SUMMARY OF INFORMATION FOR SELECTION REGARDING ENVIRONMENTAL IMPACT ASSESSMENT OF PLANNED ECONOMIC OPERATIONS

(REPLACEMENT OF THE WIND TURBINES EQUIPMENT AND OPTIMIZATION OF CONSTRUCTION SITES) IN MAŽEIKIAI DISTRICT MUNICIPALITY, ŽIDIKAI WARD, JUODEIKĖLIAI, GRIEŽĖ, DAUTARTAI, RITINĖ AND PALŪŠĖ VILLAGES

Organizer of planned economic operations:

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Planned economic operations:

Replacement of the equipment of the planned wind power plants by planning for installation of newer equipment and optimization of construction sites of wind power plants (reduction).

UAB "VVP Investment", the organizer of planned economic operations, started implementing a project of construction and operation of wind power plants in the territory administered by Židikai ward, Mažeikiai district municipality, in 2011; the said project currently covers three areas:

1. The first territory of development of wind turbines is planned in the territories of Juodeikėliai and Griežė villages, Mažeikiai district municipality (between Pikeliai settlement and AB "ORLEN Lietuva"). 10 wind turbines were planned for here in 2011-2014 and, having updated the conclusion of EIA (environmental impact assessment) selection in 2018, were planned for construction of 9 wind turbines.
2. The second area of development of wind turbines was planned Juodeikėliai, Milteniai, Dautarai and Ritinė villages in 2017; it is planned to construct up to 9-7 wind turbines here.
3. The third area of development of wind turbines is planned in the territories of Liepkalnė, Palūšė and Bataičiai villages. It was planned to construct 9 wind turbines here in 2018-2019.

A total of 25 locations for the constructions of wind turbines were planned during the four stages of the development of the project from 2011 to 2019 (see fig. 1, p. 2) and sanitary protection areas were formed and validated for them.

Taking into consideration the cutting-edge technologies being developed which are applied in the production of wind power plants as well as the newest models of wind power plants offered in the market and having assessed the economic and meteorological peculiarities, the organizer of planned economic operations decided to optimize the number of construction sites of wind power plants (to reduce it) and plans to replace the equipment of wind power plants by a more modern and optimal one. The layout of wind power plants in the territory after the optimization of the locations is presented in figure 2, p. 3.

UAB "VVP Investment" plans to reduce the number of construction sites of the planned wind power plants from 25 to 20 and to plan for the installation of newer equipment:

		EXISTING (PLANNED) SITUATION	**PLANNED SITUATION**
Total number of wind turbines:		**25 pcs.**	**20 pcs.**
Rated power, 1 pc.:	Area I Area II Area III	up to 5.0 MW up to 3.0 MW up to 4.5 MW	up to 6 MW?
Rotor diameter:	Area I Area II Area III	up to 158 m up to 117 m up to 149 m	up to 162 m
Highest point of constructions:	Area I Area II Area III	up to 220 m up to 200 m up to 230 m	up to 240 m
Maximum sound power level:	Area I Area II Area III	up to 108.5 dBA up to 105.0 dBA up to 106.1 dBA	106.1 dBA

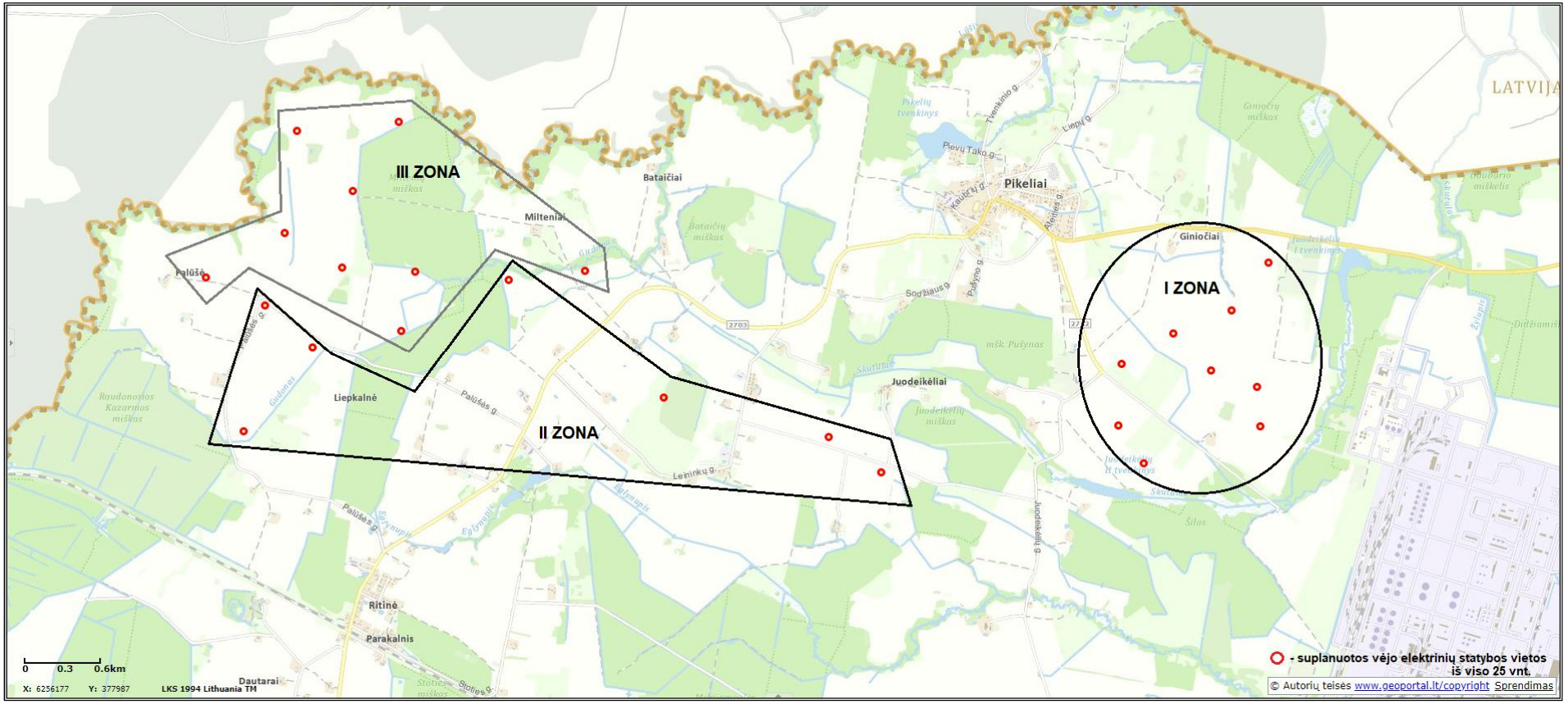

Fig. 1. Planned construction sites of wind turbines in 2011-2019 (www.geoportal.lt)

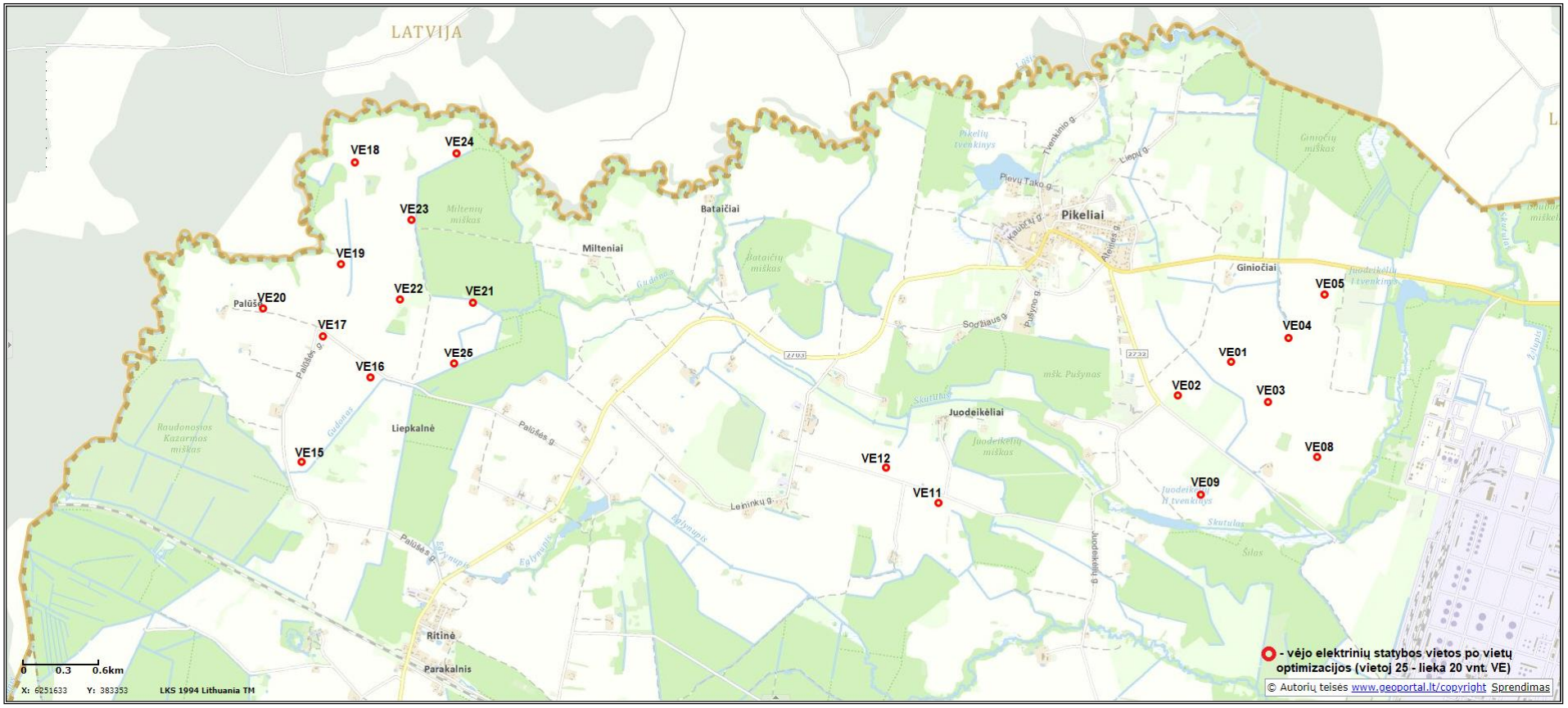

Fig. 2. Layout of wind turbines after optimization of locations (www.geoportal.lt)

No water, earth, soil and / or biological variety resources will be used for the replacement of the equipment of the wind turbines that were planned earlier when installing the newer equipment and optimizing (reducing) the construction sites of the wind turbines. It is planned to use one of the alternative sources of energy that are everlasting – wind power. The beginning of the preparatory and construction works of the planned wind power plants is not clear yet, it could be in 2020-2021. Construction would be carried out in one stage then.

Location of planned economic operations:

Telšiai County, Mažeikiai District Municipality, Židikai Ward, Juodeikėliai, Griežė, Dautarai, Ritinė and Palūšė Villages. The operations are planned in twenty land lots of other purpose (territories of the objects servicing transport communications and engineering communications) formed for the construction of the wind power plants, cadastral Nos. of lots: 6134/0008:361, 6134/0008:246, 6134/0008:156, 6134/0008:301, 6134/0008:347, 6134/0008:359, 6134/0007:52, 6134/0002:210, 6134/0002:207, 6134/0003:154, 6134/0003:149, 6134/0003:158, 6134/0003:162, 6134/0003:166, 6134/0003:172, 6134/0003:160, 6134/0003:167, 6134/0003:163, 6134/0003:165 ir 6134/0003:174. Layout coordinates of planned wind power plants: 6254310 384821; 6254044 384393; 6253991 385119; 6254513 385285; 6254864 385577; 6253543 385516; 6253244 384574; 6253172 382457; 6253456 382038; 6253504 377318; 6254187 377878; 6254526 377491; 6255928 377747; 6255103 377640; 6254749 377010; 6254795 378703; 6254824 378116; 6255461 378206; 6255999 378568; 6254301 378551. Pursuant to the solutions of the general plan of the territory of Mažeikiai District approved by the Decision No. T-95 of 27/03/2009 of Mažeikiai District Municipality Board, the territory in which construction and operation of wind turbines is planned is designed for infrastructure and wind energy.

The shortest distance from the planned wind turbines to the national board with the Republic of Latvia is 0.24-2.6 km (see fig. 3, p. 5).

It is noteworthy that the information on the environmental impact assessment always includes the assessment of the wind turbines located at a 2 km distance which have been planned earlier and/or are already being operated (such wind turbines were not found in this territory) because they have a direct cumulative impact on the environment. Based on the applicable foreign and Lithuanian practice, it is recommended to assess noise generated by the existing or earlier planned wind turbines as well at a 2 km radius to the planned wind power plants. It was determined by multiple calculations that even the most powerful wind turbines do not affect each other if they are located more than 2 km away from each other. In this case, the distance from the locations of the planned economic operations to the closest wind turbines is almost 9 km east and total (cumulative) impact between such wind farms is not foreseen (see fig. 4, p. 6).

The "Natura 2000" territory located in the territory of the Republic of Latvia which is the closest to the location of the planned economic operations is 1,7-2 km away and is located more to the west-south west (see fig. 5, p. 7). It is a territory significant for the protection of habitats (BAST) (LV0531000 "Nigrandes mezi"), the purpose of protection of which *Fennoscandian swamp deciduous woods*; another BAST territory is observed 7 km and more to the north, whereas the closest territory significant for the protection of birds (PAST) located in the territory of the Republic of Latvia is at the north-east direction, approximately 20 km away from the location of the planned economic operations. The replacement of the equipment of the planned wind turbines by installing newer equipment and optimizing (reducing) the number of construction sites of wind turbines will not have any influence on environmental impact in these territories whatsoever, whereas a negative international environmental impact in respect of the protected territories has not been determined before and is not foreseen after the reduction of the number of wind turbines.

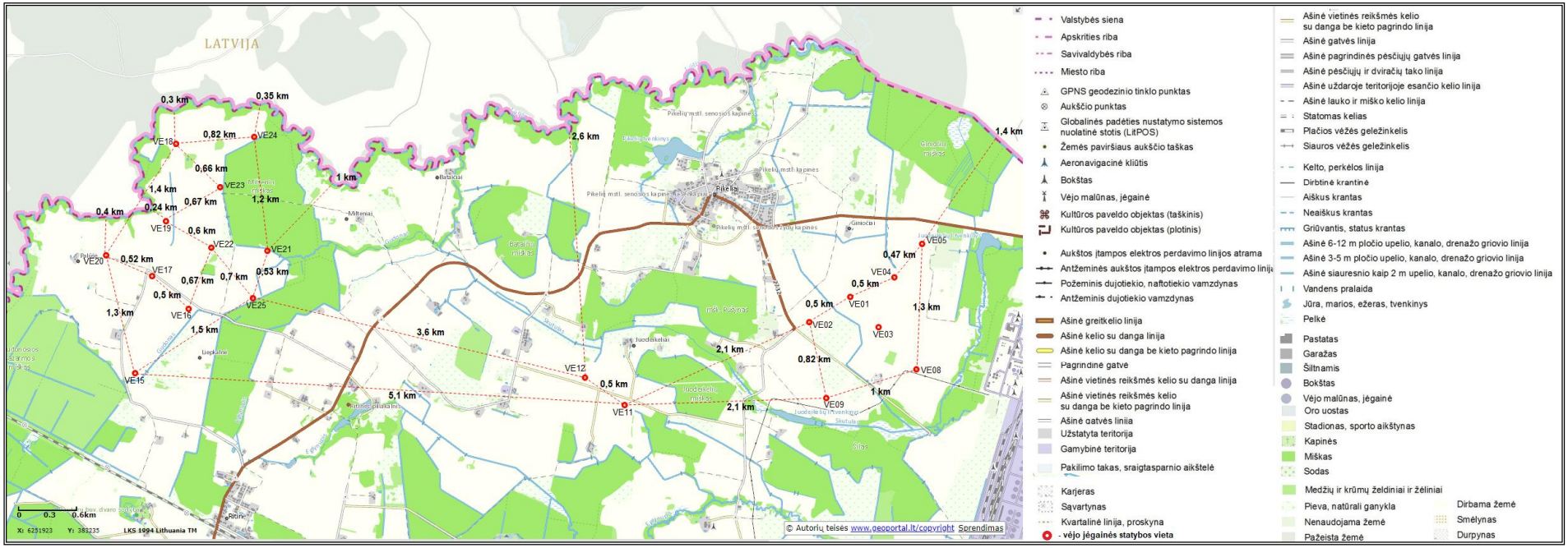

Fig. 3. Locations of wind turbines in respect of each other and of the Republic of Latvia *(www.geoportal.lt)*

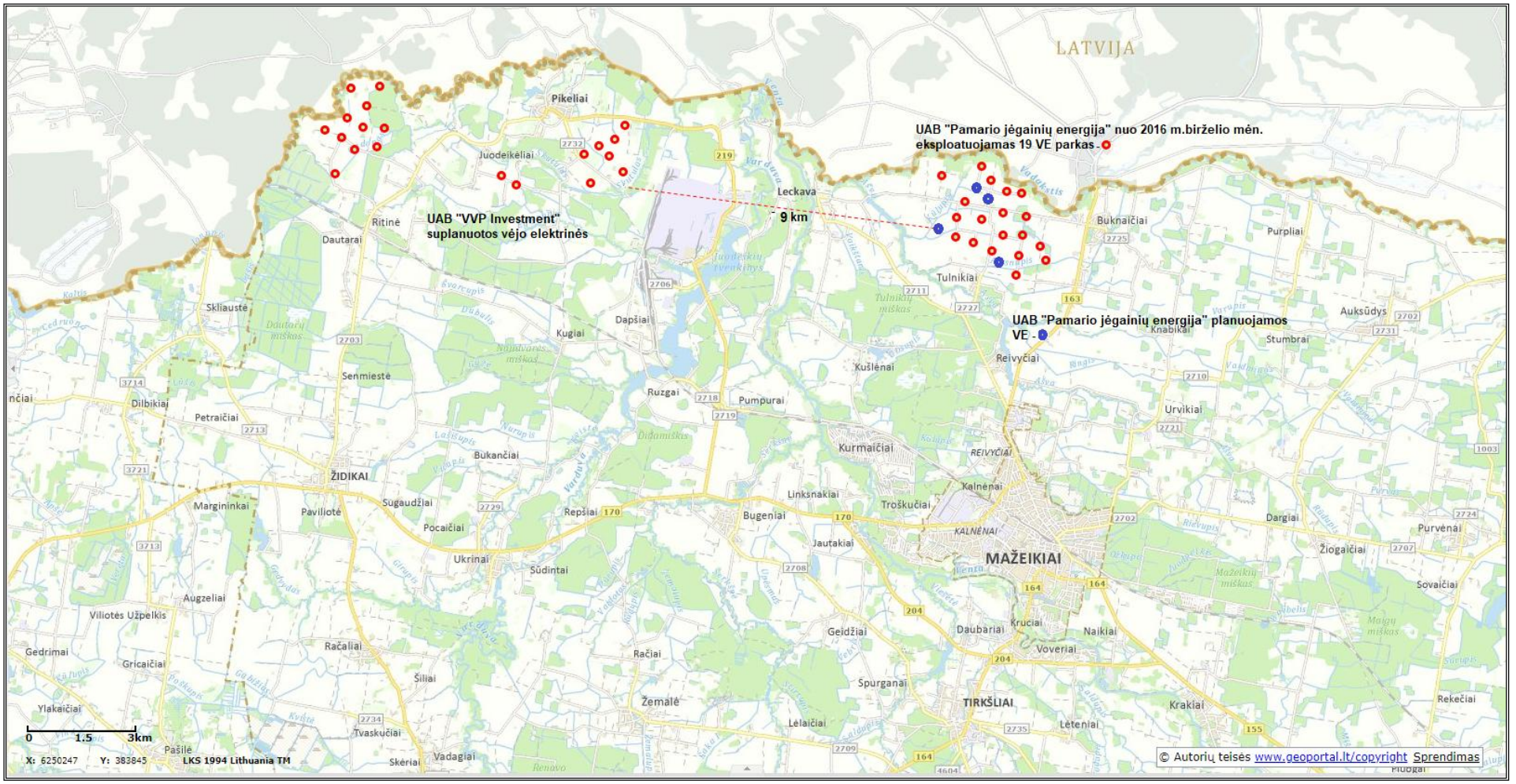

Fig. 4. Locations of the construction sites of wind turbines to the closest wind turbines which are being operated / are planned to be constructed

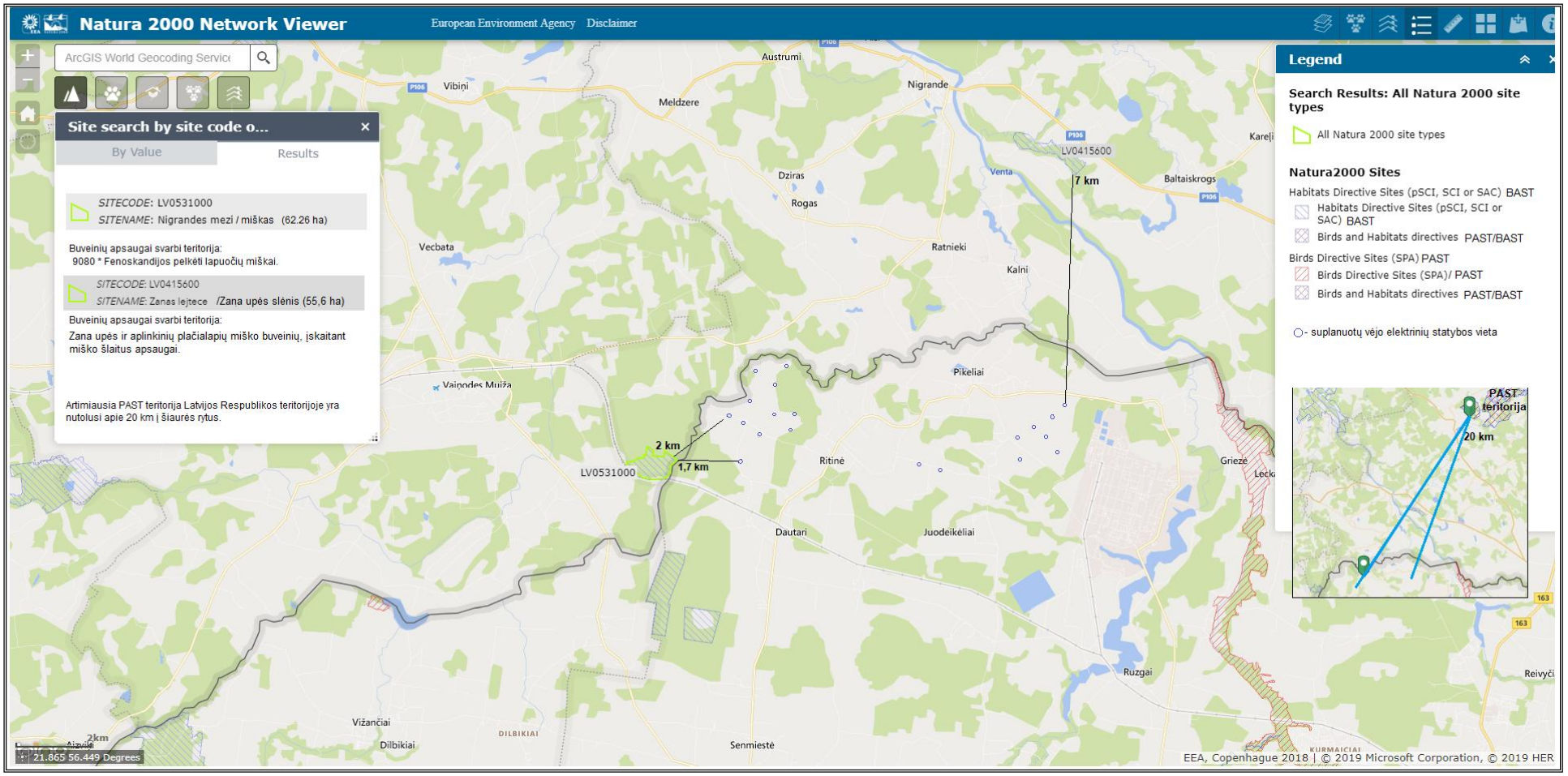

Fig. 5. Position of the construction sites of wind turbines in respect of the protected territories in the Republic of Latvia (http://natura2000.eea.europa.eu)

Environmental impact:

The replacement of the equipment of the planned wind turbines by installing newer equipment and optimizing (reducing) the number of construction sites of wind turbines will not have any influence on the pollution of surrounding air, soil or water. Also, it will not have any influence on more significant increase of noise levels in the environment than determined before because the sound parameters of the newer equipment are identical to the sound parameters of the planned wind power plants; however, a reduction of noise levels is planned in some territories after the optimization of the number of the construction sites of wind turbines.

Noise. Two models meeting maximum parameters were used for the calculations of noise dispersion: the most powerful 6 MW (Siemens Gamesa SG 6.0-155) and the highest noise level – 106.1 dBA (Nordex N149, 4,5 MW).

The results of the calculation show that no areas meeting the daily threshold value (55 dBA) are formed when constructing both 6 MW and 4.5 MW rated power wind turbines, noise level of which is 106.1 dBA, whereas the areas reaching the evening threshold value (50 dBA) are formed at a 90÷180 m radius around each wind turbines and do not reach the closest residential environment. The noise level which is permitted at the nighttime (45dBA) will be achieved if twenty wind turbines are constructed 240÷360 m away from the wind turbines, to the external direction, whereas the noise areas are combined into three separate groups (see fig. 6-6A). It is noteworthy that the noise area of 45 dBA of the wind turbines, of which power is 6 MW and noise level is 105 dBA, is slightly smaller than that of the wind turbines, of which power is 4.5 MW and noise level is up to 106.1 dBA; the results of their dispersion are presented below:

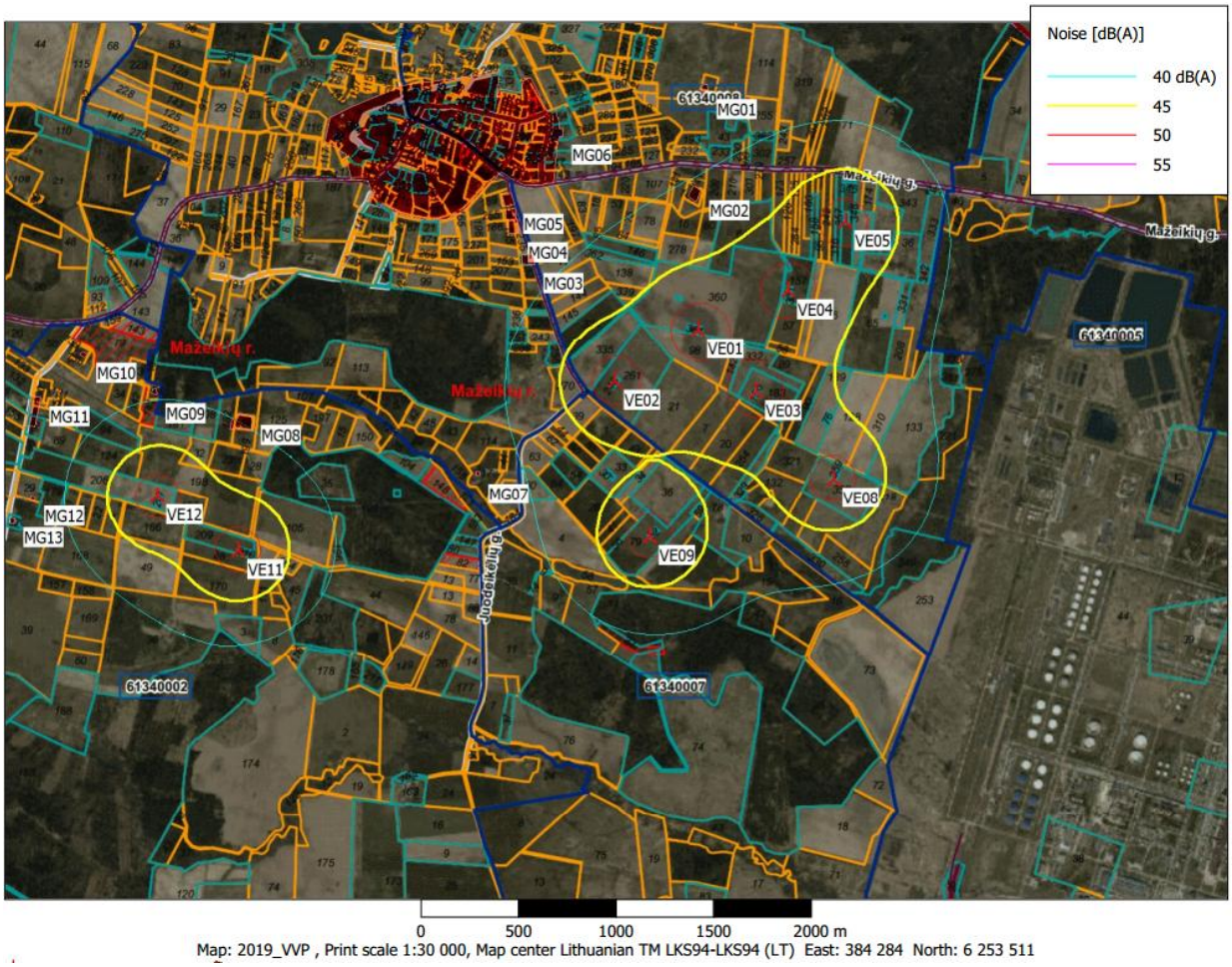

Fig. 6. Calculation results of noise dispersion during nighttime

Fig. 6A. Calculation results of noise dispersion during nighttime

Note: when operating the wind turbines during nighttime, it is planned to restrict the operation of the wind turbines (VE18, VE19 ir VE24) so that the noise generated by the wind turbines does not exceed (101÷105 dBA) and the noise area of 45 dBA does not reach the territory of the Republic of Latvia. Such restrictions were set in the previous projects and during the formation of the sanitary protection area for the operations as well. No restrictions of the operation are stipulated for other periods (day and evening) and they are not necessary.

Shadow. As UAB "VVP Investment" planned the replacement of the equipment of the planned wind turbines by installing technologically more innovative equipment and optimizing (reducing) the number of construction sites of wind turbines, it was assessed how shadow can change in the territory as a result of the possible increase of the rotor diameter of the planned wind turbines.

The calculations and assessment of the dispersion of shadowing were performed using the planned maximum rotor diameter (162 m) and the highest point of the structures (240 m) (see fig. 7, p. 10). The buildings (not differentiated by their purpose LV1, LV2) in the Republic of Latvia located the closest to the planned wind turbines (the closest one – VE05) are more than 1.45 km away and the calculations showed that the increased shadowing will not reach them if the wind turbines with maximum dimensions are constructed; therefore, no negative impact is predicted with regard to shadowing.

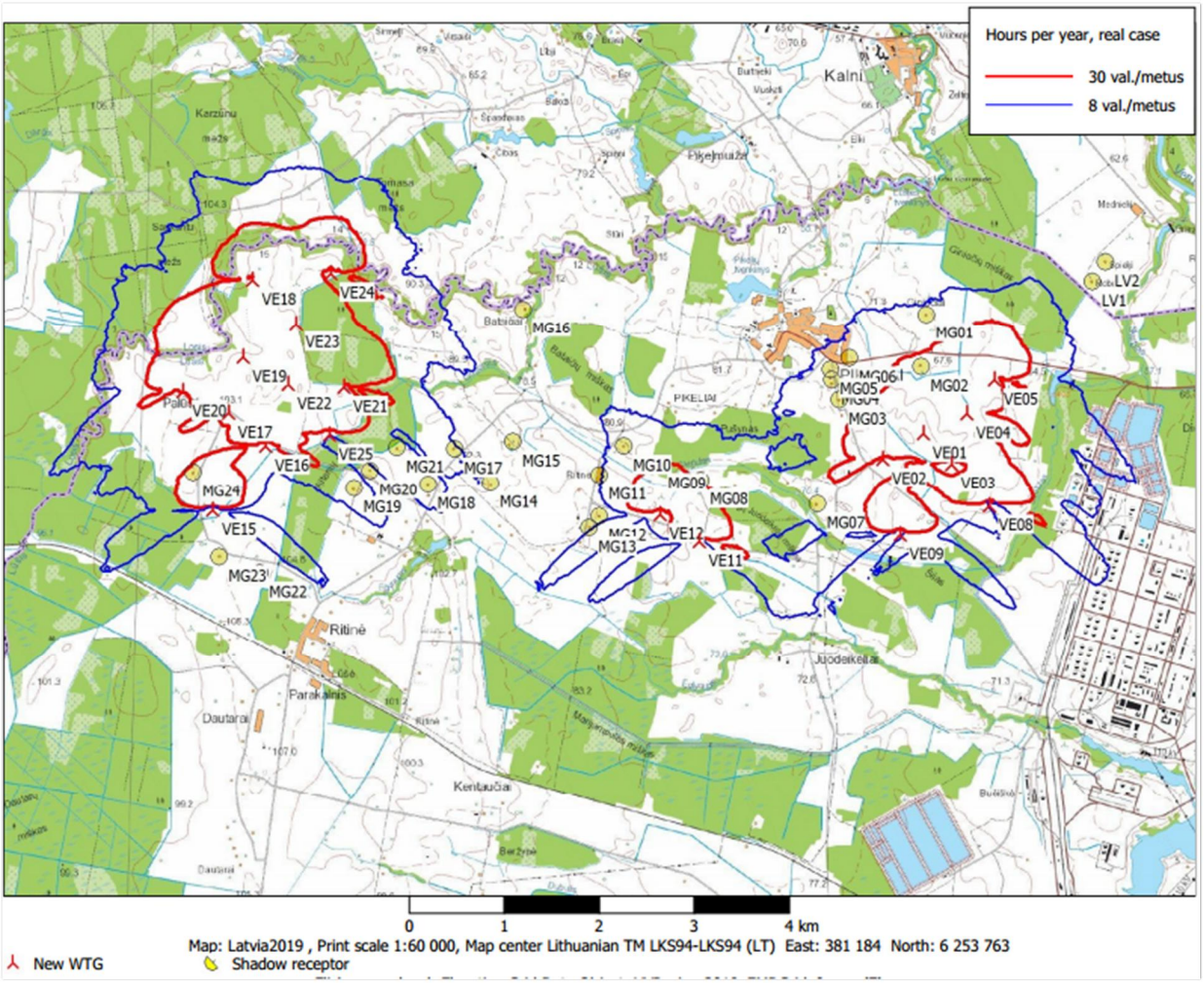

Fig. 7. Calculation results of shadow dispersion

It is noteworthy that shadowing and visibility at the aforementioned direction is reduced by the forest arrays of Giniočiai located in the territory of Lithuania and Zeltinu located in Latvia. Two built-up territories (not differentiating if their purpose is residential or not) are within a 2 km radius to the wind turbines which are planned closed to the border of the Republic of Lithuania (see fig. 8, p. 11) (*noticing the flickering of shadows located further than 1,000 m away would be difficult as a result of the scattering of the shadow, and the buildings located in the Republic of Latvia at a 2 km distance from the planned wind power plants are included in this case*); therefore, as can be seen from the results of dispersion, no negative impact on public health is predicted with regard to shadowing.

It was determined that shadowing control equipment will be installed in appropriate wind turbines when constructing wind turbines with maximum dimensions; the said equipment will enable avoiding the increased shadowing in homesteads in the territory of the Republic of Lithuania and outside of it, if necessary.

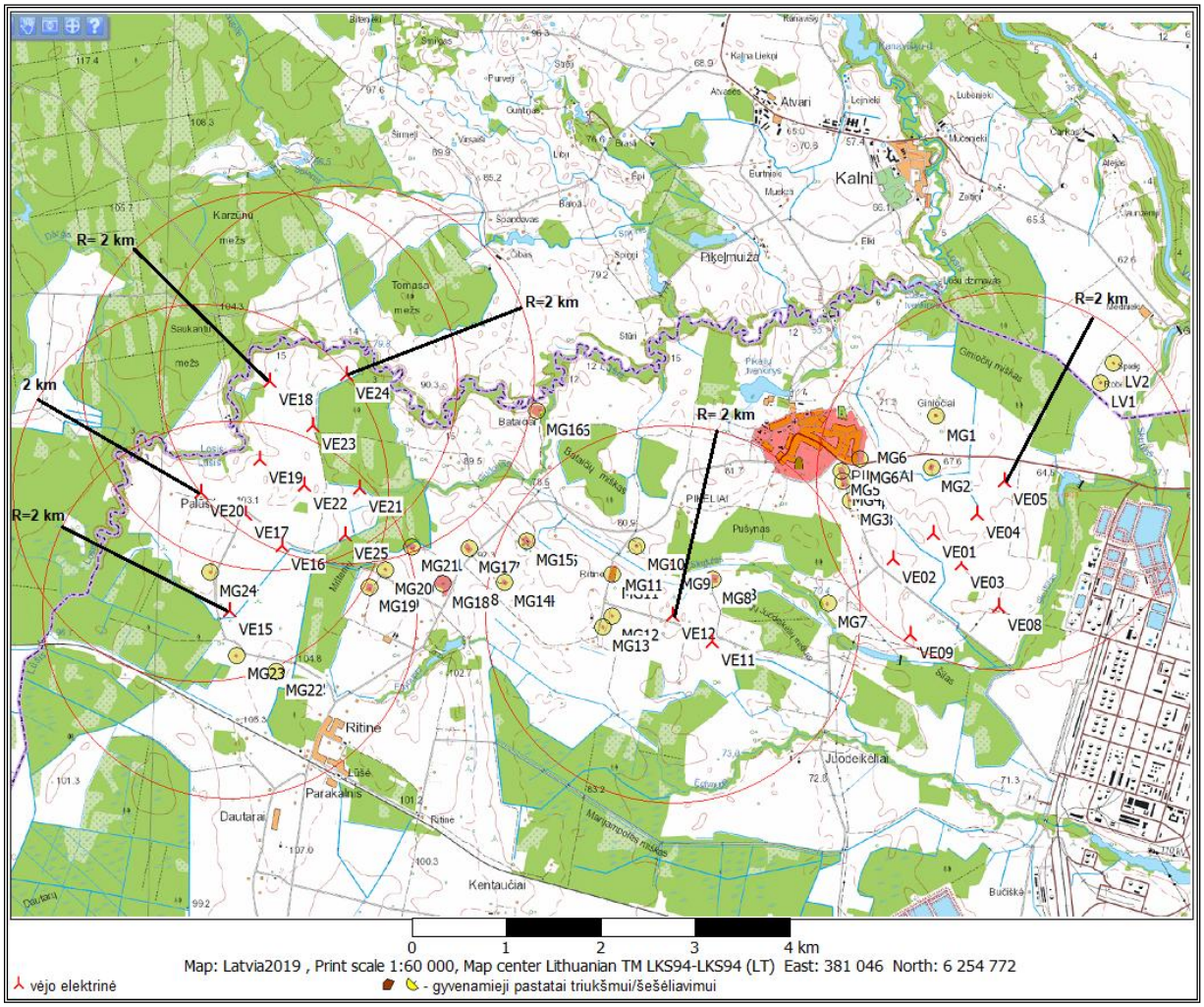

Fig 8. Position of the construction sites of wind turbines in respect of the built-up territories in the Republic of Latvia

Manufacturers install shadow shut down computer program in the control system of wind turbines by adding lights sensors onto the towers of the wind turbines so that they are able to determine the intensity and angle of sunlight, while the control system stops the operation of the wind turbines when the values measured by the sensors exceed the stipulated ones and automatically restart the wind turbines after intensive flickering of shadows cannot be caused in the sensitive environment as a result of lighting conditions for at least 10 minutes. In this way, by installing the system in appropriate wind turbines, it is ensured that the shadowing time does not exceed threshold values in the closest homesteads and does not have any negative impact on the quality of residential environment within the Republic of Lithuania or the Republic of Latvia.

Landscape. An assessment of the impact on landscape was ordered in order to dispel any doubts regarding the influence on the landscape; the head of the assessment was Dr. Jonas Abromas, a landscape architect. It was determined during the assessment that the wind turbines which are being designed currently will not have any negative influence on the visual-esthetic quality of the landscape whatsoever. It was determined when assessing the impact on the landscape of the territory of the Republic of Latvia that the wind turbines are surrounded by large areas of forest arrays on all sides of the territory of the Republic of Latvia: the forest arrays of Pauzeriai, Saukantai, Karzūnai and Tomasa reduce visibility significantly and they are not located close to any residential territories. The visibility of the wind turbines No. 11-12 at the direction of the Republic of Latvia is reduced by the forest array of Mažieji Juodeikėliai and nearby forrest arrays located close to the wind turbines being designed as well as by the lower relief of the construction site of the power plants. Meanwhile, the wind turbine No. 01-09 were planned the furthest from

the territory of the Republic of Latvia. The lowest distance from the wind turbines being designed to the border of the Republic of Latvia is 1.35-3.2 km. The distance to the closest settlement located in the Republic of Latvia (Kalni) is 3.3-4.8 km. The visibility at the direction of the said settlement is reduced by the forest arrays of Giniočiai (in the territory of Lithuania) and Zeltinu (in Latvia). The power plants become the highlights of the landscape due to the said distance of observation and forest arrays.

The structures of the wind turbines will be designed imitating the shapes existing in the nature and painted in bright colours in order to reduce the effect on the landscape. Special composition of paint will enable avoiding glittering structures and generation of reflections. Predominant vertical elements – high technogenically designed structures rising above the existing elements of the landscape will appear in the agrarian, scarcely urbanized landscape; however, the form of the said structures is not too expressive to cause a strong visual effect on the environment or to block and / or prevent from viewing the protected and / or recreational territories and valuable panoramas.

The closest territory significant for the protection of birds (PAST) located in the territory of the Republic of Latvia is at the north-east direction, approximately 20 km away from the location of the planned economic operations (see fig. 5, p. 7). The specialists of the Lithuanian Society of Ornithology assessed the territory with regards to birds and bats and determined that the species of breeding birds customary to an agrarian landscape predominate in the territory of the planned wind turbines and in its outskirts. Rare or protected species of birds can be found in the valleys of brooks or in the wet segments which are formed in valleys. No regular aggregates of water birds of international significance, which must be exceptionally protected, are formed in the territory of the planned economic operations and in its outskirts. However, a program for the monitoring of birds and bats has been prepared aiming to protect the environment to the maximum; it is planned to perform the monitoring of birds and bats having coordinated the said program with the body in charge and its results will enable assessing the situation realistically as well as selecting and applying effective preventive measures.

The organizer of the planned economic operations considers the possibility to construct white wind power plants as a preventive measure aimed at the prevention of deaths of birds, because white colour is rarely encountered in nature and thus is well visible to birds during the dark period of the day. Blue lights will also be installed on the wind turbines which shall illuminate an object / obstacle located in the migration path of birds. German scientists determined by an experiment that blue is well visible to birds. As an additional measure aimed at the reduction of any potential disturbance of migrating birds, it is planned **not to perform any works of installation of wind turbines not only during the spring migration, i.e. in March-May but also not to perform any construction works in September-October due to the potential disturbance of migrating birds in autumn** as well as to perform any such works during as short period of time as possible.

In all cases, the organizers of the planned economic operations note that the potential impact was taken into consideration during the stage of planning of wind turbines and the planned wind turbines were distanced respectively aiming to ensure as low environmental impact and impact on public health as possible.