3 Priedas. Oro tarša

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas

COMMENTS:

Anglies monoksidas (8 val.), be fono.

SOURCES:

3

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

22,6 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-30

SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas

ug/m^3

220,0

215,0

210,0

203,6

PLOT FILE OF HIGH 1ST HIGH 8-HR VALUES FOR SOURCE GROUP: ALL

Max: 224,6 [ug/m^3] at (557132,87, 6182106,27)

COMMENTS:

Anglies monoksidas (8 val.), su fonu.

SOURCES:

3

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

224,6 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-30

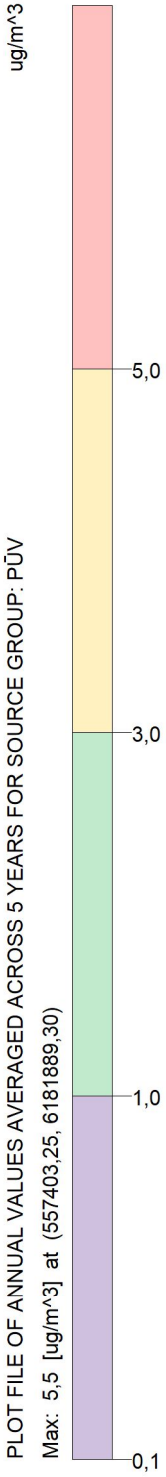
SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas



COMMENTS:

Azoto dioksidas (metų), be fono.

SOURCES:

141

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

5,5 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas

COMMENTS:

Azoto dioksidas (1 val.), su fonu.

SOURCES:

141

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

122,5 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

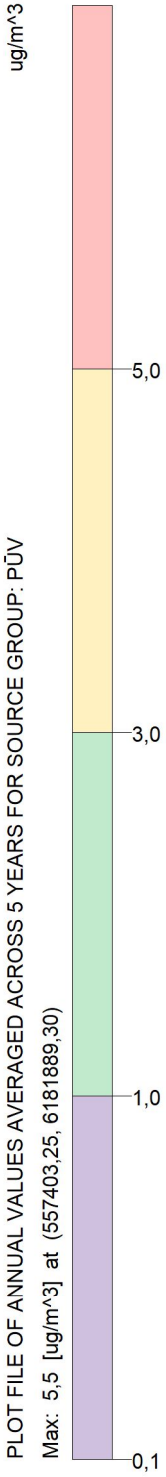
SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas



COMMENTS:

Azoto dioksidas (metų), be fono.

SOURCES:

141

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

5,5 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas

COMMENTS:

Azoto dioksidas (metų), su fonu.

SOURCES:

141

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

11,8 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

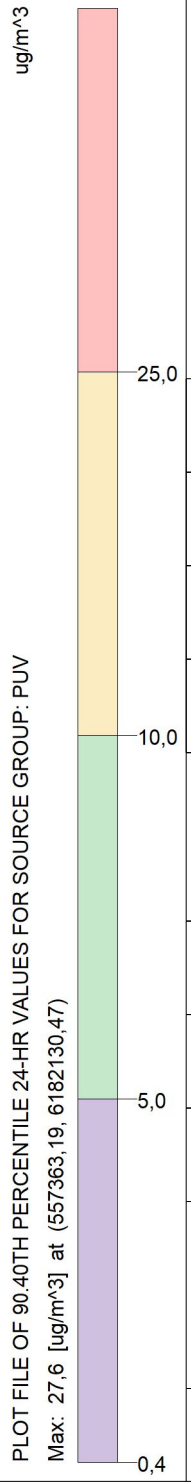
SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas



COMMENTS:

Kietosios dalelės 10 (paros), be fono.

SOURCES:

139

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

27,6 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas

COMMENTS:

Kietosios dalelės 10 (paros), su fonu.

SOURCES:

139

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

35,7 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas

COMMENTS:

Kietosios dalelės 10 (metų), be fono.

SOURCES:

139

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

12,6 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

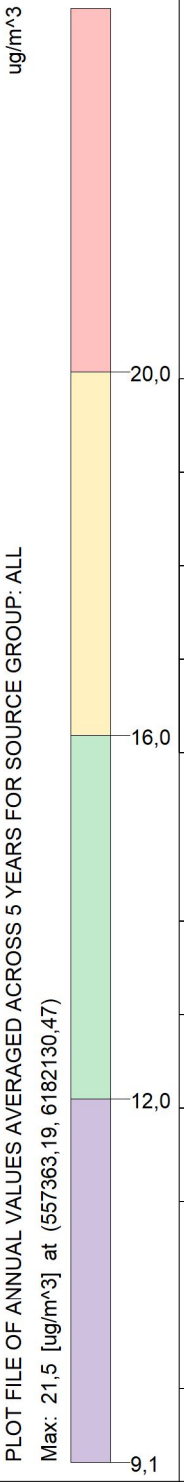
SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas



COMMENTS:

Kietosios dalelės 10 (metų), su fonu.

SOURCES:

139

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

21,5 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas

COMMENTS:

Kietosios dalelės 2,5 (metų), be fono.

SOURCES:

139

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

12,6 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

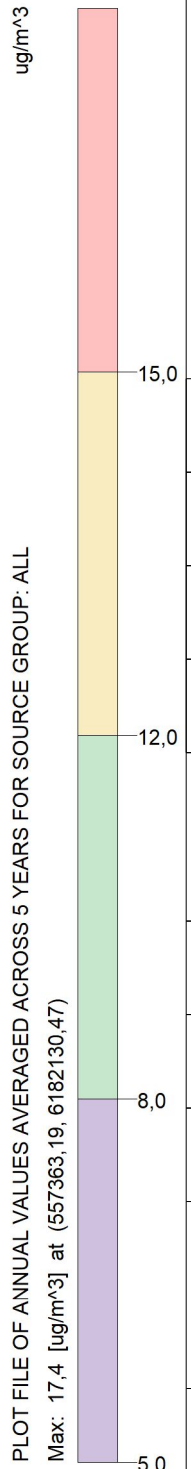
SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas



COMMENTS:

Kietosios dalelės 2,5 (metų), su fonu.

SOURCES:

139

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

17,4 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

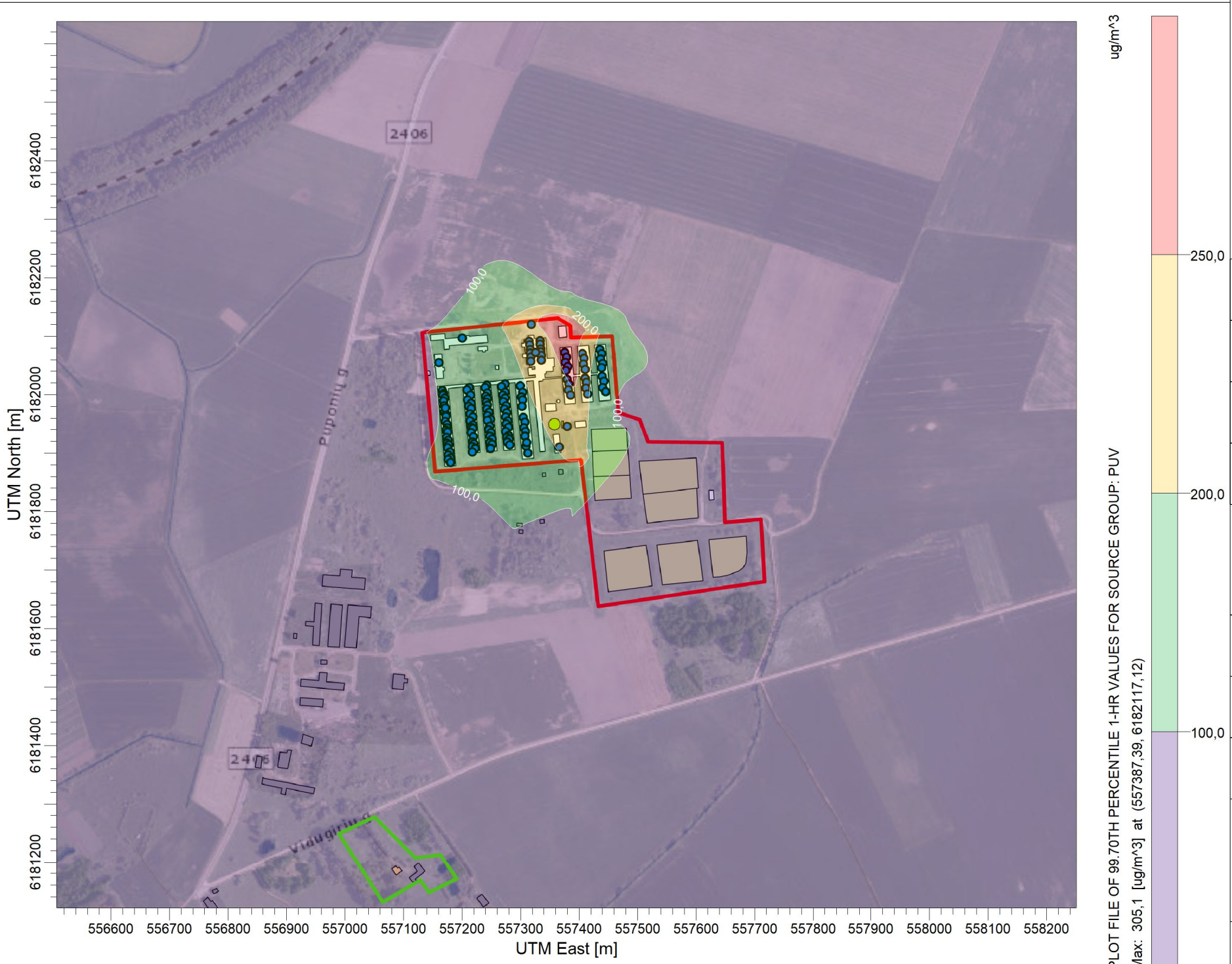
SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas



COMMENTS:

Sieros dioksidas (1 val.), be fono.

SOURCES:

1

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

305,1 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

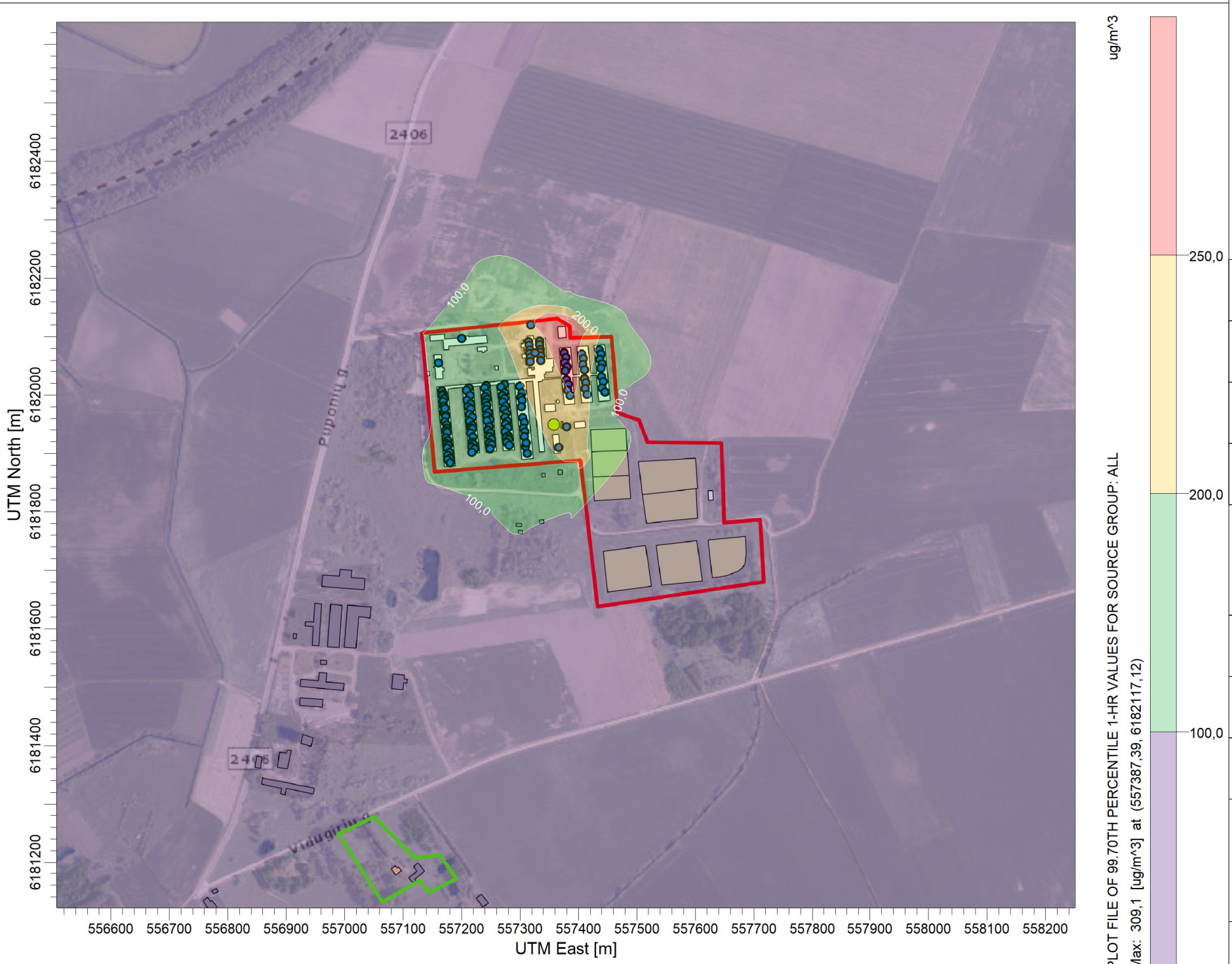
SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas



COMMENTS:

Sieros dioksidas (1 val.), su fonu.

SOURCES:

1

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

309,1 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

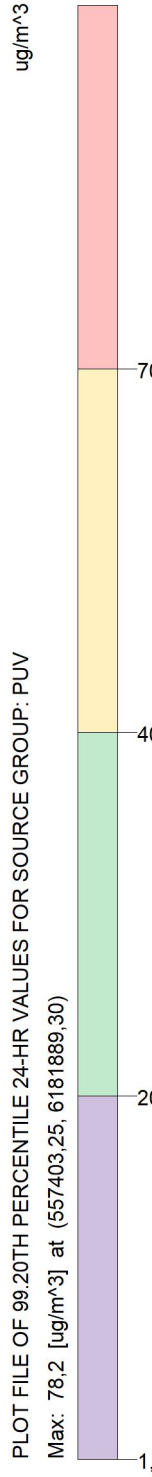
SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas



COMMENTS:

Sieros dioksidas (paros), be fono.

SOURCES:

1

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

78,2 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

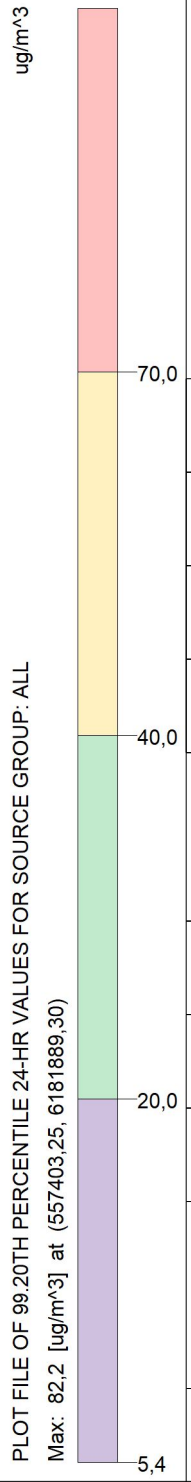
SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas



COMMENTS:

Sieros dioksidas (paros), su fonu.

SOURCES:

1

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

82,2 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-31

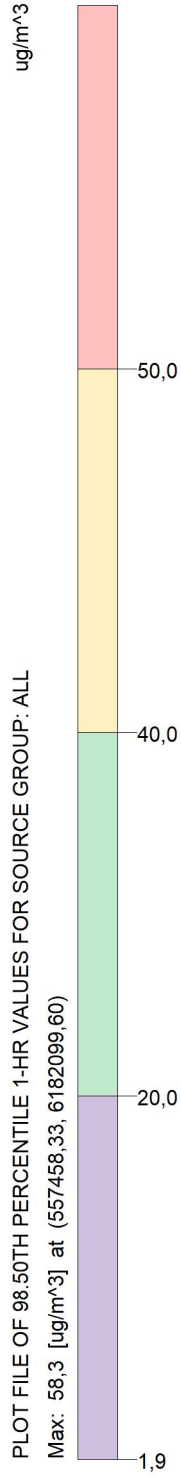
SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas



COMMENTS:

Amoniakas (0,5 val.), be fono.

SOURCES:

145

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

58,3 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-30

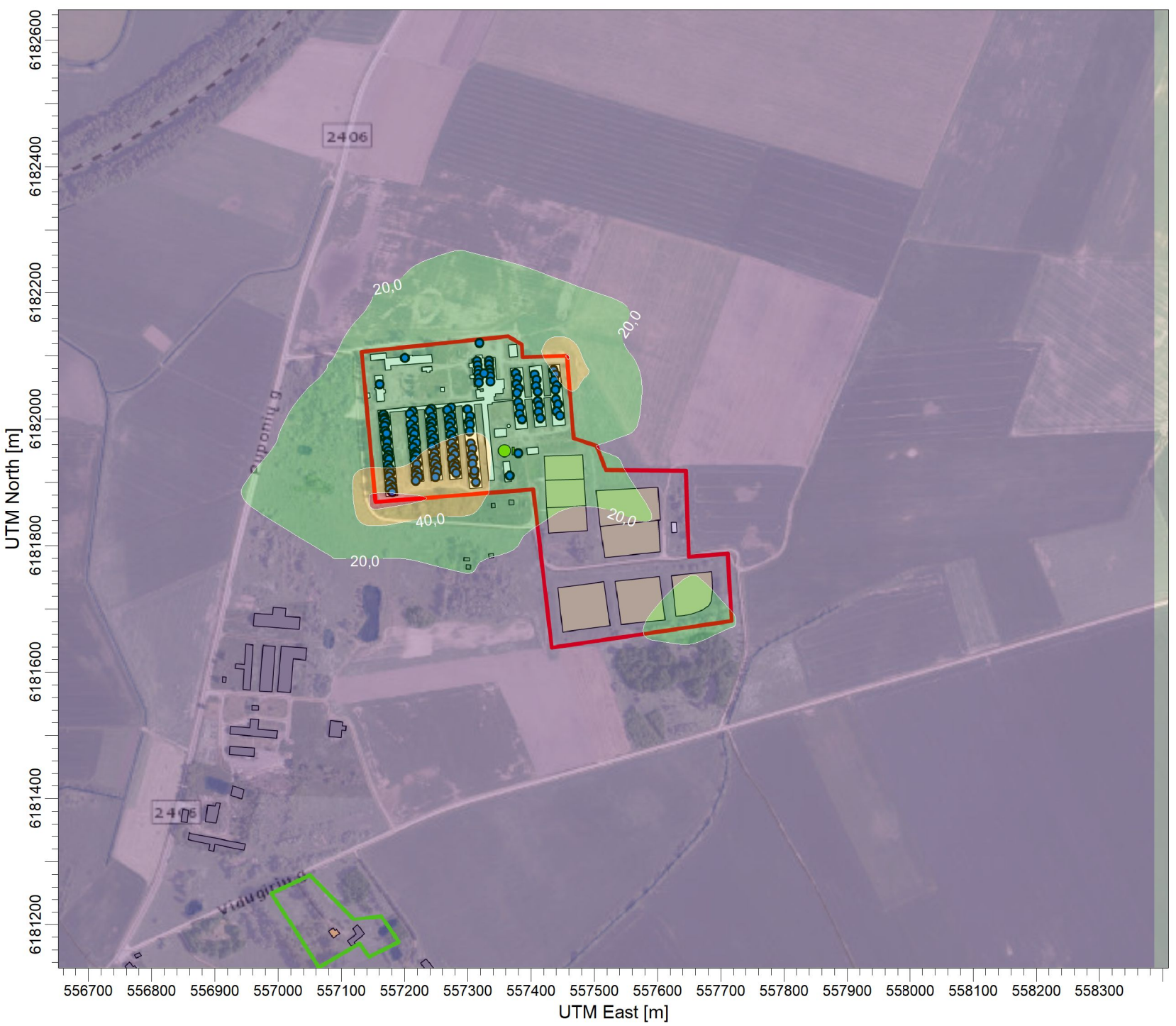
SCALE: 1:8.500

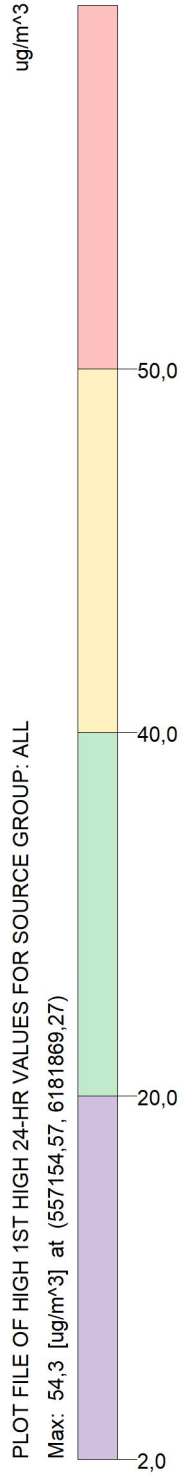
0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas





COMMENTS:

Amoniakas (paros), be fono.

SOURCES:

145

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

54,3 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-30

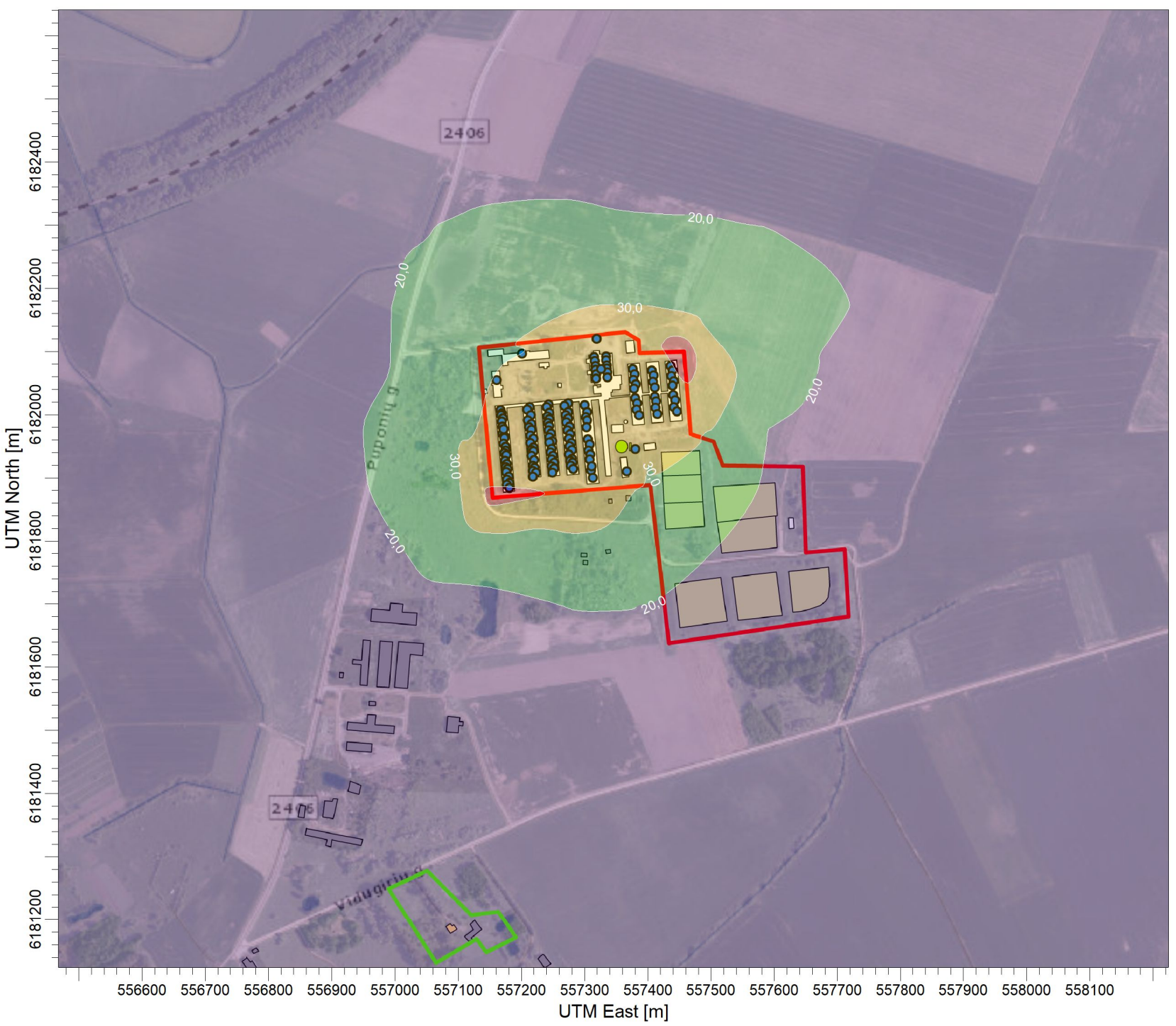
SCALE: 1:8.500

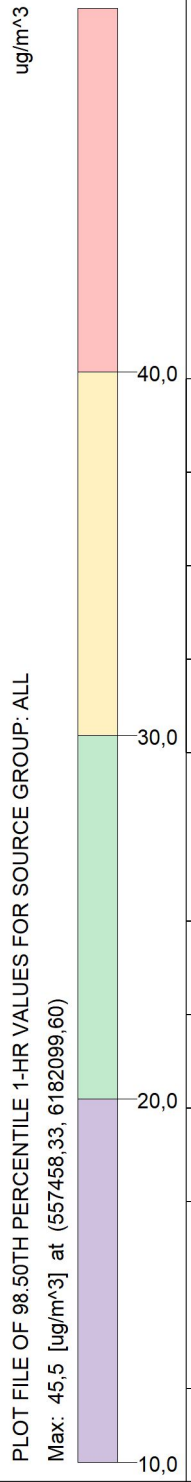
0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas





COMMENTS:

Lakieji org. jung. (0,5 val.), be fono.

SOURCES:

138

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

45,5 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-30

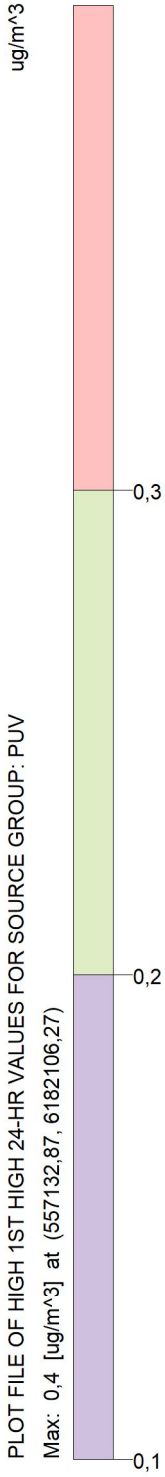
SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas



COMMENTS:

Geležis ir jos jung. (paros), be fono.

SOURCES:

1

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

0,4 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-30

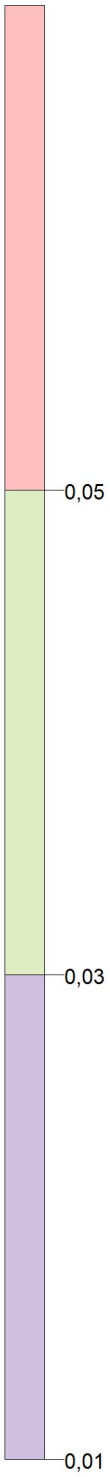
SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas



COMMENTS:

Manganas ir jo jung. (0,5 val.), be fono.

SOURCES:

1

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

0,06 ug/m^3

COMPANY NAME:

UAB "Infraplanas"

DATE:

2023-10-30

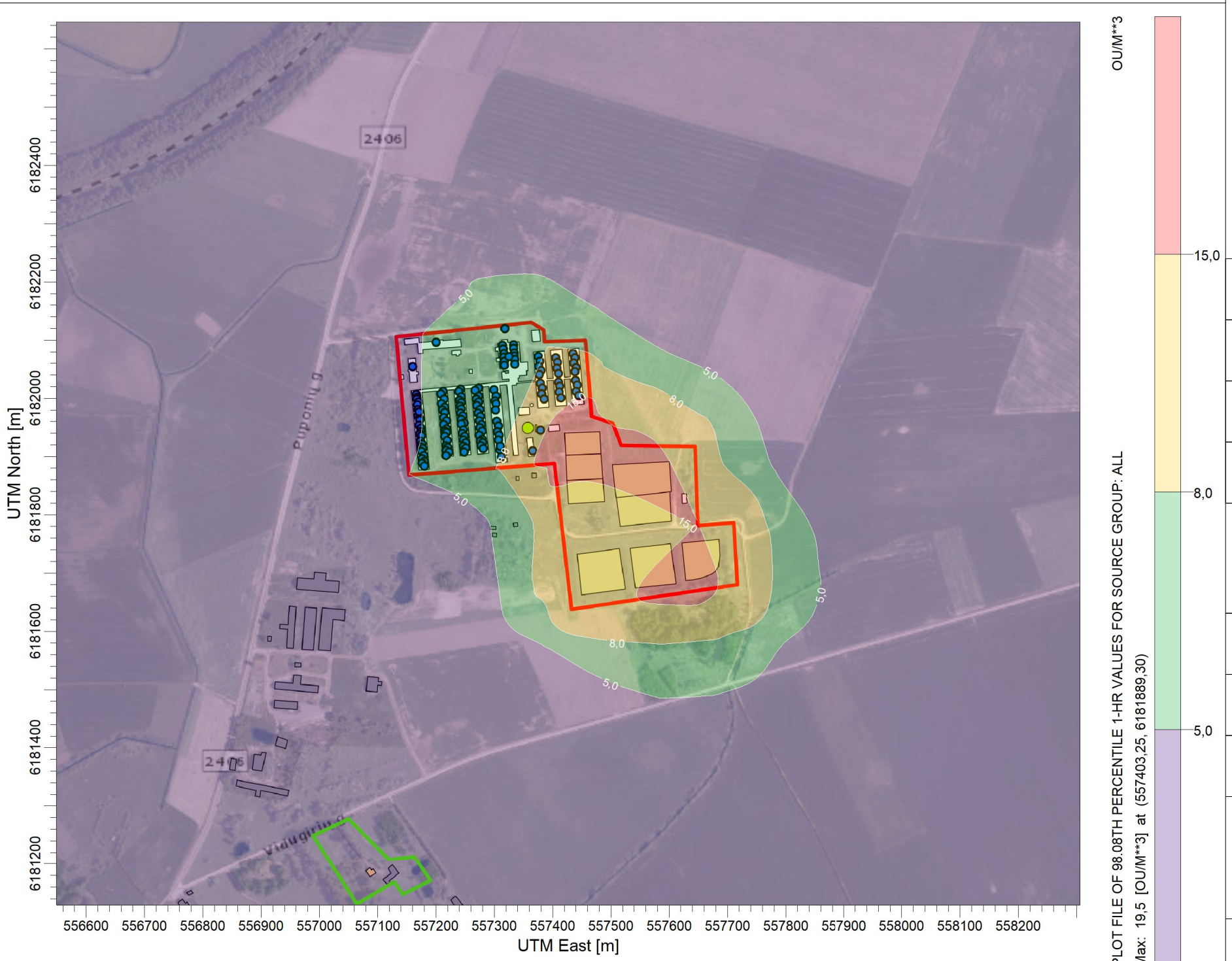
SCALE: 1:8.500

0 0,2 km

PROJECT NO.:

PROJECT TITLE:

UAB „Kupiškio Akmenlita“ kiaulių auginimo komplekso (Pupunių g. 13, Rudilių k., Noriūnų sen., Kupiškio r. sav.) poveikio visuomenės sveikatai vertinimas



COMMENTS:

Kvapas (1 val.).

SOURCES:

145

RECEPTORS:

457

OUTPUT TYPE:

Concentration

MAX:

19,5 OU/M3**

COMPANY NAME:

UAB "Infraplanas"

DATE:

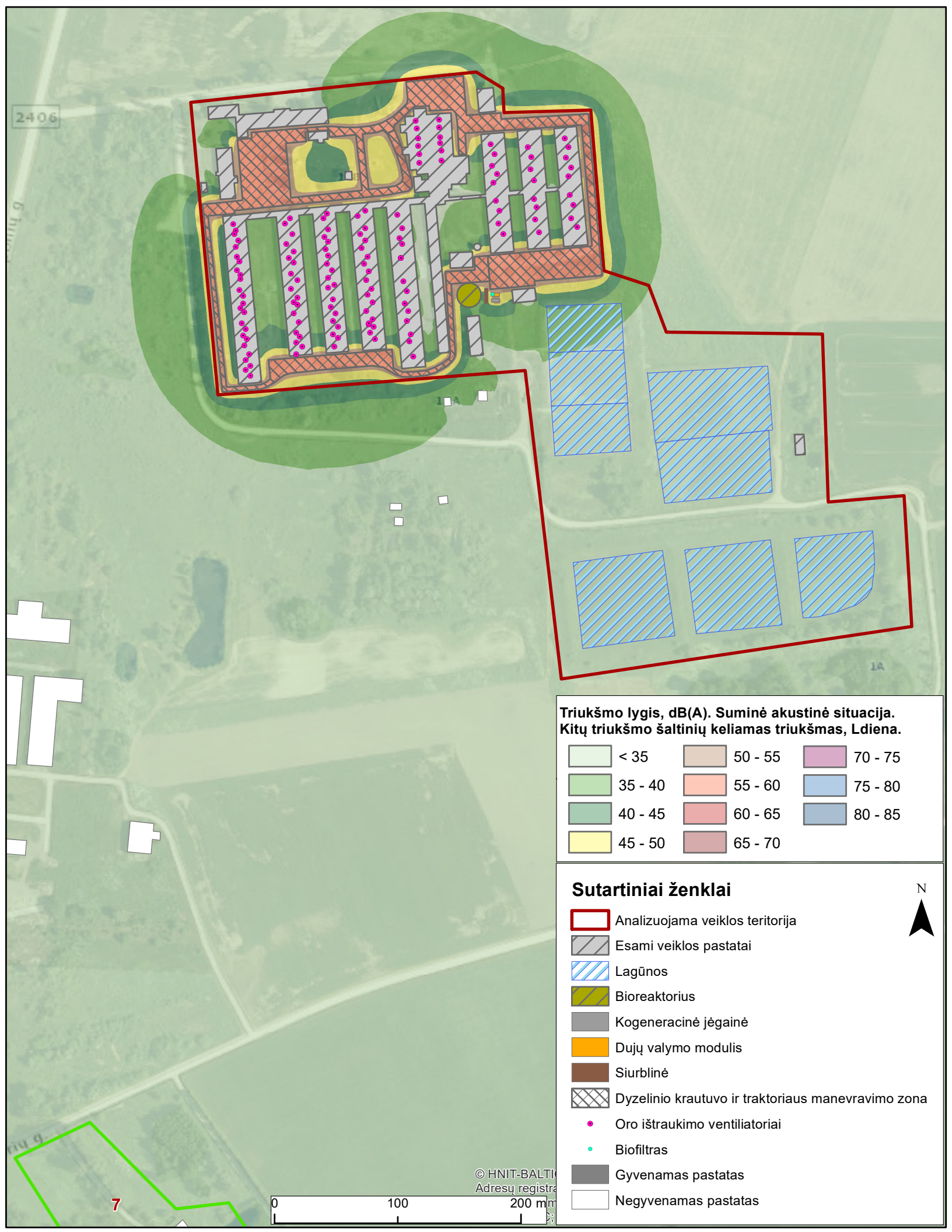
2023-10-30

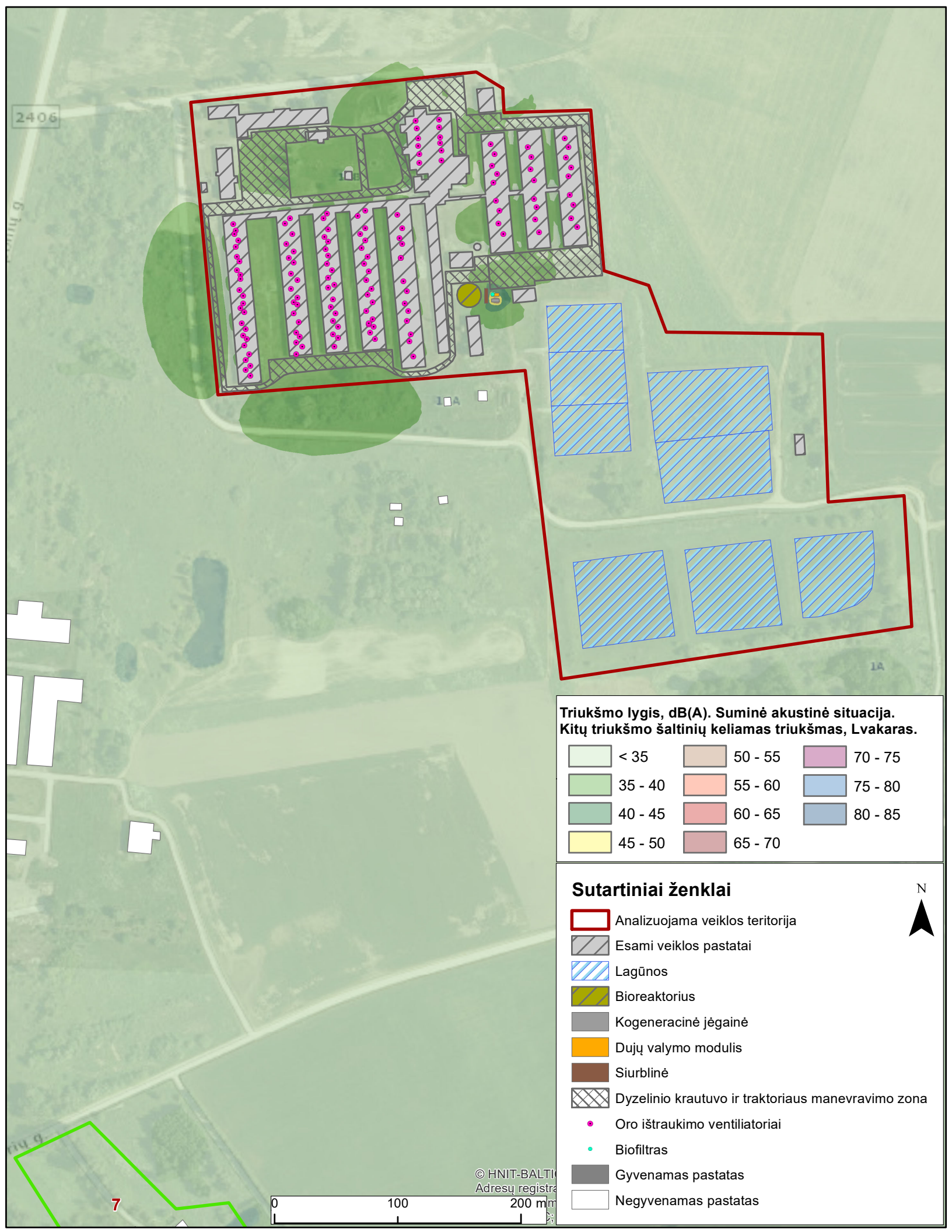
SCALE: 1:8.500

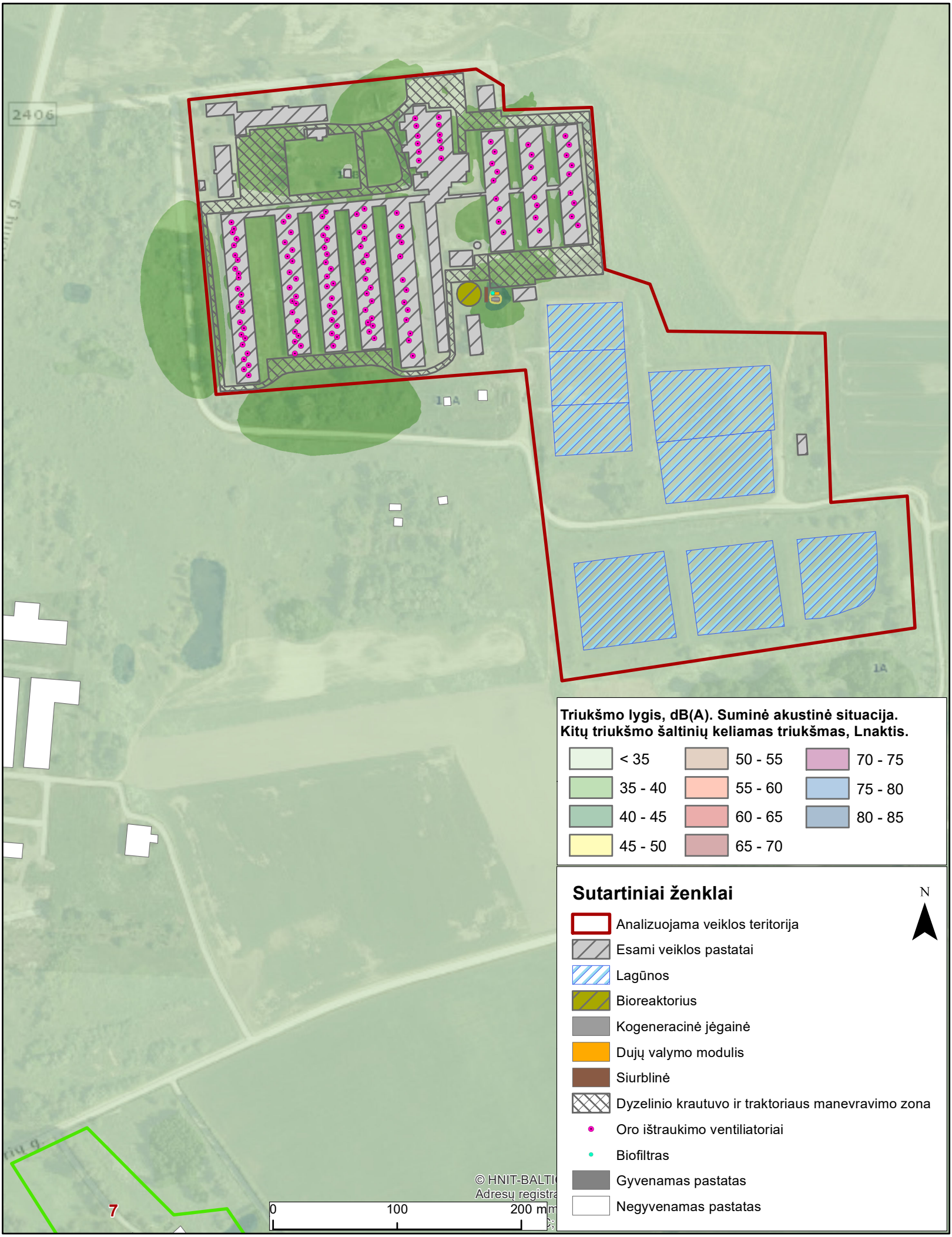
0 0,2 km

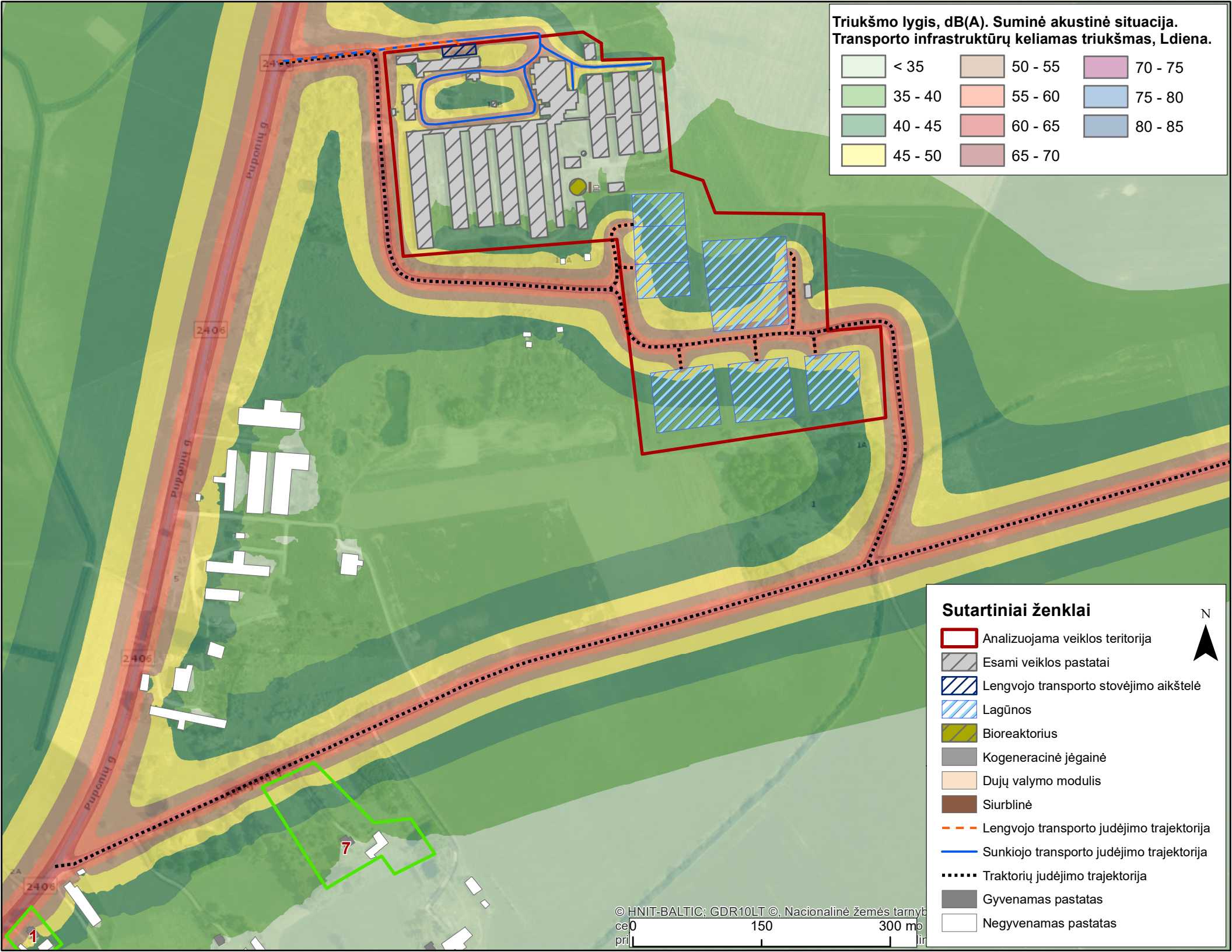
PROJECT NO.:

5 Priedas. Triukšmas


2406
Triukšmo lygis, dB(A). Suminė akustinė situacija.
Kitų triukšmo šaltinių keliamas triukšmas, Ldiena.
< 35
35 - 40
40 - 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 75
75 - 80
80 - 85
Sutartiniai ženklai
N
Analizuojama veiklos teritorija
Esami veiklos pastatai
Lagūnos
Bioreaktorius
Kogeneracinė jėgainė
Dujų valymo modulis
Siurblinė
Dyzelinio krautuvo ir traktoriaus manevravimo zona
Oro ištraukimo ventiliatoriai
Biofiltras
Gyvenamas pastatas
Negyvenamas pastatas
© HNIT-BALTI
Adresų registra
0
100
200 m
7


2406
1B
1A
1A
7
Triukšmo lygis, dB(A). Suminė akustinė situacija.
Kitų triukšmo šaltinių keliamas triukšmas, Lvakaras.
< 35
35 - 40
40 - 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 75
75 - 80
80 - 85
Sutartiniai ženklai
N
Analizuojama veiklos teritorija
Esami veiklos pastatai
Lagūnos
Bioreaktorius
Kogeneracinė jėgainė
Dujų valymo modulis
Siurblinė
Dyzelinio krautuvo ir traktoriaus manevravimo zona
Oro ištraukimo ventiliatoriai
Biofiltras
Gyvenamas pastatas
Negyvenamas pastatas
0
100
200 m
© HNIT-BALTI
Adresų registra


2406
1B
1A
1A
7
Triukšmo lygis, dB(A). Suminė akustinė situacija.
Kitų triukšmo šaltinių keliamas triukšmas, Lnaktis.
< 35
35 - 40
40 - 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 75
75 - 80
80 - 85
Sutartiniai ženklai
N
Analizuojama veiklos teritorija
Esami veiklos pastatai
Lagūnos
Bioreaktorius
Kogeneracinė jėgainė
Dujų valymo modulis
Siurblinė
Dyzelinio krautuvo ir traktoriaus manevravimo zona
Oro ištraukimo ventiliatoriai
Biofiltras
Gyvenamas pastatas
Negyvenamas pastatas
© HNIT-BALTI
Adresų registra
0
100
200 m


Triukšmo lygis, dB(A). Suminė akustinė situacija.
Transporto infrastruktūrų keliamas triukšmas, Ldiena.
< 35
35 - 40
40 - 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 75
75 - 80
80 - 85
Sutartiniai ženklai
N
Analizuojama veiklos teritorija
Esami veiklos pastatai
Lengvojo transporto stovėjimo aikštelė
Lagūnos
Bioreaktorius
Kogeneracinė jėgainė
Dujų valymo modulis
Siurblinė
Lengvojo transporto judėjimo trajektorija
Sunkiojo transporto judėjimo trajektorija
Traktorių judėjimo trajektorija
Gyvenamas pastatas
Negyvenamas pastatas
2406
Puponių g.
7
1
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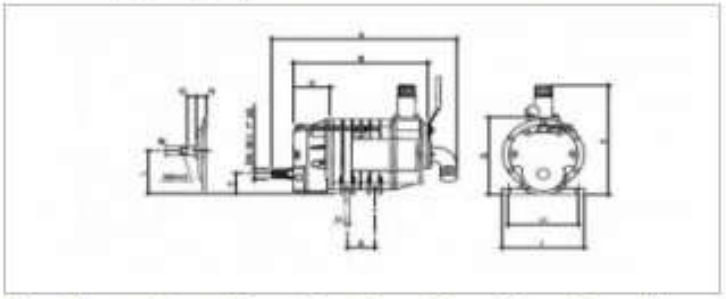
0
150
300 m

VAKUUMO SIURBLIAI

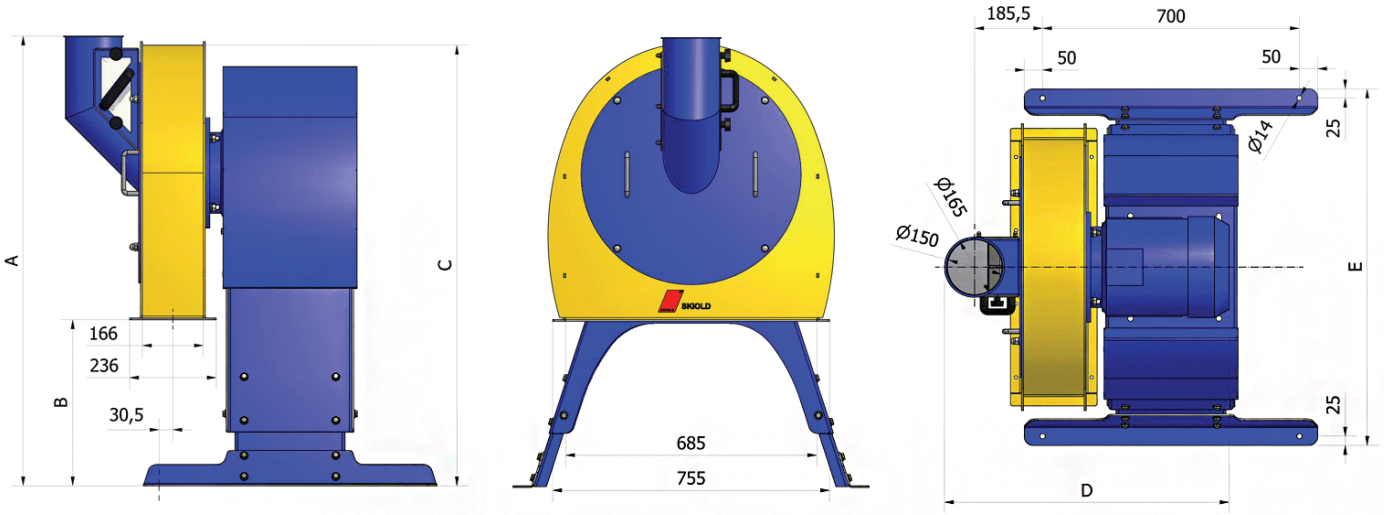
Modelis	KD-3	KD-4	KD-5	KD-6,5	KD-8	KD-10	KD-12	KD-14
Apsisukimai (aps / min)	540	540	540	540	540	540	540	540
				1000	1000	1000	1000	1000
Maks. vakumas (%)	90	90	90	90	90	90	90	90
Maks. spaudimas (bar)	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
Svoris (kg.)	64	70	75	101	111	123	135	175
Triukšmo lygis (dB)	85	86	86	87	87	87	88	87
Reikalinga galia (Kw)	8	10	12	15	18	22	25	28



Modelis	A	B	C	D	E	F	G	H	I	K	L	M	N	O	Svoris (kg.)
KD-3	570	370	80	16	88	410	290	240	260	115	169,5	28	31	30	64
KD-4	620	420	80	16	88	410	290	240	260	115	169,5	28	31	30	70
KD-5	675	475	80	16	88	410	290	240	260	115	169,5	28	31	30	75
KD-6,5	710	490	95	20	140	460	340	280	310	130	200	32	35	34	101
KD-8	770	550	95	20	140	460	340	280	310	130	200	32	35	34	111
KD-10	830	610	95	20	140	460	340	280	310	130	200	32	35	34	123
KD-12	895	675	95	20	140	460	340	280	310	130	200	32	35	34	135

SKIOLD MAKES THE DIFFERENCE!

SKIOLD DM6-G HAMMER MILL



TECHNICAL SPECIFICATIONS

DM6-G	
Motor:	7.5 - 11 - 15 - 18.5 - 22 kW 2800 rpm
Screen area:	2700 cm²
Screen types:	Ø plate screen / ☐ inter-woven screen
Number of hammers:	28
Noise level:	Approx. 85 dBa
Shipping weight:	205 - 245 - 255 - 270 - 315 kg
Guiding capacity:	350-6500

Capacity

Measured in storage dry and well cleaned crops, max. kg/h with motor sizes 7.5 - 22 kW

Material	Ø 4.0 mm screen	☐ 3.15 mm inter-woven screen
Barley	950-3200	1200-4000
Wheat	1250-4200	1250-4200
Oats	350-1400	500-1800
Maize	1650-5300	1950-6500

The capacity varies depending on screen size, motor size, moisture contents and type of cereal

Measure sketch DM6-G:

DM6-G	A	B	C	D	E
7.5 kW	1102-1400	452-750	1200-1500	830	971-1165
11 kW	1130-1400	480-750	1230-1500	940	
15 kW					
18.5 kW				995	
22 kW	1150-1400	500-750	1250-1500	1025	

NB! When grinding moist material the capacity will be reduced by 5% each time the moisture contents are increased by 1%.

DM6-G may be used for grinding of ordinary cleaned small-grained seed crops in storage dry condition. Wheat, barley etc. can furthermore be ground from gas proof silo with up to 25% moisture content.

Datablad. 986 003 115 · Ret til ændringer forbeholdes

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SKIOLD

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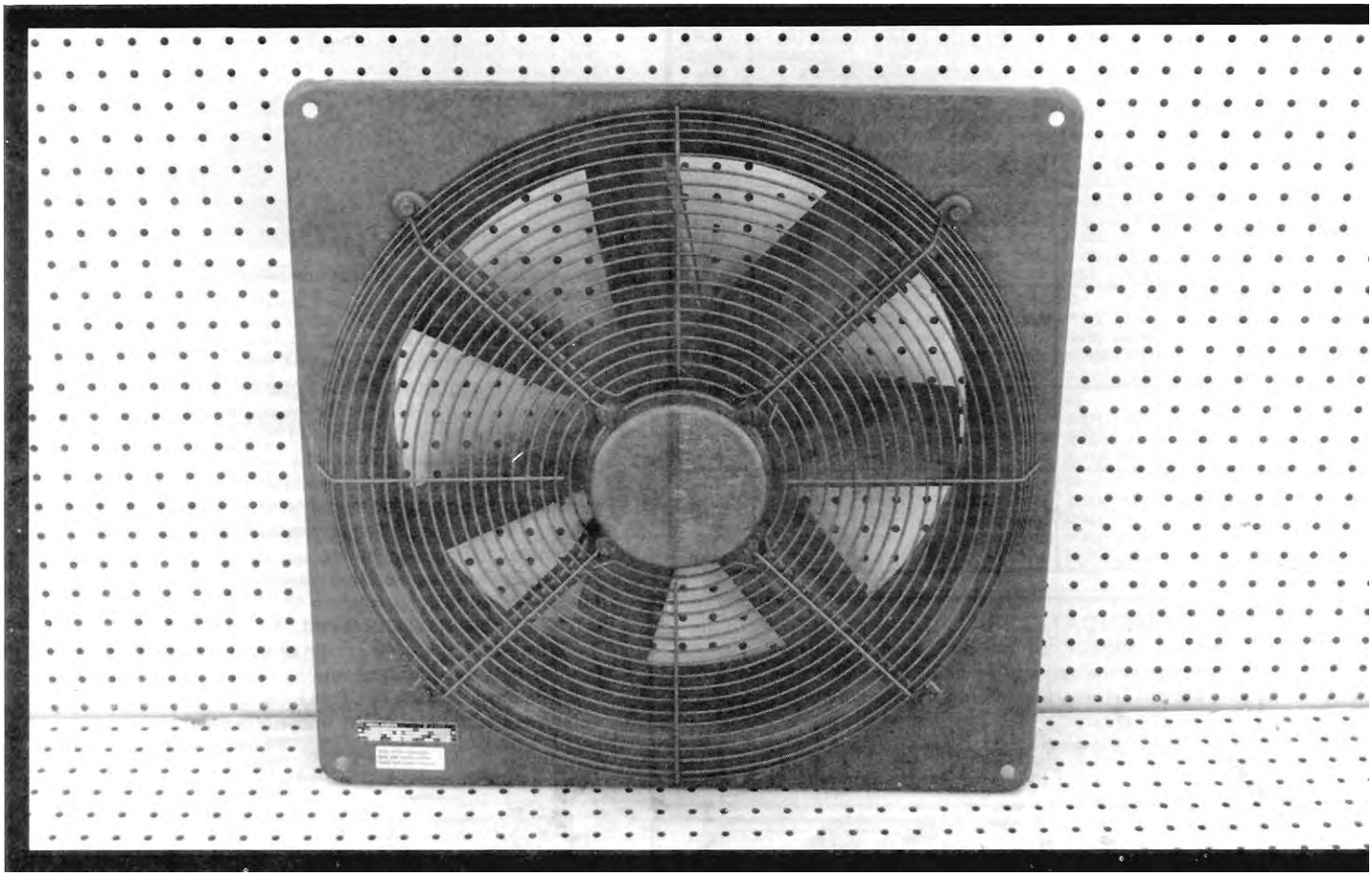
EVALUATION REPORT 383



Ziehl-Abegg Model 451-4 Ventilation Fan

A Co-operative Program Between

ALBERTA FARM MACHINERY RESEARCH CENTRE

PAMI
PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

ZIEHL-ABEGG MODEL 451-4 VENTILATION FAN

MANUFACTURER:

Ziehl-Abegg GmbH & Co. KG
Postfach 1165, Zeppelinstrasse 28
D-7118 Kunzelsau
West Germany

DISTRIBUTOR:

Aston Industries Inc.
P.O. Box 220
St. Leonard d'Aston, Quebec
J0C 1M0

RETAIL PRICE:

$333.00 (June, 1984, f.o.b. Lethbridge, Alberta complete with optional louvres).

SUMMARY OF RESULTS

TABLE 1. Ziehl-Abegg Model 451-4 Fan Performance at Typical Levels of Operation.

SETTING	STATIC PRESSURE in wg (Pa)	AIR FLOW RATE cfm (L/s)	INPUT POWER hp (W)	TOTAL EFFICIENCY %	FAN SPEED rpm
Single Speed	0 (0)	4420 (2090)	0.90 (670)	26	1546
	0.05 (12.5)	4330 (2040)	0.91 (676)	27	1540
	0.10 (24.9)	4220 (1990)	0.92 (688)	28	1534
	0.125 (31.1)	4170 (1970)	0.93 (693)	29	1530
	0.25 (62.3)	3900 (1840)	0.95 (706)	31	1521
Variable Maximum	0 (0)	4310 (2030)	0.92 (684)	24	1506
	0.05 (12.5)	4250 (2000)	0.92 (689)	25	1500
	0.10 (24.9)	4130 (1950)	0.93 (695)	26	1493
	0.125 (31.1)	4060 (1920)	0.93 (697)	27	1487
	0.25 (62.3)	3750 (1770)	0.95 (707)	28	1472
Variable Mid Range	0 (0)	3450 (1630)	0.77 (578)	15	1218
	0.05 (12.5)	3290 (1550)	0.78 (583)	15	1196
	0.10 (24.9)	3100 (1460)	0.79 (591)	16	1177
	0.125 (31.1)	3020 (1420)	0.79 (592)	16	1173
	0.25 (62.3)	2450 (1160)	0.80 (597)	16	1130
Variable Minimum	0 (0)	1980 (926)	0.49 (368)	4	713
	0.05 (12.5)	1700 (802)	0.50 (371)	5	678
	0.10 (24.9)	1330 (628)	0.50 (371)	5	672
	0.125 (31.1)	1090 (514)	0.50 (370)	4	683
Single Speed With Louvres	0 (0)	4110 (1941)	0.91 (682)	21	1531
	0.05 (12.5)	4020 (1900)	0.93 (694)	22	1515
	0.10 (24.9)	3860 (1820)	0.94 (705)	22	1512
	0.125 (31.1)	3780 (1780)	0.95 (711)	23	1508
	0.25 (62.3)	3420 (1610)	0.97 (721)	24	1499

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Updating the operator's manual to include the model 451-4 as well as including information on fan maintenance and trouble shooting.

Senior Engineer: E. H. Wiens

Project Engineer: R. P. Atkins

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. Due to the compactness and high quality of the motor fabrication, this piece of equipme0t is maintenance free in all mounting positions. Because of the in-stream, air-cooled design, our motor has long life at very low noise levels. The only care or attention to be given our fan is to keep the grating free of any foreign matter at all times. The same attention should also be given to the venturi casing and cradle mounting. In case of motor stoppage, contact the company's maintenance official or send it back to the supplier for replacement or capacitor replacement procedures.

GENERAL DESCRIPTION

The Ziehl-Abegg model 451-4 ventilation fan is a 17.75 in (451 mm) diameter variable speed, direct drive, propeller type axial flow fan. It is primarily used in livestock and poultry barns as an exhaust fan located in the wall or ceiling.

The Ziehl-Abegg 451-4 is a flush mounted unit equipped with an inlet guard grill, an inlet bell and optional shutters. A two speed control, a variable speed control and a thermostat are available as options, but were not supplied with the fan. The seven blade propeller, hub and motor mounts are made of cast aluminum. The external rotor of the motor forms the hub of the fan. A 1.05 hp (780 W), single phase, 240 V external rotor motor is used. The housing is constructed of galvanized sheet metal with a heavy enamel coating for corrosion protection.

FIGURE 1 shows the location of major components while detailed specifications are given in APPENDIX I.

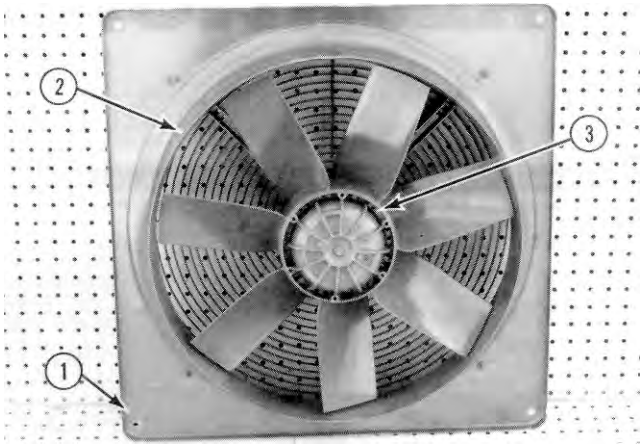


FIGURE 1. Ziehl-Abegg Model 451-4 Fan: (1) Mounting Flange, (2) Inlet Bell, (3) Externa Rotor & Hub Assembly.

SCOPE OF TEST

The Ziehl-Abegg model 451-4 fan was tested in the inlet chamber setup (Figure 2) in accordance with test procedures developed by the Machinery Institute. The intent was to determine the performance of the fan in terms of air flow rate, static pressure, input power and total efficiency.

Fan performance was determined at 230 V in both the variable and single speed mode. An SCR type speed control was used to vary the speed. Fan performance was determined at the maximum setting, the mid-range setting and the minimum setting. The minimum setting was established by reducing the fan speed to the point where a static pressure of 0.125 in wg (31.1 Pa) could still be obtained.

The effect of louvres on fan performance was determined in the single speed mode only.

The fan was also evaluated for ease of operation, operator safety and suitability of the operator's manual.

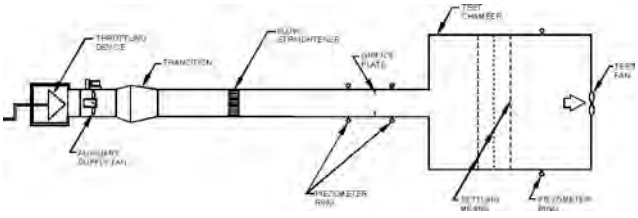


FIGURE 2. Schematic of Fan Test Apparatus - Inlet Chamber Setup.

RESULTS AND DISCUSSION

FAN PERFORMANCE

All fan performance results in this report are given at standard air[1] conditions so that direct comparisons can be made with other fan test reports. Fan performance under actual operating conditions could differ from these results by up to 10%, depending on such things as temperature, barometric pressure, humidity and elevation above sea level.

Air Flow Rate: Fan output in both the single speed mode and at the maximum setting on the variable speed control were

[1]Standard air is air with a density of 0.075 lbm/ft^3 (1.2 kg/m^3) which occurs at 68°F (20°C), 50% relative humidity and a barometric pressure of 29.92 in Hg (101.325 kPa).

similar (FIGURE 3). Reducing the fan speed, greatly reduced the air flow rate for a given static pressure[2]. For example, at a static pressure of 0.125 in wg (31.1 Pa), reducing the speed from maximum to mid range to minimum setting, reduced the air flow rate from 4060 cfm (1920 L/s) to 3020 cfm (1420 L/s) to 1090 cfm (514 L/s) respectively. At higher static pressures the reductions were even larger.

Air flow rates at typical levels of operation (i.e. static pressure) are given in TABLE 1. Ventilation fans are often rated on their output at a static pressure of 0.125 in wg (31.1 Pa). The manufacturer's rated air flow rate at 0.125 in wg (31.1 Pa), in the single speed mode, was 4000 cfm (1890 L/s). PAMI's measured flow rate at the same conditions was 4170 cfm (1970 L/s) or 4% higher than the manufacturer's rating.

The manufacturer provided fan performance information at other levels of operation in the form of a performance curve. The graph provided was not easily interpreted and there was difficulty in accurately determining air flow rates for various static pressures. The manufacturer is encouraged to modify their sales literature such that the fan performance information given can be used to its full advantage.

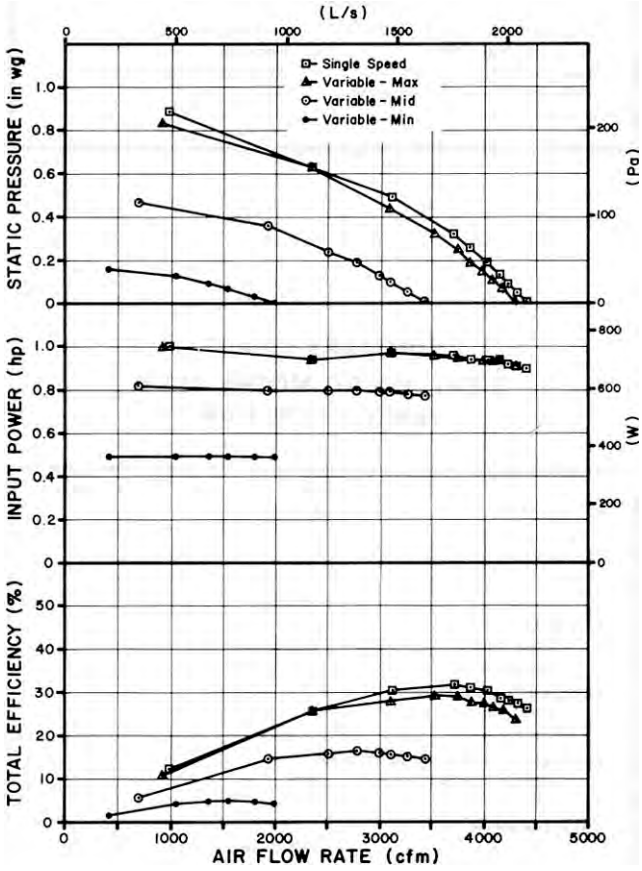


FIGURE 3. Ziehl-Abegg 451-4 Fan Performance Curves in the Single Speed Mode and at Three Speed Settings in the Variable Speed Mode.

Power Requirements: The power required to run the fan depended on fan speed. For typical levels of static pressure (TABLE 1), the input power varied from 0.92 to 0.95 hp (684 to 707 W) at maximum speed, from 0.77 to 0.80 hp (578 to 597 W) at mid range and from 0.49 to 0.50 hp (368 to 371 W) at minimum speed. The maximum amperage drawn by the motor was 3.3 amps, which was the same as the rated motor amperage.

Total Efficiency: Total efficiency is the ratio of air horsepower over the input power. Air horsepower is dependent upon the air flow rate and corresponding total pressure. For typical levels of operation, the total efficiency (TABLE 1) ranged from 24 to 28% at maximum speed, 15 to 16% at mid range and 4 to 5% at minimum speed. The total efficiency at maximum fan speed and a static pressure of 0.125 in wg (31.1 Pa) was 27%.

Effect of Louvres: The optional louvres were installed on the outlet side of the fan (FIGURE 4) to determine their effect on fan output. The fan was tested under these conditions in the single speed mode only. Using the louvres reduced the air flow rate by 7 to 12% (FIGURE 5) over the typical range of operation. For example, at a static pressure of 0.125 in wg (31.1 Pa), the louvres reduced the air flow rate by 9%, from 4170 cfm (1970 L/s) to 3780 cfm (1780 L/s) (TABLE 1). The efficiency was in turn reduced from 29 to 23%. The use of other control devices such as shutters, dampers, screens, and hoods would also reduce air flow rates by varying amounts. The use of such control devices have to be taken into consideration when designing a ventilation system.

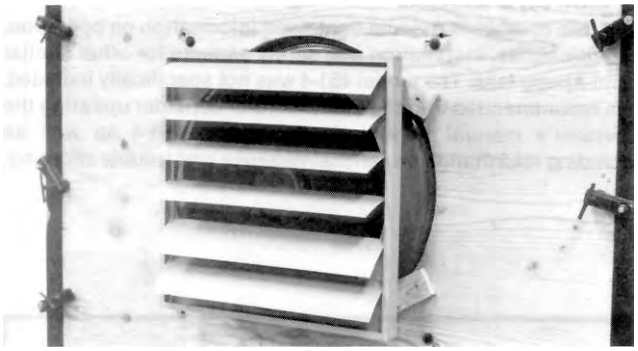


FIGURE 4. Louvres Located on Fan Discharge.

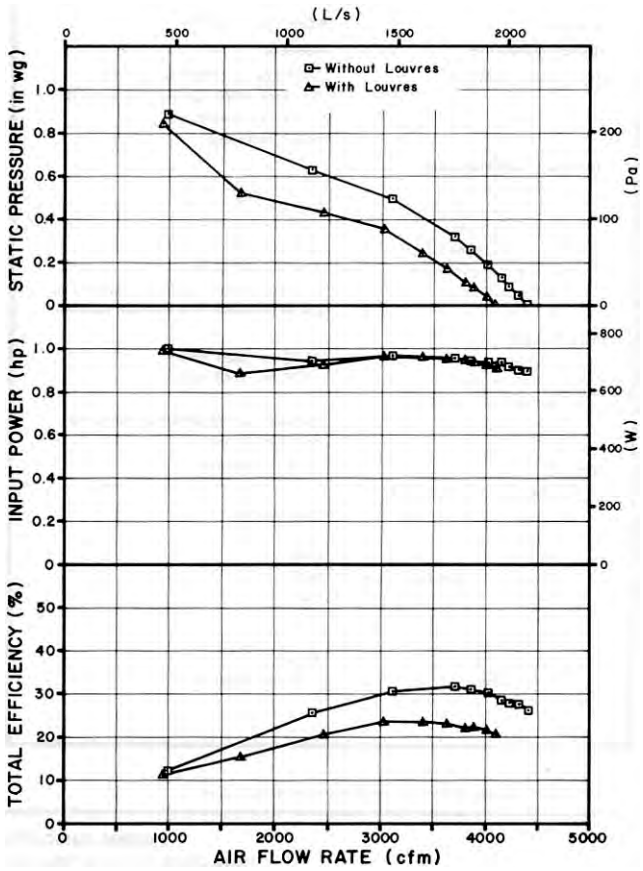


FIGURE 5. Effect of Louvres on Fan Performance.

EASE OF OPERATION

Maintenance: No maintenance instructions were supplied. The removeable inlet guard grill allowed easy access for fan cleaning. Regularly scheduled cleaning and maintenance will ensure longer motor life and optimum performance.

[2]Static pressure is a measure of the pressure difference between the pressure inside the building and the pressure on the outside of the building. Static pressure is usually expressed in inches of water gauge (in wg) or Pascals (Pa).

OPERATOR SAFETY

The inlet guard grill provided adequate protection from the fan blades. The motor was a totally enclosed unit and presented no safety hazards. The Ziehl-Abegg 451-4 was CSA approved.

The noise level[3] of the Ziehl-Abegg 451-4, at a distance of 4.9 ft (1.5 m) from the centre of the fan discharge, while operating at a 0.125 in wg (31.1 Pa) static pressure, was 72 dB(A). Higher noise levels could be expected if the fan was operated in the vicinity of other buildings. The Ziehl-Abegg 451-4 falls within range 3 of the PAMI noise level range classification (APPENDIX II). The noise level produced by this fan can be considered annoying and detrimental to hearing and operator performance under continuous exposure. Ear protection should be considered if working near the fan for prolonged periods.

OPERATOR'S MANUAL

The operator's manual contained information on operation, specifications, installation and safety aspects for other similar Ziehl-Abegg fans. The model 451-4 was not specifically included. It is recommended that the manufacturer consider updating the operator's manual to include the model 451-4 as well as including information on fan maintenance and trouble shooting.

APPENDIX I

SPECIFICATIONS

MAKE:	Ziehl-Abegg
MODEL:	ECDQ 451-4 SPTP
SERIAL NUMBER:	H363600
MANUFACTURER:	Ziehl-Abegg GmbH & Co. KG Postfach 1165, Zeppelinstrasse 28 D-7118 Kunzelsau West Germany
OVERALL DIMENSIONS:	
- housing width	22.6 in (575 mm)
- housing height	22.6 in (575 mm)
- housing depth	7.75 in (197 mm)
- housing diameter	18.3 in (465 mm)
- guard grill diameter	21.4 in (5439 mm)
- grill opening	0.09 in (2 mm) diameter spaced at 0.4 in (10 mm) in a circular pattern.
PROPELLER:	
- diameter	17.75 in (451 mm)
- hub diameter	5.75 in (146 mm)
- number of blades	7
- blade angle	variable - 27 degrees at tip to 43 degrees at hub
WEIGHT:	30 lb (13.6 kg)
MOTOR NAMEPLATE DATA:	
- make	Ziehl-Abegg
- class	B
- rpm	1450
- ambient temperature rise	40°C
- volts	240
- amps	3.3
- phase	1
- cycles	60 Hz
- horsepower	1.05 hp (780 W)

[3]PAMI Test Procedure for Determining Fan Noise Level.

APPENDIX II

NOISE LEVEL RANGES

RANGE	SOUND LEVEL (dBA)	COMMENTS
1	up to 45	Tolerable, low level background noise.
2	45 to 60	Dominating background noise that would interfere with normal conversation.
3	60 to 85	Could be annoying and be detrimental to hearing and operator performance under long-term continuous exposure. Ear protection should be considered.
4	over 85	Could damage hearing, depending on level and exposure time. Ear protection is definitely recommended.

APPENDIX III

CONVERSION TABLE

cubic feet/minute (cfm) x 0.472	=	litres/second (L/s)
horsepower (hp) x 745.7	=	watts (W)
inches (in) x 25.4	=	millimetres (mm)
inches water gauge (in wg) x 249.1	=	pascals (Pa)
pounds (lb) x 0.45	=	kilograms (kg)

SUMMARY CHART
ZIEHL-ABEGG MODEL 451-4
VENTILATION FAN

RETAIL PRICE:	$333.00 (June, 1984, f.o.b. Lethbridge)
FAN DESCRIPTION:	17.75 in (451 mm) propeller fan, variable speed, direct drive, 1.05 hp (780W) external rotor electric motor
FAN SPEED:	
- single speed	1521 to 1546 rpm
- variable speed	672 to 1506 rpm
EFFICIENCY RANGE:	
- without louvres	26 to 31%
- with louvres	21 to 24%
EFFICIENCY AT 0.125 in wg (31.1 Pa):	
- without louvres	29%
- with louvres	23%
AIR FLOW RATE:	
- range	1090 to 4420 cfm (514 to 2090 L/s)
- at 0.125 in wg (31.1 Pa)	4170 cfm (1970 L/s) without louvres and 3780 cfm (1780 L/s) with louvres
INPUT POWER:	0.49 to 0.95 hp (368 to 706W)
OPERATOR SAFETY:	inlet guard provided CSA approved noise level = 77 dB(A) at 4.9 ft (1.5 m) from fan discharge
OPERATOR'S MANUAL:	requires updating

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Humboldt, Saskatchewan, Canada S0K 2A0
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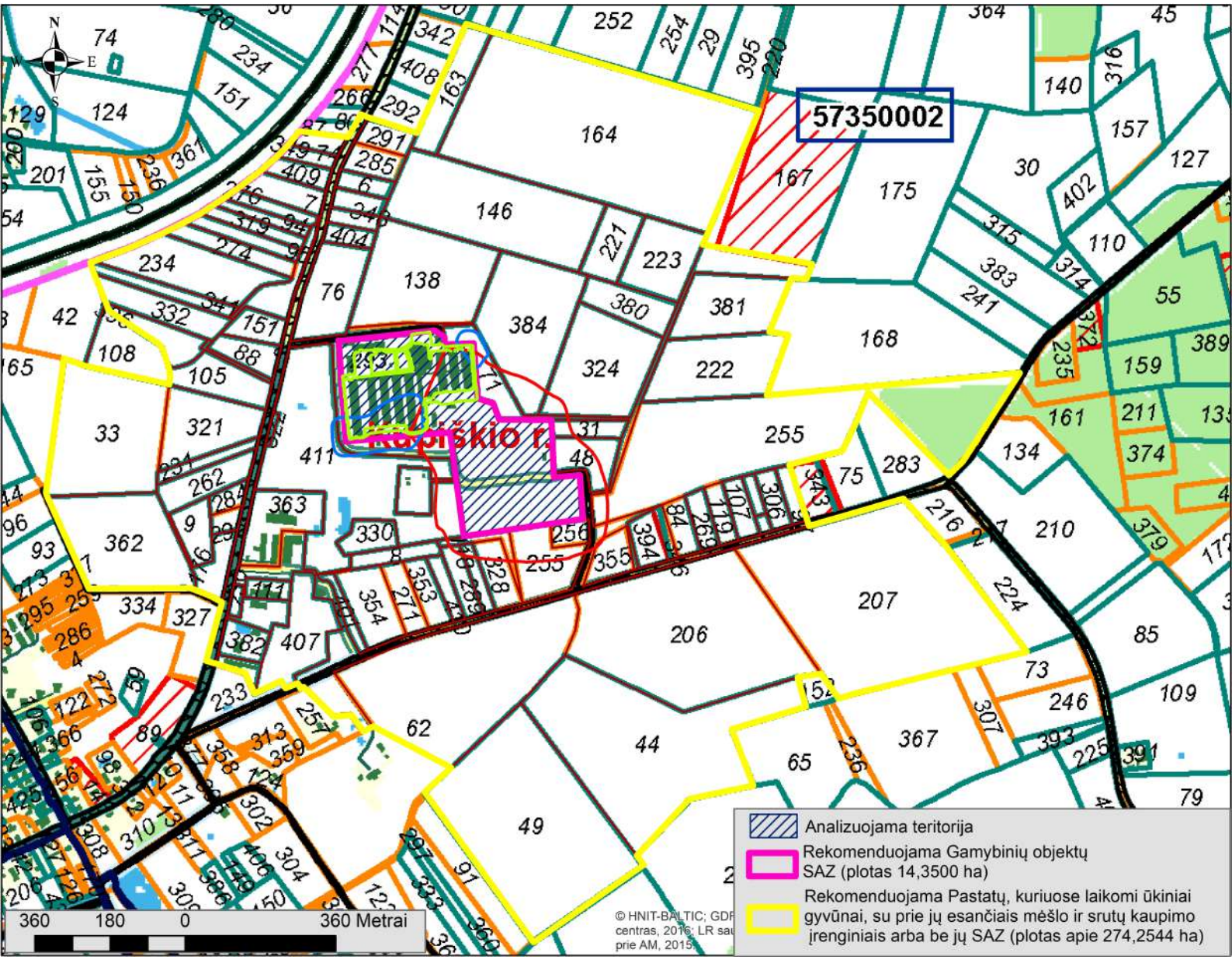
Fax: (306) 682-5080

7 Priedas. Rekomenduojama sanitarinė apsaugos zona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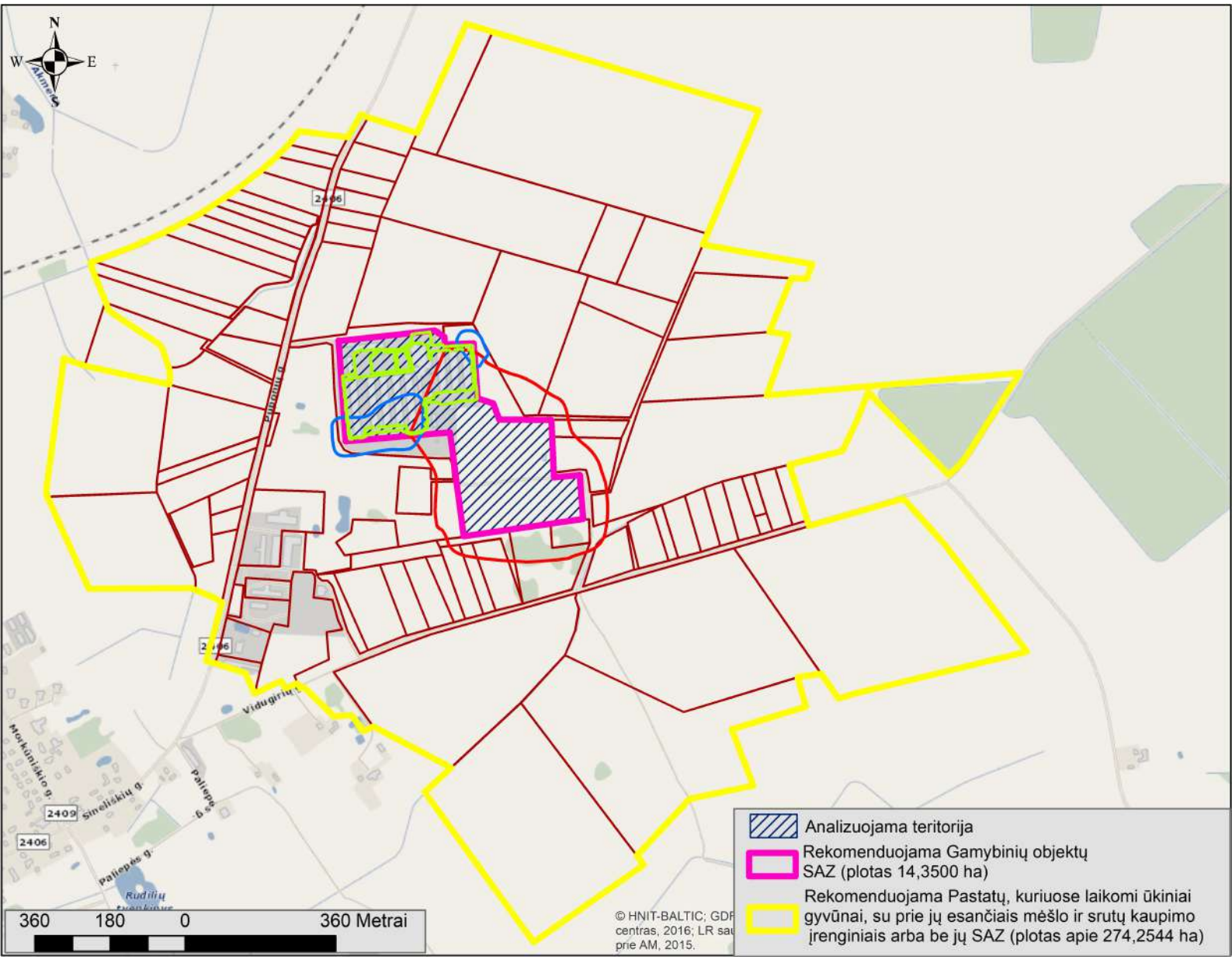
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