COMUNE DI BARDINETO

Provincia di Savona

PARCO EOLICO DA N. 2 AEROGENERATORI PER UN TOTALE DI 9 MW LOCALITA' "I GROPPI" - COMUNE DI BARDINETO (SV)



Committente : TERSIA GREEN POWER

Tersia srl
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Transport Road Survey Report

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Tecnico redattore : Dott. Leanzio Gambuti
Dott. Francesco Dragone

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00	Doc. no and Rev.: MED TTT001 – 21B.12RP01EN.R00	01/10/19	L. GAMBUTI	F. DRAGONE	F. DRAGONE

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Doc. no and Rev.: 21B.12RP01EN.R00

Issued on 01/10/19

Executor: Leanzio GAMBUTI

Approver: Francesco DRAGONE

Customer: Tersia

Transport Road Survey Report

Project: Erli 2, Italy

History of this document

Doc. and Rev. no.:	Date:	Description of changes	Exec.	Appr.
MED TTT001	01/10/19	First issue	Leanzio GAMBUTI	FRADR

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Table of Contents

History of this document 2
Disclaimer 2
Key to Confidentiality Notes 2
Summary 4
Specs Description 4
Weight and Dimension..... 5
Loading Configurations 6
General Route Description 8
Observations and required road adjustment 9
Road Modifications 10
Conclusions and Highlighted 75

Summary

According to Customer requested it has been analyzed turbine type V117 - 4.2 and HH 91,5 tower configuration transport feasibility for catching up to the Erli/Bardineto Wind Park Site.

Road Survey date: 17/09/2019

Transport Supervisor:
Giuseppe BASILE (Vestas Italia)
Francesco DRAGONE (Vestas Italia)

Attendants: dott . Matteo PROFETTO (Tersia S.r.l.)

Transporter Representative: Riccardo DI PALMA (La Molisana Trasporti)

Specs Description

Project	Erli /Bardineto
Country	Italy
Place	Location- Liguria
Scope	Planning Stage – Transport Logistic – Feasibility Study
Turbine	V117 HH91,5
MW	4.2/3.6
Transport Mode	‘ Standard X Transshipment X Blade Lifter X Tower ‘ 1 D F H O O H
Start From	Ravenna Port

Weight and Dimen sion

V117 4.2MW 91.5m

Nacelle	length mm	width mm	height mm	Weight kgs
	12731	4174	3420	67500

Single bl ade	length mm	width mm	height mm	Weight kgs
	57150	4000	2790	16000

Hub	length mm	width mm	height mm	Weight kgs
	5439	3754	3704	32600

Drive train	length mm	width mm	height mm	Weight kgs
	7323	3500	3200	62000

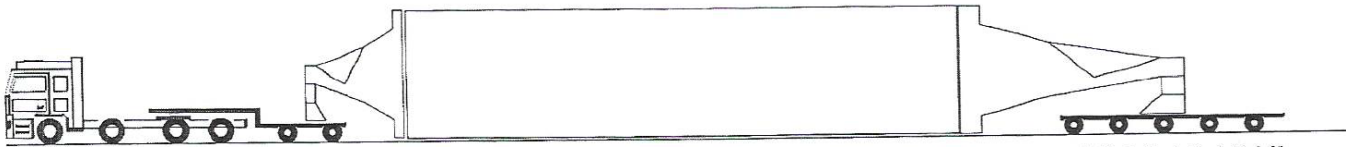
Tower	Bottom end mm.	top end mm.	length mm.	weight kgs.
Top section	3667	3258	30000	42000
Middle section 1	3930	3667	28840	68500
Middle section 2	3937	3930	17080	67000
Bottom section	4280	3937	15680	75500

Loading Configurati ons

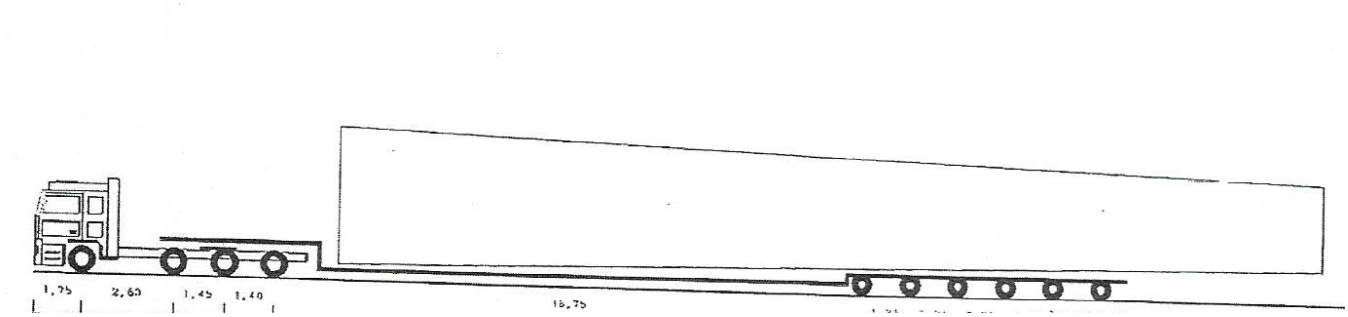
BOTTOM



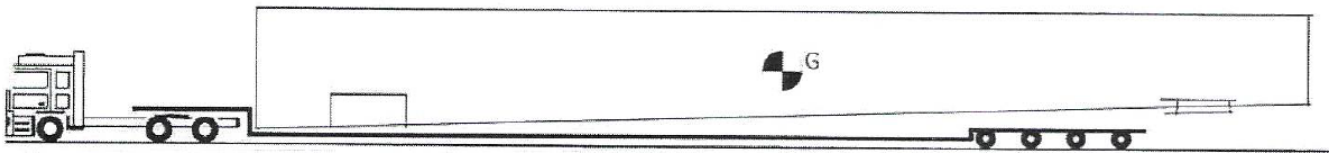
MIDDLE 1



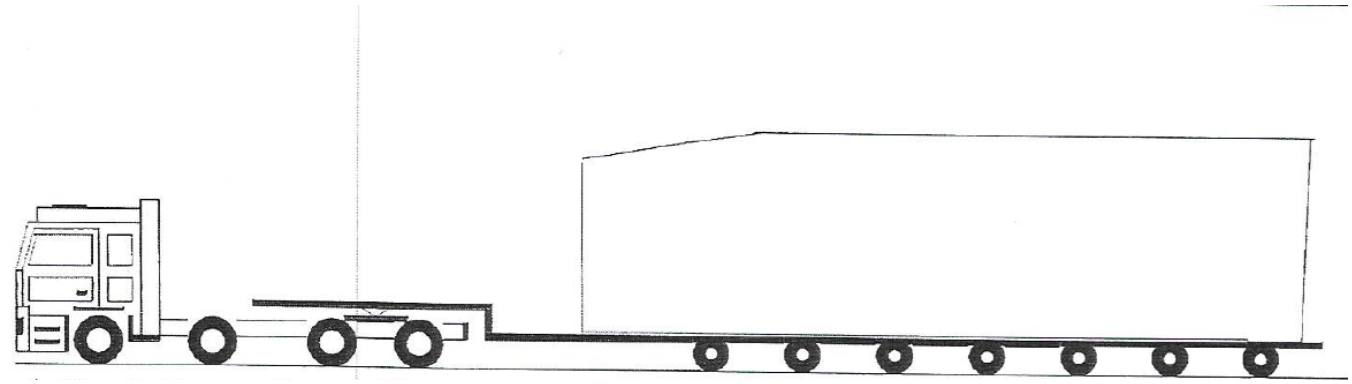
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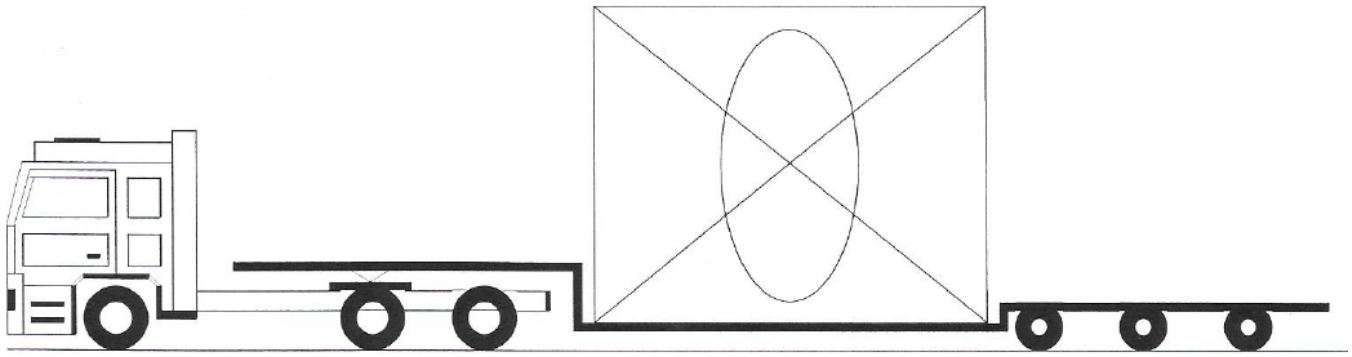
TOP



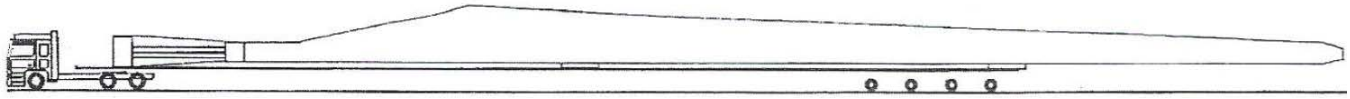
NACELLE



HUB

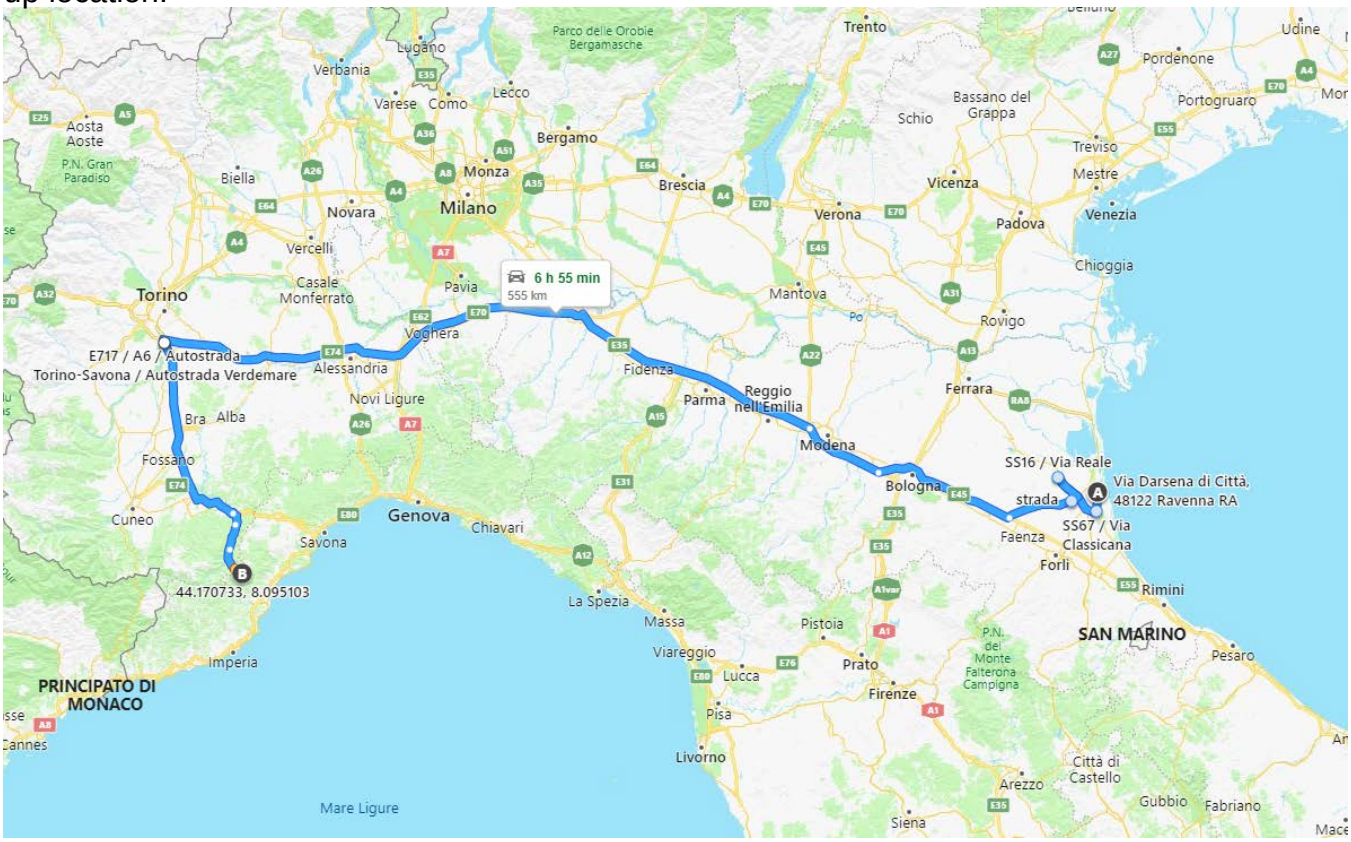


BLADE



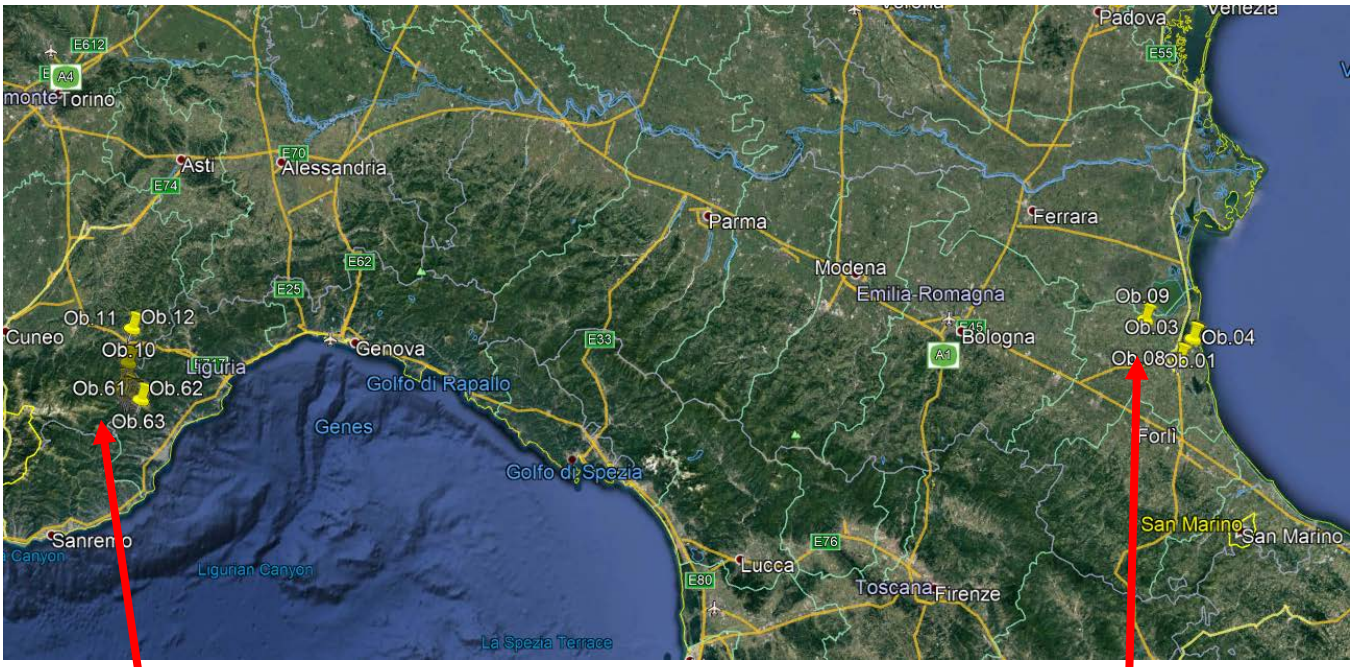
General Route Description

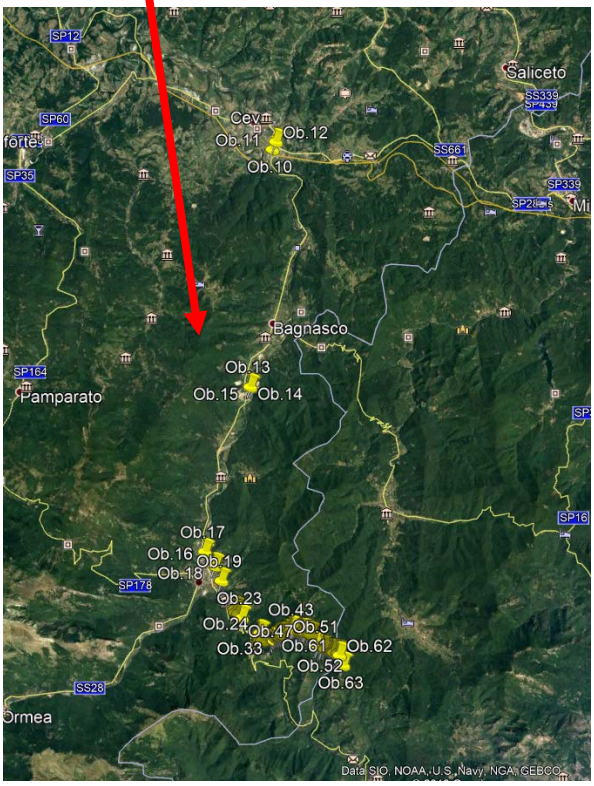
For the transport of the Wind Turbine component, Trapani Port has been considered as pick-up location.



Trapani port
Via Isola Zavorra
Via I° Dorsale ZIR
SP 21
Raccordo A29DIR
A29
Reverse
A29
Gallitello Exit
SS119
SP46
Reloading Area
SP46
SP20
Municipal Road — Site access WTG CR01 to CR23
Municipal Road — Site access WTG CR29 + CR31

Observations and required road adjust ment

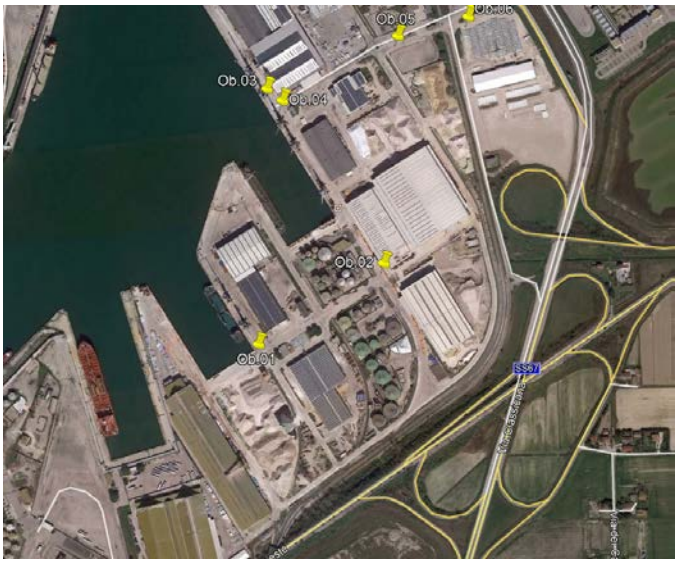






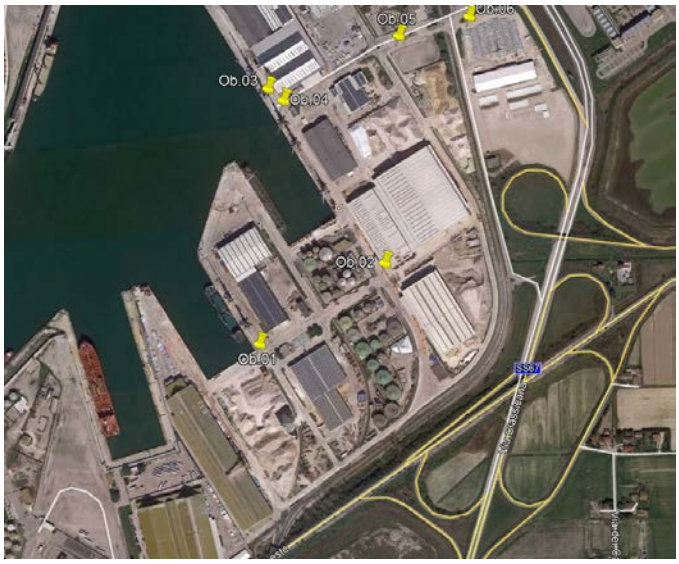
Road Modifications

Observation 1
Wharf (option 1)
Coord. 44°26'23.60"N - 12°14'48.36"E





Observation 2
If the above mentioned Wharf is selected, it will be necessary to remove the roof (removable) as per shown
Coord. 44°26'28.34"N - 12°14'58.46"E





Observation 3
Wharf (option 2)
Coord. 44°26'38.35"N - 12°14'48.89"E





Observation 4
If the offfloading operation will be at Wharf 1 (the green one) or at Wharf 2 (the Yellow one), it will be necessary to remove the new jersey and the indicated convoys.
Coord. 44°26'37.68"N - 12°14'50.15"E





Observation 5
Exit from Ravenna Port
Both options as per indications
Coord. 44°26'41.46"N - 12°14'59.45"E





Observation 6
Temporary Storage Area
Coord. 44°26'42.60"N - 12°15'05.15"E





Observatio n 7
Manage the maneouvre as shown
Coord. 44°26'44.28"N - 12°15'06.96"E





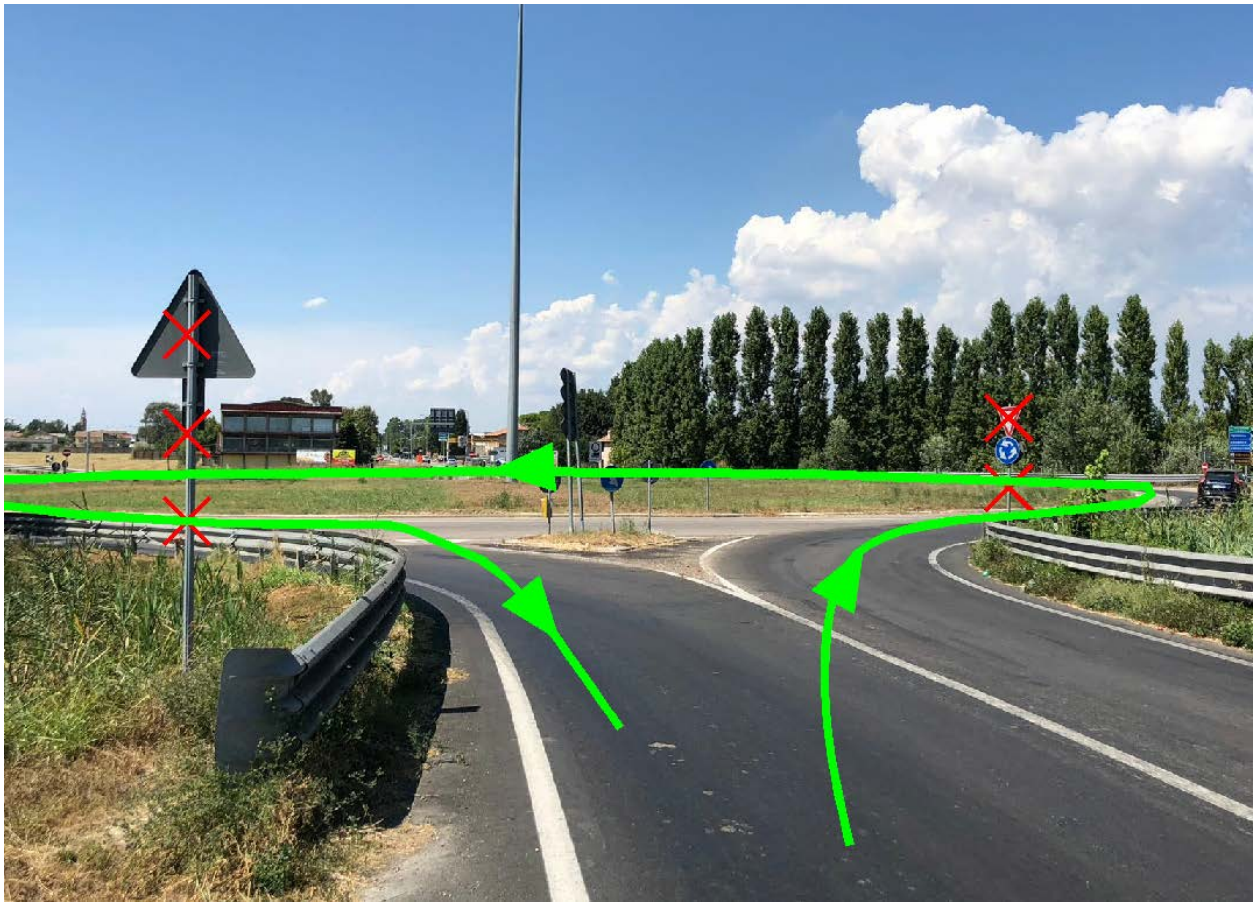
Observation 8
It will be necessary to go accross the existing track; Permit needs to be applied
Coord 44°23'3.56"N - 12°11'42.89"E





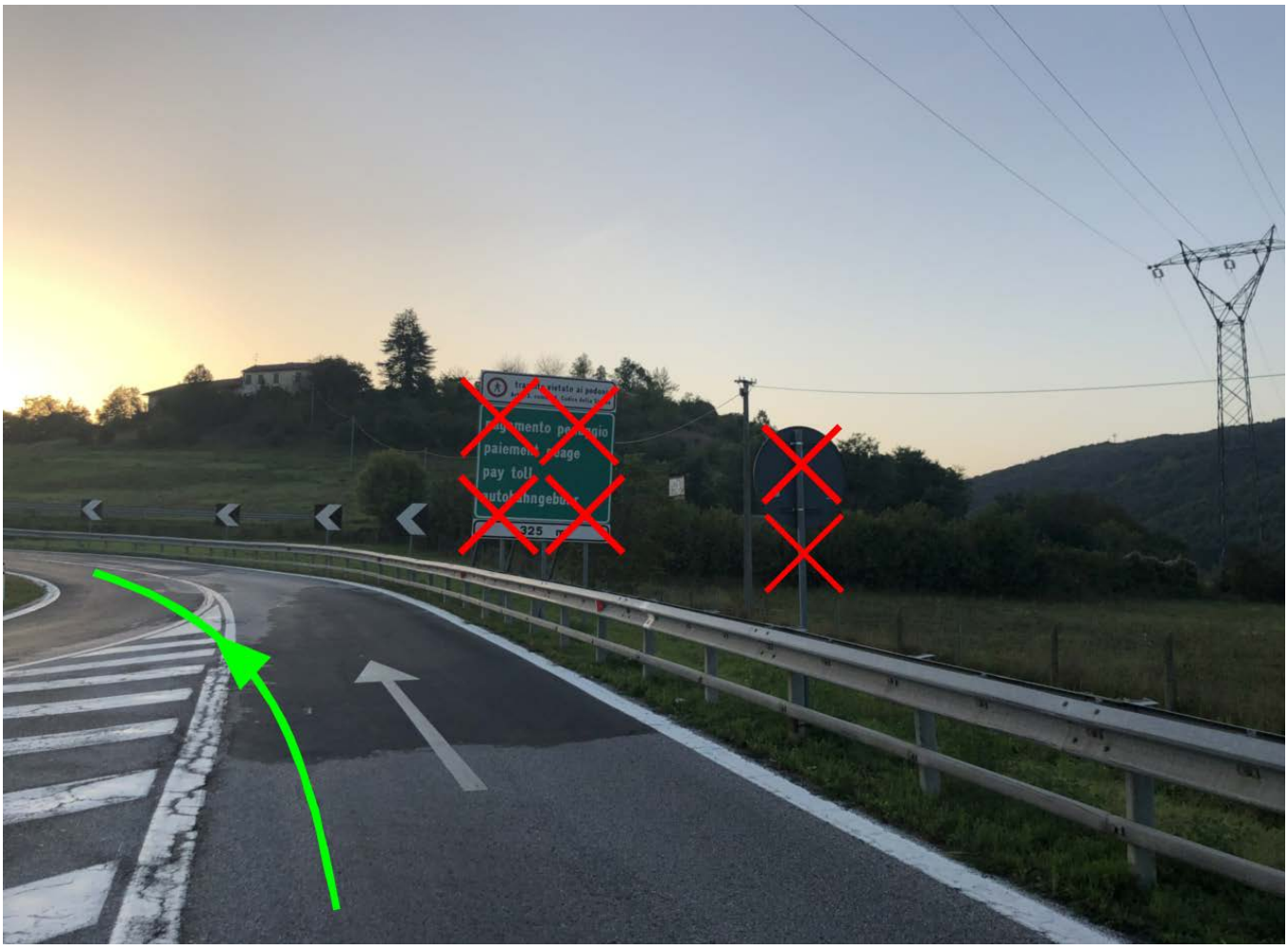
Observat ion 9
Remove the indicated signals
Perform the maneuver a shown
Coord 4 4°29'47.57"N - 12°03'24.49"E



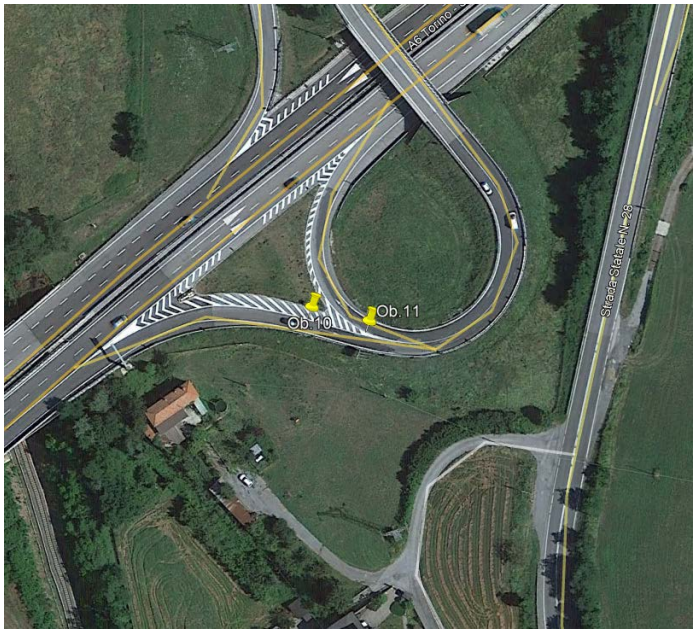


Observation 10
Remove road signals as shown
Coord. 44°22'17.30"N - 08°02'18.78"E





Observation 11
Remove guard rail as shown
Coord. 44°22'17.19"N - 08°02'19.58"E





Observation 12
Remove road signals and make a passable the traffic island as shown.
Coord. 44°22'28.47"N - 08°02'25.54"E





Observation 13
Alleged transshipment area
Coord. 44°16'38.44"N - 08°02'03.67"E





Observation 14
Alleged transshipment area
Perform reverse maneuver
Coord. 44°16'38.23"N - 08°02'04.41"E





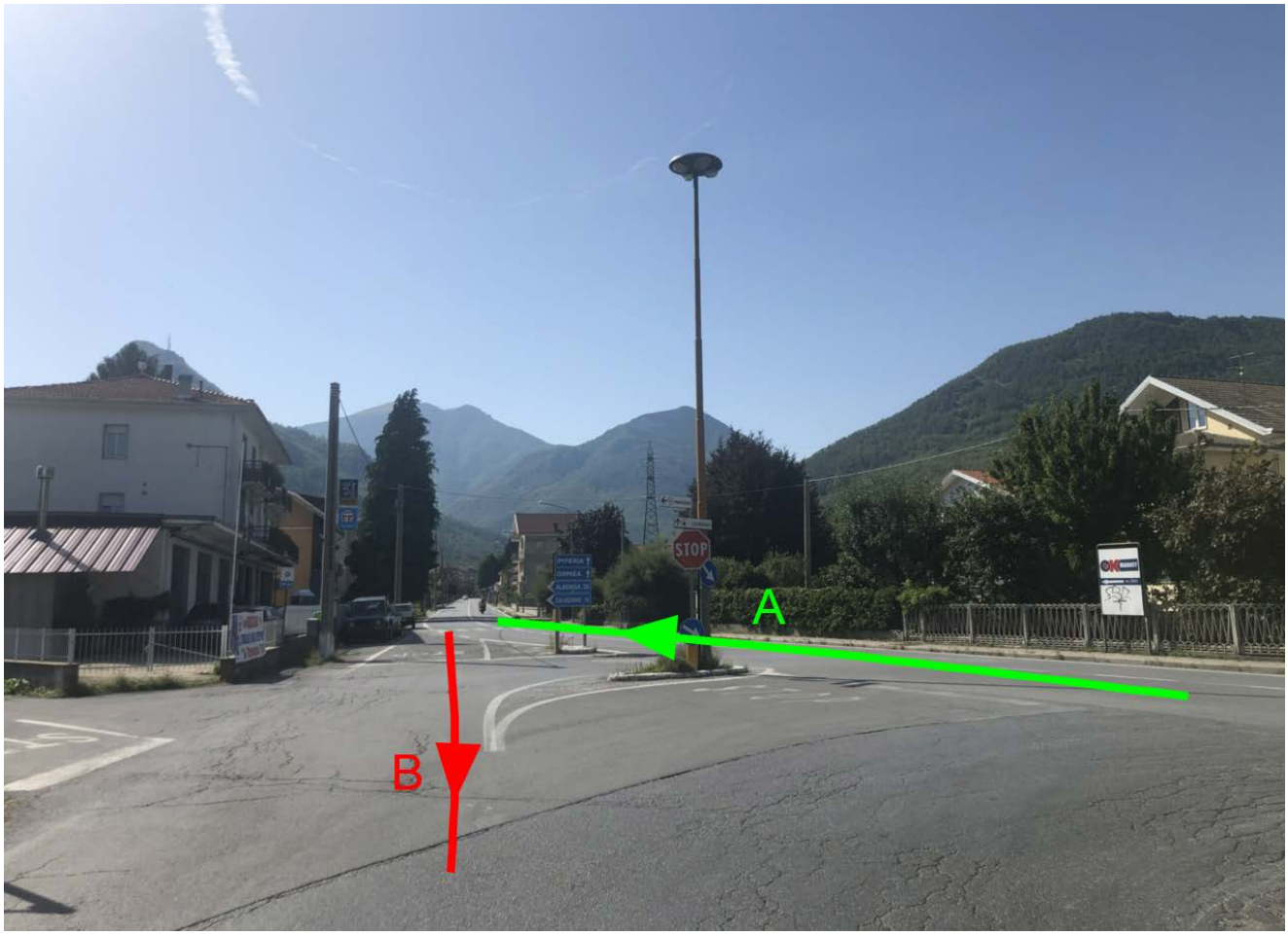
Observation 15
Alleged transshipment area
From this point it is necessary to use the blade lifter and special semi-trailers. You need a carriageway with a width of 4.5 meters in the straight part of the road and 5,5 meters in the curves All NOT INDICATED cables must be over 5,5 mt in height.
In addition, close to the bends, before 60mt and beyond 60mt, in the middle of the carriageway, it will be necessary to leave an aerial clearance without lany obstacles (limbs and cables) to allow the lifting of the blade.
Coord. 44°16'38.02"N - 08°02'04.18"E





Observation 16
Perform reversal maneuver A-B (B in reverse).
Coord. 44°12'36.06"N - 08°00'54.02"E





Observation 17
Perform reversal maneuver B-C (B in reverse).
Coord. 44°12'40.54"N - 08°00'54.34"E





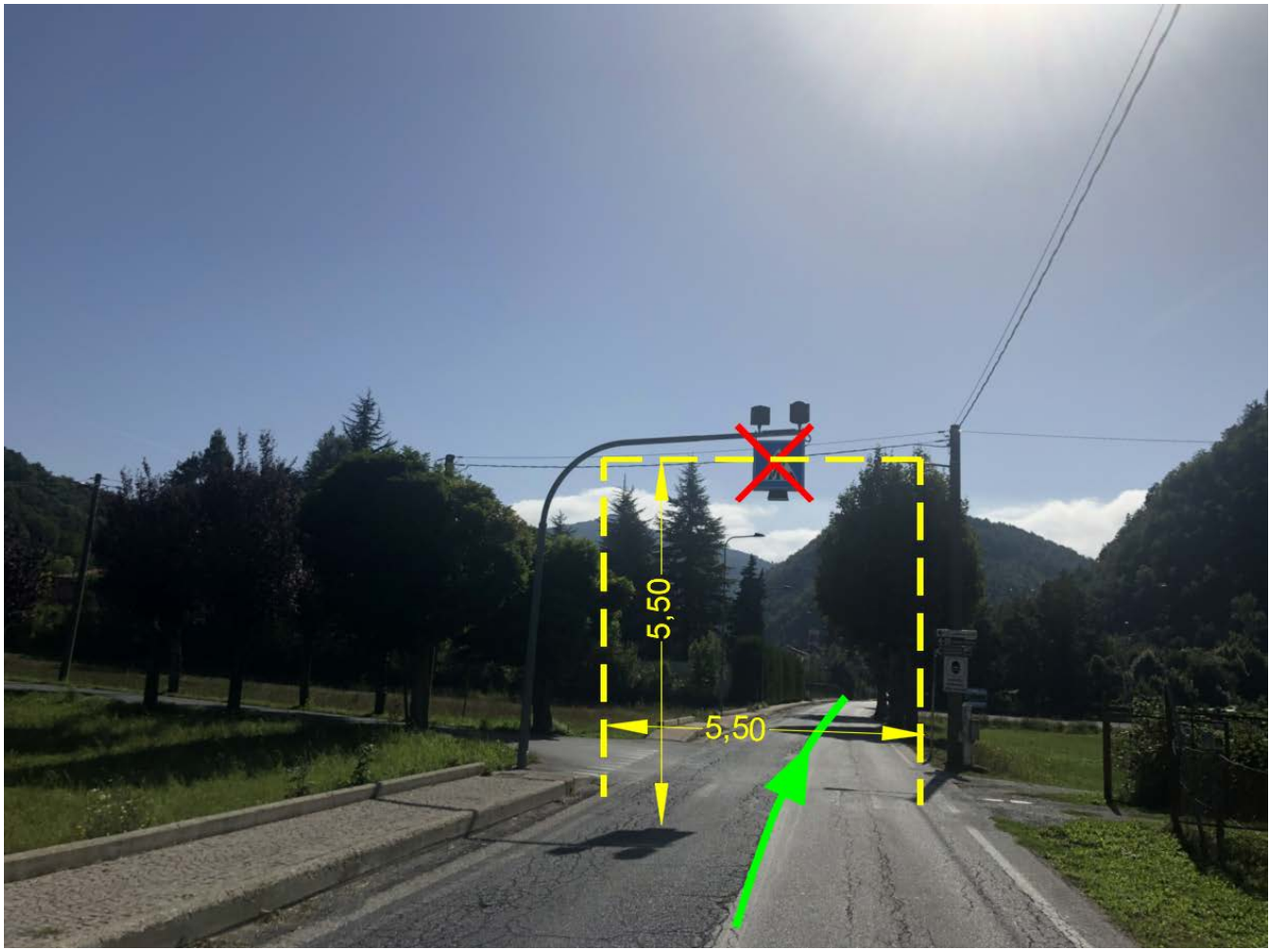
Observ ation 18
Make enlargement 2,5mt in the left side
Coord. 44°12'21.09"N - 08°01'15.20"E





Observation 19
Along the entire route it is necessary to have a 5.5x5.5 airspace free of air obstacles.
Remove road signals as shown
Coord. 44°12'00.76"N - 08°01'30.16"E





Observation 20
Remove cable as shown
Coord. 44°11'17.43"N - 08°02'02.24"E





Observation 21 – Option 1
Remove cable as shown
Coord. 44°11'22.44"N - 08°02'00.99"E





Observation 21 – Option 2
Cut vegetation as shown
Coord. 44°11'22.44"N - 08°02'00.99"E





Observation 22
Remove cables
Coord. 44°11'16.17"N - 08°02'08.86"E





Observat ion 23
Remove cable as shown
Coord. 44°11'11.04"N - 08°02'15.96"E





Observation 24
Cut the vegetation as shown
Coord. 44°10'51.96”N - 08°02'55.33"E





Observation 25
Remove cable
Coord. 44°10'50.39"N - 08°02'52.30"E



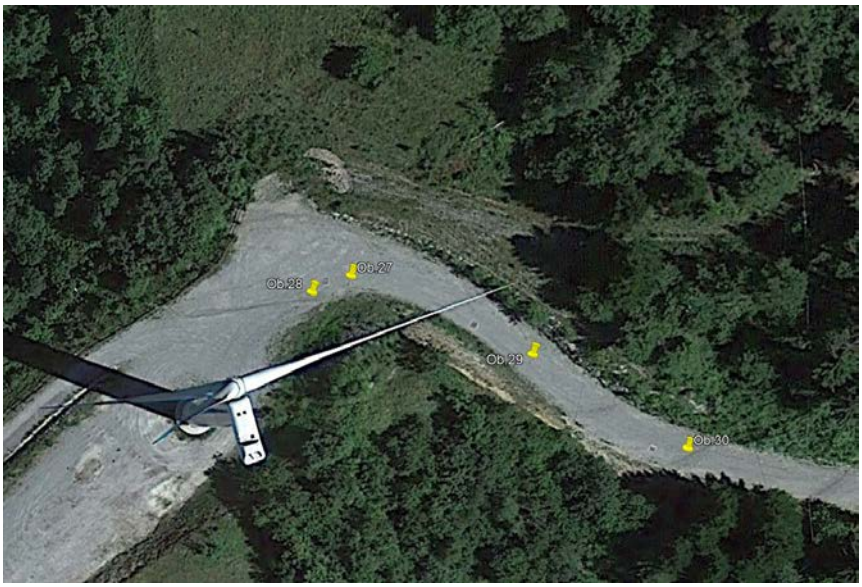


Observation 26
Create By-pass as the “0038-8194_V10 - Road Crane Pad and Hardstand Specifications V105-V112-V117-V126-V136”
Coord. 44°10'37.91"N - 08°02'48.41"E



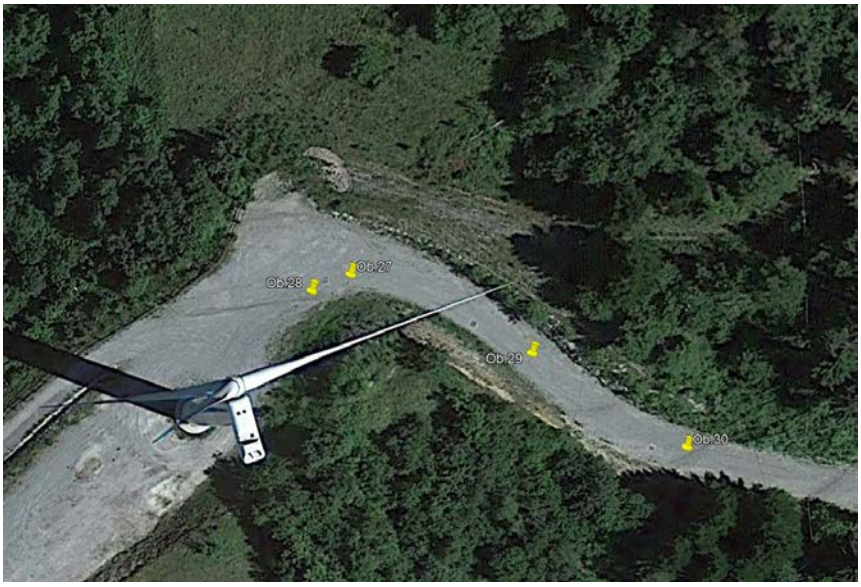


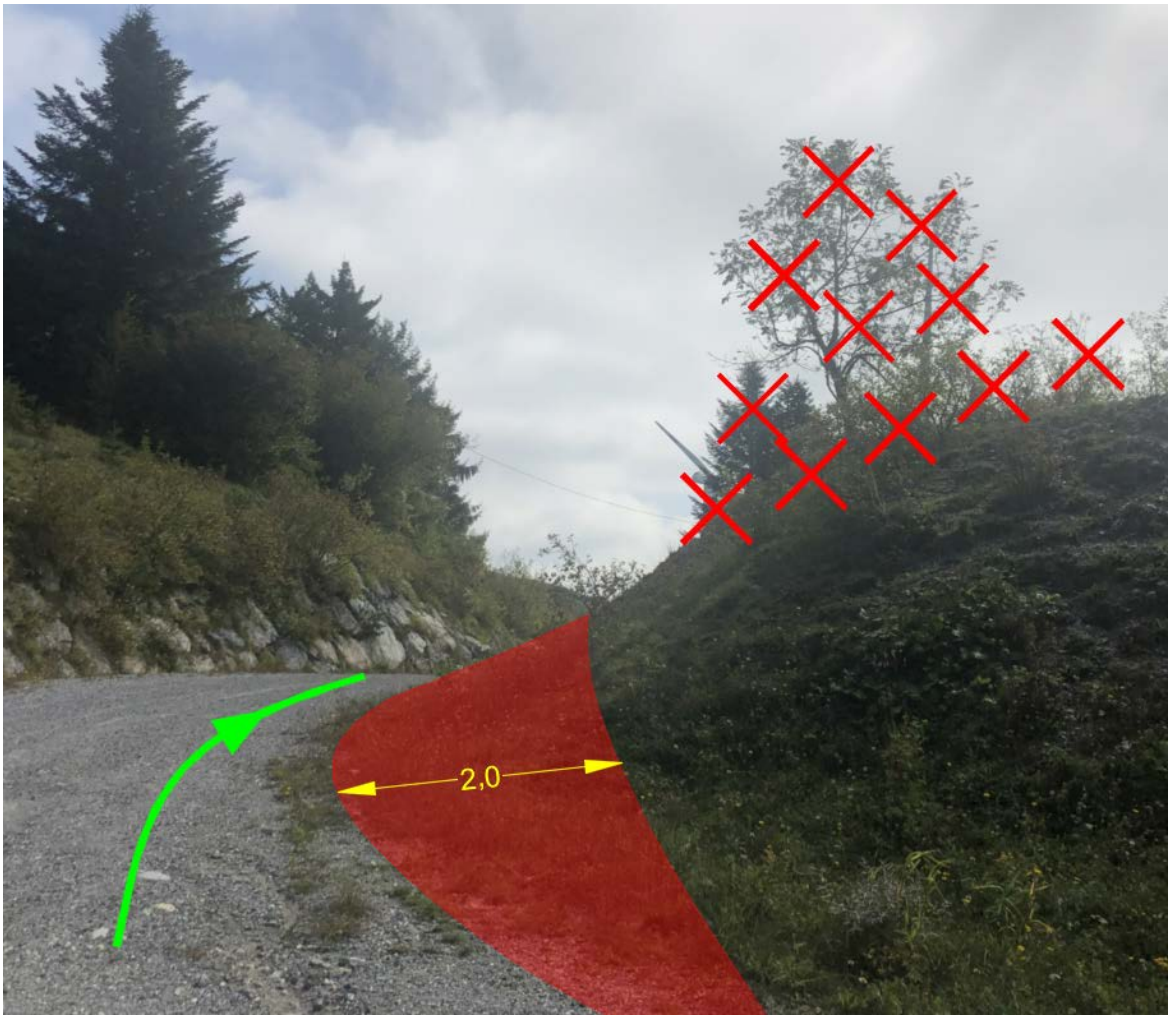
Observation 27
Make road as the “0038-8194_V10 - Road Crane Pad and Hardstand Specifications V105-V112-V117-V126-V136”
Coord. 44°10'42.48"N - 08°02'54.33E



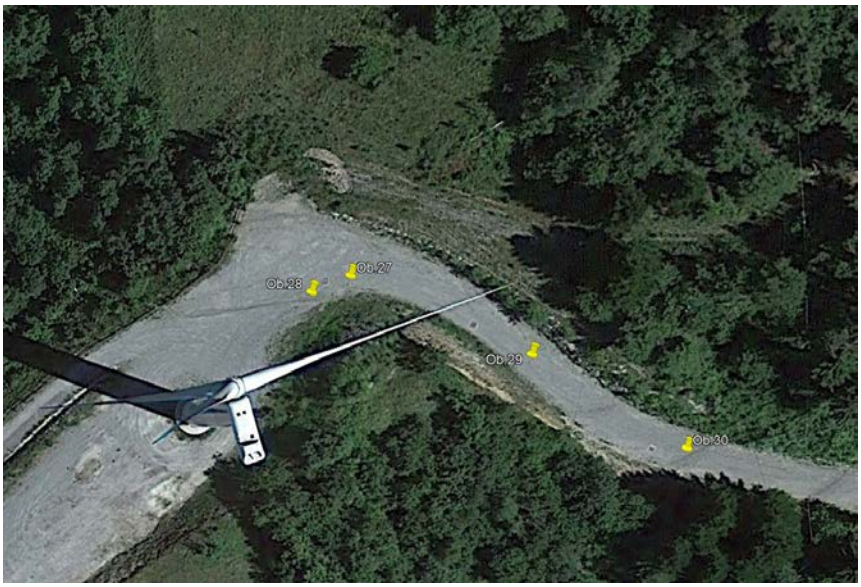


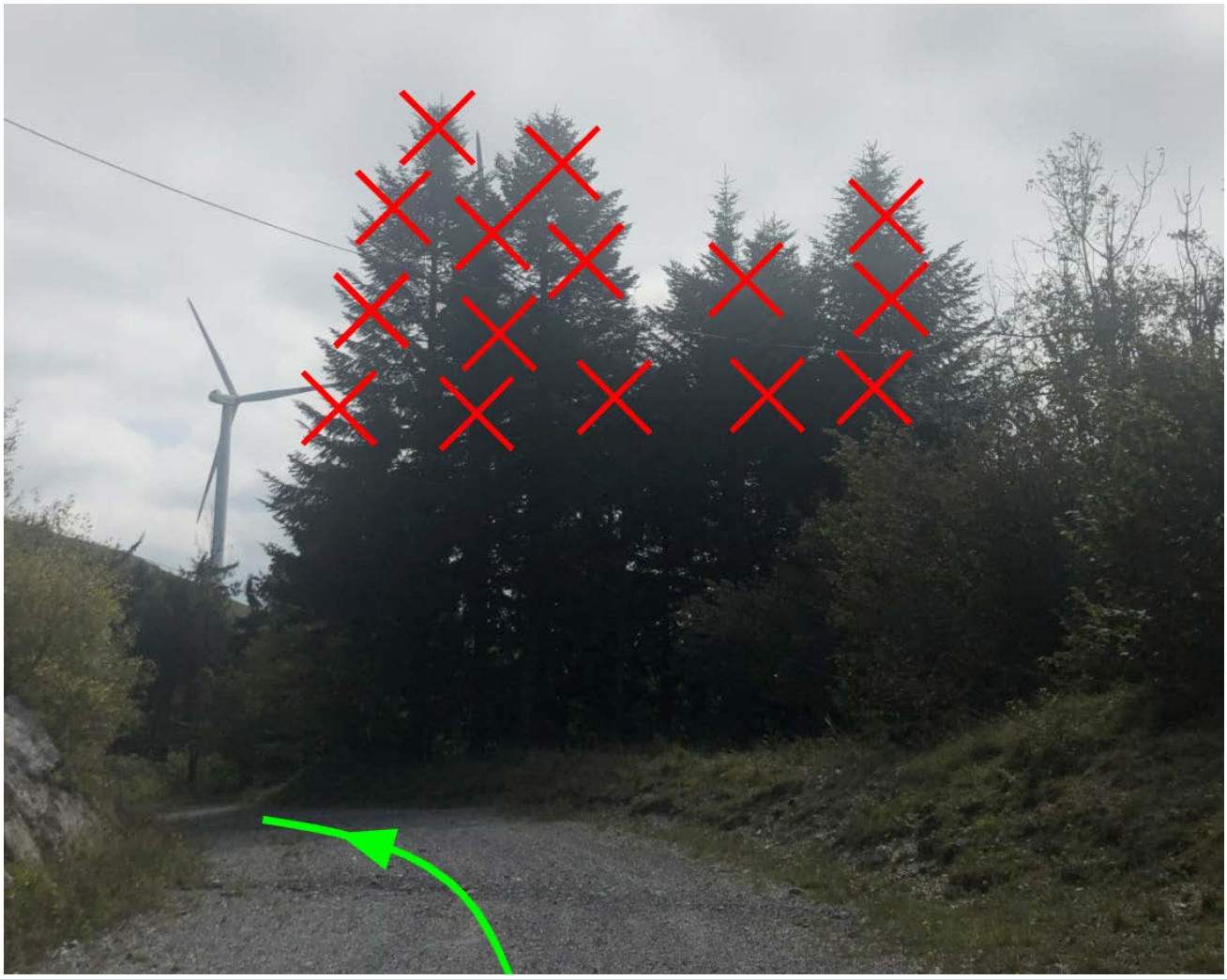
Observation 28
Make enlargement 2mt in the right side of the road.
Cut vegetation as shown
Coord. 44°10'42.40"N - 08°02'54.07





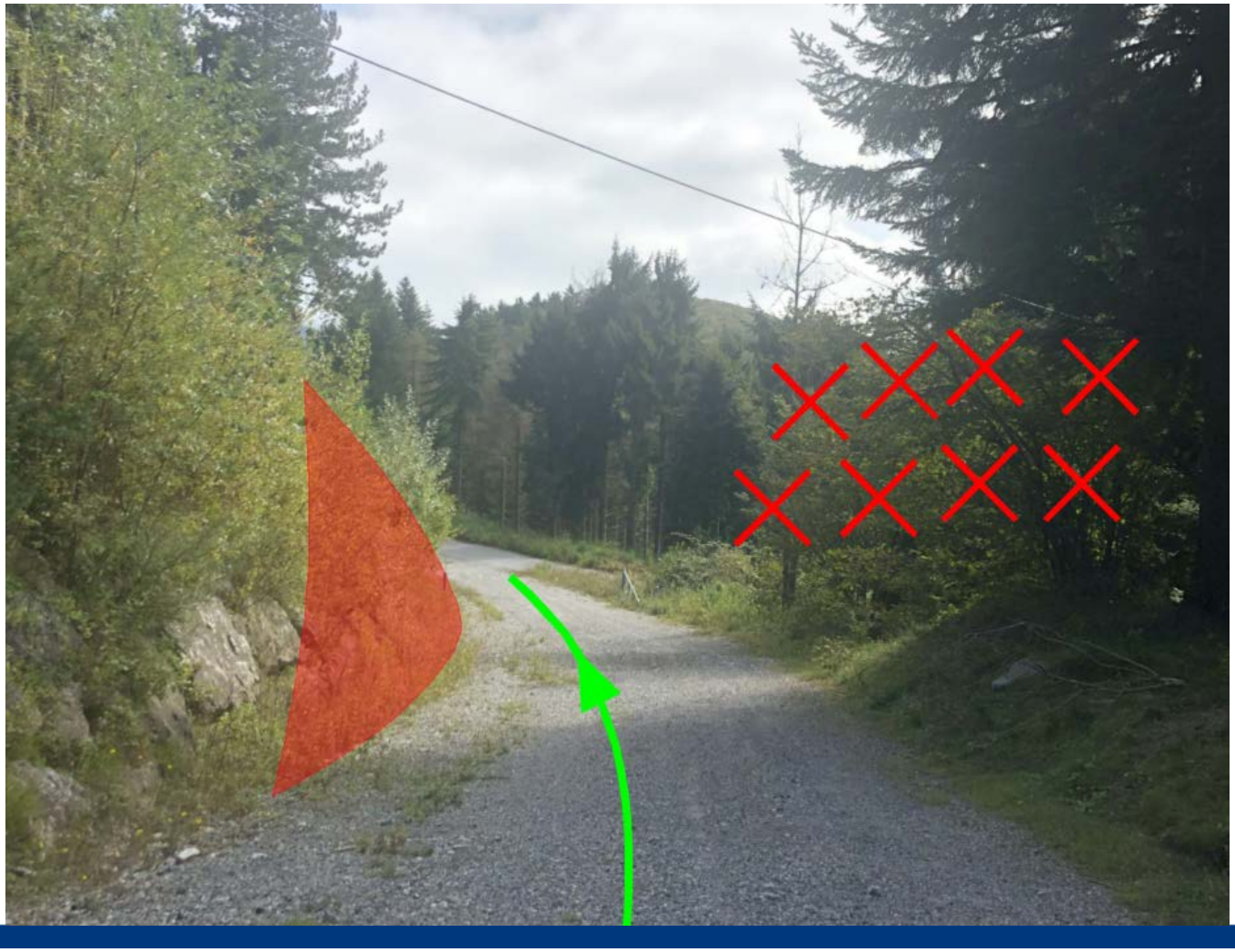
Observation 29
Cut vegetation as shown
Coord. 44°10'42.11"N - 08°02'55.51"E





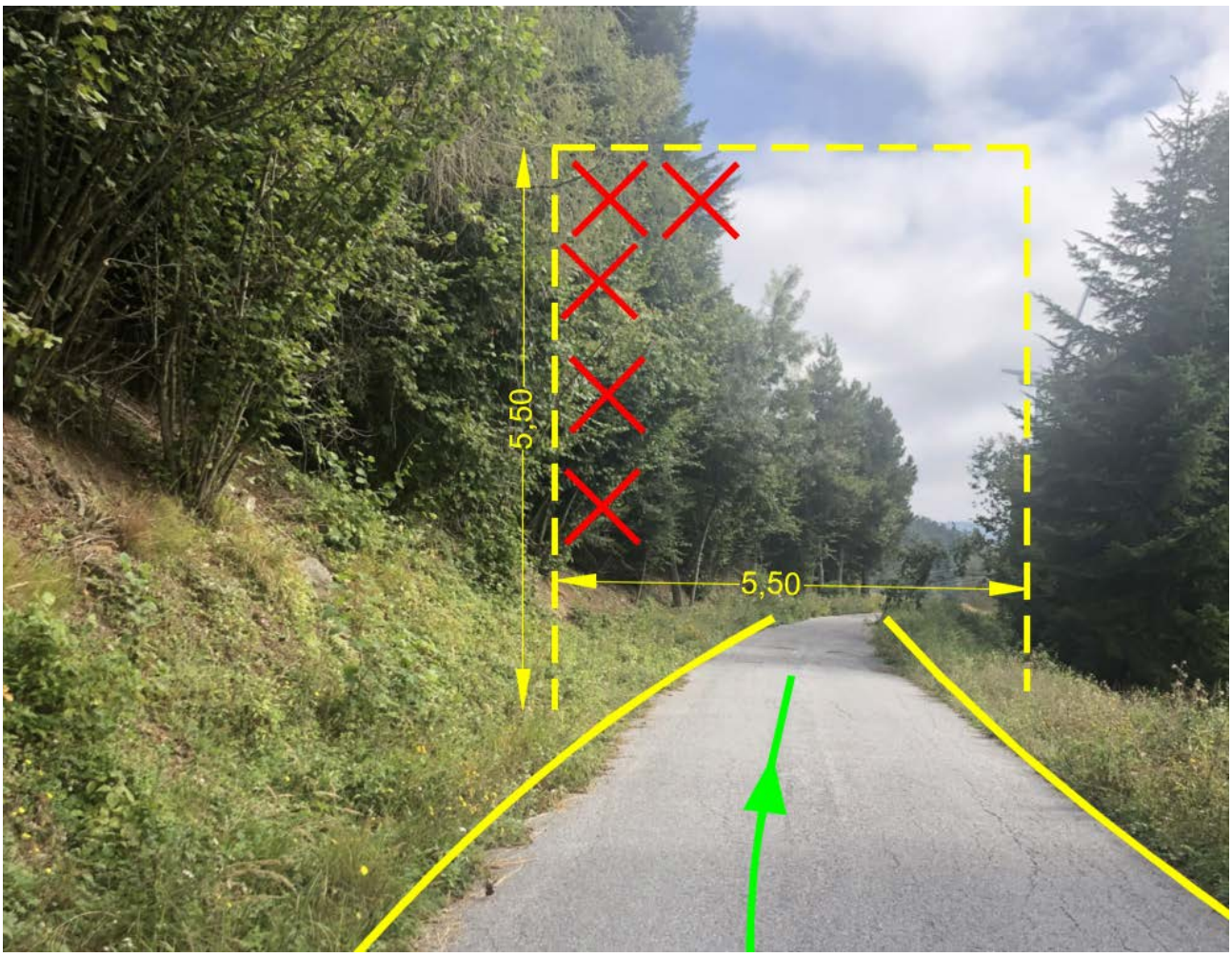
Obs ervation 30
Make enlargement in the left side of the road
Cut vegetation as shown
Coord. 44°10 '41.66"N 08°02 '56.55"E





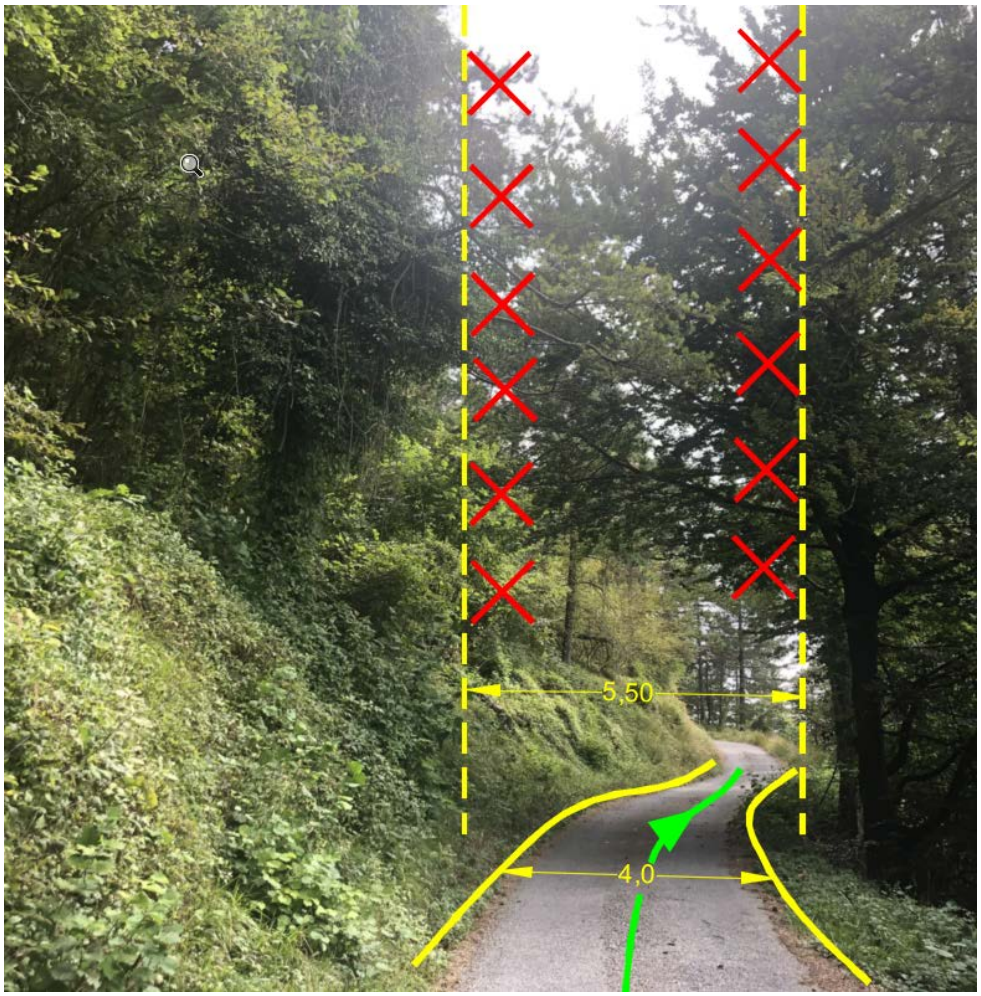
Observation 31
From this point on, it will be necessary to completely level and compact road conditions.
The minimum length of the carriageway must beo f 4,5 mt and must have an aerial clearance of 5,0 mt x 5,5 in height. Further, curvature rays must be done as the “0038-8194_V10 - Road Crane Pad and Hardstand Specifications V105-V112-V117-V126-V136”.
Coord. 44°10'51.73"N 08°03'01.18"E



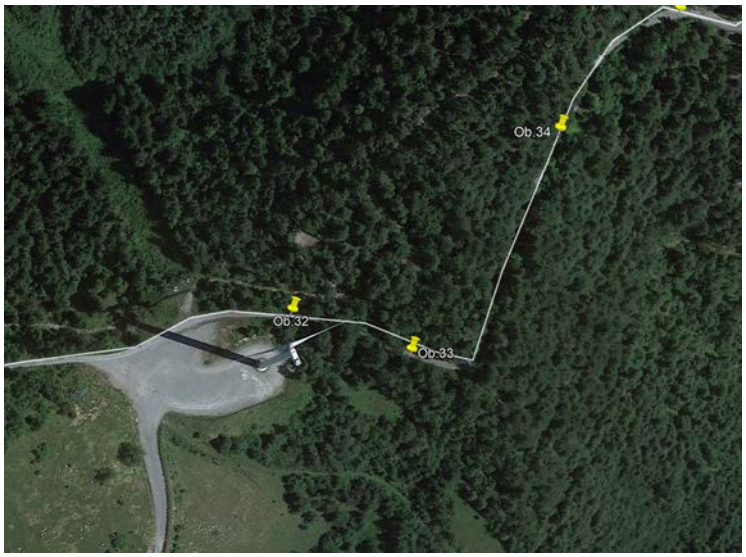


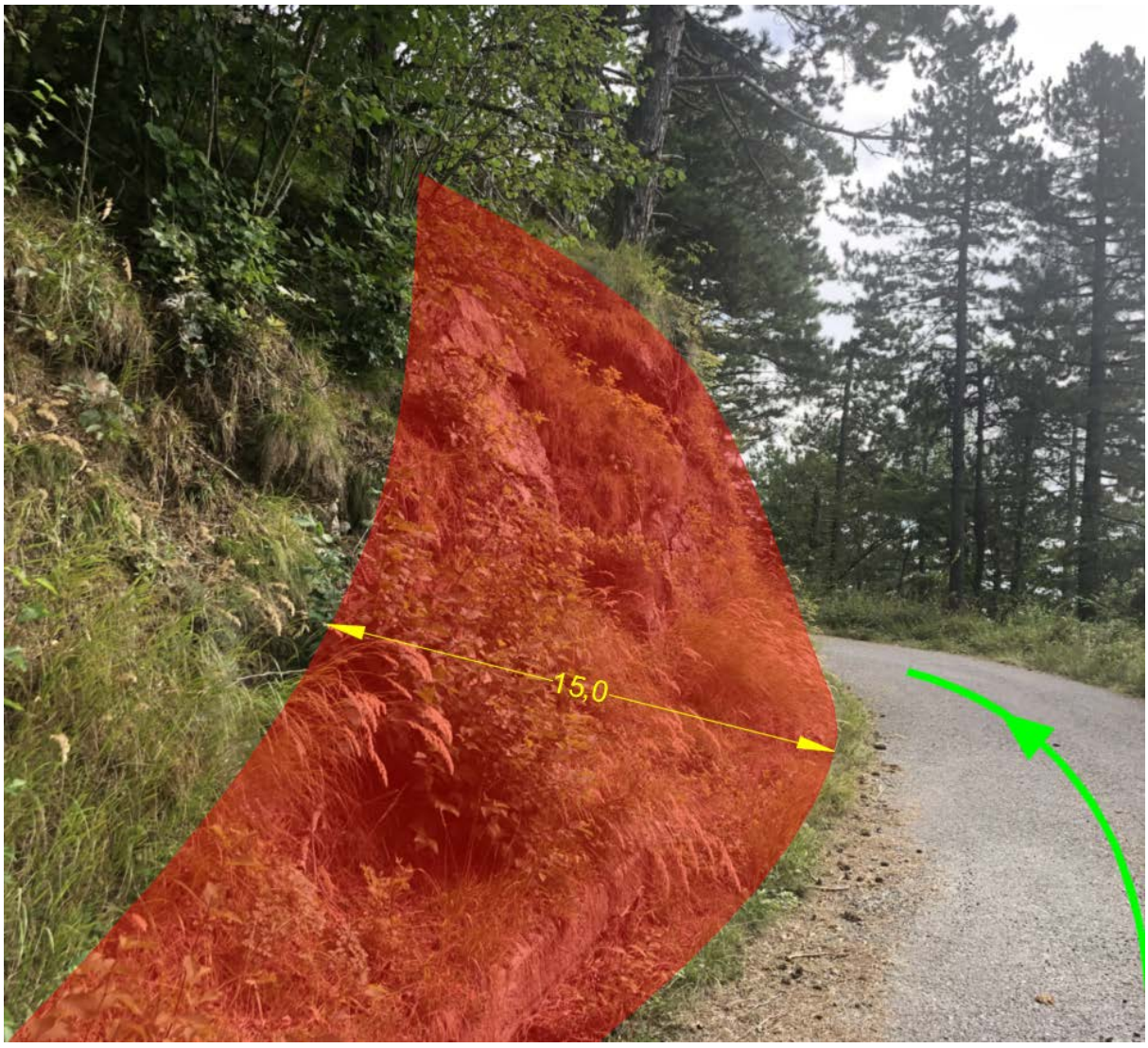
Observat ion 32
Cut the protruding vegetation on the road
Coord. 44°10 '42.82"N 08°03 '22.06"E





Observation 33
Make enlargement 15mt in the left side of the road
Coord. 44°10 '42.15"N 08°03'24.88"E





Observation 34
Make enlargement 1,5mt in the right side
Coord. 44°10'45.79"N 08°03'28.25"E





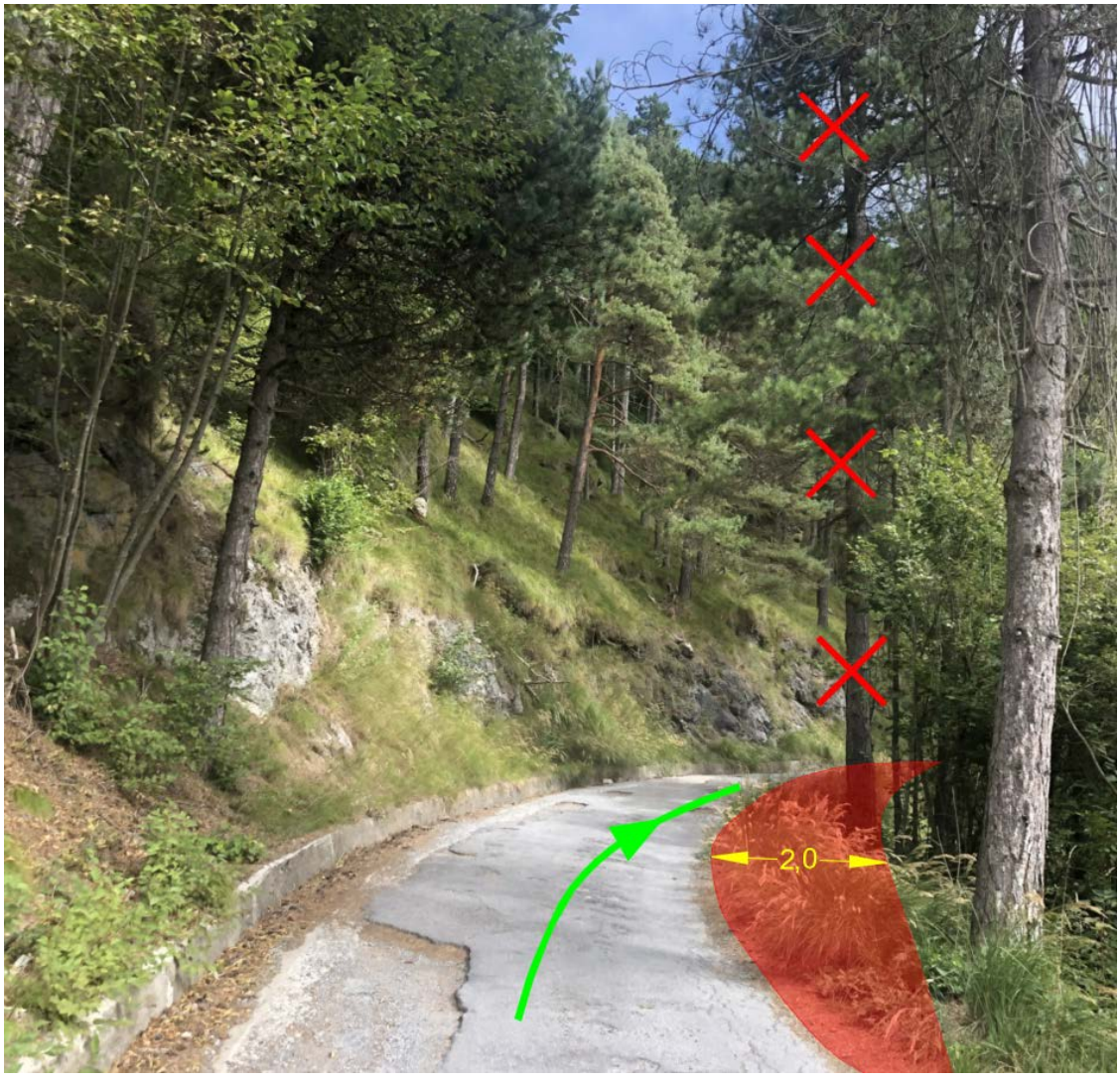
Observation 35
Make enlargement 10mt in the left side of the road
Coord. 44°10'47.68"N 08°03'30.87"E





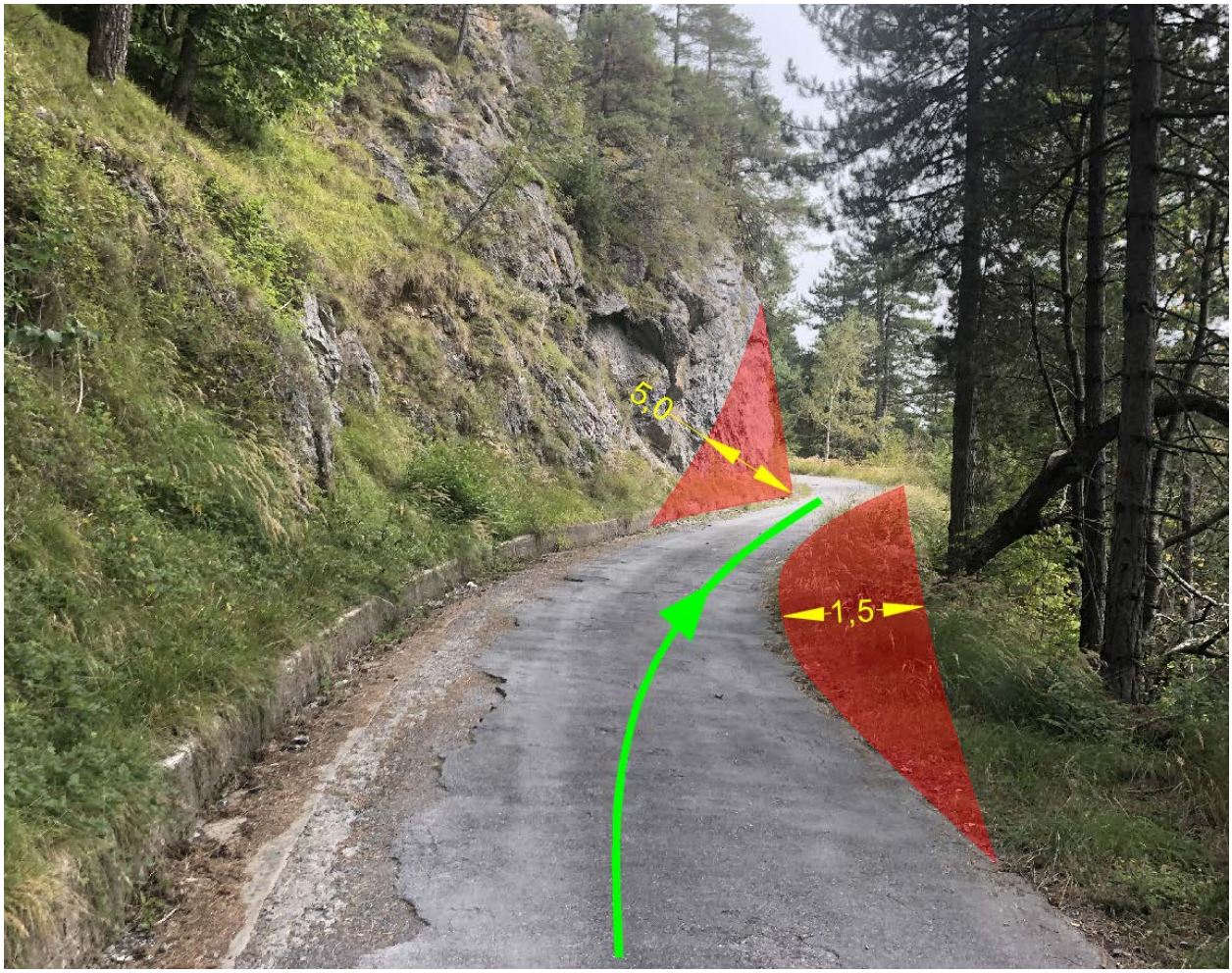
Observation 36
Make enlargement 2mt in the right side of the road
Cut vegetation as shown
Coord. 44°10'58.03"N 08°03'32.93"E





Observation 37
Make enlargement 1,5mt in the right side and 5mt in the left side of the road
Coord. 44°10'48.91"N 08°03'34.09"E





Observat ion 38
Make enlargement 2mt on the right side of the road
Coord. 4 4°10'49.89"N 08°03'37.99"E





Observation 39
Make enlargement 5mt on the left side of the road
Coord. 44°10'40.73"N 08°03'41.04"E





Observation 40
Make enlargement 2mt on the left side of the road.
Coord. 44°10'55.40"N 08°03'48.81"E





Observati on 41
Make enlargement 2mt on the right side of the road.
Coord. 44°10'59.25"N 08°03'55.04"E





Observation 42
Make enlargement 2mt on the left side of the road.
Coord. 44°11 ’00.12"N 08°03'58.51"E





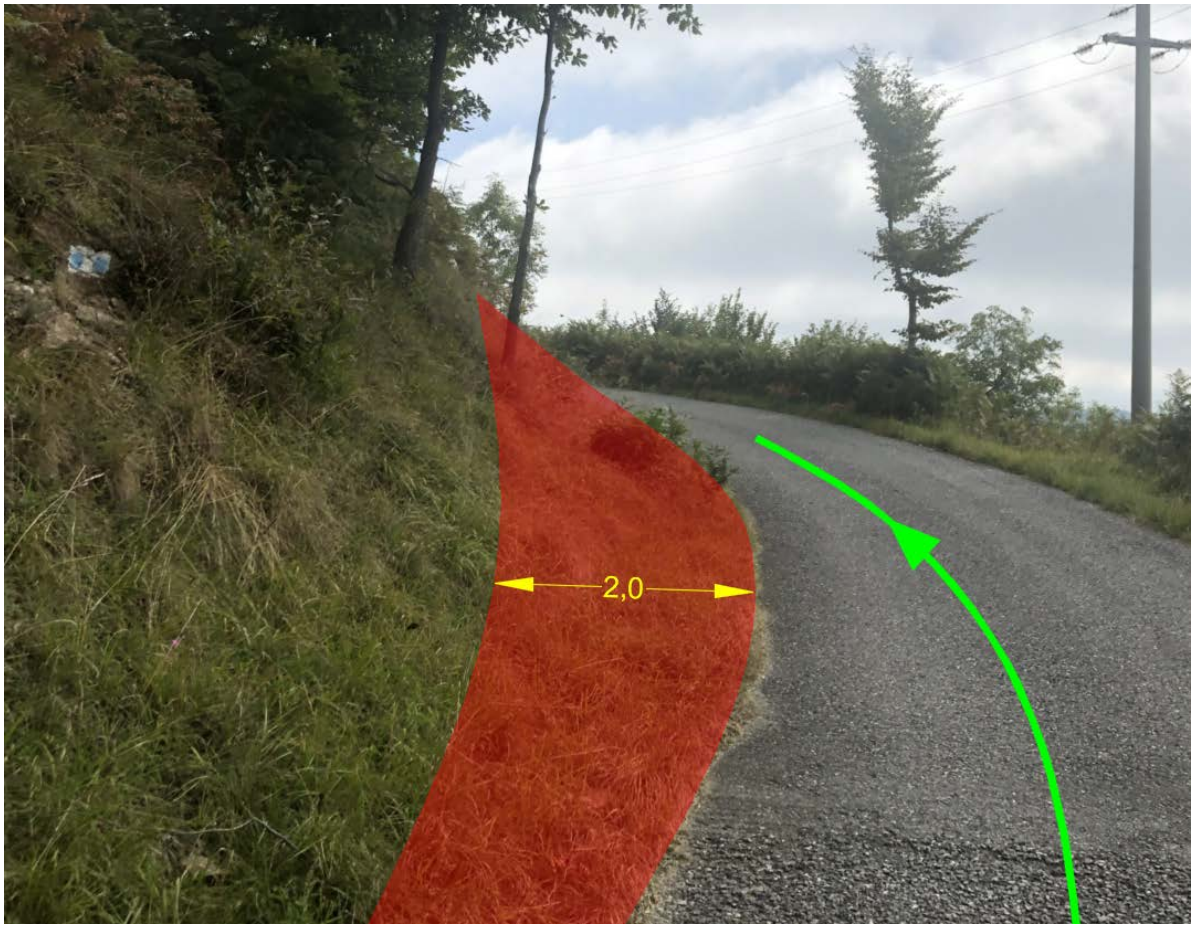
Observation 43
Make enlargement 6mt on the right side of the road.
Coord. 44°1 1’00.75"N 08°04'00.72"E





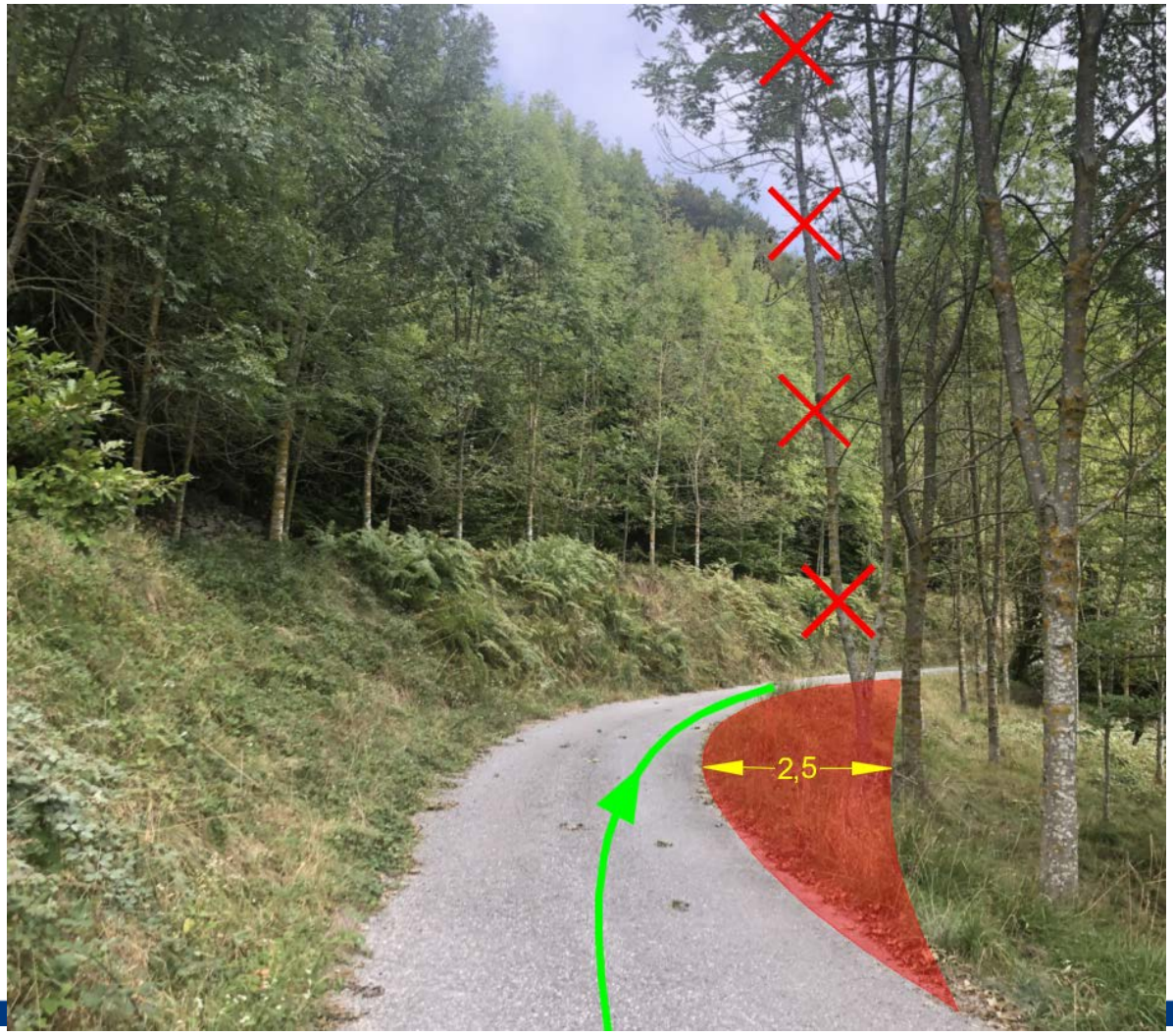
Observation 44
Make enlargement 2mt on the left side of the road.
Coord. 44°10 ’56.72"N 08°04 '13.38"E





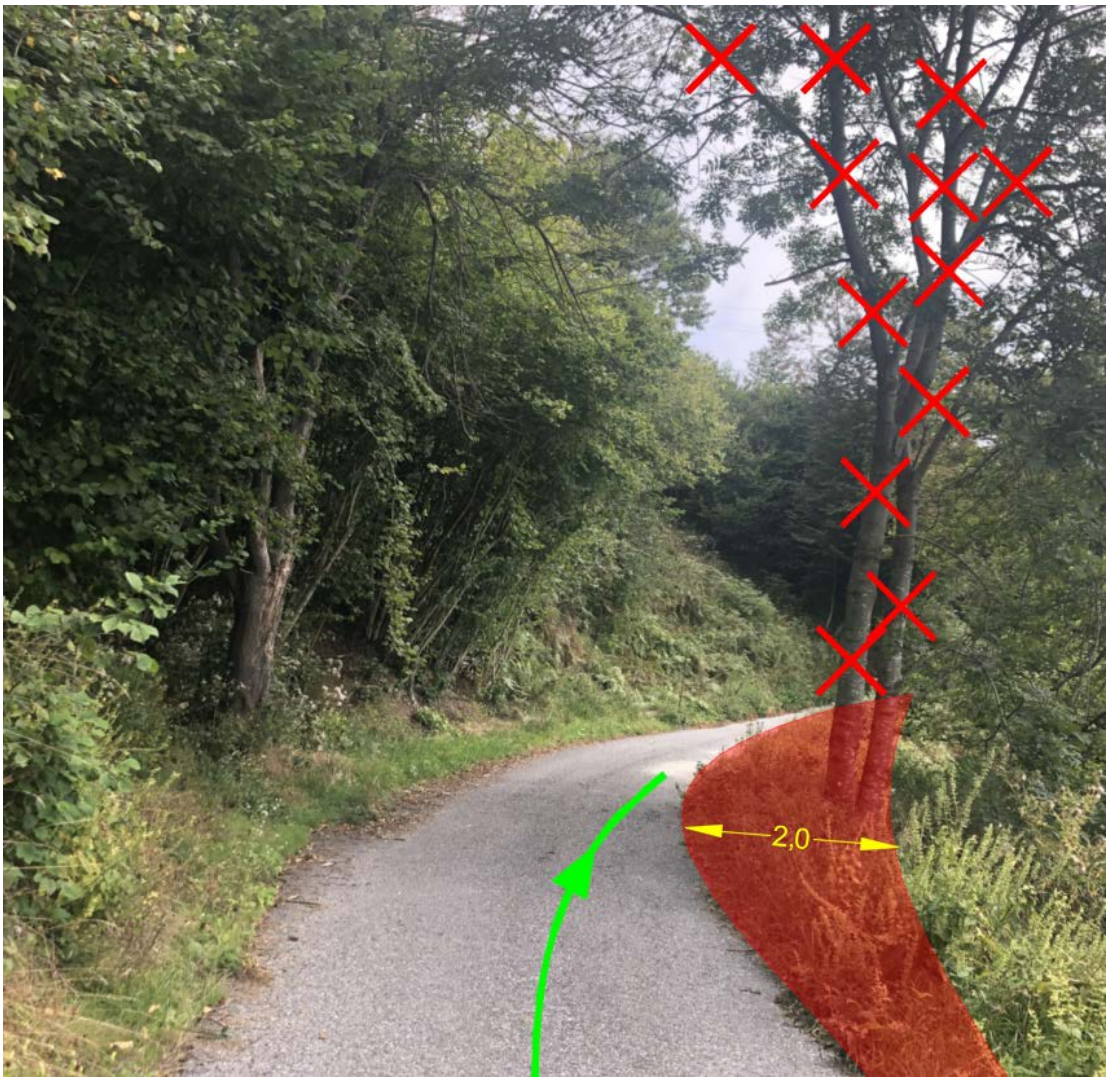
Observation 45
Make enlargement 2,5mt on the right side of the road.
Cut vegetation as shown
Coord. 44°10’57.53"N 08°04'17.22"E





Observation 46
Make enlargement 2mt on the right side of the road.
Cut vegetation as shown
Coord. 44°10 ’58.72"N 08°04 ’20.22"E





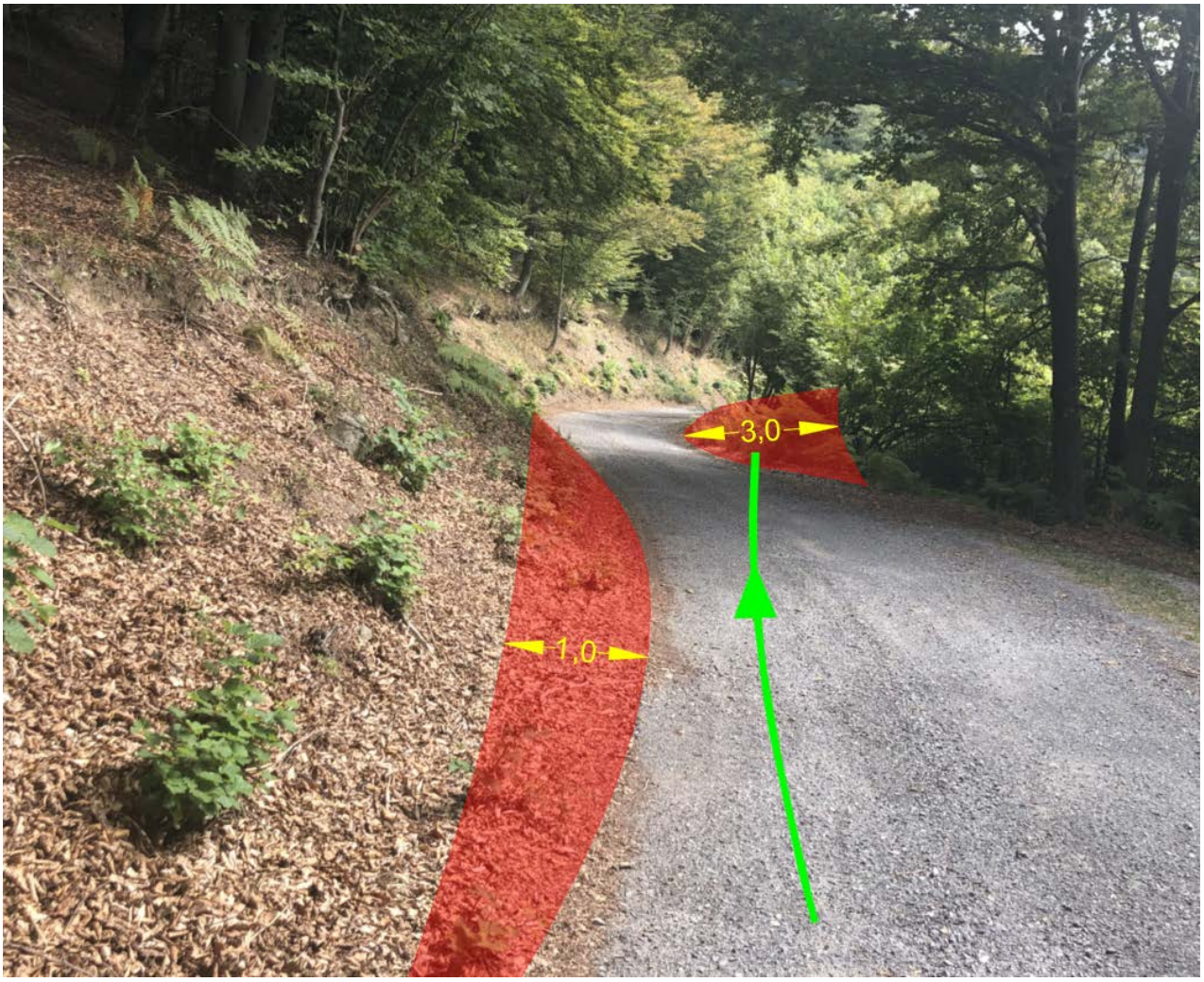
Observation 47
Make enlargement 2mt on the right side of the road.
Coord. 44°10 ’58.02" N 08°04'25.24"E





Observati on 48
Make enlargement 1mt on the left side and 3,0mt on the right side of the road.
Coord. 44°10 ’54.89"N 08°04 '31.72"E





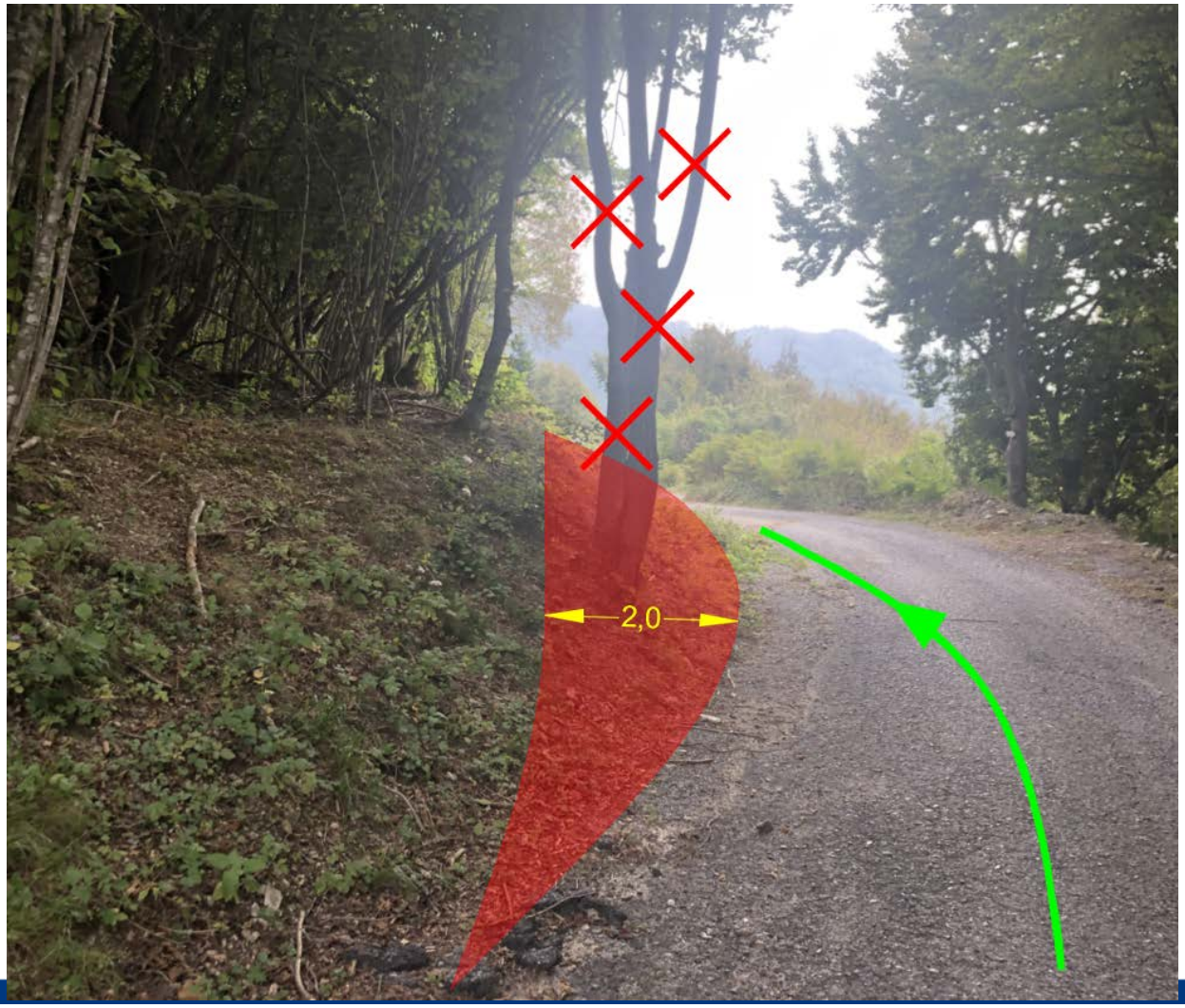
Observation 49
Make enlargement 5mt on the right side of the road.
Coord. 44°10'54.86"N 08°04'35.49"E





Observation 50
Make enlargement 2mt on the left side of the road.
Cut vegetation as shown
Coord. 44°10 ’40.84"N 08°04 '43.12"E





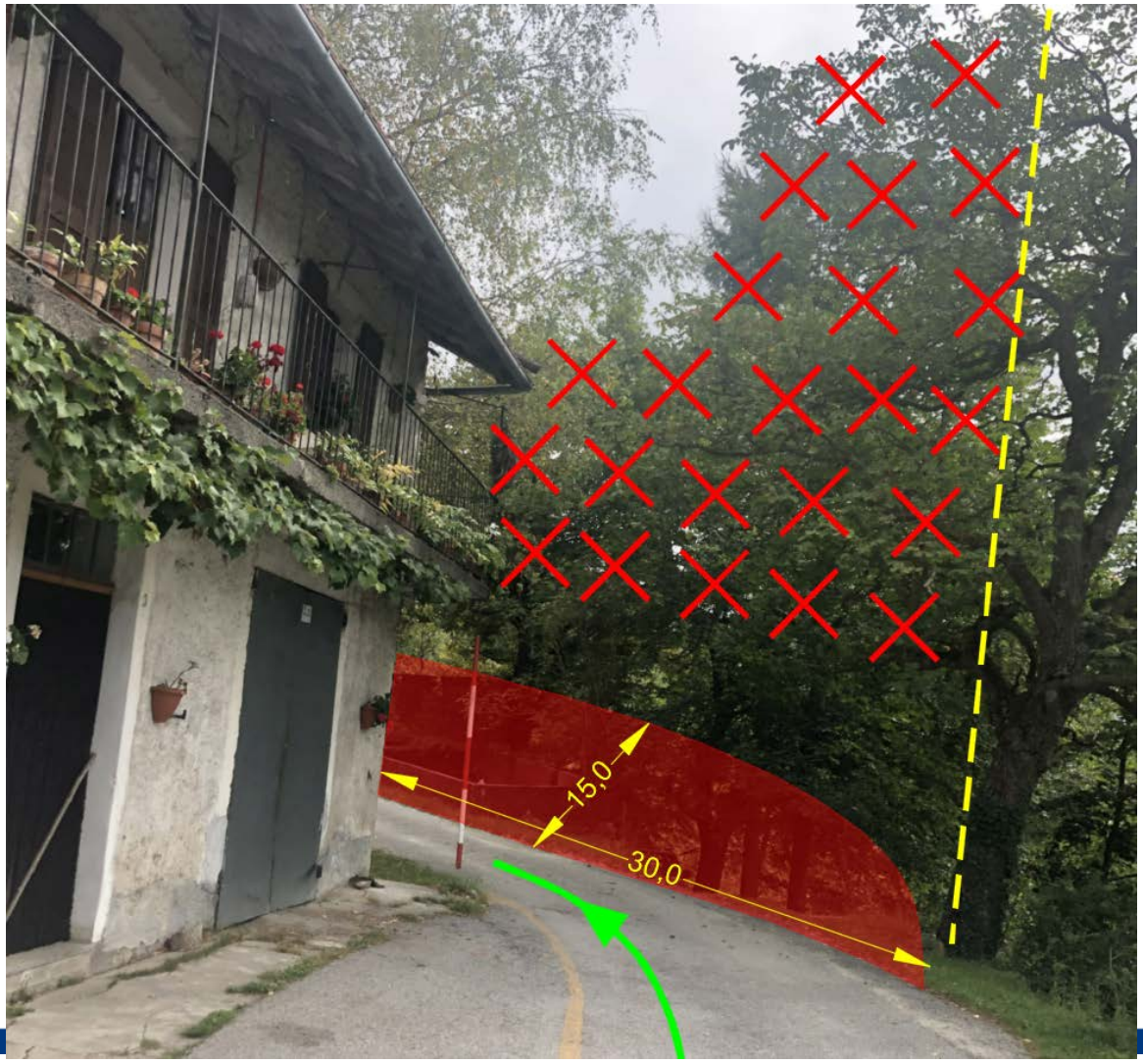
Observation 51
Make enlargement 6mt on the right side of the road.
Coord. 44°10 ’38.77"N 08°04 '50.82"E





Observation 52
Make enlargement 30mt x 15mt
Cut vegetation as shown.
Coord. 44°10’36.50"N 08°04'59.34"E





Observation 53
Make enlargement 30mt x 15mt
Cut vegetation as shown.
Coord. 44°10’36.49"N 08°04’59.55"E





Observation 54
Make enlargement 6mt on the right side of the road.
Remove cable as shown
Coord. 44°10’35.80"N 08°05'03.40"E





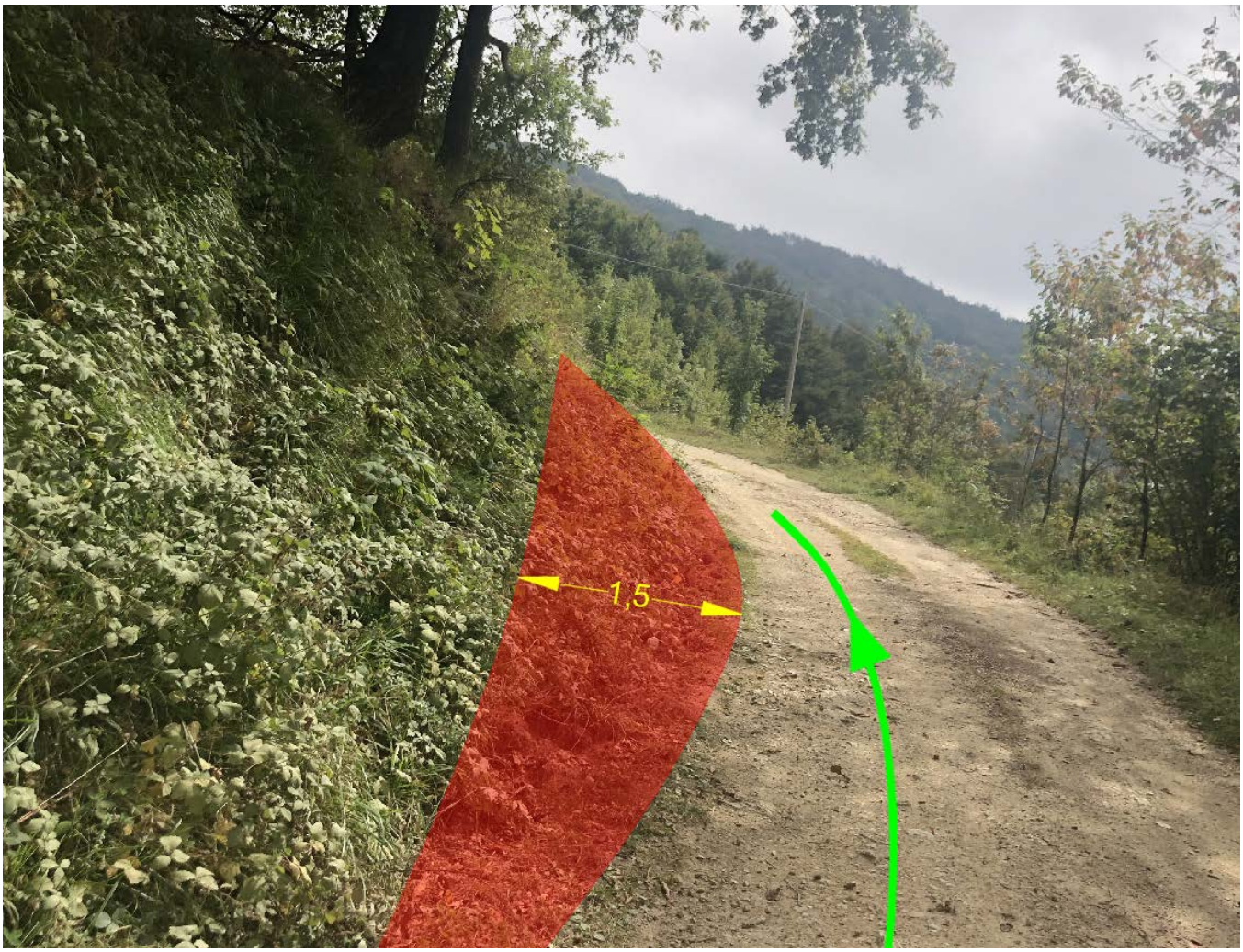
Observation 55
Make enlargement 1,5mt on the left side of the road.
Coord. 44°10’35.26"N 08°05'05.02"E





Observation 56
Make enlargement 1,5mt on the left side of the road.
Coord. 44°10’31.59"N 08°05'16.36"E





Observation 57
Make enlargement 6mt on the right side of the road.
Remove cable as shown
Coord. 44°10’31.43"N 08°05'18.33"E





Observation 58
Make enlargement 3mt on the left side of the road.
Coord. 44°10’31.00"N 08°05'20.26"E





Observation 59
Make enlargement on the left side of the road.
Cut vegetation as shown
Coord. 44°10’31.22"N 08°05’22.39"E





Observati on 60
Make enlargement 5mt on the left side and 4mt on the right of the road.
Coord. 44°10’30.71"N 08°05'30.75"E





Observation 61
Make enlargement 2mt on the left side of the road.
Coord. 44°10’28.44"N 08°05'33.45"E





Observation 62
Make enlargement 10mt on the right side of the road.
Coord. 44°10’28.19"N 08°05'34.11"E





Observation 63
Cut the protruding vegetation on the road
Restore road as the “0038-8194_V10 - Road Crane Pad and Hardstand Specifications V105-V112-V117-V126-V136”
Coord. 44°10’14.64"N 08°05'43.37"E





Observation 64
Create site access as the “0038-8194_V10 - Road Crane Pad and Hardstand Specifications V105-V112-V117-V126-V136”
Coord. 44°10’03.75"N 08°06’21.66"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 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 21/11/2018 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 “0038-8194_V10 - Road Crane Pad and Hardstand Specifications V105-V112-V117-V126-V136”

- 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