permanent ballast platforms for construction (crane placement) and maintenance of the WTGs, will include at total surface of 6.24 ha.

A crane platform, a pre-assembly platform and a bearing platform will 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.

Figure 2-4 Typical WTG and Associated Working Platforms



Source: ERM, using client data, 2022

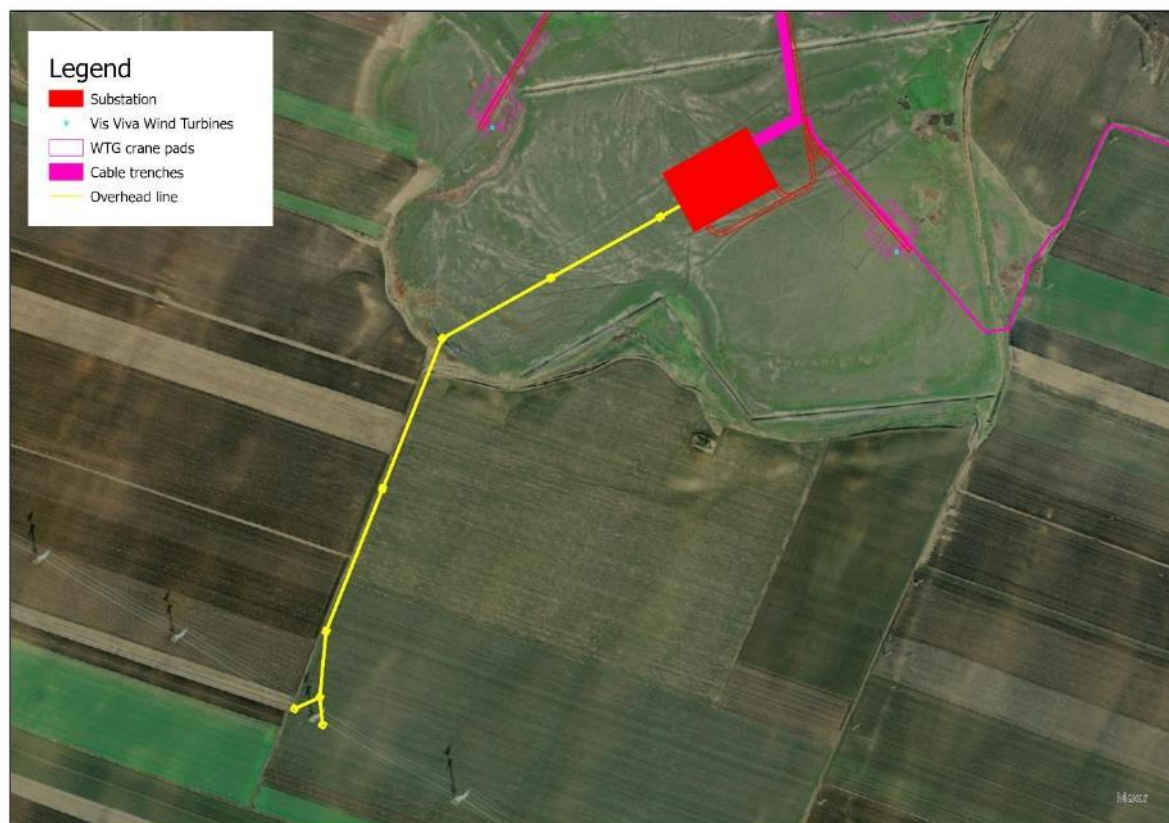
2.4.1.3 Central power collection station

The 33/400 kV central power collection station (substation/transformer station) will be located in Pogoanele sub-project, Luciu commune, on a 2.75 ha land plot owned by the Pogoanele Town Local Council.

Energy produced by WTGs will be transferred via 33 kV underground cable connection lines (UCLs) from all the sub-projects to a 33/400 kV transformer station (CPCS). Intermediate transformer stations are not planned, which will limit the impact on the environment.

The CPCS raises the voltage level to 400 kV for connection to the national grid (Sistemul Energetic National – SEN), via a short overhead line.

Figure 2-5 Transformer Station Location and OHL Connection to the 400kV OHL Cernavoda - Stâlpu Line



Source: ERM, using client data, 2022

2.4.1.4 Wind Park Internal Grid

The underground cable lines 33 kV (UCLs) will connect the WTGs with each other and with the CPCS. The UCLs will be located along the existing roads and additional access roads, up to 2.0 m depth, over a length of approx. 70 km.

2.4.1.5 Overhead lines

The CPCS will be connected to the 400 kV OHL Cernavoda - Stâlpu Line, belonging to CNTEE Transelectrica S.A., through a 1.2 km long overhead line (OHL), supported by 8 pylons. Locations of the 8 pylons were secured via 11 willing buyer willing seller purchase agreements with individual private owners in 2022. The 8 pylons will occupy a total surface of 968 m².

2.4.1.6 Access roads

Existing roads in the Project area will be used for access to the Project, together with the additional roads to be constructed to access turbines. Additional roads ('internal Project roads' – existing and new access roads) will have a total length of approx. 70 km (4.5 m wide). All internal Project roads will be available for the public.

2.4.2 Temporary Construction Facilities of the Wind Farm

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:

- construction platforms and lay-down areas,
- concrete batching station,
- containers and sanitary facilities,
- workers' accommodation.

Temporary construction facilities are described in the sections below.

2.4.2.1 Construction platforms and lay-down areas

Based on the information provided by the Client, and details included in the DTAC Studies (Construction Technical Documentation for the Building Permits, 2022) and Geotechnical Survey Studies developed for each sub-project (2011, 2022), the following areas and platforms will be developed:

- temporary platforms used for construction of the WTGs have a total estimated surface of 35.33 ha;
- temporary lay-down areas, one for each sub-project, will have a total estimated surface of 3.00 ha,
- construction/management sites and temporary offices, one for each sub-project, will have a total estimated surface of 3.00 ha.

2.4.2.2 Concrete batching station

Based on the information provided by the Client, one concrete batching station (CBS) will be needed for the entire Project. The CBS will have a surface of approx. 1.5 ha and is provided to be located close to WTG 54 and near the Construction Corridor.

The mixing capacity of the Concrete Batching Station has not been determined yet.

Figure 2-6 General Concrete Batching Station Operation Scheme



The Ready Mix Concrete Process

1	Control Room - The 'brain' of the plant that calculates and sends out the exact measurements required to each sub station, allowing them to create the specified mix.	4	Water & Additives - Once water is added to the dry ingredients, the wet concrete mix itself starts to form. Additives are also added for extra strength, faster curing or better workability.
2	Aggregate Bins - This is where all the different types of aggregates are stored. Here, the exact amount of the required materials are weighed out, then carried via a conveyor belt to the mixing station ready to be mixed together.	5	The Mixing Station - Here, all the dry ingredients are mixed together with the water until the correct consistency is formed.
3	Cement Silos - Where the cement is stored, weighed out and transferred to the mixing station ready to be mixed along with the aggregates.	6	The Discharge Point - The mixture is discharged and loaded into the back of the drum mixer, which rotates to keep the consistency correct whilst it is transported to the job.

2.4.2.3 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.

2.4.2.4 Workers' accommodation

Workforce management will be assigned to the EPC Contractor, which is expected to be Vestas. The contract has not been concluded at the time of writing, therefore details on the number, origin and accommodation provisions for the workforce are not available and will be determined once the EPC Contractor is appointed.

No accommodation camps are envisioned to be required for the Project.

2.5 Project Schedule

In accordance with the updated information received from the Client (May 2023), the schedule for Project implementation is the responsibility of the EPC Contractor (Vestas). The EPC Contractor developed an updated Implementation plan featuring activities, their duration, and milestones (Table 2-3).

This project schedule was considered for the ESIA and was taken into consideration when evaluating the environmental and social impacts.

Table 2-3 Vifor Wind Farm Project Schedule

	Activity	Duration	Milestone
Construction phase			
Mobilization on site	Start of activities	-	Semester II 2023
Reinforcements and foundations	Grading, clearing, road installation, foundations, and cabling: Construction equipment and supplies, especially concrete components, and cabling would be delivered during this period	approx. 12-14 months	April 2024 – April 2025
Delivery and construction/ assembly of turbine equipment	Wind turbine component delivery requiring oversized transport loads.	approx. 9-10 months	
Construction/ assembly of electrical systems	Central power collection station/substation construction, potentially requiring oversized transport loads	approx. 2 months	
Finalization of construction	Internal wind farm network in place (underground power lines) and connection to SEN	-	April 2025
Wind Farm Operational	End of construction activities	approx. 18 months	May 2025
Operational phase			
Operation activities	Operation and maintenance works	up to 35 years	-
Decommissioning phase			
Decommissioning activities	Dismantling and land restoration works.	approx. 4-6 months	-

2.6 Project Phases

In general, the Vifor Wind Farm Project is developed in the following major phases:

- Planning Phase;
- Construction Phase (including pre-construction activities);
- Operations Phase;
- Decommissioning Phase.

Each of these phases has a different combination of activities and the commencement of each phase is dependent on the outcome and success of its predecessor. It should be noted that the scope of the Project and the associated ESIA study relates to all the phases listed above. Planning Phase is irrelevant for purposes of the ESIA study, therefore this report does not address this Phase in detail.

2.6.1 Pre-construction Activities

Typically, pre-construction activities on WF sites comprise the following:

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

2.6.1.1 Clearance and Construction of Access Roads

To access the WTG positions, in addition to the existing agricultural roads, an internal road network will be constructed. Although there are some existing tracks / informal road networks in the Project area, it will be difficult to use these for the Project, considering the heavy machinery and loads to be used and transported.

The Project will require relatively straight roads to allow machinery and equipment to access the WTG sites. Access roads will be approximately 4.5 m in width. Drainage culverts will be installed along the roadsides. Access roads will be reinforced with crushed stone and constructed to withstand heavy loads required during the construction phase (*i.e* cranes, concrete trucks and large trucks and trailers carrying turbine components and blades).

It is anticipated that the internal roads will be constructed using materials found on the site or nearby the site, the locations of which still need to be confirmed.

Constructed roads will also be used during the operational phase to provide access to the WTGs for ongoing operation and maintenance.

2.6.1.2 Wind Turbine Site Preparation

At each WTG site an area situated immediately next to the WTG foundation will be required. This dedicated area will be required for the following:

- Laying down of turbine components prior to erection;
- Space for operation of the main crane and assist crane when erecting the WTG;
- Blade storage area;
- Assembly of the rotor (hub and blades).

The WTG site will be demarcated prior to clearing. Following demarcation, the WTG site will be cleared of all vegetation and, where necessary, the site will be built by cutting and filling low hills and rides to form a leveled area.

2.6.2 Construction Phase

2.6.2.1 Construction activities

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

All work will be conducted in accordance with the detailed master construction schedule, 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;
- Traffic 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.

Earthworks:

Earth works will include grading of Wind Turbine, Sub-station, and Transmission Line locations. It is anticipated that the soil (of low quality) and subsoil, which will be stripped and removed, shall be utilised for levelling/ backfilling. The spoil generated during earthworks will be located close to the WTGs. Earthworks, digging and removal of stockpiling of soil at the sides of the stream or canal will be avoided in order to prevent sedimentation and erosion into the water sources.

Wind Turbine Construction:

Once the construction of internal access roads has been completed to an extent that allow for access to the WTGs locations, construction of crane hardstand areas and turbine foundations commences. The crane hardstand area will be used for main crane assembly and wind turbine erection. There will also be a crane and equipment lay down area at each of the turbine location. Lifting equipment will be required for the turbine erection transported to the site via the access roads.

In general, the wind turbines components will be assembled as follows:

- The tower will be disassembled and brought for assembling on the foundation using cranes.
- The wind turbine body consists of electricity generation equipment, such as: generator which shall be assembled on the ground before lifting to install on the top of the tower by large crane.

- The blades and rotor hub will be lifted by large crane and installed on tower and nacelle. During the construction, the ground base to hold the crane must be prepared to withstand the weight of the crane.
- Other parts of the wind turbine will be assembled including the installation of electricity cable system and signal cables.
- Underground cables will connect the wind turbines to the substations which will be constructed within the Wind Farm site. The underground cables will follow the internal road alignment and finally be connected to the CPCS.

OHL Transmission Line Construction:

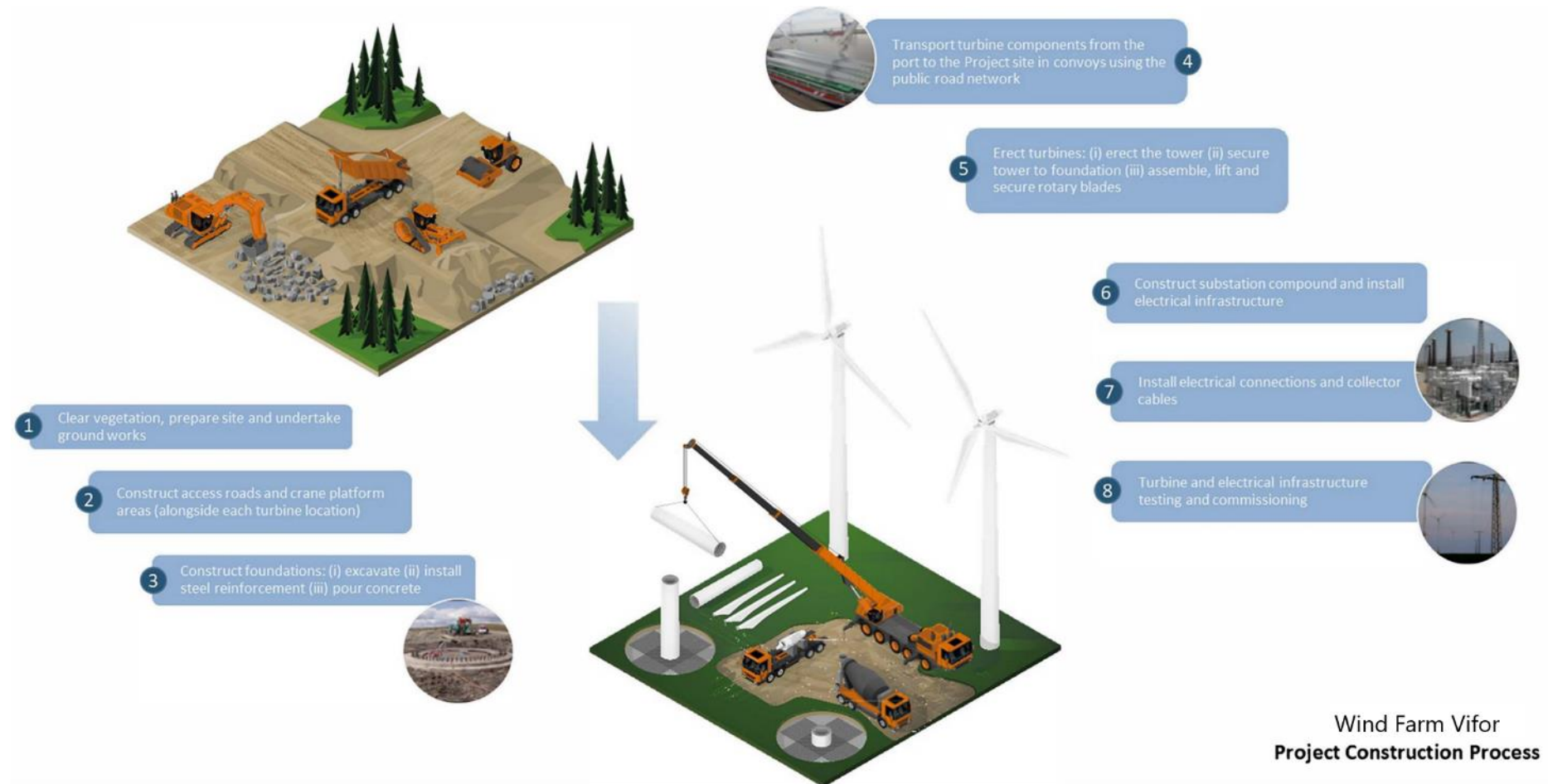
For the construction of the OHL line the following will be conducted:

- Survey of transmission line route and locations of high-voltage power towers by selecting the points which are easily accessible and have minimum impact.
- Clearance of access road to the power transmission pylon foundations.
- Cutting or clearance of the area of the transmission line route and land clearing and levelling.
- Pylon foundation work requires excavation of soil for making the reinforced concrete base.
- Erection of high-voltage power transmission pylons.
- Installation and stringing of high-voltage electrical conductors.
- Final examination and inspection.
- Test and hand-over to the project owner.

Project Site Road Upgrades:

Access roads will be created within the Project area and for connection to the public roads. The East-West Construction Corridor Road will pass near the locations of the 72 WTGs to enable the construction and installation of the turbines. After completing the construction and installation of the turbines, the roads will be renovated and will be used as access roads for turbine inspection and maintenance during the operations phase.

Figure 2-7 Vifor WF Project Construction Process



Source: ERM

Site restoration

After the installation of the wind turbines, the project will undertake the restoration of the landscape of the construction area to return it to its original condition as close as possible. Site restoration is discussed in more details in the Site Restoration Management Plan.

Engineering, Procurement and Construction (EPC) Contractors

The EPC Contractor is expected to be Vestas, however the contracting process is not concluded at the time this Study was drafted.

Construction Schedule and Manpower

All work will be conducted in accordance with the detailed master construction schedule, to be provided by the EPC Contractor.

Construction schedule is presented in Chapter 2.5 Project Schedule. As per information provided by the Client, construction is estimated to begin in October 2023, and will last until April 2025 (18 months).

Latest workforce estimation received from the Client, and used within this ESIA is 100-200 workers during the construction phase.

Construction machinery and equipment

Detailed list of construction machines and equipment is not established at the time of writing.

Transportation concept

Transportation routes include local and regional roads that will be used for supply and worker travel, and routes that will be used to transport components from a selected port – most likely to be the port at Constanța – to Project sites.

A transportation route survey was performed for the Project in 2020 (Transportation Route Survey Report Constanta – VisViva, for Vestas Central Europe, Holleman 2020). This study identified three component delivery routes to the Project sites from Constanța Port, based on the size and dimensions of particular components, road characteristics and the need for road modifications or impacts to properties near the roads.

The local transportation routes will include existing public roads, and internal Project roads connected to the public roads. All internal Project roads will be available to the public, in addition to providing access to the Project's wind turbine locations.

For the Construction phase, the transportation concept include use of the East-West Construction Corridor as the main road artery.

Utilities and Support during the Construction Phase

Power supply:

During Construction phase, electrical power will be sourced from the grid, and/or from diesel generators. Diesel generators will be used as main power source in remote Project sites and as a backup at all Project sites.

Water Supply:

Water for construction works will be primary brought to sites with water tankers, or secondary from groundwater (to be used for production of concrete in the batching station).

Another option may include only the use of tankers to deliver water for production of concrete in the batching station, dust suppression, domestic use by workers, site toilets, etc.

At this stage targeted water resources (water abstraction points and water sources for water tankers) and volumes required for construction have not yet been confirmed.

2.6.3 Operational Phase

Activities during the Operational Phase

The lifespan of a WTG is indicated at 30-35 years as per manufacturer's specification.

Activities during the operational phase will be subject to an Operations and Maintenance (O&M) contract and will involve:

- Ongoing Operation – daily operation will primarily involve surveillance of the fully automated wind farm, and activities associated with scheduled / unscheduled maintenance.
- Scheduled Maintenance – routine servicing of equipment. This will involve change of electrical components, oils, lubricants, cooling fluids, brake discs, light bulbs, etc.
- Unscheduled Maintenance – this involves *ad hoc* repairs to equipment.

The operational phase will require up to 40-50 workers, exclusive of security personnel.

Dual use of the Wind farm / implications

The 72 WTGs are to be constructed on pastureland owned by the Councils of local communes. The land between the WTGs will be available for continued agricultural use by current landowners and users, as long as the operation and maintenance of the wind park is not affected.

The Local Councils have the right to conclude any further contractual agreements regarding farming activities of the remaining land, as long as these do not affect the wind conditions on the land.

The Local Councils will benefit, according to the signed agreements with the Project Developer, among other clauses, of the – free and unrestricted use of upgraded communal and agricultural roads and new agricultural roads, as long as it does not interfere with the functioning of the wind farm.

2.6.4 Decommissioning Phase

Following the end of the Project's operational life (i.e., at least 35 years following the start of operations) the Project will be either repowered or decommissioned.

A detailed decommissioning or repowering plan, including site clean-up, will be prepared and submitted to the relevant authorities prior to commencing any decommissioning works. Because detailed decommissioning plans will not be available for many years, this phase will not be evaluated in detail.

Decommissioning will likely generate traffic associated with worker movements, disassembly of turbines, and transport of materials away from the site, along with temporary or permanent road infrastructure improvements necessary to facilitate those activities.

Overall, it is assumed that decommissioning will result in impacts similar in character and significance to those identified for the construction phase but over a shorter period (i.e. potentially 4-6 months).

All components of the WTG can be recycled, and the value of the residuals (non-recyclables) is usually much higher than the cost of dismantling, removal and disposal of the non-recyclable material in this area. The value of the recyclable material therefore contributes to the cost of disposal of waste.

2.7 Resource Requirement

2.7.1 Land requirements

The Project is not associated with physical displacement. The land was secured via voluntary lease agreements. The agreements were concluded for the respective land plots in their entirety, and not just for the surface to be permanently occupied by Project components, which constitutes a small fraction of the total leased surface. Remaining land will be available for continued agricultural use by current landowners and users.

Vifor Wind Farm Project is to be implemented on pastureland owned by the local councils of Pogoanele town and Costești, Gherăseni, Luciu, Smeeni and Țintești communes, secured via association in participation in contracts concluded with the Local Councils of each administrative unit.

The surface of pastureland permanently occupied by the Project (foundations, platforms, roads) constitutes less than 2.5% of the total land plots leased for all sub-projects. The remaining land will continue to be used by the local councils as pastureland, as long as the operation and maintenance of the wind park is not affected. Moreover, the Councils have the right to conclude any further contractual agreements regarding farming activities of the remaining land as long as these do not affect the wind conditions on the land, having only to notify the developer and ensuring the obligations of the usufruct agreement are assumed by the respective third party.

The update of the Project layout and the reduction of the number of WTGs and substations has reduced the surface of land to be permanently removed from agricultural use.

Table 2-4 Permanent and temporary land required for WTGs by subproject (ha)

Project element	Type of use	Total	% of total project area	Luciu	Gherăseni	Costesti	Smeeni	Țintești
Area of excavated foundations (including foundation surface)	Temporary	98.98	3.56	41.93	4.88	6.37	43.92	4.88
Area occupied by pylons	Permanent	0.38	0.0001	0.15	0.04	0.04	0.11	0.04
400 KV substation area	Permanent	2.75	0.09	2.75	0.00	0.00	0.00	0.00
Site organization	Temporary	5.50	0.19	2	0.50	0.50	0.50	0.50
Area of storage platforms	Temporary	5.50	0.19	3.50	0.50	0.50	0.50	0.50
Area of mounting platforms	Permanent	9.07	0.32	3.65	0.88	1.01	2.65	0.88
Area of temporary mounting platforms	Temporary	38.63	1.39	15.52	3.76	4.30	11.29	3.76
Area of new exploitation roads	Permanent	32.26	1.16	12.36	3.06	3.53	10.79	2.52
Area of land temporarily removed from the agricultural use	Temporary	147.68	5.3	60.52	9.64	11.67	56.21	9.64
Total area of land permanently removed from the agricultural use (incl. roads)	Permanent	44.45	1.6	18.91	3.98	4.58	13.54	3.44
Total area of land permanently removed from the agricultural use without roads	Permanent	20.44	0.7	6.55	0.92	1.05	2.75	9.17
Total project area	N/A	2777.02	N/A	1181.42	267.42	274.92	852.49	201.77

Source: ERM 2023, based on information provided by the Client.

2.7.2 Water use and management

2.7.2.1 Water use:

Water for the Construction and Operations phases will be primary brought to sites with water tankers, or groundwater will be used.

2.7.2.2 Wastewater management:

As detailed in section 7.2.6 Solid Waste and Wastewater Management, wastewater generated from construction activities of Vifor Wind Farm will include:

- sanitary and domestic wastewater;
- wastewater from vehicles or equipment washing / cleaning;
- liquid hazardous waste (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 licensed wastewater contractors.

2.7.3 Raw materials

Raw materials by type and quantity were not established at the time of writing.

2.7.4 Power requirements

During Construction and Operation phases, power will be sourced from the grid, and/or diesel generators.

2.7.5 Workforce and workers' accommodation

Latest workforce estimation received from the Client is:

- 100 – 200 workers during the construction of the Project (18 months), estimated to begin in October 2023;
- 40 – 50 workers during the operation of the Project.

Workforce management will be assigned to the EPC Contractor, which is expected to be Vestas.

No accommodation camps is envisioned to be required for the Project.

Any non-resident workers will be accommodated in private residencies or commercial accommodation facilities in the Project area.

2.8 Project alternatives

The interaction between the ESIA team and the Project design and planning process is one of the key areas in which an ESIA can influence how the Project develops. It includes involvement in defining the Project and identifying those activities with the potential to cause environmental and social impacts. Project planning, decision-making and refinement of the Project description will need to consider the outcomes of the ESIA process.

2.8.1 No Project alternative

The 'No Project' alternative assumes that the Project will not be developed, hence the Project site area would remain the same, with its current characteristics.

In the "No Project" scenario, the Project related negative environmental and social impacts, anticipated in this scoping report, would be avoided. However, any of the impacts predicted during the scoping phase must be further investigated during the ESIA exercise and mitigation measures defined to lower impacts to acceptable levels.

The consequences of opting for this alternative are:

- Cancellation of contributions to the achievement of targets regarding production of energy from renewable sources, reduction of greenhouse gas emissions, conservation of natural resources;
- Canceling the premises for the improvement of social and economic conditions in local communities, with negative effects on jobs, income from rents and from compensations for landowners, income from fees and taxes to local budgets, development of related activities (services);
- Maintaining the current environmental conditions;

Likewise, should the Project not be realized, following significant positive impacts would be missed:

- Contribute to increasing energy security through development of local energy resources and reducing dependency on external energy sources.
- Producing clean energy might contribute to lowering electricity generation costs compared to the current increasing costs associated with fossil fuels.
- The clean energy produced from renewable energy resources will help in reducing greenhouse gas emissions, as well as air pollutant emissions.
- Generation of local employment during the construction and operation phase, subsequently enhancing the socio-economic conditions and standards of living of the local communities.

The ESIA further investigate all potential positive and negative impacts from the Project and conclude on the preferable option as a result of the comparison of the project scenario with the no- project alternative.

2.8.2 Location selection and alternatives / Project layout

The Project sites were chosen as they offered adequate land area with consistently high wind yields further from residential areas. The areas were also selected because they benefited from good access to existing road infrastructure.

The Project development started with wind assessment and first design of VisViva Wind Farm, in 2010. Before the Client acquired back in July 2020 the development rights to the Project Vifor Wind Farm comprised seven sub-projects (Costești, Gherăseni, Smeeni, Pogoanele I, Luciu, Pogoanele II, and also Țintești), which separately followed the national permitting procedures.

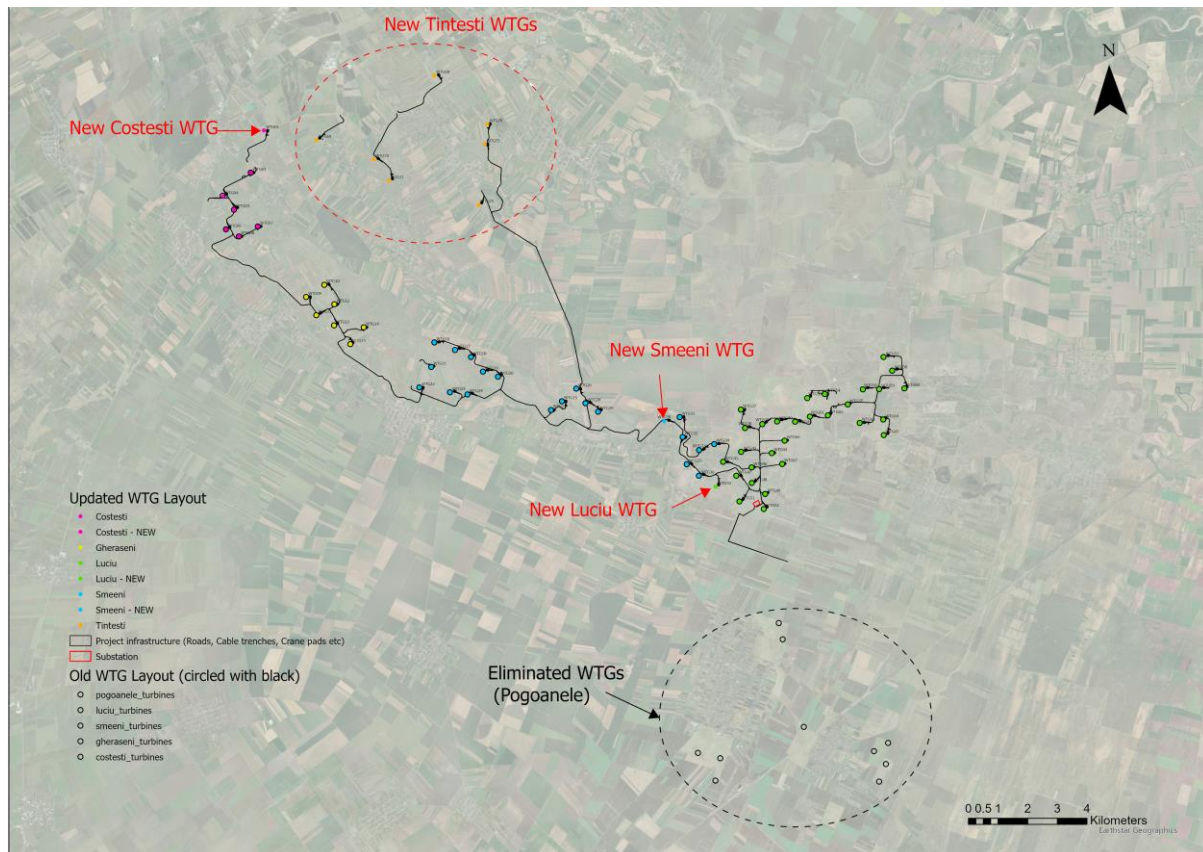
Following the technical modifications of the Project in 2020 and 2022, by increasing the turbine power to 6.2 MW and decreasing the number of turbines from 85 to 72, the Project Company decided to renounce to Țintești sub-project, and to continue the Project with six sub-projects (Costești, Gherăseni, Smeeni, Pogoanele I, Luciu and Pogoanele II).

In May 2023, the Project reconsidered its layout by removing WTGs from Pogoanele II subproject to Țintești, Costești, Smeeni and Luciu.

In addition, the following criteria were taken into consideration for environmental mitigation in selection of the current layout, compared with the initial layout:

- A number of wind turbines (WTs) were removed from initially considered layout to lessen the impact on local communities and local protected flora;
 - 2 WTs were moved in order to lessen the impact on local communities;
 - 35 km of roads were replanned in order to optimize built areas;
- 8 km of underground cables will be laid under existing local roads to minimize the impact on local bat population.

Figure 2-8 Changes in the Project layout (2023)



2.8.3 Technology alternatives

From the initiation of the VisViva Project in 2010, and until the required back in 2020 of the development rights of the Project, renamed Vifor Wind Farm, several alternatives on Wind Turbine generators and wind farm designs were used, as follows:

- The project initial selected turbine in 2010, Vestas with a total power of 5.4 MW.
- The project underwent major modification in 2020, with use of Vestas turbine type EnVentus Vestas V150-6.0 MW, with a tower height of 166 m and a rotor diameter of 150m, by increasing the turbine power and efficiency, reduction of the wind turbine numbers, switch from above-ground to underground cable lines for internal power lines connecting the turbines and reduction to one power collection station.
- The Project underwent a modification in 2022, due to some technological changes of the turbine manufacturer Vestas, by increasing turbine power and efficiency from 6 to 6.2 MW; use of turbine type EnVentus Vestas V162-6.2 MW, with a tower height of 166 m and a rotor diameter of 162 m. A total of 72 WTs will be used for the Project resulting in a total installed power of 446.4 MW.

- In 2023, the Project increased turbine capacity to 6.4 MW resulting in a total installed power for 72 WTGs of 460.8 MW.

2.8.4 *Transport alternatives / Transport routes*

The transportation and traffic for the Project area include:

- routes that will be used to transport components from a selected port – most likely to be the port at Constanța – to the Project sites;
- local and regional roads that will be used for supply and worker travel.

For transport of WTG components from Constanta port to Vifor Project area, a Transportation Route Survey Report Constanta - VisViva/Vifor (2020), was prepared by Holleman, for Vestas Central Europe. The study identified and evaluated three alternative routes to the Project sites from Constanța Port for component deliveries, based on the size and dimensions of the particular components of the WTGs, the road characteristics, and the need for road modifications or impacts to properties adjoining the roads. The selected route was considered for the traffic impact assessment in this ESIA.

The local transportation routes include the existing public roads, and the internal Project roads connected to the public roads. All internal Project roads will be available to the public.

For the Construction phase, when the highest traffic is recorded, the transportation alternatives included design of the East-West Construction Corridor of the Project area, as the main road artery.

The Construction Corridor, located north of Călmățui river, was designed to bypass the entire cluster of rural settlements located south of Călmățui river, and thus will prevent traffic congestion on existing public roads.

3. ADMINISTRATIVE FRAMEWORK

This Section details the national and international legislation and good practice requirements for the Project. National laws deemed relevant for the successful implementation of all environmental and social components of the Project are introduced here. Furthermore, this Section lists the environmental and social requirements of the EBRD Environmental and Social (E&S) Performance Requirements (2019), the IFC Performance Standards on Environmental and Social Sustainability (2012) (the IFC PS), the associated General & Industry Specific Environmental, Health and Safety (EHS) Guidelines, and the IFC's EHS Guidelines for Wind Energy (2015), and how the Project relates to these requirements.

3.1 National Policy, Legal and Administrative Framework

3.1.1 Institutional Framework

The administrative structure in Romania is governed by central and local administrations. The Romanian President is elected for a five-year representative, for maximum two terms. The Romanian Parliament is bicameral consisting of the Chamber of Deputies (Camera Deputaților) composed of 330 directly elected deputies and the Senate (Senatul) composed of 136 directly elected senators. Both chambers have a four-year term.

The Government is the public authority of executive power that functions based on the vote of confidence granted by Parliament, ensures the achievement of the country's domestic and foreign policy and that exercises the general leadership of public administration. The Government is appointed by the President of Romania based on the vote of confidence granted to the Government by Parliament. The Prime Minister leads the Government and coordinates the activities of its members, in compliance with their legal duties. The working structure of the Government is composed of the Prime Minister's Office, Secretariat - General of the Government, departments and other similar organizational structures with specific tasks set by Government Decision.

Framework Law no. 195/2006 on decentralization, revised by Government Emergency Ordinance no. 42/2016, establishes the principles, rules, and institutional framework, which regulates the administrative and decentralization process and establishes own and shared competencies for the different levels of government.

The 41 counties of Romania and the city of Bucharest are governed by the council president and the elected county councillors, while the central government appoints a prefect in each county. The role of the prefect is to represent the central authority (the government) at local level, with the power to oppose and block local authorities' unlawful or unconstitutional actions.

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 also elected for a four-year representative. According to the Constitution, Romanian territory is organized administratively into Counties (in Romanian "Județe"), at the intermediate level, while Communes, Towns and Municipalities (Cities) form the local administrative level. The status as Municipality ("Municipiu" in Romanian) is given to larger towns, but it does not give their administrations any greater powers. Below communal or town level, there are no further formal administrative subdivisions. However, communes are divided into villages (which have no administration of their own).

3.1.2 National Regulatory Framework

The environmental legal framework within Romania (Law 137/1995²) include 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 3-1 Relevant National Legislation

Law	Number	Description	Relevance
Environmental			
<i>Law on Environmental Protection</i>	137/1995, amended several times	Makes a reference to the Environmental Impact Assessment (EIA) as a means for the protection of natural resources.	EIA shall be an integral part of the technical documents; the Project execution cannot commence if the EIA procedure is not properly implemented.
<i>Law on Environmental Impact Assessment</i>	292/2018 ³	<p>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 <i>issuing the Environmental Consent by the Ministry of Environment</i>.</p> <p>The major provisions set out in the Law include:</p> <ul style="list-style-type: none"> - 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; 	The Law defines the following EIA phase.

² [LEGE 137 29/12/1995 - Portal Legislativ \(just.ro\)](#)

³ Source: Romanian Legislative Portal [LEGE 292 03/12/2018 - Portal Legislativ \(just.ro\)](#)

Law	Number	Description	Relevance
		<ul style="list-style-type: none"> - Protection of natural resources and biodiversity conservation; - Protection of water and aquatic ecosystems; - 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. 	
<i>Law on Ambient Air Quality</i>	104/2011	<p>Transposes EU Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe into national law.</p> <p>The law aims to protect human health and the environment as a whole by regulating measures aimed at maintaining or improving ambient air quality.</p>	Sets out methods and criteria, established at the European level, for the assessment of air quality and provides limit values for pollutants.
<i>Law on Waters</i>	107/1996 ⁴	<p>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.</p> <p>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.</p>	Define the need for classification of surface and ground water.
<i>Law on Nature Protection</i>	49/2011 amending 57/2007 ⁵	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.	Regulates that an assessment of impacts deriving from plans / measures / interventions on conservation goals and integrity of the ecological network is compulsory.

⁴ Source: Romanian Legislative Portal [LEGE 107 25/09/1996 - Portal Legislativ \(just.ro\)](https://portal.legislativ.just.ro/)

⁵ Source: Romanian Legislative Portal [OUG 57 20/06/2007 - Portal Legislativ \(just.ro\)](https://portal.legislativ.just.ro/)

Law	Number	Description	Relevance
		Establishes a national ecological network of protected areas.	
<i>Law on Waste</i>	92/2021 ⁶	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.
<i>Law on Noise Protection</i>	121/2019 ⁷	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

<i>Law on Road Traffic Safety</i>	195/2002 ⁸	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.
<i>Law on Cultural Heritage</i>	422/2001 ⁹ 26/2008 ¹⁰ 451/2002 ¹¹	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.
<i>Law on Labour</i>	53/2003 ¹²	Partially amended by several laws and republished. Stipulates that: discrimination is prohibited in	Regulates the rights and obligations deriving from employment.

⁶ Source: Romanian Legislative Portal [ORD DE URGENTA 92 19/08/2021 - Portal Legislativ \(just.ro\)](#)

⁷ Source: Romanian Legislative Portal [LEGE 121 03/07/2019 - Portal Legislativ \(just.ro\)](#)

⁸ Source: Romanian Legislative Portal [OUG \(R\) 195 12/12/2002 - Portal Legislativ \(just.ro\)](#)

⁹ Source: Romanian Legislative Portal [LEGE 422 18/07/2001 - Portal Legislativ \(just.ro\)](#)

¹⁰ Source: Romanian Legislative Portal [LEGE 26 29/02/2008 - Portal Legislativ \(just.ro\)](#)

¹¹ Source: Romanian Legislative Portal [LEGE 451 08/07/2002 - Portal Legislativ \(just.ro\)](#)

¹² Source: Romanian Legislative Portal [CODUL MUNCII \(A\) 24/01/2003 - Portal Legislativ \(just.ro\)](#)

Law	Number	Description	Relevance
		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.	Provisions of the Collective Contract, Employer's Internal Act and Labour Contract shall be in compliance with the provisions of this Law.
<i>Law on Occupational Safety and Health at Work</i>	319/2006 ¹³	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.
<i>Law on Cadastre</i>	105/2019 ¹⁴	Law on the amendment and completion of the Law 7/1996 on cadastre and real estate advertising, and which amends and completes Law 18/1991 on land.	The Law regulates the Cadastre of immovable property, national and cadastral surveys, geodesic and cadastral works as well as acquisition, registration, record keeping, maintenance and use of cadastral data. Immovable property – specific part of the land surface, which has boundaries (land, natural objects affixed to the land, business buildings, residential buildings etc.).
<i>Law on Property and other al Rights</i>	185/2018 ¹⁵	Law for approval of Government Emergency Ordinance 31/2018 on the amendment and completion of cadastre and real estate advertising Law 7/1996.	The Law governs the creation, content, transfer, protection, and termination of real rights. It also regulates ownership and, as limited real rights, possession, real security rights and real rights of use.

¹³Source: Romanian Legislative Portal [LEGE 319 14/07/2006 - Portal Legislativ \(just.ro\)](https://portal.legislativ.just.ro/lege/319-14-07-2006)

¹⁴ Source: Romanian Legislative Portal [LEGE 105 17/05/2019 - Portal Legislativ \(just.ro\)](https://portal.legislativ.just.ro/lege/105-17-05-2019)

¹⁵ Source: Romanian Legislative Portal [L. 185. 2018.pdf \(anaf.ro\)](https://portal.legislativ.just.ro/lege/185-2018)

3.1.2.1 Details of applicable Romanian Environmental Legislation

➤ Engagement for the Environmental Impact Assessment in Romania

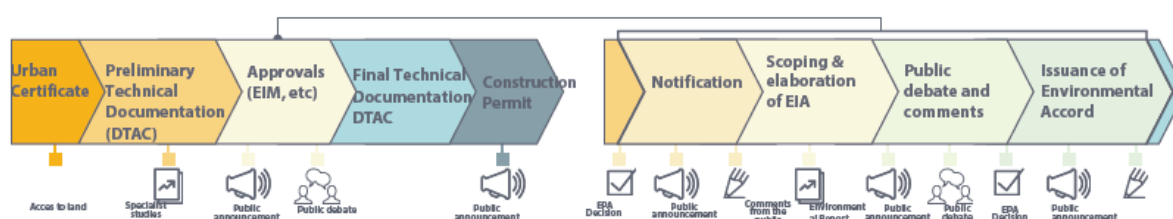
Following the approval of the Urban Zoning Plan and as a pre-condition to obtaining the Construction Permit for the Project, an Environmental Impact Assessment (EIA) needs to be undertaken in line with the requirements of Law 292/2018, which is aligned with the requirements of the EU EIA Directive 2014/52/EU.

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 3-1 Stakeholder engagement milestones as part of the EIA Procedure



➤ 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 "(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;
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.

The list of key documents related to the SEA process is presented in the following:

Table 3-2 Romanian legal framework and relevant documents related to SEA process

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.

3.1.2.2 Details of applicable Romanian Labour and Social Legislation

➤ 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, succesively 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.

➤ **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".

3.2 International Legislation, Guidelines and Standards for the ESIA

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 (collectively referred to as the "Relevant Standards"):

- Applicable EBRD Performance Requirements (PR)*, 2019, set out in the EBRD's Environmental and Social Policy:
 - PR 1: Assessment and Management of Environmental and Social Risks and Impacts;
 - PR 2: Labour and Working Conditions;
 - PR 3: Resource Efficiency and Pollution Prevention and Control;
 - PR 4: Health, Safety and Security;
 - PR 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement ;
 - PR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
 - PR 8: Cultural Heritage; and
 - PR 10: Information Disclosure and Stakeholder Engagement.

*PR7 refers to requirements linked to Indigenous Peoples, which are not present in Romania, thus is not applicable to the Project.

*PR 9 refers to standards to be considered by financial intermediaries, thus is not applicable to the Project.

- Equator Principles IV (2020);
- International Financing Corporation (IFC), Performance Standards (PS) (2012);
- IFC Environmental, Health and Safety Guidelines for Wind Energy (2015);
- IFC Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007);
- World Bank Group, General Environmental, Health, and Safety Guidelines (2007); and
- World Bank Group, Environmental, Health and Safety Guidelines for Wind Energy (2015).

3.2.1 International Conventions

3.2.1.1 The Kyoto Protocol on Climate Change (UNFCCC)

Romania became a signatory to the UNFCCC 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.

3.2.1.2 *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 became party to this Convention in 1994.

3.2.1.3 *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 1989 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.

3.2.1.4 *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.

3.2.2 *International Lender Standards and Guidelines*

The applicable International Standards that will be adopted for the present Project are as follows:

3.2.2.1 *The Equator Principles*

The Equator Principles (EPs) refer to the environmental and social risk management framework voluntarily adopted by 83 member financial institutions (Equator Principle Financial Institutions (EPFIs)). They are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The EPs were developed by private-sector banks and launched in June 2003. They were several times revised; the last revision known as EP IV took effect on July 2020.

The EPs establish voluntary principles for addressing environmental and social risks and issues in global project finance transactions, including adherence to IFC PS. The EPs are designed to serve as a benchmark for the financial industry to manage social and environmental risks in project financing. They apply to all new project financings across all industry sectors. The Principles (EPs 1 to 10) are:

- **Principle 1:** Review and Categorisation;
- **Principle 2:** Environmental and Social Assessment;

- **Principle 3:** Applicable Environmental and Social Standards;
- **Principle 4:** Environmental and Social Management System and Equator Principles Action Plan;
- **Principle 5:** Stakeholder Engagement;
- **Principle 6:** Grievance Mechanism;
- **Principle 7:** Independent Review;
- **Principle 8:** Covenants;
- **Principle 9:** Independent Monitoring and Reporting; and
- **Principle 10:** Reporting and Transparency.

The EP IV (2020) can be found on the Equator Principle website¹⁶.

Principle 2: Environmental and Social Assessment: all *Category A* and *Category B* Projects are required to conduct an assessment process to address the relevant environmental and social risks and impacts of the proposed Project.

Principle 3: Applicable Environmental and Social Standards: requires that the Project comply with relevant host country laws, regulations and permits that pertain to environmental and social issues. The principle also brings into consideration compliance with the IFC OS in Environmental and Social Sustainability and the World Bank EHS Guidelines.

Principles 4 to 7 and **Principles 9 and 10** apply to all *Category A* and, as appropriate, to *Category B* Projects.

3.2.2.2 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 website¹⁷.

Table 3-3 Summary of IFC Performance Standards and an Indicator of their Applicability to the Project

Performance Standards	Objectives and Applicability
<p>Performance Standard 1 – Assessment and Management of Environmental and Social Risks and Impacts.</p> <p>Underscores the importance of managing environmental and social performance throughout the life of a Project (any business activity that is</p>	<p>Objectives:</p> <ul style="list-style-type: none"> • Impact identification and assessment: to identify and assess environmental and social impacts, both adverse and beneficial, in the Project Area of influence (Aol); • Mitigation: to avoid, or where avoidance is not possible, to minimize, mitigate or compensate the adverse impacts on the environment, workers and affected communities;

¹⁶ [The Equator Principles EP4 July2020 \(equator-principles.com\)](https://equator-principles.com/)

¹⁷ https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_handbook_pps

Performance Standards	Objectives and Applicability
subject to assessment and management).	<ul style="list-style-type: none"> • Stakeholder engagement: to ensure that affected communities are appropriately engaged on issues that could potentially affect them; • Effective management: to promote improved social and environment performance of companies through the effective use of management systems. <p><u>Applicability:</u></p> <p>Due to the scale and nature of the Project, PS1 is applicable. The Project has identified and assessed a range of E&S impacts for all Project phases, developed mitigation/management measures, and held engagement with stakeholders.</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 5 – Stakeholder Engagement • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts
<p>Performance Standard 2 – Labour and Working Conditions.</p> <p>Recognizes that the pursuit of economic growth through employment creation and income generation should be balanced with protection for basic rights of workers.</p>	<p><u>Objectives:</u></p> <ul style="list-style-type: none"> • To promote fair treatment, non-discrimination and equal opportunity of workers, and compliance with national labor and employment laws; • To establish, maintain and improve the worker management relationship; • To promote compliance with national employment and labor laws; • To protect the workforce by addressing child labor and forced labor; • To promote safe and healthy working conditions, and to protect and promote the health of workers. <p><u>Applicability:</u></p> <p>Project workers (for all project phases) will need to be provided with fair labor and working conditions. This will apply to all categories of workers, irrespective of whether directly engaged by the Project Proponent or Contractors (direct workers), engaged through third parties (contracted workers), and workers engaged by the Client's primary suppliers (supply chain).</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 2 – Project Description • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts
<p>Performance Standard 3 – Resource Efficiency and Pollution Prevention.</p> <p>Recognizes that increased industrial activity and urbanization often generate increased levels of pollution to air, water, and land that may threaten people and the</p>	<p><u>Objectives:</u></p> <ul style="list-style-type: none"> • To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from Project activities; • To promote more sustainable use of resources, including energy and water; • To reduce Project related Green House Gas (GHG) emissions; <p><u>Applicability:</u></p>

Performance Standards	Objectives and Applicability
environment at the local, regional, and global level.	<p>Development of the Project will require resources such as water, which have the potential to cause some negative environmental and social impacts. All required resources will need to be used efficiently, and all wastes to be managed in accordance with the waste management hierarchy, where avoidance of waste generation is the main priority.</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 2.8 – Project Alternatives • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts
<p>Performance Standard 4 – Community Health, Safety and Security.</p> <p>Recognizes that Project activities, equipment and infrastructure often bring benefits to communities including employment, services, and opportunities for economic development.</p>	<p>Objectives:</p> <ul style="list-style-type: none"> • To anticipate and avoid adverse impacts on health and safety of the affected communities during the project life both from routine and non-routine circumstances; • To ensure that the safeguarding of personnel and property is carried out in accordance with the relevant human rights principles and in a manner that avoids or minimizes risks to the affected communities. <p>Applicability:</p> <p>PS4 is applicable as the Project will have a work force during the construction phase that may impact on the health and safety of the community.</p> <p>Implementation of the Project will need to ensure that the health, safety and security of all communities that may be directly and/or indirectly impacted are not compromised.</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts
<p>Performance Standard 5 – Land Acquisition and Involuntary Resettlement.</p> <p>Outlines that involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or means of livelihood) as a result of Project related land acquisition.</p>	<p>Objectives:</p> <ul style="list-style-type: none"> • To anticipate and avoid, or where not possible, to minimize adverse social and economic impacts from land acquisition or land rental, or restrictions on land use by: (i) providing compensation for loss of assets at replacement cost, and (ii) ensuring that resettlement activities (if any) are implemented with appropriate disclosure of information, consultation and the informed participation of those affected. • To improve, or restore, the livelihoods and standards of living of displaced/affected persons. <p>Applicability:</p> <p>The Project site/s and interconnection line is mainly utilized as pastures for raising cows and sheep, and on a small proportion for farming activities. Land acquisition and land rental for the Project will result in occasional restrictions on land use and economic displacement, and thus PS5 is applicable to the Project.</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 5 – Stakeholder Engagement

Performance Standards	Objectives and Applicability
	<ul style="list-style-type: none"> • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts
<p>Performance Standard 6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources.</p> <p>Recognizes that protecting and conserving biodiversity (including ecosystem diversity) and its ability to change and evolve, is fundamental to sustainable development.</p>	<p>Objectives:</p> <ul style="list-style-type: none"> • To protect and conserve biodiversity; • To maintain the benefits from ecosystem services; • To promote the sustainable development of living natural resources through the adoption of practices that integrated conservation needs and development priorities. <p>Applicability:</p> <p>PS6 is applicable to the Project as the habitats within the Project site/s are utilized for ecosystem services. Assessment of Project impacts has been carried out in line with the requirements of the PS6.</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 2.8 – Project Alternatives • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts
<p>Performance Standard 7 – Indigenous Peoples.</p> <p>Recognizes that indigenous peoples, as social groups with identities that are distinct from dominant groups in national societies, are often among the most marginalized and vulnerable segments of the population.</p>	<p>Applicability: As there are no indigenous people in Romania, PS7 is not applicable for the Project.</p>
<p>Performance Standard 8 – Cultural Heritage.</p> <p>Recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention concerning the protection of the World Cultural and Natural Heritage, PS8 aims to ensure that Clients protect cultural heritage in the course of their Project activities.</p>	<p>Objectives:</p> <p>PS8 aims to protect the irreplaceable cultural heritage and to guide clients on protecting cultural heritage in the course of their business operations. In addition, the requirements of PS8 on a Project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.</p> <p>PS8 recognizes the importance of cultural heritage with the objective to:</p> <ul style="list-style-type: none"> • Protect cultural heritage from the adverse impacts of Project activities and support its preservation, and • Promote the equitable sharing of benefits from the use of cultural heritage in business activities. The PS requires the Project Proponent to comply with relevant national law on the protection of cultural heritage, including the national law implementing Romania's obligations under the Convention concerning the protection of the World Cultural and Natural Heritage and other relevant international law.

Performance Standards	Objectives and Applicability
	<p><u>Applicability:</u></p> <p>Cultural heritage sites were identified for the Project Area of Influence (Aoi), and assessment of Project impacts on these has been carried out in line with the requirements of the PS8.</p> <p>Detailed information is provided in the chapters:</p> <ul style="list-style-type: none"> • Chapter 6 – Project Baseline Conditions • Chapter 7 – Environmental and Social Impact Assessment • Chapter 9 – Summary of Impacts

3.2.2.3 World Bank Environmental, Health and Safety Standards

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.

3.2.2.4 World Bank EHS Guidelines for Wind Energy

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.

3.2.2.5 EBRD Environmental and Social Policy and Performance Requirements

The Environmental and Social Policy is one of the Bank's three good governance policies and a key document that guides the EBRD's commitment to promoting "*environmentally sound and sustainable development*" in the full range of its investment and technical cooperation activities. It sets out the ways in which we implement this commitment in practice and on our projects.

The Policy and Performance Requirements were reviewed over a year and a half long period through extensive internal and external consultation, culminating with a 45-day public consultation period on the draft Policy and in-person consultation events in eight countries. The 2019 Environmental and Social Policy and related Performance Requirements were approved by the EBRD Board of Directors on 25 April 2019 and apply to projects initiated after 1 January 2020.

The Policy will be reviewed in 2024¹⁸.

At current stage of development, the Project qualifies **Category A** according to the Environmental and Social (E&S) policies of major international finance institutions, commercial banks and export credit agencies signatory to Equator Principles.

To access international finance, *Category A projects* require identification and assessment of associated E&S impacts based on an **Environmental and Social Impact Assessment (ESIA)**. ESIA outcomes are subject to public disclosure in line with the specific requirements of the international finance institution(s) to participate in the Project finance (different disclosure requirements may apply). Additionally, establishment of Project-specific Environmental and Social Management System (ESMS), appropriate to the nature and scale of the Project and commensurate with the level of its environmental and social risks and impacts is considered necessary.

¹⁸ Environmental and Social, European Bank for Reconstruction and Development, 2019

3.3 Developer's Policies and Standards

The Project Sponsors have their own policies and standards related to social and environmental topics, the relevant ones to be included in the ESMP.

3.4 Licenses and Permits

Before the Client acquired back in 2020 the development rights to the Project, VisViva WF went through the Romanian permitting process, having a slightly different design configuration than the one considered currently and divided for permitting purposes in sub-projects/communes (i.e. Costești, Gherăseni, Smeeni, Pogoanele, Luciu and also Țintești).

During the permitting process, each sub-project benefitted from an assessment. All the permits including the environmental ones were issued considering each of the sub-projects as standalone projects.

Initial environmental permitting of the sub-projects was done in 2010-2012, with updates in 2017. Based on 2020 Project design (wind turbines with nominal capacity of 6 MW, reduction of the wind turbine numbers, switch from above-ground to underground cable lines for internal power lines connecting the turbines and reduction to one power collection station), new Urban Certificates (UC) have been issued in January 2021 for all sub-projects mentioned above. Following these changes, re-permitting has been initiated in January-February 2021 based on information included in Urban Certificates, with Favourable Environmental Final Decision for all sub-projects issued by Environmental Protection Agency in Buzau (EPA Buzau) in August 2021.

The Project underwent a modification in 2022, due to some technological changes of the turbine manufacturer, by increasing the turbine power from 6 to 6.2 MW and a final modification in 2023 by increasing the turbine power from 6.2 to 6.4 MW.

The main Romanian E&S permit documents that have been obtained for VisViva WF are set out in Table 3-4

Table 3-4 Romanian E&S Permits and Main Permitting Requirements for Vifor WF Project

No.	Permit Type	Purpose	No/ Date of issuance	Regulatory / Authorizing Agency	Regulatory Reference	Status	Permit Requirements	Project subject to approval	Recommendations
1	Environmental Approval (SEA)	PUZ – before construction Costești site	6/31.07.2012	Local Environmental Protection Agency (EPA)	GD 1076/2004 GEO 195/2005 GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the PUZ, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The PUZ provides placement of 15 wind turbines, with a total capacity of 45 MW, with maximum height of 185,5 metres.	Monitoring should be according to the imposed schedule. Request a new environmental approval if any changes in the PUZ occur. Notify EPA whenever necessary.
2	Environmental Approval (SEA)	PUZ – before construction Gherăseni site	7/31.07.2012	Local Environmental Protection Agency (EPA)	GD 1076/2004 GEO 195/2005 GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the PUZ, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The PUZ provides placement of 16 wind turbines, with a total capacity of 48 MW, maximum height of 185,5 metres.	Monitoring should be according to the imposed schedule. Request a new environmental approval if any changes in the PUZ occur. Notify EPA whenever necessary.
3	Environmental Approval (SEA)	PUZ – before construction Smeeni site	8/31.07.2012	Local Environmental Protection Agency (EPA)	GD 1076/2004 GEO 195/2005 GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the PUZ, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The PUZ provides placement of 56 wind turbines, with a total capacity of 168 MW, maximum height of 185,5 metres.	Monitoring should be according to the imposed schedule. Request a new environmental approval if any changes in the PUZ occur. Notify EPA whenever necessary.
4	Environmental Approval (SEA)	PUZ – before construction	9/31.07.2012	Local Environmental	GD 1076/2004	In place for the entire	The permit loses its validity if the construction no	The PUZ provides placement of 38	Monitoring should be according to the imposed schedule.

No.	Permit Type	Purpose	No/ Date of issuance	Regulatory / Authorizing Agency	Regulatory Reference	Status	Permit Requirements	Project subject to approval	Recommendations
		Pogoanele site		Protection Agency (EPA)	GEO 195/2005 GEO 57/2007 updated by Law 49/2011	period of validity of the PUZ, if there are no changes.	longer corresponds to the conditions for which it was authorized.	wind turbines, with a total capacity of 114 MW, maximum height of 185,5 metres.	Request a new environmental approval if any changes in the PUZ occur. Notify EPA whenever necessary.
5	Environmental Approval (SEA)	PUZ – before construction Luciu site	10/31.07.2012	Local Environmental Protection Agency (EPA)	GD 1076/2004 GEO 195/2005 GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the PUZ, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The PUZ provides placement of 31 wind turbines, with a total capacity of 93 MW, maximum height of 185,5 metres.	Monitoring should be according to the imposed schedule. Request a new environmental approval if any changes in the PUZ occur. Notify EPA whenever necessary.
6	Environmental Approval (SEA)	PUZ – before construction Țintești site	19/17.07.2012	Local Environmental Protection Agency (EPA)	GD 1076/2004 GEO 195/2005 GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the PUZ, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The PUZ provides placement of 23 wind turbines, with a total capacity of 69 MW, maximum height of 125 metres.	Monitoring should be according to the imposed schedule. Request a new environmental approval if any changes in the PUZ occur. Notify EPA whenever necessary.
7	Environmental Approval (SEA)	Wind turbines – before construction Costești site	169/04.11.2012	Local Environmental Protection Agency (EPA)	GEO 195/2005 GD 445/2009 MO 135/2010 GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the project, if there are	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The project provides placement of 15 wind turbines, with a total capacity of 45 MW, with	Monitoring should be according to the imposed schedule. Request a new environmental approval if there are any changes in the project.

No.	Permit Type	Purpose	No/ Date of issuance	Regulatory / Authorizing Agency	Regulatory Reference	Status	Permit Requirements	Project subject to approval	Recommendations
						no changes.		maximum height of 185,5 metres.	Notify EPA whenever necessary.
8	Environmental Final Decision	Wind turbines – before construction Țintești site	170/04.12.2012	Local Environmental Protection Agency (EPA)	GEO 195/2005 GD 445/2009 MO 135/2010 GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the project, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The project provides placement of 16 wind turbines, with a total capacity of 48 MW, maximum height of 185,5 metres.	Monitoring should be according to the imposed schedule. Request a new environmental approval if there are any changes in the project. Notify EPA whenever necessary.
9	Environmental Final Decision	Wind turbines – before construction Smeeni site	171/04.12.2012	Local Environmental Protection Agency (EPA)	GEO 195/2005 GD 445/2009 MO 135/2010 GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the project, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The project provides placement of 56 wind turbines, with a total capacity of 168 MW, maximum height of 185,5 metres.	Monitoring should be according to the imposed schedule. Request a new environmental approval if there are any changes in the project. Notify EPA whenever necessary.
10	Favourable decision for approval of PUZ	PUZ – before construction Gherăseni site	30/28.09.2012	Gherăseni Local Council	L 50/1991 L 350/2001 L 215/2001	In place for the entire period of validity of the project	Compliance with the requirements specified in the approvals and agreements obtained.	The PUZ provides placement of 16 wind turbines, with a total capacity of 48 MW, maximum height of 185,5 metres.	Comply with the requirements of the approvals/ agreements obtained.
11	Favourable decision for	PUZ – before construction	40/28.09.2012	Smeeni Local Council	L 50/1991 L 350/2001 L 215/2001	5-year validity from the	Compliance with the requirements specified in the	The PUZ provides placement of 56	Comply with the requirements of the approvals/

No.	Permit Type	Purpose	No/ Date of issuance	Regulatory / Authorizing Agency	Regulatory Reference	Status	Permit Requirements	Project subject to approval	Recommendations
	approval of PUZ	Smeeni site				date of issuance.	approvals and agreements obtained.	wind turbines, with a total capacity of 168 MW, maximum height of 185,5 metres.	agreements obtained.
12	Favourable decision for approval of PUZ	PUZ – before construction Pogoanele & Luciu sites	41/15/28.09.2012	Luciu Local Council	L 50/1991 L 350/2001 L 215/2001	In place for the entire period of validity of the project	Compliance with the requirements specified in the approvals and agreements obtained.	The PUZ provides placement of 38 wind turbines, with a total capacity of 114 MW, maximum height of 185,5 metres for Pogoanele site. The PUZ provides placement of 31 wind turbines, with a total capacity of 93 MW, maximum height of 185,5 metres for Luciu site.	Comply with the requirements of the approvals/ agreements obtained.
13	Favourable decision for approval of PUG	PUG – before construction Costești site	42/23.05.2015	Costești Local Council	L 50/1991 L 350/2001 L 215/2001	10-year validity from the date of issuance.	Compliance with the requirements specified in the approvals and agreements obtained.	The PUZ provides placement of 15 wind turbines, with a total capacity of 45 MW, with maximum height of 185,5 metres.	Comply with the requirements of the approvals/ agreements obtained.
14	Environmental Final Decision	Wind turbines –	169/04.11.2012 Revised 01.11.2017	Local Environmental	GEO 195/2005 GD 445/2009	In place for the entire	The permit loses its validity if the construction no	The project provides placement of 12	Monitoring should be according to the imposed schedule.

No.	Permit Type	Purpose	No/ Date of issuance	Regulatory / Authorizing Agency	Regulatory Reference	Status	Permit Requirements	Project subject to approval	Recommendations
15	Environmental Final Decision	before construction Costești site	170/04.12.2012 Revised 01.11.2017	Protection Agency (EPA)	MO 135/2010 GEO 57/2007 updated by Law 49/2011	period of validity of the project, if there are no changes.	longer corresponds to the conditions for which it was authorized.	wind turbines, with a total capacity of 54 MW, with maximum height of 166 metres.	Request a new environmental approval if there are any changes in the project. Notify EPA whenever necessary.
		Wind turbines – before construction Gheraseni site		Local Environmental Protection Agency (EPA)	GEO 195/2005 GD 445/2009 MO 135/2010 GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the project, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The project provides placement of 11 wind turbines, with a total capacity of 49,5 MW, maximum height of 166 metres.	Monitoring should be according to the imposed schedule. Request a new environmental approval if there are any changes in the project. Notify EPA whenever necessary.
16	Environmental Final Decision	Wind turbines – before construction Smeeni site	171/04.12.2012 Revised 01.11.2017	Local Environmental Protection Agency (EPA)	GEO 195/2005 GD 445/2009 MO 135/2010 GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the project, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The project provides placement of 37 wind turbines, with a total capacity of 166,5 MW, maximum height of 166 metres.	Monitoring should be according to the imposed schedule. Request a new environmental approval if there are any changes in the project. Notify EPA whenever necessary.
17	Environmental Final Decision	Wind turbines – before construction Pogoanele site	172/04.12.2012 Revised 01.11.2017	Local Environmental Protection Agency (EPA)	GEO 195/2005 GD 445/2009 MO 135/2010 GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the project, if there are	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The project provides placement of 25 wind turbines, with a total capacity of 112,5 MW, maximum	Monitoring should be according to the imposed schedule. Request a new environmental approval if there are any changes in the project.

No.	Permit Type	Purpose	No/ Date of issuance	Regulatory / Authorizing Agency	Regulatory Reference	Status	Permit Requirements	Project subject to approval	Recommendations
18	Environmental Final Decision	Wind turbines – before construction Luciu site	173/04.12.2012 Revised 01.11.2017	Local Environmental Protection Agency (EPA)	GEO 195/2005 GD 445/2009 MO 135/2010 GEO 57/2007 updated by Law 49/2011	no changes. In place for the entire period of validity of the project, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	height of 166 metres. The project provides placement of 21 wind turbines, with a total capacity of 94,5 MW, maximum height of 166 metres.	Notify EPA whenever necessary. Monitoring should be according to the imposed schedule. Request a new environmental approval if there are any changes in the project. Notify EPA whenever necessary.
19	Environmental Final Decision	Wind turbines – before construction Țintești site	181/20.12.2012 Revised 01.11.2017	Local Environmental Protection Agency (EPA)	GEO 195/2005 GD 445/2009 MO 135/2010 GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the project, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The project provides placement of 14 wind turbines, with a total capacity of 63 MW, maximum height of 166 metres.	Monitoring should be according to the imposed schedule. Request a new environmental approval if there are any changes in the project. Notify EPA whenever necessary.
20	Decision on the modification of PUZ	PUZ – before construction Smeeni site	93/25.09.2017	Smeeni Local Council	L 350/2001 L 52/2003 L 554/2001	10-year validity from the date of issuance.	Compliance with the requirements specified in the approvals and agreements obtained.	The PUZ provides placement of 37 wind turbines, with a total capacity of 166,5 MW, maximum height of 185,5 metres.	Comply with the requirements of the approvals/ agreements obtained.
21	Favourable decision for	PUZ – before construction	33/28.07.2017	Gherăseni Local Council	L 50/1991 L 350/2001 L 215/2001	In place for the entire	Compliance with the requirements specified in the	The PUZ provides placement of 11	Comply with the requirements of the approvals/

No.	Permit Type	Purpose	No/ Date of issuance	Regulatory / Authorizing Agency	Regulatory Reference	Status	Permit Requirements	Project subject to approval	Recommendations
	approval of PUZ	Gherăseni site				period of validity of the project	approvals and agreements obtained.	wind turbines, with a total capacity of 49,5 MW, maximum height of 166 metres.	agreements obtained.
22	Favourable decision for approval of PUZ	PUZ – before construction Pogoanele & Luciu sites	24/31.07.2017	Luciu Local Council	L 350/2001 L 215/2001 L 554/2001 L 52/2003	10-year validity from the date of issuance.	Compliance with the requirements specified in the approvals and agreements obtained.	The project provides placement of 25 wind turbines, with a total capacity of 112,5 MW, maximum height of 166 metres for Pogoanele site. The project provides placement of 21 wind turbines, with a total capacity of 94,5 MW, maximum height of 166 metres for Luciu site.	Comply with the requirements of the approvals/ agreements obtained.
23	Favourable decision for approval of PUZ	PUZ – before construction Țintești	30/21.07.2017	Țintești Local Council	L 350/2001 L 215/2001 L 554/2001 L 52/2003	In place for the entire period of validity of the project	Compliance with the requirements specified in the approvals and agreements obtained.	The project provides placement of 14 wind turbines, with a total capacity of 63 MW, maximum height of 166 metres.	Comply with the requirements of the approvals/ agreements obtained.
24	Urban Certificate (UC) for	Wind turbines –	200/22.01.2021	Local Municipality –	L 50/1991	In place until 2022.	Obtaining various approvals and develop design	The new project provides placement of 8	Comply with the requirements of the approvals/

No.	Permit Type	Purpose	No/ Date of issuance	Regulatory / Authorizing Agency	Regulatory Reference	Status	Permit Requirements	Project subject to approval	Recommendations
	construction of wind farm	before construction Costești site		Costești City Hall			documentations for the project. These are the basis for obtaining the Construction Permit.	wind turbines, with a total capacity of 48 MW, with a maximum height of 166 metres.	agreements obtained following UC.
25	Urban Certificate (UC) for construction of wind farm	Wind turbines – before construction Gherăseni site	9/20.01.2021	Local Municipality – Gherăseni City Hall	L 50/1991	In place until 2022.	Obtaining various approvals and develop design documentations for the project. These are the basis for obtaining the Construction Permit.	The new project provides placement of 7 wind turbines, with a total capacity of 42 MW, with a maximum height of 166 metres.	Comply with the requirements of the approvals/ agreements obtained following UC.
26	Urban Certificate (UC) for construction of wind farm	Wind turbines – before construction Smeeni site	2/20.01.2021	Local Municipality – Smeeni City Hall	L 50/1991	In place until 2022.	Obtaining various approvals and develop design documentations for the project. These are the basis for obtaining the Construction Permit.	The new project provides placement of 21 wind turbines, with a total capacity of 126 MW, with a maximum height of 166 metres.	Comply with the requirements of the approvals/ agreements obtained following UC.
27	Urban Certificate (UC) for construction of wind farm	Wind turbines – before construction Pogoanele site	3/25.01.2021	Local Municipality – Luciu City Hall	L 50/1991	In place until 2022.	Obtaining various approvals and develop design documentations for the project. These are the basis for obtaining the Construction Permit.	The new project provides placement of 17 wind turbines, with a total capacity of 102 MW, with a maximum height of 166 metres.	Comply with the requirements of the approvals/ agreements obtained following UC.

No.	Permit Type	Purpose	No/ Date of issuance	Regulatory / Authorizing Agency	Regulatory Reference	Status	Permit Requirements	Project subject to approval	Recommendations
28	Urban Certificate (UC) for construction of wind farm	Wind turbines – before construction Luciu site	4/25.01.2021	Local Municipality – Luciu City Hall	L 50/1991	In place until 2022.	Obtaining various approvals and develop design documentations for the project. These are the basis for obtaining the Construction Permit.	The new project provides placement of 14 wind turbines, with a total capacity of 84 MW, with a maximum height of 166 metres.	Comply with the requirements of the approvals/ agreements obtained following UC.
29	Urban Certificate (UC) for construction of wind farm	Wind turbines – before construction Țintești site	1/01.02.2021	Local Municipality – Țintești City Hall	L 50/1991	In place until 2022.	Obtaining various approvals and develop design documentations for the project. These are the basis for obtaining the Construction Permit.	The new project provides placement of 7 wind turbines, with a total capacity of 42 MW, with a maximum height of 166 metres.	Comply with the requirements of the approvals/ agreements obtained following UC.
30	Environmental Final Decision (it is not subject to EIA or AA)	Wind turbines – before construction Costești site	169/04.11.2012, Revised 01.11.2017, Revised 27.08.2021	Local Environmental Protection Agency (EPA)	GEO 195/2005, GD 445/2009 repealed and replaced by Law 292/2018, MO 135/2010, GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the project, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The new project provides placement of 8 wind turbines, with a total capacity of 48 MW, with a maximum height of 166 metres.	Monitoring should be according to the imposed schedule. Request a new environmental approval if there are any changes in the project. Notify EPA whenever necessary.
31	Environmental Final Decision (it is not subject to EIA or AA)	Wind turbines – before construction Gherăseni site	170/04.12.2012, Revised 01.11.2017, Revised 27.08.2021	Local Environmental Protection Agency (EPA)	GEO 195/2005, GD 445/2009 repealed and replaced by	In place for the entire period of validity of the	The permit loses its validity if the construction no longer corresponds to the conditions for	The new project provides placement of 7 wind turbines, with a total capacity of 42	Monitoring should be according to the imposed schedule. Request a new environmental approval if there are

No.	Permit Type	Purpose	No/ Date of issuance	Regulatory / Authorizing Agency	Regulatory Reference	Status	Permit Requirements	Project subject to approval	Recommendations
					Law 292/2018, MO 135/2010, GEO 57/2007 updated by Law 49/2011	project, if there are no changes.	which it was authorized.	MW, with a maximum height of 166 metres.	any changes in the project. Notify EPA whenever necessary.
32	Environmental Final Decision (it is not subject to EIA or AA)	Wind turbines – before construction Smeeni site	171/04.12.2012, Revised 01.11.2017, Revised 27.08.2021	Local Environmental Protection Agency (EPA)	GEO 195/2005, GD 445/2009 repealed and replaced by Law 292/2018, MO 135/2010, GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the project, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The new project provides placement of 21 wind turbines, with a total capacity of 126 MW, with a maximum height of 166 metres.	Monitoring should be according to the imposed schedule. Request a new environmental approval if there are any changes in the project. Notify EPA whenever necessary.
33	Environmental Final Decision (it is not subject to EIA or AA)	Wind turbines – before construction Pogoanele site	172/04.12.2012, Revised 01.11.2017, Revised 27.08.2021	Local Environmental Protection Agency (EPA)	GEO 195/2005, GD 445/2009 repealed and replaced by Law 292/2018, MO 135/2010, GEO 57/2007 updated by Law 49/2011	In place for the entire period of validity of the project, if there are no changes.	The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	The new project provides placement of 17 wind turbines, with a total capacity of 102 MW, with a maximum height of 166 metres.	Monitoring should be according to the imposed schedule. Request a new environmental approval if there are any changes in the project. Notify EPA whenever necessary.
34	Environmental Final Decision (it is not subject to EIA or AA)	Wind turbines – before construction Luciu site	173/04.12.2012, Revised 01.11.2017, Revised 27.08.2021	Local Environmental Protection Agency (EPA)	GEO 195/2005, GD 445/2009 repealed and replaced by Law 292/2018,	In place for the entire period of validity of the project, if	The permit loses its validity if the construction no longer corresponds to the conditions for	The new project provides placement of 14 wind turbines, with a total capacity of 84 MW, with a	Monitoring should be according to the imposed schedule. Request a new environmental approval if there are

No.	Permit Type	Purpose	No/ Date of issuance	Regulatory / Authorizing Agency	Regulatory Reference	Status	Permit Requirements	Project subject to approval	Recommendations
35	Environmental Final Decision (it is not subject to EIA or AA)	Wind turbines – before construction Țintești site	181/20.12.2012, Revised 01.11.2017, Revised 27.08.2021	Local Environmental Protection Agency (EPA)	MO 135/2010, GEO 57/2007 updated by Law 49/2011 GEO 195/2005, GD 445/2009 repealed and replaced by Law 292/2018, MO 135/2010, GEO 57/2007 updated by Law 49/2011	there are no changes. In place for the entire period of validity of the project, if there are no changes.	which it was authorized. The permit loses its validity if the construction no longer corresponds to the conditions for which it was authorized.	maximum height of 166 metres. The new project provides placement of 7 wind turbines, with a total capacity of 42 MW, with a maximum height of 166 metres.	any changes in the project. Notify EPA whenever necessary. Monitoring should be according to the imposed schedule. Request a new environmental approval if there are any changes in the project. Notify EPA whenever necessary.

4. ESIA APPROACH AND METHODOLOGY

4.1 Introduction

As mentioned in Chapter 1 – Introduction and Context, the ESIA process for the Project is being undertaken in compliance with the Romanian legislative requirements described in Chapter 3 – Administrative Framework. In addition to the applicable regulations and norms of Romania, the Project should comply with the requirements of the Equator Principles IV, 2020, IFC Performance Standards on Environmental and Social Sustainability, 2012, and additional EBRD E&S Performance Requirements, 2019.

Overview of the ESIA Process

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. Over the past decades, EIAs have expanded to include social impact assessments as well as public consultation/stakeholder engagement in the planning and decision-making process to avoid, reduce, or mitigate adverse impacts, and to maximise the benefits of the proposed Project. More recently, the emphasis has moved to the ESIA producing robust social and environmental management plans, which can effectively implement the recommended mitigation measures (developed in partnership with the Project proponent) identified in the ESIA during the life of the Project. An Environmental and Social Management System (ESMS) has been developed for this Project (which will be expanded as the Project progresses) and included in the Annexes to this ESIA Report.

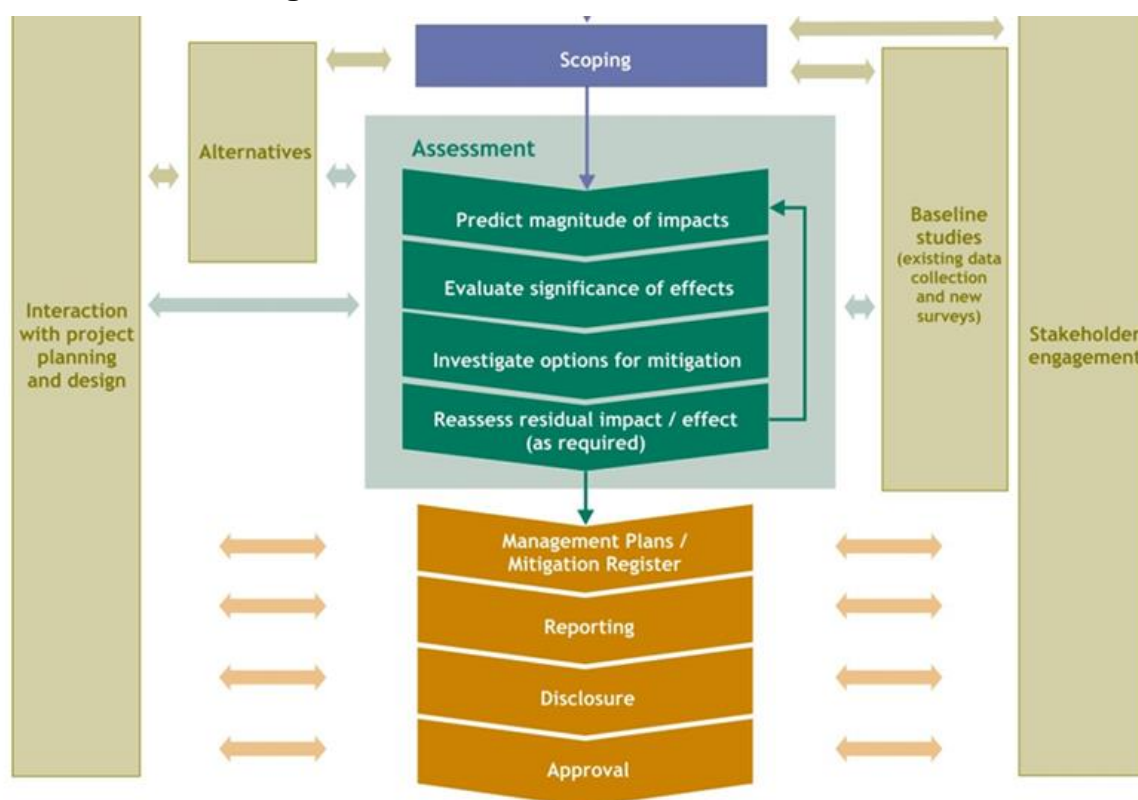
Thus, the key objectives of the ESIA are to assess the potential environmental and social impacts associated with the planning, construction, operation and, where possible, decommissioning and closure phases of the Project and, to identify measures that can be adopted to avoid, minimise or offset adverse impacts and enhance beneficial impacts.

The key stages for this ESIA process are highlighted in Figure 4-1, 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 4-1 Overview of the ESIA Process



Source: ERM, 2019

4.2 Impact Assessment Approach

4.2.1 Scoping Stage

For the current ESIA, the Scoping stage was conducted in 2022, prior to developing the methodologies for the baseline data collection for each environmental and social topic.

4.2.1.1 Purpose of the Scoping stage

Scoping has been undertaken by ERM to identify key sensitivities and those activities with the potential to contribute to, or cause, potentially significant impacts to environmental and socio-economic receptors and resources, and to evaluate siting, layout and alternatives for the Project. It also helped in developing and selecting alternatives to proposed actions and in identifying the issues to be considered in this ESIA.

Scoping for the proposed Project has been undertaken with the following objectives:

1. Identify the Project's Area of Influence (Aol), and thus an appropriate Study Area;
2. Identify where interactions between the Project and Project activities result in impacts to environmental and social resources and receptors;
3. Make a tentative evaluation of the impact of such effect and identify which should be included in the scope of the impact assessment;
4. Develop a detailed assessment of impacts.

This stage is intended to ensure that the ESIA focuses on those issues that are most important for design, decision-making and stakeholder interest.

4.2.1.2 Findings of the Scoping

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.

The findings of the Scoping stage are reported in the following table, highlighting the resources/receptors considered during scoping and the potential impact prediction.

Table 4-1 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 ₂ O), 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.
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.

4.2.2 Scope of the Assessment

The present ESIA covers the following Project elements, which were described in detail in Chapter 2. Project description and Chapter 4.2.1 Scoping stage, above.

- WTG transport and construction/installation,
- WTG foundations establishment, WTG installation, WTG site access,
- Transforming station/Central power collection station, underground cable lines and transmission line,
- WTG operation, maintenance,
- Supporting facilities such as construction laydown area and office facilities.

4.2.3 Defining Area of Influence (Aol)

The IFC Performance Standards require Project developers to identify and manage environmental and social risks and impacts within their Area of Influence (Aol).

Definition of the Aol for the Vifor Wind Farm Project has been derived following the guidance provided in the EBRD PR1. The process has also considered the relevant environmental and social aspects included in PR's 2 through 8, and the IFC EHS Guidelines for Wind Energy (2015). Thus, the Project Aol 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.

Based on available information on the Project provided by the Client, and information obtained from site visits, the scoping opinion meeting with local authorities and good international industry practice on potential E&S impacts of a wind power project, the Project's Aol is defined as below:

- *Area likely to be affected – by:*

- the primary Project sites and related facilities that the Client develops and/or controls, and the additional areas in which aspects of the environment could conceivably experience significant impacts;
- impacts from unplanned but predictable developments caused by the Project that may occur later or at a different location;
- indirect Project impacts on biodiversity or ecosystem services upon which Affected Communities' livelihoods are dependant;
- *Associated facilities* – facilities not funded as part of the Project and that would not have been constructed if the project did not exist and without which the project would not be viable.
- *Cumulative impacts* – resulting from 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.

The Project's Aol is set out below:

- **Environment Aol** that include the Project components and the environmental receptors which may be affected by the Project development:
 - **direct Environment Aol**, which comprises:
 - location of primary Project sites and related facilities that the Client develops and/or controls (e.g. *permanent*: wind turbines, central power collection station, underground cable lines and overhead lines, existing roads and additional access roads, culverts; and *temporary*: borrow and disposal areas, lay-down areas, concrete batching station, temporary offices, construction/ management sites, etc).
 - additional areas in which aspects of the environment could conceivably experience significant impacts. We are considering an area of up to 2 km applied around the Project sites and facilities,
 - **indirect Environment Aol**, including any other additional areas where impacts from unplanned but predictable developments caused by the Project may occur later or at a different location.
- **Social Aol** that include the area surrounding the Project, where various social interactions will take place:
 - **direct Social Aol**, also understood as the study area for the socio-economic qualitative baseline data collection field survey, which comprises:
 - all settlements impacted by land take for the Project components – all land plots required by the Project belong to the administrative territorial units of Costești, Gherăseni, Smeeni and Luciu communes, and Pogoanele town;
 - the settlements that could be affected by potential temporary environmental impacts during the construction phase and long-term during operations, such as noise, shadow flicker, etc. located in a 2 km buffer from the WTG,
 - **indirect Social Aol** (considered as study area for the desktop data review), including the entire Buzau County.

Further, for each Environmental & Social topic, separate Aols are identified, depending on the specifics of the respective factor, Project phase and estimated impacts. These separate Aols are identified and described at with the project baseline conditions and the environmental and social impact assessment chapters.

Among them stand out:

- As per the EHS Guidelines for Wind Energy, preliminary noise modelling should focus on sensitive receptors within 2 km of any wind turbines. Given that noise will be one of the more critical aspects to consider during the ESIA process, a Project Aol of 2 km has been applied around the Project wind turbine locations;
- Project Aol for shadow flicker impact during operational phase is determined as 10 times of rotor diameters (162 m) from each turbine location;
- Project Aol for blade throw impact during operational phase is determined as 1.5 times of turbine height (247 m hub height and rotor radius);
- Project Aol for biodiversity of 2 km radius has been applied around the Project wind turbine locations, to define habitat values in the immediate project vicinity where species may regularly dwell.

4.2.4 ESIA Scoping Matrix

Following the determination of Aol, a Scoping Matrix is used as a tool to support a methodological identification of potential interactions of each Project activity and the resources/receptors within the Aol. It consists of a list of Project activities during the construction and operation phases which may give rise to significant impacts. These are sets against a list of environmental and social resources/receptors within the Aol that they have the potential to interact with.

Entries in the matrix cells are coloured to indicate whether:

Table 4-2 Understanding the Impacts within the Scoping Matrix

Scope in/out	Description
Scoped Out	An interaction is not reasonably expected.
Scoped Out or integrated with other major interactions	An 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 at least one of the resulting impacts is likely to lead to an effect that is significant
Interaction likely to lead to Positive Impacts	An interaction with positive impact expected

All potential interactions, regardless of probability of occurrence, are to be considered at this stage. Those cells that are coloured white are 'scoped out' of further consideration in the Impact Assessment (IA). Interactions marked as grey are also 'scoped out' with supporting reasons provided to justify the decision. Those interactions that are shaded green are 'retained for further consideration' in the IA process.

Note that at this stage, detailed construction methodology is not available and so, the scoping of these potential impacts has been based on experience with similar projects and professional judgement. A conservative approach is undertaken at this preliminary stage. When this information is available, the potential impacts associated with the activities will be revisited during development of the in the ESIA.

Table 4-3 Scoping Matrix for ESIA

Project Phases and Activities	Environment							Social							
	Ambient Air Quality	Noise and Vibration	Soil Quality	Surface Water Quality	Groundwater Quality	Terrestrial Fauna and Flora	Avifauna & Bats	Economy & Employment	Livelihood	Visual Amenity	Land Use	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															
Workforce influx															
Construction of turbine foundations, transmission line pylons, internal road, auxiliary works and turbine installation															
Wastes, emissions and discharges generation, handling and disposal															
Operation of associated facilities such as the concrete batching plant															
Operation and Maintenance															

Project Phases and Activities	Environment							Social							
	Ambient Air Quality	Noise and Vibration	Soil Quality	Surface Water Quality	Groundwater Quality	Terrestrial Fauna and Flora	Avifauna & Bats	Economy & Employment	Livelihood	Visual Amenity	Land Use	Infrastructure/Public Service	Occupational Health and Safety	Community Health, Safety and Security	Archaeology and Cultural heritage
Workforce Presence															
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															
Workforce influx															

Project Phases and Activities	Environment							Social							
	Ambient Air Quality	Noise and Vibration	Soil Quality	Surface Water Quality	Groundwater Quality	Terrestrial Fauna and Flora	Avifauna & Bats	Economy & Employment	Livelihood	Visual Amenity	Land Use	Infrastructure/Public Service	Occupational Health and Safety	Community Health, Safety and Security	Archaeology and Cultural heritage
Equipment and material transport and supply															
Decommissioning works															
Wastes, emissions and discharges generation, handling and disposal															

Source: ERM

4.2.5 Baseline Data Collection

One of the main objectives of the ESIA process is to collect suitable data on the physical, biophysical and socio-economic environment, so as to understand what receptors and resources have the potential to be significantly affected by the Project. Chapter 6 – Project Baseline Conditions describes the baseline conditions that have been used to make the assessment of physical and biological impacts, and Chapter 7 – Environmental and Social Impact Assessment defines the environmental and socio-economic impacts (and impact assessments).

Description of the baseline aims at providing sufficient detail to meet the following objectives:

- Identify the key conditions and sensitivities in areas potentially to be affected by the Project;
- Provide a basis for extrapolation of the current situation, and development of future scenarios without the Project;
- Provide data to aid in the prediction and evaluation of possible impacts of the Project;
- Understand stakeholder concerns, perceptions and expectations regarding the Project;
- Allow the Project to develop appropriate mitigation measures as part of the ESIA process; and
- Provide a benchmark to assess future changes and to assess the effectiveness of mitigation measures.

At the ESIA stage, further assessment of cumulative impacts shall be performed in line with the IFC Good Practice Handbook for Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets (2013), following the six-step approach proposed therein.

Additional desktop studies are needed to identify existing and foreseeable projects that may have common valuable environmental components (VECs) with the VisViva project, as well as these VECs themselves.

Baseline status of the VECs shall be determined and significant cumulative impact shall be identified and assessed based on collected information. Once cumulative impacts are identified and assessed, appropriate mitigation measures shall be developed.

4.2.6 Stakeholder Engagement

A comprehensive impact assessment requires engagement with relevant stakeholders through key stages of development. This serves to enhance the understanding of stakeholder views on the Project as well as identifying issues that should be taken into account in the prediction and evaluation of impacts. Details of the stakeholder engagement activities undertaken for the development of this document are presented in Chapter 5 – Stakeholder Engagement.

A standalone Stakeholder Engagement Plan (SEP) is provided in addition to this ESIA document.

4.3 Impact Assessment and Mitigation Methodology

4.3.1 Introduction

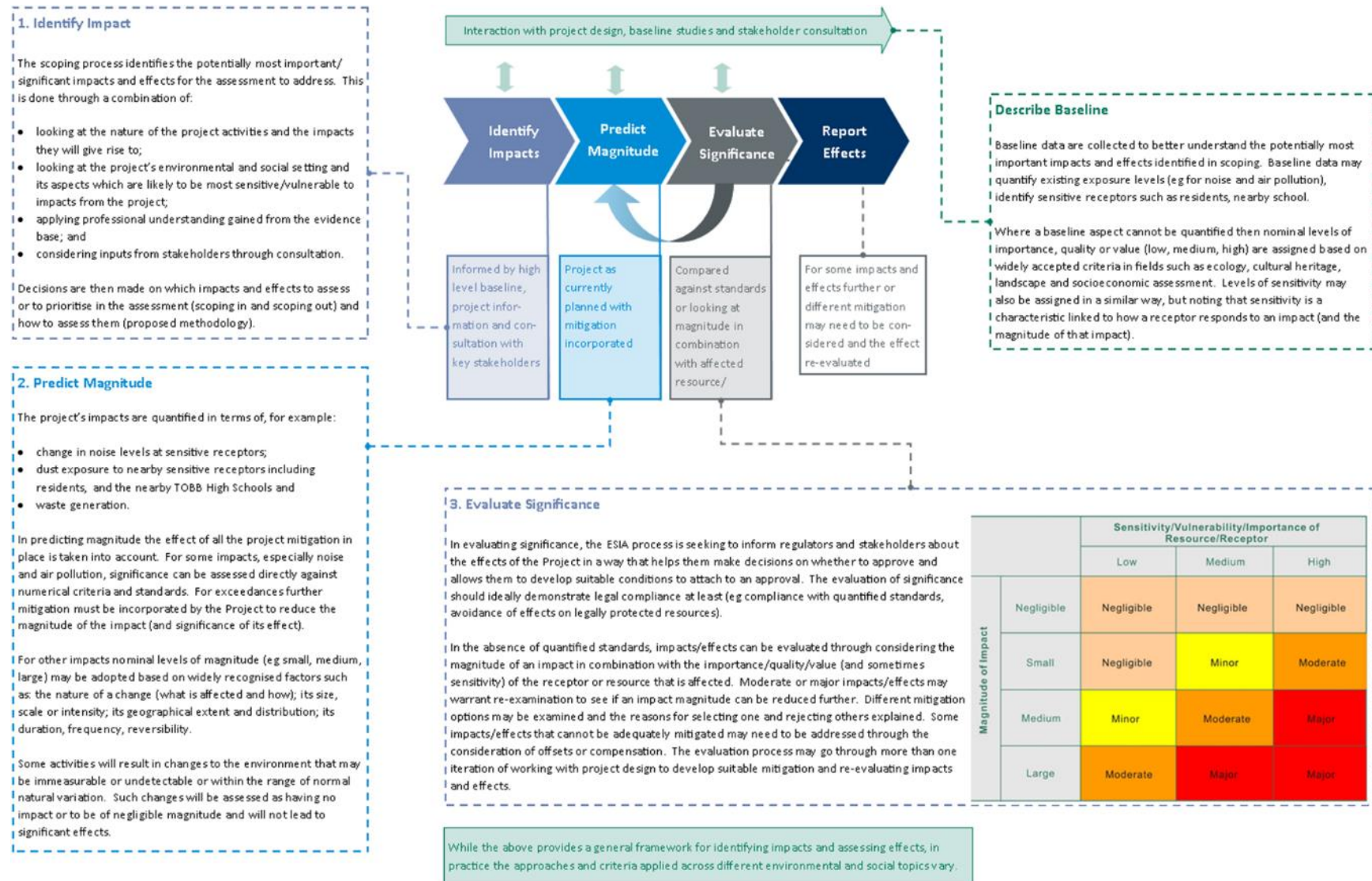
The impact assessment stage comprises a number of steps that collectively assess the manner in which the Project will interact with the elements/factors of the physical, biological, cultural or human environment to produce impacts to resources/receptors. The steps involved in the impact assessment stage are described in detail below.

4.3.2 Identification and Assessment of Impacts

Impact identification and assessment starts with scoping and continue throughout the remainder of the ESIA Process. The principal ESIA steps are summarized below and comprise of:

- **Potential impact prediction/identification:** to determine what could potentially to resources/receptors as a consequence of the Project and its associated activities;
- **Impact evaluation:** to evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity value and/or importance of the affected resource/receptor;
- **Management and mitigation enhancement measures:** to identify appropriate and justified measures to mitigate potential negative impacts and enhance potential positive impacts;
- **Residual impact evaluation:** to evaluate the significance of potential impacts assuming effective implementation of mitigation and enhancement measures.

Figure 4-2 ESIA Methodology



4.3.2.1 Impact Prediction

The impact assessment process predicts and describes impacts that are expected to occur for different phases of the Project.

Where possible, impacts are quantified to the extent practicable, which may include e.g. hectares of land affected; increase in noise or air pollution levels above acceptable standards; volume of waste or water discharged, number of graves affected etc.

For each impact, its significance is evaluated by defining and evaluating two key aspects:

- The *magnitude* of the impact; and
- The *sensitivity* of the feature or receptor that will be impacted.

4.3.2.2 Impact Magnitude

Magnitude essentially describes the intensity of the change that is predicted to occur in the resource/receptor as a result of the impact. A magnitude rating tends to reflect a combination of the size of an area that may be affected, the duration over which the aspect may be altered, and the size, degree or scale of that change. In essence, magnitude is a descriptor for the degree of change that is predicted to occur in the resource or receptor.

For positive impacts (which are mostly socio-economic impacts) magnitude is generally categorised as 'Positive' unless sufficient information is available to support a more robust characterisation and to assign the degree of magnitude as Small, Medium or Large. For instance, if the number of jobs to be assigned to local community members is confirmed or if the size or value of the contribution to the national, regional or district economy is known then a magnitude rating can be assigned. If not, then the significance rating is assigned based on the sensitivity of the feature impacted by a specific activity or change.

The term '*magnitude*' therefore encompasses all the characteristics of the predicted impact including:

- Extent;
- Duration;
- Scale;
- Frequency; and
- Likelihood (only used for unplanned events).

The definitions for characteristics of magnitude used during the impact assessment are summarised in Table 4-4 below.

Table 4-4 Impact Characteristics Terminology

Characteristics	Definition	Designations
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect)	<ul style="list-style-type: none"> - Direct - Indirect - Inducted
Extent	The "reach" of the impact (e.g., confined to a small area around the Project Footprint, projected for several kilometres, etc)	<ul style="list-style-type: none"> - Local – impacts that affect an area in a radius of 20 km around the development Site - Regional – impacts that affect regionally important environmental resources or are

		experienced at a regional scale as determined by administrative boundaries, habitat type/ecosystem. - International – impacts that cross national borders, affect an area that is nationally important/or have macro-economic consequences.
Duration	The time period over which a resource/receptor is affected.	- Temporary – impacts are predicted to be of short duration and intermittent/occasional. - Short-term – impact that are predicted to last only the duration of the construction period. - Long-term – impacts that will continue for the life of the Project, but ceases when the Project stops operating. - Permanent – impacts that cause a permanent change in the affected receptor or resource (e.g., removal or destruction of ecological habitat) that endures substantially beyond the Project lifetime.
Scale	The size of the impact (e.g., the size of the are damaged or impacted, the fraction of a resource that is lost or affected, etc.)	(no fixed designations; intended to be a numerical value or a qualitative description of “intensity”)
Frequency	A measure of the constancy or periodicity of the impact	(no fixed designations; intended to be a numerical value or a qualitative description)

The *evaluation of pre-mitigation impact significance* takes into account control measures that are already part of, or embedded within, the Project design. This avoids the situation where an impact is assigned a magnitude based on a hypothetical version of the Project that considers none of the embedded controls that are defined as part of the Project description. Examples of embedded controls could include acoustic reduction measures around noisy equipment, or buffer requirements the development is obliged to implement and is part of the layout. Additional mitigation measures aimed at further reducing the significance of impacts are proposed where necessary, or appropriate and are assessed as part of the ‘*residual*’ impact significance rating.

In the case of type, the designations are defined universally (i.e., the same definitions apply to all resources/receptors and associated impacts). For these universally defined designations, the definitions are provided in the following table.

Table 4-5 Designation Definitions

Designation	Definition
Type	
Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected).
Indirect	Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land).

Induced	Impacts the result from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g., influx of camp followers resulting from the importation of a large workforce).
Extent	
Local	Impacts that affect an area in proximity to the development area within an area defined on a resource/receptor-specific basis.
Regional	Impacts occurring at a regional scale as determined by administrative boundaries or which affect regionally important resources or ecosystems.
International	Impacts that extend across international boundaries or affect resources such as features, resources or areas protected by international conventions
Duration	
Temporary	Impacts are predicted to be short duration (in the order of days) and/or intermittent/occasional.
Short-term	Impacts that are predicted to last only for the duration of the construction period (i.e. – 8 to 9 months).
Medium-term	Impacts that will continue for a period of 5 to 10 years following the completion of the construction phase e.g., where the impact may reverse or affected resources or receptors recover within this period of time.
Long-term	Impacts that will continue for the life of the Project, but will either cease when the Project stops operating or is decommissioned, or where the impact may reverse or the affected resource/receptor recovers or reverts to a near-natural state after 10 or within 20 years following the completion of the construction phase.
Permanent	Impacts that cause a permanent change in the affected receptor or resource (e.g., removal or destruction of the ecological habitat) that endures substantially beyond 20 years following the completion of the construction phase.

In the case of *scale and frequency*, these characteristics are not assigned fixed designations, as they are typically numerical measurements (e.g., number of acres affected, number of times per day, etc.).

The terminology and designations are provided to ensure consistency when these characteristics are described in an impact assessment deliverable. However, it is not a requirement that each of these characteristics be discussed for every impact identified.

For *unplanned events* (e.g., accidental release of hazardous materials) the likelihood of the impact occurring is taken into consideration in deriving the magnitude rating. The likelihood of an impact occurring as a result of an unplanned event is expressed as a probability and is designated using a qualitative scale (or semi-quantitative, where appropriate data are available), according to the attributes described in Table 4-6 Designation of Likelihood Designations below.

Table 4-6 Designation of Likelihood Designations

Likelihood	Definition
Unlikely	The event is unlikely but may occur at some time during normal operating conditions.

Possible	The event is likely to occur at some time during normal operating conditions.
Likely	The event will occur during normal operating conditions (i.e., it is essentially inevitable).

Likelihood is estimated on the basis of experience and/or evidence that such an outcome has previously occurred.

It is important to note that likelihood is a measure of the degree to which the unplanned event is expected to occur, not the degree to which an impact or effect is expected to occur as a result of the unplanned event. The latter concept is referred to as uncertainty, and this is typically dealt with in a contextual discussion in the impact assessment deliverable, rather than in the impact significance assignment process.

In the case of impacts resulting from unplanned events, the same resource/receptor-specific approach to concluding a magnitude designation is utilised, but the 'likelihood' factor is considered, together with the other impact characteristics, when assigning a magnitude designation. There is an inherent challenge in discussing impacts resulting from (planned) Project activities and those resulting from unplanned events. To avoid the need to fully elaborate on an impact resulting from an unplanned event prior to discussing what could be a very low likelihood of occurrence for the unplanned event, this methodology incorporates likelihood into the magnitude designation (i.e. in parallel with consideration of the other impact characteristics), so that the "likelihood-factored" magnitude can then be considered with the resource/receptor sensitivity/vulnerability/importance in order to assign impact significance. Rather than taking a prescriptive (e.g. matrix) approach to factoring likelihood into the magnitude designation process, it is recommended that this be done based on professional judgment, and assisted by quantitative data (e.g. modelling, frequency charts) where available.

Once the impact characteristics are understood, these characteristics are used (in a manner specific to the resource/receptor in question) to assign each impact a magnitude.

In summary, *magnitude* is a function of the following impact characteristics:

- Extent;
- Duration;
- Scale;
- Frequency; and
- Likelihood.

Magnitude essentially describes the degree of change that the impact is likely to impart upon the resource/receptor. As in the case of extent and duration, the magnitude designations themselves (i.e. negligible, small, medium, large) are universally used and across resources/receptors, but the definitions for these designations will vary on a resource/receptor basis, as is discussed further below.

The universal magnitude designations are:

- Positive;
- Negligible;
- Small;
- Medium; and
- Large.

The *magnitude of impacts* takes into account all the various dimensions of a particular impact in order to make a determination as to where the impact falls on the spectrum (in the case of adverse impacts) from negligible to large. Some impacts will result in changes to the environment that may be

immeasurable, undetectable or within the range of normal natural variation. Such changes can be regarded as essentially having no impact and should be characterised as having a negligible magnitude.

4.3.2.3 Sensitivity

In addition to characterising the magnitude of impact, the other principal step necessary to assign significance for a given impact is to define the *sensitivity/vulnerability/importance* of the impacted resource/receptor to the type of activity proposed (e.g. habitat clearance, topsoil removal, etc.) or the consequences of a Project activity (e.g. dust, noise, water pollution, or induced population influx). This requires a range of physical, biological, cultural or human factors to be taken into account and may also need to include other factors such as legal protection, government policy, stakeholder views and economic value.

Characterisation of sensitivity for a physical or biological resource or receptor (e.g. a water feature or parameter, cliff, vegetation type) will take into account its conservation status and importance (on a local, national and international scale), its vulnerability to disturbance, and its resilience to recover or withstand a specific impact or type of impact. Where the receptor is human or cultural, the value of that social and cultural heritage receptor/s and its vulnerability to the impact is considered, taking into account the receptor's resilience, including ability to adapt to change or use alternatives where available.

As in the case of magnitude, the sensitivity/vulnerability/importance designations themselves are universally consistent, but the definitions for these designations will vary on a resource/receptor basis.

The universal sensitivity/vulnerability/importance designations are:

- Low;
- Medium; and
- High.

4.3.2.4 Evaluating Significance

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor have been characterised, the significance of the impact is assigned using the impact significance matrix shown in Table 4-7 below.

For impacts resulting from unplanned events (typically accidents, such as a major oil spill or other event that cannot be reasonably foreseen), the above methodology is applied but likelihood is also considered when assigning the magnitude designation, as classified in Table 4-7 Impact Significance.

Table 4-7 Impact Significance

Significance				
MAGNITUDE OF IMPACT		Sensitivity / Vulnerability / Importance of Resource / Receptor		
		Low	Medium	High
	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	High	Moderate	Major	Major

	Positive Impacts	
	Positive	Positive Impact

The matrix applies universally to all resources/receptors, and all impacts to these resources/receptors, as the resource/receptor- or impact-specific considerations are factored into the assignment of magnitude and sensitivity designations that enter into the matrix.

Table 4-8 below presents a brief description of the different categories of Impact Significance / Significance Definitions.

Table 4-8 Significance Definitions

Significance definitions	
Negligible significance	An impact of negligible significance (or an insignificant impact) is where a resource or receptor (including people) will not be affected in any way by a particular activity, or the predicted effect is deemed to be `negligible` or `imperceptible` or is indistinguishable from natural background variations.
Minor significance	An impact of minor significance is one where an effect will be experienced, but the impact magnitude is sufficiently small (with and without mitigation) and will within accepted standards, and/or the receptor is of low sensitivity/value.
Moderate significance	An impact of moderate significance is one within accepted limits and standards. The emphasis for moderate impacts is on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that `moderate` impacts are being managed effectively and efficiently.
Major significance	An impact of major significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. A goal of the ESIA process is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects, there may be major residual impacts after all practicable mitigation options have been exhausted (i.e., ALARP has been applied). An example might be the visual impact of a development. It is then the function of regulators and stakeholders weigh such negative factors against the positive factors such as employment, in coming to a decision on the Project.

4.3.3 Identification of Mitigation and Enhancement Measures

Once the significance of a given impact has been characterised using the above-mentioned methodologies, the next step is to evaluate what *mitigation measures* are warranted. For the purposes of this ESIA, ERM has adopted the following Mitigation Hierarchy:

In keeping with the *Mitigation Hierarchy*, the priority in mitigation is to first apply *mitigation measures to the source of the impact* (i.e. to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect to the resource/receptor via *abatement or compensatory measures or offsets* (i.e. to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

It is important to have a solid basis for recommending mitigation measures. The role of any given ESIA is to help develop a consentable/approvable Project, and to help clients meet their business objectives in a responsible manner. Impact assessment is about identifying the aspects of a Project

that need to be managed and demonstrating how these should be appropriately dealt with through implementation of the *Project Environmental and Social Management System (ESMS)*.

As key influencers in the decision-making process, the role of the impact assessment is not to stop development or propose every possible mitigation or compensatory measure imaginable, but rather to make balanced judgements as to what is warranted, informed by a high-quality evidence base.

Additional *mitigation measures* should not be declared for impacts rated as not significant, unless the associated activity is related to conformance with an applicable requirement. Further, it is important to note that it is not an absolute necessity that all impacts be mitigated to a not significant level; rather the objective is to mitigate impacts to an as low as reasonably practicable (ALARP) level.

As previously mentioned, embedded controls (i.e. physical or procedural controls that are planned as part of the Project design and are not added in response to an impact significance assignment), and are considered as part of the Project (prior to entering the impact assessment stage of the impact assessment process).

4.3.4 Residual Impact Evaluation

Once mitigation measures are declared, the next step in the impact assessment process is to assign *residual impact significance*. This is essentially a repeat of the impact assessment steps discussed above, considering the assumed implementation of the additional declared mitigation measures.

4.3.5 Cumulative Impact Assessment

According to the IFC (IFC 2013, Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets)¹⁹, 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.

4.3.6 Management Plans

The final stage in the Impact Assessment Process is the definition of the basic management and monitoring measures that are needed to identify whether:

- impacts or their associated Project components remain in conformance with applicable standards/ guidelines; and

¹⁹ Cumulative Impact Assessment and Management https://www.ifc.org/wps/wcm/connect/58fb524c-3f82-462b-918f-0ca1af135334/IFC_GoodPracticeHandbook_CumulativeImpactAssessment.pdf?MOD=AJPERES&CVID=kbnYql5

- mitigation measures are effectively addressing impacts and compensatory measures and offsets are reducing effects to the extent predicted.

Following the assessment of impacts, the ESMP will be developed as a standalone document to this ESIA Report, and it outlines the management framework plans which were developed for each topic area to be considered by ESM and further passed to the EPC contractor to develop their own set of detailed topic specific management plans. These plans set out how the mitigation measures will be put into practice, monitored and upheld. This included defining the responsibility, timing and reporting requirements associated with each measure.

4.3.7 Risk Assessment for Unplanned Events

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 4-9.

Table 4-9 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 as 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	Temporary (<1 year), adverse impacts on community	Adverse specific impacts on multiple individuals that	Adverse long-term, multiple impacts at a community	Adverse long-term, varied and diverse impacts at a community

	on a few individuals	which are within international health standards	can be restored in <1 year OR One or more injuries, not lost work injuries.	level, but restoration possible. OR One or more lost work injuries to a member of the public including permanently disabling injuries.	level or higher – restoration unlikely. 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 4-10

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 4-10 Risk Matrix for Potential Unplanned Events

Likelihood of occurrence						
		Incidental	Minor	Moderate	Major	Severe
CONSEQUENCE	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

4.4 Alternatives and Interaction with Design and Planning Process

The interaction between the ESIA team and the Design and Planning Process is one of the key areas in which an ESIA can influence how a Project develops.

It includes involvement in defining the Project and identifying those activities with the potential to cause environmental and social impacts (e.g. physical presence, noise, workforce, traffic, local employment, procurement).

Project planning, decision-making and refinement of the Project description continue throughout the ESIA process, and in response to the identified impacts, and stakeholder concerns.

5. STAKEHOLDER ENGAGEMENT

This Section provides a summary of the stakeholder engagement activities undertaken as part of the ESIA stakeholder engagement process.

EBRD requirements place an emphasis on the need to identify the range of stakeholders that may be affected by a project and to undertake engagement commensurate with projects risks and adverse impacts for developing the ESIA in a participatory manner.

5.1 Stakeholder identification

IFC's *Stakeholder Engagement Good Practice Handbook for Companies Doing Business in Emerging Markets* defines stakeholder(s) as *any individual or group who is potentially affected by a project or activity or who has an interest in the project or activity, and/or the ability to influence its outcome, positively or negatively.*

The objective of stakeholder identification is therefore to establish which organizations and individuals may be directly or indirectly affected (positively and negatively) or have an interest in the Project and its activities. are included in Table 5-1 below.

Table 5-1 Stakeholder Identification

Stakeholder Group	Stakeholders
<ul style="list-style-type: none"> ■ National Government ■ Key Ministries ■ National Regulatory bodies 	<ul style="list-style-type: none"> ■ Ministry of Environmental Protection & Buzau Environmental Protection Agency ■ Ministry of Culture/ Buzau County Culture Directorate ■ ANANP – National Association of Nature Protected Areas ■ Ministry of Transport
<ul style="list-style-type: none"> ■ Local Mayors ■ Local Councillor ■ Local inspectorates and public utilities 	<ul style="list-style-type: none"> ■ Mayoralities of: <ul style="list-style-type: none"> ○ Pogoanele Town ○ Costești Commune ○ Gherăseni Commune ○ Luciu Commune ○ Smeeni Commune ■ Mayoralities of the communes/towns/ cities located in the Social Aol ■ Spatial and Urban Planning Offices in each Commune of the Aol ■ Social Assistance Offices in each Commune of the Aol ■ Agricultural Register Offices in each Commune of the Aol
<ul style="list-style-type: none"> ■ Government funded and/or private enterprises in charge of managing specific activities 	<ul style="list-style-type: none"> ■ Transelectrica – the national grid operator ■ Other utility providers
<ul style="list-style-type: none"> ■ Land-affected stakeholders ■ Local population affected in some form by the project/activity, including Project traffic 	<ul style="list-style-type: none"> ■ Landowners and users of the Project area (shepherders, farmers) ■ People living near the project site ■ Residents of settlements located near roads used for project activities, such as transporting materials during construction and operation, contractor and supplier vehicles ■ Social / public infrastructure and service: local health, local police, emergency services ■ Chronic Disease Hospital Smeeni ■ Agricultural Highschool Smeeni ■ High School Pogoanele ■ Technology School I.A.Radulescu Pogoneanu, Pogoanele ■ Gymnasial School Costesti Commune ■ Gymnasial School Smeeni Commune

Stakeholder Group	Stakeholders
	<ul style="list-style-type: none"> Gymnasial School Luciu Commune Gymnasial School Gheraseni Commune
<ul style="list-style-type: none"> Vulnerable groups 	<ul style="list-style-type: none"> Low-income households Unemployed youth Ethnic Minority Groups – e.g. Roma minorities Pensioners/ farmer pensioners Disabled persons Female-headed households, including single mothers and widows.
<ul style="list-style-type: none"> International National Local 	<ul style="list-style-type: none"> Farmers associations Association Local Action Group (GAL) “Ecoul Campiei Buzaului” (Pogoanele City, Luciu Commune, Smeeni Commune) Association Local Action Group (GAL) “Drumul Vinului” (Costesti Commune and Gheraseni Commune) Hunting associations Women associations Sports associations
<ul style="list-style-type: none"> Media End customers 	<ul style="list-style-type: none"> Regional and national radio stations Regional and national newspapers: www.smeeni.com – local news website in Smeeni Commune TV stations Internet End customers purchasing electricity
<ul style="list-style-type: none"> Employees Contractors and subcontractors Suppliers Other businesses operating within the region/ villages. Company shareholders (for example, lenders) 	<ul style="list-style-type: none"> Other Windfarm Operators/ Developers in the area Companies operating in the Project area (construction, transport, health services providers) Vestas, Civil and Electrical Contractors

Source: ERM 2023

5.2 Stakeholder engagement to date

Regulatory stakeholder engagement was conducted for the Project since its inception, in line with Romanian legislation. .

The sub-Projects did not require an Environmental Impact Assessment (EIA), Information disclosure regarding environmental or social impacts from the Projects and public consultation has been conducted as part of the rezoning process, in 2012.

Public consultation has been supported by public announcements in the local media and public meetings organised in each commune. Public Consultation Reports have been concluded for each commune, by the respective Local Councils, as part of the PUZ approval process. The meetings were announced at each of the Commune Halls and in local media. Relevant authorities and local NGOs were provided the relevant documentation and the invitation to the meetings. The meetings took place as follows:

- public meeting held at Costești Commune Hall, on 16th of July 2012, attended by 13 individuals. Comments raised by the participants included: impact on ecological systems, migratory birds, and consideration of local seismic conditions.
- public meeting held at Gherăseni Commune Hall, on 16th of July 2012, attended by 17 individuals. The only comment raised by the participants was related to how the excavated land will be used and what the Project timeline for construction will be.
- public meeting held at Smeeni Commune Hall, on 16th of July 2012, attended by 10 individuals. No comments regarding the project impacts were raised, however one participant noted the importance of the project for the development of the local area.
- public meeting held at Pogoanele Commune Hall, on 17th of July 2012, attended by 14 individuals. No comments were raised by the public.
- public meeting held at Luciu Commune Hall, on 17th of July 2012, attended by 11 individuals. No comments were raised by the public.

Engagement with local authorities was resumed in 2019, when the developer organised a meeting with local authorities' representatives to inform them about the intention to implement the Project using international financing. The Client representatives are in permanent contact with the Local Councils and Mayors, as permitting process progresses.

During the meeting with all six mayors and a county councillor, held at Gherăseni in April 2021, additional information was provided by the developer regarding expected timeline and next steps for project implementation. All mayors confirmed the implementation of the Project will bring significant added value to local development, via the contribution to local budgets deriving from the land lease agreements, taxes, provision of jobs and use of local suppliers.

5.2.1 ESIA Engagement

In support of the ESIA process and in alignment with the international applicable standards, key stakeholders were consulted during the following stages:

- Scoping process for the ESIA, November 2022
- Socio-economic baseline data collection for the ESIA, March – April 2023

5.2.1.1 ESIA Scoping engagement

In support of the ESIA scoping study and in alignment with the international requirements, key stakeholders were consulted and engagement round held on 23 and 24th of November 2022.

Engagement during the scoping stage of the ESIA is presented in Table 5-2 below. The purpose of engagement meetings was to:

- Share relevant information about the Project and the forthcoming ESIA process including planned activities.
- Validate the Social Area of Influence defined for the Project.
- Establish communication channels with key institutional stakeholders and introduce the contact person for the Project and their communication details.
- Understand concerns, grievances, and questions that stakeholders may have about the Project. Address these where possible, or commit to providing a response.
- Understand sentiment to the Project.

Table 5-2 Overview of scoping phase engagement

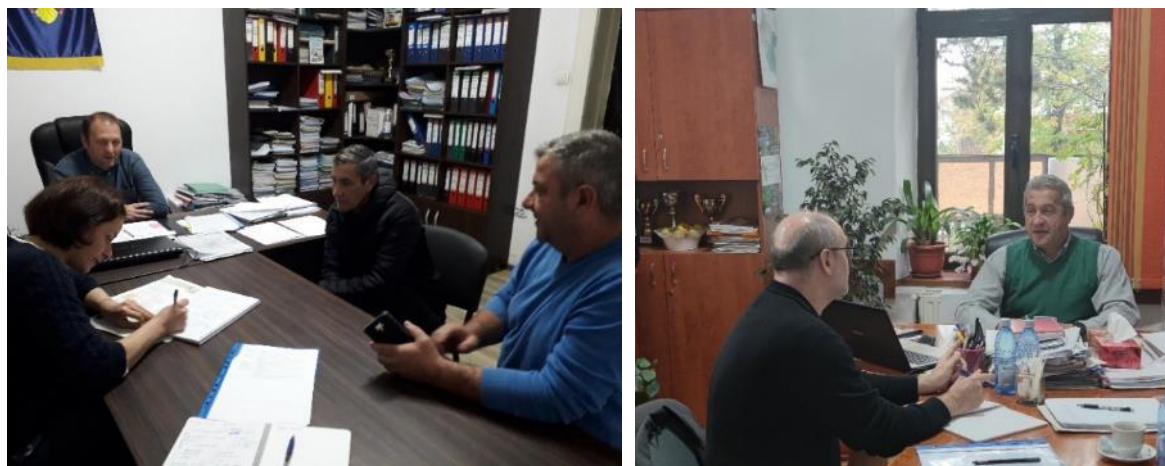
Date	Stakeholders met	Feedback
23 November, Gherăseni Commune Hall	<ul style="list-style-type: none"> ■ Gherăseni Commune Mayor ■ Gherăseni Project Manager 	<ul style="list-style-type: none"> ■ Key Project benefits: electricity; construction tax; the new project roads; more money for public expenditure ■ Development objectives – public irrigation system ■ Perceived impact on current grazing use – relatively low, particularly given the poor quality of the pastureland, other than in the months of May-June, and the available pastureland available. 4 sheepfolds are active in the commune.
23 November, Țintești Commune Hall	<ul style="list-style-type: none"> ■ Țintești Commune Mayor ■ Țintești Commune - Acquisition 	<ul style="list-style-type: none"> ■ Key Project benefits: public lighting/ electricity ■ Diminishing confidence, the Project is going to be implemented
23 November, Pogoanele Town Hall	<ul style="list-style-type: none"> ■ Pogoanele Town Vice-Mayor ■ Pogoanele Town Secretary ■ Pogoanele Town Administrator 	<ul style="list-style-type: none"> ■ Lack of clarity around the contractual arrangement, as the concession contract were signed more than a decade ago ■ Key Project benefits: access of locals to security and maintenance jobs; also, local people are interested to offer accommodation to the workforce - this was done when a company from a different county conducted the works on the sewerage system in Pogoanele. ■ Development objectives: private irrigation system (not in the Project area); a new old age centre
24 November, Costești Town Hall	<ul style="list-style-type: none"> ■ Costești Commune Mayor 	<ul style="list-style-type: none"> ■ Key Project benefits: electricity; the new Project roads which will enable farmers to avoid DN3; ■ APIA is using tele-detection so it is important to communicate early what the construction schedule is
24 November, Smeeni Town Hall	<ul style="list-style-type: none"> ■ Smeeni Commune Mayor ■ Smeeni Commune Secretary ■ Smeeni Commune - Acquisition 	<ul style="list-style-type: none"> ■ Development objective: currently, the residents use five - seven crossings over Calmatui River that are not up to standard; only one crossing is fully functional. It is not clear what crossing will the Project use - engagement on this matter could lead to a solution that also benefits the community
24 November, Luciu Town Hall	<ul style="list-style-type: none"> ■ Luciu Commune Mayor 	<ul style="list-style-type: none"> ■ Key Project benefits: Project Roads, construction tax, electricity, jobs for local youth ■ Development objective: a produce processing plant ■ Concession contract should be re-discussed

Source: ERM, November 2022

Typically, ESIA team representatives began with a presentation about the Project, ESIA process and scope. Then, stakeholders had the opportunity to ask questions and provide feedback.

Photos taken during the scoping phase engagement are illustrated in Figure 5-1 below:

Figure 5-1 Photos during the ESIA scoping engagement meetings held in November 2022



Meeting with Pogoanele local authority representatives (*top left*); Meeting with Gheraseni Commune Mayor (*top right*);



Meeting with Smeeni local authority representatives (*bottom left and centre*); Meeting with Luciu Commune Mayor (*bottom right*)

Source: ERM, November 2022

5.2.1.2 ESIA data collection and engagement

A socioeconomic and health baseline qualitative data collection field survey was undertaken by ERM between March – July 23 in the Project area.

This included key informant interviews (KII) and focus group discussions and ground truthing in the settlements the five territorial administrative units (ATU) where the Project is to be implemented.

The meetings were organised in collaboration with the newly appointed Community Liaison Officer (CLO) for the Project, who attended the meetings with the elected representatives and local farmers.

The primary goal of these activities was to collect baseline information on perceived socioeconomic and health factors and engage around key potential risks and opportunities associated with the Project.

A Project Information Leaflet (PIL) was elaborated and distributed to local stakeholders in Romanian for information and comment – see SEP Appendix A.

Additionally, dedicated maps for each ATU were developed to support engagement with farmers and other stakeholders engaged.

Out of the 58 participants in these meetings, 18 were women (approximately 31%).

The meetings consisted of:

- Key Informant Interview (KII) with relevant stakeholders (elected community representatives and civil servants in charge with agricultural, social assistance or planning departments, health and education professionals and policemen).
- Focus groups discussions with farmers in all communes and with beneficiaries of the Day Elderly Centre in Smeeni.

Data collected during these meetings was integrated in the sections of the Socioeconomic Baseline Study conducted as part of the ESIA process – see Appendix C.

The overview of stakeholders interviewed for baseline data collection is included in Table 5-4 and the list is presented in table below.

Table 5-3 List of stakeholders interviewed

Administrative Teritorial Unit (ATU)	Gender	Civil servant	Education professional	Farmer	Health professional	Pensioner	Policeman	Grand Total
Costești	Female	1	1					2
	Male	4		4				8
	Total	5	1	4				10
Gherăseni	Female	1	1					2
	Male	2		7			2	11
	Total	3	1	7			2	13
Luciu	Female	3						3
	Male	3	1	3	1			8
	Total	6	1	3	1			11
Țintești	Female	3						3
	Male	2		5				7
	Total	5		5				10
Smeeni	Female	5			1	2		8
	Male	2		4				6
	Total	7		4	1	2		14
Grand Total		26	3	23	2	2	2	58

Source: ERM 2023

Table 5-4 Overview of engagement for socio-economic data collection

Date	Stakeholders met
27 March 2023, Costesti Commune Hall	<ul style="list-style-type: none"> ■ Costesti Commune Mayor ■ Costesti Commune Vice Mayor ■ Farmers ■ Urbansim Department in Costesti ■ Social Worker in Costesti ■ Agricultural Register Department in Costesti ■ Teacher and Local Council member
29 March 2023, Luciu Commune Hall	<ul style="list-style-type: none"> ■ Luciu Commune Mayor ■ Luciu Commune Vice Mayor ■ Secretary of Luciu Commune Hall ■ Framers ■ Vice-President of Association of Animal Breeders in Luciu ■ Principal of Gymnasium Luciu ■ Community Medical Assistant ■ Social Assistance Department of Luciu Commune ■ Agricultural Register of Luciu Comune
30 March 2023, Smeeni Commune Hall	<ul style="list-style-type: none"> ■ Smeeni Commune Mayor ■ Smeeni Commune Secretary ■ Cadastre and urbanism department of Smeeni Commune ■ Social Assistance Department of Smeeni Commune ■ Smeeni Hospital Manager ■ Commune Hall representative, responsible for managing the Day Care Centre for Elderly in Smeeni ■ Beneficiaries of the Day Care Centre for Elderly in Smeeni ■ Farmers ■ Members of the Local Council
4 April 2023, Gheraseni Commune Hall	<ul style="list-style-type: none"> ■ Gheraseni Commune Mayor ■ Gheraseni Commune Vice Mayor ■ Local Police ■ Farmers ■ Social Assistance Department in Gheraseni ■ School Principal of Gheraseni Gymnasium
27 July 2023, Țintesti Commune Hall	<ul style="list-style-type: none"> ■ Tintesti Commune Mayor ■ Framers using the pastureland leased for the Project ■ Agricultural Register Department in Tintesti ■ Social Assistance Department in Tintesti

Source: ERM

An additional goal of the local engagement was to build on the local knowledge to refine stakeholder identification for the Project, resulting in a more comprehensive stakeholder identification and Stakeholder Engagement Plan (SEP) preparation.

Additionally, a community grievance mechanism was established, in partnership with local authority representatives. Grievance boxes were set up in each Commune Hall and in Pogoanele Town Hall.

Further feedback was collected on past engagement, along with suggestions for improving engagement in the following Project phases.

Photos taken during the scoping phase engagement are illustrated in Figure 5-2 below.

Figure 5-2 Stakeholder meetings during the baseline phase



1 – Meeting with farmers and Mayor in Costești Commune; 2- Meeting with farmers and Mayor in Smeeni Commune; 3- Meeting with Manager of Day Care Center for Elderly in Smeeni, and some beneficiaries; 4 - Meeting with farmers and Commune Hall workers in Luciu Commune; 5 - Discussion with Manager of Hospital in Smeeni 6- Meeting with farmers and Mayor in Gherăseni; 7- Discussion with Social Assistant and Agricultural Register Representative in Luciu Commune; 8- Discussion with Social Assistance workers in Smeeni Commune; -; 9 - Discussion with Teacher from Highschool in Costești.

Source: ERM, March – April 2023

5.2.1.3 ESIA Disclosure

ESIA results are to be disclosed in line with Applicable Standards for Category A projects, based on a Stakeholder Engagement Plan (SEP) developed for Vifor as part of the ESIA process.

5.2.1.4 ESIA Disclosure

ESIA results are to be disclosed in line with Applicable Standards for Category A projects, based on a Stakeholder Engagement Plan (SEP) developed for Vifor as part of the ESIA process.

6. PROJECT BASELINE CONDITIONS

6.1 Physical and Biological Environment

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

The Project Aol 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 Aol), 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 Aol).

The objective is to outline the existing environmental conditions in the Project area (Project Aol), so as to understand what receptors and resources can be significantly affected by the Project. This information is further used in Chapter 7.1 – Environmental 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 (Costești, Gherăseni, Smeeni, Luciu and Țintești communes). 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 and biodiversity, including bird and bat surveys, were conducted in the Project area by ERM.

The ambient noise survey was conducted in March and April 2023. Biodiversity surveys were conducted during March 2022 to February 2023 to include: habitat and flora surveys (May - June); birds survey during all season which also recorded focused flight information for target bird species; bat surveys (April to October), other fauna species (April-July).

6.1.1 Climate and Climate Change

6.1.1.1 Area of Influence

Physical Climate Change Risk Assessment (CCRA) considers impacts on the Project components and neighbouring communities, therefore the area of influence in the context of the CCRA is Project footprint and areas of neighbouring communities.

6.1.1.2 Key Baseline Conditions

Geomorphology / topography and land cover

The Project area is located within Călmățui river floodplain/meadow. The topography is generally flat, with elevations ranging from approx. 79 m above sea level (asl) in the north-western areas of the Project area, to 50 m asl in the eastern areas.

The relatively flat aspect of the Călmățui river floodplain/meadow is due to the extensive planning and drainage works carried out in the '70-'80s of the last century. The conversion of large areas of land to agricultural activities had required the creation of a system of drainage channels and dams/dykes on the entire floodplain. Some of the old swamps and overflow areas of Călmățui river, from historic times and up to the second half of the 20th century, are still active today when the flow of rainwater is increased.

Surface water

Vifor Project area is located in the hydrographic basin of Călmățui River. Direct Aol include the upper basin of Călmățui River, with a permanent course and a superficial hydrographic network represented by temporary courses, currently abandoned, clogged, with excess moisture in some places, coming from phreatic intake.

Groundwater

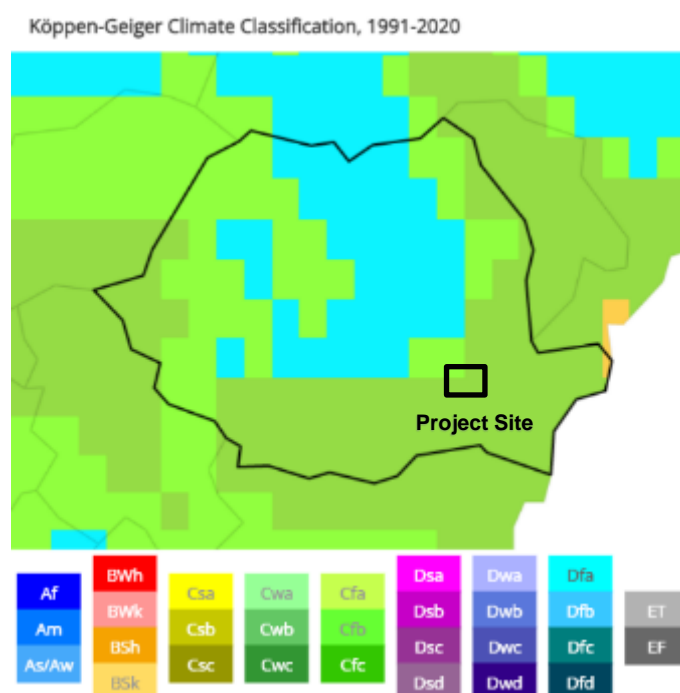
Groundwater in the Project Aol is confined in layers of porous permeable medium and coarse grain of different geological origins and sizes. Groundwater is naturally mineral, showing values of 1000 – 5000 mg/L, where Cl and Na ions prevails.

Climate Overview

Romania

The Figure below shows a breakdown of the climatic classification in Romania. Romania's "climate variability is linked with its geological sub-state, which includes coastal, plain areas and mountains" (World Bank, 2021).

Figure 6-1 Map of Romania's climate classification



Source: The World Bank Group, 2021.

Romania has three main seasons (Country Reports, 2023):

- A long, and sporadically harsh winter from December to March;
- May to August being a hot summer, and
- September to November being the elongated autumn.

Romania's peak temperatures and precipitation occur in the summer months and rainfall is experienced throughout the year. Romania's climate is relatively mild, average temperatures equal 11-12°C in the plains and 2-3°C in the mountains. The country has a strong dependence on its aquatic facilities namely its lakes, rivers, groundwaters, streams and marine waters. "It's hydrographical and hydrological

variabilities are determined mainly by its geographic position within the temperate continental climate and the presence of the Carpathian Arch" (World Bank, 2021).

Site

The Project site is located at the border of the areas with 'Humid subtropical climate' [Cfa] and 'Warm Summer Mediterranean Climate' [Csb] (Figure 6-1).

6.1.2 Air quality

6.1.2.1 Area of Influence

The air quality baseline has been identified within the Project's Area of Influence. The area of influence (Aoi) for air quality impacts is the geographic area that may be affected by the construction and operation of the wind turbines and associated infrastructure. The size of the Aoi depends on various factors, such as the capacity of the wind farm, topography, prevailing weather patterns, and the location of sensitive receptors like residential areas, schools, and hospitals.

During the construction phase of the wind farm, the primary sources of emissions are likely to be construction activities associated with fuel combustion and dust generation. Dust is known to settle at distances up to approximately 500 meters from the emission source. Therefore, the Aoi for air quality impacts during the construction stage is defined as a 500-meter radius around the construction site and transportation routes.

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.

6.1.2.2 Key baseline conditions

Ambient Air Quality Standards

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:

- AAQs 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 6-1. Pollutants unlikely to be emitted by the project are not considered and have been excluded from the table.

Table 6-1 Romanian Ambient Air Quality Standards

Pollutant	Averaging period	Value (µg/m ³)	Reference
Human Health Criteria			
SO ₂	1-hour mean	350	L 104/2011
	24-hour mean	125	L 104/2011
	Annual mean	60	STAS 12574-87

Pollutant	Averaging period	Value ($\mu\text{g}/\text{m}^3$)	Reference
NO ₂	1-hour mean	200	L 104/2011
	Annual mean	40	L 104/2011
PM ₁₀	24-hour mean	50	L 104/2011
	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/m ² /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

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. Table 6-2 below lists the ambient air quality guidelines established by these organizations.

Table 6-2 IFC/WHO Guidelines on Ambient Air Quality

Pollutant	Averaging Period	Value ($\mu\text{g}/\text{m}^3$)
NO ₂	Annual mean	40 ⁽¹⁾
NO ₂	1-hour maximum	200 ⁽¹⁾
NO _x (ecosystems only)	Annual mean	30 ⁽²⁾
SO ₂	24-hour highest	125 ⁽¹⁾
SO ₂	10-minute maximum	500 ⁽¹⁾
SO ₂ (ecosystems only)	Annual mean	20 ⁽²⁾
PM ₁₀	Annual mean	20 ⁽¹⁾
PM ₁₀	24-hour, 4 th highest (99 th percentile)	50 ⁽¹⁾
PM _{2.5}	Annual mean	10 ⁽¹⁾
PM _{2.5}	24-hour	25 ⁽¹⁾
O ₃	8-hour daily maximum	100 ⁽¹⁾
VOCs (as benzene)	Annual mean	1.7 (based on 1:100,000 lifetime cancer risk) ⁽²⁾
CO	1-hour mean	30,000 ⁽²⁾
CO	8-hour mean	10,000 ⁽²⁾

Sources:

- 1: IFC (2007) General EHS Guidelines: Environmental, Air Emissions and Ambient Air Quality
- 2: World Health Organisation (2000) Air Quality Guidelines for Europe

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 6-3 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 Table 6-1 and Table 6-2, in order to provide highly precautionary standards for the protection of human health and the environment.

Table 6-3 Project Ambient Air Quality Standards

Pollutant	Averaging Period	Value (µg/m ³)
NO ₂	Annual mean	40 ⁽¹⁾
NO ₂	1-hour maximum	200 ⁽¹⁾
NO _x (ecosystems only)	Annual mean	30 ⁽²⁾
SO ₂	24-hour highest	125 ⁽¹⁾
SO ₂	10-minute maximum	500 ⁽¹⁾
SO ₂ (ecosystems only)	Annual mean	20 ⁽²⁾
PM ₁₀	Annual mean	20 ⁽¹⁾
PM ₁₀	24-hour, 4 th highest (99 th percentile)	50 ⁽¹⁾
PM _{2.5}	Annual mean	10 ⁽¹⁾
PM _{2.5}	24-hour	25 ⁽¹⁾
VOCs (as benzene)	Annual mean	1.7 (based on 1:100,000 lifetime cancer risk) ⁽²⁾
CO	1-hour mean	30,000 ⁽²⁾
CO	8-hour mean	10,000 ⁽²⁾

Sources:

1: IFC (2007) General EHS Guidelines: Environmental, Air Emissions and Ambient Air Quality

2: World Health Organisation (2000) Air Quality Guidelines for Europe

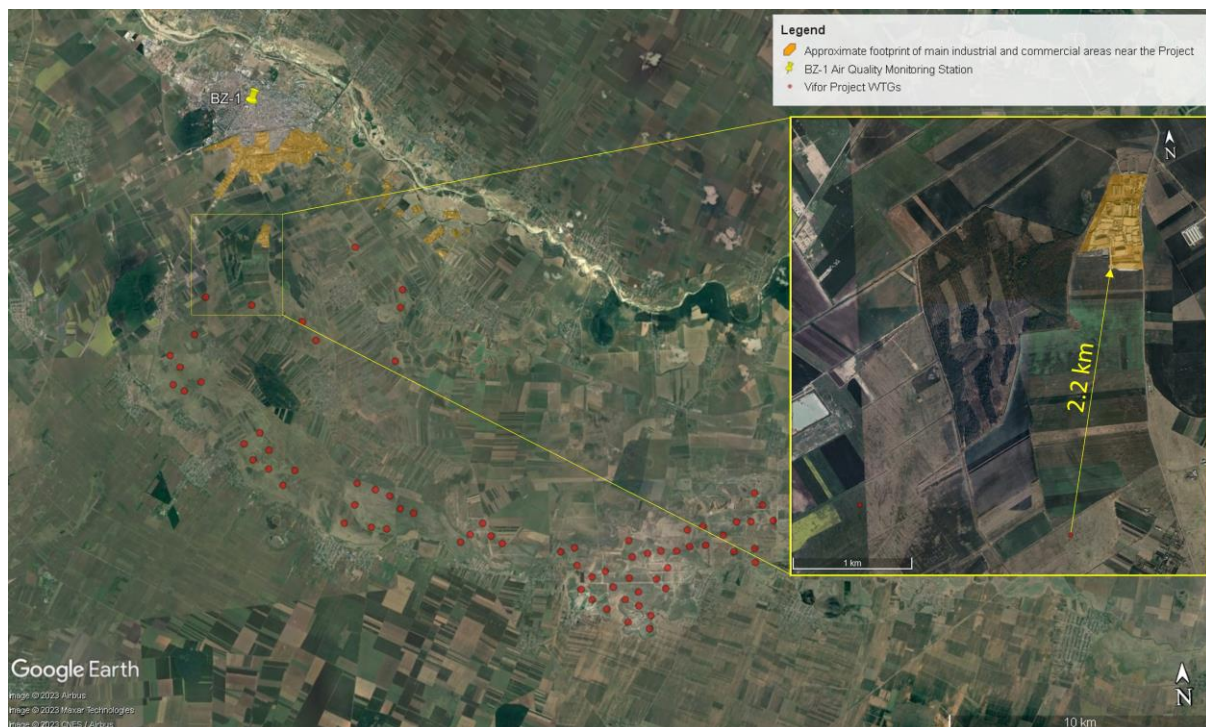
Baseline conditions

Unlike certain industrial activities, such as manufacturing or mining, wind farm projects are typically not significant sources of air pollution. In addition, the Project site is relatively far from major urban areas and significant industrial pollution sources. The existing impact is due to agricultural activities – the use of agricultural machinery, pesticides – carried out on neighbouring agricultural lands.

The nearest industrial facility (electrical and electronic waste recycling plant) is located 4 km north-northeast of wind turbine WTG 03, near Buzau. The main industrial area in Buzau is located approximately 6.5 km north-northeast of wind turbine WTG 03 and comprises of companies involved in production of metallic products, warehouses, railway system services and railway equipment distribution, food processing facilities, a sugar factory.

The Project site is relatively flat, with elevations ranging from 80 m above sea level (asl) in the north-western areas of the Project, to 50 m asl in the eastern areas. The approximate footprints of the main industrial and commercial areas in the vicinity of the Project area are shown in Figure 6-2, below.

Figure 6-2 Surrounding industrial and commercial areas

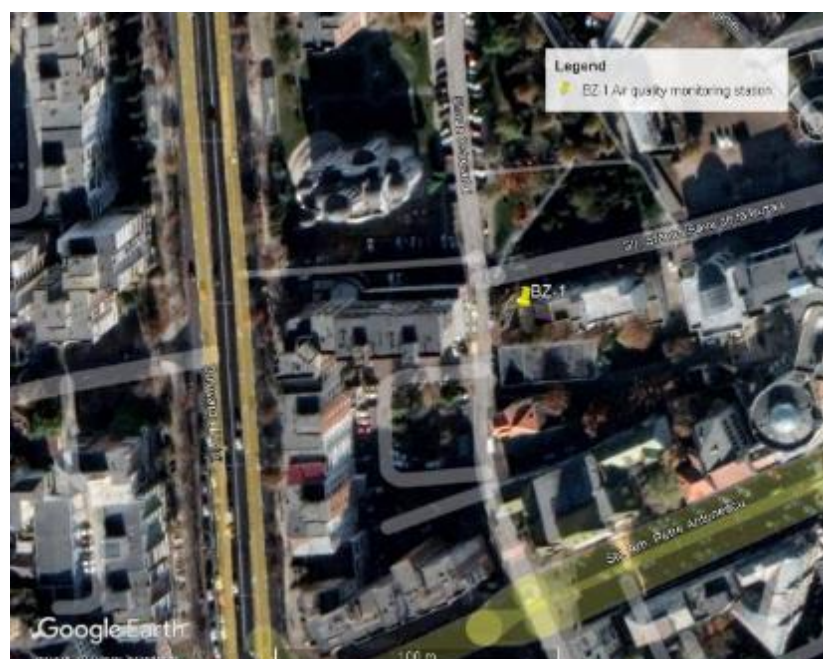


Source: ERM 2023, using Google Earth Pro aerial imagery and Client data

No ambient air quality monitoring is currently undertaken in the vicinity of the Project, based on publicly available information. Instead, air quality baseline is obtained from the National Database²⁰.

The nearest air quality monitoring station (BZ-1) of the National Air Quality Monitoring Network is located in Buzau city, approximately 10 km north of the Project boundary. BZ-1 station is located close to the main road crossing the center of Buzau city, Bulevardul Unirii, as shown in Figure 6-3 below.

Figure 6-3 Location of nearest air quality monitoring station



Source: ERM 2023, using Google Earth Pro aerial imagery and Client data

Air Quality Indicators average values monitored at BZ-1 station for the interval 01.01.2018-11.04.2023 indicate mainly Acceptable values ²⁰, according to the rating index established by the National Database²¹, as detailed below:

Figure 6-4 National Database Air Quality Index

Specific Index	SO ₂ (µg / m ³) 1-hour mean	NO ₂ (µg / m ³) 1-hour mean	O ₃ (µg / m ³) 1-hour mean	PM _{2.5} (µg / m ³) 24-hour mean	PM ₁₀ (µg / m ³) 24-hour mean
1 Good	0-100	0-40	0-50	0-10	0-20
2 Acceptable	100-200	40-90	50-100	10-20	20-40
3 Moderate	200-350	90-120	100-130	20-25	40-50
4 Bad	350-500	120-230	130-240	25-50	50-100
5 Very Bad	500-750	230-340	240-380	50-75	100-150
6 Extremely Bad	750-1250	340-1000	380-800	75-800	150-1200

Source: https://www.calitateaer.ro/public/monitoring-page/quality-indices-page/?_locale=ro

²⁰ [Disclaimer \(calitateaer.ro\)](#)

²¹ [Calitate Aer | Indici de calitate](#)

Figure 6-5 Average annual values of monitored parameters at BZ-1 station

Average annual values [$\mu\text{g}/\text{m}^3$]								
Monitoring station	BZ-1							
Parameter	NO ₂	NO _x	PM _{2.5}	PM ₁₀	CO	Benzene	SO ₂	O ₃
2018	26.8	39.5	44.8	16.1	295.4	2.3	6.3	48.4
2019	43.5	22.8	-	21	225.8	4.8	6.4	44.9
2020	15.0	26.8	45.5	19.7	212.2	2.4	8.1	40.7
2021	26.4	42.0	13.7	23.1	237.3	2.8	8.8	40
2022	21.7	36.2	40.7	16.8	411.4	2.6	9.3	42.6
Project Standard Limits	40	30	10	20	10,000 (*)	1.7	20 (**)	-

123— Data not sufficient

(*) - Value limit for 8 hours

(**) – Value limit for ecosystems only

123	Value exceeds the Project Air Quality Standard limit
	'1 - Good', according to the National Database Air Quality Index
	'2 - Acceptable', according to the National Database Air Quality Index

The General Index is based on the hourly values recorded for SO₂, NO₂, O₃, PM_{2.5} and PM₁₀. Given available data, distance to industrial areas, and mainly agricultural use of the site, ERM considers that the airshed in the Project area is **undegraded**. Air quality data from the BZ-1 station is not considered representative for the Project area, as the monitoring station is in close proximity of a major road and is closer to the industrial areas of Buzau city than to the Project site.

6.1.3 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).

Understanding the relationship between wind speed and background noise levels is crucial for accurately assessing and regulating wind farm noise. Typically, background noise levels at most receptors increase as wind speed increases. The extent of this increase can vary depending on site-specific factors such as topographic shielding and the height and density of surrounding vegetation.

To determine a line of 'best fit' from the baseline noise measurements, regression analyses of the background noise data and the hub height wind speed data were carried out. Therefore, noise impact assessment criteria have been established as a function of wind speed.

The quantification of baseline noise levels was achieved by analysing the LAeq parameter obtained from the unattended measurements results at the monitoring location.

This section presents the results of the baseline noise survey conducted in March and April 2023.

6.1.3.1 Area of influence

The area of influence (Aoi) for noise impacts at the Project is determined by the proximity of the nearest sensitive receptors (NSRs) that may be affected by the operation of wind turbine generators (WTGs) and associated infrastructure. The size of the Aoi depends on several factors, including the wind farm's capacity, topography, prevailing weather patterns (e.g., wind speed), and the locations of sensitive receptors such as residential areas, schools, and hospitals.

ERM conducted a preliminary noise modelling to identify areas with the highest predicted noise levels. Based on the results of the preliminary modelling and considering the accessibility to the receptors, a single monitoring location was carefully selected. This monitoring location is situated 700 meters away from the nearest WTG.

6.1.3.2 Key baseline conditions

Ambient Noise Standards and Guidelines

The noise impact assessment (NIA) has been undertaken with due regard to, and in accordance with, the following acoustics standards and guidelines:

- Romanian Standard STAS 10009-88: Urban Acoustics: Permitted limits of noise levels.
- International Finance Corporation's (IFC) Environmental, Health, and Safety (EHS) Guidelines – Section 1.7 – Environmental Noise Management (IFC EHS Guidelines 1.7 Noise).

Romanian Regulation

- admissible noise limits within urban areas, differentiated by zones and areas of specific use, and categories of streets.
 - 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).

World bank/IFC Guidelines for Noise

The IFC General Environmental Health and Safety Guidelines²² include (in its Section 1.7) an internationally recognized guideline document containing information for the assessment and management of noise impacts. The guidelines also present noise level criterion values applicable to the Project. The *IFC 1.7 Noise* differentiates between two principal receptor categories: residential and industrial. The corresponding limits are summarized in Table 6-4 below.

In addition, the fixed values described above, IFC 1.7 Noise states that “*impacts should not exceed the levels presented or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site*”.

The IFC 1.7 Noise fixed value noise criteria outlined in Table 6-4 are generally based on an interpretation of the relevant section of the WHO 1999 guidance concerning the effect of noise on humans and implied potential health effects.

Table 6-4 IFC/ World Bank Noise Level Guidelines

Receptor	Maximum Allowable Ambient Noise Levels, LAeq,1hr, dB(A) Free field	
	Day 07:00 – 22:00 time	Night-time 22:00 – 07:00
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Source: IFC General EHS Guidelines

The IFC General EHS Guidelines comprise two assessment requirements – that is, to meet the allowable fixed (Disturbance) noise thresholds at noise receptors or to not increase background noise levels by more than 3 dB at the nearest receptor location off-site. This second requirement is relevant where background noise levels are above the thresholds.

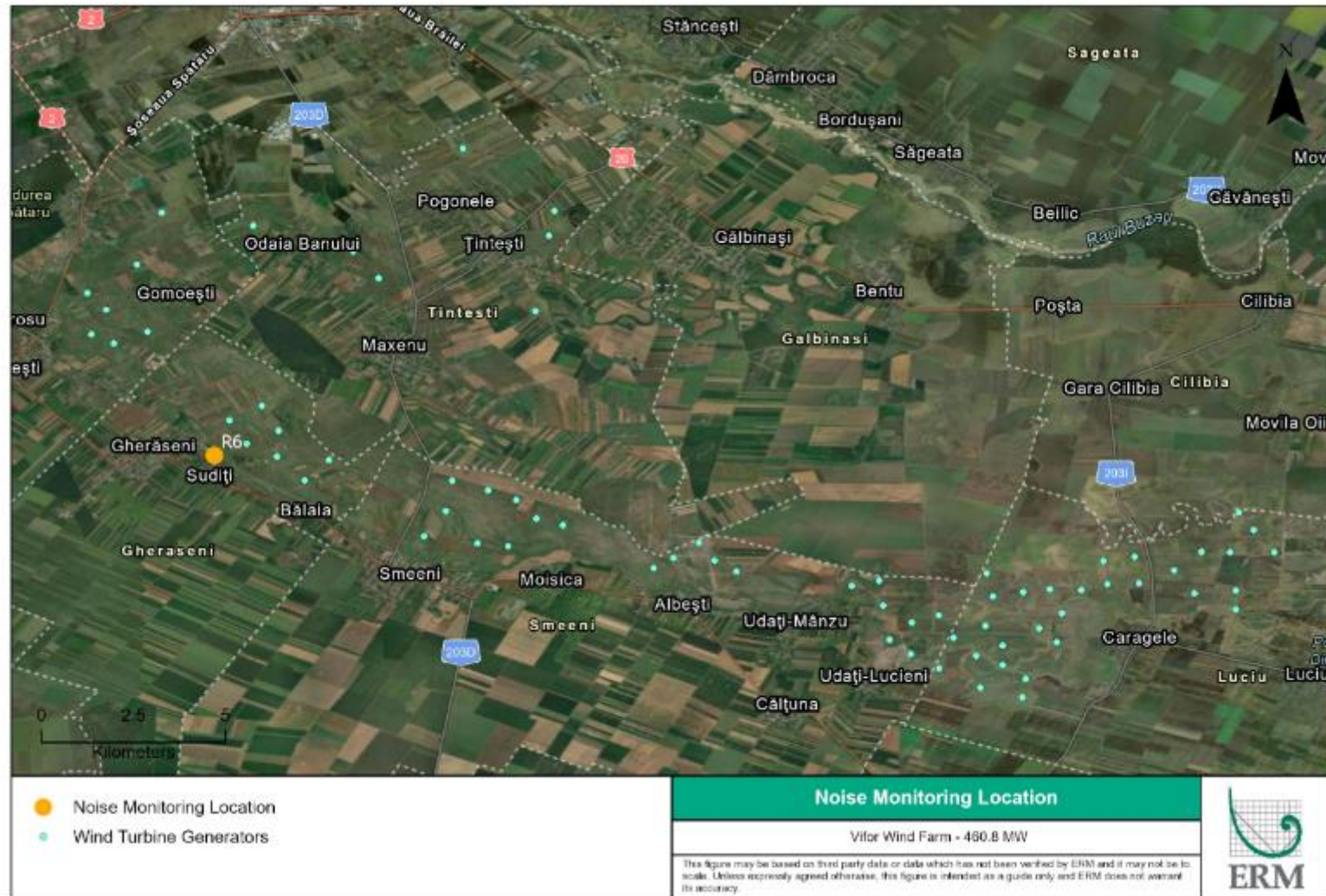
Baseline Conditions

Monitoring Location

Taking into consideration the preliminary modelling results and accessibility to the receptors, one monitoring location was carefully selected.. The monitoring location is described in Table 6-5 and illustrated in Figure 6-6.

²²International Finance Company (IFC) Environmental, Health, and Safety (EHS) Guidelines (2007), Noise Management, based on an interpretation of the relevant section of the World Health Organization (WHO) 1999 guidance concerning the effect of noise on people and implied potential health effects.

Figure 6-6 Noise Monitoring Location



ERM 2023

Table 6-5 Description of Long-Term Unattended Noise Monitoring Location

Location ID	Date	Coordinates	
		Northing	Easting
Monitoring Location	23/02/2023 -02/04/2023	4985797.46	484940.97 m

Source: ERM 2023

Baseline Methodology

Equipment and Setup

The noise monitoring procedure was undertaken in accordance with ISO 1996 -1:2003, which specifies that noise monitoring should be carried out using Type 1 sound level meter as per IFC standards. The equipment was mounted so that the microphone was installed at approximately 1.5 m above the ground. The systems were in free-field conditions (i.e., at least 3.5 m from the nearest hard reflective surface). A picture of a typical noise monitoring equipment setup is shown in Figure 6-7.

Figure 6-7 Noise Monitoring Setup



Source: ERM 2023

Data Recording

Long term noise measurements were undertaken. Noise measurements recorded different metrics, including the LAeq, LAmax, LAmin, LA10 and LA90, and 10-minute noise levels were logged continuously for each metric throughout the survey periods. A brief description of all such noise metrics is provided on this section.

The unattended noise monitoring results for each location were divided into day (0700–2200 hours) and night (2200–0700 hours) periods to understand the variation between the daytime and night-time periods.

The LAeq metric is the steady, continuous equivalent sound level, which has the same acoustic energy as the actual varying sound levels over the same time. The letter “A” in both metrics denotes that “A”-weighting has been used. The “eq” in LAeq indicates that an equivalent level has been calculated. Therefore, LAeq (T) is the A-weighted continuous sound level, measured over period “T.”

The LA90 metric is a percentile noise level, which represents the noise level exceeded for 90 per cent of the monitoring period (T) being considered. It represents the quiet lulls between noise events, such as cars or locomotives going by or planes flying overhead. The LA90 metric is the near-minimum baseline level that only occurs, by definition, 10 per cent of the time. The LA90 level is often referred to as the “background” noise level and is commonly used as a basis for determining noise criteria for assessment purposes. For this monitoring assessment, the LA90 metric was used to represent background noise levels.

Aside from the LAeq and LA90, other sound metrics typically collected during sound surveys are LAmx, LAmin, and LA10. The LAmx and LAmin metrics are the maximum and minimum noise levels in a noise sample, respectively. The LA10 metric is also a percentile representing the noise level exceeded for 10 per cent of the monitoring period (T).

The noise meter automatically logs these environmental noise measurement parameters. For the purposes of this study, the LAeq is the noise parameter of most interest, as it is this parameter that needs to be directly compared to the applicable noise standards of the International Finance Corporation (IFC).

Wind Speed Monitoring

Traditionally, the Institute of Acoustics²³ (IOA) has established noise limits based on a “standardized” wind speed at a height of 10 m in their Good Practice Guide (GPG) Supplementary Guidance. In the past, wind turbine sound power levels were often reported with reference to this “standardized” wind speed at 10 m. However, the 3rd Edition (2012) of IEC61400-113 now primarily requires sound power levels to be indicated in relation to the wind speed at the hub height. Therefore, for this analysis, the wind speed at a nominal hub height of 166 m has been chosen as the preferred reference.

In this study, wind speed data at the monitoring location was obtained from the Open Meteo²⁴ site, provided by OpenWeather Ltd. This site utilizes multiple data sources to gather information on wind speeds from around the world. Additionally, the wind speed conversion from 10 m to 166 m height was performed using the “logarithmic wind profile law,” which describes how wind speed varies with height in the atmospheric boundary layer. The general formula of the power law is as follows:

$$V_2 = V_1 * (h_2 / h_1) ^ \alpha$$

where:

V1 is the wind speed at the reference height h1,

V2 is the wind speed at the height h2, and

α is the shear exponent, which is a constant that depends on the atmospheric stability and surface roughness. In neutral atmospheric conditions over typical land surfaces, it is often approximately 0.2 to 0.3. This suggests a moderate increase in wind speed with height. For this study, a value of α equal to 0.25 was adopted.

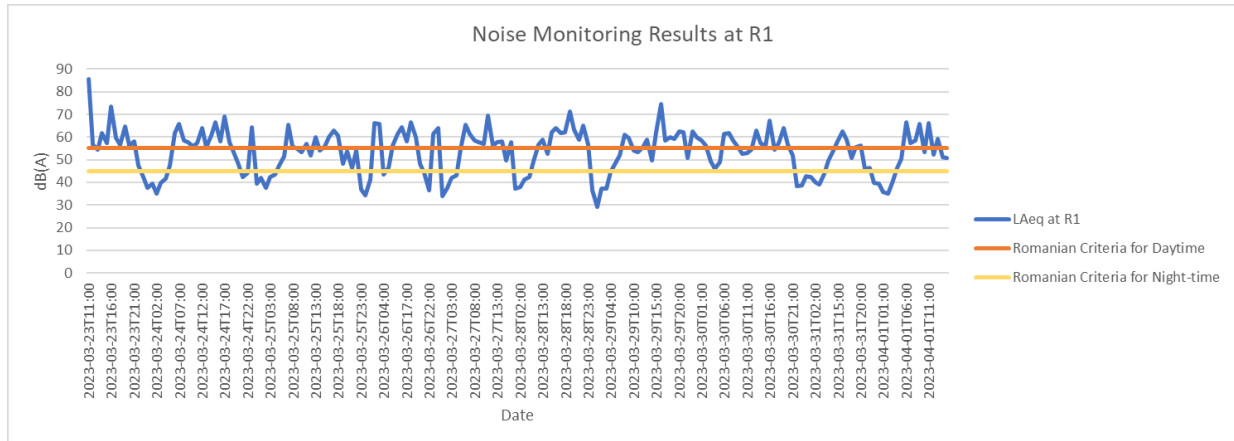
²³ Institute of Acoustics (IOA) Good Practice Guide (GPG) Supplementary Guidance Note 4: Wind shear, Section 2.1.

²⁴ <https://open-meteo.com/en/docs/historical-weather-api>

Noise Monitoring Results

The results of the measurements recorded at the long-term noise-monitoring location are summarized in Figure 6-8.

Figure 6-8 Noise Monitoring Results at R1



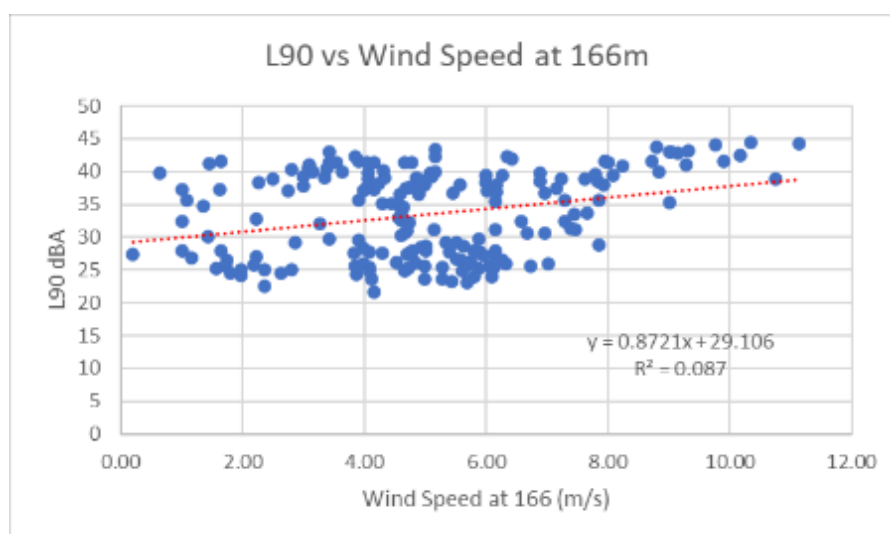
Source: ERM 2023

The noise levels at the monitoring location have been assessed and found to exceed the International Finance Corporation (IFC) and the Romanian criteria for both daytime and night-time periods. The LAeq overall values, which represent the equivalent continuous sound level, were calculated to be 67 dBA during the day and 57 dBA during the night. In comparison, the IFC and Romanian criteria set the acceptable noise level at 55 dBA for daytime and 45 dBA for nighttime periods.

Background Noise Analysis

The correlation between wind speed at a hub height of 166 m and the background noise level (LA90) is shown in Figure 6-9. During the unattended noise measurement, there were reported instances of precipitation in the area. To eliminate any potential influence of rainfall on the background noise levels, the data analysis excluded noise data collected during rainfall within the 60-minute intervals.

Figure 6-9 Correlation Between Background Noise Levels (LA90) and Wind Speed at Hub Height



Source: ERM 2023

Table 6-6 summarizes the whole set measurement, excluded, remaining valid, day, and night 60-min periods for each location.

Table 6-6 Time Periods for Noise Measurements Occurred Every 60-Min

Location	Number of Points				
	Total	Excluded	Remaining Valid	Day time	Night-time
R1	245	55	190	113	77

Period T = 15 hours for Daytime (07:00–22:00) and 9 hours for night-time (22:00–07:00) as per IFC standards

Source: ERM 2023

6.1.4 Topography and Land Cover

6.1.4.1 Area of Influence

The direct Aol to be considered for the local topography and land cover include the Project sites, components and facilities that the Client develops and/or controls (e.g. permanent: wind turbines, central power collection station, underground cable lines and overhead lines, existing roads and additional access roads, culverts and small bridges; and temporary: borrow and disposal areas, lay-down areas, concrete batching station, temporary offices, construction/management sites, etc), and any additional areas in which aspects of the topography and land cover could experience significant impacts. From this point of view, we considered an area of up to 2 km applied around the Project components as direct topography and land cover Aol.

Indirect Aol include any other additional areas where impacts on topography and land cover, from unplanned but predictable developments caused by the Project, may occur later or at a different location.

6.1.4.2 Key baseline conditions

The Project area is located within Călmățui river floodplain/meadow. The topography is generally flat, with elevations ranging from approx. 79 m above sea level (asl) in the north-western areas of the Project area, to 50 m asl in the eastern areas.

The relatively flat aspect of the Călmățui river floodplain/meadow is due to the extensive planning and drainage works carried out in the '70-'80s of the last century. The conversion of large areas of land to agricultural activities had required the creation of a system of drainage channels and dams/dykes on the entire floodplain. Some of the old swamps and overflow areas of Călmățui river, from historic times and up to the second half of the 20th century, are still active today when the flow of rainwater is increased. The specific vegetation of the marsh areas, the wet and salty soils, brownish-grey clay as well as the presence of shells and common clams indicate the marshes in the environment. These were compact areas, located in small depressions. Low hills are also visible within the landscape, some of which being totally or partially destroyed by the drainage channels²⁵.

The tabular fields south of Călmățui river make the major type of relief of the area and are covered with loessoid deposits. On the right bank of Călmățui River there are sands of several kilometers wide, highlighting a characteristic relief of dunes and inter-dunes fixed by agricultural crops. Locally, shifting sands also occur. The current geomorphological processes in Central Bărăgan are mainly subsidence and subduction²⁶.

²⁵ https://cjbuzau.ro/wp-content/uploads/2020/09/SF-1_Localizarea-geografica-cadrul-natural-mediul-zonele-de-risc.pdf

²⁶ <https://www.anticariat-unu.ro/geomorfologia-romaniei-de-grigore-posea-editia-a-ii-a-revazuta-si-adaugata-2005-p126137>

Figure 6-10 VisViva Project Area Topography and Landcover



Source: ERM, September 2022

Călmățui river floodplain/meadow, included in the Project's direct Aol is covered almost entirely by pastures and meadows. All 72 WTGs and ancillary facilities, will be located in this area. This is public land, owned by the Local Councils of Costești, Gherăseni, Smeeni, Luciu and Țintești communes, and currently leased to local farmers (agricultural companies, associations, etc.) to use and maintain the pasture, for this activity the farmers also benefitting from farming subsidies from the state side.

6.1.5 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.

Baseline data was collected through desk-based studies undertaken by ERM Romania specialists, to inform the ESIA Chapter. Furthermore, information was obtained from the detailed geotechnical site investigations carried out in the Project area, whose results were included in the Geotechnical Survey Studies developed for each sub-project (investigations were carried out initially in 2011 and resumed in 2022, due to several changes made in the Project layout in time).

6.1.5.1 Area of Influence

The direct Aol with respect the geology and soil is represented by the areas considered for Project's sites, components and facilities (e.g. permanent: wind turbines, central power collection station/substation, underground cable lines and overhead lines, existing roads and additional access roads, culverts and small bridges; and temporary: borrow and disposal areas, lay-down areas, concrete batching station, temporary offices, construction/ management sites, etc), as well as any other areas in which the geology and soil could experience significant impacts. From this point of view, we considered an area of up to 2 km applied around the Project components and facilities as the direct Aol for geology and soil topics.

The indirect Aol is represented by any additional areas where impacts on geology and soil from unplanned but predictable Project developments may occur later or at a different location.

6.1.5.2 Key baseline conditions

The geological, soil and geotechnical conditions within the Project AoI are described in the following sections.

Geology

Geological condition

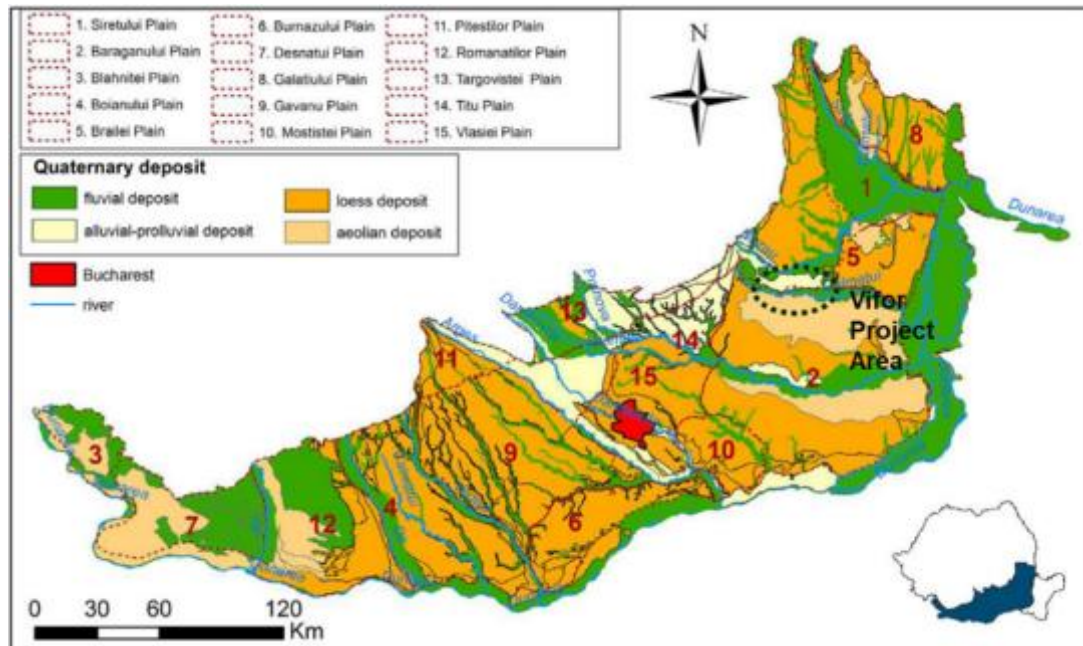
The Project area is part of the Moesian Platform, which in this sector is characterized by a foundation made up of upper Proterozoic green shales, which are an extension of the green shales that make up the central Dobrogea Massif. West of the Danube, the green shales are much lower after the Danube fault. The weak metamorphism and their consolidation took place in the Baikalian cycle.

The cover of the Moesian Platform is made up of approx. 4,000 m thick sedimentary deposit layers that have accumulated from the Cretaceous to the Quaternary.

Project area, in the upper part is represented by Quaternary deposits, more precisely lithological deposits attributed to the lower and upper Holocene. These are composed mainly of fluvial-lacustrine deposits, over which loess and loessoid deposits have been superimposed in the entire Călmățui - Ialomița interfluve, and in few places sands of wind/aeolian origin have been deposited.

A general structure of the lower Holocene highlights the presence of loessoid deposits, approx. 5-10m thick, made of dusty-sandy, macroporous, yellowish color, and in the northern part of the area, they become more and more sandy. The upper Holocene is made of alluvial accumulations of the meadows approx. 2-4 m thick, and the aeolian sands of the region. The coarse alluvium highlighted at the lower part of the meadow deposits of Călmățui, represents the alluvium of the old course of Buzău River, which once followed the current valley of Călmățui River.

Figure 6-11 Geological features and subunits of the Romanian Plain, and location of Vifor Project



Source: Grecu et al. 2012²⁷

On the surface, the area is characterized by relatively flat land, with wide areas that are higher or lower due to wind/aeolian deposits specific to the entire plain. A detailed geological-geotechnical-soil baseline condition of the Project area was determined based on the Geotechnical Survey Studies developed separately for each sub-project within the VisViva Project.

Figure 6-12 Geotechnical drillings at WTG03 and WTG04 locations, Costești sub-project area



Source: ERM 2023, using Geologic Site Srl information, September 2022

²⁷ <https://www.anticariat-unu.ro/sisteme-hidrogeomorfologice-din-campia-romana-hazard-vulnerabilitate-risc-coordonator-florina-grecu-2012-p301587>

For each sub-project, one geotechnical drilling up to 45 m depth was carried out in 2011, through which the stratigraphic sequence of the land was determined.

For each WTG location, geotechnical drillings up to 30 m depth were carried out in 2022, for determining geotechnical conditions, groundwater/hydrostatic level, and the physical-mechanical characteristics of the land.

The stratigraphic structure and the groundwater level, presented in Table 6-7, are based on the geotechnical drillings carried out in 2011.

The physical-mechanical characteristics of the land highlights the following main aspects:

- moderate risk of liquefaction – for all the geotechnical drillings carried out on the WTG locations within Luciu sub-project and secondarily for the drillings within Costesti, Gheraseni and Smeeni sub-projects.

Soil liquefaction is evident at variable depths, but might be considered in two separate segments, the first one towards the surface, around 5.0-7.0 m depth, and the second one at depth, around 10.0-15.0 m depth.

- soft sand and clay layers (non-cohesive, medium and low-density sand and clay layers) – for most of the drillings carried out on the WTG locations within Pogoanele II, Luciu and Smeeni sub-projects.

Soft sand and clay layers are evident mainly in the surface layers, around 5.0-9.0 m depth, for more than half of the drillings within Smeeni sub-project, but also in the deeper layers, around 11.0-21.0 m for more than half of the drillings within Luciu sub-project.

- Potential soil liquefaction at variable depths (up to 20 m depth – from 4 to 20 m) – for the drillings carried out on the WTG locations within Țintești sub-project.

Starting from “Combined Foundation loads - TA2A601 V162-5.4/5.6/6.0/6.2 MW, EnVentus, IECS, HH166 m 50/60 Hz” provided by Vestas, and based on the Geotechnical Survey Studies developed for the Project, the physical-mechanical characteristics of the land (the existing shallow water, risk of moderate liquefaction and the soft layers), as they were shortly summarized above, demonstrates a moderate geotechnical risk for WTG foundations, with direct implications in the technical solution chosen for the foundations, and the management of materials within the Project, as they were previously presented in Chapter 2 – Project Description.

Considering the existing shallow water, the Geotechnical Survey Studies and DTAC Studies proposes as a design solution for WTG foundation, the shallow, circular, reinforced concrete foundation type, 33 m diameter, and founded at approx. 4.00 m from the ground surface.

Also, considering the moderate risk of liquefaction and the soft sand and clay foundation layers, the Geotechnical Survey Studies and DTAC Studies proposes – as methods of improving the foundation layers and to support the geotechnical parameters of WTG foundations:

- drilling and filling of crushed stone columns, up to 20.0 m depth, for the case of soft sand and clay foundation layers;
- use of ballast columns up to 20.0 m depth under the WTG foundations, or even major earthworks up to 5 m depth, for the case of the risk of liquefaction of the foundation layers.

Table 6-7 Geological sequence – geotechnical conditions in drillings in the direct Project Aol, according to the Geotechnical Survey Studies, 2011 and 2022

Costești Commune	Gherăseni Commune	Smeeni Commune	Luciu Commune	Pogoanele on territory of Luciu Commune	Țințești commune
Project area located in the lower Călmățui river meadow, almost entirely north of Călmățui river					
Drilling period: 03-2011; 08/09-2022	Drilling period: 03-2011; 08/09-2022	Drilling period: 03-2011; 08/11-2022	Drilling period: 02-2011; 08/09-2022	Drilling period: 02-2011; 08/09-2022	Drilling period: 09-2022
Geological sequence in drillings shows a quasi-horizontal, homogeneous lithology for the entire Project area					
Geotechnical drilling: F5-F1050 (2011)	Geotechnical drilling: F4-F1049 (2011)	Geotechnical drilling: F3-F1048 (2011)	Geotechnical drilling: F1-F1046 (2011)	Geotechnical drilling: F1-F1046 (2011)	Geotechnical drilling: WTG 68-WTG75
<ul style="list-style-type: none"> - 0.0-0.3 m: soil layer - topsoil made of alluvial soil, occasionally filled with construction debris and solid waste, - 0.3-1.4 m: cohesive brown clayey dust, - 1.4-3.5 m: non-cohesive, medium-density, blue-grey sand and gravel layer, - 3.5-15.5 m: non-cohesive, medium and high-density, blue-grey gravel and dusty sand layer, - 15.5-22.5 m: non-cohesive, high-density, blue-grey dusty sand layer, 	<ul style="list-style-type: none"> - 0.0-0.3 m: soil layer - topsoil made of alluvial soil, occasionally filled with construction debris and solid waste, - 0.3-2.5 m: cohesive green-grey clayey dust, in some places with reddish-white iridescence, - 2.5-13.8 m: non-cohesive, medium-density, blue-grey gravel and dusty sand, alternating with high-density sand and gravel layer, - 13.8-15.8 m: cohesive, brown sandy clayey dust layer, 	<ul style="list-style-type: none"> - 0.0-0.3 m: soil layer - topsoil made of alluvial soil, occasionally filled with construction debris and solid waste, - 0.3-2.5 m: cohesive green-grey clayey dust, in some places with reddish-white iridescence, - 2.5-13.8 m: non-cohesive, medium-density, blue-grey gravel and dusty sand, alternating with high-density sand and gravel layer, - 13.8-15.8 m: cohesive, brown sandy clayey dust layer, 	<ul style="list-style-type: none"> - 0.0-0.4 m: soil layer – brown-black topsoil made of clayey dust with plant residues, filled on patches with construction debris and solid waste, - 0.4-2.9 m: cohesive, moist, brown and yellow-brownish clayey dust mixed with fine sand, - 2.9-4.5 m: cohesive, moist, soft, brown and yellow-brownish clayey dust mixed with fine sand, - 4.5-6.8 m: saturated, blue-grey gravel, alternating with saturated, blue-grey sand layer, - 6.8-8.5 m: saturated, medium-density, blue- 	<ul style="list-style-type: none"> - 0.0-0.4 m: soil layer – brown-black topsoil made of clayey dust with plant residues, filled on patches with construction debris and solid waste, - 0.4-2.9 m: cohesive, moist, brown and yellow-brownish clayey dust mixed with fine sand, - 2.9-4.5 m: cohesive, moist, soft, brown and yellow-brownish clayey dust mixed with fine sand, - 4.5-6.8 m: saturated, blue-grey gravel, alternating with saturated, blue-grey sand layer, - 6.8-8.5 m: saturated, medium-density, blue- 	<ul style="list-style-type: none"> 0.5-5.0 m - gravels and sands and boulders with lenticular intercalations of clays and sandy or brown clays; -15-30 m - the thickness of the age layers of the deposit; The impervious layer is 1-4 m thick and consists of loess-like silty clays.

- 22.5-26.0 m: cohesive brown sandy clayey dust, - 26.0-27.5 m: cohesive grey sandy clayey dust, - 27.5-45.0 m: non-cohesive, medium-density, blue-grey dusty sand and gravel layer.	- 15.8-22.0 m: non-cohesive, medium-density, brown and yellow-brownish dusty sand layer, - 22.0-24.5 m: cohesive, brown sandy clayey dust, - 24.5-45.0 m: non-cohesive, medium-density, blue-grey dusty sand and gravel layer.	- 15.8-22.0 m: non-cohesive, medium-density, brown and yellow-brownish dusty sand layer, - 22.0-24.5 m: cohesive, brown sandy clayey dust, - 24.5-45.0 m: non-cohesive, medium-density, blue-grey dusty sand and gravel layer.	grey sand and gravel, mixed with dust, - 8.5-11.3 m: saturated medium-density sand, mixed with medium-density gravel and dust, - 11.3-18.5 m: cohesive, brown sandy clayey dust, - 18.5-23.0 m: blue-grey dusty sand layer, alternating with medium-density, moist sand, - 23.0-45.0 m: blue-grey gravel with slightly dusty sand, alternating with blue-grey non-cohesive medium-density sand with gravel layer.	grey sand and gravel, mixed with dust, - 8.5-11.3 m: saturated medium-density sand, mixed with medium-density gravel and dust, - 11.3-18.5 m: cohesive, brown sandy clayey dust, - 18.5-23.0 m: blue-grey dusty sand layer, alternating with medium-density, moist sand, - 23.0-45.0 m: blue-grey gravel with slightly dusty sand, alternating with blue-grey non-cohesive medium-density sand with gravel layer.	
Groundwater level/ Hydrostatic level was found at -2.8 m depth, and after 24 hours it stabilized at -2.3 m.	Groundwater level/ Hydrostatic level was found at -2.8 m depth, and after 24 hours it stabilized at -2.3 m.	Groundwater level/ Hydrostatic level was found at -2.6 m depth, and after 24 hours it stabilized at -2.1 m.	Groundwater level/ Hydrostatic level was found at -4.5 m depth, and after 24 hours it stabilized at -2.0 m.	Groundwater level/ Hydrostatic level was found at -4.5 m depth, and after 24 hours it stabilized at -2.0 m.	Groundwater level/ Hydrostatic level was found at -1.9-3 m depth.

Costești Commune	Gherăseni Commune	Smeeni Commune	Luciu Commune	Pogoanele on territory of Luciu Commune	Pogoanele II town
Project area located in the lower Călmățui river meadow, almost entirely north of Călmățui river					Project area located in the tabular plain
Drilling period: 03-2011; 08/09-2022	Drilling period: 03-2011; 08/09-2022	Drilling period: 03-2011; 08/11-2022	Drilling period: 02-2011; 08/09-2022	Drilling period: 02-2011; 08/09-2022	Drilling period: 02-2011; 09/12-2022

Geological sequence in drillings shows a quasi-horizontal, homogeneous lithology for the entire Project area

Geotechnical drilling: F5-F1050 (2011)	Geotechnical drilling: F4-F1049 (2011)	Geotechnical drilling: F3-F1048 (2011)	Geotechnical drilling: F1-F1046 (2011)	Geotechnical drilling: F1-F1046 (2011)	Geotechnical drilling: F2-F1047 (2011)
<ul style="list-style-type: none"> - 0.0-0.3 m: soil layer - topsoil made of alluvial soil, occasionally filled with construction debris and solid waste, - 0.3-1.4 m: cohesive brown clayey dust, - 1.4-3.5 m: non-cohesive, medium-density, blue-grey sand and gravel layer, - 3.5-15.5 m: non-cohesive, medium and high-density, blue-grey gravel and dusty sand layer, - 15.5-22.5 m: non-cohesive, high-density, blue-grey dusty sand layer, - 22.5-26.0 m: cohesive brown sandy clayey dust, - 26.0-27.5 m: cohesive grey sandy clayey dust, - 27.5-45.0 m: non-cohesive, medium-density, blue-grey dusty sand and gravel layer. 	<ul style="list-style-type: none"> - 0.0-0.3 m: soil layer - topsoil made of alluvial soil, occasionally filled with construction debris and solid waste, - 0.3-2.5 m: cohesive green-grey clayey dust, in some places with reddish-white iridescence, - 2.5-13.8 m: non-cohesive, medium-density, blue-grey gravel and dusty sand, alternating with high-density sand and gravel layer, - 13.8-15.8 m: cohesive, brown sandy clayey dust layer, - 15.8-22.0 m: non-cohesive, medium-density, brown and yellow-brownish dusty sand layer, - 22.0-24.5 m: cohesive, brown sandy clayey dust, - 24.5-45.0 m: non-cohesive, medium-density, blue-grey dusty sand and gravel layer. 	<ul style="list-style-type: none"> - 0.0-0.3 m: soil layer - topsoil made of alluvial soil, occasionally filled with construction debris and solid waste, - 0.3-2.5 m: cohesive green-grey clayey dust, in some places with reddish-white iridescence, - 2.5-13.8 m: non-cohesive, medium-density, blue-grey gravel and dusty sand, alternating with high-density sand and gravel layer, - 13.8-15.8 m: cohesive, brown sandy clayey dust layer, - 15.8-22.0 m: non-cohesive, medium-density, brown and yellow-brownish dusty sand layer, - 22.0-24.5 m: cohesive, brown sandy clayey dust, - 24.5-45.0 m: non-cohesive, medium-density, blue-grey dusty sand and gravel layer. 	<ul style="list-style-type: none"> - 0.0-0.4 m: soil layer – brown-black topsoil made of clayey dust with plant residues, filled on patches with construction debris and solid waste, - 0.4-2.9 m: cohesive, moist, brown and yellow-brownish clayey dust mixed with fine sand, - 2.9-4.5 m: cohesive, moist, soft, brown and yellow-brownish clayey dust mixed with fine sand, - 4.5-6.8 m: saturated, blue-grey gravel, alternating with saturated, blue-grey sand layer, - 6.8-8.5 m: saturated, medium-density, blue-grey sand and gravel, mixed with dust, - 8.5-11.3 m: saturated medium-density sand, mixed with medium-density gravel and dust, - 11.3-18.5 m: cohesive, brown sandy clayey dust, - 18.5-23.0 m: blue-grey dusty sand layer, 	<ul style="list-style-type: none"> - 0.0-0.4 m: soil layer – brown-black topsoil made of clayey dust with plant residues, filled on patches with construction debris and solid waste, - 0.4-2.9 m: cohesive, moist, brown and yellow-brownish clayey dust mixed with fine sand, - 2.9-4.5 m: cohesive, moist, soft, brown and yellow-brownish clayey dust mixed with fine sand, - 4.5-6.8 m: saturated, blue-grey gravel, alternating with saturated, blue-grey sand layer, - 6.8-8.5 m: saturated, medium-density, blue-grey sand and gravel, mixed with dust, - 8.5-11.3 m: saturated medium-density sand, mixed with medium-density gravel and dust, - 11.3-18.5 m: cohesive, brown sandy clayey dust, - 18.5-23.0 m: blue-grey dusty sand layer, 	<ul style="list-style-type: none"> - 0.0–0.4 m: soil layer - topsoil made of fossil sandy leached chernozem, occasionally filled with construction debris and solid waste, - 0.4-3.5 m: yellowish brown sandy clayey dust, microporous, - 3.5–6.2 m: alluvial-lacustrine deposits, with dusty clayey sands, - 6.8-11.3 m: saturated, medium-density, blue-grey sand and gravel, mixed with fine dusts, - 11.3-14.8 m: cohesive, brown sandy clayey dust layer, - 14.8-19.2 m: non-cohesive, medium-density, brownish dusty sand layer, - 19.2-24.5 m: cohesive, brown sandy clayey dust, - 24.5-45.0 m: non-cohesive, medium-density, blue-grey dusty sand and gravel layer.

			alternating with medium-density, moist sand, - 23.0-45.0 m: blue-grey gravel with slightly dusty sand, alternating with blue-gray non-cohesive medium-density sand with gravel layer.	alternating with medium-density, moist sand, - 23.0-45.0 m: blue-grey gravel with slightly dusty sand, alternating with blue-gray non-cohesive medium-density sand with gravel layer.	
Groundwater level/ Hydrostatic level was found at -2.8 m depth, and after 24 hours it stabilized at -2.3 m.	Groundwater level/ Hydrostatic level was found at -2.8 m depth, and after 24 hours it stabilized at -2.3 m.	Groundwater level/ Hydrostatic level was found at -2.6 m depth, and after 24 hours it stabilized at -2.1 m.	Groundwater level/ Hydrostatic level was found at -4.5 m depth, and after 24 hours it stabilized at -2.0 m.	Groundwater level/ Hydrostatic level was found at -4.5 m depth, and after 24 hours it stabilized at -2.0 m.	Groundwater level/ Hydrostatic level was found at -5.0 m depth, and after 24 hours it stabilized at -3.3 m.

Soil

Soil characterization

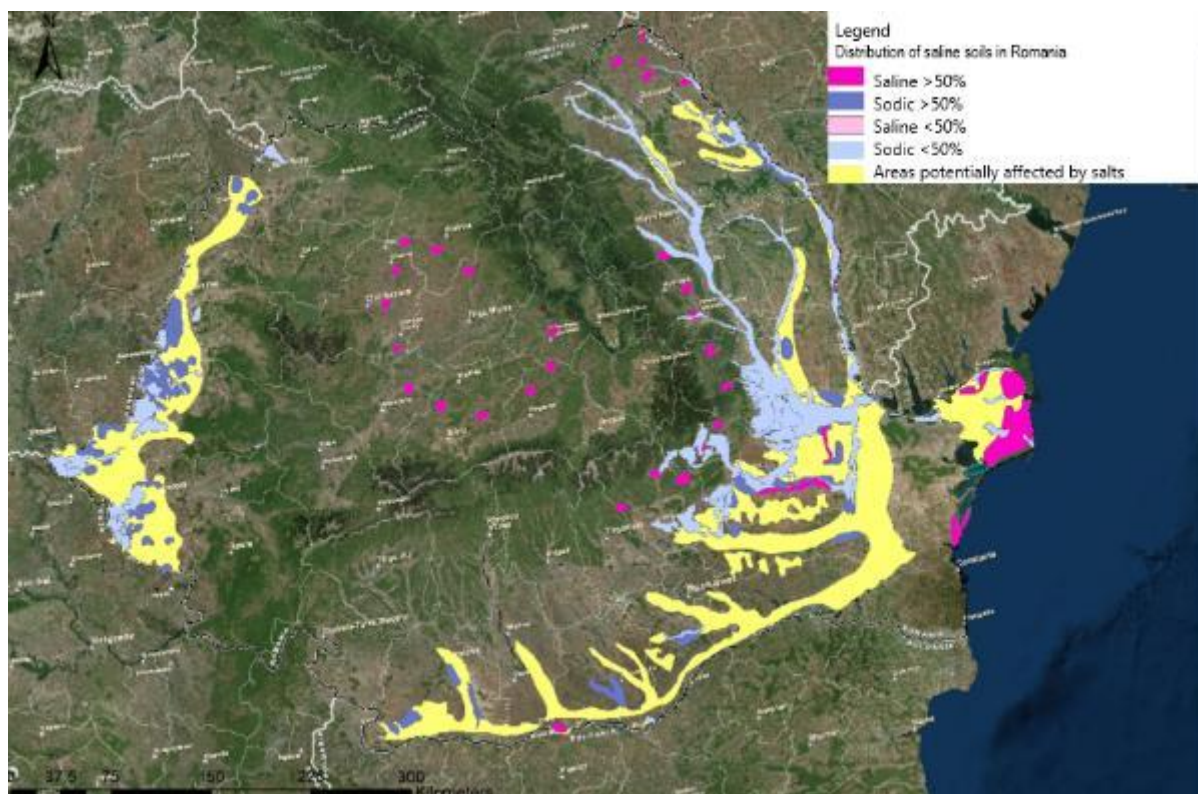
Soils are described in the Geotechnical Survey Studies developed for the Project. Soil is mainly formed of *fine terrace deposits* at the top (clay dust, sand dust), and *wind/aeolian deposits* (dust and sand loess). These horizons have thicknesses of about 0.3-0.4 m and are composed of coarse alluvial deposit over the medium and fine sands with medium tamping loose.

The soils in the entire Project area shows a sequence of stages in the process of alluvium solidification, including alluviums, alluvial soils, young chernozems, and variable leached chernozems.

Typical soils - leached chernozems - are found throughout the region. To the east, their place is taken by chocolate and chestnut chernozems (typical soils of the steppe), with gleization (leachate chernozem) in areas with higher moisture, where the aquifer is closer to surface, and with salination in the places without drainage, where salty soils occur²⁸, as the case of Călmățui River meadow, where also appear patches of land without vegetation and areas with high concentrations of salts.

On the sands south of Călmățui River there are sandy leached chernozems and silicified sands.

Figure 6-13 Distribution of saline soils by degree of salinity in Romania and Project area, 2008²⁹



Source: Toth et.al.,2008

²⁸ https://www.researchgate.net/figure/Harta-solurilor-afectate-de-saruri-din-Romania-dupa-Toth-si-colab-2008_fig1_294855962/download

²⁹ https://www.researchgate.net/figure/Harta-solurilor-afectate-de-saruri-din-Romania-dupa-Toth-si-colab-2008_fig1_294855962/download

Figure 6-14 Soil and vegetation in Călmățui River meadow: WTG18 (left) and WTG26 (right) locations, Smeeni sub-project area, September 2022



Source: ERM 2023, using Geologic Site Srl information, September 2022

The following soil types stands out (as percentage of the total surface of Costești, Gherăseni, Smeeni, Luciu and Țintești communes, and are common for the entire area)³⁰:

- Alluvial soils - 20.2%; in the lower Călmățui river meadow, north of Călmățui river,
- Moderately salty/saline soils - 10.9%; in the lower Călmățui river meadow,
- Highly salty/saline soils - 1.9%; in the lower Călmățui river meadow,
- Leachate chernozem - 27.2%; in both the lower Călmățui river meadow and the higher tabular plain,
- Chestnut chernozems - 1.9%; in both the lower Călmățui river meadow and the higher tabular plain,
- Chocolate brown sandy soil – 1.6%; in the tabular plain south of Călmățui river,
- Raw sandy soil - 1.5%; in the tabular plain south of Călmățui river,
- Chocolate chernozem - 34.8%; in the tabular plain south of Călmățui river.

Soil/Subsoil Quality

Buzau County EPA does not undertake soil quality monitoring in the Project area. According to the Annual Report on the State of Environment in Buzau County³¹ (2020, issued by Buzau EPA), there are no data on the state of soil quality at commune level, for any of Costești, Gherăseni, Smeeni, Luciu and Țintești communes.

According to the Geotechnical Survey Studies developed for each VisViva/Vifor sub-project (2022), the soil in the lower Călmățui river floodplain/meadow is usually 0.3-0.4 m thick in most of the geotechnical drillings. The topsoil to be excavated during site preparation (sites/vegetation clearance, land levelling, excavations, construction of new access roads) is of poor quality and is only considered suitable for levelling the land and general landscaping of the sites.

No soil sampling or soil quality analyses were prepared for the Project.

Existing influences on soil quality / sources of soil degradation in the Project Aol:

- drought,
- soil erosion by water,
- soil erosion by wind (sandy soils),
- changing the use of the agricultural lands,

³⁰ <https://agrointeligent.ro/238035/saratura-sau-solul-sarat-cauze-tratamente/>

³¹ http://apmbz.anpm.ro/stiri/-/asset_publisher/U3pMdlTw4f/content/apm-buzau-a-elaborat-raportul-privind-starea-mediului-in-judetul-buzau-pentru-anul-2020?p_p_auth=rHO6RWXU

- compaction/subsidence due to construction,
- uncontrolled deposit of waste from animal farms, mainly manure,
- uncontrolled deposit of solid waste from households, mainly construction debris and packaging waste,
- potential presence of hazardous residues: oils and greases, hydrocarbons from illegal of accidental spillage.

Natural hazards

Tectonic processes in the Călmățui River – Bărăganului Plain area:

- *Seismicity* – Project Aol is placed under the influence of the most active seismic area in Romania - Vrancea Seismic Zone. With regard the Project location/s, according to SR 11100/1-1993, they are included in the 8₁ macro seismicity area, as per MSK scale (index 1 corresponds to a mean return period of earthquakes of 50 years).

Geomorphological processes and land degradation in the Project Aol – are the most common natural hazards, grouped into two different categories: the inter-fluvial plain processes, and Călmățui River valley processes. The potential natural hazards that occur in the Project Aol are shortly described below:

- *Wind erosion of the land* – favoured by presence of fine sands and by the dry summer conditions. Wind erosion causes appearance of bumps and knolls (small, low, round natural hills or mounds).
- *Land subsidence* - is frequent and favoured by the loess deposits, covering the whole surface of the plain, and by the lower slopes that do not favour drainage of water from rain and snow melting. Subsidence is represented by dales where heavy rain waters are stagnant for a longer period of time.
- *Frost depth* - according to standard STAS 6054-77, the frost depth in the investigated area is 0.80 - 0.90 m.
- *Surface washing* (pluvio-denudarea) - is not common for the Project Aol. It is infrequent due to flat land relief, and because the lower slopes do not favour runoff processes.
- *Water excess and water accumulation* – is rare and is linked with occasional and short-term accumulation of rainwater in valleys and dales that favours puddles and slough. Water accumulation resulted in failing to use the land (becoming fallow), and it's use as pastures, or remaining as salty soil. Water excess and water accumulation is not common in the Project Aol due to existing drainage channels, with exception of the areas located between Gherăseni and Suditi, and between Caragele and Luciu, where puddles appear during torrential rains.
- *Floods* – does not occur usually in the higher tabular areas. Moreover, there are no present or historical records of floods on the higher territory of Costești, Gherăseni, Smeeni, Luciu and Țintești communes. The potential area for flooding (hardly ever) is Călmățui River Valley, located the direct Project Aol, however, in this area the river was channelled to avoid flooding.
- *Landslides* – do not occur on the Project Aol due to flat land relief. Landslide potential is very low, and probability of a landslide is virtually zero.

6.1.6 Hydrology (Groundwater and Surface water)

6.1.6.1 Area of Influence

Hydrology/water resources Aol (direct Environment Aol) 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. From this point of view, we considered an area of up to 2 km applied around the Project sites, components and facilities as groundwater and surface water direct Environment Aol.

Indirect Environment Aol is represented by any additional areas where impacts on groundwater and surface water resources, from unplanned but predictable developments caused by the Project, may occur later or at a different location.

6.1.6.2 Key baseline conditions

Hydrogeology

Groundwater in the Project Aol is confined in layers of porous permeable medium and coarse grain of different geological origins and sizes. Groundwater is naturally mineral, showing values of 1000 - 5000 mg/l, where Cl and Na ions prevails.

Specific to the entire Călmățui plain area are the large aquifer layers, found in coarse grained rocks, represented by:

- Phreatic waters – closely dependent to rainfalls and Călmățui water flows, are usually found at approx. 3-5 m depth, and following heavy rains rises to 1-2m depth. Phreatic waters flow direction is SSW-NNE, with changes in direction due to local valleys.
- Groundwater – accumulated in layers consisting of gravels, sands and boulders (upper Holocene age), classified as ROIL06 Călmățui River Meadow and ROIL9 South Călmățui. These waters are found at about 15-35 m depth, are chloride (sodium chloride), and therefore non-potable.
- Deep groundwater – that occurs in many layers, but mainly in the Pontian layers, with unconsolidated sand, interbedded with shales, gravels and claystone. These waters are found mainly at about 1,050-1,100 m depth, are fresh waters with some mineralization character.

Groundwater bodies belong to the public domain and are under the jurisdiction of Buzau – Ialomița River Basin Administration. It monitors the water quality of the groundwater bodies ROIL06 Călmățui river meadow and ROIL9 South Călmățui, as presented in the table below:

Table 6-8 Characterization of groundwater bodies in the Project area³²

Groundwater body	Geological characterization			Groundwater use	Contamination sources	Chemical qualitative state
	Type	Artesian water	Cover layers (m)			
ROIL06 Călmățui river meadow	Porous	No	1.0 – 5.0	Water supply, livestock, farming	Industry, human settlements (ammonia, sulfates, chlorides)	Good (exceedance for mineralization indicators from the natural background)
ROIL9 South Călmățui area	Porous	No	10.0 – 20.0	Water supply, livestock, farming, industry	Industry, human settlements (ammonia, sulfates)	Good (exceedance for mineralization indicators from the natural background)
ROIL05: ALLUVIONAL	Porous	No	Composed of gravels with sands and	Water supply, livestock, farming	Industry, human settlements (ammonia,	Good (exceedance for mineralization indicators from

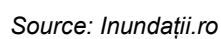
³² Updated Management Plan of Buzau-Ialomița Hydrographic Area, 2022-2027 http://buzau-ialomita.rowater.ro/wp-content/uploads/2021/02/PMB_ABABI_Text_actualizat.pdf

CONE BUZĂU (Tintești)			boulders with lenticular intercalations of clays and sandy or brown clays of 0.5-5.0 m ; The thickness of the age layers of the deposit is between 15-30 m . The overlying, impermeable layer is 1-4 m thick and consists of loess-like silt clays		sulfates, chlorides)	the natural background)
--------------------------	--	--	---	--	-------------------------	----------------------------

Surface water

VisViva/Vifor Project area is located in the hydrographic basin of Călmățui River. Direct Aol include the upper basin of Călmățui River, with a permanent course and a superficial hydrographic network represented by temporary courses, currently abandoned, clogged, with excess moisture in some places, coming from phreatic intake.³³

³³ https://cibuzau.ro/wp-content/uploads/2020/09/SF-1_Localizarea-geografica-cadrul-natural-mediul-zonele-de-risc.pdf



www.erm.com Version: 03 Project No.: 066726 Client: Low Carbon and Rezolv Energy 15 November 2023 Page 121

Figure 6-16 Călmățui River passing north of Smeeni village, north view to pastureland and future location of WTG22, March 2023



Source: ERM, March 2023, Coordinates: N45°0'2.44"; E26°51'33.88"

Călmățui river basin, with a total length of 145 km, has its origin (altitude 92 m above sea level) south of Buzău, in a swampy area, delimited by Buzău city and Stâlpu and Costești communes. Călmățui River obtains its waters from groundwater and runoff and is mostly channelled in order to prevent flooding.

- Călmățui River, cadastral code XVI – 1.46.00.00.0, is a Grade 1 waters collector in the area and direct tributary to Danube; have 4 temporary tributaries, all left side – Negreasca, Rușavăț, Strâmbu, Buzoel. The river is state owned and administered by Apele Române, Buzău-Ialomița Water Basin Administration.

The Project sites and facilities are mainly located in the lower area between Călmățui river and its tributaries.

- Costești and Gherăseni sub-projects are located in the lower meadow area north of Călmățui River and on both banks of Rușavăț tributary;
- Smeeni sub-project is located north of Călmățui River, in the lower meadow and swampy area between Călmățui, Rușavăț and Negreasca tributaries, where the two tributaries have their confluence points with the river;
- Luciu sub-project is located in the meadow area between Călmățui River and Strâmbu tributary.
- Project sites and facilities are located almost entirely north of Călmățui River course, except for the central power collection station 33kv/400kv, overhead transmission line to the national grid, 3 WTGs of Smeeni sub-project.
- Luciu Lake, has an area of approx. 359 ha, is located north of Luciu village and south of Călmățui River course. It is the largest permanent pond in the area, but usually shrinks during the dry season. The lake is public land, owned by Luciu Local Council and is not located within the direct Project Aol, but within the 2 km buffer zone indirect Aol.

Table 6-9 Characterization of surface water bodies in the Project area³⁵

Surface water body	Monitoring point	Chemical condition of the watercourse	Ecological condition of the watercourse
Călmățui_Izv. Av. Cf. Buzoel	Groșani	Good/High condition <i>(out of 161 water bodies monitored within Buzău-Ialomița hydrographic space, 95% have a good/high general chemical condition)</i>	Moderate condition <i>(out of 161 water bodies monitored within Buzău-Ialomița hydrographic space, 51% have a good ecological condition, and 45% have a moderate ecological condition)</i>

6.1.7 Biodiversity and Protected areas

This section describes the ecological baseline relevant to the assessment: the designated sites, habitats and species in the area. Further details are provided in *Appendix D* of this ESIA Report. The “Study Area” was defined as a buffer of 2 km radius around the project footprint. To identify sensitive biodiversity receptors in the wider area designated and recognised conservation sites have been identified out to 20 km from the Project Site.

Summary of Baseline Findings

1. Designated and Protected Areas

A total number of 14 national and international designated areas have been identified in the study area, 2 of which are partially overlapped by the project footprint: ROSCI0259 Valea Călmățuiului (Site of Community Importance) and ROSPA0145 Valea Călmățuiului (Special Protection Area);

2. Flora

A total of 122 plant species were recorded in the study area.

The plant species recorded belong to the following categories: a) halophytic species that grow on heavily saline soils with excess moisture at the beginning of the vegetation period; b) optional or supporting halophytic species with fluctuating soil moisture regime and high salt content (1-1.5%); c) non-halophyte species, tolerant of salinity.

No endemic plant species and no species of community interest or species listed on the Red List of plants in Romania were recorded. Moreover, the majority of species recorded have not been evaluated by IUCN, but all those that occur within the project footprint are listed as Least Concern (LC).

Invasive Alien Species

Throughout the surveyed area, the presence of drainage/irrigation channels, currently semi-dry and dominated by invasive species (*Xanthium spinosum*, *Xanthium italicum*, *Eleagnus angustifolia*), were recorded. These are common non-native weeds linked to agriculture.

3. Habitats

A total of 17 EUNIS habitats were identified in the study area during the field surveys conducted, of which five are assessed as natural habitat. The major habitat types are R622 Ponto-Sarmatic salt steppes and saltmarshes, followed by V1 Arable land and market gardens and V34 Trampled xeric grasslands with annuals.

The steppe habitat identified corresponds to Annex 1 priority habitat 1530* Pannonic salt steppes and salt marshes, listed in the Habitat Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora).

³⁵ http://buzau-ialomita.rowater.ro/wp-content/uploads/2022/02/Subcap-6.2-Stare_Potential_eco_draft-PM-III.pdf

Most of the priority habitat affected by the project is in poor condition due to drought, continuous intensive grazing with unsustainable stocking densities. Thus, the maximum height of vegetation is extremely low (<5 cm), and some plant species are adopting different reproductive strategy such as vegetative propagation.

4. Birds

Vantage points

A total of 63 different species of birds were recorded during the field surveys;

- Thirty three bird species are listed on the Annex I of Birds Directive;
- According to IUCN eight bird species are listed as Near Threatened or higher
- Twenty eight species are listed on the Romanian Red Book of Vertebrates as Vulnerable or higher;
- No distinct migratory corridors were recorded in the Project area and the area is not considered a key wintering bird area based on the baseline survey.

The Collision Risk Model identified 15 species where mortality was predicted within the lifetime of the project. Of these five are common and widespread species where wind farm mortality was unlikely to exceed natural variability. Eight were taken forward for Potential Biological Removal analysis on the basis of either conservation status, being a qualifying species of the Special Protection Area, or known sensitivity to collisions. Of these none exceeded the PBR threshold.

Breeding

A total of thirty-three bird species were confirmed as breeding in the study area. The baseline data reveals that most are wetland breeding birds or relatively common and/or widespread farmland birds whose nesting habits are likely to be linked to changing crop patterns and/or retained habitat features such as ditches, thickets and trees.

5. Bats

Ultrasound transects and point counts

- Eleven species or species groups were recorded, all being listed on Annex IV (strictly protected species), and two listed on Annex II (species that member states are required to designate sites for) of the Habitat Directive;
- According to IUCN Red list, *Barbastella barbastellus* (Western Barbastelle) is assessed globally as NearThreatened; Vulnerable at European level and *Nyctalus lasiopterus* (Giant Noctule) assessed as Vulnerable at Global level.

Static ultrasound detectors

- Fifteen bat species or species groups were identified in the project's area, all are listed on Annex IV (strictly protected species), and two of them listed on Annex II (species that member states are required to designate sites for) of the Habitat Directive;
- Calls of *Pipistrellus nathusii/kuhlii* are dominant on project's area, followed by *Nyctalus noctula* and *Pipistrellus pipistrellus*;
- According to Eurobats Guide eight of these species have high risk of wind turbine collision, while 2 of them are quoted as having medium collision risk.

Roost searches

- Potential anthropogenic and natural bat roosts were identified in the study area;
- The searched confirmed three roosts: two of *Pipistrellus kuhlii* and one maternity roost of *Eptesicus serotinus*.

Emergence/re-entry surveys at high bat roosts

- Emergency/ re-entry studies were conducted at locations which were deemed of high importance: 1) abandoned building in the center of Pogoanele, 2) Abandoned sanitary building in Caragele, 3) Old train station in Cilibia and 4) Abandoned house in Udați- Lucieni.
- Pogoanele abandoned building confirmed roost for *Popostrellus kuhlii* while Udati Lucieni site confirmed roost usage for *Eptesicus serotinus*.

Full night monitoring at Static detector 5

- Observations were dominated by *P.nathusii/kuhlii*;
- A relatively small number of bats appear to be driving the activity recorded on the static detector, particularly when they are feeding in the vicinity of the static detector. Feeding was the dominant behaviour observed;

6. Mammals

The key findings about mammals in the study area are summarized below:

- There are not any endemic species among the mammals recorded in the study area;
- IUCN assesses *Spermophilus citellus* (European souslik) both globally and at European level as Endangered and *Lutra lutra* (Eurasian otter) both globally and at European level as Near Threatened. One species is Globally Data Deficient but Least Concern at the European level (*Nannospalax leucodon* – Lesser mole rat);
- Red Book of Vertebrates from Romania assesses one species as Endangered (*Neomys anomalus* – Southern water shrew) and four species as Vulnerable (*Canis aureus*– Golden jackal, *Capreolus capreolus* –European roe deer, *Lutra lutra* – Eurasian otter and *Spermophilus citellus* –European souslik).

7. Reptiles and Amphibians

The key findings about reptiles and amphibians in the study area are summarized below:

- There are no endemic species among the amphibians recorded in the study area;
- Only one species is described as Near Threatened by the IUCN: *Emys orbicularis* (European Pond turtle);
- According to other international references: four species are included in Annex II and Annex IV of Habitats Directive (the fire bellied toad, the eastern tree frog, the green toad, the European pond turtle);
- According to the National Red List, two species (the green toad and the fire-bellied toad) are assessed as Near Threatened and two species (the European tree frog and the European pond turtle) are assessed as Vulnerable.

8. Invertebrates

The key findings about invertebrates in the study area are summarized below:

- The focal species, Large copper *Lycaena dispar*, was not found by baseline surveys.
- The southern festoon *Zerynthia polyxena*, was observed in the study area but not within the development footprint.

6.2 Socio-Economic Environment

6.2.1 Socio-economic baseline conditions

Find below an overview of key socio-economic baseline conditions. For more detailed baseline information see Appendix C.

6.2.1.1 Social Area of Influence

The Project's Social Area of Influence (AoI) was defined as follows:

- the indirect Social AoI (considered as study area for the desktop data review) includes the entire Buzău County, where the Project site is located. This also includes Buzău Municipality (main urban centre and the seat of the county, having the same name as the county). The larger area could be experiencing economic and employment impacts as a result of the Project implementation through employment of workforce and supply of goods and services, also considered for cumulative impacts;

- the direct Social Aol, also understood as the study area for the socioeconomic qualitative baseline data collection field survey. The Direct Social Aol, hereinafter referred to as Social Aol, comprises:
 - settlements impacted by land take for the Project components: substation, access roads, turbine foundations and crane pads, underground electrical cables – all land plots required by the Project belong to the administrative territorial units of Costești, Gherăseni, Smeeni, Luciu and Țintești communes;
 - settlements that could be affected by potential temporary environmental impacts during the construction phase and long-term during operations, such as noise, shadow flicker, etc. located in a 2 km buffer from the WTGs.

6.2.1.2 Government and administrative structure

Since 2007 Romania is a member of the European Union. The country is also a founding member of the International Labour Organisation.

At the intermediate administrative level Romania's four micro-regions are divided into counties, while communes, towns and municipalities (cities) form the local administrative level.

The Buzău County is located in the southeaster part of the country, in the South-East Development Region. It consists of 82 communities, 3 towns and 2 municipalities (including the capital city - Buzău Municipality), and 475 villages.

The Social Aol consists of four communes of rural character - Costești, Gherăseni, Smeeni, Luciu, and the urban-rural Pogoanele commune with the Pogoanele Town.

6.2.1.3 Planning and Development

The country's development is based on a number of strategic documents from the European to the local level.

Each commune in the Social Aol prepared the local development strategy for 2021 – 2027, guiding priority investments in the area.

6.2.1.4 Demographics

Romania had a total population of approximately 19 million people in 2021; however the country experienced a strong population decline in recent years.

In 2021 the total population of Buzău County was about 403,868 people with more female than male; the largest population group was economically active (i.e. between 50-55 years old) with the average population age at 44.4 years. Although most of the county inhabitants are Romanian, over 4% of the population belongs to Roma ethnicity. Additionally, 100 Ukrainian refugees were registered in Buzău County, mostly mothers with children and elderly women who were hosted in Buzău City.

The largest population in the Social Aol resides in the Pogoanele commune, followed by Smeeni commune. On the other hand, Luciu commune has the smallest population number. In general, a population-decreasing trend is evident within the communes. Although the Sol is defined by a strong majority of Orthodox Christian Romanians, a relative larger Roma minority is present in settlements closer to Buzău city (close to Costesti Commune) and in Luciu commune.

6.2.1.5 Land ownership and use

Most of the land in the country constitutes a private land of individuals. Similarly at the county and local level, over 90% of land is private. Almost half of the land in the country is arable land (42%), followed by forests and other forest vegetation (27%), and pastureland (15%).

Buzău County and the communes of the Social Aol follow the national ratio in terms of arable, pasture and forest land. The decrease in floodplains and marches has been observed due to channelling works of rivers in the County.

6.2.1.6 Economy, employment, and livelihoods

Romania has been experiencing economic growth in recent years, with agriculture and industry showing a decreasing trend in the country's GDP. The primary sector includes mining, agriculture, animal husbandry, fisheries and aquaculture, and forestry. The secondary sector in Romania contributed with more than 27% to the national GDP in 2021 and is focused on energy resources and power and on labour-intensive manufacturing, including food processing, textiles, and wood processing. The construction sector accounts for 6.85% of the national economy. The tertiary, services sector, represents the largest economic sector in Romania and includes the provision of services to other businesses as well as to final consumers.

Government revenues in Romania are less than 30% of GDP with a low tax burden on labour force. What is more, similarly to other European countries, the inflation in Romania is high – in December 2022 the annual inflation level was equal 16.4%.

The employment rate for the working-age population of Romania was 61.9% in 2021, increasing by 1.7% following the pandemic onset in 2022. More men are employed than women (71.1% compared to 52.5%), with higher employment levels in urban (67.2%) than rural (55.5%) areas. Women are not disadvantaged in education and are even overrepresented in higher education (the ratio of girls to boys enrolled in tertiary education is 1.2), but they may end up earning less than men while working in similar jobs.

The unemployment rate in Romania in 2021 was 5.6%. The largest unemployment group was youth (15-24 years old) in rural areas (23.8%).

In 2021, the active population of Buzău County was approximately 134,000 people and included 82,000 people in employment. Over 25,000 people are engaged in agriculture, however with the lowest employment level. The highest employment was in manufacturing and trade, while the highest level of female employment was recorded in health and education.

The highest unemployment level in the Social Aol was noted in Luciu commune (12%), while Costești commune had the smallest rate registered. Overall, unemployment is higher for men than women. Main employment sectors include the public sector - administration, education and health and the private sector - mainly manufacturing, construction, commerce, transport and agriculture companies present in the local area. Many workers commute from the Social Aol to Buzău City. Additionally, pensioners represent a significant group in the community with many identified challenges.

The main livelihood activity in the Social Aol is agriculture, practised at both economic and subsistence levels. Most of the farmers do not receive an additional salary, they are self-employed or considered as unpaid domestic workers. Additionally, in 2022 there were 1,360 authorised beehives in the county. Construction works also are a relevant livelihood activity. Civil works including road rehabilitation, gas and water systems are ongoing in the Aol, involving local and national companies.

6.2.1.7 Infrastructure and public services

Most of the households in the Social Aol are connected to the centralised power supply. Additionally, wood and coal are used for heating, while cooking is mostly done via liquified petroleum gas tanks. The communes are also connected to the centralised water supply systems, however there are some challenges with the wastewater treatment, with part of the Social Aol not being part of the centralised sewage system (including Smeeni, Costești, and parts of Pogoanele). Although the waste management system is present in all communes, it appears to be inadequate with waste collecting on the streets.

The housing stock consists largely of detached houses, but some blocks of flats are also present in Pogoanele and Smeeni. Around 100 of new houses are built each year in rural areas of the Social Aol.

6.2.1.8 Education and skills

Despite high adult literacy rate (almost 99%) in Romania, in 2021, only 50% of population aged 16-19 had basic or above-basic digital skills. Many educational challenges in the country are a result of

small expenditure on schooling, the highest percentage of early leavers from education and training in the EU, and unequal access to quality education, amongst others. There is also a substantial mismatch of workers' skills in Romania.

There are three tertiary education options offered by faculties within the Buzau Unit of 'Dunarea de Jos' University from Galati: Sport, Law, and Agriculture diplomas. Vocational paths offered in the Buzău County include agriculture, mechanics, environmental protection, tourism. Pre-school, primary and lower secondary education is available in all communes of the Social Aol. Additionally, the upper secondary education is available in Pogoanele Town and Smeeni commune. Additional funding is needed for outdoor sports facilities and school extra-curricular activities.

6.2.1.9 Community health and safety

- Access to healthcare services is free in Romania. The leading cause of mortality is cardiovascular disease, while lung cancer is the most frequent cause of cancer death. Although the spending on health services in the country has been increasing, it stays below the EU average.
- At the county level, there were 7.1 doctor specialists per 10 000 inhabitants in 2019. The main causes of death in Buzău County were circulatory system diseases, although respiratory diseases have been on the rise in recent years. The number of work-related accidents has been decreasing in Buzău County, from 67 cases in 2017 (out of which 8 were fatal) to 51 cases reported in 2021 (out of which 3 were fatal).
- In the direct Social Aol, the level of provided healthcare is satisfactory. Each commune has a dedicated family doctor. Additionally, community nurses are available, travelling to patients and serving the most vulnerable groups. Elderly care infrastructure is also present in the Social Aol.

6.2.1.10 Security

- In general, more men are convicted of a crime than women in Romania. In terms of the type of crime, public road traffic offences were the most prevalent, followed by offences against patrimony and offences against persons. Romania is also considered a country of origin for victims of human trafficking.
- Public perception of renewable energy projects in Romania is good, with around 82% of Romanians accepting the possibility of having a wind farm investment in their nearest neighbourhood.
- In the Social Aol, excessive alcohol consumption and gambling were noted, while domestic violence and prostitution are not perceived as persistent issues. Several traffic accidents are mentioned in local media, some of them caused by alcohol.

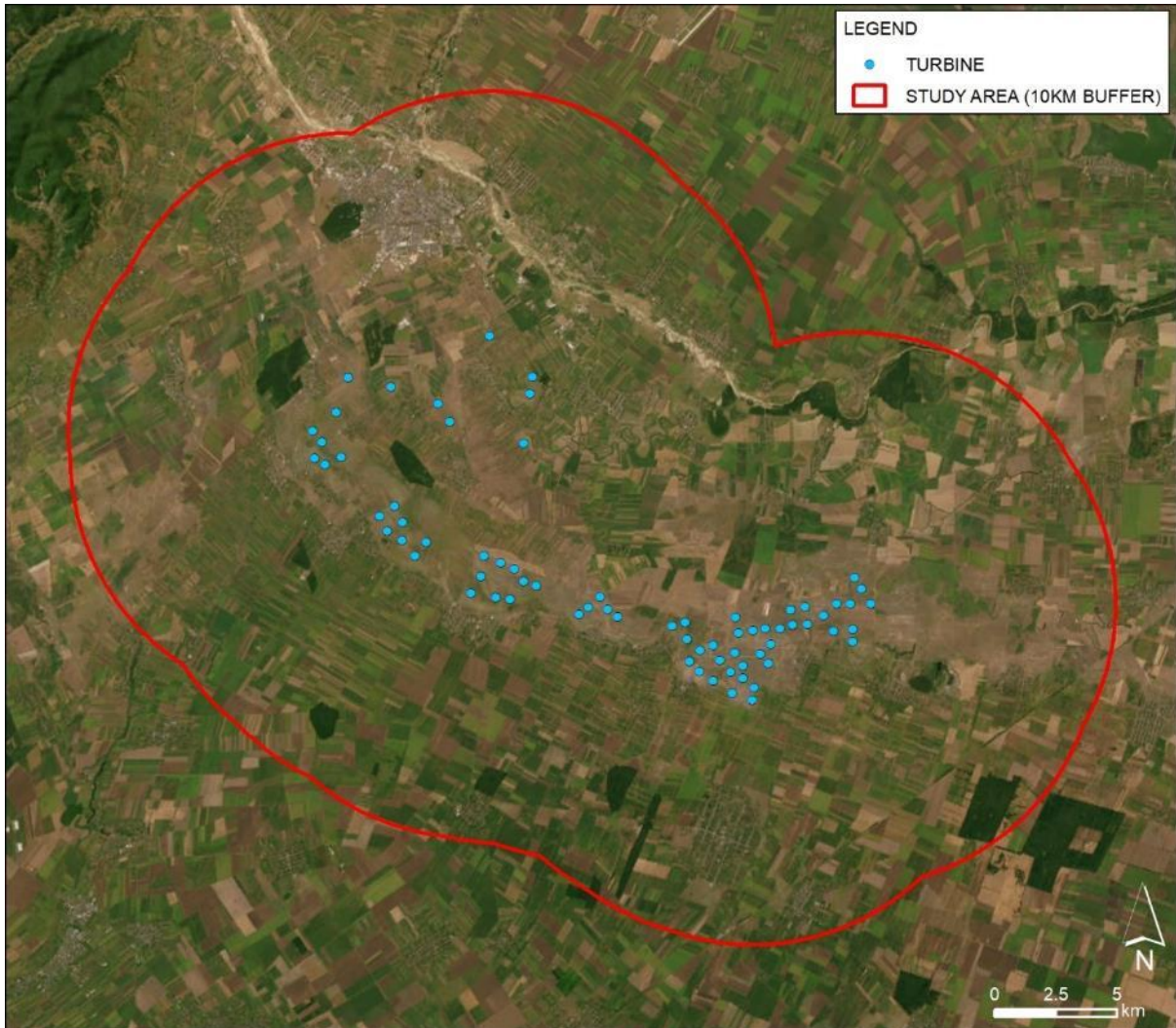
6.2.2 Landscape and Visual

This section provides a summary of the existing environmental conditions within the Project study area. The local environmental setting was determined through desktop analysis and photos from fieldwork (performed in March and July 2023) to gain a general understanding of the site visual context and landscape setting.

6.2.2.1 Landscape Area of Influence

The landscape area of influence was identified as a buffer of 10 km from each turbine to understand the wider landscape setting and context and where it is assumed that most of the potential impacts will occur (Figure 6-17).

Figure 6-17 Landscape Study Area



Source: ERM

6.2.2.2 Landscape Key baseline conditions

The landscape is characterized by different components: topography, land use and potentially sensitive areas relating to landscape (e.g., cultural heritage sites), and according to the presence of common elements. Therefore, the proposed assessment has been developed according to the following tasks:

- Description of the baseline landscape and topography in the study area;
- Mapping and description of Landscape Character Unit (LCUs);

- Landscape character; and
- Landscape value.

Topography

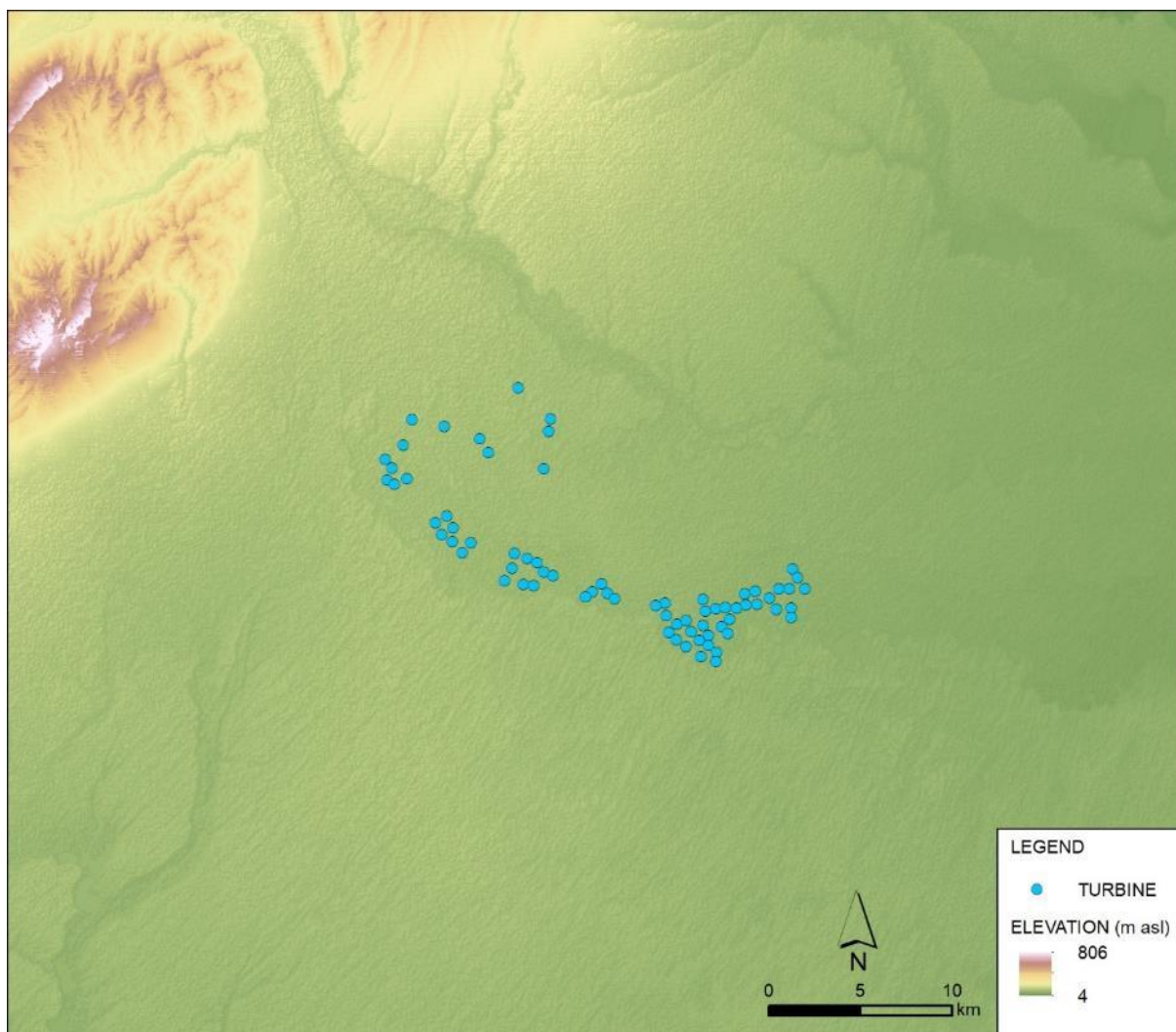
Romania's landscape is almost evenly divided among mountains, hills, and plains. These varied relief forms spread rather symmetrically from the Carpathian Mountains, which reach elevations of more than 2,400 metres, to the Danube Delta, which is just a few metres above sea level.

Beyond the Carpathian foothills and tablelands, the plains spread south and west. In the southern parts of the country, the lower Danube Plain is divided by the Olt River. Romania's lowest land is found on the Danube Delta.

The Project is located within Călmățui river floodplain. The topography is generally flat, with elevations ranging from 80 m above sea level (asl) in the north-western areas of the Project to 50 m asl in the eastern areas.

The landscape of the Project Area and topography are shown in Figure 6-18.

Figure 6-18: Topography of Project Area



Source: ERM

Landscape Characteristic Unit (LCU)

The One Earth³⁶ has classified landscape into “*bioregions*” (Landscape Characteristic Unit map Figure 6-19). A bioregion is a geographical area defined not by political boundaries but by ecological systems and could contain one or more ecoregions. The Bioregions 2023 framework is organized by the world's major biogeographical realms, the broadest divisions of Earth's land surface in which ecosystems and groupings of organisms share a common evolutionary history. These roughly correspond to the major continents of the Earth but are further subdivided.

Each ecoregion is characterized by distinct landscape characteristics. The Project is located across two bioregion:

- European Interior Mixed Forest ((PA12); and
- Pontic Steppe Grassland (PA16).

European Interior Mixed Forest

The European Interior Mixed Forests bioregion is located in the Western Eurasia realm (western Palearctic) and contains three ecoregions:

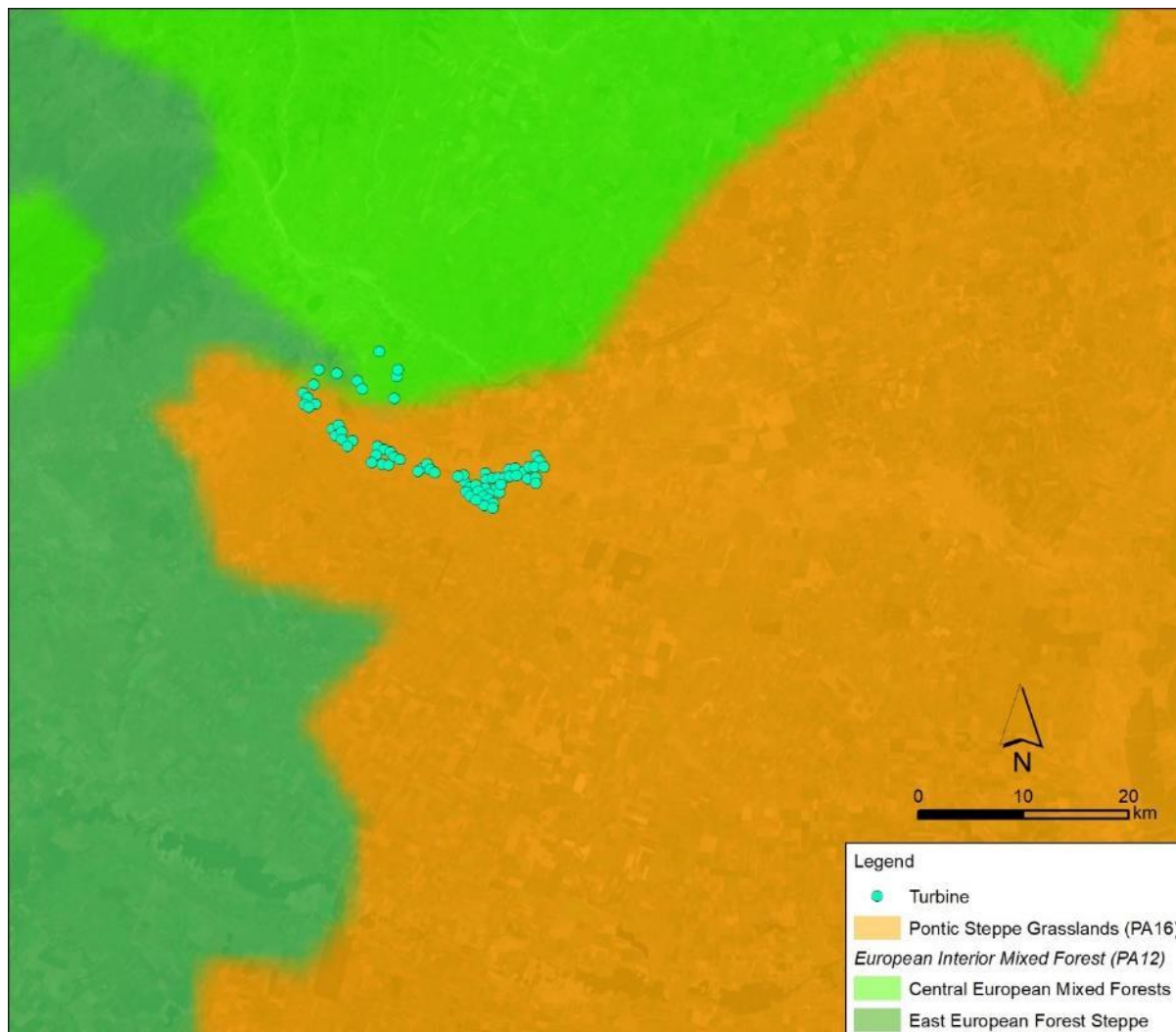
- *East European Forest Steppe (661)* - The majority of this ecoregion lies within the Russian Federation, extending into Ukraine, Moldova, the Carpathian foothills in Romania, and finally the Northeastern corner of Bulgaria. This mosaic of woodland and steppe is a transition zone, linking the temperate broadleaf forests of the North with the steppic grasslands of the South. It is the demarcation between humid and arid environments, experiencing a temperate continental climate with warm summers and cold winters.
- *Central European Mixed Forests (654)* - Traversing the lowland plains of Northern Europe, this ecoregion spans large areas of Poland, Belarus, Lithuania, and Ukraine; small portions extend into Germany, Romania, Moldova, Austria, and the Russian Federation. There is a continental climate, which is most pronounced towards the East. Natural forests contain oak, European hornbeam, lime, and beech, though Norway spruce and European silver fir are common in the North.
- *Western European Broadleaf Forests (686)* - This ecoregion covers a large part of Western Europe, including the upland areas of massifs central, central German uplands, Jura mountains, Bavarian plateau, and Bohemian massif. Some of the highest peaks include the Great Arber (1,456 m), Cret de la neige (1,718 m), and Puy de Sancy (1,885 m). The region experiences high rainfall, with annual rainfall around 1,000 mm in the Jura mountain valleys, reaching more than 2,030 mm at higher elevations.

Pontic Steppe Grasslands

The Pontic Steppe Grasslands bioregion is located in the Western Eurasia realm (western Palearctic) and contains one single ecoregion – Pontic Steppe (735). The Pontic Steppe arises in the northeastern most corner of Bulgaria, extending across Southeast Romania, Southeast Moldova, Southeast Ukraine, through Russia, and into Northwest Kazakhstan. At its Southern limits, the ecoregion touches the shorelines of both the Black and Caspian Seas. A temperate climate with appreciable winter rain generates characteristic European steppe vegetation; feather grasses and fescues are peppered with sages and colorful spring ephemerals. Countless lakes, channels, and islands form a labyrinth of water and land at the Danube Delta in Romania, which hosts the widest area of compact reeds in the world.

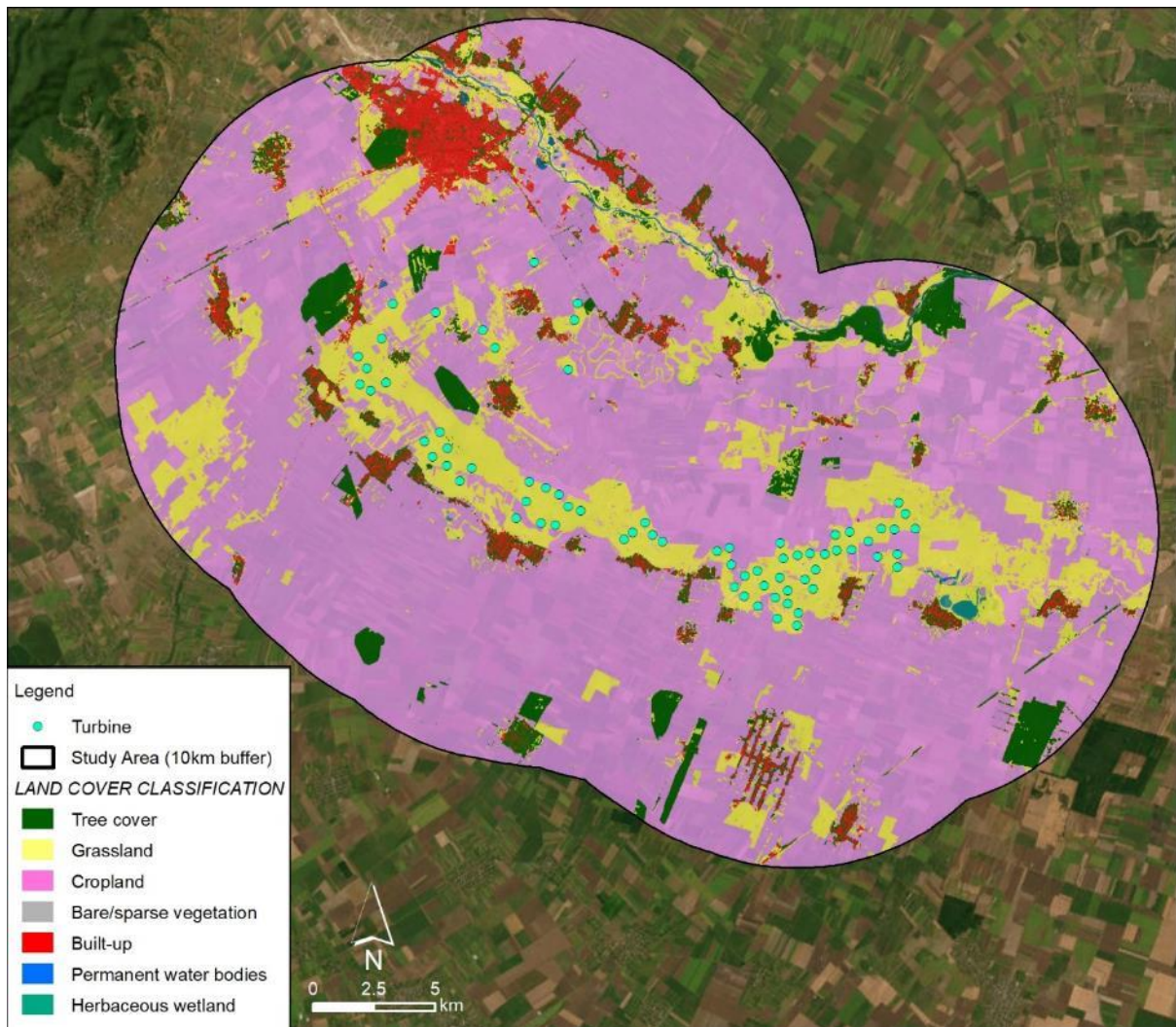
Figure 6-19: Landscape Characteristic Unit map

³⁶ <https://www.oneearth.org/>



Source: ERM

Moreover, a Land Cover map was extracted for the area nearby the Project (Figure 6-20). The land within the study area is mainly characterized by cropland and grassland in the areas surrounding the turbines. There are several settlements inside the Study Area.

Figure 6-20: Land Cover Map

Source: ERM

Given the general homogeneity of the area where the Project will be located, a single Landscape Characteristic Unit (LCU) is proposed.

- Factors affecting the sensitivity of change for landscapes are:
 - Importance and rarity of special landscape elements;
 - Ability of the landscape to accommodate change;
 - Significance of the change in the local and regional context; and
 - Maturity of the landscape.
- Figure 6-21 provides photos showing some of the main features of the landscape.

Figure 6-21: Photos of Nearby Landscape

Source: ERM

Protected Areas

During the desktop baseline review, the following national and international protected areas have been considered:

- National parks, reserve forests and other locally protected areas;

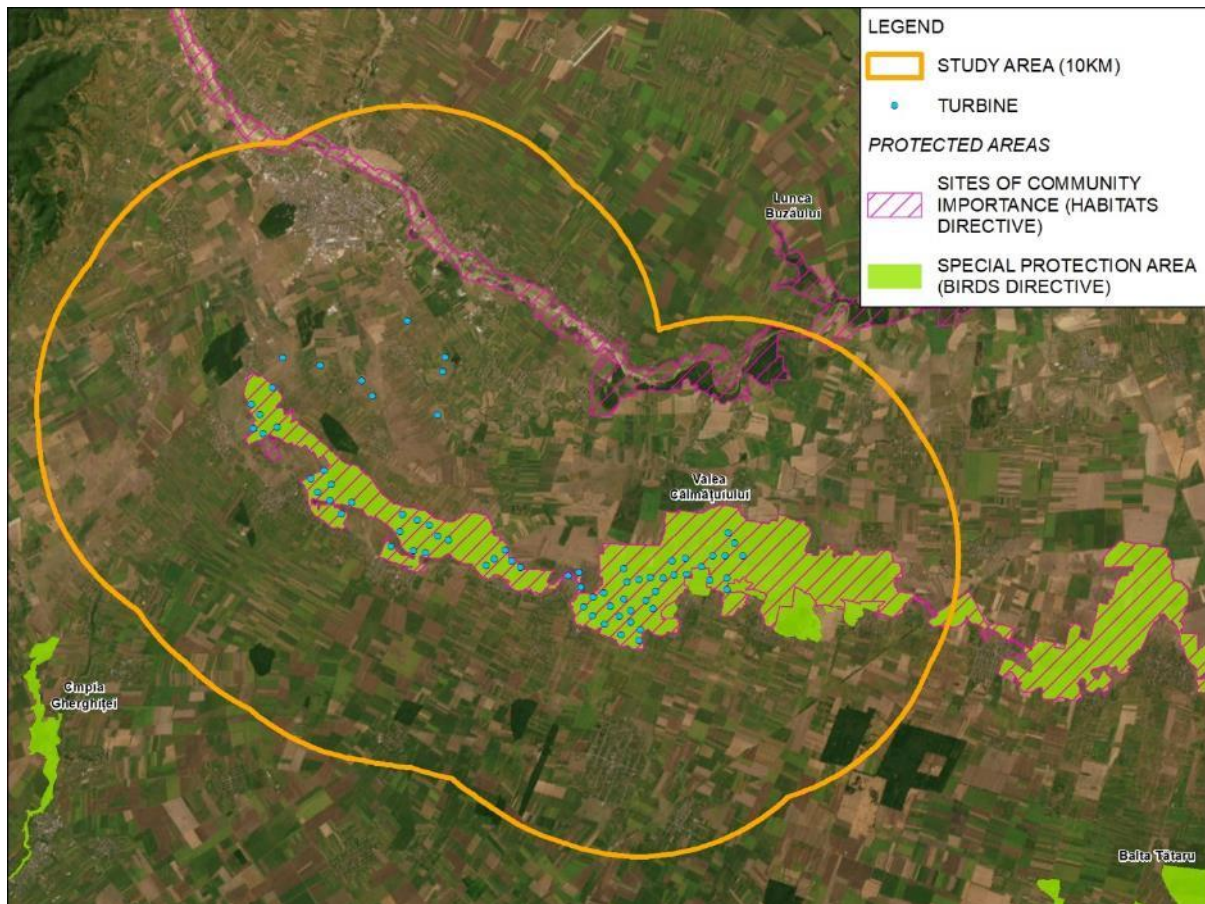
- BirdLife International Important Bird Areas (IBA) and Endemic Bird Areas;
- International Union for Conservation of Nature (IUCN) Protected Areas;
- RAMSAR³⁷ Wetlands of International Importance;
- United Nations Educational, Scientific and Cultural Organization (UNESCO) Man and Biosphere (MAB) Reserves;
- World Heritage Sites; and
- World Commission on Protected Areas.

Protected Areas include areas that are legally designated or officially proposed for biodiversity protection and conservation, while areas with recognized high biodiversity values are areas that have been voluntarily conserved by local communities through customary laws or other effective means.

For this Project, areas with recognized high biodiversity values include Protected Area (PAs) and Internationally Recognized Areas, shown on the map in Figure 6-22. Several of them are recognised as Important Bird Areas (IBAs) and these are relatively large in extent.

The Project area partially overlaps with the Natura 2000 sites ROSCI0259 Valea Călmățuiului (Site of Community Importance/SCI) and ROSPA0145 Valea Călmățuiului (Special Protection Area/SPA).

Figure 6-22: Protected Areas



Source: ERM

³⁷ The Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat

6.2.2.3 Visual Area of Influence

The visual area of influence is defined as the area within which the Project could be discernible by the human eye and could interfere with the main sensitivities identified in the local context.

The Zone of Theoretical Visibility (ZTV) has been determined through computer analysis of topographical mapping to establish the theoretical distance from which the wind turbines could be visible in each direction.

The wind turbines are the major visual element of the proposed development and may visually impact the surrounding areas. As the viewer moves further away from these structures the visual impact decreases until it is no longer visible. However, before the point of non-visibility is reached, the wind turbines have reduced in scale such that they no longer have a significant visual impact.

Table 6-10 explains how a view-shed is defined and identified depending on the horizontal and vertical field of views.

Table 6-10 Field of View

Field of View	Diagram
<p>A. Horizontal Field of View</p> <p>For most people, the horizontal central field of view covers an angle of between 50° to 60°. Within this angle, both eyes observe an object simultaneously but from a slightly different angle. This creates a central field of greater magnitude than that possible by each eye separately. This central horizontal field of view is termed the 'binocular field' (see green zone). Within this field images are sharp, depth perception occurs and color discrimination is possible. Research suggests that the visual impact of a project component will vary according to the proportion the binocular field it occupies. Project components that occupy 5%/2.5° or less of the horizontal central binocular field of vision are usually perceived as insignificant objects, whereas components that occupy 30° are considered to be visually dominating.</p>	
<p>B. Vertical Field of View</p> <p>The vertical central field of view has a similar set of parameters. The vertical binocular field is normally 25° above the vertical and 30° below the vertical. When project components exceed the 50° upper visual limit of the eye, they are considered to dominate the vertical central field of view. When project components occupy 0.5° they are not considered dominant, nor are they usually perceived as a significant change to the existing baseline condition when they are located within an anthropogenically modified landscape.</p>	
<p>C. Horizontal Versus Vertical Visibility Over Distance</p> <p>As a person moves further away from a project component, the visibility of the vertical dimension tends to reduce more significantly than the visibility of the horizontal dimension.</p>	

Source: ERM

The wind farm is comprised of a number of individual turbines of the same dimensions (166 m hub height and 162 m rotor diameter), with large separation distances between each individual turbine, about 300 m. When assessing the visual impact of the wind turbines, it is assumed that the largest horizontal component is the entire rotor, which would be a maximum of 162 m wide.

As shown in **Table 6-11**, calculations suggest that the impact of a 162 m wide wind turbine rotor would reduce to be insignificant at about 3.7 km, as it would form less than 5% or 2.5° of the horizontal field of view (physical parameters are illustrated in **Table 6-12**).

Table 6-11 Horizontal field of view

Horizontal Field of View	Impact	Distance from Observer to 162 m Turbine Rotor
<2.5° of view	The development will take up less than 5% of the central field of view. The development, unless particularly conspicuous against the background, will not intrude significantly into the view. The extent of the vertical angle will also affect the visual impact.	>3.7 km

Horizontal Field of View	Impact	Distance from Observer to 162 m Turbine Rotor
2.5° – 30° of view	The development will usually have a moderate impact that may not be noticeable at the greatest distance of this range.	302 m to 3.7 km
>30° of view	Developments that fill more than 50% of the central field of vision will always be noticed and only sympathetic treatments will mitigate visual effects.	<302 m

Source: taken from *Guideline for landscape and visual impact assessment, Third Edition (GLVIA3)*, Landscape Institute and IEMA 2002 and Horner + Maclellan and Envision (2006) *Visual representation of windfarms: good practice guidance*, Inverness. Scottish Natural Heritage

A similar analysis can be undertaken based upon the vertical field of view for human vision. **Table 6-12** shows the relationship between impact and the proportion that the development occupies within the vertical line of sight.

Table 6-12 Vertical field of view

Vertical Line of Sight	Impact	Distance from Observer to a 247 m Turbine
< 0.5° of vertical angle	A thin line in the landscape.	>28.3 km
0.5° – 2.5° of vertical angle	The degree of visual intrusion will depend on the development's ability to blend in with the surroundings.	5.6 – 28.3 km
> 2.5° of vertical angle	Usually visible, however the degree of visual intrusion will depend on the width of the object and its placement within the landscape.	<5.6 km

Source: taken from *Guideline for landscape and visual impact assessment, Third Edition (GLVIA3)*, Landscape Institute and IEMA 2002 and Horner + Maclellan and Envision (2006) *Visual representation of windfarms: good practice guidance*, Inverness. Scottish Natural Heritage

6.2.2.4 Visual Key baseline conditions

Based on the above, it is reasonable that distances greater than 28.3 km would result in an insignificant magnitude of visual impact from the wind turbines, as a fully visible wind turbine would be an insignificant element within the landscape.

Generally, the more conservative or worse-case distances form the basis for the assessment of visual impacts. Therefore, for this Project the greater impacts would be associated with the vertical field of view and so it is proposed to extend the view shed to 30 km for the wind farm.

Arc Map 10.8 was used to determine the ZTV for the Project. The current visibility within the ZTV will vary depending on the presence of intervening local topography and other features, such as vegetation and buildings. The present view shed analysis has been based solely on topography and did not take into account the potential screening granted by the local vegetation patches, which would further reduce the actual view shed. Moreover, it should be highlighted that a typical view shed assessment does not take typical meteorological conditions into account that can result in changes to real visibility. For example, rainfall and other atmospheric conditions (e.g., sand transported by the wind) will alter the visibility of the Project. The diminution of visual clarity brought about by atmospheric conditions also increases with distance, and cloudy days can result in a natural attenuation of the visibility of the Project.

Three different view shed analyses were undertaken at different heights to provide a better understanding of the degree of visibility. These mapping outputs illustrate the number of wind turbines potentially visible from within the Study Area for the different turbine visibility elements.

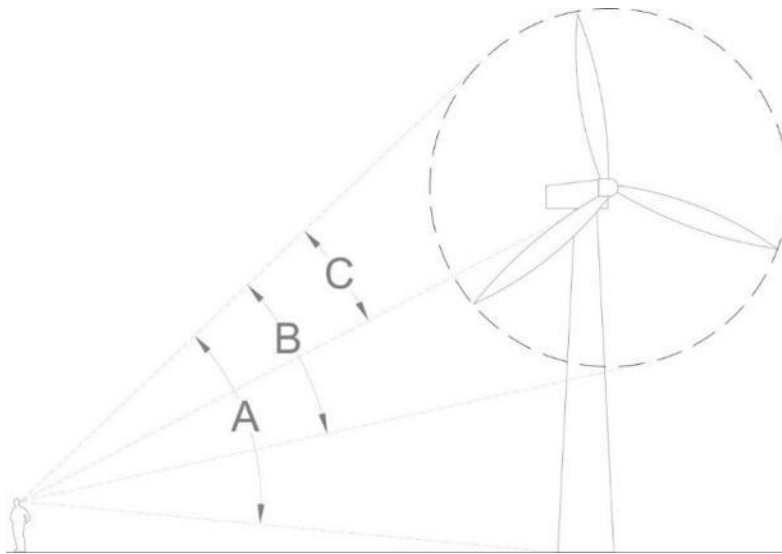
Table 6-13 and Figure 6-23 show the range of visibility options that have been mapped for turbines in the following GIS based analysis and Figure 6-24 , Figure 6-25 and Figure 6-26 show the ZTV mapping.

Table 6-13 Mapping Turbine Visibility Elements

Zone	Extent That Wind Turbines Are Visible
Zone A	One or more wind turbines in their entirety
Zone B	The entire path of the blades of one or more wind turbines
Zone C	At least half of the path of one or more wind turbines
Zone D	Any part of the wind turbine blades of one or more wind turbines

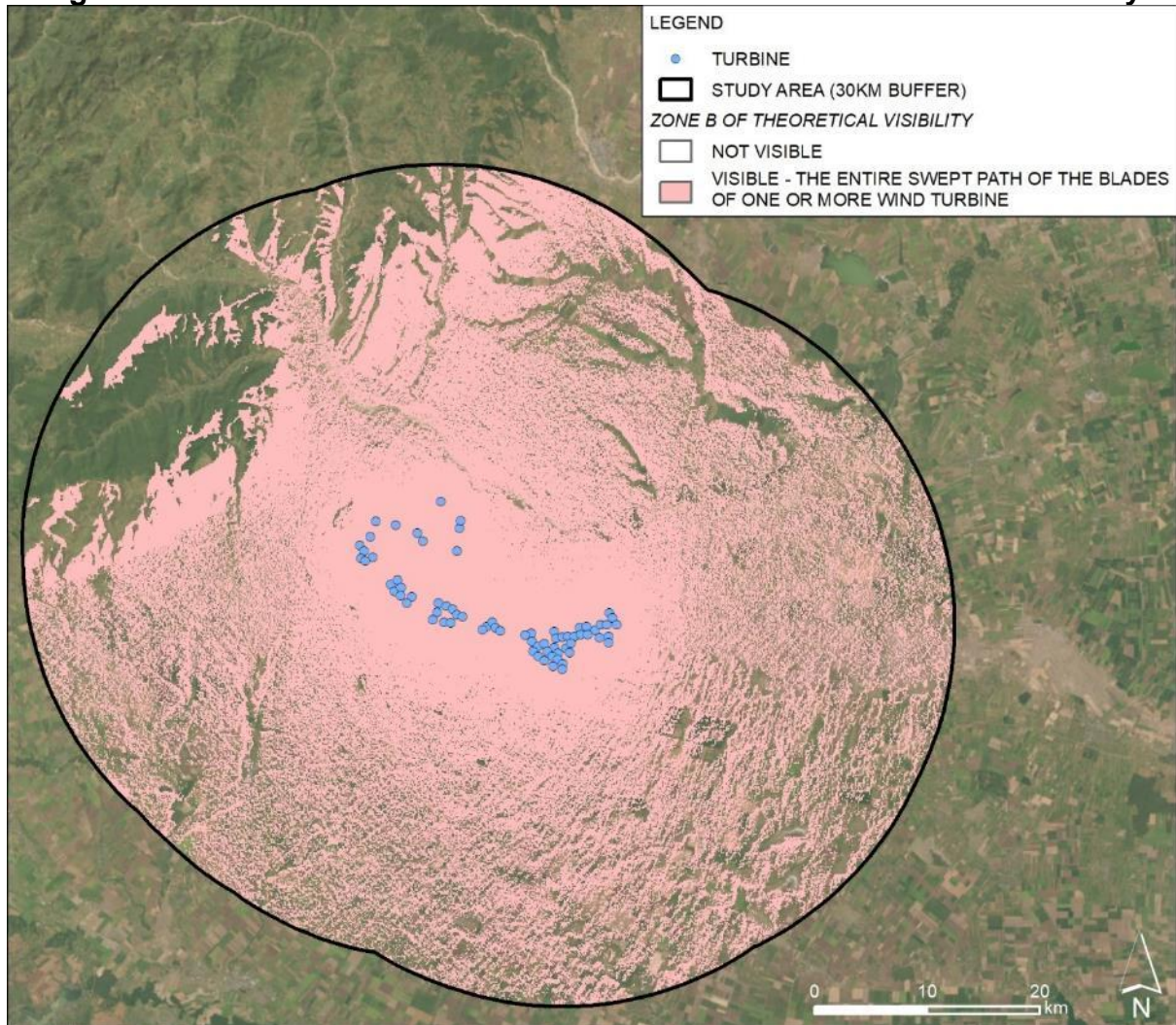
Source: ERM, using Client data, 2022.

Figure 6-23 Turbine Visibility Elements



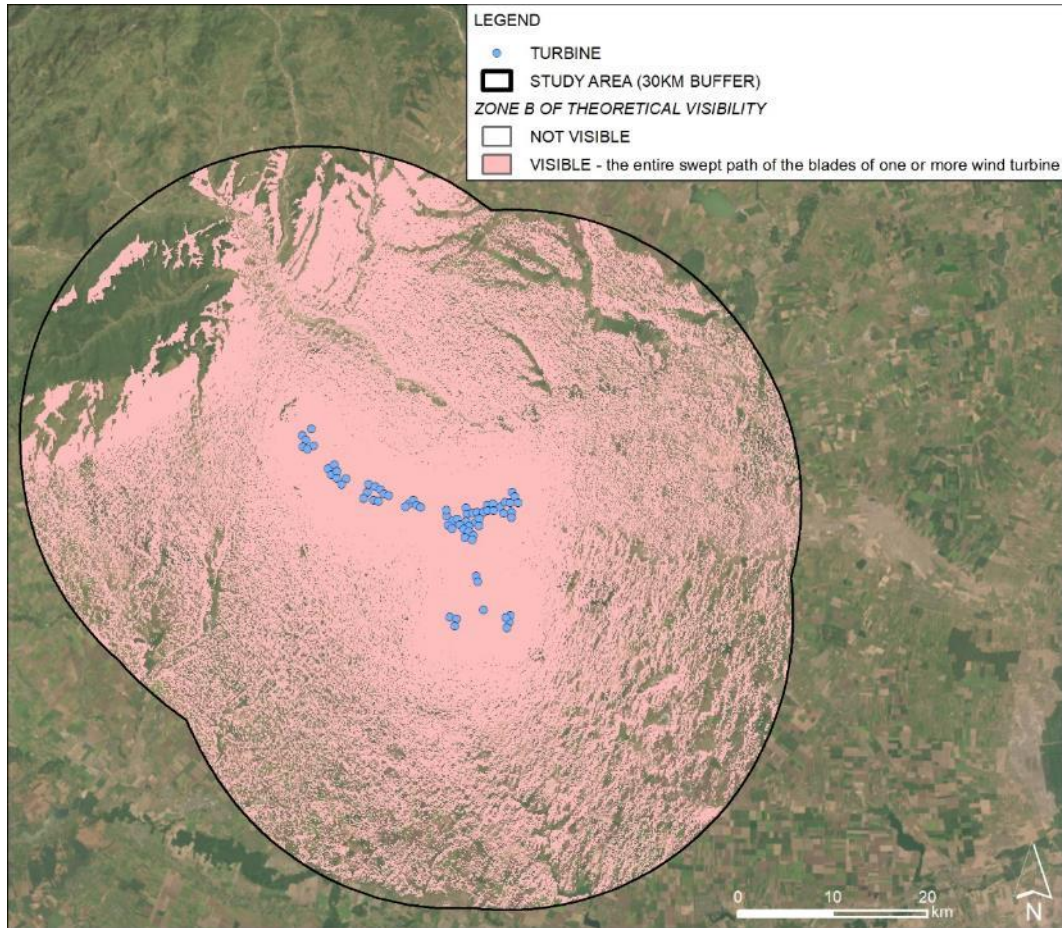
Source: ERM

Figure 6-24 View shed Zone A: One or more wind turbines in their entirety



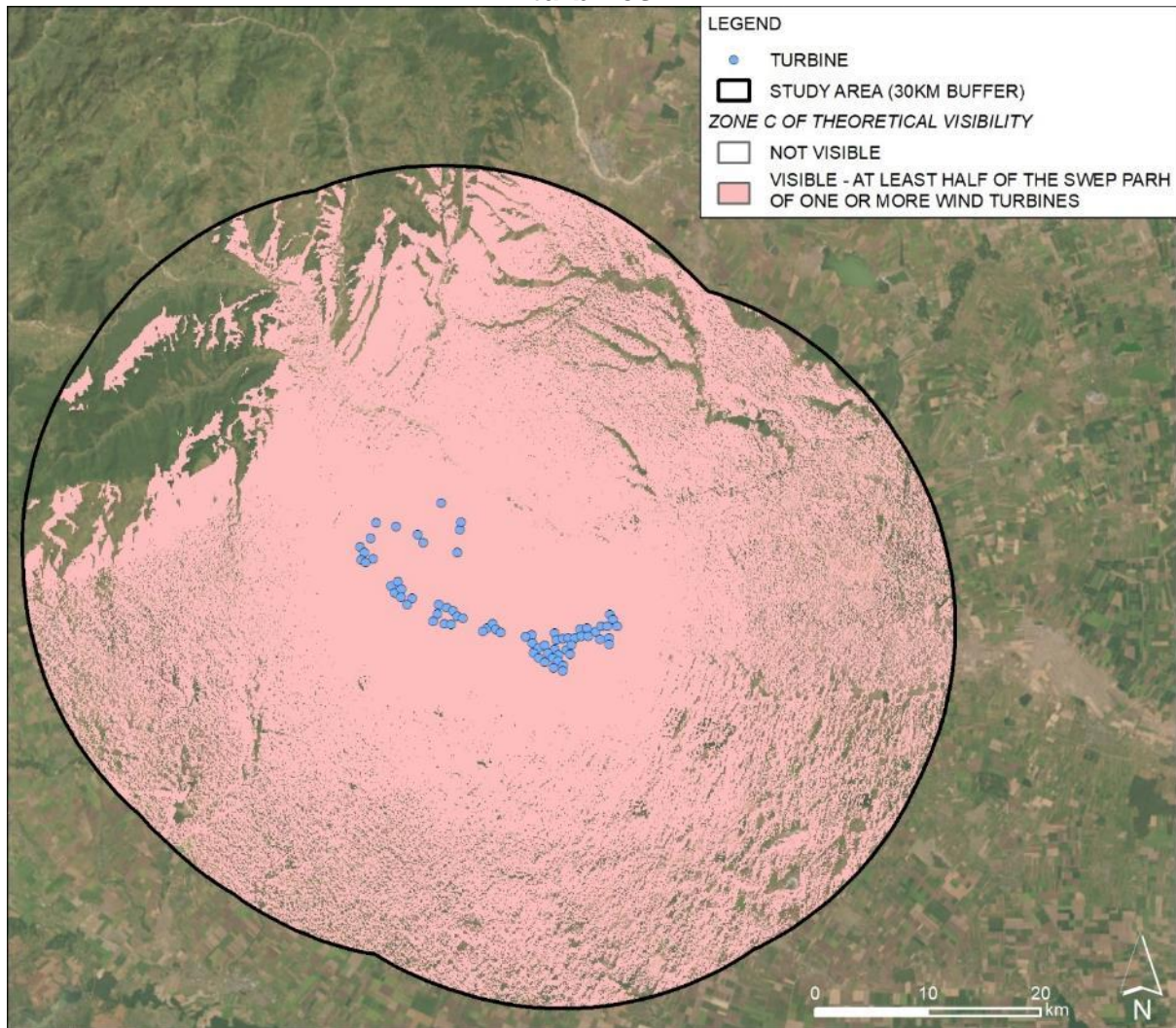
Source: ERM

Figure 6-25 View shed Zone B: The entire path of the blades for one or more wind turbines



Source: ERM

Figure 6-26 View shed Zone C: At least half of the path of one or more wind turbines



Source: ERM

The results of the view shed assessment show that the visibility is influenced by the flat morphology of the area. The flat of the terrain allow to see the wind turbines both partially and in their entirety.

It should be emphasized that intervening vegetation is not included in this mapping and is likely to significantly reduce the visibility of wind turbines, in whole or in part, and therefore reduce the impact identified.

Regarding the potential visibility from local communities, wind turbines, either in whole or in part, will be visible from the several settlements spread over the communes inside the Study Area.

Viewpoints Identification

In order to assess the visual baseline, 26 viewpoints have been identified within the Study Area. These viewpoints are referred to as Visual Sensitive Receptors (VSRs). They represent points within the view shed from where people will be able (or not) to see the Project, and where the quality of the landscape and visual resources of people could be affected by the presence of the Project.

It should be noted that, in order to screen the potential sensitive receptors, the following criteria have been used to assess the sensitivity of the VSRs:

- Value and quality of existing views;

- Type and estimated number of receiver population;
- Duration of frequency of view; and
- Degree of visibility.

Table 6-14 and Figure 6-27 show the locations of the VSRs as representative of the general landscape character of the area, from locations within the Study Area varying in distance and elevation.

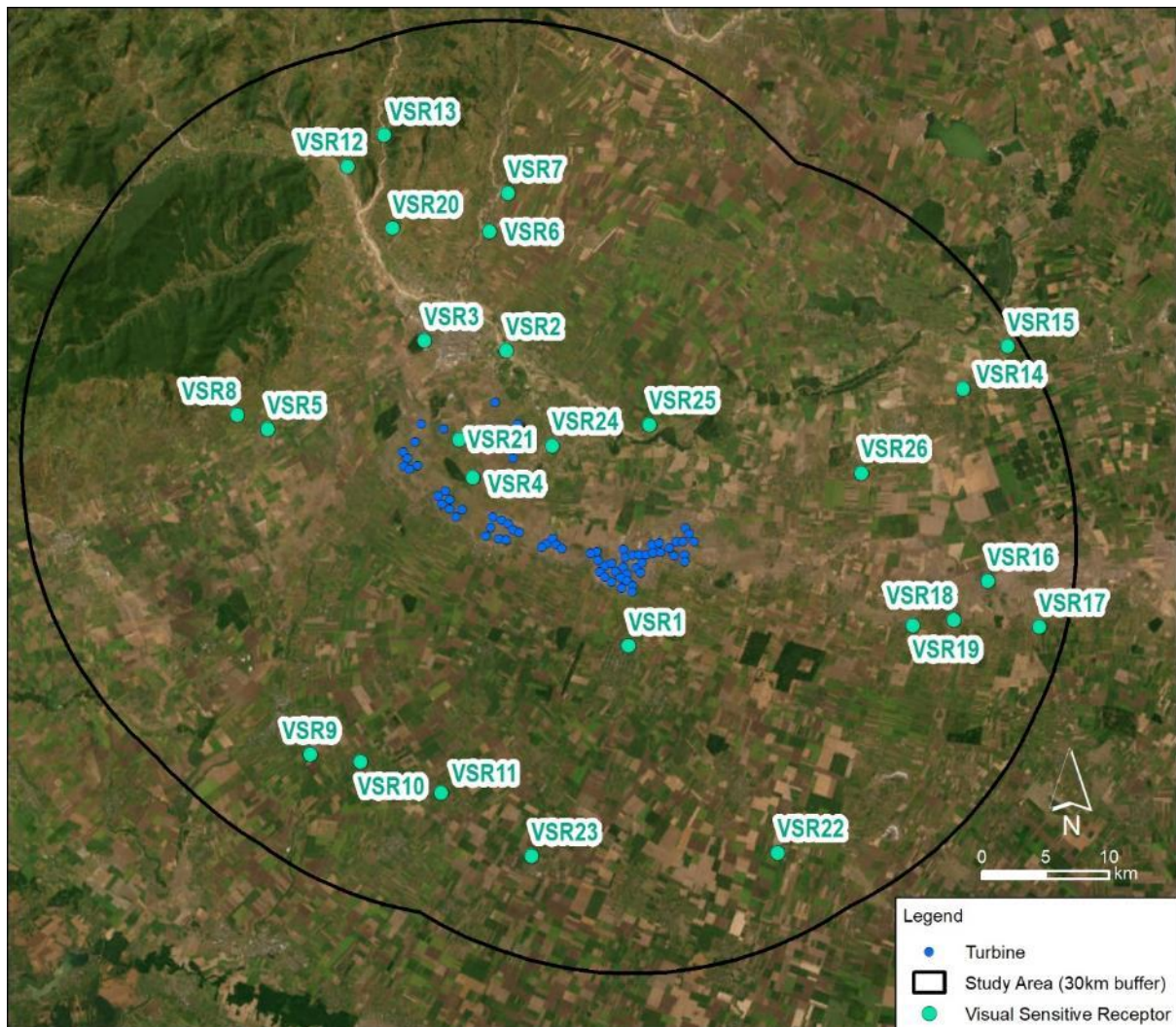
Table 6-14 provides the coordinates of the points and their distance from the closest turbine. The coordinates are expressed in WGS 1984/UTM Zone35N.

Table 6-14 Location of the proposed VSRs

VSR ID	X (East)	Y (South)	Site
VSR1	500207	4975071	On the outskirts of Pogoanele
VSR2	490565	4998301	Near Buzau river
VSR3	484135	4999074	From Buzau
VSR4	487960	4988318	Agricultural area near Maxenu
VSR5	471845	4992106	From Ulmeni
VSR6	489260	5007638	Near village, along the road
VSR7	490699	5010645	Near village, along the road
VSR8	469467	4993229	From Saranga
VSR9	475171	4966568	Along a road
VSR10	479160	4965972	Near Vacareasca
VSR11	485473	4963553	Along a road between Glodeanu-Silistea and Cotorca
VSR12	478104	5012767	Near a village
VSR13	480988	5015258	Near a village
VSR14	526420	4995283	Near Filipesti
VSR15	529966	4998637	Near Dedulesti
VSR16	528381	4980183	Agricultural area near Ciresu
VSR17	532417	4976590	Along a road
VSR18	525736	4977142	From Ulmu
VSR19	522490	4976719	From Jugureanu
VSR20	486106	4996726	From Buzau
VSR21	486883	4991322	From Odaia Banului
VSR22	511898	4958844	Along a road
VSR23	492583	4958591	From Grindu
VSR24	494197	4990829	Along the railway
VSR25	501802	4992490	Along a road
VSR26	518456	4988682	Along a road

Source: ERM, using Client data, 2022.

Figure 6-27 Location of the proposed VSRs



Source: ERM

6.2.3 Shadow flicker, Ice/Blade throwing

Shadow flicker is “the flickering effect caused when rotating wind turbine blades periodically cast shadows through constrained openings such as the windows of neighbouring properties”³⁸. Its occurrence in a specific location can be modelled and assessed³⁹ taking into account the relative positions of the sun throughout the year (dependent on the latitude of the site), the wind turbine layout and orientation, and the presence of sensitive receptors (e.g. inhabitants of residential buildings).

Within the present study an international recognised modelling package, WindPro, has been used to model the shadow flickering occurrence and the potential impact on the dwellings in proximity of the proposed windfarm.

In line with IFC standards and local guidelines, a worst case scenario has been modelled not considering presence of barriers, cloud cover, rotor turning off for low winds or high winds, local topography, dwelling windows orientation, and sun shining period.

In addition, a “real case by statistics” scenario has been included to evaluate the impact of some local conditions in the final results.

³⁸ <https://www.gov.uk/government/news/wind-turbine-shadow-flicker-study-published>

³⁹ † should be noted that modelling methods tend to be conservative and typically result in an over-estimation of the number of hours of shadow flicker likely to be experienced at the identified receptors.

6.2.3.1 Area of Influence

Some internationally adopted reference standards (A.D. Clarke 1991) exclude the occurrence of flickering shadows beyond a distance of 10 times the rotor size (in this case 1620m).

This approach has been criticized recently in 2017 by ClimateXChange (Scotland's centre of expertise connecting climate change research and policy) and LUC (landuse.co.uk) and suggested the Scottish guidance not to include reference to the 10 times the rotor diameter.

Considering the receptors distribution and the characteristics of the local landscape, in order to apply a more conservative approach, it was assumed to consider a 2 km study area within which mapping the receptors, beyond the more standard approach suggested by A.D. Clarke.

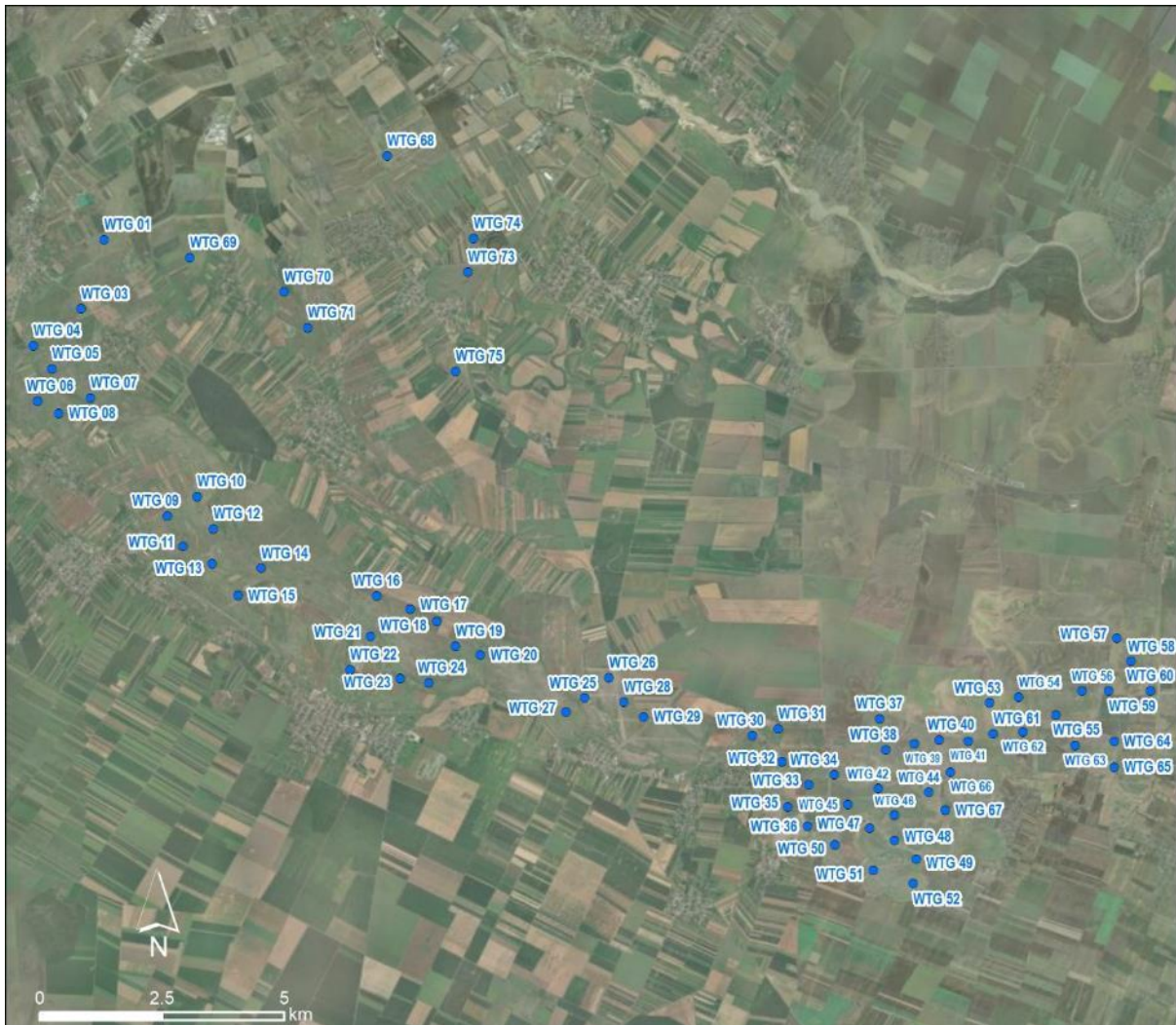
6.2.3.2 Key baseline conditions

The 460.8 MW VisViva wind farm (WF) is to be developed in Buzău County, Romania.

The VisViva Wind Farm Project extends on the administrative areas of several municipalities as follows: from west to southeast: Țintești, Costești, Gherăseni, Smeeni and Luciu, all in *Buzau County*, in South-East *Romania*.

Figure 6-28 presents the layout of the windfarm, Table 6-15 displays the coordinates and Table 6-16 presents the dimensions of the turbines.

Figure 6-28 Layout of the Project



Source: ERM

Table 6-15 Wind Turbine Coordinates

Turbine	Location	Easting(m)	Northing (m)
WTG 1	Costești WF	483967,318	4992498,799
WTG 3	Costești WF	483490,172	4991087,964
WTG 4	Costești WF	482531,562	4990316,167
WTG 5	Costești WF	482898,61	4989859,725
WTG 6	Costești WF	482611,217	4989200,897
WTG 7	Costești WF	483686,91	4989270,117
WTG 8	Costești WF	483035,232	4988951,39
WTG 9	Gherăseni WF	485257,85	4986854,999
WTG 10	Gherăseni WF	485876,194	4987251,947
WTG 11	Gherăseni WF	485584,409	4986233,446
WTG 12	Gherăseni WF	486202,184	4986581,235
WTG 13	Gherăseni WF	486170,097	4985868,419
WTG 14	Gherăseni WF	487171,423	4985778,849
WTG 15	Gherăseni WF	486704,4	4985227,541
WTG 16	Smeeni WF	489540,426	4985214,271
WTG 17	Smeeni WF	490229,018	4984947,465
WTG 18	Smeeni WF	490767,293	4984688,948
WTG 19	Smeeni WF	491153,699	4984190,229
WTG 20	Smeeni WF	491662,695	4984006,001
WTG 21	Smeeni WF	489417,695	4984392,157
WTG 22	Smeeni WF	488998,184	4983708,947
WTG 23	Smeeni WF	490026,348	4983520,829
WTG 24	Smeeni WF	490610,872	4983435,467
WTG 25	Smeeni WF	493793,706	4983125,174
WTG 26	Smeeni WF	494286,713	4983535,043
WTG 27	Smeeni WF	493415,252	4982843,168
WTG 28	Smeeni WF	494587,612	4983039,459
WTG 29	Smeeni WF	495003,782	4982743,68
WTG 30	Smeeni WF	497750,267	4982493,257
WTG 31	Smeeni WF	497832	4981821
WTG 32	Smeeni WF	498381,948	4981359,258
WTG 33	Smeeni WF	498896,152	4981557,538
WTG 34	Smeeni WF	497949,568	4980899,404
WTG 35	Smeeni WF	498354,728	4980505,344
WTG 36	Smeeni WF	489540,426	4985214,271

OFFICIAL USE

WTG 37	Luciu WF	499823,485	4982697,519
WTG 38	Luciu WF	499945,283	4982070,854
WTG 39	Luciu WF	500529,275	4982186,755
WTG 40	Luciu WF	501038,694	4982264,328
WTG 41	Luciu WF	501644,224	4982241,11
WTG 42	Luciu WF	499800,37	4981272,509
WTG 44	Luciu WF	500830,885	4981201,636
WTG 45	Luciu WF	499178,962	4980950,001
WTG 46	Luciu WF	500133,837	4980736,456
WTG 47	Luciu WF	499616,18	4980467,722
WTG 48	Luciu WF	500128,227	4980211,14
WTG 49	Luciu WF	500575,249	4979830,313
WTG 50	Luciu WF	498910,107	4980120,544
WTG 51	Luciu WF	499699,76	4979600,848
WTG 52	Luciu WF	500509,909	4979329,791
WTG 53	Luciu WF	502074,416	4983025,386
WTG 54	Luciu WF	502667,875	4983147,392
WTG 55	Luciu WF	503430,474	4982777,323
WTG 56	Luciu WF	503956,357	4983276,859
WTG 57	Luciu WF	504680,528	4984345,979
WTG 58	Luciu WF	504964,227	4983880,956
WTG 59	Luciu WF	504505,126	4983266,638
WTG 60	Luciu WF	505355,68	4983274,318
WTG 61	Luciu WF	502142,877	4982396,799
WTG 62	Luciu WF	502750,351	4982427,54
WTG 63	Luciu WF	503817,925	4982147,55
WTG 64	Luciu WF	504619,123	4982237,349
WTG 65	Luciu WF	504619,539	4981714,731
WTG 66	Luciu WF	501275,084	4981612,543
WTG 67	Luciu WF	501172,608	4980830,155
WTG 68	Țintești WF	489756.716	4994212.603
WTG 69	Țintești WF	485718.184	4992133.05
WTG 70	Țintești WF	487642.442	4991434.506
WTG 71	Țintești WF	488135.198	4990701.887
WTG 73	Țintești WF	491407.813	4991847.689
WTG 74	Țintești WF	491513.699	4992523.847
WTG 75	Țintești WF	491146.806	4989815.675

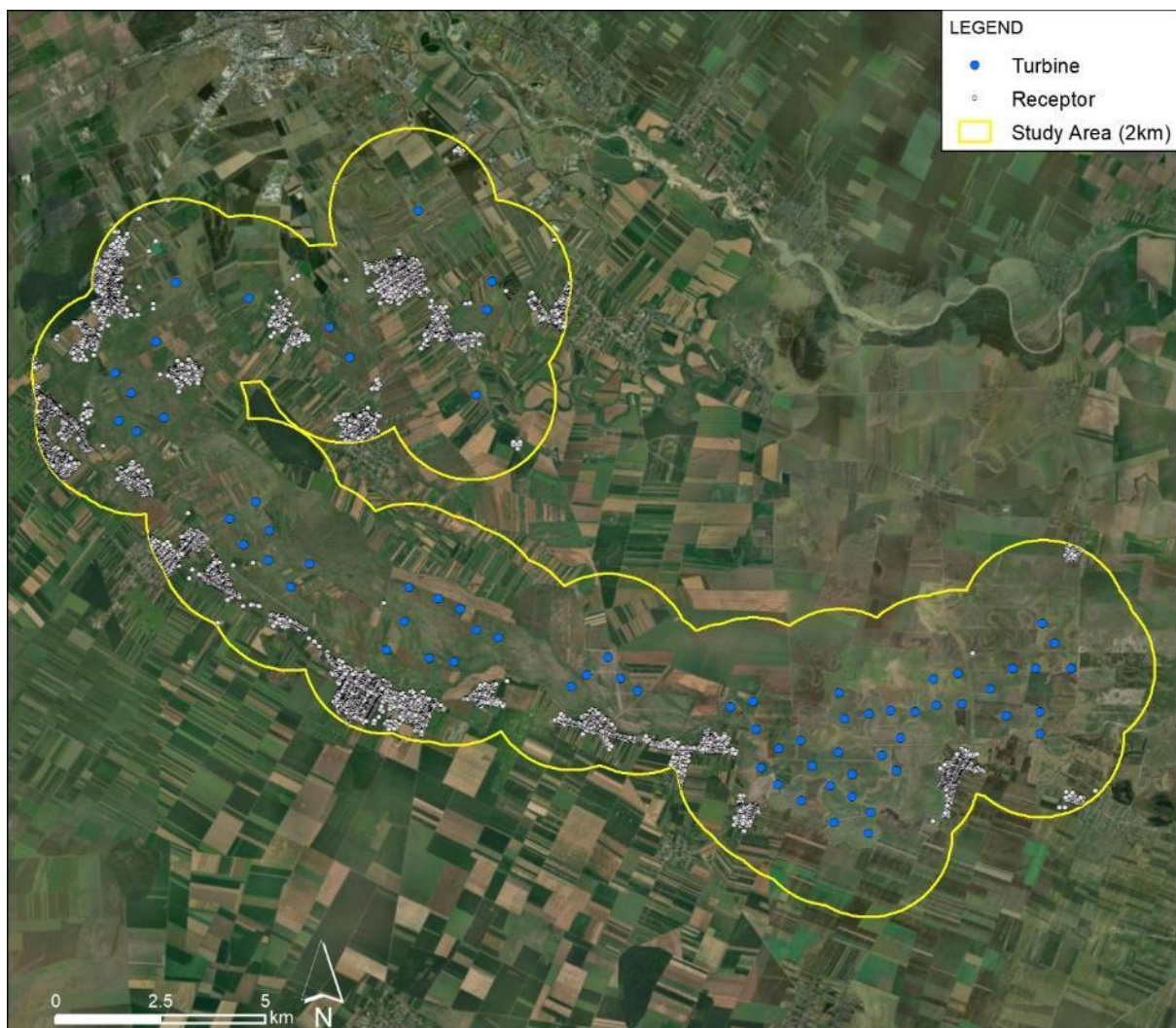
Source: ERM, using Client information, 2023.

Table 6-16 Specification of wind turbine characteristics

Turbine parameter	Value
Blade number	3
Hub height	166 m
Rotor diameter	162 m

Source: ERM, using Client information, 2022.

A total of 6882 potential shadow flicker receptors (Figure 6-29) were identified in a desktop study using topographical maps, aerial photographs and on site field visits (Figure 6-30, Figure 6-31, Figure 6-32)

Figure 6-29 Location of Dwellings/Group of Dwellings

Source: ERM

Figure 6-30 Local Dwelling



Source: ERM

Figure 6-31 Local Dwelling



Source: ERM

Figure 6-32 Local Dwelling



Source: ERM

6.2.4 Ecosystem Services

6.2.4.1 Area of Influence

6.2.4.2 Introduction

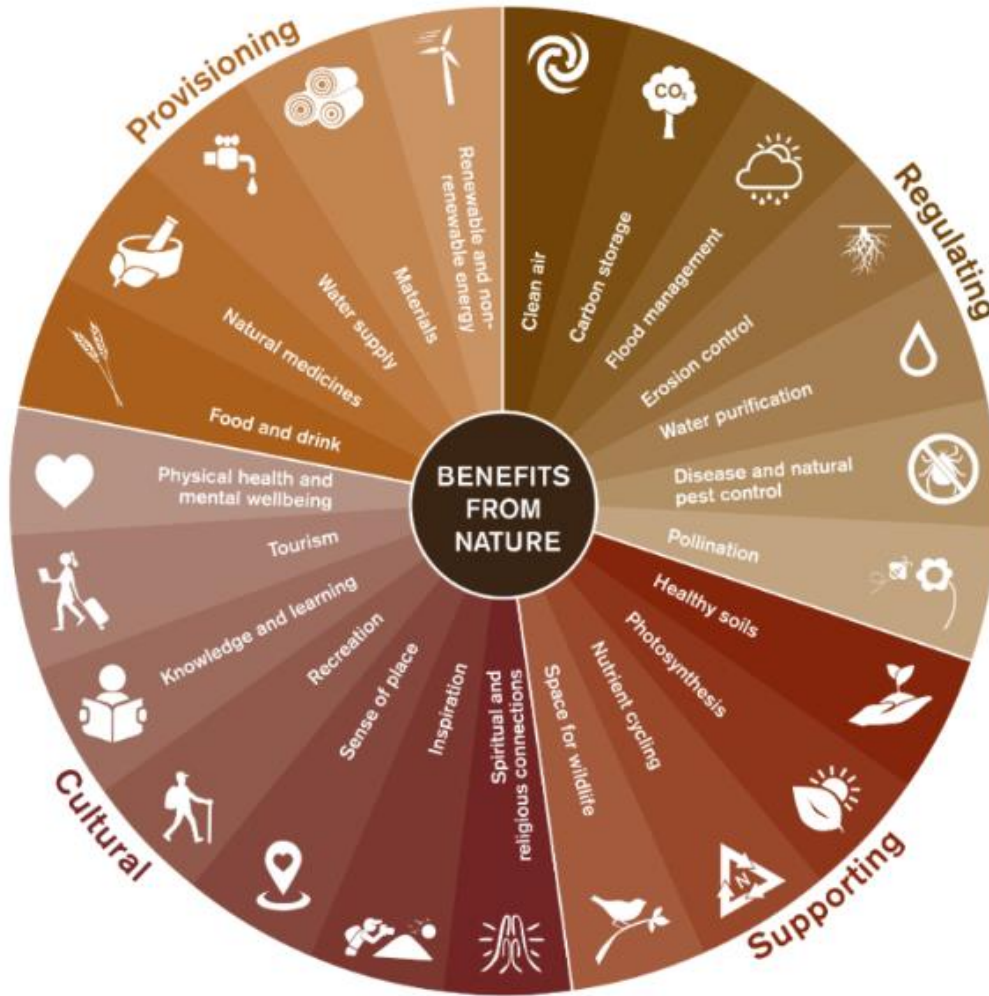
An ecosystem service is any positive benefit that nature provides to people. These are essentially direct and indirect contributions that natural ecosystems (known as natural capital) provide for human well-being and quality of life. This can be in a practical sense through providing food and water and regulating climate, as well as less tangible cultural aspects such as providing spaces for recreation to reduce stress.

What is important to acknowledge is that **underpinning all these services is nature or biodiversity.**

There are a vast number of services provided by ecosystems that are typically categorized into more manageable groups as follows (see also **Figure 6-33**):

- **Provisioning:** these are the tangible goods or products that people can extract or obtain from nature, such as food, materials (wood/fibre), fuel, medicines and water.
- **Regulating:** these are the benefits obtained from an ecosystem's control of natural processes, such as climate regulation, disease control, erosion prevention, water flow regulation, water filtration and protection from natural hazards (e.g. flood control).
- **Cultural:** these are the nonmaterial benefits obtained from ecosystems, such as recreation and aesthetic enjoyment. These include ways in which nature impacts people's health and wellbeing through recreational and education benefits as well as improving mental health and building spiritual connections.

Supporting: ecosystems could not function without supporting services, such as the nutrient cycle, soil formation and habitat provision for biodiversity, forming the basis for the other three types of services.



Source: NatureScot (Scotland's Nature Agency)

Online at: <https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy-and-cop15/ecosystem-approach/ecosystem-services-natures-benefits>

Figure 6-33 Ecosystem services categorised

6.2.4.3 Area of Influence

The Project Area of Influence (AoI) in terms of ecosystem services, was defined as the Wider Regional Area, represented by the Direct Social Area of Influence (AoI) for any potential impacts due to Vifor Wind Farm construction and operation. This comprises all settlements impacted by land take for the Project components (that belong to the administrative territorial units of Costești, Gherăseni, Smeeni, Luciu and Țintești communes), together with the settlements that could be affected by potential temporary environmental impacts during the construction phase and long-term during operations (such as noise, shadow flicker, etc.) located in a 2 km buffer from the WTGs.

Also, in terms of natural ecosystems likely to be affected by the Project, the Area of Influence (AoI) for the project was defined to include the development footprint and any temporary works infrastructure, operational activities and infrastructure, any offsite facilities (borrow areas for example) as well as areas beyond the immediate area of effect that could be subjected to indirect impacts (e.g. emissions, noise, water quality issues, etc.).

The 'study area' considered for analyses of ecosystem services is presented on the map in Figure 6-34.

The influencing factors affecting ecosystem services in the Project area could be mainly summarized into three types: natural factors, land use factors, and socio-economic factors, as detailed below:

- Natural factors – including biological factors, soil factors, topographic factors and climate factors – are the natural foundations of ecosystem services.
- Natural ecosystems are at the core of ecosystem service supply, and concerning the Project, this are represented by the natural grassland/steppe habitats. These are terrestrial ecosystems, no aquatic ecosystems are associated with the Project Aol.
- Forests in the Project area occupies insignificant surfaces and are represented by plantations and wooded habitats that are mixed forests or slightly open woodlands.
- The modified/artificial habitats are largely represented by agricultural land under active cultivation for crops, and the cluster of settlements located south of Călmățui river, and mostly south of the Project's components. These will be also taken into consideration for evaluating ecosystem services.
- Changes in land-use type – including overall pattern, intensity, etc. – all further directly affect the level of ecosystem services.
- Mapping of habitats was undertaken in GIS, using global land cover and the latest available Google Earth™ satellite imagery, with field investigations to identify the distribution of land cover types within the 'study area'. Simplified land cover details for the study area is detailed in the Figure 6-34.
- Socio-economic factors – including the economic level and economic development, population density, cultural, tourism and recreational factors, all influence ecosystem services by affecting the intensity use of ecological materials and environmental pollution (Millennium Ecosystem Assessment, 2005¹).

Table 6-17 Land cover/habitat mapped in the study area

No.	CORINE Land Cover Classification	CLC Code	Description	Class	Extent (ha)	Percentage Cover
1	Arable land	2.1	Agricultural land under active cultivation for crops.	Modified (artificial)	18,979	47.7 %
2	Natural grasslands / steppe	3.2.1 / 3.2.4	Open grassland areas, steppe habitat or sparse/transitional woodland.	Natural (but heavily degraded*)	12,434	31.2 %
3	Urban fabric	1.1	Developed areas with built infrastructure (generally residential and roads).	Modified (artificial)	5,626	14.1 %
4	Mixed Forest	3.1.3	Dense wooded habitat that is likely closed-canopy mixed forest or slightly more open woodland.	Natural	2,779	6.9 %
Totals					39,820	100 %

* Note that since no universal thresholds exist for classifying a habitat as natural habitat or modified habitat, expert analysis was relied on to assign the derived land cover categories from the mapping exercise described above as natural or modified habitat.

Figure 6-34: CORINE Land cover types mapped in the study area

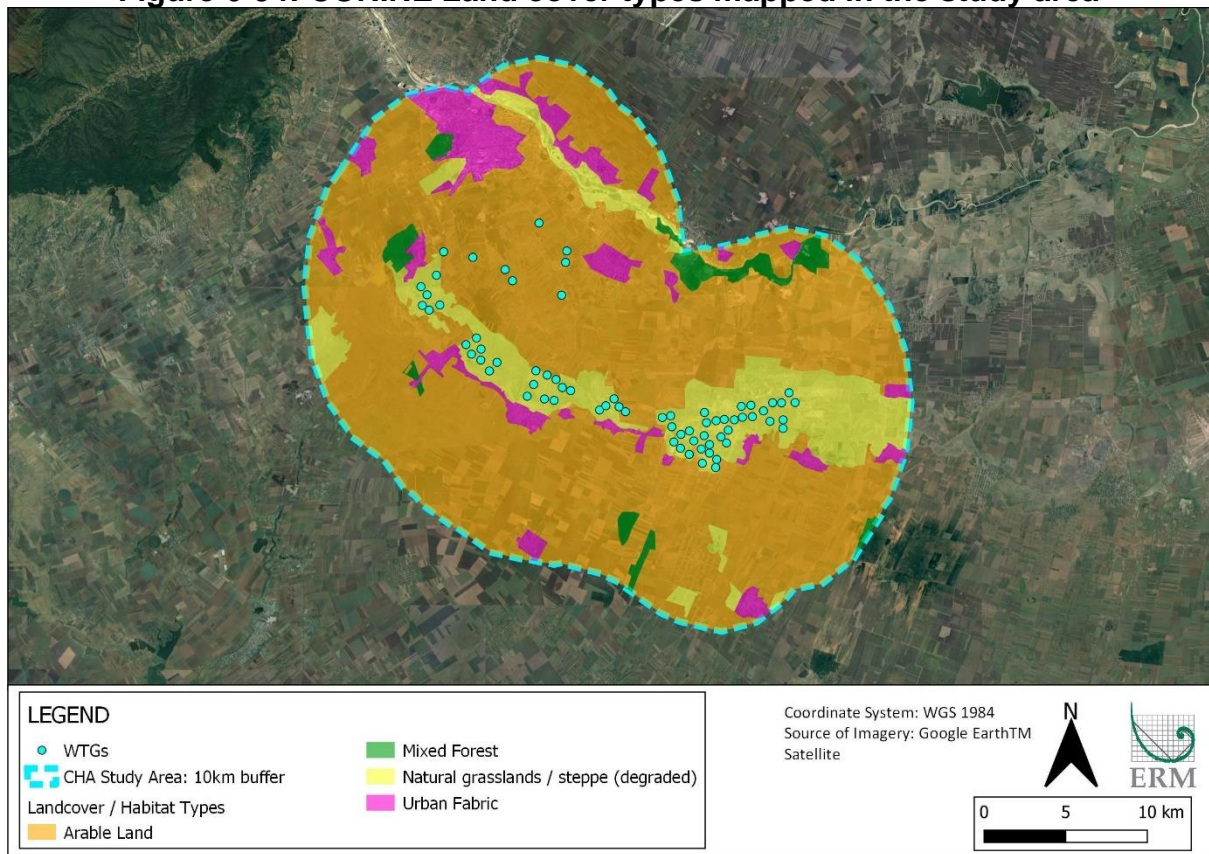
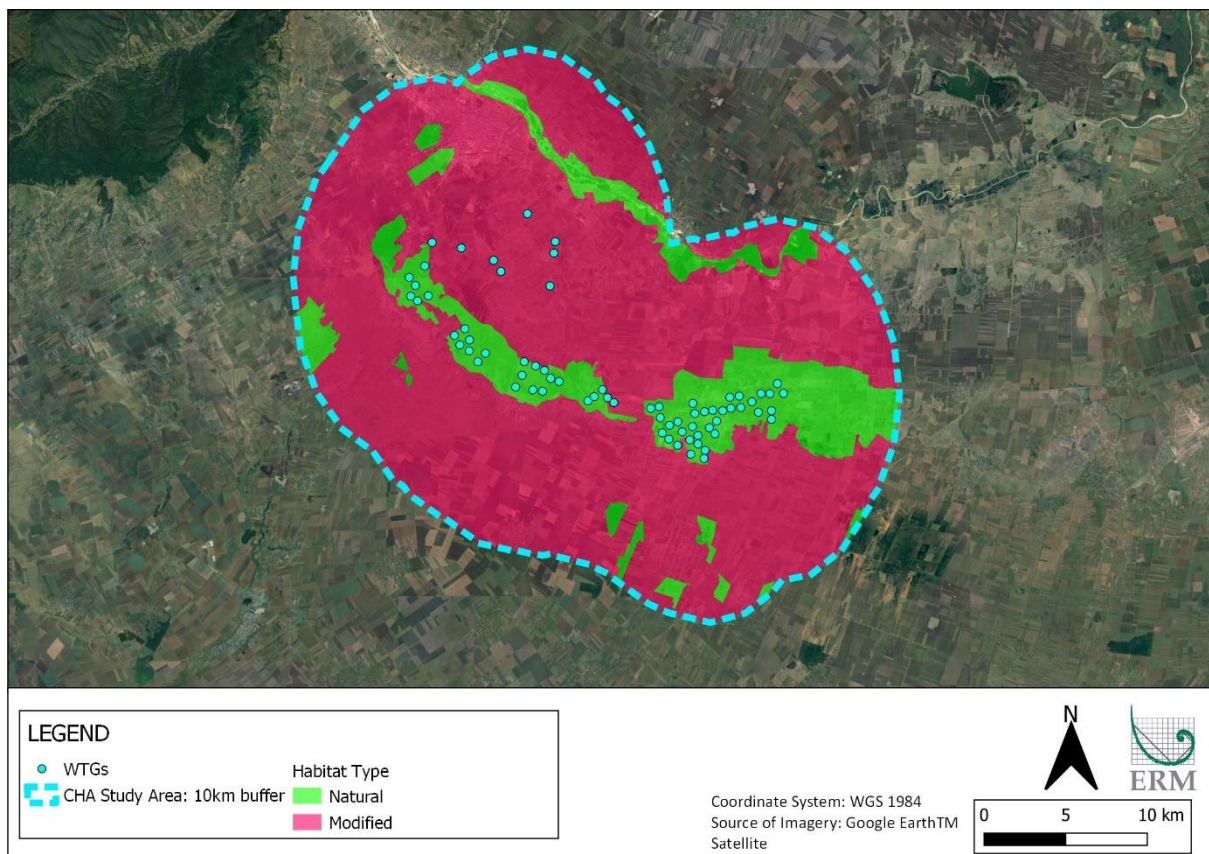


Figure 6-35 Map showing the extent and distribution of Natural vs Modified Habitat in the study area



Source: ERM, 2023

6.2.4.4 Key baseline conditions

The Project area is mainly covered by natural steppes (meadows and pastures) along the Călmățui river, and by modified (artificial) agricultural lands under active cultivation for crops in the higher tabular fields. At present major activities in the area are represented almost entirely by agricultural activities – mainly arable/agricultural crops and animal husbandry.

Ecosystem services, as per IFC PS 6 and EBRD PR6 refer to the benefits that people, including businesses, derive from ecosystems. The IFC PS6 organises the ecosystem services, as per Mapping and Assessment of Ecosystems and their Services (MAES)² and The Common International Classification of Ecosystem Services (CICES)³ into 4 types, namely: *provisioning, regulating, cultural and supporting services*.

During the Social Baseline Study, various ecosystem services were reported by local communities and/or observed by the Project team. The use of ecosystem services and dependence of local beneficiaries have been investigated through consultation and expert opinion.

For the entire Project area, the majority of ecosystem services are not considered to be supplied at high levels, especially for the following reasons:

- Habitats have been largely modified, by agricultural activities – mainly arable/agricultural crops and animal husbandry,
- There are no major known sites of cultural or historical significance,
- Landscape, cultural, tourism and recreational use is considered very low.

Demand for ecosystem services is typically low due to:

- Low cultural, tourism and recreational potential given the rural location and agricultural context (arable/agricultural crops and animal husbandry),
- Modified natural habitats, that are of limited biodiversity support value,
- Significant areas of agricultural lands (representing up to 48% of the biodiversity study area),
- There are mostly rural communities in the Project area, and only local level developed infrastructures, that demand hydrological services such as flood control, water supply, water quality enhancement, etc.

Overall, no priority ecosystem services (in terms of the IFC PS6 and EBRD PR6 definition) were identified for the Project area.

For evaluating the importance of ecosystem services based on the level of demand by local communities and supply by local ecosystems, a simple evaluating matrix was used, as detailed in the table below:

Table 6-18 Simple matrix used for rating ecosystem services importance based on level of demand and supply

		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

Table 6-19 Results of the rapid qualitative ecosystem services assessment for the Project area

Ecosystem Services	Description of the service	Potential Supply Level	Potential Demand Level	Overall Perceived Level of Importance
Provisioning Services				
Food	Cereal crops which are currently cultivated on the Project area are a source of food and income to the farmers and local communities	Moderate	Low	Low
Food	Natural steppes and secondary meadows and pastures provide resources for livestock grazing, that are a source of food and revenue for the local communities	Moderate	Low	Low
Raw Materials (Biomass Fuel)	Wooded ecosystems such as forests, woodland and shrublands can provide wood and wood residues used for biomass fuel when harvested and processed. Cereal crops residues can also provide cob for heating.	Negligible	Negligible	Negligible
Water Supply	Water supply is provided through groundwater resources. This can be for both potable and non-potable use.	Low	Moderate	Low
Other (NTFPs)	Ecosystems provide several Non-Timber Forest Products (NTFPs). One example is medicinal resources. A low variety of plants can be harvested for traditional medicine. Another example is beekeeping,	Negligible	Low	Negligible
Regulation & Maintenance Services				
Global/local climate regulation	Ecosystems influence climate at local and regional levels. Evapotranspiration from trees, vegetation and soil controls the amount of water vapor entering the atmosphere, influencing atmospheric moisture, rainfall, cloud formation, radiation transfer in the atmosphere and temperature control. Trees also serve to provide shade.	Low	High	Low
Carbon sequestration	Ecosystems, including vegetation, soils and freshwater systems can store, regulate the climate, and mitigate climate change. Different ecosystems allow for varying degrees of carbon storage.	Low	High	Low
Water Purification	Ecosystems help to regulate water quality by purification and waste treatment,	Negligible	Moderate	Negligible

Ecosystem Services	Description of the service	Potential Supply Level	Potential Demand Level	Overall Perceived Level of Importance
	<i>through the trapping of sediments and dilution/removal of harmful nutrients and chemicals. Ecosystems such as wetlands along Călmățui river filter effluents, decompose waste through biological activity of microorganisms and eliminate harmful pathogens.</i>			
Pollination	<i>Insects, wind, birds and bats pollinate plants and trees, which is essential for the development of fruits, vegetables and seeds. In agro-ecosystems, pollinators are essential for forage production as well as the production of seed for root and fibre crops.</i>	Moderate	Moderate	Low
Pest and disease control	<i>Predators and parasite activities in ecosystems control populations of potential pest and disease vectors, which can impact crops, livestock, water quality and species health.</i>	Low	Moderate	Low
Supporting Services				
Soil Formation and Quality Regulation	<i>Trees and herbaceous vegetation create the organic matter content of soils through natural decay and soil formation processes. Buffering, filtering, degradation and retention of pollutants and nutrients occurs within soils. This ensures soil fertility is maintained to support vegetation communities and human activities such as crop cultivation.</i>	Low	Low	Low
Nutrient Cycling	<i>Nutrient cycling describes the movement of nutrients between living and non-living organisms in the environment. It is enabled by having a large diversity of organisms and leads to the creation of structures and mechanisms that further regulate nutrient cycling. It underpins all ecosystem services.</i>	Moderate	Low	Low
Water Cycling	<i>Freshwater ecosystems, such as wetlands, rivers and aquifers, are a critical part of the global water cycle – supplying, purifying and protecting freshwater resources.</i>	Low	Low	Low
Habitat maintenance	<i>Habitats provide everything that an individual plant or animal needs to survive: food; water; and shelter. Each ecosystem provides different habitats that can be essential for a species' lifecycle. Some habitats have an exceptionally high number of species which makes them</i>	Moderate	High	Low

Ecosystem Services	Description of the service	Potential Supply Level	Potential Demand Level	Overall Perceived Level of Importance
	<p><i>more genetically diverse than others, known as biodiversity hotspots. Habitats also maintain a diversity of complex processes that underpin other ecosystem services. Species are a critical component in the building of habitats, with habitats and species intrinsic to one another's survival.</i></p> <p><i>Based on the CHA findings, the remaining degraded steppe and mixed forest habitats have been identified as qualifying as critical habitat, both in terms of their status as priority habitats in the EU Habitats Directive and several species of birds, small ground mammals, bats, amphibians, reptiles and invertebrates. Therefore, these habitats and the refugia for threatened and protected species heightens the level of both supply and demand which could be considered at least moderate in terms of supply and high in terms of demand. This service would then be considered of perceived moderate importance. The supply level would be moderate/negated due to the degraded nature of the habitat, and demand could be considered high due to the existing levels of transformation of habitats, such that fewer areas are available to provide refugia, increasing the demand placed on the last remaining natural habitats.</i></p>			
Social & Cultural Services				
Recreational / tourism related services	<i>Nature-based opportunities for recreation play an important role in maintaining mental and physical health. Enjoyment of nature attracts millions of travelers worldwide. This cultural ecosystem service includes both benefits to visitors and income opportunities for nature tourism service providers</i>	Negligible	Low	Negligible
Visual amenity services	<i>Animals, plants and ecosystems inspire art, culture and design.</i>	Negligible	Low	Negligible
Education, scientific & research services	<i>Ecosystems and landscapes provide educational, scientific and research purposes that develop our understanding of the natural world and can lead to important scientific discoveries.</i>	Negligible	Low	Negligible

Ecosystem Services	Description of the service	Potential Supply Level	Potential Demand Level	Overall Perceived Level of Importance
Spiritual, artistic, and symbolic services	<i>Nature is a common element in most major religions. Natural heritage, spiritual sense of belonging, traditional knowledge, and associated customs are important for creating a sense of belonging.</i>	Negligible	Low	Negligible

The baseline analysis of the ecosystem services revealed limited diversity of ecosystem services present in the Project area (biodiversity study area) which are important to community.

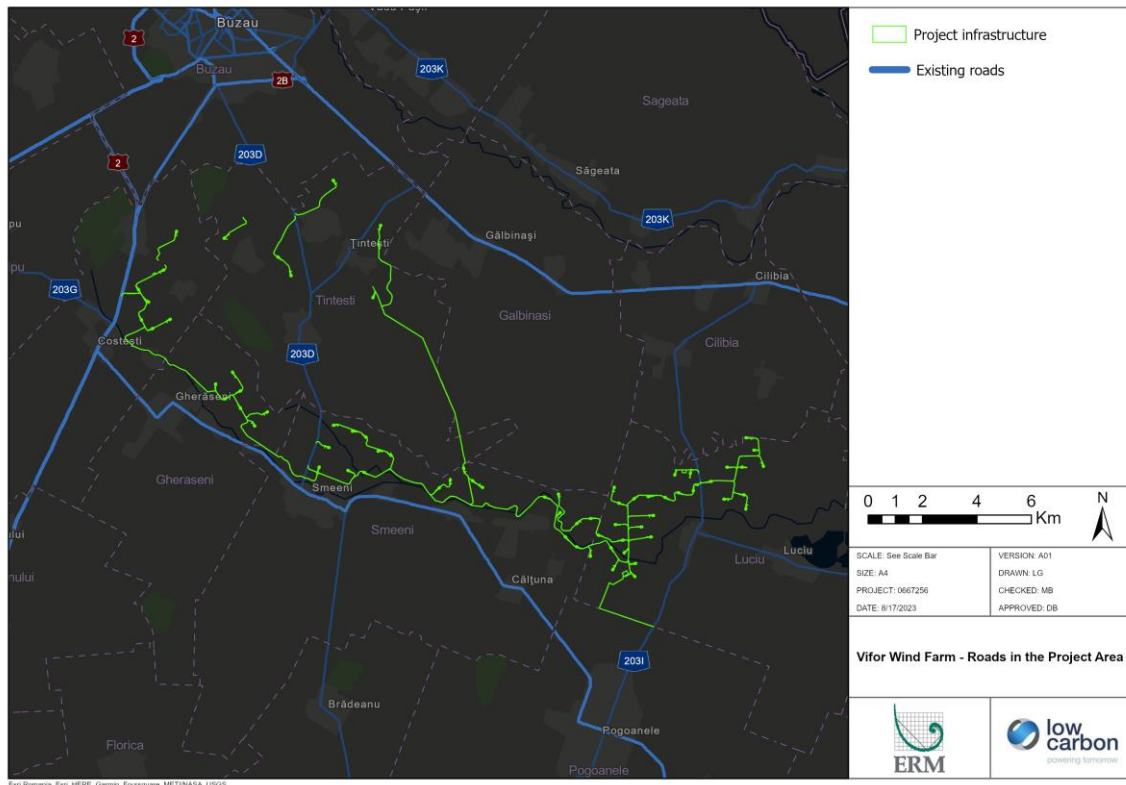
Little native vegetation remained on the Project area, with just over 30% primary vegetation and only minimal secondary vegetation, representing the original steppe ecosystems, but these being heavily degraded. As such, the local communities are not reliant on the Project area for provisioning, regulating, social&cultural and supporting services.

6.2.5 Traffic

6.2.5.1 Area of Influence

The transportation and traffic Area of influence (Aoi) includes local and regional roads that would be used for supply and worker travel and the route that would be used to transport components from the selected port – most likely to be the port at Constanța – to the Project sites. Vifor Wind Farm sites will be reached via a network of roads to be built for the project. For clarity of analysis, these roads are referred to as “internal Project roads;” however, upon completion of Project construction, internal Project roads would be available to the public for travel in addition to providing access to the Project’s wind turbine locations. The Aoi includes all existing public roads connected to internal Project roads, including (see **Figure 6-36**):

- E85 (also called National Road DN 2): one Project access point north of Costești;
- County Road (DJ) 203D: five Project access points including one west of Pogoanele and four Project access points north of Smeeni;
- DJ 203I, four Project access points, including three north of Caragele and one north of Pogoanele;
- Communal Road (DC) 37: two Project access points between Spătaru and Gomoiești;
- DC 33: one Project access point north of Odaia Banului;
- DC 176 (Str. Unirii): one Project access point northwest of Pogoanele;
- DC 241: two access points east of Gherăseni;
- DC 18: two access points east of Țintestți;
- A local road - Str. Ing. Constantin Garofild one access point south of Țintestți. A portion of this road would become an internal Project road;
- A local road – Str. Berindeasca: two Project access points north of Pogoanele;
- A local road – Str. Călmățui – within the town of Budișteni: one Project access point.

Figure 6-36 Map of roads in the Project area

Source: ERM

The primary national roads connecting the Project area to the broader region include DN 2B (north of the Project area), DN 2C (south of the Project Area), DN 2A/E 60 (south of the Project area), DN 2/E85 (west of the Project area) and DN 1B/E577 (west of the Project area). In addition to the named public roads listed above, internal Project roads would cross and be co-located with numerous unpaved, rural lanes.

The port at Constanța is the most likely port to be used for shipment of wind turbine components to Romania. A routing study identified two route alternatives to the Project sites from Constanța for deliveries of wind turbine tower sections (Tower Route A and Tower Route B), one route alternative for the delivery of the hubs, power trains, and nacelles (Hub Route), and one route alternative for delivery of wind turbine blades (Blades Route). Tower Route A, Tower Route B, Hub Route, and Blades Route follow different routes from Constanța to the city of Slobozia. From Slobozia all routes follow DN 2A/E 60 to DN 2/E 85 to access the Project area.

These routes were selected based on the size and dimensions of the particular components, the road characteristics and the need for road modifications or impacts to properties adjoining the roads (Holleman 2023).

Rail and air transport are not proposed as part of the Project transportation plans. Marine transportation is not part of the ESIA scope.

6.2.5.2 Key baseline conditions

Road Infrastructure

In 2018, Romania had 86.234 km of roadways consisting of 17.740 km of national roads and 68.494 km of county or communal roads. As shown the table below, two-thirds of all roads in Romania and nearly all national roads are made of modern surfacing (asphalt or concrete), with the remainder constructed of light asphalt paving (macadam) or unpaved with an earthen or stone surface.

Approximately 38 percent of the modern surfaced road length and 47 percent of the light cover roads were overdue for maintenance.

Table 6-20 Proportion of roads per type of surfacing (%), 2020

	Modern surfacing (asphalt and concrete)	Light asphalt paving (Macadam)	Earthen or stone
All roads	43%	25%	32%
National roads	95%	4%	1%
County or communal roads	29%	30%	41%

Source: Romania National Institute of Statistics 2020

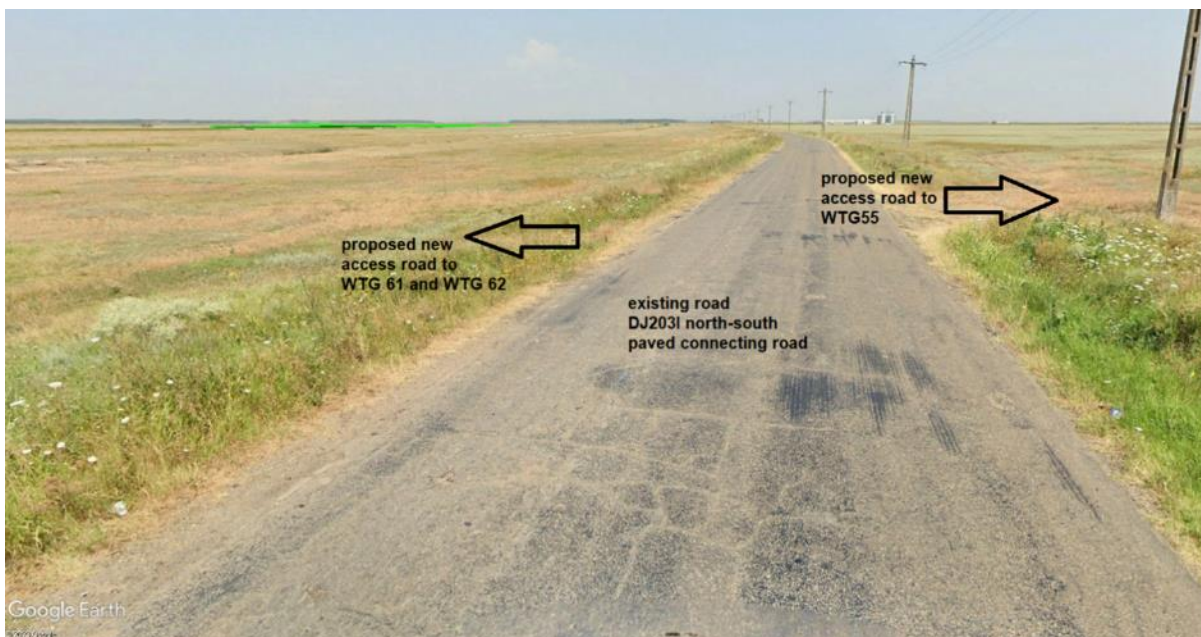
The physical characteristics of public roads in the AOI that provide access to internal Project roads are summarized below.

- E85 (also called DN 2) is a major north-south route that passes through Bucharest and connects Romania with Bulgaria to the south and Ukraine to the north. One internal Project road intersection with E85 is proposed between Costești and Spătaru. Near the proposed access to the internal Project road, E85 is a 2-lane asphalt road with paved shoulders or bicycle lanes, lane markings, and a grass swale on both sides. Total pavement width is approximately 11m. E85 retains approximately the same dimensions through towns or settlements to the north and south of the project area (Spătaru and Costești) but has gravel or concrete sidewalks along the sides rather than grass swales. E85 has a roundabout with a restricted turning radius at the intersection with DN 2B in Spătaru, about 3 kilometers north of the access to the internal Project road.
- DN 2C extends southeast from its intersection with E85 within the town of Costești. Project sites are distributed generally parallel to and north of DN 2C. DN 2C is a two lane, asphalt road with narrow gravel shoulders and pavement markings. Pavement width is approximately 6m. DN 2C has sharp turns – about 90 degrees – within the towns of Gherăseni, Smeeni, and Pogoanele. DN2C also has sharp turns, but less acute, within the towns of Albești and Caltuna.
- DJ 203D is a north-south road from the County seat of Buzău, north of the project area, to the southern County border and would intersect five internal Project roads; one west of Pogoanele and four north of DN 2C. DJ 203D is a two-lane road with a paved surface approximately 8 meters wide, lane markings, no shoulders, and grass swales. Just south of the internal Project roads, DJ 203D has two 90 degree turns within the town of Smeeni and is combined with DN 2C within the town.
- DJ 203I is a north-south road connecting DN 2A and 2B. DJ 203I is paved, with centre road striping along some segments, no shoulders, and pavement width of about 6m.
- DC 37 is a local road connecting E85 within Spătaru with the town of Gomoiești. The roadway is two lanes and has 8 meters of pavement with centre striping and no shoulders.
- DC 33 is a local road connecting Odaia Banului to Buzău. The roadway is striped pavement, approximately 5 meters wide with no shoulders.
- DC 176 is a local road connecting DJ 203D to Pogoanele. DC 176 has paved width of about 6m, with no road striping, grass shoulders, and concrete swells.
- DC 241 is a local road connecting Gherăseni to Maxenu. DC 241 is a one-lane, unmarked, unpaved road with stone and dirt surface and no shoulders. An internal

Project road would cross this local road just northeast of Gherăseni. Much of the road between the towns appears to be nothing more than tire tracks.

- DC 18 is a local road connecting Țintestți with the neighboring towns of Tăbărăști and Galbinași to the east. Within Tentesti, DC 18 is a gravel lane with width of about 5m. East of Țintestți where a Project internal road would intersect it, DC 18 appears to be only dirt tire tracks:
- Str. Ing. Constantin Garoflid is a one-lane, stone and dirt road with a terminus in Țintestți where it merges with DC 18.
- Str. Berindeasca: two Project access points north of Pogoanele.
- Str. Calmățui within Budișteni is a one-lane, stone and dirt road. An internal Project road would cross this local road and use the route of an existing, stone and dirt lane that parallels a stream to the northwest and southeast of Budișteni.

Figure 6-37 Details of local roads (pavement width of approx. 6 m) in the Călmățui meadow area, Direct Project Aol



Source: ERM 2023, using Google Maps street view,

Other national roads that serve the Project area are two-lane, paved roads with lane markings and narrow or no shoulders. County and communal roads are generally one to two lanes, surfaced with worn paving, stone or earth, with narrow or no shoulders.

The routes identified from Port of Constanța to the Project area use several roads from Constanța to Slobozia, and from Slobozia use DN 2A and E85/DN 2 to reach the general area of the Project sites (Holleman 2023). From Constanța, the study proposes the alternatives described below to reach the Project area. See further discussion in Section 7.2.11, Impact Assessment.

- **Tower Route A** includes the following roadways from the Port of Constanța before joining DN2A/E60 in Slobozia: DN 39A, DN 39, DN 38/E 675, DJ 392, DJ 391, DN 3, DJ 222, DJ 224, DN 2A/E 60, DN 21A, and DN 21.
- **Tower Route B** would be similar to Tower Route A with one exception: Tower Route B would not use DJ 392 and would access DJ 391 from DN 38.
- **The Hub Route** includes the following roadways from the Port of Constanța before reaching Medgidia: DN 39A, DN 39, A 4/E 81, DN 3, DN 22C. At Medgidia, the Hub

Route joins DJ 224 and would follow the same path as Tower Routes A and B to Slobozia.

- **The Blades Route** would include the following roadways before joining DN 2A/E 60 in Slobozia: DN 39A, DN 39, A4/E 81, A2/E 81, DN 21.

The physical characteristics of public roads in the AOI that would be used to transport project components are summarized below. The roads are generally presented from east to west.

- DN 39A provides direct access to the Port in Constanța and is an asphalt-paved, divided highway with four lanes, two lanes in either direction, sidewalks, and width of approximately 19m. The highway is divided by a metal guard rail. Portions of the road have lane markings. DN 39A provides access directly from the port to DN 39.
- DN 39 is an asphalt-paved roadway with two lanes in either direction, with lane markings and narrow shoulders. The roadway is approximately 13m in width in most areas and includes intermittent pull off areas. North of its connection with DN 39A, portions of the roadway between DN 39A and the commune of Agigea have paved drainage channels along road edges. The roadway has sidewalks as it approaches and within Agigea. A roundabout connects DN 39 to DN 38. DN 39 continues north of Agigea, crossing the Danube-Black Sea Canal and connects to A 4/E 81 at a traffic circle south of Lazu. The roadway widens to include on/off exit lanes as it approaches the canal crossing.
- DN 38/E 675 between Agigea and Amzacea is generally an asphalt-paved roadway with one lane in each direction, lane markings, with no shoulders and an approximate width of 7m. The roadway widens within towns and can include sidewalk/bike paths and parking areas. DN 38 has an additional lane in each direction at the traffic circle in Agigea where it connects with DN 39.
- A 4/E 81 is an asphalt-paved, divided highway with two lanes in either direction, with lane markings, metal guardrail median, paved shoulders, and approximate width of 19m. North of the A 2/E 81 split the roadway is named A 4 and widens to over 35m and includes multiple lanes in each direction. A 4 connects to DN 3 via an interchange west of Valu Liu Traian.
- DJ 391 is an asphalt-paved road with one lane in each direction, lane markings, unpaved shoulders and an approximate width of 6m. The roadway has a sidewalk within the commune of Cobadin.
- DJ 392 is an asphalt-paved road with one lane in each direction, lane markings, unpaved shoulders and road width between 6m and 7m. A sidewalk and drainage swales are present along the road in Movila Verde. DJ 392 connects with DJ 391 west of Movila Verde.
- DN 3 is a major east-west roadway that includes two segments; one from Constanța to the Danube River near Silistra, Bulgaria, and the other from the Danube River to Bucharest. A portion of DN 3 from the interchange with A 4 to DN 22C in Murfatlar would be included in a delivery route. DN 3 is an asphalt-paved roadway with two lanes in each direction, lane markings, unpaved shoulders, and an approximate width of 13m. The roadway includes sidewalks in Valu Liu Traian and Medgidia and widens at the A 4 interchange and the connection with DN 22C. Three traffic circles are located between A 4 and DN 22C.
- DN3 in Cobadin is an asphalt-paved road with one lane in each direction, lane markings, unpaved shoulders and an approximate width of 6m. The roadway configuration is generally consistent from DJ 391 in Cobadin to DJ 222 in Pietreni.

- DN 22C is an asphalt-paved roadway with one lane in each direction, lane markings, no shoulders and an approximate width of 7m. Pull off lanes and unpaved shoulders are located along the road intermittently. The roadway includes sidewalks within the communes it traverses from Murfatlar to DJ 224 in Medgidia.
- DJ 224 is an asphalt-paved road with one lane in each direction, lane markings, unpaved shoulders and an approximate width of 6m. The roadway includes sidewalks within the communes of Tortoman and Silistea. DJ 224 connects to DC 63 southwest of Țepeș Vodă.
- DC 63 is an asphalt-paved road with one lane in each direction, lane markings, no shoulders and an approximate width of 6m.
- DN21A is an asphalt-paved road with one lane in each direction, lane markings, no shoulders and an approximate width of 6m.
- Strada Dudești is an asphalt-paved road with one lane in each direction, no lane markings, no shoulders, and approximate width of 7m. The roadway includes sidewalks within Bărăganul.
- DN 21 is an asphalt-paved road with one lane in each direction, lane markings, narrow unpaved shoulders and an approximate width of 6m. The roadway includes sidewalks and wider shoulders in Slobozia Noua, Lazu, and Slobozia.
- DJ 222 is an asphalt-paved road with one lane in each direction, lane markings in most areas, no shoulders, and approximate width of 6m.
- DN 2A/E 60 includes a long segment of the delivery route for both Tower and Hub routes from DC 63 north and west to an intersection with DN 21A in Țândărei. The roadway is generally an asphalt-paved road with one lane in each direction, lane markings, with small, paved shoulders, and drainage swales with an approximate width of 6m. The roadway includes sidewalks and wider shoulders in some areas within the communes it traverses. The roadway includes three lanes between Gălbiori and Hârșova intermittently.
- DN 2A . is the planned route for all project components from Slobozia west to Urziceni. The roadway is generally an asphalt-paved road with one lane in each direction, lane markings, and a grass swale on both sides. Total pavement width is approximately 10m. In areas of Urziceni and Slobozia, the roadway expands to four lanes (two in each direction) and in many towns sidewalks are present and on street parking is permitted.

Road safety

Traffic safety is an important component of overall public health and safety, because road accidents contribute to health consequences such as death, disability, lower quality of life, and an economic burden for victims and their families. Key factors that can increase the risk of traffic-related accidents and injuries include a lack of traffic regulation, adherence, and enforcement, as well as poor road and weather conditions. Romania has national speed limits, a drinking and driving law, and laws requiring motorcycle helmet use, seat-belt use, child restraints, a ban on hand-held mobile phone use, vehicle safety standards, and safe road design standards (WHO 2018). Enforcement of driving regulations, in particular speed limit and seat-belt use, has been ranked 7 on a scale of zero (least effective) to ten (most effective). This is comparable to average rankings across the European Union.

A total of 1,864 deaths occurred in reported traffic accidents in Romania in 2019, resulting in a mortality rate of 96 road deaths per million population, or 2.26 fatalities per 10,000 registered vehicles, the highest mortality rates in the European Union (European Commission 2021). By comparison, the European Union countries overall reported 0.88 road deaths per 10,000 registered

vehicles in 2019, while nearby countries (Bulgaria, Hungary, Slovakia) experienced rates lower than 2 fatalities per 10,000 registered vehicles (European Commission 2021). The number and rate of road deaths in Romania decreased by 22 percent between 2010 and 2019. The number of serious injuries from traffic accidents declined by only 4 percent during this time period. Available data for Romania do not provide insight into factors contributing related to traffic accidents (e.g. speeding, drinking, road condition).

Most traffic fatalities and serious injuries in Romania occurred on urban roads as opposed to rural roads or motorways. Pedestrians accounted for 39 percent of road traffic deaths in 2019, followed by passenger car occupants (36 percent), bicyclists (11 percent), truck/bus occupants (6 percent), motorcycles or powered two-wheelers (4 percent), and unknown victims (4 percent) (European Commission 2021). Trends from 2010 through 2019 show an increasing proportion of fatalities among bicyclists and a decreasing proportion among motorcyclists and car occupants.

County-level accident data from 2021 indicate that Buzău County had 510 reported road accidents in 2022, resulting in 38 deaths and 650 injuries, roughly 2 percent of the accidents and casualties in Romania (Romanian National Institute of Statistics 2022). Buzău County is one of 41 counties, plus Bucharest, in Romania. South-eastern Romania, one of 8 reporting regions, had 13 percent of the accidents that occurred in Romania. The number of incidents occurring in Buzău County and the south-eastern region are approximately proportional to their share of national population.

Table 6-21 Road Accident Data, 2021

	Reported Accidents	Percent of Accidents	Fatalities	Percent of Fatalities	Injuries	Percent of Fatalities
Romania	26,805	100	1,779	100	33,233	100
South-east Romania	3,508	13	272	15	4,308	13
Buzau County	510	2	38	2	650	2

Source: Romanian National Institute of Statistics 2022).

6.2.6 Archaeology and Cultural Heritage

Introduction

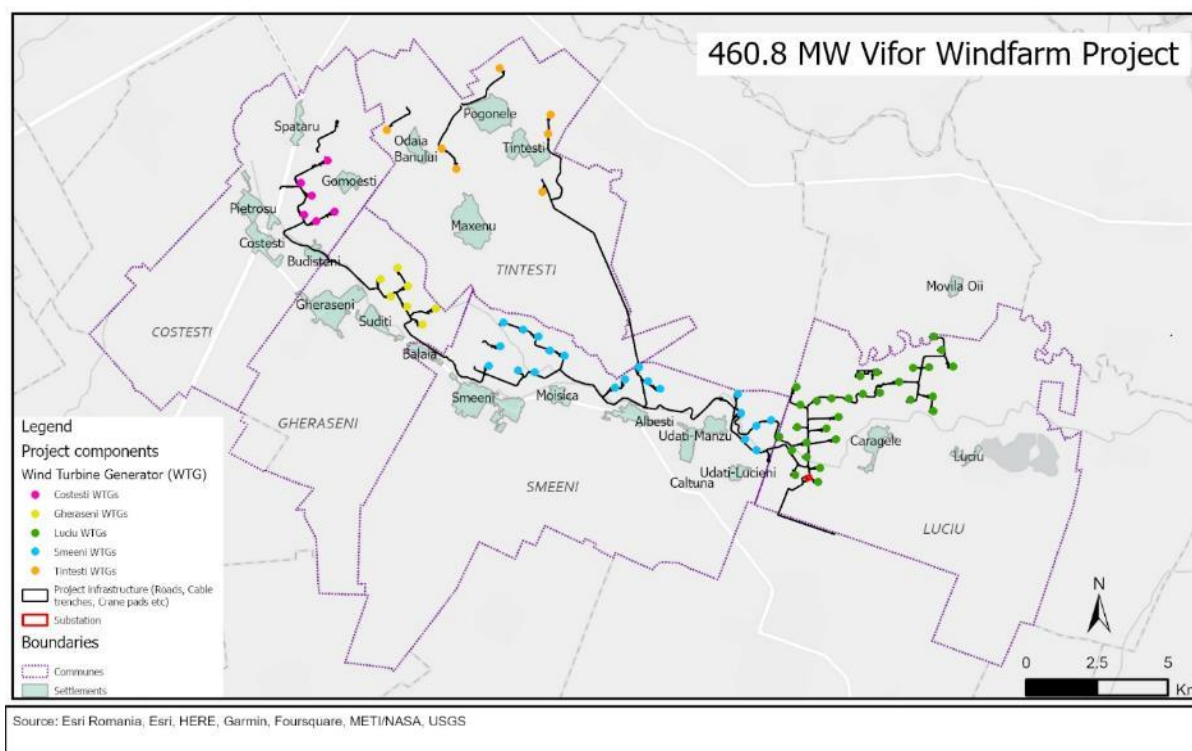
This Cultural Heritage baseline report assesses the nature, distribution and value (significance) of Cultural Heritage resources for the proposed development of the 460.8 MW Vifor Wind Farm Project in Romania (hereafter referred to as 'The Project') which consists of 72 wind turbine generators within the Buzau County, South-East Region of Romania.

The Vifor Wind Farm Project Aol, as shown in Figure 6-38 is located in the central-southern part of Buzau county, Middle Bărăganului Plain, South East Romania. The Project comprises the design, construction, commissioning and operation of five sub-projects located within the territory of Gherăseni, Smeeni, Luciu, and Țintești communes, in Buzău County, and is partially located within two Natura 2000 sites.

The Project will be implemented by First Look Solutions S.A. as the Project Company (development, construction and operation of the Project) with Low Carbon and Rezolv Energy contribute to the Project development, finance, construction and operation, as Projects' Sponsors (hereafter collectively referred to as the Client).

- The information presented in this report draws on desk-based research, remote sensing, and historic mapping. No tangible or intangible cultural heritage survey was carried out for this Project.

Figure 6-38: Project Location and Layout



■ Source: ERM

Legislative Framework

This report has been prepared taking into considerations:

- National Legislation and regulations of Romania in relation to cultural Heritage;
- International Treaties signed by the Government of Romania in relation to Cultural Heritage.
- International Environmental Standards for Cultural Heritage:
 - International Finance Corporation Performance Standards for Cultural Heritage (IFC PS8).
- Recognised Good International Practice.

National Legislation

National legislation relating to the protection of cultural heritage in Romania is summarised in table below:

Law	Brief Description
Law 26/2008	Regarding the protection of immaterial cultural heritage
Ordinance 43/2000	On the protection of the archaeological heritage and the declaration of some archaeological sites as areas of national interest
Ordinance no. 44 of January 30, 2000	Regarding the insurance of movable cultural goods temporarily exported
Order no. 2375 of 21.11.2005 for the amendment of art. 4 of the Annex no. 1 to the Order of	Authorizations issued until 31.12.2004 in order to carry out activities in the field for the protection of historical monuments are extended by 24 months from their expiry date, upon request the authorization

the Minister of Culture and Religions no. 2535/27.02.2003	holder. The extension will be made based on the presentation, by the applicant, of the legalized copy from the work card or from the collaboration contract, services, consultancy, etc. in force at the date of the extension request, concluded with the specialist/expert certified by the Ministry of Culture and Religion.
Order of the minister of culture and cults no. 2684/2003	Regarding the approval of the Methodology for drawing up the obligation regarding the use of the historical monument and its contents.
Law 422/2001	On the protection of historical monuments, Regarding protection of the designated historical monuments
Government Decision no. 902/2005	On the establishment of the Institute National for the Study of the Holocaust in Romania "Elie Wiesel", published in M. Of. no. 758 / 19 Aug. 2005
Government Decision no. 802 of July 14, 2005	On the organization and operation of the National Cultural Fund Administration
Government decision no. 610/2003	On the approval regarding the procedure for granting the credits necessary to carry out protection works at historical monuments owned by natural or legal persons under private law

Law 26/2008:

Regarding the protection of immaterial cultural heritage, this law includes the following key points:

- The protection measures are through conservation and enhancement. They do not cover appropriated culture, depersonalised commercialised objects, or commercial products of mediocre inspired by Romanian folklore.
- There are special rights granted to family producers, community producers, and key holders of community knowledge.
- Protection is given to “living human treasures”, an honorary title that can be conferred upon people who are recognised by the community as creating or transmitting forms of cultural heritage.
- The establishment of the National Commission for Safeguarding the Immaterial Cultural Heritage
- Appropriating cultural heritage or commercialising it without the agreement of traditional communities are sanctioned in the ordinance.⁴⁰

Law 422/2001:

Regarding protection of the designated historical monuments, this law includes the following key points:

- For each historical monument, a protection zone is established, delimited on the basis of topographical, geographical or urban landmarks, depending on the street layout, relief and the characteristics of the historical monument;
- The competent local public authorities shall include the delimited protection areas in the urban plans and in the related regulations. Public utility servitudes and special building regulations

⁴⁰ UNESCO, List National Cultural Heritage Laws <https://en.unesco.org/cultnatlaws/list>

can be established in the protection zone through the town planning plans and regulations approved and approved according to the law;

- In the protection areas of historical monuments that are places of worship, it is forbidden to hold outdoor events, during the period in which a religious service is held within them, of events that, through the sound or visual pollution they produce, may interfere with the performance religious service. As an exception, such demonstrations can be organized, with the consent of the religious authority that administers the place, under conditions that do not interfere with the conduct of the religious service;
- Historical monuments are protected regardless of their ownership regime or their state of conservation;
- The application of servitudes that result in the abolition, partial destruction or degradation of historical monuments and their protection zones is prohibited; and
- The abolition, partial or total destruction, desecration, as well as the degradation of historical monuments are prohibited and are sanctioned according to the law.

From a structural point of view, the List of Historical Monuments (LMI) are grouped into four categories, depending on their nature:

- I. Archaeological monuments
- II. Architectural monuments
- III. Public forum monuments
- IV. Memorial and funeral monuments

From a value point of view, the list of historical monuments includes the following categories:

- Category A - monuments of national interest
- Category B - monuments of local interest

The LMI code includes: County Acronym (e.g., 'BZ' for Buzau) - a Roman numeral that groups the monuments according to their nature (I-IV) - a lowercase letter ('m' for monument, 'a' for ensemble or 's' for archaeological site) - an uppercase letter that describes the monuments' value (A/B) - a unique order number (e.g., BZ-I-s-B-02219).⁴¹

International Treaties

International Treaties relating to the protection of cultural heritage in Romania are summarised in Table 6-22

⁴¹ Romania Ministry of Culture Website <http://www.cultura.ro/lista-monumentelor-istorice>

Table 6-22 International Treaties relating to the protection of cultural heritage in Romania

Title	Description	Ratification/ acceptance date
Convention concerning the Protection of the World Cultural and Natural Heritage	Noting that the cultural heritage and the natural heritage are increasingly threatened with destruction not only by the traditional causes of decay, but also by changing social and economic conditions which aggravate the situation with even more formidable phenomena of damage or destruction.	16 November 1972
Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property	<p>The States Parties to this Convention recognize that for the purpose of the Convention property which belongs to the following categories forms part of the cultural heritage of each State:</p> <p>(a) Cultural property created by the individual or collective genius of nationals of the State concerned, and cultural property of importance to the State concerned created within the territory of that State by foreign nationals or stateless persons resident within such territory;</p> <p>(b) Cultural property found within the national territory;</p> <p>(c) Cultural property acquired by archaeological, ethnological or natural science missions, with the consent of the competent authorities of the country of origin of such property;</p> <p>(d) Cultural property which has been the subject of a freely agreed exchange;</p> <p>(e) Cultural property received as a gift or purchased legally with the consent of the competent authorities of the country of origin of such property.</p>	14 November 1970
Convention for the Safeguarding of the Intangible Cultural Heritage	<p>The purposes of this Convention are:</p> <p>(a) to safeguard the intangible cultural heritage.</p> <p>(b) to ensure respect for the intangible cultural heritage of the communities, groups and individuals concerned;</p> <p>(c) to raise awareness at the local, national and international levels of the importance of the intangible cultural heritage, and of ensuring mutual appreciation thereof;</p>	17 October 2003

	(d) to provide for international cooperation and assistance.	
Protocol to the Convention for the Protection of Cultural Property in the Event of Armed Conflict	Each High Contracting Party undertakes to prevent the exportation, from a territory occupied by it during an armed conflict, of cultural property as defined in Article I of the Convention for the Protection of Cultural Property in the Event of Armed Conflict	14 May 1954
Convention on the Protection and Promotion of the Diversity of Cultural Expressions	<p>Article 1 – Objectives</p> <p>The objectives of this Convention are:</p> <p>(a) to protect and promote the diversity of cultural expressions;</p> <p>(b) to create the conditions for cultures to flourish and to freely interact in a mutually beneficial manner;</p> <p>(c) to encourage dialogue among cultures with a view to ensuring wider and balanced cultural exchanges in the world in favour of intercultural respect and a culture of peace;</p> <p>(d) to foster interculturality in order to develop cultural interaction in the spirit of building bridges among peoples;</p> <p>(e) to promote respect for the diversity of cultural expressions and raise awareness of its value at the local, national and international levels;</p> <p>(f) to reaffirm the importance of the link between culture and development for all countries, particularly for developing countries, and to support actions undertaken nationally and internationally to secure recognition of the true value of this link;</p> <p>(g) to give recognition to the distinctive nature of cultural activities, goods and services as vehicles of identity, values and meaning;</p> <p>(h) to reaffirm the sovereign rights of States to maintain, adopt and implement policies and measures that they deem appropriate for the protection and promotion of the diversity of cultural expressions on their territory;</p> <p>(i) to strengthen international cooperation and solidarity in a spirit of partnership with a view, in particular, to enhancing the capacities of developing countries in order to protect and promote the diversity of cultural expressions.</p>	20 October 2005

International Environmental Standards

The International Finance Corporation (IFC) has developed eight environmental and social Performance Standards (PS) to manage the social and environmental risks and impacts of IFC-financed projects (most recent version from 2012). The IFC PS's and the accompanying Guidance Notes are applicable to this Project⁴².

IFC Performance Standards state that the party responsible for implementing and operating the project must comply with the applicable national laws, including those laws implementing host country obligations under international law. The project operator is also required to meet the requirements of the standards throughout the life of an investment by IFC or other relevant financial institution.

IFC PS 8 recognises the importance of cultural heritage for the current and future generations. Consistent with the Convention Concerning the Protection of the Worlds Cultural and Natural Heritage, this PS sets out minimum requirements for the protection of Cultural Heritage resources in development projects financially supported by the IFC.⁴³

The objectives of the PS8 standard are to:

- protect Cultural Heritage from the adverse impacts of project activities and support its preservation; and
- promote the equitable sharing of benefits from the use of Cultural Heritage.

Key sections within PS8 include the following:

In paragraph 6 it calls for the implementation of international treaties and national laws relating to heritage protection, stating that clients:

'Will identify and protect Cultural Heritage by ensuring that internationally recognized practices for the protection, field-based study, and documentation of Cultural Heritage are implemented'.

In paragraph 7 it adds that:

'Where the risk and identification process determines that there is a chance of impacts to Cultural Heritage, the client will retain competent professionals to assist in the identification and protection of Cultural Heritage'.

In paragraph 9 it is also states that:

'The client is responsible for siting and designing a project to avoid significant adverse impacts to Cultural Heritage. The environmental and social risks and impacts identification process should determine whether the proposed location of a project is in areas where Cultural Heritage is expected to be found, either during construction or operations.'

The standard goes on to specify that Affected Communities and relevant national regulatory agencies should be consulted. It favours the retention of Cultural Heritage in situ (paragraph 12), only permitting exceptions where there is no feasible alternative, and the removal of the resource is carried out 'using the best available technique'.

In paragraphs 13-15, the standard addresses impact on 'critical Cultural Heritage' defined as:

'Recognized heritage of communities who use or have used within living memory the Cultural Heritage for long-standing cultural purposes; or (ii) legally protected Cultural Heritage areas, including those proposed by host governments for such designation.'

The standard states that critical heritage should not be removed unless in exceptional circumstances where impacts are unavoidable. In such cases, external experts should be retained to assist in its

⁴² https://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/Sustainability-At-IFC/Policies-Standards/Performance-Standards/

⁴³ https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/performance-standards/ps8

protection and assessment. Where there are legally protected sites, the client is required to comply with legal requirements related to their protection, consult stakeholders, and implement additional programmes to promote and enhance their conservation.

Good International Practice

Safeguarding and protecting cultural heritage with the use of innovative approaches, in corporation with stakeholders is key to appropriately managing and promoting the cultural heritage to the benefit of the country and communities for social cohesion, wellbeing and environmental sustainability.⁴⁴ This baseline has taken into consideration the following approaches in line with Good International Industry Practice

Precautionary Approach

Good International Practice requires developers to take a precautionary approach to Cultural Heritage protection and safeguarding. Where there is uncertainty about the impact of a development on Cultural Heritage (such as through an insufficient level of information) Good International Practice requires an assumption that a significant adverse impact will occur and require appropriate mitigation for the assumed impact until such a time as further information is available to allow a robust assessment of potential impact. This precautionary approach is relevant to managing risk and impacts to Cultural Heritage and has been applied to this Project.

Mitigation Hierarchy

The implementation of the mitigation hierarchy is one of the fundamental objectives of PS 8 and is recognised Good International Practice. The project developer should always in the first instance look to avoid any impacts on Cultural Heritage through project redesign. Where avoidance is not feasible, the developer will apply a mitigation hierarchy that minimises as much as possible any adverse impacts on Cultural Heritage. This concept has been applied to the selection of mitigation measures for this Project.

Scope

This section assesses the following Project-related activities of the Vifor Wind Farm and associated infrastructure with the potential to impact tangible and intangible Cultural Heritage resources:

- The proposed development and associated infrastructure.
- The project Area of Influence (Aol)⁴⁵ for the Vifor Wind Farm and associated infrastructure⁴⁶.

All Cultural Heritage resources identified in the Vifor Wind Farm Project Aol with the potential to be directly or indirectly affected were considered (Table 6-23). The extent and value (significance) of archaeological and palaeoenvironmental remains, historic buildings, the built environment and historic landscape were also considered.

Table 6-23 Scope of the Assessment and Project Area of Influence

Project Phase	Activity with Potential Impact	Project Area of Influence (Aol)
Construction	Physical ground disturbance through earthworks	Direct Impacts: 50 metres either side of the footprint and associated infrastructure of the Project
	Restriction of access	Indirect Impacts: 2000 metres either side of the footprint and associated infrastructure of the Project
	Visual, auditory and dust impacts	

⁴⁴ <https://www.unesco.org/en/cultural-heritage-7-successes-unescos-preservation-work>

⁴⁵ According to the definition given in the IFC PS1, the Project Area of Influence includes Area of Direct Impacts (e.g., Project Area), Area of Indirect Impacts, and Area of Cumulative Impact.

⁴⁶ No limits on the Construction area were available at the time of the ESIA, and assumptions had to be made in relation to the extent of this area, as shown in Table 3.

Operation	Restricted Public Access Visual and auditory impacts	Indirect Impacts: 2000 metres either side of the footprint and associated infrastructure of the Project
-----------	---	---

Source: ERM

Methodology

This baseline report is prepared using the guidance on Heritage Impact Assessments for World Heritage Sites (International Council on Monuments and Sites, ICOMOS)⁴⁷ and international guidance (ICOMOS and IFC PS8).⁴⁸

National guidance on methodology for assessment of impacts on Cultural Heritage within Romania is covered under the European Council Directive on the environmental impact assessment - EIA Directive 85/337/EC (amended by Directives 97/11/EC and 2003/35/EC).

Cultural Heritage resources were identified through the following:

- Desk-based research

Desk-based Research

The following information and sources were consulted during desk-based research of the Cultural Heritage for the Vifor Wind Farm Project Aol:

- Archaeological Diagnostic Field Assessment for the investment project 'Wind farm on Calmătiului floodplain', prepared by the Buzau County Museum in 2011;
- General historical study of Smeeni Commune for the General Urban Plan of Smeeni Commune, issued by Urbanist Marinescu C. Carmen Alina in 2017;
- Archaeological study no. 1230 of Smeeni Commune, issued by Buzau Museum in 2017;
- Published and available academic research of the region; and
- Cartographic materials and publicly available remote sensing data including satellite imagery, historic mapping, and topographic data.

Field survey for tangible and intangible cultural heritage

No tangible or intangible cultural heritage field survey was undertaken for this baseline report. Key baseline findings rely upon data collected in the field surveys reviewed in desk-based research.

Geographic/ Topographic Context

The Project is located within Călmățui river floodplain. The topography is generally flat, with elevations ranging from 80 m above sea level (asl) in the north-western areas of the Project to 50 m asl in the eastern areas. The specific vegetation of the marsh areas, the wet soil, brownish-grey clay as well as the presence of shells and common clams indicate the marshes in the environment. These were compact areas, located in small depressions. Hills at various elevations are visible within the landscape, some of which were affected by the drainage works, being totally or partially destroyed by the drainage and irrigation channels⁴⁹.

The study area is included in the upper basin of the Călmățui river, with a permanent course and a superficial hydrographic network represented by temporary courses, currently abandoned, clogged, with excess moisture in some places, coming from phreatic intake. The Călmățui basin, with a total

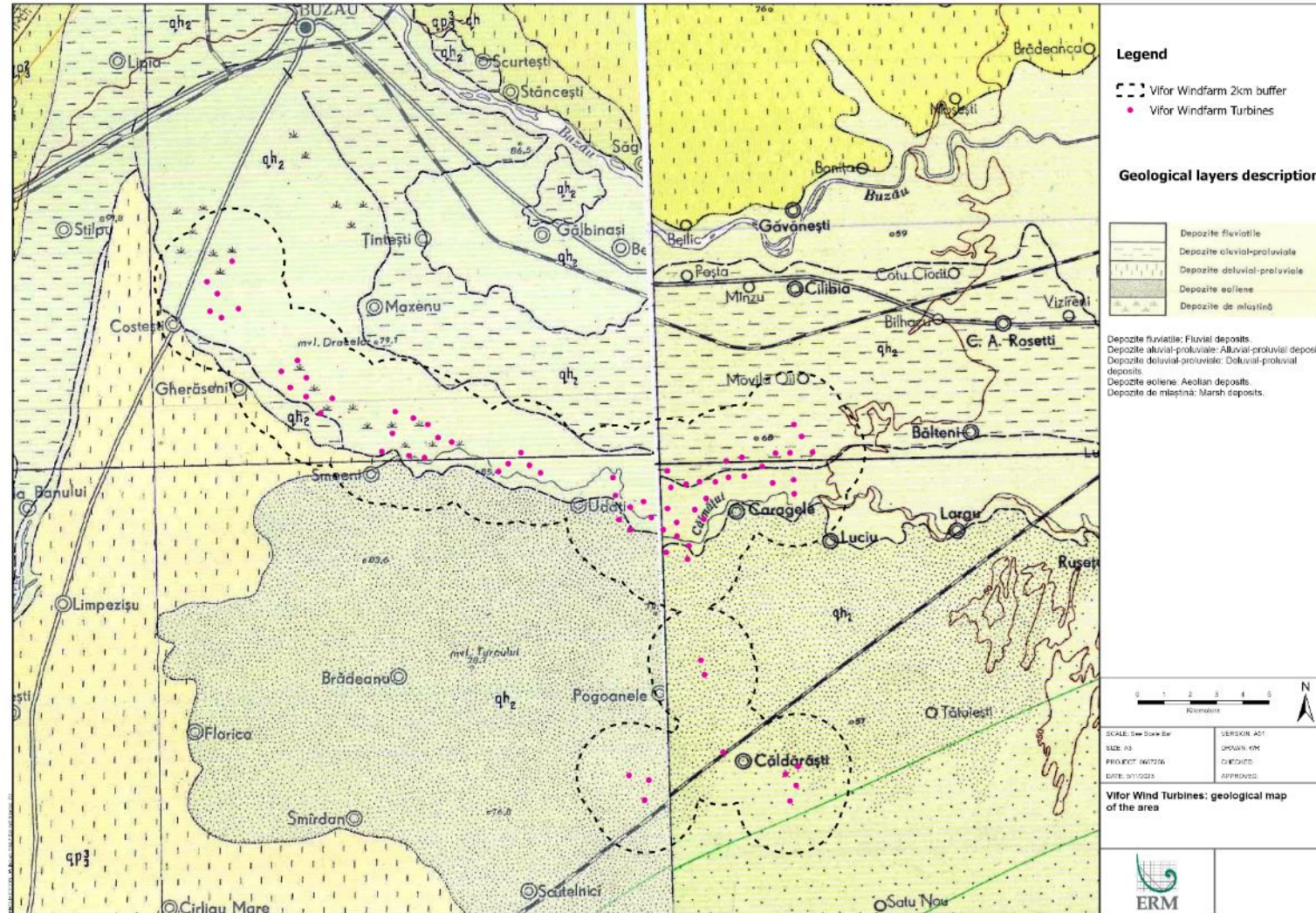
⁴⁷ ICOMOS, 49-51 rue de la Fédération 75015 Paris, France in collaboration with the World Heritage Centre. 2011. Guidance on Heritage Impact Assessments for Cultural Heritage Properties. A publication of the International Council on Monuments and Sites. Available at: icrom.org. Accessed on: 31/03/2022.

⁴⁸ https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/performance-standards/ps8

⁴⁹ According to information provided in the Archaeological Diagnostic Field Assessment performed by the Buzau County Museum in 2011.

length of the water course of 145 km, has its origin (altitude of 92 m) south of the city of *Buzău*, in a swampy area, delimited by the municipality of *Buzău* and the communes of *Stâlpu*, *Costești* and *Țintești*. The old swamps and overflow areas of Călmățui river from prehistoric times and up to the second half of the 20th century are still active today, when the flow of rainwater is increased. Lake *Luciu* with an area of approximately 3.2 km² is in the northern part of the town of the same name and south of the *Călmățui* river course. It is the largest permanent pond, but it shrinks in area during the dry season.

Figure 6-39: Geological map of the area



Note: in light yellow: river, floodplain and marsh sediments⁵⁰

Source: ERM

⁵⁰ Image adapted from Geological map of Romania, page 36 Ploiesti, L-35-XXVII, issued by the Geological Institute of Romania in 1967.

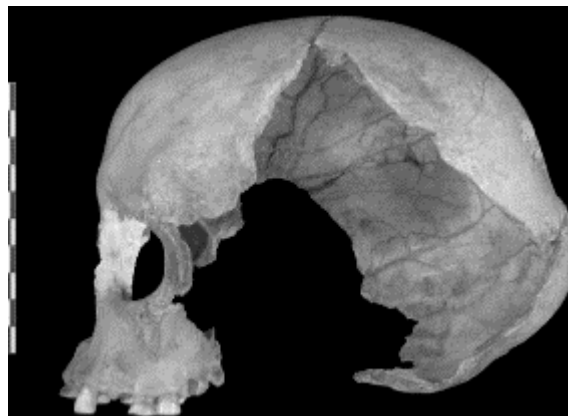
Archaeological and Historic Background

6.2.7 Palaeolithic to Mesolithic (2,601,950 BCE to 6,200 BCE)

Relatively little archaeological evidence from the Palaeolithic period has been identified in Romania. However, at Baia de Fier, located 233 km west of the Project, archaeological investigations have identified within a cave site, potential Middle Palaeolithic and Upper Palaeolithic age skeletal remains (Figure 6-40).⁵¹ The closest Palaeolithic site to the Project Aol is at Lapos, located 32 km west. At Lapos, archaeologists have identified Palaeolithic and Mesolithic remains from an open-air habitation site.⁵² Artefacts identified at these sites suggest that these were nomadic communities exploiting animal and plant resources that they hunted, gathered, or scavenged.

Archaeologists have identified early hominid skeletal remains in Romania predominately in cave sites which provide better environments for the preservation of archaeological sites. Open air sites have been identified, but primarily consist of lithic scatters.

Figure 6-40 Skull identified at Baia de Fier⁵³



6.2.8 Neolithic (6200 BCE – 5000 BCE)⁵⁴

The end of the Mesolithic coincides with the arrival of Neolithic farmers. The environment in Romania during this period warmed which allowed for woodlands to increase in size and raised the river levels.⁵⁵ The early Neolithic farmers primarily exploited resources along marshes and river channels. While they practiced horticultural cultivation and animal husbandry, they continued to supplement their diet with hunted and gathered foods. There is a large amount of archaeological evidence from this period as structures and toolkits, such as ditch systems, pottery, and loom weights, were created in addition to the stone and bone tools that previous periods utilized.

⁵¹ Boardman, J. I.E.S Edwards, G.G.L Hammond, and E. Sollberger (eds) (1982). The Cambridge Ancient History Second Edition. Volume III. Part I. The Prehistory of the Balkans; and the Middle East and the Aegean world tenth to eighth centuries B.C. University of Cambridge Press; Soficaru A., Adrian Doboş, and Erik Trinkaus (2006) Early modern humans from the Peștera Muierii, Baia de Fier, Romania. 103 (46) 17196-17201. Available at: [Early modern humans from the Peștera Muierii, Baia de Fier, Romania | PNAS](#). Accessed 31/08/2023.

⁵² Chronicle of archaeological research in Romania. Lapos | County: Prahova | Website: Poiana Romanului | Excavation Year: 2000. Available at: [Lapos | County: Prahova | Website: Poiana Romanului | Excavation Year: 2000 -- Archaeological Excavations in Romania \(cimec.ro\)](#). Accessed 31/08/2023.

⁵³ Soficaru A., Adrian Doboş, and Erik Trinkaus (2006) Early modern humans from the Peștera Muierii, Baia de Fier, Romania. 103 (46) 17196-17201. Available at: [Early modern humans from the Peștera Muierii, Baia de Fier, Romania | PNAS](#). Accessed 31/08/2023.

⁵⁴ Dates provided by the Buzău County Museum, [Stone Age - Buzău County Museum \(muzeubuzau.ro\)](#)

⁵⁵ Boardman, J. I.E.S Edwards, G.G.L Hammond, and E. Sollberger (eds) (1982). The Cambridge Ancient History Second Edition. Volume III. Part I. The Prehistory of the Balkans; and the Middle East and the Aegean world tenth to eighth centuries B.C. University of Cambridge Press.

6.2.9 *Eneolithic (4600 BCE – 3700 BCE) and Bronze Age (3200 BCE – 1125 BCE)*⁵⁶

The Eneolithic period (sometimes referred to as the Chalcolithic or Copper Age), signals the end of the Neolithic (“new stone age”) period with the introduction of copper working to the region. Beyond the innovations with metal working during the periods, archaeological cultures can be distinguished by their distinctive pottery styles and decorations. These varying decorations and forms are believed to represent religious and cosmological symbolism relevant to the different cultures. The Buzau County Museum has identified the following sites in the regions surrounding of the Project Aol that contain Enolithic and Bronze Age archaeological sites: Aldeni and Fulga (Cernătești commune [com.]), Coțatcu (Podgoria com.), Gherăseni, Moisica (Smeeni com.), Năeni, Pietrosu (Costești com.), Sărata Monteoru (Merei com.) and Sudiți (Gherăseni com.).⁵⁷

Tumuli are mounds often associated with burials and nearby settlements. Although they were constructed throughout the prehistoric period, heavy construction began in Romania during the Bronze Age.⁵⁸ The creation of mortuary landscapes in low land agropastoral areas in Romania by tumuli and their significance is a major focus of archaeological research as the importance of the intervisibility of the settlements and mounds in the region is poorly understood.⁵⁹ It is highly likely that Bronze Age sites within the Project Aol exist below the surface.

6.2.10 *Iron Age (1125 BCE- 600 AD)*

The Roman Period (3600 BC – 500 AD) had a significant impact on Romania, the inhabitants of which were then known to the Romans as the Dacians.⁶⁰ They introduced Roman-style civilization that was heavily adopted across the region, including styles of dress, metal working and architecture. By 100 AD, Dacian civilisation was at its height, and Rome incurred great expenditure to conquer and reconquer the area after it lost and regained control over the years. During this period (and especially from the 4th to 9th centuries) the Goths, Visigoths, Huns and Slavs also invaded the lands. These invasion brought new lifeways, material culture, and traditions to the region which may be identified in the archaeological record.

6.2.11 *Medieval Period to Modern Period (600 AD – Present)*⁶¹

The medieval and post-medieval period in Romania can be characterised as one of political flux. Throughout medieval period Romania experienced a number of invasions, including the Magyars from 896-1100 AD and the Ottomans in the 14th-15th centuries AD. During the early 1500's the second diocese of Wallachia in Buzău was established during Radu the Great's (the Prince of Wallachia) reign. The House of Drăculești was proceeded by Mihai Viteazul in 1600. During the post-medieval period, the Hapsburg Empire took control in 1699 AD, succeeded by Russia in 1821 AD.⁶²

However, during the post-medieval period a sense of national and local political identity developed. There were several acts and territorial unifications, including that of Moldavia and Wallachia in 1859, the culmination of which was The Great Union of 1918. By the 20th century, Romania was established

⁵⁶ Dates provided by the Buzău County Museum, <https://www.muzeubuzau.ro/epoca-bronzului/>

⁵⁷ Buzau County Museum (2023). Bronze Age. Available at: [Bronze Age - Buzău County Museum \(muzeubuzau.ro\)](https://www.muzeubuzau.ro/). Accessed 31/08/2023

⁵⁸ Alin Frînculeasa, Mădălina Nicoleta Frînculeasa. The dynamics of prehistoric burial mounds of Ploiești metropolitan area (Romania) as reflected by cartographic documents of the 18th-20th centuries. The Royal Geographical Society. <https://rgs-ibg.onlinelibrary.wiley.com/doi/10.1111/area.12354>. Accessed 26/06/2023

⁵⁹ Beck, Jess and Horia Ciugudean, and Colin P Quinn. (2020) Bioarchaeology and Mountain Landscapes in Transylvania's Golden Triangle. Bioarchaeology International. Vol 4 Issue 2 pgs 89-110; Gainesville Florida.

⁶⁰ Romania Natural and Cultural. Romania's History. Available at: <https://romaniatourism.com/history.html#ancient>. Accessed: 26/06/2023

⁶¹ Dates provided by the Buzău County Museum, [Mileniul I d. Hr. - Muzeul Județean Buzău \(muzeubuzau.ro\)](https://www.muzeubuzau.ro/)

⁶² These are an acute summary of politics in the region and should not be considered a detailed history of the area which is outside the scope of this reporting

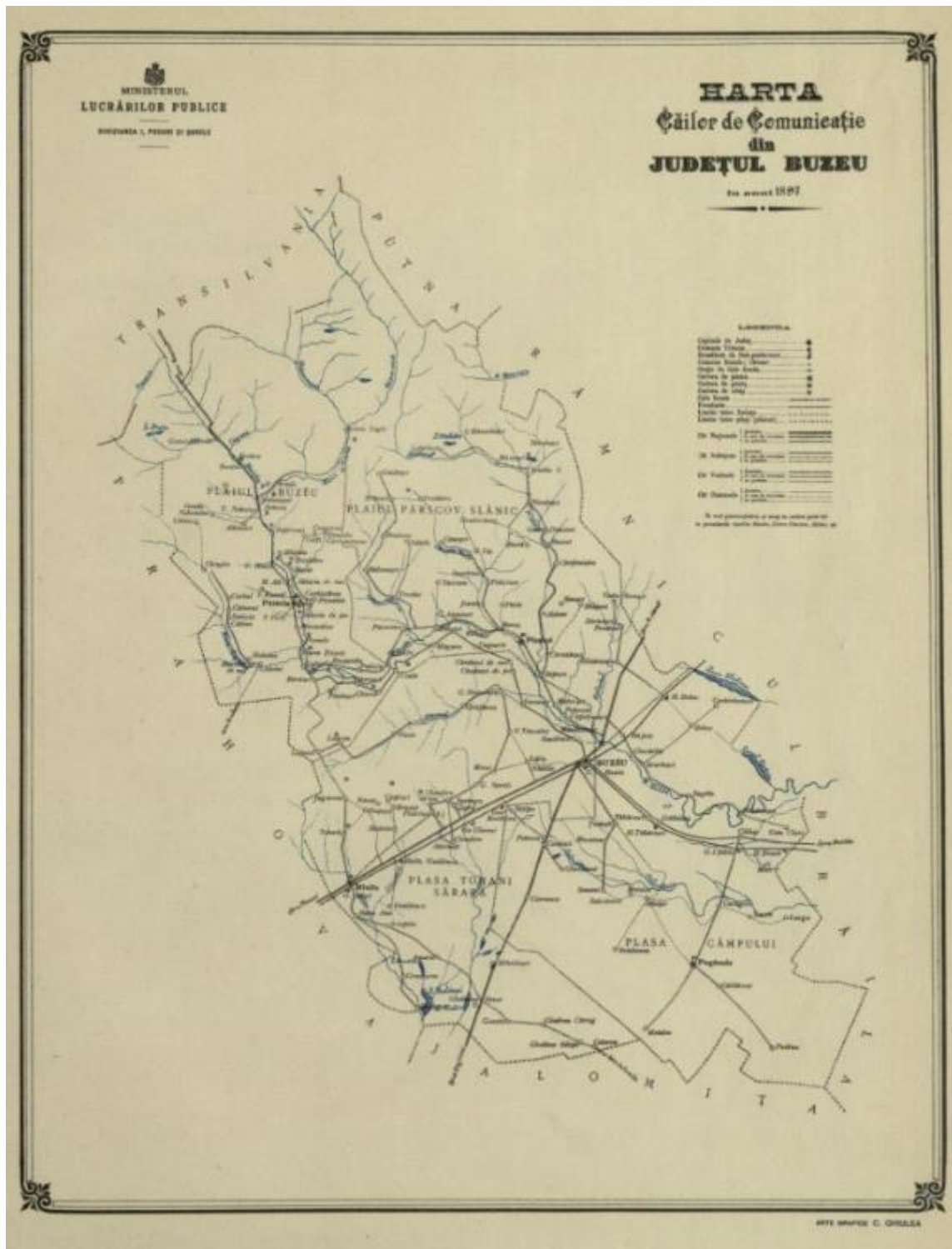
as a formal nation and ruled by a monarchy. However, in 1941 Romania became a military dictatorship in the political upheaval of the Second World War, in the later years of which the country was considered by the USSR as an occupied territory. After the conclusion of the War, Romania was a member of the Communist Bloc until the Romanian Revolution (1989). By the 1990's it was a free democracy.

Maps (Figure 6-41) from the 19th century suggest the Project Aol was primarily agricultural in use as it is today, however, the surrounding villages have developed in size since.⁶³ This primarily agricultural use of the landscape in the Project Aol may be visible in the archaeological record as well.

⁶³ Old Maps Online (1897) Harta Cailor de Comunicatie din Judetul Buzeu Available at: [Harta Cailor de Comunicatie din Judetul Buzeu \(oldmapsonline.org\)](http://oldmapsonline.org). Accessed: 08/31/2023

Intangible Traditions

⁶⁴ Old Maps Online (1897) Harta Cailor de Comunicatie din Judetul Buzeu Available at: [Harta Cailor de Comunicatie din Judetul Buzeu \(oldmapsonline.org\)](http://oldmapsonline.org). Accessed: 08/31/2023



There is no assessment of intangible heritage in the 2011 Field evaluation report prepared by the Buzau County Museum.

Traditional wall-carpet craftsmanship is a practice that is represented in the County of Buzău. It plays an important role in social communication and in enhancing and promoting a cultural identity. The wall carpets, basic traditional objects used for decorating the houses in rural areas, are also known as scoarțe (carpets), păretare (woven wall hangings), lăicere (wool rugs for covering benches), velințe (wool carpets), chilimuri (kilims), lădare (carpets for covering chests), ungherare (carpets for covering corner chests) or cergi (thick wool blankets).⁶⁵

Key Baseline Findings

The study identified 61 Cultural Heritage resources within the Vifor Wind Farm Project Aol, comprising 16 Designated and 45 Non-designated resources. Further details on each Cultural Heritage resource can be found in Appendix A.

Designated Cultural Heritage Resources

A total of **16** Designated Cultural Heritage resources (prefix BZ-I-s, section Law 26/2008:

Regarding the protection of immaterial cultural heritage, this law includes the following key points:

- The protection measures are through conservation and enhancement. They do not cover appropriated culture, depersonalised commercialised objects, or commercial products of mediocre inspired by Romanian folklore.
- There are special rights granted to family producers, community producers, and key holders of community knowledge.
- Protection is given to “living human treasures”, an honorary title that can be conferred upon people who are recognised by the community as creating or transmitting forms of cultural heritage.
- The establishment of the National Commission for Safeguarding the Immaterial Cultural Heritage
- Appropriating cultural heritage or commercialising it without the agreement of traditional communities are sanctioned in the ordinance.

Law 422/2001:)⁶⁶ were identified within the Project Aol, some of which contain sub-sites and are presented by ‘type’ below:

Dwelling and Necropolis

- VV_CH_008 (BZ-I-s-B-02289) The archaeological site from Sudiți - La Crucea lui Ștefan
 - Includes sub-sites: BZ-I-s-B-02289.05, BZ-I-s-B-02289.06⁶⁷

Settlements and Necropolis (including funerary elements and tumuli)

- VV_CH_002 (BZ-I-s-B-02220) Costești Hallstat age Archaeological Site
 - Includes sub-sites: BZ-I-m-B-02220.01, BZ-I-m-B-02220.02
- VV_CH_005 (BZ-I-s-B-02231) The archaeological site from Gherăseni - Movila Cremenea (includes mounds)

⁶⁵ Romanian Heritage inscribed on UNESCO's Representative List of the Intangible Cultural Heritage, 2022

⁶⁶ (according to List of Historical Monuments No. in Annex 1 of Order 2314/2004)

⁶⁷ All sites include their associated subsites in the gazetteer indexed by the site number (Ie BZ-I-s-B-02287) instead of their subsite number (Ie BZ-I-s-B-02287.02). Subsites can be identified by the last two decimal numbers in the name.

- Includes sub-sites: BZ-I-s-B-02231.01, BZ-I-s-B-02231.02, BZ-I-s-B-02231.03
- VV_CH_007 (BZ-I-s-B-02287) The archaeological site of Smeeni
 - Includes sub-sites: BZ-I-s-B-02287.02, BZ-I-s-B-02287.01
- BZ-I-s-B-02294 The archaeological site from Udați-Lucieni - La Pascali.
 - Includes sub-sites: BZ-I-m-B-02294.02, BZ-I-m-B-02294.01

Figure 6-42 VV_CH_007 (BZ-I-s-B-02287) archaeological site of Smeeni⁶⁸



Source: *Studiu Arheologic Comuna Smeeni, 2017*

- VV_CH_001 (BZ-I-s-B-02219) Costești (Pietrosu) Archaeological Site
 - Includes sub-sites: BZ-I-m-B-02219.01/02/01, BZ-I-m-B-02219.01/02/02, BZ-I-m-B-02219.01/02/03
- VV_CH_003 (BZ-I-s-B-02232) Gherăseni Archaeological Site „Lacul Frâncului” point
 - Includes sub-sites: BZ-I-m-B-02232.01, BZ-I-m-B-02232.02, BZ-I-m-B-02232.03, BZ-I-m-B-02232.04, BZ-I-m-B-02232.05
- VV_CH_009 (BZ-I-s-B-02295) Archaeological site from Ulmeni - Movila lui Reteșan ("La Teișanu", "La puțul dealului", "Trei movile") (includes mounds). (

⁶⁸ Studiu Archaeological Comunei Smeeni. Romania Ministry of Culture 06/06/2017.

■ Figure 6-43)

- Includes sub-sites: BZ-I-s-B-02295.02, BZ-I-s-B-02295.03, BZ-I-s-B-02295.04, BZ-I-s-B-02295.05, BZ-I-s-B-02295.06, BZ-I-s-B-02295.07

Figure 6-43 VV_CH_009 BZ-I-s-B-02295 Ulmeni - Movila lui Reteşan⁶⁹



- VV_CH_004 (BZ-I-s-B-02233) Gheraseni Archaeological Site
 - Includes sub-sites: BZ-I-m-B-02233.01, BZ-I-m-B-02233.02, BZ-I-m-B-02233.03

Settlements

- VV_CH_036 (BZ-I-s-B-02192) The archaeological site from Albeşti - On the edge towards Moisica (Figure 6-44 and Figure 6-45).

⁶⁹ Studiu Archaeological Comunei Smeeni. Romania Ministry of Culture 06/06/2017.

Figure 6-44 VV_CH_036 (BZ-I-s-B-02192) archaeological site from Albești⁷⁰



Figure 6-45 VV_CH_036 (BZ-I-s-B-02192) ceramics discovered during field survey at Albești⁷¹



⁷⁰ Studiu Archaeological Comunei Smeeni. Romania Ministry of Culture 06/06/2017.

⁷¹ Studiu Archaeological Comunei Smeeni. Romania Ministry of Culture 06/06/2017.

- VV_CH_013 and VV_CH_0015 (BZ-I-s-B-0209) The Hallstatt settlement at Caragele (One site associated with two locations)⁷²
- VV_CH_012 (BZ-I-s-B-02210) Settlement, Sântana de Mureş – Cerneahov culture
- VV_CH_006 (BZ-I-s-B-02249) The archaeological site of Moisica.
 - Includes sub-sites: BZ-I-s-B-02249.01, BZ-I-s-B-02249.02, BZ-I-s-B-02249.03
- VV_CH_034 (BZ-I-s-B-02250) The archaeological site of Moisica
- VV_CH_043 (BZ-I-s-B-02294) The archaeological site from Udaţi-Lucieni - La Pascali (Figure 6-46 - Figure 6-49).
 - Includes sub-sites: BZ-I-m-B-02294.02, BZ-I-m-B-02294.01

Figure 6-46 VV_CH_043 (BZ-I-s-B-02294) archaeological site from Udaţi-Lucieni - La Pascali⁷³



⁷² ERM identified the BZ-I-s-B-02209 site as two locations for assessment (VV_CH_0013 and VV_CH_0015) as no information about their relationship as site or subsite was provided for the report a conservative approach was taken so that impacts at the two locations could be best assessed.

⁷³ Studiu Archaeological Comunei Smeeni. Romania Ministry of Culture 06/06/2017.

Figure 6-47 VV_CH_043 (BZ-I-s-B-02294) archaeological material discovered through walkover survey at La Pascali⁷⁴



Figure 6-48 VV_CH_043 (BZ-I-s-B-02249) archaeological site of Moisica⁷⁵



⁷⁴ Studiu Archaeological Comunei Smeeni. Romania Ministry of Culture 06/06/2017.

⁷⁵ Studiu Archaeological Comunei Smeeni. Romania Ministry of Culture 06/06/2017.

Figure 6-49 BZ-I-s-B-02249 Ceramic objects from the collection of the Buzay County Museum discovered in 1978⁷⁶



Places of Worship

- VV_CH_048 (BZ-II-m-B-02474) 'Sf. Nicolae' Church (Figure 6-50)

Figure 6-50 VV_CH_048 (BZ-II-m-B-02474) 'Sf. Nicolae' Church



⁷⁶ Studiu Archaeological Comunei Smeeni. Romania Ministry of Culture 06/06/2017.



Non-Designated Cultural Heritage Resources

45 Non-Designated⁷⁷ Cultural Heritage resources were identified within the Vifor Wind Farm Project Aol (unique ID National Archaeological Repertoire code).⁷⁸ The Cultural Heritage resources are presented by 'type' below:

Archaeological sites

- VV_CH_061 (49858.05) The settlement from the migration era from Tintesti – Pârlitura
- VV_CH_059 (49885.01) The archaeological site of Pogonele 1
- VV_CH_060 (49885.02) The archaeological site of Pogonele 2

Necropolis

- VV_CH_030 (46812.16) The modern era cemetery from Gherăseni – Cremenea
- VV_CH_058 (48762.02) Prehistoric Necropolis from Căldărăști - Movila Băneasca

Necropolis and Tumulus

- VV_CH_038 (49607.02) Udați-Lucieni Necropolis - Udați Mound

Settlement

- VV_CH_014 (46536.01) The archaeological site from Pietrosu - La Arman
- VV_CH_016 (46545.01) The archaeological site of Spătaru - Spătaru Forest
- VV_CH_057 (46812.07) The Gumelnița settlement from Gherăseni - In Luncă
- VV_CH_027 (46821.02) The archaeological site from Sudiți – La lacul cu butuci
- VV_CH_024 (46821.04) Gumelnița Tell from Sudiți - La Purcăreața
- VV_CH_025 (46821.05) The multi-layered site from Sudiți - Near the Weather Pillar

⁷⁷ (i.e., not included on the LMI list)

⁷⁸ <http://ran.cimec.ro/>

- VV_CH_011 (47319.02) The Neolithic settlement from Luciu
- VV_CH_010 (47319.04) The Neolithic settlement from Luciu - Popina Chişeu
- VV_CH_050 (49554.05) The archaeological site of Smeeni - Fântâna Tămăduitoare/ Healing Spring
- VV_CH_049 (49554.06) The archaeological site of Smeeni - La Târg
- VV_CH_053 (49554.13) Smeeni - Islaz archaeological site
- VV_CH_032 (49554.14) The Smeeni-Est multi-layered site
- VV_CH_052 (49554.16) The prehistoric settlement at Smeeni - În luncă 2
- VV_CH_044 (49607.05) Gumelniţa settlement from Udaţi-Lucieni - Pochina din Luncă
- VV_CH_042 (49607.06) The multi-layered archaeological site from Udaţi-Lucieni – East
- VV_CH_045 (49616.01) Archaeological site Udaţi-Mânzu - Lunca Udatilor
- VV_CH_055 (49616.03) The archaeological site Udaţi-Mânzu - In Lunca
- VV_CH_054 (49867.06) The archaeological site from Maxenu 2
- VV_CH_023 (49867.07) The archaeological site from Maxenu 3
- VV_CH_022 (49867.08) The archaeological site from Maxenu 4
- VV_CH_021 (49867.09) The archaeological site from Maxenu 5
- VV_CH_020 (49867.10) The archaeological site from Maxenu 6
- VV_CH_019 (49867.11) The archaeological site from Maxenu 7
- VV_CH_018 (49876.01) The Gumelniţa settlement from Odaia Banului

Settlement and Necropolis (includes funerary monuments)

- VV_CH_040 (49616.02) The archaeological site with funerary monument from Udaţi-Mânzu – Cerdac
- VV_CH_031 (49554.04) The archaeological site of Smeeni - the E edge of the village
- VV_CH_017 (46518.01) The archaeological site of Gomoesti - to the SW of the village

Necropolis and Tell

- VV_CH_026 (46821.06) The archaeological site of Sudiţi - On the border between Sudiţi and Bălaia

Settlement and Tumulus

- VV_CH_056 (47328.03) The settlement from the era of migrations and the T03 Tumulus from Caragiale - Măgura Catrinei

Tumuli

- VV_CH_029 (46812.15) The Bronze Age mound from Gherăseni – Gherăseni Mound
- VV_CH_028 (46821.03) The archaeological site from Sudiţi – Boului Mound
- VV_CH_046 (47328.04) The Luciu burial mound - T 01
- VV_CH_047 (47328.05) The Luciu burial mound - T 02
- VV_CH_051 (49554.15) The archaeological site of Smeeni - Smeeni 1 Mound

- VV_CH_035 (49563.02) The archaeological site from Albești – Albești Mound
- VV_CH_038 (49563.04) Albești Mound - Mound from the water reservoir
- VV_CH_037 (49563.06) Albești Mound - Mound from the village
- VV_CH_033 (49590.03) Moșica archaeological site – Moșica Mound
- VV_CH_041 (49607.03) The archaeological site from Udați Lucieni - Mound Udați Lucieni.

Sensitivity/ Value of Receptor

Each identified Cultural Heritage resource has been assigned a sensitivity/value.⁷⁹ There are many factors to consider when assigning value to Cultural Heritage resource. Values are typically expressed as low, medium, high (and sometimes very high). These can be equated to local, national, and international values.

The sensitivity/value of receptor has been assigned based on desk-based research and the field survey on intangible Cultural Heritage. A cautionary approach has been taken when assigning sensitivity/value of receptor to each Cultural Heritage resource. A Cultural Heritage field survey would be required as next step to confirm the assigned sensitivities, and based on the field survey results the sensitivity ratings may need to be revised.

ERM's internal Impact Assessment Standard Criteria for Cultural Heritage Impact Significance is aligned with the IFC PS8 guidance, and assigns a 'Low', 'Medium' and 'High' value to Cultural Heritage resources as set out in Table below.

Table 6-24 Criteria for Cultural Heritage Impact Significance⁸⁰ (a guide)

Cultural Heritage Resource Sensitivity		
Low	Medium	High
Defining Characteristics: <ul style="list-style-type: none"> - Site is not specifically protected under local, national or international laws or treaties; - Site can be moved to another location or replaced by a similar site, or is a type of site that is common in the surrounding region; - Site has limited or no cultural value to local, national or international stakeholders; and/or - Site has limited scientific value or similar information can be obtained at numerous sites <p>■ (Replicable Cultural Heritage)</p>	Defining Characteristics: <ul style="list-style-type: none"> - Site is specifically or generally protected by local or national laws, but laws allow for mitigated impacts; - Site can be moved or replaced, or data and artefacts recovered in consultation with stakeholders; - Site has considerable cultural value for the local and/or national stakeholders; and/or - Site has substantial scientific value, but similar information can be obtained at a limited number of other sites. <p>■ (Non-replicable Cultural Heritage)</p>	Defining Characteristics: <ul style="list-style-type: none"> - Site is protected by local, national and international laws or treaties; - Site cannot be moved or replaced without a major loss if cultural value; - Legal status specifically prohibits direct impacts or encroachment on site and/or protection zone; - Site has substantial value to local, national and international stakeholders; and/or - Site has exceptional scientific value and similar site types are rare or non-existent

⁷⁹ The sensitivity/ value of receptor has been assigned based on desk-based research and the field survey on intangible Cultural Heritage. A Cultural Heritage field survey is required to confirm the assigned sensitivities, and based on the field survey results the sensitivity ratings may need to be revised.

⁸⁰ Source: Annex to The ERM Impact Assessment Standard)

Cultural Heritage Resource Sensitivity		
Low	Medium	High
		(Critical Cultural Heritage)

Tangible Cultural Heritage

Tangible Cultural Heritage refers to physical artefacts, objects or places produced, maintained and transmitted inter-generationally in a society and there is a residual risk of additional archaeological buried remains being present. While a fair amount of archaeological work has been undertaken in the area, the history of the area indicates the potential for further archaeological sites to exist below the surface.

Tangible Cultural Heritage resources were assigned the following sensitivity:

6.2.11.2 High Sensitivity

The following **3** Cultural Heritage resources can be attributed a **high** sensitivity:

- Designated
 - VV_CH_003 (BZ-I-s-B-02232); VV_CH_008 (BZ-I-s-B-02289); and VV_CH_008 (BZ-I-s-B-02295).

6.2.11.3 Medium Sensitivity

The following **43** Cultural Heritage resources can be attributed a **Medium** sensitivity:

- Designated
 - VV_CH_048 (BZ-II-m-B-02474); VV_CH_036 (BZ-I-s-B-02192), VV_CH_013 and VV_CH_015 (BZ-I-s-B-02209 [both locations]); VV_CH_012 (BZ-I-s-B-02210); VV_CH_001 (BZ-I-s-B-02219); VV_CH_002 (BZ-I-s-B-02220); VV_CH_005 (BZ-I-s-B-02231); VV_CH_004 (BZ-I-s-B-02233); VV_CH_006 (BZ-I-s-B-02249); VV_CH_034 (BZ-I-s-B-02250); VV_CH_007 (BZ-I-s-B-02287), and VV_CH_043 (BZ-I-s-B-02294).
- Non-designated
 - VV_CH_017 (46518.01); VV_CH_016 (46545.01); VV_CH_030 (46812.16); VV_CH_027 (46821.02); VV_CH_026 (46821.06); VV_CH_010 (47319.04); VV_CH_012 (47328.02); VV_CH_047 (47328.05); VV_CH_058 (48762.02); VV_CH_031 (49554.04); VV_CH_050 (49554.05); VV_CH_049 (49554.06); VV_CH_053 (49554.13); VV_CH_032 (49554.14); VV_CH_051 (49554.15); VV_CH_035 (49563.02); VV_CH_033 (49590.03); VV_CH_039 (49607.02); VV_CH_041 (49607.03); VV_CH_042 (49607.06); VV_CH_045 (49616.01); VV_CH_055 (49616.03); VV_CH_061 (49858.05); VV_CH_053 (49867.06); VV_CH_023 (49867.07); VV_CH_022 (49867.08); VV_CH_021 (49867.09); VV_CH_020 (49867.1); VV_CH_059 (49885.01); VV_CH_011 (47319.02); and VV_CH_060 (49885.02).

6.2.11.4 Low Sensitivity

The following **15** Cultural Heritage resources can be attributed a **Low** sensitivity:

- Non-designated
- VV_CH_014 (46536.01); VV_CH_057 (46812.07); VV_CH_029 (46812.15); VV_CH_028 (46821.03); VV_CH_024 (46821.04); VV_CH_025 (46821.05); VV_CH_056 (47328.03); VV_CH_046 (47328.04); VV_CH_052 (49554.16); VV_CH_038 (49563.04); VV_CH_037

(49563.06); VV_CH_044 (49607.05); VV_CH_040 (49616.02); VV_CH_019 (49867.11) and VV_CH_018 (49876.01).

Intangible Cultural Heritage

Due to the instrumental and artefactual nature of Intangible Cultural Heritage, it is common for Cultural Heritage to have both tangible and intangible value.⁸¹ Intangible Cultural Heritage features may be impacted by restricted access to, and use of, these sites during construction phase and operation phase. Intangible Cultural Heritage resources were assigned the following sensitivity:

6.2.11.5 High Sensitivity

No Intangible Cultural Heritage resources can be attributed a **high** sensitivity:

6.2.11.6 Medium Sensitivity

The following Cultural Heritage resource can be attributed a **Medium** sensitivity:

- VV_CH_048 (BZ-II-m-B-02474)

6.2.11.7 Low Sensitivity

No Cultural Heritage resources can be attributed a **Low** sensitivity.

⁸¹ Intangible Cultural Heritage indicates 'the practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their Cultural Heritage' (UNESCO, 2003).

7. ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

7.1 Environmental Impact Assessment

Potential impacts of the physical environment have been further assessed, including topography, geology and soil, climate change, air quality, noise, surface water quality, landscape values and visual amenity, and impact associated with shadow flicker. Details of the impact assessment are presented in the following sections.

7.1.1 Climate change (*Climate Risk and Adaptation*)

7.1.1.1 Introduction

This CCRA report assesses the potential impact of climate change on the proposed VisViva Wind Farm in Buzau County, Romania. VisViva Wind Farm comprises six sub-projects in the administrative areas of Costești, Gherăseni, Smeeni, Luciu and Țintești communes. The Project comprises 72 6.4-MW wind turbine generators (WTGs), resulting in a total site capacity of 460.8 MW. All WTGs will be connected by underground cable lines to a single transformer station, and from there through a short overhead transmission line (OHL) to the national grid. Construction works are planned to begin in late 2023 or early 2024, and will last around 1.5 years. The estimated operation period of the Project is 30 to 35 years, after which, for the purposes of this CCRA, decommissioning is envisaged.

ERM conducted an ESIA scoping in January 2022 and recommended a CCRA study aligned with EP4.

The CCRA considers potential impact climate events may have on the Project during its operational and decommissioning phases. It has been performed with a combination of ERM expertise, information provided by the Client and climate data to consider how climate change may impact the site, which is summarised in this report as a high-level interpretation of climate-related risks and opportunities to the Project. This report presents high-level mitigation/adaptation measures and / or recommend appropriate next steps/considerations which could be considered by the Project team for material risks for both operation and decommissioning. These recommendations can be implemented by the Project to reduce the risk or monopolise on any potential opportunities. ERM will recommend further assessment or the investigation of adaptation measures.

This report covers a physical CCRA, in alignment with the guidance set out within EP4 and TCFD documentation. This includes the identification of the key physical risks posed to the Project under baseline and future climate conditions using climate scenario's (hereafter referred to as SSPs). Due to the duration of construction (i.e. 2024-2027), this report does not include Project's construction phase, because in terms of physical climate risks it will be very close to the baseline.

7.1.1.2 Applicable Standards

Internationally recognised Equator Principles 4 (EP4) (2020) and International Finance Corporation (IFC) Performance Standards (2012 release) explicitly require consideration of relevant climate-related risks.

Equator Principles 4

According to Principle 2, the Project is expected to include assessment of climate change risks as part of the ESIA or other Assessment and present its results the assessment documentation. The Climate Change Risk Assessment should be aligned with Climate Physical Risk and Climate Transition Risk categories of the Task Force for Climate-related Financial Disclosure (TCFD).

IFC Performance Standards

The IFC Performance Standards (IFC PS) are directed towards clients, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. Together, the eight IFC Performance Standards establish standards that the client is to meet throughout the life cycle of an investment.

The **IFC PS 1** requires that the risks and impacts identification process to consider the emissions of greenhouse gases, the relevant risks associated with a changing climate and the adaptation opportunities.

EP4 Requirements for Physical CCRA

Under the Equator Principles, Projects are assigned a category depending on their potential to cause adverse environmental and social risks and/or impacts. These Project's categories are outlined Figure 7-1.

Figure 7-1 Project categories as defined by EP4 and TCFD guidelines

Category A
• Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;
Category B
• Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and
Category C
• Projects with minimal or no adverse environmental and social risks and/or impacts.

According to EP4, published in September 2020⁸², a physical CCRA is required:

- For all Category A and, as appropriate, Category B Project's, and will include the consideration of relevant physical risks as defined by the TCFD;
- Similarly, EP4 guidelines also recommend that physical CCRAs should include⁸³:
 - A high level assessment of the current and anticipated physical risks present with regards to the Project and its operations and;
 - A high-level assessment of the Clients plans, processes, policies and systems in place to manage these risks.

Project Specifications in Relation to EP4

Based on the Environmental and Social (E&S) Policy criteria as implemented by the major international finance institutions and international lenders in general (including but not limited to EP4 signatories), the Project qualifies as 'Category A'.

EP4 also require that projects where combined Scope 1 and Scope 2 emissions are expected to be more than 100,000 tonnes of CO₂ equivalent annually, must consider relevant transition risks (as

⁸² Equator Principles. THE EQUATOR PRINCIPLES. Available at: <https://equator-principles.com/wp-content/uploads/2021/02/The-Equator-Principles-July-2020.pdf>

⁸³ Equator Principles. Equator Principles Guidance Note on Climate Assessment. Available at: https://equator-principles.com/wp-content/uploads/2020/09/CCRA_Guidance_Note_Ext_Sept_2020.pdf

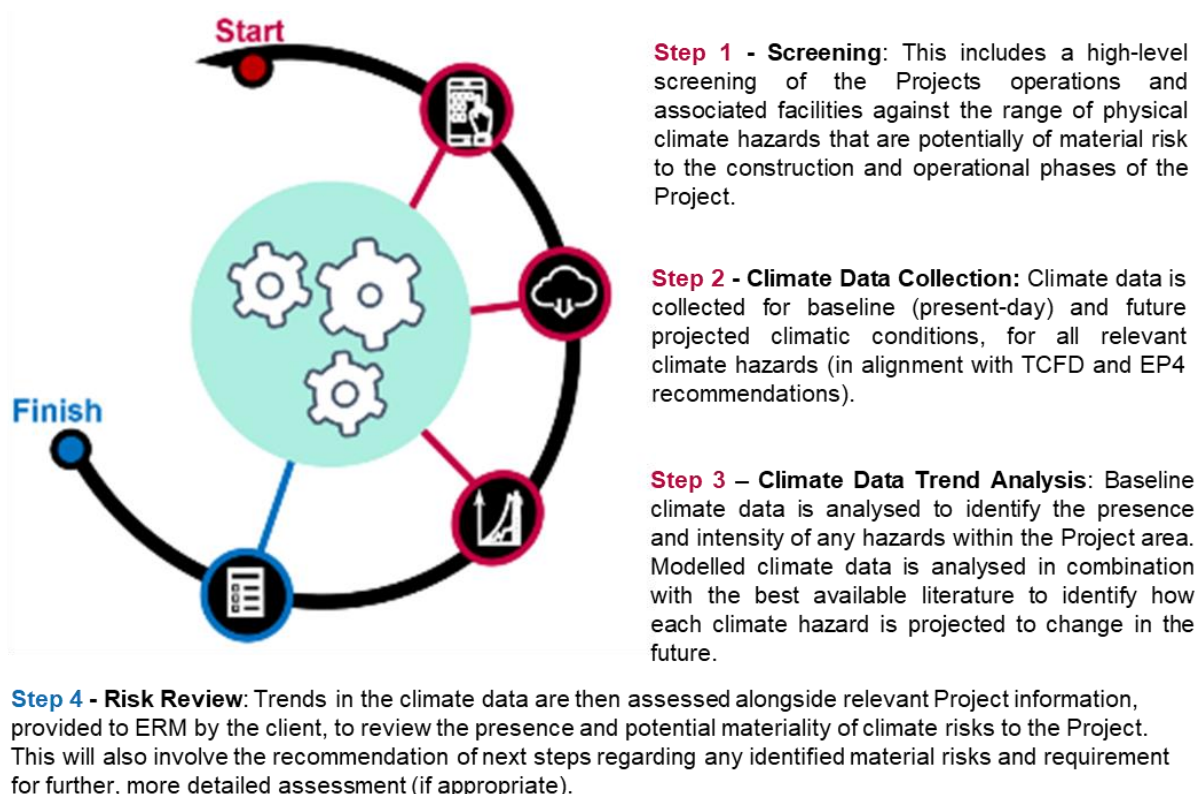
defined by the TCFD) and an alternatives analysis. This is not the case for the Project since it is unlikely to generate greenhouse gas (GHG) emissions of that level.

7.1.1.3 Approach

This physical CCRA is conducted through four key steps as outlined in Figure 7-2:

- Steps 1-3 (in red) involve the high-level screening of the operational and decommissioning phases of the Project through the collection and analysis of climate data and climate trends.
- Step 4 (in blue) involve the review of any hazards which are identified as posing potentially material risks to the operational and decommissioning phases of the Project.

Figure 7-2 Physical CCRA process steps



Approach for the Physical Climate Hazard and Risk Review

Step 4 involves conducting a review of the climate data, which has been collected for each hazard included within this assessment. ERM collects a series of data variables for each climate hazard included within this assessment. This climate data is collected primarily using ERM's Climate Impact Platform and is supplemented by any climate data provided by the client as well as the best available online sources of data.

Once the climate data is collected, the trends associated with each variable are assessed for each climate hazard. Following this, ERM undertakes a review of the potential risks posed to the Project in relation to each climate hazard (within the 'Risks review' sections).

Climate data is collected and discussed in relation to three time periods (baseline, 2030 & 2050) - 'Risk Materiality Categories' (see Table 7-1) are assigned to all of these three time-periods, representing the start (baseline & start of operations), into 2030 for full operations and its decommissioning (till 2050).

Table 7-1 Risk materiality categories and associated definitions

Risk Materiality Category		Definition
Unlikely material		Impacts with this category (such as those related to operational, financial, or other types of impacts) are unlikely to be material. This means that, for example, (a) operational impacts could be expected to be short term, impacting a limited proportion of the overall asset and its operations, or (b) financial impacts would be expected to be minimal relative to the project's overall revenue and/or costs.
Likely material	Low to moderate	Impacts with this category (such as those related to operational, financial, or other types of impacts) are likely to be of low-moderate materiality. This means that, for example, (a) operational impacts could be expected to be short to medium term, impacting a low to moderate proportion of the overall asset and its operations, or (b) financial impacts would be expected to be small to moderate relative to the project's overall revenue and/or costs.
	High	Impacts associated with this category (such as those related to operational, financial, or other types of impacts) are likely to be of high materiality. This means that, for example, (a) operational impacts could be expected to be medium to long term, impacting a low to moderate proportion of the overall asset and its operations, or (b) financial impacts would be expected to be moderate to high relative to the project's overall revenue and/or costs.

Within the 'Next Steps' section ERM provides high-level recommendations to the Client for any risk areas that are identified as being potentially material in relation to the Project (i.e., any risk area assigned the 'Likely Material' categorisation). Such recommendations could identify:

- The potential value in undertaking further assessment of specific climate hazards/risks (which exceed the scope of this assessment), or
- No further assessment is required (e.g., if information supplied by Client suggests that risks are already being managed effectively).

These recommended next steps are outlined and explained in greater detail in Table 7-2 below.

Table 7-2 Next step categories and their associated definitions.

Next Steps Category	Definition
No further action required	ERM does not identify any further action required by the Client.
Potential value in assessing the risk further	Further assessment of a specific climate hazard/risk item could provide additional value to the Project team. This is typically recommended for risk items that are classified as 'Likely Material – Low to Moderate'.
High value in assessing the risk further	Further, detailed assessment of a specific climate hazard/risk item could provide a significant additional value to the Project team. This is typically recommended for risk items classified as 'Likely Material – High'.

Overview of Climate Data, Scenarios and Time Horizons

A number of data sources are used in the physical CCRA, including baseline and projections data. ERM uses baseline data to understand the current presence and intensity of each climate hazard within the Project's area, whilst projections data is used to suggest the potential change (if any) in intensity and frequency of each climate hazard within the Project area, under a number of specified future time-frames and climate scenarios.

Baseline and projections data

The baseline and projections climate data used in this assessment is compiled from numerous international scientific organizations, including Intergovernmental Panel for Climate Change (IPCC), World Resource Institute (WRI), International Best Track Archive for Climate Stewardship (IBTrACS), National Aeronautics and Space Administration (NASA), European Space Agency (ESA), Fathom (for flooding) and World Bank.

The climate data used in this assessment is comprised of a variety of types of climate data including **Observational (baseline only), Modelled and Reanalysis (baseline only) data:**

- **Observational data (baseline only)** is based upon observations recorded and collected at various weather stations located around the world.
- **Modelled data** aims to identify, quantify and accurately represent complex physical processes within the climate and can be generated in a variety of formats, depending on the physical process being modelled, based on models of differing resolution (e.g., Global Climate Models or Regional Climate Models). Modelled climate data can be used highlight trends in climatic processes under historic (past), present and projected future climatic conditions⁸⁴.
- **Reanalysis data (baseline only)** describes the reanalysis of previously recorded climate data, either from observational or modelled records. This source of data aims to correct any biases, errors and aspects of physical climatic processes that were previously unidentified within older iterations of data. These corrections can be carried out via the back testing of data against newly observed climatic trends and/or modelled climate data⁸⁵.

Climate Impact Platform by ERM

ERM's proprietary Climate Impact Platform provides an indication of climate trends at site locations. It provides data for key climate physical hazards, such as extreme temperatures, flooding, storms, precipitation-induced landslides, wildfires, and water stress and drought. The platform uses the best available global data sources to provide baseline and future projected results for each climate hazard. The climate data includes the latest round of IPCC and CMIP climate data (CMIP6), amongst other industry-leading sources of data.

Climate scenarios

Scenarios are plausible descriptions of how the future may develop, based on a coherent and set of assumptions about driving forces, e.g., rate of greenhouse gas emissions or changes in land use. They are not predictions nor forecasts. Scenario analysis is a useful approach for assessing the exposure of sites to climate-related risks and opportunities in an uncertain future world.

The IPCC is the UN's leading body for assessing the science related to climate change. The IPCC provides periodic Assessment Reports (AR) reviewing the available literature on climate change as well as trends in climatic hazards. With each new AR comes a new round of climate models and data which is developed by the IPCC and Coupled Model Intercomparison Project (CMIP). ERM utilises the

⁸⁴ NOAA (2021), Climate Models. Available at: <https://www.climate.gov/maps-data/primer/climate-models>

⁸⁵ ECMWF (2021), Climate Reanalysis. Available at: <https://www.ecmwf.int/en/research/climate-reanalysis>

newest round of climate data from the IPCCs AR6, published in 2021, which marks the most well-rounded set of published climate data (as provided in CMIP6).

The data provided by CMIP6 is seen to improve upon the data provided by CMIP5 by using a greater number of climate model runs and modelling groups. CMIP6 also sees a move away from Representative Concentration Pathways (RCPs), to SSPs, which aim to bridge the gaps between the physical climate and social sciences, and to explore the potential future climate response to a broader range of greenhouse gases (GHG), land uses and air pollutants, in comparison to AR5.

Each of the SSPs set out by the IPCC represent scenarios that vary on the basis of future projected greenhouse gas (GHG) emissions and resultant warming over the next century. As GHG's increase, there is the potential that climatic conditions within any given area could also change (e.g., increasing temperatures and/or changes to precipitation regimes). However, the specific changes experienced for any given area can vary, depending on prescribed increase in GHG emissions associated with each SSP and time horizon.

SSPs are used in this assessment to indicate the impact of varying degrees of warming on the risk associated with each climate hazard. As is standard practice when undertaking climate risk assessments, scenarios are selected on the basis of their appropriateness for any given assessment being undertaken. The technical guidance on physical scenario analysis from the TCFD and other sources advise the inclusion of a selection of scenarios covering a variety of reasonable outcomes. This includes the inclusion of a scenario representative of keeping global average temperatures at 2°C or lower, most closely aligned with the Paris Agreement⁸⁶. As a result, ERM has selected to inclusion of two SSPs: SSP1-2.6 and SSP5-8.5. (See below table for estimated temperature increases and definitions associated with each SSP):

Table 7-3 Climate Scenarios used in this physical CCRA Assessment

Scenario	Definition	Mean annual temperature increase by 2100 compared to pre-industrial averages (1850)
SSP1-2.6	Envisions a central pathway in which trends continue their historical patterns without substantial deviations.	+1.8°C (very likely range of 1.0°C to 1.8°C)
SSP5-8.5	High challenges for mitigation (resource / fossil fuel intensive) and low for adapt (rapid development).	+4.4°C (very likely range of 3.3°C to 5.7°C)

Where such uncertainties are material to CCRA's findings, they are clearly stated and are approached conservatively ('the precautionary approach'), to identify the broadest range of likely residual impacts and necessary mitigation measures.

Time horizons

The time horizons used within this assessment have been selected to best align with the expected schedule of the operation and decommissioning phases (Table 7-4). These time horizons reflect the technical view of the assessment team in terms of identifying periods that provide best insight to climate-related trends. Climate data is available for specific future time horizons – typically in 5- or 10-year intervals. For physical climate risk, it is recommended to review trends over generally longer timeframes as it provides a clearer indication of possible emerging issues. The 2030 time horizon is therefore provided as an insight to the possible climate trends for the operation stage, whereas 2050

⁸⁶ TCFD (2017), Recommendations of the Task Force on Climate-related Financial Disclosures. Available at: <https://assets.bbhub.io/company/sites/60/2020/10/FINAL-2017-TCFD-Report-11052018.pdf>

is used to provide insight to the climate trends towards the later stages of the operational phase and the decommissioning phase.

Table 7-4 Time Horizons included within this Physical CCRA

Future Time Horizons Included within this Assessment	Justification
Baseline (present-day)	Provides insight to the existing climate trends as context for the construction phase (not assessed in this CCRA) and the start of the Operational Phase.
2030	Provides insight to the possible climate trends for the Operational Phase.
2050	Provides insight as to the climate trends for the Operational Phase and the possible start of the decommissioning phase.

Assumptions and Limitations

This CCRA provides a high-level review of the possible risks posed to the Project. As a result, this assessment aims to identify risks and aspects of the Project's design that ERM believes should be assessed further as the Project and its operations progress.

However, there are also a number of limitations and assumptions that accompany this type of approach, which should be recognised when interpreting the results of this assessment. These include:

- This is a fully desk-based assessment, meaning that ERM's team has not conducted any on-site visits associated with this physical CCRA, and thus assessments of the exposure of each asset are based upon information provided by the Client and ERM's research.
- ERM has not sought to verify the accuracy of any information provided by the Client (for example design specifications, observational data provided etc.).
- This assessment uses projected outputs from Global Climate Models (GCMs). This means that GCM data has not been regionally downscaled and validated for the region where the Project is located (no downscaling specific to Romania has been undertaken).
- This high-level screening exercise should not be considered as sufficiently detailed in the nature of its output for use within a lender's credit risk assessment associated with the proposed financing facility.
- This report does not include an assessment of the potential impact of seismic activity (e.g., earthquakes) on the Project and its operations as these events are associated with, and induced by, seismic activity and therefore not considered a physical climate change event/hazard.
- ERM has mainly used existing reports and existing project design reports to gather baseline and future climate data of the project area. Hence, ERM has not collected additional local data for the site's location (including local weather stations / meteorological agencies). For future climate data, the team uses global data sources from Climate Impact Platform and other sources.
- ERM has made assumptions and limitations where there may be data gaps, e.g., related to the site itself.

Climate Risk Assessment Methodology

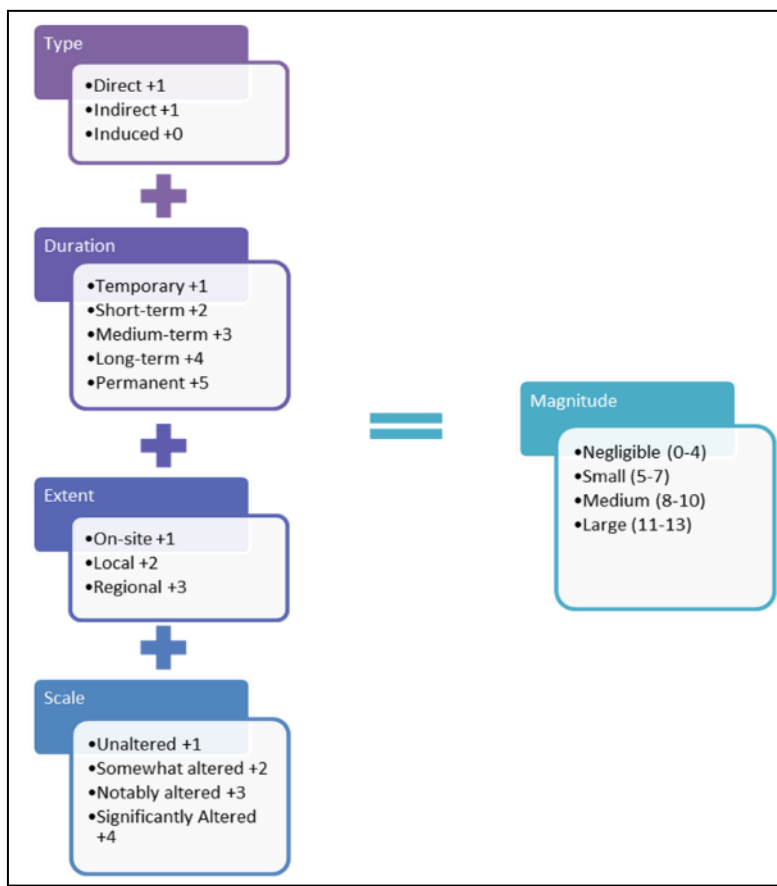
The significance of potential climate-related risks to the Project is determined through an assessment of the magnitude of an effect against the vulnerability of the receiving environment and the likelihood and frequency of occurrence.

Magnitude

Magnitude is determined by the type, extent, duration and scale of the potential impact (the 'characteristics' of the risk), with designations given in Table 7-5. Potential negative impacts are assigned a rating of 'negligible', 'small', 'medium', or 'large' (Figure 7-3).

Table 7-5 Characteristics for Assessing Magnitude

Characteristic	Definition	Designation
Type	A descriptor indicating the relationship of the effect on the project (e.g., pathway).	<ul style="list-style-type: none"> ■ Direct – Effects that result from a direct interaction between a climate event and the project (e.g., heavy rainfall flooding the facility) ■ Indirect – Effects on the project which is not the result of a climate event affecting the project (e.g., community health affecting workforce) ■ Induced – does not apply
Duration	The time period over which the project is affected.	<ul style="list-style-type: none"> ■ Temporary – less than one day ■ Short-term – one day to one week ■ Medium-term – longer than one week, shorter than a month ■ Long-term – longer than one month ■ Permanent – impact to sustain a number of years and up to the entire life of the facility
Extent	The spatial dimension of the potential effect.	<ul style="list-style-type: none"> ■ On-site – Effects that are limited to the project site ■ Local – Effects that are limited to the project site and adjacent properties ■ Regional – Effects that affect communities/properties at a regional scale (with implications for the project)
Scale	The severity of the effect on the project.	<ul style="list-style-type: none"> ■ Unaltered – Project functions and/or processes remain unaltered, e.g., heat stress affects part of workforce ■ Somewhat altered – Project functions and/or processes are somewhat altered, e.g., wind delays construction/maintenance activities ■ Notably altered – Project functions and/or processes are notably altered, e.g., flooding results in a one-day shutdown ■ Significantly altered – Project functions and/or processes are significantly altered, e.g., flooding results in a two-week shutdown

Figure 7-3 Risk Magnitude Scoring Approach

Vulnerability

Vulnerability is determined according to a factor of frequency and likelihood (Table 7-6), with the former referring to the frequency of the potential extreme weather event occurring over time, and likelihood describing the probability of a project experiencing a negative consequence due to extreme weather.

Table 7-6 Frequency and Likelihood Definitions for Extreme Event Effects

Characteristic	Definition	Designation
Frequency	Measure of the periodicity of the extreme weather event.	<ul style="list-style-type: none"> ■ (>10) – Occurs once in ten years or more. ■ (5-10) – Occurs once in five to ten years. ■ (1-5) – Occurs once in one to five years. ■ (<1) – Occurs once a year or more.
Likelihood	The probability of the project experiencing a consequence as a result of the extreme weather event.	<ul style="list-style-type: none"> ■ Unlikely – the event is unlikely to result in the project experiencing a potential consequence. ■ Possible – the event may well result in a consequence for the project. ■ Likely – the event will result in one or more potential consequences for the project.

Table 7-7 Impact Vulnerability Rating Matrix

		Frequency of extreme event			
		> every 10 years (>10)	Every 5 – 10 years (5 – 10)	Every 1 – 5 years (1-5)	Once a year or more (<1)
Likelihood of experiencing a negative impact	Likely	Medium	Medium	High	High
	Possible	Low	Low	Medium	High
	Unlikely	Low	Low	Low	Medium

Significance

Significance is a factor of vulnerability and magnitude. Similarly, to previous, a rating between 'negligible' and 'large' is applied. This is completed only for negative impacts (Table 7-8).

Table 7-8 Risk Significance Ratings Matrix

		Vulnerability		
		Unlikely	Seldom/Occasional	Likely
Magnitude of Impact	Large	Moderate	Major	Major
	Medium	Minor	Moderate	Major
	Small	Negligible	Minor	Minor
	Negligible	Negligible	Negligible	Negligible

7.1.1.4 Site Receptors

This section provides a summary of the Project elements for the operation and decommissioning phases, divided into a number of receptor types. Receptors are defined as the elements of the Project site(s) that are allocated into types based on their function and/or use (see Table 7-9 and Table 7-10 for the range of site receptors considered for both phases).

Table 7-9 Site Receptors at the Operational phase

Receptor Type	Operational Site Elements	
Operation		
Machinery	<ul style="list-style-type: none">■ Operations equipment	<ul style="list-style-type: none">■ Operations trucks / vehicles
Structures & Operations	<ul style="list-style-type: none">■ Wind turbine equipment (towers, rotors, blades, generators)	<ul style="list-style-type: none">■
Infrastructure (On site & off-site surface)	<ul style="list-style-type: none">■ Substation Connections■ Transmission Lines■ Supports foundation (circuits, cabling, switches, etc)■ Transformer station■ Central power collection station 33 kV/ 400 kV (CPCS)■ Electrical Substations■ Concrete surfaces associated with infrastructure■ Central power collection station 33 kV/ 400 kV (CPCS)	<ul style="list-style-type: none">■ Transmission Lines - Overhead lines (OL), underground cable lines 33 kV (CLs)■ Fencing■ Culverts
Transport	<ul style="list-style-type: none">■ Site Access Roads and new built roads■ Vehicles (site personnel cars)	<ul style="list-style-type: none">■ Internal roads, parking areas and walkways
Human (staff and community) & animals	<ul style="list-style-type: none">■ Staff working on ground■ Local community & farmers	<ul style="list-style-type: none">■ Workers accommodation

Table 7-10 Site Receptors at the Decommissioning phase

Receptor Type	Operational Site Elements	
Decommissioning		
Removal Machinery	■ Removal equipment	■ Removal trucks / vehicles

Receptor Type	Operational Site Elements	
Structures & Operations (Dismantling & Removal)	<ul style="list-style-type: none"> ■ Substation Connections ■ Transmission Lines ■ Supports foundation (circuits, cabling, switches, etc) ■ Transformer station ■ Central power collection station 33 kV/ 400 kV (CPCS) ■ Electrical Substations ■ Concrete surfaces associated with infrastructure ■ Off-site Substation (Grid Connection Station 400 kV) 	<ul style="list-style-type: none"> ■ Main transformer station ■ Central power collection station 33 kV/ 400 kV (CPCS) ■ Transmission Lines - Overhead lines (OL), underground cable lines 33 kV (CLs) ■ Fencing ■ Temporary add-on: ■ Temporary camp, laydown, parking areas construction ■ Power supply (on-site generators)
Land Use, site restoration* & Maintenance Operations	<ul style="list-style-type: none"> ■ The land will be returned to its pre-disturbance potential ■ Earthworks 	<ul style="list-style-type: none"> ■ Dismantling & Removal ■ Continued restoration (if needed) and regular vegetation maintenance
Transport	<ul style="list-style-type: none"> ■ Site Access Roads and new built roads ■ Rehabilitation Vehicles (if additional rehabilitating is needed) & site personnel cars 	<ul style="list-style-type: none"> ■ Internal roads, parking areas and walkways ■ Dirt tracks
Human (staff and community) & animals	<ul style="list-style-type: none"> ■ Staff working on ground ■ Local community & farmers 	<ul style="list-style-type: none"> ■ Livestock (sheep) grazing

**It is to be noted that for decommissioning we have taken the worst case scenario of continued, delayed or additional restoration works required on site.*

7.1.1.5 Risk Scores and Material Hazards

Risk Score Baseline Data

Asset risk score

Climate Impact Platform by ERM provides baseline data (based on current climate conditions) for the site asset (Figure 7-4), which is calculated by combining the exposure of the site asset to each physical climate event with baseline climate data for the location. The 'Asset Risk Score' identifies the risk that the asset may currently face. The Project site is considered at 'Minimal Asset Risk' to current climate events.

Figure 7-4 Baseline Asset Risk Score

	Asset	Baseline
1	Vifor Wind Farm	0.59, Minimal Asset Risk

Risk score composition

The composition of the asset risk score can be further broken down by climate hazard, to help identify the key drives of the risk profile. Figure 7-5 provides a breakdown per hazard.

Table 7-11 shows the most prominent hazards. This helps to identify the five prominent hazard types for the Project.

Figure 7-5 Baseline Risk Score Composition

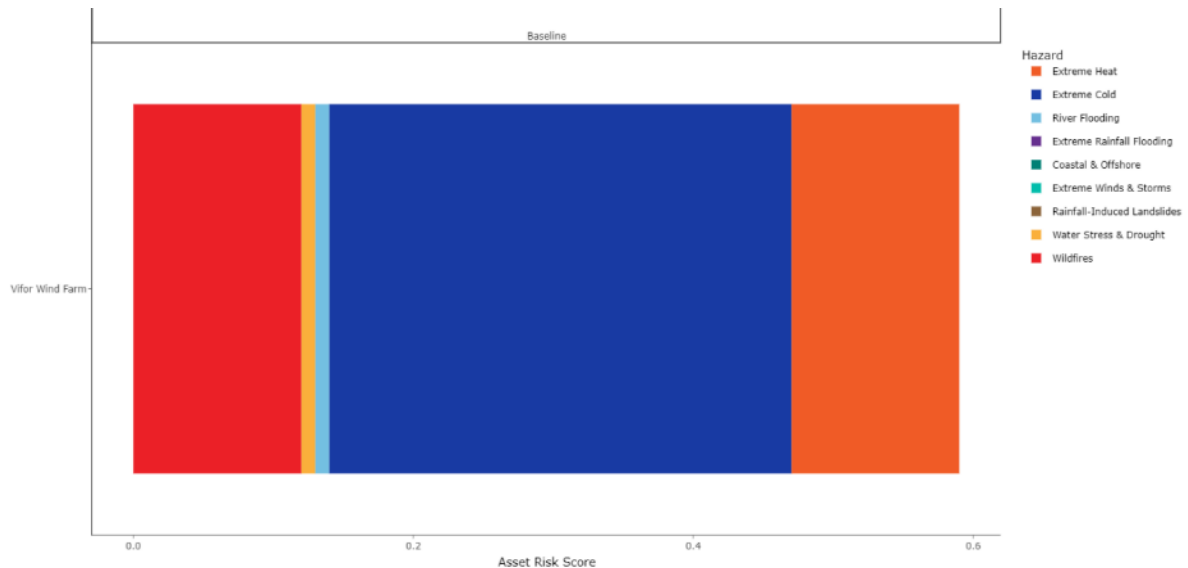


Table 7-11 Baseline Prominent Hazards

Asset	Prominent Hazards				
	Extreme Cold	Extreme Heat	Wildfires	Water Stress & Drought	River Flooding
Vifor Wind Farm	Yes	Yes	Yes	Yes	Yes

Risk Score Future Climate Projections



Asset risk score

Climate impacts on the Project is considered based on SSP1-2.6 and SSP5-8.5. Figure 7-6 and Figure 7-7 provide the 'Asset Risk Score' that identifies the potential change in risk profile for the site.

The site is projected to experience a minimal increase in risk across SSP1-2.6 and SSP5-8.5 scenarios for both 2030 and 2050. It is noteworthy that under SSP5-8.5 scenario (i.e., the 'business-as-usual', worst case scenario) in 2050 the asset's risk score will increase from 'Minimal' to 'Moderate' risk score.

Scenario: SSP1-2.6

Figure 7-6 Asset Risk Score, SSP1-2.6

Asset	Baseline	2030	2050
1 Vifor Wind Farm	0.59, Minimal Asset Risk	0.76, Minimal Asset Risk 	0.84, Minimal Asset Risk 

Scenario: SSP5-8.5

Figure 7-7 Asset Risk Score, SSP5-8.5

Asset	Baseline	2030	2050
1 Vifor Wind Farm	0.59, Minimal Asset Risk	0.76, Minimal Asset Risk 	1.05, Low Asset Risk 

Key:

Climate Hazard	Significant Decrease	Moderate Decrease	Minimal Decrease	Minimal Increase	Moderate Increase	Significant Increase
						

Risk score composition

Scenario: SSP1-2.6

Furthermore to the above, under scenario SSP1-2.6 the figures (Figure 7-8 and Figure 7-9) show the risk breakdown per hazard type.

The breakdown for the site per Hazard type is as follows:

- **Extreme Cold:** baseline risk score of 2.96 will decrease by 0.60 (2.36) by 2030 and will stay at the same level by 2050.
- **Extreme Heat:** slightly increases from the baseline risk score of 1.08 to 1.52 by 2030 (+0.44) and to 1.72 by 2050 (+0.64).
- **Wildfires:** increases moderately from the baseline risk score of 1.08 to 2.10 by 2030 (+1.02) and later slighter decreases to 2.04 by 2050 (still resulting in the risk change of +96 compared to baseline and in changing the risk category to 'Moderate').
- **Water Stress & Drought:** minimal increase from the baseline risk score of 0.10 to 0.80 by 2030 (+0.70) and moderate increase to 1.40 by 2050 (+1.30).
- **River Flooding:** no significant change from the baseline risk value of 0.06.

Figure 7-8 Projection Risk Score Composition: SSP1-2.6, 2030

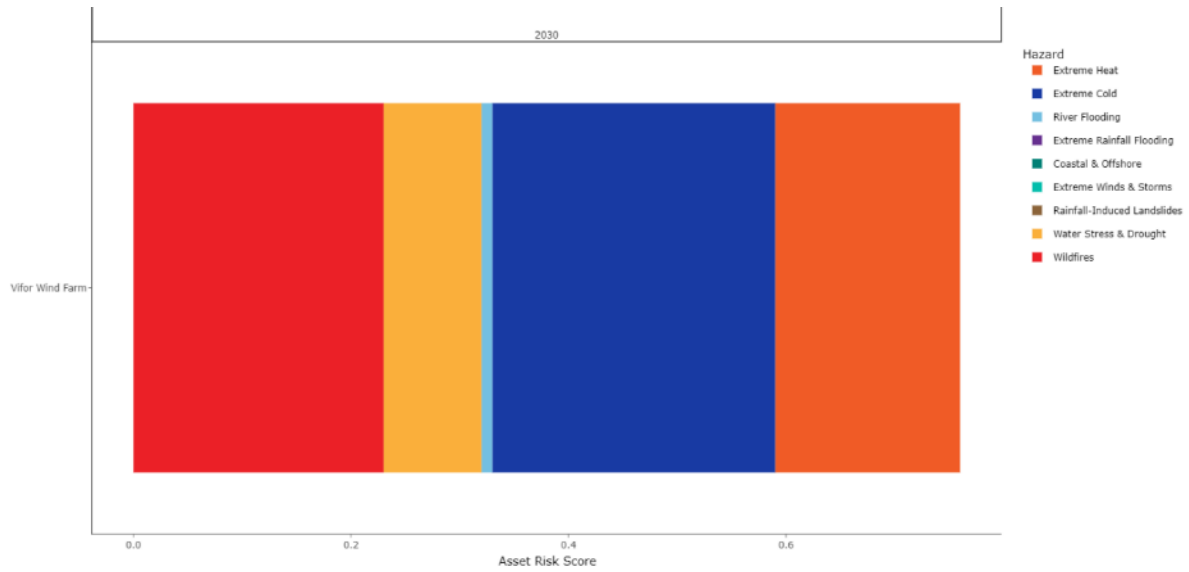
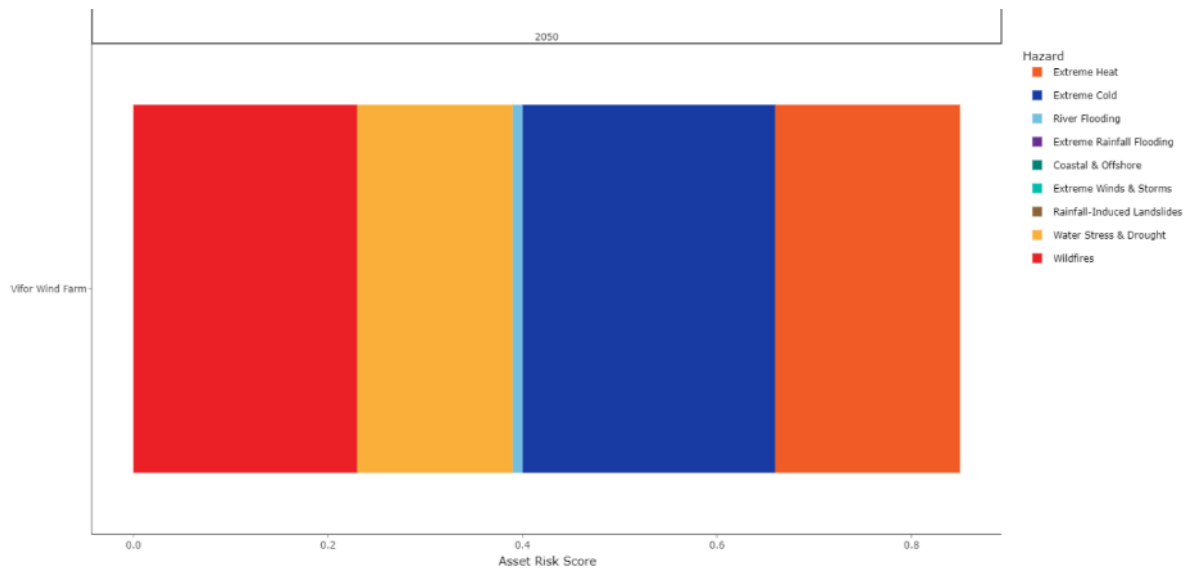


Figure 7-9 Projection Risk Score Composition: SSP1-2.6, 2050



Scenario: SSP5-8.5

Under scenario SSP5-8.5 the figures (

Figure 7-10 and

Figure 7-11) show the risk breakdown per asset and hazard type. The breakdown for the site per Hazard type is as follows:

- **Extreme Cold:** baseline risk score of 2.96 will slightly decrease to 2.28 by 2030 (-0.68) and will moderately decrease to 1.88 by 2050 (-1.08).
- **Extreme Heat:** slightly increases from the baseline risk score of 1.08 to 1.72 by 2030 (+0.64) and to 2.40 by 2050 (+1.32).
- **Wildfires:** increases moderately from the baseline risk score of 1.08 to 1.92 by 2030 (+0.84) and later significantly increases to 3.60 by 2050 (+2.52).

- **Water Stress & Drought:** minimal increase from the baseline risk score of 0.10 to 0.94 by 2030 (+0.84) and moderate increase to 1.52 by 2050 (+1.42).
- **River Flooding:** no significant change from the baseline risk value of 0.06.

Figure 7-10 Projection Risk Score Composition: SSP5-8.5, 2030

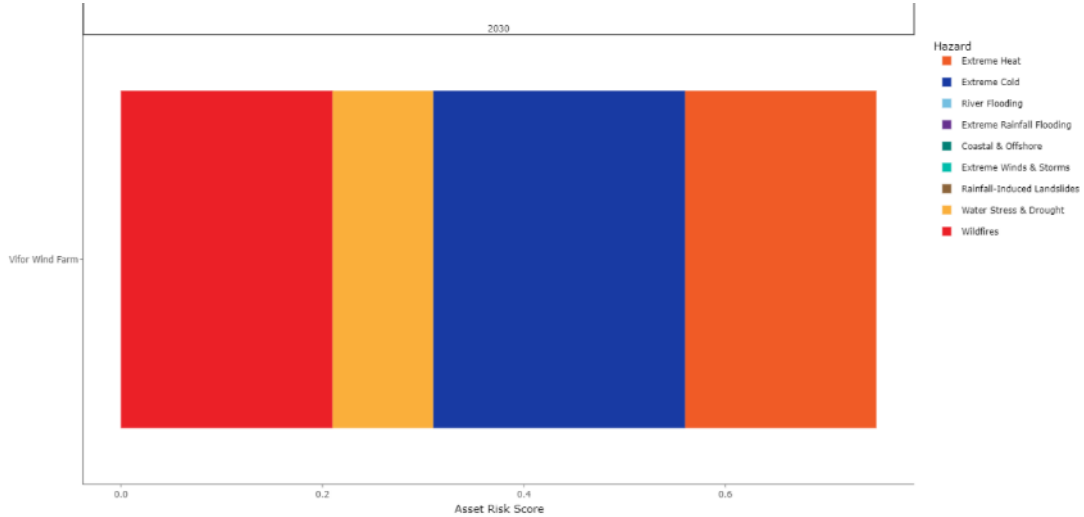
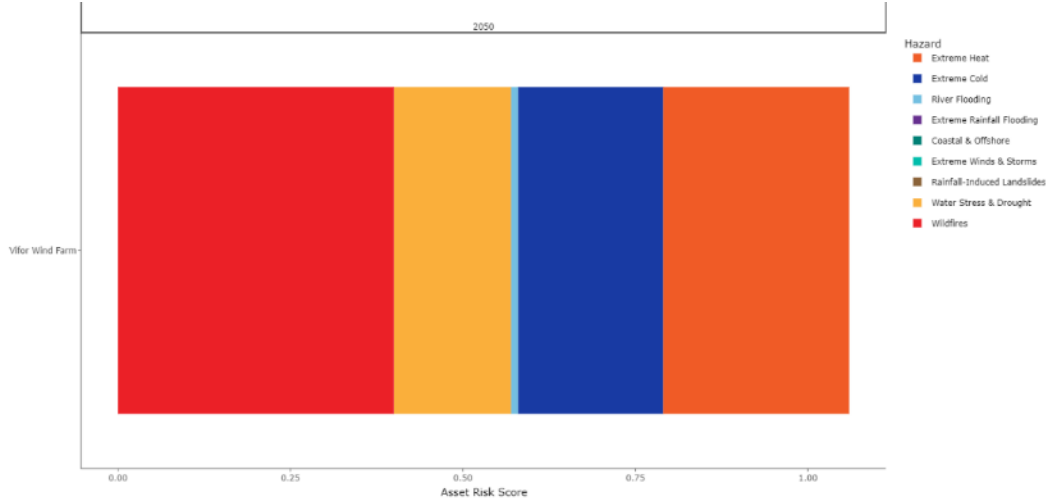


Figure 7-11 Projection Risk Score Composition: SSP5-8.5, 2050



Summary of Material Hazards

Table 7-12 presents a summary of the potentially material hazards* for the Project. In summary:

- Extreme Cold risk score will decrease in both scenarios in 2030 and 2050. In the SSP5-8.5 scenario, it will change its risk category from Moderate to Low Risk by 2050.
- Extreme Heat risk score will increase in both scenarios in 2030 and 2050. In the SSP5-8.5 it will change its risk category from Low to Moderate Risk by 2050.
- Wildfires risk score shows the highest increments in all scenarios and will change its risk score to High by 2050 in the SSP5-8.5 scenario.
- Water Stress & Drought will grow from Minimal to Low Risk by 2050 in all scenarios.
- River Flooding risk score will not change from its baseline Minimal Risk value.

Table 7-12 Summary of Material Hazards for baseline and projections

Vifor Wind Farm	Period									
	Baseline					Projection				
	Material Hazards									
SSP1-2.6 & SSP5-8.5										
SSP1-2.6 - 2030						D	I	I	I	—
SSP1-2.6 - 2050						D	I	I	I	—
SSP5-8.5 - 2030						D	I	I	I	—
SSP5-8.5 - 2050						D	I	I	I	—

*Note - It is to be noted that we have taken the worst case risk.

Key:

Extreme Cold	Extreme Heat	Wildfires	Water Stress & Drought	River Flooding
--------------	--------------	-----------	------------------------	----------------

I – Increase in Hazard for 2030 and 2050.

D – Decrease in Hazard for 2030 and 2050.

D&S – Decrease in Hazard for 2030 and 2050 but still a significant risk.

— – No change

Rationale for Hazard Inclusion

Climate risks are selected for inclusion within this assessment based on the site's location, the climate data results and the level of exposure of the site to each of the climate events considered in this exercise. The rationale for the inclusion of each hazard / event is noted in Table 7-13.

The site, during operational and decommissioning phases, will potentially be exposed to climate events and so it is necessary to develop a list of potential risk items for each of the hazard types. This step (Risk Review) for each selected hazard will also identify which site receptor types for the two phases are potentially exposed to climate risks. Key impacts of (a) present climate and (b) future climate to the Project is identified, using information included in:

- ERM Environmental and Social Scoping Report (2022);
- Other available data on the Project.

The process to develop a list of the potential impacts to site receptors includes:

- 1. Identification of relevant climate events for the Project (Baseline data).**
- 2. For hazards deemed relevant to the site, the risk items are identified for both the operational and decommissioning phases.**
- 3. Each risk item is analysed against the relevant receptor types to identify the potential impact.**

In assessing the climate-related risks for the Project, the Project elements from Table 7-9 and Table 7-10 are considered. A summary of these project aspects and the related climate risks are shown in Table 7-13. Those highlighted in orange are identified as likely to be of greater materiality and will be considered in detail later in the assessment.

Table 7-13 Table showing the rationale for Hazard inclusion

Climate Hazard	Will the Hazard be Included?	Rationale for Inclusion
Extreme Cold	No	<p>Historical (for operation): Historically Extreme Cold and Cold Spell Duration Index is rated as being likely present and likely material.</p> <p>Projections (for operation & decommissioning): Trends in Extreme Cold and Cold Spell Duration Index are projected to decrease significantly over both SSP's into 2030 and 2050. Hence, rated as being unlikely material as it decreases with each time horizon.</p> <p>This hazard is unlikely to impact the site during the operation and decommissioning phases and is therefore not included in this assessment.</p>
Extreme Heat	Yes	<p>Historical (for operation): Historically Extreme Heat and the Warm Spell Duration Index is rated as being likely material.</p> <p>Projections (for operation & decommissioning): Trends of Extreme Heat and the Warm Spell Duration Index are projected to have significant increases into 2030 and 2050 (over SSP5-8.5).</p> <p>This hazard has the potential to impact the site during the operation and decommissioning phases and is therefore included in this assessment.</p>
Wildfires	Yes	<p>Historical (for operation): Historically Wildfires and the Forest Fire Danger Index is rated as being likely material.</p> <p>Projections (for operation & decommissioning): Wildfires and the Forest Fire Danger Index trends suggest a significant projected increase in this hazard for 2030 and 2050 (over both SSP's).</p> <p>This hazard has the potential to impact the site during the operation and decommissioning phases and is therefore included in this assessment.</p>
Water Stress & Drought	Yes	<p>Historical (for operation): Historically Water Stress & Drought and the Water Stress Index is rated as being unlikely material.</p> <p>Projections (for operation & decommissioning): Water Stress & Drought and the Water Stress Index are projected to increase moderately in 2030 and 2050 for both SSP's.</p> <p>This hazard has the potential to impact the site during the operation and decommissioning phases and is therefore included in this assessment.</p>
River Flooding <i>Including fluvial and pluvial</i>	No	<p>Historical (for operation): Historically River Flooding and the River Flooding Inundation Depth Index is rated as being likely present and likely material.</p> <p>Projections (for operation & decommissioning): River Flooding and the River Flooding Inundation Depth Index trends suggest projected no significant changes in this hazard for 2030 and 2050 for both SSP's. Risk scope is minimal.</p> <p>This hazard is unlikely to impact the site during the operation and decommissioning phases and is therefore not included in this assessment.</p>

A summary of the Project aspects considered, and the related climate risks are shown in the 'Risk Review' section under each selected hazard in the next section.

Those in **bold** and highlighted are identified as risk items likely to be of greater materiality and therefore considered in detail in later stages of the assessment.

7.1.1.6 Climate Data Results and Risk Review

Extreme Heat

Climate data and trends

Baseline data

The below table and figure (Table 7-14 and Source: *The World Bank Group, 2021*

) shows the results of the World Bank's Climate Change Knowledge Portal (2021) research on Romania's climate from 1991 to 2020:

- 10.19°C is Romania's mean annual temperature;
- The maximum recorded observed average seasonal maximum temperature for Romania was over the June to August period at 26.5°C between 1991 and 2020;
- On the other hand, the minimum recorded observed average seasonal maximum temperature for Romania between 1991 and 2020 in the period of December to February at -4.63°C.

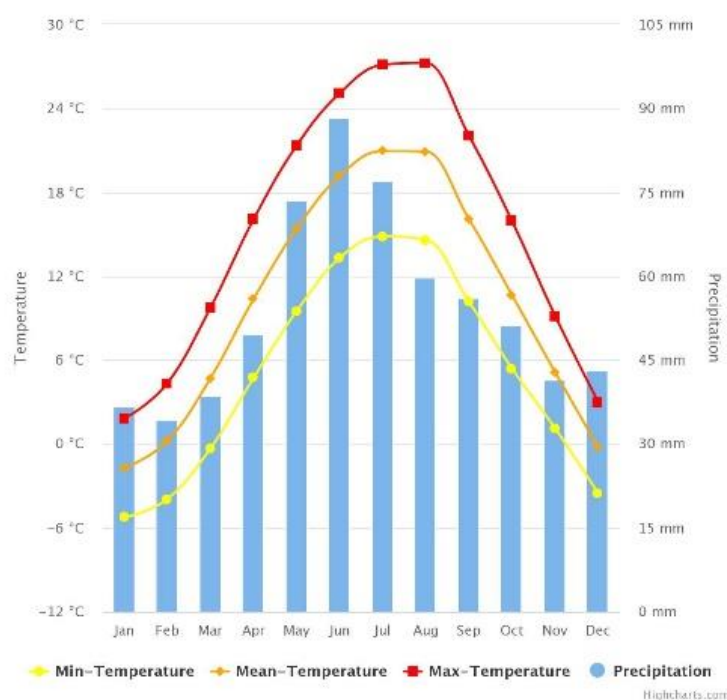
Table 7-14 Data snapshots: summary statistics

Climate Variables	1991–2020
Mean Annual Temperature (°C)	10.19°C

Source: *The World Bank Group, 2021*

Figure 7-12 Monthly Minimum, Mean and Maximum Temperature and Rainfall for Romania, 1991–2020

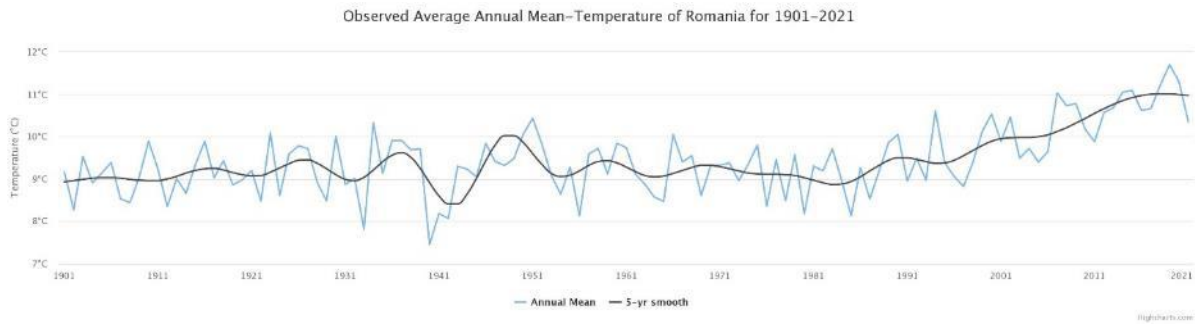
Monthly Climatology of Min-Temperature, Mean-Temperature, Max-Temperature & Precipitation 1991–2020
Romania



Source: *The World Bank Group, 2021*

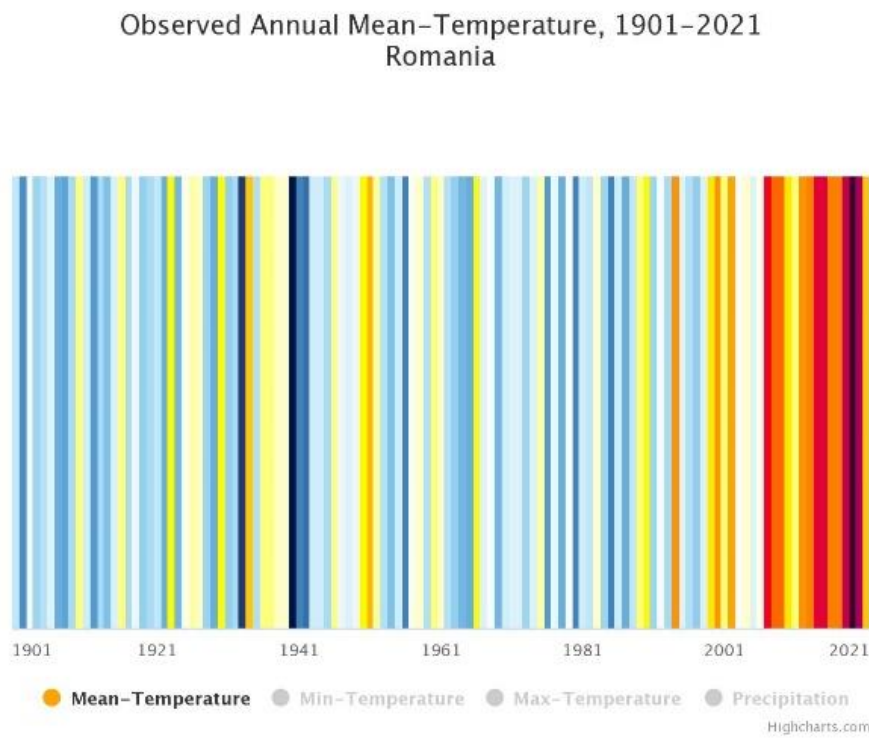
The below figures shows the results of the World Bank's Climate Change Knowledge Portal (2021) research on Romania's climate from 1901 to 2021 for mean temperature's:

Figure 7-13 Observed Average Annual Mean Temperature for Romania, 1901–2021



Source: The World Bank Group, 2021

Figure 7-14 Observed Annual Mean Temperature for Romania, 1901–2021



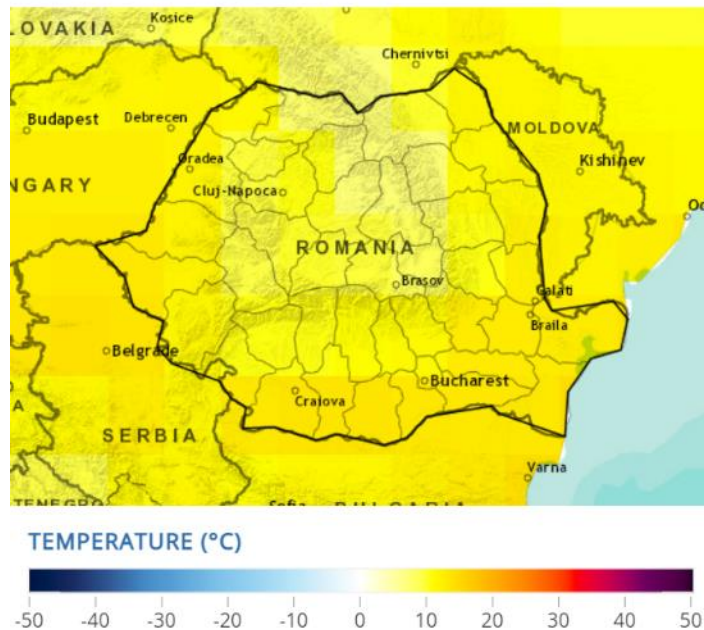
Source: The World Bank Group, 2021

Future climate projections

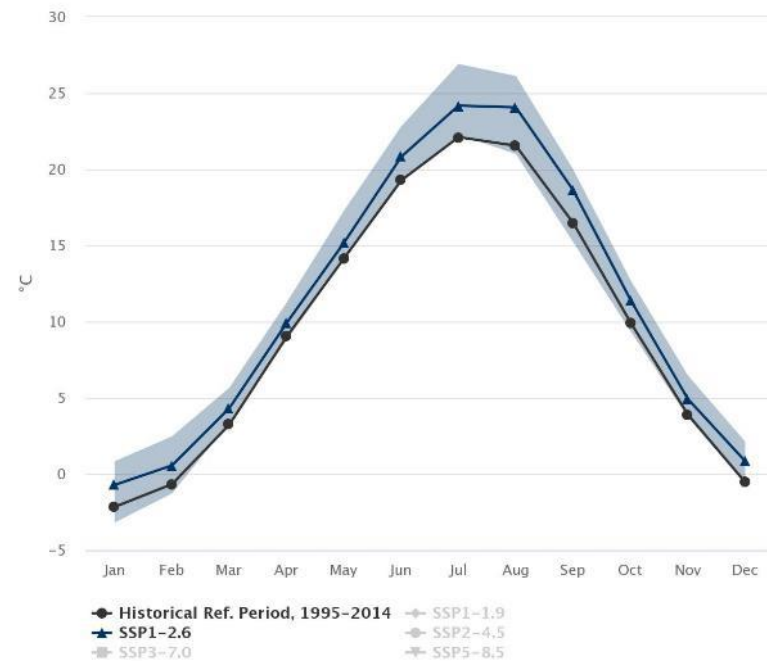
The below figures (Figure 7-15 & Figure 7-16) shows the results of the World Bank's Climate Change Knowledge Portal (2021) research on Romania's climate projections for the period of 2040 to 2059 at the SSP1-2.6 and SSP5-8.5 for mean temperatures.

Figure 7-15 Projected Mean Temperature for Romania for 2040-2059 at SSP1-2.6

Projected Climatology of Mean-Temperature for 2040-2059
(Annual)
Romania; (Ref. Period: 1995-2014), SSP1-2.6, Multi-Model
Ensemble



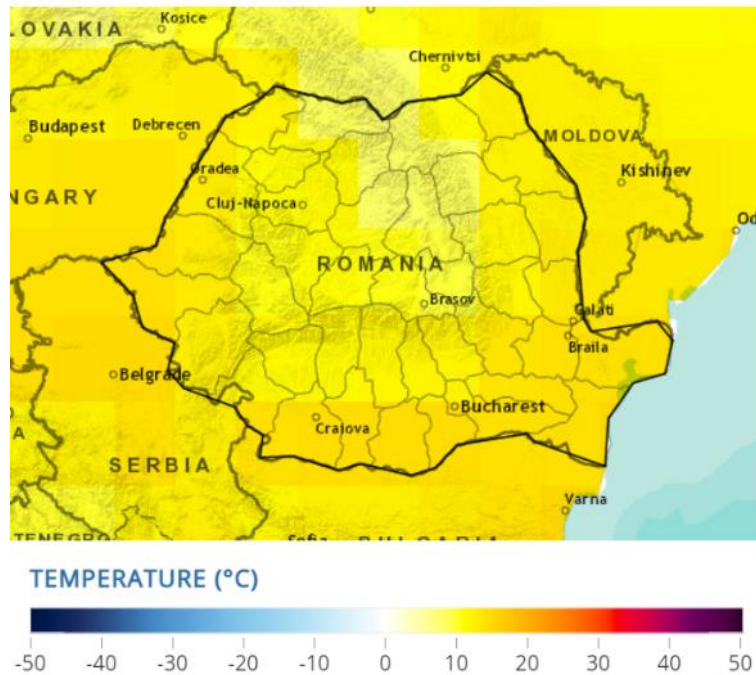
Projected Climatology of Mean-Temperature for 2040-2059
Romania; (Reference Period: 1995-2014), SSP1-2.6, Multi-Model
Ensemble



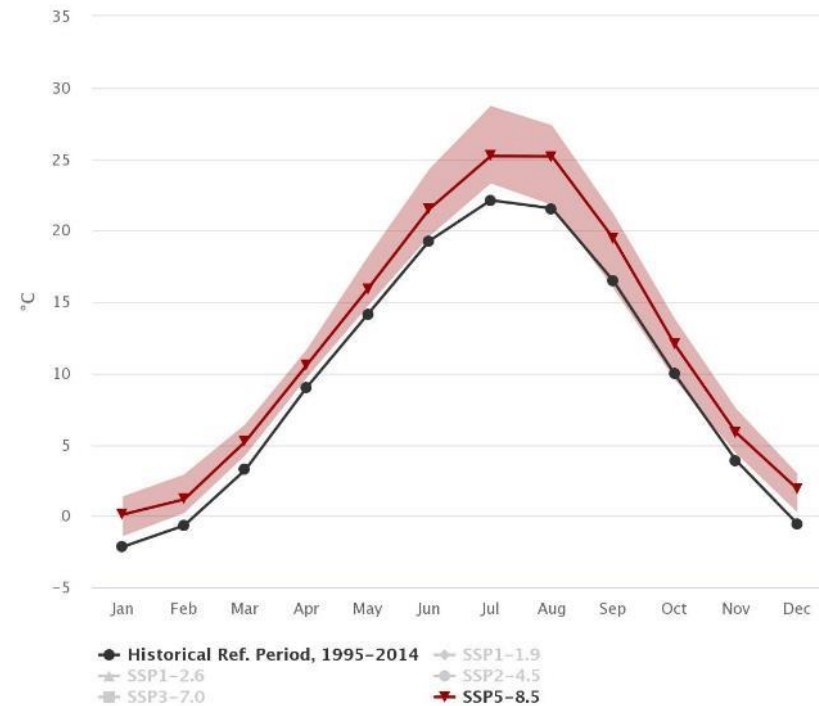
Source: The World Bank Group, 2021

Figure 7-16 Projected Mean Temperature for Romania for 2040-2059 at SSP5-8.5

Projected Climatology of Mean-Temperature for 2040-2059
(Annual)
Romania; (Ref. Period: 1995-2014), SSP5-8.5, Multi-Model
Ensemble



Projected Climatology of Mean-Temperature for 2040-2059
Romania; (Reference Period: 1995-2014), SSP5-8.5, Multi-Model
Ensemble



Source: The World Bank Group, 2021

The below table (Table 7-15) shows the results from the Climate Impact Platform by ERM on Romania's climate data for baseline and projections for Extreme Heat.

Table 7-15 Baseline and projected Extreme Heat climate data

<u>Variable</u>	<u>Baseline</u>	<u>Projections</u>			
		2030		2050	
		SSP1-2.6	SSP5-8.5	SSP1-2.6	SSP5-8.5
Warm Spell Duration Index (WSDI) (days)	36.03	63.80	78.10	79.20	140.70

Risk review

A series of potential risk areas at the start and end of operations associated with the Project for the Extreme Heat Hazard grouping under baseline and future projected climatic conditions are included in the table below.

Table 7-16 Potential impacts from Extreme Heat to Site Receptors for Operations phase on the Vifor Wind Farm Project

Climate Hazard	Risk Item	Potential Impact to Site Receptor Type				
		Machinery	Structures & Operations	Infrastructure (On site & off site surface)	Transport	Human & Animal
Extreme Heat	Could disrupt and / or delay operations.	Reduced efficiency of equipment / engines due to higher ambient temperatures.	OH1: Heat stress to various steel structures by thermal expansion.	Increased use of air conditioning at offices / administrative building and operation and maintenance centre over an increased period.	Extreme heat causing overheating of operation and maintenance vehicles.	Damage to operational structures due to extreme heat may result in limited access to a specific area.
			OH2: Extreme heat may cause overheating to substations, and transformers.	OH3: Extreme heat could damage infrastructure and hence delay operations (e.g.: cabling, supports foundation, transmission lines, generators).		
	May disrupt and / or delay transport vehicles onto and off site.	Days of extreme and prolonged heat periods could cause cracks and potholes in the road surface.			Days of extreme and prolonged heat periods cause cracks and potholes in the road surface.	
	May result in damage to operation infrastructure.			OH4: Extreme heat could damage infrastructure (e.g.: fencing, earthing, security systems, lightning installations, video monitoring, fibre).		
	Could result in health issues for workers.					OH5: Heat impacting workers, resulting in health issues and restricted working hours and work delays due to shortages of staff.

Note: Those which are in **bold** and highlighted have been identified as those risks which are likely to be of greater materiality and will be considered in detail through later stages of assessment.

*Operations - It is to be noted that for operations we have taken the worst case scenario.

OH = Operations & Heat.

Table 7-17 Potential impacts from Extreme Heat to Site Receptors for Decommissioning phase on the Vifor Wind Farm Project

Climate Hazard	Risk Item	Potential Impact to Site Receptor Type					
		Machinery	Structures & Operations	Land Use, site restoration* & Maintenance Operations	Infrastructure (On site & off site surface)	Transport	Human & Animal
Extreme Heat	Could disrupt and / or delay operations* (continued restoration, maintenance)	Reduced efficiency of removal equipment / engines due to higher ambient temperatures.	DH1: Extreme heat may cause overheating and hence delay dismantling & removal of operations (e.g.: substations, transformers, and temporary on-site generators).	Higher evaporation and water shortages due to extreme heat can lead to an increase in the withdrawal of more water for operations.		Extreme heat causing overheating of restoration & maintenance vehicles.	Due to restoration operations may result in limited access to specific areas.

Climate Hazard	Risk Item	Potential Impact to Site Receptor Type					
		Machinery	Structures & Operations	Land Use, site restoration* & Maintenance Operations	Infrastructure (On site & off site surface)	Transport	Human & Animal
	May disrupt and / or delay transport vehicles onto and off site.	Days of extreme and prolonged heat periods could cause cracks and potholes in the road surface.				Days of extreme and prolonged heat periods cause cracks and potholes in the road surface.	
	May result in damage to restoration infrastructure.				DH2: Extreme heat may cause overheating and hence delay dismantling & removal of operations (e.g.: cabling, transmission lines, generators, circuit cabinets).		
	Could result in health issues for workers.						Heat impacting workers, resulting in health issues and restricted working hours and work delays due to shortages of staff.

*Note: Those which are in **bold** have been identified as those risks which are likely to be of greater materiality and will be considered in detail through later stages of assessment.*

**Operations - It is to be noted that for decommissioning we have taken the worst case scenario of continued or additional restoration works required on site. Additionally, ongoing maintenance of pasture land is also included under decommissioning operations.*

DH = Decommissioning & Heat.

Risk rating

Climate events pose a number of risks to the Project, and these can be rated based on the associated impacts and materiality. It should be noted that risk ratings have been performed with no input from site personnel and are therefore based on information obtained from site documents. The ratings provided in this step are therefore representative of risk 'before implementation of operation and decommissioning criteria' and do not account for any planned mitigation measures for the site during the operation and decommissioning phases.

The implications of potentially material risks are assessed through the following stages:

1. Against baseline and future climate risk during the operation stage, as shown in Table 7-18.
2. Against baseline and future climate risk during decommissioning activity, using 2030 and 2050 timeframes to cover the full potential lifecycle of the Project (
3. Table 7-19).
4. Accounting for Project adaptation / mitigation / recommendation measures (see Table 7-22 &
5. Table 7-23).

Table 7-18 Operational phase risk rating, based on current conditions (baseline) and future climate for Extreme Heat

Risk: Extreme Heat	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
OH1: Heat stress to various steel structures by thermal expansion.	Direct	Long-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
OH2: Extreme heat may cause overheating to substations, transformers.	Direct	Medium-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate

Risk: Extreme Heat	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
OH3: Extreme heat could damage infrastructure and hence delay operations (e.g.: cabling, supports foundation, transmission lines, generators).	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
OH4: Extreme heat could damage infrastructure (e.g.: fencing, earthing, security systems, lightning installations, video monitoring, fibre).	Direct	Medium-term	On-site	Somewhat altered	Small	Occurs once in one to five years.	Likely	Medium	Minor
OH5: Heat impacting workers, resulting in health issues and restricted working hours and work delays due to shortages of staff.	Direct	Short-term	On-site	Unaltered	Small	Occurs once a year or more.	Possible	High	Minor

Table 7-19 Decommissioning phase risk rating, based on current conditions (baseline) and future climate for Extreme Heat

Risk: Extreme Heat	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
DH1: Extreme heat may cause overheating and hence delay dismantling & removal of operations (e.g.: substations, transformers, and temporary on-site generators).	Direct	Short-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Likely	High	Major

Risk: Extreme Heat	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
DH2: Extreme heat may cause overheating and hence delay dismantling & removal of operations (e.g.: cabling, transmission lines, generators, circuit cabinets).	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Likely	High	Major

Adaptation

This section provides an overview of ERM's high-level mitigation/adaptation measures and / or recommended appropriate next steps/considerations for all risk areas that have been identified within the 'Risk review' section as being 'Likely Material'. The recommended next steps within this section are based upon the risk review undertaken for each risk area and ERM's technical review and input into this assessment.

Table 7-20 Potential High-Level Mitigation/Adaptation Measures or Recommended Next Steps for each risk area identified as being 'Likely Material' for the Extreme Heat Hazard grouping for Operational phase

Extreme Heat			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Operation			
OH1: Heat stress to various steel structures by thermal expansion.	High value in assessing the risk further	<p>It is recommended to carry out regular checks to identify potential damage and stress as a result of thermal expansion before major damage to infrastructure occurs such. Further assessment may be required to take this potential risk into consideration.</p> <p>A structural integrity assessment is recommended to consider any important weaknesses in the steel infrastructure.</p>	<p>It is not possible to prevent thermal expansion occurring, but by regular checks will increase the chance of any early stage damage or stress being identified and therefore repaired. This in turn minimises the risk and costs.</p>
OH2: Extreme heat may cause overheating to substations, and transformer.	High value in assessing the risk further	<p>Temperature sensitive electrical infrastructure / equipment should be identified initially to determine what impacts this might have to the operations. This should be completed through a review of all major operating electrical infrastructure / equipment at the site, using its key specification.</p> <p>Once this is completed, a review should be completed which considers the different ways to cool the electrical infrastructure / equipment to deliver the same outcome (for example through air or water cooling). If the specific electrical infrastructure cannot be cooled in this way, then an alternatives analysis should be completed to determine other</p>	<p>It is not possible to prevent overheating to electricity storage units, inverters, substations, and transformer from occurring, but by regularly having workers checking on the condition of the electrical infrastructure / equipment, this increases the chance of any early stage damage or stress being identified and therefore repaired. This in turn minimises the risk and costs.</p>

Extreme Heat			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Operation			
		options for achieving the same outcome.	
OH3: Extreme heat could damage infrastructure and hence delay operations (e.g.: cabling, supports foundation, transmission lines, generators, circuit cabinets).	High value in assessing the risk further	It is recommended to carry out regular checks to identify potential damage and stress as a result of thermal expansion before major damage to infrastructure occurs such. Further assessment may be required to take this potential risk into consideration.	It is not possible to prevent thermal expansion occurring, but by regular checks will increase the chance of any early stage damage or stress being identified and therefore repaired. This in turn minimises the risk and costs.
OH4: Extreme heat could damage infrastructure (e.g.: fencing, earthing, security systems, lightning installations, video monitoring, fibre).	High value in assessing the risk further	It is recommended to carry out regular checks to identify potential damage and stress as a result of thermal expansion before major damage to infrastructure occurs such. Further assessment may be required to take this potential risk into consideration.	It is not possible to prevent thermal expansion occurring, but by regular checks will increase the chance of any early stage damage or stress being identified and therefore repaired. This in turn minimises the risk and costs.
OH5: Heat impacting workers, resulting in health issues and restricted working hours and work delays due to shortages of staff.	High value in assessing the risk further	Ensure an occupational health and safety policy is in place, and staff are trained and practise requirements, especially for extreme temperature conditions. An occupational health and safety policy for extreme heat conditions may consider providing water to outdoor workers, more frequent breaks, provision of shaded areas across site, etc.	The health and safety of staff is important and relatively small adjustments to patterns could significantly reduce the risk of negative outcomes.

These adaptation /mitigation / recommendation measures are general measures and will need to be used in conjunction with the existing or planned measures for the site.

Table 7-21 Potential High-Level Mitigation/Adaptation Measures or Recommended Next Steps for each risk area identified as being ‘Likely Material’ for the Extreme Heat Hazard grouping for Decommissioning phase

Extreme Heat			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Decommissioning			
DH1: Extreme heat may cause overheating and hence delay dismantling & removal of operations (e.g.: substations, transformers, and temporary on-site generators).	High value in assessing the risk further	Temperature sensitive electrical infrastructure / equipment should be identified initially to determine what impacts this might have to the operations. This should be completed through a review of all major operating electrical infrastructure / equipment at the site, using its key specification. Once this is completed, a review should be completed which considers the different ways to cool the electrical infrastructure / equipment to deliver the same outcome (for example through air or water cooling). If the specific electrical infrastructure cannot be cooled in this way, then an alternatives analysis should be completed to determine other options for achieving the same outcome.	It is not possible to prevent thermal expansion occurring, but by regular checks will increase the chance of any early stage damage or stress being identified and therefore repaired. This in turn minimises the risk and costs.
DH2: Extreme heat may cause overheating and hence delay dismantling & removal of operations (e.g.: cabling, transmission lines, generators, circuit cabinets).	High value in assessing the risk further	Temperature sensitive electrical infrastructure / equipment should be identified initially to determine what impacts this might have to the operations. This should be completed through a review of all major operating electrical infrastructure / equipment at the site, using its key specification. Once this is completed, a review should be completed which considers the different ways to cool the electrical infrastructure / equipment to deliver the same outcome (for example through air or water cooling). If the specific electrical infrastructure cannot be cooled in this way, then an alternatives analysis should be completed to determine other	It is not possible to prevent thermal expansion occurring, but by regular checks will increase the chance of any early stage damage or stress being identified and therefore repaired. This in turn minimises the risk and costs.

Extreme Heat			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Decommissioning			
		options for achieving the same outcome.	

These adaptation /mitigation / recommendation measures are general measures and will need to be used in conjunction with the existing or planned measures for the site.

Risk review, considering adaptation

A final risk review is included in this section, taking into consideration the high-level mitigation/adaptation measures and / or recommended appropriate next steps/considerations. Table 7-22 and Table 7-23 below shows the effect that these may have on the ratings for each risk.

Table 7-22 Operational phase Risk Rating for Extreme Heat, based on current conditions (baseline) and future climate after implementation of High-Level Mitigation/Adaptation Measures and / or Recommended Appropriate Next Steps/Considerations

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
OH1: Heat stress to various steel structures by thermal expansion.	Direct	Short-term	On-site	Notably altered	Small	Occurs once in one to five years.	Possible	Medium	Minor
OH2: Extreme heat may cause overheating to substations and transformers.	Direct	Short-term	On-site	Notably altered	Small	Occurs once in one to five years.	Possible	Medium	Minor
OH3: Extreme heat could damage infrastructure and hence delay operations (e.g.: cabling, supports foundation, transmission lines, generators).	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
OH4: Extreme heat could damage infrastructure (e.g.: fencing, earthing, security systems, lightning installations, video monitoring, fibre).	Direct	Short-term	On-site	Somewhat altered	Small	Occurs once in one to five years.	Possible	Medium	Minor

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
OH5: Heat impacting workers, resulting in health issues and restricted working hours and work delays due to shortages of staff.	Direct	Temporary	On-site	Unaltered	Negligible	Occurs once a year or more.	Unlikely	Medium	Negligible

Table 7-23 Decommissioning phase Risk Rating for Extreme Heat, based on current conditions (baseline) and future climate after implementation of High-Level Mitigation/Adaptation Measures and / or Recommended Appropriate Next Steps/Considerations

Risk: Extreme Heat	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
DH1: Extreme heat may cause overheating and hence delay dismantling & removal of operations (e.g.: substations, transformers, and temporary on-site generators).	Direct	Short-term	On-site	Notably altered	Small	Occurs once in one to five years.	Possible	Medium	Minor
DH2: Extreme heat may cause overheating and hence delay dismantling & removal of operations (e.g.: cabling, transmission lines, generators).	Direct	Short-term	On-site	Notably altered	Small	Occurs once in one to five years.	Possible	Medium	Minor

Wildfires

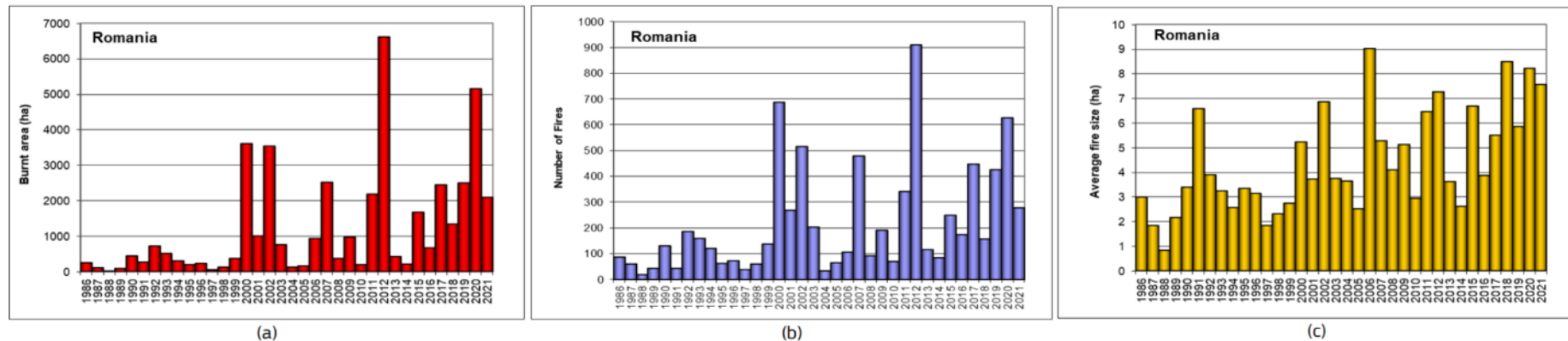
Climate data and trends

Baseline data

“Romania is already experiencing increased aridity through changes in precipitation patterns, reduction in rainfall and increased temperatures. Romania is increasingly vulnerable to: droughts, high temperatures, heat waves, heavy precipitation, landslides, earthquakes, and floods.” Hence, this will result in additional burden on agricultural zones and crop yields, forest's, tourism areas (mountains and coastal zones), hydropower generation and water resource management (The World Bank Group, 2021).

The below figure (Figure 7-17) shows the results from the EU's report on Forest Fires in Europe, Middle East and North Africa 2021, it shows Romania's burnt area, number of fires and average fire size from 1986 to 2021.

Figure 7-17 Burnt area (a), number of fires (b) and average fire size (c) in Romania from 1986 to 2021



Source: Kok & Stoof, 2021

Future climate projections

Droughts in Romania in some areas are projected to become more frequent due to river runoff decrease, but also due to the increased demand and consumption as a result of economic development and population growth. In addition, climate change projections are seen as likely to exacerbate hydrometeorological risks including recurring drought and floods. Hence, due to the prolonged droughts, this can lead to the projection of having shorter growing seasons and worsening forest fires (The World Bank Group, 2021).

The table below (Table 7-24) shows the results from the Climate Impact Platform by ERM on Romania's climate data for baseline and projections for Forest Fires.

Table 7-24 Baseline and projected Wildfires climate data

<u>Baseline</u>	<u>Projections</u>			
Forest Fire Danger Index (FFDI) (days)	Forest Fire Danger Index (FFDI)			
	2030		2050	
	SSP1-2.6	SSP5-8.5	SSP1-2.6	SSP5-8.5
7.17	27.00	26.00	23.00	82.50

Risk review

A series of potential risk areas at the start and end of operations associated with the Project for the Wildfires hazard grouping under baseline and future projected climatic conditions are included in the table below.

Table 7-25 Potential Impacts from Wildfires to Site Receptors for Operations phase on the Vifor Wind Farm Project

Climate Hazard	Risk Item	Potential Impact to Site Receptor Type				
		Machinery	Structures & Operations	Infrastructure (On site & off site surface)	Transport	Human & Animal
Wildfires	Wildfires damage operations.	Possible damage to equipment from wildfires.	OW1: Potential damage from wildfires to various steel structures.	OW3: Fires could delay operations (e.g.: damage to cabling, supports foundation, transmission lines, generators).		OW5: Fires may result in impacts on health and safety.
			OW2: Damage to electricity storage units, inverters, substations, and transformer from fires.			
	Wildfires restrict access to roads.	Delays in getting operation vehicles to site due to access problems.			Restricting access to roads, potential delays to operation.	
	Wildfires damage infrastructure.			Wildfires could damage infrastructure (e.g.: fencing, earthing, security systems, lightning installations, video monitoring, fibre).		
				OW4: Damage to buildings due to fires (offices / administrative buildings).		
	Wildfires have the potential for health issues for surrounding communities.					OW6: Impacts on health and safety, e.g.: respiratory issues, burns, air quality for staff and surrounding communities.

Note: Those which are in **bold** and highlighted have been identified as those risks which are likely to be of greater materiality and will be considered in detail through later stages of assessment.

*Operations - It is to be noted that for operations we have taken the worst case scenario.

OW = Operations & Wildfires.

Table 7-26 Potential Impacts from Wildfires to Site Receptors for Decommissioning phase on Vifor Wind Farm Project

Climate Hazard	Risk Item	Potential Impact to Site Receptor Type					
		Machinery	Structures & Operations	Land Use, site restoration* & Maintenance Operations	Infrastructure (On site & off site surface)	Transport	Human & Animal
Wildfires	Wildfires damage operations (restoration).	Possible damage to removal equipment from wildfires.	DW1: Damage to substations and transformers from fires, which may delay dismantling & removal of operations.	DW3: Delays and interruptions to continued restoration due to fires (or smoke restricting visibility).			DW7: Fires may result in impacts on health and safety.

Climate Hazard	Risk Item	Potential Impact to Site Receptor Type					
		Machinery	Structures & Operations	Land Use, site restoration* & Maintenance Operations	Infrastructure (On site & off site surface)	Transport	Human & Animal
			DW2: Damage to temporary add-on (camp, laydown, parking areas construction, on-site generators) by fires.				
	Wildfires restrict access to roads.	Delays in getting restoration vehicles to site due to access problems.		DW4: Impact of fire damages to vegetated restored land.		Restricting access to roads, leading to potential delays to dismantling, removals and restoration.	
	Wildfires damage infrastructure.				DW5: Potential damage from wildfires and hence delay dismantling & removal of operations (e.g.: cabling, transmission lines, generators). DW6: Damage to fencing due to fires.		
	Wildfires have the potential for health issues for surrounding communities						Impacts on health and safety, e.g.: respiratory issues, burns, air quality for decommissioning staff and surrounding communities.

Note: Those which are in **bold** have been identified as those risks which are likely to be of greater materiality and will be considered in detail through later stages of assessment.

*Operations - It is to be noted that for decommissioning we have taken the worst case scenario of continued or additional restoration works required on site. Additionally, ongoing maintenance of pasture land is also included under decommissioning operations.

DW = Decommissioning & Wildfires.

Risk rating

Climate events pose a number of risks to the Project, and these can be rated based on the associated impacts and materiality. It should be noted that risk ratings have been performed with no input from site personnel and are therefore based on information obtained from site documents. The ratings provided in this step are therefore representative of risk 'before implementation of operation and decommissioning criteria' and do not account for any planned mitigation measures for the site during the operation and decommissioning phases.

The implications of potentially material risks are assessed through the following stages:

1. Against baseline and future climate risk during the operation stage, as shown in Table 7-27.
2. Against baseline and future climate risk during decommissioning activity, using 2030 and 2050 timeframes to cover the full potential lifecycle of the Project (Table 7-28).
3. Accounting for Project adaptation / mitigation / recommendation measures (see Table 7-31 & Table 7-32).

Table 7-27 Operational phase risk rating, based on current conditions (baseline) and future climate for Wildfires

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
OW1: Potential damage from wildfires to various steel structures.	Direct	Long-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
OW2: Damage to electricity storage units, inverters, substations, and transformer from fires.	Direct	Medium-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Likely	High	Major
OW3: Fires could delay operations (e.g.: damage to cabling, supports foundation, transmission lines, generators).	Direct	Long-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Likely	High	Major

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
OW4: Damage to buildings due to fires (offices / administrative buildings).	Direct	Long-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
OW5: Fires may result in impacts on health and safety.	Direct	Medium-term	Local	Significantly altered	Medium	Occurs once in one to five years.	Likely	High	Major
OW6: Impacts on health and safety, e.g.: respiratory issues, burns, air quality for staff and surrounding communities.	Direct	Medium-term	Local	Unaltered	Small	Occurs once in five to ten years.	Likely	Medium	Minor

Table 7-28 Decommissioning phase risk rating, based on current conditions (baseline) and future climate for Wildfires

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
DW1: Damage to substations and transformers from fires, which may delay dismantling & removal of operations.	Direct	Medium-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Likely	High	Major
DW2: Damage to temporary add-on (camp, laydown, parking areas construction, on-site generators) by fires.	Direct	Medium-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Likely	High	Major
DW3: Delays and interruptions to continued restoration due to fires (or smoke restricting visibility).	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
DW4: Impact of fire damages to vegetated restored land.	Direct	Long-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
DW5: Potential damage from wildfires and hence delay dismantling & removal of operations (e.g.: cabling, transmission lines, generators).	Direct	Long-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Likely	High	Major
DW6: Damage to fencing due to fires.	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
DW7: Fires may result in impacts on health and safety.	Direct	Medium-term	Local	Somewhat altered	Medium	Occurs once in one to five years.	Likely	High	Major

Adaptation

This section provides an overview of ERM's high-level mitigation/adaptation measures and / or recommended appropriate next steps/considerations for all risk areas that have been identified within the 'Risk review' section as being 'Likely Material'. The recommended next steps within this section are based upon the risk review undertaken for each risk area and ERM's technical review and input into this assessment.

Table 7-29 Potential High-Level Mitigation/Adaptation Measures or Recommended Next Steps for each risk area identified as being 'Likely Material' for the Wildfires Hazard Grouping for Operational phase

Wildfires			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Operation			
OW1: Potential damage from wildfires to various steel structures.	High value in assessing the risk further	<p>Ensure a fire policy is in place, and staff are trained and practise drills.</p> <p>Specific wildfire hotspot locations in the vicinity of the site should be identified. This would include locations where the groundcover (for example trees, grass, etc.) makes risks more pronounced than elsewhere across the region. Options may be available to reduce the risks associated with these locations, for example by cutting back green ground cover and by adding water to the ground prior to and during the key months of the wildfire season to decrease the spread of wildfire events and their materiality.</p>	Training staff on fire risk is important and can significantly improve safety and awareness reducing the overall risk.
OW2: Damage to electricity storage units, inverters, substations, and transformer from fires.	High value in assessing the risk further	<p>Ensure a fire policy is in place, and staff are trained and practise drills.</p> <p>Specific wildfire hotspot locations in the vicinity of the site should be identified. This would include locations where the groundcover (for example trees, grass, etc.) makes risks more pronounced than elsewhere across the region. Options may be available to reduce the risks associated with these locations, for example by cutting back green ground cover and by adding water to the ground</p>	Training staff on fire risk is important and can significantly improve safety and awareness reducing the overall risk.

Wildfires			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Operation			
		prior to and during the key months of the wildfire season to decrease the spread of wildfire events and their materiality.	
OW3: Fires could delay operations (e.g.: damage to cabling, supports foundation, transmission lines, generators).	High value in assessing the risk further	<p>Ensure a fire policy is in place, and staff are trained and practise drills.</p> <p>Specific wildfire hotspot locations in the vicinity of the site should be identified. This would include locations where the groundcover (for example trees, grass, etc.) makes risks more pronounced than elsewhere across the region. Options may be available to reduce the risks associated with these locations, for example by cutting back green ground cover and by adding water to the ground prior to and during the key months of the wildfire season to decrease the spread of wildfire events and their materiality.</p>	Training staff on fire risk is important and can significantly improve safety and awareness reducing the overall risk.
OW4: Damage to buildings due to fires (offices / administrative buildings).	High value in assessing the risk further	<p>Ensure a fire policy is in place, and staff are trained and practise drills.</p> <p>Specific wildfire hotspot locations in the vicinity of the site should be identified. This would include locations where the groundcover (for example trees, grass, etc.) makes risks more pronounced than elsewhere across the region. Options may be available to reduce the risks associated with these locations, for example by cutting back green ground cover and by adding water to the ground prior to and during the key months of the wildfire season to decrease the spread of wildfire events and their materiality.</p> <p>It is more likely that the green material can be moved than that site buildings and assets can be</p>	Training staff on fire risk is important and can significantly improve safety and awareness reducing the overall risk.

Wildfires			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Operation			
		moved, but it may make sense to consider the locations of susceptible ground cover when locating and designing future buildings at the site.	
OW5: Fires may result in impacts on health and safety.	High value in assessing the risk further	Ensure a fire policy is in place, and staff are trained and practise drills.	Training staff on fire risk is important and can significantly improve safety and awareness reducing the overall risk.
OW6: Impacts on health and safety, e.g.: respiratory issues, burns, air quality for staff and surrounding communities.	High value in assessing the risk further	Ensure a fire policy is in place, and staff are trained and practise drills.	Training staff on fire risk is important and can significantly improve safety and awareness reducing the overall risk. The health and safety of staff is important and relatively small adjustments to patterns could significantly reduce the risk of negative outcomes.

These adaptation /mitigation / recommendation measures are general measures and will need to be used in conjunction with the existing or planned measures for the site.

Table 7-30 Potential High-Level Mitigation/Adaptation Measures or Recommended Next Steps for each risk area identified as being ‘Likely Material’ for the Wildfires Hazard Grouping for Decommissioning phase

Wildfires			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Decommissioning			
DW1: Damage to substations and transformers from fires, which may delay dismantling & removal of operations.	High value in assessing the risk further	Ensure a fire policy is in place, and staff are trained and practise drills. Specific wildfire hotspot locations in the vicinity of the site should be identified. This would include locations where the groundcover (for example trees, grass, etc.) makes risks more pronounced than elsewhere across the region. Options may be available to reduce the risks associated with	Training staff on fire risk is important and can significantly improve safety and awareness reducing the overall risk.

Wildfires			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Decommissioning			
		these locations, for example by cutting back green ground cover and by adding water to the ground prior to and during the key months of the wildfire season to decrease the spread of wildfire events and their materiality.	
DW2: Damage to temporary add-on (camp, laydown, parking areas construction, on-site generators) by fires.	High value in assessing the risk further	<p>Ensure a fire policy is in place, and staff are trained and practise drills.</p> <p>Specific wildfire hotspot locations in the vicinity of the site should be identified. This would include locations where the groundcover (for example trees, grass, etc.) makes risks more pronounced than elsewhere across the region. Options may be available to reduce the risks associated with these locations, for example by cutting back green ground cover and by adding water to the ground prior to and during the key months of the wildfire season to decrease the spread of wildfire events and their materiality.</p> <p>It is more likely that the green material can be moved than temporary camp, laydown, parking areas construction and on-site generators can be moved, but it may make sense to consider the locations of susceptible ground cover when determining the location of temporary add-ons.</p>	Training staff on fire risk is important and can significantly improve safety and awareness reducing the overall risk.
DW3: Delays and interruptions to continued restoration due to fires (or smoke restricting visibility).	High value in assessing the risk further	<p>Ensure a fire policy is in place, and staff are trained and practise drills.</p> <p>Specific wildfire hotspot locations in the vicinity of the site should be identified. This would include locations where the groundcover (for example trees, grass, etc.) makes risks more pronounced than elsewhere across the region.</p>	Training staff on fire risk is important and can significantly improve safety and awareness reducing the overall risk.

Wildfires			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Decommissioning			
		Options may be available to reduce the risks associated with these locations, for example by cutting back green ground cover and by adding water to the ground prior to and during the key months of the wildfire season to decrease the spread of wildfire events and their materiality.	
DW4: Impact of fire damages to vegetated restored land.	High value in assessing the risk further	<p>Ensure a fire policy is in place, and staff are trained and practise drills.</p> <p>Specific wildfire hotspot locations in the vicinity of the site should be identified. This would include locations where the groundcover (for example trees, grass, etc.) makes risks more pronounced than elsewhere across the region.</p> <p>Options may be available to reduce the risks associated with these locations, for example by cutting back green ground cover and by adding water to the ground prior to and during the key months of the wildfire season to decrease the spread of wildfire events and their materiality.</p>	Training staff on fire risk is important and can significantly improve safety and awareness reducing the overall risk.
DW5: Potential damage from wildfires and hence delay dismantling & removal of operations (e.g.: cabling, transmission lines, generators).	High value in assessing the risk further	<p>Ensure a fire policy is in place, and staff are trained and practise drills.</p> <p>Specific wildfire hotspot locations in the vicinity of the site should be identified. This would include locations where the groundcover (for example trees, grass, etc.) makes risks more pronounced than elsewhere across the region.</p> <p>Options may be available to reduce the risks associated with these locations, for example by cutting back green ground cover and by adding water to the ground prior to and during the key months of the wildfire season to decrease</p>	Training staff on fire risk is important and can significantly improve safety and awareness reducing the overall risk.

Wildfires			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Decommissioning			
		the spread of wildfire events and their materiality.	
DW6: Damage to fencing due to fires.	High value in assessing the risk further	<p>Ensure a fire policy is in place, and staff are trained and practise drills.</p> <p>Specific wildfire hotspot locations in the vicinity of the site should be identified. This would include locations where the groundcover (for example trees, grass, etc.) makes risks more pronounced than elsewhere across the region. Options may be available to reduce the risks associated with these locations, for example by cutting back green ground cover and by adding water to the ground prior to and during the key months of the wildfire season to decrease the spread of wildfire events and their materiality.</p>	Training staff on fire risk is important and can significantly improve safety and awareness reducing the overall risk.
DW7: Fires may result in impacts on health and safety.	High value in assessing the risk further	<p>Ensure a fire policy is in place, and staff are trained and practise drills.</p>	Training staff on fire risk is important and can significantly improve safety and awareness reducing the overall risk.

These adaptation /mitigation / recommendation measures are general measures and will need to be used in conjunction with the existing or planned measures for the site.

Risk review, considering adaptation

A final risk review is included in this section, taking into consideration the high-level mitigation/adaptation measures and / or recommended appropriate next steps/considerations. Table 7-31 and Table 7-32 shows the effect that these may have on the ratings for each risk.

Table 7-31 Operational phase Risk Rating for Wildfires, based on current conditions (baseline) and future climate after implementation of High-Level Mitigation/Adaptation Measures and / or Recommended Appropriate Next Steps/Considerations

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
OW1: Potential damage from wildfires to various steel structures.	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
OW2: Damage to electricity storage units, inverters, substations, and transformer from fires.	Direct	Medium-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
OW3: Fires could delay operations (e.g.: damage to cabling, supports foundation, transmission lines, generators).	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
OW4: Damage to buildings due to fires (offices / administrative buildings).	Direct	Medium-term	On-site	Somewhat altered	Small	Occurs once in one to five years.	Possible	Medium	Minor
OW5: Fires may result in impacts on health and safety.	Direct	Medium-term	Local	Significantly altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
OW6: Impacts on health and safety, e.g.: respiratory issues, burns, air quality for staff and surrounding communities.	Direct	Medium-term	Local	Unaltered	Small	Occurs once in five to ten years.	Possible	Low	Negligible

Table 7-32 Decommissioning phase Risk Rating for Wildfires, based on current conditions (baseline) and future climate after implementation of High-Level Mitigation/Adaptation Measures and / or Recommended Appropriate Next Steps/Considerations

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
DW1: Damage to substations and transformers from fires, which may delay dismantling & removal of operations.	Direct	Medium-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
DW2: Damage to temporary add-on (camp, laydown, parking areas construction, on-site generators) by fires.	Direct	Medium-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
DW3: Delays and interruptions to continued restoration due to fires (or smoke restricting visibility).	Direct	Medium-term	On-site	Somewhat altered	Small	Occurs once in one to five years.	Possible	Medium	Minor
DW4: Impact of fire damages to vegetated restored land.	Direct	Medium-term	On-site	Somewhat altered	Small	Occurs once in one to five years.	Possible	Medium	Minor

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
DW5: Potential damage from wildfires and hence delay dismantling & removal of operations (e.g.: cabling, transmission lines, generators).	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
DW6: Damage to fencing due to fires.	Direct	Medium-term	On-site	Somewhat altered	Small	Occurs once in one to five years.	Possible	Medium	Minor
DW7: Fires may result in impacts on health and safety.	Direct	Medium-term	Local	Somewhat altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate

Water Stress and Drought

Climate data and trends

Baseline data

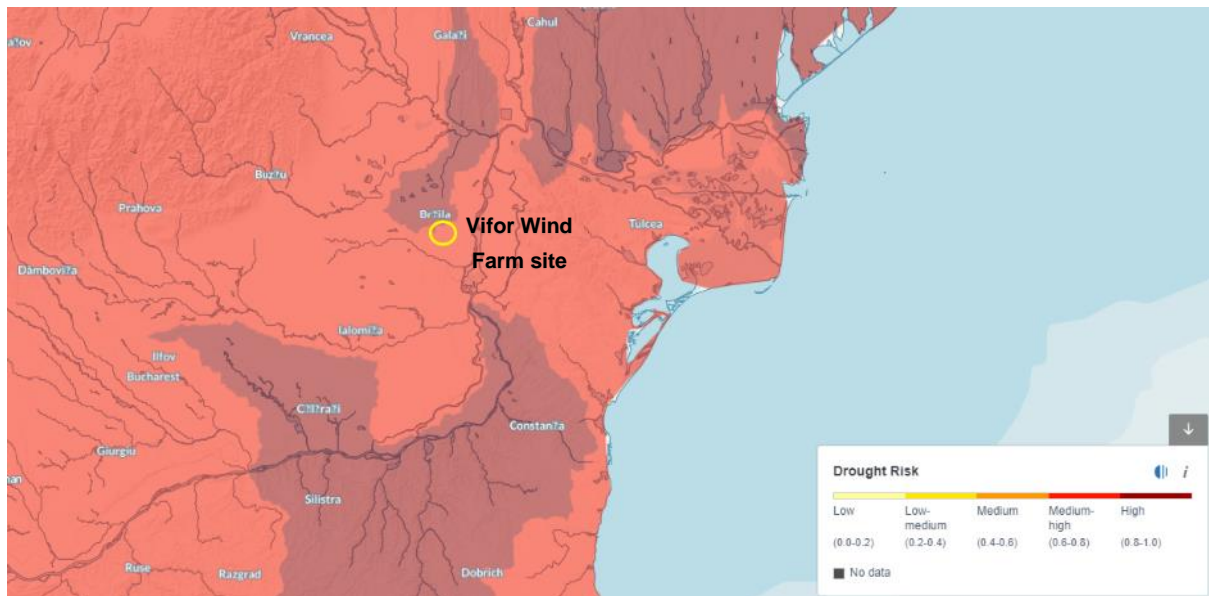
Water risk

The World Resources Institute (WRI) Aqueduct water data assesses drought risk, accounting for overall water risk⁸⁷. Results for the Project are shown in Table 7-33 and Figure 7-18.

Table 7-33 Water Risk Data for Vifor Wind Farm

Climate Variable / Event	Historic Data
Drought Risk / Overall Water Risk	Medium-high (2-3) overall water risk

Figure 7-18 Overall Water Risk Data for Vifor Wind Farm



Source: WRI (Aqueduct)

Future climate projections

Water stress

The WRI Aqueduct offer projections to 2040 under a pessimistic⁸⁸ scenario. Results for the Project for drought risk / the projected change in water stress⁸⁹ is shown in Table 7-34 and Figure 7-19.

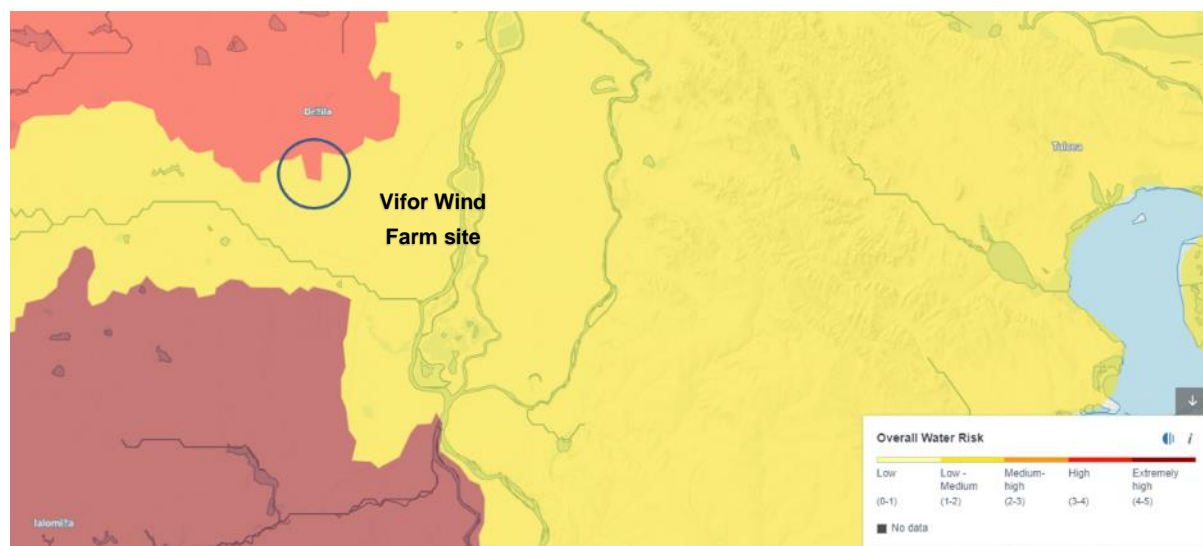
⁸⁷ "Overall water risk measures all water-related risks, by aggregating all selected indicators from the Physical Quantity, Quality and Regulatory & Reputational Risk categories. Higher values indicate higher water risk." (WRI Aqueduct, 2019).

⁸⁸ The "pessimistic" scenario represents a fragmented world with uneven economic development, higher population growth, lower GDP growth, and a lower rate of urbanization, all of which potentially affect water usage; and steadily rising global carbon emissions, with CO₂ concentrations reaching ~1370 ppm by 2100 and global mean temperatures increasing by 2.6–4.8°C relative to 1986–2005 levels.

⁸⁹ Water stress is an indicator of competition for water resources and is defined informally as the ratio of demand for water by human society divided by available water." (WRI Aqueduct 2015)

Table 7-34 Projected Water Stress for Vifor Wind Farm

Climate Variable / Event	Projection
Drought Risk / Water Stress	Low to High (10-40%) water stress

Figure 7-19 Projected Water Stress for Vifor Wind Farm

Source: WRI (Aqueduct)

The below table (Table 7-35) shows the results from the Climate Impact Platform by ERM on Romania's climate data for baseline and projections for Water Stress & Drought.

Table 7-35 Baseline and projected Water Stress and Drought climate data

Baseline	Projections			
Baseline Water Stress (categorical)	Change in Water Stress			
	2030		2050	
Low (<10%)	SSP1-2.6	SSP5-8.5	SSP1-2.6	SSP5-8.5
	High (40-80%)	High (40-80%)	High (40-80%)	High (40-80%)

Risk review

A series of potential risks to the Project associated with Water Stress & Drought hazard grouping are identified under baseline and future projected climatic conditions in the table below.

Table 7-36 Potential Impacts from Water Stress & Drought to Site Receptors for Operations phase on the Vifor Wind Farm Project

Climate Hazard	Risk Item	Potential Impact to Site Receptor Type				
		Machinery	Structures & Operations	Infrastructure (On site & off site surface)	Transport	Human & Animal
Water Stress & Drought	Prolonged and more frequent dry periods result in higher water consumption for operations.		OD1: Surface and ground water will decrease in depth and area if dry spells are longer leading to water shortages.			
	Prolonged and more frequent dry periods result in higher evaporation.					Higher evaporation and water shortages due to extreme heat can lead to surface and ground water decreasing in depth and area if dry spells are longer leading to water shortages for surrounding communities and farmers.
	Prolonged and more frequent dry periods can damage structures & operations.		OD2: Instability and erosion of ground (soil) can lead to potential damage or becoming unstable to various steel structures.	Instability and erosion of ground (soil) can lead to potential damage or becoming unstable to transmission lines.		OD4: Damage to operational structures due to erosion / instability may result in limited access to a specific area.
				OD3: Damage to operational structures due to erosion / instability could delay operations		
	Prolonged and more frequent dry periods result in dust generation (dust storms) for site and local communities	Impacts on visibility along transportation corridors.	Dry ground becomes the source of dust which may impact the functionality of infrastructure		Impacts on visibility along transportation corridors.	Impacts on health and safety of surrounding communities, e.g.: respiratory issues.

Note: Those which are in **bold** have been identified as those risks which are likely to be of greater materiality and will be considered in detail through later stages of assessment.

*Operations - It is to be noted that for operations we have taken the worst case scenario.

OD = Operations & Drought.

Table 7-37 Potential Impacts from Water Stress & Drought to Site Receptors for Decommissioning phase on Vifor Wind Farm Project

Climate Hazard	Risk Item	Potential Impact to Site Receptor Type					
		Machinery	Structures & Operations	Land Use, site restoration* & Maintenance Operations	Infrastructure (On site & off site surface)	Transport	Human & Animal
Water Stress & Drought	Prolonged and more frequent dry periods result in higher water consumption for operations* & grazing.			DD2: Surface and ground water will decrease in depth and area if dry spells are longer leading to water shortages for restoration.			
	Prolonged and more frequent dry periods result in higher evaporation.			DD3: Higher evaporation and water shortages can lead to an increase in the withdrawal of more water for restoration.			Higher evaporation and water shortages due to extreme heat can lead to surface and ground water decreasing in depth and area if dry spells are longer leading to water shortages for surrounding communities and farmers.
	Prolonged and more frequent dry periods can damage structures & operations.		DD1: Instability and erosion of ground (soil) can lead to potential damage or becoming unstable of structures & operations and hence delay dismantling & removal operations.				DD4: Due to restoration operations may result in limited access to a specific area due to dismantling & removal operations.
	Prolonged and more frequent dry periods result in dust generation (dust storms) for site and local communities	Impacts on visibility along transportation corridors.				Impacts on visibility along transportation corridors.	Impacts on health and safety of surrounding communities, e.g.: respiratory issues.

Note: Those which are in **bold** have been identified as those risks which are likely to be of greater materiality and will be considered in detail through later stages of assessment.

*Operations - It is to be noted that for decommissioning we have taken the worst case scenario of continued or additional restoration works required on site. Additionally, ongoing maintenance of pasture land is also included under decommissioning operations.

DD = Decommissioning & Drought.

Risk rating

Climate events pose a number of risks to the Project, and these can be rated based on the associated impacts and materiality. It should be noted that risk ratings have been performed with no input from site personnel and are therefore based on information obtained from site documents. The ratings provided in this step are therefore representative of risk 'before implementation of operation and decommissioning criteria' and do not account for any planned mitigation measures for the site during the operation and decommissioning phases.

The implications of potentially material risks are assessed through the following stages:

1. Against baseline and future climate risk during the operation stage, as shown in Table 7-38.
2. Against baseline and future climate risk during decommissioning activity, using 2030 and 2050 timeframes to cover the full potential lifecycle of the Project (Table 7-39).
3. Accounting for Project adaptation / mitigation / recommendation measures (see Table 7-42 & Table 7-43).

Table 7-38 Operational phase risk rating, based on current conditions (baseline) and future climate for Water Stress & Drought

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
OD1: Surface and ground water will decrease in depth and area if dry spells are longer leading to water shortages.	Direct	Long-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
OD2: Instability and erosion of ground (soil) can lead to potential damage or becoming unstable to various steel structures.	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in five to ten years.	Likely	Medium	Moderate

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
OD3: Damage to operational structures due to erosion / instability could delay operations	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in five to ten years.	Likely	Medium	Moderate
OD4: Damage to operational structures due to erosion / instability may result in limited access to a specific area.	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in five to ten years.	Possible	Low	Minor

Table 7-39 Decommissioning phase risk rating, based on current conditions (baseline) and future climate for Water Stress & Drought

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
DD1: Instability and erosion of ground (soil) can lead to potential damage or becoming unstable of structures & operations and hence delay dismantling & removal operations.	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in five to ten years.	Likely	Medium	Moderate
DD2: Surface and ground water will decrease in depth and area if dry spells are longer leading to water shortages for restoration.	Direct	Long-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
DD3: Higher evaporation and water shortages can lead to an increase in the withdrawal of more water for restoration.	Direct	Long-term	On-site	Significantly altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
DD4: Due to restoration operations may result in limited access to a specific area due to dismantling & removal operations.	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate

Adaptation

This section provides an overview of ERM's high-level mitigation/adaptation measures and / or recommended appropriate next steps/considerations for all risk areas that have been identified within the 'Risk review' section as being 'Likely Material'. The recommended next steps within this section are based upon the risk review undertaken for each risk area and ERM's technical review and input into this assessment.

Table 7-40 Potential High-Level Mitigation/Adaptation Measures or Recommended Next Steps for each risk area identified as being 'Likely Material' for the Water Stress & Drought Hazard Grouping for Operational phase

Water Stress & Drought			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Operation			
OD1: Surface and ground water will decrease in depth and area if dry spells are longer leading to water shortages.	Potential value in assessing the risk further	If water cannot be provided to the site by any other means, and therefore water shortages would restrict operations if they were to occur. Therefore, the best solution to water shortages would be to limit water use during other parts of the year. However, the benefit of this would need to be balanced against the costs in terms of reducing water capacity which will be needed for standard operations throughout the year.	If the site has not yet worked with the local authority to determine risks, it is possible that water issues will become chronic over time and the plant should consider a long term plan for dealing with these issues, which it could develop with an expert.
OD2: Instability and erosion of ground (soil) can lead to potential damage or becoming unstable to various steel structures.	Potential value in assessing the risk further	If water cannot be provided to the site by any other means, and therefore water shortages would restrict operations if they were to occur. Therefore, the best solution to water shortages would be to limit water use during other parts of the year. However, the benefit of this would need to be balanced against the costs in terms of reducing water capacity which will be needed for standard operations throughout the year.	If the site has not yet worked with the local authority to determine risks, it is possible that water issues will become chronic over time and the plant should consider a long term plan for dealing with these issues, which it could develop with an expert.

Water Stress & Drought			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Operation			
OD3: Damage to operational structures due to erosion / instability could delay operations	Potential value in assessing the risk further	If water cannot be provided to the site by any other means, and therefore water shortages would restrict operations if they were to occur. Therefore, the best solution to water shortages would be to limit water use during other parts of the year. However, the benefit of this would need to be balanced against the costs in terms of reducing water capacity which will be needed for standard operations throughout the year.	If the site has not yet worked with the local authority to determine risks, it is possible that water issues will become chronic over time and the plant should consider a long term plan for dealing with these issues, which it could develop with an expert.
OD4: Damage to operational structures due to erosion / instability may result in limited access to a specific area.	Potential value in assessing the risk further	If water cannot be provided to the site by any other means, and therefore water shortages would restrict operations if they were to occur. Therefore, the best solution to water shortages would be to limit water use during other parts of the year. However, the benefit of this would need to be balanced against the costs in terms of reducing water capacity which will be needed for standard operations throughout the year.	If the site has not yet worked with the local authority to determine risks, it is possible that water issues will become chronic over time and the plant should consider a long term plan for dealing with these issues, which it could develop with an expert.

These adaptation /mitigation / recommendation measures are general measures and will need to be used in conjunction with the existing or planned measures for the site.

Table 7-41 Potential High-Level Mitigation/Adaptation Measures or Recommended Next Steps for each risk area identified as being ‘Likely Material’ for the Water Stress & Drought Hazard Grouping Decommissioning Phases

Water Stress & Drought			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Decommissioning			
DD1: Instability and erosion of ground (soil) can lead to potential damage or becoming unstable of structures & operations and hence delay dismantling & removal operations.	Potential value in assessing the risk further	If water cannot be provided to the site by any other means, and therefore water shortages would restrict operations if they were to occur. Therefore, the best solution to water shortages would be to limit water use during other parts of the year. However, the benefit of this would need to be balanced against the costs in terms of reducing water capacity which will be needed for standard operations throughout the year.	If the site has not yet worked with the local authority to determine risks, it is possible that water issues will become chronic over time and the plant should consider a long term plan for dealing with these issues, which it could develop with an expert.
DD2: Surface and ground water will decrease in depth and area if dry spells are longer leading to water shortages for restoration.	Potential value in assessing the risk further	If water cannot be provided to the site by any other means, and therefore water shortages would restrict operations if they were to occur. Therefore, the best solution to water shortages would be to limit water use during other parts of the year. However, the benefit of this would need to be balanced against the costs in terms of reducing water capacity which will be needed for standard operations throughout the year.	If the site has not yet worked with the local authority to determine risks, it is possible that water issues will become chronic over time and the plant should consider a long term plan for dealing with these issues, which it could develop with an expert.
DD3: Higher evaporation and water shortages can lead to an increase in the withdrawal of more water for restoration.	Potential value in assessing the risk further	If water cannot be provided to the site by any other means, and therefore water shortages would restrict operations if they were to occur. Therefore, the best solution to water shortages would be to limit water use during other parts of the year. However, the benefit of this would need to be balanced against the costs in terms of reducing water capacity which will be needed for standard operations throughout the year.	If the site has not yet worked with the local authority to determine risks, it is possible that water issues will become chronic over time and the plant should consider a long term plan for dealing with these issues, which it could develop with an expert.

Water Stress & Drought			
Risk	Next Steps	Adaptation Measure	Reason for Adaptation Measures / Justification
Decommissioning			
DD4: Due to restoration operations may result in limited access to a specific area due to dismantling & removal operations.	Potential value in assessing the risk further	If water cannot be provided to the site by any other means, and therefore water shortages would restrict operations if they were to occur. Therefore, the best solution to water shortages would be to limit water use during other parts of the year. However, the benefit of this would need to be balanced against the costs in terms of reducing water capacity which will be needed for standard operations throughout the year.	If the site has not yet worked with the local authority to determine risks, it is possible that water issues will become chronic over time and the plant should consider a long term plan for dealing with these issues, which it could develop with an expert.

These adaptation /mitigation / recommendation measures are general measures and will need to be used in conjunction with the existing or planned measures for the site.

Risk review, considering adaptation

A final risk review is included in this section, taking into consideration the high-level mitigation/adaptation measures and / or recommended appropriate next steps/considerations. Table 7-42 and Table 7-43 shows the effect that these may have on the ratings for each risk.

Table 7-42 Operational phase Risk Rating for Water Stress & Drought, based on current conditions (baseline) and future climate after implementation of High-Level Mitigation/Adaptation Measures and / or Recommended Appropriate Next Steps/Considerations

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
OD1: Surface and ground water will decrease in depth and area if dry spells are longer leading to water shortages.	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
OD2: Instability and erosion of ground (soil) can lead to potential damage or becoming unstable to various steel structures.	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in five to ten years.	Possible	Low	Minor
OD3: Damage to operational structures due to erosion / instability could delay operations	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in five to ten years.	Possible	Low	Minor
OD4: Damage to operational structures due to erosion / instability may result in limited access to a specific area.	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in five to ten years.	Possible	Low	Minor

Table 7-43 Decommissioning phase Risk Rating for Water Stress & Drought, based on current conditions (baseline) and future climate after implementation of High-Level Mitigation/Adaptation Measures and / or Recommended Appropriate Next Steps/Considerations

Risk	Type	Duration	Extent	Scale	Magnitude Rating	Frequency	Likelihood	Vulnerability Rating	Risk Significance
DD1: Instability and erosion of ground (soil) can lead to potential damage or becoming unstable of structures & operations and hence delay dismantling & removal operations.	Direct	Short-term	On-site	Notably altered	Small	Occurs once in five to ten years.	Likely	Medium	Minor
DD2: Surface and ground water will decrease in depth and area if dry spells are longer leading to water shortages for restoration.	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
DD3: Higher evaporation and water shortages can lead to an increase in the withdrawal of more water for restoration.	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate
DD4: Due to restoration operations may result in limited access to a specific area due to dismantling & removal operations.	Direct	Medium-term	On-site	Notably altered	Medium	Occurs once in one to five years.	Possible	Medium	Moderate

Conclusions

The following climate hazards have the potential to impact the site for operation and decommissioning phases:

- **Extreme Heat:** currently considered as being likely material while projections suggest that it will have significant increases and will therefore be likely material in the future.
- **Wildfires:** currently are considered as being likely material while projections suggest that it will have significant increases and will therefore be likely material in the future.
- **Water Stress & Drought:** currently considered as being unlikely material, while projections suggest that it will have moderate increases making it likely material in the future.

Hence, there are numerous risk items assessed against the site receptors for each of the above climate hazards, with the most material being:

- Extreme Heat causing heat stress to various steel structures, overheating of equipment could delay operations, damage infrastructure and prolonged heat causing fatigue, sunstroke, and other related health issues for staff.
- Wildfires causing damage to various steel structures and equipment could delay operations, damage to buildings, damage infrastructure, may result in impacts on safety to livestock and impacts on health and safety of staff.
- Water Stress & Drought may lead to water shortages, withdrawal of more water operations, instability and erosion of ground (soil) can lead to potential damage or becoming unstable to various operations and structures which limit access to a specific area due to repairs and loss of vegetation due to lack of water.

However, there are also several measures that could be implemented to reduce the risk profile for the Project, including development of robust health and safety policies for workers, training of workers, control water use and monitoring of extreme events to enable preparedness.

7.1.2 Air Quality

7.1.2.1 Introduction

The assessment of potential impacts to air quality is limited to the assessment of dust generated during construction from both construction traffic movements, vehicle exhaust fumes and earthworks/construction works.

The Aol for air quality impacts during the construction stage is defined as a 500-meter radius around the construction site and transportation routes. Wind farms at operational stage are typically not associated with significant air quality impacts. Therefore, an Aol has not been defined for the operational stage of the wind farm.

7.1.2.2 Receptors

The receptors of the air quality impact will be the Project personnel, residents of the nearest settlements, as well as the vegetation cover and terrestrial fauna of the Project area. The contribution of dust to impacts on biodiversity is discussed in Chapter 7.1.7.

The vulnerability of the Project personnel and local residents to air quality impacts, as well as their importance, are high, given the known data on the effects of air pollution on human health, as well as the generally recognized value of human life and health. The sensitivity 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. Thus, the responsivity of the Project staff is medium, and that of the local residents is high (Table 7-44).

Table 7-44 Responsivity of Receptors to air quality impacts

Receptor	Impact	Sensitivity	Vulnerability/Importance	Responsivity
Project personnel	Air pollution	Medium	High	Medium
Local residents	Air pollution	High	High	High

Source: ERM

7.1.2.3 Potential Impacts

Construction

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 activities;
- General construction activities for Project infrastructure;
- The soils on the Project Site have been subjected to loosening through sustained cultivation over a long period, and have weakened the soil structure, leaving these soils highly susceptible to both wind and water erosion, leading to an increased risk of elevated dust levels.
- Vehicle movement over unpaved surfaces, and in particular heavy vehicles;
- Vehicle exhaust emissions; and
- Potential power generation utilising fossil fuels.

Atmospheric emissions (specifically dust) from the aforementioned sources will be short-term and of a nuisance nature only. Periodic construction traffic along unpaved surfaces and/or during site preparation activities can cause significant local nuisance to receptors in the Aol and immediate surrounds, increasing the already high nuisance and respirable dust baseline. This will be managed through dust suppression techniques detailed below and in the ESMP.

Operation and Decommissioning impacts are considered insignificant.

7.1.2.4 Assessment of impacts:

Construction dust

Construction will occur over a period of approx. 1.5 years, with a possibility to start at the end of 2023 or beginning of 2024. During periods with higher precipitation (September to February), conditions at the Project Site are not conducive for *dust generation*. In addition, emissions will not be even throughout the construction period, rather emissions will be higher during Site clearance and upon delivery of construction material, turbines and mounting structures.

Ten villages (Spătaru, **Costești**, **Budișteni**, **Gherăseni**, Sudiți, **Bălaia**, **Smeeni**, Moisica, **Albești**, **Udați-Mânzu**) are located within 500 m of the Project Site. Of the ten villages, seven (in bold) are located less than 200 m from the Project infrastructure.

These communities will have a high sensitivity to nuisance dust, especially during the dry season. The impact duration will be temporary (approx. 18 months). The impact magnitude is considered medium-high.

On this basis, the impact on local ambient air quality due to dust emissions on surrounding receptors is considered to be of major significance for any receptors within 200 m of the source. Details of impact assessment due to dust emissions during Construction is detailed in Table 7-45 below.

Table 7-45 Impact Assessment: Air Quality – Dust Emissions during Construction

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Air quality impacts will remain within 500 m of the Project Site
Duration	Short term	The impact duration is considered to be short term (only during construction – 18 months).
Scale	Small	Based on the above the impact the scale is considered small.
Frequency	Occasional	During the dry season there is the potential for dust on a daily basis, however, this is less likely during the rainy and snowy seasons (September to February)
Magnitude		
Medium Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High Sensitivity		
The sensitivity is considered high due to the large number of the sensitive receptors (residential structures) within 200 m of the Site (closest being approx. 15 m of the project road boundary in Budištení village).		
Significance Rating Before Mitigation		
Moderate - High Negative Impact		
The impact is considered to be of High significance within the 0 - 100m from the Project Site, Moderate significance within 100 – 200 m and of Minor significance at a distance greater than 200m.		

Construction traffic

Estimations were made by ERM for truck traffic (by heavy duty vehicles) during Project Construction (see Table 7-46 below) in the Traffic Impact Assessment section. These estimations are subject to change due to Client update regarding Construction period (from 3 years to 1.5 years). Even so, our estimation is that annual average daily traffic would not exceed 1000 (which, according to the screening methodology, results in negligible magnitude - considering level of project traffic relative to an undegraded airshed).

During peak periods, truck deliveries would be more frequent, although the extent of peak-period Project traffic has not yet been determined.

Table 7-46 Estimated Truck Traffic for Project Construction

Project component	Truck Deliveries per Turbine (round trip)	Total Truck Round Trips for Project's 72 wind Turbines	Average Monthly Truck Round Trips
Aggregate, fill and water deliveries ^a	0	0	0
Construction equipment deliveries ^b	8	576	72
Concrete mixer ^c	100	7,200	400
Turbine components ^c	11	792	44
Substation and cable components	Unknown		Unknown
Fuel and supply delivery ^d			48
Waste removal ^e			8
Total with overlapping phases			572

a. Assumes all water, fill, aggregate and other road materials are sourced locally and transported on the road network interior to the Project sites.

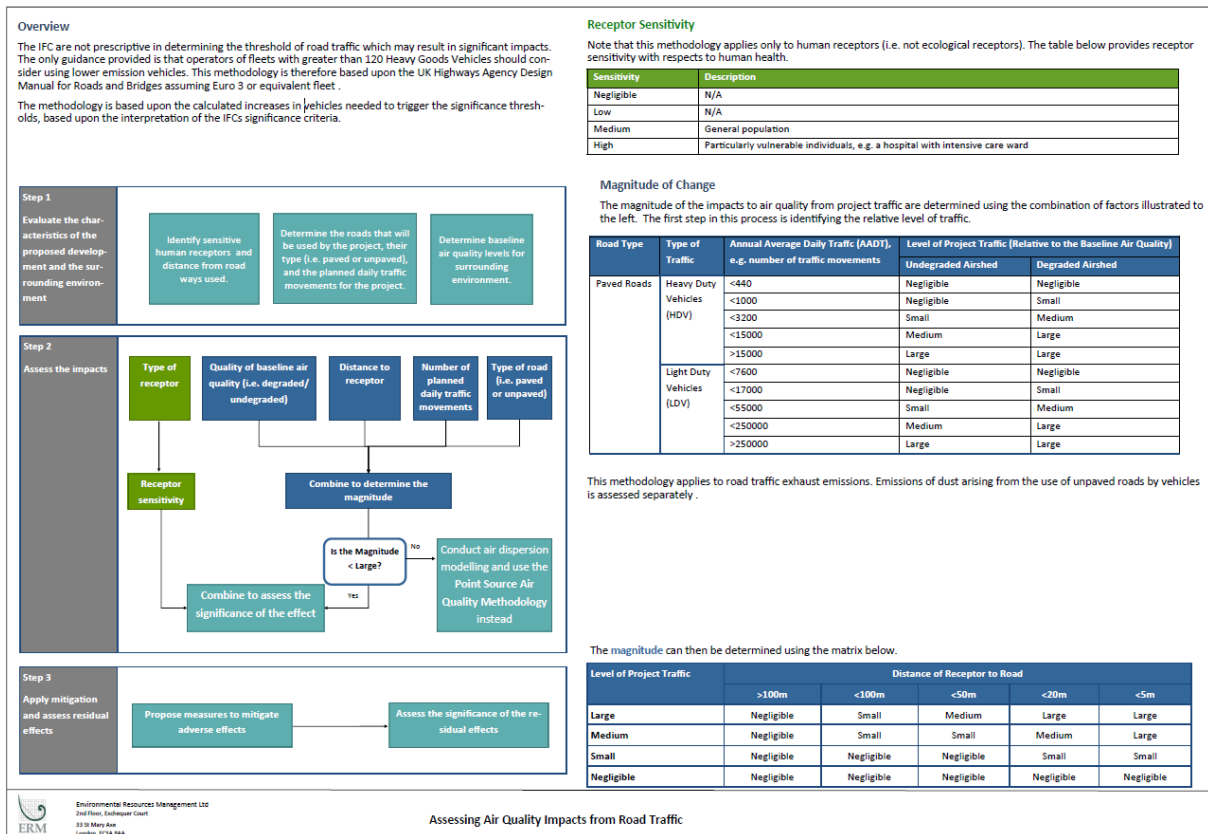
b. Estimates of construction equipment deliveries assumes a 6-month delivery period.

c. Estimates of concrete mixer trips and turbine component trips assume a 18-month delivery period.

d. Estimated average of two deliveries per day, 6 days per week.

e. Estimated average of 2 trips per week waste removal

Figure 7-20 below sets out the process for screening of construction traffic impacts. This methodology is used in the absence of detailed traffic numbers for the Project.

Figure 7-20 Construction traffic impacts screening process

Based on the screening methodology presented above in Figure 7-20 and the ESIA Impact Assessment methodology described in section 7.3.4., the impact of traffic during construction is detailed in Table 7-47 below:

Table 7-47 Impact Assessment: Air Quality – Traffic during Construction

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Air quality impacts remain within 500 m of the Project Site.
Duration	Short term	The impact duration is considered to be short term (only during construction – 18 months).
Scale	Small	Based on the above the impact the scale is considered small.
Frequency	Occasional	During construction.
Magnitude		
Negligible Magnitude		

The magnitude is negligible, as the number of estimated daily traffic movements by heavy duty vehicles is <1000 and the baseline condition of the airshed is undegraded.

Sensitivity/Vulnerability/Importance of the Resource/Receptor

High Sensitivity

The sensitivity is considered high due to the large number of the sensitive receptors (residential structures) within 200 m of the Site (closest being approx. 15 m of the project road boundary in Budisteni village).

Significance Rating Before Mitigation

Minor - Moderate Negative Impact

Based on the high sensitivity of the receptors and on the negligible magnitude determined, the significance of air quality impacts from road traffic emissions is considered Minor to Moderate.

Operation – N/A

Wind power plants utilise renewable energy and rely on the direct conversion of mechanical energy into electrical energy. Thus, during the Operational Phase of wind power plants, fossil fuels are not used. There will not be any combustion processes and there will be no emissions resulting from heating. As a result, the operation of Vifor Wind Project is not anticipated to cause air emissions and have any adverse impact on local air quality.

Decommissioning – N/A

During the closure phase, potential sources of emissions are likely to be similar to those associated with construction. There may be some dust, generated during the decommissioning of the proposed project, however, this will not be to the same extent as during the construction phase, as there will be less soil moving required. Thus, a significant amount of emissions is not expected to be generated during the closure phase of the Project. The closure phase is not anticipated to have an adverse impact on local air quality.

7.1.2.5 Mitigation Measures

The construction of the Vifor project requires mitigation in order to render impacts as negligible or at worst minor. Recommended mitigation at the construction stage encompasses a wide range of measures summarized in the sections below. The following mitigation measures will be implemented by the EPC Contractor to control nuisance dust and particulate emissions.

Construction Traffic

- A speed limit of 30 km/h on unpaved surfaces, especially the access road to the site, to be enforced and the national speed limits on public roads should not be exceeded;
- All construction vehicles must be regularly maintained to minimise exhaust emissions;
- When not in use, vehicles will be switched off, unless impractical for health and safety reasons (for example, maintenance of air conditioning);
- Exercise traffic planning and control: avoid driving through settlements and close to residential areas, travel planning to minimise congestions, etc.
- Perform proper fleet management: use modern vehicles meeting up to date emission limits, routine maintenance, use of low sulphur fuels.

Construction Dust

- Restrict the area for the removal of vegetation and soil cover to that only necessary for the Project;
- Land clearance should be sequential and where ground and earthworks are undertaken the smallest possible area for working will be exposed;
- Stripping of topsoil will not be conducted earlier than required (maintain vegetation cover for as long as possible) in order to prevent the erosion (wind and water) of organic matter, clay and silt.
- Access road is to be wetted, especially during the dry season, and when construction activities are in progress, and especially in those areas in close proximity to residential homesteads (< 200 m).
- All transported bulk materials must be covered with tarpaulins to prevent fugitive dust emissions;
- Stockpiles stored longer than six weeks should be vegetated to reduce soil loss from wind or storm water runoff;
- Stockpiles will be located as far away from receptors as possible;
- Any air quality related grievances received from neighbours must be reported to the HSE Officer or to the CLO, through the established Community Grievance Mechanism;
- Grievance mechanism to be implemented for operation and decommissioning phase.

7.1.2.6 Residual Impact Significance

With the application of the mitigation measures during Construction, the residual impact on air quality due to dust and construction traffic emissions is anticipated to be of minor significance as shown in Table 7-48 below:

Table 7-48 Pre and Post Mitigation: Air Quality Impacts

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Construction dust	Construction	Moderate - High	Minor
Construction traffic	Construction	Minor - Moderate	Minor

7.1.3 Noise and Vibrations

7.1.3.1 Introduction

This assessment aims to address the potential noise issues associated with the Project by predicting and evaluating the operational noise levels of the wind farm. The focus of the assessment is on nearby sensitive receptors to determine the potential impact on the surrounding environment. The objective is to ensure that the wind farm operates within acceptable noise levels and minimizes any negative effects on the receptors.

As described in Section 6.1.3, Romanian noise standards and guidelines, as well as those issued by the International Finance Corporation/World Bank Environmental, Health, and Safety Guidelines (where relevant) were used to determine if noise from the operation is likely to be significant.

Area of Influence (Aoi)

The determination of the area of influence (Aoi) for noise impacts at the project relies on the findings from the preliminary modelling, which identify areas with the highest predicted noise levels. Taking into account accessibility to the receptors, a specific monitoring location has been meticulously chosen. This monitoring location is located at a distance of 700 meters from the nearest WTG. The location of the Noise Sensitive Receptors assessed is shown in Figure 7-21 .

Figure 7-21 Area of Influence and Noise Sensitive Receptors



ERM 2023

7.1.3.2 Potential Impacts

Operation

Excessive noise or nuisance can arise from the operational activities associated with suggested wind farm project, particularly due to the noise generated by wind turbine generators (WTGs).

7.1.3.3 Significance of Impacts

The noise limits of the Project are based on the IFC General EHS Guideline noise guidelines and the Romanian Criteria as mentioned in Section 3. Both criteria establish a limit of 55 dB LAeq during the daytime period and 45 dB LAeq during the night-time period.

When assessing the significance of an impact in the noise assessment, the process is slightly from the approach used in other aspects of this ESIA. While impact magnitude is a key consideration, other factors such as duration and the design details of the noise-sensitive property are also considered. Furthermore, the sensitivity of the receptor, or the affected area, is considered when calculating the impact magnitude.

The criteria used for assessment take into consideration the receptor's specific sensitivity to noise. For instance, receptors sensitive to noise during the daytime only are evaluated using criteria that focus on the impact of noise on daytime activities. On the other hand, receptors rated as sensitive during the night time are assessed using criteria that account for the impact of noise on sleep disturbance. The significance of noise effects is set out below in Table 7-49.

Table 7-49 Magnitude and Significance of Noise Effects

Exceedance of criteria, dBA	Magnitude of predicted impact	Other relevant factors	Resulting Significance of effect
5 or more below the criteria	Negligible	Factors which may influence significance of effects, e.g., duration of construction activity	Negligible
> 5 below, up to the criteria	Small		Minor
Up to 5 dB above the criteria	Medium		Moderate
> 5 above the criteria	Large		Major

ERM 2023

The classification of significance refers to not-significant, minor, moderate and major. Impacts rated as Moderate or Major should be mitigated where practicable, feasible and reasonable with proportionately more emphasis on the Major items. Mitigation may not fully eliminate an impact but would be expected to reduce its severity.

7.1.3.4 Assessment of impacts:

Operation

Predictor V2023 (by SoftNoise) noise modelling software package has been utilised to calculate noise emissions from the Project operations using ISO 9613-2:1996 (ISO9613:2) - Acoustics - Attenuation of Sound during Propagation Outdoors - Part 2: General Method of Calculation noise propagation algorithms (international method for general purpose, 1/1 octaves).

The Predictor software package allows topographic details to be combined with ground regions, water, foliage, significant building structures etc. and receptor locations, to create a detailed and accurate representation of the site and surrounding area. The noise model allowed for the quantification of noise levels from multiple sources, based on the sound characteristics (overall level,

frequency data etc.) emitted from each source to predict the contributed noise levels the operation at the nearest potentially affected receivers for various operating scenarios.

The inputs and assumptions used in the predictive noise modelling are outlined below:

- Ground factor of 0.5 was applied for the study area (0 is acoustically hard or reflective, 1.0 is soft);
- Temperature 20°C;
- Relative Humidity of 60%;
- Noise levels were predicted at a height of 1.5m (representing the typical height the ear level), are presented in decibels, dB(A)
- The Project will be operating 24 hours per day, seven days per week; and
- Wind Turbine Generator (WTG) location coordinates;

The WTG specifications considered in the model are presented in the table below. The modelling was performed considering the standard day / night-time operational mode with the use of the Serrated Trailing Edge.

Table 7-50 Technical Specifications of the Vestas V162-6.4 MW (WTGs)

Technical Specifications	
Type	3-blade horizontal axis rotor upwind runner
Power control	active single blade adjustment
Rated capacity	Up to 6450 kW
Operating speed range of the rotor	4.3 -12.1 rpm
Cut-in wind speed	3 m/s
Cut-out wind speed	24 m/s
Re cut-in wind speed	22 m/s
Hub height	166 m
Rotor diameter	162 m
Swept area	20612 m ²
Sound Power Level at Hub Height (Mode PO4600)	160.6 dB(A)

ERM 2023, based on the data provided by the Client.

Table 7-51 Sound Power Level at Hub Height, Mode PO6400

Wind speed at hub height (m/s)	SWL, dB(A) – Blades with serrated trailing edge
3	94.0
4	94.0
5	94.0
6	95.5
7	98.9
8	102.2
9	104.9
10	105.4

11	105.6
12	105.8
13	106.0
14	106.2
15	106.4
16	106.5
>17	106.6

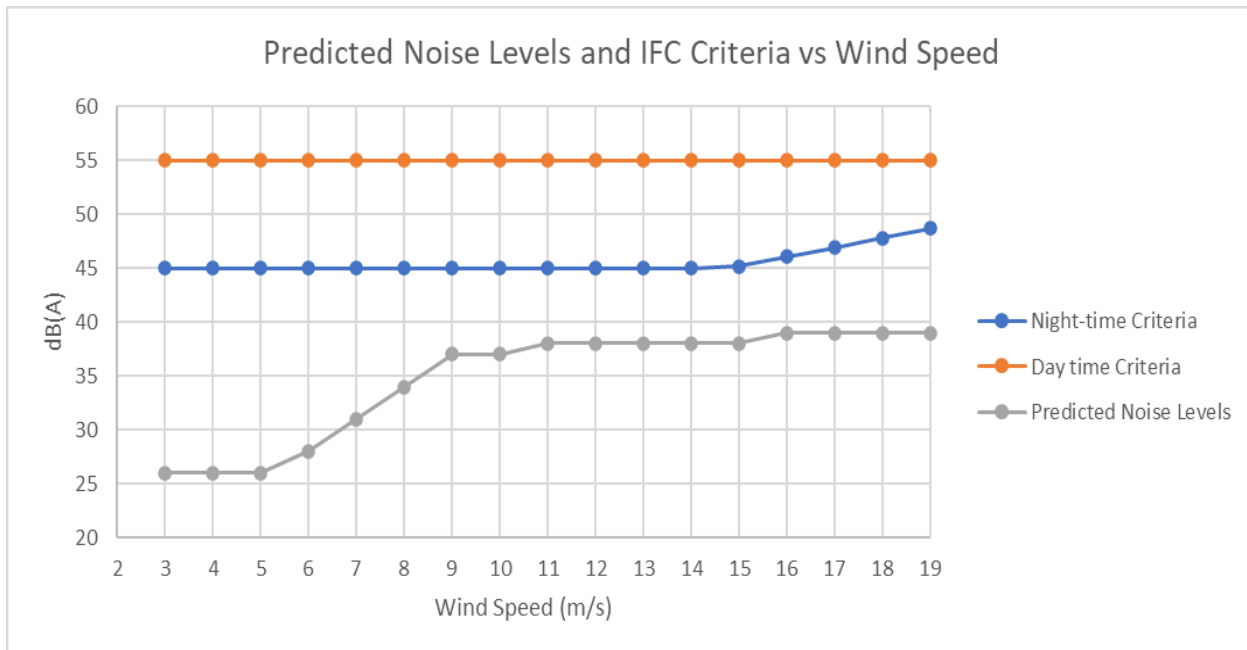
ERM 2023, based on the data provided by the Client.

Results

Noise levels were assessed at 23 NSRs, including the baseline location. At the baseline location, noise levels were predicted for all wind speeds to be able to compare the criteria as defined by the combination of baseline data and absolute criteria. However, for the remaining receptors, noise levels were only predicted for the wind speed range that resulted in the highest sound power level, i.e., equal or greater than 17 m/s, as per shown in Table 7-51.

The predicted noise values and corresponding noise criteria for both daytime and night-time periods at the baseline location are presented in Figure 7-22 and Table 7-52, respectively. Other predicted values and criteria are shown in Table 7-53.

Figure 7-22 Predicted Noise Levels at Monitoring Location



ERM 2023

Table 7-52 Predicted Operational Noise Levels at Monitoring Location

Monitoring Location Receptor	Wind Speed (m/s)																
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Predicted Noise Level, dB(A)	26	26	26	28	31	34	37	37	38	38	38	38	38	39	39	39	39

IFC Day time limit, dB(A)	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	
IFC Night time limit, dB(A)	45	45	45	45	45	45	45	45	45	45	45	45	45	46	47	48	49

ERM,2023

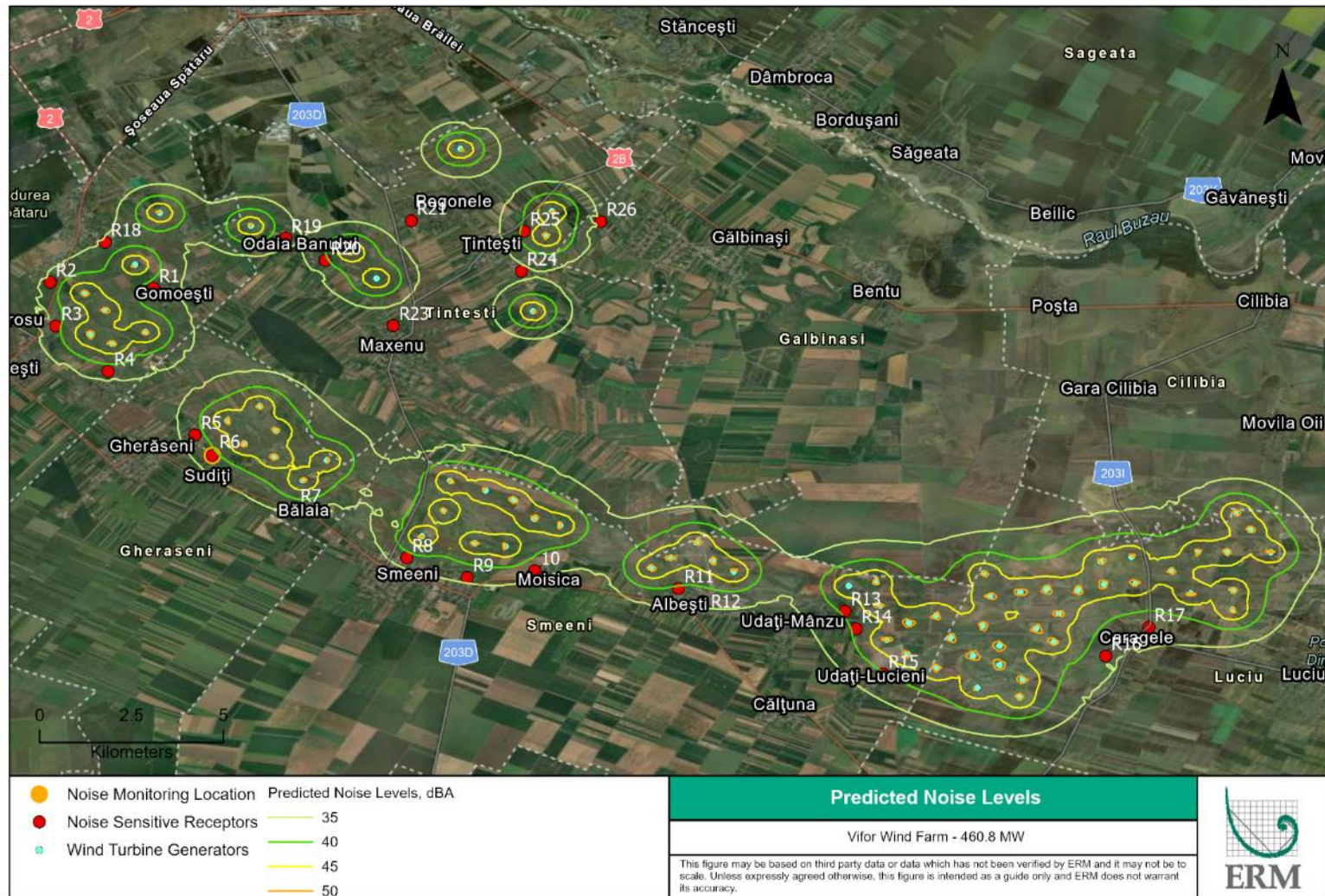
Table 7-53 Predicted Operational Noise Levels at all receptors at 17 m/s wind speed (highest SWL)

NSR	Easting Coordinate	Northing Coordinate	Height (m)	Noise Predicted Level, dB(A)	IFC and Romanian Criteria Day-time, dB(A)	IFC and Romanian Criteria Night-time, dB(A)
R01	641429.4	397979.4	1.5	38	55	45
R02	639440.8	398093.1	1.5	37	55	45
R03	639570.4	396911	1.5	39	55	45
R04	640613.1	395695.7	1.5	37	55	45
R05	642323.5	394015.5	1.5	38	55	45
R06*	642662.9	393464.6	1.5	39	55	45
R07	644286.6	392077.3	1.5	37	55	45
R08	646472.3	390776.9	1.5	38	55	45
R09	647655.6	390270	1.5	36	55	45
R10	648956.3	390482.4	1.5	37	55	45
R11	651735.6	390062.5	1.5	39	55	45
R12	652208.5	389728.1	1.5	36	55	45
R13	654961.9	389531.2	1.5	41	55	45
R14	655182.6	389056.8	1.5	41	55	45
R15	655730.1	387847.5	1.5	40	55	45
R16	660015.4	388434.3	1.5	37	55	45
R17	660830.1	389241.7	1.5	37	55	45
R18	640473.7	399202.1	1.5	36	55	45
R19	643944.5	399386.9	1.5	36	55	45
R20	644720.3	398800.3	1.5	39	55	45
R21	646351.8	399921.1	1.5	31	55	45
R22	646074.0	397063.4	1.5	30	55	45
R23	648502.7	398598.2	1.5	34	55	45
R24	648536.8	399681.7	1.5	41	55	45
R25	650000.0	399981.5	1.5	34	55	45

*Monitoring Location

ERM 2023

Figure 7-23 Predicted Noise Levels at All Receptors



ERM 2023

Noise levels are predicted to comply with the relevant criteria at all assessment locations, with predicted levels anticipated to be more than 4 dB below the specified criteria, resulting in a **Negligible to Small** impact. The impacts due to the operation of the Project are summarized in the table below.

Table 7-54 Impact Assessment: Noise – Operation

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Noise impacts remain within <700m of the Project Site.
Duration	Long Term	The impact duration is considered to be long term (during the operation of the Project).
Scale	Negligible	Based on the above the impact the scale is considered negligible.
Frequency	Occasional	During
Magnitude		
Negligible to Small Magnitude		
Noise levels are predicted to comply with the relevant criteria at all assessment locations, with predicted levels anticipated to be more than 4 dB below the specified criteria.		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High Sensitivity		
The sensitivity is considered high due to the large number of the sensitive receptors (residential structures). The nearest NSR is within 700 m of the Site (Suditi village).		
Significance Rating Before Mitigation		
Negligible - Minor Negative Impact		
Based on the high sensitivity of the receptors and on the negligible magnitude determined, the significance of Noise impacts from the operation is considered Negligible to Minor.		

ERM 2023

As Negligible impacts are predicted, no mitigation measures are suggested. However, ERM recommends that regular compliance monitoring should be conducted through direct measurements at critical receptor locations. This proactive approach will enable the timely identification of any potential breaches of the criteria. If an exceedance of the criteria is identified, the implementation of an Operational Noise Management Plan (ONMP) becomes necessary. The ONMP will investigate the source of the noise and establish corrective actions to minimize any potential environmental effects.

7.1.4 Geology and Soil

This chapter discusses the potential impacts that the construction, operation and decommissioning phases of the Project will have on geology and land/soil condition. Where required, appropriate mitigation measures have been set out to limit any identified significant impacts, and/or monitoring programs to reduce residual impacts.

The assessment identifies potential impacts to geology and land/soil resources resulting from the Project. Impacts will occur mainly during the construction phase, as a result of on-site Project site activities, including vegetation clearance, site preparation, excavation and heavy vehicle movement over land and unpaved roads.

7.1.4.1 Introduction

Baseline data was collected through desk-based studies undertaken by ERM Romania specialists. Furthermore, information was obtained from the DTAC Studies (Construction Technical Documentation for the Building Permits, 2022) and Geotechnical Survey Studies developed for each sub-project (2011, 2022). This information, as described in Chapter 6.1.5, has been utilised to identify and guide the assessment of potential impacts. The methodology for the assessment has been based upon that outlined in Chapter 4.3 – Impact Assessment and Mitigation Methodology.

Area of Influence (Aol)

The Aol for geology 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. From this point of view, from the experience gained from other ESIA's prepared by ERM, we might consider an area of up to 2 km applied around the Project components and facilities as the geology and land/soil Aol.

The total of 164,73 ha of the Project area will be cleared of vegetation and levelled. According to the information provided by Client, this includes (Table 7-55):

- *Temporary sites and facilities*, used during the construction phase, for a period of up to 18 months, with a total area of 116.21 ha.
- *Permanent sites and facilities* (built/arranged area) used during construction, operation and decommissioning phases, up to 35 years, with a total area of 48.52 ha.

Table 7-55 Summary of permanent and temporary land required for the Project (ha)

Project element	Type of use	Total	Luciu	Gherăseni	Costesti	Smeeni	Țintești
Area of land temporarily removed from the agricultural use	Temporary	116.21	29.05	9.64	11.67	56.21	9.64
Total area of land permanently removed from the agricultural use (incl. roads)	Permanent	32.80	7.26	3.98	4.58	13.54	3.44
Total area of land permanently removed from the agricultural use without roads	Permanent	15.72	1.83	0.92	1.05	2.75	9.17

7.1.4.2 Potential Impacts

The Project key activities that are likely to have negative impacts on geology and land/soil, include vegetation clearance, site preparation, excavation and heavy vehicle movement over land and unpaved roads, as follows:

- Pre-construction activities and construction phase:
 - Groundworks and construction activities (vegetation clearance, land levelling, excavations, construction of new access roads, use of existing access roads, installation of concrete foundations for WTGs and buildings, etc.) resulting in *soil compaction* and *loss of soil stabilising vegetation*, hence increasing surface runoff and localised *erosion*,
 - Accidental leaks/spills of fuel, oil and hazardous materials/waste from equipment during construction phase, that might *contaminate soil*.
- Operational phase:
 - Accidental leaks/spills of fuel, oil, chemicals and hazardous materials from Operation and Maintenance (O&M) activities that might *contaminate soil*.
- Decommissioning phase:
 - Dismantling of equipment and land restoration works, similar to activities during construction phase, with similar effects of *soil compaction and erosion*,
 - Leaks/spills of fuel, oil and hazardous materials/waste from equipment during decommissioning phase, that might *contaminate soil*.

Compaction and erosion from increased exposure of bare ground to wind and water are also likely to cause changes in the soil structure and further degradation of soil quality. Erosion may occur when surface water flows come into contact with areas of bare soil.

Rainstorms can also increase the potential for erosion. In addition, the compaction of the subsoils through site grading and levelling, and the presence of heavy vehicles during construction, will result in potential lower permeability of the soil and therefore decrease infiltration and increase run-off (where the slopes could allow this), altering the natural drainage of the soil. Heavy vehicle movement over soils which have lost their structure will also result in increased wind erosion of soil.

The scope of geology and land/soil Environment Impact Assessment which listed potential impacts and consequences, as well as identified receptors is described in Table 7-56 below:

Table 7-56 Land/Soil Impacts by Project Phase

Phase	Potential activities	Potential impacts	Potential consequences	Receptors
Construction phase	Groundworks and construction activities: - Land and vegetation clearance for all permanent and temporary sites and facilities, - Excavation for WTG and other facilities foundations, - Installation of concrete foundations	- Loss of soil stabilizing vegetation, - Soil compaction and erosion, - Soil contamination.	- Loss of topsoil quality would affect pasture productivity, - Loss of vegetation for WTG and other facilities foundations, by removal of topsoil might potentially result in localized soil erosion.	- Soil quality in the Project area

Phase	Potential activities	Potential impacts	Potential consequences	Receptors
	for WTGs and buildings, - Improvement of existing roads and construction of access road system			
	Accidental leaks/spills of fuel, oil and hazardous materials/ waste from equipment during construction.			
Operational phase	Spillage of fuel, oil, chemicals and hazardous materials from Operation and Maintenance activities.			
Decommissioning phase	Dismantling and land restoration works.			
	Leaks/spills of fuel, oil and hazardous materials/waste from equipment during decommissioning phase, that might contaminate soil.			

7.1.4.3 Assessment of Impacts

Construction Phase

Project construction will take place gradually, over a period of approx. 18 months / October 2023 to April 2025), and as previously mentioned, will require specific activities involving vegetation clearance, site preparation, excavation and heavy vehicle movement over unpaved roads.

Potential impacts from the pre-construction and construction activities likely to have negative impacts on geology and land/soil, will include mainly *soil compaction and erosion* – due to groundworks and construction activities, and *soil contamination* – due to accidental leaks/spills of fuel, oil and hazardous materials/waste from equipment.

The impact will be evident on the Project temporary sites and facilities, used during the construction phase, with a total area of approx. 116.21 ha, and on the permanent sites and facilities, used during the construction phase, with a total area of approx. 48.52 ha.

Soil Compaction and Erosion – during construction phase

Based on the specific construction activities, estimated areas to be affected by construction works, and duration of works, a summary of impacts related to *soil compaction and erosion during construction* is detailed in the Table 7-57 below.

Table 7-57 Impact Assessment: Soil Compaction and Erosion (Construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of soil compaction and erosion are largely focused on the Project sites, that will be cleared of vegetation and levelled for construction, and due to heavy vehicle movement over land and unpaved roads.
Duration	Short term	The impacts are short-term during the construction phase (approx. 18 months / October 2023 to April 2025) and will cease upon completion of construction.
Scale	Medium	Impacts of soil compaction and erosion are largely focussed on the Project sites (temporary and permanent sites and facilities) that has been cleared and prepared for construction.
Frequency	Continuously	The frequency is throughout the construction phase, with periods affected by drought making the soil more prone to wind erosion, whilst wetter periods contribute to a more pronounced compaction and physical erosion of cleared land.
Magnitude		
Medium Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium Sensitivity		
The sensitivity of the soil resource is expected to be medium due to its current use as pasture for animal husbandry and agriculture in the broader Aol (area of up to 2 km applied around the Project components and facilities as the geology and land/soil direct Environment Aol), and the low permeability and high sensitivity of the loessoid soils to wind erosion across Project sites.		
Significance Rating Before Mitigation		
Moderate Negative Impact		
The impact significance is considered to be Moderate.		

Soil Contamination – during construction phase

Construction workers working on-site would also generate domestic waste and wastewater, which may be released to the ground if not properly managed. The domestic waste at the construction sites may include organic waste, plastic, glass, etc. In addition, construction activities will also generate various types of hazardous waste, including oil, lubricants and diesel leaked from vehicles and construction equipment in the areas already subject to vegetation clearance, site preparation, and heavy vehicle movement over unpaved roads.

Based on the specific construction activities, estimated areas to be affected by construction works, and duration of works, a summary of impacts related to *soil contamination during construction* is detailed in the Table 7-58 below.

Table 7-58 Impact Assessment: Soil Contamination (Construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of soil contamination due to accidental leaks/spills of fuel, oil and hazardous materials/waste - are largely focused on the Project sites that will already be cleared of vegetation and levelled for construction, and also due to heavy vehicle movement over land and unpaved roads.
Duration	Short term	The impacts are short-term during the construction phase (approx. 18 months / October 2023 to April 2025), with both phases starting at the same time) and will cease upon completion of construction.
Scale	Small	Impacts of soil contamination are largely focussed on the Project sites (temporary and permanent sites and facilities) that has been cleared and prepared for construction. The scale is considered small.
Frequency	Intermittent	The frequency is intermittent over the construction phase.
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Low Sensitivity		
The sensitivity of the soil resource is expected to be Low, as soil contamination will affect local community's livelihood in minor level.		
Significance Rating Before Mitigation		
Minor Negative Impact		
The impact significance of soil contamination due to accidental leaks/spills of fuel, oil and hazardous materials/waste from equipment, is considered to be Minor.		

Operational Phase

Soil Contamination – during operational phase

The Project sites would be visited regularly during the operation phase for inspections, maintenance and repair (O&M activities). These activities would generate minimal effects on land/soils, since the Project facilities and the road system will already be in place.

Solid waste generated by the O&M team, including organic waste, plastic, glass, etc, and accidental leaks/spills of fuel, oil, chemicals and hazardous materials – were considered the main sources that might contaminate the land/soil during the operational phase.

Based on the specific O&M activities, the areas to be affected by inspections, maintenance and repair works, and the expected operation of the wind farm, up to 35 years, a summary of impacts related to *soil contamination during operation* is detailed in the Table 7-59 below.

Table 7-59 Impact Assessment: Soil Contamination (Operation)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of soil contamination due to regular inspections, maintenance and repair (O&M activities), and accidental leaks/spills of fuel, oil and hazardous materials/waste - are focused on the Project sites and facilities and the road system already be in place.
Duration	Short-term	The impacts are short-term during every inspection, maintenance and repair activity; but will take place over the entire operational phase (up to 35 years).
Scale	Small	Impacts of soil contamination are largely focussed on the Project sites and facilities (permanent sites and facilities) and the road system. The scale is considered small.
Frequency	Intermittent	The frequency is intermittent/occasional over the entire operational phase.
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Low Sensitivity		
The sensitivity of the soil resource is expected to be Low, as soil contamination will only affect local community's livelihood in minor level.		
Significance Rating Before Mitigation		
Minor Negative Impact		
The impact significance of soil contamination due to accidental leaks/spills of fuel, oil and hazardous materials/waste from equipment, is considered to be Minor.		

Decommissioning Phase

Project decommissioning will take place upon ceasing of operation of the windfarm and will likely generate impacts on land/soil associated with dismantling of equipment and land restoration works, similar to activities developed during the construction phase. Overall, it is assumed that decommissioning will result in impacts similar in character and significance to those identified for the construction phase, but likely of shorter duration and with a lower volume of works.

The impacts on land/soil will be evident on the Project permanent sites and facilities, with a total area of approx. 48.52 ha, and will be represented mainly by – *soil compaction and erosion* due to dismantling of equipment and land restoration works, and potential – *land/soil contamination* due to leaks/spills of fuel, oil and hazardous materials/waste from vehicles and equipment.

Soil Compaction and Erosion – during decommissioning phase

A summary of impacts related to soil compaction and erosion during decommissioning phase is detailed in the Table 7-60 below.

Table 7-60 Impact Assessment: Soil Compaction and Erosion (Decommissioning)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of soil compaction and erosion are largely focused on the Project sites and facilities, due to dismantling of equipment and land restoration works, and heavy vehicle movement over land and existing road system.
Duration	Short term	The impacts are short-term during the decommissioning phase (potentially 4-6 months) and will cease upon completion of decommissioning activities.
Scale	Medium	Impacts of soil compaction and erosion are largely focussed on the permanent Project facilities, which will be dismantled and recovered or recycled, and Project sites on which land/soil restoration works will be carried out.
Frequency	Continuously	The frequency is throughout the decommissioning phase, with periods affected by drought making the soil more prone to wind erosion, whilst wetter periods contribute to a more pronounced compaction and physical erosion land.
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Low Sensitivity		
The sensitivity/vulnerability/importance of the soil resources to compaction and erosion is expected to be Low, due to the general use of lands as pasture for animal husbandry and agriculture in the broader AoI (area of up to 2 km applied around the Project components and facilities). The decommissioning activities will only affect local community's livelihood in minor level.		
Significance Rating Before Mitigation		
Minor Negative Impact		
The impact significance of soil compaction and erosion due to dismantling of equipment and land restoration works, is considered to be Minor.		

Soil Contamination – during decommissioning phase

A summary of impacts related to soil contamination during decommissioning phase is detailed in the Table 7-61 below.

Table 7-61 Impact Assessment: Soil Contamination (Decommissioning)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		

Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of soil contamination are largely focused on the Project sites and facilities and the road system in place, due to leaks/spills of fuel, oil and hazardous materials/waste from vehicles and equipment.
Duration	Short-term	The impacts are short-term during the decommissioning phase (potentially 4-6 months) and will cease upon completion of decommissioning activities.
Scale	Small	Impacts of soil contamination are largely focussed on the Project sites and facilities (permanent sites and facilities) and the road system. The scale is considered small.
Frequency	Continuously	The frequency of soil contamination impacts is throughout over the entire decommissioning phase.

Magnitude

Small Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

Low Sensitivity

The sensitivity of the soil resource is expected to be Low, as soil contamination will only affect local community's livelihood in minor level.

Significance Rating Before Mitigation

Minor Negative Impact

The impact significance of soil contamination due to leaks/spills of fuel, oil and hazardous materials/waste from equipment, is considered to be Minor.

7.1.4.4 Mitigation Measures

The recommended mitigation measures below, to be implemented by the EPC Contractor, are divided into measures that address soil compaction and erosion, and soil contamination, although some overlap in the effects of these measures.

Mitigations to address Soil compaction and erosion Impacts

The following mitigation measures are based on ESIA requirements to minimise impacts, including:

- Preparation and implementation of a Soil Management Plan during construction to incorporate requirements such as use of dust suppression, soil stabilisation during construction, and stormwater and sediment management and control,
- 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,
- Sites should be restored at the end of the Project life cycle to pre-Project level. Progressive rehabilitation measures should be implemented, beginning during vegetation clearance, and sites preparation,
- 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,
- Additional measures will be implemented in areas identified as having a high compaction and/or erosion potential,
- 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 associated facilities/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.

Mitigations to address Soil contamination Impacts

The following mitigation measures are based on ESIA requirements to minimise impacts, including:

- Contract a licensed contractor to collect, transport and treat domestic, construction and hazardous wastes from Project sites,
- Prohibit dumping any types of solid waste to the soil, or burning waste of sites,
- Ensure that hazardous materials are stored in designated areas that are designed with impermeable floor, inflammable walls and accessible to authorized personnel,
- Hazardous waste shall be properly managed in accordance with existing legislation on hazardous waste, as follows:
 - Hazardous waste is prohibited to be illegally disposed into the ground,
 - All workers shall be trained on hazardous and non-hazardous waste classification and their handling methods,
 - Proper facilities shall be supplied and areas for hazardous waste storage in the construction sites should be clearly determined according to the law,
 - Appropriate licensed entities shall be contracted to periodically transport and dispose hazardous waste,
 - A record of hazardous waste should be documented to allow monitoring volume of hazardous waste generated in place and disposed by contractors of hazardous waste. The numeric data in the record must be consistent in order to ensure that no improper disposal is made in the Project area or other locations,
- Maintenance works are restricted to specially designated platforms with strict control of accidental spills,
- Procedures for responding to emergencies / accidental spills of hazardous materials, fuel and handling, and waste management are developed and implemented,
- In case of accidental/unintended spillage, the contaminated soil should be immediately collected and stored as hazardous waste.

7.1.4.5 Residual Impact

The residual adverse impacts on land/soils, with application of the mitigation measures, are anticipated to be of minor significance during construction, and of negligible significance during both the operation and decommissioning phases, as presented in the table below.

Table 7-62 Pre- and Post-mitigation: Soil Compaction and Erosion, and Soil contamination

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Soil Compaction and Erosion	Construction	Moderate	Minor
Soil Contamination	Construction	Minor	Minor
Soil Contamination	Operation	Minor	Negligible
Soil Compaction and Erosion	Decommissioning	Minor	Negligible
Soil Contamination	Decommissioning	Minor	Negligible

7.1.5 Groundwater and Surface Water

7.1.5.1 Introduction

Groundwater and surface water baseline data were collected through desk-based studies undertaken by ERM specialists. Furthermore, site related information was obtained from the Geotechnical Survey Studies developed for each sub-project (2011, 2022). This information has been utilised to identify and guide the assessment of potential impacts. The methodology of assessment has been based upon that outlined in this ESIA Report at Chapter 4.3 Impact Assessment and Mitigation Methodology.

This assessment identifies potential impacts on water resources (groundwater and surface water) as a result of Vifor Project. Impacts will occur largely during the construction phase, and primarily relate to a potential reduction in groundwater availability and potential contamination.

Area of Influence:

Surface water resources included in the Project's direct AoI are represented by Călmățui river course and the left side tributaries of Rușavăț, Negreasca and Strâmbu, where 62 WTGs and ancillary facilities, out of a total number of 72 WTGs of the Project will be located. In the entire area the river is dammed to prevent flooding, and tributaries are dry for most of the year. Luciu Lake, is located north of Luciu village and south of Călmățui River course. It is the largest permanent pond in the area, with a surface of approx. 359 ha, but usually shrinks during the dry season. The lake is not located within the direct Project AoI, but within the 2 km buffer zone indirect AoI.

Vifor Project sites and facilities are located almost entirely north of Călmățui river course, except for the central power collection station 33kv/400kv and overhead transmission line to the national grid, which are located south of the river course.

The human settlements of the entire area, with a rural character, are located south of Călmățui river, forming a cluster of villages along the river. As a result, it is likely that the hydrology of Călmățui river is being impacted by agricultural activities, and especially grazing of livestock, and household activities. Moreover, given the grazing of livestock and communities in the indirect AoI it is likely that surface water will be degraded from non-point (diffuse) sources of pollution of the watercourse, such as from livestock, from chemical fertilizers used in agriculture and from nutrients from pit latrines which are still prevalent in the area (even if water supply and sewerage systems are working in the

villages). The presence of several agrifood manufacturing plants in the area may also contribute to a deterioration in water quality in the indirect AoI.

Water quality of Călmățui river, as monitored by Buzău Ialomița Water Basin Administration, highlights a good/high chemical condition and a moderate ecological condition of the watercourse, which places the river waters as having an average quality out of 161 water bodies monitored within Buzău-Ialomița hydrographic space.

Groundwater resources in the Project area are found in large aquifer layers, represented by: phreatic waters, usually found at 3-5 m depth, and rising to 1-2m depth during heavy rains; groundwater, classified as groundwater bodies ROIL06 Călmățui River Meadow and ROIL9 South Călmățui, usually found at 15-35 m depth, being chloride (sodium chloride) and therefore non-potable; and deep groundwater, that occurs at 1,050-1,100 m depth, being fresh waters with some mineralization.

The existing groundwater bodies ROIL06 Călmățui River Meadow and ROIL9 South Călmățui, are mainly used for water supply, livestock, farming, and industry, having as major contamination sources the industry and human settlements (ammonia, sulphates, chlorides).

Groundwater quality of the existing groundwater bodies is monitored by Buzău Ialomița Water Basin Administration and highlights a good chemical qualitative status of the waters (with exceedance only for mineralization indicators from the natural background).

For Vifor Project area, based on the characteristics of the existing groundwater and surface water bodies, the water sources that can be used during the Project implementation will be water brought with water tankers and potentially the groundwater.

7.1.5.2 Potential Impacts

This section analyses the potential impacts of the Project's construction, operation and decommissioning activities to the water resources (both surface water and groundwater).

Key activities causing the potential impacts to water availability and quality, as well as receptors of the impacts are described in Table -below.

Activities causing potential impacts to water resources during construction phase, include:

- Land preparation and civil works;
- Central power collection station/substation, underground cable lines and overhead lines, laydown area and office construction;
- Waste and Wastewater management from construction activities and workers activities;
- Hazardous storage and handling

Activities causing potential impacts to water resources during the operation and decommissioning phases are likely to have an insignificant impact on water quality and quantity. Therefore, the scope for impact assessment on water resources is limited to only activities in the construction phase for this ESIA, as described in Table 7-63 below:

Table 7-63 Water Resource Impacts by Project Phase

Phase	Potential activities	Potential impacts	Potential consequences	Receptors
Construction phase	- Land preparation and civil works	- Increased turbidity due to suspended sediments washed into Călmățui river of tributaries, - Increased contaminants such	- Reduction in flows and water levels of surface and groundwater due to water use for dust control, concrete	- Surface and groundwater availability and quality, - Flora and fauna,
	- Central power collection station, underground cable lines and overhead lines, existing roads			

	and additional access roads, including the construction corridor, lay-down areas construction	as heavy metals, oil, and grease etc. washed into surface water bodies from construction activities,	production, use as drinking water, - Alteration of water flow systems by access roads and excavation activities,	- Users of surface and groundwater.
	- Operation of associated facilities, such as the concrete batching station	- Waste discharged from construction activities and worker's activities,	- Aquatic ecology is affected due to increase of turbidity and pollution,	
	- Waste and wastewater management from construction activities and workers activities	- Accidental spills and leaks associated with construction: oil, chemicals, hazardous chemicals from use of vehicles and construction equipment.	- Decreased quality of surface water.	
	- Hazardous waste storage and handling			
Operational phase	- Accidental spills and leaks associated with operation	- Insignificant impact on water quality and quantity		
	- Hazardous waste storage and handling			
Decommissioning phase	- Dismantling of equipment and land restoration works	- Insignificant impact on water quality and quantity		
	- Waste and wastewater management from construction activities and workers activities			
	- Accidental spills and leaks associated with decommissioning			
	- Hazardous waste storage and handling			

Significance of impacts:

For the assessment of water quantity and quality, the sensitivity and magnitude criteria are outline the Tables below, respectively based on the selected Methodology (see Chapter 4).

Table 7-64 Water Resource Impacts by Project Phase

Sensitivity Criteria	Contributing Criteria	
	Environment	Social
Water Resources – Surface water and groundwater (quality/quantity related criteria)	The extent to which the water resource plays and ecosystem or amenity role in terms of supporting biodiversity either directly or indirectly, particularly with respect to dependent ecosystems.	The extent to which the water resource provides or could provide a use (drinking water, agricultural uses, washing and other domestic or industrial) to the local communities and businesses, or is important in terms of national resource protection objectives, targets and legislation.
Low	The water resources does not support diverse aquatic habitat or populations or supports aquatic habitat or population that is of low quality.	The surface water resource has little or no role in terms of provisioning services as agricultural water source, other domestic uses as washing, bathing, industrial use for the local community. The groundwater resource is not currently abstracted and used in the vicinity of the Project but is of sufficient quality and yield to be used for that purpose in the future (and there is a reasonable potential for future use).
Medium	The water resources support diverse populations of flora and fauna but available in the surface water bodies in the region.	The surface water resources have local importance in terms of provisioning services but there is ample capacity and/or adequate opportunity for alternative sources of comparable quality. The groundwater resource is an important water supply, and is currently being used, but there is capacity and/or adequate opportunity for alternative resources of comparable quality.
High	The water resource supports economically important or biologically unique aquatic species or provides essential habitat for such species.	The surface water resources are wholly relied upon locally, with no suitable technically or economically feasible alternatives, or is important at a regional or transboundary watershed level for provisioning services. The groundwater resources are wholly relied upon locally, with no suitable technically or economically feasible alternatives. The development stage of groundwater is critical or over exploited.

Table 7-65 Criteria for Impact Magnitude for Water Resource Impact Assessment

Magnitude Criteria	Negligible	Small	Medium	Large
General Criteria	No perceptible or readily measurable change from baseline conditions.	Perceptible change from baseline conditions but likely to be within	Clearly evident (e.g. perceptible and readily measurable) change from	Major changes in comparison to baseline conditions and/or

		applicable norms and standards for model of use.	baseline conditions and/or likely to approach and even occasionally exceed applicable norms and standards for mode of use.	
Water Quantity	There is likely to be negligible or no consumption of surface water by the Project at any time.	The Project will consume surface water, but the amounts abstracted are likely to be relatively small in comparison to the resources available at the time of use (i.e. taking into account seasonal fluctuation).	The Project will consume surface water, and the amounts abstracted are likely to be significant in comparison to the resource available at the time of use (i.e. taking into account seasonal fluctuation).	The Project will consume surface water, and the amounts abstracted are likely to be very significant in comparison to the resource available at the time of use (i.e. taking into account seasonal fluctuation).
Water Quality	Water quality impacts are likely to be well within ambient levels or allowable criteria. Discharges are expected to be well within statutory limits. Potential short-term localized effects on water quality but likely to be highly transitory (e.g. lasting a matter of hours) and well within natural fluctuations.	Water quality impacts are likely to be well within ambient levels or allowable criteria. Discharges are expected to be within statutory limits. Potential short-term localized effects on water quality but which are likely to return to equilibrium conditions within a short timeframe (e.g. hours of days at most).	Water quality impacts are likely to result in occasional exceedances of ambient levels or allowable criteria. Occasional breaches of statutory discharge limits (limited periods) expected. Potential localized effects on water quality which are likely to be fairly long lasting (e.g. weeks or months) and/or give rise to indirect ecological and/or socio-economic impacts.	Water quality impacts are likely to routinely exceed ambient criteria levels or allowable criteria over large areas. Repeated breaches of statutory discharge limits (over extended periods) expected. Potentially severe effects on water quality which are likely to be long-lasting (e.g. months or more) or permanent and/or give rise to indirect ecological and/or socio-economic impacts.

7.1.5.3 Assessment of Impacts

Construction Phase

Project construction will take place gradually, over a period of 18 months (October 2023 – April 2025), and it is likely to obtain water for the construction phase brought with water tankers or, potentially from groundwater (to be used for production of concrete in the batching station); other option may include only water tankers to be used for production of concrete in the batching station, but also during clearance of vegetation and excavation works, for dust suppression activities, domestic use by

workers, site toilets etc. A total estimated number of about 600-700 workers are anticipated for the construction phase.

Targeted water sources and volumes required for construction have not yet confirmed. At this stage it is assumed that all water needs for the Project will be via water tankers, with water provided by “ADI Buzau 2008” (The Intercommunity Public Utilities Development Association for Water Supply and Sewerage Services).

For the use of groundwater, the necessary permits for water abstraction (wells drilled on site and volume of water to be used) will have to be obtained from Buzau-Ialomița Water Basin Administration prior to the start of the Construction phase.

Potential impacts on water resources from the Pre-construction and Construction activities are likely to be negative and will affect water quantity – used to support the construction activities, and water quality – due to potential improper use and management during the construction activities. The latter may include excavation of foundations and ditches, road construction and road improvements, dust suppression, domestic use, or accidental leaks/spills of fuel, oil and hazardous materials/waste from equipment into soil and groundwater, or surface runoff.

Potential impact will be particularly evident in the Project's temporary sites and facilities used during the Construction phase, and less so in the case of the permanent sites and facilities.

While typically not a groundwater or surface water issue, control of the pollution sources is necessary to preclude impacts to water resources.

Sensitive receptors include those settlements that may be affected by changes in quantity and quality of both the surface- and groundwater. Settlements in the Project area are not reliant on surface water, but on groundwater as their primary source for public and domestic water supply and for livestock watering.

Impact on Water Quantity during the Construction Phase

Based on the specific construction activities, estimated areas to be affected by construction works, and duration of works, a summary of Impacts on water quantity (groundwater and surface water resources) during the Construction Phase is provided in the Table below.

Table 7-66 Impact on Water Quantity (groundwater and surface water resources) – during Construction

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of water resources – water quantity/water abstraction are largely limited to Area of Impact (AoI).
Duration	Long term	The impacts are long-term and only present when stated activities are ongoing during the Construction phase (approx. 18 months / October 2023 to April 2025).
Scale	Medium	Impacts on water resources quality are largely focussed on the Project sites (temporary and permanent sites and facilities) and the immediate surroundings. The scale is considered small.
Frequency	Intermittent	The frequency is intermittent over the Construction phase.
Magnitude		
Small Magnitude		

If underground water will be used for the Construction phase, it can be stated that the amount of water abstracted is likely to be relatively small in comparison to the water resource availability at the time of use, and water from water tankers is sufficient to support project demand without disrupting the current water use of the local communities. As such the impact magnitude can be assessed as Small.

Sensitivity/Vulnerability/Importance of the Resource/Receptor

Medium Sensitivity

Sensitivity of the receptors in the Project area has been assessed as Medium for social receptors, taking into account the chances of an overexploited source of groundwater during summer dry periods, causing scarcity of water in the entire Aol (area of up to 2 km applied around the Project components and facilities). The public consultation of April 2023 indicate that most households rely on groundwater as a source of water for livestock watering, and for public and domestic water supply.

Significance Rating Before Mitigation

Moderate Negative Impact

Overall, regards on Water Quantity Impact Assessment, the impact significance in the Construction phase has been assessed as Moderate.

Impact on Water Quality during the Construction Phase

Construction activities, due to improper use and management of the construction activities, including excavation, road construction, dust suppression, domestic use of water, generate potential contamination of water resources.

In addition, construction activities will also generate various types of hazardous waste, including oil, lubricants and diesel leaked from vehicles and construction equipment in the areas already subject to vegetation clearance, site preparation, and heavy vehicle movement over unpaved roads, with potential contamination of water resources.

Construction workers working on-site would generate domestic waste and wastewater, which may be released to the ground if not properly managed. The domestic waste at the Construction site/s may include organic waste, plastic, glass, etc.

Based on the specific construction activities, estimated areas to be affected by construction works, and duration of works, a summary of Impacts on water quality (groundwater and surface water resources) during the Construction Phase is detailed in the Table below.

Table 7-67 Impact on Water Quality (groundwater and surface water resources) – during Construction

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impact is limited to Area of Impact (Aol).
Duration	Long-term	The impacts are long-term and only present when stated activities are ongoing during the Construction phase (approx. 18 months / October 2023 to April 2025).
Scale	Small	Impacts on water resources quality are largely focussed on the Project sites (temporary and permanent sites and facilities) and the immediate surroundings. The scale is dependent on the number of communities/villages that are reliant on the eventual targeted water resource for the project. The scale is considered small.

Frequency	Intermittent	The frequency is intermittent over the Construction phase.
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium Sensitivity		
The sensitivity of receptors is expected to be Medium, as water contamination will affect those local communities' livelihoods that use groundwater and surface water resources for public and domestic water supply and for livestock watering.		
Significance Rating Before Mitigation		
Moderate Negative Impact		
Overall, regards to Water Quality Impact Assessment, the impact significance in the Construction phase has been assessed as Moderate.		

Operational Phase

The Operational phase will include inspections, maintenance and repair (O&M activities) of the windfarm facilities and equipment. Certain preventive and unplanned maintenance works may include the use of paints and other hazardous materials; however, these are not expected in large quantities. These activities will be static and would generate minimal effects on water resources (surface and groundwater). A total estimated number of about 40-50 operation and maintenance personnel are anticipated for the operational phase.

Specific Project impacts to surface and underground waters quantity and quality are expected to be insignificant. Impacts could potentially include accidental spills and leaks, including the ones associated with operation and hazardous waste handling and storage. Although these materials may be used in small quantities, precaution must be taken to ensure proper storage, handling, transportation and adequate spill prevention. It is expected that the storage of any of these materials, chemicals and fuels will be within designated areas which have specific management and mitigation measures in place to prevent partway to surface and underground waters.

Decommissioning Phase

Impacts on water resources (surface and groundwater) during Decommissioning phase are likely to be similar in character and significance to those identified for the construction phase, but likely to be of shorter duration and with a much lower volume of works.

It is assumed that the risk of accidental spills (such as oils, transformer oils, equipment lubricants, fluids and solvents, etc.) and waste management (such as lubricated turbine parts, equipment lubricants and paints) will be expected during the decommissioning phase. Likewise, the mitigation and management measures outlined for the construction phase in relation to accidental spills and waste management will be applicable to the decommissioning phase as well. For additional information on decommissioning/demolition waste impacts & mitigation and management measures can be consulted Chapter 7.2.6 Solid Waste and Wastewater Management.

Contaminated materials such as oil storage tanks would need to be removed from the sites and taken to a suitable disposal site to prevent future contamination of surface and groundwater. The result will consist of insignificant impact on water quality and quantity.

7.1.5.4 Mitigation Measures

The above identified and assessed impacts on surface and groundwater resources – water quantity (abstraction) and water quality – are controlled through the implementation of general best practice housekeeping measured expected to be implemented by the selected OEM/EPC Contractor.

These practices include following the Construction Health and Safety Plan, staging of work areas, provision of washout/washdown facilities with filter/neutralization prior to discharge, erosion and sediment control, excavation and grading containment, provision of spill response equipment, etc.

Mitigation measures to address Impact on Water Quality (groundwater and surface water resources):

- Sediment traps and culverts should be installed as part of the drainage infrastructure around the Project sites prior to clearance and earthworks, so as to prevent any sediment run-off into the surrounding area.
- Culverts along new access roads should be provided to facilitate drainage along with ditches. Where practical, exposed surfaces and friable materials should be covered.
- Sufficient toilets at active work areas should be provided for staff and workers and these should be serviced regularly by a competent and suitably qualified person.
- As part of overall ESMS, the Project should develop and implement a Spill Prevention, Control and Containment Procedure, which ensures that a process for rapid and efficient response to and management of hazardous materials spill is developed. Furthermore, this process should define the procedures for handling hazardous materials/chemicals in a manner that does not impact the environment.
- Contractors and applicable Project staff should be trained regarding proper methods for transporting, transferring and hazardous substances that have the potential to impact water resources.
- Areas where spillage of contaminants occurs should be excavated (to the depth of contamination) and suitably rehabilitated. If any other minor spillage occurs, it should be cleaned immediately, and the contaminated area should be rehabilitated. All contaminated material should be suitable disposed of.
- The washing of Project vehicles in any surface water bodies in and around Project site(s) will be strictly prohibited. All Project vehicles should be washed at designated washbays on site/s. These wash bays will include oil/grease and sediment traps for grey water.
- The Project should prevent any ad-hoc maintenance of vehicles/equipment in and around the Project site(s). All vehicles/equipment should be maintained at a designated workshop. The workshop will include an oil/grease trap.
- All active work areas should be maintained in a good and tidy condition; debris and waste should be contained in such a way that they cannot become entrained into surface run during periods of heavy rain.
- At this stage the method associated with the management of sewage has been considered by taking over by a licensed contractor and be disposal for appropriate treatment. A wastewater treatment plant and a licensed contractor have not yet been determined. This will be determined by the EPC Contractor prior to commencement of construction activities. This method should ensure zero discharge of raw sewage to the environment, and if treated sewage is discharged into the environment, then this should conform the specific standards prior to discharge.

- Hazardous waste storage areas should be provided with secondary containment. Moreover, hazardous waste should be stored in sealed/covered containers to prevent rainwater intrusion.
- All dangerous and hazardous material stores and handling areas should be provided with secondary containment capable of holding 110% of the total capacity of all tanks/vessels.
- The loading and unloading of dangerous and hazardous material should be confined to areas that are provided with secondary containment and in line with hazardous material handling procedures.
- During operational phase, when possible, those areas around WTGs should be grassed to minimise runoff.

Mitigation measures to address Impact on Water Quantity / Water Abstraction (groundwater and surface water resources):

- Abstraction of surface water will potentially affect the grazing potential within the river meadow area during the dry periods, as well as the availability of water in wells as a result of groundwater drawdown, the radius of which may be relatively wide given the low soils and phreatic waters on the surface that are predominantly on the Project site(s).
- Before groundwater is selected as a source of water for the Project, a thorough assessment should be conducted on water availability and vulnerability in and around Project site(s). These studies should be undertaken by a suitably qualified specialist and should ensure that the design of the Project water supply scheme is such that it minimises and avoids abstraction rates beyond the safe yield volume and subsequent impacts to sensitive social receptors.
- Abstraction from surface water should be avoided.
- Operation and management of water abstraction should be undertaken in such a way that the rate of abstraction is monitored against safe yield abstraction rates.
- The Project should develop and implement a Grievance procedure in the event of any water reduction and subsequent water availability complaints being received.

7.1.5.5 Residual Impact

The residual adverse impacts on water resources (groundwater and surface water), after application of mitigation measures, are anticipated to be of minor significance during construction, and of negligible significance during both the operation and decommissioning phases, as presented in the table below.

Table 7-68 Pre- and Post-mitigation: Construction impacts on water resources (groundwater and surface water)

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Water Quantity (groundwater and surface water resources)	Construction	Moderate	Minor
Water Quality (groundwater and surface water resources)	Construction	Moderate	Minor
Water Quality (groundwater and surface water resources)	Operation	Minor	Negligible

Water Quality (groundwater and surface water resources)	Decommissioning	Minor	Negligible
---	-----------------	-------	------------

7.1.6 Solid Waste and Wastewater Management

7.1.6.1 Introduction

This chapter assesses Vifor Project' expected generation of solid waste and wastewater during the construction and operational phases. It does not consider the significance of impacts with respect to a specific receptor (i.e., soil or groundwater quality); as such, impacts to soil or groundwater quality with respect to solid waste and wastewater have been assessed in the respective Geology and Soil (section 2.1.4), and Water resources (Groundwater and Surface water, section 2.1.5) sections of this ESIA.

The primary purpose of this chapter is to identify specific management measures with regard to solid waste and wastewater generation as result of the Project. These measures can be adopted in the construction and operational phases ESMS' in order to ensure compliance with applicable regulations and standards.

Area of Influence (Aol)

The Area of Influence for solid waste and wastewater generation and management is represented by the direct environment and social Aol, understood as the study area for the environmental and socio-economic impacts, which comprises:

- Project's permanent and temporary sites, components and facilities, and
- all settlements on the administrative territorial units of Costești, Gherăseni, Smeeni, Luciu and Țintești communes, potentially impacted by the Project, as well as
- any other areas that could be affected during the construction and Operational Phases, located in an up to 2 km buffer from the WTGs.

Solid Waste Management

Waste collection, transportation, disposal and management in the Project area (indirect Aol) are provided by several waste management operators that work at the local public administration level, as follows:

- RER Sud SA for Pogoanele town and Luciu Commune,
- Sanitation Service of the Local Councils for Costești and for Gherăseni Communes, and
- Smeeni Town Hall for Smeeni Commune.
- The only solid waste landfill in the region is the RER Sud Vadu Pasii landfill, located east of Buzău City, where there is also a waste sorting and recycling station. A new landfill is being developed in Poșta Câlnău, north of Buzău City.

Wastewater Management

Similar to the solid waste management in the Project area, there are two functional wastewater treatment facilities (WWTP) with tertiary treatment in the entire area, represented by Buzău City

WWTP and Pogoanele town WWTP. At local level, there is one functional water and sewerage system with a secondary stage WWTP in Gherăseni Commune, and for each of the Smeeni, Luciu and Costești Communes and villages being developed water and sewerage systems including secondary stage WWTPs.

7.1.6.2 Potential Impacts

Inadequate Waste and Wastewater Management

Construction of Vifor windfarm will involve activities that generate solid hazardous and non-hazardous waste, as well as potential wastewater (liquid wastes) resulting mainly from sanitary waste streams. Waste and wastewater generated during these activities poses a threat to the soils, and secondary to surface and underground waters. Of particular concern is the management of hazardous waste generated during the construction phase and its handling.

Although the hazardous fraction of construction waste such as used oil, equipment and machinery lubricants and paints, etc. will represent a very small proportion of the total amount of construction waste it will, however, require special attention for management and disposal.

Concrete washout water will be highly alkaline and may contain traces of heavy metals such as chromium. Inadequate management of the concrete washout area can pose a risk of contaminating the soil and leaching into the ground leading to groundwater contamination especially during the rainy season.

If the temporary storage and handling of such waste on the construction sites is inadequate prior to being removed for disposal, the risk of soil and potentially indirect effects to groundwater quality increases. Potential environmental impacts arising from the generation of hazardous waste are covered below.

Operation of Vifor windfarm will involve activities that may potentially have impacts onto soil, groundwater and surface water, likely to have an insignificant impact on soil and water quality and quantity.

Table 7-69 Solid Waste and Wastewater Management Impacts by Project Phase

Phase	Potential activities	Potential impacts	Potential consequences	Receptors
Construction phase	- Waste and wastewater management from construction activities and workers activities	- Degradation of soil and water due to hazardous and non-hazardous waste discarded on the environment.	- Reduction in flows and water levels of surface and groundwater due to water use for dust control, concrete production, use as drinking water, - Alteration of underground water	- Soil, - Surface and Groundwater, - Flora and Fauna, - Human environment.
	- Operation of associated facilities, such as the concrete batching station	- Untreated wastewater returned to local water courses disrupting and		
	- Hazardous waste storage and handling			

	- Accidental spills and leaks associated with decommissioning	degrading aquatic environments. - Toxicity impact on fauna and flora.	flow systems by excavation activities, - Aquatic ecology is affected due to increase of turbidity and pollution, - Decreased quality of soil, surface water and groundwater.	
Operational phase	- Wastewater storage and handling	- Insignificant impact on soil and water quality and quantity		
	- Domestic waste storage and handling			
	- Hazardous waste storage and handling			
Decommissioning phase	- Dismantling of equipment and land restoration works	- Insignificant impact on soil and water quality and quantity		
	- Waste and wastewater management from construction activities and workers activities			
	- Hazardous waste storage and handling			
	- Accidental spills and leaks associated with decommissioning			

7.1.6.3 Assessment of impacts:

Construction Phase

Solid Waste

During construction of Vifor windfarm, waste will be generated by earthworks, concrete foundation works, construction of 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 Vifor windfarm will include the following:

■ **Non-hazardous waste, such as:**

- Waste related to construction processes, including earthworks (such as rubble, soils and potentially rock), installation (such as bolts, rebars, etc);
- Paper/cardboard, plastics, packaging, plastic bottles, glass, scrap metal, excess fill materials, sand, gravel, ballast, excess construction materials, concrete, subsoil and rock (not contaminated);
- Domestic waste generated by the construction workforce (e.g. food/organic waste, paper trash, cardboard, aluminium, plastic).

■ *Hazardous waste, such as:*

- Batteries (unused), chemical drums, aerosol cans, contaminated metals, empty containers, expired and unused chemicals, adhesives, machinery lubricants, clean-up materials such as rags, containers and tins (with remains of hazardous substances), used spill kits and clean-up materials;
- Replacement parts from vehicles, and equipment such as tyres – specific to the windfarm;
- Residual materials from electrical equipment installation, such as Waste Electrical Equipment (WEE).

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 Solid Waste*

Non-hazardous construction 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 Solid Waste*

Due to the nature of the project and the proposed construction works, there will be a few hazardous materials used. Such materials 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, as assessed in the Geology and Soil, and Water resources (Groundwater and Surface water) Chapters of this ESIA.

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 Buzau to identify licensed waste disposal sites and licensed waste collectors.

Solid waste streams likely to be associated with the construction phase of the Project are listed in the table below.

Table 7-70 Anticipated Solid Waste types associated with the Construction Phase

Type	Waste Stream
Inert	Subsoil and Rock
	Glass
Non-Hazardous	Concrete and cement
	Asphalt
	Scrap metal
	Wood
	Plastic
	Packaging
	Municipal waste from construction workers
	Contaminated soil/asphalt
Hazardous	Resins and paints
	Waste oils
	Waste solvents and thinners
	Waste fuel and chemicals
	Batteries
	Used spill kits and clean up materials
	Waste Electrical Equipment (WEE)

Wastewater

Wastewater generated from construction activities of Vifor Wind Farm will include the following:

- Sanitary and domestic wastewater generation;
- Wastewater from washing and cleaning of vehicles or equipment;
- 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 & domestic wastewater can be estimated as an average of 0.1m³/person/day (100 litres). Assuming an estimated number of construction workers at the windfarm during peak periods between 600 - 700 personnel, sanitary wastewater is estimated to total 60m³ - 70m³ at peak periods of construction.

Improper handling, storage and transportation of sanitary and domestic wastewater could potentially cause contamination to soil or groundwater resources; as assessed in the Geology and Soil, and the Water resources (Groundwater and Surface water) Chapters of this ESIA.

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.

Operational Phase

The operational phase of Vifor Wind Farm 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. An estimated number of about 40-60 operation and maintenance personnel is expected for the operational phase, 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 directly from toilets and kitchen facilities in the administrative area. All sanitary streams will be directed to the septic tank for collection and disposal by a licensed contractor.

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, which have been assessed for significance in the Geology and Soil, and Water resources (Groundwater and Surface water) Chapters of this ESIA Report.

Decommissioning Phase

During decommissioning of the wind farm, for a period of approx. 4-6 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 PR3 on Resource Efficiency and Pollution Prevention and Control.

7.1.6.4 Mitigation Measures

The major waste and wastewater mitigation and management approach considered for the Project was focused on:

- Waste Characterization management measure,
- Waste Management Hierarchy measure,
- Construction Phase mitigation and management measures,
- Operational 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 Vifor Project, waste has been considered classified into three main categories, as defined in the Table below.

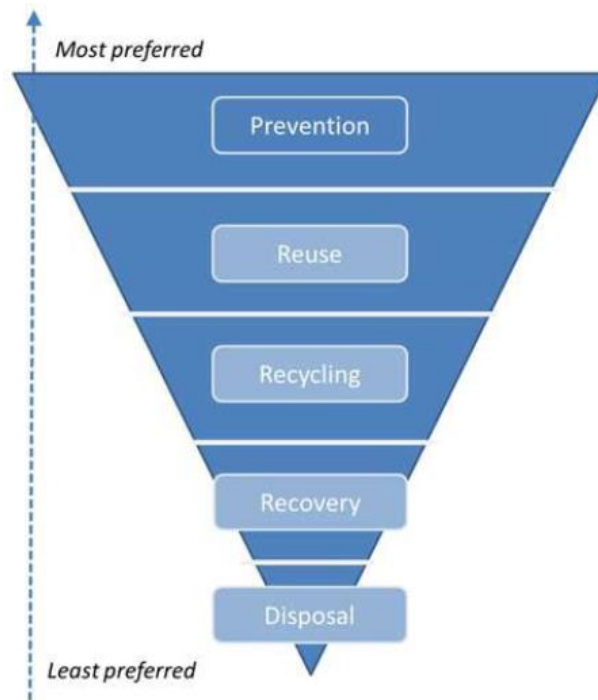
Table 7-71 Waste Characterization

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 7-24 Waste Hierarchy

Source: United Nations Environment Programme, 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

Figure 7-25 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	<ul style="list-style-type: none"> - The project will develop and implement a Project specific Construction Waste Management Plan (CWMP) 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.

	<ul style="list-style-type: none"> - 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. - 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 Buzau County or in the the region in order to implement the recycling of waste.
Inappropriate/uncontrolled handling, storage, transport and/or disposal of solid hazardous waste	<ul style="list-style-type: none"> - 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 signed and labeled 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	<ul style="list-style-type: none"> - Contractor to develop and implement a Project specific Construction Waste Management Plan (CWMP) 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.

	<ul style="list-style-type: none"> - 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.
Inappropriate handling and disposal of contaminated soil from clearing and excavation works causing cross-contamination of soils	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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.

Operational Phase Mitigation and Management Measures

Figure 7-26 Waste & Wastewater Mitigation and Management Measures – Operational Phase

Impact/Source	Mitigation and Management Measures
Inappropriate handling, storage, transport and disposal of non-hazardous solid waste	<ul style="list-style-type: none"> - Contractor to develop and implement a Project specific Operational Waste Management Plan (OWMP) 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.

	<ul style="list-style-type: none"> - 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. - 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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.

7.1.6.5 Residual Impact Significance

The residual adverse impacts of Solid Waste and Wastewater Management, after application of mitigation and management measures, are anticipated to be of minor significance during construction, and of negligible significance during both the operation and decommissioning phases, as presented in the Table below.

Figure 7-27 Pre- and Post-mitigation: Inadequate Waste and Wastewater Management during Construction, Operation and Decommissioning Phases

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Inadequate Waste and Wastewater Management	Construction	Moderate	Minor
Inadequate Waste and Wastewater Management	Operation	Minor	Negligible
Inadequate Waste and Wastewater Management	Decommissioning	Minor	Negligible

7.1.7 Biodiversity and Protected Areas

The full assessment of the impacts on biodiversity is presented in *Appendix D* of this ESIA Report. The Appendix presents the ecological baseline description and the ecological impact assessment of the Project and defines mitigation measures. The sections below summarise the findings of this assessment.

A number of ecological features were screened out of assessment as significant effects were determined to be highly unlikely. These included:

Flora - due to the modified nature of the landscape, field surveys only recorded the presence of common species with no conservation status, therefore impacts on this group were screened out for further assessment;

Mammals – due to their high conservation status the Eurasian Otter *Lutra lutra* and the European Souslik *Spermophilus citellus* were the only mammals assessed. Common and widespread species would not be affected at anything other than the purely local level and were excluded. Golden jackal *Canis aureus*, European roe deer *Capreolus capreolus* and the southern water shrew *Neomys anomalus* that are listed as Vulnerable or/and Endangered at national level in the Red Book of Vertebrates from Romania. These were excluded from further assessment as , due to the outdated nature of the assessment in the red book, the absence of any EU listing under Annex II or IV, and the low likelihood of effects on any of the species.

Invertebrates: The focal species, Large copper *Lycaena dispar*, was not found by baseline surveys. The southern festoon *Zerynthia polyxena*, was observed in the study area but not within the development footprint, and no direct or indirect pathway of effect exists with the population location. Invertebrates were therefore screened out of further assessment.

Ecosystem services: the land purchased or leased for the wind farm is almost entirely modified agricultural habitat, and the small area used for the wind farm footprint will have no significant effect on crop or livestock production. There are no significant dependencies by local communities on the ecosystem services affected by the project, nor is the project significantly dependent on any ecosystem services within the study area.

Table 7-72, Table 7-73 and Table 7-74 present a summary of biodiversity impacts during construction, operation and decommissioning, respectively. As different ecological receptors differ in their sensitivity, both in terms of conservation status and capacity to respond to the impacts, the table identifies the significant effects for each main receptor.

Table 7-72 Biodiversity Impacts - Construction

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
Designated and Protected Areas				
C1	Habitat Loss / Degradation / Fragmentation	Moderate	<ul style="list-style-type: none"> Implement construction standards; Reinstate temporary land take to original use; Avoid locating construction camps near identified natural or semi-natural habitat; Utilise existing roads wherever possible. 	Minor
Habitats				

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
C2	Habitat Loss / Degradation / Fragmentation Introduction/Spread of Invasive Species	Moderate	<ul style="list-style-type: none"> Implement construction standards; Avoid locating construction camps near identified natural or semi-natural habitat; Post-construction habitat restoration plan; Use existing access roads or upgrade existing roads wherever possible before considered new access road construction; Place appropriate limits on the number of vehicle movements to and from the wind farm; Restrict vehicles to the use of only authorized access roads. Compile a suitable Invasive Alien Plant (IAP) species control plan and programme to manage IAP's within the control of the development; For residual permanent natural habitat loss identify areas for restoration and habitat creation, and produce restoration plan identifying where restoration/creation will be undertaken, and how. 	Negligible
Birds				
C3	Habitat Loss / Degradation / Fragmentation Noise and Vibration Disturbance Direct Mortality Installation of overhead transmission line and pylons	Moderate	<ul style="list-style-type: none"> Buffers around important nesting or foraging sites to minimize disturbance; Avoid site clearance during the breeding season.; Noise controls; Pre-construction surveys; Install bird diverters; Install avian protection devices on electrical equipment; 	Negligible
Bats				

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
C4	Habitat Loss / Degradation / Fragmentation Direct mortality	Moderate	<ul style="list-style-type: none"> Pre-construction surveys; Lighting controls; Noise controls; Buffers around bat roosts Adjusting construction schedules to avoid sensitive periods; 	Negligible
Mammals				
<i>Spermophilus citellus</i>				
C5	Habitat Loss / Degradation / Fragmentation. Direct loss of species.	Major	<ul style="list-style-type: none"> Pre construction surveys; Buffers around sensitive habitat; Implement construction protocols; Monitoring program during construction; Undertake licenced translocation where precautionary working methods cannot prevent disturbance; 	Negligible
C6	Noise and vibration	Moderate	<ul style="list-style-type: none"> Buffers around active burrows; Noise controls; 	Negligible
<i>Lutra lutra</i>				
C7	Habitat Loss / Degradation / Fragmentation Water Quality Noise and Vibration	Moderate	<ul style="list-style-type: none"> Pre construction surveys; Avoidance measures; Buffers around Călmățui River, Implement best management for river crossings (SEPA 2010); Noise controls. 	Negligible
Herpetofauna				
C8	Habitat Loss/ Degradation / Fragmentation	Major	<ul style="list-style-type: none"> Pre-construction surveys; Implement best management for river crossings (SEPA 2010). 	Negligible
C9	Noise and Vibration Disturbance Water pollution Direct mortality	Moderate	<ul style="list-style-type: none"> Buffers around sensitive habitat; Noise controls; Pollution controls, including reporting , management and emergency response; 	Negligible

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
			<ul style="list-style-type: none">• Water quality testing;• Capture and removal to suitable habitat;• Mitigation awareness and training for workforce.	

Table 7-73 Biodiversity Impacts – Operation

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
Designated and Protected Areas				
O1	Species distribution and abundance Collision Risk	Major	<ul style="list-style-type: none"> Post construction fatality monitoring; Develop management plan; Implement monitoring programs to assess the effectiveness of mitigation measures; Monitor effects of displacement. 	Negligible.
Habitat				
O2	Habitat Degradation / Fragmentation	Negligible	<ul style="list-style-type: none"> N/A. 	Negligible
O3	Invasive Alien Species	Moderate	<ul style="list-style-type: none"> Implement monitoring program; Establish protocols to minimize introduction of invasive alien species; 	Negligible
Mammals				
<i>Spermophilus citellus</i>				
O4	Habitat Degradation / Fragmentation Noise and Vibration Electrocution Risks	Moderate	<ul style="list-style-type: none"> Implement crossings strategy ahead of construction; Implement habitat restoration; Noise control; Post-construction monitoring; Implement adaptive management plan; Implement insulated covers on power lines; Conduct regular inspections and maintenance. 	Negligible
<i>Lutra lutra</i>				
O5	Habitat Degradation / Fragmentation Disturbance and Stress	Moderate	<ul style="list-style-type: none"> Implement habitat restoration; Noise controls; Develop protocols minimize human presence and vehicle. 	Negligible
Birds				
O6	Species Collision with Wind Turbines	Major	<ul style="list-style-type: none"> Implement post-construction fatality monitoring; 	Negligible

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
			<ul style="list-style-type: none"> Develop adaptive management plan; Implement monitoring programs to assess the effectiveness of mitigation measures; Implement appropriate lighting systems. 	
	Displacement	Moderate	<ul style="list-style-type: none"> Utilize low-noise wind turbine designs; Noise controls; Implement advanced turbine foundation designs that minimize vibration transmission to the surrounding environment; Implement appropriate lighting systems; Establish bird monitoring program; Implement adaptive management. 	Negligible
O7	Mortality through electrocution on distribution lines	Major	<ul style="list-style-type: none"> Installing bird flight diverters; Post-construction fatality monitoring; Ensure bird safe pylon design. 	Negligible
Bats				
O8	Direct mortality a. Collision risk b. Barotrauma	Major	<ul style="list-style-type: none"> Post construction fatality monitoring; Develop adaptive management plan; Curtailment protocols; Implement lighting systems that minimize attraction of bats; Post construction bats monitoring. 	Negligible

Table 7-74 Biodiversity Impact Assessment – Decommissioning

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
Designated and Protected Areas				
D1	Disturbance	Moderate	<ul style="list-style-type: none"> Pre-decommissioning surveys; Schedule decommissioning activities during periods of low biological sensitivity; Noise controls; Implement monitoring programs to assess the effectiveness of mitigation measures 	Negligible
Habitats				
D2	Habitat expansion and restoration	Minor Positive	<ul style="list-style-type: none"> Develop a comprehensive habitat enhancement plan 	Minor Positive
D3	Introduction/Spread of Invasive Species	Moderate	<ul style="list-style-type: none"> Implement measures to prevent the spread of invasive species; Develop and implement measures to control and manage invasive plant species 	Negligible
Birds				
D4	Direct Mortality Disturbance and displacement	Moderate	<ul style="list-style-type: none"> Buffers around nesting, foraging sites or sensitive habitats; Avoid site clearance during breeding season; Consider using deterrents, such as visual markers or sound device. 	Negligible
Bats				
D5	Direct Mortality	Moderate	<ul style="list-style-type: none"> Buffer zones around sensitive bat habitats; Pre-decommissioning checks for bat roosts in and adjacent to decommissioning areas; Schedule activities during daylight hours; 	Negligible
D6	Disturbance and displacement	Negligible	<ul style="list-style-type: none"> Buffers around sensitive bat habitats; Implement exclusion zones; Minimize artificial lighting during nighttime and “use bat-friendly” lighting fixtures. 	Negligible
Mammals				

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
<i>Spermophilus citellus</i>				
D7	Habitat Loss/ Fragmentation Disturbance and displacement Direct mortality	Moderate	<ul style="list-style-type: none"> Identify and protect important souslik habitat; Develop a habitat restoration plan; Implement wild-friendly structures to facilitate safe movement across decommissioned areas; Buffer zones around <i>Spermophilus citellus</i> colonies; Noise controls; Implement protocols to minimize human presence and traffic; Surveys to identify active burrows and colony location; Mark known borrows or colonies; Implement careful clearance procedures. 	Negligible
<i>Lutra lutra</i>				
D8	Habitat Loss/ Fragmentation Disturbance and displacement Water Quality and Pollution	Moderate	<ul style="list-style-type: none"> Identify and protect important habitat areas; Implement a habitat restoration plan; Buffers zones around sensitive habitat; Noise controls; Implement protocols to minimize human presence and traffic; Erosion and sediment control; Use appropriate containment system; Monitor water quality parameters; 	Negligible
Herpetofauna				
D9	Disturbance and displacement Migration and Movement	Moderate	<ul style="list-style-type: none"> Buffer zones around sensitive habitats; Noise controls; Implement protocols to minimize human presence and traffic; Movement corridors, Design and install structures, to facilitate safe movement across roads or barriers. 	Negligible

After the application of mitigation, and subject to verification through a programme of post construction fatality monitoring and adaptive management plans for birds and bats, no significant residual impacts for biodiversity are anticipated. The cumulative impact assessment indicates that existing mitigation is sufficient to prevent significant residual impacts in relation to other plans and projects in the region.

7.1.7.1 Collision Risk Modelling

A Collision Risk Modelling (CRM) was provided based on the Vantage Point Data collected from February 2022 to March 2023 in order to estimate the number of birds likely to collide with turbines at Vifor proposed Wind Farm.

A brief summary is provided in this section, hence the full assessment of collision risk on birds is presented in Appendix F of this ESIA Report.

The CRM report contains the methods and results of modelling for 15 bird species and subsequently Potential Biological Removal (PBR) calculations for 8 bird species.

The 15 species that were identified as being relevant either on the basis of their conservation status and/or collision risk – as shown in table 7-75:

Table 7-75 Estimated Annual Mortality of Species in the Vifor Wind Farm Array

Latin Name	English Common Name	SNH recommended avoidance rate	Estimated mortality (0% avoidance)	Estimated mortality (with avoidance)	Years per estimated bird mortality (with avoidance)
<i>Anas crecca</i>	Eurasian teal	98.0%	73.69	1.474	0.7
<i>Anas platyrhynchos</i>	Mallard	98.0%	426.28	8.526	0.1
<i>Anser albifrons</i>	Greater white-fronted goose	99.8%	33.03	0.066	15.1
<i>Buteo buteo</i>	Common buzzard	98.0%	13.633	0.273	3.7
<i>Ciconia ciconia</i>	White stork	98.0%	85.12	1.702	0.6
<i>Circus cyaneus</i>	Hen harrier	99.0%	0.51	0.005	194.4
<i>Egretta garzetta</i>	Little egret	98.0%	0.80	0.016	62.6
<i>Falco tinnunculus</i>	Common kestrel	95.0%	5.83	0.292	3.4
<i>Falco vespertinus</i>	Red-footed falcon	98.0%	2.25	0.045	22.2
<i>Glareola pratincola</i>	Collared pratincole	98.0%	2.73	0.055	18.3
<i>Numenius arquata</i>	Eurasian curlew	98.0%	1.30	0.026	38.5
<i>Pelecanus onocrotalus</i>	Great white pelican	98.0%	9.50	0.190	5.3
<i>Philomachus pugnax</i>	Ruff	98.0%	25.52	0.510	2.0
<i>Pluvialis apricaria</i>	European golden plover	98.0%	27.13	0.543	1.8

<i>Vanellus vanellus</i>	Northern lapwing	98.0%	14.57	0.291	3.4
--------------------------	------------------	-------	-------	--------------	-----

To assess the potential impact of the Vifor project on these species, collision risk modelling to estimate annual mortality as a result of the project was undertaken following the Band onshore model outlined in the Wind farm impacts on birds - Calculating a theoretical collision risk assuming no avoiding action guidance note (NatureScot, 2000). Species modelled for collision risk that were also IUCN European Redlist species above Least Concern, cited as qualifying interested in the Valea Călmățuiului SPA, and thought to be vulnerable to population effects as a result of collisions with Wind Turbine Generators (WTGs) were also input to a PBR calculation. Table 7-76 shows percentage of PBR estimated to be caused by this project.

Table 7-76 Potential biological removal results

Species	Estimated mortality (with avoidance)	CRM estimated mortality	Project proportion of PBR
<i>Ciconia ciconia</i>	0.6	1.702	0.005%
<i>Falco tinnunculus</i>	3.4	0.292	<0.0003%
<i>Falco vespertinus</i>	22.2	0.045	0.003%
<i>Glareola pratincola</i>	18.3	0.055	0.001%
<i>Numenius arquata</i>	38.5	0.026	<0.0003%
<i>Pelecanus onocrotalus</i>	5.3	0.190	0.011%
<i>Philomachus pugnax</i>	2.0	0.510	0.002%
<i>Vanellus vanellus</i>	3.4	0.291	0.001%

The results show that the project will have an estimated impact of maximum 0.011% of the total European PBR for Pelican, 0.005% of the total PBR for White stork, and 0.003% of the total PBR for Red-footed falcon. These when considered on a project only basis are unlikely to cause any population level effects, but should be considered as part of a cumulative analysis on European populations.

7.1.7.2 Critical Habitat Assessment

Separately from the Biodiversity Impact Assessment, a Critical Habitat Assessment (CHA) was made to identify critical and natural habitat requirements for net gain and no net loss. The Critical Habitat Assessment is based on IFC Performance Standard 6 2012 as updated in 2019 and EBRD Performance Requirement Guidance Note 6, 2022.

A brief summary is provided in this section, hence the full assessment of critical and natural habitats is presented in Appendix E of this ESIA Report.

The CHA undertaken for Vifor Wind Farm considered the following qualifying criteria:

- Screening of the biodiversity baseline data to identify any candidate Critical Habitat (CH) and/or Priority Biodiversity Features (PBF) regularly occurring in the study area. The study area encompassed the area affected by the Project's direct and indirect impacts i.e. the Area of Influence (AoI), and the surrounding landscape.
- Where candidates were identified, an Ecologically Appropriate Area of Analysis (EAAA) was defined. The EAAAs were mapped according to EBRD GN6, as supplemented with information from IFC PS6 (i.e. paragraph GN59).
- The criteria for CH / PBFs were applied to the EAAAs to determine whether each candidate qualified as such or not.

- Where CH or PBFs were confirmed present (or likely present), the implications for the Project under PR6 were then set out. This information was used to inform the Project's impact assessment process.

The following additional matters were also applied in accordance with EBRD PR6;

- *PR6 paragraph 12-iii: significant biodiversity features identified by a broad set of stakeholders or governments (including in this Report legally protected and internationally / nationally recognized areas of high conservation value);*
- *PR6 paragraph 12-iv: ecological structure and functions needed to maintain the viability of PBFs described in this paragraph; and*
- *PR6 paragraph 14-v: Areas associated with key evolutionary processes.*

After screening several species and running through the critical habitat qualifying criteria of EBRD PR6 and IFC PS6, it was determined that steppe habitat representative of 1530* Pannonic salt steppes and salt marshes habitat identified in the EAAA (which is an EU Priority Habitat Types listed in Resolution 4 of the Bern Convention), qualifies this habitat type as CH for the project. Critical habitat is also triggered for several species of small mammals, herpetofauna (amphibians and reptiles) and invertebrates listed in Annex IV of the EU Habitats Directive, with associated supporting habitat for these species being the steppe (grassland/wetland) and remaining mixed forests in the study area. As a result, biodiversity Net Gain (NG) in terms of CH needs to be achieved for the project and the following is recommended:

- Review of the key threats affecting the Pannonic steppe and salt marsh habitat and faunal species for which CH has been identified to inform further mitigation options;
- The Biodiversity Impact Assessment (BIA) section of the ESIA will describe measures to avoid and minimize impacts on CH (identified as the key steppe and salt marsh habitats and several species of mammals, bats, herpetofauna, invertebrates);
- The BIA will cover embedded mitigation and measures to be implemented as part of construction and operational activities;
- Consider possible habitat management enhancements or creation to achieve net gains at the scale of the EAAA;
- Monitoring and management is to be based on pre-established targets and goals using quantified data;
- Reviews at appropriate intervals will be needed to determine the success of habitat protection and/or enhancement measures; and
- The required measures to achieve NG (for CH) and NNL (for PBF) are to be addressed within a Biodiversity Action Plan (BAP) as required in terms of EBRD PR6 and IFC PS6.

In addition to CH, several species qualify as Priority Biodiversity Features (PBFs), consisting mainly of birds listed in the EU habitats/birds directives, but also small mammals, bats and herpetofauna. For the identified PBF species, biodiversity No Net Loss (NNL) will need to be achieved, including the habitat supporting these species (i.e. primarily the steppe habitat in the study area). This is likely to require focused mitigation around the habitats supporting these species and possible habitat enhancement to compensate for any impacts resulting from the Project on steppe habitats in the Project area. It is also recommended that the BAP consider appropriate mitigation measures that may be required for PBF species.

Another requirement will be ensuring No Net Loss (NNL) of other natural habitat in the project area, in line with the EBRD PR6 and IFC PS6 requirements, which include: avoidance of natural habitat loss/conversion or degradation, implementing mitigation measures to minimize habitat fragmentation, restoring habitats and Implementing biodiversity offsets as a last resort measure after considering all other options first.

Finally, the wind farm overlaps with identified legally protected areas, with the majority (60 of 71 turbines) being located within the Natura 2000 protected area. Therefore, the requirements in terms of paragraph 22 of EBRD Environmental and Social Policy PR6 (April 2019) apply to the Project. Paragraph 22 states that if the assessment identifies that the project has the potential to adversely impact the conservation objectives and integrity of the site, priority biodiversity features and/or critical habitat within the internationally recognised areas the client will seek to avoid such impacts. In addition, the client will need to ensure the following:

- demonstrate that the development is legally permitted, which may have entailed that a specific assessment of the project related impacts on the protected area has been carried out as required under national law;
- act in a manner consistent with any government recognised management plans for such areas;
- consult protected areas managements, relevant authorities, local communities and other stakeholders on the proposed project in accordance with EBRD PR10; and
- implement additional programmes as appropriate to promote and enhance conservation objectives of area.

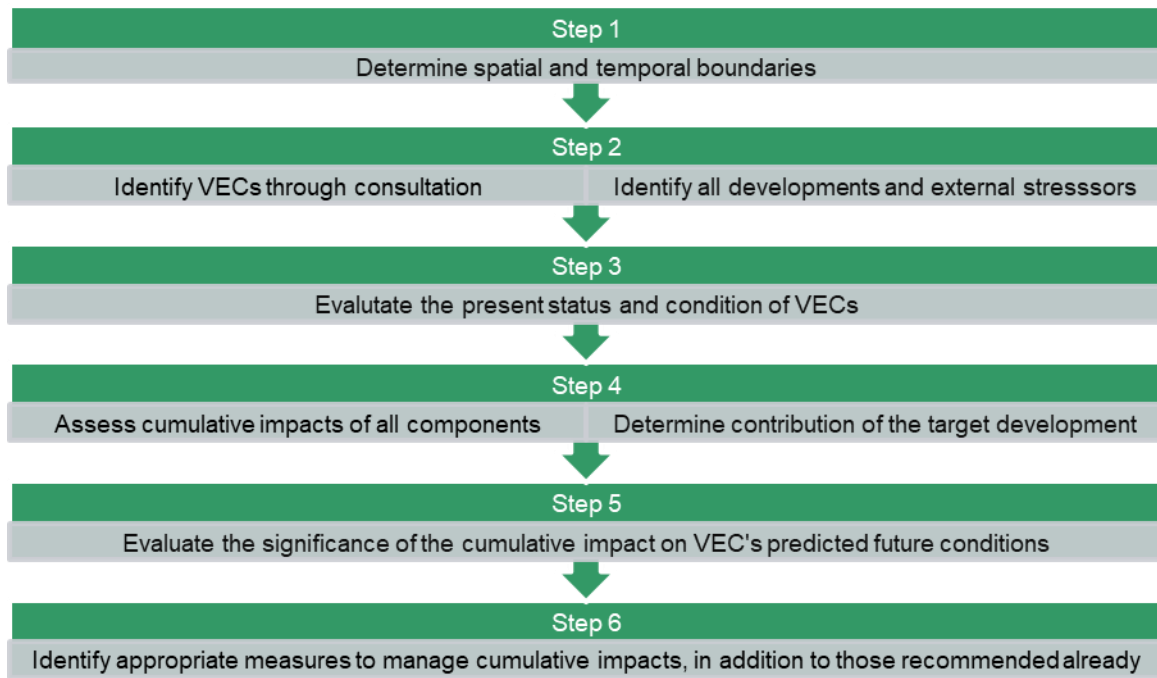
7.1.7.3 Cumulative Impact Assessment

Cumulative Impact Assessment (CIA) is a separate process from the Biodiversity Impact Assessment that is required to meet lenders requirements.

A brief summary is provided in this section, hence the full assessment of critical and natural habitats is presented in Appendix G of this ESIA Report.

The Cumulative Impact Assessment was guided by IFC's Performance Standard 1 (PS1):Assessment and Management of Environmental and Social Risks and Impacts and Standard Guidance Note 1 (GN1), in paragraph GN38.

Based on the guidance of IFC (2013), the approach to the CIA was undertaken in an iterative manner based on the recommended 6-step process, which included the following:

Figure 7-28 IFC's Six Step Approach to CIA

- The following aspects have been screened out of the CIA as the Wind Farm Project is not considered to be a significant risk or contributing factor to cumulative impacts:
- Other non-volant (ground dwelling) fauna;
- Flora;
- Natural habitat;
- Critical habitat;
- Aquatic ecosystems;
- Designated and protected areas.

The VECs that have been included in the CIA given the potential minor to moderate project level impact significance/risk which could be significant when considered in aggregation with other wind farm and transmission line development impacts and existing land uses in the Aol were avifauna (birds and bats) and non-volant fauna (small mammals & reptiles).

Birds

- Potential VEC bird species have been screened based on migratory status, conservation/threat status, key threats, habitat requirements/preferences and population trends, with species of conservation concern recorded in the Project area, with population trends that are generally decreasing (globally or in Europe) and birds at particular risk of collision and mortality in terms of the literature and known/observed bird behaviour in combination with the outcomes of the preliminary CRM in the context of wind farm development. Based on the VEC screening, none of the candidate species are considered priority VECs that could incur significant cumulative impacts as a result of the WF operation, from the perspective that these species are either:
 - are not particularly susceptible to wind farm collisions;
 - limited to very limited collision risk potential due to observed flight height and behaviour; or
 - the CRM predicts that significant detrimental population level effects based on Potential Biological Removal (PBR) are unlikely over the lifetime of the WF.

This is further supported by the findings of the biodiversity impact assessment, which predicts that in terms of the operational phase (when the greatest impacts to avifauna are likely to occur), that the wind farm is likely to have a negligible effect on bird species through direct mortalities should appropriate mitigation be effective in reducing initial risks.

List of VEC Birds: European Turtle – dove (*Streptopelia turtur*), Red-footed falcon (*Falco vespertinus*), Northern Lapwing (*Vanellus vanellus*), Eurasian Curlew (*Numenius arquata*), Rook (*Corvus frugilegus*), Merlin (*Falco columbarius*), Common quail (*Coturnix coturnix*), Ruff (*Philomachus pugnax*), Pallid Harrier (*Circus macrourus*).

Bats

Fatality threshold targets cannot be determined for priority bat VECs due to a lack of information on the regional size and status of these populations.

The findings of the biodiversity impact assessment for the ESIA, which predicts that in terms of the operational phase (when the greatest impacts to bats are likely to occur), that the wind farm is likely to have a potentially significant effect on bat species through direct mortalities should appropriate mitigation be ineffective in reducing initial risks and adaptive management be unsuccessful. Since local bat activity can change after WF construction, pre-construction studies have consistently proven to be poor predictors of the scale and magnitude of bat fatality impacts at species and population levels (Hein et al., 2013, Lintott et al., 2016). Given the constraints in determining bat fatality impacts prior to operation of the WF, it will be necessary to undertake further operational monitoring to validate cumulative operational impacts and to inform adaptive management if required.

List of VEC Bats: Western Barbastelle (*Barbastella barbastellus*), Giant Noctule (*Nyctalus lasiopterus*).

Small mammals and reptiles

During the baseline surveys, two threatened species of small mammal were recorded in the project area, including European Souslik (*Spermophilus citellus*, EN) and Eurasian Otter (*Lutra lutra*, NT). One threatened reptile species (European Pond turtle *Emys orbicularis*, NT) was recorded. *L. lutra* and *E. orbicularis* are both freshwater/aquatic species and given that impacts of the project on aquatic habitat are considered to be limited, it is unlikely that these species will be affected to a large extent.

In terms of the European Souslik (EN), whilst this candidate species was determined not to qualify the study area habitats as critical habitat, Souslik is still considered 'priority biodiversity' given its globally endangered threat status and presence within the Natura 2000 degraded steppe habitats in the Project area. The biodiversity impact assessment for the ESIA determined that the potential for direct loss of this species during construction is significant, and unmitigated, the wind farm development could potentially affect local Souslik populations negatively. However, with appropriate mitigation that aim to avoid entirely such direct impacts on Souslik populations, the post-mitigation impact is unlikely to be significant (negligible effect). Since baseline surveys revealed that the species was found to be confined mainly to canal embankments that are unlikely to be affected by construction (as the turbine infrastructure will be located away from these areas), this further substantiates the impact assessment findings.

In the context of a CIA, the incremental cumulative impact of a development under review is considered in terms of the following two scenarios:

- Scenario A: the anticipated future condition of the VECs when impacted only by the other developments in the future baseline.
- Scenario B: the anticipated future condition of the VECs taking into account both other developments and the Vifor WF Project, collectively.

The CIA was completed based on these scenarios and summarized in Table Table 7-77 Cumulative Impact Assessment Summary

VECs	Scenario A: Cumulative Impact of other developments and land uses	Scenario B: Contribution of Vifor WF to Cumulative Impact
1 Birds & Bats	Habitat loss and fragmentation effects: Cumulative habitat loss is a major regional trend due to a range of legacy impacts associated with	<ul style="list-style-type: none"> ■ <u>Impact contribution statement:</u> ■

VECs	Scenario A: Cumulative Impact of other developments and land uses	Scenario B: Contribution of Vifor WF to Cumulative Impact
	<p>land uses such as human settlement, agriculture and infrastructure development. What is probably the most important is the existing pressures by agricultural activities and the consequent loss of large areas of steppe and forest habitat for supporting key species, which has arguably reached an unacceptable threshold. Given that the habitat within the region represents a mixture of degraded natural habitat and agricultural land (under active or recent cultivation), the effects of further habitat loss due to multiple renewable energy projects (existing and planned) for birds and bats may not be considered very significant, as there will still remain alternative habitat in the broader Aol.</p> <p>Displacement and disturbance: Of particular concern can be the combination of multiple wind farm projects potentially displacing birds and bats in the region and affecting their flight, hunting, mating and breeding behaviour. This may be particularly significant for certain target species such as migrants and threatened bird species for example.</p> <p>Barrier effects to species movement: Barrier effects of multiple wind farms operating in close proximity and in combination could be of concern, particularly for migratory species, but there is limited existing information to indicate how significant this could be for the region. The cumulative effect of construction and operation of the proposed WFs could potentially, in the absence of mitigation, lead to an appreciable disturbance to flight paths habitually used by resident bats species, leading to potential displacement and changes in species behavior patterns at a local scale. This is likely to be exacerbated where placement of turbine infrastructure occurs within the areas of higher value to bat species, particularly key roosting, hunting and foraging sites (probably linked mainly to wooded habitat and edges). As bats are typically long-lived and have exceptionally low reproductive rates, fatalities of significant bat numbers could affect local populations of recorded species. A regional assessment of the effect of multiple wind projects on species migrations would be required to provide information to support further impact analyses.</p> <p>Collisions with turbines resulting in mortality: Existing and planned wind farms will likely increase the statistical chance of collisions as the network of turbines and grid connections grows in the region. The presence of several species such as raptors, waterfowl, large-bodied birds and bats known to be collision risk species in the region, including several threatened species, raises the concern that the potential cumulative effect of direct mortality could be considered a potentially significance impact.</p>	<ul style="list-style-type: none"> ■ Birds: The findings of the biodiversity impact assessment for the Vifor WF project ESIA predicts that in terms of the operational phase (when the greatest impacts to avifauna are likely to occur), that the wind farm is likely to have a relatively 'negligible' effect on bird species through direct mortalities by turbines/transmission lines should appropriate mitigation be effective in reducing key risks. Whilst threatened bird species may be affected negatively, but the CRM predicts that significant detrimental population level effects based on Potential Biological Removal (PBR) are unlikely over the lifetime of the WF. In light of these assessment outcomes, the WF project is therefore unlikely to contribute significantly towards cumulative impacts on populations of threatened bird species and other important birds from the perspective of the proximal Natura 2000 sites. ■ ■ Bats: The findings of the biodiversity impact assessment for the ESIA, which predicts that in terms of the operational phase (when the greatest impacts to bats are likely to occur), that the wind farm is likely to have a potentially significant effect on bat species through direct mortalities should appropriate mitigation be ineffective in reducing initial risks and adaptive management be unsuccessful. ■ Only Giant Noctule (NT globally) was identified as a VEC in terms of bat species and is considered to be at risk from wind turbine collision and mortality. This species may possibly utilize grassland/steppe habitat and where necessary the agricultural fields on the site for foraging, but in general, available literature on this species and others indicates they are more active and present foraging within dense wooded habitats (e.g. deciduous woodland, riverine forests and orchards) and associated clearings of forest/woodland, rather than open steppe and agricultural fields. There is no evidence of the use of the site as a migratory flyway for bats, such that mortalities due to collision are expected to be relatively few and therefore probably of limited significance for local bat populations. The contribution of the Vifor WF to cumulative risks on bat species populations is expected to be relatively minor.

VECs	Scenario A: Cumulative Impact of other developments and land uses	Scenario B: Contribution of Vifor WF to Cumulative Impact
	<p>Electrocution from transmission lines resulting in mortality: Whilst it is difficult to quantify this impact (with limited published information), available information suggests that residual bird interaction impacts with power lines can probably be effectively mitigated such that this is potentially of limited significance, but this is purely speculative at this stage as poorly planned electricity transmission infrastructure can have potentially disastrous effects on avifauna such as birds in particular. Bat species in the region are typically small bodied and less likely to be of electrocution risk.</p>	<ul style="list-style-type: none"> ■ ■ <u>Selected project ESIA information for informing the impact statement:</u> ■ ■ Birds: ■ No distinct migratory corridors were recorded in the Project area and the area is not considered a key wintering bird area based on the baseline survey findings for the ESIA. ■ Key bird species at risk of collision impact with the wind farm were screened. ■ Based on the VEC screening, none of the candidate species in are considered priority VECs that could incur significant cumulative impacts as a result of the WF operation, from the perspective that the majority of these species are not particularly susceptible to wind farm collisions, there is limited to very limited collision risk potential due to observed flight height and behaviour and/or the CRM predicts that significant detrimental population level effects based on Potential Biological Removal (PBR) are unlikely over the lifetime of the WF. ■ ■ Bats: ■ As bats are typically long-lived and have exceptionally low reproductive rates, fatalities of significant bat numbers could affect local populations of recorded species. ■ From the baseline surveys for the ESIA, there was no obvious evidence of autumn migration, with no evidence of the use of the project Aol as a migration flyway for bats. ■ Giant noctule, <i>Nyctalus lasiopterus</i> (globally VU), is considered to be at particularly high risk from wind turbine collisions and mortality based on information from EUROBATS concerning collision risk and flight height. This species of bat was therefore included as the primary bat species VEC. The other species of bat concerned have comparatively lower collision risk (Rodrigues <i>et al.</i>, 2014) based on observed flight heights and with lower reported bat fatalities in Europe (EUROBATS).
<p>2 Small Mammals (European Souslik)</p>	<p>A general trend of extensive cumulative losses of viable natural steppe habitat have already been documented for the 'Pannonian mixed forests' ecoregion, which was once covered by large tracts of oak-dominated forests, steppes, and lakes, due to a range of legacy impacts associated with land uses such as human settlement, agriculture and infrastructure</p>	<ul style="list-style-type: none"> ■ <u>Impact contribution statement:</u> ■ Field surveys in the study area indicate that <i>S. citellus</i> is confined mainly to canal embankments that are unlikely to be affected by construction (as the turbine infrastructure will be located away from these areas). As such, the contribution of the Vifor WF project to

VECs	Scenario A: Cumulative Impact of other developments and land uses	Scenario B: Contribution of Vifor WF to Cumulative Impact
	<p>development. Since the habitat within the region represents a mixture of degraded natural habitat and agricultural land (under active or recent cultivation), the effects of further habitat loss for European Souslik are not considered significant, as there will still remain abundant alternative habitat in the broader Aol. Additional habitat loss or fragmentation will be both temporary during the construction and decommissioning phases and permanent during the operational phase of multiple windfarms. The scale of total habitat loss is quite unlikely to be significant.</p>	<p>declines in regional Souslik populations is likely to be negligible at most.</p> <ul style="list-style-type: none"> ■ ■ <u>Selected project ESIA information for informing the impact statement:</u> <ul style="list-style-type: none"> ■ Despite not qualify the site as critical habits, European Souslik (EN) is still considered 'priority biodiversity' given its globally endangered threat status and presence within the Natura 2000 degraded steppe habitats in the Project area. ■ The biodiversity impact assessment for the ESIA determined that the potential for direct loss of this species during construction is significant, and unmitigated, the wind farm development could potentially affect local Souslik populations negatively. However, with appropriate mitigation that aim to avoid entirely such direct impacts on Souslik populations, the post-mitigation impact is unlikely to be significant (negligible effect).

As a result of the assessment of these two scenarios on the identified VECs it has been concluded that the Vifor Project is unlikely to be a major contributor to cumulative impacts to the VECs identified, and Project level mitigation measures recommended should be adequate for reducing residual impact significance to insignificant or minor levels.

For the VECs that were identified additional mitigation has been proposed and this will be captured into the relevant biodiversity management plan.

As part of the Cumulative Impact Mitigation Strategy, several broad mitigation measures shall 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.

, providing an indication of cumulative impacts of other WF development projects, historic impacts and current land use trends (under scenario A) and the relative contribution of the Vifor WF Project (under scenario B).

Table 7-77 Cumulative Impact Assessment Summary

VECs	Scenario A: Cumulative Impact of other developments and land uses	Scenario B: Contribution of Vifor WF to Cumulative Impact
1 Birds & Bats	<p>Habitat loss and fragmentation effects: Cumulative habitat loss is a major regional trend due to a range of legacy impacts associated with land uses such as human settlement, agriculture and infrastructure development. What is probably the most important is the existing pressures by agricultural activities and the consequent loss of large areas of steppe and forest habitat for supporting key species, which has arguably reached an unacceptable threshold. Given that the habitat within the region represents a mixture of degraded natural habitat and agricultural land (under active or recent cultivation), the effects of further habitat loss due to multiple renewable energy projects (existing and planned) for birds and bats may not be considered very significant, as there will still remain alternative habitat in the broader Aol.</p> <p>Displacement and disturbance: Of particular concern can be the combination of multiple wind farm projects potentially displacing birds and bats in the region and affecting their flight, hunting, mating and breeding behaviour. This may be particularly significant for certain target species such as migrants and threatened bird species for example.</p> <p>Barrier effects to species movement: Barrier effects of multiple wind farms operating in close proximity and in combination could be of concern, particularly for migratory species, but there is limited existing information to indicate how significant this could be for the region. The cumulative effect of construction and operation of the proposed WFs could potentially, in the absence of mitigation, lead to an appreciable disturbance to flight paths habitually used by resident bats species, leading to potential displacement and changes in species behavior patterns at a local scale. This is likely to be exacerbated where placement of turbine infrastructure occurs within the areas of higher value to bat species, particularly key roosting, hunting and foraging sites (probably linked mainly to wooded habitat and edges). As bats are typically long-lived and have exceptionally low reproductive rates, fatalities of significant bat numbers could affect local populations of recorded species. A regional assessment of the effect of multiple wind projects on species migrations would be required to provide information to support further impact analyses.</p>	<p>■ <u>Impact contribution statement:</u></p> <p>■</p> <p>■ Birds: The findings of the biodiversity impact assessment for the Vifor WF project ESIA predicts that in terms of the operational phase (when the greatest impacts to avifauna are likely to occur), that the wind farm is likely to have a relatively 'negligible' effect on bird species through direct mortalities by turbines/transmission lines should appropriate mitigation be effective in reducing key risks. Whilst threatened bird species may be affected negatively, but the CRM predicts that significant detrimental population level effects based on Potential Biological Removal (PBR) are unlikely over the lifetime of the WF. In light of these assessment outcomes, the WF project is therefore unlikely to contribute significantly towards cumulative impacts on populations of threatened bird species and other important birds from the perspective of the proximal Natura 2000 sites.</p> <p>■</p> <p>■ Bats: The findings of the biodiversity impact assessment for the ESIA, which predicts that in terms of the operational phase (when the greatest impacts to bats are likely to occur), that the wind farm is likely to have a potentially significant effect on bat species through direct mortalities should appropriate mitigation be ineffective in reducing initial risks and adaptive management be unsuccessful.</p> <p>■ Only Giant Noctule (NT globally) was identified as a VEC in terms of bat species and is considered to be at risk from wind turbine collision and mortality. This species may possibly utilize grassland/steppe habitat and where necessary the agricultural fields on the site for foraging, but in general, available literature on this species and others indicates they are more active and present foraging within dense wooded habitats (e.g. deciduous woodland, riverine forests and orchards) and associated clearings of forest/woodland, rather than open steppe and agricultural fields. There is no evidence of the use of the site as a migratory flyway for bats, such that mortalities due to collision are expected to be relatively few and therefore probably of limited significance for local bat populations. The contribution of</p>

VECs	Scenario A: Cumulative Impact of other developments and land uses	Scenario B: Contribution of Vifor WF to Cumulative Impact
	<p>Collisions with turbines resulting in mortality: Existing and planned wind farms will likely increase the statistical chance of collisions as the network of turbines and grid connections grows in the region. The presence of several species such as raptors, waterfowl, large-bodied birds and bats known to be collision risk species in the region, including several threatened species, raises the concern that the potential cumulative effect of direct mortality could be considered a potentially significance impact.</p> <p>Electrocution from transmission lines resulting in mortality: Whilst it is difficult to quantify this impact (with limited published information), available information suggests that residual bird interaction impacts with power lines can probably be effectively mitigated such that this is potentially of limited significance, but this is purely speculative at this stage as poorly planned electricity transmission infrastructure can have potentially disastrous effects on avifauna such as birds in particular. Bat species in the region are typically small bodied and less likely to be of electrocution risk.</p>	<p>the Vifor WF to cumulative risks on bat species populations is expected to be relatively minor.</p> <ul style="list-style-type: none"> ■ ■ <u>Selected project ESIA information for informing the impact statement:</u> ■ ■ Birds: ■ No distinct migratory corridors were recorded in the Project area and the area is not considered a key wintering bird area based on the baseline survey findings for the ESIA. ■ Key bird species at risk of collision impact with the wind farm were screened. ■ Based on the VEC screening, none of the candidate species in are considered priority VECs that could incur significant cumulative impacts as a result of the WF operation, from the perspective that the majority of these species are not particularly susceptible to wind farm collisions, there is limited to very limited collision risk potential due to observed flight height and behaviour and/or the CRM predicts that significant detrimental population level effects based on Potential Biological Removal (PBR) are unlikely over the lifetime of the WF. ■ ■ Bats: ■ As bats are typically long-lived and have exceptionally low reproductive rates, fatalities of significant bat numbers could affect local populations of recorded species. ■ From the baseline surveys for the ESIA, there was no obvious evidence of autumn migration, with no evidence of the use of the project Aol as a migration flyway for bats. ■ Giant noctule, <i>Nyctalus lasiopterus</i> (globally VU), is considered to be at particularly high risk from wind turbine collisions and mortality based on information from EUROBATS concerning collision risk and flight height. This species of bat was therefore included as the primary bat species VEC. The other species of bat concerned have comparatively lower collision risk (Rodrigues <i>et al.</i>, 2014⁹⁰) based on observed flight heights and with lower reported bat fatalities in Europe (EUROBATS).

⁹⁰ Rodrigues et al., 2014. EUROBATS Publication Series No 6: *Guidelines for consideration of bats in wind farm projects*.

VECs	Scenario A: Cumulative Impact of other developments and land uses	Scenario B: Contribution of Vifor WF to Cumulative Impact
2 Small Mammals (European Souslik)	<p>A general trend of extensive cumulative losses of viable natural steppe habitat have already been documented for the 'Pannonian mixed forests' ecoregion, which was once covered by large tracts of oak-dominated forests, steppes, and lakes, due to a range of legacy impacts associated with land uses such as human settlement, agriculture and infrastructure development. Since the habitat within the region represents a mixture of degraded natural habitat and agricultural land (under active or recent cultivation), the effects of further habitat loss for European Souslik are not considered significant, as there will still remain abundant alternative habitat in the broader Aol. Additional habitat loss or fragmentation will be both temporary during the construction and decommissioning phases and permanent during the operational phase of multiple windfarms. The scale of total habitat loss is quite unlikely to be significant.</p>	<ul style="list-style-type: none"> ■ <u>Impact contribution statement:</u> ■ Field surveys in the study area indicate that <i>S. citellus</i> is confined mainly to canal embankments that are unlikely to be affected by construction (as the turbine infrastructure will be located away from these areas). As such, the contribution of the Vifor WF project to declines in regional Souslik populations is likely to be negligible at most. ■ ■ <u>Selected project ESIA information for informing the impact statement:</u> <ul style="list-style-type: none"> ■ Despite not qualify the site as critical habits, European Souslik (EN) is still considered 'priority biodiversity' given its globally endangered threat status and presence within the Natura 2000 degraded steppe habitats in the Project area. ■ The biodiversity impact assessment for the ESIA determined that the potential for direct loss of this species during construction is significant, and unmitigated, the wind farm development could potentially affect local Souslik populations negatively. However, with appropriate mitigation that aim to avoid entirely such direct impacts on Souslik populations, the post-mitigation impact is unlikely to be significant (negligible effect).

As a result of the assessment of these two scenarios on the identified VECs it has been concluded that the Vifor Project is unlikely to be a major contributor to cumulative impacts to the VECs identified, and Project level mitigation measures recommended should be adequate for reducing residual impact significance to insignificant or minor levels.

For the VECs that were identified additional mitigation has been proposed and this will be captured into the relevant biodiversity management plan.

As part of the Cumulative Impact Mitigation Strategy, several broad mitigation measures shall 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.

7.2 Social Impact Assessment

7.2.1 Livelihood

7.2.1.1 Introduction

More than two hundred farmers are currently leasing pastureland across the Aol in the five administrative territorial units (ATU) where the Project is to be implemented.

This section addresses potential economic displacement impacts caused by land acquisition or restrictions on pastureland and agricultural roads, resulting in loss of assets and/or means of livelihood, regardless of whether or not the affected people are physically, displaced.

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. Furthermore, road closures or associated works are likely to affect access to farmland.

7.2.1.2 Potential impacts

Economic displacement results from an action that interrupts or eliminates people's access to productive assets, even without physical displacement (IFC PS5).

Potential livelihood impacts are to be expected during construction stage. Approx. 133 ha are expected to be impacted by construction works, displacing the respective land area from the grazing surface available prior to the Project.

Table 7-78 Potential impacts land-related impacts by Project's phase

Project phase	Potential Impact
Construction	Loss of income associated with grazing activities

Similar impacts will be experienced during decommissioning, however it is not possible to assess impacts to land use at this stage because there is insufficient information about the decommissioning activities. The Project will assess impacts and opportunities associated to decommissioning on the basis of detailed plans and updated socioeconomic baseline. The assessment will also need to consider legal requirements in force at that time and feedback from ongoing engagement with local communities and stakeholders. The Project will aim to identify post-closure land use through engagement with the local stakeholders. As the Project closes, Project facilities would be removed, terrain would be restored, and the land would be revegetated to comparable prior conditions.

Impacts during Construction

Loss of income associated with grazing activities

The project area is located on pastureland owned by the Local Councils of the five ATUs, who collectively benefit from approximately 6,000 ha of pastureland, most of it being in private property. The pastureland taken by the Project may have an impact on the income, living standards, and livelihood of people who depend on resources located in, on or around that land.

For example, a shepherd may lose a portion of its currently allocated pastureland to the Project for one – two years depending on the duration of the works in the particular area. Depending on the size of their herd, the loss of access to even a portion of land may reduce the overall productivity of that farm for the duration of at least one year.

KII conducted during the ERM Field Survey in Apr – May 2023 confirmed that all the pasture is leased to local farmers (exception is Gheraseni Commune, where 100 ha of pastureland is currently available

for leasing due to lack decreasing interest from farmers). In Smeeni, approximately 124 animal breeders are registered. In Luciu all the 47 registered animal breeders are organised in a farming association that is leasing and using the Luciu pasture, with an estimated number of 8000 of sheep.

Several KII included discussions on the fact that the pastureland is providing the required nourishment for only three months (Apr – Jun) in the last few years, due to registered drought and that some shepherds may not supplement sufficiently leading to concerns for animal welfare; further reduction of the available pastureland will exacerbate this issue.

Between the 1st of March and the 15th of April, farmers apply to The Agency for Payments and Intervention for Agriculture (APIA), who allocates subsidies of cca. 200 – 250 Eur /ha of permanent pasture outside the stabulation period (15 Nov until the week before Orthodox Easter - next is 05 May 2024). APIA implements a satellite detection system and applies sanctions if the land is not managed in line with the Payment Claims made by 1st of March and 15th of May for the respective agricultural year:

- if more than 30% deviation is resulting from APIA's monitoring, all subventions are denied for 3 years, for all categories;
- if less than 30% - then the amount of subvention deduction is calculated based on the undeclared area.

Lack of timely coordination between the Client and the Local Councils in relation to the exact surfaces that will be impacted by construction works can lead to farmers being fined and/ or risking to lose all their subsidies for a period of 3 years. The penalty would apply for all the subsidies received by the respective farmer, including those received for arable plots. This situation would endanger the sustainability of every agricultural enterprise, in particular that of smaller farmers.

The sensitivity of land users (shepherds) to Project land take is considered medium. While livelihoods/ subsistence activities depend on access to and use of pastureland, there are still ample areas that will remain available for grazing around the active construction sites, given the works will be adequately secured and fenced to avoid accidents involving the animals or generating damage to equipment.

Farmers with particularly low incomes and high land dependency for subsistence and income generation will be the most vulnerable to this impact. Some might struggle to find other types of income or may need to travel longer distances if available land within proximity is reduced. Their vulnerability is considered high.

Table 7-79 Impact Assessment: Loss of income for farmers (construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The land impact will be local as it will be limited to the number of farmers currently leasing the pastureland from the Local Councils in the five ATUs.
Duration	Short term/ mid term	The impact is expected to last throughout the construction phase only, when more land will be required on a temporary basis and presence of construction workforce and machinery may impact access to certain areas of pasture.
Scale	Medium	Depending on the detailed scheduling of construction works, scale of impact will be low to medium, as reduction of grazing areas will generate a perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of shepherds at a time.

Frequency	Constant	The frequency is expected to be constant during construction.
Magnitude		
Small		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium / High for vulnerable groups		
The farmers active in the Aol include small-scale and older farmers who may be potentially vulnerable and lack capacity to deal with the change generated by the Project land-take.		
Significance Rating Before Mitigation		
Minor to Medium		

7.2.1.3 Mitigation measures

According to the IFC PS5, the Project should develop a Land Acquisition Plan (the contents of a typical Livelihood Restoration plan are assimilated within this plan), that will outline the Project's commitment to mitigate adverse socioeconomic impacts from land acquisition or restrictions on affected persons' use of or access to land and livelihoods.

This LAP is to be developed as soon as detailed construction programme is defined, in collaboration with the landowners (Local Councils of Costesti, Gheraseni, Smeeni and Luciu Communes and Pogoanele Town) and in close consultation with the affected land users (shepherders leasing the pastureland required for the Project or surrounding plots). Formal consultation of APIA in managing the process of application for subsidies during the construction period will be essential, in order to avoid penalties or cancellation of subsidies incurred by local farmers. The LAP is to be developed prior to March 2024, in order to allow time for the formal re-allocation of remaining pasture land to be done in line with the legal requirements in terms of contracting.

There are several key elements to this mitigation approach including:

- All land users shall be duly identified and compensated for reduction in subsidies, including both formal and informal land users and prior to accessing the land;
- Providing compensation for loss of assets at replacement cost;
- Ensuring appropriate disclosure of information, consultation, and the informed participation of those affected;
- Improving or, at a minimum, restoring the livelihoods and standards of living of affected persons to pre-project levels, so as to facilitate sustainable improvements to socio-economic status;
- Paying particular attention to the needs of vulnerable groups – a.i. older farmers, small-scale farmers, who are typically less resilient to change and may be made more vulnerable by Project impacts. These may include the extremely poor and groups that suffer social and economic discrimination, incl Roma minority. Members of vulnerable groups may require special or supplementary displacement assistance because they are less able to cope with change than the general population. Elderly farmers, for example, may not be able to use replacement pasture or deal with increased distance from pastureland to home.

The Livelihood Restoration Plan (LRP) is to provide the foundation for adequate compensation process. The LRP will include an entitlement matrix applicable to all Project Affected People (PAPs) and ensure that:

- Farmers are able to continue to access the same livelihood resources or otherwise livelihood restoration measures will be provided to adequately manage economic displacement impacts.

- Land users will be compensated for the loss of their specific interest in part of the pastureland for a period of time and assisted in their re-establishment, if required, once the constructions works are completed.
- The Project will compensate for all eligible crops identified and valued in the asset inventory. Compensation payments for crops, trees and other agricultural assets will be awarded according to official government rates, or based on full replacement value, whichever rate is higher and in line with applicable law.
- Engagement will be maintained with PAPs through the process of robust stakeholder engagement, including an effective and accessible grievance mechanism, also applicable to land-related aspects. The grievance mechanism will be maintained during operations to ensure that local communities and stakeholders have an adequate channel to voice concerns and land related queries and complaints. If feedback is received about stakeholders suffering loss of income or subsistence that affects living standard, the Client will establish appropriate measures to understand the impacts and work with stakeholders to develop appropriate additional mitigation.
- Moreover, the LRP shall include an Accidental Damage Compensation Procedure that is to be developed as part of the Project ESMS and used to guide compensations during the Construction and Operation of the Project.
- The Project will also assist farmers through livelihoods restoration programs, including measures to increase productivity of residual holdings.

7.2.1.4 Residual impact significance

The project is expected to have a low magnitude impact if the LAP and associated engagement is conducted effectively.

The sensitivity of land users (farmers, shepherds) to Project land take is considered medium. While livelihoods/ subsistence activities depend on access to and use of pastureland, options for relocation could be defined together with the Local Councils. Households with particularly low incomes and high land dependency for subsistence and income generation will be the most vulnerable to this impact. Their vulnerability is considered high, resulting in a residual **minor negative impact**.

7.2.2 Economy, Employment, and Income

7.2.2.1 Introduction

Buzău county is characterised by low to medium economic development, being one of the least developed regions in the EU. It has a higher rate of employment in the agricultural sector, however in 2021 there were approximately 6,000 people employed in the construction sector, and over 2,500 people engaged in the hospitality sector. In 2021 the unemployment rate in Buzău County was at 5.7%.

The communes located in the direct Social AoI have well-developed agriculture and industry sectors, however the main employment sector include administration and education and health. In 2020, there were 88,536 employed people in the Buzau County.

The highest registered unemployment is noted in the Luciu commune (8.6% in 2022) with more men being out of work than women. Additionally, the highest rate of social assistance was recorded in Luciu commune in 2023.

7.2.2.2 Potential Impacts

The activities related to each Project's phase will require the engagement of number of employees, as well as the procurement of goods - often from local and regional sources – therefore potentially directly and indirectly affecting both temporary employment and income in the Social AoI and the

wider Buzău County. The Project will also have a potential long-term impact on the Social Aol, increasing local councils' revenue through tax payments.

Table 7-80 summarises the potential sources of economy, employment, and income impacts associated with each Project's phase.

Table 7-80 Potential impacts on economy, employment, and income by Project's phase

Project phase	Potential Impact
Construction	Increase in direct employment levels in the Social Aol and the wider Buzău County
	Economic benefits on indirect and induced employment, and Project procurement
Operation	Increase in local councils' revenue from payment of taxes by the Project
Decommissioning	Increase in direct employment levels in the Social Aol and the wider Buzău County
	Economic benefits on indirect and induced employment, and Project procurement

Impacts during Construction and Decommissioning

Increase in direct employment levels in the Social Aol and the wider Buzău County

The need for construction workers can partially be met through a direct employment in the Social Aol and the wider area of Buzău County. It is assumed that the Project will employ daily around 500 to 600 people for the duration of construction phase currently estimated in 18 months. However, in case the Project timeline is accelerated at a later planning stage, there will be a need to engage additional workforce.

Three categories of potential Project's employees can be distinguished: low-skilled, skilled, and expatriates. With around 6,000 people already possessing experience in construction works, there is a possibility that the Project's construction phase will attract some skilled workers from the local and regional communities. Also, it is expected that the Project will source its low-skilled employees from local workforce, given a high unemployment rate in the region and the associated reduction in cost of workforce accommodation and travel.

It is worth noting that the positive impact of the Project induced employment may be limited for the local community due to mismatch between required skill sets and the education or training of locally available workforce. This can be most impactful at the construction stage and during the transition from the construction to the operation phase.

The impact of the Project on direct employment during construction and decommissioning will be **regional**, potentially affecting the workforce in the whole Buzău County – depending on the existing skills within local community and the number of migrant workers which will be hired for the Project. Its duration will mostly be **medium term** (about 3-5 years) and will cease after the construction and decommissioning phases. During the operation phase only small number of workforces with specific wind farm operation and maintenance skills and experience is expected to be employed. The scale of the impact will be **high**, and its frequency will be **constant**, with around 300 workers employed for the whole duration of the Project's construction phase, with majority probably sourced from local or regional workforce. The magnitude is therefore assessed as **medium**, with **high** vulnerability due to high rates of unemployment and risk of poverty in the region. Overall, the Project will have a **positive impact** on local and regional communities. The impact of the Project on direct employment levels in the Social Aol, as well as the wider Buzău County, during the construction and decommissioning phases, is summarized in Table 7-81

Increase in direct employment levels – Impact Assessment

Table 7-81 Increase in direct employment levels – Impact Assessment

Type of Impact		
Direct Positive Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Regional	The increase in direct employment will concern the workforce in the wider Buzău County. It will be of a significant importance for both, the labour force which already possess the specific skills and the population ready to undertake appropriate training.
Duration	Medium term	Construction-related employment is estimated at 3-5 years and will cease once the construction phase is completed. Only a small proportion of jobs will be retained during the operation stage.
Scale	High	The project will have a high demand of workers on site (expected around 500 workers or more in peak construction periods), whose major part will be probably covered by local/regional workforce (although this will depend on the company finally in charge of the construction works). Local hiring can be increased by means of previous training of local workforce for, e.g., civil works.
Frequency	Constant	The construction-related employment is expected to last throughout the whole phase.
Magnitude		
Medium		
Sensitivity / Vulnerability / Importance of the Resource / Receptor		
High		
Given the relative high rates of unemployment and risk of poverty in the region, the sensitivity of this impact's receptors is considered high, bringing about not only an immediate increase of employment during construction (and in less degree during operation), but also professional experience for future projects of similar character, Positive indirect impact is also expected through the work generated by the economic development of the area.		
Significance Rating Before Mitigation		
Positive Impact		

Economic benefits on indirect and induced employment, and Project procurement

The influx of workers and a potential increase in income of the local community will indirectly benefit the service and supply sectors where many local citizens will be able to find at least temporary jobs. Indirect and induced employment will particularly provide more opportunities to women, as opposed to direct employment in construction works, where more men are anticipated to be involved. What is more, the wages earned by construction and decommissioning workers can be spent in the vicinity of the Project's activities, therefore further feeding the local economy. The hotels and restaurant sector contributed 1/5 to the gross value in Buzău county in 2017, therefore the potential of the Project's workforce use of such facilities and accelerated growth of this sector of local economy is expected to be significant for local small and medium enterprises (SMEs).

In case the temporary accommodation facility is provided to non-local construction workers, the impact of the Project on indirect employment in the hospitality and renting sectors will be reduced. On the other hand, if accommodation is not present, the influx of the workforce to local towns in close proximity to Project sites will cause a temporary increase in rent prices, boosting the incomes of lenders. The impact of the workforce accommodation will be dependent on the number of local workers versus non-local employees.

Additionally, the Project is expected to locally source part of the construction materials and supplies, having a positive impact on the local economy. This will include, among others, heavy equipment for earth works, logistic services to transport parts of the WTGs and other materials, as well as workers. There is also a potential for local citizens to be employed as drivers. Currently, there are around 4,000 people employed in the transport and storage sector in Buzău county, with skills that can be transferable to the Project's needs.

The Project will potentially induce indirect employment and procurement of goods at **a regional to a national** extent. The hospitality, logistics, service, and supply sectors are expected to benefit most from the increased revenue due to a number of workers temporarily inhabiting local areas. The duration of the impact will be **medium** and will strongly decrease once the construction phase is over. Considering the number of local and regional companies involved in the transport and production of the construction materials, as well as depending on whether workers' accommodation is provided, the scale will be **small to high**. The frequency of the impact will be **constant**, as workers are expected to use local services throughout the whole construction stage. The magnitude of the impact will be, therefore, **medium** with a **high** vulnerability and a **positive** significance. The Project will positively increase local and regional revenue from the procurement of goods, as well as the usage of local services and transportation. The indirect and induced employment associated with the Project will benefit local communities through increased household income.

The impact of the Project on indirect and induced employment levels and procurement of goods, during the construction and decommissioning phases, is summarized in Table 7-81 Increase in direct employment levels – Impact Assessment

Table 7-82 Impact Assessment: Economic benefits of indirect and induced employment, and Project procurement

Type of Impact		
Indirect Positive Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Regional to national	Project procurement is expected to involve national, regional, as well as local companies. At the same time, the local community will experience boost in their economy associated with indirect and induced employment in service and supply sectors.
Duration	Medium term	Most of the workers influx and Project's procurement will occur during construction stage.
Scale	Medium to high	The scale of the impact will depend on number of factors. In case there is no workers accommodation camp provided, the impact is expected to be of medium scale. Similarly, the procurement of goods will have a medium to high scale, depending on the number of goods sourced from local and regional companies.
Frequency	Constant	The local and regional procurement of goods is expected to mostly take place at the beginning of construction works (and during the pre-construction phase), however the impact on direct and indirect employment will be constant, as workers will benefit from services available locally throughout the construction stage.
Magnitude		
Medium		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		

There is a high unemployment level in the direct Social Aol, therefore any additional income will have a strong impact on local society's economy and spending.

Significance Rating Before Mitigation

Positive Impact

Impacts during Operation

Increase in local councils' revenue from payment of taxes by the Investor

The Investor is expected to pay taxes associated with the operation of the renewable energy sources. This will help increase local councils' revenue, while this income can be invested in the development of public services or the education system. Therefore, the impact of the taxes will benefit and will be felt directly by the local community. The positive effect on local revenues in the Social Aol may be however limited due to the structure of fiscal policy in Romania where local authorities rather distribute their income on behalf of the central government than have an administrative power in its allocation.

As outlined in Table 7-83, the impact on the increase in the council's revenue will be **local** in extent. Its magnitude is assessed as **medium** due to the relative high income from building permitting fees (a percentage of the total project investment), the **long-term** duration of the project operation and the **regular** nature of income payments. The sensitivity of local councils is assessed as **high** since there is lack of revenue that could be spent on solving social issues, such as the integration of Roma people or the improvement of waste management system. The overall impact of the Project on local councils' revenue is **positive**.

Table 7-83 Impact Assessment: Increase in local council's revenue from Project's taxes.

Type of Impact		
Direct Positive Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Taxes related to the Projects operation are expected to boost the revenue of local councils.
Duration	Long term	The income from the Project's taxes will last during the construction and operation stage.
Scale	Medium	Relative high income due fees for building permit and regular taxes on economic activities.
Frequency	Regular	The taxes will be paid by the Investor on the regular basis
Magnitude		
Medium		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
The local authorities mostly rely on grants and subsidies from the central government and any additional revenue will potentially allow them to redirect the money to social issues and public services, for example reducing the impact of inadequate waste management system.		
Significance Rating Before Mitigation		
Positive Impact		

7.2.2.3 Enhancement Measures

Assuming the local population will be involved in the project, both to provide services and workforce, the Project's impacts on the local economy and employment are expected to be positive, to a greater or lesser degree, depending on the extent of involvement. It is important to involve the local communities as much as possible to avoid dissatisfaction. Mitigation measures like training local workforce can enhance this positive impact.

The Investor will implement clear and transparent recruitment procedures, providing the workforce with documentation that will outline labour rights, such as the working hours, compensations for overtime, and any additional employee benefits. The documentation will also highlight the workers' right to self-organisation and collective agreements.

What is more, the Investor will develop a Construction Labour and Working Management Plan, which will contain amongst others:

- Selection criteria, job profiles, and number of workers for the construction phase with specific attention to the enhancement of the local community, women, and vulnerable groups' employment.
- Clear communication of required involvement of local workforce and local companies, explaining requirements on qualification, availability, eventual training, etc.
- Description of the recruitment process and details of the recruitment information disclosure to local communities.
- Details of vocational trainings available to employed construction workers.
- Description of the Worker's Code of Conduct, highlighting labour conditions with an aim to reduce the risk of gender-based violence and harassment.
- Details of worker's grievance mechanism that will be disclosed during the recruitment process and the employment period.
- A commitment to provide workers with a sufficient notice period as to when their job contract terminates.
- Monitoring indicators and the reporting timeline for the recruitment process and management of the workforce.

Additionally, the expectation of local employment will be fulfilled in cooperation with local communities through the implementation of the Stakeholder Engagement Plan, which will outline how the Project will ensure regular, open and transparent communication with all stakeholders, concretely:

- To provide clear information on the number and limited timescales of employment opportunities.
- To ensure information on the employment and the procurement strategies is disclosed at all settlements within the Aol.
- To plan an engagement with stakeholders through early, inclusive dialogue to build a shared understanding of the potential positive and negative impacts of workers' influx, and the associated risks and opportunities.
- Continuing to engage local people in the employment opportunities and work with suppliers to enable capacity building, procurement, employment and contracting opportunities at a settlement-level, as part of maximizing the positive benefits.
- As part of the SEP, a Community Grievance Management Procedure will be implemented to ensure that individuals who have concerns or complaints about the Project or wish to report their potential expectations or concerns related to local economy and employment can communicate directly with the Project.

The positive impact on the local and regional economy will be further enhanced with Investor implementing internal policies with aim to source construction materials and services from local SMEs, especially from the business led by women.

7.2.2.4 Residual Impact Significance

No significant residual impacts associated with the economy and employment are expected.

7.2.3 Education and Training

7.2.3.1 Introduction

In hiring a local workforce, the Project will contribute to their professional development and capacity building as a result of their involvement in the project activities in the different project phases, but specially during the intense 2-3 years of the expected time of construction. In addition to the on-the-job training effect, specific technical and HSE trainings will have to be imparted to the workforce to comply with the quality and HSE project requirements, developing the job skills of the local workforce and increasing their professional competitiveness for the future in similar projects and in general.

7.2.3.2 Potential Impacts

Possible employment of the local workforce during all phases of the Project's life-cycle will increase the local population's knowledge and skills, allowing them to undertake similar employment opportunities in the future. This impact will be further exacerbated in the case of specific training provided by the Investor to the local community.

Table 7-84 summarises the potential sources of education and training impacts associated with each Project's phase.

Table 7-84 Potential impacts on education and training by Project's phase

Project phase	Potential Impact
Construction	Improved levels of education and skills which can be transferred to future employment opportunities
Operation	Improved levels of education and skills which can be transferred to future employment opportunities
Decommissioning	Improved levels of education and skills which can be transferred to future employment opportunities

7.2.3.3 Impacts during Construction, Operation, and Decommissioning

Improved levels of education and skills.

The local pool of workers can be enhanced through appropriate training prior to, and during, employment. Although there are some renewable energy sources education programmes in the country (such as the RenewAcad - Academy for Professional Training and Advice for Renewable Energy Sources enrolling mine workers in the Jiu Valley) with an aim of training the labour force to work on the construction and operation of wind farms, the access to such courses for many local citizens is not possible. Any training provided by the Investor will benefit local community and equip it with a set of skills that can be applied in similar jobs.

The Project will impact the whole Buzău county through increased level of education and skills of the workforce employed in the construction, operation, and decommissioning of the wind farm, therefore the extent of this impact is assessed as **regional**. This effect will be **long-term**, and the trained labour

force will retain their skills and knowledge for possible similar future employment. Since a significant level of local involvement is expected, the effect of an increased level of education and skills will be at **medium** scale, while the learning process will have a **continuous** character. The magnitude of the impact is **medium** with **high** sensitivity of local receptors and an overall **positive** impact on local communities. The results of the assessment are summarised in Table 7-85 below.

Table 7-85 Impact Assessment: Increased level of education and skills

Type of Impact		
Direct Positive Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Regional	The hiring of the local workforce is expected to occur both at the municipality and regional level.
Duration	Long term	The acquired knowledge and expertise will remain after the project is finished.
Scale	Medium	A relatively significant level of local involvement is expected.
Frequency	Constant	Learning process will have continuous character.
Magnitude		
Medium		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
The level of education in the Social Aol is very low, with a lack of specific skills which are need in the labour market.		
Significance Rating Before Mitigation		
Positive Impact		

7.2.3.4 Enhancement Measures

In addition to the on-the-job learning effect, topic-specific training measures will enhance the professional development of the workforce, ensuring at the same time the required work quality and environmental and H&S project compliance. To achieve this a training program shall be developed considering the training needs of the hired workforce according to the project requirements. Apart from the technical trainings, the training program shall cover the required H&S method statements, H&S risks, and environmental site management, among others.

7.2.3.5 Residual Impact Significance

Not applicable for positive impacts.

7.2.4 Infrastructure and Public Services

7.2.4.1 Introduction

There are limited number of households in the direct Social AoI which are not connected to electricity. In most houses wood and coal are used for heating, while cooking is mostly done with a use of liquified petroleum gas tanks. There are also known challenges in the Social AoI regarding the infrastructure for water supply and sanitation, and waste management.

7.2.4.2 Potential Impacts

The influx of workers, particularly associated with construction and decommissioning works, will potentially put pressure on existing infrastructure and utilities (such as health services, water and sanitation etc.), limiting their accessibility for local citizens. Additionally, in case of lack of dedicated workers camp, the incoming workforce will be allocated in the locally available accommodation, reducing the number of apartments available to the community and potentially further affecting the housing market. What is more, the erected wind turbines will create an additional feature in local landscape, potentially impacting visuals aesthetics of local communities and tourist visiting the region.

In addition, the transportation of machinery and wind farm elements, as well as the influx of workers with cars will potentially result in higher road congestion and increased risk of traffic accidents. The impact of Project on traffic is described in detail in section 7.6.6.

Table 7-86 summarises the potential impacts on the infrastructure and public services associated with each Project's phase.

Table 7-86 Potential impacts on infrastructure and public services

Project phase	Potential Impact
Construction	Increased demand on public services, potentially reducing availability for existing local users
	Pressure on housing stock through the influx of non-local workers
Operation	Changes in landscape and visual disruption
Decommissioning	Increased demand on public services, potentially reducing availability for existing local users
	Pressure on housing stock through influx of non-local workers

7.2.4.3 Impacts during Construction and Decommissioning

Increased demand on public services, potentially reducing availability for existing local users.

An influx of the non-local workforce may put a strain on public services, such as medical services, increasing the waiting lines and general effectiveness of healthcare, local administration, and supply of food, electricity, and other commodities. It is expected that the Project will employ 300 workers throughout the construction phase who will require similar use of public services as local citizens, particularly in the case where worker's accommodation camp is not provided. The Social AoI is characterised by inadequate waste collection system, with three sorting stations in the whole Buzău county. Some communes also do not have access to proper wastewater treatment system. Without a good management system and the quick rise in number of newcomers, which is expected at the commencement of the construction work, the impact of the waste on the environment and

surrounding landscape will possibly be higher than usual - however this effect will be limited taking into consideration the overall small number of expected construction workers in comparison to the Social Aol population statistics.

On the other hand, it is worth noting that public institutions will benefit from the Project by receiving a certain amount of electricity which will reduce the heating and lighting costs. The amount of electricity provided by Investor to public buildings will be confirmed in the Community Development Plan.

The increased demand on public services related to the influx of construction workers will be experienced at the **local** level on a **small** scale and with **medium term** duration throughout the construction period and in cases of emergency. The increase in the number of public services' users will be most felt at the beginning of the construction phase, however the presence of additional users of public services will be **constant**. The magnitude of this impact is assessed as **small**, with medium vulnerability based on some present issues with waste and wastewater collection systems in certain parts of the Social Aol. The overall significance of the Project's effect on public services is evaluated as **minor**.

Table 7-87 below summarizes the impact assessment of the Project on public services.

Table 7-87 Impact Assessment: Increased demand on public services

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The influx of workers will potentially impact the whole Buzau County, since many public services will be available or will originate from outside of the direct Social Aol
Duration	Medium term	The impact is expected to last throughout the construction phase; however it will be mostly felt at the beginning of this stage and in cases of emergency.
Scale	Small	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.
Frequency	Constant	The increase in the number of public services' users will be constant and will cease with the outflux of the Project's workers from the Social Aol at the end of the construction works.
Magnitude		
Small		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium		
Although overall general public services are provided to the local communities, there is some inadequate management of waste and wastewater in parts of the Social Aol. Access to public services may also be limited for vulnerable groups, such as Roma citizens.		
Significance Rating Before Mitigation		
Minor		

Pressure on housing stock through influx of non-local workers

The expected influx of non-workers during the construction phase will have an effect on the local housing stock in case no accommodation camp is provided by the Investor. 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. There is a visible investment in the housing stock in the countryside of

Social AoI, with rooms that potentially could be rented for the time of construction period. As a result, the local citizens will possibly experience a temporary increase in house prices which may benefit landowners, however this impact will be perceived negatively by tenants, especially those with poor backgrounds.

The extent of the Project's impact on housing stock through the influx of non-local workers will be **local**, and mostly experienced in area close to the construction sites. It will last throughout the construction stage, therefore its duration is assessed as **medium term**, while frequency will be **constant**. The impact's scale will be **medium** due to relative high number of contracted workers during construction at the same time which can be mitigated by new housing investments under way. Due to an uneven effect of possible increase in rental prices, the vulnerability is evaluated as **medium** resulting in **moderate** impact significance before mitigation.

Table 7-88 Impact Assessment: Pressure on housing stock through the influx of non-local workers

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The pressure on housing stock will be mostly felt in the areas near the Project's construction sites.
Duration	Medium term	Workers will need to be accommodated throughout the construction phase.
Scale	Small	With app. 300 construction workers, which equals to less than 1.5% of the current population in the direct Social AoI and with ongoing investment in housing in the area, the scale of impact on housing stock will be small.
Frequency	Constant	The pressure on housing stock and rental prices will be felt throughout the construction phase.
Magnitude		
Medium		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium		
In general, there seems to be sufficient housing stock in the area with new housing investments under completion. However, the possible increase in rental prices may be particularly felt by vulnerable groups, such as unemployed or Roma people with poor backgrounds.		
Significance Rating Before Mitigation		
Moderate		

7.2.4.4 Impacts during Operation

There will be impact due to changes in landscape and visual disruption, addressed in the EIA document.

7.2.4.5 Mitigation Measures

The Investor will ascertain, prior to the construction phase, whether the local services are sufficient for workforce influx and, where appropriate, will liaise with relevant authorities to limit the negative impact of the Project on local users' access to public services.

An accommodation management plan, a traffic management plan, policy on site rules, along with the corresponding training shall be prepared and implemented.

7.2.4.6 Residual Impact Significance

After the implementation of mitigation measures the residual impact significance is expected to be minor.

7.2.5 Community Health and Safety

7.2.5.1 Introduction

The main objective of community health and safety is to achieve zero harm from the project's activities to the local community, manage risks and improve overall community health and well-being. Community health and safety management should integrate local citizens into the Project environment, providing them with transparent and reliable information.

The wind farm projects in Romania are generally well perceived by the public – over 80% of Romanians would accept living in close proximity to such wind farm. This is particularly important from the point of view of possible security risks.

The overall access to the health and safety of the community in the direct Social Aol is fairly good with the healthcare services being free of charge. There are family doctors and community nurses available in each commune. What is more, a dedicated Roma mediator is provided in the Costesti commune to facilitate and provide healthcare to the vulnerable group. Amongst local challenges, there is a need for increased funding to address the need of aging population.

7.2.5.2 Potential Impacts

The community health and safety impacts can occur during numerous project activities throughout its life cycle and may be associated with project infrastructure, public accessibility, and general life safety. During the construction and decommissioning phase, the use of heavy transportation, together with the construction works, emits noise and pollutants which deteriorate air quality. This impact may further affect the overall well-being and health of a local community, especially of vulnerable groups, such as people with respiratory diseases or learning difficulties. Additionally, the influx of the workforce, which may potentially need medical assistance, puts pressure on existing health and emergency facilities, resulting in longer waiting times for doctor's appointments, increased public spending on healthcare, and generally decreased access of the local population to medical services. The presence of a non-local workforce can also result in increase of the infectious diseases incidence rate, as well as the rate of crimes, alcoholism etc. However, the increase in infectious disease spread may also be attributed to land clearing during the site and access road preparation.

The impacts on community health and safety can also be distinguished during the operation phase of a project. The construction phase' land clearing impacts may be extended in duration for the operation stage, further causing an increase in infectious disease incidence among the local residents. Noise from operating WTGs and shadow flicker can also cause mental and physical distress. In addition, the impact on other users of the air space should be considered. Due to wind turbines' height, the WTGs can create a potential risk of collisions or alteration of flight paths for aircrafts flying over a project area. This is particularly true for projects located near airports, military low-flying zones, or known flight paths. What is more, depending on the significance of unaltered viewscape to local communities and tourism, the WTGs can be considered as visual disruptors, creating unpleasant changes in the landscape.

Table 7-89 summarises the potential impacts on community health and safety related to a wind farm project.

Table 7-89 Potential impacts on community health and safety by project's phase

Project phase	Potential Impact
Construction	Impact on air quality and noise
	Impacts related to workforce influx
Operation	Mental and physical distress on people due to noise
	Mental and physical distress on people due to shadow flicker
	Changes in landscape and visual disruption
	Risk of aircrafts' collisions with wind turbines
Decommissioning	Impact on air quality and noise
	Impacts related to workforce influx

7.2.5.3 Impacts during Construction and Decommissioning

Impact on air quality and noise

Although onshore wind farms are generally regarded as a non-polluting source of energy, there may be a temporary increase in pollution during the construction period due to the usage of heavy vehicles for construction materials' transportation. Most of the large materials and wind turbine parts are expected to be sourced from other countries and transported via existing roads (see) from the Port of Constanta. However, other local roads will be used for the transportation of workers or smaller construction materials. This traffic will affect local communities, particularly those with existing diseases, reducing the effectiveness of their medical treatments, as well as the overall health and well-being of residents. The use of heavy machinery and increased traffic will also affect the level of noise present in the community throughout the duration of the construction phase. Additionally, noise associated with construction activities such as blasting, piling, construction of roads and turbine foundations, and the erection of WTGs, can further influence the quality of life in settlements located near the Project's sites.

Table 7-90 Impact Assessment: Impact on air quality and noise

Type of Impact		
Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The noise and pollution impacts will be reduced to areas of the Social Aol within proximity to the construction site and access roads.
Duration	Medium term	Disruptive effects associated with noise and pollution from transportation will be temporary and will be greatly reduced at the end of the construction period.
Scale	Medium	Although a number of citizens inhabiting areas near the transportation roads can be affected, this impact will mainly occur in relation to increased traffic during the transportation of materials and workforce, which will peak at the beginning of the construction process and then decline with time.

Frequency	Daily	The transportation of materials, as well as the construction works are expected to occur daily throughout the construction stage.
Magnitude		
Medium		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
Respiratory disease is the second biggest cause of death in the local community.		
Significance Rating Before Mitigation		
Major		

Impacts related to workforce influx

During the construction phase, many non-local employees are expected to settle in the Social Aol, which may result in numerous negative social and health outcomes. Firstly, this influx may cause a spread of infectious diseases (such as COVID-19) as well as other sexually transmitted diseases (such as human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS), either through insufficient waste collection system or through direct contact between workers and citizens. This will affect the availability and effectiveness of local medical resources (see Chapter 2.1.3 on access to public services). Nevertheless, the healthcare provided to citizens of the Social Aol is at the good level, while infectious and parasitic diseases are not common in the county.

Additionally, the presence of newcomers may lead to an increase in crime and violence levels, particularly if they become unsatisfied with the lack of employment opportunities after the termination of their contract. The arrival of jobseekers in the settlements will potentially cause social tensions with local citizens since immigrants may be regarded as a form of competition for newly created jobs at the Project's construction site.

The impacts' significance is rated as **moderate** since the increasing tensions between local communities and non-local workers may arise quickly and the general perception of migrant workers by citizens can be easily altered with a small number of incidents.

Table 7-91 Impact Assessment: Impacts related to workforce influx

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The workforce influx, and the associated impacts, is expected to occur mainly in larger settlements with relatively close proximity to the construction sites and with good access to roads.
Duration	Medium term	The highest worker numbers are expected during the construction phase, while workforce quantity will be reduced at the operation stage.
Scale	Small	The number of local citizens affected by crimes or disease related to the presence of external workforce is not expected to be high.
Frequency	Sporadic	The impacts associated with the presence of non-local employees will persist throughout the construction phase, however particular incidents related to crime or spread of disease will occur sporadically.
Magnitude		

Small Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

High

The perception of local communities of the negative impact associated with workers' influx may be influenced with a small number of incidents related to crime or an increase in infectious disease rate. Additionally, there is only one emergency hospital in the whole Buzău County, and any sudden escalation in number of incidents may lead to its overburdening. On the other hand, the level of healthcare provided in the Social Aol is satisfactory, with dedicated family doctors and community nurses available in each ATU.

Significance Rating Before Mitigation

Moderate

7.2.5.4 Impacts during Operation

Risk of aircraft collisions with wind turbines

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. There is no airports are located in the vicinity, therefore the probability of collisions is regarded as **low**. The risk of collision will be closely tied to the presence of erected WTGs, with **long-term** duration throughout the operation phase and **local** extent limited to the Project site. The magnitude of the impact is assessed as **small**, resulting in **moderate** significance. The impact assessment is summarised in Table 7-92 below.

Table 7-92 Impact Assessment: Risk of aircrafts collisions with wind turbines

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The risk of collisions will occur near the Project's sites with wind turbine generators.
Duration	Long term	As the impact is associated with the presence of wind turbines, its duration will cover the entire operation phase.
Scale	Low	The Project area is not currently used by aviation; therefore the scale of the impact will be limited.
Frequency	Sporadic	The presence of aircrafts in the Project's area is not expected at a high rate.
Magnitude		
Small		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
Aviation accidents can have severe consequences on the local communities.		
Significance Rating Before Mitigation		
Moderate		

Mental and physical distress impact on people due to noise and shadow flicker

During the operation phase both the shadow flicker and noise from the working wind turbines will affect the quality of local communities. The noise of a working WTG is produced mostly from mechanical and aerodynamical sources.

Shadow flicker, on the other hand, is closely associated with the position of the sun in relation to the wind turbine. When the sun passes behind the wind turbine it casts a “moving” shadow. This impact is present when the turbines are located in close proximity to sensitive receptors, such as residential buildings, learning and/or health centres, and offices). Shadow flicker has been found to occur at distances smaller than 10 rotor diameters from the wind turbine, mostly in buildings with narrow window openings. Duration of the flicker depends also on wind direction, location of the building in relation to the WTG, time of the day and year, and general weather conditions.

Note: This section on noise and shadow flicker will be completed in the final draft.

Changes in landscape and visual disruptions

Visual disruptions are mostly related to the presence of the WTGs (including their colour, height, and number of turbines) in close vicinity to settlements and other areas important to the local community (such as tourism and recreational sites). This impact can be exacerbated when the wind farm turbines interfere with the surrounding viewscape.

Note: This section on landscape impact will be completed in the final draft of this report.

7.2.5.5 Mitigation Measures

The proposed mitigation measures follow the recommendations of the World Bank Group’s Environmental, Health, and Safety (EHS) Guidelines for Wind Energy, 2015.

The Investor will consult with relevant aviation authorities and follow air traffic safety regulations. Additionally, the WTGs will be equipped with anti-collision lighting and marking systems in line with the national standards and/or good industry practices to prevent possible accidents with aviation.

The impacts associated with the workers’ influx will be alleviated through Investor’s actions outlined below:

- Enhancement of local employment through sourcing employees from the direct Social Aoi and limiting the numbers of non-local workers.
- Enforcement of Workers’ Code of Conduct containing a set of rules on behavioural standards and cultural awareness requirements for all employees (including security personnel)
- Preparation of the Community Health, Safety and Security Management Plan outlining measures to be undertaken to avoid a spread of communicable diseases.
- Collaboration with local health and safety services to sustainably manage the pressures put on security and medical units during accidents, as well as during unacceptable social behaviour.

Note: Mitigation measures for noise and shadow flicker impact will be completed in the final draft.

7.2.5.6 Residual Impact Significance

After the application of mitigation measures, the impact of the Project on community health and safety will be negligible to minor in case of shadow flicker and visual impacts during operation stage of the Vifor wind farm development.

7.2.6 Labour and working conditions

7.2.6.1 Introduction

The international standards on labour and working conditions highlight that employment creation and income generation should be accompanied by the protection of the fundamental rights of workers, as guided by the ILO and UN conventions applying to the Project. Romania joined ILO in 1919, and then again in 1956, ratifying the main conventions, including 8 out of 10 fundamental conventions.

7.2.6.2 Potential Impacts

The construction, operation, and decommissioning works are associated with a number of hazards that may negatively affect the workforce's health and safety, especially in cases where the labour and working conditions are not sufficient. This can be further exacerbated in case adequate accommodation is not provided for the non-local workers. The H&S risks can also exist indirectly, affecting the supply chain's labour force.

Table 7-93 summarises the potential impacts on labour and working conditions, including occupational health and safety.

Table 7-93 Potential impacts on labour and working conditions by project's phase

Project phase	Potential Impact
Construction	Inadequate working and/or workforce accommodation conditions
	Indirect impacts on the health and safety of supply chain workers
	Workers' health and safety impacts due to incidents during construction activities
Operation	Workers' health and safety impacts due to incidents during operation activities
Decommissioning	Inadequate working and/or workforce accommodation conditions
	Indirect impacts on health and safety of supply chain workers
	Workers' health and safety impacts due to incidents during construction activities

7.2.6.3 Impacts during Construction and Decommissioning

Inadequate working and/or workforce accommodation conditions

In case no adequate accommodation and working conditions are provided, the workforce can be exposed to health and safety risks, such as fire, electrical safety, theft, and other crime, as well as poor sanitation and food quality. Additionally, migrant workers contracted by 3rd parties and not familiar with national and international requirements can be more prone to inadequate working conditions, such as long hours or lack of appropriate safety equipment and procedures.

The extent of the inadequate working and/or workforce accommodation conditions will be **local** with **small** scale – limited to the Project's sites and/or the labour force's place of residence. Nevertheless, providing no mitigation measures are undertaken, the impact will be **constantly** present during the construction stage with medium to **long term** duration in case of serious and permanent injuries to

employees. Given that the Project Company has a HSE Policy⁹¹ in place according to which both Project Company and EPC Contractor commits to comply with the requirements of the applicable HSE international standards and good industry practice, the magnitude of the impact on labour and accommodation conditions is assessed as small. The vulnerability of the workforce to such unfavourable conditions is **high** due to the possibility of irreversible injuries as a result and the importance of preserving the good health and wellbeing status of construction workers. The overall significance of the is assessed as **moderate** negative (see table below for more details).

Table 7-94 Impact Assessment: Inadequate working and/or workforce accommodation conditions

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The inadequate working conditions will be closely associated with the construction site and/or place of workers' accommodation.
Duration	Medium to long term	Although the inadequate working and/or accommodation conditions will affect the workers only during the construction period, the damage that may result can cause permanent injury to the health and well-being of workers.
Scale	Medium	The inadequate working conditions will be closely associated with the construction site and/or place of workers' accommodation.
Frequency	Constant	In case no adequate working and/or workforce accommodation conditions are provided, the impact on the health and safety of employees will last throughout the employment contract.
Magnitude		
Small		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
The vulnerability is assessed as high, as the health and safety of contracted workers are a priority, and inadequate conditions may potentially lead to irreversible changes in the labour health and wellbeing status.		
Significance Rating Before Mitigation		
Moderate		

Indirect impacts on the health and safety of supply chain workers

Indirect involvement of supply chain workers in the Project-related production of materials and activities may leave them prone to inadequate occupational health and safety conditions. This effect may be exacerbated by the fact that supply chains are global, managed by 3rd parties and have a large number of employees. Particularly vulnerable here are migrant workers, who work in a country other than their mother country and may not be informed about their labour rights and work long hours in conditions that are dangerous to life and health, which leads to their overexploitation.

Due to the sourcing of materials for wind farm construction from different countries, the indirect impact on the health and safety of supply chain workers will be **global** in its extent. Its scale will be **medium** as the number of workers employed in the material production and provision of services will be significant. However, the impact's duration will be **short term** with **sporadic** frequency, as the supply

⁹¹ Project Vifor, Health, Safety and Environmental Policy, August 2023.

chain workers will be exposed to H&S risks when performing Project-related activities (which will constitute only a portion of their tasks). As for labour conditions, the magnitude of H&S impact on the primary supply chain is assessed as small, based on the commitment of Project Company and requirements regarding supply chain. The vulnerability of supply chain workers, on the other hand, is **high** – any incidents that may occur during project work can potentially leave the employees with permanent injuries or lead to death. As outlined in Table 7-95, the significance of the impact is **moderate**.

Table 7-95 Impact Assessment: Impact on the health and safety of supply chain workers

Type of Impact		
Indirect Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Global	The Project will source some of the construction materials from other countries.
Duration	Short term	The impact will be present during the direct and indirect engagement of supply chain workers in the Project's activities. The duration of this engagement will vary depending on the type of activity, however generally it is expected to last shorter than the construction phase.
Scale	Medium	Considering the number of materials that will need to be procured and services performed, the number of workers involved in the supply chain may be fairly significant.
Frequency	Sporadic	The impact will be present during the direct and indirect engagement of supply chain workers in the Project's activities.
Magnitude		
Small		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
The health and safety of supply chain workers should be managed and monitored by contracted 3 rd parties and only experienced or trained people should perform more dangerous tasks. However, the possible injuries caused during the engagement in Project-related activities may result in irreversible injuries, affecting future employability and the quality of life of the supply chain workforce.		
Significance Rating Before Mitigation		
Moderate		

Worker's health and safety impacts due to incidents during construction activities

The wind farm construction activities, such as working at height, ground excavations, working with and around power lines, and use of hazardous substances, pose several health and safety (H&S) risks to the workers employed on the Project. Although all employees must comply with safety standards adjusted to specific types of work, and any injury or death should be preventable through appropriate H&S management systems, the influx of workers from different parts of the world, contracted by different 3rd parties, will increase the possibility of accidents at work.

Most of the accidents are expected to be **local** in extent and **small** in scale, and closely associated with the Project's sites. Although the duration of the impact is assessed as **medium**, serious incidents may leave **long term** effects on workers' health and wellbeing, and the possibility of such impact will occur **daily** during the construction activities. Taking the above mentioned Project Company's HSE policy into consideration, the magnitude of the impact is expected to be small with a **high** vulnerability

of workers to injuries and unfamiliar work conditions, with the impact's significance evaluated as **moderate**. The impact assessment's results are summarised in Table below.

Table 7-96 Impact Assessment: Impact on workers' health and safety associated with incidents during construction activities

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	The possibility of injury or death from construction activities will be linked to the Project's sites.
Duration	Medium to long term	The possibility of injury or death in relation to construction activities will be present throughout the duration of works. However, in case of serious accident, the related injury may cause long term or permanent worker's disability.
Scale	Small	The possibility of injury or death from construction activities will be linked to the Project's sites.
Frequency	Daily	The risk of injury or death will be associated with daily activities at the construction site.
Magnitude		
Small		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
The influx of workers with different levels of experience and from different parts of the world may leave them highly susceptible to any injury in relation to construction activities, which they may not be familiar with.		
Significance Rating Before Mitigation		
Moderate		

7.2.6.4 Impacts during Operation

Worker's health and safety impacts due to incidents during operation activities

Although the operation stage is generally perceived as involving less-hazardous activities than the construction phase, there is still a high possibility of incidents occurring during servicing and maintenance tasks, such as an electrocution and/or a fall from high objects. This impact will be reduced to a **local** extent, closely linked to the Project's operation and maintenance sites. The risk of incidents will occur **daily**, during everyday activities and given the length of the operation phase its duration will be **long term**. The number of staff employed at this stage of the Project's life-cycle will be limited, therefore the scale of a possible incident will be **low**. The magnitude of the impact is assessed as **small**, with **high** vulnerability of the receptor due to the possibility of permanent injury to the workers' health and wellbeing. As a result, the significance of the Project-related incidents' effect on worker's health and safety is **moderate** (Table 7-97).

Table 7-97 Impact Assessment: Impact on workers' health and safety associated with incidents during operation activities

Type of Impact		
Direct Negative Impact		
Rating of Impacts		

Characteristic	Designation	Summary of Reasoning
Extent	Local	The possibility of injury or death will be linked to the Project's operation and maintenance sites.
Duration	Long term	The possibility of injury or death in relation to operation activities will be present throughout the duration of works.
Scale	Low	The possibility of injury or death will be linked to the Project's operation and maintenance sites where limited number of employees will be present.
Frequency	Daily	The risk of injury or death will be associated with daily operation and maintenance activities.

Magnitude**Small****Sensitivity/Vulnerability/Importance of the Resource/Receptor****High**

Possible incidents may leave permanent injuries to the operation phase workers, affecting their employability and the quality of life.

Significance Rating Before Mitigation**Moderate Impact**

7.2.6.5 Mitigation Measures

The proposed mitigation measures are in line with the provisions of the ILO and specific UN conventions on labour and working conditions. In order to maximise the safety of workers, the Investor will:

- Provide workers with safety equipment to prevent occupational health issue and reduce the number of accidents at work;
- Provide regular training on first aid and safety responses in order to limit accidents' impact on workers' health;
- Hold safety briefings with the employed labour force to ensure greater attention to detail and safety, especially when performing work activities in dangerous environments, i.e. working at heights during the wind turbine construction;
- Implement the Human Resource Policy reflecting national and international (IFC PS2 and ILO) requirements. The document will outline the Investor's commitment to ensuring equal treatment for all individuals as well as preventing and addressing child and forced labour, and harassment at work. The Policy will apply to all contractors involved in the Project;
- Develop the Workforce Management Plan which will include, amongst other, the general requirements for good working conditions, terms of employment, and the right of workers to self-organisation;
- Develop the Occupational Health and Safety Management Plan prior to the commencement of work. The Plan will apply to all contractors of the Project and will be disseminated to the local community. The Plan will include:
 - Project safety principles and philosophy;
 - H&S policies and commitments;
 - Project H&S objectives;
 - Project H&S challenges;
 - Project H&S management system structure;
 - H&S leadership, organization, competence, communication;

- H&S contractors management;
- PPE requirements and enforcement;
- Incident reporting, investigation, and monitoring of Non-conformances;
- Risk profiling and emergency preparedness and response planning;
- H&S audit & review;
- H&S performance monitoring / improvement;
 - Management of change;
- Ensure that the appropriate accommodation is provided to all workers, in line with IFC PS2 and national requirements.

In addition, a grievance mechanism will be available to the employees. The potentially affected workforce will be able to raise any concerns/problems through such mechanisms, while the Investor will commit to a timely response to submitted issues.

7.2.6.6 *Residual Impact Significance*

After the implementation of mitigation measures outlined in Chapter 2.1.6.5, the residual impact significance is expected to be minor. Nevertheless, the Investor will undertake additional monitoring measures to ensure that all health and safety recommendations are implemented on-site. Any incidents will be appropriately reported, and specific steps will be introduced to avoid further accidents of similar nature to the reported one.

7.2.7 *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 Guidance Note on Implementation of Human Rights Assessments under the Equator Principles provides practical guidelines which are the core reference for this session, along with the UNGPs.

7.2.7.1 *Methodology*

The methodology used to assess the human rights risks related to the project is closely referencing the UN Guiding Principles on Business and Human Rights (UNGPs) and the Guidance Note on Implementation of Human Rights Assessments under the Equator Principles.

The human rights risk topics here assessed are those identified risk topics identified in the scoping report and additional ones. In line with Equator Principles Guidance Note aforementioned, the risk topics were grouped in the following categories:

- Labour
- Civil and political
- Economic, social and cultural
- Group rights for groups with higher risk of vulnerability
- Environmental related Risks

1. The risks are assessed based on Severity and Likelihood. Severity is defined based on Scale, Irremediability and Scope.

2.

	Characteristics	Definition	Designations
Severity	Scale, Irremediability	<ul style="list-style-type: none"> Scale: how serious are the impacts for the victim? Irremediability: Will a remedy restore the victim to the same or equivalent position before the harm; how easy or difficult would it be for the victim to get a remedy? 	<p>Low</p> <ul style="list-style-type: none"> unlikely to cause body or psychological harm / change in standard of living remediation will return the victim to the same or equivalent position <p>Medium</p> <ul style="list-style-type: none"> may cause body or psychological harm / change in standard of living remediation may return the victim to the same or equivalent position <p>High</p> <ul style="list-style-type: none"> may result in death or irreversible loss of physical or mental abilities / significant disruption in standard of living remediation will not return the victim to the same or equivalent position"
	Scope	<ul style="list-style-type: none"> How many people could be affected by the harm? 	<ul style="list-style-type: none"> Low: 1 to 9 people potentially affected Medium: 10 to 99 people potentially affected High: 100 to 999 people potentially affected Very high: >1000 people potentially affected
Likelihood		<ul style="list-style-type: none"> What is the likelihood of the impact occurring? 	<ul style="list-style-type: none"> Low: Unlikely to happen. Medium: The impact is possible to happen. There is a 50% or greater chance it will occur. High: The impact will probably / almost certain or is already occurring.

3.

By combining these parameters, the associated **inherent risk** is calculated.



As a next step, under the assumption that the listed mitigation measures will be implemented, the **residual risk** is calculated.



In this report, the human rights risks have been classified taking into consideration the mitigation measures have been applied (residual risk). The classification is divided between:

	Inherent Risk	Residual Risk
Low	Project and local contexts provide for a low inherent risk.	Risks are in place, but it is expected that the Project's Environmental and Social Management System (ESMS) standard measures will be sufficient for mitigation and remedy.

Medium	Project and local contexts provide for a medium inherent risk.	Risks are in place and the ESMS standard measures may not be sufficient for mitigation and remedy.
High	Project and local contexts provide for a high inherent risk.	ESMS standard measures will not be sufficient for mitigation and remedy. Further assessment and an in-depth analysis are required. These risks are expected to cause a delay, reputational risk, or breach of national or lender requirements for the project.

7.2.7.2 Local context and international human rights benchmark

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 Treaties. A full list of ratified conventions and international treaties is available in the SBS of this project.⁹⁷

In addition as an EU Member country, Romania has been translating European conventions and treaties related into national laws. These have been voluntarily and democratically approved by all EU countries. Considering international conventions and national legislation related to protecting human rights, a benchmark was defined, against which the project information was evaluated. In October 2022, the UN General Assembly elected Romania as a member of the UN Human Rights Council for 2023-2025.

As part of the assessment, the local context has been also considered, including on country, region, and county level of the Project's AoI, to best understand the potential for human rights risks related to different rights holders.

It is important to note, that the legal context has been considered with regards to existing national legislations relevant to protecting human rights. However, the effectiveness of the implementation of these legal instruments could be evaluated up to a limited extent, due partial statistical data and publicly available relevant information.

7.2.7.3 Assessment of Human Rights risks

Rights Category	Human Rights Issue	Rightsholder Affected	Human Rights Context in Romania and in the Project Area	Inherent Risk level	Mitigation measures	Residual risks
Labour	Child Labour	Worker	<p>Under the protection of fundamental rights in the Constitution of Romania, Article 49 point 3, the exploitation of minors, their employment in activities that might be harmful to their health, or morals, or might endanger their life and normal development are prohibited. Furthermore minors under the age of fifteen may not be employed in any paid labour.⁹² Minors between the ages of 15 and 18 may work a maximum of six hours per day and no more than 30 hours per week, provided their school attendance is not affected. The ministry of Labour and Social Protection may impose fines and close businesses if exploitation of child labour is confirmed.</p> <p>In 2022, the National Authority for the Protection of the Rights of the Child and Adoption (ANDPDCA) within the ministry, has reported concerns of lack of law enforcement on child labor in rural areas with mostly agricultural households and lack of welfare services. According to ANPDCA, 304 children were subject to child labor in 2021 in both rural and urban areas. Children most vulnerable to child labor were ages 10 to 13 (33.5 percent), 14 to 17 (27.6 percent), and 3 to 6 (16.1 percent). Incidents of child labor were widely believed to be much higher than official statistics.⁹³</p>	Medium	<p>Mitigation measures integrated into Project's ESMS:</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures Contractor and Supplier Management Plan Construction Labour and Working Conditions Management Plan, incl. Workers Code of Conduct (CoC) <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> Human Resources Policies to include minimum age restrictions in compliance with national law 	Low
	Collective bargaining and Freedom of association	Worker	<p>The Romanian Constitution under Article 37.1. protects the right of association of all citizens to freely associate into political parties, trade unions and other forms of association. Under Article 38.5 the right to collective labour bargaining and the binding force of collective agreements is protected.⁹⁴ According to Article 7 in the Labour Code: The employees and employers may freely associate to defend their rights and professional, economic, and social interests. Additionally, within the main rights and obligations of the employee, the right to collective and individual bargaining is clearly stated.^{95,96}</p>	Low	<p>Mitigation measures integrated into Project's ESMS:</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures Clear communication to employees upon 	Low

⁹² [The Constitution of Romania \(presidency.ro\)](https://presidency.ro/en/constitution)

⁹³ [ROMANIA 2022 HUMAN RIGHTS REPORT \(state.gov\)](https://state.gov/romania-2022-human-rights-report)

⁹⁴ [The Constitution of Romania \(presidency.ro\)](https://presidency.ro/en/constitution)

⁹⁶ [Labour Code of Romania \(ilo.org\)](https://ilo.org/romania)

			<p>The national law prohibits antiunion discrimination and allows workers fired for union activity to challenge their dismissal in court for reinstatement. The law provides for protection of freedom of association and collective bargaining; however, complaints have been reported by unions that there was little enforcement to protect against violation of these rights. The Romanian government enacted Social Dialogue Law 367 on December 19, 2022, stating that those with individual labour contracts, most civil servants, members of cooperatives, farmers, and independent workers could join unions. A union may be established by at least 10 workers from the same employer or 20 workers from a group of employers belonging to the same collective bargaining sector. To register as a union, founding members must submit a decision letter, a copy of the union's statute, and a list of union management members.⁹⁷</p> <p>According to the international Human Rights Practices report, published in 2022 by the United States Bureau of Democracy, Human Rights and Labour, reports of antiunion discrimination incidents were minimal. The government and employers generally respected the right of association and collective bargaining. However, it is difficult to prove legally that employers laid off employees in retaliation for union activities.⁹⁸</p>		<p>employment, providing sufficient information of employee rights and obligations, especially with regards to non-local workforce.</p> <ul style="list-style-type: none"> Construction Labour and Working Conditions Management Plan Contractor <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures to ensure communication procedures upon employment, providing sufficient information of employee rights and obligations, especially with regards to non-local workforce 	
	Modern Slavery (Forced Labour) -	Worker	<p>The prohibition of any form of forced labour is part of the Constitution at Article 42 and the Criminal Code Article 212, which criminalises the act of compelling a person to work against their own will or into forced or compulsory labour.</p> <p>Article 4 of the Labour Code also addresses the topic of forced labour and prohibits any work or service imposed on a person under threat or for which they did not freely express their consent.</p> <p>Nevertheless, there were reports that such practices continued to occur, often involving minorities, such as Roma people, people with</p>	Medium	<p>Mitigation measures integrated into Project's ESMS:</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures, i.e., employee contracts and mandatory introduction of CoC Monitoring indicators and timeline for the recruitment process and 	Low

⁹⁷ [ROMANIA 2022 HUMAN RIGHTS REPORT \(state.gov\)](#)

⁹⁸

			<p>disabilities, and children. The government, reportedly, did not effectively enforce the law and took limited measures to prevent forced or compulsory labour⁹⁹. The law criminalizes forced labour, and penalties for violations were commensurate with those of other serious crimes, such as kidnapping, but were not evenly applied in all sectors. According to the Ministry of Internal Affairs, 16 percent of human-trafficking victims officially identified in 2020 were exploited specifically for labour purposes. In 2019 organized-crime investigators detained five individuals on charges of modern slavery. The individuals were accused of having kidnapped and detained several persons with a vulnerable background or mental-health problems; the victims were used for agricultural work without pay, starved, and forced to live in inadequate farm annexes. This case remained pending as of December 2021. Men, women, and children were subjected to labour trafficking in agriculture, construction, domestic service, hotels, and manufacturing.¹⁰⁰</p>		<p>management of the workforce</p> <ul style="list-style-type: none"> • Transparent and comprehensive introduction of internal grievance mechanism <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> • Human Resources Policies and Procedures to ensure communication procedures upon employment, providing sufficient information of employee rights and obligations, especially with regards to non-local workforce • Provide transparency in recruitment process and ensure monitoring of third-party recruitment agencies and their processes, especially for foreign seasonal workforce; 	
	Grievance Mechanism and Remedy	Worker & Community	<p>In December 2022, a new Law “on the protection of whistle-blowers in the public interest” was adopted. The law would replace the 2004 legislation and represented Romania’s transposition of the European Union’s 2019 Whistleblowing Directive.¹⁰¹</p> <p>Local Community</p> <p>As part of the Stakeholder Engagement Plan (SEP) and in line with EP 4 Guidance Note a Community Grievance Mechanism (CGM) has been developed for the Project. The CGM provides a transparent and</p>	Low	<p>Mitigation measures integrated into Project’s ESMS:</p> <ul style="list-style-type: none"> • Construction Labour and Working Conditions Management Plan • Community Grievance Mechanism (CGM) • Workers Grievance Mechanism (WGM) 	Low

⁹⁹ *ibid.*

¹⁰⁰ [ROMANIA 2021 HUMAN RIGHTS REPORT \(state.gov\)](#)

¹⁰¹ [WEBPOL1056702023ENGLISH-2 \(1\).pdf](#)

			<p>predictable process of submitting complaints and guaranteeing anonymity to the complainant. The CGM is publicly available to the local community, and communication tools such as flyers and posters, in Romanian and English are distributed to inform the local population on how to submit a complaint with regards to the Project during both construction and operation phase. Detailed information of the CGM complaint submission and process flow is available in the SEP, as a standalone document of this ESIA</p>		<ul style="list-style-type: none"> Details of worker's grievance mechanism will be disclosed during the recruitment process and the employment period. <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> The CGM and the WGM shall be aligned to the UNGPs, Principle 29 and 31, in line with EP 4 Guidance and as international best practice. Periodic monitoring of CGM and WGM effectiveness is to be conducted and complaints submissions and resolutions shall be kept on file 	
	Job Security /Right to Work	Worker	<p>According to the national Labour Code, Art. 3. [right to work]: (1) The right to work is guaranteed by the Constitution. The right to work may not be abridged; (2) A person shall be free to choose his/her job and profession, trade or activity to perform; (3) No one may be forced to work or not to work at a specific workplace or in a specific profession, whichever they may be</p> <p>According to Art. 6. [employee protection]: An employee engaged in an occupation shall enjoy working conditions adequate to the activity carried out, social protection, health and safety at work, and respect of his/her dignity and conscience, without discrimination.</p> <p>However, international Human Rights Reports on Romania expressed concerns about the informal employment sector, remaining to be a pressing national issue. Informal employment continues to affect employees in Romania especially in retail, agriculture, hospitality, and construction sectors. Recently, the government declared to target limiting undeclared work, by imposing labour taxes and social contributions on employers also for part-time employees. Minorities, such as Roma people remain especially vulnerable to this risk, due to their lack of personal identifications documents and remaining "invisible"</p>	Medium	<p>Mitigation measures integrated into Project's ESMS:</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures Contractor and Supplier Management Plan. HR Department to ensure that workers understand the terms of their employment. This will include regularly informing workers of the short-term nature of their contract. 	Low

			to the system, and unable to receive social benefits, access health insurance, secure property documents, and participate in the labour market ¹⁰² In 2021 approximately 62000 Romanian citizens above the age of 14 did not poses personal identification documents, the main reason being they reside in informal settlements and housing.			
	Non-discrimination	Worker	<p>Despite the strong regulatory framework discrimination prevails as one of the societal issues that need to be systemically addressed. Gender, ethnicity, sexual orientation and physical or mental disability are among some of the main basis for discrimination that require greater attention in the country. According to ACCEPT a local NGO specialised in LGBTQI+, hate crimes were severely underreported and authorities have not initiated prosecution in any reported LGBTQI+ hate crime case since 2006. The law prohibits discrimination based on sexual orientation, however according to NGOs reporting that societal discrimination against LGBTQI+ persons was common but severely underreported.</p> <p>Ethnic minorities, most notably, the Roma community is another target of discrimination. Negative stereotypes and discriminatory language regarding Roma were widespread. Researchers and activists reported a significant number of the remaining Romani Holocaust survivors who applied for pensions were denied because of unreasonable administrative barriers raised by the pension offices, problematic standards, lack of knowledge regarding the Holocaust and Roma, and other burdensome requirements. Additionally, Roma groups complained that there were instances of police harassment and brutality.</p> <p>Citizens with disabilities are reported not to be able to access education, health services, public buildings, and transportation on an equal basis with others. Laws and regulations require such access, but the government did not fully implement the law, and discrimination against persons with disabilities remained a problem. There was no systemic integration of persons with disabilities into the workforce, and public bias against persons with disabilities persisted. The law requires companies or institutions with more than 50 employees to fill at least 4 percent of their positions with workers with disabilities. Many companies chose to pay the fine for noncompliance rather than meet the human resources requirements but may redirect half of penalties incurred to</p>	High	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> • Human Resources Policies and Procedures • Employment contracts to include a non-discrimination clause, respecting the right of non-discrimination • Periodic training to be provided to both Project management and workers, to raise awareness on discriminatory practices • Workforce Management Plan <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> • Comply with the national quota established of Art. 78, Law no. 448/2006, on employing people with disabilities, if Project falls under scope of the law. 	Low

¹⁰² https://www.state.gov/wp-content/uploads/2023/03/415610_ROMANIA-2022-HUMAN-RIGHTS-REPORT.pdf

			<p>purchase goods and services from “protected” or “social” enterprises employing persons with disabilities or at-risk groups.</p> <p>Gender based discrimination is present among female population, where women experienced discrimination in marriage, divorce, child custody, employment, credit, pay, owning or managing businesses or property, education, the judicial process, and housing. Segregation by profession existed, with women overrepresented in lower-paying jobs. There were reports of discrimination in employment. Women experienced discrimination in access to pension benefits and retirement.</p>			
	Occupational health and safety	Worker	<p>As for Occupational Health and Safety (OHS), the legislation hierarchy is a three layer structure with Constitution and Labour Code at the top, the Law no 319 of 2006 on Safety and Health at Work and the Methodological Norms for its application in the middle level and a larger base of Government Decisions that have more detailed provisions at the bottom. The Law on Safety and Health at Work provides the main legal framework for OHS. The Government Decisions are, in general, transpositions of different EU Directives on different OSH matters such as types of hazards, protective or work equipment, among others.</p> <p>The Ministry of Labour, through the Labour Inspectorate, is responsible for enforcing the law on working conditions, hours, minimum wage rates and OSH, though enforcement was not always effective. Penalties for violations were commensurate with those for similar crimes but were only applied sometimes against violators. Labour inspectors have the authority to make unannounced visits and initiate sanctions, but the number of inspectors has been insufficient to enforce compliance in all sectors. Additionally, the Labour Inspectorate collaborates with the National Authority for Fiscal Administration to conduct joint operations to check employers in sectors prone to underreported labour, including the textile, construction, security, cleaning, food preparation, transportation, and storage industries. These investigations often focused on underpayment of taxes rather than workers’ rights.</p> <p>Occupational safety and health standards were appropriate for the main industries, but compliance and enforcement remained weak. Workers can remove themselves from situations they deemed dangerous to their health or safety without jeopardy to their employment.</p> <p>According to the US States Department Human Rights Reporting from 2021, union leaders often claimed labour inspectors only superficially investigating workplace accidents, including ones involving fatalities,</p>	High	<p>Mitigation measures integrated into Project’s ESMS</p> <ul style="list-style-type: none"> • Health and Safety Policy - Ensure an occupational health and safety policy is in place, and staff are trained and practise requirements, especially for extreme working, such as working at heights during the wind turbine construction conditions. • Occupational Health and Safety Plan applicable to contractors of the Project • Human Resources Policies and Procedures • Provide workers with safety equipment to prevent occupational health issue and reduce the number of accidents at work; • Provide regular training on first aid and safety responses in order to 	Low

www.erm.com Version: 03 Project No.: 066726 Client: Low Carbon and Rezolv Energy 15 November 2023 Page 36

	Working hours	Worker	<p>Working hours are limited to 8 hours per day and 40 hours per week; for young people under the age of 18 working hours are limited to 6 hours per day and 30 hours per week.</p> <p>In the case of shift work, working time may exceed 8 hours per day and 48 hours per week, provided that the total number of working hours, calculated for a period of up to maximum 3 weeks, does not exceed 8 hours per day and 48 hours per week. Working time, including overtime, may exceptionally exceed 48 hours per week, provided that the average number of working hours, calculated for a reference period of 3 calendar months, does not exceed 48 hours per week.</p> <p>Under the Labour Code, the following rest periods are granted to employees: lunch break, daily rest, weekly rest and public holidays.¹⁰⁴</p>	Medium	Mitigation measures integrated into Project's ESMS <ul style="list-style-type: none"> Human Resources Policies and Procedures Employment contracts Workforce Management Plan Workers Grievance Mechanism 	Low
Civil and Political	Freedom of expression	Worker & Community	<p>In May 2021, the European Court of Human Rights (ECtHR) ruled against disproportionate restrictions to spontaneous protests. The ECtHR ruled that Romania violated the rights to freedom of expression and peaceful assembly in relation to a fine given for a spontaneous protest against a mining project. It found that, by applying the three days' notification requirement for assemblies to a small group protest lasting only a few minutes, authorities disproportionately restricted the protesters' rights and created a potentially chilling effect on public discourse.¹⁰⁵</p> <p>In December, a new Law "on the protection of whistleblowers in the public interest" was adopted. The law would replace the 2004 legislation and represented Romania's transposition of the European Union's 2019 Whistleblowing Directive</p>	Medium	Mitigation measures integrated into Project's ESMS <ul style="list-style-type: none"> Human Resources Policies and Procedures Stakeholder Engagement Plan Workforce Management Plan Community and Workers Grievance Mechanisms 	Low
	Right to life and security of person	Worker & Community	<p>Impunity was a significant problem in the security forces, particularly among police and gendarmerie. Police officers were frequently exonerated in cases of alleged beatings and other cruel, inhuman, or degrading treatment. Prosecutors were responsible for investigating abuses. The Directorate for Internal Review within the Romanian Police could conduct, under prosecutorial supervision, criminal investigations of abuses committed by members of the police as well as internal administrative investigations. The government took steps to increase respect for human rights by security forces. For example, the police and</p>	High	Mitigation measures integrated into Project's ESMS <ul style="list-style-type: none"> Security Personnel Management Plan Enhancement of local employment through sourcing employees from the direct Social Aoi and 	Low

¹⁰⁴ [https://eures.ec.europa.eu/living-and-working/living-and-working-conditions/living-and-working-conditions-romania_en#:~:text=Working%20hours%20are%20limited%20to,and%2030%20hours%20per%20week.WEBPOL1056702023ENGLISH-2 \(1\).pdf](https://eures.ec.europa.eu/living-and-working/living-and-working-conditions/living-and-working-conditions-romania_en#:~:text=Working%20hours%20are%20limited%20to,and%2030%20hours%20per%20week.WEBPOL1056702023ENGLISH-2%20(1).pdf)

¹⁰⁵ [Amnesty International Annual Report 2021/22](#)

		gendarmerie received training on a wide range of human rights issues, including gender equality, abuse against children, prevention of torture, gender-based violence, and preventing discrimination.		limiting the numbers of non-local workers Additional mitigation measures: <ul style="list-style-type: none">• Training to security personnel on proportionate use of force and human rights	
--	--	---	--	---	--

	Right to Land	Community	<p>The Constitution and the Land Circulation Law (Law no. 54/1998) contain a number of special rules covering ownership of plots of land, including the right of ownership (freehold); various usage rights (lease, usufruct, superficies); and rights under a concession According to the Law a due diligence process applies, when acquiring or leasing agricultural land for the process of construction.</p> <p>The Project affects the Land rights of the local communities, as individuals or groups may lose the right to occupy, use, access, control and transfer land during construction and operation phase.</p> <p>As part of the Project, more than two hundred farmers are currently leasing pastureland across the Aol in the five administrative territorial units (ATU) where the Project is to be implemented. In this regard, economic displacement may occur by project-related land acquisition or restriction of access to natural resources. This results in loss of assets or access to assets, thereby affecting income sources or means of livelihood. Furthermore, road closures or associated works are likely to affect access to farmland. Potential livelihood impacts are to be expected during construction stage. Approx. 133 ha are expected to be impacted by construction works, displacing the respective land area from the grazing surface available prior to the Project.</p>	Medium	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> • Project Land Acquisition Plan (LAP) • Livelihood Restoration Plan (LRP) • All land users shall be duly identified and compensated for reduction in subsidies, including both formal and informal land users and prior to accessing the land • Providing compensation for loss of assets at replacement cost; • Ensuring appropriate disclosure of information, consultation, and the informed participation of those affected 	Low
--	---------------	-----------	---	--------	--	-----

Group Rights / Heightened Risk of Vulnerability	Disability Rights	Worker	<p>The rights of disabled people are provided under the Romanian constitution and the Law no. 448/2006 Regarding the Protection and Promotion of the Rights of Disabled Persons.¹¹⁵</p> <p>The law regulates the rights and obligations of disabled persons granted for the purpose of social integration and inclusion. According to Article 4 in the Law, all the legal representatives in charge of promotion, observation and guarantee of the rights of disabled persons, shall ensure their application, established according to the provisions of the European social Chart, adopted in Strasbourg on 3rd of May 1996, ratified by Law no. 74/1999, and to the other internal and international documents in this field.</p> <p>According to Art. 78, Law no. 448/2006, disabled persons may be employed according to their professional background and labour capacity. All public or private employers having at least 50 employees, shall hire disabled persons representing at least 4% of the total number of employees. Not performing under this obligation is a subject to financial penalties.¹¹⁶</p> <p>As identified in the Non-discrimination Human Rights Issue of this assessment, people with mental or physical disabilities are subject to continuous discrimination in their daily lives and more often than not, prevented on participating in the labour market, as well as provided appropriate education levels.</p> <p>There seems to be no systemic integration of persons with disabilities into the workforce, and public bias against persons with disabilities persists. While NGOs worked to change attitudes and assist persons with disabilities in gaining skills and employment, the government lacked adequate programs to prevent discrimination.</p>	Medium	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> Human Resources Procedures and Policies Construction Labour and Working Conditions Management Plan <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> Code of Conduct to include commitment on non-discrimination and inclusivity also with regards to mental and physical disabilities Comply with the national quota established of Art. 78, Law no. 448/2006, on employing people with disabilities, if Project falls under scope of the law. 	Low
	Migrant's Rights	Worker	<p>Official statistics show a steady increase in the number of third-country nationals (TCNs) in the country, observed in the period between 2013 and 2020. The increase is mostly due to the increase in the number of migrant workers.</p> <p>Relevant legislations on the topic on migrant workers include Emergency ordinance no 194/2002 on the regime of aliens in Romania , as the regulatory framework for the entry, stay and exit of foreigners. It also defines their rights and obligations, as well as specific measures to control immigration; Law no. 122/2006 on asylum, establishes the legal status of aliens who are applying for protection in Romania and of persons granted subsidiary or international protection; and the government decision no. 1.521/2006 to approve the methodological</p>	High	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures Code of Conduct Worker Grievance Mechanism Contractor and Supplier Management Plan Construction Labour and Working Conditions Management Plan 	Low

			<p>norms for the enforcement of Law no 122/2006 that regulates the rights, obligations and assistance for asylum seekers and persons granted protection.¹⁰⁹</p> <p>According to NGOs, several incidents of harassment, discrimination, abuses against refugees and migrants, pushbacks, and deviations from asylum procedures at border areas occurred throughout the year, although most incidents were not reported because of fear, lack of information, inadequate support services, and inefficient redress mechanisms. Discrimination against migrant workers also occurred.¹⁰⁹ It can be expected that a large portion of the workforce recruited for the Project will be recruited from abroad and contracted by a 3rd party. This heightens the possibility of placing migrant's rights at risk.</p>		<p>Additional mitigation measures:</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures to ensure communication procedures upon employment, providing sufficient information of employee rights and obligations, especially with regards to non-local workforce 	
	Women's Rights & Gender Equality	Worker & Community	<p>The Constitution provides for protection on equal rights between men and women at the workplace, stating that men and women should be provided with equal pay for equal work. Law No.211/2004 protects victims from sexual violence, Law No.217/2003 covers domestic violence and intimate partner violence. The Romanian law on the prevention and fight against domestic violence was revised in 2012, expanding the definition of violence as well as the rights of victims.</p> <p>According to Government Ordinance 137/2000 republished in 2014 concerning preventing and sanctioning all discrimination forms, without any discrimination, each person who performs work must benefit from good working conditions, social protection, health and safety at work, with respect for their dignity and personal beliefs. Sexual harassment at work is a form of discrimination (Law 324/2006 Anti-discrimination Law, Article 2(5)) and is also defined in the Criminal Code, punishable by prison from three months to two years or fine.</p> <p>In August, the ECtHR found that Romania violated the right to private life when authorities failed to adequately investigate and ensure justice in the case of a woman applicant who, in 2017, filed a criminal complaint of sexual harassment against her boss. This was the first case in the history of the ECtHR to conclude that an inadequate response to alleged sexual harassment constituted a violation of the right to private life. As such, it represented an important milestone.¹¹⁰</p>	Medium	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> Human Resources Policies and Procedures Code of Conduct Construction Labour and Working Conditions Management Plan Workers and Community Grievance Mechanism Provide periodic GBVH training to all workers, incl. own workers, contactors, subcontractors, and core suppliers 	Low

¹⁰⁹ [ROMANIA 2022 HUMAN RIGHTS REPORT \(state.gov\)](#)

¹¹⁰ [WEBPOL1056702023ENGLISH-2 \(1\).pdf](#)

			<p>A 2022 to 2027 national strategy for the promotion of equal opportunities between women and men and the prevention and combating of domestic violence, which had been under public consultation since March 2021, was adopted in December.</p> <p>In the Social AoI it may be expected that the influx of male non-local workforce may increase the risk of GBVH incidents.</p>			
	Human Rights in the Supply Chain	Worker	<p>On February 23rd, 2022, the European Commission presented its proposal for a law on corporate sustainability obligations - the Corporate Sustainability Due Diligence Directive (CSDDD). European member countries agreed on an EU-wide supply chain law in December 2022. Next steps are expected in May 2023.</p> <p>Affecting human rights in the supply chain in this section refers to the workers involved in the production of equipment and goods (such as wind turbines) beyond the workforce of this project.</p> <p>Wind turbines rely on several critical minerals, including cobalt, copper, manganese and nickel, among others. The World Bank estimates a 250% rise in demand for key minerals used in wind turbines under a 2-degree climate scenario, including aluminum, chromium, copper, iron, lead, manganese, molybdenum, neodymium, nickel and zinc.¹¹¹</p> <p>As many of these minerals currently have limited recycling possibilities, new mining projects will be needed to meet the demand of wind power developers worldwide, which increases the risk of adverse human rights risks and impacts in the global supply chains of production of wind turbines.¹¹²</p> <p>According to the Business and Human Right Resource Centre, copper mining had the most allegations of all minerals related to human rights. The allegations raised concerns about a disconnect between policies and practice on the ground.</p> <p>As the wind industry supply chains are closely connected to human rights adverse risks, the companies and projects in the low carbon transition economy shall use their leverage towards respecting human rights.</p>	High	<p>Mitigation measures integrated into Project's ESMS</p> <ul style="list-style-type: none"> • Human Resources Policies and Procedures • Supplier Code of Conduct • Construction Labour and Working Conditions Management Plan • Workers Grievance Mechanism 	Medium

¹¹¹The Growing Role for Minerals and Metals in the Low Carbon Future [World Bank Document](#)

¹¹² [Human Rights in the Mineral Supply Chains of Wind Turbines \(business-humanrights.org\)](#)

Environmental related Risks	Right to clean environment and access to resources	Worker and Community	<p>Provided under Romanian Constitution 35 Article: "The State recognizes the right of everyone to a healthy environment and ecologically balanced", and establishes the duty natural and legal persons have to protect and improve the environment.</p> <p>To meet legal commitments entered internationally, Romania has ratified a number of 36 governmental and ministerial treaties in force in environmental protection and water management. EU environmental acquis covered over 450 directives, regulations and decisions, which are horizontal legislation and sectorial legislation on environmental protection.¹¹³</p> <p>A detailed analysis of the risks and potential impacts related to the right to clean environment and access to resources, including, but not limited to, air quality, noise, hazardous waste management etc. has been provided in the previous chapters of this Environmental Impact Assessment of this ESIA.</p>	High	<p>Standard mitigation measures:</p> <p>See EIA mitigation measures</p>	Low

7.2.7.4 Summary and conclusion

In the national context many human rights risks persist across Romania, particularly with regards to occupational health and safety practices, discrimination against gender, ethnicity and disability, abuse of force of national and private security, gender equality and migrants' rights. However, within the context of the Project, we consider that these risks can be adequately mitigated and addressed through the existing or planned procedures and plans of the ESMS and the additional mitigation measures listed in this report.

The results of the Human Rights Risk Assessment have not identified any residual 'High' risks which require further investigation and detailed assessment. After the implementation of mitigation measures outlined in section 7.2.7.3, the residual risk significance is expected to be low.

7.2.8 Landscape and Visual

7.2.8.1 Introduction

Baseline data was collected through desktop studies and the field survey. This information, as described in Chapter 6.3.2. – Key baseline conditions, has been utilised to identify and guide the assessment of potential impacts.

7.2.8.2 Potential Impacts

Landscape Value

Landscape sensitivity can be assessed by the ability of a particular landscape character to absorb aesthetic alterations. Landscape impacts may occur upon a landscape characteristic as a direct result of the presence of the Project within an area of a particular landscape character. The area identified for the Project has a predominant abundance of cropland and grassland.

The presence of the WTGs is likely to cause impacts to landscape value. The Project key activities that are likely to have negative impacts on landscape include site preparation, vegetation clearance and excavation.

Visual

Visual impacts refer mainly to the visual character changes of available views resulting from project development, such as obstruction of existing views; removal of screening elements, thereby exposing viewers to unsightly views; the introduction of new elements into the views; and intrusion of foreign elements into the viewshed of landscape features.

The presence of the WTGs is likely to cause impacts to visual.

7.2.8.3 Assessment of impacts:

Landscape Value Construction Phase

The potential impacts from the construction phase likely to have negative impacts on landscape, will include mainly vegetation clearance and site preparation. Impacts will be limited to areas adjacent to the Project (**Table 7-98**).

Table 7-98 Impact Assessment: Landscape Value (Construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of landscape are largely focused on the Project sites that will already be cleared of vegetation and levelled for construction
Duration	Short term	The impacts are short-term during the construction phase (approx. 23 months) and will cease upon completion of construction.
Scale	Small	Impacts of landscape are focussed on the Project sites that has been prepared for construction. The scale is considered small.

Frequency	Intermittent	The frequency is intermittent over the construction phase.
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium Sensitivity		
The sensitivity of the landscape resource is expected to be Medium, as character type identified has been modified in a way by human activities and it is considered to have good capacity to absorb the type of change envisaged by the Project.		
Significance Rating Before Mitigation		
Minor Negative Impact		
The impact significance of landscape is considered to be Minor.		

Landscape Value Operational Phase – N/A

Landscape Value Decommissioning Phase

Project decommissioning will take place upon ceasing of operation of the windfarm and will likely generate impacts on landscape associated with land restoration works, similar to activities developed during the construction phase. Overall, it is assumed that decommissioning will result in impacts similar in character and significance to those identified for the construction phase, but likely of shorter duration and with a lower volume of works.

Table 7-99 Impact Assessment: Landscape Value (Decommissioning)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of landscape are largely focused on the Project site that will already be cleared of vegetation and levelled for construction
Duration	Short term	The impacts are short-term during the construction phase (approx. 18 months) and will cease upon completion of construction.
Scale	Small	Impacts of landscape are focused on the Project site on which land/soil restoration works will be carried out. The scale is considered small.
Frequency	Intermittent	The frequency is intermittent over the decommissioning phase.
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Low Sensitivity		

The sensitivity of the landscape is expected to be Low, due to the general use of lands as pasture for animal husbandry and agriculture.

Significance Rating Before Mitigation

Negligible Negative Impact

The impact significance of landscape is considered to be Minor.

Visual Construction Phase

The visual impact is a product of the magnitude of change to the existing baseline conditions, the landscape context, and the sensitivities of Visual Sensitive Receptors.

Construction of the wind farm is likely to generate visual impacts associated with turbine erection and vehicle movement.

Table 7-100 Impact Assessment: Visual (Construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of visual affected an area in a radius of 30 km around the development Site
Duration	Short term	The impacts are short-term during the construction phase (approx. 18 months)
Scale	Small	Impacts on visual are focused on the Project site on which turbine erection works will be carried out.
Frequency	Intermittent	The frequency is intermittent over the construction phase.
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Low to Medium Sensitivity		
The sensitivity of the visual resource is expected to be Low to Medium, depending on whether they are places of residence or routes of passage.		
Significance Rating Before Mitigation		
Negligible to minor Negative Impact		
The impact significance on visual is considered to be Minor.		

Visual Operational Phase

When determining the significance of visual effects, the following is taken into account:

- Large scale changes which introduce new discordant or intrusive elements into the view are more likely to be significant than small changes or changes involving features already present in the view;
- Changes in views from recognized and important viewpoints or amenity routes are likely to be more significant than changes affecting less important paths and roads; and
- Changes affecting large numbers of people are generally more significant than those affecting a relatively small group of users. However, in wilderness landscapes the sensitivity of the people who use the areas may be very high and this will be reflected in the significance of effect.

The visual impact is a product of the magnitude of change to the existing baseline conditions, the landscape context, and the sensitivities of Visual Sensitive Receptors (VSRs).

The viewshed analysis shows that the proposed wind turbines have the potential to be visible in the nearby areas, although not continuously due to the variability of the landscape for the area surrounding the Project.

Specific considerations were made for each VSR, and the impact significance, receptor sensitivity, and impact magnitude is summarized in Table 7-101 and Table 7-102.

Table 7-101 Impact Assessment: Visual (Operational)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of visual affected an area in a radius of 30 km around the development Site
Duration	Long term	The impacts are long-term during the life of the Project.
Scale	Medium	Impacts of landscape are focussed an area in a radius of 30 km around the development Site. The scale is considered medium.
Frequency	Intermittent	The frequency is intermittent over the construction phase.
Magnitude		
Negligible to High Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Low to Medium Sensitivity		
The sensitivity of the visual resource is expected to be Low to Medium, depending on whether they are places of residence or routes of passage.		
Significance Rating Before Mitigation		
Negligible to Major Negative Impact		
The impact significance of landscape is considered to be Negligible to Major, depends on the VSR		

Table 7-102 Summary of Visual Impact

VSR	Site	Distance to nearest wind turbine	Project visibility	Sensitivity of receptor	Magnitude of visual effect	Significance of visual effect
VSR01	On the outskirts of Pogoanele	4.2 km	Visible	Medium	Small	Minor
VSR02	Near Buzau river	4.1 km	Visible	Medium	Small	Minor
VSR03	From Buzau	6.5 km	Not visible	Medium	Negligible	Negligible
VSR04	Agricultural area near Maxenu	2.3 km	Visible	Medium	High	Major
VSR05	From Ulmeni	10.8 km	Visible	Medium	Small	Minor
VSR06	Near village, along the road	13.4 km	Not visible	Low	Negligible	Negligible
VSR07	Near village, along the road	16.4 km	Not visible	Low	Negligible	Negligible
VSR08	From Saranga	13.3 km	Visible	Medium	Small	Minor
VSR09	Along a road	22 km	Not visible	Low	Negligible	Negligible
VSR10	Near Vacareasca	20.2 km	Visible	Medium	Small	Minor
VSR11	Along a road between Glodeanu-Silistea and Cotorca	20.4 km	Not visible	Low	Small	Negligible
VSR12	Near a village	21 km	Not visible	Medium	Negligible	Negligible
VSR13	Near a village	22.7 km	Not visible	Medium	Negligible	Negligible
VSR14	Near Filipesti	24.2 km	Not visible	Medium	Negligible	Negligible
VSR15	Near Dedulesti	29 km	Not visible	Medium	Negligible	Negligible
VSR16	Agricultural area near Ciresu	23.2 km	Not visible	Medium	Negligible	Negligible
VSR17	Along a road	27.8 km	Visible	Low	Negligible	Negligible
VSR18	From Ulmu	21.2 km	Visible	Medium	Small	Minor
VSR19	From Jugureanu	18.3 km	Not visible	Medium	Negligible	Negligible
VSR20	From Buzau	15.5 km	Visible	Medium	Medium	Medium
VSR21	From Odaia Banului	760 m	Visible	Medium	Small	Minor
VSR22	Along a road	23.4 km	Visible	Low	Small	Negligible
VSR23	From Grindu	22.2 km	Visible	Medium	Small	Minor
VSR24	Along the railway	2.9 km	Visible	Low	Medium	Minor
VSR25	Along a road	10.2 km	Visible	Medium	Medium	Moderate
VSR26	Along a road	14.1 km	Visible	Low	Small	Negligible

A selection was made from the VSRs, considering distances and receptor type, wireframes and photomontages are visible in the graphics sheets below.

Figure 7-29 outlines how the graphic sheets below are organized (**Figure 7-30** to **Figure 7-41**), with sections matching these numbered descriptions:

1. Location and direction of VSR;
2. Distance and visibility of turbines within view;
3. Photo current state;
4. Photo simulation;
5. Wireframe view
6. Construction line; and

7. Summary of visual impact.

Figure 7-29 Legend of Visual Graphic Sheets



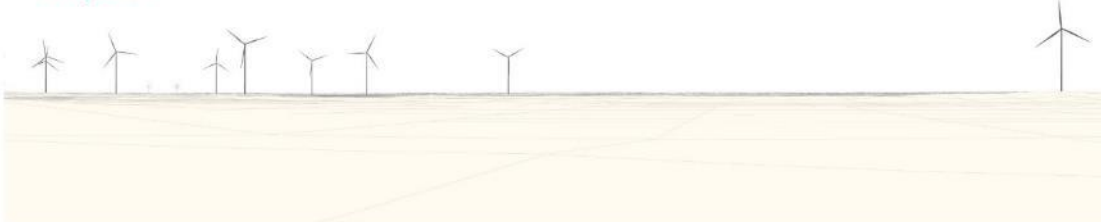
Figure 7-30 Photomontage for VSR1



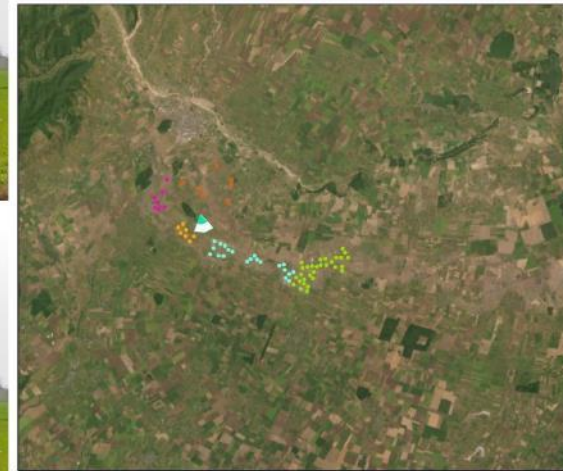


Figure 7-31 Photomontage for VSR4



Current**Photomontage****Wireframe****Construction lines**

Coordinate System
WGS84 - Zone 35N
X - 487964 Y - 4988325

VSR04**(2 of 6)**

Costesti Tintesti Gheraseni Luciu Smeeni

View direction: 170 degree

WTGs in the field of view (FoV) 14
Nearest WTG in the FoV 2.6 km
Farther WTG in the FoV 21.3 km
WTGs visible in the wireframe mode only considering terrain surface
⇒ at tip height 14
⇒ at hub height 14

The view is taken in the Agricultural area near Maxenu, the sensitivity level is therefore considered to be Medium.

Given the proximity, the turbines are visible. The magnitude level is therefore considered to be High.

Sensitivity	Magnitude	Significance
Medium	High	Major

Current



Photomontage



Wireframe

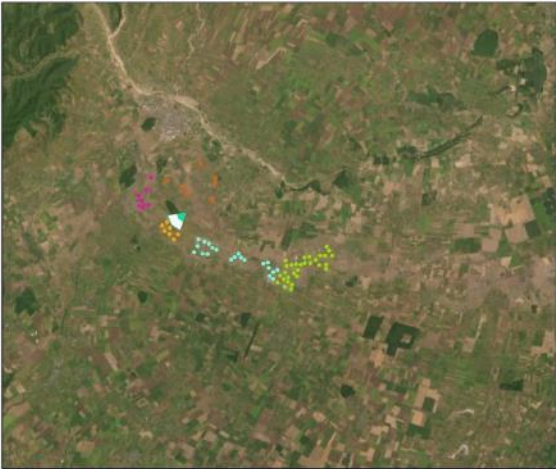


Construction lines



Coordinate System
WGS84 - Zone 35N
X - 487964 Y - 4988325

VSR04
(3 of 6)



Costesti Tintesti Gheraseni Luciu Smeeni

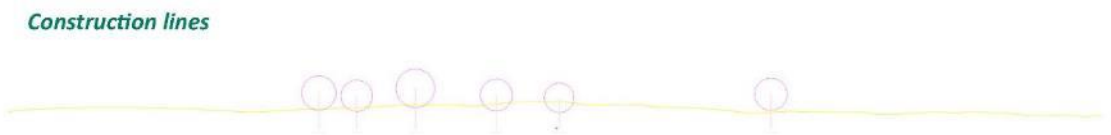
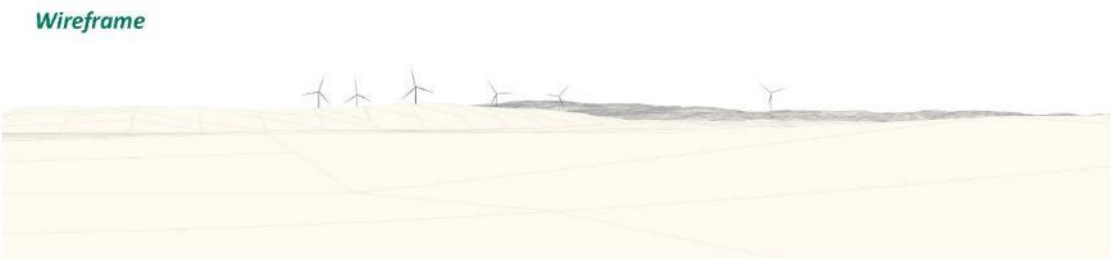
View direction: 230 degree

WTGs in the field of view (FoV) 6
Nearest WTG in the FoV 2.3 km
Farther WTG in the FoV 3.3 km
WTGs visible in the wireframe mode only considering terrain surface
⇒ at tip height 6
⇒ at hub height 6

The view is taken in the Agricultural area near Maxenu, the sensitivity level is therefore considered to be Medium.

Given the proximity, the turbines are visible. The magnitude level is therefore considered to be High.

Sensitivity	Magnitude	Significance
Medium	High	Major



Coordinate System
WGS84 - Zone 35N
X - 487964 Y - 4988325

VSR04
(4 of 6)

Costesti Tintesti Gheraseni Luciu Smeeni

View direction: 290 degree

WTGs in the field of view (FoV) 6
Nearest WTG in the FoV 4.3 km
Farther WTG in the FoV 5.7 km
WTGs visible in the wireframe mode only considering terrain surface
⇒ at tip height 6
⇒ at hub height 6

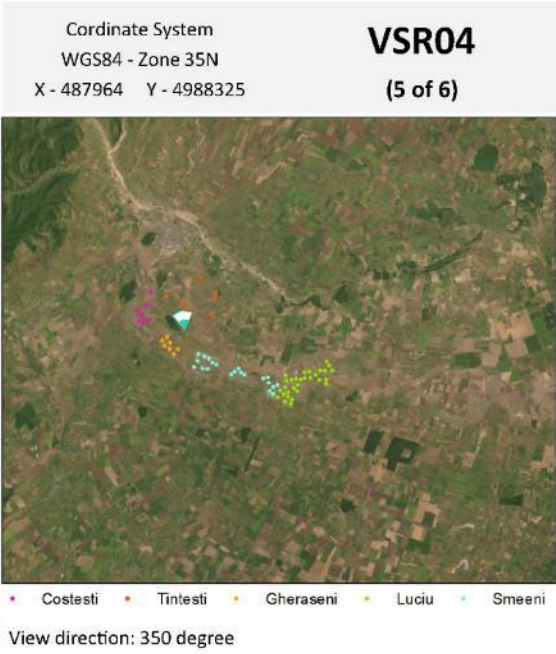
The view is taken in the Agricultural area near Maxenu, the sensitivity level is therefore considered to be Medium.

Given the proximity, the turbines are visible. The magnitude level is therefore considered to be High.

Sensitivity	Magnitude	Significance
Medium	High	Major



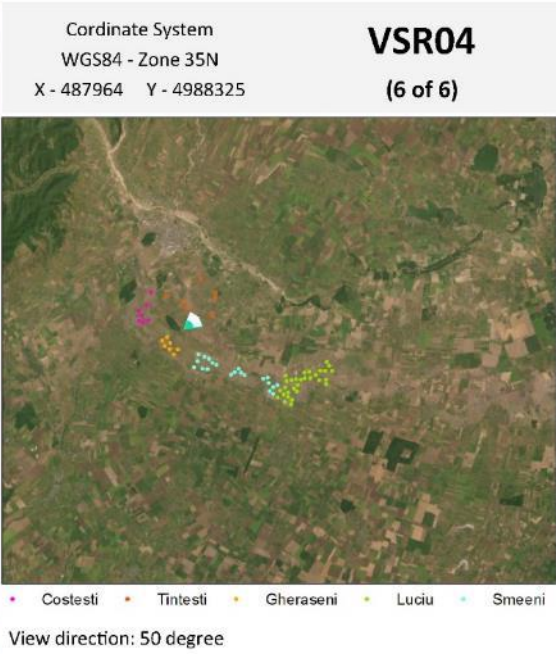
Wireframe



WTGs in the field of view (FoV) 4
Nearest WTG in the FoV 2.3 km
Farther WTG in the FoV 6.1 km
WTGs visible in the wireframe mode only considering terrain surface
⇒ at tip height 4
⇒ at hub height 4

The view is taken in the Agricultural area near Maxenu, the sensitivity level is therefore considered to be Medium.
Given the proximity, the turbines are visible. The magnitude level is therefore considered to be High.

Sensitivity	Magnitude	Significance
Medium	High	Major



WTGs in the field of view (FoV) 3
Nearest WTG in the FoV 3.5 km
Farther WTG in the FoV 5.5 km
WTGs visible in the wireframe mode only considering terrain surface
⇒ at tip height 3
⇒ at hub height 3

The view is taken in the Agricultural area near Maxenu, the sensitivity level is therefore considered to be Medium.

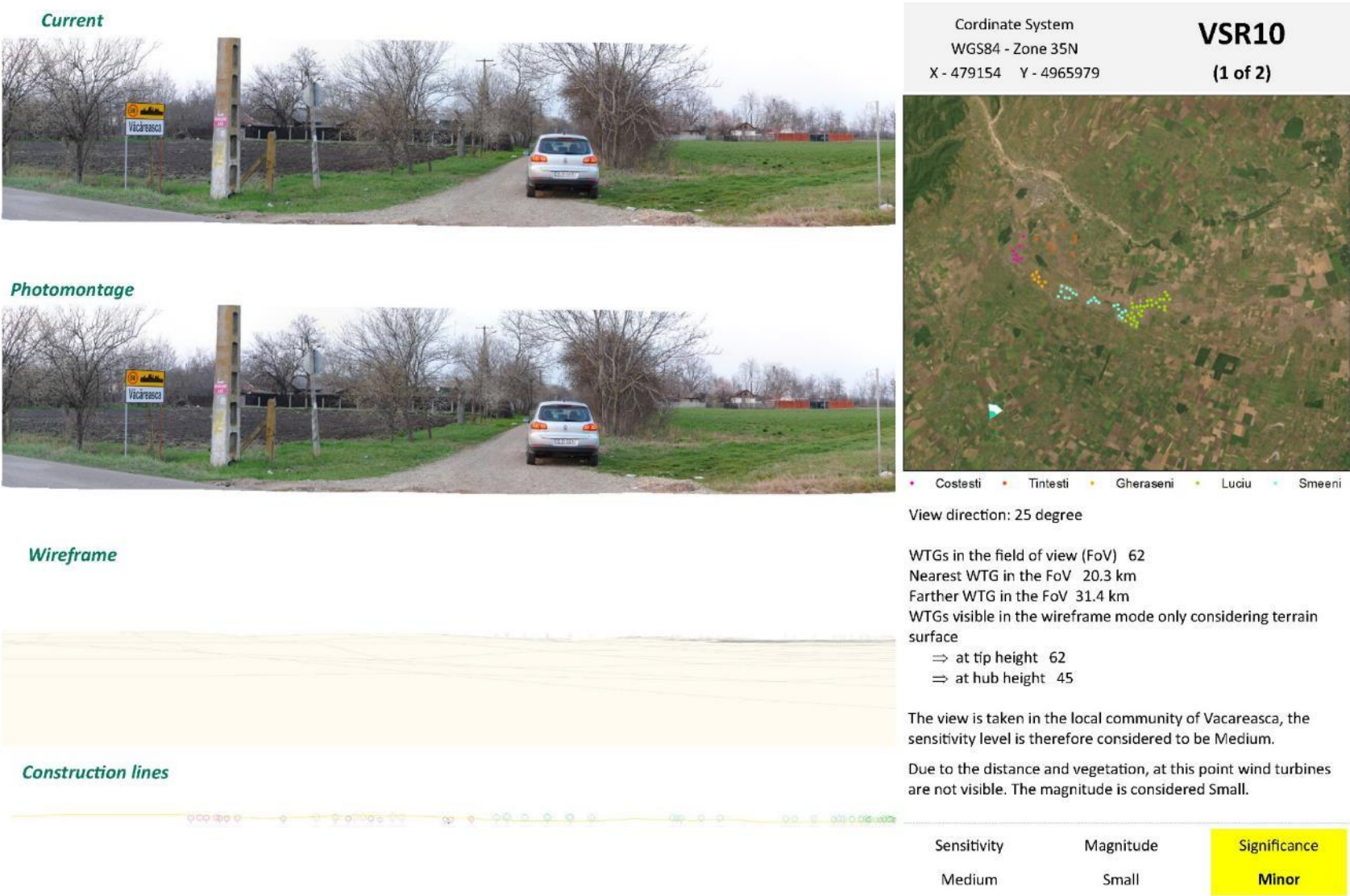
Given the proximity, the turbines are visible. The magnitude level is therefore considered to be High.

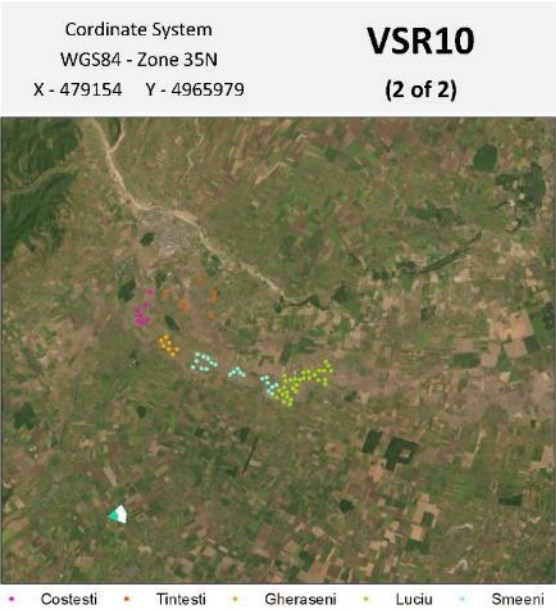
Sensitivity	Magnitude	Significance
Medium	High	Major

Figure 7-32 Photomontage for VSR5



Figure 7-33 Photomontage for VSR10





View direction: 78 degree

WTGs in the field of view (FoV) 36
Nearest WTG in the FoV 23.9 km
Farther WTG in the FoV 31.4 km
WTGs visible in the wireframe mode only considering terrain surface
⇒ at tip height 36
⇒ at hub height 36

The view is taken in the local community of Vacareasca, the sensitivity level is therefore considered to be Medium.

Due to the distance and vegetation, at this point wind turbines are not visible. The magnitude is considered Small.

Sensitivity	Magnitude	Significance
Medium	Small	Minor

Figure 7-34 Photomontage for VSR12

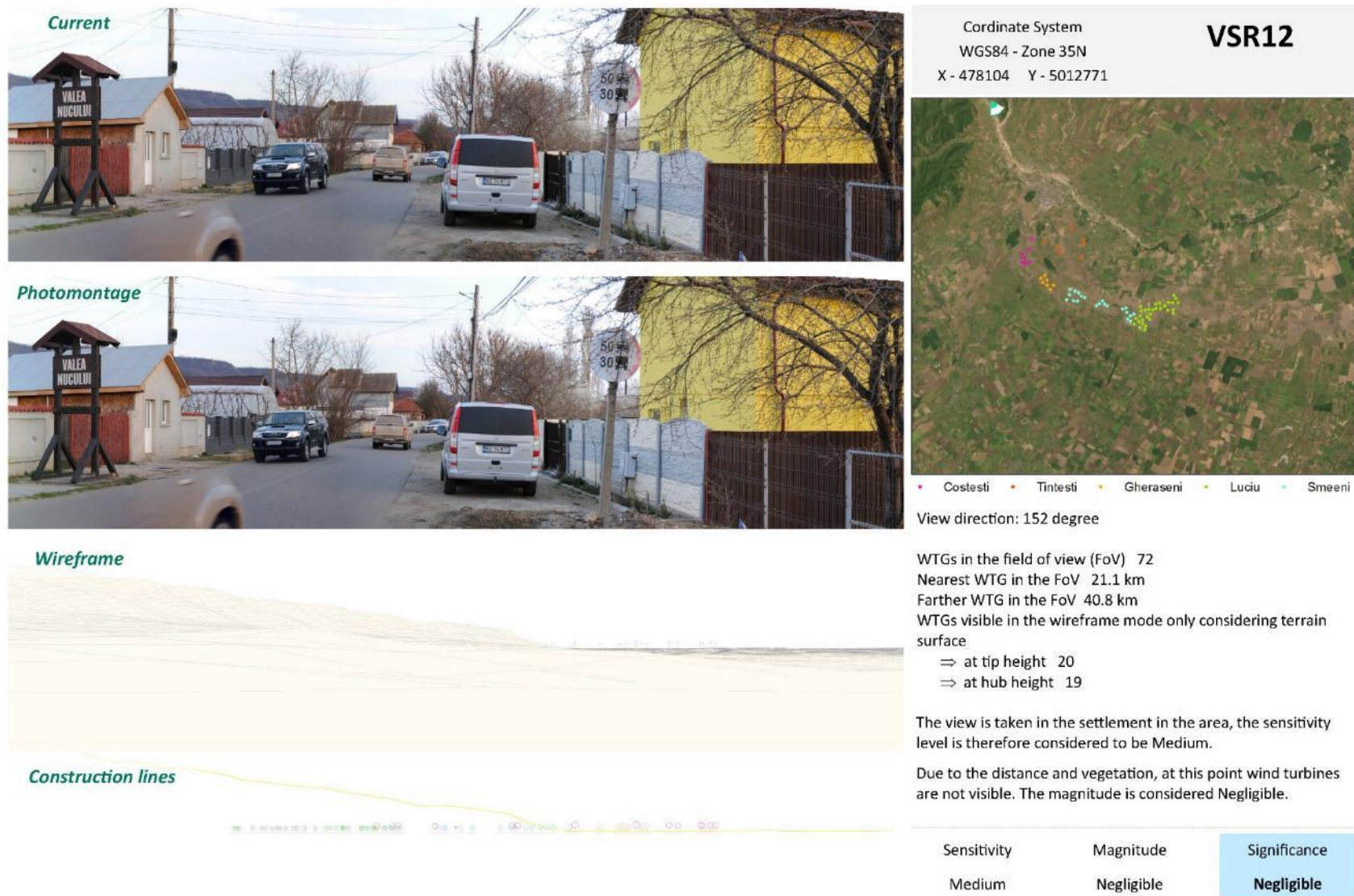


Figure 7-35 Photomontage for VSR14



Figure 7-36 Photomontage for VSR18

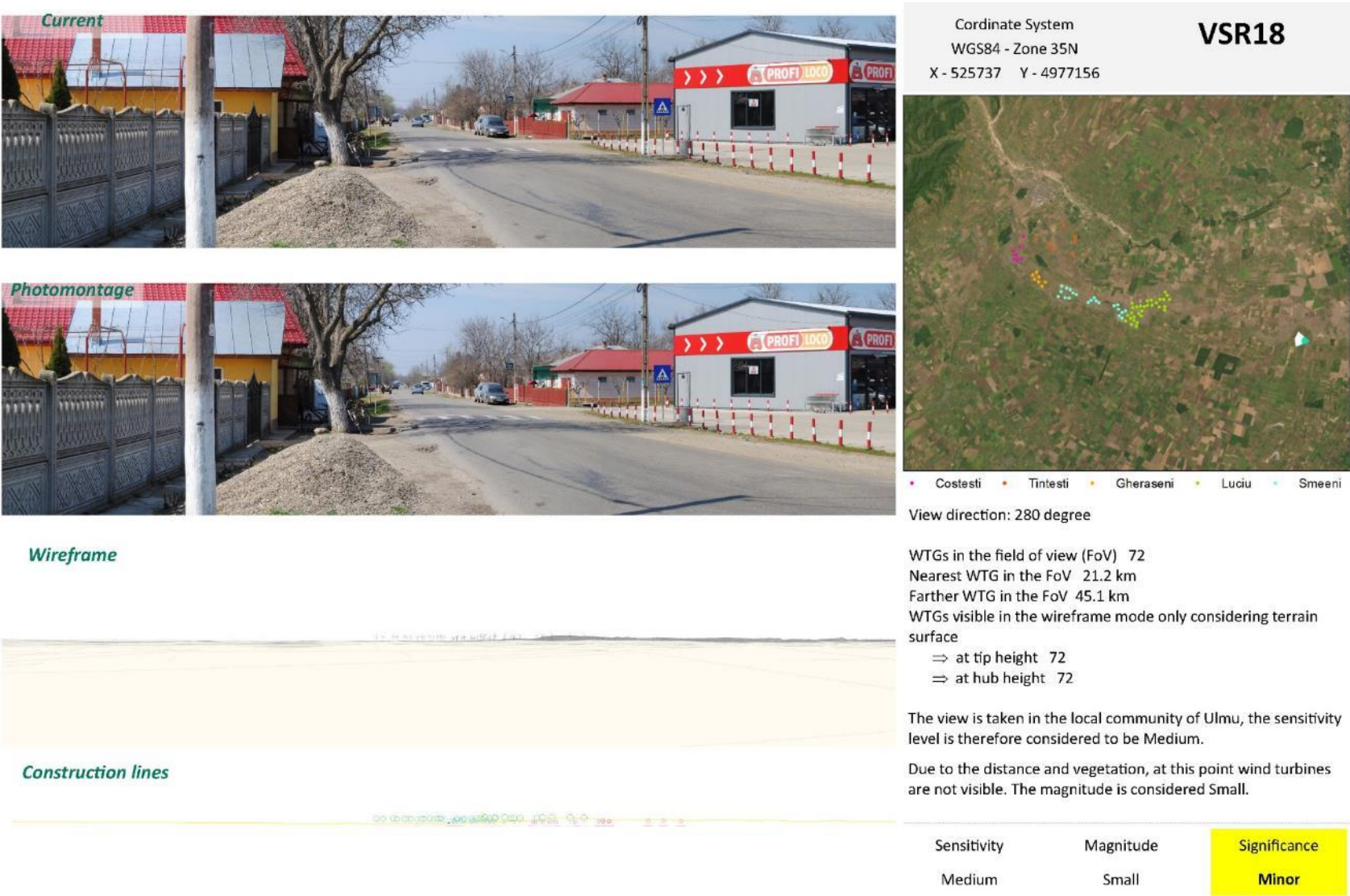
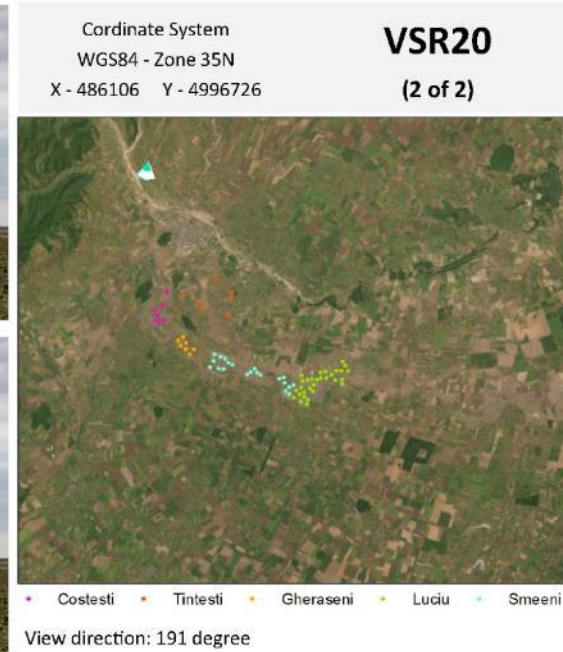


Figure 7-37 Photomontage for VSR21





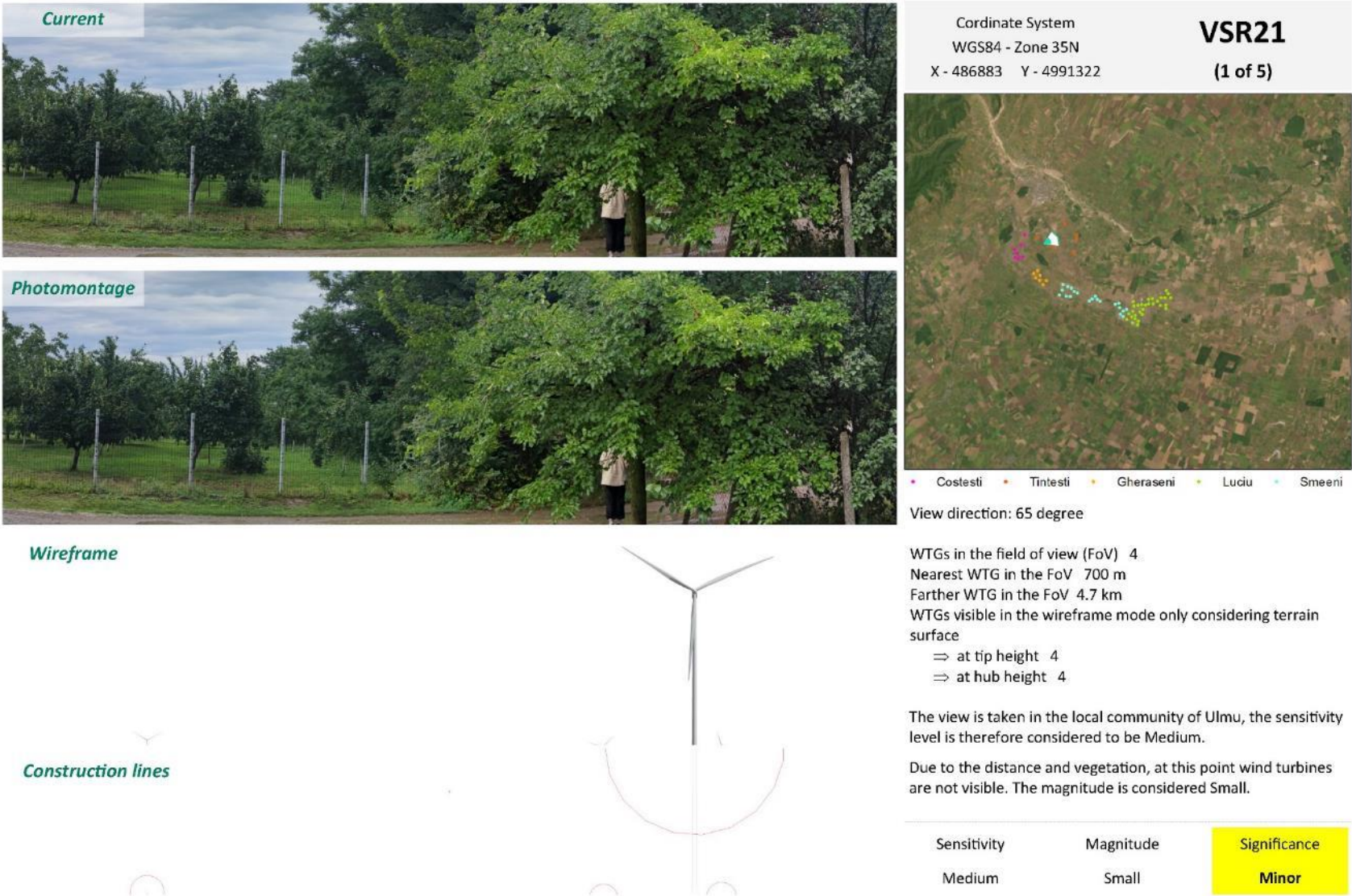
WTGs in the field of view (FoV) 23
 Nearest WTG in the FoV 4.6 km
 Farther WTG in the FoV 14 km
 WTGs visible in the wireframe mode only considering terrain surface
 ⇒ at tip height 23
 ⇒ at hub height 23

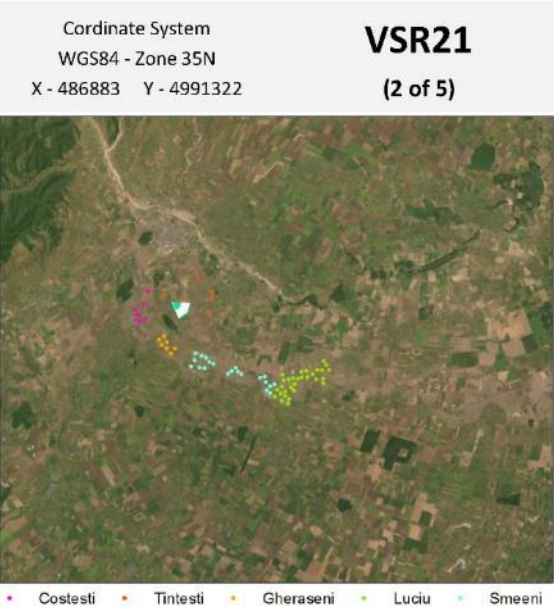
The view is taken in the local community of Ulmu, the sensitivity level is therefore considered to be Medium.

Due to the distance and vegetation, at this point wind turbines are not visible. The magnitude is considered Medium.

Sensitivity	Magnitude	Significance
Medium	Medium	Moderate

Figure 7-38 Photomontage for VSR21





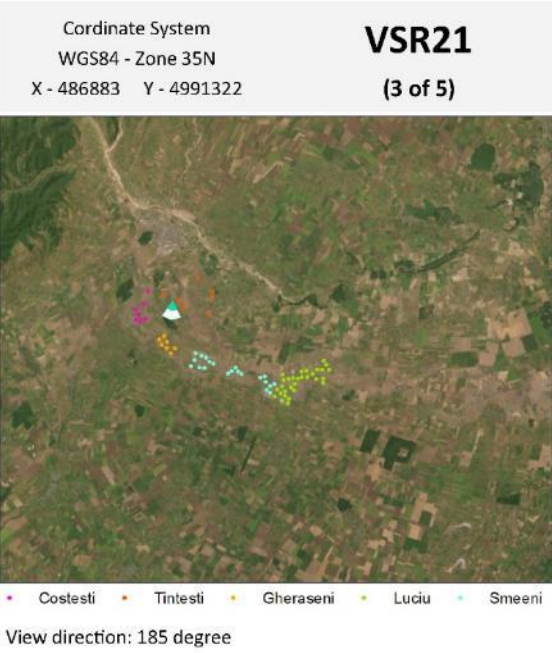
View direction: 125 degree

WTGs in the field of view (FoV) 49
Nearest WTG in the FoV 1.4 km
Farther WTG in the FoV 20 km
WTGs visible in the wire frame mode only considering terrain surface
⇒ at tip height 49
⇒ at hub height 49

The view is taken in the local community of Ulmu, the sensitivity level is therefore considered to be Medium.

Due to the distance and vegetation, at this point wind turbines are not visible. The magnitude is considered Small.

Sensitivity	Magnitude	Significance
Medium	Small	Minor

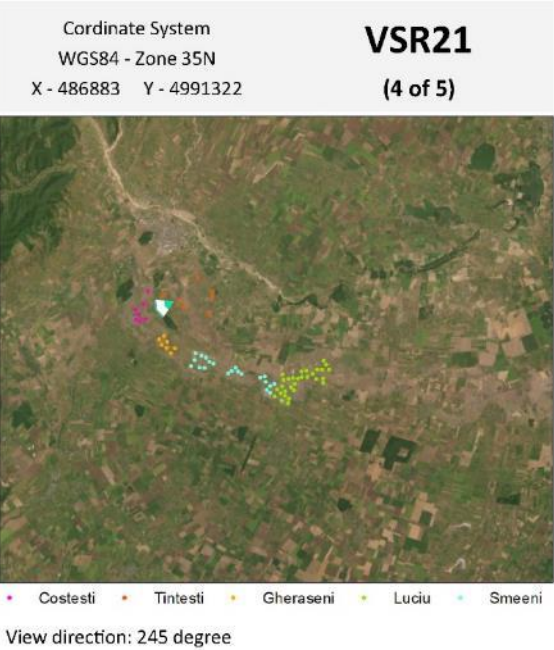
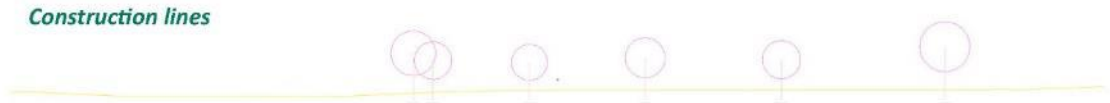


WTGs in the field of view (FoV) 12
Nearest WTG in the FoV 4.2 km
Farther WTG in the FoV 8.7 km
WTGs visible in the wireframe mode only considering terrain surface
⇒ at tip height 12
⇒ at hub height 12

The view is taken in the local community of Ulmu, the sensitivity level is therefore considered to be Medium.

Due to the distance and vegetation, at this point wind turbines are not visible. The magnitude is considered Small.

Sensitivity	Magnitude	Significance
Medium	Small	Minor

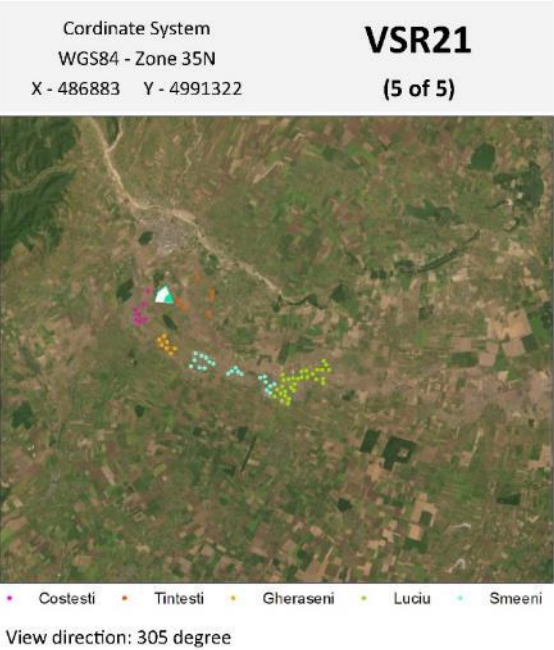
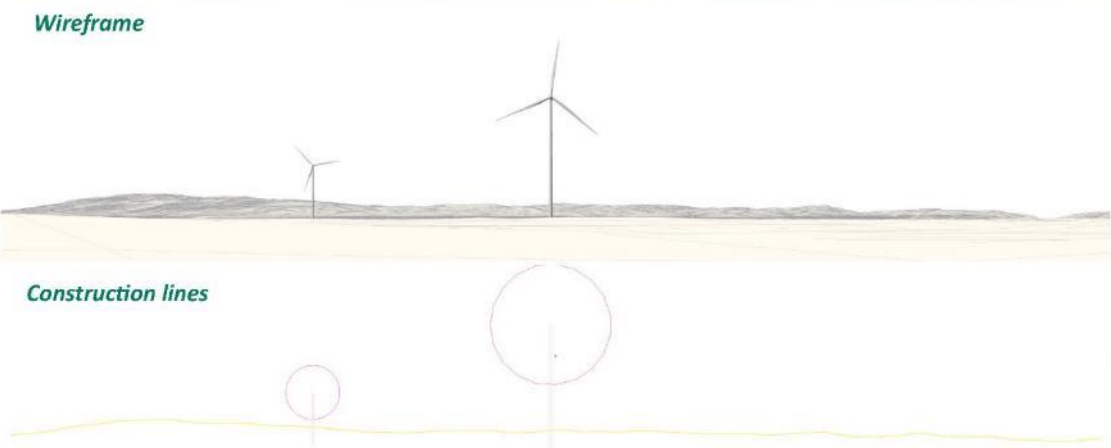


WTGs in the field of view (FoV) 6
Nearest WTG in the FoV 3.3 km
Farther WTG in the FoV 4.7 km
WTGs visible in the wireframe mode only considering terrain surface
⇒ at tip height 6
⇒ at hub height 6

The view is taken in the local community of Ulmu, the sensitivity level is therefore considered to be Medium.

Due to the distance and vegetation, at this point wind turbines are not visible. The magnitude is considered Small.

Sensitivity	Magnitude	Significance
Medium	Small	Minor



WTGs in the field of view (FoV) 2
Nearest WTG in the FoV 1.4 km
Farther WTG in the FoV 3.1 km
WTGs visible in the wireframe mode only considering terrain surface
⇒ at tip height 2
⇒ at hub height 2

The view is taken in the local community of Ulmu, the sensitivity level is therefore considered to be Medium.

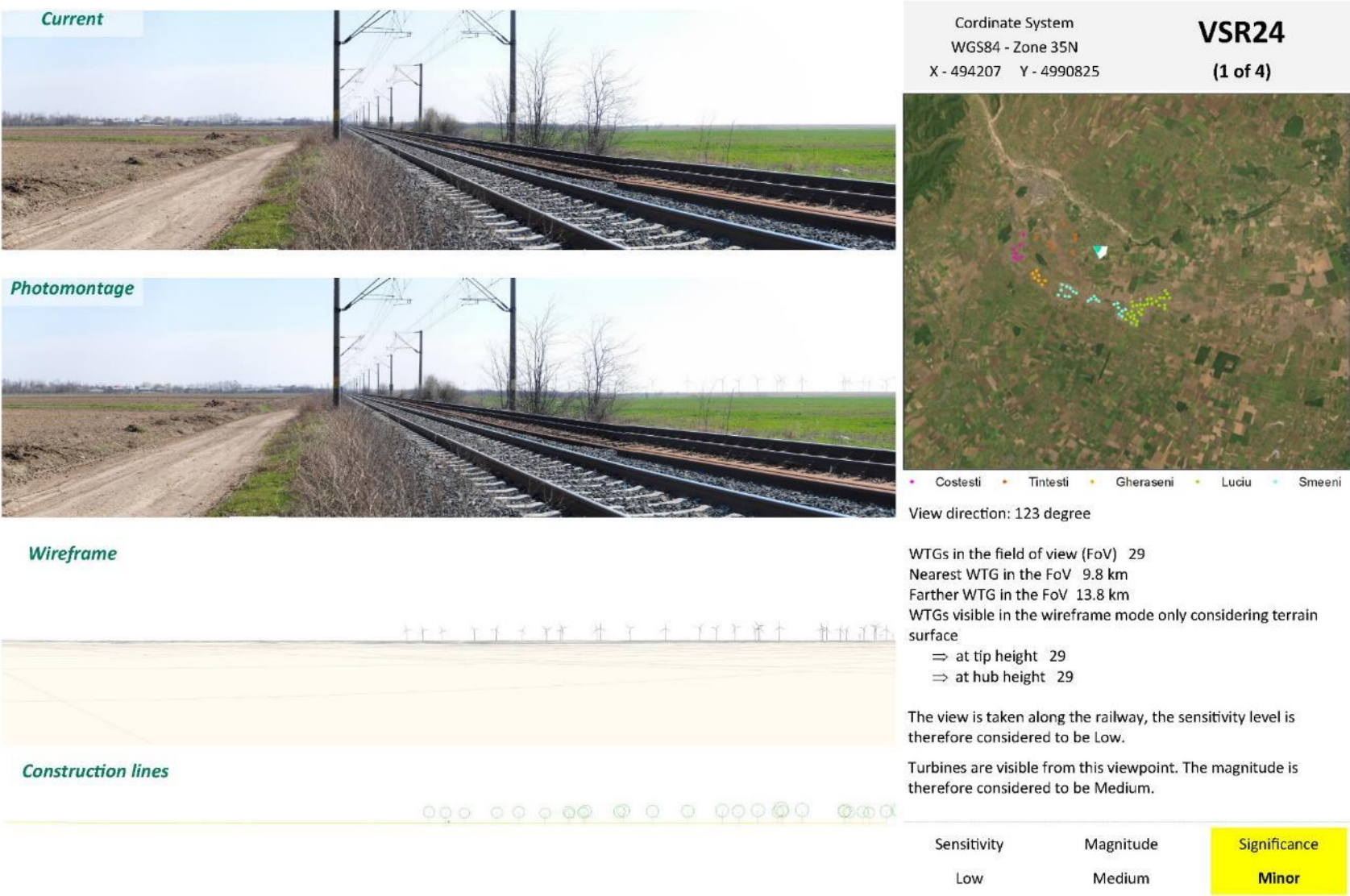
Due to the distance and vegetation, at this point wind turbines are not visible. The magnitude is considered Small.

Sensitivity	Magnitude	Significance
Medium	Small	Minor

Figure 7-39 Photomontage for VSR23



Figure 7-40 Photomontage for VSR24



Coordinate System

WGS84 - Zone 35N

X - 494207 Y - 4990825

VSR24

(1 of 4)



Costesti

Tintesti

Gheraseni

Luciu

Smeeni

View direction: 123 degree

WTGs in the field of view (FoV) 29

Nearest WTG in the FoV 9.8 km

Farther WTG in the FoV 13.8 km

WTGs visible in the wireframe mode only considering terrain surface

⇒ at tip height 29

⇒ at hub height 29

The view is taken along the railway, the sensitivity level is therefore considered to be Low.

Turbines are visible from this viewpoint. The magnitude is therefore considered to be Medium.

Sensitivity	Magnitude	Significance
Low	Medium	Minor

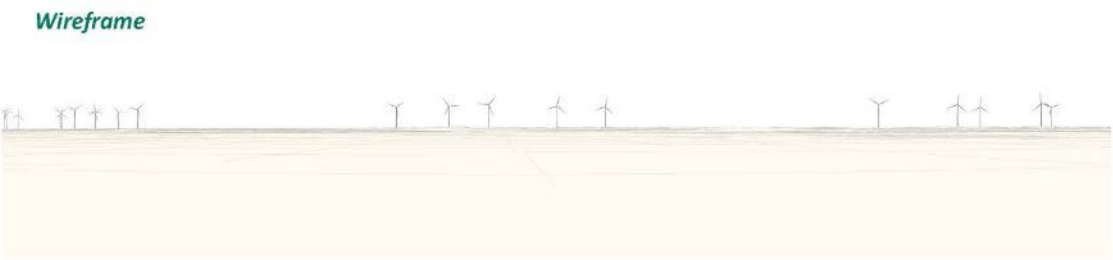
Current



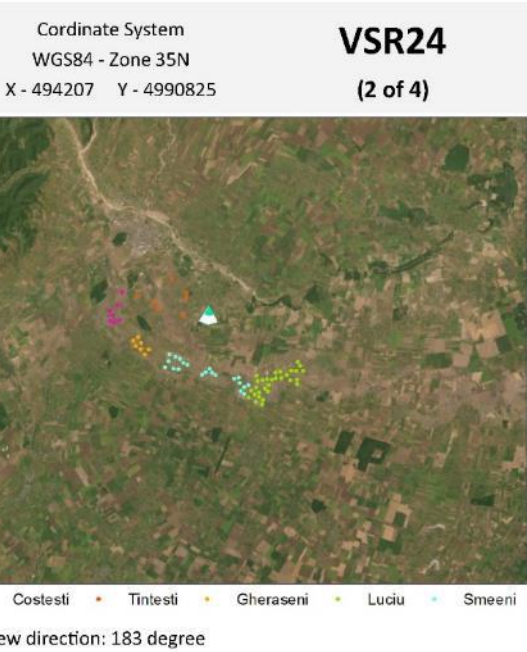
Photomontage



Wireframe



Construction lines

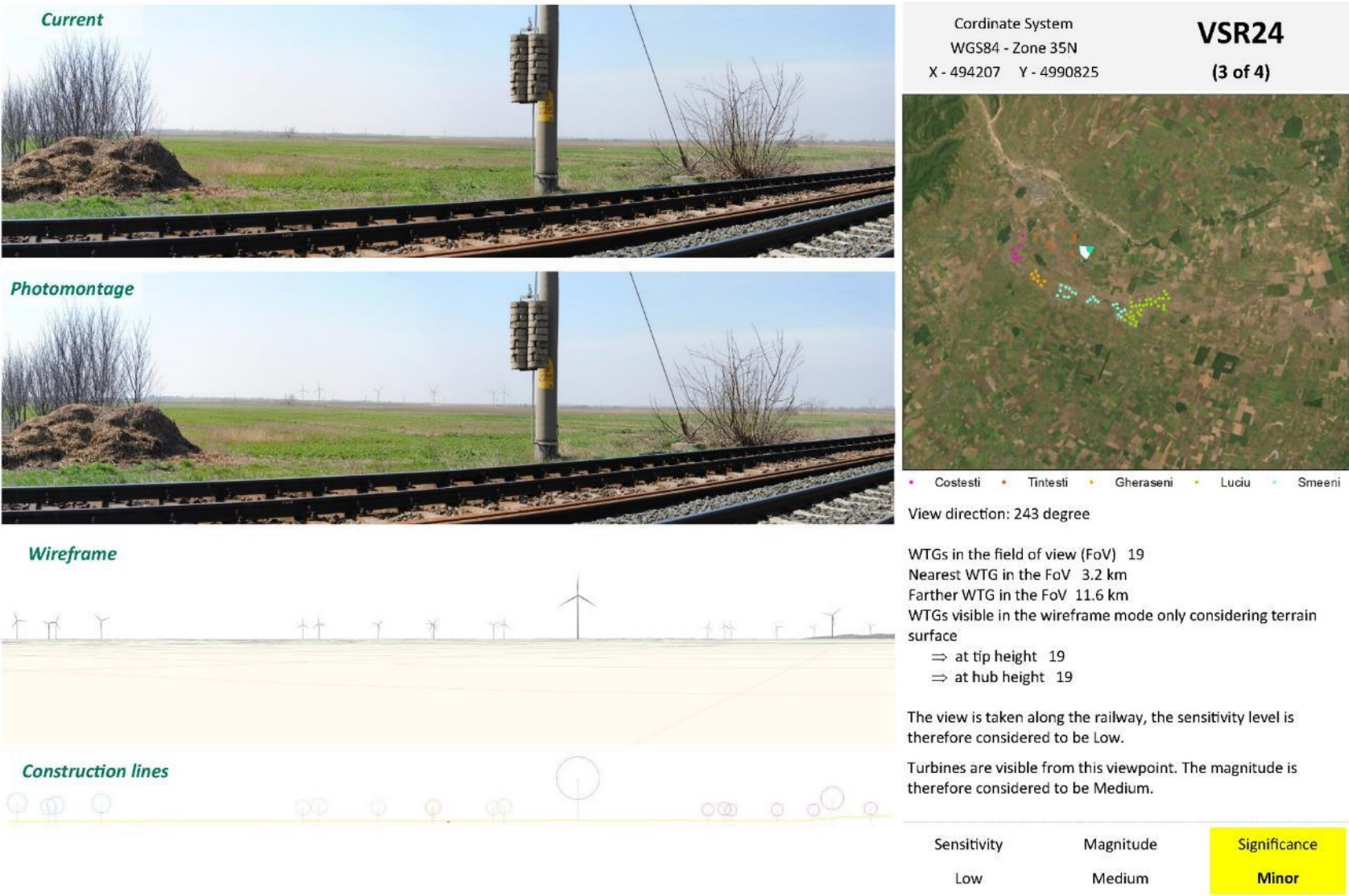


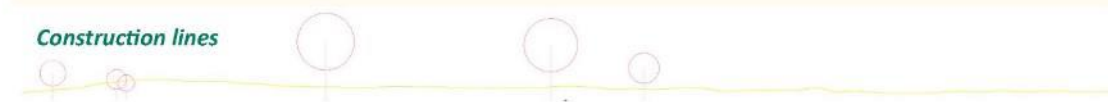
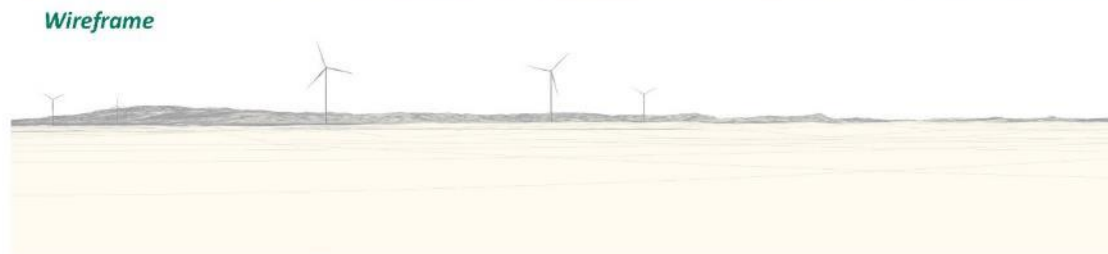
WTGs in the field of view (FoV) 20
Nearest WTG in the FoV 7 km
Farther WTG in the FoV 12.5 km
WTGs visible in the wireframe mode only considering terrain surface
⇒ at tip height 20
⇒ at hub height 20

The view is taken along the railway, the sensitivity level is therefore considered to be Low.

Turbines are visible from this viewpoint. The magnitude is therefore considered to be Medium.

Sensitivity	Magnitude	Significance
Low	Medium	Minor





Coordinate System
WGS84 - Zone 35N
X - 494207 Y - 4990825

VSR24
(4 of 4)



• Costesti • Tintesti • Gheraseni • Luciu • Smeeni

View direction: 303 degree

WTGs in the field of view (FoV) 6
Nearest WTG in the FoV 2.9 km
Farther WTG in the FoV 10.3 km
WTGs visible in the wireframe mode only considering terrain surface
⇒ at tip height 6
⇒ at hub height 6

The view is taken along the railway, the sensitivity level is therefore considered to be Low.

Turbines are visible from this viewpoint. The magnitude is therefore considered to be Medium.

Sensitivity	Magnitude	Significance
Low	Medium	Minor

Figure 7-41 Photomontage for VSR26



Coordinate System

WGS84 - Zone 35N

X - 518534 Y - 4988734

VSR26

View direction: 260 degree

WTGs in the field of view 72

Nearest WTG in the FoV 14.2 km

Farther WTG in the FoV 36 km

WTGs visible in the wireframe mode only considering terrain surface

⇒ at tip height 72

⇒ at hub height 73

The view is taken along a road, the sensitivity level is therefore considered to be Low.

Turbines are visible from this viewpoint but blend in with the existing line of pylons. The magnitude is therefore considered to be

Sensitivity	Magnitude	Significance
Low	Small	Negligible

Visual Decommissioning Phase

- Project decommissioning will take place upon ceasing of operation of the windfarm and will likely generate impacts on visual associated with turbine removal, similar to activities developed during the construction phase.
- Overall, it is assumed that decommissioning will result in impacts similar in character and significance to those identified for the construction phase, but likely of shorter duration and with a lower volume of works.

Table 7-103 Impact Assessment: Visual (Decommissioning)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of visual affected an area in a radius of 30 km around the development Site
Duration	Short term	The impacts are short-term during the decommissioning phase (approx. 12 months)
Scale	Small	Impacts on visual are focused on the Project site on which turbine removal works will be carried out. The scale is considered small.
Frequency	Intermittent	The frequency is intermittent over the decommissioning phase.
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Low Sensitivity		
The sensitivity of the visual is expected to be Low, due to the general use of lands as pasture for animal husbandry and agriculture.		
Significance Rating Before Mitigation		
Negligible Negative Impact		
The impact significance on visual is considered to be Negligible.		

■

7.2.8.4 Mitigation Measures

Landscape Value

In order to mitigate the landscape impacts, there are different actions that should be considered, especially during the construction phase, such as:

- Demarcate construction boundaries and minimize areas of surface disturbance;
- Where possible, locate laydown areas and construction camps in areas that are already disturbed or cleared of vegetation;

- For the construction site maintenance, conduct good housekeeping on site to avoid litter and minimize waste;
- Use existing tracks/roads for access, where possible; and
- Within the environmental management system, prepare a restoration management plan including replanting indigenous species, and landscaping and rehabilitating construction yards.

Visual

The following identifies mitigation measures to be applied for visual impacts, including:

- Where possible, locate laydown areas and construction camps in areas that are already disturbed or cleared of vegetation;
- For the construction site maintenance, conduct good housekeeping on site to avoid litter and minimize waste;
- Minimize night lighting while guaranteeing the minimum safety level;
- Use of materials that will minimize light reflection should be used for all Project components;
- Bright patterns and obvious logos should be avoided on WTG;
- The replacement of wind turbines with visually different wind turbines can result in visual clutter, therefore wind turbines with the same or a visually similar model should be used for replacements; and
- Existing vegetation should be retained to the greatest extent possible. Vegetation should be retained along roads, and other Project infrastructure.

7.2.8.5 Residual Impact Significance

Table 7-104 shows the residual adverse impacts on landscape and visual, with application of the mitigation measures.

Table 7-104 Pre- and Post-mitigation: Landscape and visual

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Landscape value	Construction	Minor	Minor
Landscape value	Operation	NA	NA
Landscape value	Decommissioning	Negligible	Negligible
Visual	Construction	Minor	Minor
Visual	Operation	Negligible to Major	Negligible to Major
Visual	Decommissioning	Negligible	Negligible

7.2.9 Shadow flicker, Ice throwing

7.2.9.1 Introduction

Worldwide the status of the legislation related to shadow flickering is not homogenous. In several countries, shadow flickering is not falling under specific regulations but frequently, the assessment of the potential impacts is driven by guidelines.

7.2.9.2 National Standards

Globally, several countries have been identified national guidelines to evaluate and assess the potential impacts related shadow flickering. As the shadow flickering is relevantly affected by the sun angle at the horizon, it is considered to be more relevant at higher latitudes, leading northern and southern countries to publish specific technical guidelines.

It should be noted that most countries have based their regulations on the German Guideline “Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (WEA-Schattenwurf-Hinweise)” (Guideline for Identification and Evaluation of the Optical Emissions of Wind Turbines). This document states a limit value of 30 hours per year and 30 minutes per day for the astronomical maximum possible shadow (worst case), whilst real case must be limited to 8 hours per year.

The following Table 7-105 is reporting the most relevant guidelines currently existing worldwide and able to inform and influence international best practices and standards.

Table 7-105 Relevant National Standards

Country	Reference	Relevant Notes
England	<p>Planning for Renewable Energy - A companion guide to PPS22 – Office of the Deputy Prime Minister 2004</p> <p>Onshore Wind Energy Planning Conditions Guidance notes – Renewables Advisory Board and BERR 2007</p> <p>UK Government Department for Communities and Local Government (March 2012) National Planning Policy Framework</p> <p>UK Government Department for Communities and Local Government (July 2013) Planning practice guidance for renewable and low carbon energy</p>	<ul style="list-style-type: none"> Shadow flicker has been proven to occur only within a distance of 10 rotor diameters from the turbines. Shadow flicker only occurs inside buildings where the flicker appears through a narrow window opening
Northern Ireland	<p>Best Practice Guidance to Planning Policy Statement 18 ‘Renewable Energy’ – Northern Ireland Department of the Environment 2009</p>	<ul style="list-style-type: none"> Shadow flicker only occurs inside buildings through narrow window openings The potential for shadow flicker at distances greater than 10 rotor diameters is very low It is recommended shadow flicker at neighboring residential buildings and offices should not exceed 30 hours per year
Ireland	<p>Ireland Government Department of Environment (2013) Wind energy Development Guidelines</p>	<ul style="list-style-type: none"> Shadow flicker only occurs inside buildings through narrow window openings The potential for shadow flicker at distances greater than 10 rotor diameters is very low It is recommended shadow flicker at neighboring residential buildings and

		offices should not exceed 30 hours per year
Germany	Länderausschuss für Immissionsschutz (2002) Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (WEA-Schattenwurf-Hinweise) (Guideline for Identification and Evaluation of the Optical Emissions of Wind Turbines)	<ul style="list-style-type: none"> • Worst case scenario limited to a maximum of 30 hours per year and 30 minutes per day • Real case limited to 8 hours per day
Australia	Environment Protection and Heritage Council (EPHC) (2010) National Wind Farm Development Guidelines	<ul style="list-style-type: none"> • Worst case: 30 hours/year • No daily limit • Real case: 10 hours/year (only required if worst case exceeds 30 hours/year)
Canada	Natural Forces Wind Inc (June 2013) Gaetz Brook Wind Farm Shadow Flicker Assessment Report	<ul style="list-style-type: none"> • Worst case: 30 hours/year and 30 min./day
USA	National Association of Regulatory Utility Commissioners (NARUC) Grants & Research Department (January 2012) Wind Energy & Wind Park Siting and Zoning Best Practices and Guidance for States	<ul style="list-style-type: none"> • Worst case: 30 hours/year and 30 min./day
Denmark	Danish Government – Miljøministeriet Naturstyrelsen (2015) Vejledning om planlægning for og tilladelse til opstilling af vindmøller, 19-20	<ul style="list-style-type: none"> • Real case: 10 hours/year
Netherlands	Nederlandse overheid – Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer (2017) Regeling algemene regels voor inrichtingen milieubeheer, Art. 3.12	<ul style="list-style-type: none"> • Wind turbine shall be equipped with automatic shadow flicker control system which stalls the turbine if shadow flicker occurs at sensitive receptors and the distance between the turbine and the sensitive receptor is less than 12 times the rotor diameter and if on average shadow flicker occurs more than 17 days per year for more than 20 minutes per day. • Receptors like office buildings are not mapped as sensitive receptors

7.2.9.3 International Standards

In August 2015, the World Bank Group published the Environmental, Health and Safety (EHS) Guidelines for Wind Energy. These are technical reference documents containing examples of good industry practice.

The definition adopted in the EHS guidelines states that shadow flicker occurs when the sun passes behind the wind turbine and casts a shadow. As the rotor blades rotate, shadows pass over the same point causing an effect termed shadow flicker. Shadow flicker may become a problem when potentially sensitive receptors (e.g., residential properties, workplaces, learning and/or health care spaces/facilities) are located nearby, or have a specific orientation to the wind energy facility.

Key points identified in the guidelines include:

- Potential shadow flicker issues are more likely at higher latitudes where the sun is lower in the sky and therefore are longer shadows that will extend the radius within which potentially significant shadow flicker impact will be experienced.
- If it is not possible to locate the wind turbines where neighboring receptors experience no shadow flicker effects, it is recommended that the predicted duration of shadow flicker effects experienced at a sensitive receptor should not exceed 30 hours per year and 30 minutes per day on the worst affected days, based on a worst-case scenario.
- Recommended prevention and control measures to avoid significant shadow flicker impacts include siting wind turbines appropriately to avoid shadow flicker being experienced or to meet limits placed on the duration of shadow flicker occurrence, as set out in the paragraph above, or programming turbines to shut down at times when shadow flicker limits are exceeded.

As per this consideration, this study considered the IFC guidelines as a reference integrating the results with a real case scenario modelling in order to assess the effect raised by the inclusion of more local conditions.

Based on the analysis of the different national standards, for real case scenario, it is proposed to take into consideration the most conservative ones that place the annual limits at 8 hours (Germany).

7.2.9.4 Potential Impacts

The association between shadow flicker caused by wind turbines and the effects on human health is highly debated.

Some studies suggest that flicker from turbines pose a potential risk of inducing photosensitive seizures (Harding et al, 2008; Smedley et al., 2010).

However, in 2011, the UK Department of Energy and Climate Change concluded in their Update Shadow Flicker Evidence Base report that *“On health effects and nuisance of the shadow flicker effect, it is considered that the frequency of the flickering caused by the wind turbine rotation is such that it should not cause a significant risk to health”*.

Despite such conclusions, other reports state that although shadow flicker from wind turbines is unlikely to lead to a risk of photo-induced epilepsy, the potential for annoyance and disturbance are still present leading to stress (Cope et al., 2009; Minnesota Department of Health, 2009; National Research Council, 2007).

In any case, mitigation options are available to reduce potential impacts, including:

- Careful site design;
- Locating wind turbines at least 500m from sensitive receptors;
- terminating turbines which are known to cause problematic flicker during specific periods and weather conditions;
- planting vegetation or tree lines to “cut” the line of sight to turbines that are causing flicker; and

the installation of window blinds or awnings to avoid the flicker phenomenon inside buildings.

7.2.9.5 Assessment of impacts:

The likelihood and duration of the flicker effect depends upon a number of factors, including:

- Direction of the property relative to the turbine;
- Turbine height and rotor diameter;

- Time of the day and year;
- Distance from the turbine (the further the observer is from the turbine, the less pronounced the effect will be);
- Wind direction (that affect potential wind turbine orientation); and
- Weather conditions (presence of cloud cover, fog, humidity reduces the occurrence of shadow flicker as the visibility itself of the turbine is reduced).

In general, shadow flicker occurs during clear sky conditions, when the sun is low on the horizon. As the sun angle on the horizon changes throughout the year, the locations experiencing the phenomenon changes, so specific shadow receptors can be affected in different periods.

The theoretical number of hours of shadow flicker experienced annually at a given location can be calculated using modelling packages incorporating the sun path, topographic variation over the wind farm site, and wind turbine details such as rotor diameter and hub height.

When assessing shadow flicker impacts, the worst case and/or real case impacts are determined:

- **Worst Case Scenario:** the astronomical maximum possible shadow flicker duration is defined as the shadow flicker duration which occurs when the sun is always shining during daylight hours (i.e. the sky is always clear), the wind turbine is always rotating and the rotor is always rotor plane is always perpendicular to the line from the WTG to the sun;
- **Real Case Scenario:** the expected shadow flicker duration is the shadow flicker duration when taking into account average sunshine hour probabilities and wind statistics of the particular region including turning off periods (low winds and high winds).

The following section briefly describes the modelling package used, as well as the input criteria for assessing the shadow flicker throughout the different scenarios identified in the introduction.

WindPro Model: Scenarios and Input Criteria

This assessment has been undertaken using WindPro 3.6[®]; a computer package widely used in the wind industry. The software package includes a Shadow Flicker Module (SHADOW) that calculates how often and the intervals in which a specific neighbour or area will be affected by one or more wind turbines.

As reported in the introduction, two main scenarios have been modelled Worst case and Real case. Within Worst Case Scenario, the calculations are based on a worst case scenario with no parameters characterizing the local settings and conditions as well as project specific characteristics:

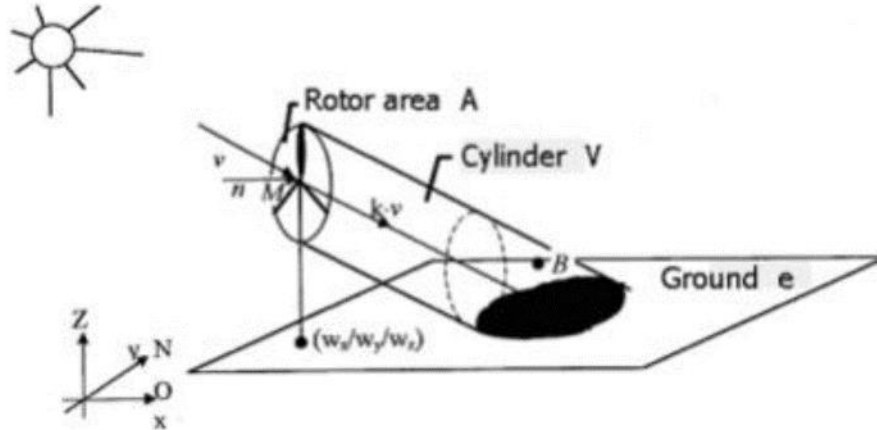
- The presence of physical barriers is not considered;
- Natural vegetation screening not included;
- Cloud cover, humidity is not included;
- The sun is shining all the day, from sunrise to sunset;
- Rotor is not turning off for low winds or high winds,
- Shadow receptors are modelled using the greenhouse mode, meaning that each receptor will face all directions (visibility 360 degrees).

Within Real Case Scenario, the calculations are based on a more realistic situation where sun shining probability is based on real datasets. However, it should be stated that such modelling assumptions are not still taking into consideration other parameters characterizing the local settings and in any case lead to an overestimation of the shadow flickering occurrence.

All scenarios have been carried out with a temporal resolution of 1 minute (if shadow flicker is predicted to occur in any 1-minute period, the model records this as 1 minute of shadow flicker).

Independent of the selected scenario, the model calculates outputs according to the principles presented in the following Figure 7-42.

Figure 7-42 Shadow Flickering Theory



All dwellings/group of dwellings on site have been modelled taking into consideration the following:

- single storey tall, and so shadow flicker has been calculated at a height of 1 m (equivalent to the ground floor windows);
- Slope of the window has been set to 90°;
- The identified receptors are simulated as fixed points with the possibility to view 360°C, representing an unrealistic scenario, as real windows would be facing only a particular direction.

Worst Case Scenario

The calculations are based on a worst-case scenario modelled without parameters that characterize local settings and conditions (e.g., the sun always shines during daylight hours), as well as project-specific characteristics.

The following assumptions have been considered in the modelling setting for Worst Case Scenario:

- Rotors are always turning;
- Sun is always shining all the day, from sunrise to sunset;
- Local topography has been obtained from SRTM DTM;
- No cloud cover or any other meteorological conditions that could potentially reduce visibility and the sunlight have been assumed;
- Receptors modelled using greenhouse mode;
- No physical barriers are considered.

Real Case by Statistics Scenario

The following assumptions have been considered in the modelling setting for Real Case Scenario:

- Data about the average daily sunshine hours (cloud cover data - Bucuresti meteo station):

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2.41	2.98	4.08	5.84	7.72	8.52	9.18	9.03	7.18	5.46	2.90	2.08
- Local topography has been obtained from SRTM DTM;
- Receptors modelled using greenhouse mode;
- No existing physical barriers have been considered such as forests; and
- Rotors are always turning; The site was divided into four area and the hours of operation by sector depend on the nearest Mast

Figure 7-43 Operational hours by sector for every site areas

Map	Mast Area	Operational time													
	Gheraseni V1	N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum	
		972	3,660	587	158	53	53	88	272	1,708	403	403	403	8,760	
	Luciu V4	N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum	
		990	3,670	333	140	18	237	175	280	1,638	526	473	280	8,760	
	NER 3 pos 2	N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum	
		543	3,391	1,156	166	9	9	88	201	1,708	517	420	552	8,760	

It should be noted for Real Case Scenario that the shadow flickering assessment performed with such assumptions is still affected by an over estimation in terms of the annual number of hours of flickering experienced at a specific location mainly due to the following reasons:

- The occurrence of cloud cover has the potential to significantly reduce the number of hours during which the observer is experiencing the flickering;
- The presence of fog and high humidity can reduce the visibility and consequently reduce the effects of flickering on the observer;
- The presence of aerosols in the atmosphere have the ability to influence the flickering duration as the length of the shadow cast by a wind turbine is dependent on the degree that direct sunlight is diffused, which is strictly dependent on the amount of dispersant in between the observer and the rotor; and
- The analysis has not considered the presence of vegetation or other physical barriers around a receptor that are able to shield the view (at least partially) of the turbine.

Summary of Scenarios Settings

The following Figure 7-44 is reporting the modelling settings adopted per each Scenario.

Figure 7-44 WindPro Shadow Module Inputs (in bold the differences among Worst Case and Real Case Scenario)

Inputs	WorstCase Scenario	Real Case Scenario
Wind Turbine location	See Figure 6-28	See Figure 6-28
Rotor diameter and hub height	162m / 166m	162m / 166m
Wind Turbine Operation	Rotors are always turning	Rotors are always turning
Wind Turbine Visibility	A WTG will be visible if it is visible from any part of the receiver window (greenhouse mode)	A WTG will be visible if it is visible from any part of the receiver window (greenhouse mode)
Window stories dimensions	1m height / 1 m large / 1 m from the ground floor	1 m height / 1 m large / 1 m from the ground floor
Cloud Cover	Not considered	Average daily sunshine hours
Physical Barriers (i.e. vegetation)	Not considered	Not considered
Minimum sun height over horizon for influence	3°	3°
Day step for calculation	1 day	1 day
Time step for calculation	1 minute	1 minute
Shining period	The sun is always shining all day, from sunrise to sunset	The sun is shining as per available local sunshine data
Height contour	SRTM DTM	SRTM DTM
Eye Height	1.5 m	1.5 m

7.2.9.6 Model Results

As presented above, two scenarios have been modelled using Shadow Flickering WindPro Module in order to identify the receptors potentially affected by the flickering. The project area is characterized by the presence of a village in the south west of the project site.

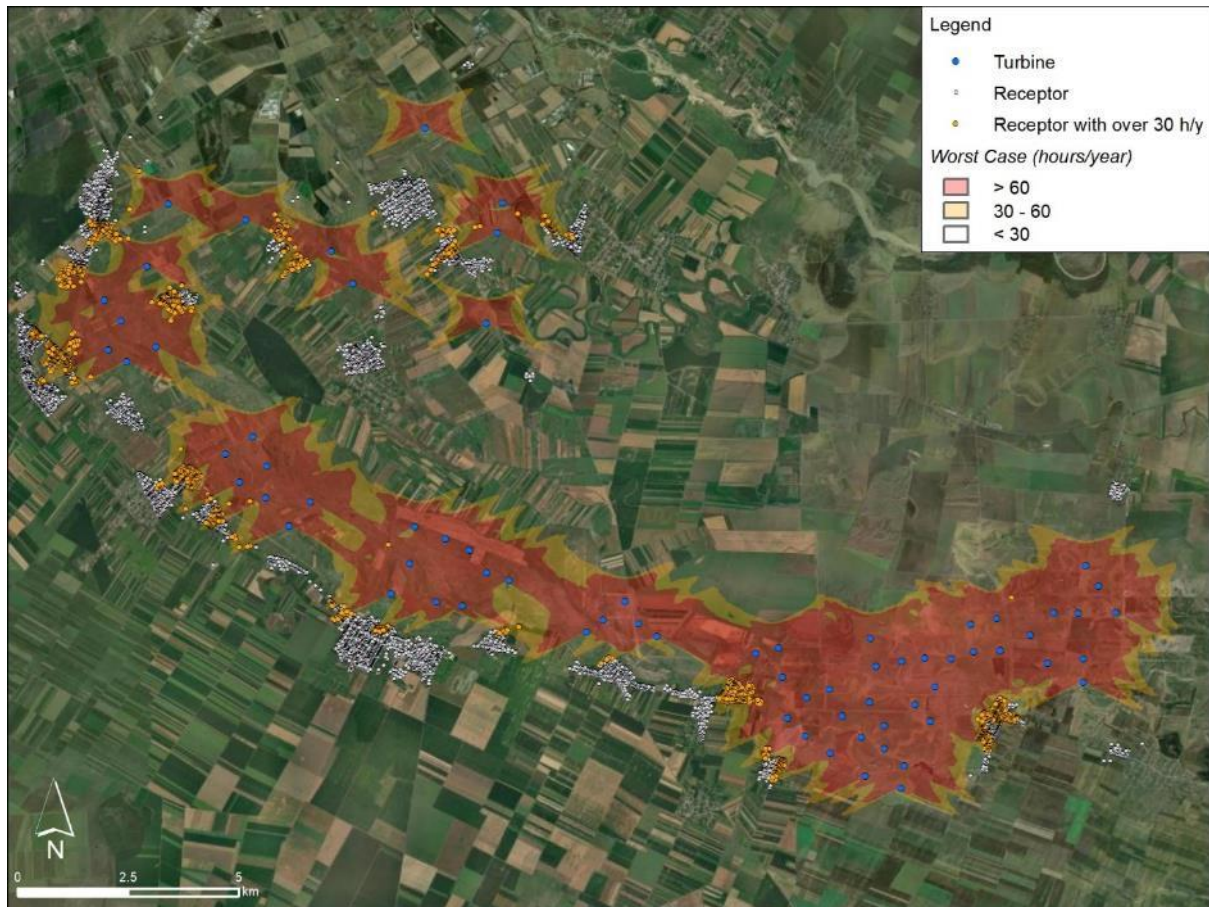
The following sections are reporting the number of potentially affected receptors per each scenario. For all the modelling details refers to Appendix A (Shadow Main Results).

Worst Case Scenario – Results

As reported above, the modelling package is calculating the predicted shadow flickering durations at receptors. Worst Case Scenario has considered a fully worst case scenario with unrealistic conditions leading to a potential of 988 impacted receptors (both for hours/year and minutes/day) among the 8530 mapped receptors. For these, IFC thresholds have been exceeded for both parameters: hours/year and minutes/day.

The following maps present the distribution of areas where flickering is calculated according to the Worst Case Scenario (Figure 7-45 and Figure 7-46). For further detail modelling result, please refer to Appendix A.

Figure 7-45 Map of Predicted shadow flicker (hours/year) – Worst Case Scenario



Source: ERM

Figure 7-46 Map of Predicted shadow flicker (minutes/day) - Worst Case Scenario



Source: ERM

Real Case by Statistics Results – Real Case Scenario

Following the results of the Worst Case Scenario presented in the previous section, a second scenario was calculated in order to assess the effect raised by the inclusion of more local conditions (as the average daily sunshine hours and wind direction) on the 988 receptors that exceeded the threshold defined by the World Bank EHS for shadow flicker issues.

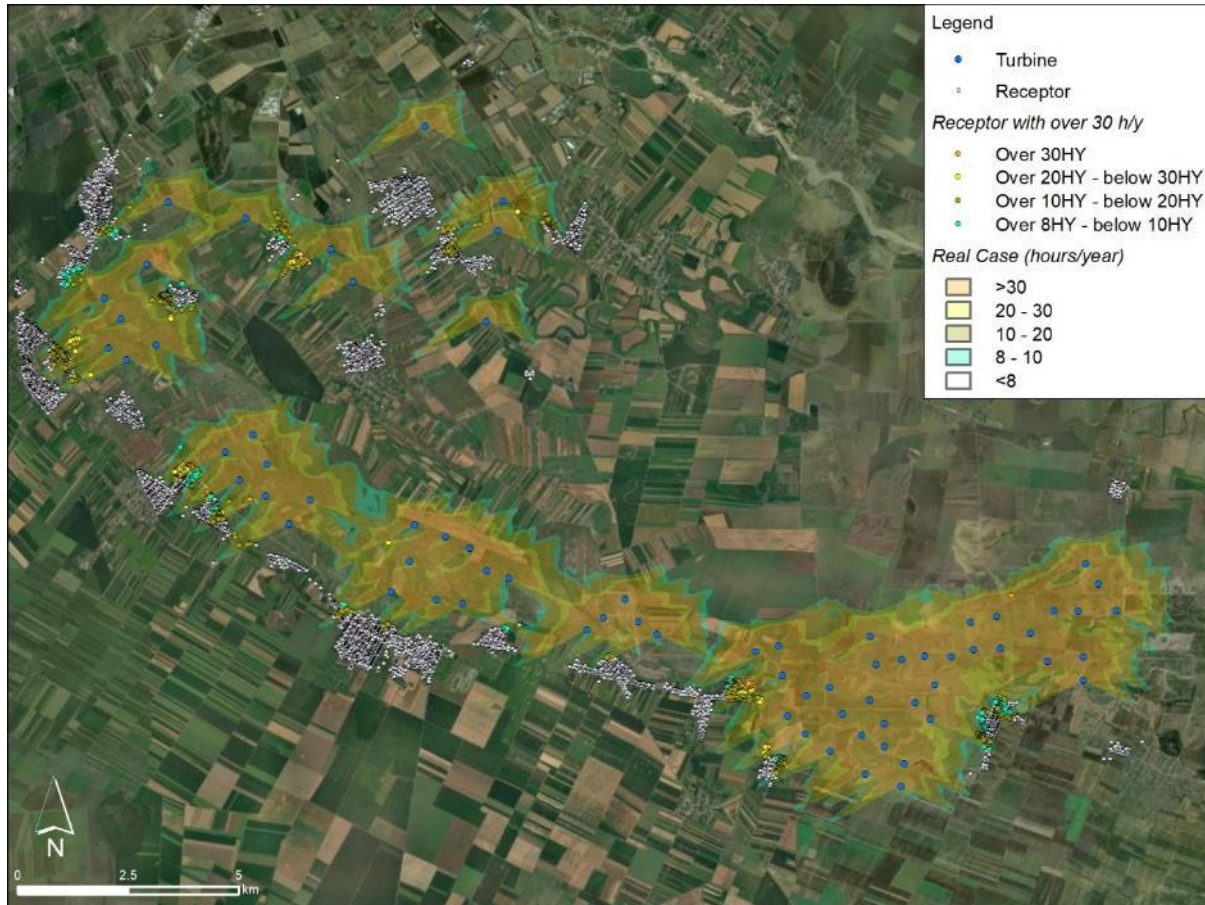
As indicated in the paragraph 7.3.6.1 there are no international guidance on standards to be followed internationally for the real case and we decided to take into consideration the most conservative ones that place the annual limits at 8 hours.

Based on the annual limit of 8 hours the real case scenario leading to a potential of 838 impacted receptors:

- 147 impacted receptors >8 and <10 hours/year
- 577 impacted receptors >10 and <20 hours/year
- 122 impacted receptors >20 and <30 hours/year
- 32 impacted receptors >30 hours/year

The predicted shadow flicker durations at receptors are presented in Figure 7-47.

Figure 7-47 Map of Predicted shadow flicker (hours/year) – Real Case Scenario



Source: ERM

The Impact Assessment Methodology is a quantitative methodology, generated through a spreadsheet provided by a model, and backed up by professional judgement in the application of the criteria.

The shadow flickering assessment has taken into consideration two scenarios: a worst case scenario and a more realistic one embedding local meteorological conditions. Many receptors are considered to be potentially impacted by shadow flickering above international guidance levels.

It should be noted that embedding few local conditions (average daily sunshine hours and operation time per each windfarm sector) the potential occurrence of shadow flickering has been significantly reduced as reported by the following table. Receptors with values above 30hours/year and 30 minutes per day moved from 988 to 32 (Table 7-106) and the astronomical maximum possible shadow.moved from 197:58:00 hours/year to 56:21:00 hours/year.

Table 7-106: Comparison Worst Case to real case

Worst Case Range	Worst Case Results	Real Case Range	Real Case Results
OVER 50 hours/year	481	OVER 50 hours/year	1*
>40 and <50 hours/year	251	>40 and <50 hours/year	1*
>30 and <40 hours/year	256	>30 and <40 hours/year	30

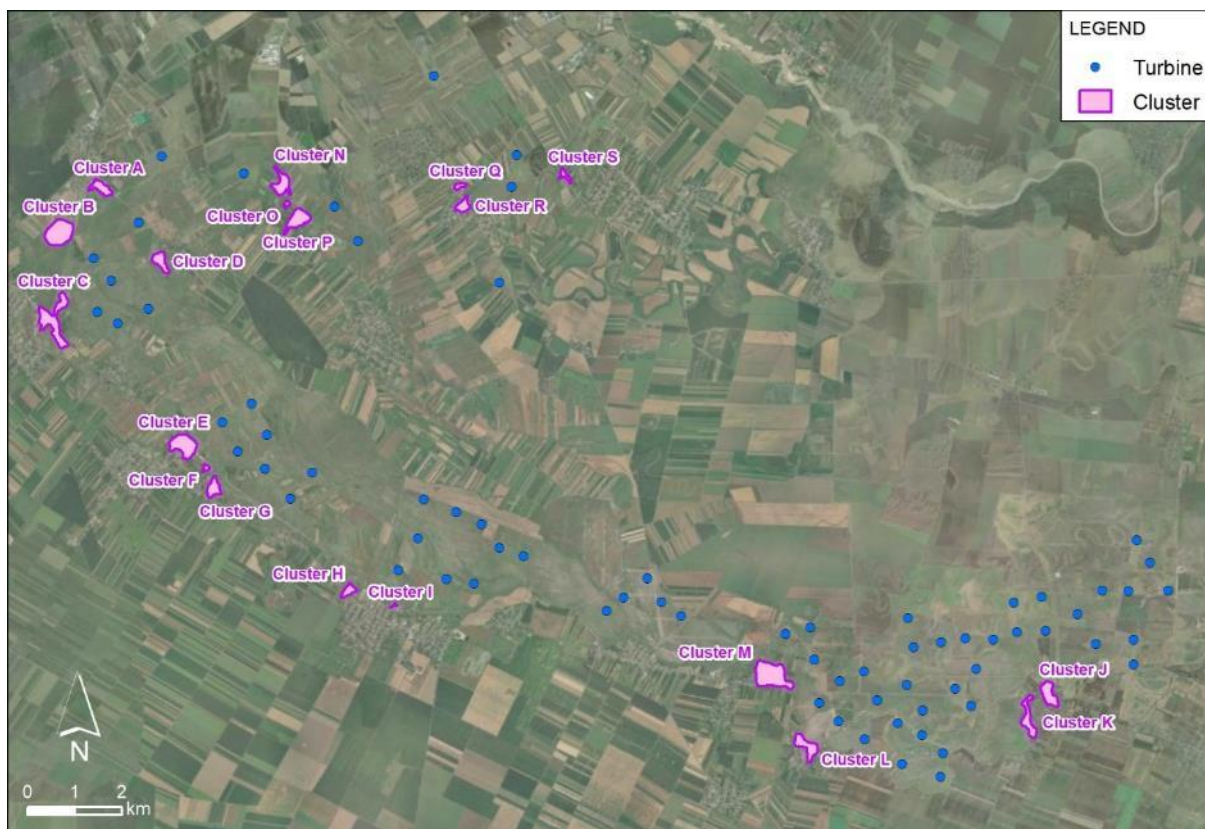
Worst Case Range	Worst Case Results	Real Case Range	Real Case Results
-	-	>20 and <30 hours/year	122
		>10 and <20 hours/year	577
		>8 and <10 hours/year	147
		Below 8 hours/year	110
sum	988	sum	988

* Industrial site, ERM Survey 2022.

As mentioned above, also the real case is still influenced by conservative results it should be noted that the performed calculations do not take into account the actual location and orientation of windows, or the screening effects associated with existing, site-specific conditions and obstacles like other buildings, leading to over-estimate the duration of occurrences when shadow flicker might be experienced at a specific location.

Based on the results of worst-case modelling results, 19 clusters were defined by grouping the potentially affected receptors according to their location (Figure 7-48).

Figure 7-48 Clusters location



Source: ERM

Some general considerations observed based on the outcomes of the field photo survey that can prevent/reduce shadow flickering to occur once the Project will be in operation:

- Some receptors were observed to have no windows facing the shadow direction of the turbines;

- Some receptors were observed to be former industrial facility or farm (e.g. N169, N245 or 4673);
- There is more than one receptor close to each other, the mutual position of the receptors could reduce the occurrence (one receptor could be screened by the proximity with another one).;
- There aren't existing natural barriers (i.e. forest, vegetation patches) surrounding the receptors;
- Some receptors identified during the survey were found to be uninhabited or they are to be excluded (e.g., rec. 4476 or N1 which are churches)
- According to the calendar results, the impact on some receptors could be reduced given the time of impact (e.g., rec. 771 which is a commercial center with possible impact during early morning hours);

Based on all these considerations, it is reasonable to expect a further reduction in the occurrence of the shadow flickering once the project will be in operation. Specific considerations were made within each cluster, and the results can be seen in the graphic sheets presented below.

The graphic sheets are organized as presented in Figure 7-49.

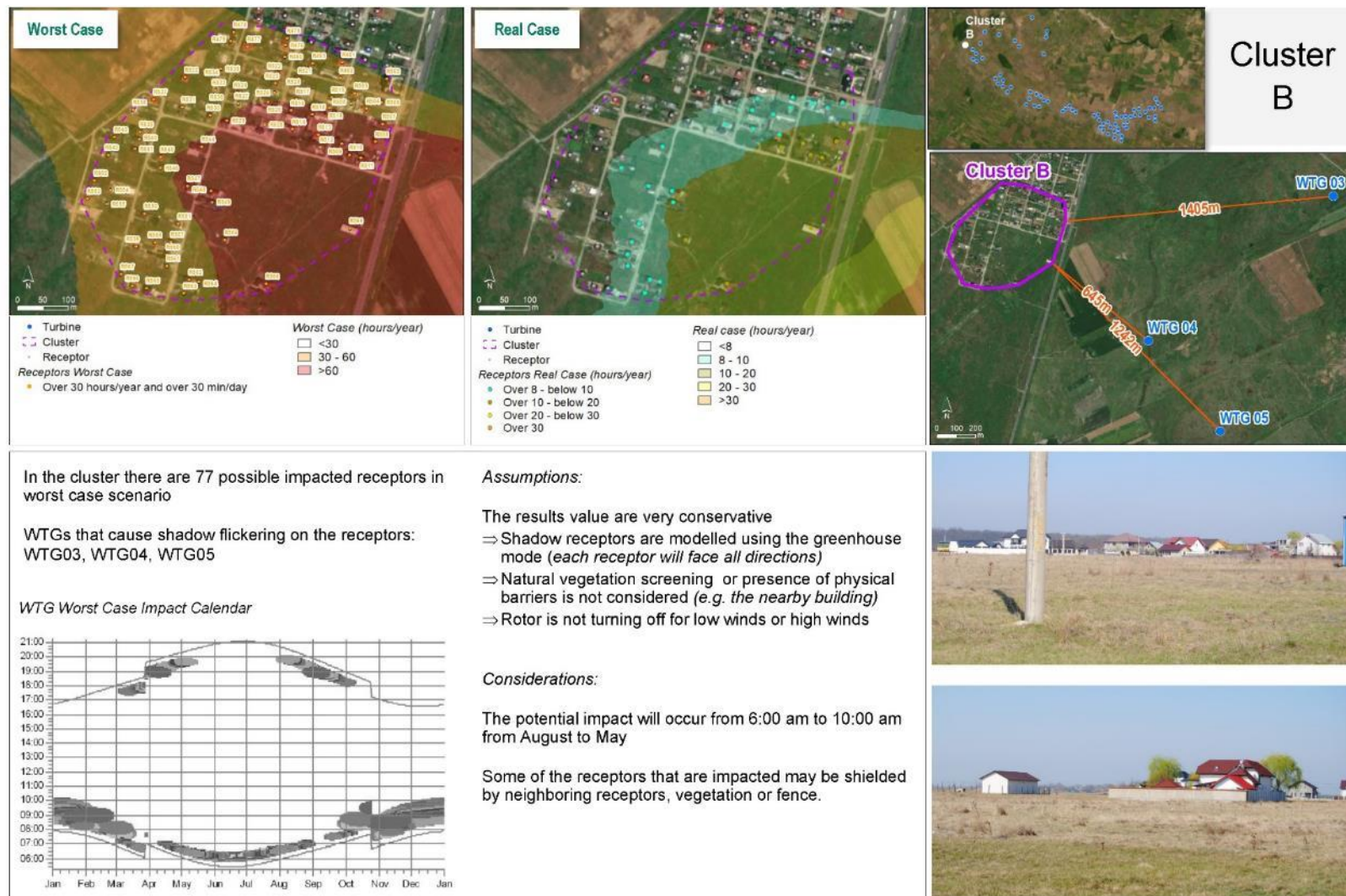
1. Cluster location;
2. Cluster name;
3. Distance and positioning of the turbine with respect to the cluster on which it impacts;
4. Worst case cluster map;
5. Real case cluster map;
6. Turbine calendar telling when (hours, days and months) the flickering problems may occur (worst case), assumptions and considerations;
7. Photos of some receptors of the cluster.

Figure 7-49 Cluster graphic sheets - legend



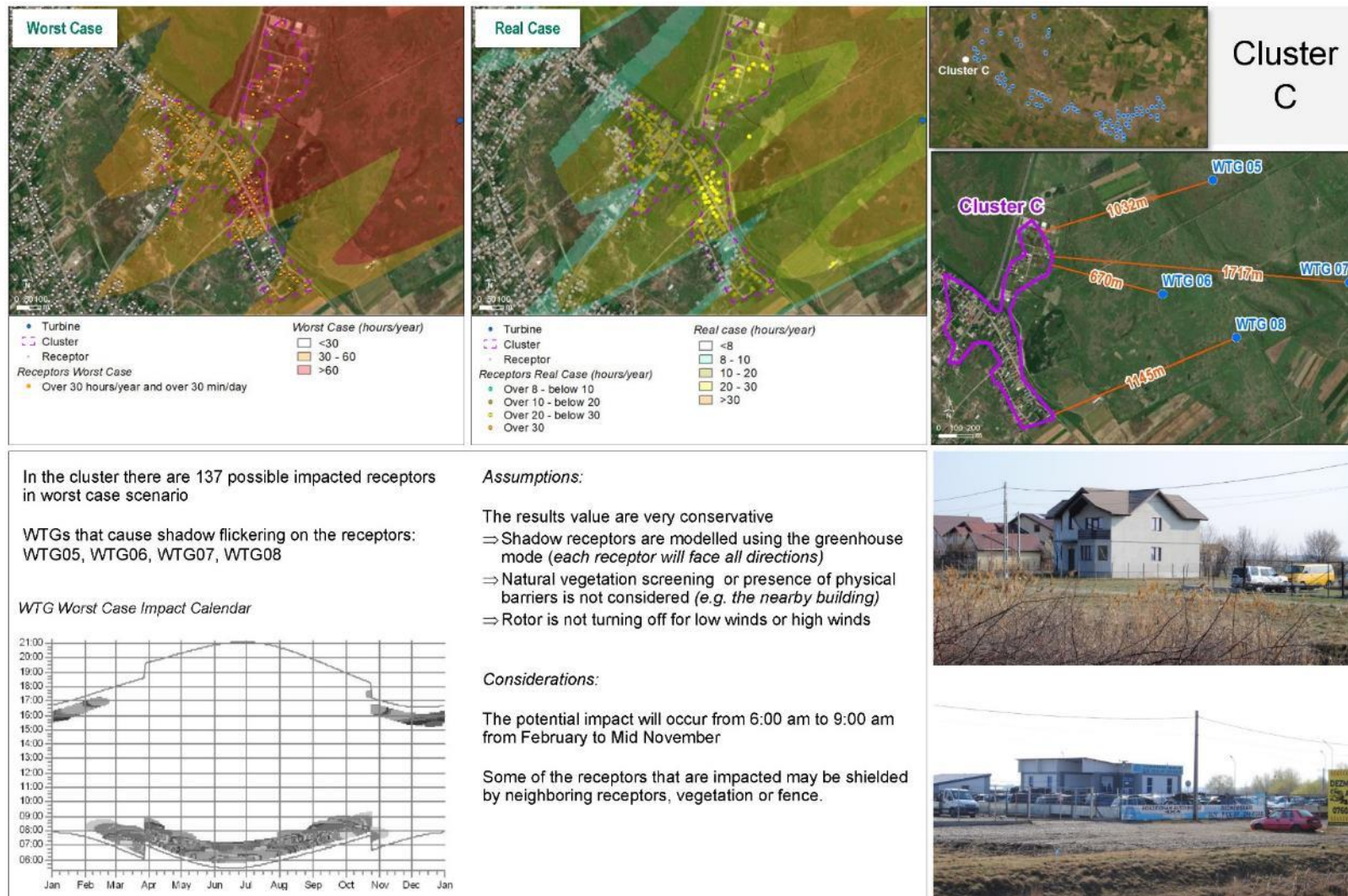
Source: ERM

Figure 7-51 Cluster B - graphic sheets



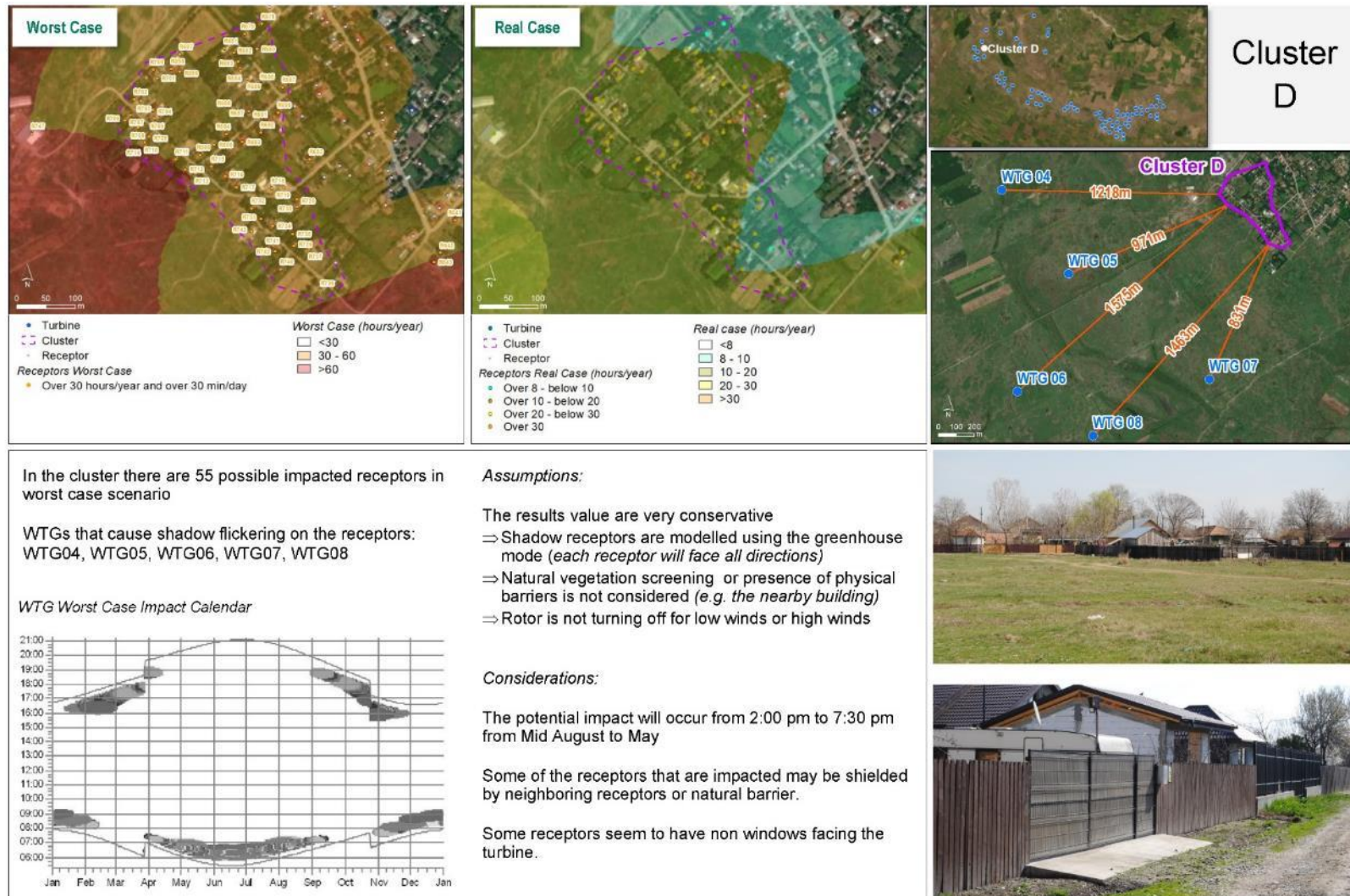
Source: ERM

Figure 7-52 Cluster C - graphic sheets



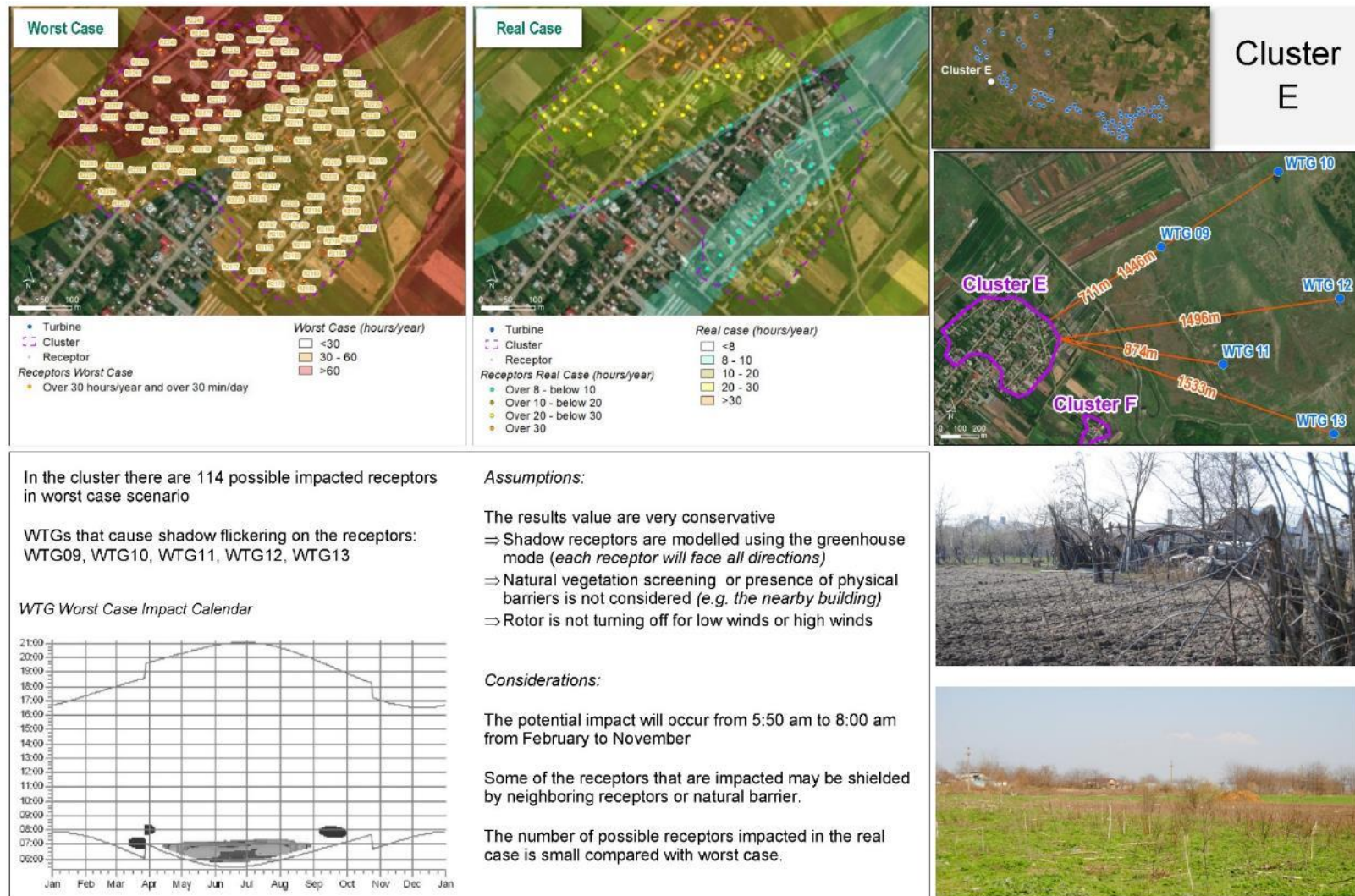
Source: ERM

Figure 7-53 Cluster D - graphic sheets



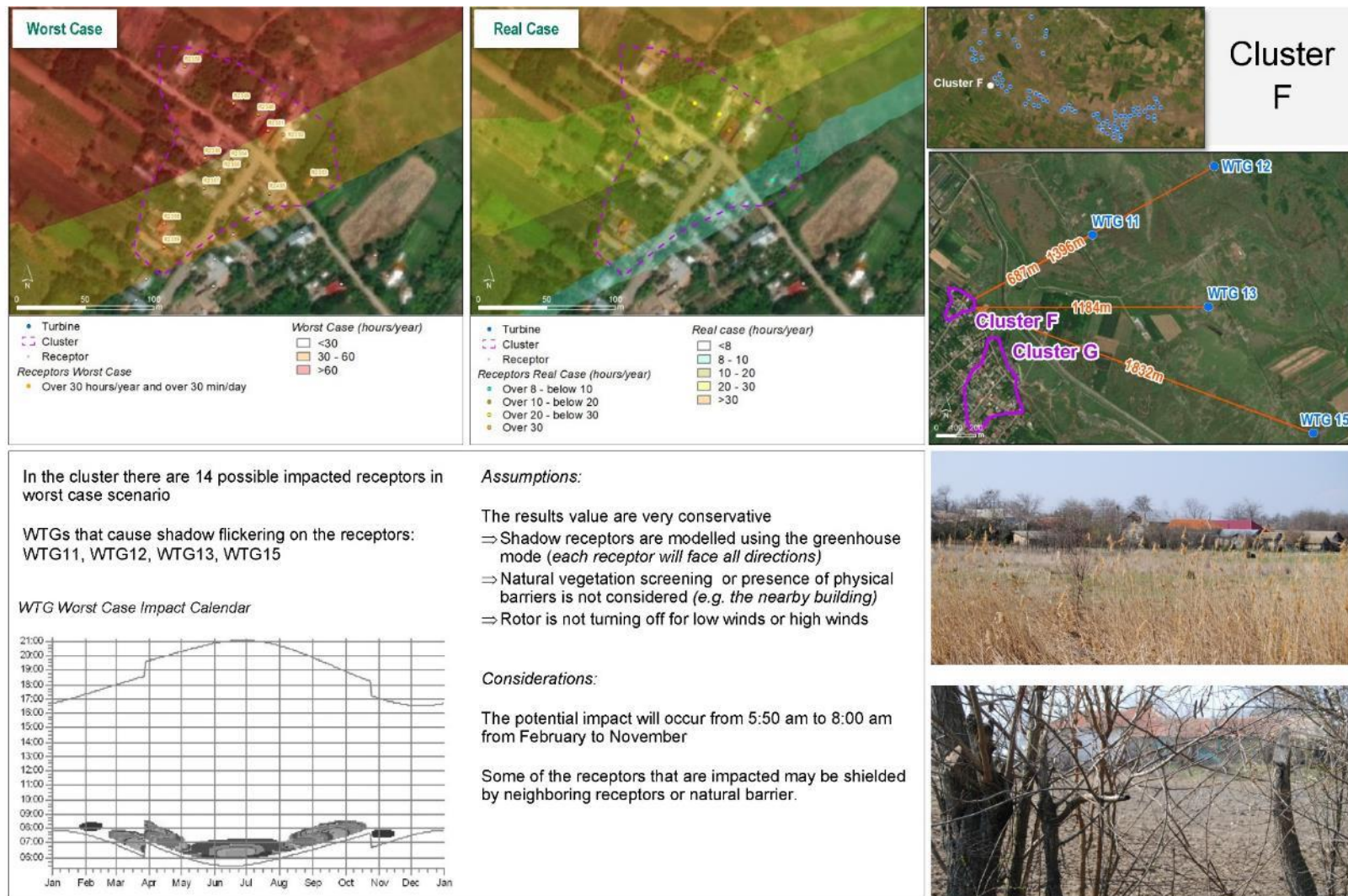
Source: ERM

Figure 7-54 Cluster E - graphic sheets



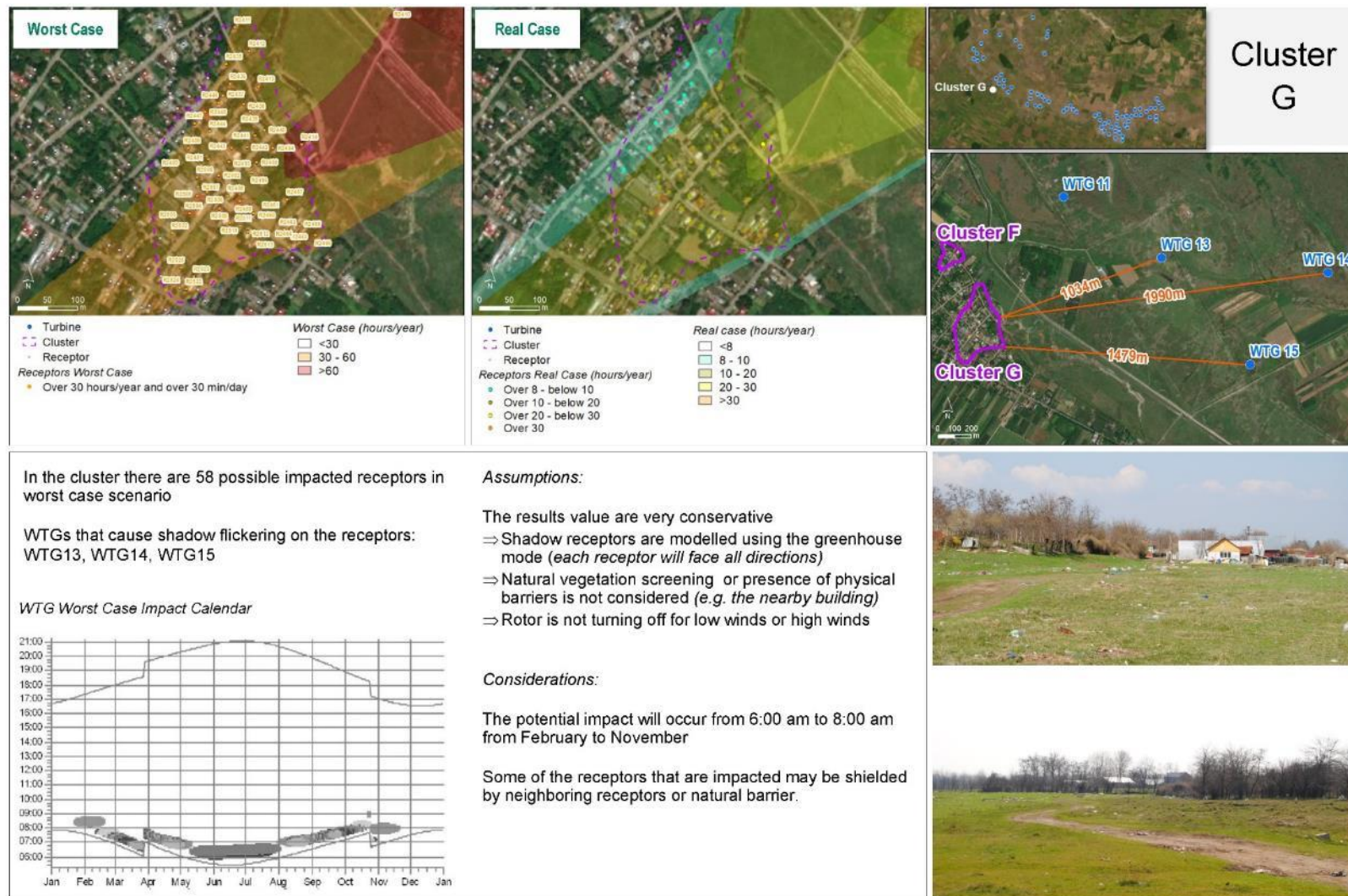
Source: ERM

Figure 7-55 Cluster F - graphic sheets



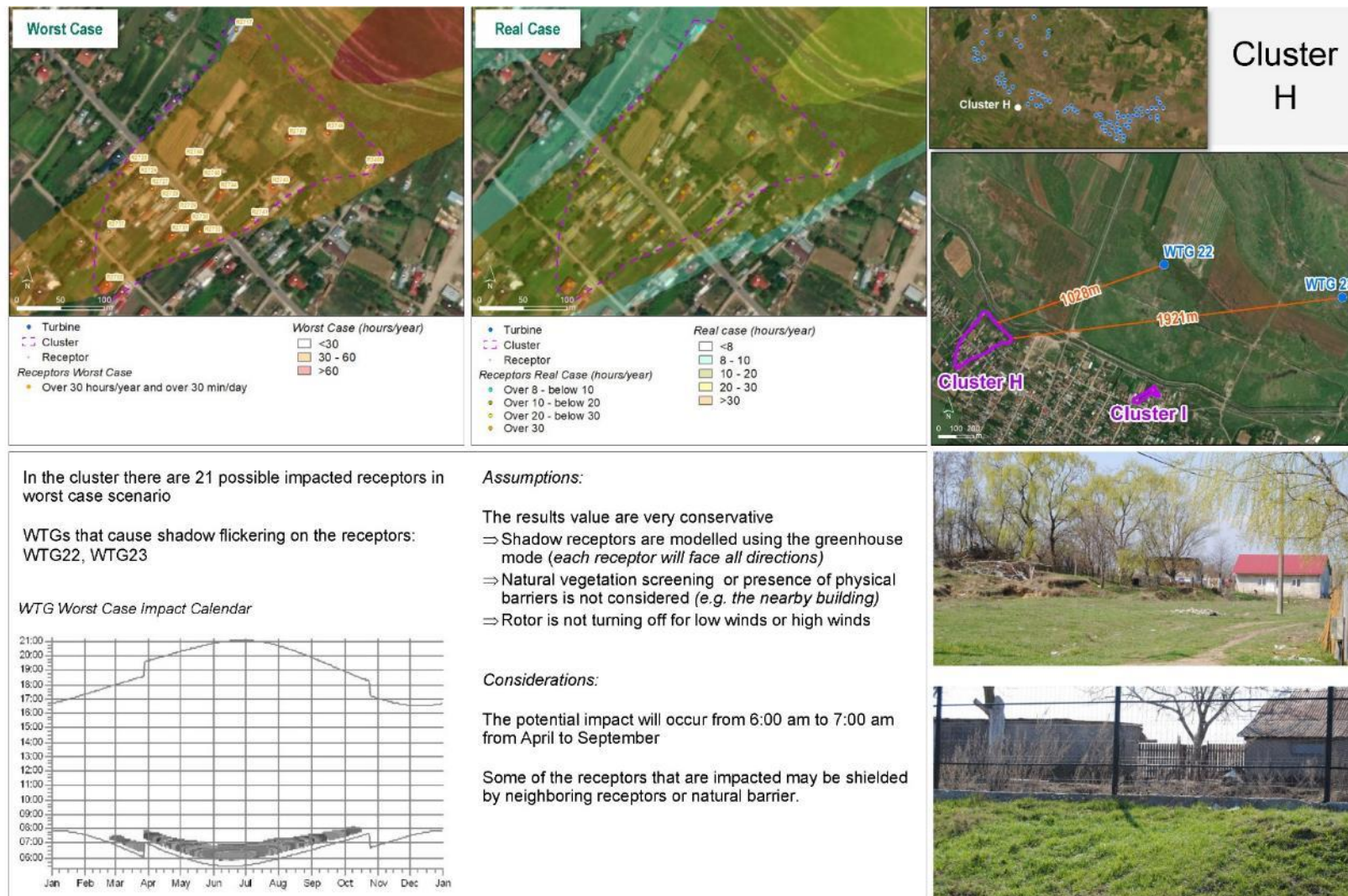
Source: ERM

Figure 7-56 Cluster G - graphic sheets



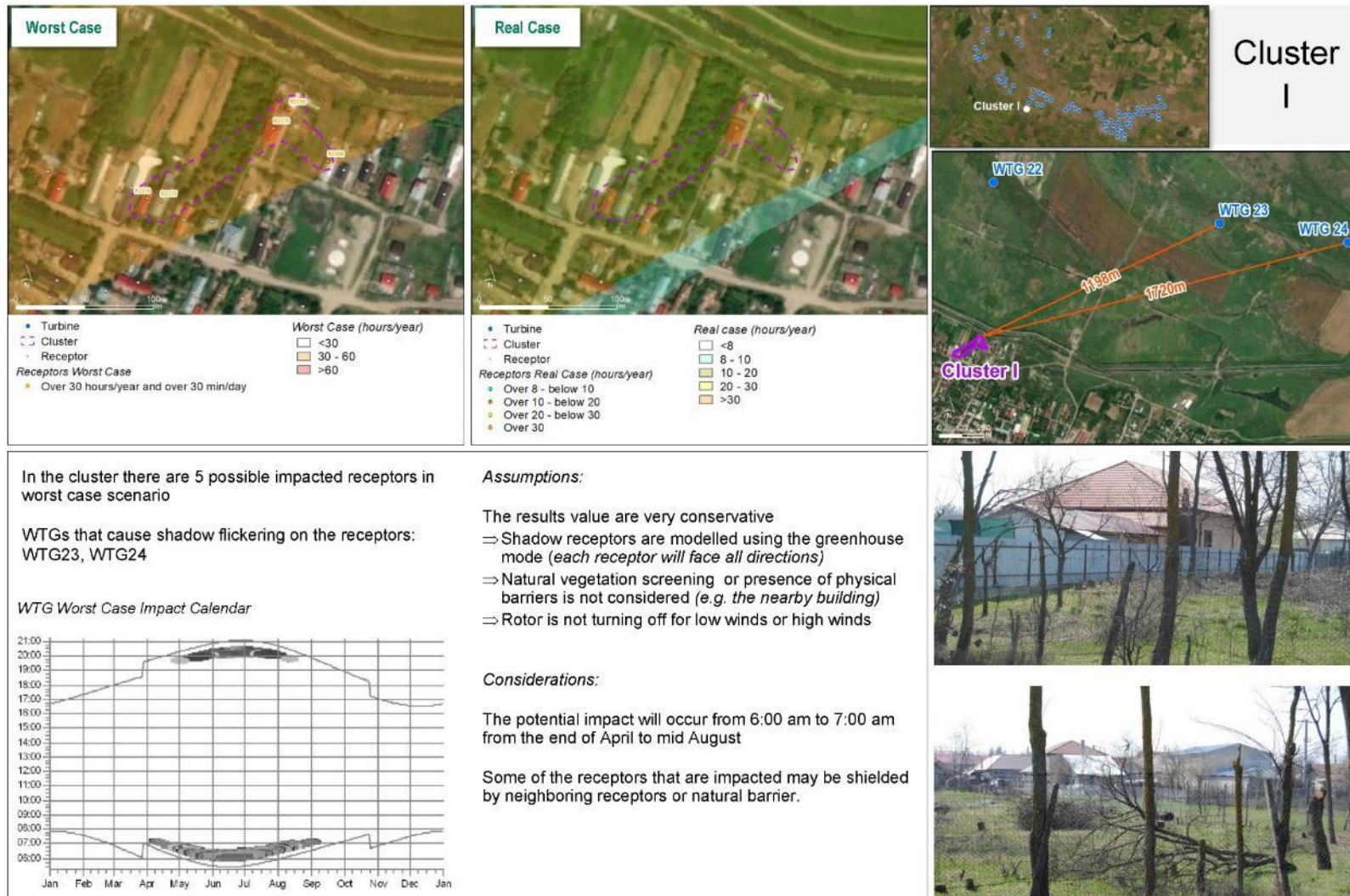
Source: ERM

Figure 7-57 Cluster H - graphic sheets



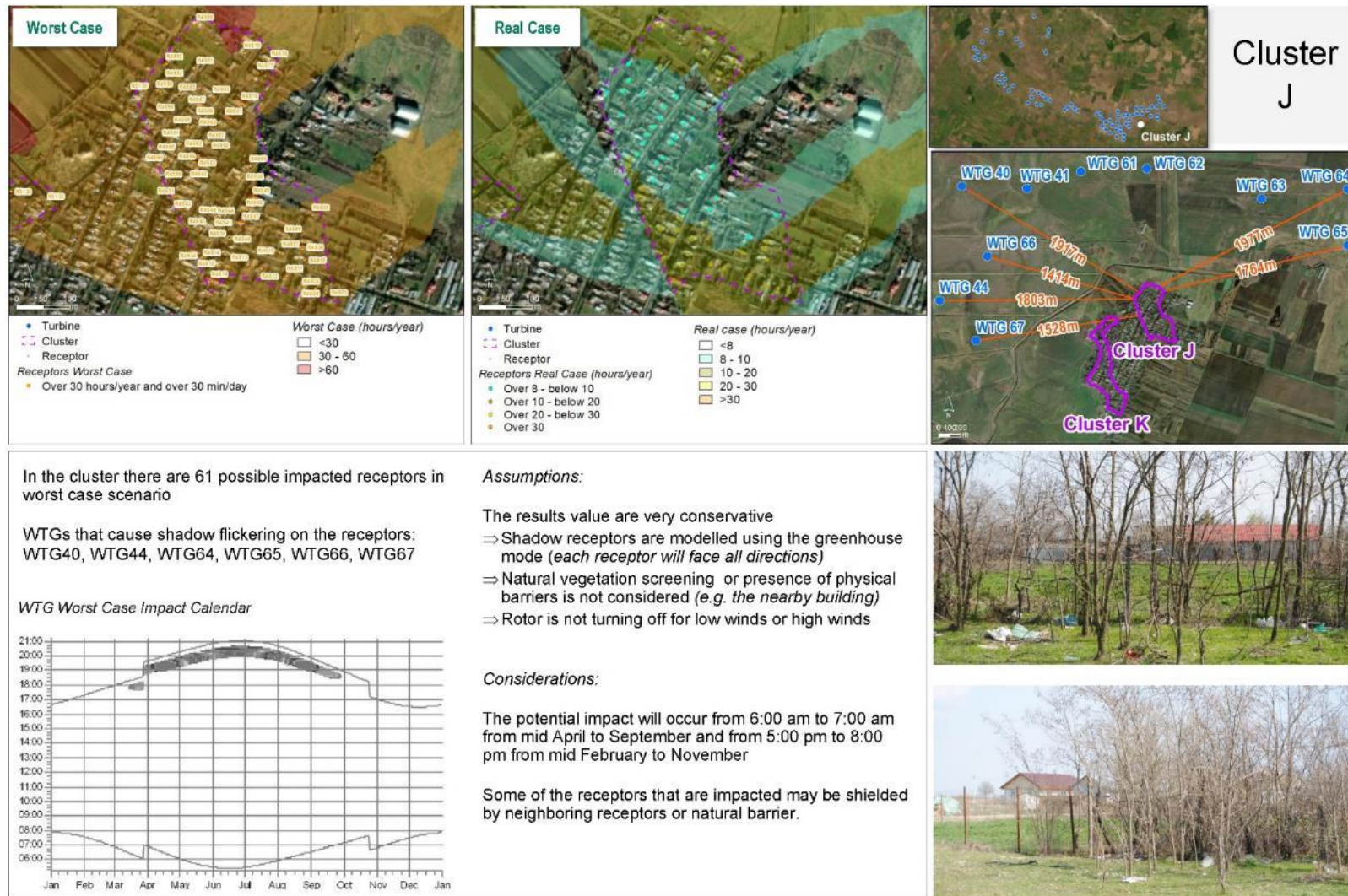
Source: ERM

Figure 7-58 Cluster I - graphic sheets



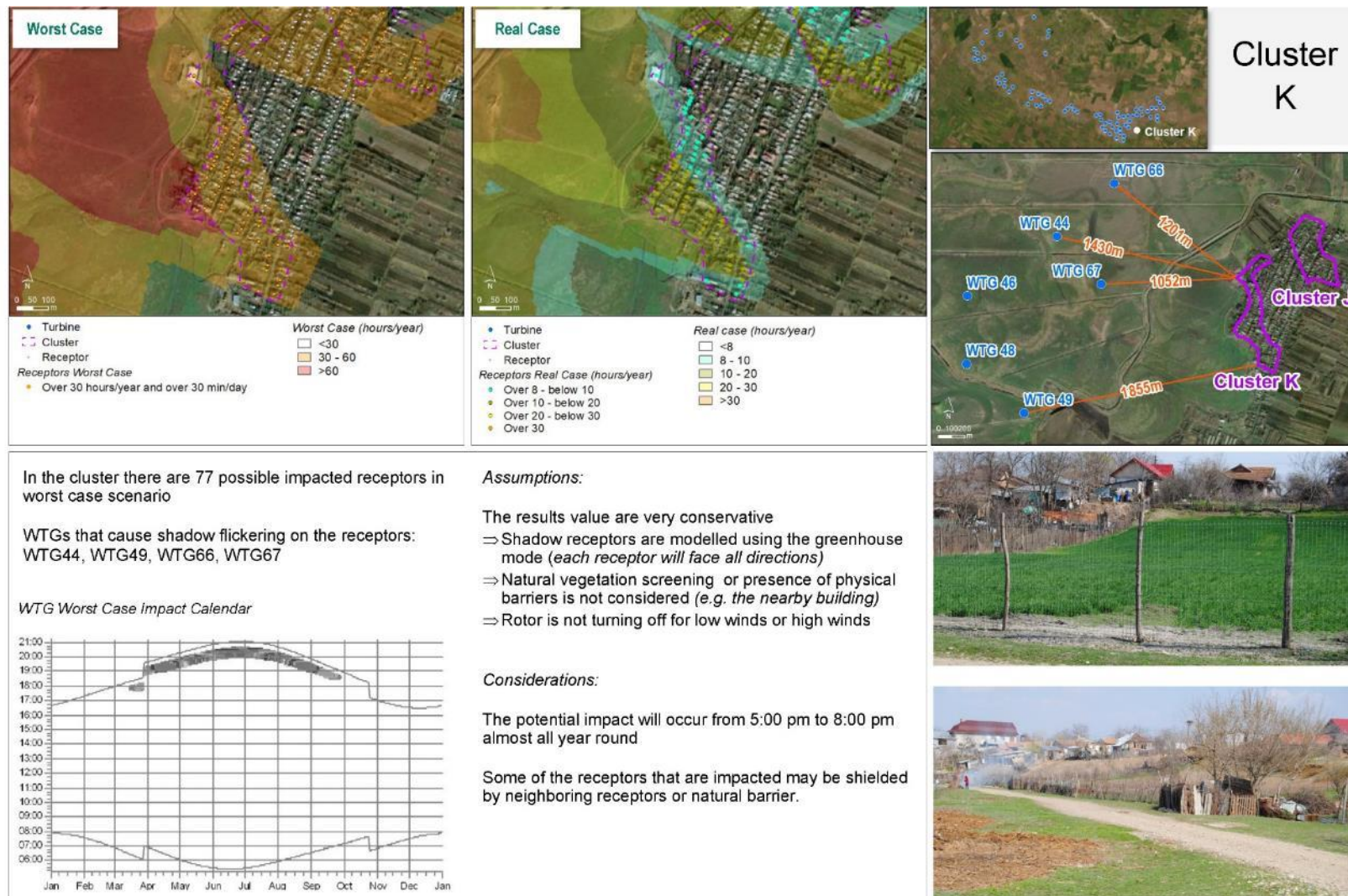
Source: ERM

Figure 7-59 Cluster J - graphic sheets



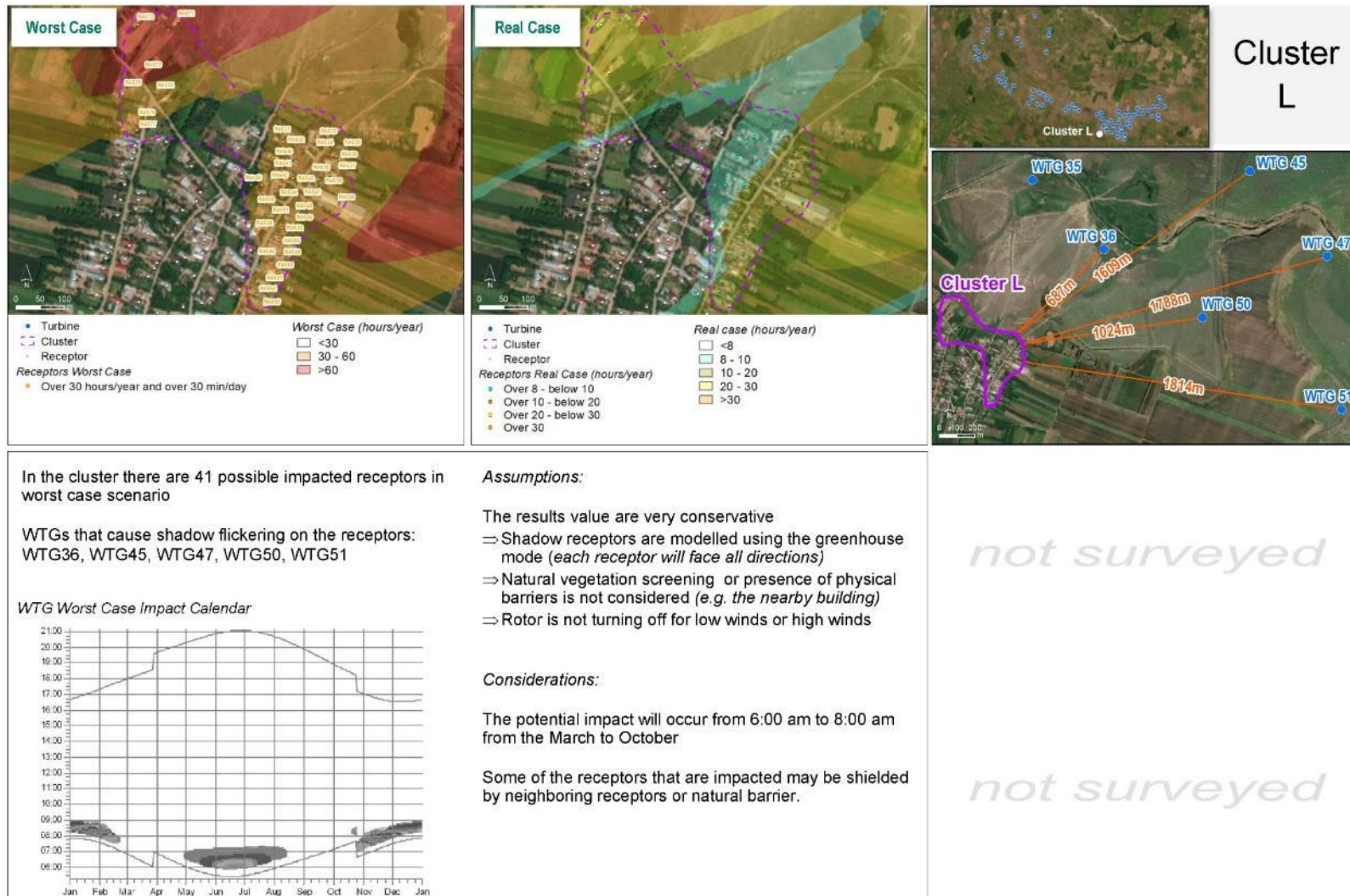
Source: ERM

Figure 7-60 Cluster K - graphic sheets



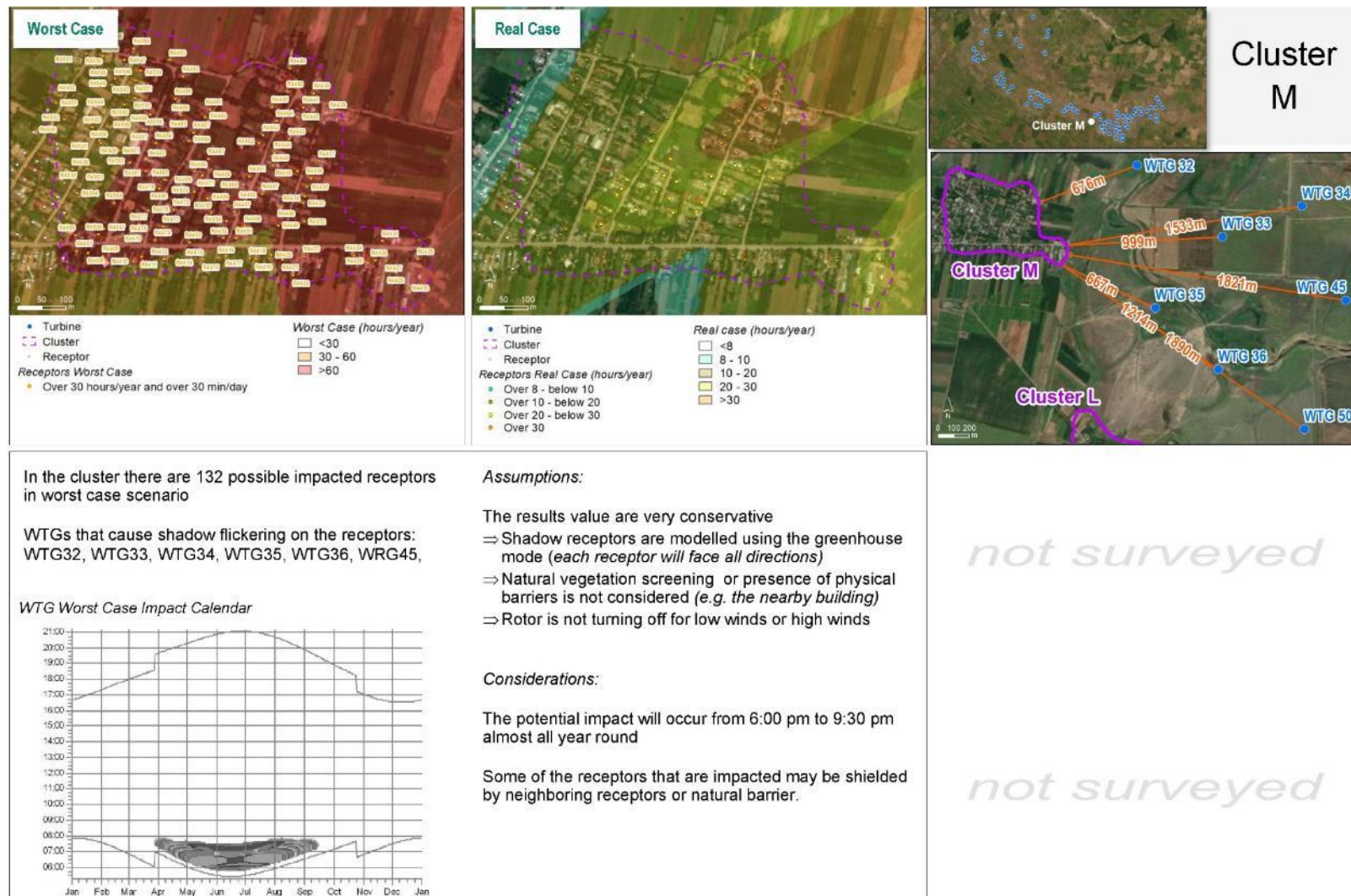
Source: ERM

Figure 7-61 Cluster L - graphic sheets



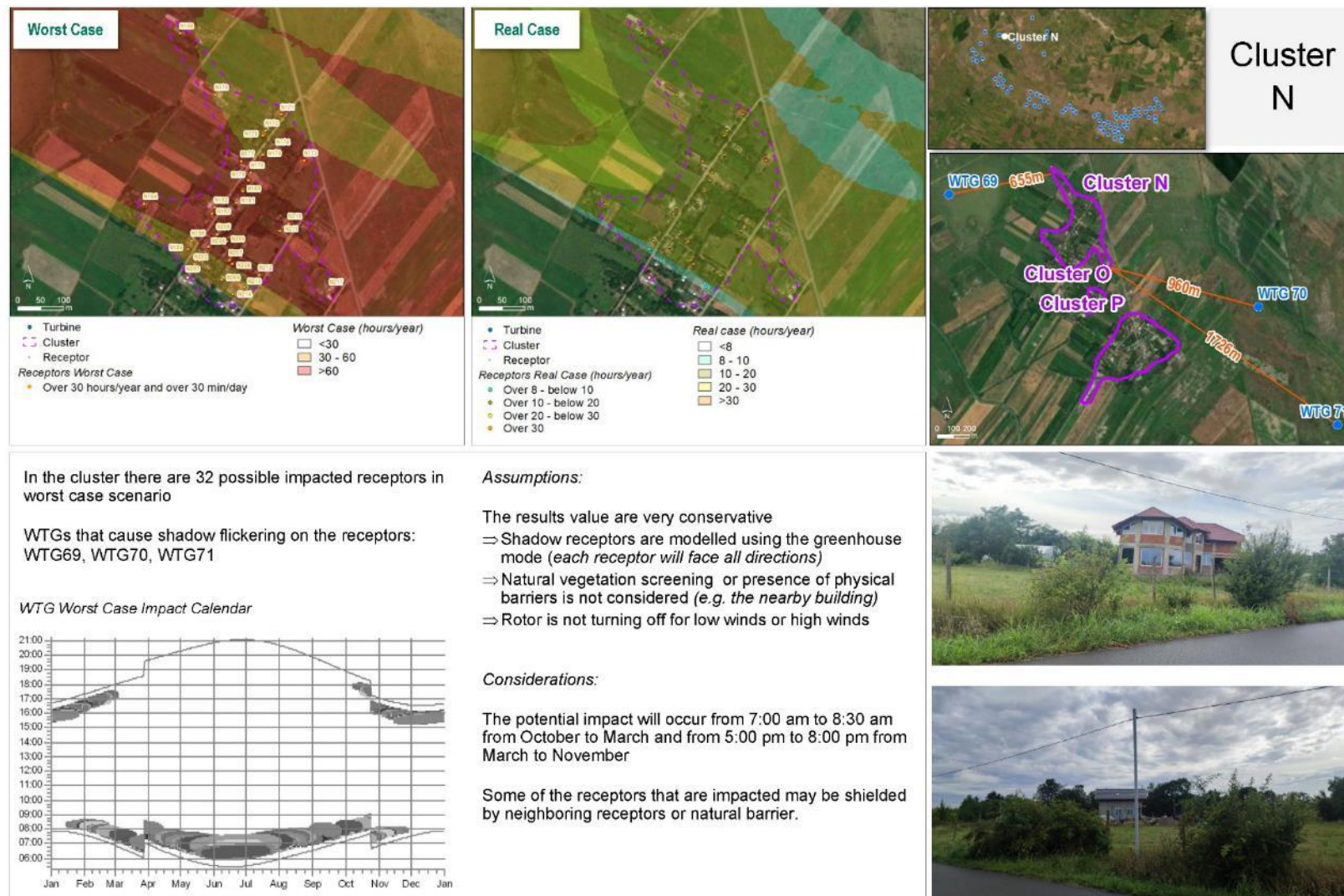
Source: ERM

Figure 7-62 Cluster M - graphic sheets



Source: ERM

Figure 7-63 Cluster N - graphic sheets



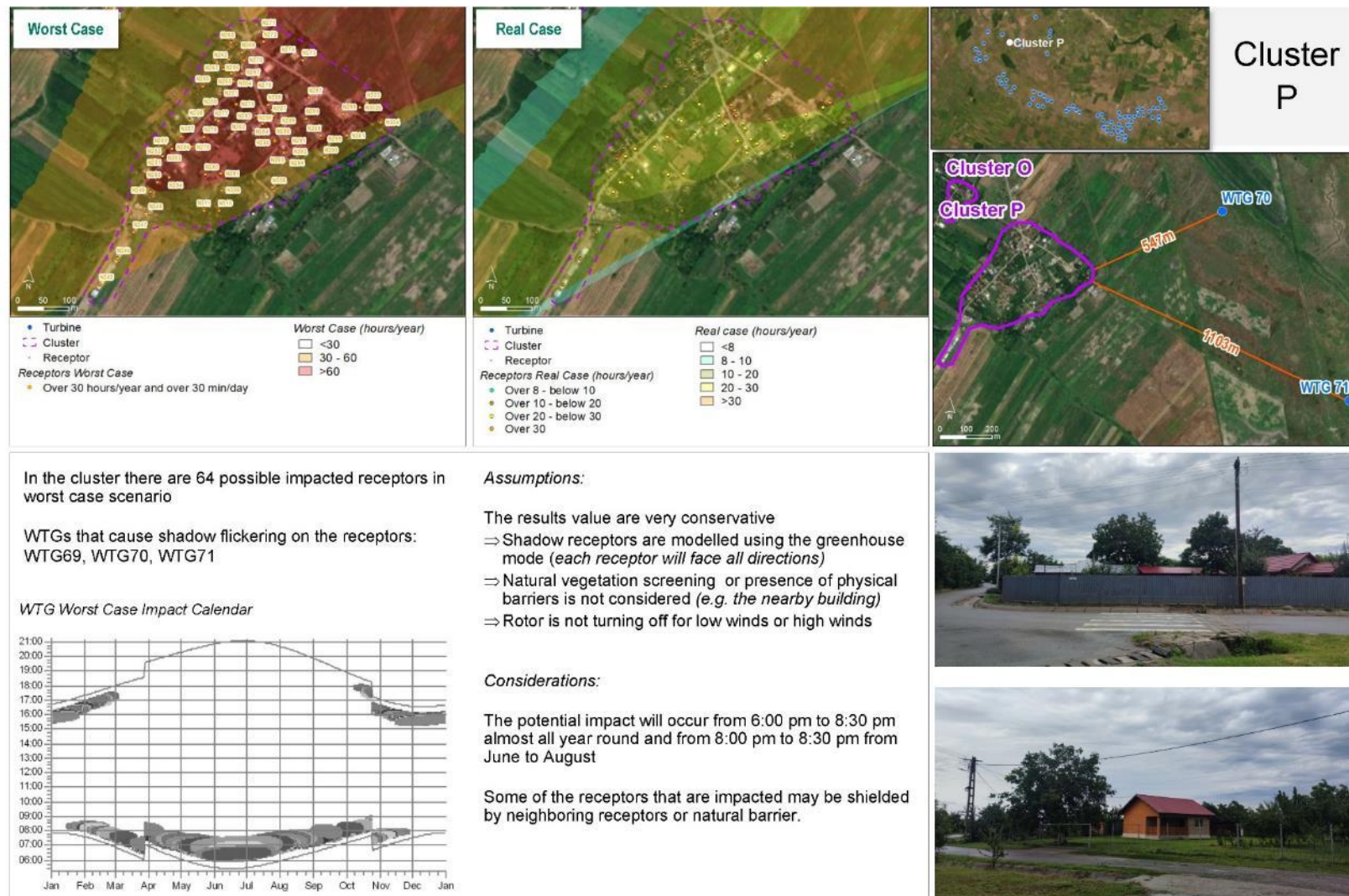
Source: ERM

Figure 7-64 Cluster O - graphic sheets



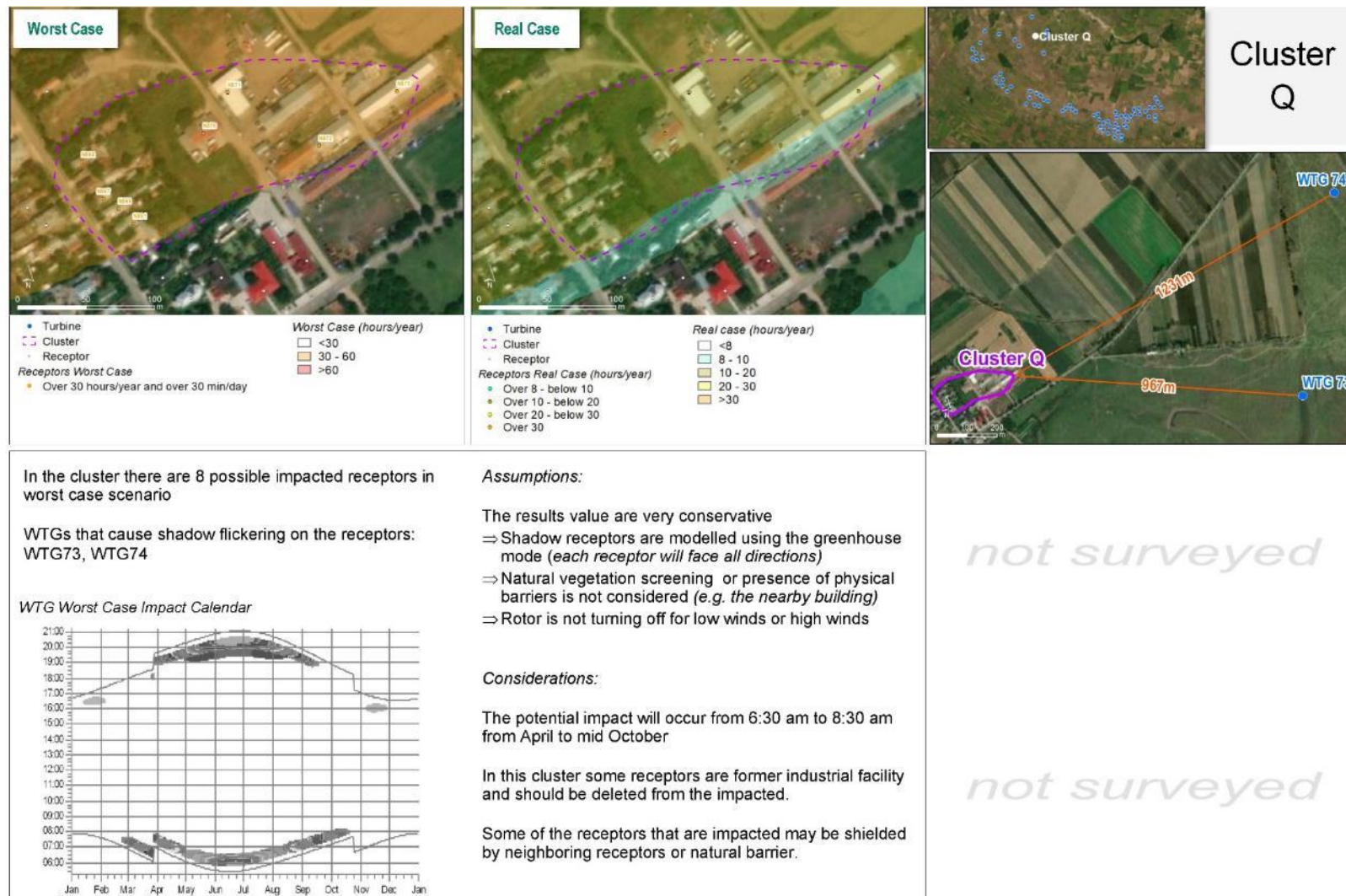
Source: ERM

Figure 7-65 Cluster P - graphic sheets



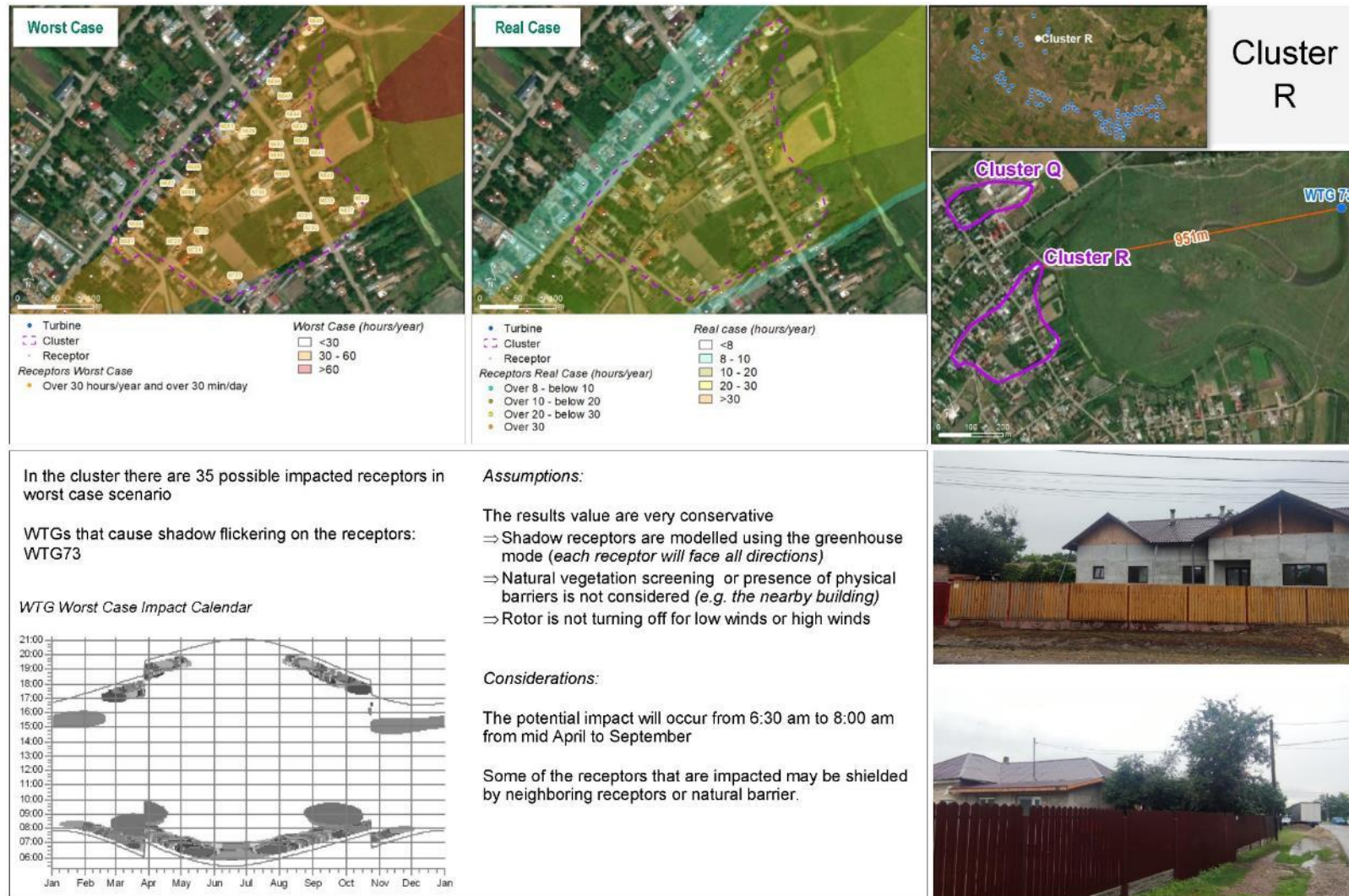
Source: ERM

Figure 7-66 Cluster Q - graphic sheets



Source: ERM

Figure 7-67 Cluster R - graphic sheets



Source: ERM

Figure 7-68 Cluster S - graphic sheets



Source: ERM

7.2.9.7 Receptor Sensitivity and Impact Magnitude

Based on the modeling results and the photographic field survey, the sensitivity of the 17 clusters is estimated as shown in Table 7-107. The overall impact significance is negligible to moderate depending on the cluster.

Table 7-107 Cluster Sensitivity and Magnitude

Cluster	Sensitivity	Magnitude	Impact Significance
A	Medium	Small	Minor
B	Medium	Small	Minor
C	Medium	Medium	Moderate
D	Medium	Small - Medium	Moderate
E	Medium	Small	Minor
F	Medium	Small	Minor
G	Medium	Small	Minor
H	Medium	Small	Minor
I	Medium	Small - Medium	Moderate
J	Medium	Small	Minor
K	Medium	Small	Minor
L	Medium	Small	Minor
M	Medium	Medium	Moderate
N	Medium	Medium	Moderate
O	Medium	Negligible	Negligible
P	Medium	Medium	Moderate
Q	Small	Small	Negligible
R	Medium	Small	Minor
S	Medium	Small	Minor

Source: ERM

7.2.9.8 Mitigation Measures

It is envisaged that once the executive project will be developed, a final run of the model will be performed and a detailed survey on the potential critical receptors, taking into account local specific receptor settings (such as the mutual position of buildings that can limit the occurrence of shadow flickering, the presence of vegetation barriers, window orientation etc)

The outcome of the field survey will allow a proper development of 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 for locations that have been finalized by the project proponent and earmarked for construction.

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 will be adopted as follow:

- Visual Screening (Natural) – Continuously assess identified and any potentially sensitive receptors, where shadow flicker modelling indicates the amount could exceed 30 hours per

year and 30 minutes per day, to ascertain the extent of existing natural visual screening in place. If not existing, the occurrence of shadow flickering during operation could be further investigated, and if confirmed, natural screening could be implemented to minimize the effect.

- Visual Screening (Architectural/Structural) - If grievances will be received or if natural visual screening at potentially sensitive receptors are found to be insufficient, investigations to implement architectural/structural screening, such as the installation of blinds, window shades, window tinting, awnings or fences, at affected receptors could be evaluated to further minimize the effect of shadow flicker.
- Control - Use of turbine control strategies which shut down turbines when shadow flicker is likely to occur.

7.2.9.9 Residual Impact Significance

The mitigation measures above will be implemented for identified receptors that experience shadow flicker. Residual impacts following the implementation of these mitigation measures will reduce to **Minor** (Table 7-108).

Table 7-108 Impact of Shadow Flicker (Operation)

Significance of Impact					
Impact	■ Shadow flicker impacts during construction and operation.				
Impact Nature	Negative	Positive		Neutral	
	Potential impacts from shadow flicker would be considered to be negative				
Impact Type	Direct	Indirect		Induced	
	Impacts would be direct				
Impact Duration	Temporary	Short-term	Long-term	Permanent	
	Only a certain times under right conditions				
Impact Extent	Local	Regional		International	
	The impact will only be localized within the Area of Influence of the Project.				
Impact Scale	Impact scale is considered localized and small.				
Frequency	Impacts could occur during the operation phase.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the characteristic above, the impact is likely to be at worst case medium, depending on the receptor.				
Receptor Sensitivity	Low	Medium		High	
	The sensitivity is considered to be at worst case Medium, depending on the receptor.				
Impact Significance	Negligible	Minor	Moderate	Major	
	Cluster C, D, I, M, N, P are moderate.				
Residual Impact Magnitude	Positive	Negligible	Small	Medium	
Residual Magnitude Significance	Negligible	Minor	Moderate	Major	
	Upon considering the mitigation measure, the residual impact is assessed to be Minor.				

Source: ERM

7.2.10 Ecosystem services

7.2.10.1 Introduction

Area of Influence (Aol)

The Biodiversity Baseline Study and the Social Baseline Study revealed limited diversity of ecosystem services present in the Project area, which are important to local communities' well-being.

The Project Area of Influence (Aol) in terms of ecosystem services, was defined as the Wider Regional Area, represented by the Direct Social Area of Influence (Aol) for any impacts due to Vifor Wind Farm construction and operation. This comprises all settlements, with a rural character, located south of Călmățui river, forming a cluster of villages along the river, and impacted by land take for the Project (that belong to the administrative territorial units of Costești, Gherăseni, Smeeni and Luciu communes, and Pogoanele town), together with the settlements that could be affected by potential temporary impacts during the Project construction and operations, located in a 2 km buffer from the WTGs.

Also, in terms of natural ecosystems likely to be affected by the Project, the Area of Influence (Aol) for the project was defined to include the development footprint and any temporary works infrastructure, operational activities and infrastructure, any offsite facilities (borrow areas for example) as well as areas beyond the immediate area of effect that could be subjected to indirect impacts (e.g. emissions, noise, water quality issues, etc.).

Potential Impacts

The main factors affecting ecosystem services in the Project area, before the construction and operation of the Vifor Wind Farm Project are summarized into three types: natural factors, land use factors, and socio-economic factors, as detailed below:

- Natural factors – including biological factors, soil factors, topographic factors and climate factors – are the natural foundations of ecosystem services.
- Changes in land-use type – including overall pattern, intensity, etc. – all further directly affect the level of ecosystem services.
- Socio-economic factors – including the economic level and economic development, population density, cultural, tourism and recreational factors, all influence ecosystem services by affecting the intensity use of ecological materials and environmental pollution (Millennium Ecosystem Assessment, 2005⁴).

Project activities causing potential impacts to ecosystem services in the Project area are mainly represented by – land taking and clearing of vegetation on the Project sites for the construction of the Vifor Wind Farm Project. These are likely to result in a disruption or reduction of ecosystem services that occur in the Project area, predominantly through the loss of available land (natural steppes, or seminatural meadows and pastures) for sheep and cattle grazing.

The land purchased or leased for the wind farm is almost entirely modified agricultural habitat, and the small area used for the wind farm footprint will unlikely have a significant effect on crop or livestock production. There are no significant dependencies by local communities on the ecosystem services affected by the project, nor is the project significantly dependent on any ecosystem services within the study area.

7.2.10.2 Assessment of impacts:

Assessment of impacts on ecosystem services was based on:

- Stakeholders' perception on impacts on ecosystem services;

- Expert assessment of impacts on ecosystem services;
- Data available for the Wider Regional Area;
- The Project's layout and immediately adjacent areas (for direct impacts) and the Ecosystem Services Aol (for indirect impacts), taking into account the Project development phases: construction, operation, and decommissioning; and
- Selected indicators (such as ecosystem condition and extent) for key ecosystem services impacted in the Ecosystem Services Aol (indirect Social Aol).

Construction Phase

Table below provides an assessment of impacts related to access restrictions to ecosystem services, considered as food provisioning services (cereal crops and sheep and cattle grazing), during Project's construction phase.

Table 7-109 Impact assessment: Disruption of Ecosystem Services – during Construction

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impacts of ecosystem services is largely limited to the Direct Social Area of Influence and Biodiversity Study area.
Duration	Medium	The impacts are long-term and ongoing during the Construction phase (approx. 18 months / October 2023 to April 2025), as the biodiversity recovers slowly.
Scale	Small Scale, Permanent	The impact duration will be permanent as the disrupted ecosystems will not be restored. However, the scale is considered small.
Frequency	Continuous	The frequency is continuous during the Construction phase, as there will be ongoing risk of disruption of the ecosystem services.
Magnitude		
Small Magnitude		
A limited diversity of invasive alien plants has been identified in the Project area, but are already present due to existing modified nature of the affected and surrounding habitats. As such the impact magnitude can be assessed as Small.		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Low Sensitivity		
The natural steppe habitat is classified as natural but degraded. The semi-natural meadows and pastures are classified as modified, which qualifies for a low sensitivity and few of the species are highly invasive.		
Significance Rating Before Mitigation		
Minor Negative Impact		
Considering the impact magnitude of change is small and the sensitivity is low, the overall significance is considered to be of Minor significance.		

7.2.10.3 Mitigation Measures

The recommended mitigation measures below, that address ecosystem services, are to be implemented by the EPC Contractor:

- Rehabilitation of all viable disturbed areas (e.g. temporary access tracks and laydown areas) must be undertaken following construction. This must be done in such a way so as to facilitate natural regeneration of vegetation;
- 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.

Mitigation measures for loss of livelihoods as a result of land acquisition for the Project are also applicable to this impact as assessed within Chapter 7.3.1 Livelihood. Main mitigation measure will include preparation of the Livelihood Restoration Plan (LRP), to provide the foundation for adequate compensation process. The LRP will include an entitlement matrix applicable to all Project Affected People (PAPs).

Moreover, the LRP shall include an Accidental Damage Compensation Procedure that is to be developed as part of the Project ESMS and used to guide compensations during the Construction and Operation of the Project.

7.2.10.4 *Residual Impact Significance*

After the application of mitigation measures, the impact significance of the Project on ecosystem services during the Construction is considered to remain Minor, as presented in the table below.

Table 7-110 Pre- and Post-mitigation: Disruption of Ecosystem Services

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Disruption of Ecosystem Services	Construction	Minor	Minor

7.2.11 Traffic

7.2.11.1 Introduction

As described in Chapter 6.2.5.1 – Area of Influence, the AoI for traffic includes county and communal roads that cross or border the Project site, roads that would be used for worker commuting and transport of materials, and routes from the Port of Constanța that may be used for transport of internationally-sourced components. Rail and air transportation are not proposed for this Project. Sea freight would be the primary mode of transport for bringing internationally sourced components to Romania; however, impacts on marine transportation are not within the scope of this ESIA.

7.2.11.2 Potential Impacts

Project-related traffic on communal, county, and national roads could potentially affect traffic function, transportation infrastructure and transportation safety.

- Traffic function refers to the capacity of the public road system to accommodate the traffic volumes generated by the Project, and the likelihood of traffic congestion or delays.
- Transportation infrastructure refers to the physical ability of existing and proposed public roads to accommodate Project activities, and the likelihood of infrastructure experiencing deterioration or damage.
- Transportation safety refers to increased safety risks on public roads due to Project-related traffic.

Table 7-111 summarises the potential sources of transportation impacts associated with each Project phase.

Table 7-111 Traffic Impacts by Project Phase

Project phase	Activity with potential impact
Construction	Transport of turbine components from port to the Project site
	Transport of concrete and aggregate to the Project site
	Daily movement of construction workers to and from the Project site
	Delivery of construction equipment, fuel and other supplies to Project site
Operation	Travel to the Project area by employees for inspection and maintenance
	Transport of equipment or components needed for maintenance or repairs
	Clearing roads to the Project site of snow or ice to provide site access during winter
Decommissioning	Transport of dismantled materials from the site; movement of construction workers during the decommissioning process

7.2.11.3 Assessment of impacts

Construction Phase

Project construction will require the movement of materials to the project site, including turbine components, construction supplies, equipment, and materials to produce concrete. All turbine components and most other supplies will be transported by ship to the selected port (likely the Port of Constanța) and from the port will be transported by truck to the Project sites.

Turbine components would include very large components (blades, turbine tower sections, nacelle, and transformers) requiring oversized vehicles. Transporting turbine installation equipment (cranes) would also require travel of oversized vehicles.

The planned route from the Agigea harbour within Port of Constanța to the project site, updated in May, 2023, includes two possible route alternatives to the Project sites from Constanța for wind turbine tower sections and one route alternative for wind turbine blades. The possible routes were designated for the particular components based on dimensions and weight as summarized on Figure 7-69 and in Table 7-112.

Figure 7-69 Component Transport Routes from Constanța

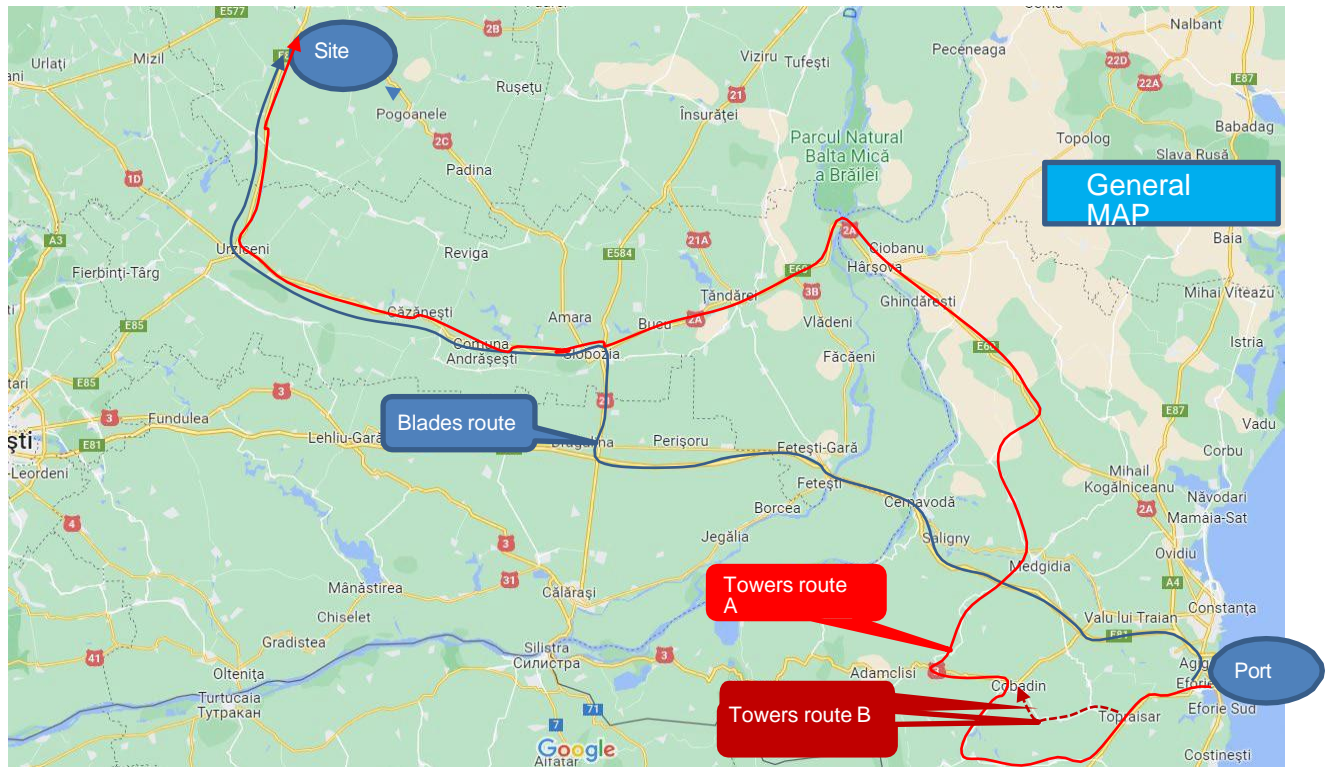


Table 7-112 Component Transport Routes from Constanța

Route	Max. Total Weight allowed	Max. length (m)	Max. Width (m)	Max. Height (m)	Potential Transmission Cable Hazard	Components to be transported on this route:
Blades Route	50 tonnes	90.00	6.50	5.00	No	Blades.
Tower Route A	Not applicable	57.00	6.50	7.50	Yes	Tower elements
Tower Route B	Not applicable	55.00	6.50	7.50	Yes	Tower elements

Source: Holleman, 2023

The road transport route study also identified obstacles to the oversized loads (Holleman, 2023). The obstacles are classified according to the level of difficulty in addressing, and include the following:

- **Level 1:** Normal modifications for the movement of oversized loads: for example, temporary removal of traffic signs.

- *Level 2:* High level modifications: for example, strengthening traffic islands, use of mobile track panels.
- *Level 3:* Complex and major modifications: for example, removal of traffic barriers, roundabout reconstruction, turning area construction, widening roads, traffic light removal.
- *Level 4:* Difficult, may not be possible, additional calculations, studies, or actions necessary. For example: bridges may not support proposed loads or private property may be impacted.

The proposed routes require numerous Level 1 and Level 2 adjustments. A total of 13 Level 3 modifications were identified for blade delivery and 13 for tower component delivery. Modifications include removal of trees, signs, poles, and traffic signals, roundabout dismantling, installation of gravel on private land, use of steel plates to cross ditches or traffic islands, and the construction of a new, 2 km road. In most cases, the road and landscape would be restored at the conclusion of deliveries. No Level 4 obstructions were identified for any of the routes, but the route study notes the need for load calculation for some bridges prior to finalizing the delivery routes. In numerous places trucks would use both lanes and/or move in the direction opposite to traffic. In many locations such as sharp turns and turnaround locations where trucks need to leave the road to turn around, oversized truck movements would be slower than typical traffic, resulting in temporary traffic delays (Holleman, 2023).

All modifications, overweight and oversize permits, and final internal Project roads would be subject to confirmation and issuance of transportation permits by relevant public authorities. The route study limits access to internal Project roads for deliveries to two locations, both from E 85/DN 2. The main entrance, used for deliveries for 68 WTGs, would be south of Spataru in the vicinity of Pietrosu. The second access point, to be used for deliveries for 4 WTGs, would be from DJ 203D, a local road (described in Section 6.2.5.2) that intersects E 85/DN 2 within Buzau. By limiting the delivery of WTG components to these two public road access points, Project construction impacts on other local roads would be limited to possible local supply deliveries and employee commuting.

From existing public roads, trucks would travel to locations within the Project sites via an extensive internal road network, including areas designated for warehousing materials, truck parking, and turbine component staging (Chapter 2.3 – Project Location). Because the East-West Construction Corridor would be the main internal Project artery for transport during construction, most Project deliveries (and all component deliveries for 68 of the 72 WTGs) would access the internal Project road network via the proposed intersection of E85 (DN2) with the East-West Construction Corridor. The Construction Corridor, located north of Călmățui river, uses existing rural lanes and requires improvement of these lanes as well as new road construction where no roads currently exist. The Construction Corridor passes through the northern edge of the town of Budișteni, intersecting three local roads that each serve several properties on the north side of the river, but otherwise avoids towns and settlements.

The internal Project roads will consist of reconstructed agricultural roads and new roads as described in Chapter 2.3. These roads will be open to local and agricultural traffic during operations. The internal Project roads would have with a stone surface, width of 4.5 meters, and drainage swales.

Construction is anticipated to take 18 months, according to updated information provided by Client, starting with mobilisation on site/s in October 2023 and finishing with operation in April 2025. The following tasks are likely to overlap for much of the construction period:

- Grading, clearing, road installation, foundations and cabling: Construction equipment and supplies, especially concrete components, and cabling would be delivered during this period. Assumed to take place over 12-14 months.
- Wind turbine component delivery and assembly, requiring oversized transport loads. Assumed to take place over 9-10 months.
- Central power collection station/substation construction, potentially requiring oversized transport loads. Assumed to take place over 2 months.

Project-specific estimates of the number of truck deliveries needed for turbine components, cables, substation components, construction equipment, fuel, general supplies, or concrete (or materials for concrete plant) are not yet available.

For purposes of estimating total Project traffic, this assessment uses estimates from other ESIAs prepared by ERM (Table 7-113). Truck traffic for transport of aggregate and sand or substation and cable components has not been estimated and is therefore not included in Table 7-113. In particular, materials for concrete manufacture and road construction could generate substantial heavy truck traffic not reflected in the Table. The impact ratings in this assessment account for these additional trips.

A temporary concrete batching station will be used at a location with access to the East West Construction Corridor Road. Most of the water needed for construction, including concrete production will be brought in with water tanker trucks; groundwater may be a secondary source of water. Sand, gravel and crushed stone supply vehicles will travel to the Project site from unidentified source locations, possibly including off-site suppliers, and will use the East West Construction Corridor Road within the Project site. Concrete delivery trucks will also travel primarily on the East West Construction Corridor Road from the concrete batching station to WTG and other foundation locations.

Table 7-113 Estimated Truck Traffic for Project Construction

Project component	Truck Deliveries per Turbine (round trip)	Total Truck Round Trips for Project's 72 wind Turbines	Average Monthly Truck Round Trips
Aggregate and sand (concrete manufacture and road construction) ^a	Unknown		Unknown
Concrete delivery trucks ^b	0		0
Construction equipment deliveries ^c	8	576	144
Water tanker trucks ^d	8	576	48
Turbine components	11	792	88
Substation and cable components	Unknown		Unknown
Fuel and supply delivery ^e			96
Waste removal ^f			16
Total with overlapping phases			392

^a Volume of materials for road construction and concrete manufacture and extent of on-site sourcing versus delivery of materials is unknown.

^b Assumes concrete delivery trucks travel only on internal Project roads from batching plant to construction sites.

^c Estimates of construction equipment deliveries assumes a 4-month delivery period.

^d Estimates of water tanker truck deliveries are based on the following: an estimated 90 to 110 cubic meters of water for concrete manufacture per turbine foundation, or up to 110,000 litres; tanker trucks with 15,000 litre capacity, requiring 7.3 trucks per foundation; additional water for workers, dust control and other purposes resulting in estimated 8 tanker trucks per WTG.

^e Estimated average of two deliveries per day, 6 days per week for fuel and general supplies.

^f Estimated average of 2 trips per week waste removal

Impacts on Road Function and Congestion

Based on the partial estimate of truck traffic (not including aggregates/sand and substation/cable components), project construction could generate an average of 392 truck deliveries monthly (784 one-way trips) when all phases of construction are overlapping, or an average of 16 daily deliveries (32 one-way trips) assuming deliveries occurred 6 days per week. During peak periods, truck deliveries would be more frequent, although the extent of peak-period Project traffic has not yet been determined. While traffic volumes on DN 2/E 85 are unknown, the Project's daily trips are unlikely to represent a meaningful increase in existing volumes. More important, Project construction would likely result in a notable increase in the number and proportion of large trucks on those roads, as compared to current traffic. Project truck deliveries, and especially oversized truck transport, would result in

frequent, temporary periods of traffic slow-downs and backups during the 18 months construction period. Congestion would occur within towns with multiple intersections, on narrower or unpaved roads, or along road segments with sharp turns and curves.

A total of 600-700 workers are anticipated during construction. Workers driving to and from the Project sites would also generate traffic on public roads. This analysis assumes an average of approximately 200 workers travelling to the sites daily in individual vehicles (i.e., one vehicle per worker). These workers would travel to the Project sites daily from farms and towns within commuting distance of the sites, resulting in 400 one-way trips on DN 2/E 85 and other local roads.

A traffic flow of up to 1,300 passenger cars per lane per hour is considered low to moderate flow conditions (i.e., somewhat congested) on a paved, two-lane road in good condition (AASHTO 2018). Congestion would occur at lower volumes within towns with multiple intersections, on narrower or unpaved roads, or along road segments with sharp turns and curves. No information is available on the current traffic volume or level of congestion for roads within the AoI. Daily Project worker trips added during commuting hours are unlikely to create new peak hour congestion but may contribute incrementally to existing congestion at intersections and road segments that already experience congestion at times of peak traffic volumes.

Project construction will result in extensive traffic on the internal Project roads. These roads will be open for use by the public and would thus represent an improvement to the local road network in terms of road quality and overall road network connectivity. Frequent, temporary delays are likely on these roads during construction due to movement of heavy and oversized vehicles within the Project sites, resulting in inconvenience to non-Project road users but not precluding the usefulness of the roads to the local road users. Table below summarizes impacts on road function, congestion and delay during construction.

Table 7-114 Impact Assessment: Traffic – Road Function (Construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Regional	Project deliveries will originate at ports (for turbine components) and unknown regional sources (for various construction equipment, supplies and components).
Duration	Short term	Construction-related travel will cease upon completion of construction.
Scale	Medium	Over 400 one-way truck trips monthly, including oversized loads, will result in a measurable and noticeable increase in delays on local and regional roads as trucks will take curves and turns more slowly than smaller vehicles and oversized loads will result in multiple road and lane closures. Worker commuting during construction may contribute to local road congestion.
Frequency	Daily	Daily truck and worker travel is anticipated during construction. Oversized truck loads would be less frequent but still occur with regularity during the construction period.
Magnitude		
Medium Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		

Medium Sensitivity

Potential receptors for the Project's traffic-related impacts include users of and residents near the roads within the Traffic AoI, listed in Chapter 6.2.5.1 – Area of Influence, and users of the local agricultural roads within and around the Project site. Receptor sensitivity is considered to be Medium.

Alternative routes to use if a particular road has temporary delays or closures are generally available but require long and circuitous detours. Regional roads along the route from the port would experience lane or road closures and delays. Road users and residents would not be accustomed to the project-related heavy truck traffic and would need to adjust their driving practices and expectations to accommodate these vehicles. Road users and residents would be accustomed to the type of passenger vehicle traffic that would be generated by worker commuting.

Significance Rating Before Mitigation

Moderate Negative Impact

The impact is considered to be of moderate significance along the travel routes from the port for components, along the routes where concrete mixer trucks or supplies travel to the Project area (not yet determined), and along E85 and local routes used to reach the access points to the internal Project roads. The Project would also have a direct positive impact on road function resulting from the addition of new roads within the Project area.

Impacts on Road Condition

The wear and tear of multiple heavy and oversized truckloads, such as those associated with delivery of concrete, equipment, and turbine components, would degrade road infrastructure, leading to conditions such as pitted, cracked or crumbling asphalt, and trenches, ridges and ditches on dirt and stone road surfaces. A road surface in poor condition results in additional wear on vehicles, lower travel speeds, safety risks and stress for road users. The number of truckloads likely on DN 2/E 85 and DN 2A would result in substantial wear to the road surface during the 18 months of construction. The county and communal roads that are unpaved, have light asphalt, and may already be in need of maintenance would be likely to experience pitting and severe deterioration.

Transport of oversized loads would require removal of street furniture, the temporary placement of materials over shoulders and ditches to allow larger turning radii, and other temporary measures, as identified in the desktop review of the route from the Constanța Port to the Project area. These measures would temporarily affect the driving environment but would be planned and approved by the appropriate road authorities.

Project construction would improve existing agricultural roads within the Project area and add additional roads, offering alternative routes between local properties and settlements and providing an improvement to the local road network.

Table below, summarizes impacts on road condition during construction.

Table 7-115 Impact Assessment: Traffic – Road Condition (Construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Regional	Roads within the immediate area of the Project will receive the greatest wear from multiple heavy truck deliveries; however, the selected routes from ports or supply sources to the local

		area will also experience wear from truck travel. Supply sources for concrete, equipment, fuel, and other construction supplies have not been identified but would experience heavy wear.
Duration	Permanent	The impact from construction of internal Project roads that will connect rural areas within the Aol would be positive and local.
Scale	Major	The effect on road condition will be permanent if maintenance and repairs do not occur. The new internal Project roads are anticipated to be permanent improvements to the road network.
Frequency	Daily	The number of heavy truck deliveries would result in moderate to major wear to road surfaces, depending on the particular road's share of truck traffic or type of surface. The overall scale is major due to the total volume and frequency of heavy truck traffic anticipated during construction.

Magnitude

High Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor

Medium Sensitivity

The sensitivity is considered medium due to the ability of road users to adjust their driving habits based upon road conditions and the presence of alternate routes for many of the regional and local roads.

Significant Rating Before Mitigation

Major Negative Impact

The negative impact on existing roads is considered to be of major significance. The Project would also have a direct positive impact on road infrastructure resulting from the construction and upgrade of some rural roads within the Project area.

Impacts on Road Safety

Increased traffic volumes are positively correlated with accident frequency, indicating that increased traffic volumes due to Project activity would generate an increase in traffic-related accidents if not properly managed or mitigated (Retallack and Ostendorf, 2020). The risk of additional incidents would increase if existing road users were not accustomed to increased traffic volumes and heavy or oversized vehicle traffic. Oversize Project vehicles delivering turbine components create particular safety concerns. Safety risks associated with these vehicles include potential property damage, as well as crashes resulting from the lack of public familiarity with the slow manoeuvring and travel speeds and the wide turning radii of these oversize vehicles. The size of Project vehicles (especially oversize vehicles) would also likely increase the severity of outcomes of a crash.

Final routes for oversized load deliveries from the selected port to the Project sites have not been finalized, although these routes are likely to be similar to those evaluated in the 2023 routing study. That study identifies the types of impacts that can occur, notes the need for additional study at several locations and pointed to possible property damage if routes are used that do not provide the necessary turning radius and clearance (Holleman, 2023). In the absence of selected routes, this assessment notes that many roads within the Aol are narrow, include sharp turns or traffic circles, and have structures located close to the travel lanes within towns and settlements. There is a high potential risk to road users and property depending on the route selected and extent of advance planning. Table below summarizes impacts on road safety during construction.

Table 7-116 Impact Assessment: Traffic – Road Safety (Construction)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Regional	Project-related construction travel is regional due to deliveries from ports and suppliers that have not yet been identified
Duration	Short term	Impact will be limited to the construction period.
Scale	Major	Moderate increases in road safety hazards will result from the increase in total traffic volumes on local roads due to Project construction, the significant increase in the number of heavy truck deliveries in the local area and the delays, lane closures and slow-moving traffic resulting from oversized loads. Major increases in road safety hazards will result from oversized loads travelling and making turning movements on roads with insufficient clearance. Collisions of oversized freight with property and other vehicles could result from inadequate planning and preparation for movement of oversized loads.
Frequency	Daily	Construction traffic will occur daily.
Magnitude		
High Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium Sensitivity		
<p>The sensitivity is considered medium. Road users and residents will not be accustomed to the oversized loads, heavy truck traffic or local patterns of commuting to the Project sites but are capable of adjusting their driving behaviours to safely accommodate these traffic patterns. Oversized loads would be accompanied by escort vehicles to warn other drivers and pedestrians.</p>		
Significant Rating Before Mitigation		
Major Negative Impact		
<p>The impact is potentially considered to be of major significance, primarily due to the potential for property damage and serious injury from crashes involving Project vehicles (especially trucks and oversize vehicles) if routes with inadequate clearance and turning movement room are used.</p>		

Operation Phase

The Project site would be visited regularly during operations for inspections, maintenance, and repair; however, these activities would generate minimal traffic volume. Infrequent, temporary congestion would result when truck deliveries are needed for repair. A total of about 40-50 workers are anticipated during operations.

The internal Project roads, including new roads and improvements to local agricultural roads, would provide benefits for local road users during the operations phase. While the frequency of site visits has not been specified, ongoing Project inspection, maintenance, and repair would have a negligible impact on road function or transportation safety. Ongoing monitoring and repair or restoration of local,

unpaved, or lightly paved roads would be necessary following the movement of heavy trucks related to turbine repair.

Table 7-117 summarizes impacts on road function, condition, and safety during operations.

Table 7-117 Impact Assessment: Traffic—Road Function, Condition and Safety (Operations)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Operations would result in regular traffic within the local area. Regionally, operational traffic would not be discernible from the background traffic levels except possibly for occasional delivery of oversized loads.
Duration	Long term	The impact duration would continue through the operational period.
Scale	Small	Based on the anticipated traffic generated by 40-50 workers and periodic repairs, the scale is considered small.
Frequency	Daily	A low level of regular worker traffic is anticipated, with less frequent periods of higher volume traffic for a few days for turbine repairs or major maintenance.
Magnitude		
Small Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium Sensitivity		
Local road users and residents have medium sensitivity to traffic volumes and types. They depend upon local roads for transportation but can adjust to changing traffic. Alternative routes are available but circuitous and limited.		
Significant Rating Before Mitigation		
Minor Negative Impact		
The impact of traffic for project operations and maintenance is considered to be of minor significance. The Project would also have a positive impact on traffic function and road condition during operations due to the establishment and maintenance of roads connecting the Project sites that will be open for public use.		

Decommissioning Phase

Decommissioning will likely generate traffic associated with worker movements, disassembly of turbines, and transport of materials away from the site, along with temporary or permanent road infrastructure improvements necessary to facilitate those activities. Overall, it is assumed that decommissioning will result in impacts similar in character and significance to those identified for the construction phase, but likely of shorter duration and with a lower volume of heavy truck trips.

Table 7-118 summarizes impacts on road function, condition and safety during decommissioning.

Table 7-118 Impact Assessment: Traffic – Road Function, Condition and Safety (Decommissioning)

Type of Impact		
Direct Negative Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Regional	Travel would be regional due to equipment deliveries from unidentified suppliers and material transports to recycling and disposal facilities.
Duration	Short term	Impact will be limited to the decommissioning period.
Scale	Medium	Road function, condition and safety impacts would result from the temporary increase in heavy truck movements on local roads and to a lesser extent on regional roads. The volume of deliveries would be lower than during construction, and components could be dismantled on-site to avoid the need for oversized loads, resulting in a medium scale of impact.
Frequency	Daily	Decommissioning traffic would occur daily.
Magnitude		
Medium Magnitude		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium Sensitivity		
Road users and residents would not be accustomed to the project-related heavy truck traffic, and would need to adjust their driving practices and expectations to accommodate these vehicles. Road users and residents would be accustomed to the type of passenger vehicle traffic that would be generated by worker commuting.		
Significant Rating Before Mitigation		
Moderate Negative Impact		
The impact is considered to be of moderate significance.		

7.2.11.4 Mitigation Measures

The recommended mitigation measures below are divided into measures that address road function, condition, and safety, although there is some overlap in the effects of these measures. Each mitigation is identified by phase.

Mitigations to Address Road Function Impacts

- Prepare and implement a Transportation Management Plan (TMP) that addresses the other mitigations listed below, provides a detailed plan for Project deliveries, and incorporates the results of stakeholder and community engagement. (construction, operations, decommissioning)
- Work with local authorities in scheduling truck deliveries, especially oversized truck deliveries, to reduce impacts on road function and safety. Specifically:
 - Where safe and feasible, schedule deliveries to minimize travel impacts for other road users based upon local conditions and the results of stakeholder engagement. Consider

scheduling deliveries during non-peak hours and at intervals to avoid queuing of delivery vehicles along public roads near the access points to internal Project roads. (construction, operations, decommissioning).

- Consider scheduling deliveries, especially the oversized turbine components, in convoys of multiple trucks at one time to reduce the frequency of road travel interruption and delays. (construction, decommissioning).
- Consider movement of oversized or escorted loads at night, if feasible and safe, to reduce impact to road function. (construction, operations, decommissioning).
- As part of a Project-related public engagement programme, regularly inform, educate, and update stakeholders and communities close to transport routes about Project traffic, especially about the safety issues and scheduling associated with movement of heavy and oversized loads on public roads. (construction, decommissioning).

Mitigations to Address Road Condition Impacts

- Obtain necessary permits and implement all necessary road improvements or alterations prior to use of the routes for oversized Project shipments. (construction, operations, decommissioning).
- Restore signs, street lights and other street furniture removed for or damaged by the movement of Project-related trucks. (construction, operations, decommissioning).
- Survey the condition of roads to be used for concrete, supply, equipment, and component deliveries prior to construction and submit reports to local road authorities. (pre-construction).
- Repair road damage resulting from construction traffic during the 18 months construction period (construction).
- Upon completion of the construction and decommissioning phases, work with local road authorities to identify damage to and restore county, communal, and agricultural roads used for Project-related heavy truck traffic. Coordinate with national road authorities (the Romanian National Road Infrastructure Company, or CNAIR) to coordinate and contribute to repair and maintenance of national roads damaged by construction. (construction, decommissioning).
- Upon completion of construction, install road signage for the new public roads built for the Project as required by the local road authorities. (construction).
- Upon completion of construction, in coordination with local road authorities and stakeholders, establish a schedule to be implemented by the Proponent and other stakeholders for maintenance of roads within the Project area during wind farm operations. (construction).

Mitigations to Address Road Safety Impacts

- As part of the TMP, address transportation safety risks of Project traffic, including (but not limited to) truck routes, hours of transport, community notification, signage, education, and other measures to minimize safety hazards. (construction, decommissioning)
- Obtain permits and implement alterations prior to deliveries. If necessary, construct bypasses to avoid hazards to properties or other road users at constrained road segments or intersections. (pre-construction, construction, decommissioning)
- Plan truck routes for non-oversized loads using roads with adequate geometrics and load-bearing capacity for safe passage. (pre-construction, construction, operations, decommissioning)
- Consider community schedules that result in higher levels of local traffic, school schedules, or community events. Schedule truck traffic outside of these times in addition to avoiding periods of peak traffic volumes. (construction, operations, decommissioning)

- As part of a Project-related public engagement programme, regularly inform, educate, and update stakeholders about Project construction traffic, oversized vehicle movements, and related safety considerations. (pre-construction, construction, decommissioning)
- Establish and implement standards addressing the following (constructions, operations, decommissioning):
 - Training and accreditation for project drivers, including contractors.
 - Driver fitness standards, including mandatory rest periods and prohibition of drug/alcohol use.
 - In-vehicle monitoring systems to monitor vehicle speed and location (Project vehicles and contractors).
 - Project and contractor standards for vehicle safety and maintenance.
 - Security response for vehicle incidents.
 - Load stability standards.

7.2.11.5 *Residual Impact Significance*

With the application of mitigation measures listed in Chapter 7.3.10.4 – Mitigation Measures, the residual adverse impacts on roads and traffic are anticipated to be of minor significance during construction and decommissioning, and negligible significance during operations, as detailed in Table below.

With negligible adverse impacts, the overall impact on road function and condition during operations would be positive, due to the presence of new local roads constructed and maintained by the Project proponent.

Table 7-119 Pre and Post Mitigation: Impacts on Road Function, Condition and Safety

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Road Function	Construction	Moderate	Minor
Road Condition	Construction	Major	Minor
Road Safety	Construction	Major	Minor
Road Function	Operations	Minor	Positive
Road Condition	Operations	Minor	Positive
Road Safety	Operations	Minor	Minor
Road Function	Decommissioning	Moderate	Minor
Road Condition	Decommissioning	Moderate	Minor
Road Safety	Decommissioning	Moderate	Minor

7.2.12 Archaeology and Cultural Heritage

7.2.12.1 Summary of Key Baseline Findings

The baseline study for cultural heritage identified a total of 61 cultural heritage resources comprising 16 Designated resources and 45 Non-Designated Resources within the Area of Influence of the Vifor Wind Farm Project. Each resource was assigned a unique identifier (for example VV_CH_001) and comprise the following type of resource:

- Archaeological sites
- Dwelling and Necropolis
- Settlements and Necropolis
- Settlements
- Necropolis
- Necropolis and Tumulus
- Necropolis and Tell
- Settlements and Tumulus
- Places of Worship
- Tumuli

Sensitivity of Receptor

As identified in the baseline, each of the **61** Cultural Heritage resources is presented with a sensitivity in line with the ERM Impact Assessment Methodology¹¹³. The impact assessment takes a conservative, precautionary approach to the assessment of sensitivity and impact, in line with Good International Industry Practice.

Identification of potential impacts

The predicted impacts to the Cultural Heritage resources as a result of the Project are described in this section.

The impact assessment considers both tangible and intangible Cultural Heritage resources as described below:

- Tangible Cultural Heritage – such as (but not limited to) archaeological sites, built heritage (historic or culturally significant buildings or structures), places of worship, historic enclosures and potential settlements;
- Intangible Cultural Heritage – such as (but not limited to) places that hold cultural, artistic, or religious values, knowledge, innovations, and practices of communities embodying traditional lifestyles, and living heritage resources (shrines, cemeteries, religious/ritual sites) etc.

7.2.12.2 Project considerations

The Project Area of Influence (Aol) and construction corridor for Cultural Heritage are outlined in Table 7-120. For the impact assessment it is assumed¹¹⁴ that any identified Cultural Heritage Resources located within the construction corridor (defined as 50 metres either side of the Project alignment and

¹¹³ (Source: Annex to The ERM Impact Assessment Standard)

¹¹⁴ At the time of writing, no construction limits for the project had been defined, as such assumptions needed to be applied to the study.

including the limits of any associated infrastructure) will be wholly removed¹¹⁵ during the construction phase.

Table 7-120 Scope of the Impact Assessment and Area of Influence

Project Phase	Construction corridor	Area of Influence
Construction	50 metre corridor (50 metres either side of the alignment) and the limits of any associated infrastructure.	1000 metres from the alignment of the proposed development and associated infrastructure;
Operation	n/a – it is assumed any cultural heritage resources located within the construction corridor will have been wholly removed at construction stage	1000 metres from the alignment of the proposed development and associated infrastructure;

Direct, indirect, and cumulative impacts

Three types of impacts to Cultural Heritage resources are considered in this assessment resulting from construction and operation phases of the Project:

- Direct: ground disturbance due to earthworks are the most likely source of direct, physical impacts to known and unknown Cultural Heritage resources, with the potential to partially or wholly remove these resources. Direct impacts have the potential to be once off, non-reversible and permanent.



Unless the principle of avoidance is adopted in the first instance, mitigation measures will not significantly reduce the predicted residual effect of this impact on the Cultural Heritage.

- Indirect: Cultural Heritage resources are susceptible to indirect impacts through the introduction of intrusive visual, auditory or dust elements to their physical environment or 'setting'. Indirect impacts also include restricted access to existing Cultural Heritage resources as a result of construction or operation phases; and
- Cumulative: impacts to Cultural Heritage resulting from incremental change caused by surrounding projects in the past, present or reasonably foreseeable future, combined with this Project.

Impact Magnitude

Standard terminology and designations as per ESIA Chapter 4 is provided to ensure consistency when characteristics are described in an impact assessment report. An assessment of the overall magnitude of an impact is provided by considering all the dimensions of the impact described in order to determine whether an impact is of negligible, small, medium or large magnitude¹¹⁶.

Table 7-121 Impact Magnitude definitions for Cultural Heritage

Magnitude	Cultural Heritage resources
Negligible	No discernible change in the physical condition, setting or accessibility of the site

¹¹⁵ "Removed" here means the resource will need to be physically removed in its totality for construction of the Project, and no trace will survive in-situ beyond the construction phase

¹¹⁶ Source: ERM Impact Assessment Methodology 2021

Small	Small part of the site is lost or damaged, resulting in a loss of scientific or cultural value; Setting undergoes temporary or permanent change that has limited effect on the site's perceived value to stakeholders; Stakeholder/public or scientific access to site is temporarily impeded; and/or Historic building suffers minor, reparable, structural damage.
Medium	A significant portion of the site is lost or damaged, resulting in a loss of scientific or cultural value; Setting undergoes permanent change that permanently diminishes the site's perceived value to stakeholders; Site becomes inaccessible for the life of the Project to stakeholders including traditional users or researchers; and/or Historic building suffers major structural damage that is not reparable.
Large	The entire site is damaged or lost, resulting in a nearly complete or complete loss of scientific or cultural value; Setting is sufficiently impacted to cause site to lose nearly all or all cultural value or functionality; Site becomes permanently inaccessible to stakeholders including traditional users or researchers; and/or Historic building suffers major structural failure.

7.2.12.3 Construction Phase Impacts

Five Potential Impacts (PI) are considered during the construction phase:

- **PI1 Physical ground disturbance through earthworks:** a direct impact, ground disturbance and earthworks associated with the construction phase have the potential to partially or wholly remove Cultural Heritage resources, such as:
 - Buried archaeology, including undiscovered archaeological sites and pyramids;
 - Built heritage including historic buildings, places of worship, shrines or tombs;
 - Historic agricultural, irrigation, settlements or enclosures; and
 - Industrial heritage including historic railways, rail and road bridges.
- **PI2 Restriction of access:** restriction zones associated with the construction phase have the potential to temporarily or permanently restrict the access for traditional users or researchers to existing Cultural Heritage resources;
- **PI3 Visual:** The construction of temporary or permanent structures (bridges, fly-over, embankments etc.) has the potential indirectly impact built and living Cultural Heritage through the introduction of intrusive visual elements to the physical environment or 'setting' where the resource draws value from its surroundings.
- **PI4 Auditorial:** The construction phase has the potential to introduce intrusive auditorial (noise) elements through associated construction works to the physical environment or 'setting' of Cultural Heritage resources; and
- **PI5 Dust:** The construction phase has the potential to introduce intrusive dust elements through associated works to the physical environment or 'setting' of Cultural Heritage resources

Pre-mitigation Direct Impacts

Construction phase direct impacts are presented below in Table 7-122 to Table 7-124. For clarity, each table is presented by the Cultural Heritage sensitivity of receptor (high, medium, and low) and by the types of potential impacts (PI1 through to PI5 as applicable).

Direct Impacts on High Sensitivity resources

The magnitude of impact through physical ground disturbance activities (earth works) on the VV_CH_003 (BZ-I-s-B-02232) **high** sensitivity Cultural Heritage resource during the construction phase is assessed as **small**, as a small part of the site is lost or damaged, resulting in a loss of scientific or cultural value. The resulting significance of impact (based on the sensitivity of the resources and the magnitude of impact) is **Permanent Moderate Adverse**, which is a significant effect.

Table 7-122 Direct impacts PI1 Physical ground disturbance activities (earthworks) on High sensitivity Cultural Heritage Resources (Pre-Mitigation)

Type of Impact		
Direct Permanent Moderate Adverse Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impact is limited to the construction corridor
Duration	Permanent	Ground disturbance and earthworks associated with construction has the potential to permanently alter the landscape and remove any buried archaeology.
Scale	Small	This resource is situated partially within the construction corridor. Any buried human remains will be wholly removed by earthworks, resulting in a direct impact. A small part of the site is lost or damaged, resulting in a loss of scientific or cultural value
Frequency	Once off	Ground disturbance and earthworks associated with construction has the potential to permanently alter the landscape and remove any buried archaeology permanently, once.
Magnitude		
Small		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
High		
Significant Rating Before Mitigation		
Moderate		

Direct Impacts on Medium Sensitivity resources

The magnitude of impact through physical ground disturbance activities (earth works) on the following seven VV_CH_006 (BZ-I-s-B-02249); VV_CH_036 (BZ-I-s-B-02192); VV_CH_049 (49554.06); VV_CH_050 (49554.05); VV_CH_059 (49885.01); VV_CH_060 (49885.02); and VV_CH_061 (49858.05) **medium** sensitivity Cultural Heritage resources during the construction phase is assessed as **small** as a small part of the site is lost or damaged, resulting in a loss of scientific or cultural value. The resulting significance of impact (based on the sensitivity of the resources and the magnitude of impact) is **Permanent Minor Adverse**, which is a non-significant effect.

Table 7-123 Direct impacts PI1 Physical ground disturbance activities (earthworks) on Medium sensitivity Cultural Heritage Resources (Pre-Mitigation)

Type of Impact		
Direct Permanent Minor Adverse Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Extent	Local	Impact is limited to the construction corridor
Duration	Permanent	Ground disturbance and earthworks associated with construction has the potential to permanently alter the landscape and remove any buried archaeology.
Scale	Small	This resource is situated partially within the construction corridor. Any buried human remains will be wholly removed by earthworks, resulting in a direct impact. A small part of the site is lost or damaged, resulting in a loss of scientific or cultural value
Frequency	Once off	Ground disturbance and earthworks associated with construction has the potential to permanently alter the landscape and remove any buried archaeology permanently, once.
Magnitude		
Small		
Sensitivity/Vulnerability/Importance of the Resource/Receptor		
Medium		
Significant Rating Before Mitigation		
Minor		

Direct Impacts on Low Sensitivity resources

The magnitude of impact through physical ground disturbance activities (earth works) on the following three VV_CH_024 [46821.04]; VV_CH_040 [49616.02] and VV_CH_044 [49607.05] **Low** sensitivity Cultural Heritage resources during the construction phase is assessed as **Small** as a small part of the site is lost or damaged, resulting in a loss of scientific or cultural value. The resulting significance of impact (based on the sensitivity of the resources and the magnitude of impact) is **Permanent Negligible Adverse** which is a non-significant effect.

Table 7-124 Direct impacts PI1 Physical ground disturbance activities (earthworks) on Low sensitivity Cultural Heritage Resources (Pre-Mitigation)

Type of Impact		
Direct Permanent Negligible Adverse Impact		
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning

Extent	Local	Impact is limited to the construction corridor
Duration	Permanent	Ground disturbance and earthworks associated with construction has the potential to permanently alter the landscape and remove any buried archaeology.
Scale	Small	This resource is situated partially within the construction corridor. Any buried human remains will be wholly removed by earthworks, resulting in a direct impact. A small part of the site is lost or damaged, resulting in a loss of scientific or cultural value
Frequency	Once off	Ground disturbance and earthworks associated with construction has the potential to permanently alter the landscape and remove any buried archaeology permanently, once.

Magnitude**Small****Sensitivity/Vulnerability/Importance of the Resource/Receptor****Low****Significant Rating Before Mitigation****Negligible***Pre-mitigation Indirect Impacts*

No predicted pre-mitigation indirect impacts were assessed at construction phase on cultural heritage resources.

Construction Phase Mitigation Measures

A comprehensive Cultural Heritage Management Plan (CHMP) will be developed for the Project to ensure all Cultural Heritage resources are addressed and managed adequately. The plan will be developed and agreed pre-construction, to allow appropriate mitigation measures to be applied before any impact occurs. Items to be covered in the CHMP include (but not limited to):

- Specific design measures, such as screening bunds or noise reduction measures, to address indirect impacts;
- Regulator engagement with the Ministry of Culture to agree site-specific mitigation measures;
- Site specific field survey will be required under the CHMP to determine the full extents and significance of Project impacts and to develop site specific mitigation measures for cultural heritage resources assessed in the impact assessment. This field survey needs to be undertaken by an appropriately qualified Cultural Heritage specialist. The CHMP will need to be updated to reflect the findings of this survey;
- Access management (Memorandum of Understanding with local communities regarding access and activities). Access arrangements will be made to the satisfaction of identified stakeholders through a Memorandum of Understanding agreed to by authorities and identified stakeholders, which will allow unrestricted access to Cultural Heritage resources. This memorandum should be in place before construction begins.
- Cultural Heritage input into the Community Grievance Mechanism;
- Grave Relocation Plan. This will be designed and implemented with the agreement of the local communities (for the cemetery identified in the Aol).

- Chance Finds Procedure. A Chance Finds Procedure will be designed and implemented to manage any unexpected discovery of archaeological material in-line with international requirements and guidelines IFC PS8.
- Detailed site-specific Archaeological mitigation, such as pre-construction investigations, archaeological excavations, etc.;
- Built heritage recording; and
- Monitoring of mitigation measures and Mitigation Control.



The only mitigation measure that would be effective in reducing the significance of direct physical impact would be avoidance via rerouting¹¹⁷. If this were to be applied, the resulting Post-Mitigation significance would be negligible.

Post Mitigation Direct Impacts

The direct impacts presented in Table 7-122 to Table 7-124 on **High, Medium and Low** sensitivity Cultural Heritage resources will not change with the imposition of specific mitigation measures listed within the CHMP in Construction Phase Mitigation Measures above. Thus, direct impacts will not be reduced unless avoidance is adopted in the first instance.

Post-mitigation Indirect Impacts

No predicted post-mitigation indirect impacts were assessed at construction phase on cultural heritage resources.

7.2.12.4 Operation Phase Impacts

Three types of indirect impacts are considered during the operation phase:

- **PI6 Restriction of access:** the potential to permanently restrict access for traditional users or researchers to existing Cultural Heritage resources;
- **PI7 Visual:** the potential to introduce mobile intermittent intrusive visual elements to the physical environment or 'setting' of Cultural Heritage resources;
- **PI8 Auditorial:** the potential to introduce intermittent intrusive auditorial elements to the physical environment or 'setting' of Cultural Heritage resources;

Pre-mitigation direct Impacts

No direct impacts to Cultural Heritage resources have been identified at the Operation phase of the Project, as direct impacts to cultural heritage resources will happen at construction phase during earthwork activities, either partially or wholly removing the resource.

Pre-mitigation Indirect Impacts

No predicted pre-mitigation indirect impacts were assessed at operation phase on cultural heritage resources.

Operation Phase Mitigation Measures & Residual Effect

As all predicted impacts at Operation phase are currently assessed as negligible, no further mitigation measures are proposed, and the residual effects remain the same.

¹¹⁷ For the purposes of this Impact Assessment, it is assumed rerouting the alignment to avoid impact is not possible as a mitigation measure

8. 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:

1. Avifauna (birds and bats) – see Section 7.1.7.3;
2. Small Mammals (European Souslik) – see Section 7.1.7.3;
3. Traffic;
4. Employment;
5. 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 Report for the biodiversity VECs is provided in Section 7.1.7.3. The CIA Report for the other VECs is presented in Appendix G.

9. SUMMARY OF IMPACTS

This ESIA Report was prepared for the construction and operation of the 450 MW Vifor Wind Farm, located in Costesti, Gheraseni, Smeeni, Luciu communes and Pogoanele town, in Buzau County, Romania. The ESIA has been conducted to evaluate the impacts associated with the Project in accordance with international best and national legislative requirements.

ESIA was focussed on interactions between the Project activities and various resources/receptors that could result in significant impacts. Table 9-1 below presents the outcomes of the comprehensive assessment of identified impacts as a result of the various phases of the Project.

Potential adverse impacts after mitigation are classified as being of negligible to moderate significance, with the implementation of mitigation measures captured within the ESMP; there are no residual impacts of major significance.

Positive impacts are expected through the employment of up to approx. 600-700 workers, anticipated for the construction phase (up to 18 months/October 2023 to April 2025). Approx 40-50 people are anticipated to be employed during the operational phase associated with the ongoing Operations and Maintenance (O&M) requirements of the Project (up to 35 years). In addition, the generation

More than that, there is always the potential for unplanned events such as spills, and improper disposal of waste and wastewater, and traffic accidents. These have been identified, and preventative measures will be put in place to reduce the likelihood of these occurring. With these measures in place, the likelihood and risk of an unplanned event occurring will be reduced significantly.

Key impacts	Applicable IFC PS/ EBRD PR	Project Phase	Significance of impact	
			Before mitigation	With mitigation
Environmental impacts				
Project activities on climate change	-	Construction	Negligible-Minor	Negligible
		Operation	Positive	Positive
Climate change to the Project	-	Operation	Moderate	Minor
Air quality - construction dust	IFC PS3	Construction	Moderate-Major	Minor
Air quality - construction traffic		Construction	Minor-Moderate	Minor
Noise emissions	IFC PS3 EBRD PR4	Operation	Minor	Negligible
Soil compaction and erosion	IFC PS3	Construction	Moderate	Minor
Soil contamination	IFC PS3	Construction	Minor	Minor
		Operation	Minor	Negligible
Water resources - water quantity	IFC PS3 EBRD PR3	Construction	Moderate	Minor

Key impacts	Applicable IFC PS/ EBRD PR	Project Phase	Significance of impact	
			Before mitigation	With mitigation
Water resources - water quality	IFC PS3 EBRD PR3	Construction	Moderate	Minor
		Operation	Minor	Negligible
Solid waste and wastewater generation	IFC PS3 EBRD PR3	Construction	Moderate	Minor
		Operation	Minor	Negligible
Habitat Loss / Degradation/ Fragmentation	IFC PS6 EBRD PR6	Construction	Major	Moderate
		Operation	Moderate	Negligible
Introduction/Spread of Invasive Species	IFC PS6 EBRD PR6	Construction	Moderate	Negligible
		Operation	Moderate	Negligible
Noise and Vibration Disturbance of Fauna species	IFC PS6 EBRD PR6	Construction	Moderate	Negligible
		Operation	Moderate	Negligible
Direct Mortality of Fauna Species	IFC PS6 EBRD PR6	Construction	Major	Negligible
		Operation	Major	Moderate
Displacement of Fauna Species	IFC PS6 EBRD PR6	Operation	Moderate	Negligible
Species Collision with Wind Turbines	IFC PS6 EBRD PR6	Operation	Major	Negligible
Mortality through electrocution of Fauna Species	IFC PS6 EBRD PR6	Construction	Moderate	Negligible
		Operation	Major	Moderate
Social Impacts				
Land acquisition	IFC PS5 EBRD PR5	Construction	Moderate	Minor
Visual impact	IFC PS4 EBRD PR4	Operation	Moderate	Minor
Shadow flicker	IFC PS4 EBRD PR4	Operation	Moderate	Minor
Ice/Blade throwing	IFC PS4 EBRD PR4	Operation	Minor-Moderate	Minor

Key impacts	Applicable IFC PS/ EBRD PR	Project Phase	Significance of impact	
			Before mitigation	With mitigation
Traffic - Road Function	IFC PS4 EBRD PR4	Construction	Moderate	Minor
		Operation	Minor	Positive
Traffic - Road Condition	IFC PS4 EBRD PR4	Construction	Major	Minor
		Operation	Minor	Positive
Traffic - Road Safety	IFC PS4 EBRD PR4	Construction	Major	Minor
		Operation	Minor	Minor
Cultural Heritage Direct Impacts Physical ground disturbance activities (earthworks) on High sensitivity Cultural Heritage Resources	IFC PS8 EBRD PR8	Construction	Moderate	Moderate
Cultural Heritage Direct Impacts Physical ground disturbance activities (earthworks) on Medium sensitivity Cultural Heritage Resources	IFC PS8 EBRD PR8	Construction	Minor	Minor
Cultural Heritage Direct impacts Physical ground disturbance activities (earthworks) on Low sensitivity Cultural Heritage Resources	IFC PS8 EBRD PR8	Construction	Negligible	Negligible
Livelihood - Loss of farming income	IFC PS5 EBRD PR5	Construction	Moderate	Minor
Economy, Employment, and Income - Increase in direct employment levels in the Social AoI and the wider Buzău County	IFC PS5 EBRD PR5	Construction	Positive	Positive
Economy, Employment, and Income - Economic benefits on indirect and induced employment, and Project procurement	IFC PS5 EBRD PR5	Construction		
Economy, Employment, and Income - Increase in local councils' revenue from payment of taxes by the Investor	IFC PS4 EBRD PR4	Operation	Positive	Positive
	IFC PS4	Construction	Positive	Positive

Key impacts	Applicable IFC PS/ EBRD PR	Project Phase	Significance of impact	
			Before mitigation	With mitigation
Education and Training - Improved levels of education and skills which can be transferred to future employment opportunities	EBRD PR4	Operation	Positive	Positive
Infrastructure and public services - Increased demand on public services, potentially reducing availability for existing local users	IFC PS4 EBRD PR4	Construction	Minor	Minor
Infrastructure and public services - Pressure on housing stock through the influx of non-local workers	IFC PS4 EBRD PR4	Construction	Moderate	Minor
Community health and safety - Impacts related to workforce influx	IFC PS4 EBRD PR4	Construction	Moderate	Negligible
Labour and working conditions - Inadequate working and/or workforce accommodation conditions	IFC PS4 EBRD PR4	Construction	Moderate	Minor
Labour and working conditions - Indirect impacts on the health and safety of supply chain workers	IFC PS4 EBRD PR4	Construction	Moderate	Minor
Labour and working conditions - Worker's health and safety impacts due to incidents during construction activities	IFC PS4 EBRD PR4	Construction	Moderate	Minor
Labour and working conditions - Worker's health and safety impacts due to incidents during operation activities	IFC PS4 EBRD PR4	Operation	Moderate	Minor

10. CONCLUSION

First Look Solutions S.A. as the Project Company (development, construction and operation of the Project), is planning to develop the 460.8 MW Vifor Wind Farm (the Project), on approx. 2,869 ha leased public land, owned by the Local Councils of Costești, Gherăseni, Smeeni, Luciu and Țintești communes, located in Buzau County, South-East Romania. This Environmental and Social Impact Assessment (ESIA) has been prepared on behalf of the Company.

The Project received an EIA approval and project acceptance (the Favourable Environmental Final Decision for all sub-projects, issued by EPA Buzau in August 2021); however, at the time of writing this ESIA, the Romanian Aviation Authority Permit for the Project is still pending, potentially including conditions that could lead to the modification of the location of some WTGs.

Low Carbon and Rezolv Energy (the Client, the Project Owners) have appointed ERM as independent environmental and social practitioners to undertake this Environmental and Social Impact Assessment (ESIA) for the Project against the standards and guidelines of international finance institutions, most commonly the IFC's Performance Standards (PS, 2012) and EBRD's E&S Performance Requirements (PR, 2019), signatory of Equator Principles (EP, 2020), together with the Romanian and EU Law and Regulations relevant for the Project, including but not limited to EU EIA Directive and EU Habitats and Birds Directives. Moreover, First Look Solutions S.A. is committed to working with the local communities and authorities during the construction and operation of the Project and will maintain open dialogue as part of their ongoing stakeholder engagement activities, which have been detailed in the Stakeholder Engagement Plan (SEP) developed for the Project.

This ESIA process undertaken has identified and assessed a range of potential impacts to the physical, biological and social environments. Where impacts have been identified, mitigation measures to manage those impacts have been provided in the ESIA. With many of the identified impacts, mitigation will reduce the significance of such impacts to a minor or negligible level. The mitigation measures provided, and the management of residual impacts are being described in the standalone Environmental and Social Management Plan (ESMP) to provide an overview of future environmental and social commitments of the Project.

ESMP implementation will be included in the responsibilities of the EPC Contractor, who is obliged to implement all the mitigation measures that are provided in the ESIA. The Project Company will also appoint applicable staff (such as a HR Manager, HSSE Officer, and CLO) to ensure the mitigation measures are being adequately implemented.

This ESIA process does not stop with the submission of the Project ESIA. Following submission of the ESIA, detailed DTAC Studies (Construction Technical Documentation) of the Project will be updated and finalised, and the Building Permits will be obtained.

During the finalisation of detailed design, changes to Project design may occur. All changes will be assessed in terms of their potential to alter the ESIA findings (i.e. those that result in adverse changes to the predicted significance of environmental and social impacts). In most cases, changes may not result in a material change to the ESIA findings; however, in some instances, these changes may be material, potentially influencing the original findings of the ESIA. Material changes will be subject to re-assessment, further stakeholder consultation, supplementary reporting and revision of the Project's ESMS. Typically, such changes will be submitted as an addendum to this ESIA.

Provided that all environmental and social mitigation and management measures provided in this ESIA and associated ESMP are implemented and are a condition of authorisation, it is the opinion of ERM that there are no environmental or social fatal issues that would delay authorisation of the Project, considering also the positive benefits of the Project.

11. REFERENCES

- (2023, 03 07). Retrieved from e-guvernare.ro: <https://edirect.e-guvernare.ro/informatiigenerale/SitePages/cetateni.aspx?IDC=1>
- Association of Regional Development Agencies in Romania (2023). Regional Development Strategy 2021-2027 Retrieved from <https://www.roreg.eu/assets/files/downloads/POR%20SE%2029.09.2020.pdf>
- Association of Regional Development Agencies in Romania (2023). Regional Development Strategy 2021-2027. Retrieved from <https://www.roreg.eu/assets/files/downloads/POR%20SE%2029.09.2020.pdf>
- BTI (2022). Romania Country Report. Retrieved from <https://bti-project.org/en/reports/country-report/ROU>
- Buzău County Territorial Development Plan (PATJ), Stage I - Basic Studies, 2020. Retrieved from https://cjbuzau.ro/wp-content/uploads/2020/09/SF-1_Localizarea-geografica-cadrul-natural-mediul-zonele-de-risc.pdf
- Buzău County Territorial Development Plan (PATJ), Stage IV – Action Plan, 2021. Retrieved from https://cjbuzau.ro/wp-content/uploads/2021/08/Partea-IV.-Planul-de-actiune-pentru-implementarea-prevederilor-PATJ_rev-iulie.pdf
- Buzau County Council (2022). Retrieved from <https://cjbuzau.ro/wp-content/uploads/2022/04/Hot%C4%83r%C3%A2rea-nr.71-din-2022.pdf>
- Buzau County Council (2023). Retrieved from https://cjbuzau.ro/wp-content/uploads/2020/09/SF-4_Infrastructurile-tehnice-majore.pdf
- Buzau County Council (2023). Retrieved from Hotărârea-nr.118-din-2021.pdf (cjbuzau.ro)
- Constitution of Romania, Article 44 (n.d.). Retrieved from https://www.cdep.ro/pls/dic/site.page?den=act2_2&par1=2
- Convention for Biological Diversity, Invasive alien species page, <https://www.cbd.int/invasive/>
- Costești Commune Master Plan Update, Environmental Report 2020. Retrieved from https://www.arhiva.costesti-buzau.ro/fisiere/stiri/RM_PUG_COSTESTI.pdf
- Directorate for Investigating Organized Crime and Terrorism (2023). Retrieved from DIICOT 2022 Activity Report, https://www.diicot.ro/images/documents/rapoarte_activitate/raport2022.pdf
- EBRD Performance Requirements (2019). Retrieved from <https://www.ebrd.com/who-we-are/our-values/environmental-and-social-policy/performance-requirements.html%20>
- EU Agency for Fundamental Rights (2022). Roma Survey 2021 Results. Retrieved from https://fra.europa.eu/sites/default/files/fra_uploads/fra-2022-roma-survey-2021-main-results_en.pdf
- European Centre for the Development of Vocational Training (2020). 2020 skills forecast Romania. Retrieved from https://www.cedefop.europa.eu/files/skills_forecast_2020_romania.pdf
- European Centre for the Development of Vocational Training. (2022). Retrieved from <https://www.cedefop.europa.eu/en/print/pdf/node/145919>
- European Climate Foundation (2021). Europeans support new wind and solar projects in their local area. Retrieved from <https://europeanclimate.org/resources/europeans-support-new-wind-and-solar-projects-in-their-local-area/>
- European Commission (2020). Commission issues guidance on reconciling wind energy developments and nature, Retrieved from https://environment.ec.europa.eu/news/commission-issues-guidance-reconciling-wind-energy-developments-and-nature-2020-11-19_en

- European Commission (2022). European Semester Country Report - Romania. Retrieved from : 2022-european-semester-country-report-romania_en.pdf (europa.eu)
- European Commission (2023). Retrieved from https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility/recovery-and-resilience-plan-romania_en
- Eurostat (2021). Retrieved from The Digital Economy and Society Index (DESI) | Shaping Europe's digital future (europa.eu)
- Eurostat (2021). Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Educational_attainment_statistics#The_populations_in_the_EU_Member_States_have_different_educational_attainment_levels_in_2021
- Eurostat (2022). Retrieved from https://ec.europa.eu/eurostat/databrowser/view/SDG_08_10/bookmark/table?lang=en&bookmarkId=248a23a6-de2b-4415-a1f8-028e4576207c
- Eurostat (2022). Retrieved from Statistics on young people neither in employment nor in education or training - Statistics Explained (europa.eu)
- Eurostat (2022). Accidents at work. Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Accidents_at_work_statistics
- Eurostat (2022). Population Density. Retrieved from <https://ec.europa.eu/eurostat/web/interactive-publications/demography-2023>
- Eurostat (2023, March 8). Retrieved from https://ec.europa.eu/eurostat/databrowser/view/urt_d3dens/default/table?lang=en
- Eurostat (2023). NUTS- Nomenclature of territorial units for statistics. Retrieved from <https://ec.europa.eu/eurostat/web/nuts/background>
- Equator Principles EP4 (2020). Retrieved from https://equator-principles.com/app/uploads/The-Equator-Principles_EP4_July2020.pdf
- F.Varga (2022). Roma Children's School Segregation as a Persistent Public Educational System Issue in Romania. Research and Education. Retrieved from https://researchandeducation.ro/wp-content/uploads/2023/03/Fernando_Varga_Roma_Childrens_School_Segregation_As_a_Persistent_Public_Educational_System_Issue_in_Romania_REd_nr7.pdf
- Gazeta Buzoiana (2022). More than 300 refugees from Ukraine also arrived in Buzau County. Retrieved from <https://gazetabuzoiana.ro/2022/03/18/peste-300-dde-refugiati-din-ucraina-au-ajuns-si-in-judetul-buzau/>
- GfK (2022). GfK Purchasing Power Romania 2022. Retrieved from <https://www.themarketforideas.com/gfk-romania-51-below-the-european-purchasing-power-average-in-2022-a825/#:~:text=Romania%20had%20a%20spending%20potential,power%20has%20widened%20even%20further.>
- Gherăseni Commune Master Plan Update, Environmental Report 2015. Retrieved from http://www.anpm.ro/documents/16687/69050909/Memoriu+de+prezentare_Inf.+Ord.+19_PUG+Gheraseni.pdf/316a8f0c-a75a-4d8c-9930-cff3b9316362
- Holleman Special Transport & Project Cargo S.R.L., 2020. Transportation Route Survey Report Constanta – Vis Viva, for Vestas Central Europe, Retrieved from https://www.holleman.ro/?gclid=EAIaIQobChMIvanZ9PyL_wlVilODBx0a-Ap0EAAyAiAAEgLvLvD_BwE#
- Hoteluri Vile Pensiuni (2023). Retrieved from <https://www.hvp.ro/harta/obiective-turistice-buzau-buzau/rezervatia-naturala-padurea-spataru>

- IFC Performance Standards (2012). Retrieved from https://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/Sustainability-At-IFC/Policies-Standards/Performance-Standards
- IFC Environmental, Health and Safety Guidelines for Wind Energy (2015). Retrieved from https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_policy_ehs-wind_energy
- IFC Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007). Retrieved from <https://www.ifc.org/wps/wcm/connect/7b65ce6b-129d-4634-99dc-12f85c0674b3/Final%2B-%2BElectric%2BTransmission%2Band%2BDistribution.pdf?MOD=AJPERES&CVID=nPtfp32&id=1323162154847>
- Interreg Europe (2019). Regional Action Plan for the Southeast Region of Romania. Retrieved from www.interregeurope.eu: https://projects2014-2020.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1587390274.pdf
- IUCN Red List of Threatened Species, 2022-2, Retrieved from <https://www.iucnredlist.org/>
- Low Carbon & Rezolv Energy (2022). DTAC Construction Technical Documentation for the Building Permits, for each sub-project in the Vifor Wind Farm Project Area, 2022.
- Low Carbon & Rezolv Energy (2022). Geotechnical Survey studies for each sub-project in the Vifor Wind Farm Area, 2011 and 2022
- Ministry of Development, Public Works and Administration (2021). Regional Development Policy - Concepts. Retrieved from <https://www.mdpa.ro/pages/politicadedezvoltareregionala>
- Municipality of Buzau (2023). Strategy for Buzau Circular Economy 2020-2030. Retrieved from www.primariabuzau.ro: [Strategy-for-Buzau-circular-economy-2020-2030.pdf](http://www.primariabuzau.ro/strategy-for-buzau-circular-economy-2020-2030.pdf)
- National Administration Romanian Waters, Water Basin Administration Buzau – Ialomița (2021). Management Plan of the Buzau-Ialomița Hydrographic Area, 2021. Retrieved from http://buzau-ialomita.rowater.ro/wp-content/uploads/2021/02/PMB_ABABI_Text_actualizat.pdf
- National Agency for Payments and Social Inspection (2022). Retrieved from <https://buzau.mmanpis.ro/wp-content/uploads/2023/03/Raport-de-activitate-Serviciu-Inspectie-Sociala-2022.pdf>
- National Agency for Payments and Social Inspection (2023). Retrieved from <https://www.mmanpis.ro/informatii-de-interes-public/plati-efectuate-de-anpis/>
- National Agency for Payments and Social Inspection (2023). Retrieved from https://buzau.mmanpis.ro/wp-content/uploads/2023/05/VMG_2023_04.pdf
- National House of Public Pensions (2023). Retrieved from <https://www.cnpp.ro/documents/10180/8851477/2023.01%20-%20Ianuarie?version=1.0&t=1674812207396>
- National Institute of Statistics (2021). Retrieved from <https://insse.ro/cms/ro/content/mijloace-%C5%9Fi-activit%C4%83%C5%A3i-de-comunica%C5%A3ii-%C3%AEEn-anul-2021https://insse.ro/cms/ro/content/mijloace-%C5%9Fi-activit%C4%83%C5%A3i-de-comunica%C5%A3ii-%C3%AEEn-anul-2021>
- National Institute of Statistics (2023). Retrieved from https://insse.ro/cms/sites/default/files/com_presa/com_pdf/popdom1ian2023r.pdf
- National Institute of Statistics. (2020). Retrieved from https://insse.ro/cms/sites/default/files/com_presa/com_pdf/rga_2020e.pdf

- National Institute of Statistics of Romania, Buzau County Statistics Directorate (2021). Statistical Yearbook of Buzau County for year 2020. Retrieved from <https://buzau.insse.ro/wp-content/uploads/2021/05/Anuar-2020.pdf>
- National Institute of Statistics of Romania (2023). The Economic and Social State of Romania – Statistical Data 2023. Retrieved from https://insse.ro/cms/sites/default/files/field/publicatii/starea_economica_si_sociala_a_romaniei_2023.pdf
- National Institute of Statistics (2021). Retrieved from https://insse.ro/cms/sites/default/files/com_presa/com_pdf/tic_r2021.pdf
- National Institute of Statistics (2021). Preliminary data for the Population and Housing Census, 2021. Retrieved from https://insse.ro/cms/sites/default/files/com_presa/com_pdf/cp-date-provizorii-rpl2021.pdf
- National Institute of Statistics (2022). Retrieved from https://insse.ro/cms/sites/default/files/field/publicatii/sistemul_educational_in_romanian_2020_2021.pdf
- National Institute of Statistics (2022). Buzau County Yearbook. Retrieved from <https://buzau.insse.ro/produse-si-servicii/publicatii-statistice/>
- National Institute of Statistics (2023). Inflation and Evolution of Consumer Prices: April 2023. Retrieved from https://insse.ro/cms/sites/default/files/com_presa/com_pdf/ipc04e23.pdf
- National Institute of Statistics (2023). National Accounts Romania 2019-2020. Retrieved from https://insse.ro/cms/sites/default/files/field/publicatii/regional_national_accounts_2019-2020_0.pdf
- National Institute of Statistics (2023). Statistical Bulletin Counties. Retrieved from <https://insse.ro/cms/en/content/monthly-statistical-bulletin-counties-no22023>
- National Institute of Statistics of Romania (2011). 2011 Romanian Census. Retrieved from <https://www.recensamantromania.ro/rpl-2011/rezultate-2011/>
- National Institute of Statistics of Romania (2022). Romanian Statistical Yearbook 2022. Retrieved from https://insse.ro/cms/sites/default/files/field/publicatii/anuarul_statistic_al_romaniei_carte-ed.2022.pdf
- National Institute of Statistics of Romania (2022). Romanian Statistical Yearbook 2022. Retrieved from https://insse.ro/cms/sites/default/files/field/publicatii/anuarul_statistic_al_romaniei_carte-ed.2022.pdf
- National Statistics Institute of Romania (2023). 2021 Romanian Census. Bucharest, Romania. Retrieved from <https://insse.ro/cms/en/tags/population-and-housing-census-press-release>
- Natura 2000 Network Viewer. Retrieved from <https://natura2000.eea.europa.eu/expertviewer/>
- Natura 2000 Standard Data Form for Site of Community Importance (SCI) ROSCI0259 Valea Călmățuiului. Retrieved from <https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=ROSCI0259>
- Natura 2000 Standard Data Form for Special Protection Area (SPA) ROSPA0145 Valea Călmățuiului. Retrieved from <https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=ROSPA0145>
- Observer News (2018). Retrieved from <https://observatornews.ro/eveniment/accident-12-victime-pogoanele-vinovat-tractorist-microbuz-263305.html>
- Organisation for Economic Co-operation and Development (2021). Romania: Country Health Profile 2021. Retrieved from <https://www.oecd.org/publications/romania-country-health-profile-2021-74ad9999-en.htm>

- Pogoanele Town Master Plan, Geological and Geotechnical Baseline Study, 2010. Retrieved from <https://translate.google.com/?sl=ro&tl=en&text=Studiu%20de%20fundamentare&op=translate>
- Pogoanele Town Sustainable Development Strategy 2021-2027. Retrieved from <https://www.primariepogoanele.ro/wp-content/uploads/Strategia-de-Dezvoltare-Durabila-a-oras%CC%A6ului-Pogoanele-2021-2027.pdf>
- Policy Brief: What's holding back large-scale renewable deployment in Romania? Energy Policy Group (EPG), Bucharest, November 2022. Retrieved from <https://www.enpg.ro/wp-content/uploads/2022/11/Whats-holding-back-large-scale-renewable-deployment-in-Romania-Policy-Brief.pdf>
- Price Waterhouse Coopers (2020). Law no. 175/2020, in force since October 13, 2020, regarding new rules for the sale of agricultural land outside the city. Retrieved 2023, from <https://www.pwc.ro/ro/tax-legal/alerts/legea-nr--175-2020---in-vigoare-din-data-de-13-octombrie-2020--p.html#:~:text=Legea%20nr.%20175/2020%201%2c%20%C3%AEEn%20vigoare%20din%20data%2cprincipal%20dreptul%20de%20preemp%C8%9Biune%20la%20v%C3%A2nzarea%20terenu>
- PRO BIODIVERSITAS S.R.L. (n.d.). Management Plan for Natura 2000 sites in Bărăgan area (ROSCI088 Gura Vedei-Saica-Slobozia). Retrieved from <https://www.bio-romania.org/wp-content/uploads/2019/10/Plan-de-Management-Gura-Vedei-Saica-Slobozia-si-Ostrovu-Lung-Gostinu.pdf>
- Publications Office of the European Union (2022). European Commission, Directorate-General for Education, Youth, Sport and Culture, Education and training monitor 2022 – Romania, Publications Office of the European Union. Retrieved from <https://op.europa.eu/en/publication-detail/-/publication/6a29fe32-66f9-11ed-b14f-01aa75ed71a1/language-en>
- Renew Academy (2023). Retrieved from <https://www.renewacad.eu/>
- Romanian Government (2023). Government Program 2020-2024. Retrieved from https://gov.ro/fisiere/pagini_fisiere/Program_de_guvernare_2020_2024.pdf
- Romanian Government Website (n.d.). Retrieved from <https://www.gov.ro/en>
- Romanian National Bank (2023). [www.bnr.ro](https://www.bnr.ro/Exchange-Rates-3727.aspx). Retrieved from <https://www.bnr.ro/Exchange-Rates-3727.aspx>
- Romanian Yearly Statistical Yearbook 2022. (n.d.). Retrieved from https://insse.ro/cms/sites/default/files/field/publicatii/anuarul_statistic_al_romaniei_carte-ed.2022.pdf
- Smeeni Commune Master Plan Update, Environmental Report 2021. Retrieved from http://www.anpm.ro/documents/16687/69050909/Memoriu+de+prezentare_PUG+SMEENI.pdf/6ed0bbbc-0cb5-477c-a265-476d912ce9f5
- South-East Regional Development Agency (2023). The Regional Smart Specialization Strategy (RIS3) for the South-East Region 2021-2027. Retrieved from https://www.adrse.ro/Documente/Planificare/RIS3/SRSI_SE_2021-2027_eng.pdf
- Swiss Contribution for the European Union (2016). Guide for Planning and Implementation of Investments in the Wind Energy Sector, Bucharest, 2016. Retrieved from http://apmbn.anpm.ro/documents/14903/33214777/ghid_de_bune_practici_energie_eoliana_1.pdf/d085d050-da73-4337-a91f-90bcca45c02f
- The Professional Qualification and Training Centre (2023). Retrieved from <https://calificare-evalua.ro/electrician-constructor/>
- The World Bank. (2022). The World Bank in Romania Overview. Retrieved from <https://www.worldbank.org/en/country/romania/overview>

- US Department of State (2023). Retrieved from <https://www.state.gov/reports/2022-trafficking-in-persons-report/romania/>
- Vestas Denmark (2023). General Description Vestas EnVentus Turbines, The V162-6.2 MW™. Retrieved from <https://www.vestas.com/en/products/enventus-platform/v162-6-2-mw>
- World Bank Group (2015, August 7). www.ifc.org. Retrieved from https://www.ifc.org/wps/wcm/connect/b82d0563-b39a-42a7-b94e-0b926b4a82f9/FINAL_Aug%2B2015_Wind%2BEnergy_EHS%2BGuideline.pdf?MOD=AJPERES&CVID=mpusVXY
- World Bank General Environmental, Health and Safety (EHS) Guidelines (2007). Retrieved from <https://documents1.worldbank.org/curated/en/157871484635724258/pdf/112110-WP-Final-General-EHS-Guidelines.pdf>
- World Bank (2018). Good Practice Note: Addressing Gender Based Violence in Investment Project Financing involving Major Civil Works 2018. Retrieved from <https://ppp.worldbank.org/public-private-partnership/library/good-practice-note-addressing-gender-based-violence-investment-project-financing-involving-major-civil-works>
- World Bank Documents and Reports. Guide for Human Rights Impact Assessment and Management (HRIAM). Retrieved from <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099050501192329955/idu0dd876e7e0d93804e330ae410f05ab6fd7f4d>
- World Bank Open Data (2021). Retrieved from <https://data.worldbank.org/>
- Country Reports: Romania Geography 2023. [Romania geography, maps, climate, environment and terrain from Romania | - CountryReports](#) (Accessed: 05.04.2023)
- ERM. Environmental and Social Scoping Report. 2022.
- Google Earth.
- Kok, E., Stoof, C., 2021. Country report for Romania, in San-Miguel-Ayanz et al. (Eds), Forest Fires in Europe, Middle East and North Africa 2021, Publications Office of the European Union, Luxembourg, 2022, doi:10.2760/34094, JRC130846. (Accessed: 08.05.2023)
- World Bank. Climate Change Overview: Country Summary Romania. 2021. <https://climateknowledgeportal.worldbank.org/country/romania> (Accessed: 08.05.2023)
- World Bank. Current Climate: Climatology Romania. 2021. <https://climateknowledgeportal.worldbank.org/country/romania/climate-data-historical> (Accessed: 08.05.2023)
- World Bank. Vulnerability - Romania. 2021. <https://climateknowledgeportal.worldbank.org/country/romania/vulnerability> (Accessed: 08.05.2023)
- American Association of State Highway Transportation Officials (AASHTO). 2018. A Policy on Geometric Design of Highways and Streets, 7th Edition. Washington, D.C
- Business Review. 2018. Romania's infrastructure: 35 percent of the roads are covered with stone and soil. 25-04-2018. Available online at: <https://business-review.eu/news/romanas-infrastructure-35-percent-of-the-roads-are-covered-with-stone-and-ground-166631>
- European Commission. 2021. National Road Safety Profile: Romania. Brussels, European Commission, Directorate General for Transport
- Holleman (Holleman Special Transport & Project Cargo S.R.L.). 2020. Transportation Route Survey Report: Constanța—Vis Viva. For Vestas Central Europe.

- Retallack, Angus Eugene and Ostendorf, Bertram. 2020. Relationship Between Traffic Volume and Accident Frequency at Intersections. Published online 2020 Feb 21 International Journal of Environmental Research and Public Health. Accessed November 2021 at: Relationship Between Traffic Volume and Accident Frequency at Intersections (nih.gov).
- Romania National Institute of Statistics. 2020. 2019 Romanian Statistical Yearbook. Liberatii 16 BVD Bucharest 5. <http://www.insse.ro>.
- Romania National Institute of Statistics. 2022. *INS mijloace de transport vehicule inmatriculate si accidente de circulatie rutiera 2022*
- [Vestas'-Social-Management-System.pdf](#)
- WHO (World Health Organization). 2018. Global Status Report on Road Safety 2018. Geneva: World Health Organization. Licence: CC BYNC-SA 3.0 IGO.

APPENDIX A CULTURAL HERITAGE BASELINE GAZETTEER

APPENDIX B CLIMATE CHANGE SUPPORTING MATERIALS

APPENDIX C SOCIO-ECONOMIC ENVIRONMENT

APPENDIX D BIODIVERSITY AND PROTECTED AREAS

APPENDIX E CRITICAL HABITATS RISK ASSESSMENT

APPENDIX F COLLISION RISK MODELLING

APPENDIX G CUMULATIVE IMPACT ASSESSMENT

ERM has over 160 offices across the following countries and territories worldwide

Argentina	The Netherlands
Australia	New Zealand
Belgium	Peru
Brazil	Poland
Canada	Portugal
China	Puerto Rico
Colombia	Romania
France	Senegal
Germany	Singapore
Ghana	South Africa
Guyana	South Korea
Hong Kong	Spain
India	Switzerland
Indonesia	Taiwan
Ireland	Tanzania
Italy	Thailand
Japan	UAE
Kazakhstan	UK
Kenya	US
Malaysia	Vietnam
Mexico	
Mozambique	

ERM Environmental Resources Management S.R.L.

145 Calea Victoriei | 8th floor Victoria Center | Sector 1, 010072 Bucharest, Romania

T +40-31-405-1680

F: +40-31-405-1681

www.erm.com