

Pre-Survey Report for Transports

MYRSKY: SÄKYLÄ – RUOTANSUO

11.12.2023

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1 BACKGROUND OF THIS REPORT

This report has been made as an assignment for Myrsky Energia Oy. Its purpose is to preliminary describe the transportation options and plans of a project that is under planning.

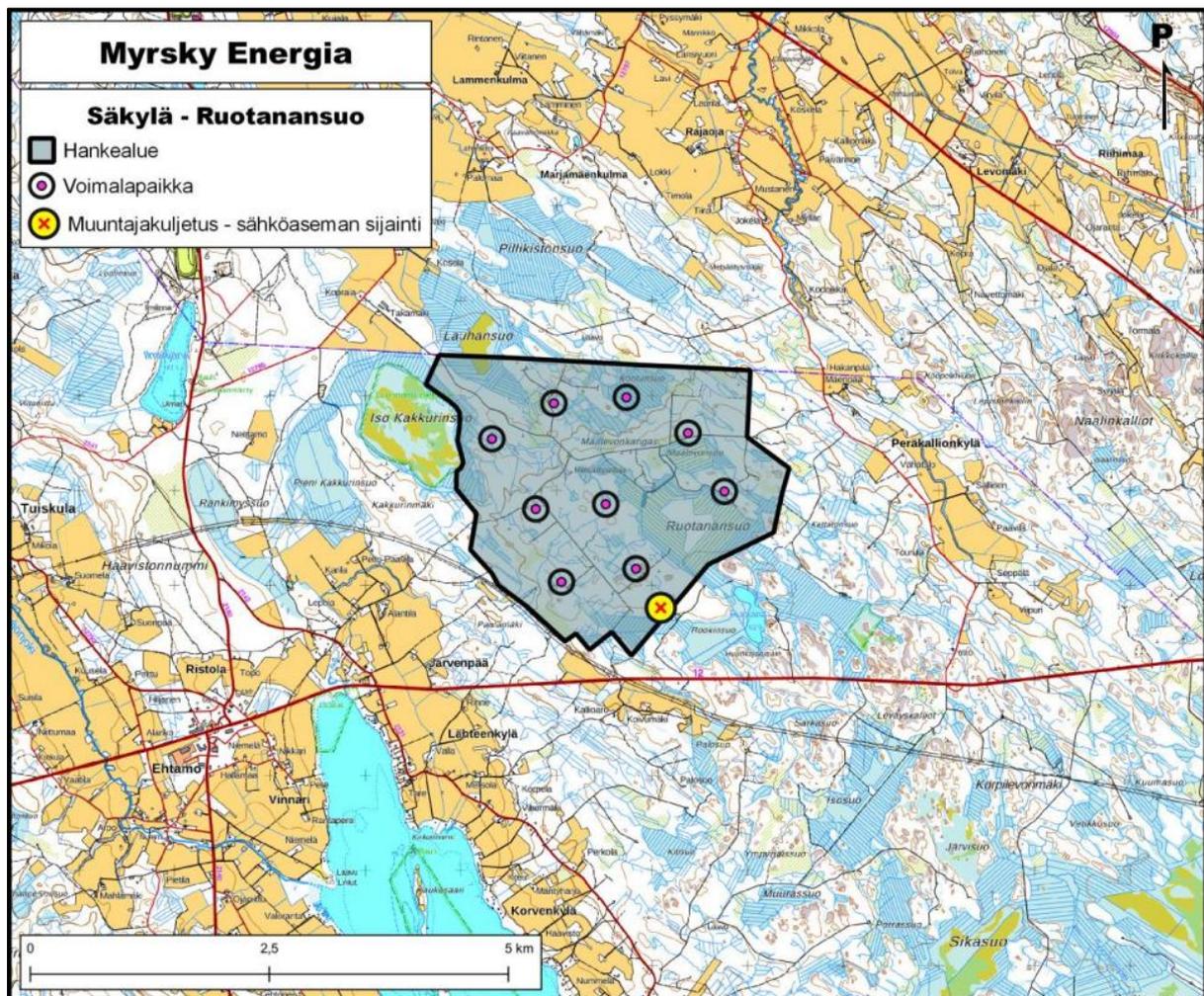
The report describes options and plans concerning the transport of heavy transformers as well as wind turbine components.

This report is made as a “desktop” survey. The report has been written using information available at the time of making the report. Vuorsola Oy is not responsible for possible incomplete or incorrect information, nor for changes to circumstances or other reported matters after the time of making the report.

2 THE PROJECT

Myrsky Energia Oy is planning to build Vestas V172 or similar wind turbines and 63MVA 110kV powerstation to SÄKYLÄ - RUOTANSUO windpark.

SÄKYLÄ - RUOTANSUO is located between Kokemäki and Säkyliä.



Planned transformer: 1 X Max power 63MVA, 110kV, transport weight 76,5t

Planned turbine type: Vestas V172 or similar,
blade length 85m,
heaviest component 105t

3 SUGGESTED PORT

Geographically the best option would be to transport the transformer from Port of Pori to the powerplant/windpark. Turbine components will use the same port.

Port of Pori has the capacity and equipment needed for handling the windmill components and the transformer. Port of Pori is one of the Finland's main ports for the wind power projects. There is suitable access from the port to main road 2.

Here is link for Port of Pori's own website for more detailed information about the port:

<https://portofpori.fi/>

4 TRANSPORT FOR TRANSFORMER

4.1 Route



<https://maps.app.goo.gl/974hsy4kSE8i1nVk9>

Port of Pori/Merisatamantie 3 – 42020 (Merisatamantie) – 2 – 12 – Valtatie 12 1108
(61.166711, 22.426406)

4.2 Special Notes About the Route

Number	Km	Coordinates N/W	Map	Transport road	Class	Action
1.	3km	61.583350, 21.527855	Map 1	2	2	Moderate section
2.	17km	61.492531, 21.738208	Map 2	2	1	Easy section
3.	25km	61.451239, 21.829158	Map 3	2	1	Easy section
4.	28km	61.432617, 21.862480	Map 4	2	1	Easy section
5.	39km	61.363348, 21.992195	Map 5	2	1	Easy section
6.	46km	61.319722, 22.092272	Map 6	2	1	Easy section
7.	48km	61.307692, 22.125112	Map 7	2	1	Easy section
8.	60km	61.251253, 22.300771	Map 8	2	1	Easy section
9.	76km	61.177843, 22.579454	Map 9	Turn from 2 to 12	1	Easy section

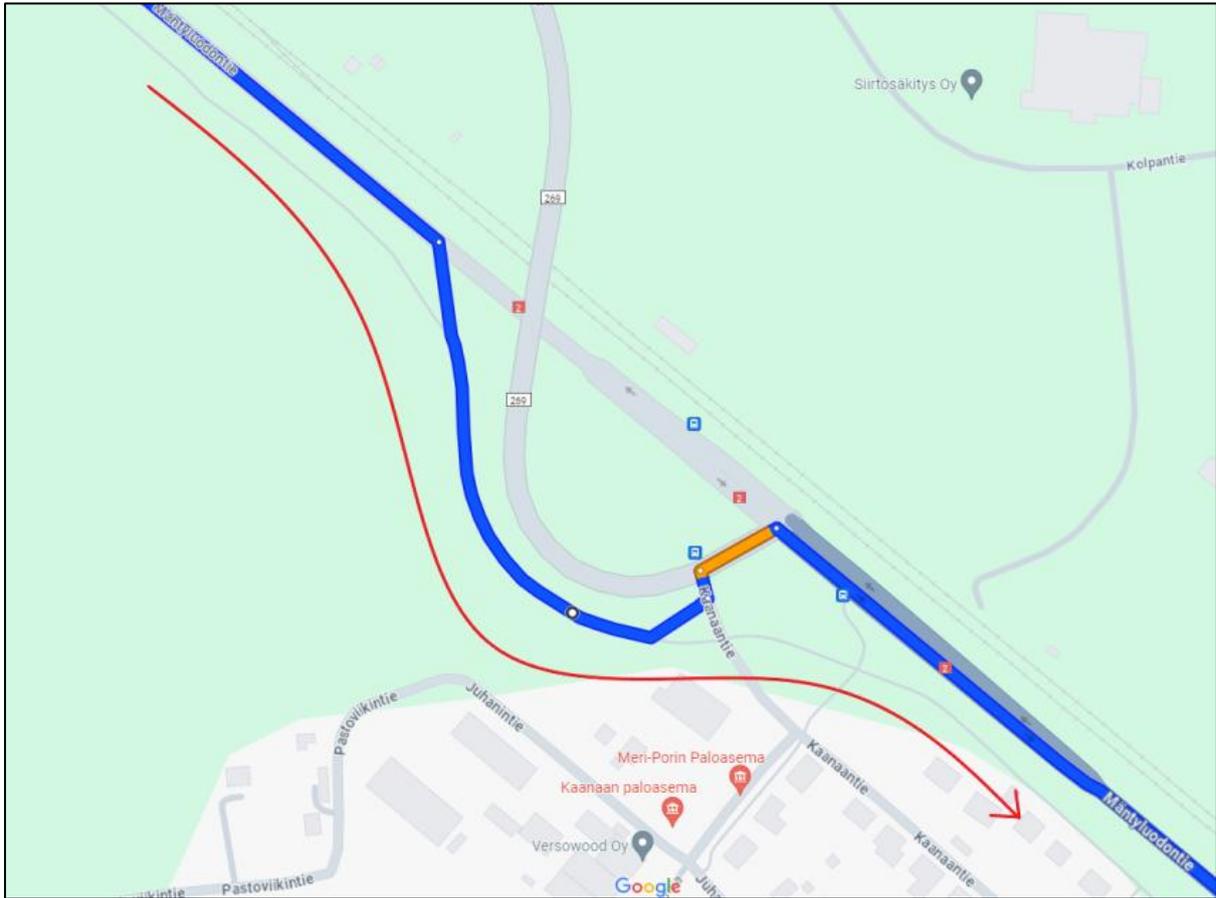
Classification of constructional measures

Class	Category	Description
1	Easy section	Minor modifications needed, like e.g. removing road signs or arranging a parking section
2	Moderate section	Modifications necessary , like e.g. removing signs, fixing a traffic refuge or pedestrian path, covering with steel or concrete plates and other smaller road constructions or modifications
3	Complex section	Large modifications necessary, like e. g. removing crash barriers, reconstruction of roundabouts, establishment of turn tunnels, road enlargements, turning maneuver in general, private and undeveloped properties are affected, traffic lights and streetlamps must be removed, considerable long-term construction site with a high licensing effort.
4	Difficult section	Passage is doubtful , some additional investigations are necessary (e.g. expertise, swept path analysis, simulations, bearing capacity tests or dummy runs).

In simulations:

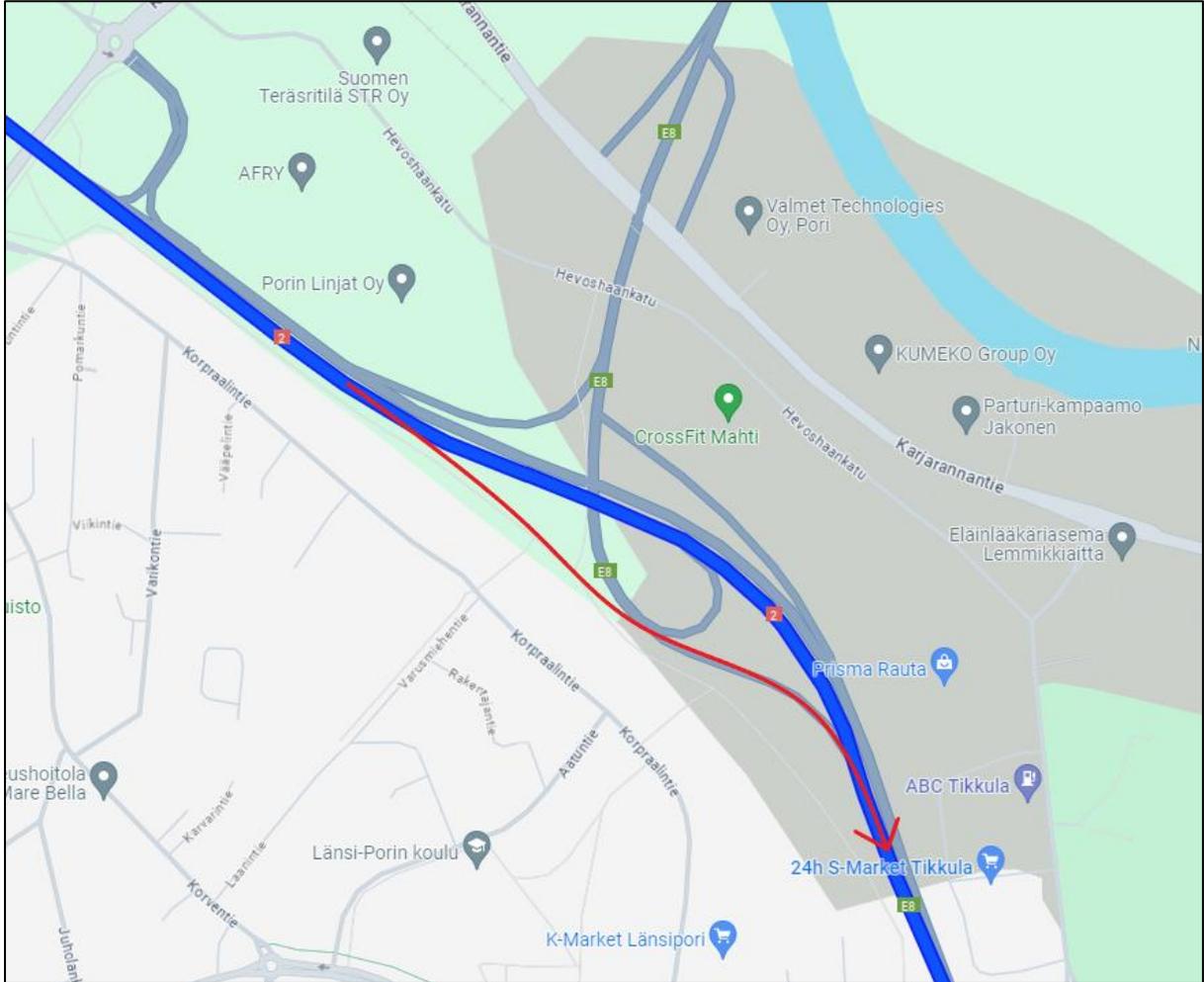
- Driveable Area
- Obstacle (Not passable. Traversable if the height of the obstacle allows it)
- Tire tracks of tractor
- Tire tracks of trailer
- Area covered by vehicle combination
- Area covered by cargo

1.	3km	Map 1	Class 2
Bypassing the Levo bridge. Possible fillings.			



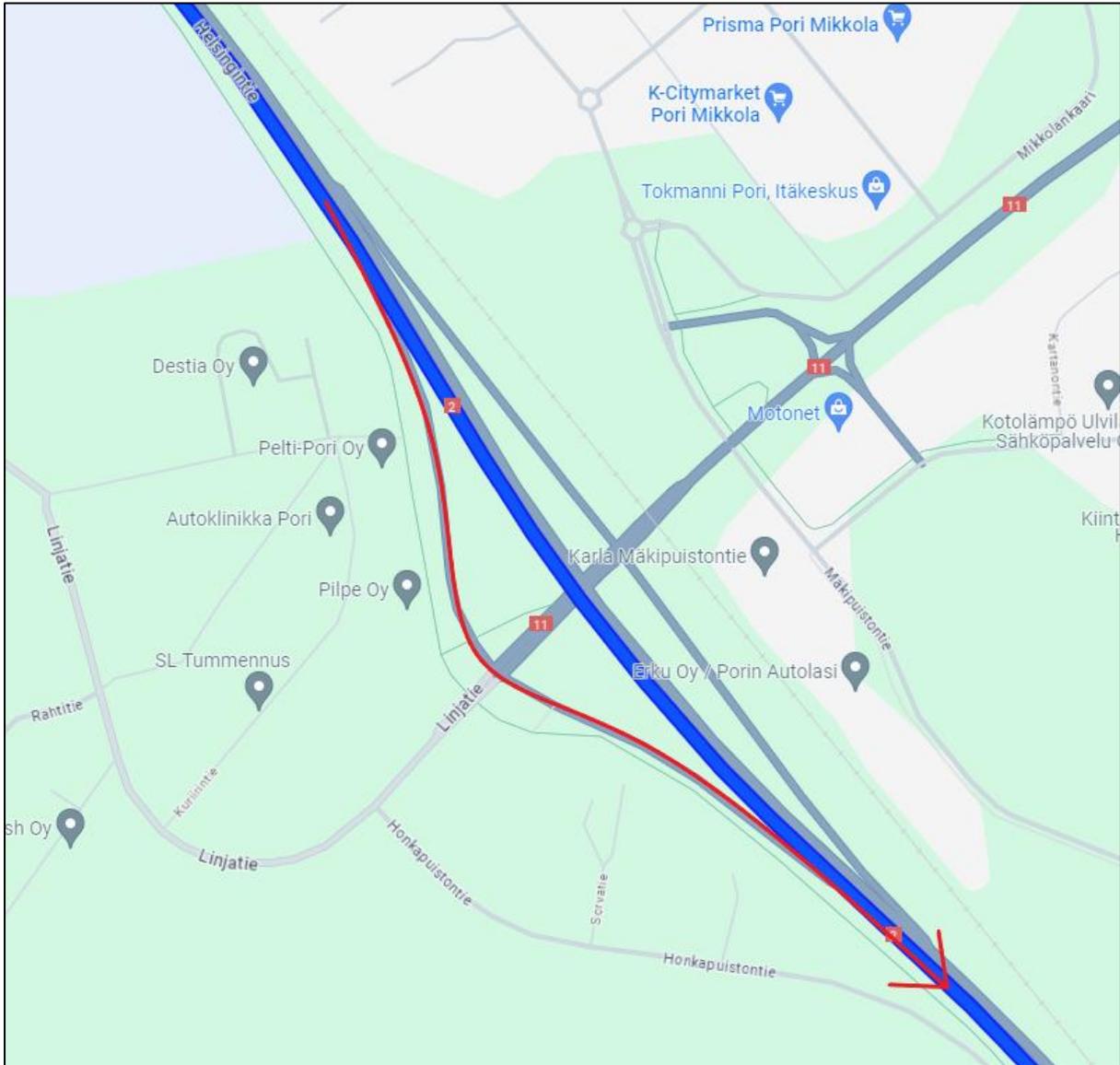
Map 1 – Turn from 2 to 2.

2.	18km	Map 2	Class 1
Bypassing the Laani interchange. Should be easy section with only minor modifications			



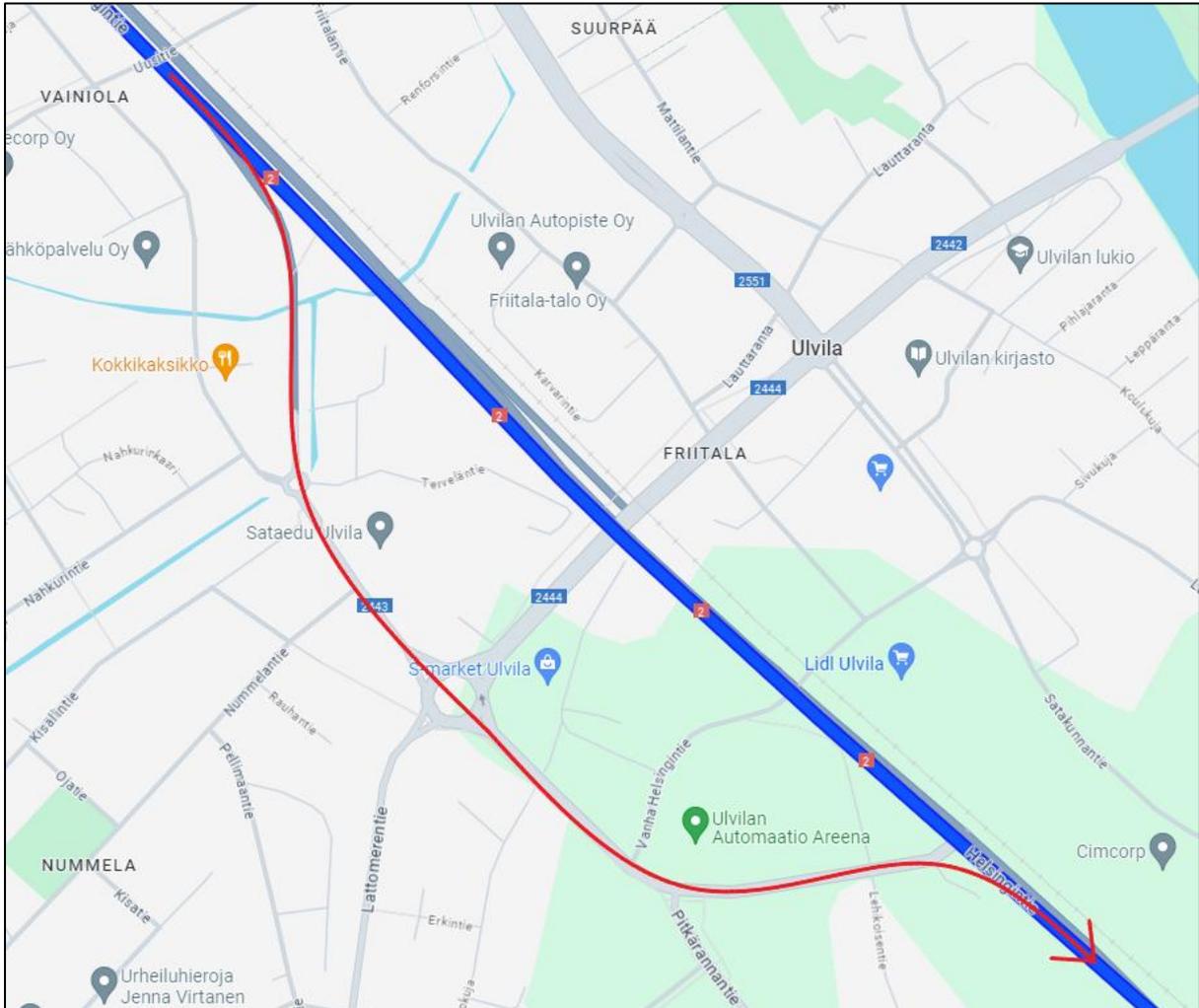
Map 2 – Turn from 2 to 2. Red arrow marks the special transport route.

3.	25km	Map 3	Class 1
Bypassing the Honkaluoto bridge. Should be easy access with only minor modifications.			



Map 3 – Turn from 2 to 2. The red arrow marks the driving line.

4.	28km	Map 4	Class 1
Bypassing the Friitala bridge. Should be easy access with only minor modifications.			



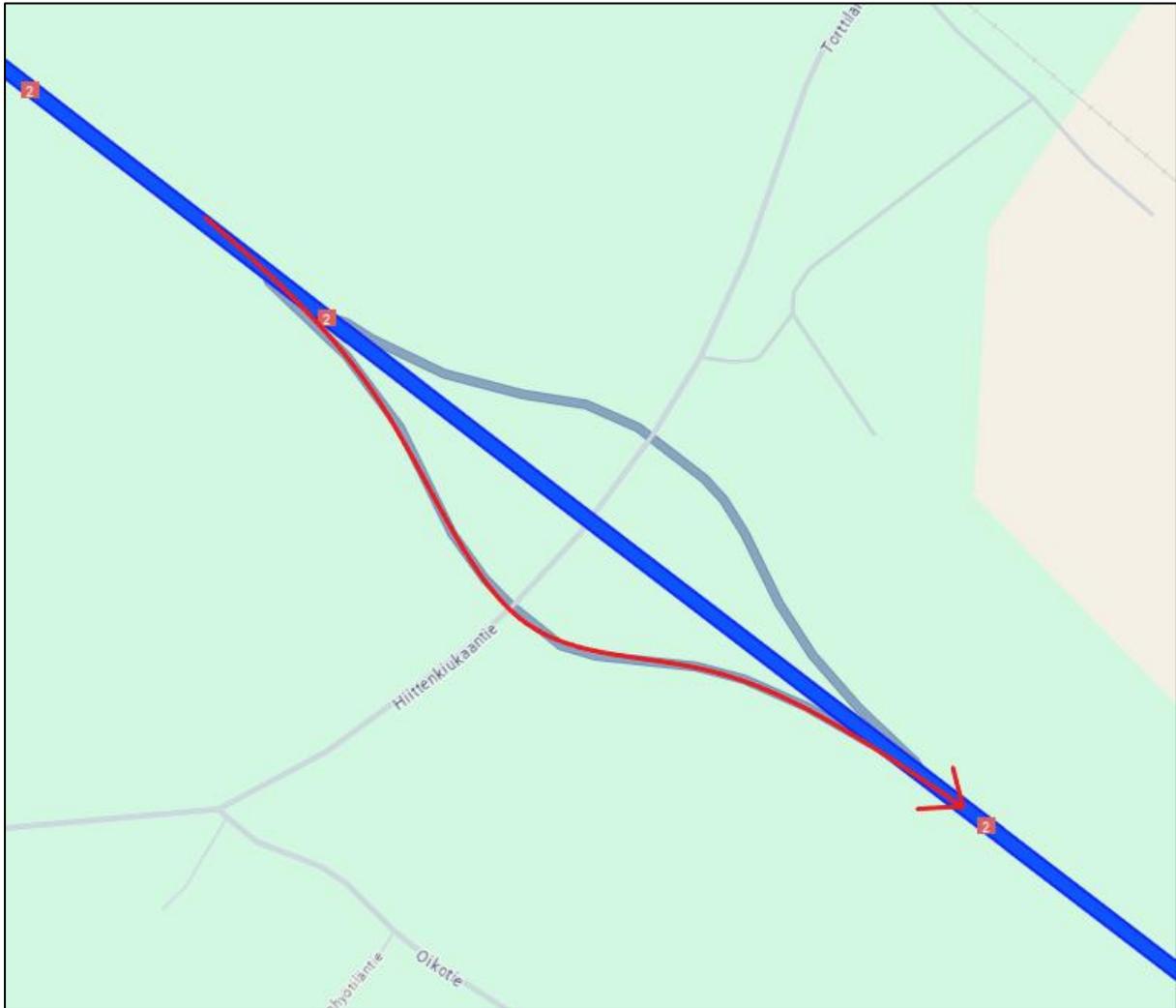
Map 4 – Turn from 2 to 2. The red arrow marks the driving line.

5.	39km	Map 5	Class 1
Bypassing the Nakkila bridge. Should be easy access with only minor modifications.			



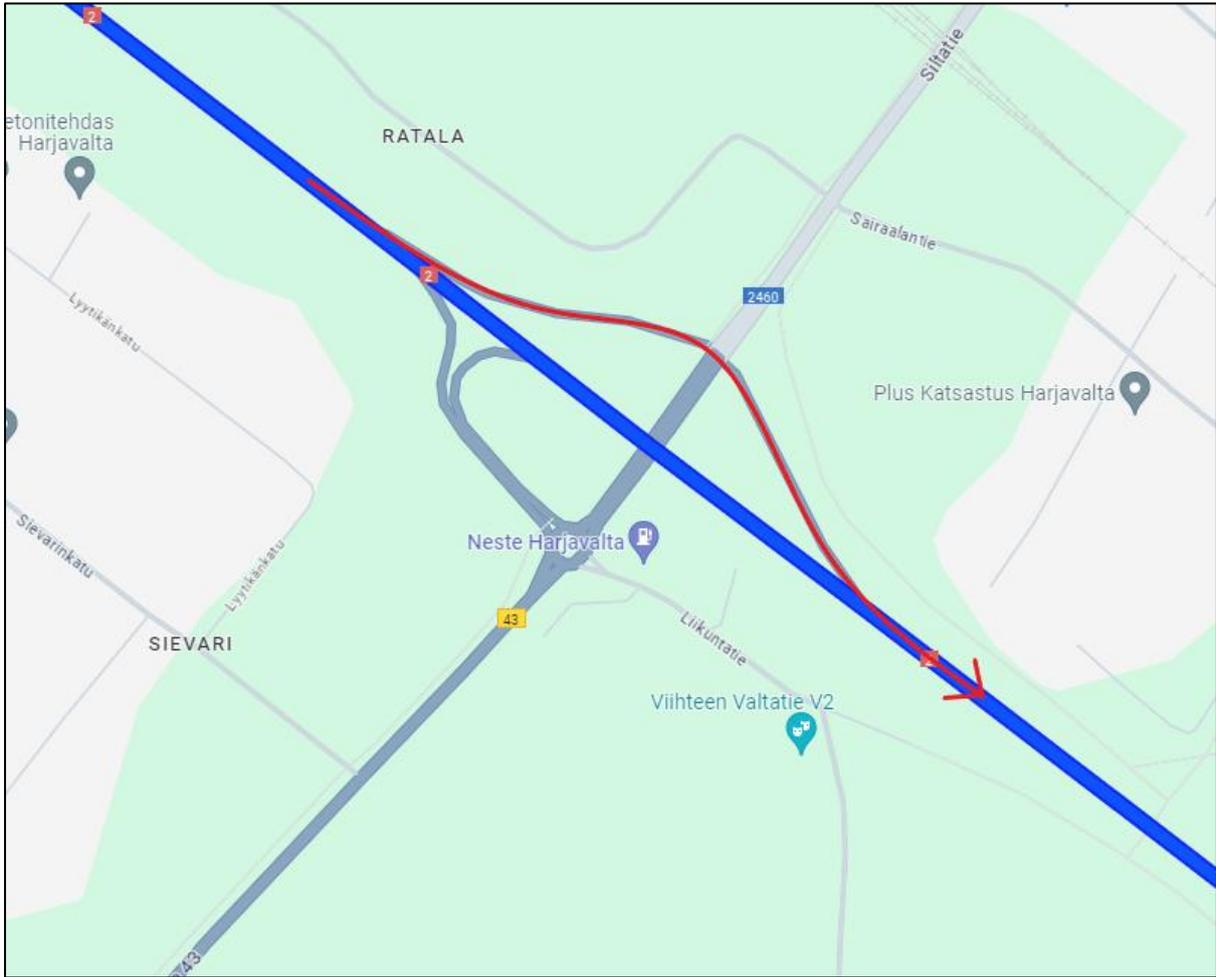
Map 5 – Turn from road 2 to 2. The red arrow marks the driving line.

6.	46km	Map 6	Class 1
Bypassing the Torttila bridge. Should be easy access with only minor modifications.			



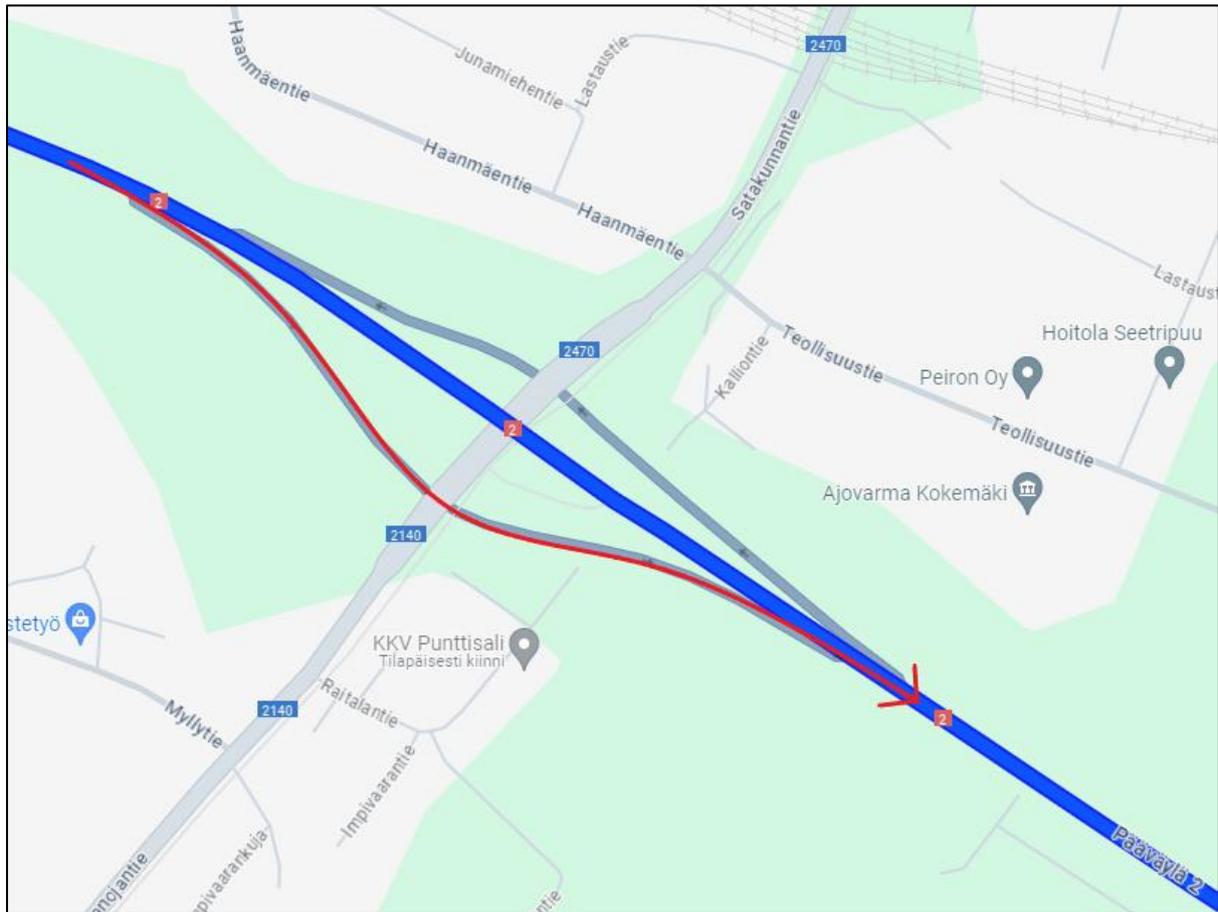
Map 6 – Turn from 2 to 2. The red arrow marks the driving line.

7.	48km	Map 7	Class 1
Bypassing the Harjavalta bridge. Should be easy access with only minor modifications.			



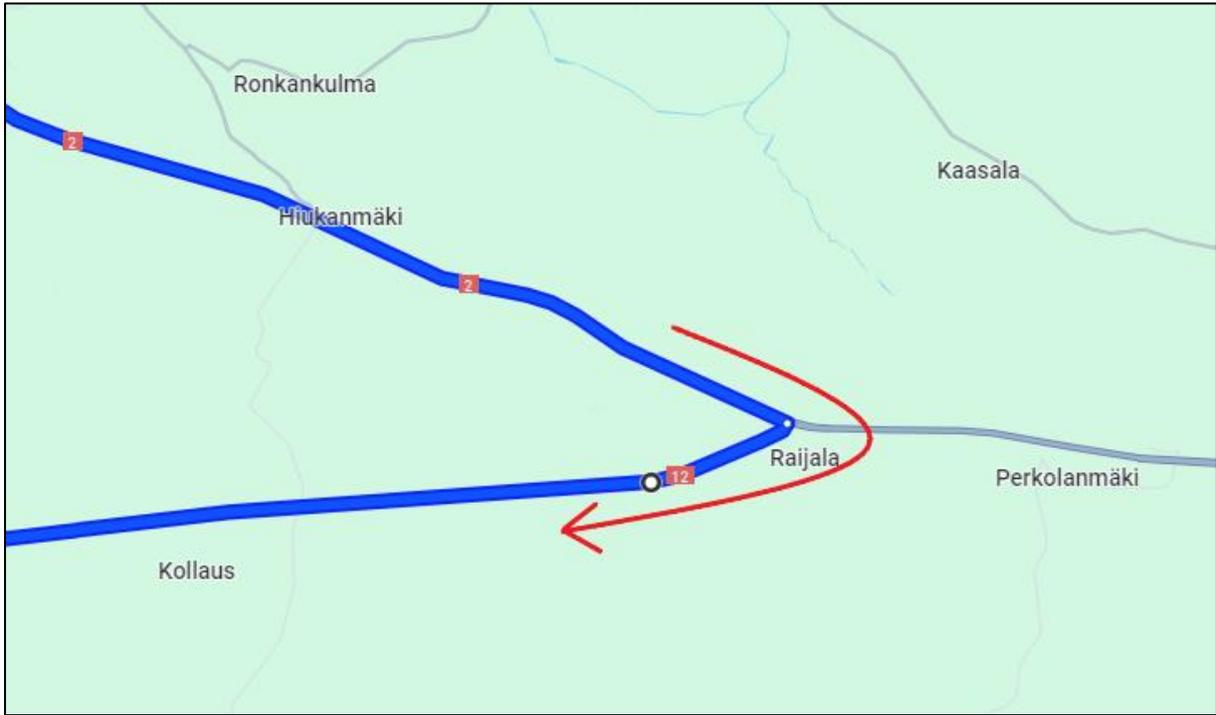
Map 7 – Turn from 2 to 2. The red arrow marks the driving line.

8.	60km	Map 8	Class 1
Bypassing the Kokemäki bridge. Should be easy access with only minor modifications.			



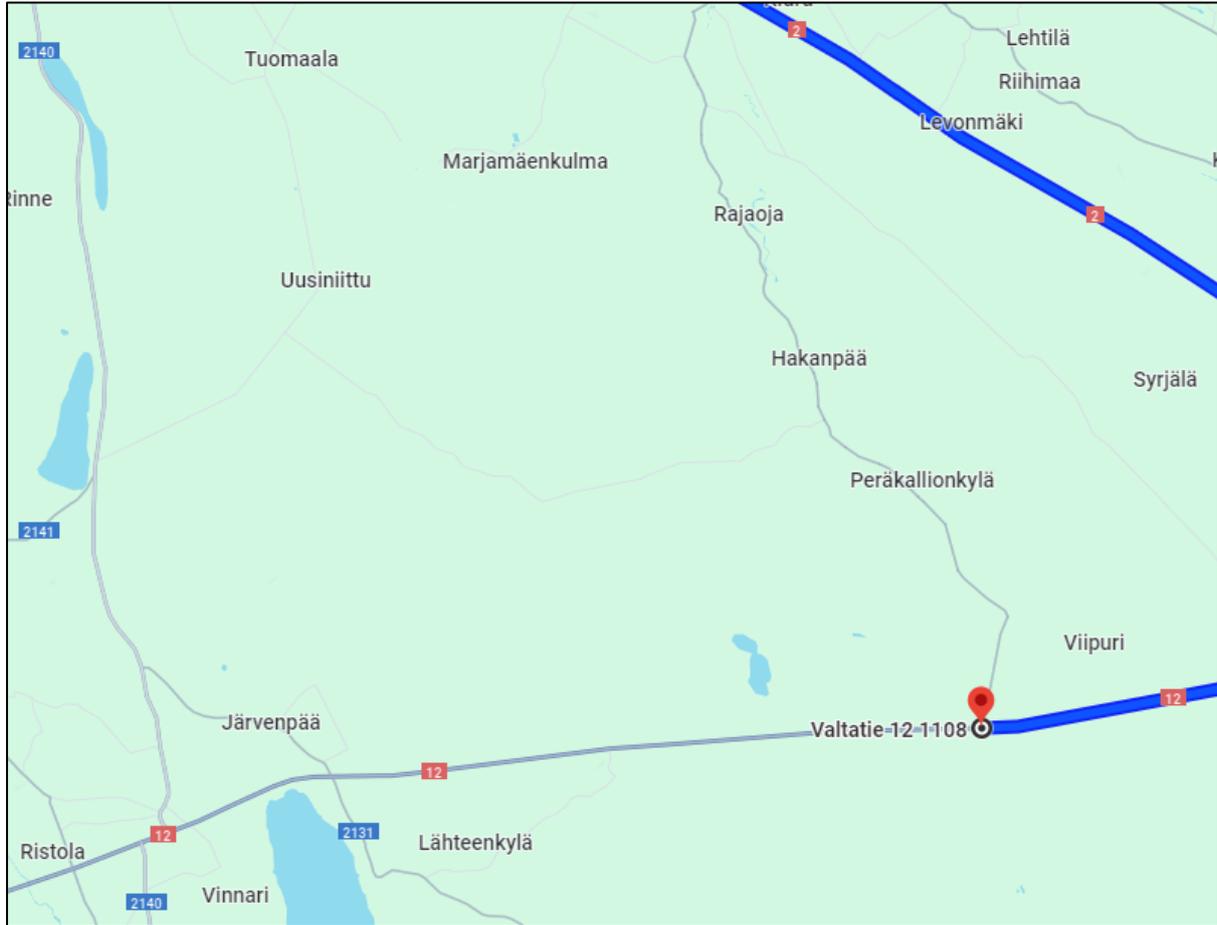
Map 8 – Turn from 2 to 2. The red arrow marks the driving line.

9.	76km	Map 9	Class 1
Should be easy access with only minor modifications.			



Map 9 – Turn from 2 to 12.

4.3 Suggested Handover Point



Suggested handover point.

Suggested handover point is located on road 12 on point 61.166711, 22.426406. The handover point can also be before the given point or after it if there is suitable access to the site road. Also, the handover point can be on west side of the site on road 2140.

4.4 Preliminary Transport Permit

Preliminary transport permit has been applied on 27.11.2023. The Preliminary transport permit (13159/2023) was accepted 4.12.2023 with condition.

The condition relates to the road 12799 (Peräkalliontie). It needs to be inspected before the road modifications and after the transports with the Centre for Economic Development, Transport and the Environment (ELY-keskus). It's required that the road 12799 (Peräkalliontie) must be restored to the same condition after transports as it was before transports started.

The preliminary transport permit was applied with the estimated dimensions of the powertrain. It is the limiting component on the transport because it is so short and heavy.

4.5 Other Notes

There is suitable access from the Port of Pori to main road 2 due to the special transport gate.

On road 12799 (Peräkalliontie) modifications are necessary to make the road suitable for the transports. There is going to be lot of tree removals from private lands to make the blades and other turbine components to be able to fit there and to use that road. Also, the road needs to be made wider and possibly stronger to make sure it has sufficient bearing capacity.

Required restoring of the road 12799 (Peräkalliontie) after the transports should be discussed with the Centre for Economic Development, Transport and the Environment (ELY-keskus) because the road is going to be in better condition after the road modifications than it was before.

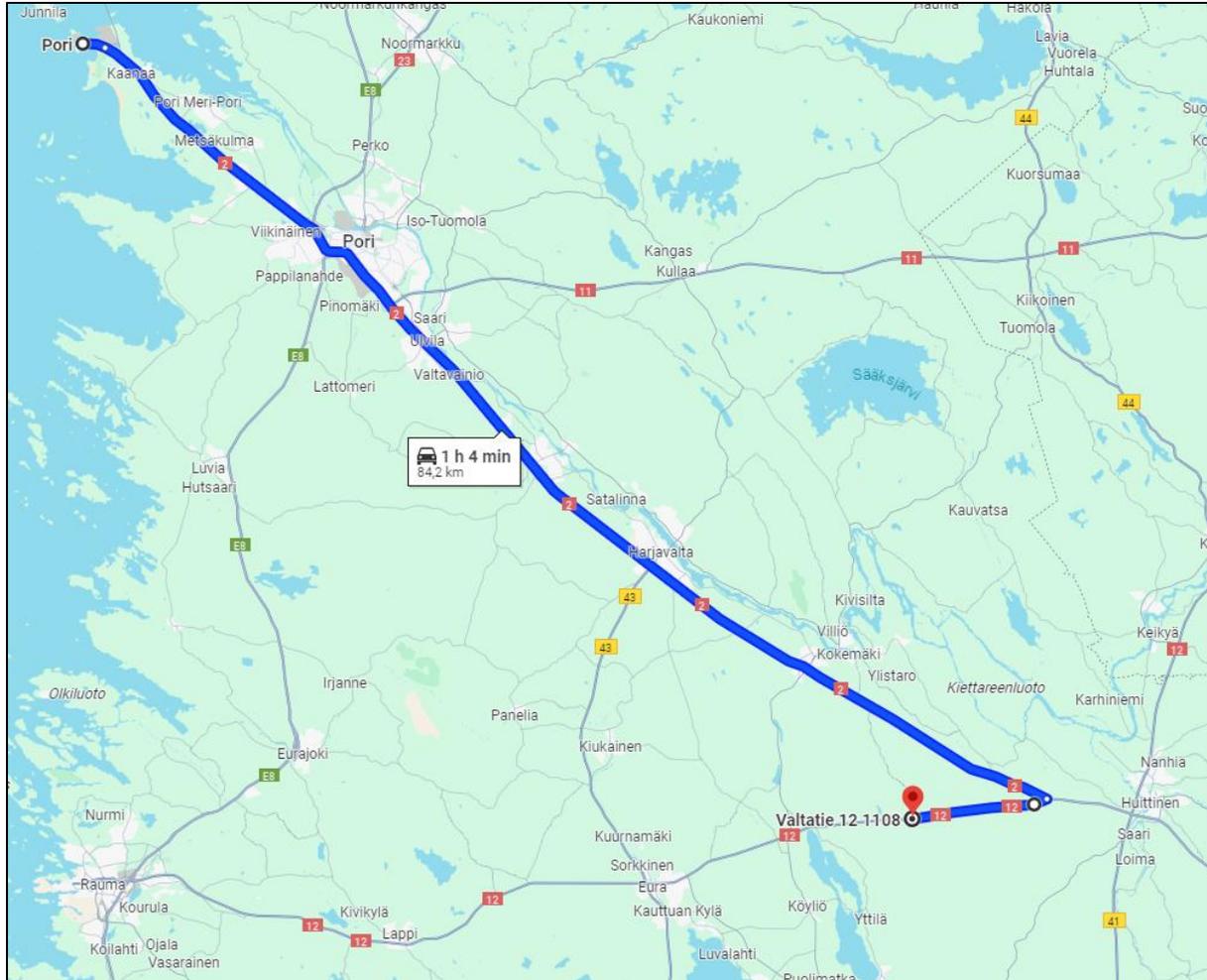
A full route survey is needed to determine all possible modifications and to confirm that the route is suitable for the transports. For example, the amount of overhead cable work will be confirmed when the transformer dimensions are confirmed, and the route is measured.

The suitability of the route for transports depends on:

- Transport permit is granted

5 TRANSPORT FOR TURBINE COMPONENTS

5.1 Route for blades



<https://maps.app.goo.gl/2bkZ8QBCRqB6wFX49>

Port of Pori/Merisatamantie 3 – 42020 (Merisatamantie) – 2 – 12 – Valtatie 12 1108
(61.166711, 22.426406)

5.2 Special Notes About the Route for blades

Number	Km	Coordinates N/W	Map	Transport road	Class	Action
10.	76km	61.177842, 22.579471	Map 10 & Sim 1	Turn from 2 to 12	3	Complex section

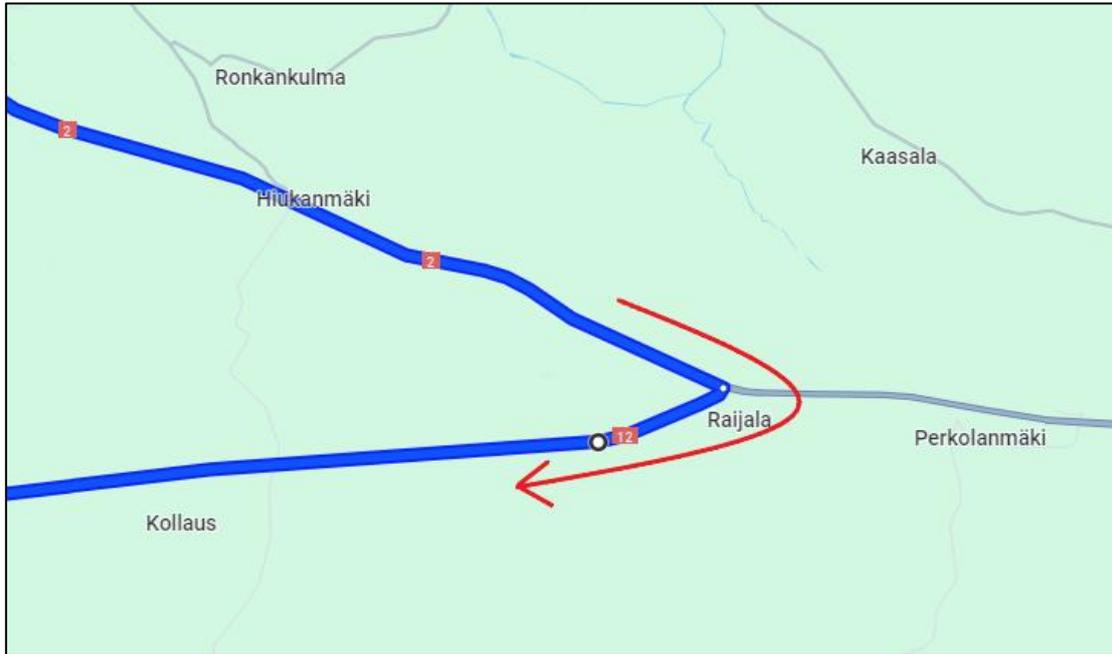
Classification of constructional measures

Class	Category	Description
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3	Complex section	Large modifications necessary, like e. g. removing crash barriers, reconstruction of roundabouts, establishment of turn tunnels, road enlargements, turning maneuver in general, private and undeveloped properties are affected, traffic lights and streetlamps must be removed, considerable long-term construction site with a high licensing effort.
4	Difficult section	Passage is doubtful , some additional investigations are necessary (e.g. expertise, swept path analysis, simulations or dummy runs).

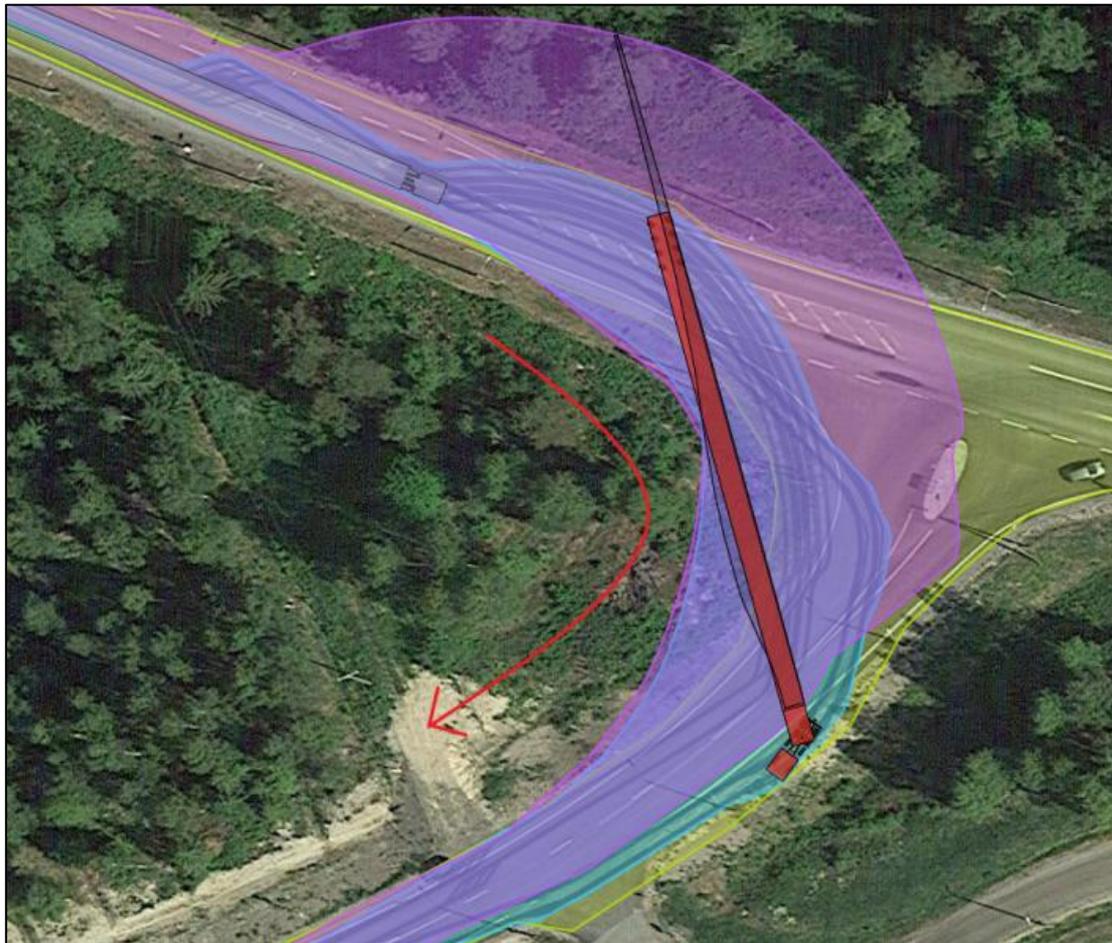
In simulations:

- Driveable Area
- Obstacle (Not passable. Traversable if the height of the obstacle allows it)
- Tire tracks of tractor
- Tire tracks of trailer
- Area covered by vehicle combination
- Area covered by cargo

10.	76km	Map 10 & Sim 1	Class 3
Removal of lamp poles. Fillings needed. Tree removals on private land (102-430-4-25).			

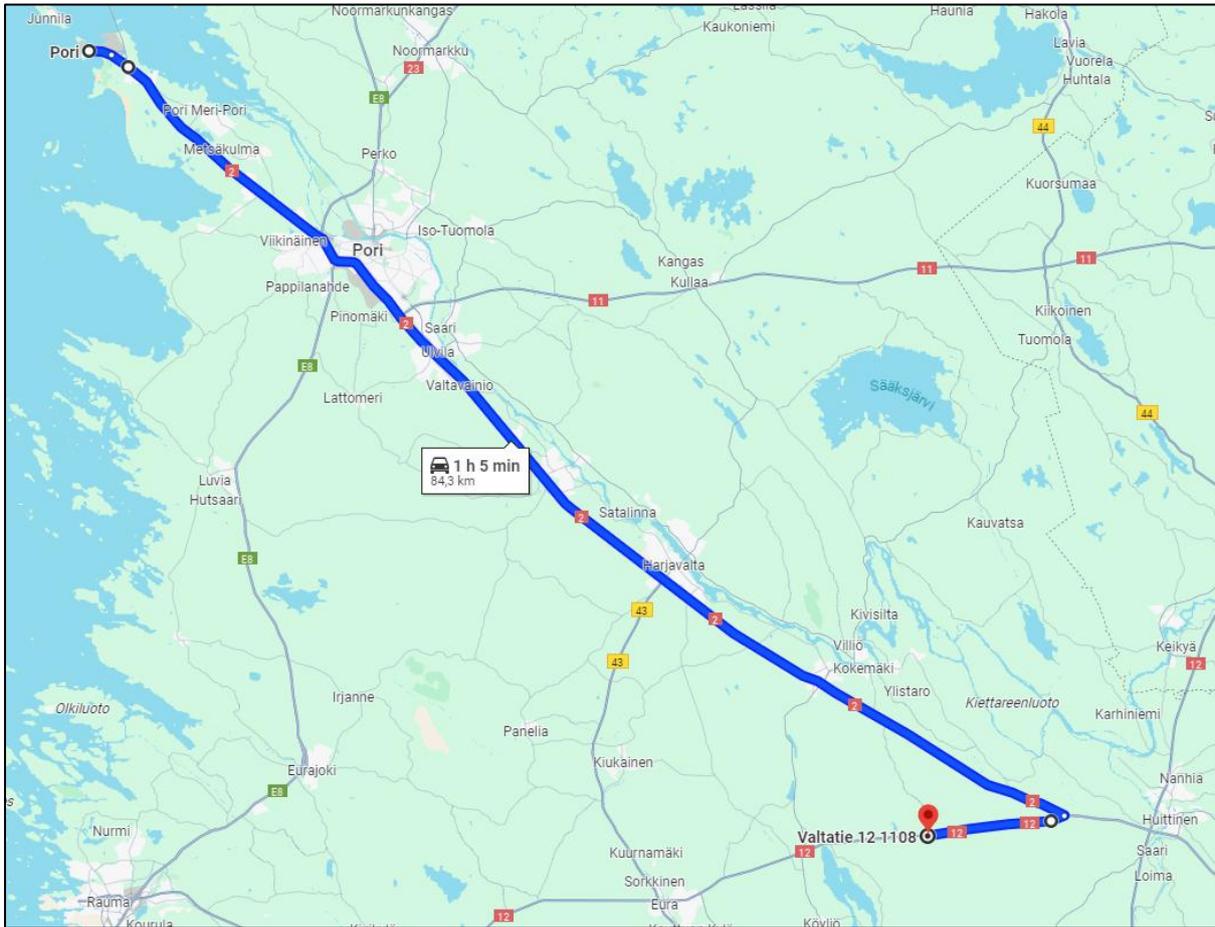


Map 10 – Turn from 2 to 12.



Sim 1 – Turn from 2 to 12.

5.3 Route for main components and tower sections



<https://maps.app.goo.gl/974hsy4kSE8i1nVk9>

Port of Pori/Merisatamantie 3 – 42020 (Merisatamantie) – 2 – 12 – Valtatie 12 1108
(61.166711, 22.426406)

5.4 Special Notes About the Route for main components and tower sections

Number	Km	Coordinates N/W	Map	Transport road	Class	Action
11.	3km	61.583350, 21.527855	Map 11	2	1	Easy section
12.	17km	61.492531, 21.738208	Map 12	2	1	Easy section
13.	25km	61.451239, 21.829158	Map 13	2	1	Easy section
14.	28km	61.432617, 21.862480	Map 14	2	3	Complex section
15.	39km	61.363348, 21.992195	Map 15	2	1	Easy section
16.	46km	61.319722, 22.092272	Map 16	2	1	Easy section
17.	48km	61.307692, 22.125112	Map 17	2	1	Easy section
18.	60km	61.251253, 22.300771	Map 18	2	1	Easy section
19.	76km	61.177843, 22.579454	Map 19	Turn from 2 to 12	1	Easy section

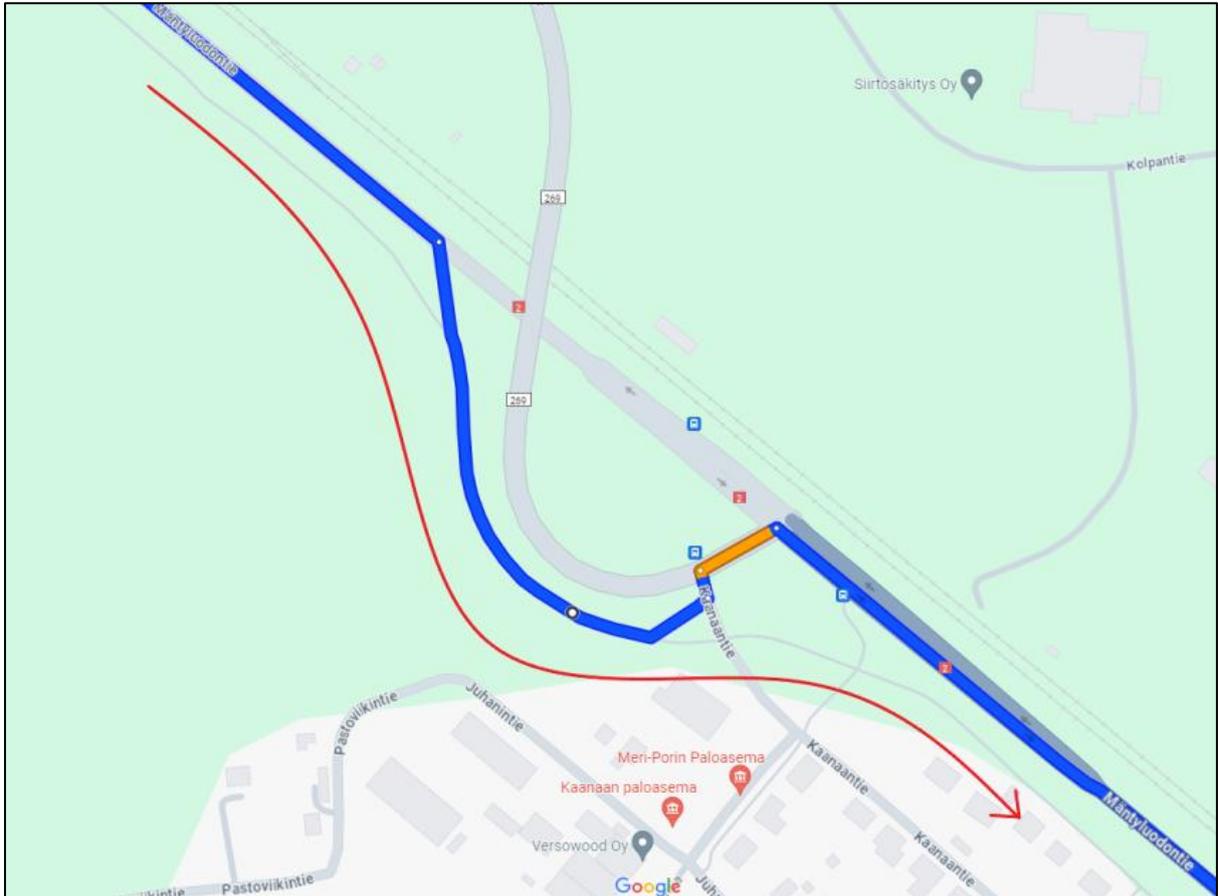
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4	Difficult section	Passage is doubtful , some additional investigations are necessary (e.g. expertise, swept path analysis, simulations or dummy runs).

In simulations:

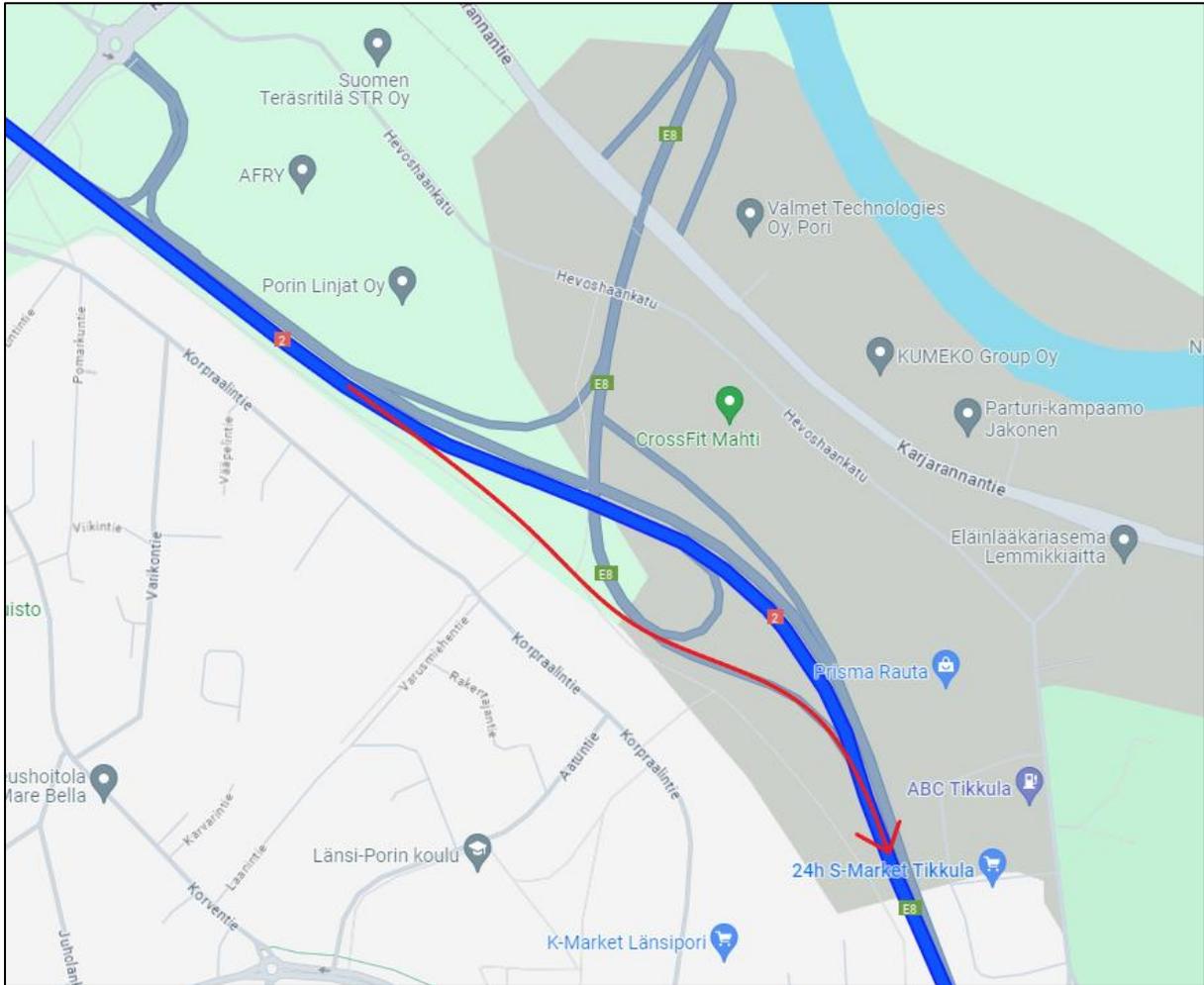
- Driveable Area
- Obstacle (Not passable. Traversable if the height of the obstacle allows it)
- Tire tracks of tractor
- Tire tracks of trailer
- Area covered by vehicle combination
- Area covered by cargo

11.	3km	Map 11	Class 1
Bypassing the Levo bridge. Should be easy section with only minor modifications			



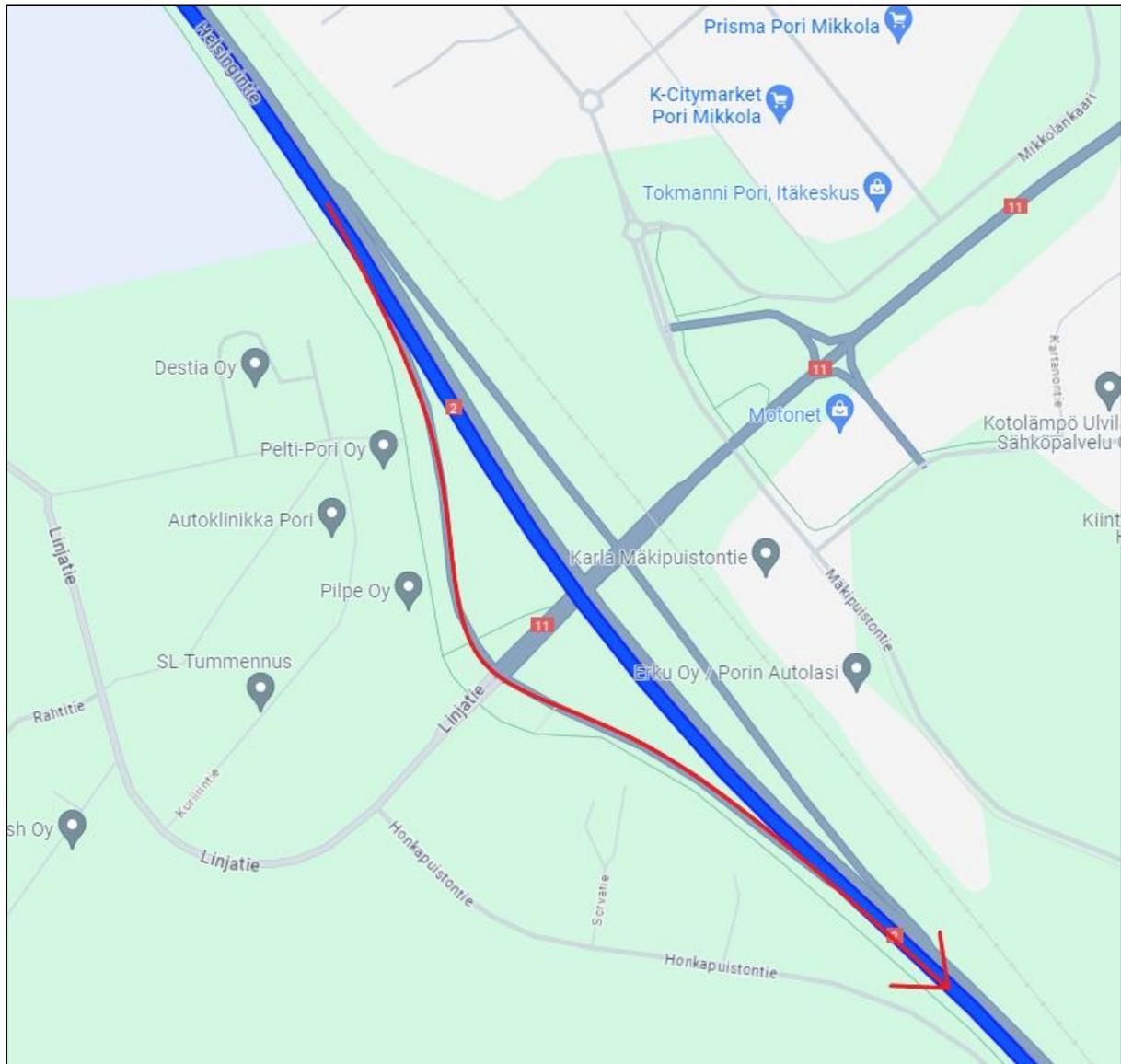
Map 31 – Turn from 2 to 2.

12.	18km	Map 12	Class 1
Bypassing the Laani interchange. Should be easy section with only minor modifications			



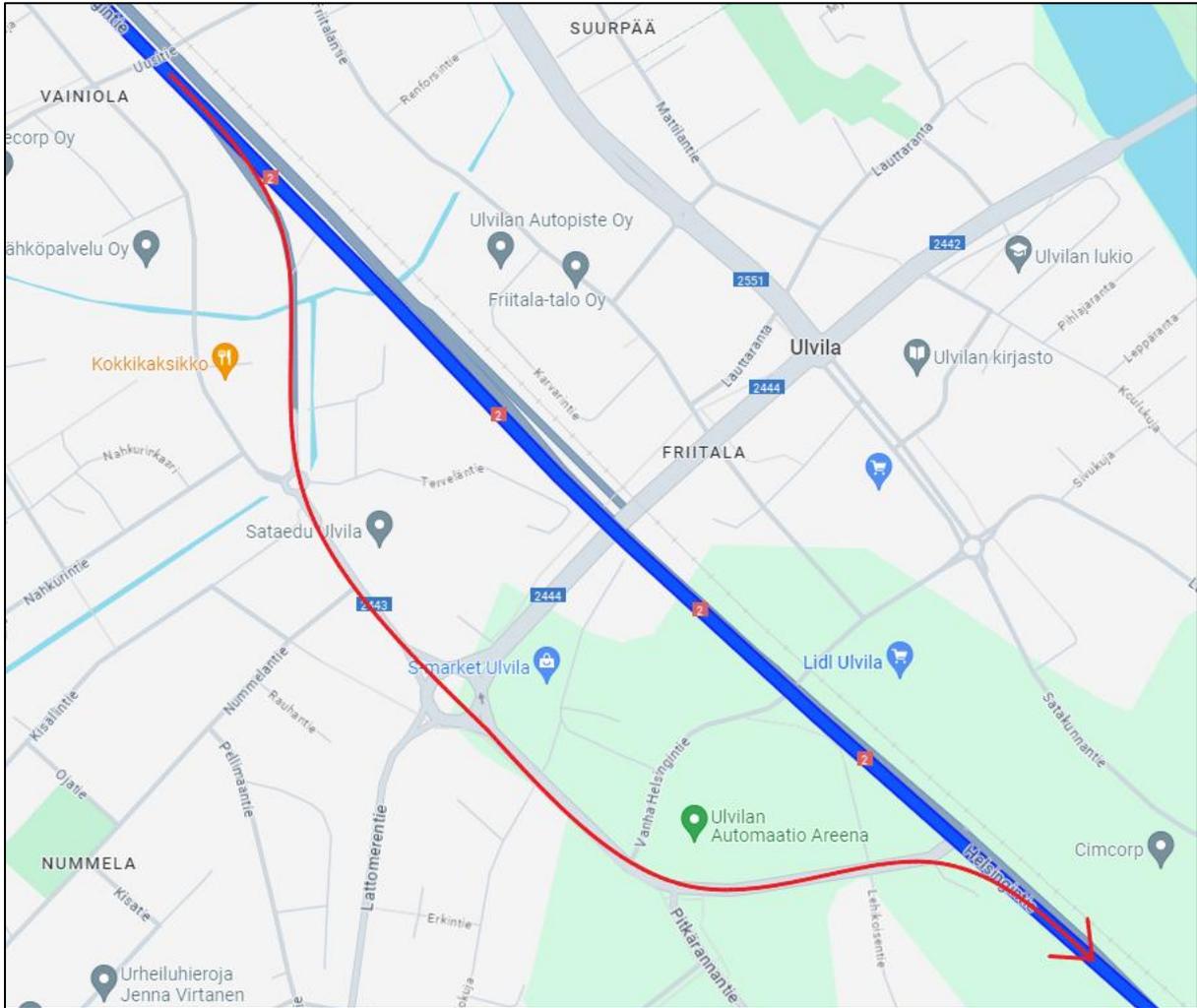
Map 12 – Turn from 2 to 2. Red arrow marks the special transport route.

13.	25km	Map 13	Class 1
Bypassing the Honkaluoto bridge. Should be easy access with only minor modifications.			



Map 13 – Turn from 2 to 2. The red arrow marks the driving line.

14.	28km	Map 14	Class 3
Bypassing the Friitala bridge. Simulations and full route survey needed to determine exact modifications. Fillings needed. Possible removal of lamp poles. Possible fillings of traffic dividers.			



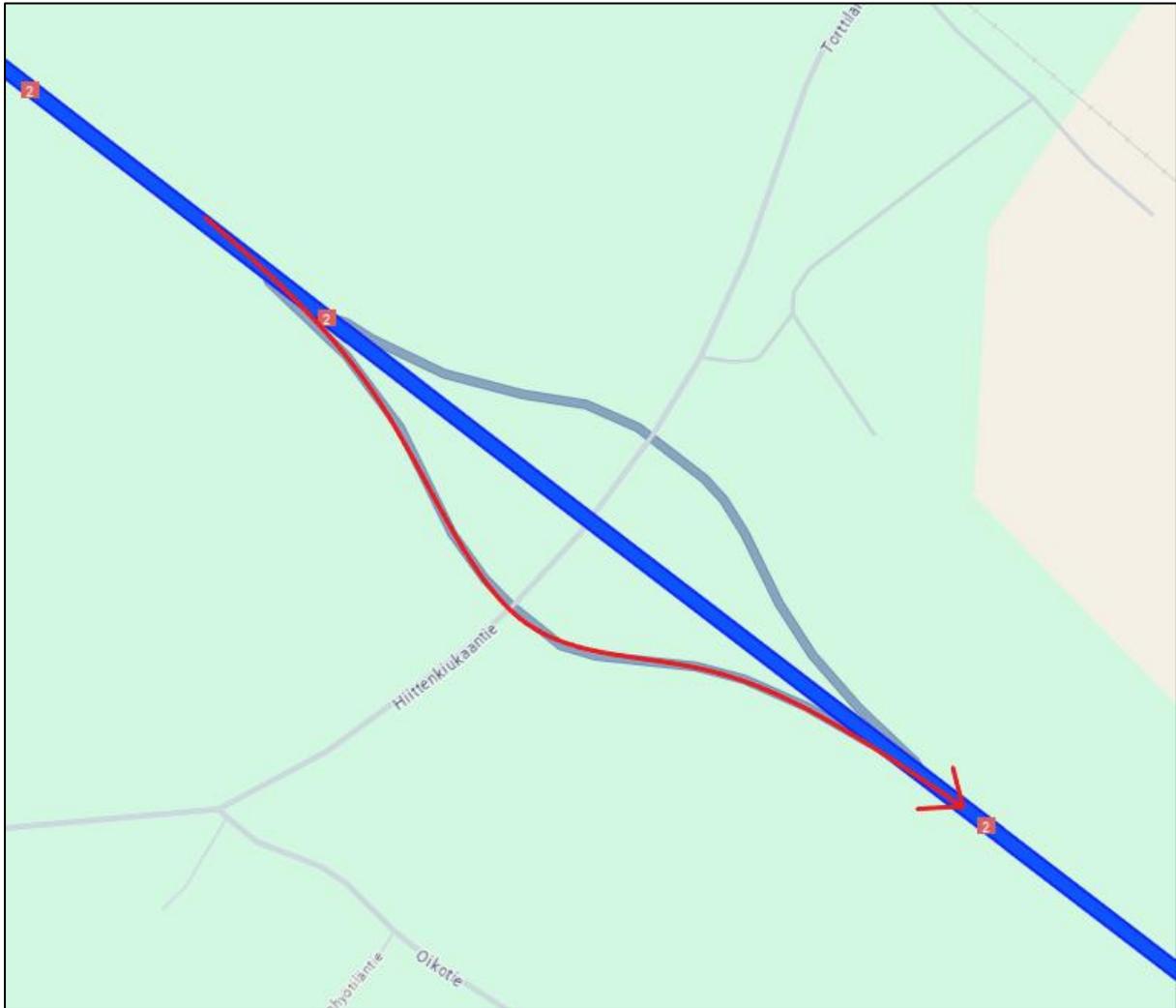
Map 14 – Turn from 2 to 2. The red arrow marks the driving line.

15.	39km	Map 15	Class 1
Bypassing the Nakkila bridge. Should be easy access with only minor modifications.			



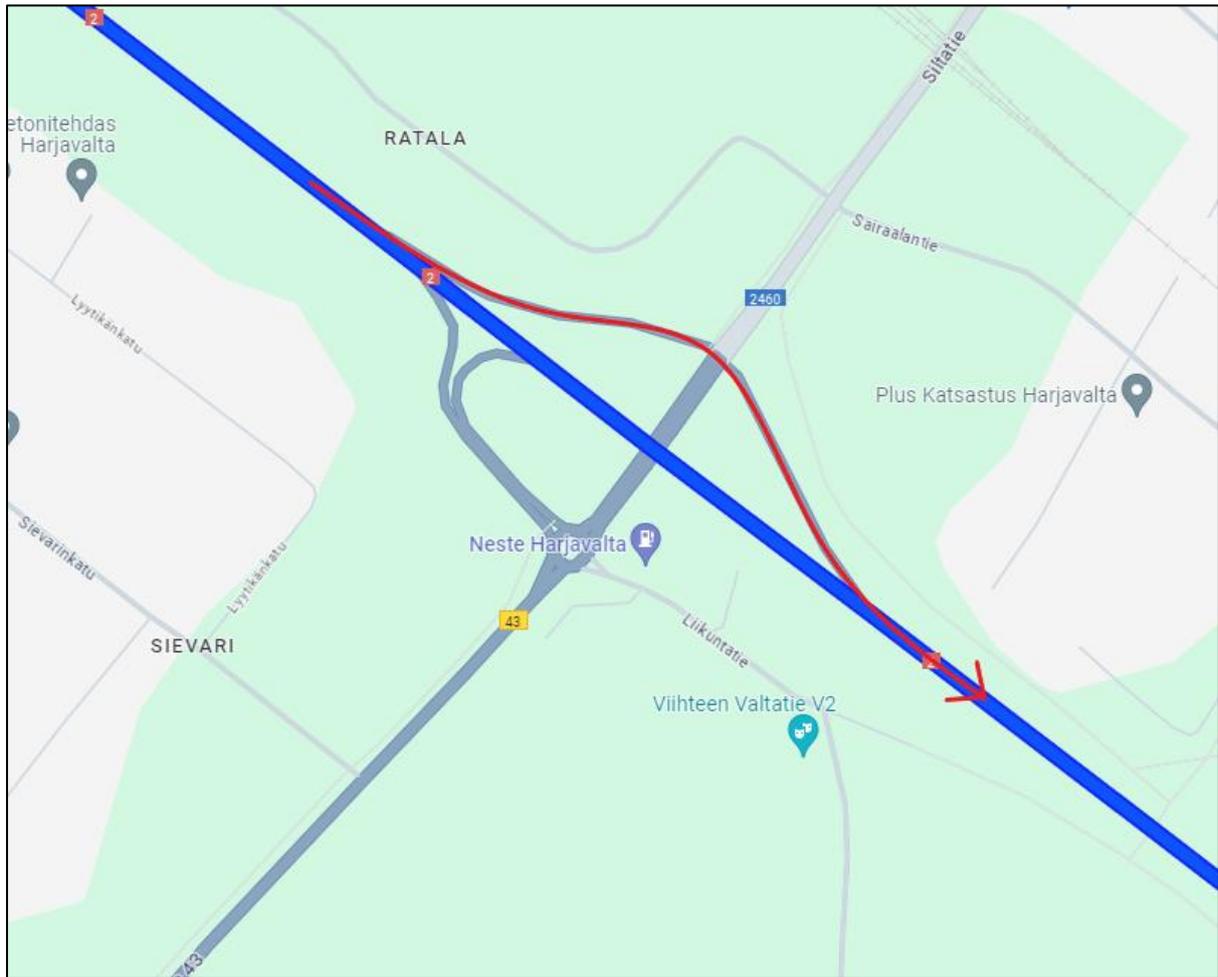
Map 15 – Turn from road 2 to 2. The red arrow marks the driving line.

16.	46km	Map 16	Class 1
Bypassing the Torttila bridge. Should be easy access with only minor modifications.			



Map 16 – Turn from 2 to 2. The red arrow marks the driving line.

17.	48km	Map 17	Class 1
Bypassing the Harjavalta bridge. Should be easy access with only minor modifications.			



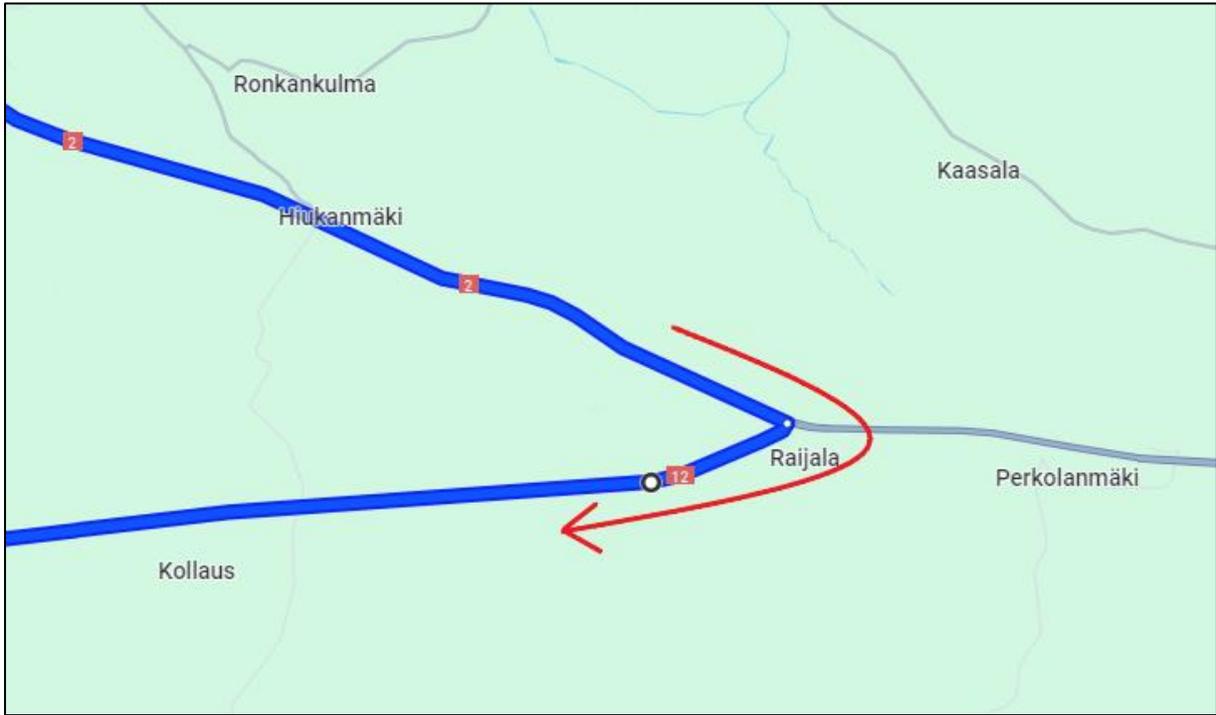
Map 17 – Turn from 2 to 2. The red arrow marks the driving line.

18.	60km	Map 18	Class 1
Bypassing the Kokemäki bridge. Should be easy access with only minor modifications.			



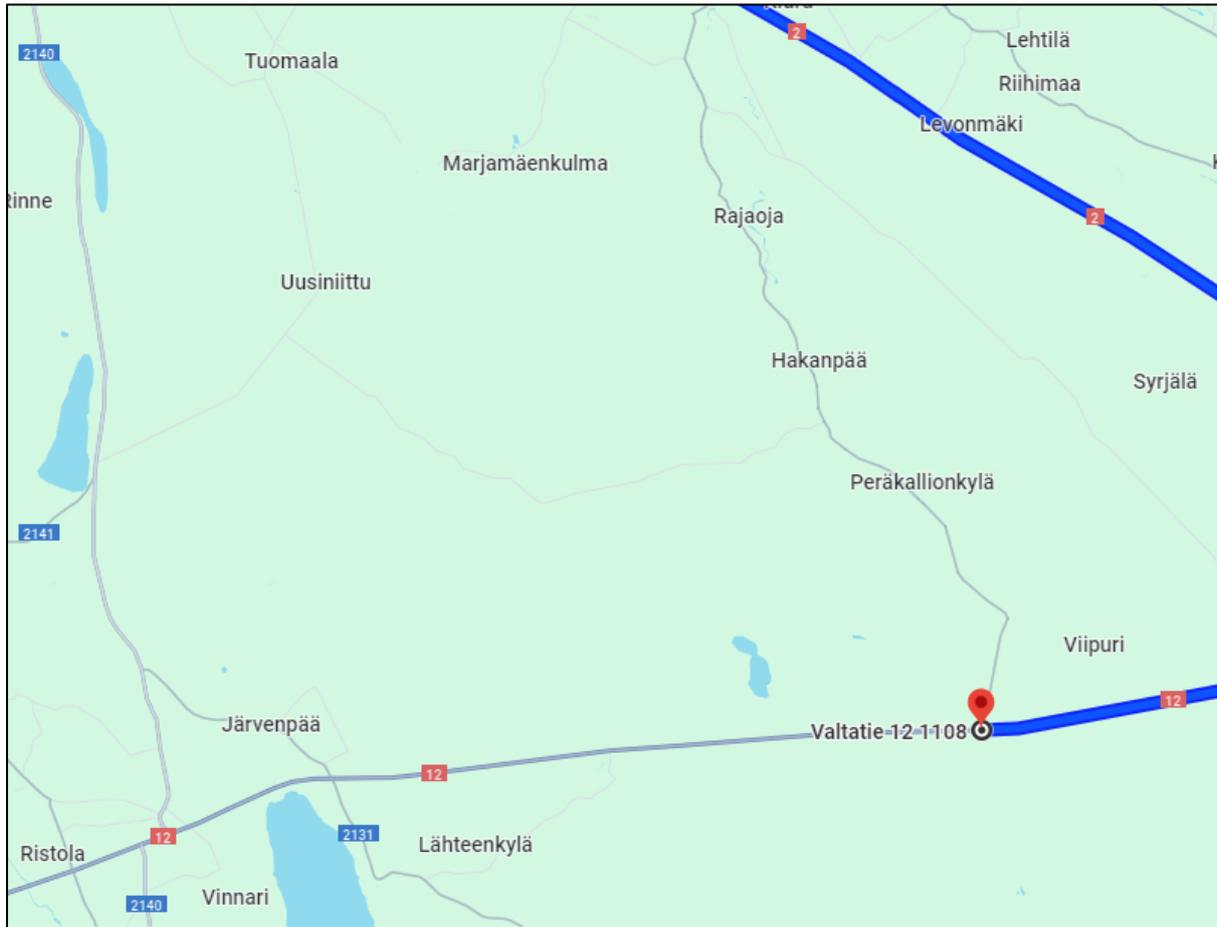
Map 18 – Turn from 2 to 2. The red arrow marks the driving line.

19.	76km	Map 19	Class 1
Should be easy access with only minor modifications.			



Map 19 – Turn from 2 to 12.

5.5 Suggested Handover Point



Suggested handover point.

Suggested handover point is located on road 12 on point 61.166711, 22.426406. The handover point can also be before the given point or after it if there is suitable access to the site road. Also, the handover point can be on west side of the site on road 2140.

5.6 Preliminary Transport Permit

Preliminary transport permit has been applied on 27.11.2023. The Preliminary transport permit (13159/2023) was accepted 4.12.2023 with condition.

The condition relates to the road 12799 (Peräkalliontie). It needs to be inspected before the road modifications and after the transports with the Centre for Economic Development, Transport and the Environment (ELY-keskus). It's required that the road 12799 (Peräkalliontie) must be restored to the same condition after transports as it was before transports started.

The preliminary transport permit was applied with the estimated dimensions of the powertrain. It is the limiting component on the transport because it is so short and heavy.

5.7 Other Notes

There is suitable access from the Port of Pori to main road 2 due to the special transport gate.

On the route there is traffic portals that can be necessary to remove but that will become clear with the full route survey.

On road 12799 (Peräkalliontie) modifications are necessary to make the road suitable for the transports. There is going to be lot of tree removals from private lands to make the blades and other turbine components to be able to fit there and to use that road. Also, the road needs to be made wider and possibly stronger to make sure it has sufficient bearing capacity.

Required restoring of the road 12799 (Peräkalliontie) after the transports should be discussed with the Centre for Economic Development, Transport and the Environment (ELY-keskus) because the road is going to be in better condition after the road modifications than it was before.

The route is quite tight for V172 size blades and other turbine components so when planning to increase the size of the components (for example blade length increase to 100m), the route must be further explored with route survey and simulations. If the diameter of 100m blade increases a lot from the V172 size blade it can be possible that those blades won't be able to pass under some bridges of the route.

A full route survey is needed to determine all possible modifications and to confirm that the route is suitable for the transports. For example, the amount of overhead cable work will be confirmed when the transformer dimensions are confirmed, and the route is measured.

The suitability of the route for transports depends on:

- Transport permit is granted

6 CONCLUSIONS

The transport route is suitable for transport with some modifications. A full route survey including more exact simulations is needed to determine necessary modifications. Modifications might include fillings, removal of lamp poles, traffic signs and trees, and other needed modifications. Cost estimate for these road modifications can be estimated after a full route survey and final simulations.

The suitability of the route for transport depends on whether the transport permit is granted.

6.1 Next steps

- Full route survey for transformer/turbine transports.
- Cost estimate for road modifications.
- Permitting road modifications.
- Transport permit for each component.
- Project execution.