SUMMARY OF INFORMATION FOR THE SCREENING FOR ENVIRONMENTAL IMPACT ASSESSMENT
Production of electrical energy using alternative regenerating wind energy sources – PLLC "Akmenės vėjo energija" park of wind turbines at Akmenė District Municipality, Naujosios Akmenės kaimiškoji Eldership, Suginčiai, Vegeriai, Vėlaičiai villages

Name (title), address, telephone, e-mail of the developer (proponent of the proposed economic activity):

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Type of activity and indication whether the proposed activity is listed in Appendix I to the UN Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention):

Electricity generation using alternative renewable wind energy emissions – activity is not listed in Appendix I of Espoo Convention.

During PEA (Planned economic activity) it is planned to construct up to 16 wind turbines, the nominal capacity of each is up to 5.7 MW. The height of wind turbine tower planned to be constructed is up to 163 m; the total height of wind turbine to be constructed is up to 245,5 m.

Construction is expected to begin in 2022 I-II quarter, end – 2023 I-II quarter, operation time - 20-25 years.

Wind turbines are delivered to the construction place, unloaded and installed with the help of a specific crane. During construction process, considering the weight of wind turbines and safety requirements, the steel rods and special-purpose concrete for foundation are used. Having formed the foundation the towers of wind turbines, rotor and blades, produced at special-purpose wind turbine manufacturing factory, are installed in the order of priority. For the access to the WPP it is foreseen to use local roads which will be strengthened and renovated.

In order to decrease visual pollution of landscape, the electrical energy generated by wind turbines will be connected to the electrical networks at the connection point specified by the operator in the connection conditions by underground electric power cables. Underground electric cables will be laid through state land and private land plots.

Manufacturer	Vestas	General electric	Nordex
Model	V150-4.0	GE5.3-158	N163/5.X
Network power frequency of generator unit	50/60 Hz	50/60 Hz	50/60 Hz
Nominal capacity	4000 kW / 4200 kW	5300 kW	5400 kW / 5700 kW
Height of the tower	Up to 166 m	Up to 161 m	Up to 164 m
Rotor diameter	150 m	158 m	163 m
Total height	Up to 241 m	Up to 240 m	Up to 245.5 m
Speed of breaking wind	22.5 m/s	20 m/s	20 m/s

Maximum level of noise emitted	104.9 dB(A)	106 dB(A)	106–107.2 dB(A)

The table provides the alternatives of three wind turbine models with similar technical data, so that the PEA initiator would have opportunity to choose the most suitable option at a later stage of the design works.

During the Planned economic activity the waste production is not foreseen. Small amount of metal and mixed construction waste may be produced during installation – construction of wind turbines. These wastes will be grouped into special containers and in accordance with the agreements with waste managers will be transported for the further management. Wastes will be managed in accordance with the new revision of *"Waste Management Requirements"* approved by the order of the Minister of Energy of the Republic of Lithuania No. D1-368 dated 3 May 2011.

For the operation of wind turbines the water is not foreseen to be used, no sewage water will be discharged. In the planned territory, surface (rain) sewage water will be discharged from the formed surfaces. The amount of surface sewage water will be marginal; the pollution sources during operation are not foreseen. Surface water from the roads will be discharged through surface water slopes to the reconstructed drainage collectors. In the planned territory of wind turbines the equipment of existing recreation system is planned to be reconstructed or restore those damaged during construction according to the developed solutions of the recreation system project part.

During Planned economic activity the pollutants produced by those vehicles arriving at site may be emitted to the environment air. However, the estimated number of vehicle arriving at site per day may be equal 0-2.

During operation of wind turbines the smell is not developed.

Performing planned economic activity the following physical pollution will be resulted: noise, shadowing, infrasound and low-frequency sound, electromagnetic emission.

When feathering the blades of the rotor of wind turbine makes aerodynamic noise the volume of which depends on the rotation speed and the shape of wind generator wings, and features. The limit values for noise in residential and public buildings and their surroundings in Lithuania are determined by the Lithuanian hygiene norm *HN 33:2011 "Noise limit values for residential and public buildings and their surroundings"*, therefore when planning economic activity a sanitary protection zone will be arranged around wind turbine – specific land use condition *Sanitary protection impact zones of production objects*, which will ensure that the permissible levels are not exceeded.

Wind turbines, as well as other high structures at the sunny weather, project shadow on the nearby objects. Beside, living nearby wind turbines the light flashing effect caused by rotating wings may occur. Selection of appropriate area and use of quality equipment may solve this problem. When planning economic activity the wideness and direction of the shadow projected by wind turbines was calculated, and turbines are distributed in such a manner that they would not residential surrounding. In accordance with the simulation results, considering average sun shine duration, and arrangement of local homesteads it is apparent that the shadow of planned park towers will not exceed the recommended permitted limit of 30 h/year at the territory of residential homesteads.

Evaluating the infra sound produced by wind turbines the difficulties to separate it from the level of existing infra sound made by wind itself or other sources arise. Also in Lithuanian Republic there are no established methods for forecasting (simulating) the expansion of infra sound and low frequency sound. On the basis of published data about infra sound and low frequency sound emitted by wind turbines it may be concluded that that at a 100 m distance the level of sound mentioned decreases up to an insensible for a human. Sanitary protection zone, formed in accordance with noise emitted by the turbines, is more than 100 m from the wind turbine, so the significant impact on the human health is not foreseen.

Electrical fields are usually formed in the area of high voltage of electric transmission lines. According to the similar wind turbine technical data the EMF power flow frequency (SLV) of operating at full capacity generator is equal to 24 μW/cm2. This frequency is measured at 1 m distance from generator. Since the generator is in the body at 120-166 m above the ground the power of electromagnetic field, varying according to the cubic dependence of the distance, will not impact the environment because it will not exceed the level permitted – will not reach 0.5 kV/m *(HN 104:2011 "Human protection against electromagnetic fields caused by overhead power lines").*

Forecasted levels of noise are established by calculations, in accordance with preliminary calculations, do not exceed *HN 33:2011* limit values of noise level at night (22-07 o'clock), i.e. Forecasted levels of noise are established by calculations, in accordance with preliminary calculations, do not exceed *HN 33:2011* limit values of noise level at night (22-07 o'clock), i.e. **45 dB(A),** in the nearby homesteads. In order avoid possible noise impact caused by WT to those people living nearby, from the nearest wind turbine to the territory of residential homesteads at least 45 dB(A) sound level (until the night time (22-07 o'clock)) corresponding distance shall be maintained. Alternatively, the planned wind turbines may operate at reduced rotation speed and power during the night, reducing noise levels. It is planned that the sanitary protection zone will not cross the territory of Latvia.

When planning economic activity, the calculation of physical pollution (noise and shadow) were performed, and wind turbine park shall be arranged in such a manner that the limit values in the residential area would not be exceeded. The nearest homestead from the planned wind turbines is at 513/613 m distance (depending on the layout option chosen). Having evaluated noise dissipation and shadowing calculations in accordance with published literature, having performed analysis of electromagnetic emission and infra sound, and low frequency sound level the following was determined: planned wind turbines will not negatively impact public health in the nearest residential area. Having performed calculations of noise dissipation it was established that the excess of noise level in the nearest residential area is not foreseen. In addition the impact on human health is considered when developing public health impact assessment and arranging sanitary protection zones.

For the period of planned economic activity the biological pollution is not foreseen.

The worth case scenarios which can happen during operation of wind turbine and may impact environment and residents around are the accidents related to the damages of mechanical structures which may cause tower falling or blade drop-over, falling of tower top part together with blades and rotor, and similar mechanical accidents which may impede normal working and living conditions of residents around. Mechanical falling of wind turbine tower may be caused by natural and anthropogenic factors. Such meteorological factors as hurricanes, tornado and heavy shower are considered as natural factors. Blade accident may be caused by severe icing if, calculating blade constructional resistance, the possible increase of blade weigh in case they are covered with ice, was not considered. Mechanical deformation of wind turbine towers, their falling and blade drop-over would cause negative implications and would be dangerous just near these towers only. Heavy structures shall not be thrown by wind, so the area of potential impact is determined only by the height of the structures. In this case the zone of potential impact – up to 1.5 times of total wind turbine height, i.e. up to 245,5 x 1.5 = 368.25 meters, as the height of planned to constructed wind turbines shall not be higher than 245,5 meters. Since the nearest built-up area is 513/613 meters far from WT, WT towers are far enough from the nearest built-up territory, so the deformation of wind turbine tower, which could cause natural and anthropogenic factors, will not impact existing structures.

Construction stages:

- finish of design development works (arrangement of land plots and reconstruction designs, technical and detail plans, etc.);
- selection of construction site (construction of roads and foundation);
- installation and connection of wind turbines.

Whether during construction or completion of construction, agricultural work and other necessary types of economic activity will not be disrupted at the project territory and other surrounding territories.

The area for planned economic activity (PEA) was selected having evaluated alternative areas to perform envisaged economic activity. Nature conditions (relief, prevailing wind direction, landscape) and existing infrastructure (possibility to connect to the electrical networks and existing road network) were evaluated; a possible situation of economic activity in respect of urbanised (residential), protected areas and those areas of historical, cultural or archaeological values was considered. The area has been selected as conforming to the envisaged economic activity.

The current initial target purpose of land plots – agriculture. The area is not built-up, meadowlands prevail, and land plots are cultivated.

Land plots are reformed by developing designs of land plot formation and conversion. Plots will be portioned and leased by parts (0.20 ha for each wind turbine); the main target destination is changed to the land of "Other" purpose (Areas of communication and engineering services maintenance objects).

Following the Akmenė District Regulations on Land use and protection of General Plan, Recreation, Tourism, Development of Nature and Cultural Heritage, Natural Frame, Forest and NATURA 2000 Territory Arrangement, Territorial Engineering Infrastructure and Communication Drawings, the Planned Economic Activity (PEA) do not contradict the general plan solutions since at the territory of planned economic activity there are no objects of cultural heritage, protected areas, forests, recreational areas, urbanized territories.

According to the solutions of the currently being prepared General Plan of Akmenė District Municipality, potential wind power plant territories are envisaged.

In accordance with the map approved by the Commander of the Lithuanian Armed Forces, the area the construction of wind turbines is planned at falls into areas where wind turbine sites are approved provided that the producer of energy from renewable sources signs an agreement with the Lithuanian Armed Forces for the reimbursement of part of the investment and other costs for the performance of national security functions.

There are no other existing, approved or proposed activities in the immediate environment which could have an additional impact on the PEA.

According to the data of the Register of Earth Interior (REI) the nearest source of mineral products is at about 10-915 m distance. The nearest existing drinking fresh water source is at about 940-1500 m distance from PEA. Industrial and mineral water sources at the nearest territory are not available.

Following the Geological Information System GEOLIS, at the territory of planned economic activity no geological processes and events happen. The nearest recorded geological events – landslides at a distance of more than 20 km from the PEA.

The nearest to the PEA geotope being found – Karpėnai canyon – is at about 2.4 km distance from the PEA territory.

Considering that the nearest NATURA 2000 PAST (bird protection) protected territories from the territory being investigated is at about 6 km distance (Ukru garsa, LV0523200, in Latvia); determining the significance of the impact of the proposed economic activity on the established or potential territories of NATURA 2000 is not practical. At the territory of planned wind turbine park there are no significant impounded surface water, just some short sewered rivers (up to 50 km lenght), channels. It is envisaged that none of the wind turbines will be in the protected strand lines. It is foreseen that underground electrical cables, the wind turbines will be connected to the electrical network with, in several points will cross rivers or channels. In these points underground electrical cables will be laid by the method of directional drilling, leaving at least 3 meters above the bed of impounded surface water, following the procedure set by legal acts. On the planned territory there are no protected values or their fragments, as well as

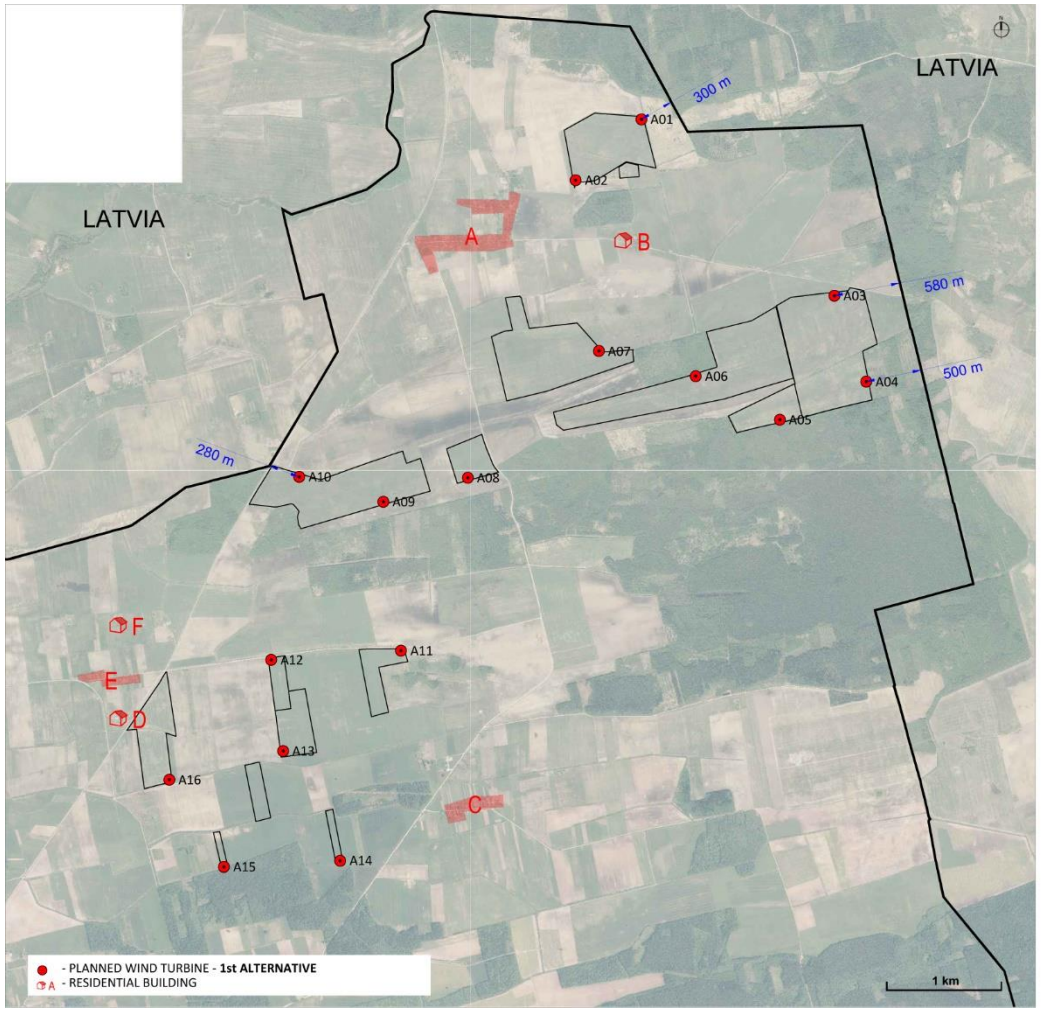
historical values and immovable cultural values evaluating in relation to the assessment of the monumental aspect.

During planned economic activity the environment will not be impacted significantly. However, it would be possible to highlight several alternatives of technical, technological and environment impact minimising measures. The following compensating and environment impact minimising measures are:

1. To minimise shadow impact wind turbines will be arranged in such a manner that shadow projected by the generator blades would not reach the territories of the nearest homesteads. Otherwise (generator blades reach the territories of the nearest homesteads), having obtained consent of the owners of homesteads, the surrounding of homesteads with green plants, preventing wind turbine at the time when their shadow is projected on the homestead is envisaged, or shadow minimising (shadow shut-down) mechanism is installed on WT, the purpose of which is to minimise flashing of the shadow in the residential area. This system will stop the rotation of WT in the most intense hours of the sunlight and allow to eliminate the flashing of shadows in the territory of the homesteads.
2. In order to avoid negative environment impact caused by the noise emitted by wind turbines the tower of wind turbine will be arranged in such a manner that level of its emitted noise would not exceed the highest permitted noise limit set by *HN 33:2011 "Noise limit values for residential and public buildings and their surroundings"*. Otherwise at night planned wind turbines may operate with reduced rotation speed and capacity, by doing so decreasing noise level.
3. Planned WT shall conform to the EU standards and safety requirements applied to such equipment.
4. Panned WT should be painted in light colors, special paints to prevent gloss and reflections of structures.
5. When constructing WT, ensure that the hydrological regime is not deteriorated.

The nearest WTs are about 280-580 m from the Latvian border. In accordance with the results of simulation performed, evaluating the most adverse conditions, the shadowing and noise do not impact residential environment on the territory of the Republic of Latvia.

Evaluating at a distance of 5 km from the PEA there are no protected areas in the territory of the Republic of Latvia.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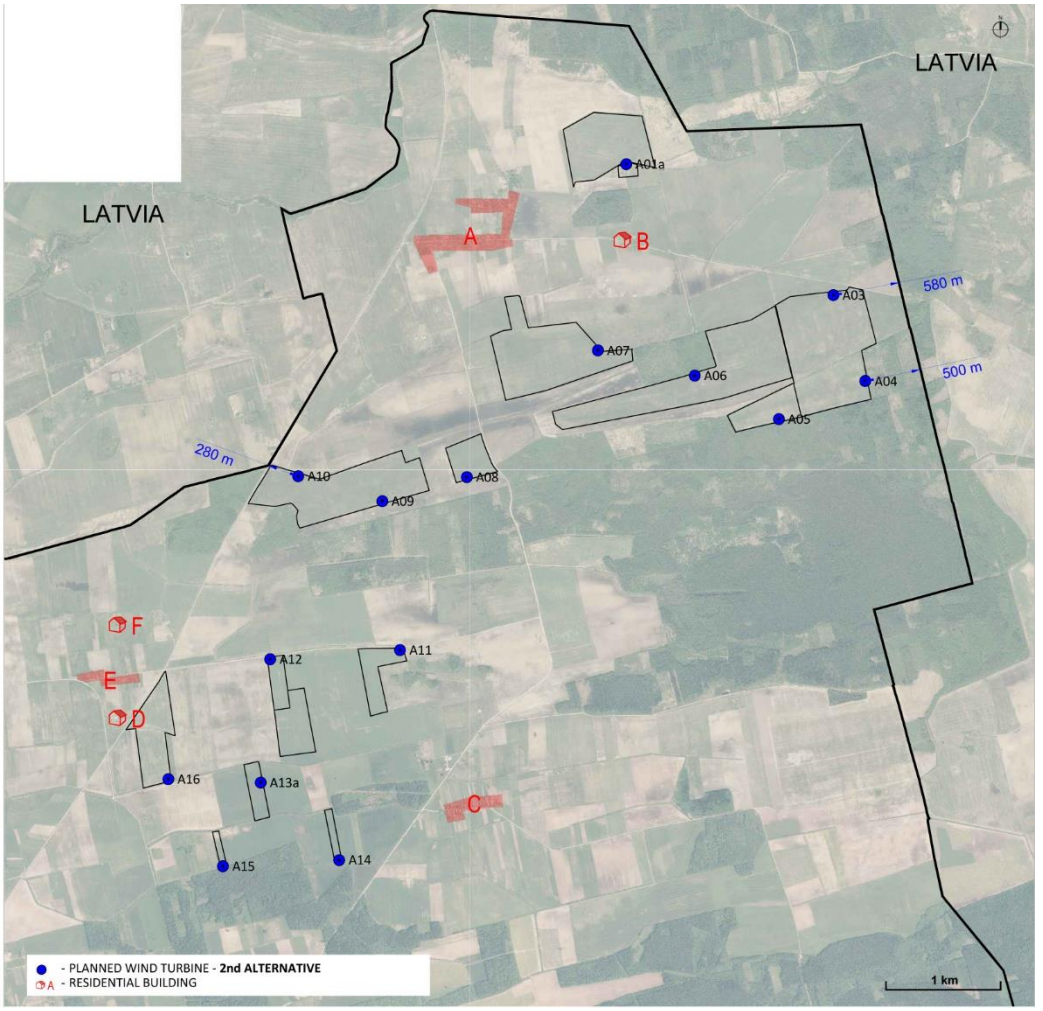
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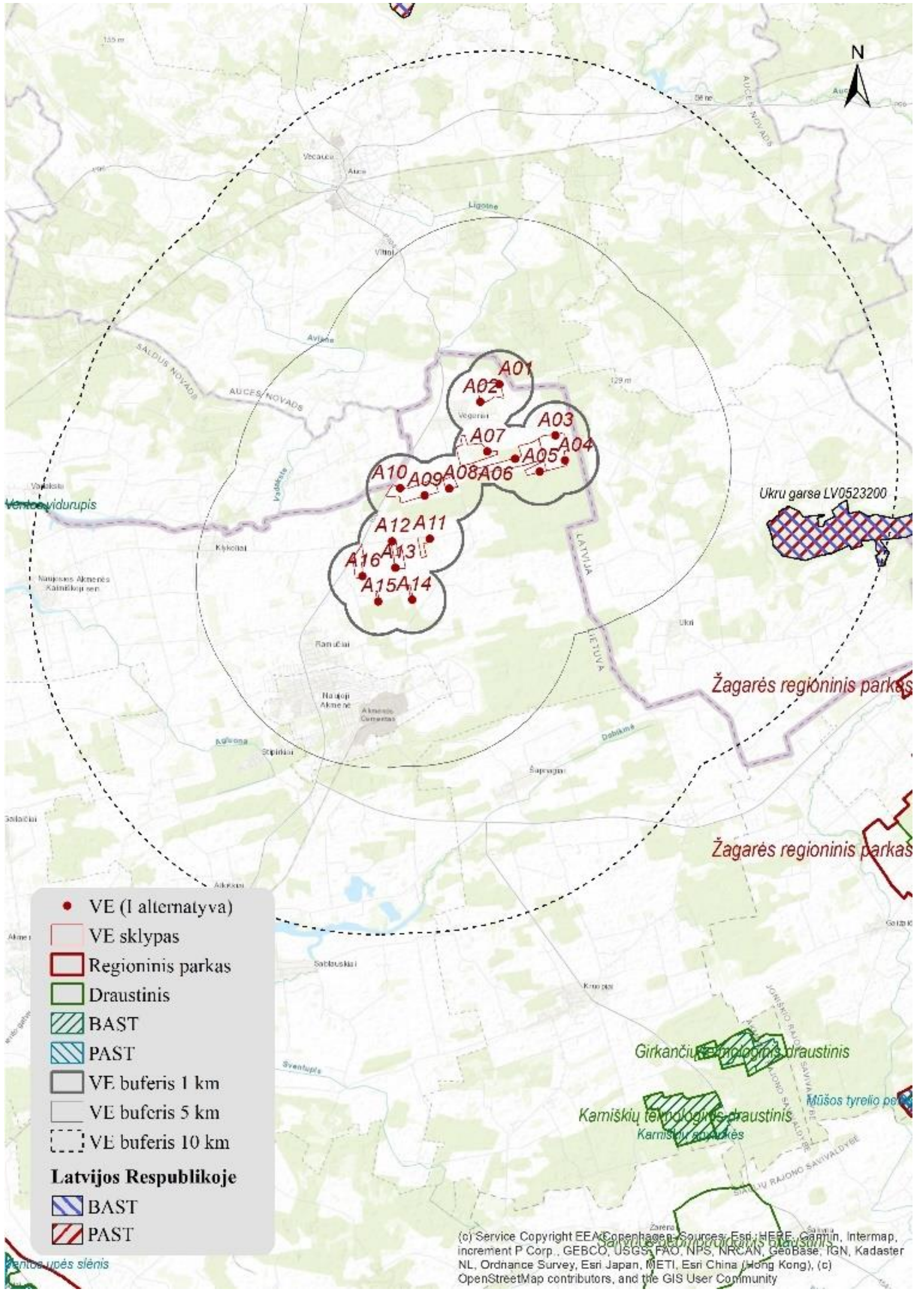
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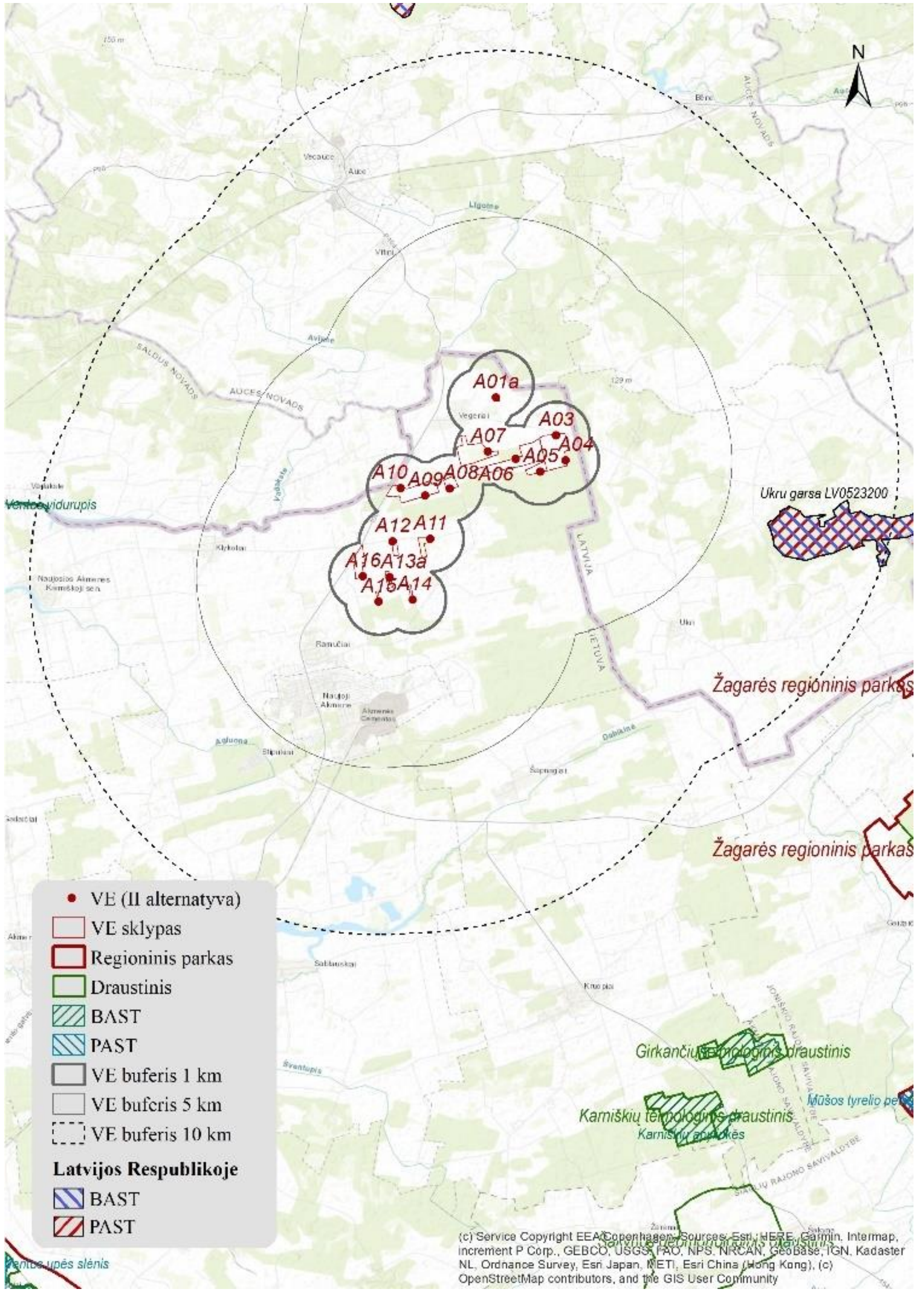
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