REGIONE PUGLIA

COMUNE DI AVETRANA

PROVINCIA DI TARANTO

PROGETTO PER LA REALIZZAZIONE DI IMPIANTO PER LA PRODUZIONE DI ENERGIA ELETTRICA DA FONTE EOLICA, NONCHE' OPERE ED INFRASTRUTTURE CONNESSE, DI POTENZA INSTALLATA DI 63 MW DENOMINATO "AVETRANA ENERGIA"

OPERE DI CONNESSIONE ALLA RTN NEL COMUNE DI ERCHIE (BR)

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Executor: Leanzio GAMBUTI

Approver: Francesco DRAGONE

Customer: FRI.EL.

Transport Road Survey Report

Project: Avetrana (TA), Italy

History of this document

Doc. and Rev. no.:	Date:	Description of changes	Exec.	Appr.
MED TTT001	20/11/19	First issue	Leanzio GAMBUTI	FRADR

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Table of Contents

Summary

According to Customer requested it has been analyzed turbine type V150 and HH 105 / V162 h119-125 tower configuration transport feasibility for catching up to the Avetrana Wind Park Site.

Road Survey date:	13/11/19
Transport Supervisor:	Giuseppe BASILE (Vestas Italia) Francesco DRAGONE (Vestas Italia)
Attendants:	**Piero Vetere (Fri.El.)**
Transporter Representative:	**Riccardo DI PALMA (La Molisana Trasporti)**

Specs Description

Project	**Avetrana (TA)**
Country	Italy
Place	Location- Puglia
Scope	Planning Stage – Transport Logistic – Feasibility Study
Turbine	V150 HH105 – V162 HH119/125
MW	4.2
Transport Mode	**X** Standard **X** Transshipment **X** Blade Lifter □ Tower □ Nacelle
Start From	Taranto Port – Component and Blade Atessa – Tower

Weight and Dimension

V150 4.2MW 105m

Nacelle	length mm	width mm	height mm	Weight kgs
	12861	4004	3412	64938

Single blade	length mm	width mm	height mm	Weight kgs
	73839	4083	2600	17000

Hub	length mm	width mm	height mm	Weight kgs
	5472	3784	3964	34196

Drive train	length mm	width mm	height mm	Weight kgs
	7230	3500	3200	61059

Tower	Bottom end mm.	top end mm.	length mm.	weight kgs.
Top section	3670	3258	33000	51000
Middle section 2	4028	3670	28840	67000
Middle section 1	4041	4028	24920	83000
Bottom section	4450	4041	15840	83000

V162 4.2MW

Nacelle	length mm	width mm	height mm	Weight kgs
	18176	**4200**	**4350**	**83670**

Single blade	length mm	width mm	height mm	Weight kgs
	79350	**4320**	**3294**	**21700**

Hub	length mm	width mm	height mm	Weight kgs
	4980	**4401**	**4040**	**64000**

Drive train	length mm	width mm	height mm	Weight kgs
	7500	**2700**	**3000**	**94040**

HH119m

Tower	**Bottom end mm.**	**top end mm.**	**length mm.**	**weight kgs.**
Section 1	4500	4150	11560	80000
Section 2	4150	4150	14280	79000
Section 3	4150	4150	18760	76000
Section 4	4150	4150	21000	63000
Section 5	4150	4150	21000	47000
Section 6	4150	4000	30000	52000

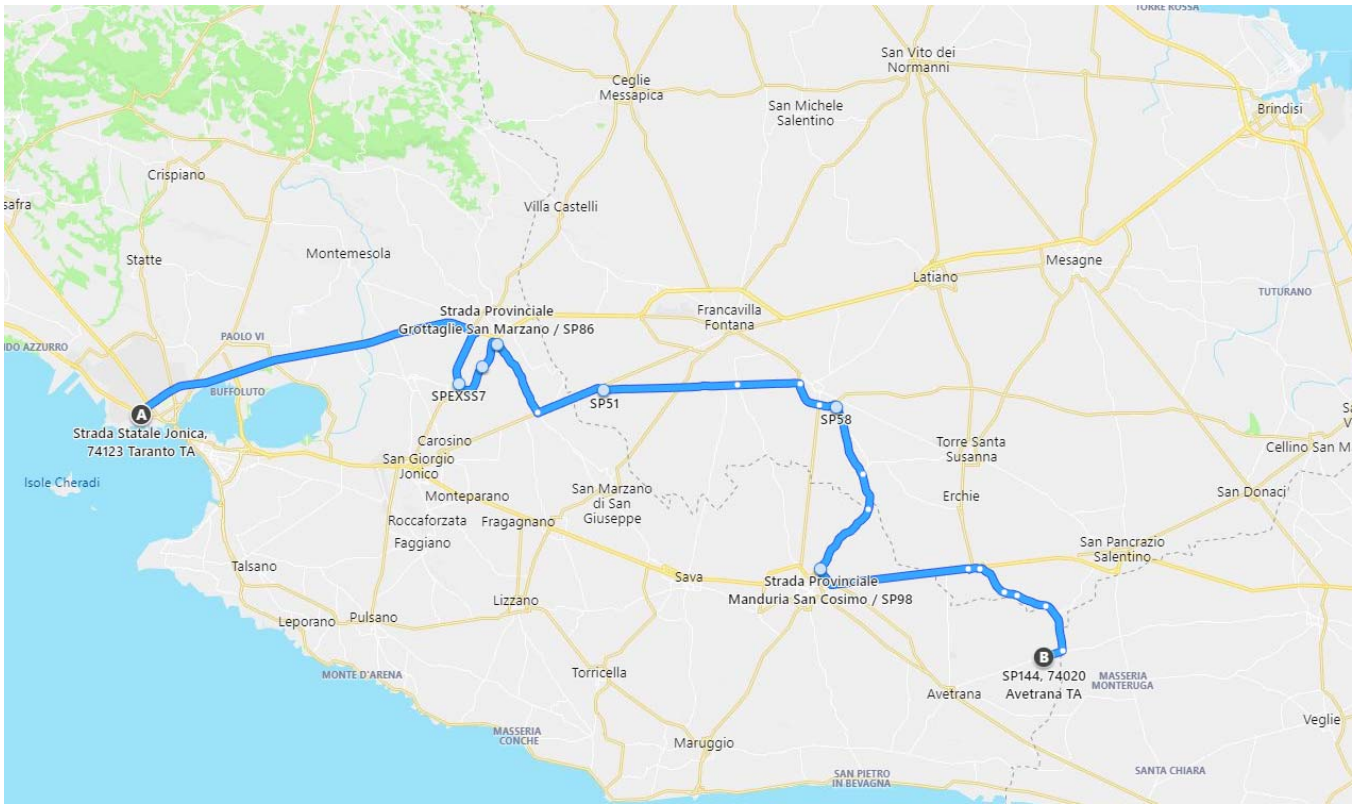
HH125m

Tower	Bottom end mm.	top end mm.	length mm.	weight kgs.
Section 1	**4500**	**4150**	**12500**	**80000**
Section 2	**4150**	**4150**	**14280**	**77000**
Section 3	**4150**	**4150**	**16800**	**77000**
Section 4	**4150**	**4150**	**20720**	**75000**
Section 5	**4150**	**4150**	**28000**	**73000**
Section 6	**4150**	**4000**	**30000**	**53000**

General Route Description

External Route Blade - Component

For the transport of the Wind Turbine Blade and component, Taranto has been considered as pick-up location.



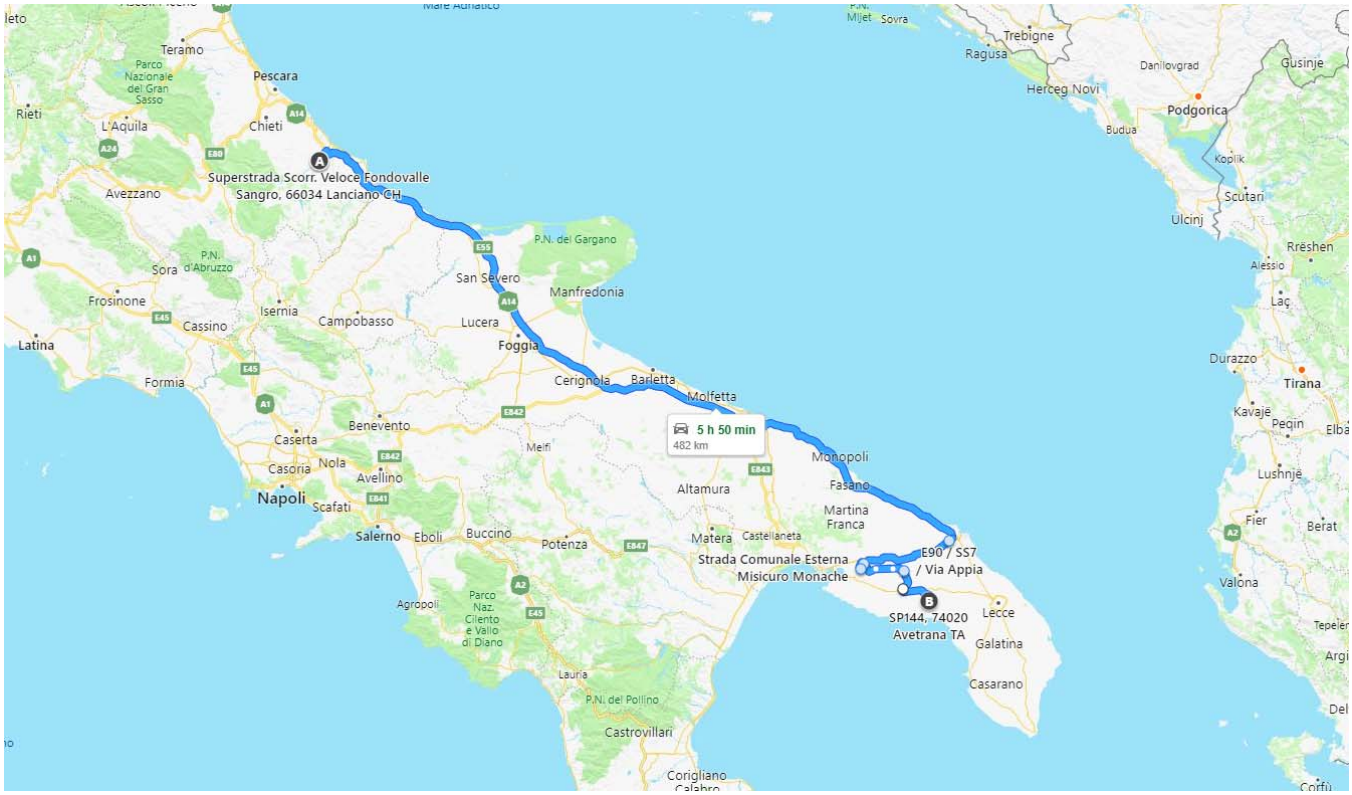
Taranto Port (Varco Nord) **:** SS7►SP ExSS7 ► Contrada Montedoro ► Via Per Carosino ►
►SP86►SS603►SP51►SP58►SP59►SP98►SS7ter►

To Access 1-2-3 ►SP64 dir► Site access

To Access 4-5-6-7 ►SP144► Site access 4-5 ►SP107 ►Site access 6-7

External Route Tower

For the transport of the Wind Turbine Tower, Atessa has been considered as pick-up location.

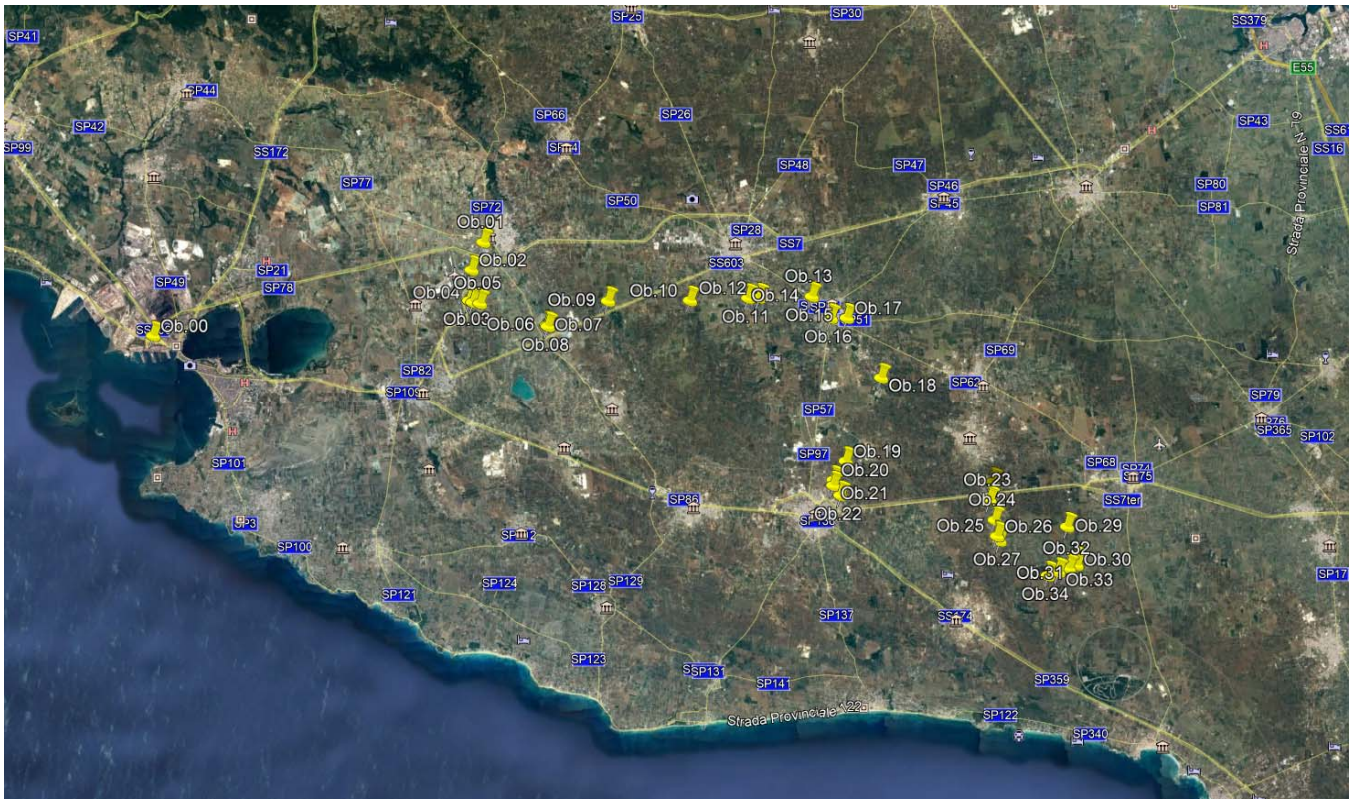


Industrie Pugliese (Atessa) ► SP97 ►SS652►SS16►A14►SS7►SP ExSS7 ► Contrada Montedoro ► ►Via Per Carosino ►SP86►SS603►SP51►SP58►SP59►SP98►SS7ter►

To Access 1-2-3 ►SP64 dir► Site access

To Access 4-5-6-7 ►SP144► Site access 4-5 ►SP107 ►Site access 6-7

Observation Map Overview



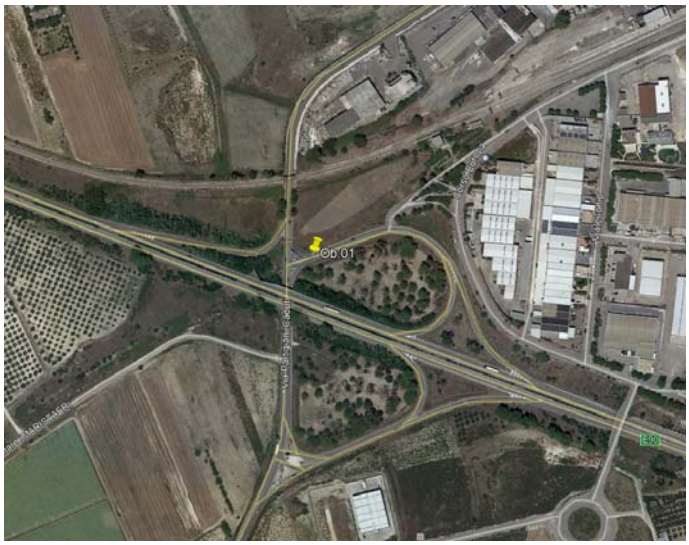
Road Modifications

Observation 0

The blades will be transhipped directly on the Blade Lifter Device.
You need a carriageway with a width of 4.5 meters in the straight part of the road and 5,5 meters in the curves All NOT INDICATED (cables, limbs, etc..) must be over 5,5 mt in height. In addition, close to the bends, before 80mt and beyond 80mt (V150) and before 90mt and beyond 90mt (V162), in the middle of the carriageway, it will be necessary to leave an aerial clearance without any obstacles (limbs and cables) to allow the lifting of the blade.

40°28'51.29"N - 17°12'28.58"E

Observation 1
Remove the road signal and the indicated Traffic Islands
40°31'36.58"N - 17°25'12.47"E

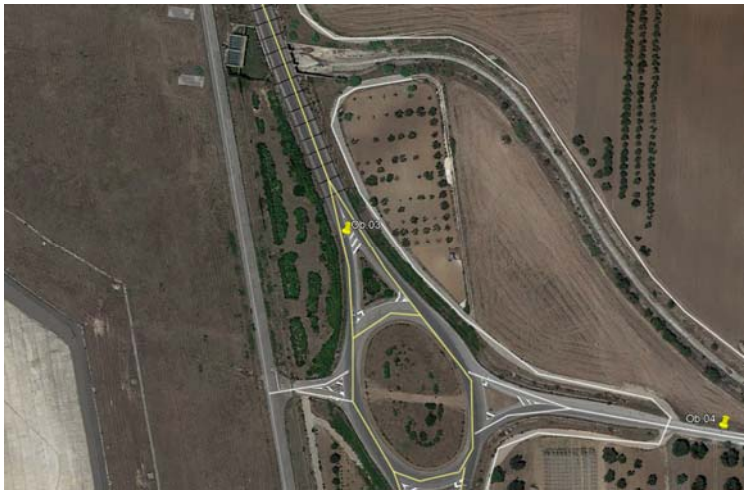


Observation 2

Make the operation against the flow

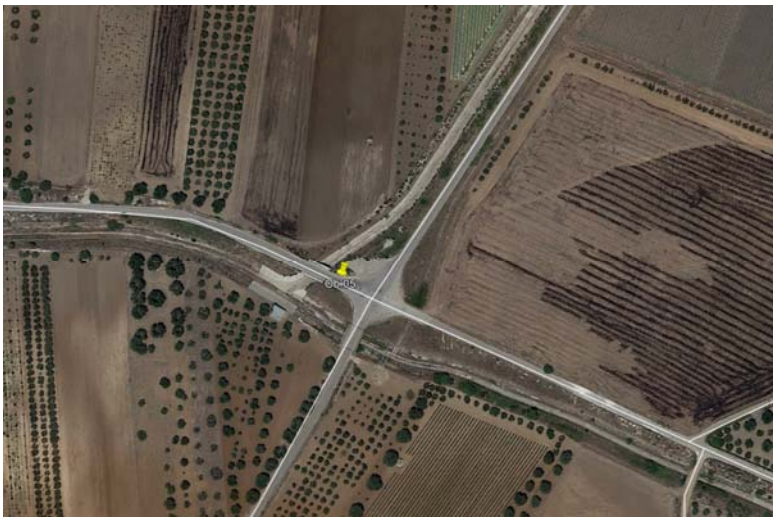
40°30'48.32"N - 17°24'45.27"E

Observation 3
Make the operation against the flow
40°29'54.58"N - 17°24'40.33"E



Observation 4
It is necessary to fix the road surface as the “0054-6051- Wind farm Roads Requirements”
40°29'51.47"N - 17°24'48.83"E

Observation 5
Make the indicated operation
40°29'49.55"N - 17°25'04.82"E



Observation 6
Make the operation against the flow.
Remove the road signal and the Traffic Island
40°29'11.59"N - 17°27'39.92"E

Observation 7
Remove 10mt of guard rail.
Make a ramp to allow the passage on the Traffic Island
40°29'10.75"N - 17°27'40.38"E

Observation 8
Remove the road signal.
Make a ramp and make passable the Traffic Island
40°29'09.76"N - 17°27'41.81"E

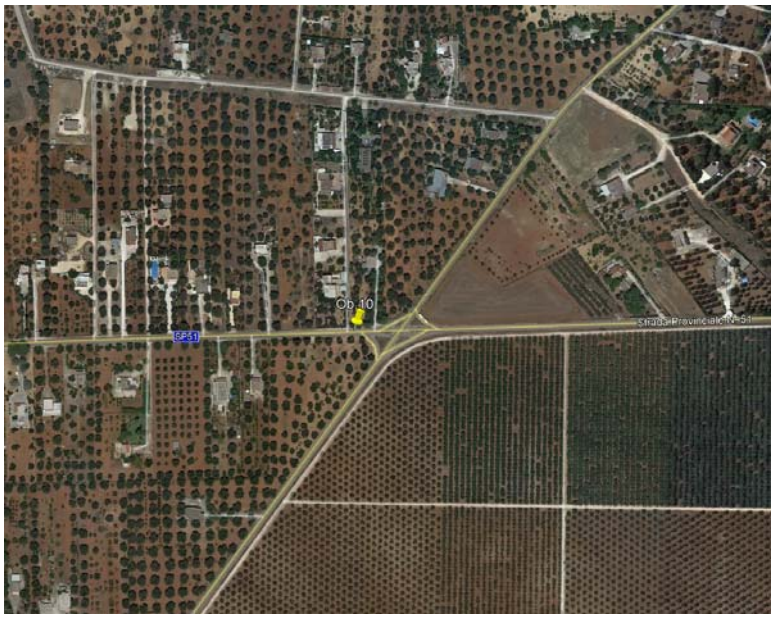
Observation 9

Make a widening up to 4 mt on the right side of the road
40°29‘54.01"N - 17°30'00.86"E

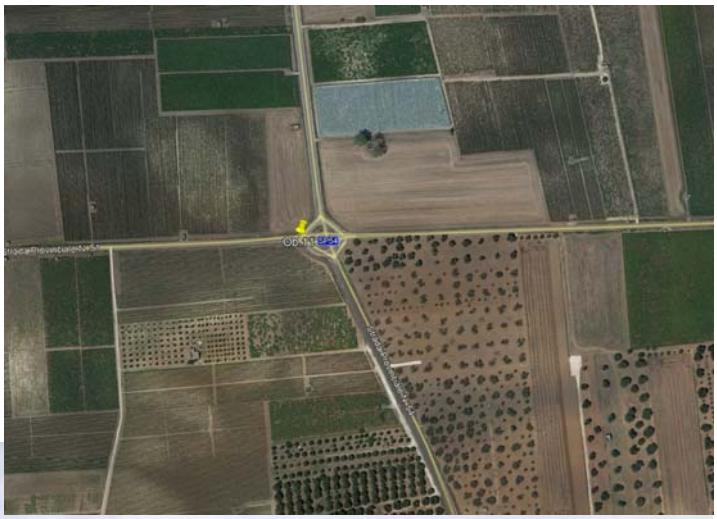
Observation 10

Make the operation against the flow

40°29'55.21"N - 17°33'09.70"E



Observation 11
Make the road signal and make a a By-Pass
40°29'59.35"N - 17°35'24.10"E

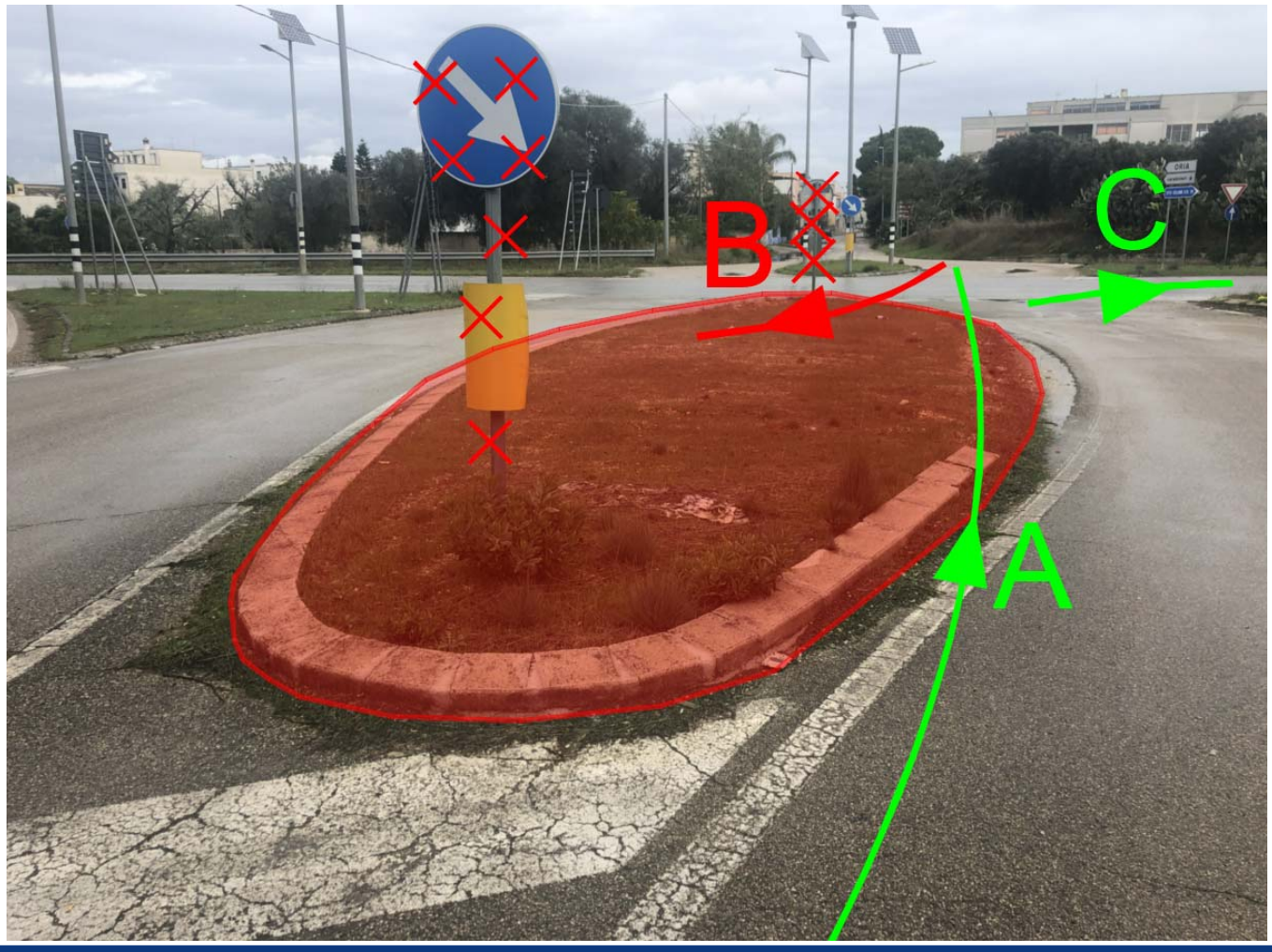


Observation 12

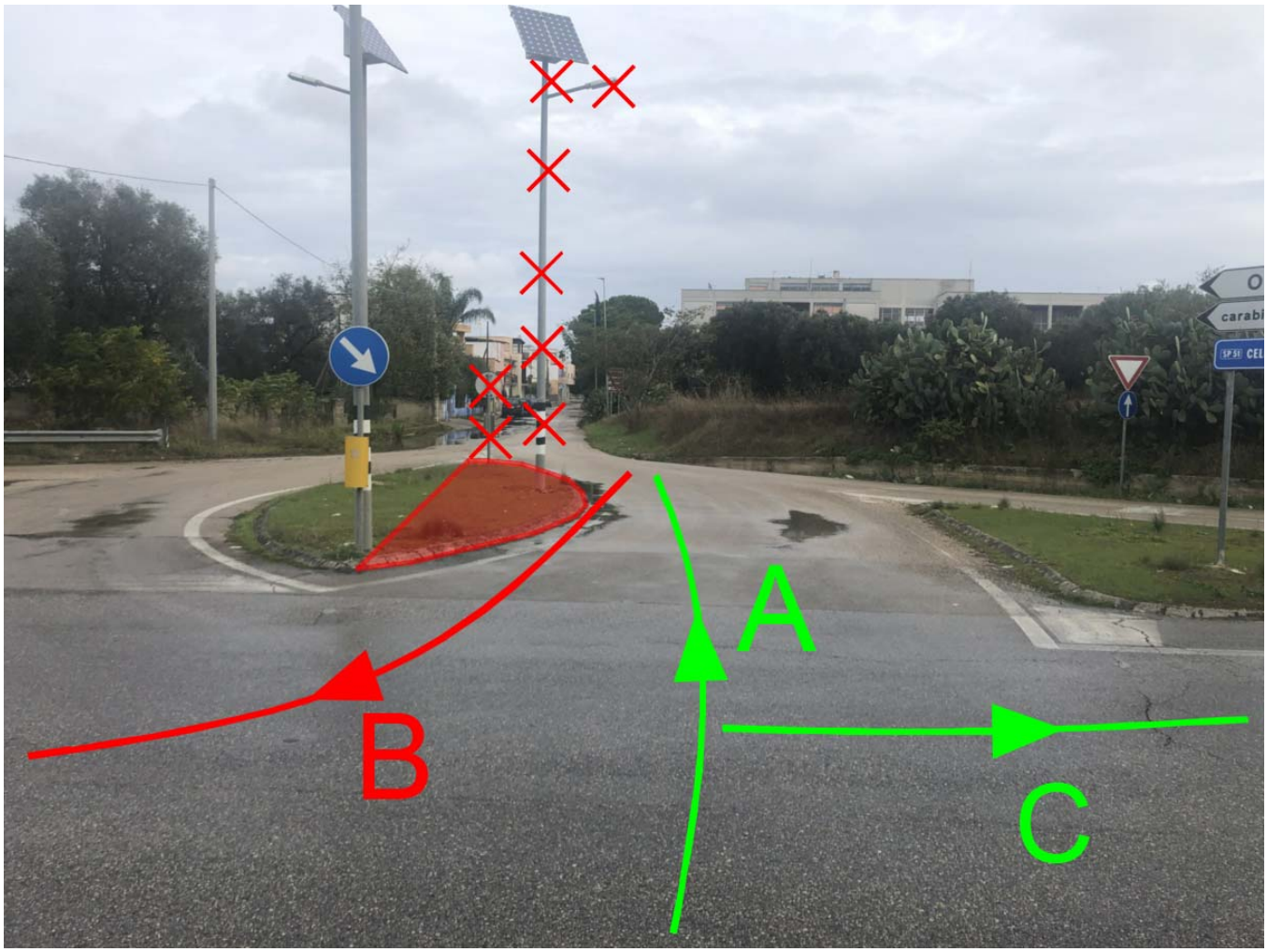
Go straight at level crossing

40°30'00.05"N - 17°35'49.08"E

Observation 13
Manoeuvre Area
Remove the indicated road signal
Make passable the Traffic Island and make the U-Turn A-B-C (B in reverse)
40°30'02.42"N - 17°37'48.76"E



Observation 14
Manoeuvre Area
Remove the indicated road signal
Make passable the Traffic Island and make the U-Turn A-B-C (B in reverse)
40°30'02.43"N - 17°37'50.52"E



Observation 15
Remove the indicated road signal
Make a widening up to 2,5 on the right side of the road
40°30'02.14"N - 17°37'50.20"E

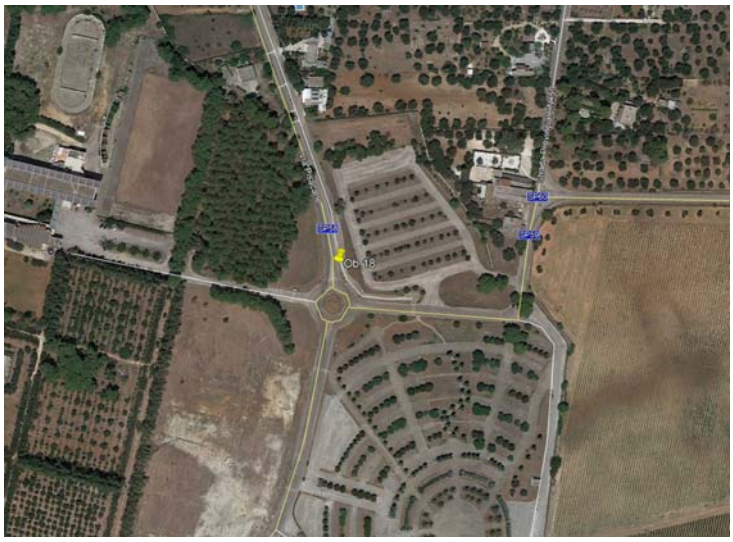
Observation 16

Make a By-pass

40°29'24.59"N - 17°38'34.04"E

Observation 17
Remove the indicated road signal, the streetlamp and make passable the Traffic Island
40°29'24.94"N - 17°39'11.33"E

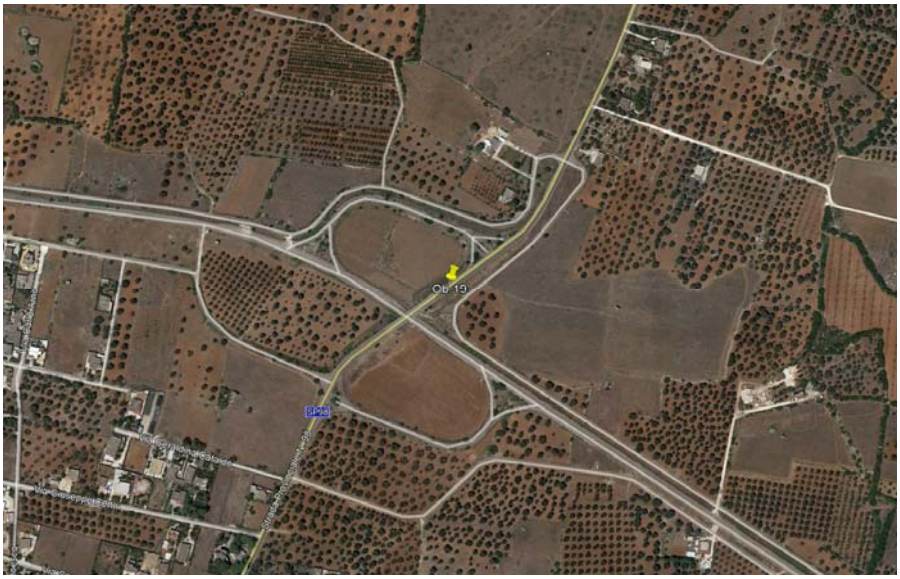
Observation 18
Make a widening as per picture
40°27'40.34"N - 17°40'30.46"E



Observation 19

Possible bridge inspection

40°25'12.71"N - 17°39'09.06"E



Observation 20

Remove the indicated cables

40°24'39.89"N - 17°38'41.01"E

Observation 21

Make the operation against the flow

40°24'30.11"N - 17°38'40.36"E

Observation 22

Possible bridge inspection

40°24'12.82"N - 17°38'56.87"E

Observation 23
Site Access 1 to be done as the “0054-6051- Wind farm Roads Requirements”
40°24'04.15"N - 17°44'40.82"E

Observation 24

Site Access 2 to be done as the “0054-6051- Wind farm Roads Requirements”
40°23'29.26"N - 17°44'52.27"E

Observation 25
Make passable the indicated area
Cut the protruding vegetation off along the road
40°23'02.57"N - 17°44'56.81"E

Observation 26

Fix the road surface as the “0054-6051- Wind farm Roads Requirements”

40°23'01.15"N - 17°44'57.89"E

Observation 27

Site Access 3 to be done as the “0054-6051- Wind farm Roads Requirements”

40°22'52.87"N - 17°45'03.16"E

Observation 28
Make the operation against the flow
Make a widening up to 10 mt
40°24'35.92"N - 17°44'47.93"E

Observation 29

Site Access 4 to be done as the “0054-6051- Wind farm Roads Requirements”

40°23'17.58"N - 17°47'34.41"E

Observation 30

Site Access 5 to be done as the “0054-6051- Wind farm Roads Requirements”

40°22'18.27"N - 17°47'59.77"E

Observation 31

Make a widening up to 20mt x 20mt

40°22'10.35"N - 17°48'00.64"E

Observation 32
Make a widening
Site Access 6 to be done as the “0054-6051- Wind farm Roads Requirements”
40°22'04.52"N - 17°47'43.04"E

Observation 33

Site Access 6 to be done as the “0054-6051- Wind farm Roads Requirements”
40°21'58.13"N - 17°47'18.28"E

Observation 34

Site Access 7 to be done as the “0054-6051- Wind farm Roads Requirements”

40°21'52.18"N - 17°46'54.64"E

Conclusions and Highlighted

- Every branches jutting out on routing roads will have to be cut (5,5mt width and 5,5mt high)

- Keep flat every height difference (along 45mt vertical bending radius has to be 250m) on the complete road surveyed.

- Every air electric and phone cables have to be at least 5,5 mt high.

- The blades will be transhipped directly on the Blade Lifter Device.

You need a carriageway with a width of 4.5 meters in the straight part of the road and 5,5 meters in the curves All NOT INDICATED (cables, limbs, etc..) must be over 5,5 mt in height. In addition, close to the bends, before 80mt and beyond 80mt (V150) and before 90mt and beyond 90mt (V162), in the middle of the carriageway, it will be necessary to leave an aerial clearance without any obstacles (limbs and cables) to allow the lifting of the blade.

- The survey road report has been written up considering authorities go head for exceptional transport along every route analyzed

- The feasibility studies and activities suppose owners availability for transiting and making civil works on their farmsteads.

- Site inland practicability, Wind Turbine Generators stocking area and its accesses roads have not taken into account.

- The survey road report has referred to the date 13/11/2019 therefore variations and/or changes of practicability state will be evaluated subsequently

- For transport activities related to site and new roads, refer to Vestas guidelines as described as the “0054-6051- Wind farm Roads Requirements”

- This report could be changed according to the final survey performed by Transport Company

- The Buyer will have to use pull trailers able to tow up our trailers, in order to guarantee the passing on internal site roads in safety way when necessary

- It is necessary to conduct part of the transport service, using normal trains and special convoys as well as using the blade lifting device.