Environmental Due Diligence Report
Andali Wind Farm (Calabria, Italy)

(pj 0485162)

November 22nd, 2018

CEF 5 Wind Energy

The world's leading sustainability consultancy

ERM

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To
CEF 5 Wind Energy
Via Guido D'Arezzo 15
Milano, 20145 (MI)
ITALY

Milan, November 22nd, 2018

Environmental Due Diligence – Andali Wind Farm (Calabria) – (pj 0485162)

Dear Sirs,

We are pleased to submit our *report* which summarises the findings from ERM's Environmental Due Diligence of the Andali Wind Farm, located in Andali (Catanzaro, Calabria, Italy)

The assessment was based on a detailed review of the key environmental documentation and information made available to ERM in the Virtual Data Room (VDR).

Yours sincerely,

Alessandro Battaglia

Partner in Charge

Flavia Brusati

Project Manager

Contents

This Report contains:

Non-Technical Summary

The Environmental Due Diligence (EDD) comprises:

- A review of the environmental permit requirements
- An assessment of the compliance of the project with aforementioned requirements
- A constraint analysis, reviewing nature protection and hydrogeological planning documents.

Based on the information made available to ERM for review, the **potentially material finding** of the EDD is the following:

The following **potentially material issues** were identified:

The Project is authorized since 2008 but construction activities have not been started yet. Following a number of extensions, the Environmental Authorization is valid until March 31st 2020 and the deadline for the end of construction activities is July 17th 2019. It is likely that the project will not be completed within the deadline of July 2019 and a new extension will need to be requested. This is adding uncertainty to the project realization time which is considered a potentially material issue. It is also recommended to verify through the legal DD whether a deadline for the start of construction activities was indicated by authorities and whether this deadline has not been exceeded yet.

The opinion issued by the Technical Committee of Calabria Region on Oct 29th 2018 requires the installation of technologically advanced optical sensors for avoiding birds' collision against wind turbines. Costs associated to the installation and maintenance of this system are considered material (cost estimate 200 k€, 20 k€ for installation on each turbine, assuming the system required is video camera-based, to be confirmed).

No additional material findings were identified through the EDD, based on the information made available to ERM for review.

The following findings related to environmental requirements on the project were identified:

- The authorizations require continuous noise monitoring during operation, without specifying the duration nor the frequency of the monitoring. It is recommended to confirm with the competent Authority the duration and the frequency of the required noise monitoring and define the monitoring program accordingly. Costs associated to the implementation of this action are not material.
- The Environmental Authorization imposes a number of mitigation measures during and after construction and operation (e.g. fauna protection, vegetation reinstatement, air emissions control, soil compacting avoidance, reuse of excavated material). It is recommended to conduct site surveys to verify compliance with these mitigation measures.
- The project includes one crossing of the underground MV power line with the river Nasari. The River Basin Authority required to ensure that the MV (Medium Voltage) power line is not an obstacle to the natural flow of the river, also in case of overflow. It is recommended to verify that the present project design complies with this requirement.
- Even if no archaeological finding has been identified during the archaeological survey, the archaeological heritage authority required the presence of professional archaeologists during construction earthworks.

The project is located in a class 2 seismic risk area (in a range from 1 to 4 where 4 is the lowest risk).

Introduction

CEF 5 Wind Energy (CEF 5) has requested ERM to conduct a review of the environmentally relevant documents available in the VDR (Virtual Data Room) in order to identify:

- Environmental Permit requirements that might lead to liabilities and costs if not complied with. The analysis is focused on requirements which are still applicable and verifiable during construction, operation and decommissioning;
- Environmental risks associated with sensitivities of the environment (natural environment, cultural heritage, noise receptors);
- Possible liabilities associated with monitoring campaigns results;
- Additional decommissioning costs.

Issues which have been considered as material are those which do or could materially impact the business and:

- Are in excess of 20,000 Euro per issue;
- Might lead to business interruption;
- Have a potential impact on the license to operate;
- Have the potential to lead prosecution of CEF 5 or impact CEF 5's reputation from an environmental perspective.

An estimate of costs to address the issue is provided, where possible, for each significant (material) issue.

This Report provides a summary of the desktop Environmental Due Diligence (EDD) on the environmentally relevant documents uploaded in the Project Virtual Data Room (VDR) until November 5th, 2018.

Limitations

The information and conclusions expressed in this desk-top based Phase I Environmental Due Diligence have been limited to a Virtual Data Room (VDR) organized by the Vendor. No site visit or management interviews were conducted by ERM within the scope of this assignment.

Conclusions obtained are based upon ERM professional judgement and experience in assessing liabilities in similar operations. However, the conclusions obtained are limited to the quantity of information reviewed in the timeline available for review. Therefore, provided the limited scope of the assessment, the existence of material implications cannot be discarded even if specific potential environmental issues are not mentioned in this report or have not been found as of material cost therein.

The focus of the assessment has been on the Project's environmental permitting requirements and subsequent activities reports.

This report is confidential to CEF 5 we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party rely upon the report at their own risk.

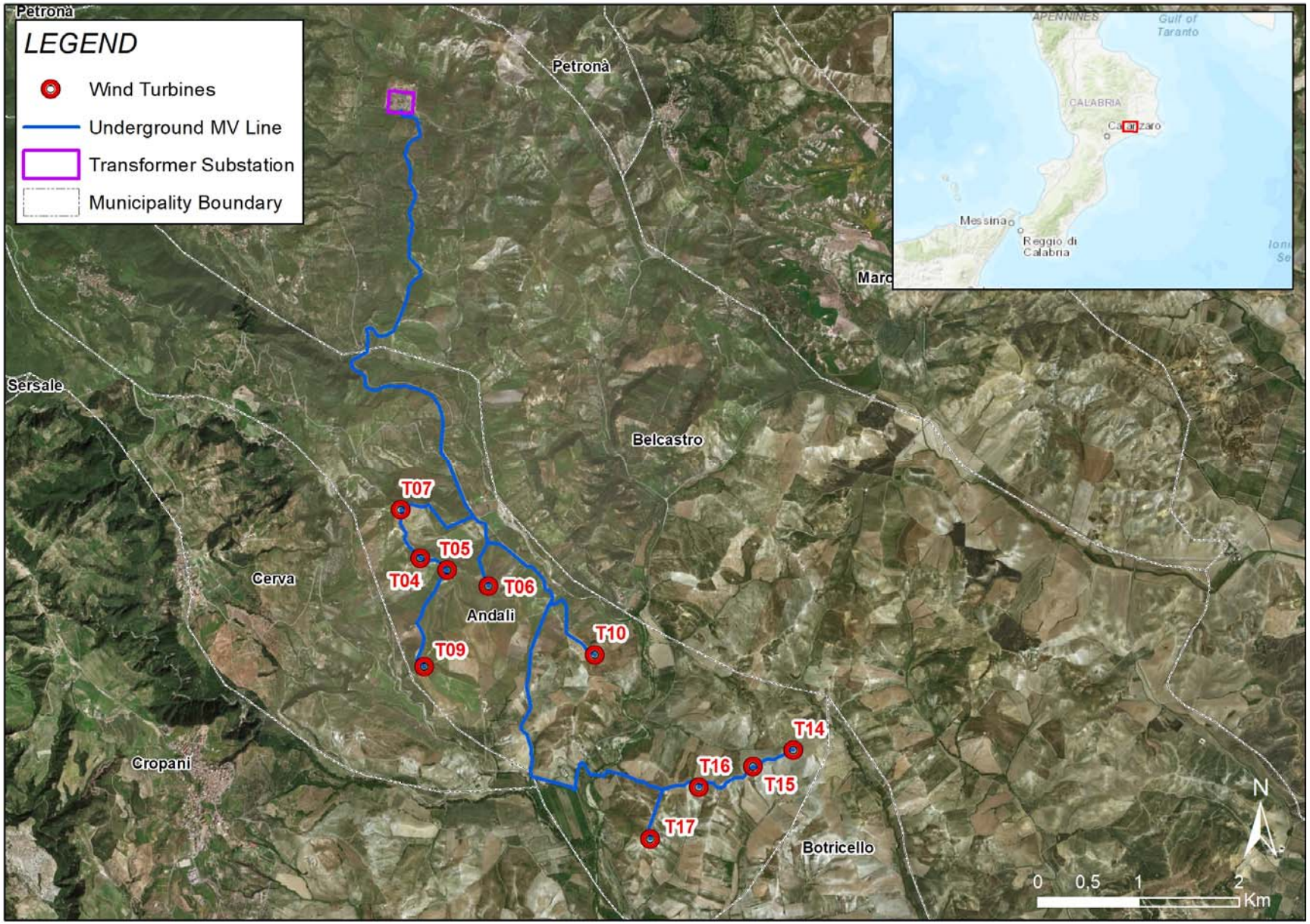
Andali Wind Farm

- The asset is located in the Municipality of Andali Province of Catanzaro, Calabria Region. The wind farm has been authorized, but construction activities have not started yet. According to the latest changes in layout, the main features are as follows:
  - 36 MW: 10 Wind Turbines Generators (WTGs) x 3.6 MW each

Region	Province	Municipality	Altitude	Rotor width	Hub Height	Max Height
Calabria	Catanzaro	Andali	150 m	136 m	82 m	150 m

- The main ancillary facilities include:
  - 10 areas around each wind turbine (maximum 400 sqm each) for construction and maintenance purposes;
  - underground electric cables (30kV) for the connection of the turbines and transformation station (30/150 kV)
  - electric transformation substation (30/150 kV), including all the ancillary facilities;
  - underground electric connection (0.12 km long HT line) to the distribution grid through an existing electric station (150/380 kV) in the Belcastro Municipality.
- The footprint of the project (including ancillary facilities) is included in the territory of the Municipality of Andali, with the exception of the transformer substation which is located at the Municipality of Belcastro, Province of Catanzaro, Calabria Region.

Wind Farm Location



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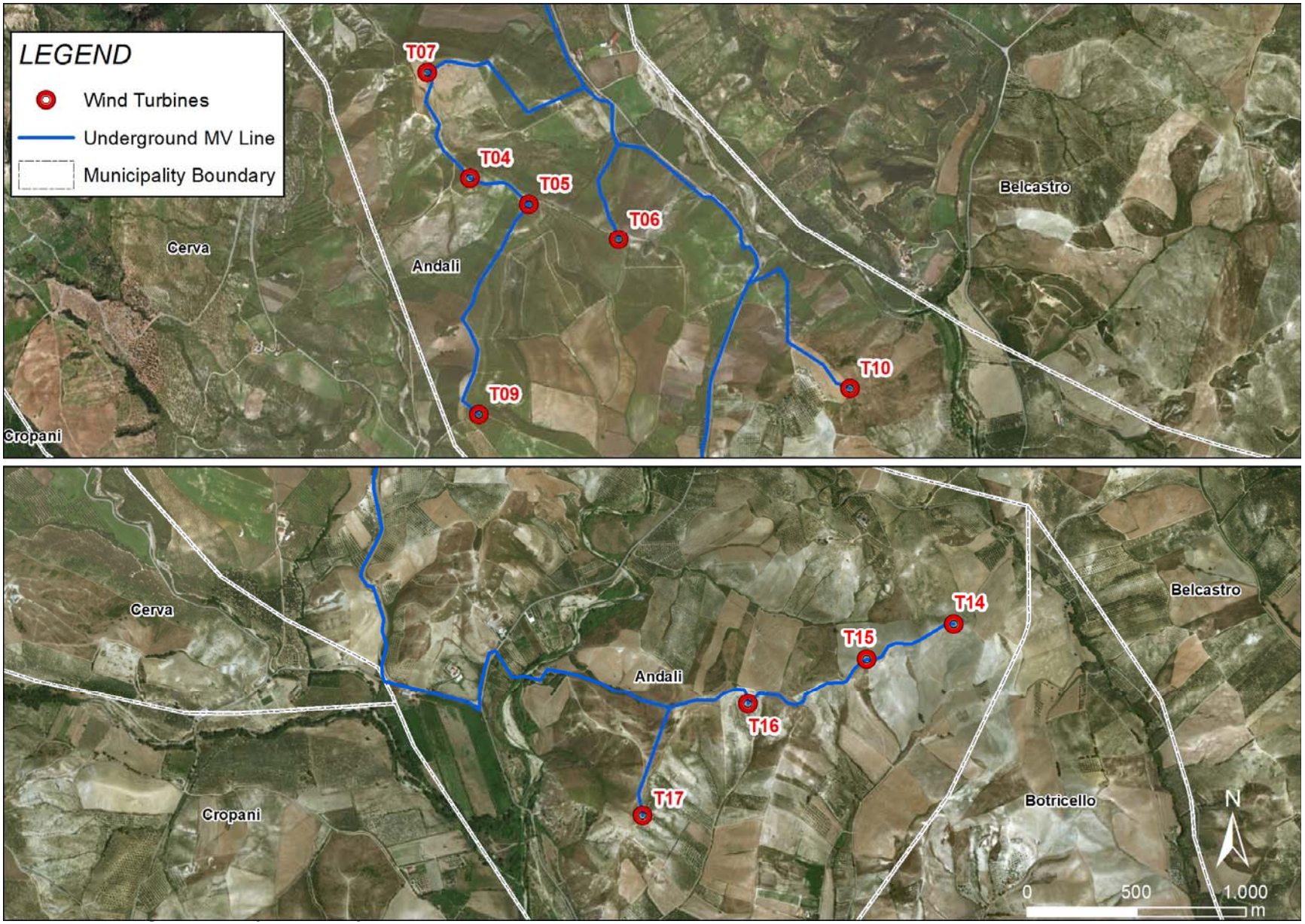
Project Layout



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Environmental Permitting Framework

The Andali Wind Farm was authorized based on the Italian Legislative Decree n. 387 of Dec 23rd, 2003 on the permitting of renewable energy production plants. This procedure was intended to simplify the permitting process and unify the permitting outcomes in an umbrella permit called “Autorizzazione Unica” (AU), single permit for construction and operation.

The exclusion of the project from the National procedure for Environmental Impact Assessment (“Valutazione d’Impatto Ambientale”-VIA) was confirmed after the Environmental Impact Screening procedures (**Regional Decree no. 12412 of Aug 24th, 2007** issued by the Environmental Department of Calabria Region) which expressed a favourable opinion about the environmental compatibility of the project and defined the environmental requirements.

The following single permit was issued for the Andali Wind Farm:

- **Autorizzazione Unica** issued by Calabria Region through the **Regional Decree no. 1053 of Feb 14th, 2008**

The AU has been integrated and amended through the following Regional Decrees:

- **Decree no. 2885 of Apr 6th, 2011** following a substantial change on the project (connection to the National Electrical Network, i.e. RTN)
- **Decree no. 7776 of May 22nd, 2013** following a non substantial change on the project (changes to the technical details of 3 wind turbines and use of wind turbines with a slightly lower unit power (2.4 MW instead of 2.5 MW)
- **Decree no. 16194 of Nov 28th, 2013** extending the deadline for the end of the construction activities up to Apr 6th, 2016
- **Decree no. 8112 of Jul 2nd, 2014** acknowledging the transfer of the AU to Terna SpA limited to the construction and the operation of the electrical station (380/150 kV) in the Belcastro Municipality and the 380 kV connection to the existing power line Magisano – Scandale (380 kV) in the Municipalities of Belcastro and Petronà
- **Decree no. 8355 of Aug 10th, 2015** extending the deadline for the end of the construction activities up to Apr 6th, 2017
- **Decree no. 10601 of Sep 28th, 2017** extending the deadline for the end of the construction activities up to Apr 6th, 2018
- **Decree no. 2685 of Mar 29th, 2018** extending the deadline for the end of the construction activities up to **Jul 17th, 2019**

Environmental Permitting Framework

The **Regional Decree no. 2817 of Mar 31st, 2015** has extended the favourable opinion about the environmental compatibility of the project up to **Mar 31st, 2020** confirming the requirements of the previous decree (no. 12412 of Aug 24th, 2007).

According to the Italian Legislative Decree 104/2017, which has modified the Annex II, point 2 of the Legislative Decree 152/2006 regarding the permitting procedure for onshore wind farm producing more than 30 MW, new non substantial changes to the layout have been presented to the Ministry of Environment on May 2018.

The non substantial changes optimize the project layout by:

- reducing the number of wind turbines from 15 to 10
- shortening the MV cable
- optimizing the access road layout
- reducing the footprint of the transformer substation.

On **Jun 25th, 2018 the Ministry expressed a favourable opinion** regarding the changes and confirmed the exclusion of the Project from the national EIA procedure.

In the same note the Ministry required a Landscape Impact Assessment to be presented to the Calabria Region due to the proximity of a Natura 2000 area (SIC IT9330109 “Madama Lucrezia”) to the project.

Opinion no. 12242 of Oct 29th, 2018 of the Environmental Department of the Calabria Region expressed a favourable opinion on the landscape impact of the project, determining some specific requirements.

Environmental Permitting - Conclusion

General Conclusion on Environmental Permitting

The Project is authorized since 2008 but construction activities have not been started yet. Following a number of extensions, the Environmental Authorization is valid until March 31st, 2020 and the deadline for the end of construction activities is July 17th 2019.

Given the above it is likely that the project will not be completed within the deadline of July 2019 and a new extension will need to be requested. This is adding uncertainty to the project realization time which is considered a potentially material issue. It is also recommended to verify through the legal DD:

- whether a deadline for the start of construction activities was indicated by authorities and
- whether this deadline has not been exceeded yet.

The following slides provide an overview of:

- Requirements defined by authorities within (Slides 13-14):
  - Environmental Permitting
  - Landscape impact evaluation procedure
- Requirements implementation: check of implementation of above defined requirements in terms of
  - Technical Design modifications already occurred
  - Management, monitoring and assessments activities to be implemented during construciton and operation.

Requirements – Environmental Permitting

The Regional Decree no. 12412 of Aug 24th, 2007 expressing favourable opinion to the environmental compatibility of the project has defined the following requirements:

- **relocate** or, if not possible, delete **wind turbine T8**
- use **neutrally coloured and not reflecting wind turbines** in order to minimize the visual perception of the project
- install **underground power lines** for the internal plant connections at a **depth of 1.0 ÷ 1.2 meters bgl** and **comply with the thresholds for the exposition to the magnetic field**
- locate the transformation substation so as to **avoid the construction of new aerial transmission lines**
- provide the wind turbines with a **stop system for safety purpose** when wind speed is more than 25 m/s
- build the foundation of the wind turbines with the **upper edge at a minimum depth of 0.8 meters bgl** in order to facilitate the restoration of the area during decommissioning
- adopt **adjustments for reusing the material resulting from earthworks**
- **avoid the waterproofing of the ex-novo internal plant road system** in order to not alter the hydrogeology of the area
- **collect stormwater** from the project area and drain it towards the **natural watershed**
- minimize the presence of birds in the construction and operation area by creating natural areas of attraction for birds outside the project area
- **avoid to increase the number and the height of the wind turbines**
- require all the **permits and nulla osta needed for the construction of the ancillary facilities** for connection to the existing power network
- **remove the wind turbines** at the end of operation and restore the original conditions of the site
- **avoid removal of trees** and, if needed, require all the permits to the Authorities
- **monitor in continuous (24/24 hours) noise levels**.

The AU issued on Feb 14th, 2008 has defined the following environmental requirements:

- obtain the specific nulla osta for the aspects related to the **protection of olive trees**
- guarantee that the **MV power line is not an obstacle to the natural flow of the Nasari river**, also in case of flood events.

Requirements – Landscape Impact Procedure

The Regional Decree no. 12242 of Oct 29th, 2018, expressing favourable opinion to the landscape impact of the project, refers to the requirements defined by the Technical Committee of the Environmental Department of the Calabria Region following the meeting of Oct 17th, 2018. The requirements are the following:

- obtain before the start of the construction works all the nulla osta, permits and opinion needed according to the normative
- during construction phase, **avoid any activity which may alter or damage the natural characteristics of the areas** nearby the project
- avoid any damage to birds' nests
- during construction activities, adopt **measures to minimize disturbance in terms of noise and vibrations**, as per art. 13, points 5 and 6, of the Regional Law no. 34 of Oct. 19th 2009. Use machinery compliant with applicable safety requirements (Decree no.81/2008).
- during operation, **monitor noise pressure** generated by wind turbines at the potential receptors located nearby the plant
- during construction, adopt **mitigation measures aimed at preserving natural areas** nearby the project area in order to minimize noise, air emissions and waste
- **turn off vehicles and machineries when not working** in order to minimize air emissions
- during construction, adopt technical and management adjustments, such as selection of the construction time period, in order to **avoid any interference to the wildlife of the area, especially avifauna**
- **adopt precautions when moving excavated material**, by using the authorized road systems
- install on the wind turbines **advanced optical sensors for detecting birds** (eg DTB® or similar) in order to avoid any collision
- use only access roads in order to **avoid soil compacting**
- use **colours for wind turbines which make them visible to birds**
- **avoid the presence of rodents and snakes under the wind turbines** in order to avoid birds' collision when hunting
- **avoid the presence of standing water**, even temporary, nearby the wind turbines which may attract fauna.

Requirements Implementation - Wind Farm Design

The technical design requirements of the Regional Decree no. 12412 of Aug 24th, 2007 (see previous page) **have been addressed with changes to the layout authorized by the AU integration issued on Apr 6th 2011**.

The main mitigation measures which have been adopted to minimize environmental impacts are the following:

- **Installing tubular towers** instead of pylons to minimize land occupation and visual impact
- Locate wind turbines and ancillary project facilities **outside constrained areas and densely vegetated areas**
- **Minimize as much as possible the construction of new roads**
- **Preserve the hydrogeology** of the area by adequately collecting rain water through a system of drain channels
- **Install underground power lines** for the internal plant connections as well as for the external transmission lines in MV.

Requirements Implementation - Noise

Two **noise studies** have been conducted, dated Mar 9th, 2015 and Sep 28th, 2018, the latter reflecting the latest changes to the layout.

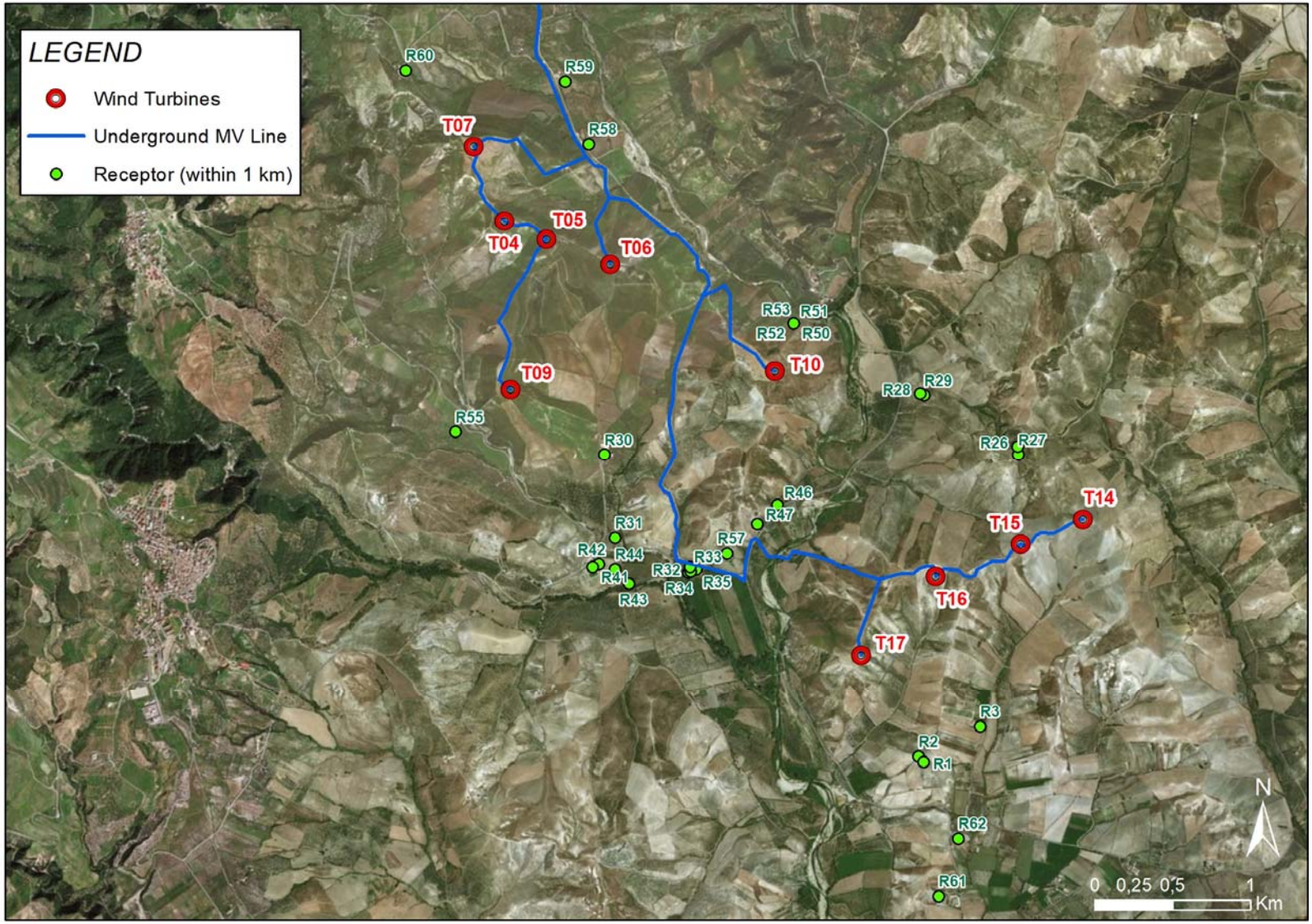
The study analyzed two scenarios:

- ante-operam, which is the baseline condition
- post-operam, which computes the increase of noise levels expected due to the operation of wind turbines.

30 receptors have been identified within a radius of distance of 1 km from the plant. Among these, 8 have been classified as “sensitive receptors” since they were found to be inhabited or used for at least 4 hours continously.

The study reports that the noise levels computed at the receptors in the post-operam scenario are **within the thresholds** set by the Italian normative (no. 447/95).

Requirements Implementation - Noise



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Requirements Implementation - Noise

The Regional Decree no. 12412 of Aug 24th, 2007 requires a **monitoring in continuous (24 hrs/24) of the noise levels**, as indicated in the first EIA submitted (June 2007). The duration and frequency of this monitoring is not clearly stated in the permit requirement.

The Regional Decree no. 12242 of Oct 29th, 2018 expressing a favourable opinion about the landscape impact of the project requires **monitoring of the noise pressure** generated by wind turbines at the potential receptors located nearby the plant during operation. The duration and frequency of this monitoring is not clearly stated in the permit requirement.

ERM recommendation

Verify with the competent Authority the duration and frequency of the required noise monitoring and define the monitoring program accordingly.

Requirements Implementation - Air

Potential air impacts are mainly linked to *construction activities* which may increase levels of dusts due to earthworks and exhausted gas due to the emissions from construction vehicles.

Impacts are expected to be negligible, however the following mitigation measures are reported *for the construction phase* in the first submitted EIA (June 2007):

- **Periodically irrigate** roads and areas around the wind turbines
- **Limit vehicles' speed**

Requirements Implementation – Soil and Groundwater

No impacts are expected on groundwater and soil quality as **no chemicals are expected to be used** *during construction and operation phase.*

Potential impacts on the soil are mainly linked to:

- change of land use due to project footprint
- earthworks for road construction and underground placement of cables
- soil compacting due to vehicles' movement during construction

The following mitigation measures regarding soil are reported in the EIA report (June 2007) and its integration (April 2018):

Construction activities

- **minimize** as much as possible the **project footprint**
- **minimize the construction of new roads**
- forbid the movement of vehicles' **outside the tracked road network**
- **reuse excavated material**

At the end of the operation phase (which is expected to last around 30 years), **soil will be restored to the original conditions**.

Requirements Implementation - Flora and Fauna

Impacts on **flora** are expected to be negligible, as the project area is characterized by a **high level of human modification**. **The removal and future replanting of the olive trees present on the project area have been authorized by the Catanzaro province** (cfr. Prot 8517/Espr. of the Feb 8th, 2010).

Among the fauna species present in the project area, the avifauna is considered the most sensitive to wind farm projects. Some surveys have been conducted in order to identify the bird and terrestrial species present in the Andali area, as reported in the first EIA report.

Impacts on fauna are expected to be not significant. The project is located in an agricultural area and outside areas of high environmental value, thus the presence of animal species is limited.

A number of mitigation measures regarding the flora and fauna are reported in the EIA report (June 2007) and its integration (April 2018):

Construction activities

- **Maximize the collection of vegetated soil during earthworks** in order to reuse it during restoration activities
- **Locate temporary construction areas on sites with a minimum vegetation cover**
- **Plant local herbaceous species in the service areas around the wind turbines**
- **Maximize the reuse of excavated material for project's construction scopes** (eg new road construction, drywalls)
- **Use of silenced machineries**
- **Place power lines underground**

Operation activities

- **Reduce possible birds collision** by using visible and not reflecting material for the wind turbine and the tower
- **Install a tubular tower instead of pylon**

Requirements Implementation - Flora and Fauna

Regional Decree no. 12412 of Aug 24th, 2007 and Regional Decree no. 12242 of Oct 29th, 2018 set a number of requirements regarding flora and fauna, mostly aimed at:

- Minimize vegetation removal
- Minimize the decrease of fauna in the areas in proximity of the project
- Minimize the risk of mortality of avifauna.

Installation of technologically advanced optical sensors (eg DTB®) for avoiding birds' collision against wind turbines is required.

ERM recommendation

The **installation of technologically advanced optical sensors** (eg DTB®) for avoiding birds' collision against wind turbines.

It is recommended to define a monitoring plna to ensure the implementation of the mitigation measures reported in the EIA study (June 2007) and its integration (April 2018) and the compliance with the requirements. Annual costs related to the implementation of the plan are not expected to be material.

Requirements Implementation - Landscape and Visual Impact

The project is located in an agricultural context, characterized by a hilly morphology.

Requirements regarding landscape and visual impact have been satisfied by the latest changes to the original layout of the project (dated 2018), which have **optimized the project layout** and minimized its visual impact by:

- reducing the number of wind turbines
- assessing wind turbines' location in terms of landscape impact minimization.

Requirements Implementation - Geology and Hydrogeology

A geological study of the project area has been performed in 2008, highlighting the geological feasibility of the project.

The Andali Municipality is considered to have a **medium seismic risk, class 2 (in a range from 1 to 4 where 4 is the lowest risk).**

The project area isn't included in any area classified as "at a high level of geological or hydraulic risk" according to the Regional Hydrogeological System Plan (P.A.I.) (classes R3 and R4).

The AU issued on Feb 14th, 2008 has defined among its requirements:

- ensure that the **MV power line is not an obstacle to the natural flow of the Nasari river**, also in case of overflow

based on the Opinion no. 2840-2857/07 released by the River Basin Authority of Calabria Region, which stated that a section of the underground MV line crosses an "area of (hydraulic) attention".

ERM recommendation

It is recommended to verify that the present project design complies with the requirement imposed by the River Basin Authority, i.e. ensure that the MV power line is not an obstacle to the natural flow of the Nasari river, also in case of overflow.

Decommissioning and Reinstatement

No specific requirements regarding decommissioning and reinstatement costs are reported in the authorizations.

However, a number of requirements aim at ensuring the **complete reinstatement of the project area to the original natural conditions** at the end of operation.

In particular it is required to **replant** the vegetation removed during costruction phase, with a particular focus on olive trees.

Archaeology

The AU issued on Feb 14th, 2008 refers to a number of requirements regarding the conduction of archaeological survey for verifying the absence of any archaeological findings in the project area, as reported in the opinion of the competent authority for archaeological heritage (Soprintendenza Beni Archeologici Calabria, Prot. no. 18907 of Oct 10th).

In Prot. no. 15474 of Sep 16th, 2009, issued by the archaeological heritage authority, favourable opinion is expressed to the project, given that no findings have been detected during the survey. The only requirement included in the note regards the **presence of professional archaeologists during earthworks.**

ERM reviewed the map of the constrained archaeological sites present in the province of Catanzaro. None of them is within the project area, neither in its proximity.

Environmental Constraints

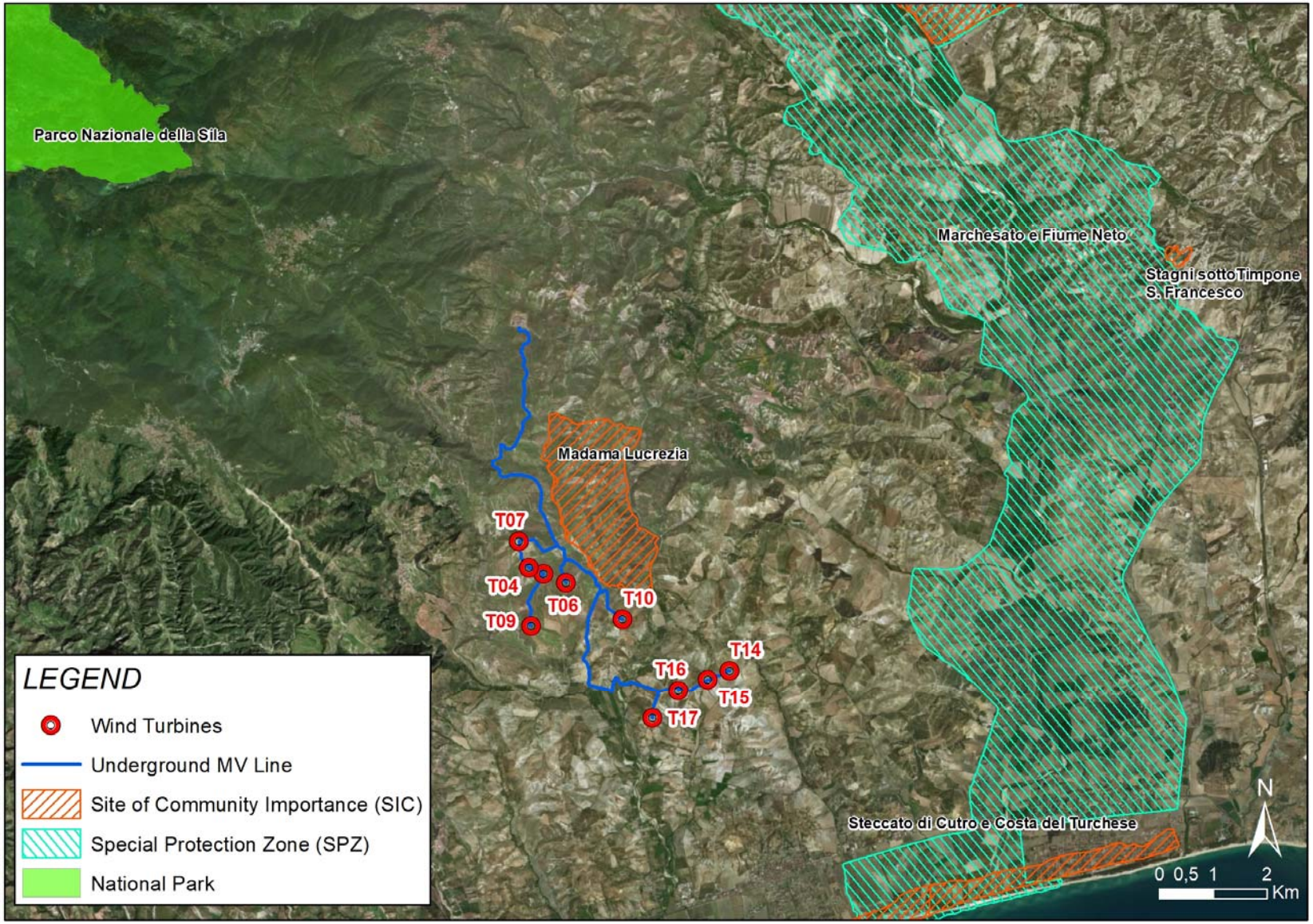
ERM reviewed the following sources to identify possible constraints relevant to the area of Andali and produce Environmental Constraint Maps (see following slides):

- Protected Areas, Important Bird Areas: *Geoportale della Regione Calabria*
- Hydrogeological Constraints: *Piano Assetto Idrogeologico Autorità di Bacino Calabria*

No constraints were identified in the area of the wind turbines in terms of natural areas protection, hydrogeological or flooding risk and archaeological interest.

The Landscape Impact Assessment performed in 2018 due to the proximity of the Natura 2000 area (SIC IT9330109 “Madama Lucrezia”) concluded that no significant interference to the flora and fauna species are expected due to the wind farm construction and operation.

Natural Protected Areas Map



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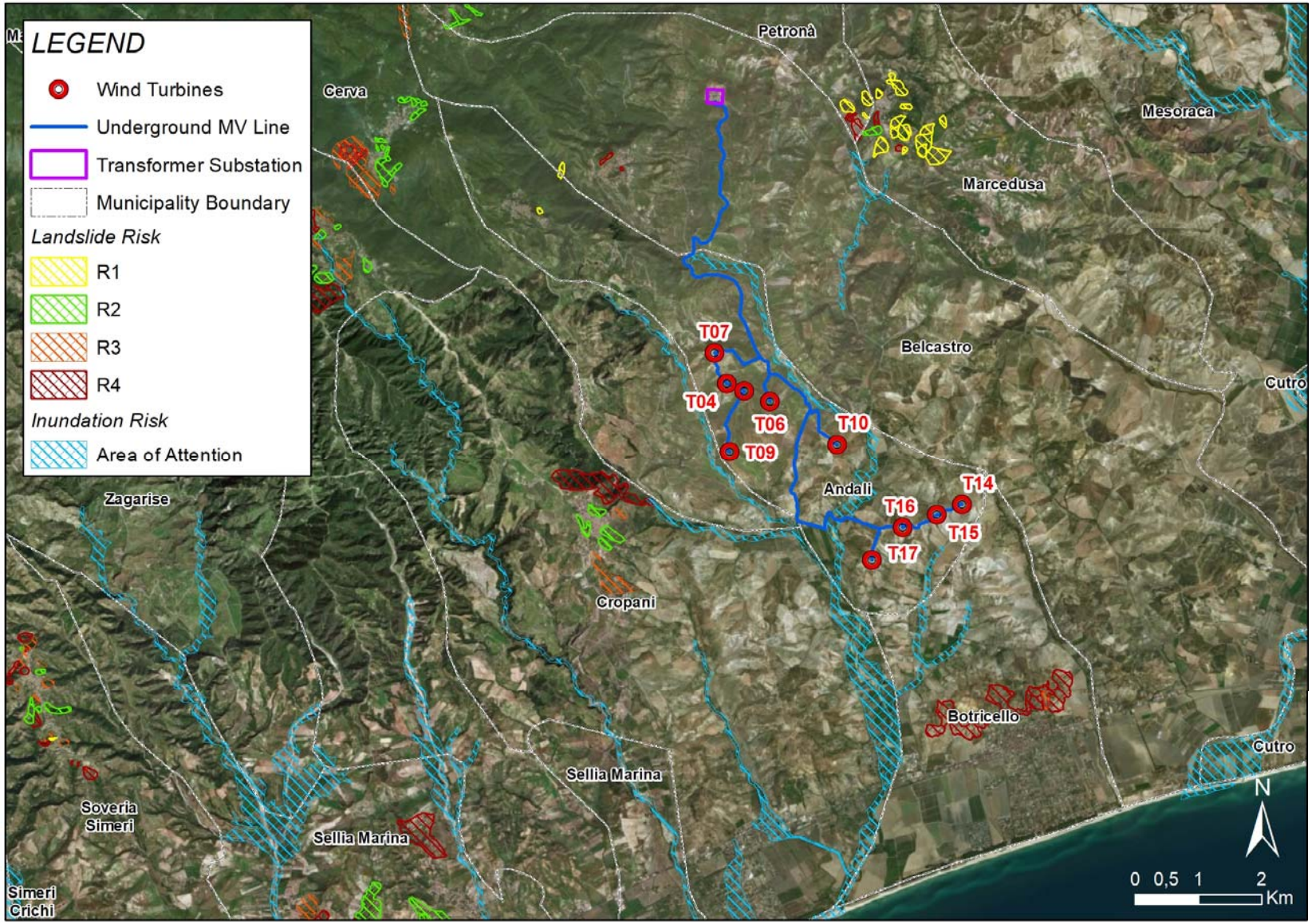
Hydrogeological Risk Map



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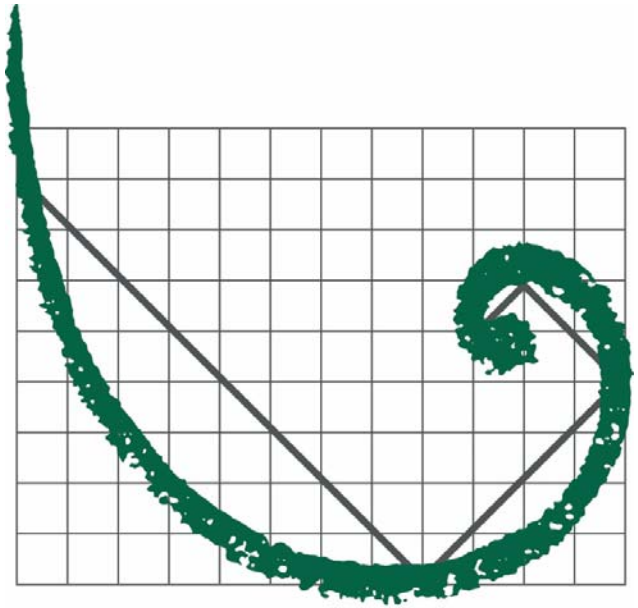

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