

ROUTE SURVEY

- 1. Name of project:** URLEASCA
- 2. Customer name:** URLEASCA WIND FARM SRL, Romania
- 3. Departure location:** Agigea port, Romania
- 4. Delivery location:** Rleasca, Braila area, Romania
- 5. Scope:** The road study was requested for the transport of 17 wtg and the main scope of that was to determine the critical points and to show feasibility of the access roads from the port up to the future entrance of the jobsite from the transport point of view.
- 6.** Performed in February- March 2022 by Marius Tudose from SC FELBERMAYR ROMANIA SRL

7. Cargo dimensions and weights:

Nacelle, L8.553x W5.45x H4.164m and G 48to
Rotor, L5.195x W4.7x H4.182m and G 61to
Generator, L5.788x W5.492x H4.16m and G 131to
Blade, L81.489x W4.995x H3.784m and G 25to
Tower section 1, L15.5x W5.3x H5.3m and G 100.645to
Tower section 2, L18.76x W5.3x H4.99m and G 98.73to
Tower section 3, L26.88x W4.99x H4.99m and G 112.388to
Tower section 4, L28x W4.99x H4.974m and G 64.754to
Tower section 5, L28.32x W4.974x H4.47m and G 57.45to

8. Legislation:

According with Romanian legislation concerning standard and exceptional road transports, the permits are obtained from the national and local roads administrations based on exceeding in dimensions and weight of the loaded component(exceeding in weights are calculated and charged per each driven kilometer, both concerning the total weight, over 40 to; and on each axle or group of axles of the convoy; the exceeding of the total dimensions are charged per each kilometer for more than 16.5 m length, 2.55 m width, 4.00m height).

Sundays and Saturdays it is not permitted to drive during day light, but in the night.

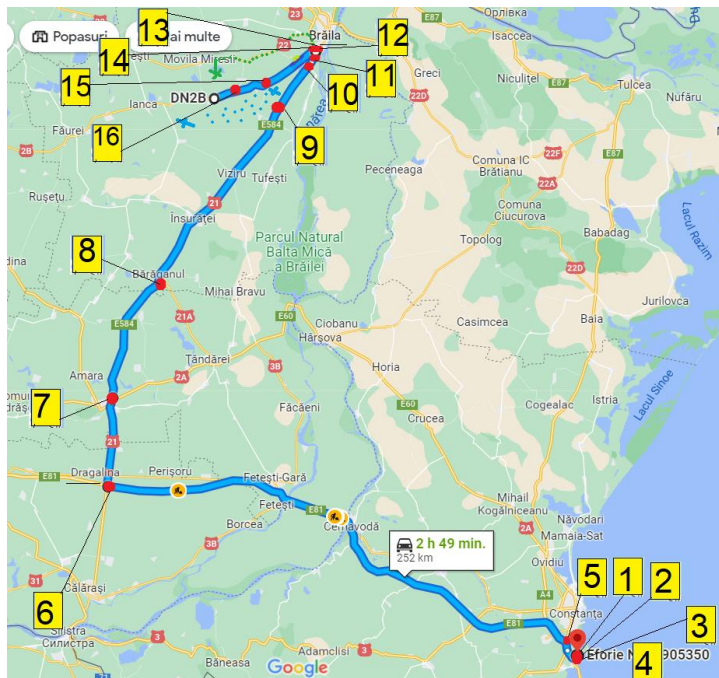
In the summer season (15 of June – 15 of September), the circulation of trucks is stopped starting Friday, 14.00 to Sunday, 22.00.

9.1. The route option for transport with components

9.1.1. The map of the route A

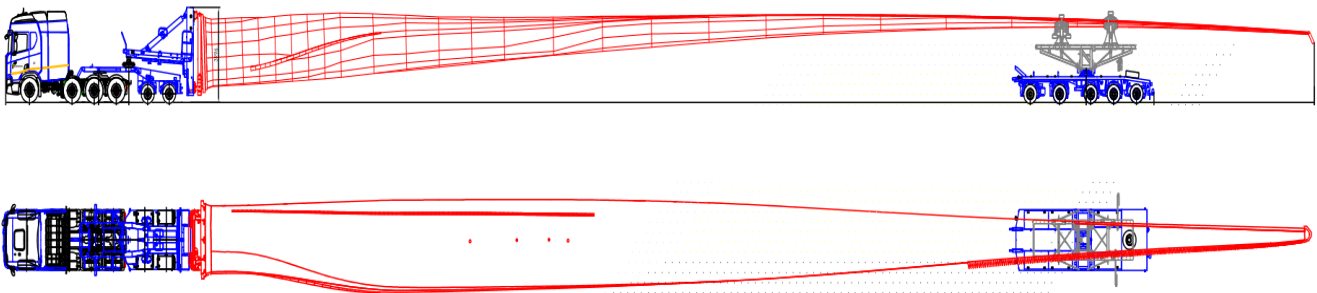
Starting from the port of Agigea, Constanta South we drive on DN39 and turning left on A2 highway – right on DN21 Drajna Noua- Slobozia- Baraganul- Braila- left on the ring road of the city- turning left on DN2B Lacu Sarat- Silistraru- Urleasca- future entrance into the jobsite- aprox. KM 260.

At this moment on A2 between Cernavoda and Fetesti, there is a temporary weight restriction for maximum 50to but the the civil works, reinforcement of bridges are in progress- has to be checked again before the project.



Transport configuration:

The blades have to be loaded on a special trailer:
 The loaded convoy is L94x W4.995x H4.35m and G64to



Results:

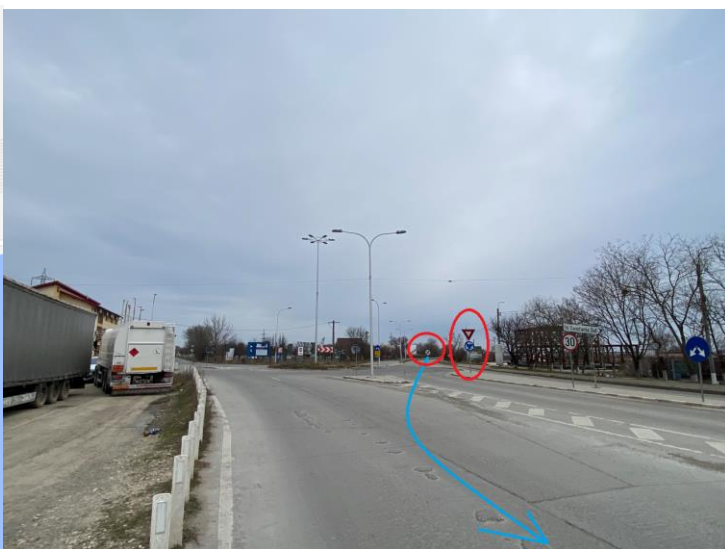
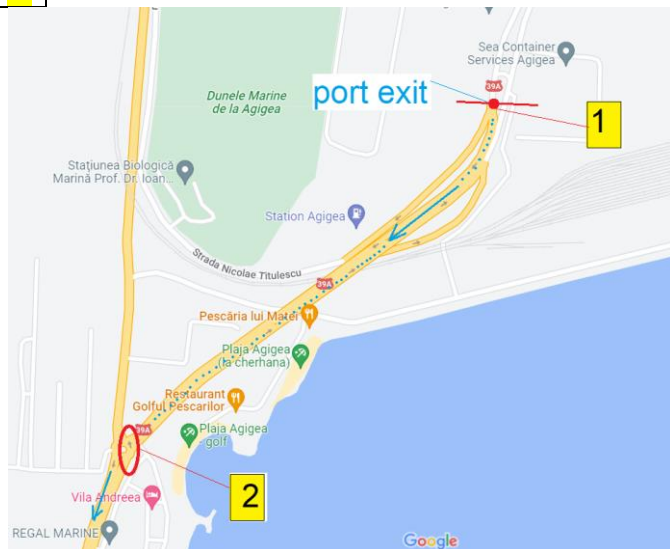
The exit solution from the port has to be agreed with the port authority, obstacle **No.1**

1.



Starting with the exit gate of the port we continue to drive on opposite sense up to the roundabout. At the roundabout we drive on the left side and continue forwards on DN39A, obstacle **No.2**. There the traffic signs, street furniture and one pole have to be removed.

2.



At the crossroad with DN39 we continue over the bridge into Constanta city direction, obstacle **No.3**. In order to be able to drive with the blades, before the bridge, one traffic sign will be removed and the vegetation from the right side has to be cut.

3.



Passing the bridge the vegetation left and right has to be removed. The clearance between the top of the blade and the power lines has to be checked with the authorities before the project, obstacle **No.4**
We enter back on DN39 driving on opposite sense.

4.



Crossroad with the highway A4, we turn left before the roundabout, obstacle **No. 5** on the map. Before the curve the concrete furniture and traffic sign have to be removed. After the curve the traffic signs have to be removed.

5.



Top view with the roundabout.



Driving forwards on A2, at the crossroad with DN21 we turn right into Dragalina direction, obstacle **No.6** on the map. There the traffic signs, poles and street furniture have to be removed.

6.

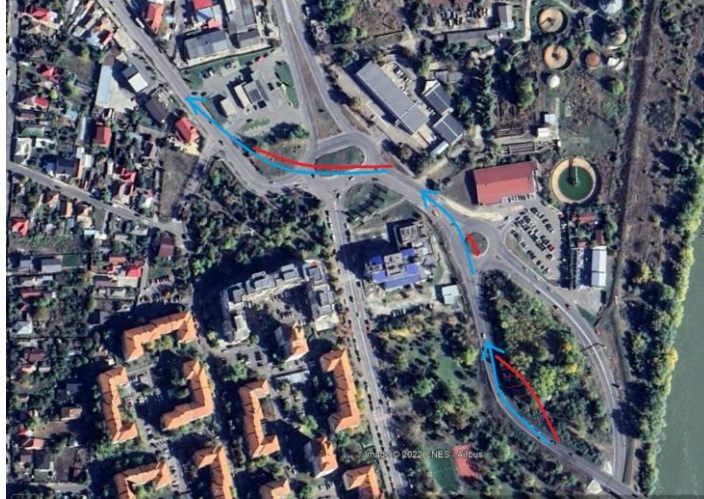


Driving on DN21 after the intersection with DN3A there is a railway power lines where the label is shown us at 4m height and technical assistance from the authorities is required at the moment of the transport.



Before + inside + after the intersection with DN2A, there has to be prepared an empty corridor for the loaded trailer with the blade, obstacle **No.7**
Before the intersection the vegetation on the right side will be cut. Parts from the roundabouts will be removed, the traffic signs will be removed.

7.



Driving forwards on DN21, at Baraganu we pass under the railway power lines where the clearance is H4.5m. The plastic elements from the middle of the asphalt will be removed, obstacle **No.8** on the map.

8.



We continue forwards thru Insuratei- Viziru- Lanurile- Valea Canepii.

Driving on DN21 before to reach Albina village we can chose to build an entrance on the left side of the road in order to reach the area of the future turbines, obstacle **No.9** on the map.

9.



If we chose to continue into Braila direction, at the crossroad with DJ212 is a roundabout where we have to drive on opposite sense, obstacle **No.10**

The concrete elements and traffic signs have to be removed. After the roundabout we come back on our driving sense into Braila direction. In this matter again the traffic signs and concrete elements will be removed.

10.



Driving on DN21 at the next roundabout we keep straight forwards.



On the same DN21 before the entrance in the city there is another roundabout, obstacle **No.11**. There we need a temporary empty corridor for W5.5m in order to be able to pass with the blades.

11.



Braila city

At the intersection with the ring road of the city we turn left before the roundabout, obstacle **No.12** on the map. The inside corner has to be enlarged, traffic signs and light poles will be removed, wooden pieces will be used around of curbstones in order to protect the tires. Before the intersection, on the right side, the trees will be removed and also the branches over the private fence in order to be able to pass with the top of the blade.

12.

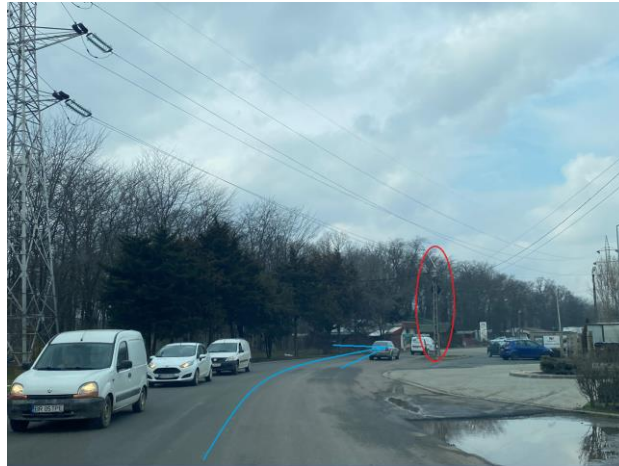


On the ring road is a passage with tram, the wires are fixed at 5m height.



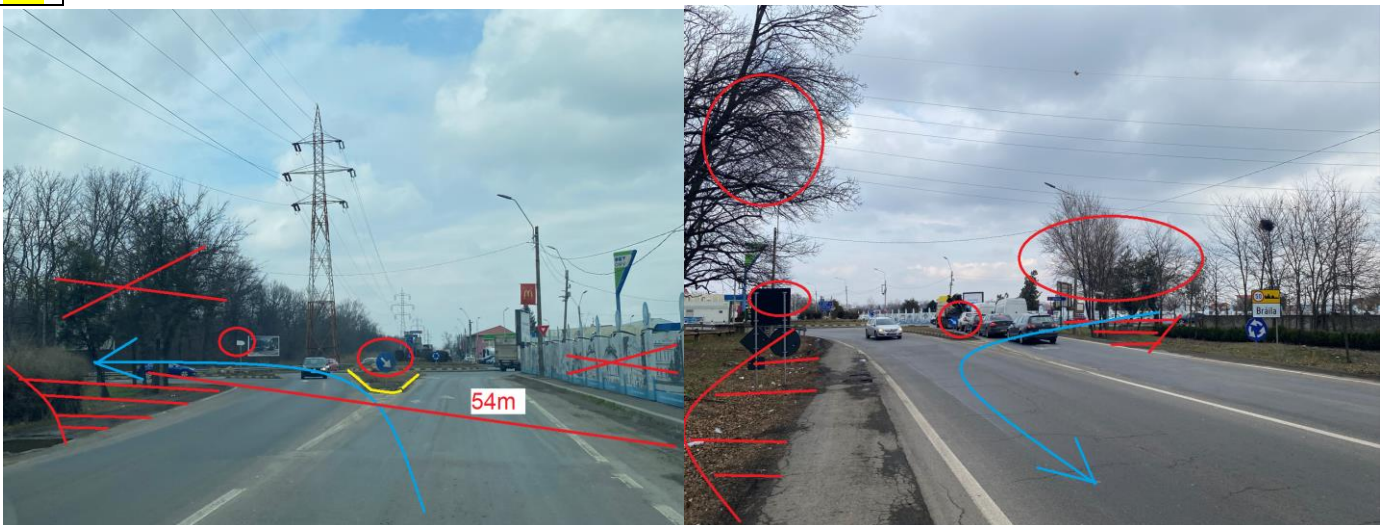
Driving forwards on the ring road of the city, in the right curve one light pole has to be removed, **No.13** on the map.

13.

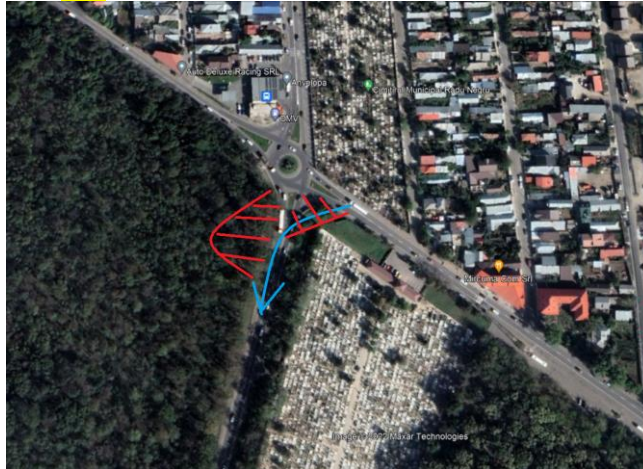


At the intersection with DN2B we turn left, there is a diagonal of 54m, obstacle **No.14** on the map. The solution is to enlarge the space.

14.



Top view with the intersection **14.**



Driving forwards on DN2B we find a bridge and the steel traverse is H4.47m from the asphalt.



Before Silistraru village on the left side could be the future entrance into the jobsite, T17 turbine. The entrance has to be enlarged, obstacle **No.15** on the map.

15.



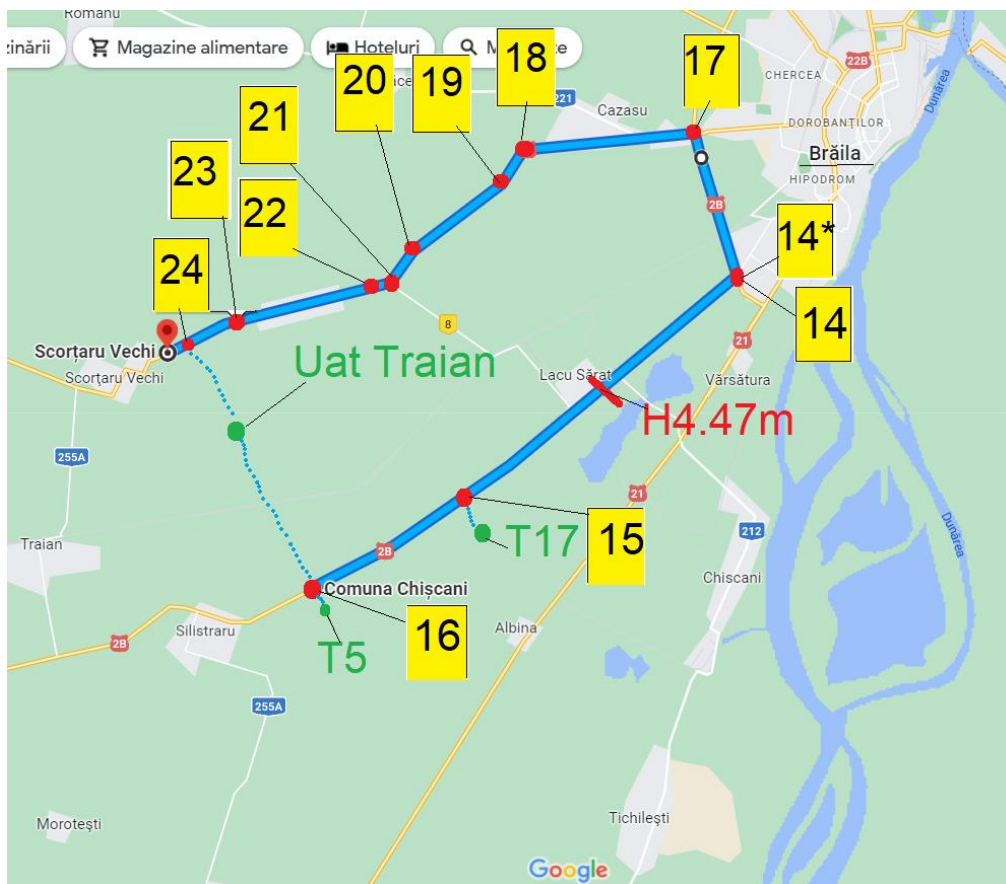
If we chose to continue to drive forwards, outside of the village on the left side of the road, there could be a second entrance into the jobsite, T5 turbine. The entrance has to be enlarged, obstacle **No.16** on the map.

16.



On the right side of the road could be the future entrance into the last turbine named UAT Traian if we build the road access up to the foundation.

Otherwise, we have to use the ring road of Braila city and to turn left at the crossroad with DN22, see below the new map.



Coming back at the intersection between the ring road of Braila city and DN2B, now we have to keep forwards after the roundabout so, different civil works has to be done, obstacle **No.14*** Part of the roundabout has to be removed of W5.5m free space.

14*

At the intersection with DN22 we turn left into Cazasu direction, obstacle **No.17** on the map. An option could be to enlarge the right side of the curve in front for the truck and also the right side before the roundabout for the trailer. The traffic signs will be removed.

17.

Driving forwards on DN22, exit from Cazasu village, there is a curve to the left, No.18 on the map. The traffic signs and vegetation will be removed.

18.



Next curve is to the right and the diagonal has 71m, it has to be enlarged and the traffic signs will be removed, obstacle No.19

19.



Driving forwards in the next curve to the left the traffic signs and 2 trees will be remove, obstacle No.20

20.



The next curve is to the right with a diagonal of 80m, obstacle **No.21** on the map. The inside corner will be enlarged, the traffic signs left and right will be removed.

21.



Inside of Tudor Vladimirescu village in the curve to the right the diagonal is 44m. The curve has to be enough enlarged in order to obtain enough space for the trailer loaded with the blades, obstacle **No.22** on the map.

22.



Driving forwards on DN22 outside of the village is a curve to the left with a diagonal of 84m, obstacle **No.23**
The trees and traffic signs will be removed and inside corner will be filled up and compacted.

23.



Before Scortaru Vechi village, on the left side could be the future entrance into the jobsite, obstacle **No.24**
on the map. The curve has to be enlarged according with the loaded convoy.

24.



CONCLUSIONS:

1. This route checking was performed according with above described loaded convoy.
2. We have found and wrote the route option and critical points which must be eliminated in order to be able to transport the requested component.
3. Before the project we have to be sure that existing weight restriction of A2 highway is not in place anymore.
3. Inside of the jobsite the roads have to be prepared taking into consideration the axle pressure, inner radius, outside radius and the type of the equipment involved.
5. In the next step of the project civil works have to be evaluated.

R O A D S U R V E Y

URLEASCA WIND FARM

9.1.2. The map of the route B

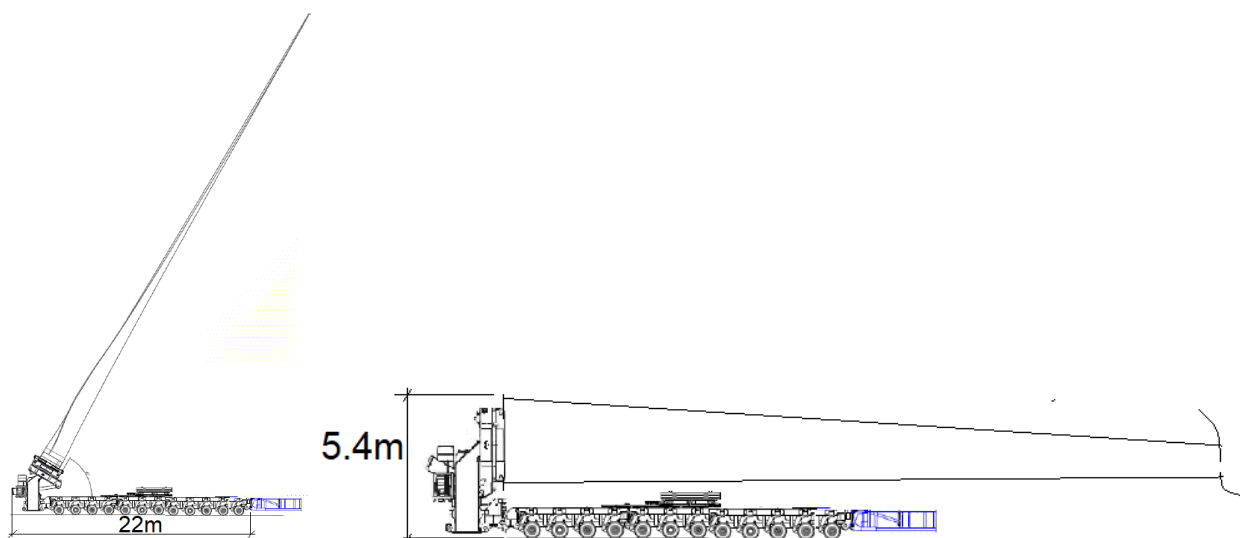
Starting from the river port Braila, STX SA- we turn left on DN21 into Varsatura- Albina- jobsite direction, aprox 15KM; in this way we reach the turbine 1- 17. (blue color on the map)

If we turn right on the ring of Braila city at the crossroad with DN22 we turn left into Cazasu- Tudor Vladimirescu direction, aprox 25km. In this way we reach the turbine named UAT Traian. (green color on the map)



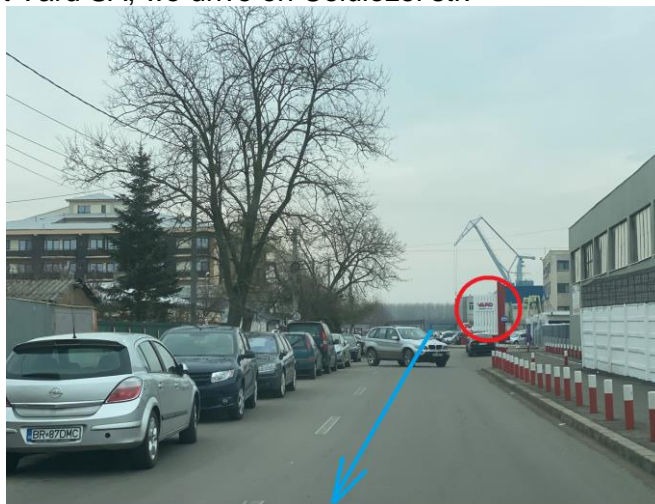
Transport configuration:

The height of the loaded convoy with the blade in horizontal position is 5.4m



Results:

Coming from the private port Vard SA, we drive on Celulozei str.



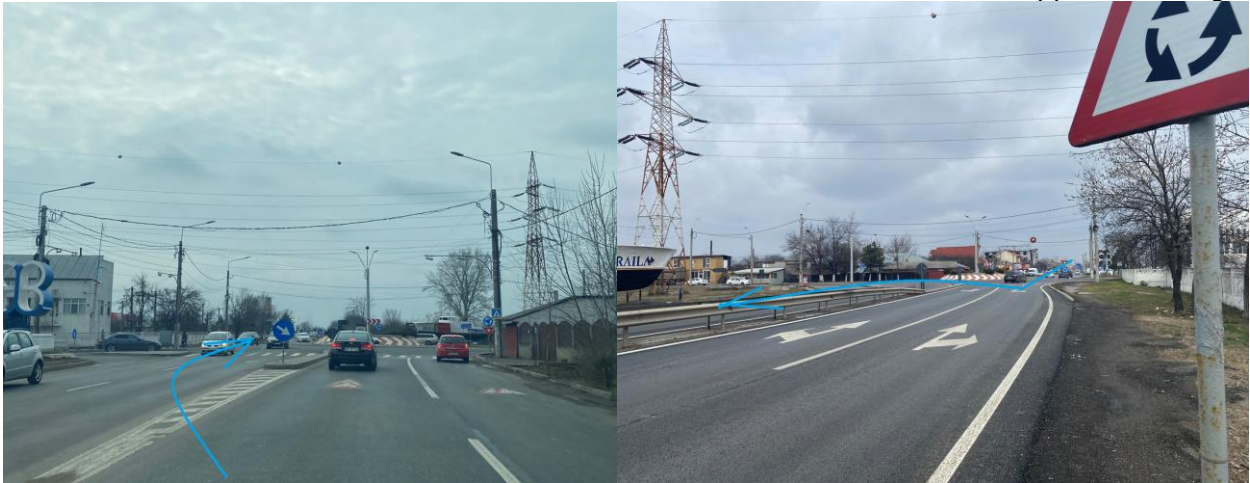
At the crossroad with Calea Calarasilor str we turn left, there the diagonal is 38m.



Driving on Calea Calarasilor str, at the first roundabout we keep forwards, the space is 41m



At the crossroad with the ring road of Braila city we keep straight but driving on opposite way.
Another view from opposite driving way.



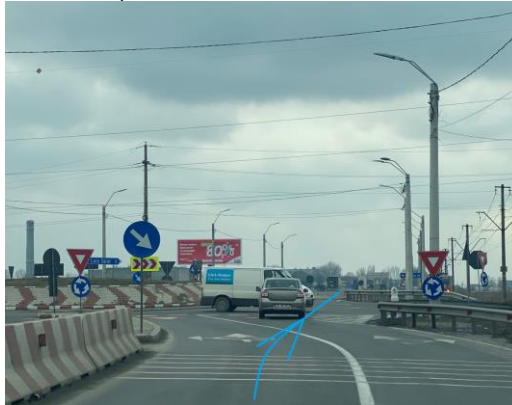
Driving forwards on DN21 at the roundabout we continue straight, the diagonal is 38m (see page 8, obstacle No.11)



At the next roundabout we continue forwards, there the diagonal is 37m.(at the page 8 it is shown this roundabout where the opposite driving way is clean)



Driving forwards on DN21 at the crossroad with DJ212 we continue straight. (that is the same roundabout as shown above at page 7, obstacle No.10)



We continue to drive forwards on DN21, after Albina village at the crossroad with DJ9 Tichelesti, we turn right into the jobsite direction, turbine T14, obstacle **No.9** on our map. (as it was shown at page 7)
In this way we can reach the turbines 1- 17.

9.



Coming back on the ring road of Braila city following the route in green color, we reach the last turbine named Uat Traian. All the route it was explained with details starting with obstacle No12/ page 10, page 13, 14, 15, 16.

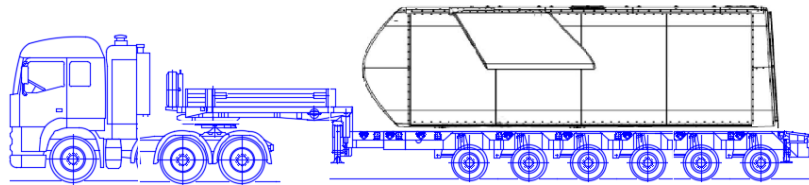
Before Scortaru Vechi village, on the left side could be the future entrance into the jobsite, obstacle No.24 on the map. The curve has to be enlarged according with the loaded convoy.

24.

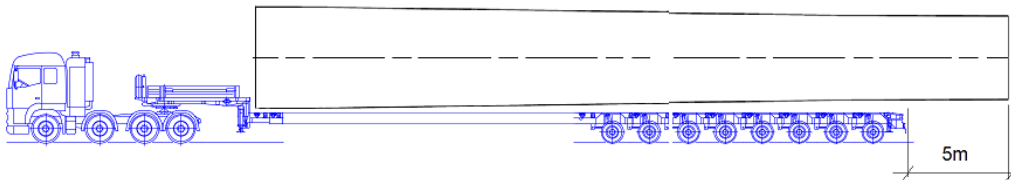


CONCLUSIONS:

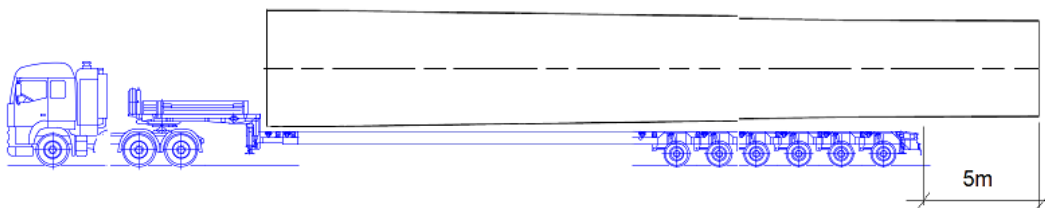
1. This route checking was performed according with above described loaded convoy.
2. We have found and wrote the route option and critical points which must be eliminated in order to be able to transport the requested component.
3. Before the project, on the entire route all the branches of the trees have to be cut.
4. Before the project, in the area of all intersections/ roundabouts of the entire route, all the cables/ wires will be removed because there we have to lift up the blade.
5. Before the project we have to be sure that existing weight restriction of A2 highway is not in place anymore.
6. Inside of the jobsite the roads have to be prepared taking into consideration the axle pressure, inner radius, outside radius and the type of the equipment involved.
7. This route option is subject to the availability of the private port operator VARD SA where two fix cranes of 50to capacity- each, can work in tandem.
8. The nacelle can follow both routes (blue and green colors) starting with the port of Braila.
The loaded convoy is L21.5x W5.45x H5.2m and G83to



9. The tower section 4 can follow both routes (blue and green colors) starting with the port of Braila. In this matter all the cables/ wires have to be removed before the project.
The loaded convoy is L38.5x W5x H6.2m and G107to



10. The tower section 5 can follow both routes (blue and green colors) starting with the port of Braila. In this matter all the cables/ wires have to be removed before the project.
The loaded convoy is L36x W5x H6.2m and G92.5to

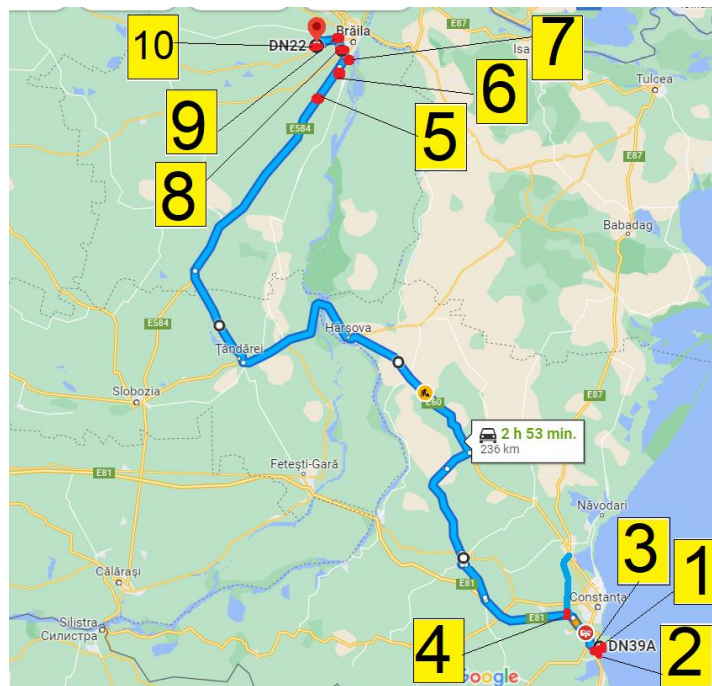


11. In the next step of the project civil works have to be evaluated.

9.1.3. The map of the route C

Starting from the port of Agigea we drive on DN39A- turning right on DN39 over the bridge- turning left on A4- right on DN3, Valu lui Traian, Murfatlar, Castelu- Medgidia- turning right on DJ224, Tortoman, Silistea, Tepes Voda- turning left on DN2A Galbiori, Harsova- Tandarei- turning right on DN21A Baraganu- turning right on DN21 Insuratei, Viziru, Valea Canepii- turning left into the jobsite direction in order to reach the turbines 1... 17, aprox 210km.

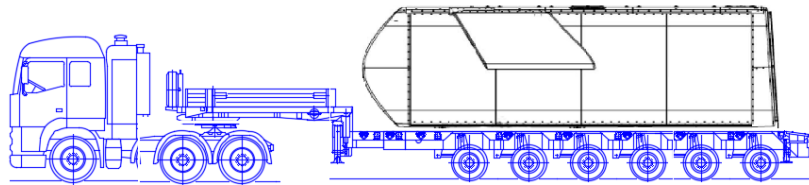
We continue forwards on DN21, Albina- Braila- turning left on the ring road of Braila city- turning left on DN22, Cazasu- Tudor Vladimirescu- future entrance into the jobsite, turbine named UAT Traian- aprox 240km.



Transport configuration:

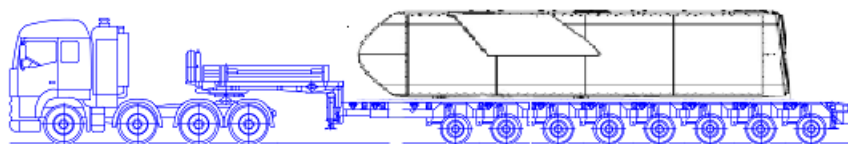
The nacelle:

Loaded convoy is L21.5x W5.45x H5.2m and G83to
Axle pressure is 7-9-9/ 6x 9.66to per axle



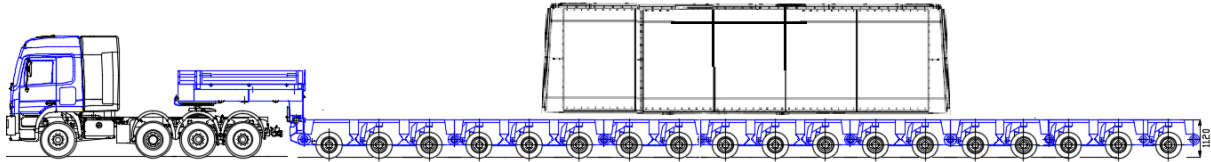
The rotor:

Loaded convoy is L22.5x W4.7x H5.2m and 104to
Axle pressure is 7-7-10-10/ 8x 8.75to per axle



The generator:

Loaded convoy is L36.5x W5.5x H5.2m and 219to
 Axle pressure is 7-7-10-10/ 18x 10.27to per axle



Results:

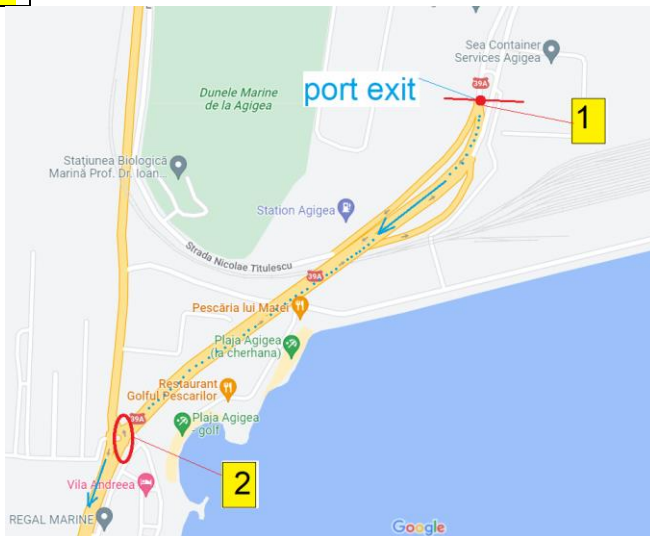
We use to leave the port on the opposite driving way, obstacle **No.1**

1.



We continue to drive on straight forwards on the normal driving way up to the roundabout. At the roundabout we drive on the left side and continue forwards on DN39A, obstacle **No.2**.

2.



At the crossroad with DN39 we continue forwards over the bridge and turning left into Constanta direction driving on opposite way, obstacle **No.3**

3.

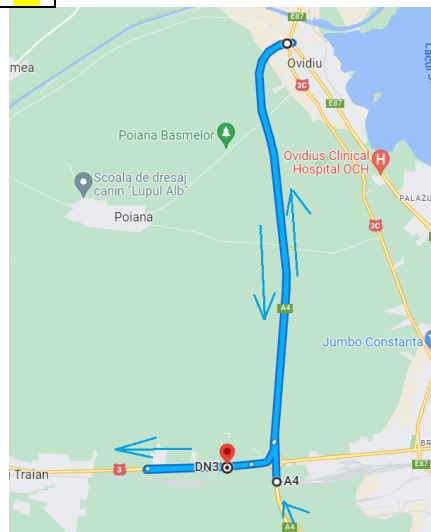


At the crossroad with A4 highway we turn left using the normal driving way.



In order to enter on DN3 we continue forwards on the A4 highway up to Ovidiu roundabout and we come back on A4 up to the crossroad with DN 3 where we turn right, obstacle **No.4** on the map.

4.



We drive forwards on DN3 thru Valu lui Traian- Murfatlar – turning right on DN22 thru Poarta Alba- Castelu- Medgidia- turning right on DJ224 thru Tortomanu- Silistea- Tepes Voda- turning left on DN2A thru Galbiori- Crucea- Stupina- Harsova- Vadu Oii- Giurgeni- Tandarei, without obstacles for our loaded trailers. Inside Tandarei city we turn right on DN21 A.



Driving forwards on DN21A at the exit from Baraganu village there is the intersection with DN21 and we turn right on it into Braila direction.



We continue to drive forwards on DN21 thru Insuratei- Viziru- Lanurile- Valea Canepii, without obstacles for our loaded trailers. Before Stupina we turn left into the future entrance of the jobsite, there we can reach the turbines 1 ... 17, **No.5** on our map.

5.



In order to deliver the components to the last turbine, we continue forwards on DN21 into Braila direction. At the crossroad with DJ212 is a roundabout where we have to drive on opposite sense, obstacle **No.6**. The concrete elements and traffic signs have to be removed. After the roundabout we come back on our driving sense into Braila direction. In this matter again the traffic signs and concrete elements will be removed.

6.



Driving on DN21 at the next roundabout we keep straight forwards.

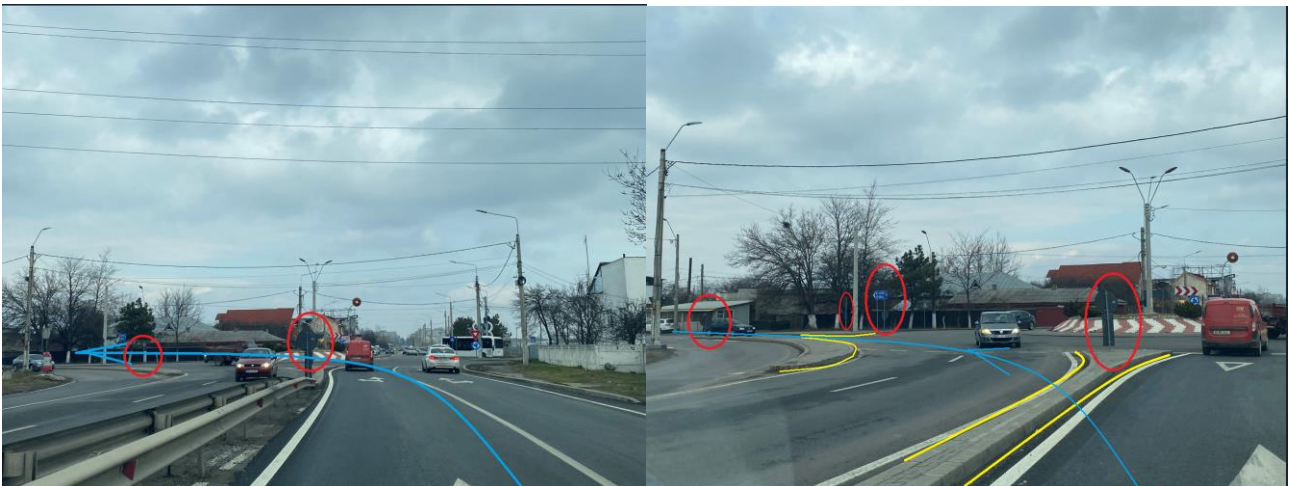


Driving forwards on DN21, inside Varsatura village we pass the roundabout on normal sense.



At the crossroad with the ring road of Braila city we turn left on opposite driving way, obstacle **No.7** on the map. The traffic signs will be removed. Wooden pieces will be used around of curbstones.

7.



We drive forwards on the ring road of Braila city, there is a tram wire at H5m and technical assistance has to support the loaded convoy, obstacle **No.8**

8.



At the crossroad with DN2B we pass the roundabout on the normal driving way.



Driving forwards on the ring road of Braila city, at the next roundabout is the intersection with DN22 where we must turn left on opposite driving way. There the diagonal is 34m and before curve one traffic sign and 5m of the island have to be removed. On the inside corner the branches will be cut, obstacle **No.9**

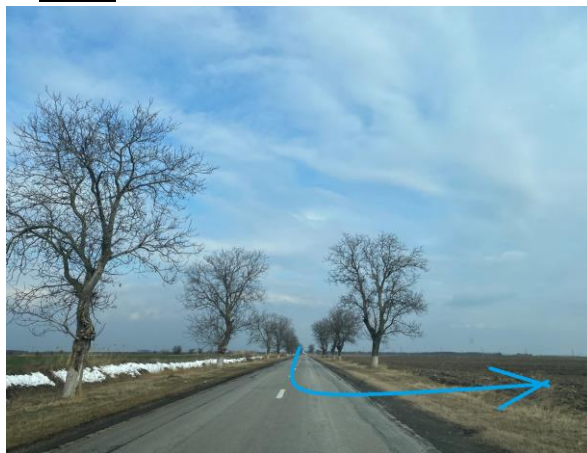
After the intersection one traffic sign and few meters of the island will be removed.

9.



From now on we continue to drive forwards on DN22 up to the future entrance into the jobsite, before Scortary Vechi village, obstacle **No.10** on our map.

10.



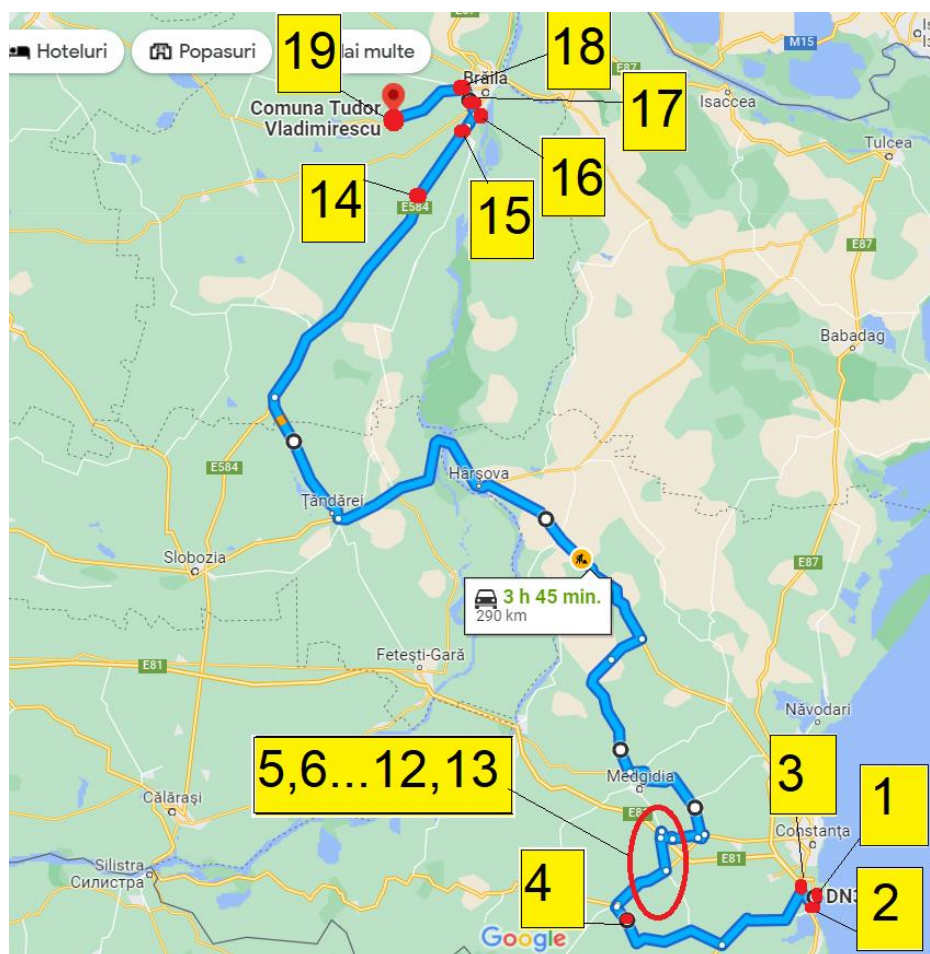
CONCLUSIONS:

1. This route checking was performed according with above described loaded convoy.
2. We have found and wrote the route option and critical points which must be eliminated in order to be able to transport the requested component.
3. Before the project, on the entire route all the branches of the trees have to be cut.
4. Inside of the jobsite the roads have to be prepared taking into consideration the axle pressure, inner radius, outside radius and the type of the equipment involved.
5. In the next step of the project civil works have to be evaluated.

9.1.4. The map of the route D

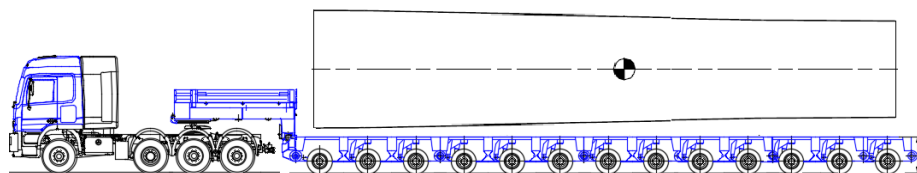
Starting from the port of Agigea we drive on DN39A- turning right on DN39 over the bridge- left on DN38, Techirghiol- Movilita- Topraisar- Mereni- Ciobanita- Cobadin- Ciocarlia de Sus- turning left on DJ381- turning right on DJ27 thru Siminoc- Murfatlar- turning left on DN22C thru Castelu- Medgidia- turning right on DJ224, Tortoman, Silistea, Tepes Voda- turning left on DN2A Galbiori, Harsova- Tandarei- turning right on DN21A Baraganu- turning right on DN21 Insuratei, Viziru, Valea Canepii- turning left into the jobsite direction in order to reach the turbines 1... 17, aprox 270km.

We continue forwards on DN21, Albina- Braila- turning left on the ring road of Braila city- turning left on DN22, Cazasu- Tudor Vladimirescu- future entrance into the jobsite, turbine named UAT Traian- aprox 290km.



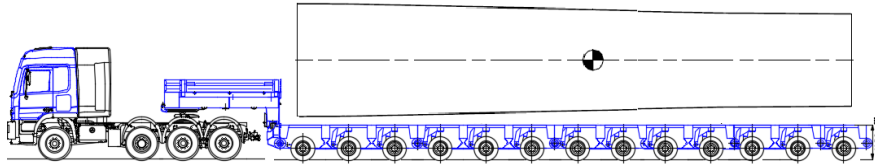
Transport configuration:

The tower section 1:
 The loaded convoy is L29x W5.3x H6.5m and G 172t
 Axle pressure is 7-7-10-10/ 13x 10.61t to per axle



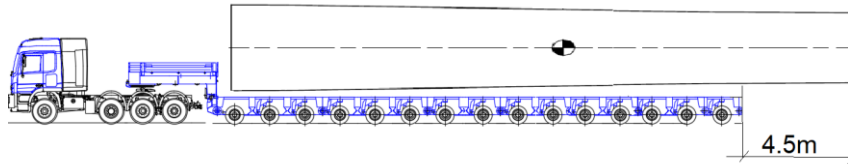
The tower section 2:

The loaded convoy is L29x W5.3x H6.5m and G170to
 Axle pressure is 7-7-10-10/ 13x 10.46to per axle



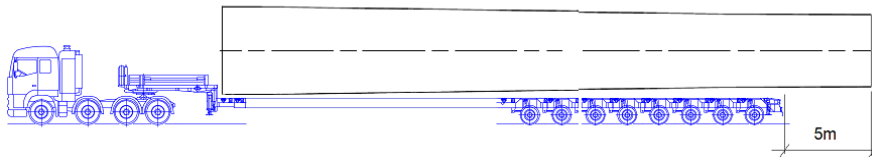
The tower section 3:

The loaded convoy is L36.5x W5x H6.2m and G190to
 Axle pressure is 7-7-10-10/ 15x 10.4to per axle



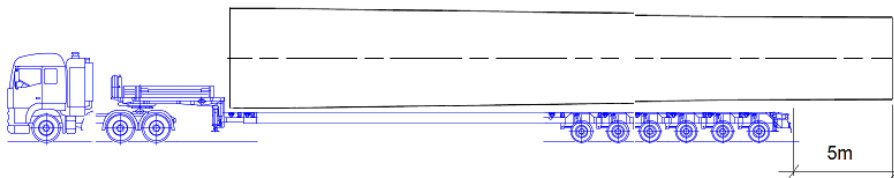
The tower section 4:

The loaded convoy is L38.5x W5x H6.2m and G107to
 Axle pressure is 7-7-10-10/ 8x 9.12to per axle



The tower section 5:

The loaded convoy is L36x W5x H6.2m and G92.5to
 Axle pressure is 7-10-10/ 6x 10.9to per axle



Results:

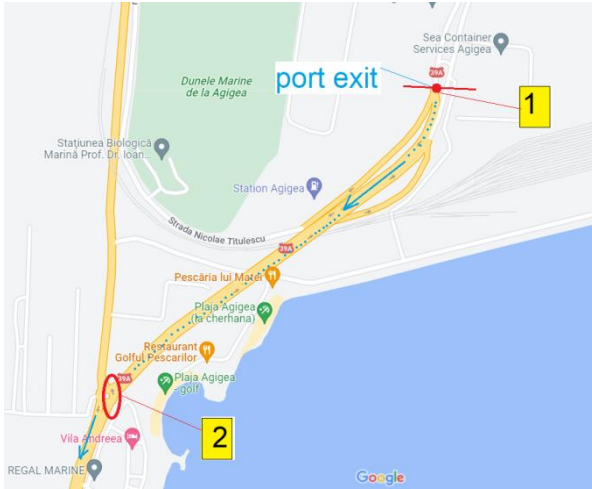
We use to leave the port on the opposite driving way, obstacle **No.1**

1.



We continue to drive on straight forwards on the normal driving way up to the roundabout. At the roundabout we drive on the left side and continue forwards on DN39A, obstacle **No.2**.

2.



At the crossroad with DN39 we turn right on normal driving way.



At the crossroad with DN38 we turn left on opposite way, before the roundabout. The small plastic elements have to be removed from the asphalt, **No.3**

3.



On the entire route all the wires have to be removed before the project, the branches of the trees will be removed- in order to have an open window for W6/ H7m. The traffic signs or video cameras which are fixed on the side of the road have to be rotated 90° or even dismantled.



Inside Cobadin village, the left corner has to be correctly prepared, obstacle **No.4**
 Now the diagonal of the curve is 36.5m so, it has to be enlarged and the traffic sign removed.

4.



At the exit from Cobadin village, the traffic sign has to be rotated, obstacle **No.5** on the map.

5.



Before Ciocarlia village, the traffic sign and the branches have to be removed.

6.



Inside of the village, the plastic signs will be removed from the asphalt, obstacle **No.7**

7.



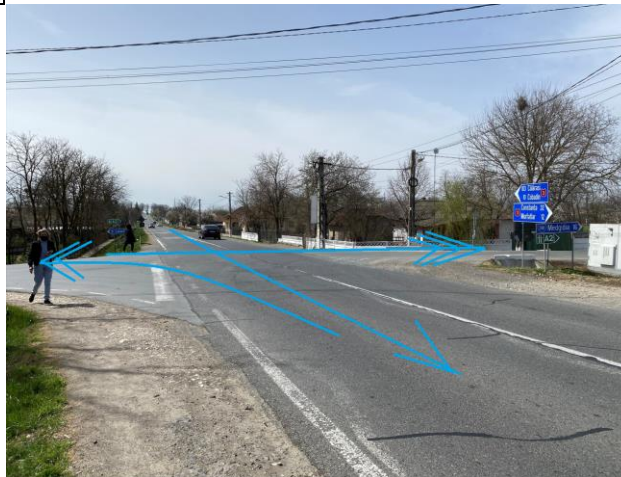
Driving forwards, another traffic sign has to be removed, obstacle **No.8** on the map.

8.



Inside of Ciocarla de Sus at the crossroad with DJ381 we turn left in 3 steps, obstacle **No.9** on the map.

9.



Driving forwards on DJ381 the traffic labels have to be removed, obstacle **No.10**

10.





At the crossroad with DJ27 we turn right into Siminoc direction. There the traffic signs will be removed, **No.11** on the map.

11.



Driving forwards on DJ27, another traffic sign has to be removed, **No.12.**

12.



We continue to drive into Siminoc direction, another traffic sign has to be removed, **No.13** on the map.

13.



Driving forwards thru Siminoc village and Murfatlar, at the crossroad with DN22C we turn left into Castelu – Medgidia direction. All over the route the same remarks remain available in respect of wires, cables, traffic signs and trees : all have to be removed before the project in order to obtain an open window of W6x H7m. At the crossroad with DJ224 we turn right and continue to drive thru Tortomanu- Silistea- Tepes Voda- turning left on DN2A thru Galbiori- Crucea- Stupina- Harsova- Vadu Oii- Giurgeni- Tandarei, without obstacles for our loaded trailers.

Inside Tandarei city we turn right on DN21 A.



Driving forwards on DN21A at the exit from Baraganu village there is the intersection with DN21 and we turn right on it into Braila direction.



We continue to drive forwards on DN21 thru Insuratei- Viziru- Lanurile- Valea Canepii, without obstacles for our loaded trailers. Before Stupina we turn left into the future entrance of the jobsite, there we can reach the turbines 1 ... 17, **No.14** on our map.

14.



In order to deliver the components to the last turbine, we continue forwards on DN21 into Braila direction. At the crossroad with DJ212 is a roundabout where we have to drive on opposite sense, obstacle **No.15**. The concrete elements and traffic signs have to be removed. After the roundabout we come back on our driving sense into Braila direction. In this matter again the traffic signs and concrete elements will be removed.

15.



Driving on DN21 at the next roundabout we keep straight forwards.

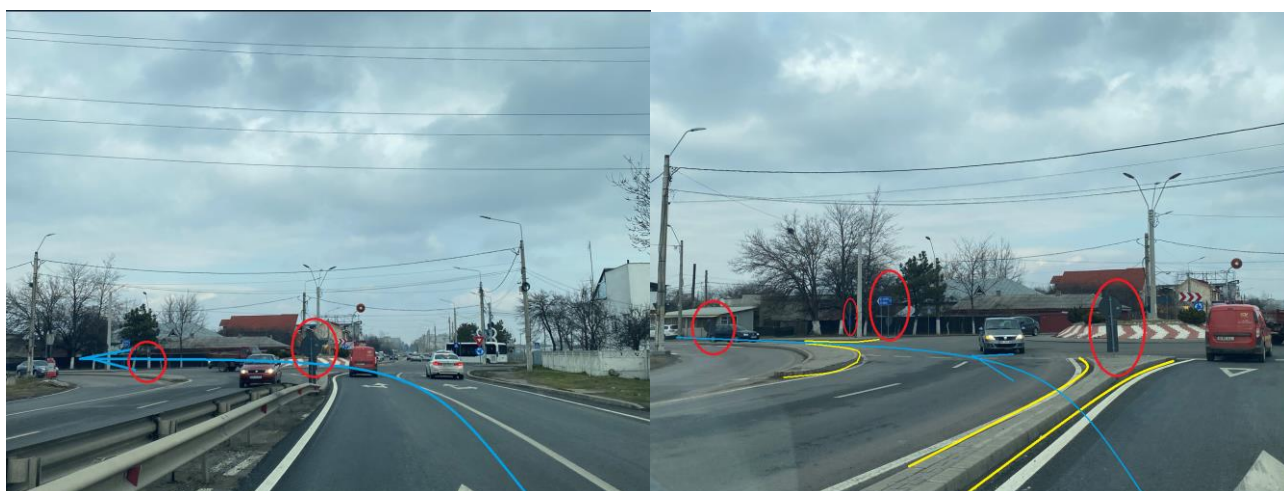


Driving forwards on DN21, inside Varsatura village we pass the roundabout on normal sense.



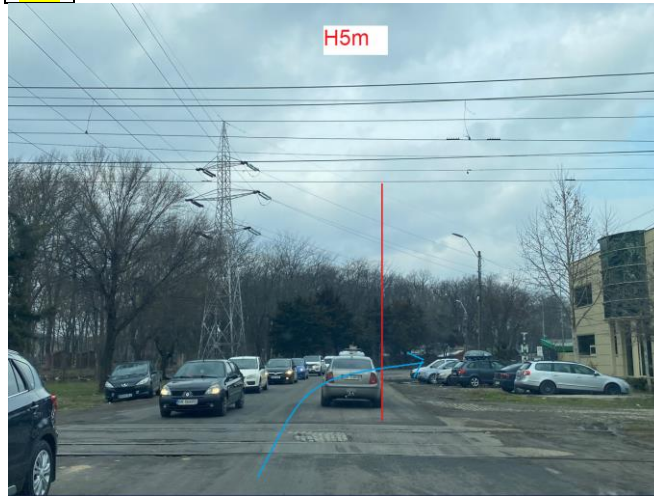
At the crossroad with the ring road of Braila city we turn left on opposite driving way, obstacle **No.16** on the map. The traffic signs will be removed. Wooden pieces will be used around of curbstones.

16.



We drive forwards on the ring road of Braila city, there is a tram wire at H5m and technical assistance has to support the loaded convoy, obstacle **No.17**

17.



At the crossroad with DN2B we pass the roundabout on the normal driving way.



Driving forwards on the ring road of Braila city, at the next roundabout is the intersection with DN22 where we must turn left on opposite driving way. There the diagonal is 34m and before curve one traffic sign and 5m of the island have to be removed. On the inside corner the branches will be cut, obstacle **No.18**

After the intersection one traffic sign and few meters of the island will be removed.

18.



From now on we continue to drive forwards on DN22 up to the future entrance into the jobsite, before Scortary Vechi village, obstacle **No.19** on our map.

19.



CONCLUSIONS:

1. This route checking was performed according with above described loaded convoy.
2. We have found and wrote the route option and critical points which must be eliminated in order to be able to transport the requested component.
3. Before the project, on the entire route all the traffic signs, wires, cables and branches of the trees have to be removed.
4. Inside of the jobsite the roads have to be prepared taking into consideration the axle pressure, inner radius, outside radius and the type of the equipment involved.
5. In the next step of the project civil works have to be evaluated.

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