PROJECT OPERATOR	**:**	**MYTILINEOS S.A.** **POWER & GAS BUSINESS UNIT**
TYPE OF ACTIVITY	**:**	**TRANSMISSION LINE OF ELECTRIC ENERGY 400kV, FOR THE CONNECTION OF AGIOS NIKOLAS HIGH VOLTAGE SUBSTATION (HVS) WITH THE DISTOMO HIGH VOLTAGE SUBSTATION (HVS), IN VIOTIA REGION.**
PROJECT SITE	**:**	**POSITION "AGIOS NIKOLAOS" - OUTSIDE URBAN DESIGN REGION - MUNICIPALITY UNIT (MU) OF DISTOMO – MUNICIPALITY OF DISTOMO - ARACHOVAS - ANTIKYRAS & OUTSIDE URBAN DESIGN REGION OF KYRIAKI - MUNICIPALITY UNIT (MU) OF KYRIAKI – MUNICIPALITY OF LEVADEONS, VIOTIA REGION**

ENVIRONMENTAL IMPACT ASSESSMENT

Environmental Study Engineer:

SAMARAS & ASSOCIATES S.A.
CONSULTING ENGINEERS

T H E S S A L O N I K I , D E C E M B E R 2 0 2 0

PROJECT OPERATOR

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THESSALONIKI, DECEMBER 2020

PROJECT OPERATOR	ENVIRONMENTAL STUDY ENGINEER

CONTENT **PAGES**

1 INTRODUCTION

EMPLOYER	:	**MYTILINEOS S.A. - POWER & GAS BUSINESS UNIT**
PROJECT	:	**ELECTRIC TRANSMISSION LINE (T.L.) 400kV**
PROJECT SITE	:	**POSITION "AGIOS NIKOLAOS" - OUTSIDE URBAN DESIGN REGION - DISTOMO – MUNICIPALITY OF DISTOMO - ARAHOVAS - ANTIKYRAS & OUTSIDE URBAN DESIGN REGION KYRIAKIOY - MUNICIPALITY OF LEVADEONS, REGION OF VIOTIA**

1.1 PROJECT TITLE

This Environmental Impact Study concerns the construction and operation of a **new Electric Transmission Line (T.L.) of 400kV Agios Nikolaos HVS – Distomo HVS**, for the connection of the Agios Nikolaos HVS with the Distomo HVS, as part of the connection of the Agios Nikolaos New Power Plant 826MW with the National Electricity Transmission System, at the Agios Nikolaos HVC. The new 400kV Electric Transmission Line will have a total length of about 14km and will consist of forty-two (42) High Voltage pylons.

1.2 TYPE AND SIZE OF THE PROJECT

The transmission line under study (T.L.) of electricity 400kV Agios Nikolaos HVS– Distomo HVS, with a total length of about 14km, is starting from Agios Nikolaos HVS (High Voltage P/S - within the existing facilities of Mytilineos S.A.) and is completed in Distomo HVS, as shown in the following satellite imaging extract. The projects proposed in this Environmental Impact Study concern the following:

- Construction of a new Transmission Line (T.L.) of 400kV high voltage electricity, with a total length of about 14km.
- Construction of forty-two (42) new High Voltage pylons.
- Opening of a forest road, with a total length of about 8,700m, to serve the construction and operation needs of the new electricity transmission line.
- Configuration of a plot of development of cable systems, below the terminal pylon (P42) of T.L. electricity, area 1,265m^2.
- Execution of work – addition of equipment to connect the development plot of cable systems with the Agios Nikolaos HVS.

- Connection of the new T.L. to the Distomo HVS (connection of the terminal pylon of (T.L.) to the terminal wall, the available gateway, to the Distomo HVC.

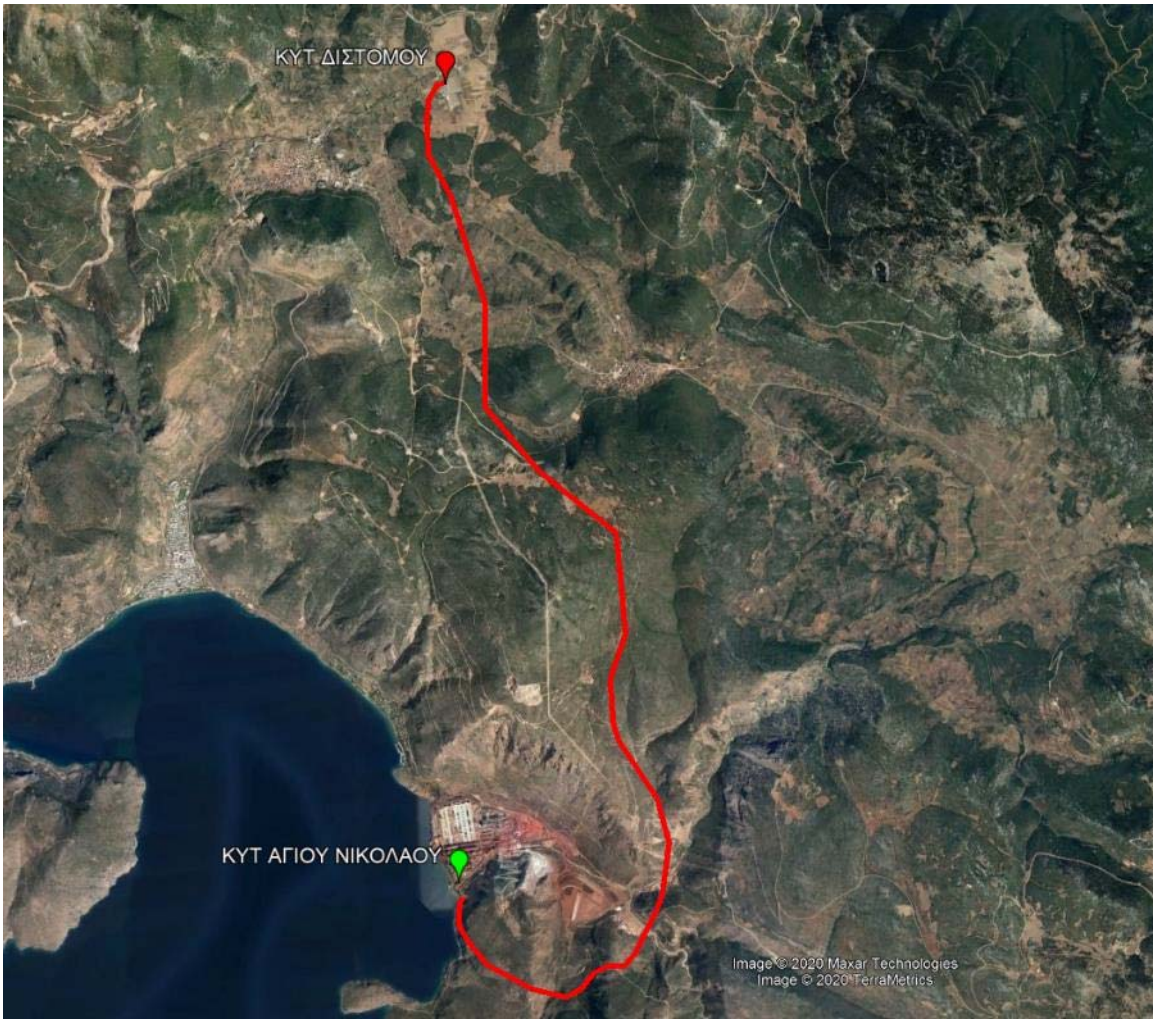


Figure 1.1: Extract of satellite imaging (google earth), showing with a red line the electricity (T.L.) 400kV under study, and the locations of the Agios Nikolaos and Distomo HVC are indicated.

In order to meet the construction and operation needs of the electricity transmission line, a new forest road, with a total length of about 8,700m is required. The proposed road sections are presented in the following satellite imagery extract.

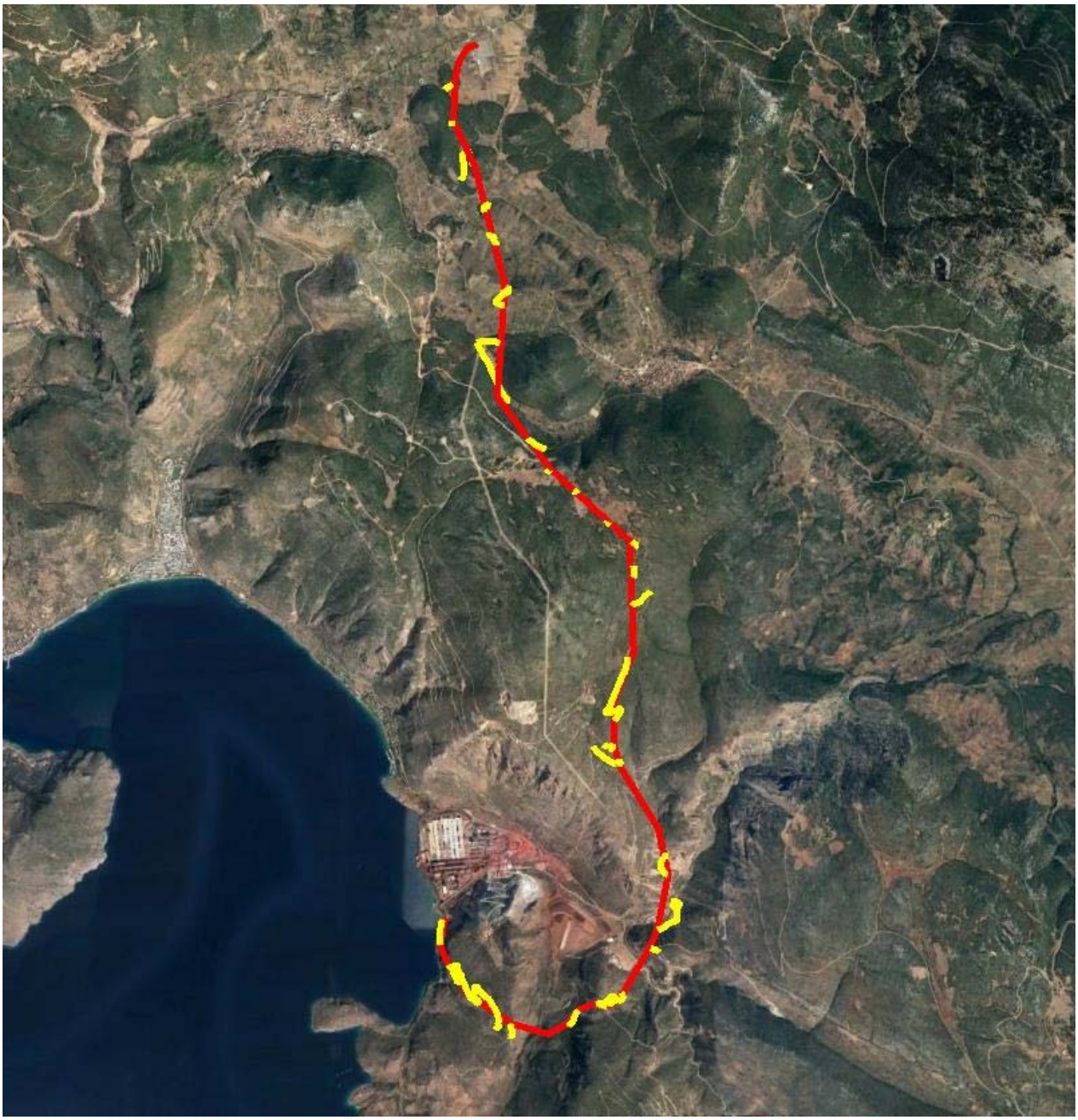


Figure 1.2: A google earth extract, showing the new electricity (T.L.) with a red line, while yellow lines show the access roads that will be opened to serve the construction and operation needs of the new line.

For the connection needs of the new electricity (T.L.) with the Agios Nikolaos HVS requires the development of a plot of cable systems, below the terminal pylons (P42) of T.L. electricity. This plot of 1,265m^2 provides for the construction of the necessary fencing, the installation of grounding and the construction of nine (9) outdoor suspension bases.

Finally, in order to connect the development plot of cable systems with the Agios Nikolaos HVS, the following tasks are required – addition of equipment:

- opening of underground channels for the underground high voltage of cables from Agios Nikolaos HVC to the plot of development of cable systems, total length of about 200m.
- installation of High Voltage cable supports on the retaining wall of the new 826MW Power Plant, in Ag. Nikolaos, total length of about 175m and
- installation and termination of a dual cable HV circuit, by Agios Nikolaos HVC up to the cable system development plot, total length of about 430m.

Figure 1.3: A satellite imagery extract (google earth), showing the new 400kV power transmission line with a purple polygon, shows the Agios Nikolaos HVC, with blue polygon is captured the plot of development of cable systems, while with purple line the connection of the development plot of cable systems with the Agios Nikolaos HVC.

Feasibility of the project.

Near Agios Nikolaos HVS, the new power plant with a rated power of 826MW has been licensed and according to the connection conditions, it will be connected to the existing Agios Nikolaos HVS. Agios Nikolaos HVS already serves the Power Station with a rated power of 444,48MW.

Figure 1.4: Satellite imaging extract (google earth), where the Agios Nikolaos HVC, with a green polygon the existing power station with a rated power of 444,48MW and with a yellow polygon the installation pitch of the new power station with a rated power of 826MW.

In order to ensure the absorption of the full power of the two (2) power plants, it is necessary to implement an enhanced connection scheme of the Agios Nikolaos HVS with the Distomo HV, which are part of the System, both in terms of transit power per connection, and increased availability with the choice of completely separate and independent routes for the main and backup connection, in accordance with the requirement of the Independent Power Transmission Operator.

Therefore, in October 2020 it was filed with No. 184669/14.10.2020 application to Directorate of Environment and Spatial Planning of Central Greece, Environmental Impact Study for the amendment of

No. 124363/16.04.2010 environmental terms approval, as amended and in force by No. 32394/2177/13.11.2019 environmental terms approval, for the diversion of part of the existing electric transmission line Agios Nikolaos HVS – Distomo HVS, while with this Environmental Impact Study the new electricity transmission line Agios Nikolaos HVS – Distomo HVS is licensed. **It is also pointed, as noted above, that according to the Connection Offer of the 826MW "New Power Plant" of the Independent Power Transmission Operator, it is necessary both to build the new electricity transmission line (as it is presented to this environmental impact assessment) and to divert the existing transmission line (environmental impact assessment October 2020), with a view to safely absorb the full power of the new 826MW power plant.** The above is explicitly mentioned in the Connection Offer of the new 826MW station, attached to this environmental impact assessment (independent electricity transmission operator /DSSAS/ 20804/8.10.2019). The new T.L., after its construction, as well as the diversion of the existing T.L., will be transferred **free of charge to independent power transmission operator**, as provided for by the relevant legislation and will form part of the System (hellenic electricity transmission system operator). The following satellite imagery extract shows the existing and new electricity transmission line Agios Nikolaos HVS – Distomo HVS.

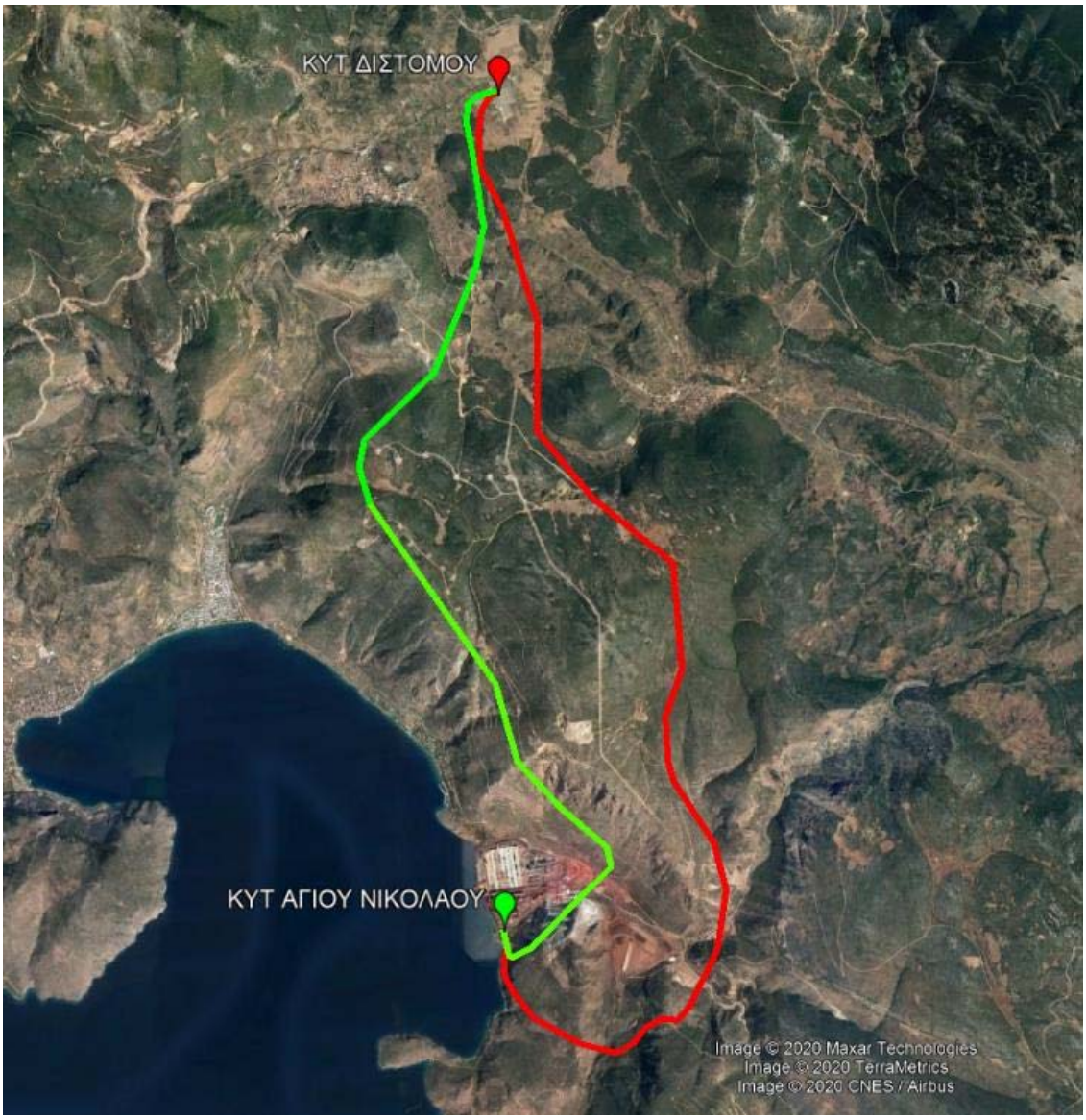


Figure 1.5: Extract of satellite imaging (google earth), where a green line is presented the existing electricity transmission line 400kV Agios Nikolaos HVS – Distomo HVS, while with a red line is presented the new power transmission line 400kV Agios Nikolaos HVS – Distomo HVS.

Finally, it is stated that the HVS of Agios Nikolaos has been environmentally licensed with the following environmental impact assessment:

- No. 124363/16.04.2010 environmental terms approval of the Special Environment Agency (E.Y.PE.) of the Ministry of Environment, Energy and Climate Change.
- 32394/2177/13.11.2019 environmental terms approval of the Directorate of Environmental Licensing (regional development directorates) of the Ministry of Environment and Energy, for which an Environmental Impact Study for the modification of environmental terms approval has been submitted in October 2020.

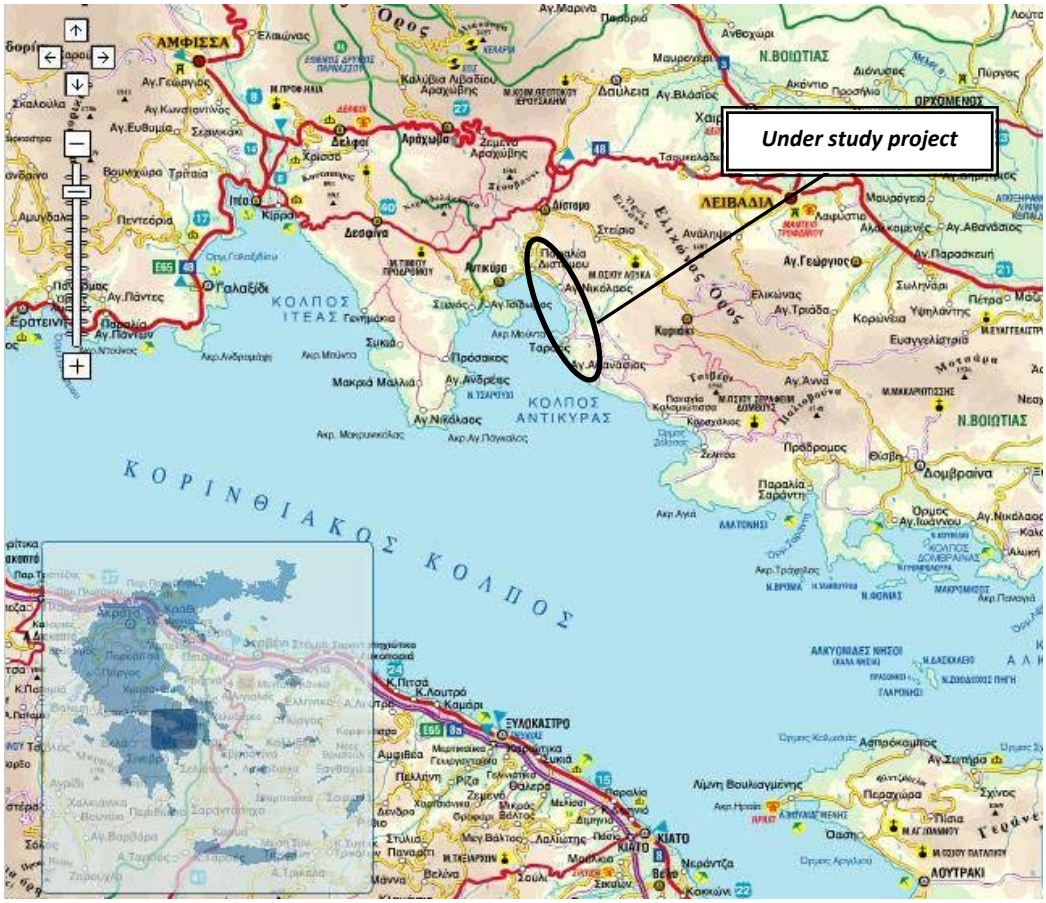
The Distomo HVS, has been licensed with the following environmental impact assessment:

- No. 5119/19.08.2009/ environmental impact assessment of the Ministry of Environment, Spatial Planning and Public Works and for which a file for renewal of environmental terms approval has been submitted in October 2019.

1.3 GEOGRAPHICAL POSITION AND ADMINISTRATIVE WORK PRODUCTION

1.3.1 Place

The project under study is located on the north coast of the Corinthian Gulf and in particular in the bay of Antikyra, between the extensions of the mountain volumes Parnassos and Elikonas, and extends to the west of the settlement of Distomo as shown by Figure 1.6.



Fugure 1.6: Geographical location of the project.

The nearest settlements to the electric T.L. under study are:

- Tarsos, located at a distance of about 150m South of the electric T.L. under study. The settlement of Tarsos was established by No. 3149/16.11.1987 Decision of the Prefect of Viotia (Government Gazette 1187/D/14.12.1987).
- Steiri is located about 1.000m east of the electric T.L.under study. The settlement of Steiri was institutionalized with the No. 3354/27.07.1986 Decision of the Prefect of Viotia (Government Gazette 926/D/06.10.1986).
- Distomo, located at a distance of about 1.000m west of the electric T.L.under study. The settlement of Distomo was established by No. 36642/20.06.1972 Decision of the Prefect of Viotia (Government Gazette 156/D/07.07.1972).

Figure 1.7: Google Earth extract showing the project under study, as well as the nearest demarcated settlements.

1.3.2 Project Administrative Submission

The project under study belongs administratively to the Region of Central Greece, to the Regional Unit (R.U.) of Viotia, to the Municipalities of Levadia and Distomo - Arachova - Antikyra (as formed pursuant to Law 3852/2010) and in particular, to the Municipal Units (M.U) of Kyriaki and Distomo, respectively.

1.3.3 Geographical Coordinates

The following table shows the geographical coordinates of the pylons of the 400kV High Voltage Transmission Line under study, in the Greek Geodesic Reference System 1987 (GGRS '87) and in the Global Geodesic System GGS '84.

Table 1.1: Coordinates of the pillars of the new electricity (T.L.) 400kV.

A/A	GGRS '87		GGS '84	
	X (m)	Y (m)	ϕ (°)	λ (°)
ΙΚΡΙΟΜΑ	385.280,033	4.254.960,755	38ο 26′ 17,39	22ο 41′ 14,04
Π1	385.188,969	4.254.929,034	38ο 26′ 16,32	22ο 41′ 10,30
Π2	385.099,975	4.254.766,161	38ο 26′ 11,00	22ο 41′ 6,73
Π3	385.069,571	4.254.529,026	38ο 26′ 3,29	22ο 41′ 5,61
Π4	385.087,470	4.254.130,000	38ο 25′ 50,36	22ο 41′ 6,59
Π5	385.329,340	4.253.676,500	38ο 25′ 35,76	22ο 41′ 16,83
Π6	385.469,253	4.253.221,747	38ο 25′ 21,07	22ο 41′ 22,86
Π7	385.578,057	4.252.868,106	38ο 25′ 9,65	22ο 41′ 27,56
Π8	385.710,694	4.252.436,999	38ο 24′ 55,73	22ο 41′ 33,28
Π9	385.707,103	4.252.208,105	38ο 24′ 48,30	22ο 41′ 33,26
Π10	385.700,985	4.251.818,125	38ο 24′ 35,65	22ο 41′ 33,24
Π11	385.692,190	4.251.257,500	38ο 24′ 17,46	22ο 41′ 33,20
Π12	386.035,640	4.250.841,691	38ο 24′ 4,13	22ο 41′ 47,60
Π13	386.304,870	4.250.515,740	38ο 23′ 53,69	22ο 41′ 58,89
Π14	386.613,053	4.250.264,003	38ο 23′ 45,66	22ο 42′ 11,74
Π15	386.930,583	4.250.004,630	38ο 23′ 37,39	22ο 42′ 24,97
Π16	387.173,750	4.249.806,000	38ο 23′ 31,06	22ο 42′ 35,11
Π17	387.202,987	4.249.435,743	38ο 23′ 19,06	22ο 42′ 36,53
Π18	387.227,783	4.249.121,720	38ο 23′ 8,89	22ο 42′ 37,73
Π19	387.264,440	4.248.657,500	38ο 22′ 53,85	22ο 42′ 39,51
Π20	387.171,251	4.248.393,462	38ο 22′ 45,24	22ο 42′ 35,82
Π21	387.083,030	4.248.143,498	38ο 22′ 37,09	22ο 42′ 32,33
Π22	387.094,087	4.247.908,760	38ο 22′ 29,49	22ο 42′ 32,92
Π23	387103,995	4247681,841	38ο 22′ 22,13	22ο 42′ 33,46

A/A	GGRS ΄87		GGS ΄84	
	X (m)	Y (m)	ϕ (°)	λ (°)
Π24	387.166,063	4.247.443,000	38ο 22΄ 14,41	22ο 42΄ 36,16
Π25	387.363,499	4.247.138,299	38ο 22΄ 4,62	22ο 42΄ 44,46
Π26	387.597,551	4.246.777,166	38ο 21΄ 53,01	22ο 42΄ 54,31
Π27	387.730,082	4.246.268,516	38ο 21΄ 36,57	22ο 43΄ 0,07
Π28	387.639,609	4.245.672,927	38ο 21΄ 17,21	22ο 42΄ 56,68
Π29	387.568,024	4.245.491,850	38ο 21΄ 11,30	22ο 42΄ 53,84
Π30	387.316,306	4.245.010,152	38ο 20΄ 55,57	22ο 42΄ 43,74
Π31	387.196,250	4.244.873,420	38ο 20΄ 51,08	22ο 42΄ 38,88
Π32	387.015,780	4.244.882,930	38ο 20΄ 51,30	22ο 42΄ 31,44
Π33	386.844,060	4.244.799,410	38ο 20΄ 48,52	22ο 42΄ 24,41
Π34	386.715,994	4.244.635,334	38ο 20΄ 43,14	22ο 42΄ 19,23
Π35	386.529,860	4.244.527,647	38ο 20΄ 39,56	22ο 42΄ 11,63
Π36	386.142,902	4.244.627,561	38ο 20΄ 42,62	22ο 41΄ 55,63
Π37	385.957,659	4.244.729,189	38ο 20΄ 45,84	22ο 41΄ 47,95
Π38	385.631,526	4.244.908,517	38ο 20΄ 51,50	22ο 41΄ 34,41
Π39	385.406,084	4.245.194,306	38ο 21΄ 0,67	22ο 41΄ 24,96
Π40	385.311,054	4.245.373,533	38ο 21΄ 6,44	22ο 41΄ 20,94
Π41	385.324,934	4.245.618,455	38ο 21΄ 14,39	22ο 41΄ 21,37
Π42	385.365,005	4.245.675,007	38ο 21΄ 16,24	22ο 41΄ 22,98

The table below shows the geographical coordinates of the road sections under study (beginning, middle and end), which are being used to meet the construction needs of the proposed project, i.e. the diversion of the 400kV High Voltage Transmission Line. The geographical coordinates of the new routes are given in the Greek Geodesic Reference System 1987 (GGRS ‘87) and the Global Geodesic System GGS ‘84.

Table 1.2: Coordinates of the road sections under study, in the Greek Geodesic Reference System 1987 (GGRS ‘87) and in the Global Geodesic System GGS ‘84.

ROAD	A/A	GGRS ΄87		GGS ΄84	
		X (m)	Y (m)	ϕ (°)	λ (°)
ROAD 1	beginning	384.970,7	4.254.466,9	38ο 26΄ 1,23	22ο 41΄ 1,57
	middle	385.008,9	4.254.499,8	38ο 26΄ 2,31	22ο 41΄ 3,13
	End	385.050,2	4.254.528,9	38ο 26΄ 3,28	22ο 41΄ 4,82
ROAD 2	beginning	385.071,6	4.254.077,0	38ο 25΄ 48,63	22ο 41΄ 5,96
	middle	385.076,7	4.254.107,2	38ο 25΄ 49,61	22ο 41΄ 6,16
	End	385.069,0	4.254.136,4	38ο 25΄ 50,55	22ο 41΄ 5,82

ROAD	A/A	GGRS ΄87		GGS ΄84	
		X (m)	Y (m)	ϕ (°)	λ (°)
ROAD 3	Beginning	385.184,5	4.253.522,6	38ο 25΄ 30,70	22ο 41΄ 10,95
	Middle	385.196,8	4.253.767,5	38ο 25΄ 38,65	22ο 41΄ 11,31
	End	385.316,1	4.253.683,4	38ο 25΄ 35,98	22ο 41΄ 16,28
ROAD 4	Beginning	385.508,8	4.253.274,1	38ο 25΄ 22,79	22ο 41΄ 24,46
	Middle	385.450,7	4.253.260,2	38ο 25΄ 22,31	22ο 41΄ 22,08
	End	385.460,6	4.253.204,3	38ο 25΄ 20,50	22ο 41΄ 22,52
ROAD 5	Beginning	385.487,5	4.252.955,8	38ο 25΄ 12,45	22ο 41΄ 23,77
	Middle	385.568,3	4.252.935,3	38ο 25΄ 11,83	22ο 41΄ 27,11
	End	385.596,6	4.252.858,0	38ο 25΄ 9,33	22ο 41΄ 28,33
ROAD 6	Beginning	385.685,9	4.252.347,5	38ο 24΄ 52,81	22ο 41΄ 32,31
	Middle	385.755,0	4.252.377,6	38ο 24΄ 53,82	22ο 41΄ 35,14
	End	385.755,0	4.252.423,5	38ο 24΄ 55,31	22ο 41΄ 35,11
ROAD 7	Beginning	385.702,2	4.252.334,6	38ο 24΄ 52,40	22ο 41΄ 32,99
	Middle	385.625,5	4.252.261,7	38ο 24΄ 50,00	22ο 41΄ 29,87
	End	385.719,6	4.252.222,3	38ο 24΄ 48,77	22ο 41΄ 33,77
ROAD 8	Beginning	385.702,2	4.252.334,6	38ο 24΄ 35,54	22ο 41΄ 22,80
	Middle	385.568,2	4.251.842,3	38ο 24΄ 36,38	22ο 41΄ 27,75
	End	385.687,5	4.251.814,8	38ο 24΄ 35,54	22ο 41΄ 32,68
ROAD 9	Beginning	385.443,5	4.251.821,3	38ο 24΄ 35,64	22ο 41΄ 22,62
	Middle	385.647,5	4.251.468,5	38ο 24΄ 24,29	22ο 41΄ 31,24
	End	385.692,2	4.251.242,6	38ο 24΄ 16,98	22ο 41΄ 33,21
ROAD 10	Beginning	386.239,7	4.250.727,6	38ο 24΄ 0,53	22ο 41΄ 56,08
	Middle	386.133,9	4.250.764,3	38ο 24΄ 1,67	22ο 41΄ 51,70
	End	386.040,7	4.250.827,7	38ο 24΄ 3,68	22ο 41΄ 47,82
ROAD 11	Beginning	386.265,7	4.250.468,5	38ο 23΄ 52,14	22ο 41΄ 57,30
	Middle	386.280,5	4.250.487,4	38ο 23΄ 52,76	22ο 41΄ 57,90
	End	386.295,9	4.250.506,9	38ο 23΄ 53,39	22ο 41΄ 58,52
ROAD 12	Beginning	386.556,2	4.250.298,7	38ο 23΄ 46,76	22ο 42΄ 9,37
	Middle	386.582,7	4.250.289,8	38ο 23΄ 46,48	22ο 42΄ 10,47
	End	386.601,4	4.250.269,5	38ο 23΄ 45,83	22ο 42΄ 11,25
ROAD 13	Beginning	386.909,6	4.249.969,9	38ο 23΄ 36,26	22ο 42΄ 24,13
	Middle	386.929,5	4.249.978,0	38ο 23΄ 36,53	22ο 42΄ 24,94
	End	386.942,1	4.249.995,1	38ο 23΄ 37,09	22ο 42΄ 25,45
ROAD 14	Beginning	387.225,0	4.249.741,0	38ο 23΄ 28,97	22ο 42΄ 37,26
	Middle	387.230,7	4.249.777,9	38ο 23΄ 30,17	22ο 42΄ 37,47
	End	387.193,5	4.249.803,0	38ο 23΄ 30,97	22ο 42΄ 35,93

ROAD	A/A	GGRS ΄87		GGS ΄84	
		X (m)	Y (m)	ϕ (°)	λ (°)
ROAD 15	Beginning	387.220,9	4.249.555,4	38ο 23΄ 22,95	22ο 42΄ 37,20
	Middle	387.231,4	4.249.493,8	38ο 23΄ 20,96	22ο 42΄ 37,67
	End	387.219,7	4.249.437,4	38ο 23΄ 19,13	22ο 42΄ 37,22
ROAD 16	Beginning	387.410,4	4.249.298,0	38ο 23΄ 14,69	22ο 42΄ 45,16
	Middle	387.328,5	4.249.209,6	38ο 23΄ 11,79	22ο 42΄ 41,83
	End	387.233,7	4.249.138,2	38ο 23΄ 9,43	22ο 42΄ 37,97
ROAD 17	Beginning	387.198,5	4.248.600,4	38ο 22ο 51,97	22ο 42΄ 36,83
	Middle	387.064,7	4.248.146,7	38ο 22ο 37,19	22ο 42΄ 31,57
	End	387.093,7	4.247.921,6	38ο 22ο 29,90	22ο 42΄ 32,90
ROAD 18	Beginning	386.990,7	4.247.664,1	38ο 22ο 21,50	22ο 42΄ 28,80
	Middle	387.065,0	4.247.654,3	38ο 22ο 21,22	22ο 42΄ 31,87
	End	387.050,0	4.247.619,0	38ο 22ο 20,07	22ο 42΄ 31,27
ROAD 19	Beginning	386.873,4	4.247.639,7	38ο 22ο 20,66	22ο 42΄ 23,98
	Middle	387.028,4	4.247.509,5	38ο 22ο 16,51	22ο 42΄ 30,45
	End	387.148,3	4.247.452,5	38ο 22ο 14,71	22ο 42΄ 35,42
ROAD 20	Beginning	387.714,1	4.246.476,4	38ο 21΄ 43,31	22ο 42΄ 59,29
	Middle	387.645,8	4.246.376,3	38ο 21΄ 40,03	22ο 42΄ 56,53
	End	387.721,1	4.246.274,4	38ο 21΄ 36,76	22ο 42΄ 59,69
ROAD 21	Beginning	387.801,2	4.246.012,1	38ο 21΄ 28,28	22ο 43΄ 3,14
	Middle	387.838,7	4.245.864,4	38ο 21΄ 23,51	22ο 43΄ 4,77
	End	387.650,9	4.245.675,7	38ο 21΄ 17,31	22ο 42΄ 57,14
ROAD 22	Beginning	387.578,9	4.245.487,2	38ο 21΄ 11,16	22ο 42΄ 54,29
	Middle	387.626,2	4.245.478,0	38ο 21΄ 10,88	22ο 42΄ 56,24
	End	387.668,5	4.245.456,9	38ο 21΄ 10,22	22ο 42΄ 57,99
ROAD 23	Beginning	387.289,3	4.245.005,8	38ο 20΄ 55,41	22ο 42΄ 42,63
	Middle	387.276,4	4.244.925,7	38ο 20΄ 52,81	22ο 42΄ 42,15
	End	387.187,6	4.244.891,0	38ο 20΄ 51,64	22ο 42΄ 38,51
ROAD 24	Beginning	387.181,7	4.244.859,6	38ο 20΄ 50,62	22ο 42΄ 38,29
	Middle	387.188,9	4.244.966,8	38ο 20΄ 54,10	22ο 42΄ 38,52
	End	387.103,2	4.244.844,3	38ο 20΄ 50,09	22ο 42΄ 35,06
ROAD 25	Beginning	387.097,2	4.244.847,0	38ο 20΄ 50,18	22ο 42΄ 34,81
	Middle	387.083,3	4.244.889,4	38ο 20΄ 51,54	22ο 42΄ 34,22
	End	387.031,6	4.244.880,7	38ο 20΄ 51,24	22ο 42΄ 32,09
ROAD 26	Beginning	386.749,8	4.244.624,6	38ο 20΄ 42,80	22ο 42΄ 20,63
	Middle	386.795,6	4.244.704,7	38ο 20΄ 45,42	22ο 42΄ 22,47
	End	386.839,0	4.244.786,6	38ο 20΄ 48,10	22ο 42΄ 24,21

ROAD	A/A	GGRS ΄87		GGS ΄84	
		X (m)	Y (m)	ϕ (°)	λ (°)
ROAD 27	Beginning	386.141,8	4.244.463,1	38o 20΄ 37,29	22o 41΄ 55,69
	Middle	386.139,8	4.244.543,9	38o 20΄ 39,91	22o 41΄ 55,56
	End	386.126,0	4.244.623,0	38o 20΄ 42,47	22o 41΄ 54,94
ROAD 28	Beginning	385.965,2	4.244.547,1	38o 20΄ 39,93	22o 41΄ 48,36
	Middle	385.701,9	4.244.843,2	38o 20΄ 49,42	22o 41΄ 37,35
	End	385.410,2	4.245.180,5	38o 21΄ 0,22	22o 41΄ 25,13
ROAD 29	Beginning	385.308,9	4.245.649,3	38o 21΄ 15,38	22o 41΄ 20,69
	Middle	385.292,2	4.245.516,2	38o 21΄ 11,06	22o 41΄ 20,08
	End	385.303,5	4.245.383,2	38o 21΄ 6,75	22o 41΄ 20,62

1.4 CLASSIFICATION OF THE PROJECT

According to No. DIPA/oik. 37674/10.08.2016 (Government Gazette 2471/B/2016) as applicable, the project under study belongs to the 11th Project Group "Energy, Fuel and Chemical Transport" and concerns "Air power transmission lines with these accompanying installations (super-high voltage substations and centers)" (A/A 10).

As an accompanying project, it is the opening of sections of road construction, which belong to the 1st Project Group "Land and air transport projects" and concerns a "Forest Road" (A/A 11).

The environmental classification of the project is as follows:

Table 1.3: Classification of the project under study, in accordance with No. oik37674/10.08.2016, as applicable.

Project Group	A/A	Type of project - activity	subcategories A1	subcategories A2	Category B	Comments
11η	10	Aerial (overhead) power transmission lines with these accompanying installations (super-high voltage substations and centres)	T ≥ 150kV and L >15km	**50 ≤ T ≤ 450 and L ≤ 15km**		T: L-line operating voltage: line length
1η	11	Forest Road			**Total**	

On the basis of the above table, the following are indicated:

- the operating voltage of the power transmission line under study is T=400kV and
- the length of the new electricity transmission line, amounts to approximately 14km
- to serve the construction needs of the new pylons, the opening of road construction is required

On the basis of the above and in accordance with Article 1 (5) of Law 4014/2011, a project or activity involving individual projects or activities is classified in the subcategory of the individual project or activity with the most significant impact on the environment and therefore in the highest subcategory. The project under study is therefore classified in **subcategory A2**. According to the Statistical Coding of Economic Activities (STAKOD, 2008) the activity is classified in Section D "electric reference, physical gas, steam and climation" with Code **35.12-0 "Electricity Transmission".**

The activity in question is not subject to the provisions of the 172058/2016 (Government Gazette 354B/2016) laying down measures and conditions for dealing with risks from large-scale accidents in installations or units; in view of the existence of dangerous substances, in compliance with the provisions of Directive 2003/105/EC "amending Council Directive 96/82/EC on the treatment of the risks of major accidents related to dangerous substances" of the European Parliament and of the Council of 16 December 2003". However, in this study the required funds have been added (Chapters 5.6 & 7.13), as referred to in Decision 1915 (Government Gazette 304/b/02-02-2018).

At this point it is stressed that the **Forest Road Study** prepared for the opening of the forest sections to serve the construction and operation needs of the new section of the electricity transmission line, was prepared by **Ms. Keskilidou Konstantina**, Forester, who holds study degrees of 24 class B and 25 class A, which are integrated into the **Company SAMARAS & COOPERATES S.A. – Engineering Consultants** , with A.M. Company Degree: 926**.**

1.5 PROJECT OPERATOR

MYTILINEOS S.A

Power & Gas Business Unit

Contact: Mr Kyriakos Berbebes

Technical Director & Director of Renewable Energy Sources, Electricity & Natural Gas Business Sector

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1.6 ENVIRONMENTAL STUDY ENGINEER

SAMARAS & COOPERATES S.A. - ENGINEERING CONSULTANTS

President and CEO: Mr. Samaras Dimitrios.

A.M. Company Degree: 926.

Category No. 27: Degree Class D.

Address 26 October 43 – FIX Area. (Operation "Limani" Center).

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2 NON-TECHNICAL SUMMARY

This chapter provides a non-Technical Summary of the Environmental Impact Study concerning the construction and operation of a **new Electric Transmission Line (T.L.) of 400kV Agios Nikolaos HVS – Distomo HVS**, for the connection of the HVS of Agios Nikolaos with the High Voltage Substation of Distomo , as part of the connection of the New Power Station 826MW of Agios Nikolaos , with the (HVS) of Agios Nikolaos.

The projects proposed in this Environmental Impact Study concern the following:

- Construction of a new Transmission Line (T.L.) of 400kV high voltage electricity, total length of approximately 14km.
- Construction of forty-two (42) new High Voltage pylons.
- Opening of a forest road, with a total length of approximately 8,700m, to serve the construction and operation needs of the new electric transmission line.
- Configuration of a plot of development of cable systems, below the terminal pylon (P42) of (T.L.) electricity, area 1,265m^2.
- Execution of work – addition of equipment to connect the development plot of cable systems with the Agios Nikolaos HVS.
- Connection of the new T.L. to the Distomo HVS (connection of the terminal pylon of T.L. to the terminal wall, the available gateway, to the Distomo HVS).

The following satellite imagery extract shows the route of the 400kV electricity transmission line under study.

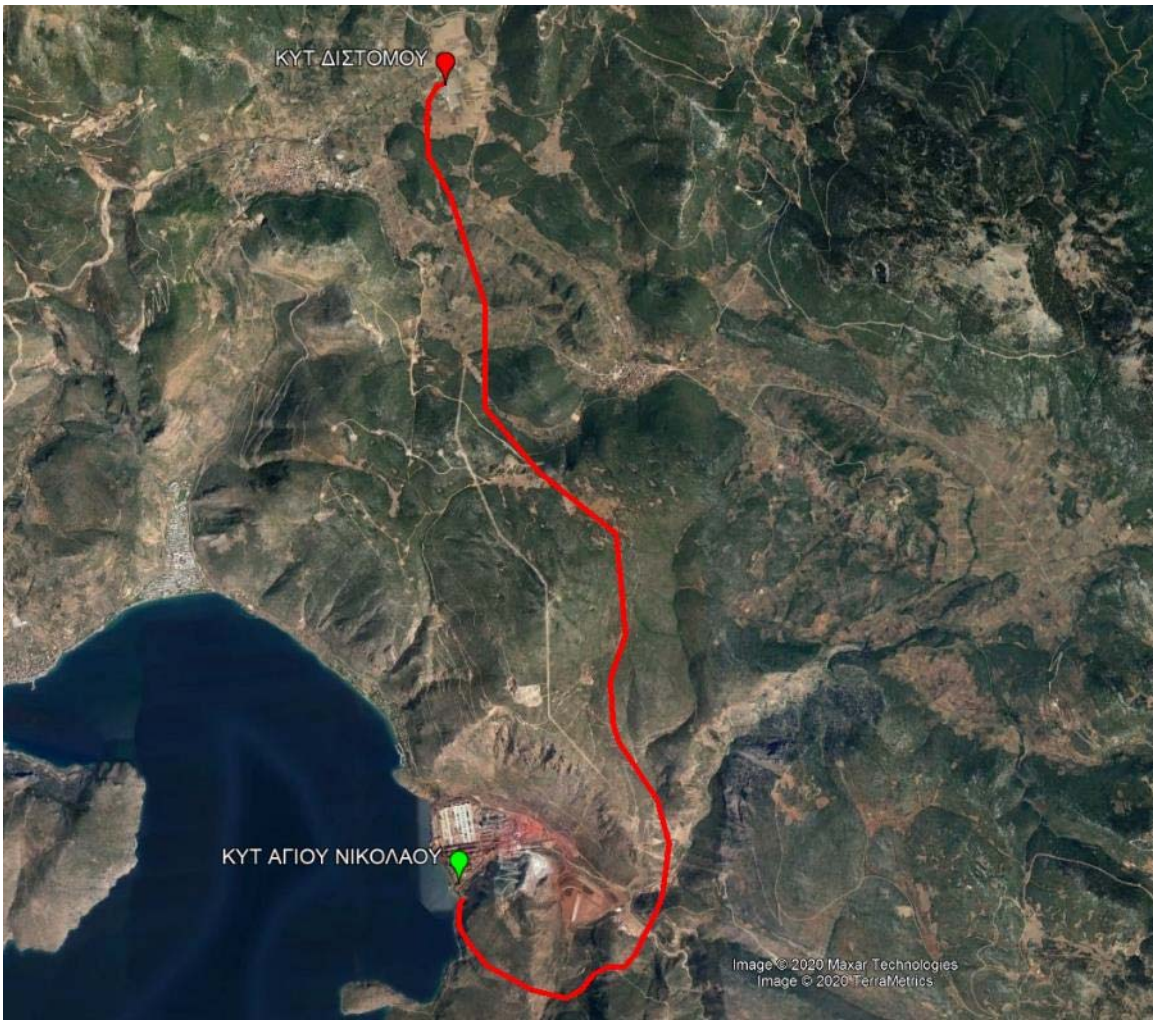


Figure 2.1: Extract of satellite imaging (google earth), showing with a red line the electricity T.L. 400kV under study, and the locations of the Agios Nikolaos HVC and Distomo are indicated.

In order to meet the construction and operation needs of the electricity transmission line, a new forest road, with a total length of about 8,700m, is required. The proposed road sections are presented in the following satellite imagery extract:

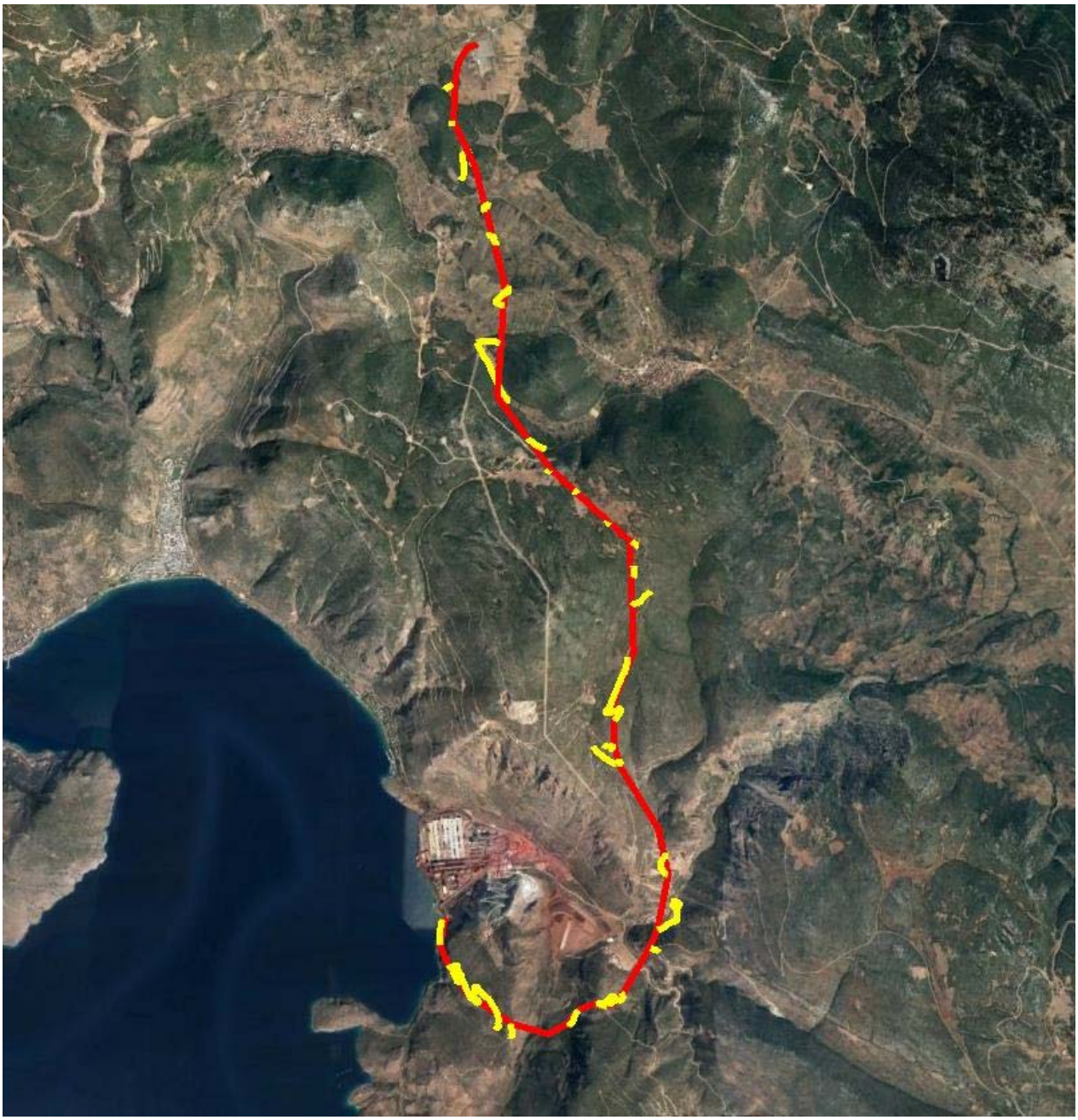


Figure 2.2: A google earth extract, showing the new electricity T.L. with a red line, while yellow lines show the access roads that will be opened to serve the construction and operation needs of the new line.

For the connection needs of the new electricity T.L. with the Agios Nikolaos HVS requires the development of a plot of cable systems, below the terminal pylon (P42) of T.L. electricity.

Finally, there will be a connection of the cable development plot with the Agios Nikolaos HVS.

The project under study belongs administratively to the Region of Central Greece, to the Regional Unit (R.U.) of Viotia, to the Municipalities of Levadia and Distomo - Arachova - Antikyra (as formed pursuant to Law 3852/2010) and in particular, to the Municipal Units (M.U) of Kyriaki and Distomo, respectively. The projects under study fall under the Municipality of Distomo - Arachova - Antikyra.

The project under study does **not** fall within a protected area of the **European Ecological Network Natura 2000** (Directive 92/43/EEC), nor in any other protected area of Law 3937/2011. Closer to the activity under study are the following protected areas of the European Ecological Network Natura 2000:

- "Corinthian Gulf" (GR 2530007) which has been designated as a Special Conservation Zone (SCI) and is located at a distance of about 100m west of the electric T.L. under study.
- "Parnassos National Park" (GR 2410002) which has been designated as a Special Protection Zone (SPA) and is located at a distance of approximately 1,600m NW of the electricity under study.
- "Southeastern Parnassos-Parnassos National Park-Tithoreas Forest" (GR 2450005) which has been designated as a Special Conservation Zone (SCI) and is located at a distance of approximately 9,500m NW of the electric T.L. under study.

Also, in the wider area of activity are located the following Wildlife Refuges:

- "All Saints (Delphi – Desfinas – Chrysos)" (Government Gazette 343/B/1987), at a distance of about 16km West of the electric T.L. under study.
- "Latsoudi (Distomo – Styrio)" (Government Gazette 961/B/1995), at a distance of about 6.0km East of the electric T.L. under study.
- "Asprochoma-Psilo-Prodol-Kelari (Arachova)" (Government Gazette 1043/B/1976), at a distance of about 9.8km NW of the electric T.L. under study.

Figure 2.3: A google earth extract showing the 400kV electricity T.L.) under study. The protected lines of the European Ecological Network Natura 2000 (green shading) and the Wildlife Refuges (brown shading) of the area are also reflected.

For the road area of the new T.L. there are no ratified or posted forest maps.

In any case, in accordance with Chapter 6 of L. 998/1979 "Allowable interventions in forests, forest areas and public areas referred to in points (a) and (b) of paragraph 5 of Article 3 of this Law', in particular in accordance with paragraph 5 of Article 53 'Infrastructure projects', the installation of power stations using conventional fuel and accompanying works, is permitted only on public land referred to in points (a) and (b) of Article 3(5) of Law 998/1979 and in the absence thereof, in forested areas and forests.

In the wider area of the project are located the following archaeological sites:

- Remnants of the wall of the acropolis of Fokikos Medeon, which is built on the hill of Agioi Theodoroi, at a distance of 1,500m NW of the electric transmission line under study.

- The monastery of St. Luke, which was built in the 10th century and belongs to the list of UNESCO World Heritage Sites. A small part of the electricity transmission line under study of about 1,300m, as well as four pylonsfall within the Protection Zone II of this archaeological site.
- The location Farygio Akro part (Puntas Tarsos area – Aspra Spitia of Viotia), at a distance of about 700m SW of the electricity under study.
- Part of the settlement of Distomo, which has been designated as a historical site, at a distance of about 2-3km east of the electricity under study.

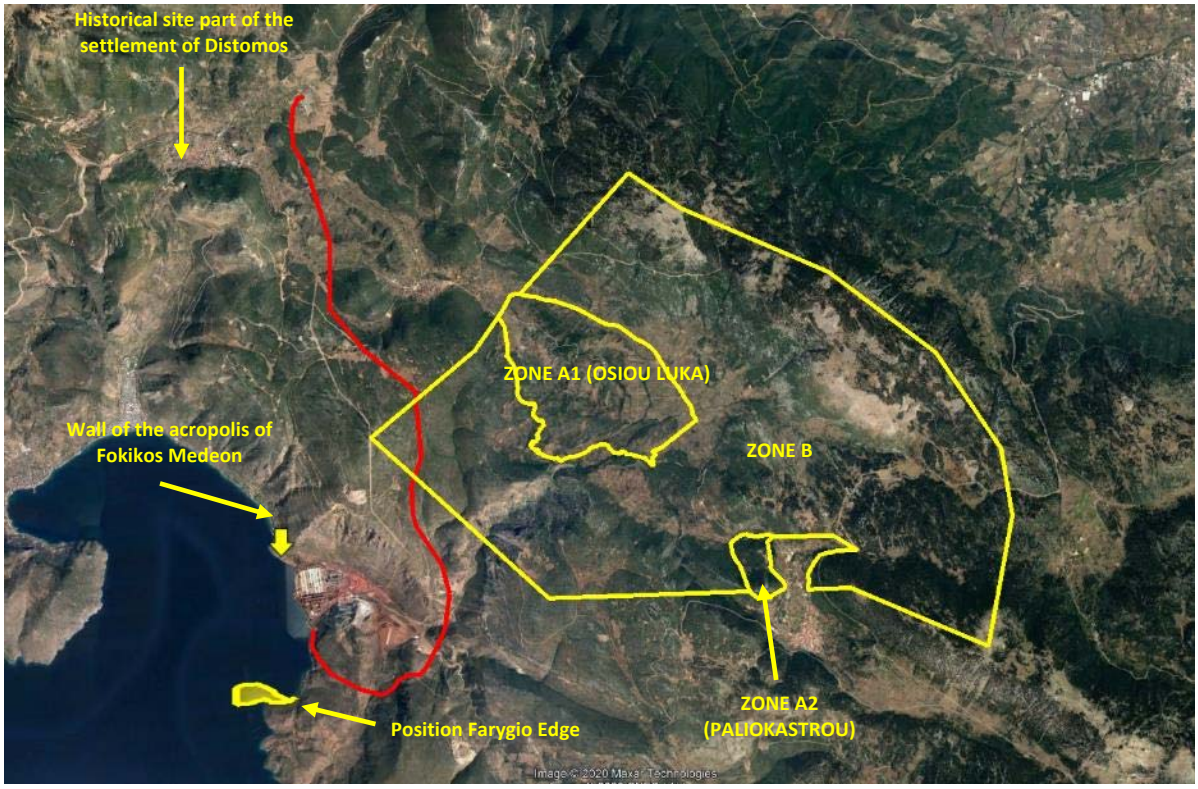


Figure 2.4: Extract of satellite imagery (google earth), showing with a red line the proposed route of the new (T.L.) Also in yellow are the archaeological sites of the area.

The nearest settlements in the project under study are:

- Tarsos, located at a distance of about 150m South of the electricity under study. The settlement of Tarsos was established by No. 3149/16.11.1987 Decision of the Prefect of Viotia (Government Gazette 1187/D/14.12.1987).
- Steiri is located about 1,000m east of the electricity sector under study. The settlement of Steiri was institutionalized with the No. 3354/27.07.1986 Decision of the Prefect of Viotia (Government Gazette 926/D/06.10.1986).

- Distomo, located at a distance of about 1,000m west of the electricity sector under study. The settlement of Distomo was established by No. 36642/20.06.1972 Decision of the Prefect of Viotia (Government Gazette 156/D/07.07.1972).

According to Decision 3124/128532 (Government Gazette 432/A.A.P./31.12.2012) "Approval of the General Urban Plan (G.U.P.) of the Municipal Unit (M.U) of Distomo , Municipality of Distomo - Arachova - Antikyra", the project under study passes through the Areas of Control and Restriction of Construction PEPD1 "Zone for the protection of agricultural land and the rural landscape and the development of agricultural activities (falls the smallest part of the TL under consideration)" and PEPD 2 "Zone of grassland and development of RENEWABLE ENERGY SOURCES facilities and bauxite mines (falls for most of the TL concerned)". In both the PEPD1 and the PEPD2 zone, technical infrastructure installations and networks are permitted, inter alia.

According to Decision 3529/149006 (Government Gazette 273/A.A.P./12.12.2016) "Approval of the General Urban Plan (G.U.P.) of the Community of Kyriaki, Municipality of Levadia", part of the project under study falls under the Areas of Control and Restriction of Construction (PEPD) PEPD 1 "Agricultural Development Area" and PEPD 2 "Coastal Area".

Facilities and technical infrastructure networks are permitted in both the agricultural development area and the coastal area.

The purpose of this study is to present the environmental impact of the construction and operation of the proposed project.

The following table summarizes the environmental impact on the natural and man-made environment of the study area, the construction of the proposed projects, but also the operation of the project. In particular, color encoding is used in which the positive edge of the variance range of each property is shown in green, with white the neutral state and with yellow the negative edge.

Table 2.1: Summary environmental impact table of the project.

Impact Category		Impact characterization during the construction phase of the projects under study	Impact characterisation during the operational phase of the projects under study
Climate and Bioclimatic Characteristics		Neutral	Neutral
Morphologique - Caractéristiques topologiques			
■	Changes in the image of the wider region	Negative, weak, short-term, fully treatable	Negative, weak, long-term, un treatable
■	Assessment of local changes	Neutral	Neutral
■	Probability of disruption of the horizon line and the natural shapes and colors of the landscape	Neutral	Neutral
■	Compatibility of upcoming changes in relation to the European Landscape Convention, ratified by L. 3827/2010	Neutral	Neutral
Geological, Masonic and Soil Characteristics			
■	Alteration, partitioning of the outer surface of the rocks	Negative, weak, short-term, fully treatable	Neutral
■	Possible destruction of special geological characteristics	Neutral	Neutral
■	Possible occurrence of geological phenomena of special importance	Neutral	Neutral
■	Probability of soil pollution	Negative, weak, short-term, fully treatable	Neutral
■	Soil quality degradation	Neutral	Neutral
■	Soil erosion	Negative, weak, short-term, fully treatable	Neutral
Natural Environment			
■	Effects on flora, fauna and ecosystems	Negative, weak, short-term, fully treatable	Negative, weak, long-term, treatable
■	Impact on areas of the national system of protected areas	Neutral	Neutral

■	Effects on forests and woodlands	Negative, weak, long-term, partially treatable	Negative, weak, long-term, partially treatable
Anthropogenic Environment			
■	Spatial Planning - Land Uses	Neutral	Neutral
■	Structure and Functions of the Anthropogenic Environment	Negative, weak, short-term, fully treatable	Neutral
■	cultural heritage	Neutral	Neutral
Socio-economic Impact		Positive	Positive
Impact on Technical Infrastructure		Negative, moderate, short-term, treatable	Neutral
Association with anthropogenic pressures in the environment		Neutral	Neutral
Effects on air quality		Negative, weak, short-term, fully treatable	Neutral
Effects of noise or vibration		Negative, weak, short-term, fully treatable	Neutral
Effects related to electromagnetic fields		Neutral	Neutral
Effects on water		Neutral	Neutral

3 SUMMARY DESCRIPON OF THE PROJECT

3.1 BASIC DATA OF THE PROJECT

This Environmental Impact Study concerns the construction and operation of a **new Electric Transmission Line T.L. of 400kV Agios Nikolaos HVS –Distomo HVS**, for the connection of the High Voltage Substation of Agios Nikolaos with the High Voltage Substation of Distomo , as part of the connection of the New Thermal Power Plant 826MW of Agios Nikolaos with the (HVS) of Agios Nikolaos (System).

In particular, the existing Agios Nikolaos HVS already serves the Agios Nikolaos Power Plant with a rated capacity of 444,48MW. The new power plant with a rated power of 826MW is also planned to be connected to the Agios Nikolaos HVS.

According to the Connection Offer of the Combined Cycle 826MW Power Plant of independent power transmission operator, it is necessary both to build the new electricity transmission line Agios Nikolaos HVS – Distomo HVS, which is being considered with this environmental impact assessment, and to divert the existing transmission line Agios Nikolaos HVS – Distomo HVS, environmental impact assessment October 2020), with a view to the safe absorption of the full power of the two (2) power plants.

The projects proposed in this Environmental Impact Study concern the following:

- Construction of a new Transmission Line (T.L.) of 400kV high voltage electricity, total length of about 14km.
- Construction of forty-two (42) new High Voltage pylons.
- Opening of a forest road, with a total length of about 8,700m, to serve the construction and operation needs of the new electricity transmission line.
- Configuration of a plot of development of cable systems, below the terminal pylon(P42) of electric T.L., surface 1,265^{m2}. Execution of work – addition of equipment to connect the development plot of cable systems with the Agios Nikolaos HVS.
- Connection of the new T.L. to the Distomo HVS (connection of the terminal pylon of T.L. to the terminal, the available gateway, to the Distomo HVC.

The following satellite imagery extract shows the route of the 400kV electricity transmission line under study.

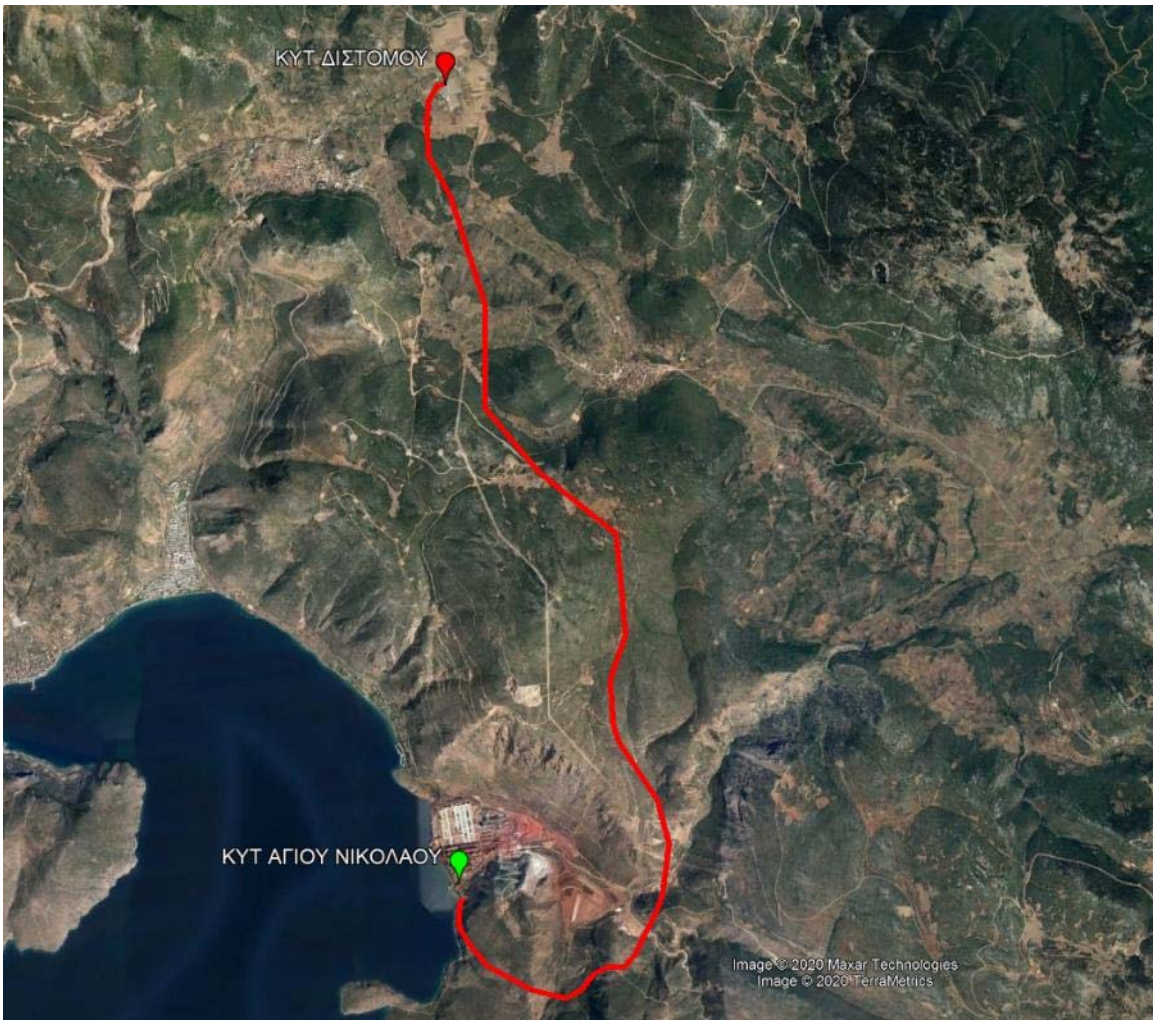


Figure 3.1: Extract of satellite imaging (google earth), showing the electricity under study 400kV, and indicating the locations of the Agios Nikolaos HVC and Distomo .

For the assembly and installation needs of the pylons, it is necessary to have an appropriate surface area (square) dimensions mainly 25m×25m=625m^2, while some squares located in difficult positions with regard to the topography of the area, are selected with dimensions of 20m×20m=400m^2, sizes sufficient to place the superstructure in the optimal position.

A total of forty-two (42) new squares are planned, of which thirty-one (31) squares will have dimensions of 25m×25m=625m^2 and eleven (11) squares will be formed with dimensions of 20m×20m=400m^2. Therefore, the total area of occupation of the squares amounts to 23,775m^2 (11×400m^2 + 31×625m^2).

In order to meet the construction and operation needs of the electricity transmission line, a new forest road, with a total length of about 8,700m, is required. The proposed road sections are presented in the following satellite imagery extract.

Figure 3.2: A satellite imagery extract (google earth), showing the new electricity (T.L.) with a red line, while yellow lines show the access roads that will be opened to serve the construction and operation needs of the new line.

The following table shows the main characteristics of the road sections under study, i.e. deck length and width.

Table 3.1: Area of occupation of each road section to be opened.

ROADS	Length (m)	STOCK PLATE (m)
ROAD 1	105.00	5.00
ROAD 2	65.00	5.00
ROAD 3	510.00	5.00
ROAD 4	135.00	4.00
ROAD 5	180.00	4.00
ROAD 6	145.00	4.00
ROAD 7	220.00	4.00
ROAD 8	250.00	4.00
ROAD 9	820.00	5.00
ROAD 10	225.00	5.00
ROAD 11	50.00	5.00
ROAD 12	60.00	5.00
ROAD 13	45.00	5.00
ROAD 14	90.00	5.00
ROAD 15	125.00	5.00
ROAD 16	245.00	5.00
ROAD 17	960.00	5.00
ROAD 18	160.00	5.00
ROAD 19	410.00	4.00
ROAD 20	265.00	4.00
ROAD 21	610.00	4.00
ROAD 22	100.00	4.00
ROAD 23	215.00	4.00
ROAD 24	305.00	5.00
ROAD 25	105.00	5.00
ROAD 26	190.00	5.00
ROAD 27	165.00	5.00
ROAD 28	1,675.00	5.00
ROAD 29	270.00	4.00
Σύνολο	**8,700.00**	**-**

For the connection needs of the new electricity T.L. with the Agios Nikolaos HVS requires the development of a plot of cable systems, below the terminal pylons (P42) of (T.L.) electricity. This plot of 1,265m^2 provides for the construction of the necessary fencing, the installation of grounding and the construction of nine (9) outdoor suspension bases.

In order to connect the development plot of the cable systems with the HVS of Agios Nikolaos, the following tasks are required – the addition of equipment:

- opening of underground channels for the underground transmission of HV cables from the Agios Nikolaos HVC up to the cable system development plot, total length approximately 200m.
- installation of High Voltage cable supports on the retaining wall of the new Station 826MW, total length of about 175m and
- installation and termination of a dual cable HV circuit, by Agios Nikolaos HVS up to the cable system development plot, total length of about 430m.

Figure 3.3: A satellite imagery extract (google earth), showing the new 400kV power transmission line with a purple polygon, shows the Agios Nikolaos HVC, with yellow polygon the new Station 826MW, with blue polygon is captured the plot of development of cable systems, while with purple line the connection of the development plot of cable systems with the Agios Nikolaos HVC.

The connection of the new electricity transmission line to the Distomo HVS requires the connection of the terminal pylons of the new line to the available gate and in particular to the corresponding terminal of the licensed with no. 5119/149.08.2009 environmental terms approval, and in operation Distomo HVS. The relevant scaffolding required to connect the new line is already licensed and constructed. The development of the two (2) complete gates, with the necessary equipment for the 400kV T.L. interconnection within the Distomo HVS, is referred to the already submitted environmental terms approval Renewal Folder 143072/04.08.2009 HVS 400/150kV Distomo as a future possibility. All works are included in the environmental impact study submitted (October 2020) concerning the diversion of the existing Electricity Transmission Line.

3.2 BASIC INFORMATION OF THE CONSTRUCTION AND OPERATION PHASES OF THE PROJECT

3.2.1 Construction phase

- **Schedule of construction of the project**

According to the project plan, the work on the implementation of the project under study is estimated to be carried out gradually within eighteen (18) months.

- **Support facilities**

The operation of the project will not require supporting facilities, such as borrow pits or spoil pits.

With regard to the borrowed materials that will be required for the construction needs of the proposed project, they will be obtained from legally operated quarries in the area.

From the construction of the proposed project, i.e. from the configuration of the squares for the installation of the pillars, from the opening of the new forest road, but also from the construction work of the pillars, earthworks are planned,.

Excavations amounting to 109,970m^3 are required from the construction work of the proposed projects, of which 21,210m^3 will be used for the necessary excavations. Therefore, the excess of the excavation products to be managed amounts to **88,760m^3**.

Surplus materials resulting from the construction phase, which cannot be used in re-construction operations, will be deposited in an environmentally licensed repository or in landfills or in areas where

other projects are carried out, which have approved environmental terms and in which such materials can be used either in inactive quarries or through alternative management systems. In any case, account must be taken of the legislation in force, namely ministerial decision 36259/1757/E103/2010 "Measures, conditions and programs for the alternative management of waste from excavations, constructions and demolitions (waste from excavations, construction and demolition)" (Government Gazette 1312 B' 2010), as amended and in force.

For the construction needs of the project and due to its nature, since it is developed linearly, the location of a construction site will not be required. The machinery required for the construction of the project will come daily to the area and will not require the construction of construction facilities, i.e. offices, warehouses of materials, workshops, storage areas of machinery, concrete production complexes, etc. The storage of the machines will take place within the installation site of the Agios Nikolaos HVS or the adjacent Power Stations of Mytilineos S.A. / Electrical & Natural Gas Business Sector.

- **Liquid waste outflows**

Chemical toilets will be installed for the collection of urban wastewater, which will be produced by the staff working on the construction of the projects. Considering a construction site of 10 persons, a sewage supply equal to: 50 l/ person/ day x 10 persons = 500 l/ day or 0,5 m^3/day.

The collected waste water will be disposed by specialized tankers at the nearest, in-service Wastewater Treatment Facility. Used Waste Oils (UWO) resulting from construction machinery and equipment will be collected and stored in a temporary waste water storage area until they are delivery to approved ALE collectors. In the construction area there is no provision for washing or maintenance of the construction machinery, as it will be done either in specialized workshops.

- **Surplus or waste materials or solid waste**

As mentioned above, excavations amounting to 109,970m3 are required from the construction work of the proposed projects, of which 21,210m^3 will be used for the necessary excavations. Therefore, the excess of the excavation products to be managed amounts to **88,760m^3.**

Surplus materials resulting from the construction phase, which cannot be used in re-construction operations, will be deposited in an environmentally licensed repository or in landfills or in areas where

other projects are carried out, which have approved environmental conditions and in which such materials can be used either in inactive quarries or through alternative management systems.

In any case, account must be taken of the legislation in force, namely ministerial decision 36259/1757/E103/2010 "Measures, conditions and programs for the alternative management of waste from excavations, constructions and demolitions (Government Gazette 1312 B' 2010), as amended and in force.

In addition, it is expected that small quantities of solid waste, of household waste type, will be produced by the personnel working on the site during the construction phase of the project. This waste will be collected and disposed of in the bins of the area's municipal waste collection system.

Other waste that may be produced in the construction phase of the projects, such as damaged spare parts or materials from mobile equipment (for example tyres, rubber or metal pipes, etc.), will be delivered - returned to suppliers.

Finally, waste such as: mineral oils, petroleum lubricants, oil tankers, spare parts for machinery, batteries - accumulators of cars, trucks, car consumables, trucks, such as pads, oil filters, air filters, etc., will be collected in suitable watertight containers and removed by authorized management companies.

- **Emissions of pollutants into the air**

During the construction phase of the project, small-scale emissions of gaseous pollutants are expected to occur in the immediate area, which will mainly include emissions of particulate matter (dust) during earthworks and exhaust emissions from the operation of excavating and construction machinery, etc.

- **Noise and vibration emissions**

Noise emissions are expected during the construction of the project mainly due to the operation of excavating and construction machinery, which will be relatively short in intensity and duration.

3.2.2 Operating phase

During the operation of the project under study, regular inspection and maintenance of the computer equipment and cleaning of the project area, as well as maintenance work, will be carried out if required. During the operation of the projects, control and supervision will be carried out by remote control, remote control and remote control or on the spot.

Periodic checks will be carried out in the area of the overhead transmission line, consisting of cleaning the insulators by aerial or ground means in the control of the pillars. The new T.L., after its construction, will be transferred free of charge to independent electricity transmission operator as provided for by the relevant legislation and will form part of the System (Hellenic electricity transmission system operator).

Ground access for the maintenance of the Air Transport Line (insulator washing, control of pylons) will be by aerial and/or ground means where possible.

3.3 REQUIRED QUALITY OF RAW MATERIALS, WATER AND ENERGY, REQUIRED QUALITY OF RESULTS

The nature of the project under study does not require inputs of materials, nor does it require significant energy and water consumption.

Due to the nature of the project under study, this is not related to the outflow of significant amounts of wastewater. Any liquid waste resulting from the maintenance of the computer equipment will be collected and delivered to companies authorized to manage it.

Due to the nature of the project under study, this is not related to the outflow of significant quantities of solid waste. During the operation of the projects, solid waste will periodically be generated from the maintenance work of the project's equipment. Such waste, if hazardous, will be delivered to authorized companies for proper disposal. If they are not hazardous, they will either be recycled or used (metal materials) or if they fall into the category of municipal waste they will be disposed of in landfills.

In the operational phase of the projects under study, no significant emissions of gaseous pollutants into the atmosphere are expected.

Noise during the operating phase of the project is limited to the appearance of the Corona effect on the surface of the transmission lines when the intensity of the electric field on the surface of the conductor exceeds the dielectric strength of the air

4 OBJECTIVE AND PURPOSE OF PROJECT IMPLEMENTATION

4.1 OBJECTIVE AND SCOPE

4.1.1 Objective and feasibility of the project

This Environmental Impact Study concerns the construction and operation of a **New Transmission Line (T.L.) of Electricity 400kV,** for the connection of the High Voltage Center of Agios Nikolaos with the High Voltage Center of Distomo, as part of the connection of the New Power Plant 826MW of Agios Nikolaos with the HVC of Agios Nikolaos.

The new Agios Nikolaos Power Plant with a rated power of 826MW, according to the connection conditions, will be connected to the existing Ag. Nikolaos HVC. Ag. Nikolaos HVCalready serves the Agios Nikolaos Power Station with a rated capacity of 444,48MW.

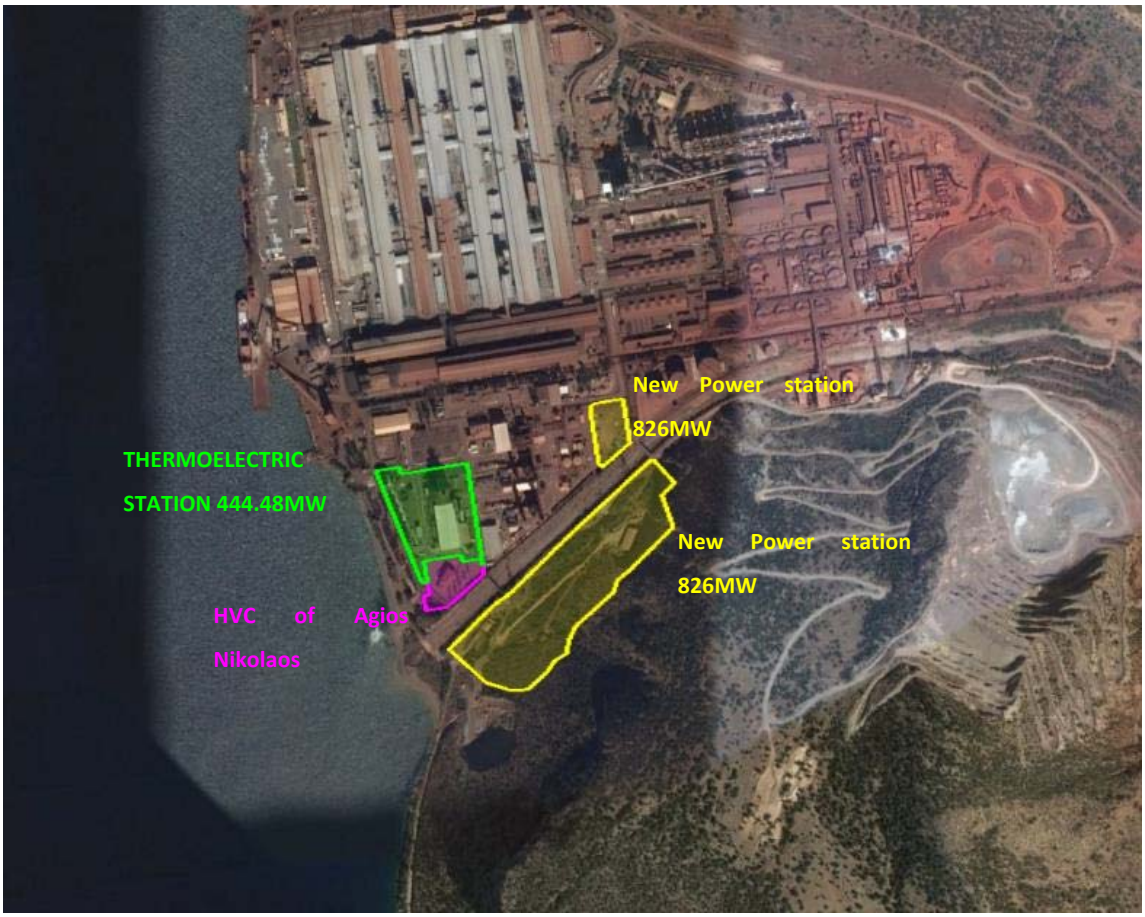


Figure 4.1: Satellite imaging extract (google earth), where the Agios Nikolaos HVC, with green polygon the existing power station with a rated power of 444,48MW and with a yellow polygon the installation pitch of the new power station with a rated power of 826MW.

In order to ensure the absorption of the full power of the two (2) power plants, it is necessary to implement an enhanced connection scheme of the Agios Nikolaos HVC with Distomo HVC, both in terms of transit power per connection, as well as increased availability with the choice of completely separate and independent routes for the main and backup connection.

Therefore, in October 2020 it was filed with No. 184669/14.10.2020 application to Directorate of Environment and Spatial Planning of Central Greece, Environmental Impact Study for the amendment of No. 124363/16.04.2010 environmental terms approval, as amended and in force by No. Ministry of environment and energy/32394/2177/13.11.2019 environmental terms approval, for the diversion of part of the existing electricity transmission line Agios Nikolaos HVC – Distomo HVC, while with this Environmental Impact Study the new electricity transmission line Agios Nikolaos HVC– Distomo HVC is licensed.

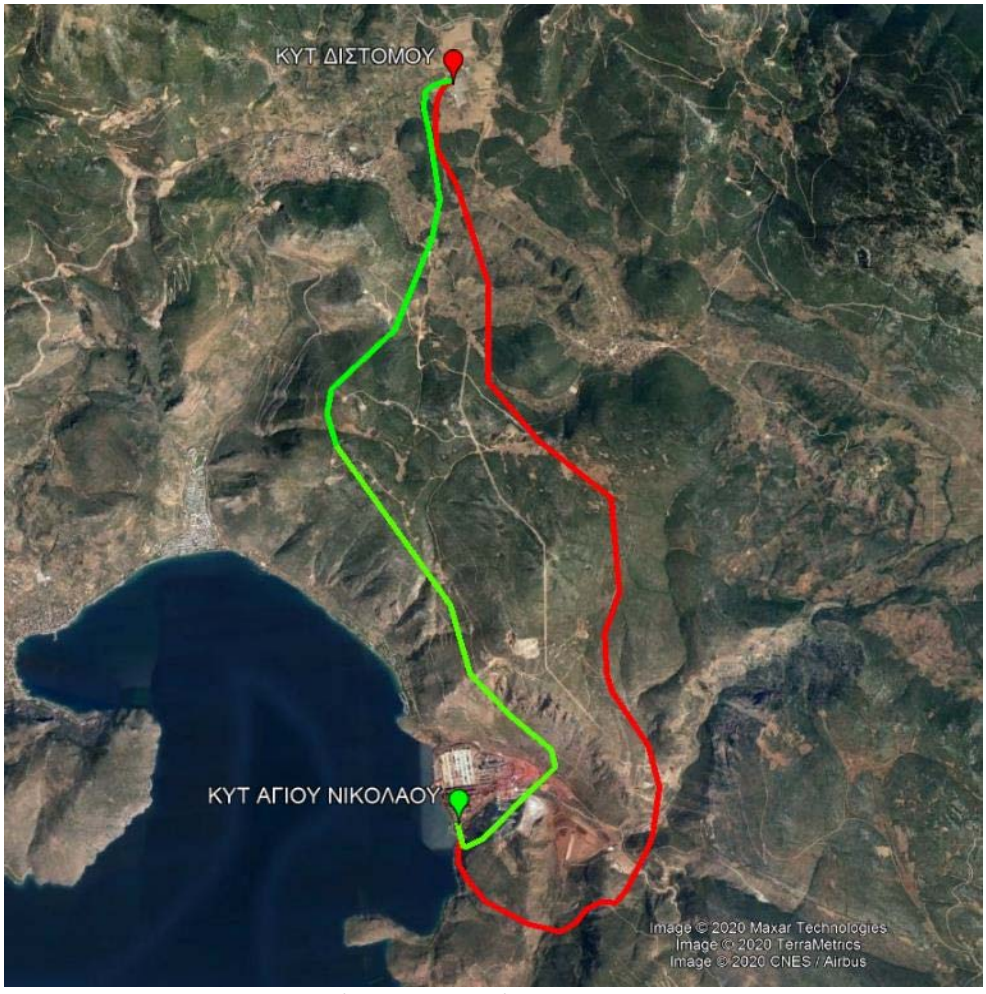


Figure 4.2: Satellite imaging extract (google earth), showing the existing electricity transmission line 400kV Agios Nikolaos HVC – Distomo HVC, while a red line presents the new electricity transmission line 400kV Agios Nikolaos HVC – Distomo HVC.

In this respect, it is pointed out that according to the Connection Offer of the 826MW Power Plant of the Independent Electricity Transmission Operator, it is necessary both to build the new electricity transmission line (present environmental impact assessment) and to divert the existing transmission line (environmental impact assessment October 2020), with a view to safely absorbing the full power of the new 826MW power plant.

The dual connection option ensures the functionality of the connection even in error conditions (N-1 criterion), but upgraded with the choice of separate and independent routes, it now ensures that in case of error or maintenance of one connection road there is the possibility through the independent backup road the safe passage of all power, while allowing maintenance crews to work safely on the off-site corridor. At the same time, spatial independence ensures that in the event of exogenous interference in one circuit (for example landslide, lightning strike or other natural disaster), the availability of the other circuit will not be affected. The above provisions are now necessary and essential for the stability and functionality of the System taking into account the upgraded importance of Agios Nikolaos HVC for the National System, due to the increased more dependent Electrical Production in it.

4.1.2 Development, environmental, social and other criteria supporting the operation of the project

All the proposed projects are fully compatible with the country's energy policy and the fight against climate change, as it is linked to the gradual withdrawal of lignite plants.

The following figure shows the evolution of the Total Net Electricity Demand of the System (pumping load has been removed) since 2000, in accordance with the 10-year Development Program of the independent electricity transmission operator Transmission System. It is noted that the Total Net Demand also includes that served directly at the Distribution level from dispersed production. Between 2000 and 2008 there was a continuous increase in total net demand. Then, in the wake of the economic crisis, there is a continuous decline, and after 2013 there has been a stabilization of overall net demand.

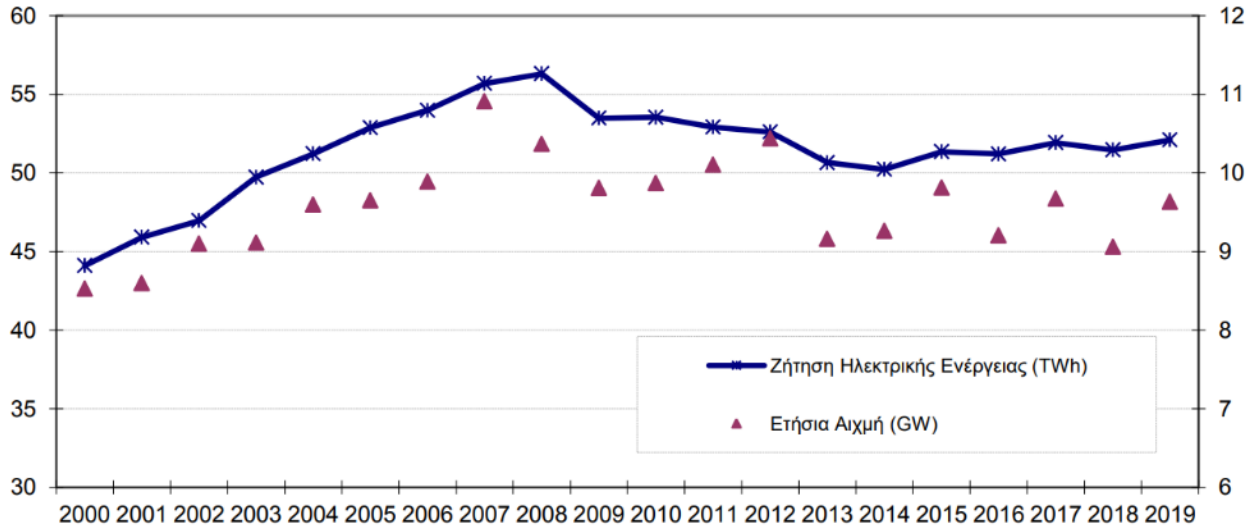


Figure 4.3: Evolution of total net electricity demand in the period 2000 - 2019.

The average annual growth rate of total net demand in the decade 2000 to 2010 was 2.17%, a significant decrease over past decades. In the period 2000 to 2007 the average annual growth rate of total net electricity demand was 3.39%. In 2008, at the beginning of the economic crisis, total net demand (excluding pumping load) in the System reached 56.3TWh and is a historic peak, an increase of 1.11% over 2007. 2009 was marked by a significant decrease in total net demand in the System, by 5.01% compared to 2008, due to a marked decrease in industrial loads of 20.19% compared to 2008, while consumption at distribution level decreased by 3.63%. After 2013 the total net demand for electricity in the hellenic electricity transmission system operator shows a stabilization of around 51TWh. In 2019 the total net demand for electricity in the Hellenic electricity transmission system operator amounted to 52.101GWh, an increase of 1.24% compared to 2018.

The independent electricity transmission operator forecasts for annual total net electricity demand for the period 2020 to 2030, summarized graphically below figure.

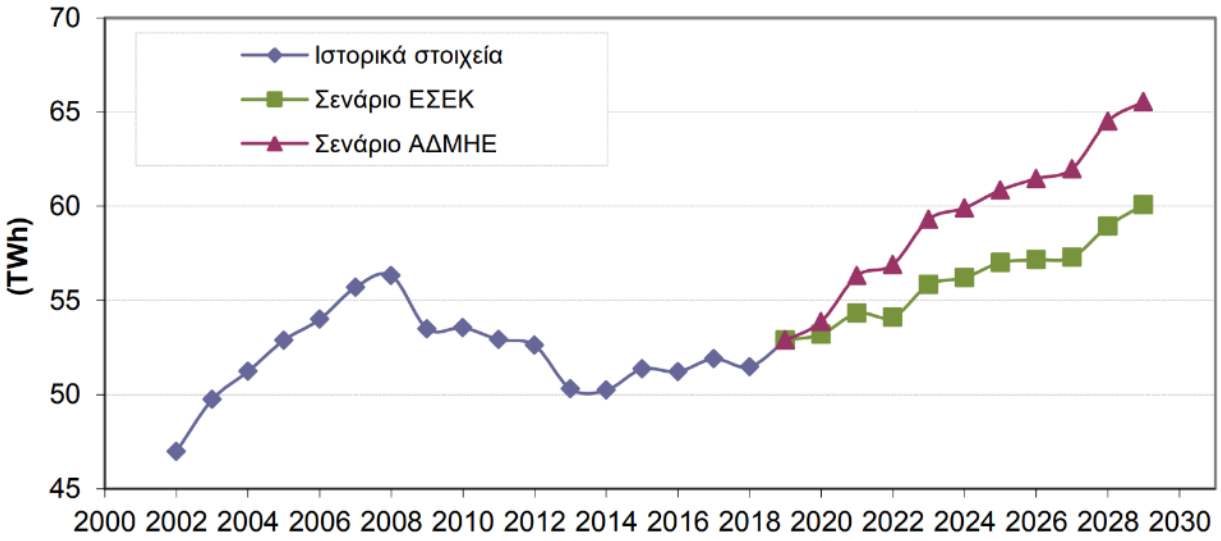


Figure 4.4: Forecasts of the evolution of total net electricity demand in the period 2020 - 2030.

It should be noted that the forecasts shown in the graph above include the demand of the islands to be interconnected from the first year of full operation of their interconnection. In particular, from the year 2021 includes the demand of Crete, which will be served through the association ER, while from the year 2023 includes all the demand of Crete (with the completion of the association SR). After 2025, the estimated demand of the Western Cyclades (Phase IV of the Interconnection of the Cyclades) is included, while from 2028 and 2029 the estimated demand of the Dodecanese and The North Aegean Islands under interconnection is included, respectively.

The above data show that demand for electricity in the coming years is on the rise. In this context, the operation of the project under study contributes to enhancing the safety of the Electricity Transmission System.

4.1.3 Benefits identified at local, regional or national level

The expected benefits of the construction and operation of the project under study at local, regional or national level are:

- ✓ Covering the country's electricity needs and ensuring the use of different sources.
- ✓ To promote the country's environmentally friendly policy on the use of cleaner primary energy sources, limiting greenhouse gas emissions.
- ✓ Economic development at both local and national level.
- ✓ Strengthening local employment and developing the local economy.

4.2 HISTORIC DEVELOPMENT OF THE PROJECT

Near Agios Nikolaos HVC, has been environmentally licensed with No. Cfi. Ministry of environment and energy/114847/6959/09.12.2019 environmental terms approval and the construction and operation of a New Power Station (P.S.) of Mytilineos S.A. / Electrical & Natural Gas Business Sector with a rated capacity of 826MW with natural gas fuel is under way.

For this station, No. 20804/08.10.2019 Association Offer, attached to a corresponding Annex at the end of the issue. In accordance with the above connection conditions, the new combined cycle 826MW power station will be connected to the existing Agios Nikolaos HVC.

4.3 ECONOMIC INFORMATION OF THE PROJECT

Its work under study is a private project and its financial data are not the subject of this study.

4.4 COLLECTION OF THE WORK WITH OTHER PROJECTS

Within the study area and close to the projects under study, the following projects are identified:

i. The Independent Power Station Combined Cycle of Mytilineos S.A. / Power & Gas Business Unit, with a rated capacity of 444,48MW with natural gas fuel.

ii. The High Efficiency Electricity and Heat Cogeneration Station of Mytilineos S.A., with a rated capacity of 334MW with natural gas fuel.

iii. The construction and operation of a new Power Plan(P.S.) of Mytilineos S.A. / Power & Gas Business Unit, with a rated power of 826MW, with natural gas fuel is under way.

The above 1st Power Station is connected, and 3rd Power Station will be connected, to the HVC of Agios Nikolaos, which is part of the System (Hellenic electricity transmission system operator) and the 400kV electricity T.L. under study will connect the HVC of Agios Nikolaos with the Distomo HVC.

Also, in the wider area there are a number of high and ultra-high voltage transmission lines, as well as substations and ultra-high voltage centres, as presented in the Extract of the Charter of the Ten-Year Development Programme (D.P.) of the National Electricity Transmission System 2021-2030.

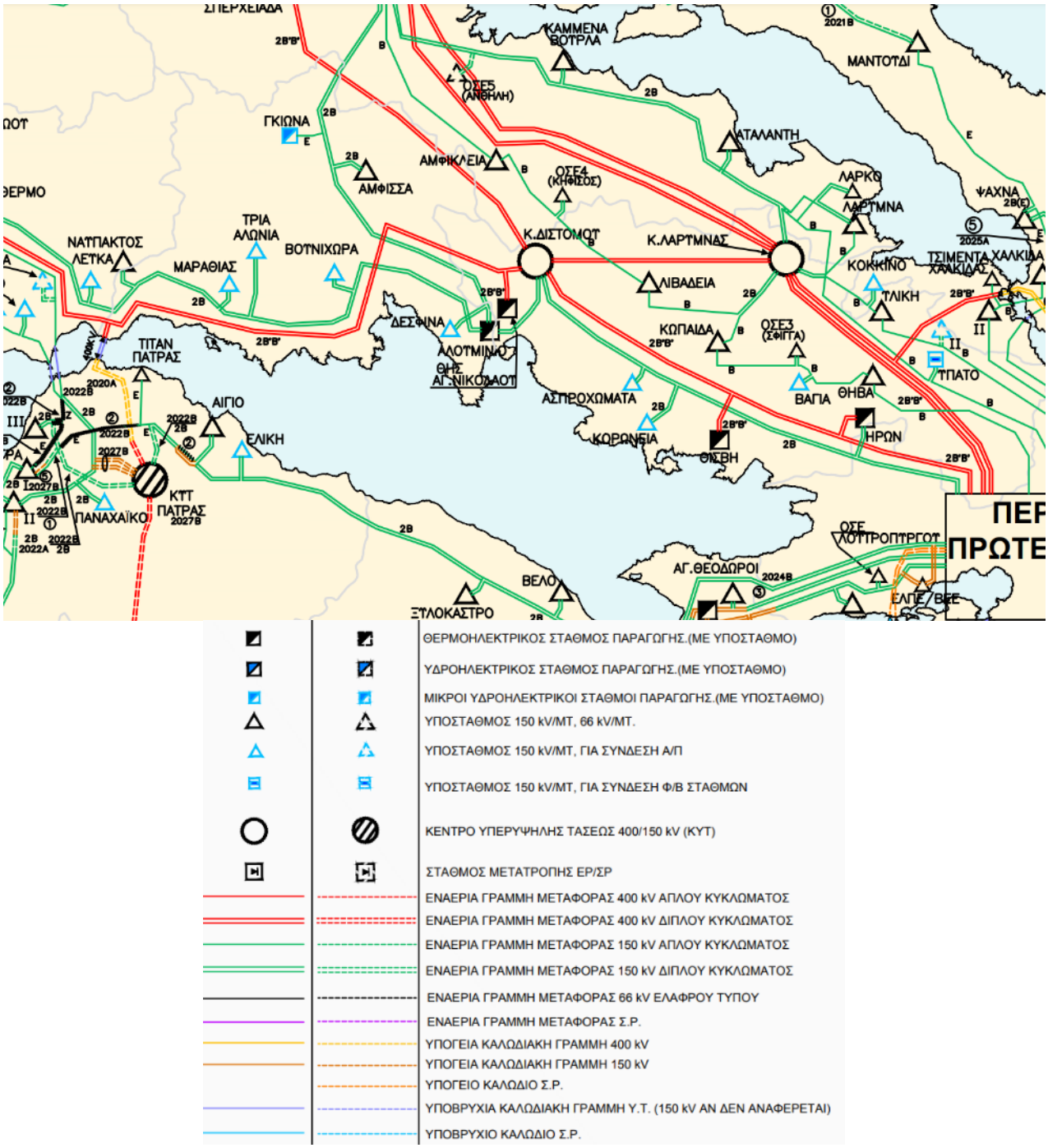


Figure 4.5: Extract Map of the Ten-Year Development Programme (D.P.) of the National Electricity Transmission System 2021 - 2030.

5 COMPATIBILITY OF THE PROJECT WITH INSTITUTIONAL COUNTRIES AND POLITICAL COMMISSIONS OF THE REGION

5.1 POSITION OF THE PROJECT AS TO EXPENDITURE OF THE PHYSICAL AND HUMAN ENVIRONMENT OF THE REGION

5.1.1 Statutory boundaries of settlements and approved urban plans

The project under study belongs administratively to the Region of Central Greece, to the Regional Unit (R.U.) of Viotia, to the Municipalities of Levadeon and Distomo - Arachova - Antikyra (as formed pursuant to Law 3852/2010) and in particular, to the Municipal Units (M.U) of Kyriaki and Distomo , respectively. Most of the new T.L. falls to M.U Distomo, while the smallest part of it, near Agios Nikolaos HVC, falls to the M.U Kyriakou.

G.U.P. M.U Distomo of the Municipality of Distomo - Arachova - Antikyra

According to Decision 3124/128532 (Government Gazette 432/A.A.P./31.12.2012) "Approval of the General Urban Plan (G.U.P.) of the Municipal Unit (M.U) of Distomo , Municipality of Distomo - Arachova - Antikyra", approved the G.U.P. concerning the entire area of the I.E., through which the electricity transmission line under study passes.

The following is an excerpt of the project entitled "Land Uses and Environmental Protection" (Plan No. P.2) of the approved G.U.P. of M.U Distomo , indicating the electricity T.L.under consideration.

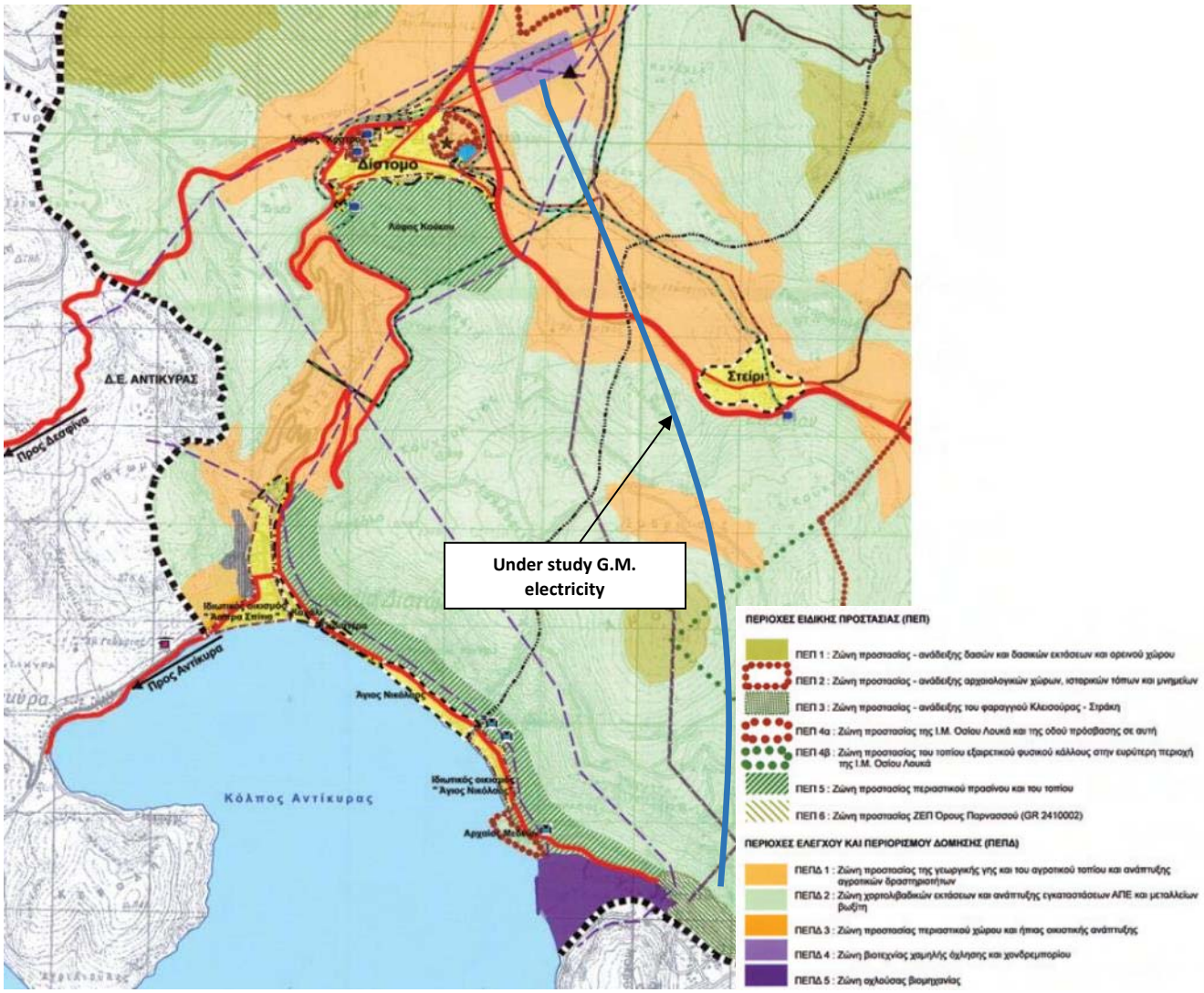


Figure 5.1: Excerpt from a project entitled "Land Uses and Environmental Protection" (Plan No. P.2) of the approved GIS. of (M.U) Distomo , where the blue curve indicates the route of the proposed (T.L.) electric power.

According to the organization of land uses and environmental protection of the route of the proposed electricity transmission line passes mainly through the Areas of Control and Restriction of Construction (PEPD):

- PEPD 1: Zone for the protection of agricultural land and the rural landscape and the development of agricultural activities (falls the smallest part of the TL under consideration).
- PEPD 2: Zone of grassland and development of RES facilities and bauxite mines (most of the T.L. concerned falls).

In both the PEPD1 and the PEPD2 zone, technical infrastructure installations and networks are permitted, inter alia.

G.U.P. (M.U) Kyrakiou Municipality of Levadeon

According to Decision 3529/149006 (Government Gazette 273/12.12.2016) "Approval of the General Urban Plan (G.U.P.) of the Community of Kyriaki, Municipality of Levadeon", approved the G.U.P. of the current (M.U.) Kyriaki concerning the entire area of the (M.U), from which the electricity transmission line under study passes, in the area near the Agios Nikolaos HVC.

The following is an excerpt of the project entitled "Land Uses and Environmental Protection" (Plan No. P.2) of the approved G.U.P. of the I.E. Kyriaki, which indicates the area through which the electricity (T.L.) under study passes.

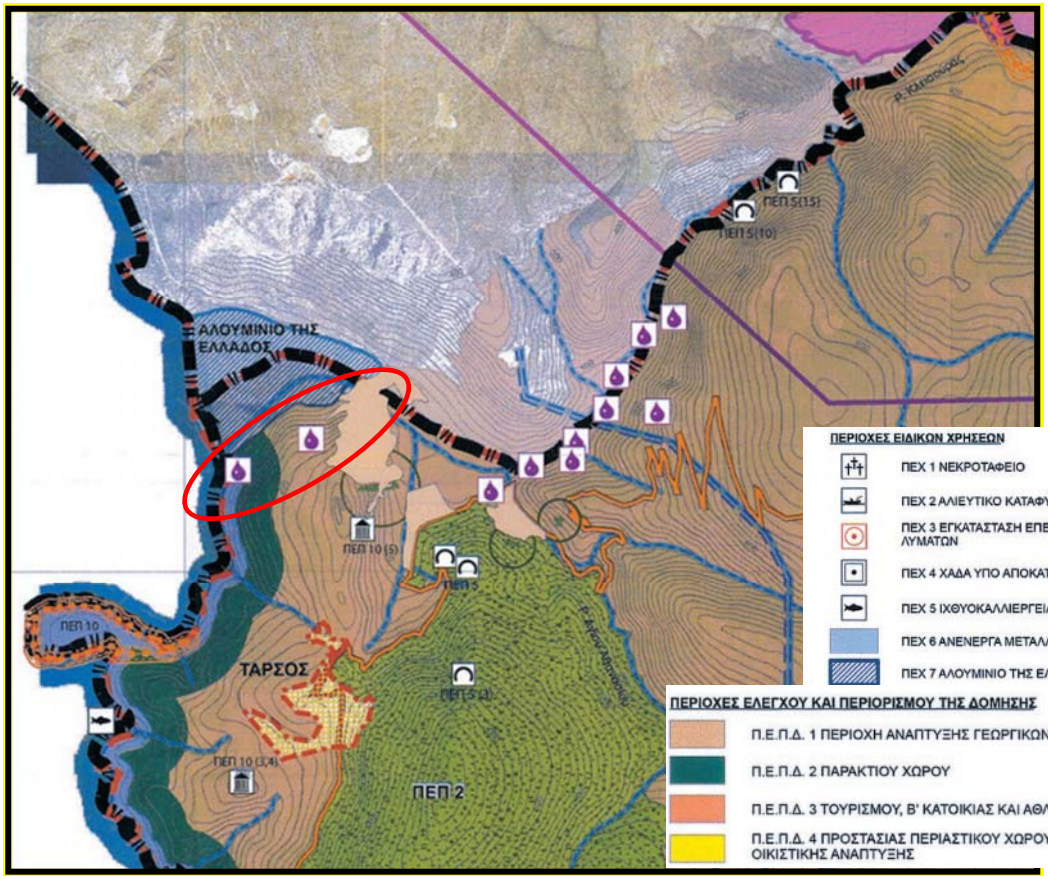


Figure 5.2: Excerpt of a project entitled "Land Uses and Environmental Protection" (Plan No. P.2) of the approved G.U.P. of the I.E. Kyriaki, where the red ellipse includes part of the electricity under study.

According to the organization of land uses and environmental protection of the city section, part of the electricity under study passes through the Areas of Control and Restriction of Construction (PEPD):

- PEPD 1: Area of development of agricultural uses.
- PEPD 2: Coastal area.

Facilities and technical infrastructure networks are permitted in both the agricultural development area and the coastal area.

The nearest settlements in the project under study are:

- Tarsos, located at a distance of about 150m South of the electricity under study. The settlement of Tarsos was established by No. 3149/16.11.1987 Decision of the Prefect of Viotia (Government Gazette 1187/D/14.12.1987).
- Steiri is located about 1,000m east of the electricity sector under study. The settlement of Steiri was institutionalized with the No. 3354/27.07.1986 Decision of the Prefect of Viotia (Government Gazette 926/D/06.10.1986).
- Distomo, located at a distance of about 1.000m west of the electricity sector under study. The settlement of Distomo was established by No. 36642/20.06.1972 Decision of the Prefect of Viotia (Government Gazette 156/D/07.07.1972).

Figure 5.3: Google Earth extract showing the project under study, as well as the nearest demarcated settlements.

On the basis of the above, the project under study of the new 400kV electricity T.L. is fully compatible and compatible with the statutory boundaries of settlements and approved urban planning plans.

5.1.2 Limits of areas of the National System of Protected Areas of Law 3937/2011

With regard to the areas of the National System of Protected Areas, in accordance with No. 50743/2017 joint ministerial decision (Government Gazette 4432B/15.12.2017) revised the national list of areas of the European Natura 2000 Ecological Network.

The nearest protected areas of the European Ecological Network Natura 2000 (Directive 92/43) to the project under study are the following:

- "Corinthian Gulf" (GR 2530007) which has been designated as a Special Conservation Zone (SCI) and is located at a distance of approximately 100m west of the electricity T.L. under study.

- "Parnassos National Park" (GR 2410002) which has been designated as a Special Protection Zone (SPA) and is located at a distance of about 1,600m NW of the electricity under study.
- "Southeastern Parnassos-Parnassos National Park-Tithoreas Forest" (GR 2450005) which has been designated as a Special Conservation Zone (SCI) and is located at a distance of approximately 9.500m NW of the electricity under study.

Also, in the wider area of activity are located the following Wildlife Refuges:

- "All Saints (Delphi – Desfinas – Chrysos)" (Government Gazette 343/B/1987), at a distance of about 16km West of the electricity under study.
- "Latsoudi (Distomo – Styrio)" (Government Gazette 961/B/1995), at a distance of about 6.0km East of the electricity under study.
- "Asprochoma-Psilo-Prodol-Kelari (Arachova)" (Government Gazette 1043/B/1976), at a distance of about 9.8km NW of the electricity under study.

Figure 5.4: A google earth extract showing the 400kV electricity (T.L.) under study. The protected lines of the European Ecological Network Natura 2000 (green shading) and the Wildlife Refuges (brown shading) of the area are also reflected.

In any case, the electricity transmission line under study does not fall within areas of the National Protected Areas System.

5.1.3 Forests, Forest Areas and Recused Areas

For the study area there are no ratified or posted forest maps. In any case, in accordance with Chapter 6 of L. 998/1979 "Allowable interventions in forests, forest areas and public areas referred to in points (a) and (b) of paragraph 5 of Article 3 of this Law', in particular in accordance with paragraph 5 of Article 53 'Infrastructure projects', **the installation of power stations by conventional fuel and accompanying works only** on public land referred to in points (a) and (b) of Article 3(5) of Law 998/1979 and in the absence thereof in forested areas and forests.

Also, in accordance with Article 46 'Extraordinary nature of permissible interference with recused land', in public and private forests and woodlands declared resusperable, no intervention provided for in the provisions of Chapter 6 of Law 998/1979 or by any other provision, with the exception of those referred to in Article 48(1) **is permitted**, paragraphs 1, 3, 4 and 5 of Article 53 **(the installation of conventional fuel power stations and their accompanying works)**, paragraph 1 of Article 54, paragraph 1 of Article 55 and paragraph 5 of Article 57 of Chapter 6, and the provisions of Article 16 of Law 998/1979.

Also, in accordance with Article 45(5) of Law 998/1979, for national and regional road, irrigation and water supply projects as well as **networks for the transmission** and distribution of natural gas, petroleum products and **electricity in forests, forest areas and public areas referred to in points (a) and (b) of Article 3(5) of Law 998/1979, in the case of no definitive technical studies have been carried out, the competent forestry authority shall deliver an opinion, with a view to the issue of ENVIRONMENTAL TERMS APPROVAL, on the dossier of the Environmental impact assessment (EIA)** taking into account the limitations and conditions laid down by forestry legislation for the implementation of those projects on those areas. At the completion of the final studies of the projects, the project operator is obliged to submit to the competent forestry authority the relevant dossier for the adoption of a designation act.

In any case, after the finalization of the project design, a request for the issuance of a designation act will be submitted to the competent forestry office. However, based on the above, the project under study is compatible with the provisions of forest legislation

5.1.4 Social infrastructure, utilities

Within the study area and close to the projects under study are located the following facilities of social infrastructure, utilities, etc.:

i. The Independent Power Station (ASI/IPP) Combined Cycle of the company MYTILINEOS S.A. / Electrical & Natural Gas Business Sector, with a rated capacity of 444,48MW with natural gas fuel.

ii. The High Efficiency Electricity and Heat Cogeneration Station of MYTILINEOS S.A., with a rated capacity of 334MW with natural gas fuel.

iii. The construction and operation of a new Power Station (of MYTILINEOS S.A. / Electrical & Natural Gas Business Sector, with a rated power of 826MW, with natural gas fuel is under way.

The above 1st Power Station is connected, and 3rd Power Station will be connected, to the HVC of Agios Nikolaos, which is part of the System (Hellenic electricity transmission system operator) and the 400kV electricity (T.L.) under study will connect the HVC of Agios Nikolaos with the Distomo HVC. Also, in the wider area there are a number of high and ultra-high voltage transmission lines, as well as substations and ultra-high voltage centers, as presented in the Extract of the Charter of the Ten-Year Development Programme (D.P.) of the National Electricity Transmission System 2021-2030.

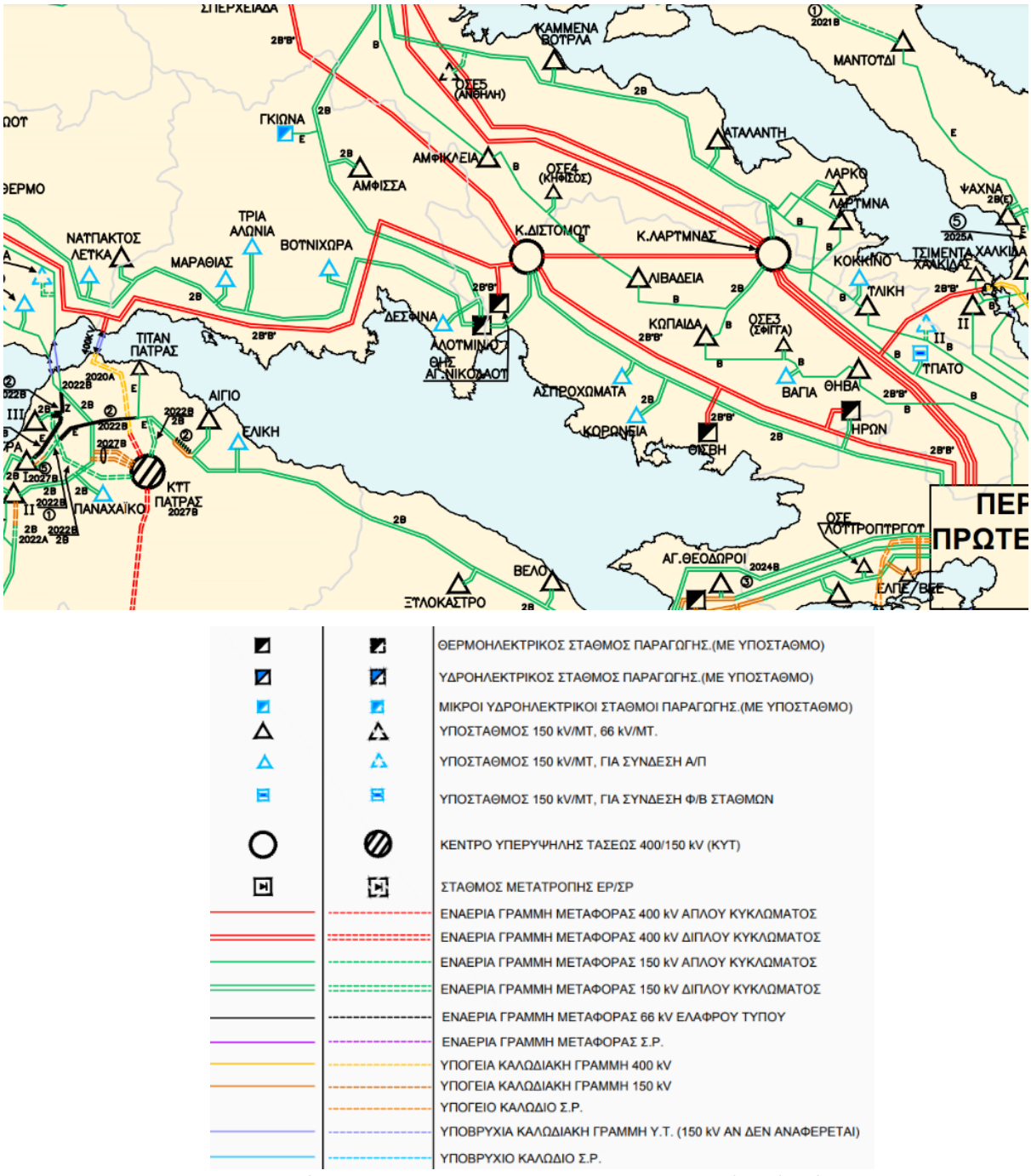


Figure 5.5: Extract Map of the Ten-Year Development Program (D.P.) of the National Electricity Transmission System from 2021 to 2030.

Finally, it is stated that there is no question of the compatibility of the electricity transmission line under study with the social infrastructure facilities of general interest in the region.

5.1.5 Places of archaeological interest

An important archaeological site of the area is the **remains of the wall of the acropolis of Fokikos Medeon**, which is built on the hill of Agioi Theodoroi, at a distance of 1,500m NW of the electricity transmission line under study.

The low walled hill of Agioi Theodoroi, on the east coast of the gulf of Antikyra, has been identified by scholars with the ancient city of Fokikos Medeon. At the time Pausanias visited it, the city was deserted. The citadel is surrounded by strong fortification from the east, north and west sides of the hill, while the steep southern sides of the hill offer natural fortification on the side of the sea. The walls, dating back to the 4th century BC, are constructed according to the irregular isostructural system of wallwork, without binders in the joints with large stonework.

The first excavations were carried out in 1907 by the archaeologist Georgios Sotiriadis, while in the 1960s a part of an extensive ancient cemetery was excavated with uninterrupted use from the Meso-Hellenic era (2100/2000 – 1600 BC) until the 2nd century BC in 1966 on the north side of the hill a vaulted tomb was revealed, preserving its built road, while the dome is not preserved. A characteristic feature of the monument is the existence of a small side room.

A similar archaeological site, through which part of the electricity under study passes, is **the monastery of St. Luke**, which was built in the 10th century and belongs to the list of UNESCO World Heritage Sites. It is built on the western slopes of Elicus, under the citadel of ancient Steiri is one of the most important monuments of the Mid-Byzantine period in Greece. The church was dedicated to St. Luke (29 July 896 - 7 February 953), whose remains have been in the Monastery since 1986, when it was transferred from Venice.

The year 2012 and with the ministry decision/85715/20176/2942/288/20-20 8-2012 (Government Gazette 287/AAP/13.9.2012), Zones A of Absolute Protection and Zone B of Protection of the Monastery of St. Luke, Regional Unit of Viotia were established. The protection zones of this archaeological site are indicated in the satellite imagery extract below. A small part of the electricity transmission line under study, about 1.300m, as well as four pillars (P17, P18, P19 and P20) fall within the Protection Zone B of this archaeological site, but a long way from the Protection Zone A of this (about 2km). In accordance with the above Decision, no permitted activities are defined for Zone B of the archaeological site in question. However, the permitted

activities of Zone A of absolute protection state, inter alia, that '**The maintenance and decentness of existing infrastructure networks, as well as the installation of above-ground or underground networks of general interest, shall be permitted, provided that no direct or indirect damage to monuments is caused and after the prior approval of the services of the Ministry of Public Health is ensured**'. Considering that the project under study is a conditional permissible activity even in Zone A of absolute protection, it is possible to get through Zone B protection of the Monastery of St. Luke.

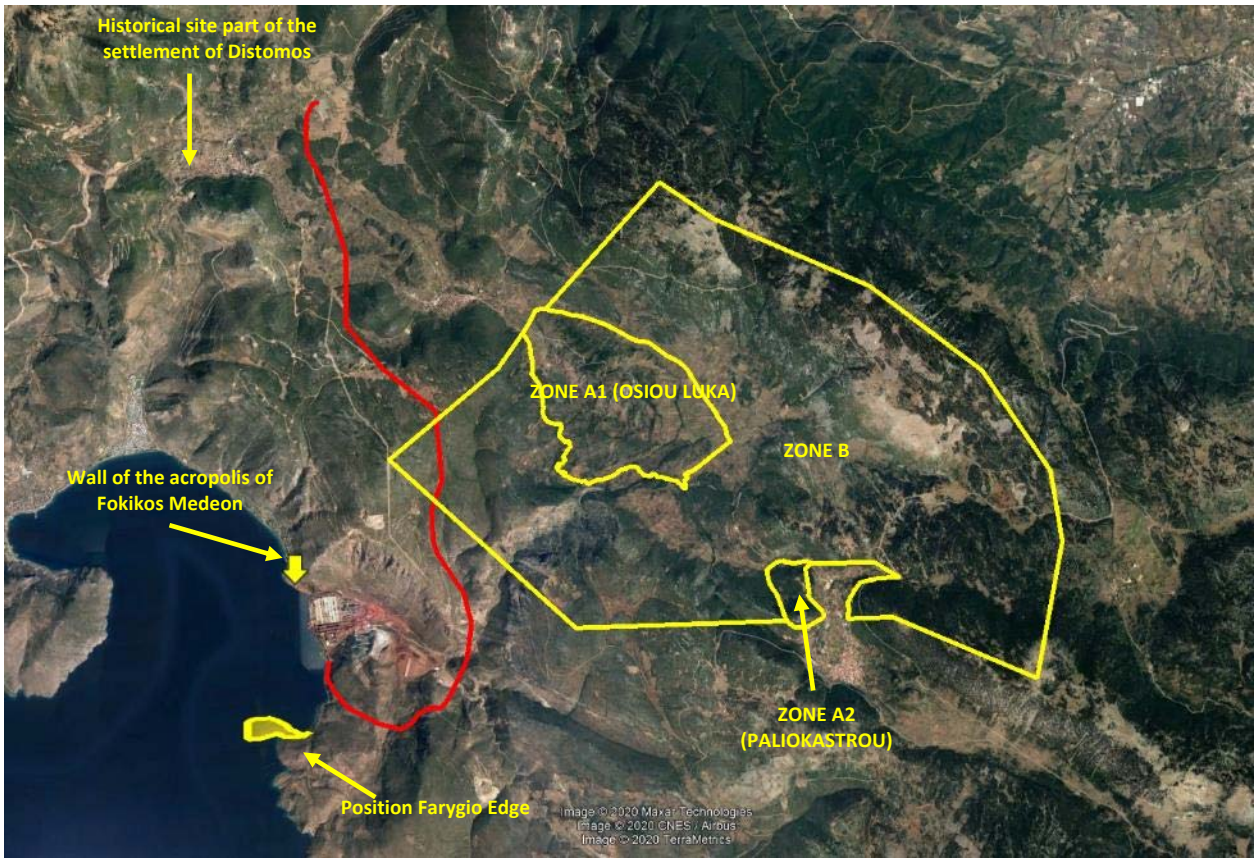


Figure 5.6: A google earth extract, showing the 400kV electricity under study and yellow capturing the archaeological sites of the area.

At a distance of about 700m SW of the (T.L.) study declared by A/F43/22714/1420 (Government Gazette 603/B/22.05.2001) as an archaeological site the **location Farygio** A tip (Puntas Tarsos area – White Houses of Viotia) for the protection of the surviving settlement remains of the years of the Late Roman Empire. These are ruins of houses, a new ancient water tank and a wall that runs through the neck of the Punta Peninsula.

Finally, it is stated that according to the (Government Gazette 168/A/08.08.2018) of the **Ministry of Culture and Sport, part of the settlement of Distomo has been designated as a historical site**, because it is directly linked to historical memory at local and national level, as it is a place of sacrifice and martyrdom of the civilian inhabitants of Distomo during the Second World War. The distance of the new electricity transmission line from this part of the settlement is about 2-3km.

On the basis of the above, the project under study is compatible with the sites of archaeological interest identified in the project area.

5.2 APPLICABLE COUNTRIES AND WAR REGULATIONS IN THE PROJECT AREA

This section explores the institutional framework governing land uses and building conditions in the study area. In particular, the following are investigated:

- ✓ General Framework for Spatial Planning and Sustainable Development.
- ✓ Regional Framework for Spatial Planning and Sustainable Development of the Region of Central Greece.
- ✓ General Urban Plans (G.U.P.).
- ✓ Plan for the Management of river basins of the Water District of Eastern Central Greece (1st revision).
- ✓ River Basin Flood Risk Management Plan of the Water District of Eastern Central Greece.

5.2.1 Provisions and guidelines of the General, Special and Regional Framework for Spatial Planning and Sustainable Development

5.2.1.1 General Framework for Spatial Planning & Sustainable Development

In the General Framework for Spatial Planning and Sustainable Development (GFSPSD) (Government Gazette 128/A/03-07-2008) among other things general guidelines are given for the energy sector.

In particular, the aim for the energy sector is to:

- to fully ensure that energy needs are met in all parts of the national area (combined with the continuous effort to save energy in all sectors),
- to enhance energy security with full res development, to promote the use of alternative fuels and to exploit domestic resources,
- to effectively control the environmental performance of the energy sector and to reduce the impact of the sector on climate change within the framework of our country's related commitments.

As regards energy production and transmission infrastructures, the aim is to:

- support the proposed development options,
- increase the rate of penetration of renewable energy sources into total energy production, in accordance with the specific guidelines of the relevant Special Framework,
- modernize lignite power plants and gradually reduce lignite's participation in the energy balance.
- strengthening our country's international role as a transmission centre for electricity, gas and oil,
- sub-grounding electricity distribution networks in traditional settlements and archaeological sites, providing suitable sites for distribution substations.

  Also, the avoidance of the passage of transport networks from archaeological sites and, as far as possible, from areas of the Nature Network (NATURA) 2000 and protected landscapes.

The integration of strategic energy infrastructures into national spatial planning requires the following arrangements and interventions:

- the exploitation for energy production of the particular energy advantages of specific regions of the country,
- exploring the feasibility of complementing the existing oil refineries (Attica/Corinthia and Thessaloniki), with new facilities in Alexandroupolis, in conjunction with the construction of the oil pipeline from Burgas,
- completion, according to the existing design, of the gas network (main interconnection with Italy and Turkey with branches to Albania, etc.) and addition of new infrastructure,
- radical improvement of the electricity generation and transmission system,
- promotion of an integrated energy saving program.

In accordance with the above-mentioned regional framework for spatial planning and sustainable development the project under study is in the direction of the above General Framework and in accordance with the guidelines and objectives set out in it, it is not presumed that the project under study is incompatibility with the regional framework for spatial planning and sustainable development under consideration.

5.2.1.2 Regional Framework for Spatial Planning and Sustainable Development of the Region of Central Greece

In the Regional Framework for Spatial Planning and Sustainable Development of the Region of Central Greece (Government Gazette 229/14-12-2018) among other things, guidelines are given for the spatial structure of the main technical infrastructure networks, including energy infrastructures.

In particular, a general strategy proposes the development of the energy system in synergy with the ten-year Transmission System Development Program. At the same time, the following strategic objectives are promoted:

- Interconnection of energy production with local human resources, environmental conservation and sustainability of development as well as the creation of capital gains at local level that will enhance the extroversion of the Region.
- Energy saving both in buildings and at the level of the exploitation and dissemination of new technologies in the areas of energy demand and supply.
- Establishment and network operation of Energy Centres (Aliveri, Larymnas, Distomo , Thebes) with the aim of contributing to the formulation of regional energy policy through cooperation in the energy system.
- Further promote natural gas networks to serve all urban centres and production poles (industrial areas, energy centres, large individual production facilities, etc.) and complementary operation with RES and electricity system networks.
- Further penetration of RES.
- Maintenance of existing res plant development and rational development of new plants close to existing ones, since accompanying projects - which require significant interventions in the environment (road networks, electrical networks) - are already being constructed.
- Development of renewable energy sources (RES) and the exploitation of biomass using the mildest technologies and facilities in the sensitive ecological and developmental mountainous area of high forest and alpine ecosystems and their landslide areas and in particular in (M.U.) Evritania due to the presence of all the above parameters.
- Promotion of feedback to the RES of the early exclusion of Evritania as a whole and parts of the mountain volumes Oiti - Vardousia - Giona and Elikia and parts of Evia from the pap areas of the M.U.
- Spatially focused repowering after the life span of installed RES stations.

- It is proposed to diversify the constructions of the accompanying projects mainly (roads and interconnection projects) towards milder construction for the environment and landscape (for example underground electricity networks).
- Priority is given to the location of Wind and Photovoltaic Parks in the areas of inactive quarries or mines.

The above objectives and proposals of the regional framework for spatial planning and sustainable development of Central Greece are in no way contrary to the operation of the proposed project and in accordance with the guidelines set out in it, it is not presumed that the project under study is not compatible with the regional framework for spatial planning and sustainable development under consideration.

5.2.2 Institutional regime, in accordance with approved plans (regulatory, general urban planning, planning, housing control zone, urban planning , demarcation of settlements or other land use definition and building plans)

As detailed in section 5.1.1, in the area has been approved the Decision 3124/128532 (Government Gazette 432/A.A.P./31.12.2012) "Approval of the General Urban Plan (G.U.P.) of Municipal Unity (M.U) of Distomo, Municipality of Distomo - Arachova - Antikyra" and the Decision 3529/149006 (Government Gazette 273/A.A.P./12.12.2016) "Approval of the General Urban Plan of the Community of Kyriaki, Municipality of Levadeon".

The project under study is compatible with the above approved General Urban Plans.

The nearest settlements in the project under study are:

- Tarsos, located at a distance of about 150m South of the electricity under study. The settlement of Tarsos was established by No. 3149/16.11.1987 Decision of the Prefect of Viotia (Government Gazette 1187/D/14.12.1987).
- Steiri is located about 1,000m east of the electricity sector under study. The settlement of Steiri was institutionalized with the No. 3354/27.07.1986 Decision of the Prefect of Viotia (Government Gazette 926/D/06.10.1986).
- Distomo, located at a distance of about 1.000m west of the electricity sector under study. The settlement of Distomo was established by No. 36642/20.06.1972 Decision of the Prefect of Viotia (Government Gazette 156/D/07.07.1972).

5.2.3 Special Management Plans

5.2.3.1 Plan for the Management of river basins of the Water District of Eastern Central Greece

The Water District of Eastern Central Greece (YD07), has an area of 12,291k^{m2} and includes the entire Regional Units of Evia (and Skyros), Viotia and Sporades, large parts of (M.U.) Fthiotida (87.2%) and Fokida (42.2%) and small parts of (M.U.) West Attica (8.2%), East Attica (13%) and Magnesia (1%). Most of the Water District is characterized as lowland to semi-mountainous. The main lowland areas of the YD are the valleys of Sperchios and Boeotic Kifissos - Kopida, while smaller are the plains of Istia and Artakis in Evia. The lakes of the water department are Yliki (20k^{m2}), Paralimni (11km2) and Dystos (5k^{m2}).

In accordance with Decision No. For example: oc.902 (Government Gazette 4673/B/29.12.2017) approved the 1st Review of the River Basin Management Plan of the Water District of Eastern Central Greece and the corresponding Strategic Environmental impact assessment. According to the approved of the Eastern Central Greece (**YD EL07**), this consists of seven (7) River Basins (RB), which are presented in the table below.

Table 5.1: Water catchment areas of Eastern Central Greece (YD EL07).

Λεκάνη Απορροής Ποταμού (ΛΑΠ)	Έκταση ΛΑΠ (km^2)
Σπερχειού (EL0718)	2.315
Εύβοιας (EL0719)	3.681
ΒΑ Παραλίας Καλλιδρόμου (EL0722)	919
Βοιωτικού Κηφισού (EL0723)	2.719
Άμφισσας (EL0724)	786
Ασωπού (EL0725)	1.362
Σποράδων (EL0735)	497
ΣΥΝΟΛΟ έκτασης ΥΔ 07	**12.279**

The 400kV high-voltage electricity transmission line under study falls under the River Basins (RB) of Asopos (EL0725) and RB of Boeotic Kifissos (EL0723).

Figure 5.7: Satellite imaging extract, showing the electricity transmission line under study, as well as the limit of RB Asopos (EL0725), RB Amfissa (EL0724) & RB Boeotic Kifissos (EL0723).

Surface Water Systems (SWS)

From the River Water Systems (RWS) recorded under the Management Plan, closer to the study area is the Klisouras stream (EL0725R000300028N). The power transmission line under study runs through that stream. The Klisouras stream ends up in the sea area on the eastern coast of Antikyra Bay. According to the approved management plan, the length of the Klisouras stream amounts to 8.03km and its catchment area to 135.8k^{m2}. According to the Management Plan, the ecological status of the stream is classified as moderate and its chemical status as good.

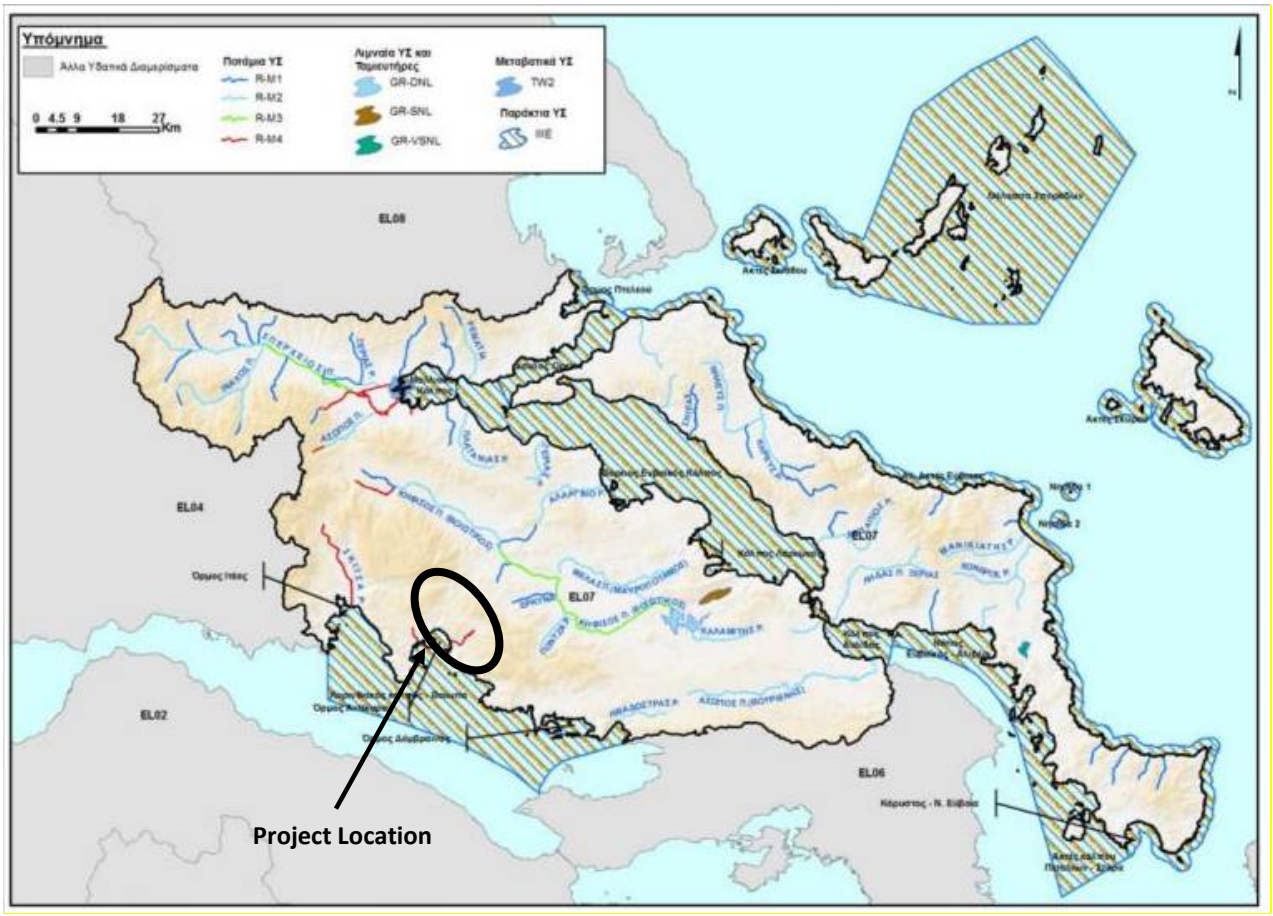


Figure 5.8: Extract Map of Surface Water Systems (SWS) in YD EL07.

In the immediate area of the project under study, the Coastal YS Bay of Antikyra (EL0724C0017N) is recorded, whose ecological and chemical status are classified as good.

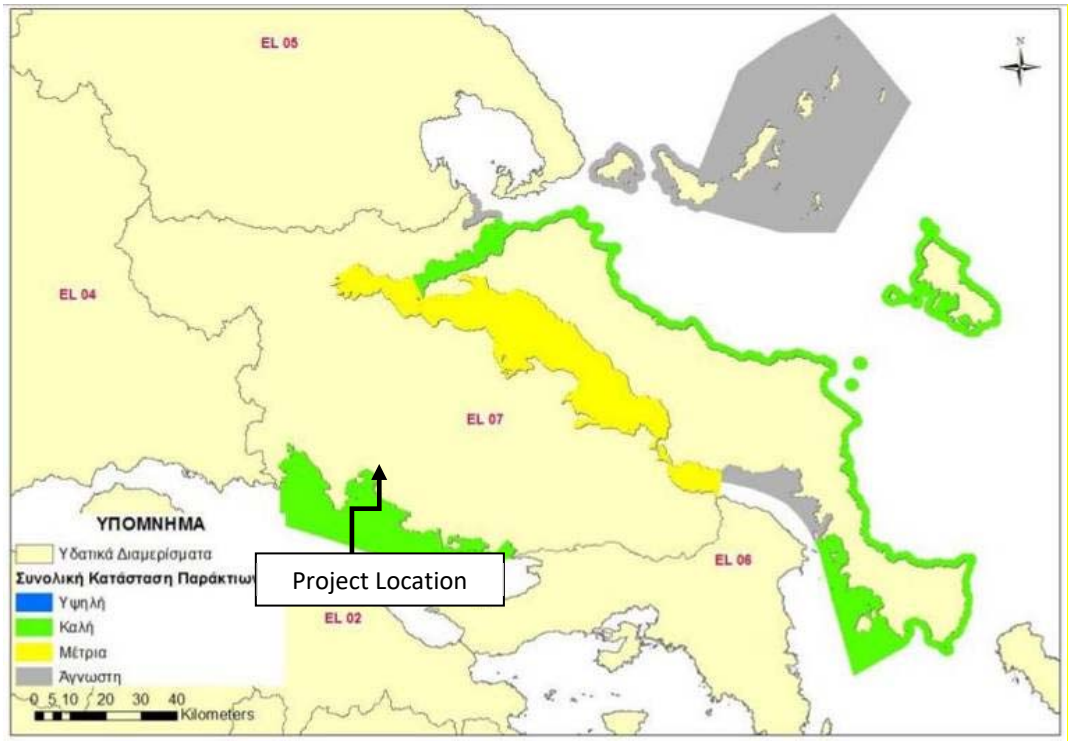


Figure 5.9: Classification of the overall status of coastal water systems of Eastern Central Greece (EL07).

In the study area there is no surface water system that falls within an area intended for water abstraction for human consumption and has been included in the Register of Protected Areas.

The objectives of the 1st revision of the management plan set for surface HS include the following:

- For surface waters with good or high status or good ecological potential and good chemical status, the environmental objective is not to degrade them. For surface waters with a status/potential below good, the environmental objective is to upgrade them through the implementation of the Program of Measures.
- For surface waters their status remains unknown due to a lack of available data, no environmental objective is set other than non-degradation, while the Program of Measures provides for the collection of data through specific monitoring programs in order to be able to assess their situation as soon as possible.
- For all river bodies of water identified as Highly Modified Water Systems (not including river reservoirs), a target of 2021 is set to achieve good ecological potential.

Underground Water Systems (UWS)

With regard to groundwater, the study area is located the Underground Water System (UWS) "Antikyra - Kithairon". (EL0700230). The UWS "Antikyra - Kithairon" (EL0700230), an area of 900k^{m2}, develops in the masses of carbon rocks that form the southern coastal region of the Water District. From the Gulf of Itea to Fokida to Porto Germeno in Attica. It is a particularly extensive area in which many important aquifers, mainly karstic form, are developed, which are in direct hydraulic communication with the sea, where they are unloaded with large coastal and brackish sources.

The supply of the system is made by the direct injection of meteoric water, which moves in depth through the karstic network.

Discharges of the system are made in places laterally in autogenic materials, but its most important discharge, which characterizes the system, takes place in the coastal zone towards the sea. The sea level forms a base level of the karst aquifer with which it is in direct hydraulic communication. Coastal brackish sources of high supply are gushing across the coastline.

The average annual supply of the system is 200×106^{m3}/year, while total receipts are estimated at 9.51×106^{m3}/year. The quantitative status of the MINISTRY "Antikyra - Kithairon" (EL0700230), as shown in the extract of the map below, is characterized as good.

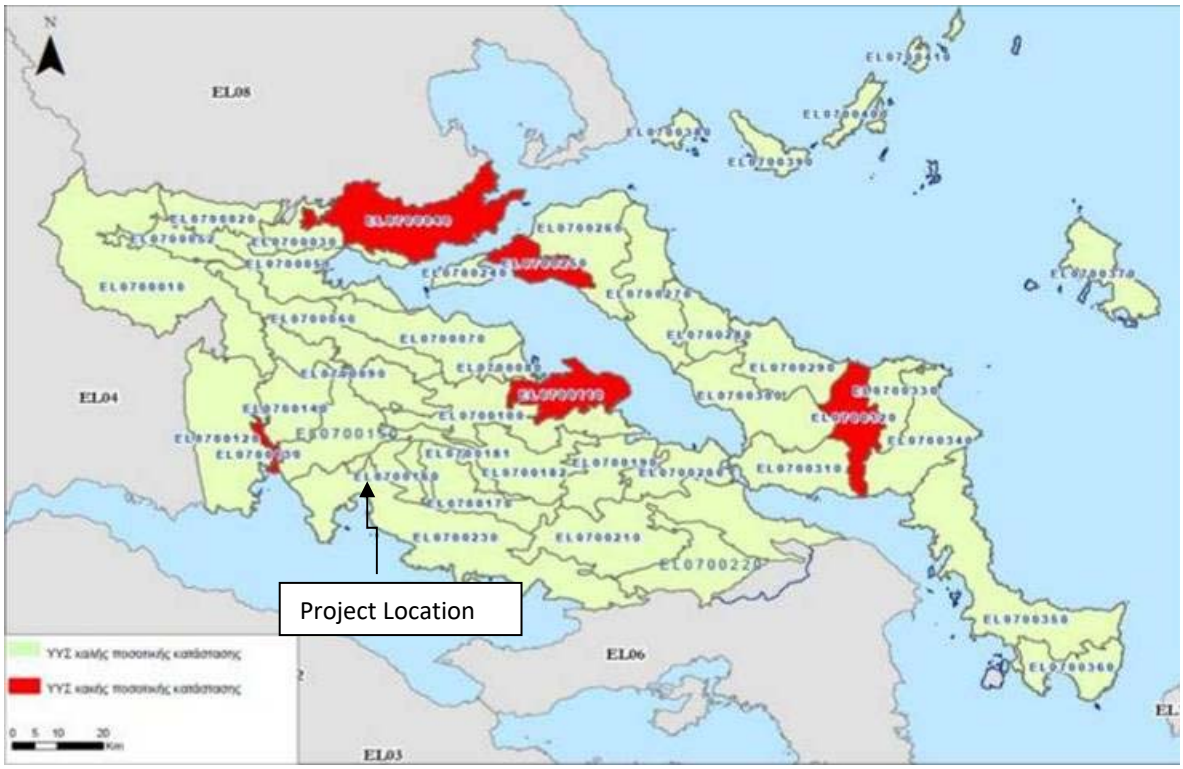


Figure 5.10: Quantitative status of Groundwater Systems (GS) in ministerial decision EL07. Similarly, the chemical status of the ministry "Antikyra - Kithairon" (EL0700230), as shown in the extract of the map below, is characterized as good**.**

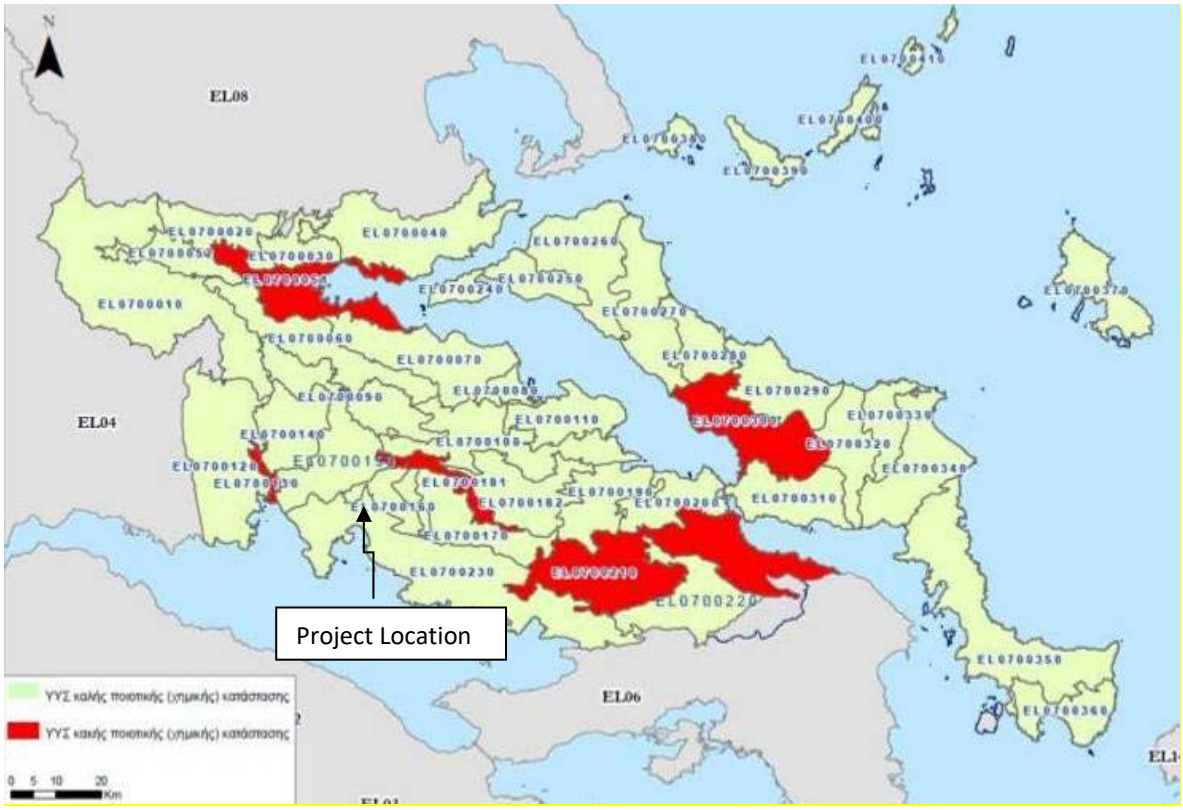


Figure 5.11: Chemical status of Underground Water Systems (UWS) in ministerial decision EL07.

In the study area there is no underground body of water falling within an area intended for the abstraction of water for human consumption and has been included in the Register of Protected Areas.

The objectives of the 1st revision of the management plan set for groundwater include the following:

- For groundwater with good quantitative status, the environmental objective is to maintain good quantitative status.
- For groundwater with poor quantitative status, the environmental objective is to achieve good quantitative status whenever natural conditions permit after 2027.
- For groundwater with good chemical status, the environmental objective is to maintain good chemical status.
- For groundwater with poor chemical status, the environmental objective is to achieve good chemical status whenever natural conditions permit after 2027.

Since the project under study cannot have an impact on groundwater in the area, this is compatible with the objectives of the approved management plan with regard to groundwater bodies.

5.2.3.2 River Basin Flood Risk Management Plan of the Water District of Eastern Central Greece

As part of Greece's adaptation of the Community Directive 2007/60/EC on flood risk assessment and management, the Preliminary Flood Risk Assessment (FRA) was carried out by the special secretariat for water(SSW) in 2012. The FRA defined the Potentially High Flood Risk Zones (HFRZ), collected information on flood events from the relevant risk and disaster management bodies at local and central level, evaluated and recorded their data in territory-specific spreadsheets. In particular, the Preliminary Flood Risk Assessment included the following stages:

- The recording of historic floods with their main characteristics and the identification of significant historical floods based on their consequences.
- Identify areas where flooding is likely to occur and assess the potential negative effects of future flooding, taking into account historical flood data and changes in flood conditions since then.
- The definition of Potentially High Flood Risk Zones.

According to the 1st Revision of the FRA under Directive 2007/60, pursuant to the ministry of environment, energy and climate change JMD 31822/1542/e103, the study area does not fall within a Potentially High Flood Risk Zone, as shown in the following figure:

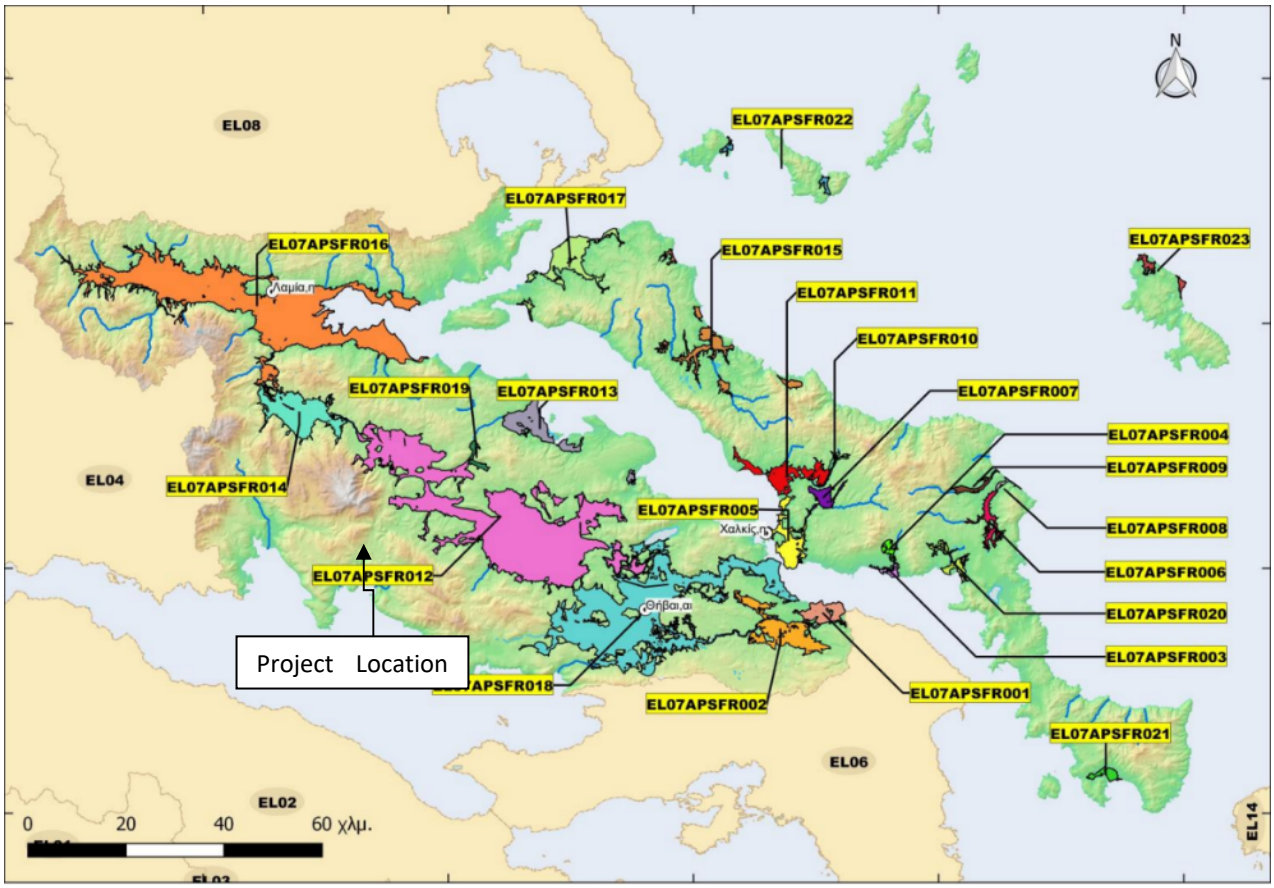


Figure 5.12: Excerpt from the Map of Potentially High Flood Risk Zones, based on the 1st Review of the FRA.

In accordance with the Decision of the European Commission, the Court of First Ins ministry of environment and energy/GR special secretariat for water(SSW)/41375/328/2018 (Government Gazette 2682/B/06.07.2018) approved the River Basin Flood Risk Management Plan of the Eastern Central Greece Water District (EL07) and the corresponding Environmental impact assessment Strategy. The Flood Risk Management Plan is structured in two stages as follows:

- 1st Stage: Preparation of Flood Risk Maps and Flood Risk Maps
- 2st Stage: Preparation of Flood Risk Management Plans (PFRMP), Preparation of Strategic Environmental Impact Studies (SEIS) and Consultation

In particular, flood risk maps have been prepared and approved for each flood risk management plan(FRMP), based on the spatial distribution of the flood surface for each recovery period (T=50, 100 and 1000 years). Flood Risk Maps based on the spatial distribution of the flood surface from river flows compiled correspond to the following scenarios:

- floods with a high probability of exceeding a 50-year reset period,

- floods with an average probability of exceeding a 100-year recovery period,
- floods with a low probability of exceeding a 1000-year reset period.

Below are excerpts from the Flood Risk Maps for each recovery period (T=50, T=100 and T=1000) & their legend, which:

- red dots depict the areas originally identified under the Preliminary Planning and historical facts and other bibliographical information as Potentially High Flood Risk Zones,
- with a blue stripe, depicts the flood zone in each recovery period relating to the actual zone that can be flood under the Flood Risk Management Plans,
- a red spot shows the location of the project.

Figure 5.13: Flood Risk Map Memo from Inland Waters, in accordance with approved Flood Risk Management Plans.

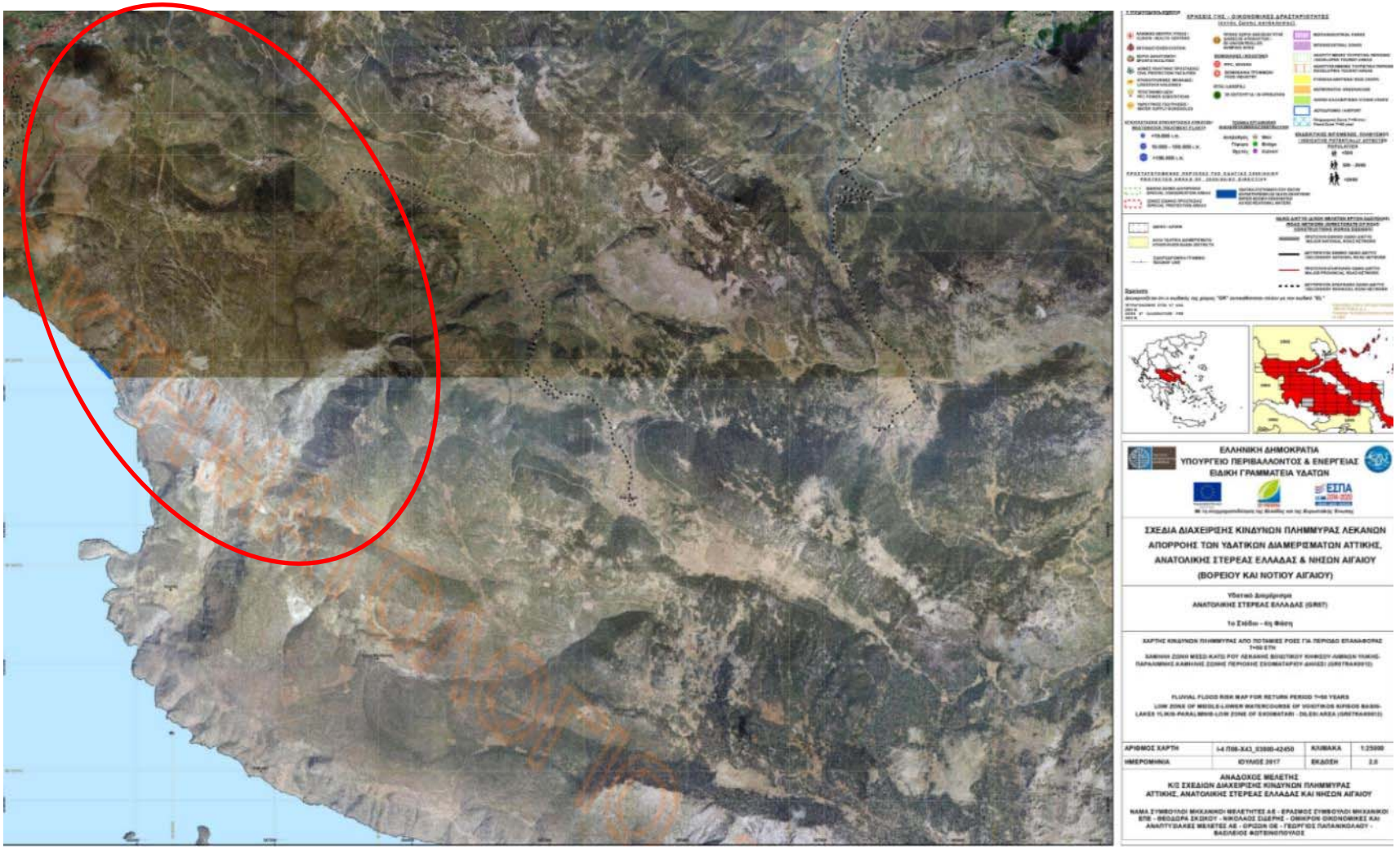


Figure 5.14: Extract Flood Risk Map from inland waters (F.C. 03800-42450) for a period of restoration T=50 years. The project under study does not fall into a flood zone for a 50-year restoration period.

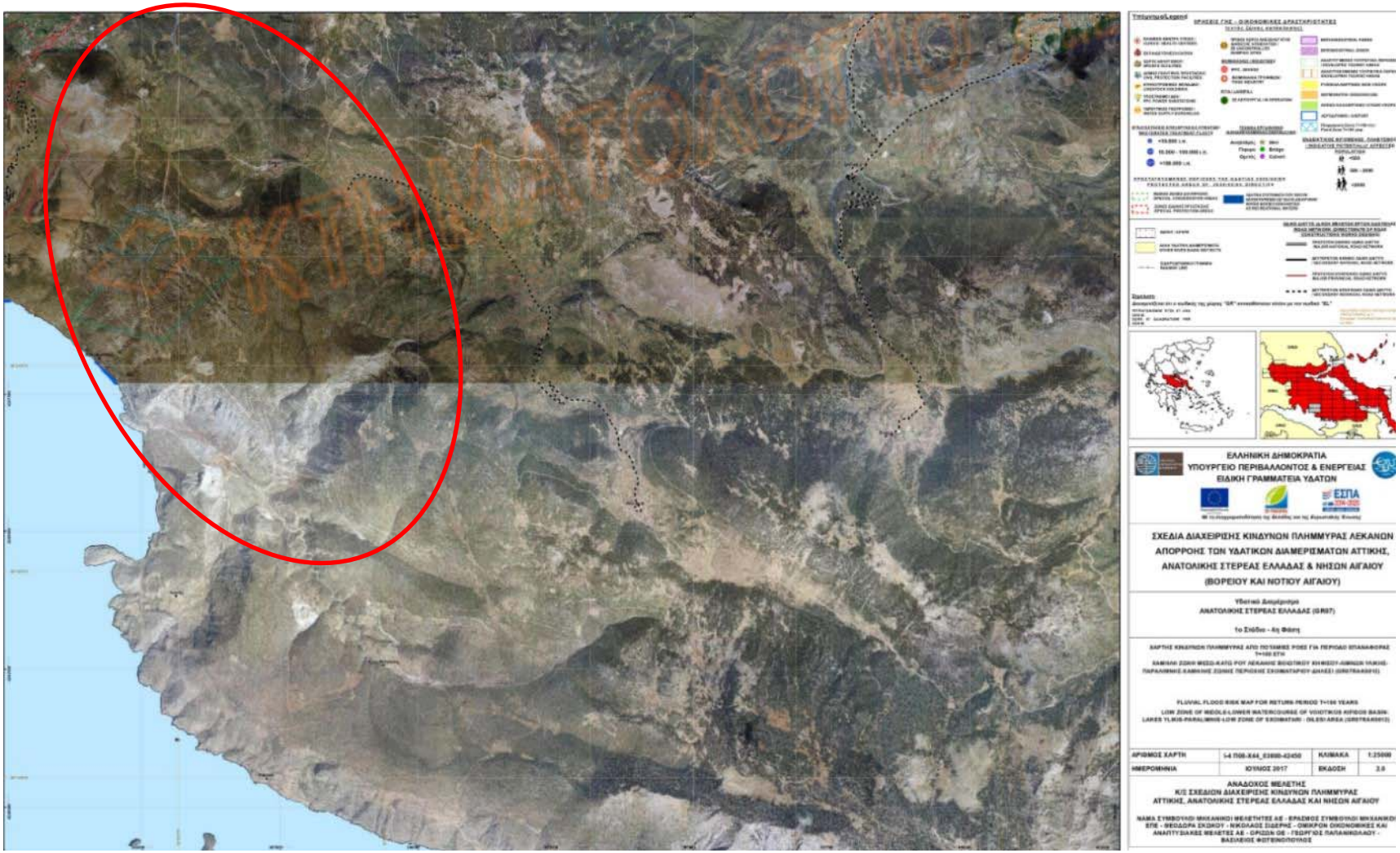


Figure 5.15: Extract Flood Risk Map from inland waters (F.C. 03800-42450) for a period of restoration T=100 years. The project under study does not fall into a flood zone for a 100-year restoration period.

Figure 5.16: Extract flood risk map from inland waters (apsfr0008_5) for a recovery period of T=1000 years. The project under study does not fall into a flood zone for a 1000-year restoration period.

As can be seen from the above Figures, the project under study does not fall into a flood zone for any period of restoration (T=50, T=100 and T=1000).

In any case, there is no question of the compatibility of the project under study with the approved River Basin Flood Risk Management Plan of the Eastern Central Greece Water District (EL07).

5.2.4 Organized activity receptors

The 400kV electricity transmission line under study is starting from Agios Nikolaos HVC and is closed in Distomo HVC .

In the study area are located the facilities of the alumina and aluminum production plant (briefly factory "Aluminum of Greece" or "AGA") of Business Sector Metallurgy, of MYTILINEOS S.A.

The facilities of mytilineos S.A. in the area have been located by an act of the Greek State, as early as 1960, for higher reasons of public interest of a development nature. **Since then, the entire area, acquired through expropriation for public benefit, has been purely industrial in nature**, with industrial use of the land. In particular, the area of expropriation of an area of **7,035,700^{m2}** was expropriated on the basis of **GG 138/D/01.11.1962.**

Ate's existing facilities include:

- The industrial alumina production complex.
- The industrial aluminum production complex.
  - The accompanying installations, which concern:
  - the industrial anon production complex.
  - port facilities for servicing the plant.
  - limestone quarry and lime production facilities.
  - industrial waste water treatment plants and urban waste water treatment plants.
  - facilities for the disposal of solid waste.
  - pumping and water treatment facilities.
  - other support facilities of the activity.
- The 334MW High Efficiency Electricity and Heat Cogeneration Station (STHYA),
- the pilot bauxite residue treatment plant.

It should be noted that adjacent to the premises of ate and in particular adjacent to the POINTA unit and within the expropriated area of the N.D. -Government Gazette138D/1962, in the position "Agios Nikolaos":

i. since 2011 the Independent Power Station of the company MYTILINEOS S.A. / Electrical & Natural Gas Business Sector, with a rated capacity of 444.48MW with natural gas fuel, for the operation of which has been issued No. 23918/01.11.2016 permit of approval of environmental conditions.

ii. has been environmentally licensed with No. Ministry of environment and energy/114847/6959/09.12.2019 permit of approval of environmental conditions and the construction and operation of a new Power Station (P.S.) of mytilineos s.a. / Electrical & Natural Gas Business Sector, with a rated capacity of 826MW, with natural gas fuel.

Figure 5.17: A satellite imagery extract (google earth), showing the expropriated area of the ATE plant in red, with a green outline depicts the installation site of the existing Independent Power Station and with a yellow outline depicts the installation site of the new Power Station of Mytilineos S.A. / Electrical & Natural Gas Business Sector.

6 ANALYTICAL DESCRIPTION OF THE PROJECT DESIGN

6.1 ANALYTICAL DESCRIPTION OF THE PROJECT

6.1.1 Generally

This Environmental impact assessment concerns the construction and operation of **a new Electric Transmission Line (T.L.) of 400kV Agios Nikolaos HVS – Distomo HVS**, for the connection of the High Voltage Substation of Agios Nikolaos with the HVS of Distomo , as part of the connection of the New Power Thermal Plant 826MW with the HVS of Agios Nikolaos.

In particular, the existing Agios Nikolaos HVS already serves the Power Station with a rated power of 444.48MW. The new combined cycle power station with a rated power of 826MW is also planned to be connected to the Agios Nikolaos HVS.

According to the Connection Offer of the Combined Cycle 826MW Power Plant of the Independent Transmission Operator of Electricity (independent electricity transmission operator), it is necessary both to build the new electricity transmission line Agios Nikolaos HVS – Distomo HVS, which is being examined with this environmental impact assessment, and to divert the existing transmission line Agios Nikolaos HVS – Distomo HVS, (environmental impact assessment October 2020), with a view to safely absorbing the full power of the two (2) power plants.

The transmission line under study (T.L.) of electricity 400kV Agios Nikolaos HVS – Distomo HVS, with a total length of about 14km, is starting from Agios Nikolaos HVS (High Voltage P/S - within the existing facilities of MYTILINEOS S.A.) and is completed at Distomo HVS. The projects proposed in this Environmental impact assessment concern the following:

- Construction of a new Transmission Line T.L. of high voltage electricity of 400kV, total length of about 14km.
- Construction of forty-two (42) new High Voltage pylons.
- Opening of a forest road, with a total length of about 8,700m, to serve the construction and operation needs of the new electricity transmission line.
- Configuration of a plot of development of cable systems, below the terminal pylon (P42) of electric T.L., area 1,265m^2.

- Execution of work – addition of equipment to connect the development plot of cable systems with the Agios Nikolaos HVS.
- Connection of the new T.L. to the Distomo HVS (connection of the terminal pylon of T.L. to the terminal wall, the available gateway, to the Distomo HVS).

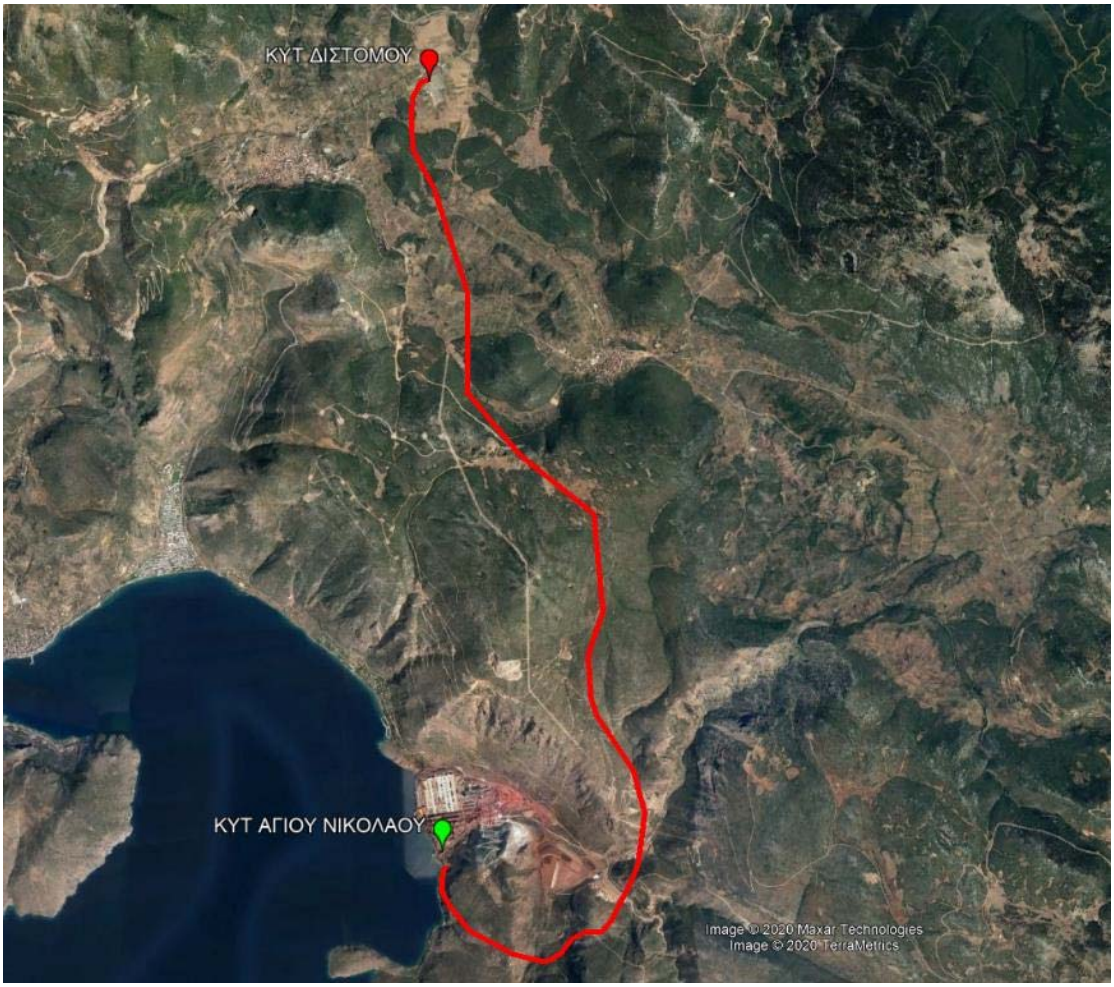


Figure 6.1: Extract of satellite imaging (google earth), showing with a red line the electricity T.L. 400kV under study, and the locations of the Agios Nikolaos HVC and Distomo HVC are indicated.

The following table shows the geographical coordinates of the pillars of the 400kV High Voltage Transmission Line under study, in the Greek Geodesic Reference System 1987 (GGRS ‘87) and in the Global Geodesic System GGS ‘84.

Table 6.1: Coordinates of the pillars of the new electricity (T.L.) 400kV.

A/A	GGRS ΄87		GGS ΄84	
	X (m)	Y (m)	ϕ (°)	λ (°)
ΙΚΡΙΟΜΑ	385.280,033	4.254.960,755	38ο 26΄ 17,39	22ο 41΄ 14,04
Π1	385.188,969	4.254.929,034	38ο 26΄ 16,32	22ο 41΄ 10,30
Π2	385.099,975	4.254.766,161	38ο 26΄ 11,00	22ο 41΄ 6,73
Π3	385.069,571	4.254.529,026	38ο 26΄ 3,29	22ο 41΄ 5,61
Π4	385.087,470	4.254.130,000	38ο 25΄ 50,36	22ο 41΄ 6,59
Π5	385.329,340	4.253.676,500	38ο 25΄ 35,76	22ο 41΄ 16,83
Π6	385.469,253	4.253.221,747	38ο 25΄ 21,07	22ο 41΄ 22,86
Π7	385.578,057	4.252.868,106	38ο 25΄ 9,65	22ο 41΄ 27,56
Π8	385.710,694	4.252.436,999	38ο 24΄ 55,73	22ο 41΄ 33,28
Π9	385.707,103	4.252.208,105	38ο 24΄ 48,30	22ο 41΄ 33,26
Π10	385.700,985	4.251.818,125	38ο 24΄ 35,65	22ο 41΄ 33,24
Π11	385.692,190	4.251.257,500	38ο 24΄ 17,46	22ο 41΄ 33,20
Π12	386.035,640	4.250.841,691	38ο 24΄ 4,13	22ο 41΄ 47,60
Π13	386.304,870	4.250.515,740	38ο 23΄ 53,69	22ο 41΄ 58,89
Π14	386.613,053	4.250.264,003	38ο 23΄ 45,66	22ο 42΄ 11,74
Π15	386.930,583	4.250.004,630	38ο 23΄ 37,39	22ο 42΄ 24,97
Π16	387.173,750	4.249.806,000	38ο 23΄ 31,06	22ο 42΄ 35,11
Π17	387.202,987	4.249.435,743	38ο 23΄ 19,06	22ο 42΄ 36,53
Π18	387.227,783	4.249.121,720	38ο 23΄ 8,89	22ο 42΄ 37,73
Π19	387.264,440	4.248.657,500	38ο 22΄ 53,85	22ο 42΄ 39,51
Π20	387.171,251	4.248.393,462	38ο 22΄ 45,24	22ο 42΄ 35,82
Π21	387.083,030	4.248.143,498	38ο 22΄ 37,09	22ο 42΄ 32,33
Π22	387.094,087	4.247.908,760	38ο 22΄ 29,49	22ο 42΄ 32,92
Π23	387103,995	4247681,841	38ο 22΄ 22,13	22ο 42΄ 33,46
Π24	387.166,063	4.247.443,000	38ο 22΄ 14,41	22ο 42΄ 36,16
Π25	387.363,499	4.247.138,299	38ο 22΄ 4,62	22ο 42΄ 44,46
Π26	387.597,551	4.246.777,166	38ο 21΄ 53,01	22ο 42΄ 54,31
Π27	387.730,082	4.246.268,516	38ο 21΄ 36,57	22ο 43΄ 0,07
Π28	387.639,609	4.245.672,927	38ο 21΄ 17,21	22ο 42΄ 56,68
Π29	387.568,024	4.245.491,850	38ο 21΄ 11,30	22ο 42΄ 53,84
Π30	387.316,306	4.245.010,152	38ο 20΄ 55,57	22ο 42΄ 43,74
Π31	387.196,250	4.244.873,420	38ο 20΄ 51,08	22ο 42΄ 38,88
Π32	387.015,780	4.244.882,930	38ο 20΄ 51,30	22ο 42΄ 31,44
Π33	386.844,060	4.244.799,410	38ο 20΄ 48,52	22ο 42΄ 24,41
Π34	386.715,994	4.244.635,334	38ο 20΄ 43,14	22ο 42΄ 19,23

A/A	GGRS ΄87		GGS ΄84	
	X (m)	Y (m)	ϕ (°)	λ (°)
Π35	386.529,860	4.244.527,647	38ο 20΄ 39,56	22ο 42΄ 11,63
Π36	386.142,902	4.244.627,561	38ο 20΄ 42,62	22ο 41΄ 55,63
Π37	385.957,659	4.244.729,189	38ο 20΄ 45,84	22ο 41΄ 47,95
Π38	385.631,526	4.244.908,517	38ο 20΄ 51,50	22ο 41΄ 34,41
Π39	385.406,084	4.245.194,306	38ο 21΄ 0,67	22ο 41΄ 24,96
Π40	385.311,054	4.245.373,533	38ο 21΄ 6,44	22ο 41΄ 20,94
Π41	385.324,934	4.245.618,455	38ο 21΄ 14,39	22ο 41΄ 21,37
Π42	385.365,005	4.245.675,007	38ο 21΄ 16,24	22ο 41΄ 22,98

6.1.2 Electric transmission Lines

The new electricity transmission line, based on the requested route, will have a total length of about 14km and will be built in accordance with the air transmission line specifications and the transmission line pylon foundation plans available from the independent electricity transmission operator. It will include forty-two (42) new simple circuit towers of the Series ''7".

Like all overhead power transmission lines, aluminum conductors will be used because they have very good electrical conductivity, low weight and low cost. Aluminum ducts are generally long-circuited. They consist, in other words, of many clones, which are helicoidally surrounded in successive layers, so as to form a conductor that resembles a wire rope. Successive layer clones are rotated in opposite directions to prevent their unwrapping and to achieve a coincidence of the outer radius of one layer with the inner radius of the next layer. The long-circuited conductors are more flexible than the monoclons of equal diameter, so they are more flexible and subject to less stresses. They also have the advantage of being safer in mechanical breakage.

6.1.3 Types of towers

Forty-two (42) new towers (pylons) of the "7" Series will be erected for the 14km power transmission line under study. The "7" Series towers are a simple circuit in a horizontal phase layout, with two (2) peaks and two (2) protective ducts.

The towers will be constructed from angular sheets of construction steel of the type of open floor, Electric Furnace or E.F. High strength steel qualities are used. For uprights, main bridge elements and main foundation elements are used cross sections of a thickness of not less than 3mm. Metric high strength screws of a minimum diameter of 12mm and a maximum of four screw diameters are used for each type

of tower. The suspension height from the ground for a normal height tower is 20,65m for towers of type S, R, T and G. All horizontal sections of the towers are square. The meshes of the sides of the towers are symmetrical.

All types of towers have horizontal frames:

- On the lower surfaces of the bridges
- At the top of the legs
- At the slope change points of the uprights

It should be noted that the pillars of series '7' are those which can carry a triple conductor **ACSR CARDINAL 954000 CM** and as such the Thermal Limit (T.L.) using Pillars of series '7' amounts under nominal conditions to **2000 MVA** and respectively under adverse conditions to **1600 MVA.**

The following table shows the types of new towers to be installed.

Table 6.2: Types of new towers.

A/A Tower	Tower Type	
1	Series "7", angle 75th	Z_7
2	Series "7", angle 45th	T_7
3	Series "7", angle 45th	T_7+4
4	Series "7", angle 75th	Z_7
5	Series "7", angle 45th	T_7+8
6	Series "7", Small Angle	R7
7	Series "7", Small Angle	R_7 +8
8	Series "7", angle 45th	T_7+8
9	Series "7", Small Angle	R_7 +8
10	Series "7", Small Angle	R_7
11	Series "7", angle 75th	Z_7H+8
12	Series "7", Small Angle	R_7 +8
13	Series "7", angle 45th	T_7H+8
14	Series "7", Small Angle	R_7 +8
15	Series "7", Small Angle	R_7 +8
16	Series "7", angle 45th	T_7+8

17	Series "7", Large Openings	G_7+8
18	Series "7", Large Openings	G_7+8
19	Series "7", angle 45th	T_7+8
20	Series "7", Alignment	S_7
21	Series "7", angle 45th	T_7
22	Series "7", Large Openings	G_7
23	Series "7", angle 45th	T_7HU
24	Series "7", angle 45th	T_7HU+8
25	Series "7", Small Angle	R_7
26	Series "7", angle 45th	T_7U+18
27	Series "7", angle 45th	T_7+18
28	Series "7", angle 45th	T_7U+18
29	Series "7", angle 45th	T_7H
30	Series "7", angle 45th	T_7+18
31	Series "7", angle 75th	Z_7+18
32	Series "7", angle 45th	T_7H+8
33	Series "7", angle 45th	T_7U+18
34	Series "7", angle 45th	T_7+8
35	Series "7", angle 75th	Z_7+8
36	Series "7", angle 45th	T_7
37	Series "7", Small Angle	R_7 +8
38	Series "7", angle 45th	T_7H+18
39	Series "7", angle 45th	T_7H+8
40	Series "7", angle 45th	T_7U+8
41	Series "7", angle 75th	Z_7+8
42	Series "7", angle 75th	Z_7+8

The suspension height from the ground for each tower of normal height is 20.65m. For each tower there is also a trunk extension of +8.0m. Especially for the T7 towers there is also a trunk lengthening of +18.0m. The above table shows the trunk lengthening for each tower.

This indicates that corner towers are used, where the line changes direction. The point where this change of direction (angle) appears is called a crossing point (intersection). The angle pillars shall be placed at the crossing points so that the transverse axis of the arm divides the angle created by the conductor, thus balancing the longitudinal loads of the ducts in the adjacent openings.

Finally, as shown in the above table, special specification pillars are also used, as follows:

- T7U pillar reinforced in Up-Lift as to normal T7.
- Pillar T7Th reinforced by 50% in positive vertical load compared to normal T7.
- Pillar T7IU reinforced in Up-Lift and positive vertical load (50%) normal T7.
- Pillar Z7H reinforced by 50% in positive vertical load compared to normal Z7.

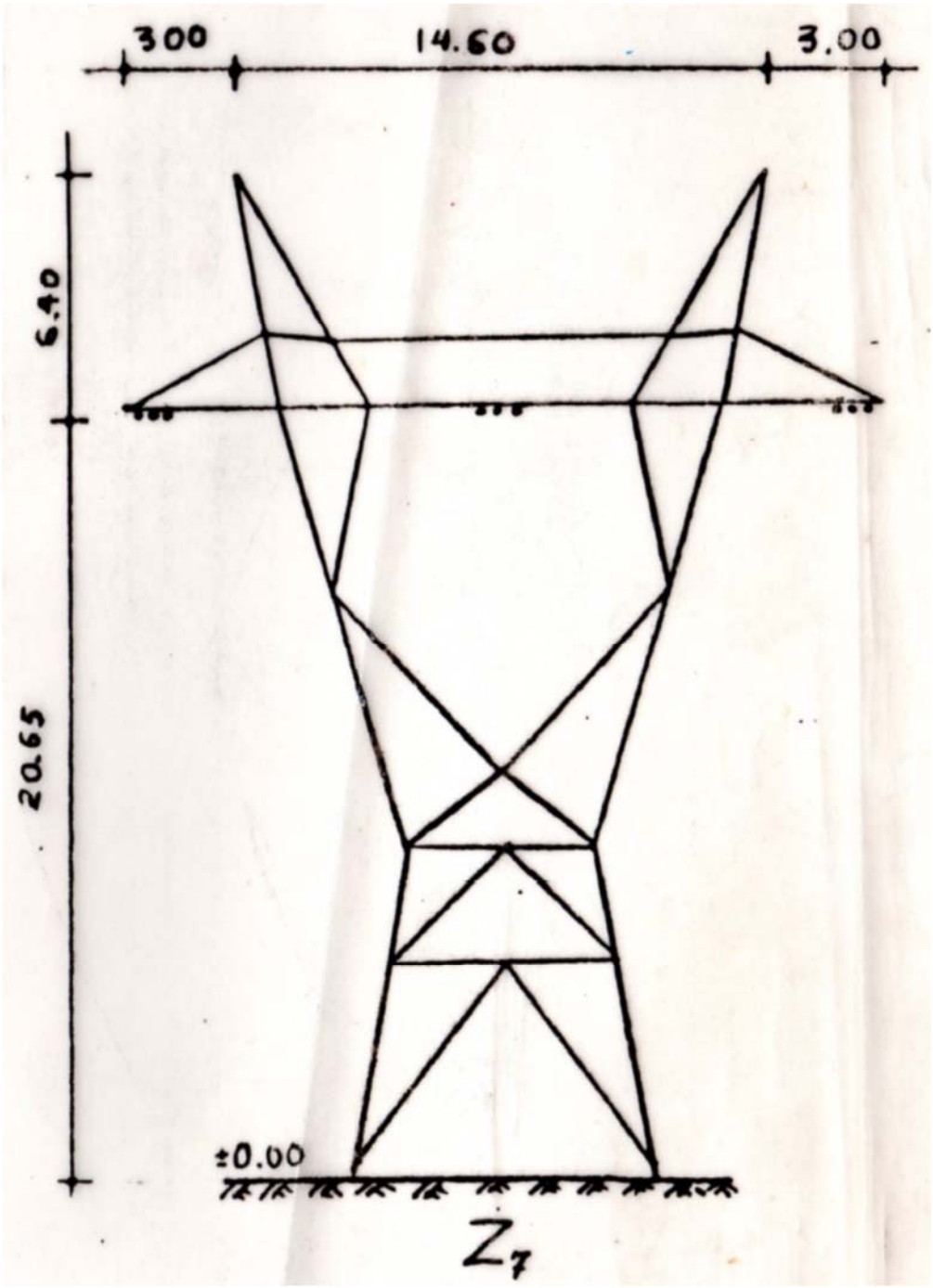


Figure 6.2: 75° or finish angle "7" series pillar, type Z7.

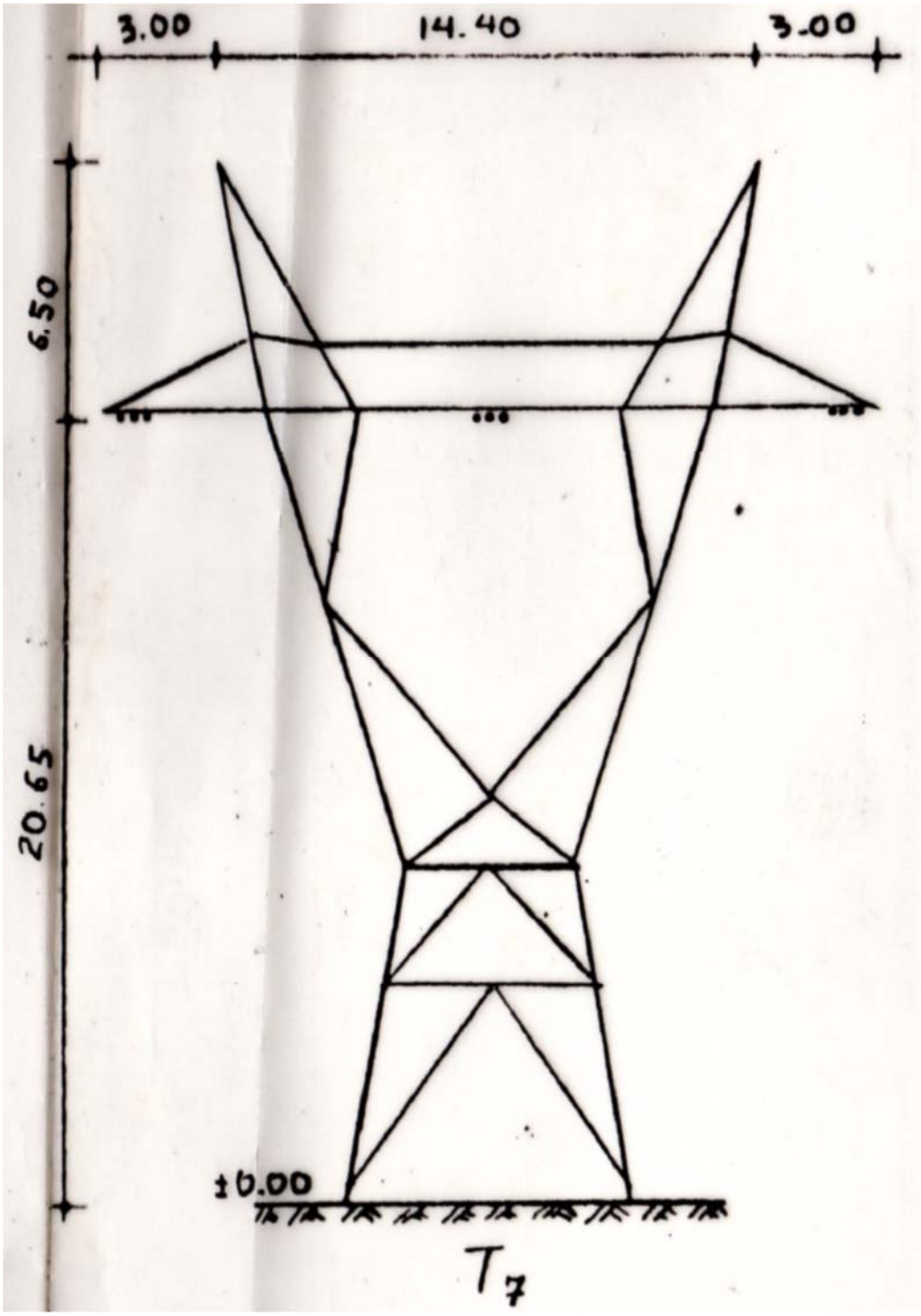


Figure 6.3: 45° angle '7' series pillar, type T7.

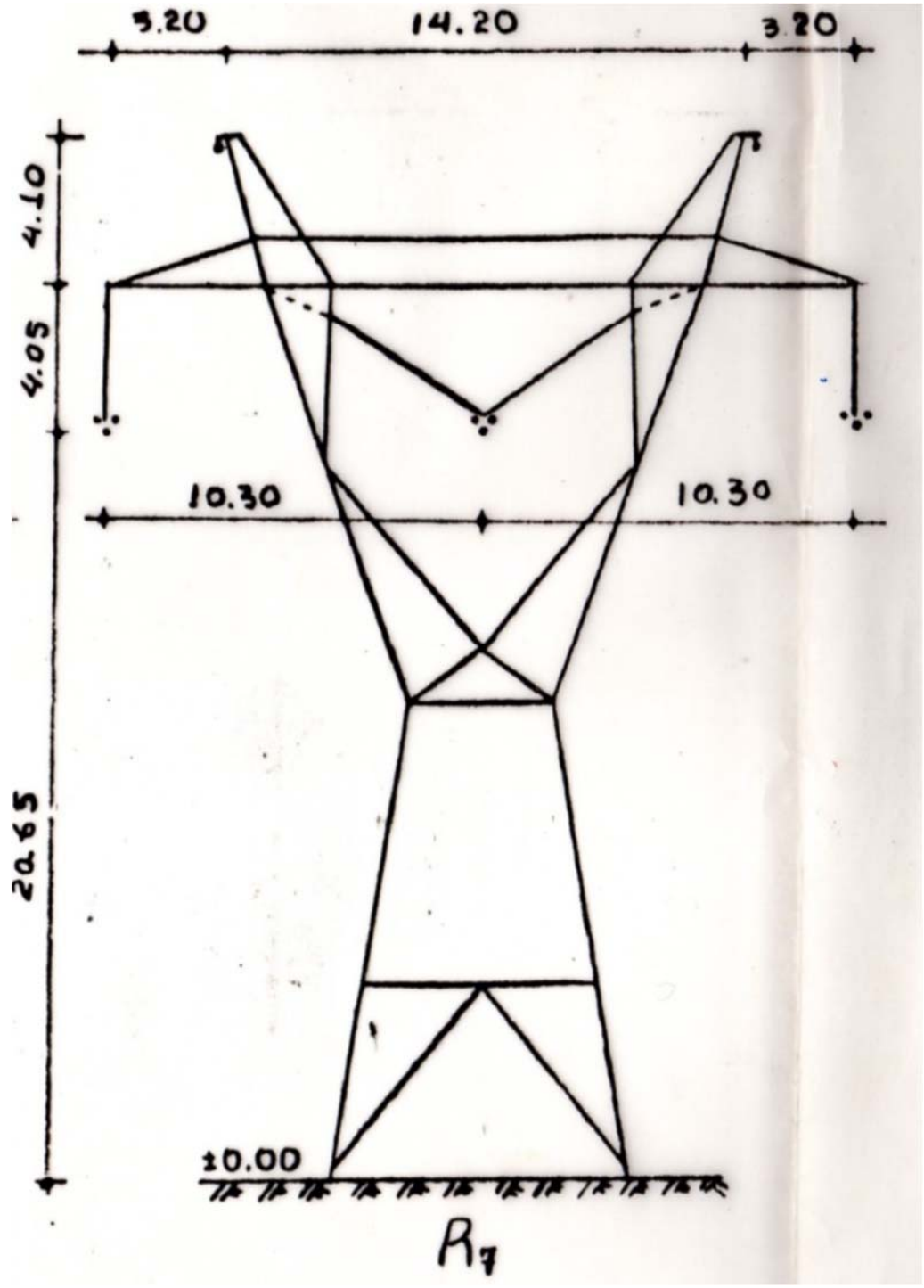


Figure 6.4: Small angle "7" series pillar, type R7.

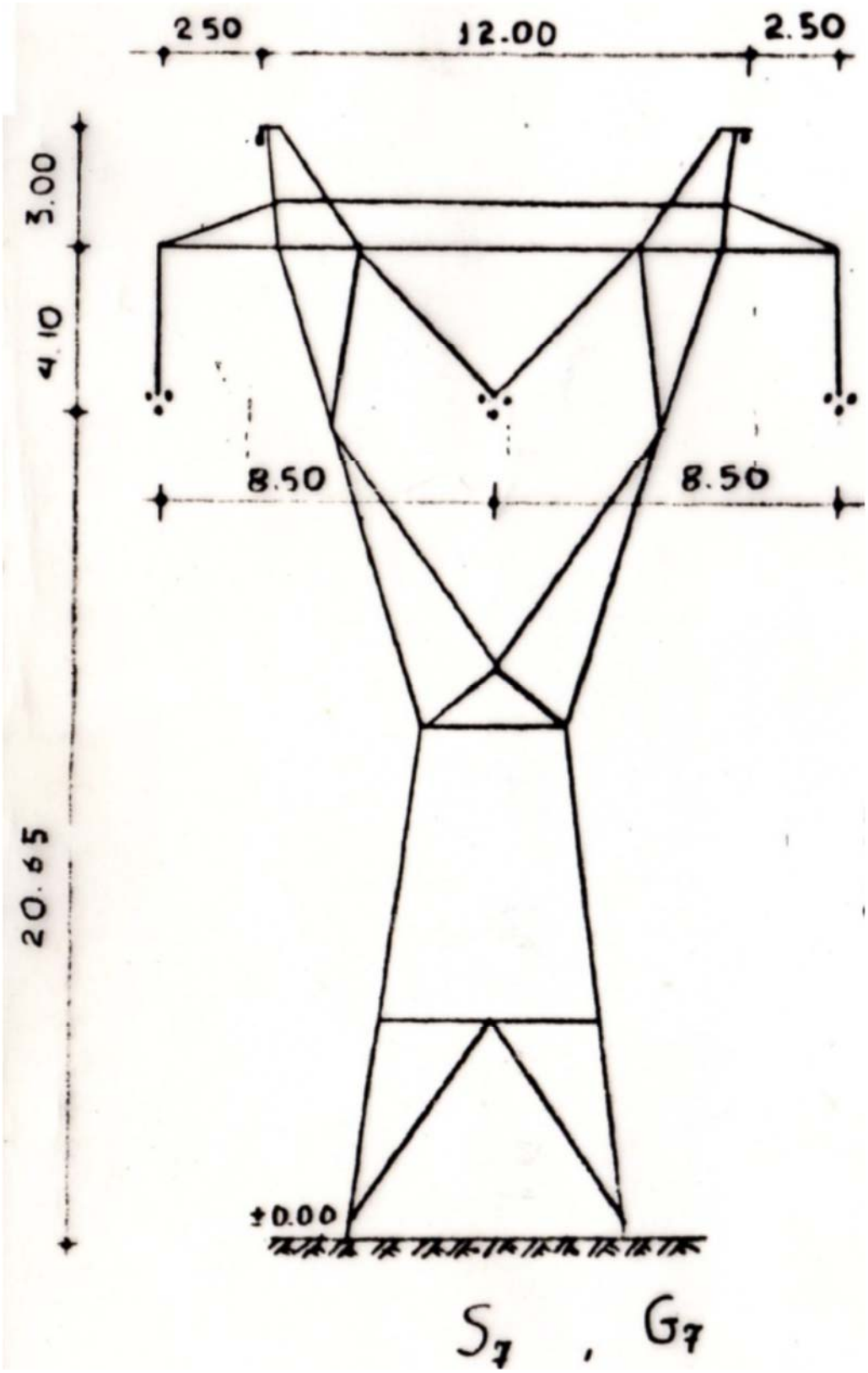


Figure 6.5: G7 & S7 series pylon of large openings & alignment

6.1.4 Foundations - Pylon construction squares

Each tower is based on four (4) independent concrete foundations. The steel stems of the foundations (extensions of the uprights of the strands) are surrounded by the concrete of the foundation reinforced, if necessary, by reinforcement of concrete. The strains will be of varying sizes depending on the type of foundation to be applied. However, their lengths and corresponding theoretical weights are determined by independent electricity transmission operator. The following types of foundations are used: rock anchorage, sandal type for various ground voltages, stake type, etc. Each tower will be accompanied by four ground rods, one for each foundation. These are steel, hot plated, 2cm in diameter and 2.0m long and are connected each to each foundation, to the corresponding foundation stem, at the bottom of the base, and to a suitable screw, via a single-circuit steel plated hot conductor in order to achieve a good electrical connection of the rod to the tower. For additional grounding, where necessary, a single-stage 1cm diameter steel ground conductor connected to the tower at the first screw above the ground may be used. It takes four such screws of sufficient length for each tower (one for each leg).

For the assembly and installation needs of the pillars, it is necessary to have an appropriate surface area (square) dimensions mainly 25m×25m=625m^2, while some squares located in difficult positions with regard to the topography of the area, are selected with dimensions of 20m×20m=400m^2, sizes sufficient to place the superstructure in the optimal position.

A total of forty-two (42) new squares are planned, of which thirty-one (31) squares will have dimensions of 25m×25m=625m^2 and eleven (11) squares will be formed with dimensions of 20m×20m=400m^2. Therefore, the total area of occupation of the squares amounts to 23.775m^2 (11×400m^2 + 31×625m^2).

6.2 ANALYTICAL DESCRIPTION OF MAIN, AUXILLIARY AND SUPPORTERS – CONTENT WORKS

6.2.1 Configuration of a new road construction

In order to meet the construction and operation needs of the new electricity transmission line, a new forest road, with a total length of about 8.700m, is required. The proposed road sections are presented in the following satellite imagery extract.

Figure 6.6: A google earth extract, showing the new electricity T.L. with a red line, while yellow lines show the access roads that will be opened to serve the construction and operation needs of the new line.

Road 1

The 1-length road, about 105m long, moves from its confluence with the existing dirt road in the south, up to the position of square 3, via a short course and relatively in altitude contact with the existing ground. Regarding its geometric characteristics, the longitudinal gradients are mild. The morphology of the terrain of the crossing is particularly rocky with some transverse gradients of up to 25%. The width of the road is set at 5m.

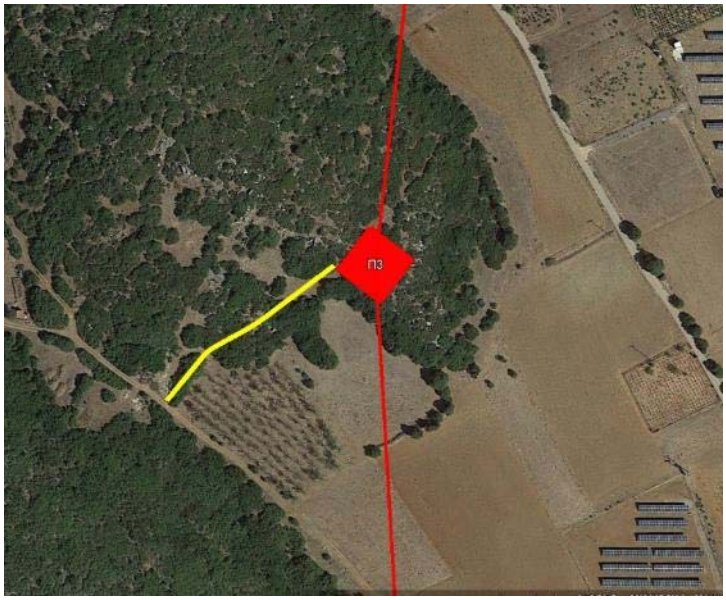


Figure 6.7: Road 1.

Road 2

The 2-length road of about 65m, moves from its confluence with the forest road under authorization (green line - to environmental licensing with the environmental impact assessment October 2020 – No. 184669/14.10.2020 application) in the south to the position of Square 4, via a short course, generally moving in a cove, in order to avoid the creation of a coating on the right half width. Regarding its geometric characteristics, the longitude gradients are pronounced at the beginning and the morphology of the ground of the crossing is particularly rocky with locally moderate to increased gradients of up to 25%. The width of the road is set at 5m.

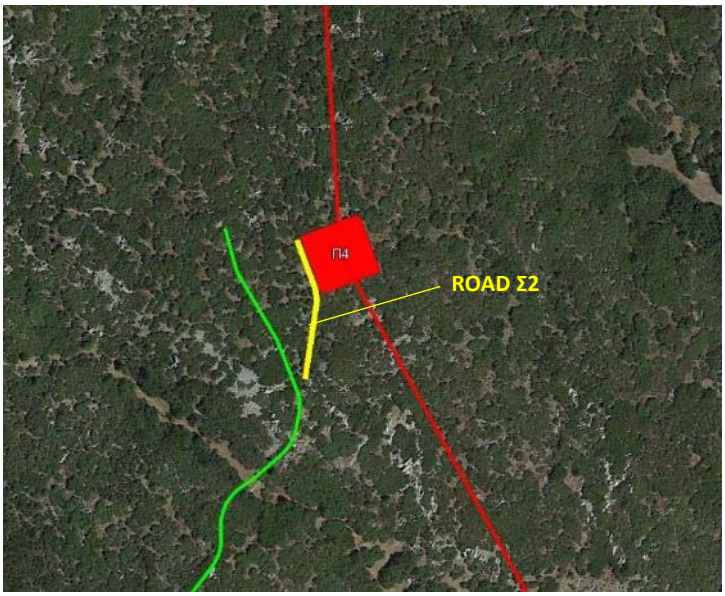


Figure 6.8: Road 2.

Road 3

Route 3, with a total length of about 510m, is an improvement of the existing dirt road up to cross section A'5 (length of about 285m) and then a new engraving (length of about 225m), which moves up to the position of square 5, on land with a strong terrain (slopes >30%). The 3-lenght Road begins from its confluence with the existing dirt road (green line - to environmental licensing with the EIA No 184669/14-10-2020 application). Regarding its geometric characteristics, the longitudin gradients are mild in the lowland section and a polygonal gradient of up to 11.4% is applied during the climb to the new pillar square. The morphology of the transit ground is particularly rocky with local flare-ups of rocky volumes. The width of the road is set at 5m.

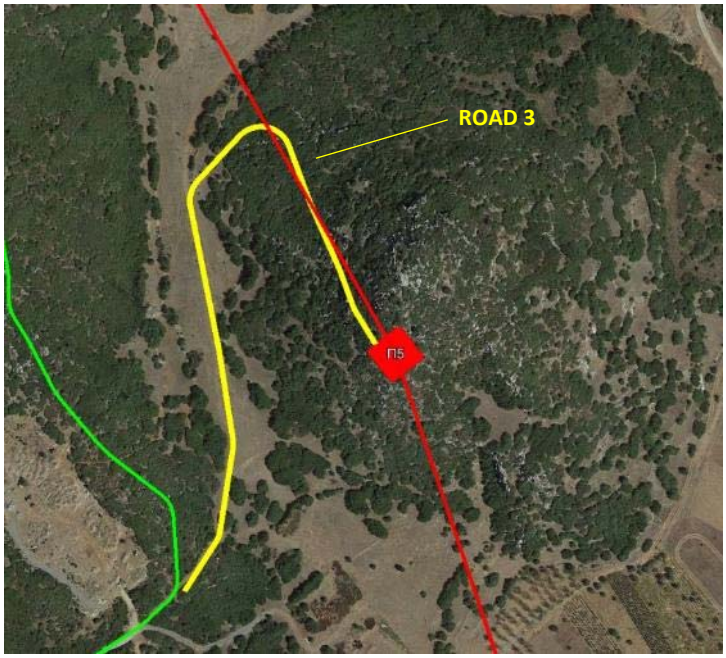


Figure 6.9: Road 3.

Road 4

The 4-length road, about 135m long, moves from its confluence with the existing dirt road in the north to the position of square 6, via a short course, generally moving in a cove, in order to avoid the creation of a coating on the right half width. Regarding its geometric characteristics, the longitudine gradients are mild and the morphology of the soil of the crossing is earthy and semi-rocky locally, with moderate gradients. The width of the road is set at 4m.

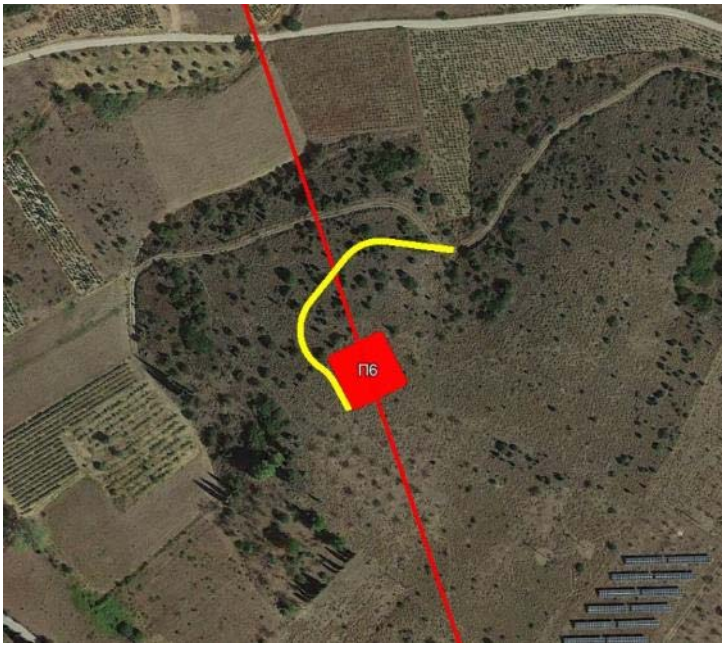
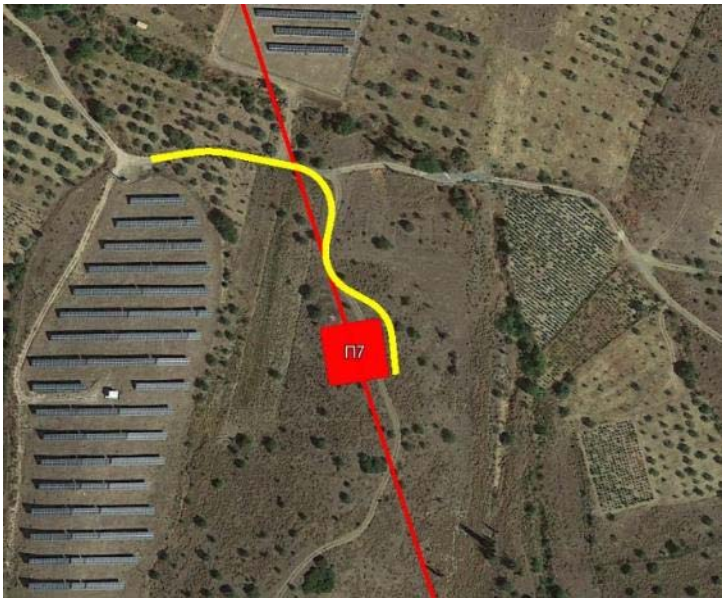


Figure 6.10: Road 4.

Road 5

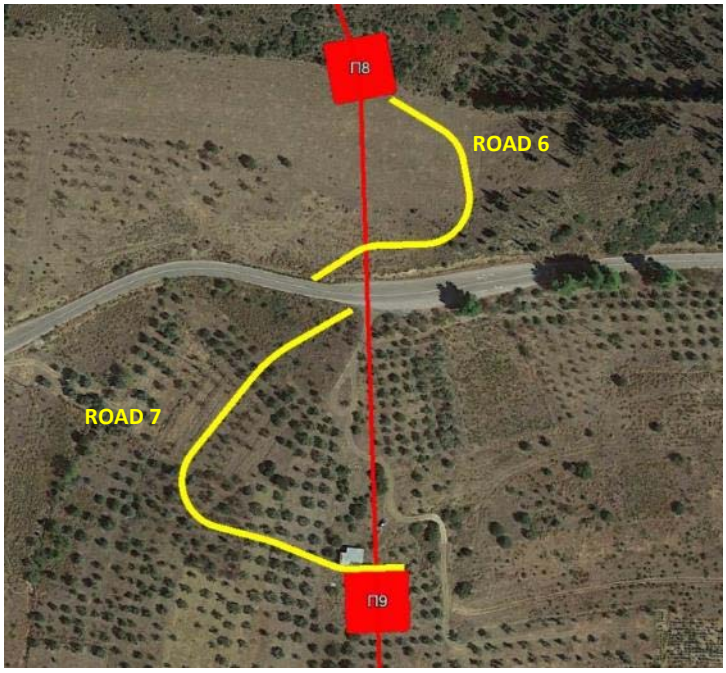
The 5-length road of about 180m, moves on an existing dirt road of short width (<3m), in front of the



installed Photovoltaic power station up to the position of square 7, through a short course and relatively in altitude contact with the existing ground. Regarding its geometric characteristics, the longitudin gradients are mild at the beginning and relatively elevated towards the end of the engraving. The morphology of the soil of the crossing is earthy with some transverse gradients of up to 25%. The width of the road is set at 4m.

Figure 6.11: Road 5.

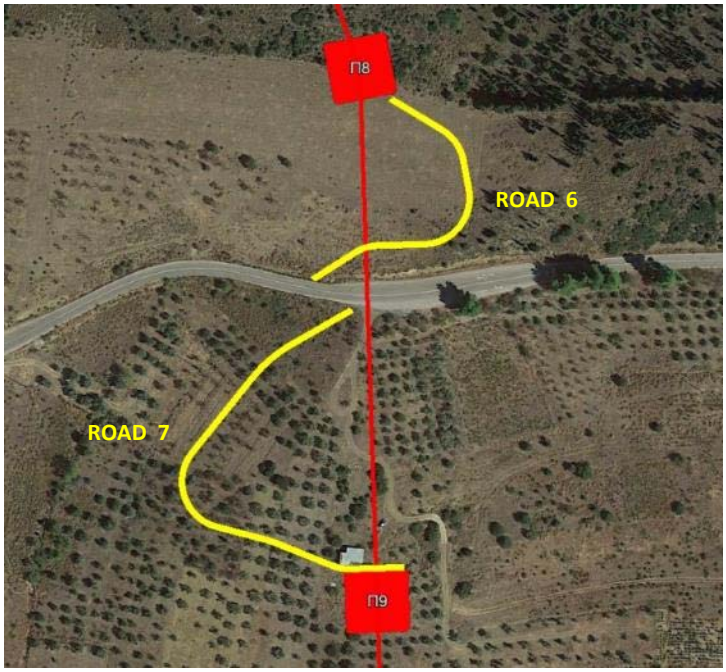
- **Road 6**



The 6-length road of about 145m, moves from its confluence (and at the same time engraving authority) with the existing Highway in the south up to the position of square 8, through a short course and relatively in altitude contact with the existing ground. Regarding its geometric characteristics, the longitudin gradients are moderate to intense. The morphology of the soil of the crossing is earthy with some transverse gradients of up to 25%. The width of the road is set at 4m.

Figure 6.12: Roads 6 και 7.

Road 7



Road 7, about 220m long, runs from its confluence (and at the same time the beginning of the road) with the existing National Road 29 in the north to the location of Square 9, via a short path and in relative altitude contact with the existing ground. Regarding its geometric characteristics, the longitudinal slopes are moderate (up to 8%). The morphology of the crossing soil is terrestrial with some transverse slopes up to 25%. %. The width of the road is set at 4m

Figure 6.13: Roads 6 και 7.

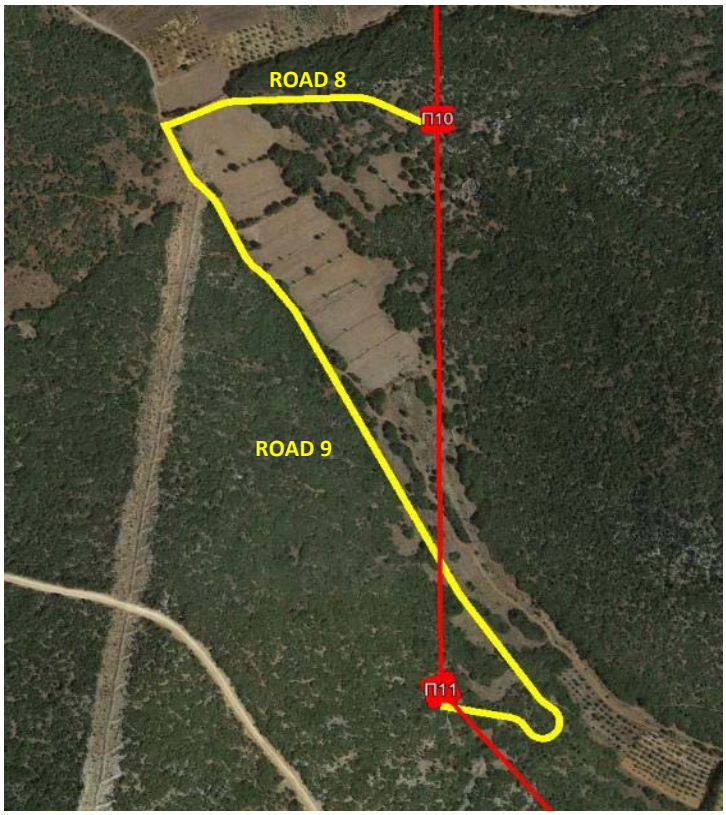
Road 8

The 8-length road, about 250m long, moves from its confluence with the existing dirt road at the western

end to the position of square 10, via a short course, generally in contact with the natural soil. Regarding its geometric characteristics, the longitudine gradients are intense in order to achieve the elevation in the planned square and the morphology of the terrain of the crossing is earthy and semi-rocky locally with moderate gradients. The width of the road is set at 4m.

Figure 6.14: Road 8.

Road 9



Route 9, with a total length of about 820m, is an improvement of the rudimentary dirt road up to cross section 7 (length about 275m) and then constitutes a new engraving (length of about 545m), moving up to the position of square 11, in soil with a strong terrain (slopes >30%). new pillar square. The morphology of the transit ground is particularly rocky with local flare-ups of rock volumes. The width of the road is set at 5m

Figure 6.15: Road 9.

Road 10

The 10-length road, about 225m long, moves from its confluence with the existing dirt road in the south to the position of square 12, via a short course, generally moving in a cove, in order to avoid the creation of a coating on the right half width. Regarding its geometric characteristics, the longitudon gradients are particularly large (>40%) and the morphology of the terrain of the crossing is semi-rocky and rocky locally. The width of the road is set at 5m.

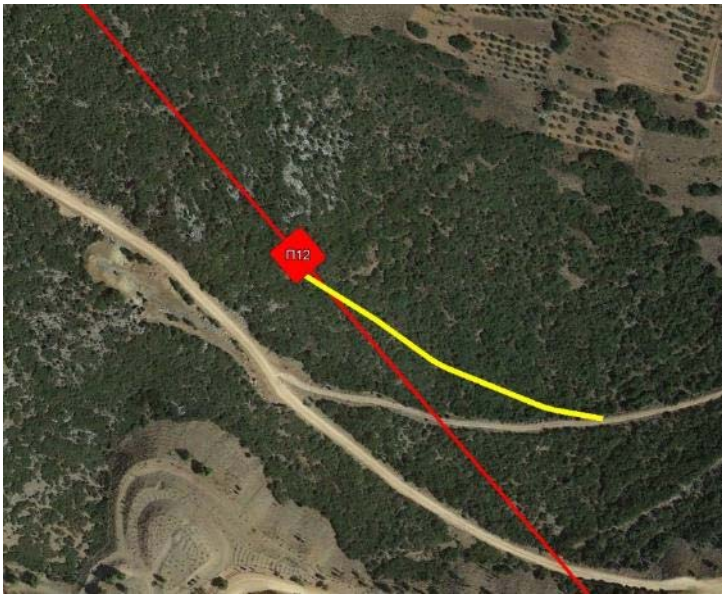
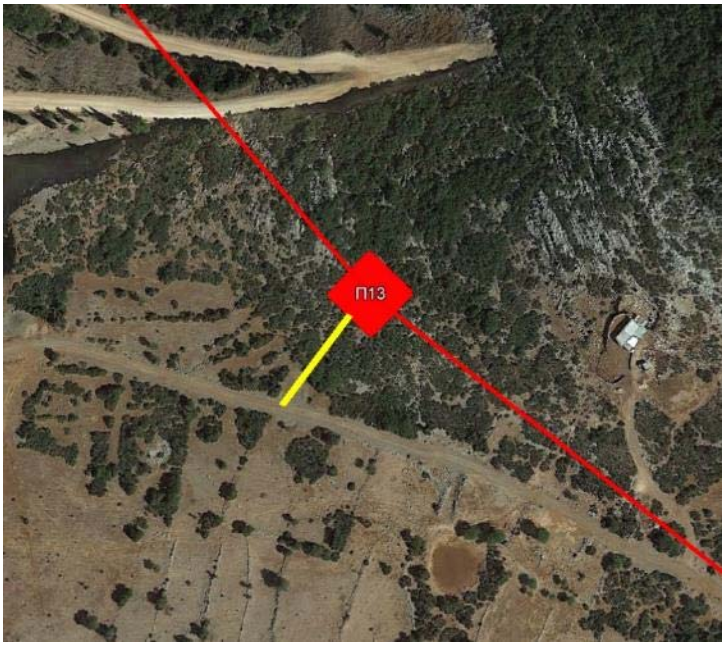


Figure 6.16: Road 10.

Road 11



The 11-length road, about 50m long, moves from its confluence with the existing dirt road in the south to the location of square 13, via a short course and relatively in altitude contact with the existing ground. Regarding its geometric characteristics, the longitudin gradients are mild. The morphology of the territory of the crossing is earthy and road width is set at 5m.

Figure 6.17: Road 11.

Road 12

The 12-length road, about 60m long, moves from its confluence with the existing dirt road at the western end to the position of square 14, via a short course and in altitude contact with the existing ground. Regarding its geometric characteristics, the longitudin gradients are mild. The morphology of the territory of the crossing is earthy and road width is set at 5m.

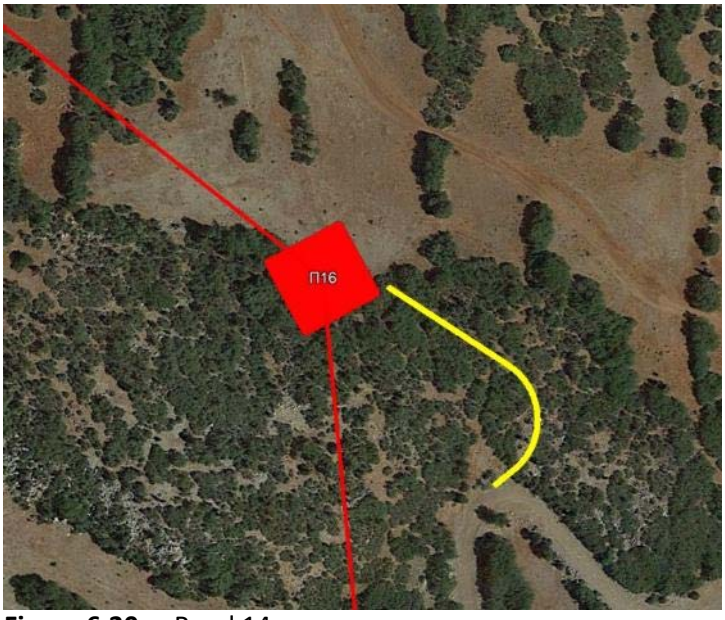
Figure 6.18: Road 12.

Road 13

The 13-length road, about 45m long, moves from its confluence with the existing dirt road in the south to the position of square 15, via a short course and relatively in altitude contact with the existing ground. Regarding its geometric characteristics, the longitudin gradients are mild. The morphology of the territory of the crossing is earthy and the width of the road is set at 5m.

Figure 6.19: Road 13.

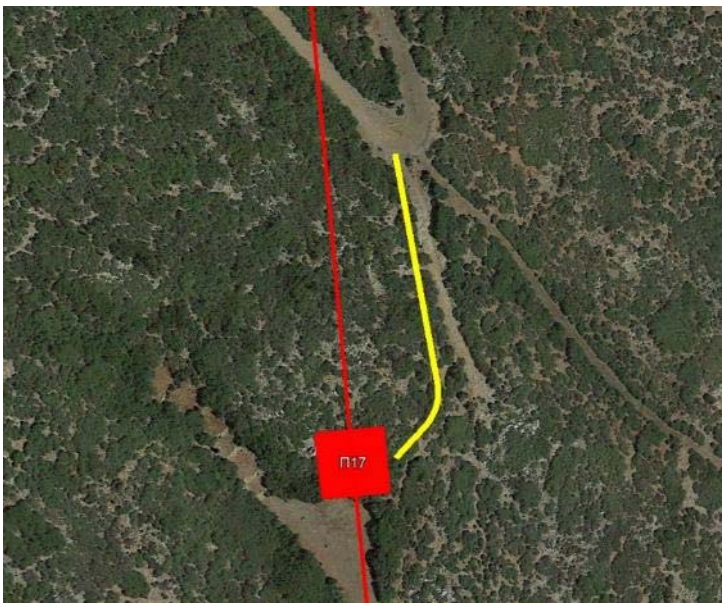
Road 14



The 14-length road, about 90m long, moves from its confluence with the existing dirt road in the south to the location of square 16, via a short course and relatively in altitude contact with the existing ground. Regarding its geometric characteristics, the longitudin gradients are mild. The morphology of the territory of the crossing is earthy and road width is set at 5m.

Figure 6.20: Road 14.

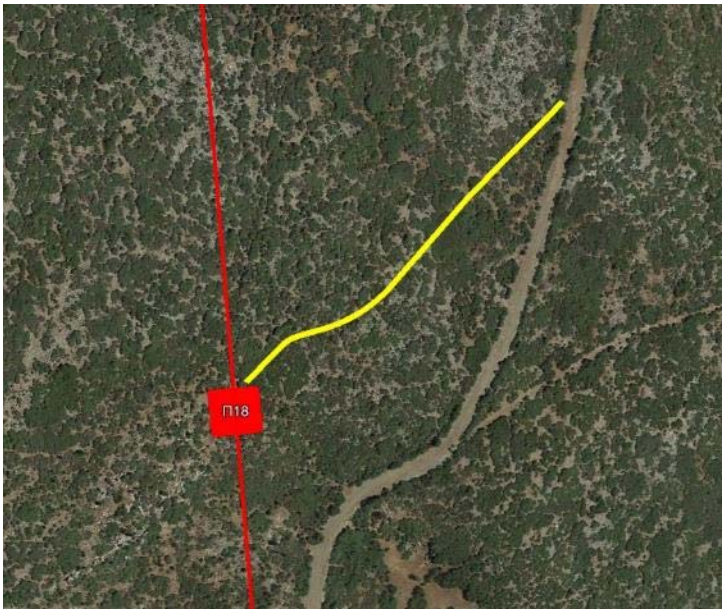
Road 15



The 15-length road, about 125m long, moves from its confluence with the existing dirt road at the northern end to the position of square 17, via a short course, generally in contact with the natural soil. Regarding its geometric characteristics, the longitudine gradients are mild and the morphology of the soil of the crossing is earthy and semi-rocky locally with moderate gradients. The width of the road is set at 5m.

Figure 6.21: Road 15.

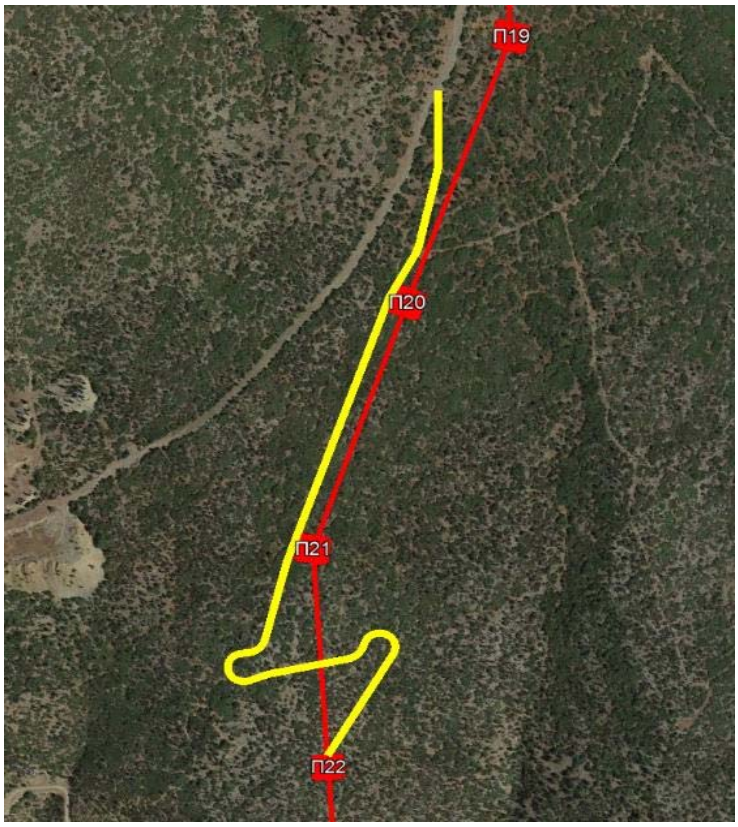
Road 16



The 16-length road, about 245m long, moves from its confluence with the existing dirt road at the eastern end, up to the position of square 18, via a short course, generally in contact with the natural soil. Regarding its geometric characteristics, the longitudine gradients are mild and the morphology of the soil of the crossing is earthy and semi-rocky locally with moderate gradients. The width of the road is set at 5m.

Figure 6.22: Road 16.

Road 17



The 17-length Road, about 960m long, is a new engraving that moves up to the position of square 22, passing through squares 20 and 21. It passes through soil with a strong relief (slopes >2 >0%). and a polygonal gradient of up to 12% is applied on the descent path to square 22. The morphology of the terrain of the crossing is rocky. The width of the road is set at 5m.

Figure 6.23: Road 17.

Road 18

The 18-metre-long road is an amendment to the existing engraving due to non-compliance of the road man oeuvre at this point with the minimum radius of curvature of 15m on maneuvering on category C forest roads. It moves in contact with the natural soil. Regarding its geometric characteristics, the longitudine gradients are mild and the morphology of the soil of the crossing is earthy and semi-rocky locally with moderate gradients. The width of the road is set at 5m.

Figure 6.24: Road 18.

Road 19

The 19-length Road, about 410m long, is a new engraving that moves up to the position of square 24. It passes through soil with a strong relief (>30%). Regarding its geometric characteristics, the longitudon gradients are particularly increased, up to 12% and generally the aim is to place the road in a cove in order to have as little exposure as possible to the slope of the natural soil., as shown on the sections width diagrams. The width of the road is set at 4m.

Figure 6.25: Road 19.

Road 20

The 20-length Road, about 265m long, moves on an existing rough engraving up to the location of square 27. It passes through soil with a strong relief (>40%). Regarding its geometric characteristics, the longitudin gradients are particularly increased, up to 12% and generally the aim is to place the road in a cove in order to spread the existing trace and avoid the creation of a soil that is poorly coherent. arrival in the square with the implementation of excavation upgrades of the pits, as shown on the diagrams across sections. The width of the road is set at 4m.

Figure 6.26: Road 20.

Road 21

The 21-length Road, about 610m long, moves around fenced space up to the position of square 28. It passes through soil with a strong relief (>40% up to 70% locally). Regarding its geometric characteristics, the longitudon gradients are particularly increased, up to 12% and generally the aim is to place the road in a cove in order to avoid the creation of a coating on soil showing the above gradients. The morphology of the transit ground is particularly rocky with local soil deposits and the need to pass around the installed site, creates the need for technical work at the transit site of the stream, which at its exit continues to the existing technical work. The need to support the road in many locations is highlighted by the implementation of excavation upgrades of the pits, as well as anchorage upgrades of the pits, as shown in the diagrams along sections. The width of the road is set at 4m.

Figure 6.27: Road 21.

Road 22

The 22-length Road, about 100m long, creates access to the position of square 29, passing through a ground with a strong relief (slopes >50%).

Figure 6.28: Road 22.

The morphology of the transit ground of route 22 is particularly rocky with local sudden flare-ups of rocky tumors. The need to support the road in many locations is highlighted by the implementation of excavation upgrades of the pits, as well as anchorage upgrades of the pits, as shown in the diagrams along sections. The width of the road is set at 4m.

Road 23

The 23-length Road, about 215m long, creates access to the location of square 30, starting from the position of square 31. It passes through a ground with a strong relief (slopes >30%). , as shown on the sections width diagrams. The width of the road is set at 4m.

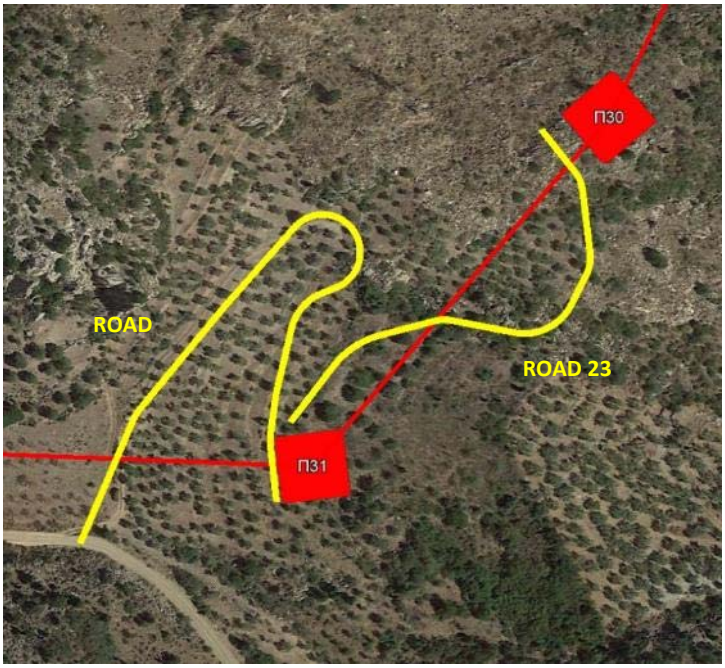
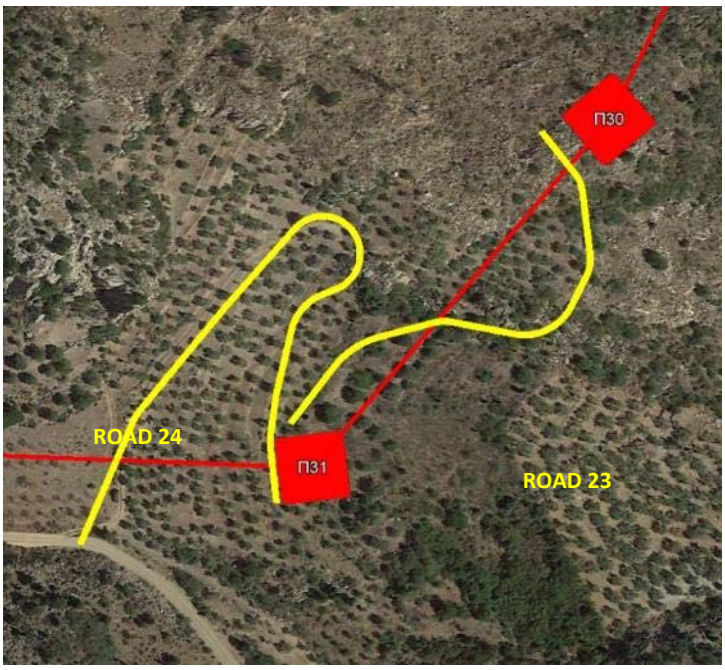


Figure 6.29: Roads 23 και 24.

Road 24



Road 24, about 305m long, creates access to the location of square 31, starting from the existing dirt road at its southern end. It passes through terrain with intense relief (slopes> 30%). Regarding its geometric characteristics, the longitudinal slopes are increased, equal to 12% in places and the placement of the road in a trench is generally sought, something that is achieved for most of the deck. The road width is set at 5m.

Figure 6.30: Roads 23 και 24.

Road 25

Road 25, about 105m long, creates access to the site of square 32, starting from the existing dirt road at its southern end. It passes through terrain with intense relief (slopes> 30%). Regarding its geometric characteristics, the longitudinal slopes are increased, equal to 11% in places and the placement of the road in a trench is generally sought, something that is achieved for most of the deck. The road width is set at 5m

Figure 6.31: Road 25.

Road 26

Road 26, about 190m long, is a new alignment that moves up to the location of square 33, passing through ground with intense relief (slopes> 50%). Regarding its geometric characteristics, the longitudinal slopes are moderate to increased and generally the placement of the road in a trench is sought in order to have as little exposure as possible to the above slopes. The width of the road is set at 5m

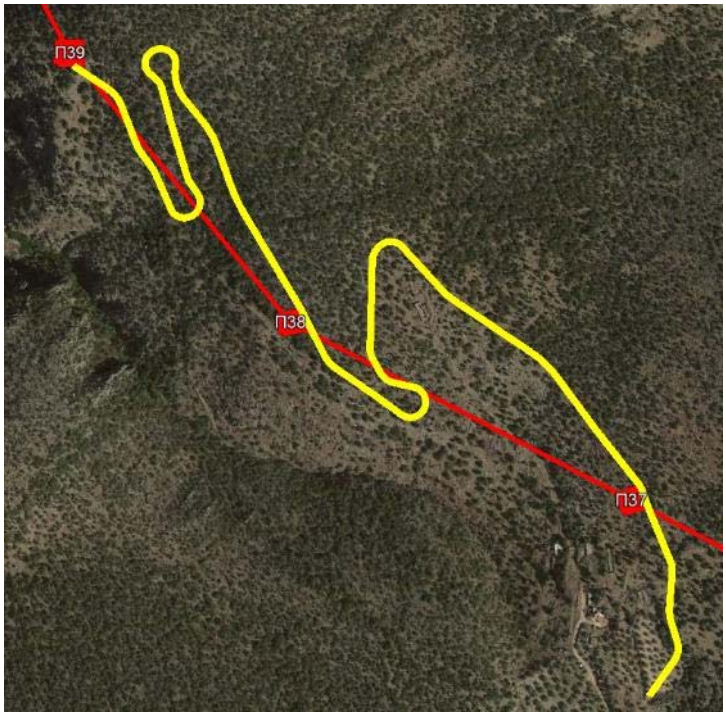
Figure 6.32: Road 26.

Road 27

Road 27, about 165m long, creates access to the location of square 36, starting from the existing dirt road at its southern end. It passes through terrain with intense relief (slopes> 30%). Regarding its geometric characteristics, the longitudinal slopes are increased, equal to 12% in places and the placement of the road in a trench is generally sought, something that is achieved for most of the deck. The width of the road is set at 5m

Figure 6.33: Road 27.

Road 28



The 28-length Road, about 1,675m long, is a new engraving that moves up to the position of square 39, passing through squares 37 and 38. It passes through a ground with a strong relief (slopes >40%). , as well as anchorage upgrades of the floors, as shown on the sections width diagrams. The width of the road is set at 5m.

Figure 6.34: Road 28.

Road 29

The 29th Road, about 270m long, creates access to the location of square 40, starting from the existing dirt road inside the alumina-aluminum factory of Mytilineos SA at its northern end. It passes through terrain with intense relief (slopes> 50%). Regarding its geometric characteristics, the longitudinal slopes are marginal, equal to 12% and generally the road is placed in a trench, in order to avoid the need to build an embankment on exposed large transverse slopes, which is achieved for most of the deck.

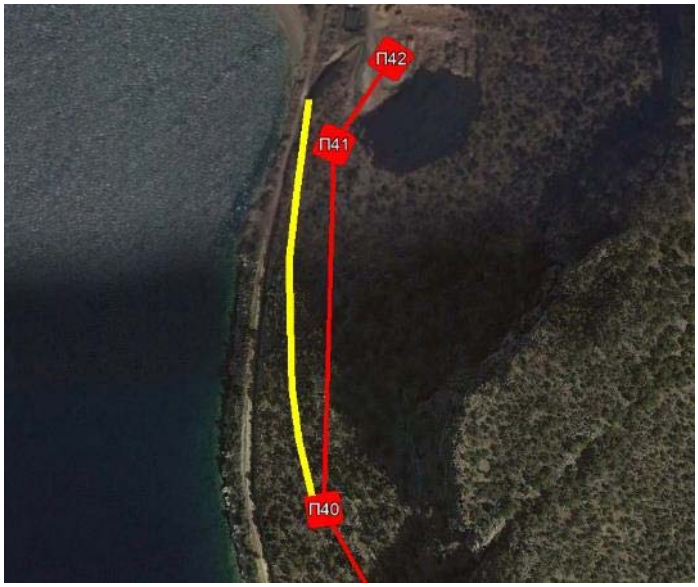


Figure 6.35: Road 29.

Approaching the end of the road 29, a widening of the road is created in order to be assembled with the landscaped ground, which will result from the construction of square 40. The width of the road is set at 4m

The following table shows the geographical coordinates of the road sections under study (beginning, middle and end), which are being used to meet the construction needs of the proposed project, namely the new 400kV High Voltage Transmission Line. The geographical coordinates of the new routes are given in the Greek Geodesic Reference System 1987 (GGRS ‘87) and the Global Geodesic System GGS ‘84.

Table 6.3: Coordinates of the road sections under study, in the Greek Geodesic Reference System 1987 (GGRS ‘87) and in the Global Geodesic System GGS ‘84.

ROADS	A/A	GGRS ΄87		GGS ΄84	
		X (m)	Y (m)	ϕ (°)	λ (°)
ROAD 1	beginning	384.970,7	4.254.466,9	38o 26΄ 1,23	22o 41΄ 1,57
	middle	385.008,9	4.254.499,8	38o 26΄ 2,31	22o 41΄ 3,13
	end	385.050,2	4.254.528,9	38o 26΄ 3,28	22o 41΄ 4,82
ROAD 2	beginning	385.071,6	4.254.077,0	38o 25΄ 48,63	22o 41΄ 5,96
	middle	385.076,7	4.254.107,2	38o 25΄ 49,61	22o 41΄ 6,16
	end	385.069,0	4.254.136,4	38o 25΄ 50,55	22o 41΄ 5,82
ROAD 3	beginning	385.184,5	4.253.522,6	38o 25΄ 30,70	22o 41΄ 10,95
	middle	385.196,8	4.253.767,5	38o 25΄ 38,65	22o 41΄ 11,31
	end	385.316,1	4.253.683,4	38o 25΄ 35,98	22o 41΄ 16,28
ROAD 4	beginning	385.508,8	4.253.274,1	38o 25΄ 22,79	22o 41΄ 24,46
	middle	385.450,7	4.253.260,2	38o 25΄ 22,31	22o 41΄ 22,08
	end	385.460,6	4.253.204,3	38o 25΄ 20,50	22o 41΄ 22,52
ROAD 5	beginning	385.487,5	4.252.955,8	38o 25΄ 12,45	22o 41΄ 23,77
	middle	385.568,3	4.252.935,3	38o 25΄ 11,83	22o 41΄ 27,11
	end	385.596,6	4.252.858,0	38o 25΄ 9,33	22o 41΄ 28,33
ROAD 6	beginning	385.685,9	4.252.347,5	38o 24΄ 52,81	22o 41΄ 32,31
	middle	385.755,0	4.252.377,6	38o 24΄ 53,82	22o 41΄ 35,14
	end	385.755,0	4.252.423,5	38o 24΄ 55,31	22o 41΄ 35,11
ROAD 7	beginning	385.702,2	4.252.334,6	38o 24΄ 52,40	22o 41΄ 32,99
	middle	385.625,5	4.252.261,7	38o 24΄ 50,00	22o 41΄ 29,87
	end	385.719,6	4.252.222,3	38o 24΄ 48,77	22o 41΄ 33,77
ROAD 8	beginning	385.447,7	4.251.818,2	38o 24΄ 35,54	22o 41΄ 22,80
	middle	385.568,2	4.251.842,3	38o 24΄ 36,38	22o 41΄ 27,75
	end	385.687,5	4.251.814,8	38o 24΄ 35,54	22o 41΄ 32,68
ROAD 9	beginning	385.443,5	4.251.821,3	38o 24΄ 35,64	22o 41΄ 22,62

ROADS	A/A	GGRS ΄87		GGS ΄84	
		X (m)	Y (m)	ϕ (°)	λ (°)
	middle	385.647,5	4.251.468,5	38ο 24΄ 24,29	22ο 41΄ 31,24
	end	385.692,2	4.251.242,6	38ο 24΄ 16,98	22ο 41΄ 33,21
ROAD 10	beginning	386.239,7	4.250.727,6	38ο 24΄ 0,53	22ο 41΄ 56,08
	middle	386.133,9	4.250.764,3	38ο 24΄ 1,67	22ο 41΄ 51,70
	end	386.040,7	4.250.827,7	38ο 24΄ 3,68	22ο 41΄ 47,82
ROAD 11	beginning	386.265,7	4.250.468,5	38ο 23΄ 52,14	22ο 41΄ 57,30
	middle	386.280,5	4.250.487,4	38ο 23΄ 52,76	22ο 41΄ 57,90
	end	386.295,9	4.250.506,9	38ο 23΄ 53,39	22ο 41΄ 58,52
ROAD 12	beginning	386.556,2	4.250.298,7	38ο 23΄ 46,76	22ο 42΄ 9,37
	middle	386.582,7	4.250.289,8	38ο 23΄ 46,48	22ο 42΄ 10,47
	end	386.601,4	4.250.269,5	38ο 23΄ 45,83	22ο 42΄ 11,25
ROAD 13	beginning	386.909,6	4.249.969,9	38ο 23΄ 36,26	22ο 42΄ 24,13
	middle	386.929,5	4.249.978,0	38ο 23΄ 36,53	22ο 42΄ 24,94
	end	386.942,1	4.249.995,1	38ο 23΄ 37,09	22ο 42΄ 25,45
ROAD 14	beginning	387.225,0	4.249.741,0	38ο 23΄ 28,97	22ο 42΄ 37,26
	middle	387.230,7	4.249.777,9	38ο 23΄ 30,17	22ο 42΄ 37,47
	end	387.193,5	4.249.803,0	38ο 23΄ 30,97	22ο 42΄ 35,93
ROAD 15	beginning	387.220,9	4.249.555,4	38ο 23΄ 22,95	22ο 42΄ 37,20
	middle	387.231,4	4.249.493,8	38ο 23΄ 20,96	22ο 42΄ 37,67
	end	387.219,7	4.249.437,4	38ο 23΄ 19,13	22ο 42΄ 37,22
ROAD 16	beginning	387.410,4	4.249.298,0	38ο 23΄ 14,69	22ο 42΄ 45,16
	middle	387.328,5	4.249.209,6	38ο 23΄ 11,79	22ο 42΄ 41,83
	end	387.233,7	4.249.138,2	38ο 23΄ 9,43	22ο 42΄ 37,97
ROAD 17	beginning	387.198,5	4.248.600,4	38ο 22ο 51,97	22ο 42΄ 36,83
	middle	387.064,7	4.248.146,7	38ο 22ο 37,19	22ο 42΄ 31,57
	end	387.093,7	4.247.921,6	38ο 22ο 29,90	22ο 42΄ 32,90
ROAD 18	beginning	386.990,7	4.247.664,1	38ο 22ο 21,50	22ο 42΄ 28,80
	middle	387.065,0	4.247.654,3	38ο 22ο 21,22	22ο 42΄ 31,87
	end	387.050,0	4.247.619,0	38ο 22ο 20,07	22ο 42΄ 31,27
ROAD 19	beginning	386.873,4	4.247.639,7	38ο 22ο 20,66	22ο 42΄ 23,98
	middle	387.028,4	4.247.509,5	38ο 22ο 16,51	22ο 42΄ 30,45
	end	387.148,3	4.247.452,5	38ο 22ο 14,71	22ο 42΄ 35,42
ROAD 20	beginning	387.714,1	4.246.476,4	38ο 21΄ 43,31	22ο 42΄ 59,29
	middle	387.645,8	4.246.376,3	38ο 21΄ 40,03	22ο 42΄ 56,53
	end	387.721,1	4.246.274,4	38ο 21΄ 36,76	22ο 42΄ 59,69
ROAD 21	beginning	387.801,2	4.246.012,1	38ο 21΄ 28,28	22ο 43΄ 3,14

ROADS	A/A	GGRS ΄87		GGS ΄84	
		X (m)	Y (m)	ϕ (°)	λ (°)
	middle	387.838,7	4.245.864,4	38ο 21΄ 23,51	22ο 43΄ 4,77
	end	387.650,9	4.245.675,7	38ο 21΄ 17,31	22ο 42΄ 57,14
ROAD 22	beginning	387.578,9	4.245.487,2	38ο 21΄ 11,16	22ο 42΄ 54,29
	middle	387.626,2	4.245.478,0	38ο 21΄ 10,88	22ο 42΄ 56,24
	end	387.668,5	4.245.456,9	38ο 21΄ 10,22	22ο 42΄ 57,99
ROAD 23	beginning	387.289,3	4.245.005,8	38ο 20΄ 55,41	22ο 42΄ 42,63
	middle	387.276,4	4.244.925,7	38ο 20΄ 52,81	22ο 42΄ 42,15
	end	387.187,6	4.244.891,0	38ο 20΄ 51,64	22ο 42΄ 38,51
ROAD 24	beginning	387.181,7	4.244.859,6	38ο 20΄ 50,62	22ο 42΄ 38,29
	middle	387.188,9	4.244.966,8	38ο 20΄ 54,10	22ο 42΄ 38,52
	end	387.103,2	4.244.844,3	38ο 20΄ 50,09	22ο 42΄ 35,06
ROAD 25	beginning	387.097,2	4.244.847,0	38ο 20΄ 50,18	22ο 42΄ 34,81
	middle	387.083,3	4.244.889,4	38ο 20΄ 51,54	22ο 42΄ 34,22
	end	387.031,6	4.244.880,7	38ο 20΄ 51,24	22ο 42΄ 32,09
ROAD 26	beginning	386.749,8	4.244.624,6	38ο 20΄ 42,80	22ο 42΄ 20,63
	middle	386.795,6	4.244.704,7	38ο 20΄ 45,42	22ο 42΄ 22,47
	end	386.839,0	4.244.786,6	38ο 20΄ 48,10	22ο 42΄ 24,21
ROAD 27	beginning	386.141,8	4.244.463,1	38ο 20΄ 37,29	22ο 41΄ 55,69
	middle	386.139,8	4.244.543,9	38ο 20΄ 39,91	22ο 41΄ 55,56
	end	386.126,0	4.244.623,0	38ο 20΄ 42,47	22ο 41΄ 54,94
ROAD 28	beginning	385.965,2	4.244.547,1	38ο 20΄ 39,93	22ο 41΄ 48,36
	middle	385.701,9	4.244.843,2	38ο 20΄ 49,42	22ο 41΄ 37,35
	end	385.410,2	4.245.180,5	38ο 21΄ 0,22	22ο 41΄ 25,13
ROAD 29	beginning	385.308,9	4.245.649,3	38ο 21΄ 15,38	22ο 41΄ 20,69
	middle	385.292,2	4.245.516,2	38ο 21΄ 11,06	22ο 41΄ 20,08
	end	385.303,5	4.245.383,2	38ο 21΄ 6,75	22ο 41΄ 20,62

6.2.2 Configuration of a cable systems development plot

For the connection needs of the new electric T.L. with the Agios Nikolaos HVC requires the development of a plot of cable systems, below the terminal pillar (P42) of T.L. electricity, of an area of 1,265m^2.

This plot provides for the construction of the necessary fencing, the installation of grounding and the construction of nine (9) outdoor suspension bases.

The following figure shows the boundary of the cable system development plot.

Figure 6.36: View of satellite imaging (google earth), indicating the boundary of the cable system development plot with its peaks.

The following table shows the geographical coordinates of the cable system development plot, in the Greek Geodesic Reference System 1987 (GGRS ‘87) and in the Global Geodesic System GGS ‘84.

Table 6.4: Coordinates of the tops of the cable systems development plot

A/A	GGRS ΄87		GGS ΄84	
	X (m)	Y (m)	ϕ (°)	λ (°)
A	385.335	4.245.655	38° 21΄ 15,59΄΄	22° 41΄ 21,76΄΄
B	385.360	4.245.691	38° 21΄ 16,76΄΄	22° 41΄ 22,77΄΄
C	385.384	4.245.675	38° 21΄ 16,24΄΄	22° 41΄ 23,76΄΄
D	385.358	4.245.639	38° 21΄ 15,08΄΄	22° 41΄ 22,71΄΄

6.2.3 Execution of work – addition of equipment to connect the development plot of cable systems with the HVS of Agios Nikolaos

In order to connect the development plot of the cable systems with the high voltage substation of Agios Nikolaos, the following tasks are required - addition of equipment:

- opening of underground channels for the underground transmission of high voltage cables from the Agios Nikolaos HVS up to the cable system development plot, total length of about 200m
- installation of High Voltage cable supports on the support wall of the new 826MW unit, total length of approximately 175m and
- installation and termination of a dual cable high voltage circuit, by Agios Nikolaos HVC up to the cable system development plot, total length of about 430m.

Particularly, the work on connecting the new line, located in the Agios Nikolaos HVS, since the relevant high voltage cable terminal bases (LV Sealing Ends) are already licensed and constructed include:

- Execution of civil engineering works for the construction of a high voltage underground cable channel for the purpose of driving a cable starting in front of the existing gate to Acheloos HVS and up to the boundaries of the HV 400kV – Agios Nikolaos HVS, as shown in Figure 6.37, with orange shading (points A-B).
- Installation of Metal Structures supporting HV cable terminals in front of the existing gate to Acheloos HVS at positions R01, S01 & T01 for the connection of the 2nd HV cable system to serve HV 400kV Agios Nikolaos HVS - Distomo HVS, Series 7 Towers, simple circuit of tridym conductors per phase (B'B'B'/400).
- Installation of the 2 three-phase cable HV systems (indicative type 2XS(FL)2Y 1x1600 RMS/120 230/400kV) for the connection of the Agios Nikolaos HVS with HV 400kV Agios Nikolaos HVS - Distomo HVS and completion of this route to the neighboring plot of cable system development below the terminal pillar of the line near Agios Nikolaos HVC.
- Termination of the edges of the above cable systems HV R01, S01, T01 & R02, S02, T02.
- Installation of plates and sealing of HV cable channel.
- Electrical cable terminal connection with GIS terminals, according to design.
- Modify relevant HV line protection settings in accordance with the new conditions.

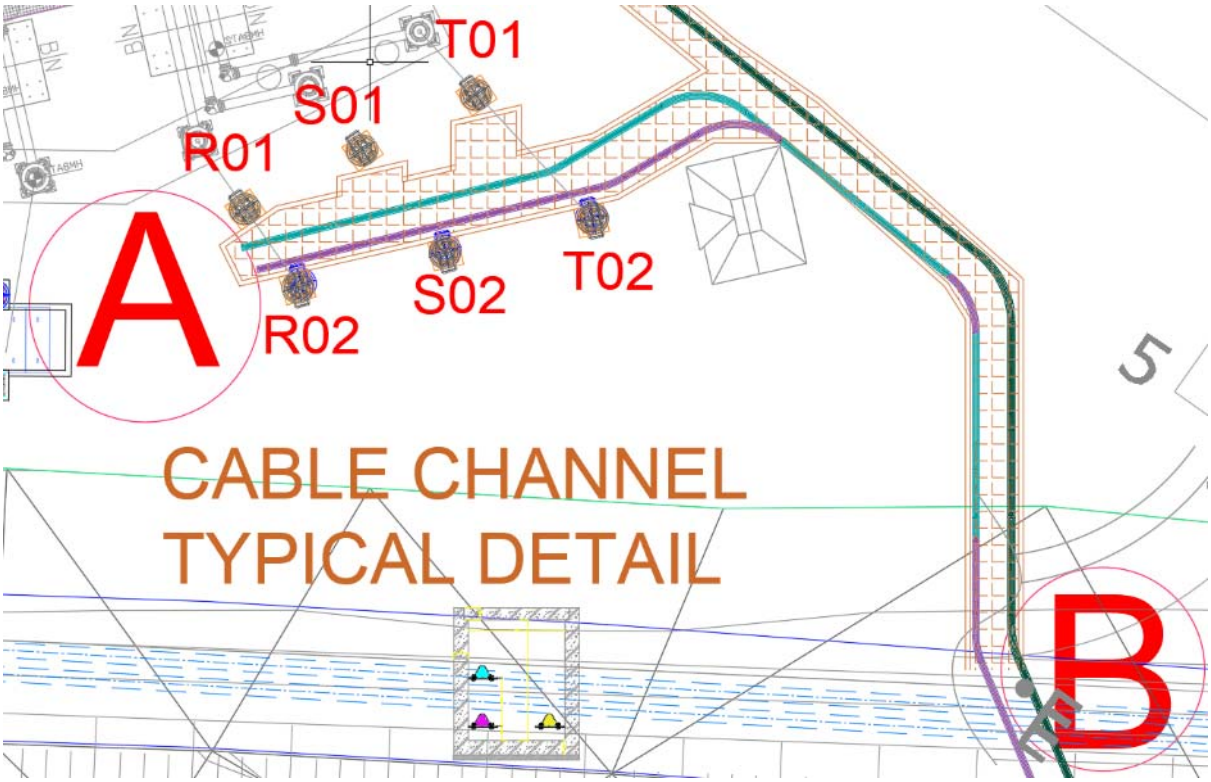


Figure 6.37: Development of Cable Interface Agios Nikolaos HVC with HV 400kV Series Towers 7.

The work carried out by the Agios Nikolaos HVS up to the cable system development plot include:

- Strengthening the existing metal cable/pipe bridge and connecting to the above mentioned cable channel, so that it is possible to suspension of both three-phase cable systems HV (indicative type 2XS(FL)2Y 1x1600 RMS/120 230/400kV). (Figure 6.38, points B & C).
- Installation of HV cable supports on the perimeter wall of reinforced concrete, which is used as the support wall of the new 826MW Station. The 2 three-phase cable systems will be routed along the entire above-ground length of the support wall, as shown in Figure 6.39 (points C-D-E & Z).
- Execution of civil engineering works for the construction of a high voltage underground cable channel for the purpose of using a cable from the retaining wall to below the terminal pylon of the line near Agios Nikolaos HVC, as shown in blue shading in Figure 6.40 (points G & H).
- Installation of Metal Support Structures of six (6) TH cable terminals (LV Sealing Ends) and three (3) 400kV (Surge Arresters).
- Installation of the 2 three-phase cable HV systems (indicative type 2XS(FL)2Y 1x1600 RMS/120 230/400kV) for the connection of the Agios Nikolaos HVS with HV 400kV Agios Nikolaos HVS - Distomo HVS and completion of these route from a plot of cable system development below the terminal pillar of the line to Agios Nikolaos HVS.

- Electrical cable terminal connection with HV 400kV Agios Nikolaos HVS - Distomo HVS, Series 7 Towers, simple three-way pipeline circuit per phase (B'B'B'/400), according to design.

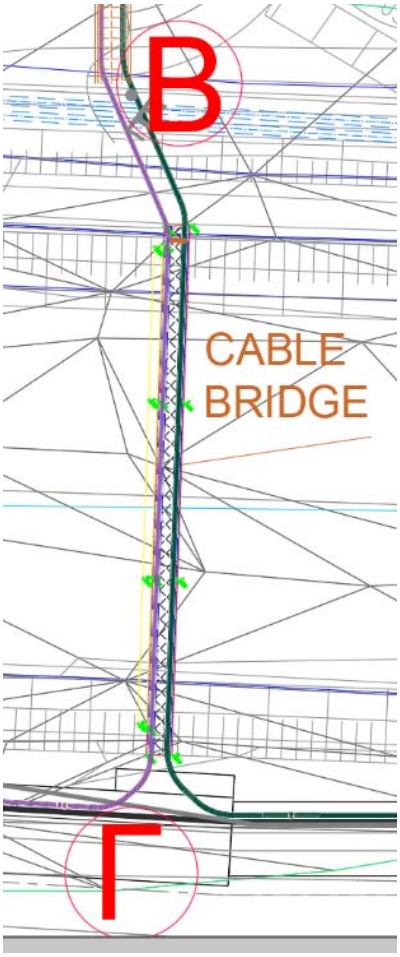


Figure 6.38: Cable systems on board the existing metal cable/pipe bridge.

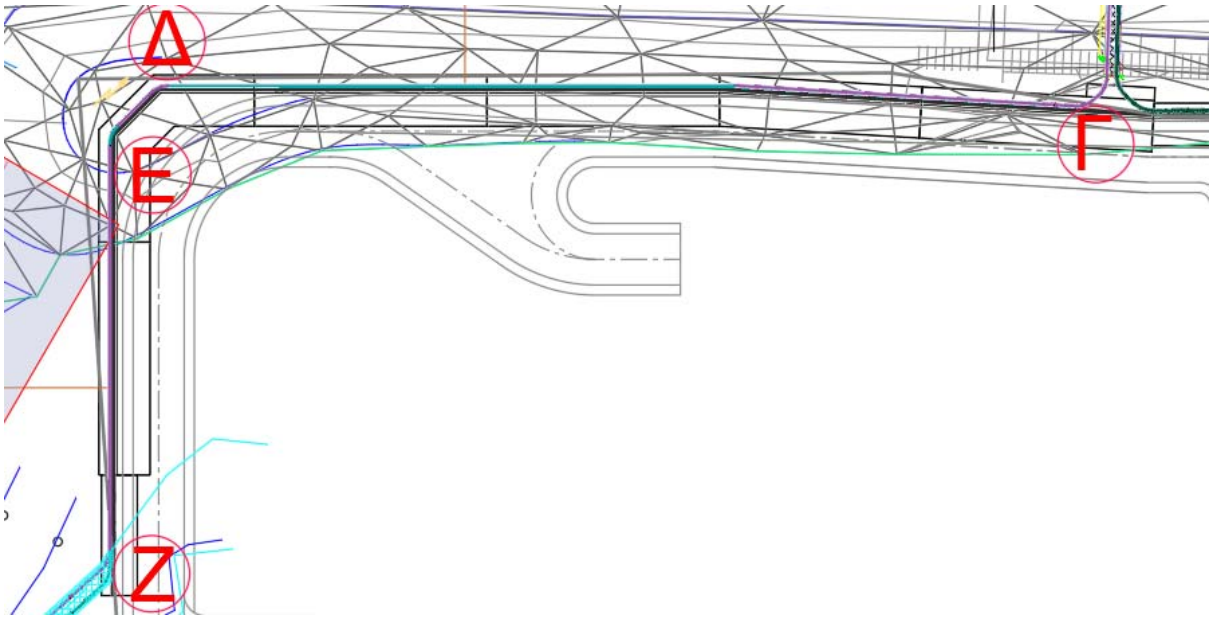


Figure 6.39: Cable systems on the support walls of the new Station 826MW.

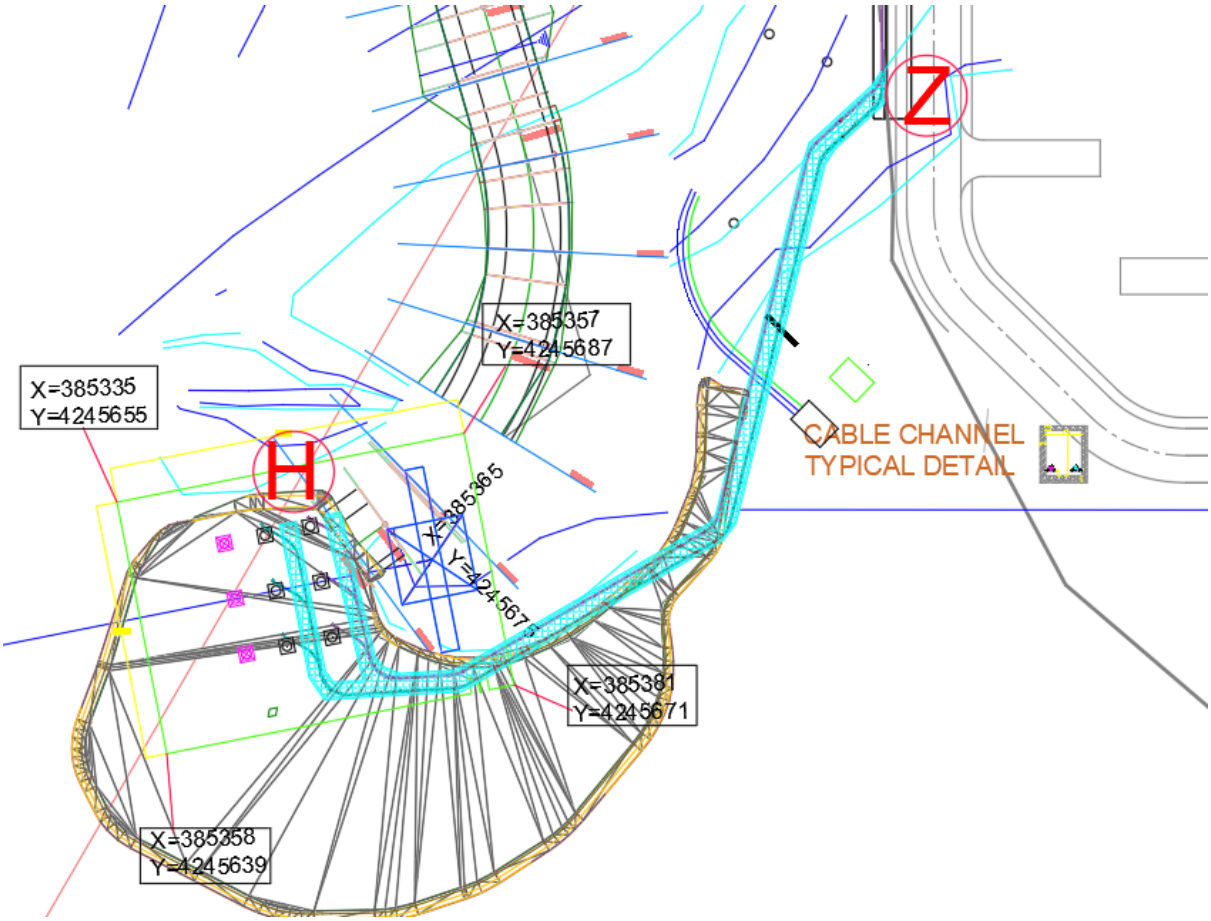


Figure 6.40: HV underground cable channel from the support wall to below the terminal pylon.

The overall design of work and activities for the construction of the second HV 400kV simple triple conductor circuit per phase (B'B'B'/400) near HVC Ag. Nicholas you present in the following Figure 6.42.

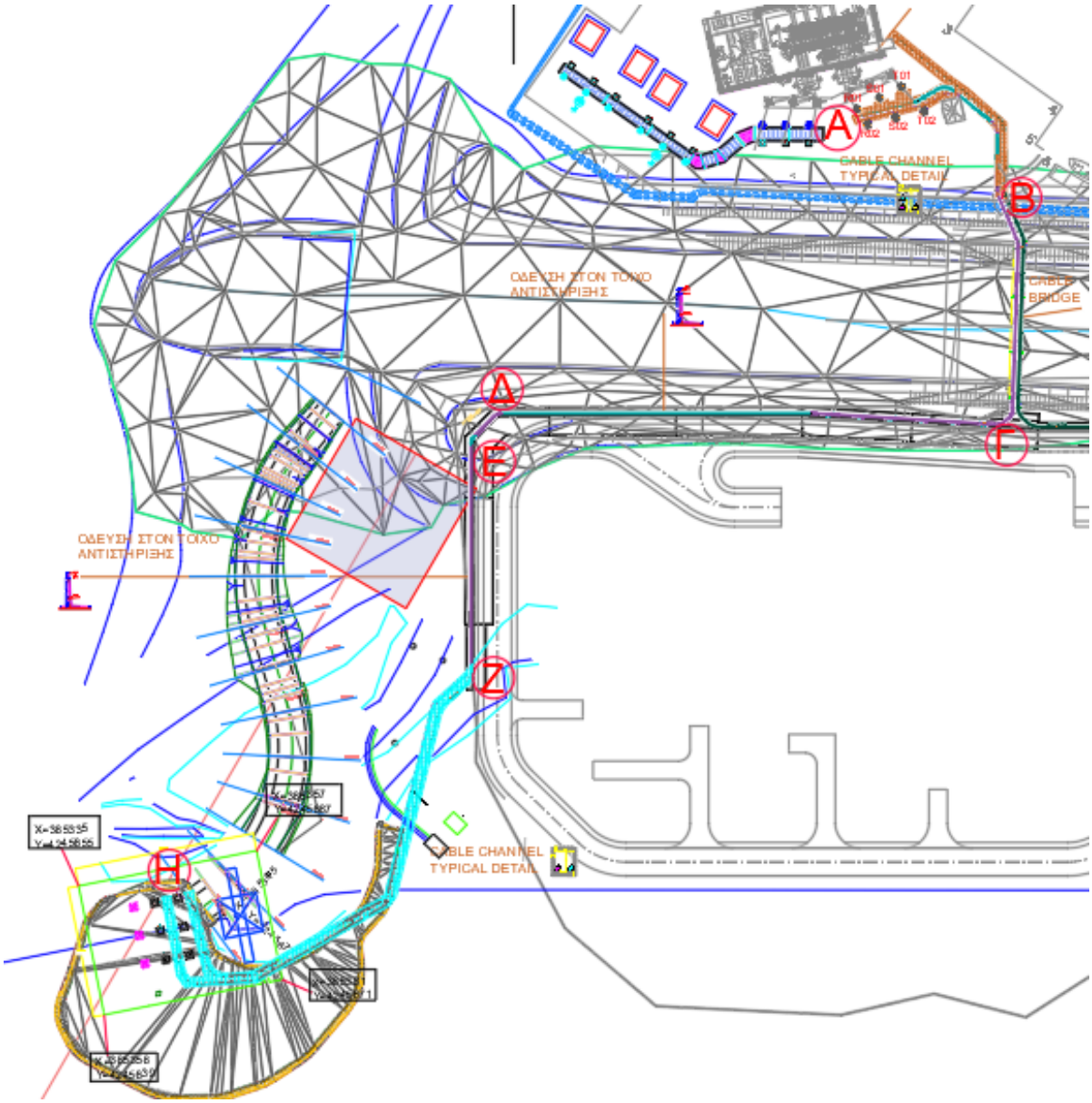


Figure 6.41: Cable Interconnection Agios Nikolaos HVC with HV 400kV Series Towers 7.

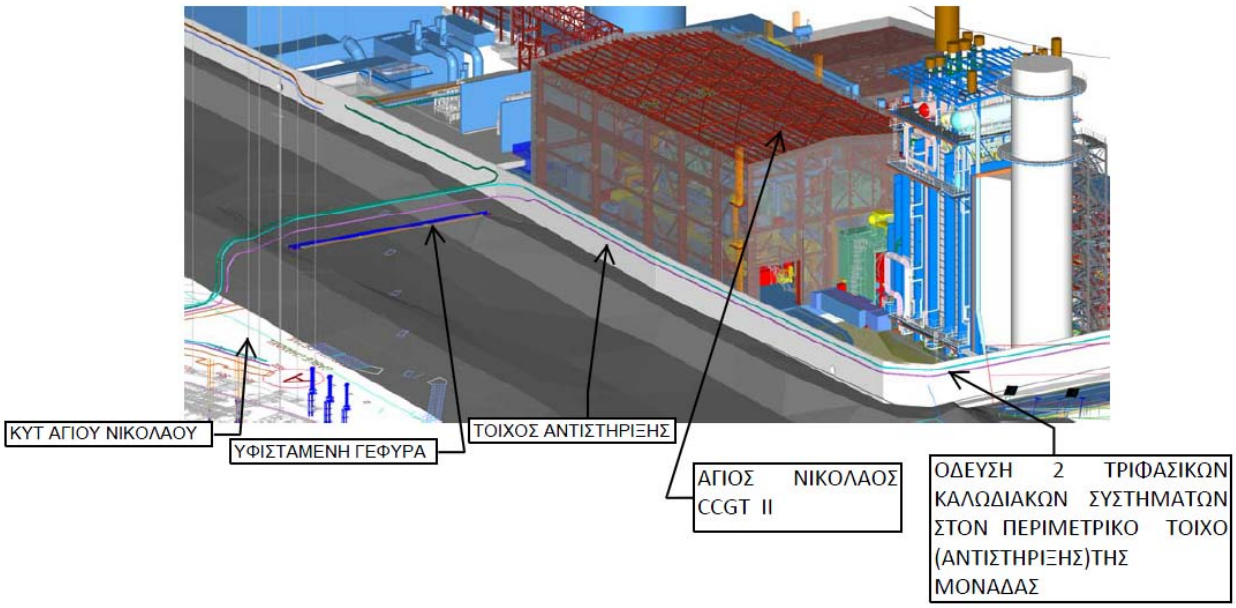


Figure 6.42: 3D illustration of the road of the 2 three-phase HV cable systems near the new unit.

6.2.4 Connection of the new electricity transmission line to the Distomo HVS

For the interconnection of the new T.L. 400kV with the Distomo HVS, equipment is provided which will be installed within the licensed, with the No. 5119/149.08.2009 decision of environmental terms approval, and in operation Distomo HVS, without extending it to a neighboring stadium, while the relevant terminal scaffolding lines are already licensed and constructed. The development of the two (2) complete gateways with the necessary equipment for the 400kV T.L. interconnection within the Distomo HVS is referred to the already submitted permit of approval of environmental terms Renewal Folder No 143072/04.08.2009 HVC 400/150kV Distomo . All the work is included in the Environmental impact assessment submitted (October 2020) concerning the diversion of the existing Electricity Transmission Line, in particular section 6.2.4.

Therefore, for the connection of the new electricity transmission line - licensed by this environmental impact assessment - to the Distomo HVC, it is necessary to connect the terminal pillar to the available gate and in particular to the corresponding terminal.

6.3 DESCRIPTION OF PROJECT'S INDIVIDUAL DATA

6.3.1 Road and infrastructure links

Access to the project under study is via the existing paved road network, but also through the adjacent dirt roads. In order to meet the construction needs of the new section of the transmission line, a new forest road, with a total length of about 8,700m, is required, as detailed in section 6.2.1.

6.3.2 Parking Spaces

The project under study does not create the need for parking spaces.

6.3.3 Overall assessment of the surface area of the soil occupied

The projects proposed by this Environmental impact assessment concern the following:

- the construction of forty-two (42) new towers (pylons), of which thirty-one (31) squares will have dimensions of 25m×25m=625m^2 and eleven (11) squares will be formed with dimensions of 20m×20m=400^{m2}. Therefore, the total area of occupation of the squares amounts to 23,775m^2 (11×400m^2 + 31×625m^2).
- the development plot of the cable systems, below the terminal pylon (P42) of electric T.L. , area 1,265m^2.
- opening of a new forest road - to serve the construction needs of the new transmission line - with a total length of about 8,700m. The area of occupation of the new roads, as documented in the following table, amounts to approximately 72,125m^2.

Table 6.5: Area of occupation of each road section to be opened.

ROAD	Length (m)	STOCK PLATE (m)	CONSTRUCTION (m^2)
ROAD 1	105.00	5.00	671.00
ROAD 2	65.00	5.00	376.00
ROAD 3	510.00	5.00	3,710.00
ROAD 4	135.00	4.00	813.00
ROAD 5	180.00	4.00	919.00
ROAD 6	145.00	4.00	687.00
ROAD 7	220.00	4.00	1,549.00
ROAD 8	250.00	4.00	1,622.00
ROAD 9	820.00	5.00	6,825.00
ROAD 10	225.00	5.00	2,297.00
ROAD 11	50.00	5.00	325.00

ROAD	Length (m)	STOCK PLATE (m)	CONSTRUCTION (m^2)
ROAD 12	60.00	5.00	338.00
ROAD 13	45.00	5.00	249.00
ROAD 14	90.00	5.00	542.00
ROAD 15	125.00	5.00	954.00
ROAD 16	245.00	5.00	1,984.00
ROAD 17	960.00	5.00	7,595.00
ROAD 18	160.00	5.00	1,457.00
ROAD 19	410.00	4.00	3,691.00
ROAD 20	265.00	4.00	2,467.00
ROAD 21	610.00	4.00	5,316.00
ROAD 22	100.00	4.00	1,442.00
ROAD 23	215.00	4.00	2,057.00
ROAD 24	305.00	5.00	2,725.00
ROAD 25	105.00	5.00	749.00
ROAD 26	190.00	5.00	1,500.00
ROAD 27	165.00	5.00	easement 1,050.00
ROAD 28	1,675.00	5.00	15,987.00
ROAD 29	270.00	4.00	2,228.00
total	**8,700.00**	**-**	**72,125.00**

According to the above**, the proposed projects will occupy an area of**: 23,775m^2 + 1,265m^2 + 72,125m^2 = **97,165m^2.**

The new section of the 400kV Power Transmission Line will require an easement zone of 50m (25m on either side of the line at the intervention points) and a total area of 695,115m^2, as shown in the plan attached to this study, as well as in the Google Earth extract below.

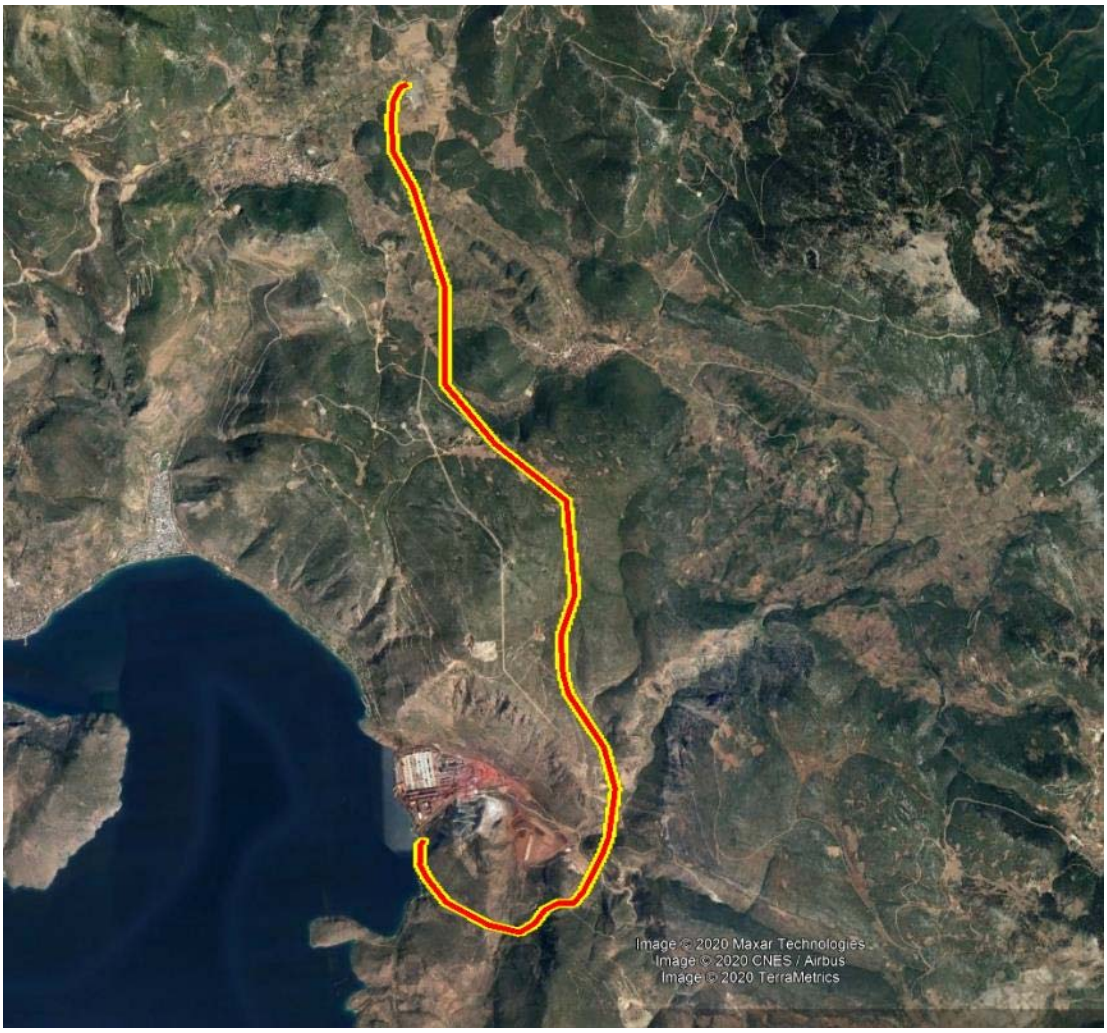


Figure 6.43: Google Earth, showing the proposed high-voltage transmission line with a red line and a yellow polygon the easement zone.

In the table below, the geographical coordinates of the peaks of the easement zone of the new transmission line are presented in the Greek Geodesic Reference System 1987 (GGRS ‘87)

Table 6.6: Coordinates of the easement zone of the new electricity transmission line, in the Greek Geodesic Reference System 1987 (GGRS ‘87).

A/A	GGRS ΄87	
	X (m)	Y (m)
Δ1	385.273,59	4.254.984,16
Δ2	385.288,26	4.254.937,15
Δ3	385.206,29	4.254.908,59
Δ4	385.124,17	4.254.758,31
Δ5	385.094,64	4.254.527,99
Δ6	385.112,19	4.254.136,77
Δ7	385.352,53	4.253.686,15

A/A	GGRS ΄87	
	X (m)	Y (m)
Δ8	385.493,15	4.253.229,10
Δ9	385.601,95	4.252.875,46
Δ10	385.735,75	4.252.440,57
Δ11	385.732,10	4.252.207,71
Δ12	385.725,98	4.251.817,73
Δ13	385.717,33	4.251.266,32
Δ14	386.054,92	4.250.857,61
Δ15	386.322,58	4.250.533,55
Δ16	386.628,87	4.250.283,36
Δ17	386.946,40	4.250.023,99
Δ18	387.197,83	4.249.818,61
Δ19	387.227,91	4.249.437,71
Δ20	387.252,71	4.249.123,69
Δ21	387.289,78	4.248.654,18
Δ22	387.194,83	4.248.385,14
Δ23	387.108,23	4.248.139,79
Δ24	387.119,06	4.247.909,94
Δ25	387129,75	4247684,47
Δ26	387.189,07	4.247.453,47
Δ27	387.620,73	4.246.787,38
Δ28	387.755,57	4.246.269,84
Δ29	387.663,90	4.245.666,37
Δ30	387.590,79	4.245.481,44
Δ31	387.337,07	4.244.995,91
Δ32	387.207,04	4.244.847,82
Δ33	387.020,91	4.244.857,63
Δ34	386.860,20	4.244.779,46
Δ35	386.732,71	4.244.616,12
Δ36	386.533,52	4.244.500,88
Δ37	386.133,61	4.244.604,14
Δ38	385.615,04	4.244.889,05
Δ39	385.385,06	4.245.180,60
Δ40	385.285,70	4.245.367,98
Δ41	385.300,38	4.245.627,05
Δ42	385.344,61	4.245.689,46
Δ43	385.385,40	4.245.660,55
Δ44	385.349,49	4.245.609,87
Δ45	385.336,41	4.245.379,08
Δ46	385.427,11	4.245.208,01
Δ47	385.648,01	4.244.927,98
Δ48	386.152,19	4.244.650,98

A/A	GGRS ΄87	
	X (m)	Y (m)
Δ49	386.526,20	4.244.554,41
Δ50	386.699,27	4.244.654,54
Δ51	386.827,92	4.244.819,36
Δ52	387.010,65	4.244.908,24
Δ53	387.185,46	4.244.899,02
Δ54	387.295,54	4.245.024,39
Δ55	387.545,26	4.245.502,26
Δ56	387.615,32	4.245.679,48
Δ57	387.704,59	4.246.267,19
Δ58	387.574,38	4.246.766,96
Δ59	387.143,05	4.247.432,53
Δ60	387080,05	4247676,98
Δ61	387.069,11	4.247.907,58
Δ62	387.057,83	4.248.147,21
Δ63	387.147,68	4.248.401,78
Δ64	387.239,10	4.248.660,82
Δ65	387.202,86	4.249.119,75
Δ66	387.178,06	4.249.433,77
Δ67	387.149,67	4.249.793,39
Δ68	386.914,77	4.249.985,27
Δ69	386.597,24	4.250.244,64
Δ70	386.287,16	4.250.497,93
Δ71	386.016,37	4.250.825,77
Δ72	385.667,05	4.251.248,68
Δ73	385.675,99	4.251.818,52
Δ74	385.682,11	4.252.208,50
Δ75	385.685,63	4.252.433,43
Δ76	385.554,16	4.252.860,75
Δ77	385.445,36	4.253.214,40
Δ78	385.306,15	4.253.666,85
Δ79	385.062,75	4.254.123,23
Δ80	385.044,50	4.254.530,06
Δ81	385.075,78	4.254.774,01
Δ82	385.171,65	4.254.949,47
Δ83	385.271,81	4.254.984,36

6.4 CONSTRUCTION PHASE

6.4.1 Planning and timing of individual works and construction stages

According to the project plan, the work on the implementation of the project under study is estimated to be carried out gradually within eighteen (18) months.

6.4.2 Individual technical works of the main project

The work of the complete construction of the new towers includes, but is not limited to:

- The construction of access roads to the locations of the towers where necessary and the maintenance of these during the project.
- The configuration of the ground in the area of the tower.
- Verification of the strands of the towers provided for in the study.
- Excavation, drilling, armament and concrete construction of the foundations.
- The transport of steel of bases (strands), logs and binder to the place of work.
- Storage, sorting and distribution of steel in the locations of towers.
- The assembly and installation of the base legs for which adjustment and horizontalization should be checked.
- The erection of the extensions and logs of the towers.
- The final arrangement of the soil around the strands as well as the painting of the strands where required with special material described in the issue of the Technical Specifications for the anti-s moth protection of the strands.

Ground pipeline installation work includes, but is not limited to:

- Measuring the resistances of all new towers after the construction of the bases and before the wirework.
- Excavation in earthy or rocky soils and in depth specified in the Technical Specifications.
- The placement of the ground duct.
- The re-construction of the excavation and the connection of the pipeline to the tower.
- The installation of appropriate links, where the autonomous length of the ground pipeline is not sufficient.

The wirework includes, but is not limited to:

- The transport of all the materials necessary for full wirework (insulators, ducts, micro materials) to the construction site.
- The placement of all the required materials in the project.
- The assembly and installation of insulator chains, rolling pulleys, wire ropes drivers for the traction of phase and protection pipelines (OPGW and OPGW), any arrangement, construction or project required for the roll-out of pipelines over highways, roads, buildings, railways, telephone or electrical lines (Distribution or Transport), bridges, rivers, etc.
- The adjustment and tethering (terminal or suspension as appropriate) of the ducts.
- Installation of tower components that may not have been installed (tension chain lengthening, tension chain removal beams, etc.), installation of bridges in tension towers.
- The clearance of the tower site and the transit easement zone, the final inspection of the Transmission Line, in general all relevant work and services required for the full integration of the T.L.

6.4.3 Supporting construction facilities such as loan rooms, storage rooms and construction sites

The operation of the project will not require supporting facilities, such as loan and storage cubices.

With regard to the loans materials that will be required for the construction needs of the proposed project, they will be procured from legally operated quarries in the area.

From the construction of the proposed project, i.e. from the configuration of the squares for the installation of the pillars, from the opening of the new forest road, but also from the work on the foundation of the pillars, earthworks, i.e. excavations and earthworks, are provided, which are detailed in the table below.

Table 6.7: Table of earthworks of proposed projects.

WORK TYPE	EXPENDITURE (m^3)	BUSINESS (m^3)	EXCESS (m^3)
Π1	0	0	0
Π2	35	20	15
Π3	234	60	174
Π4	298	81	217
Π5	908	59	849
Π6	92	63	29
Π7	122	112	10

WORK TYPE	EXPENDITURE (m^3)	BUSINESS (m^3)	EXCESS (m^3)
П8	203	227	-24
П9	355	13	342
П10	327	163	164
П11	823	416	407
П12	1.238	10	1.228
П13	246	31	215
П14	135	114	21
П15	190	166	24
П16	140	153	-13
П17	250	215	35
П18	247	33	214
П19	213	215	-2
П20	450	113	337
П21	663	110	553
П22	225	196	29
П23	301	13	288
П24	604	557	47
П25	203	268	-65
П26	587	79	508
П27	1.740	57	1.683
П28	686	33	653
П29	238	283	-45
П30	2.589	0	2.589
П31	535	46	489
П32	410	120	290
П33	660	147	513
П34	1.884	0	1.884
П35	808	62	746
П36	471	26	445
П37	368	62	306
П38	408	65	343
П39	807	53	754
П40	884	17	867
П41	517	52	465
П42	6	156	-150
ROAD 1	305	149	156

WORK TYPE	EXPENDITURE (m^3)	BUSINESS (m^3)	EXCESS (m^3)
ROAD 2	310	15	295
ROAD 3	2.746	1.006	1.740
ROAD 4	546	96	450
ROAD 5	162	140	22
ROAD 6	305	38	267
ROAD 7	729	287	442
ROAD 8	730	479	251
ROAD 9	5.757	1.539	4.218
ROAD 10	3.293	372	2.921
ROAD 11	345	9	336
ROAD 12	131	49	82
ROAD 13	148	7	141
ROAD 14	253	73	180
ROAD 15	592	119	473
ROAD 16	1.328	249	1.079
ROAD 17	7.772	1.236	6.536
ROAD 18	1.708	69	1.639
ROAD 19	3.548	1.557	1.991
ROAD 20	3.315	362	2.953
ROAD 21	9.875	1.499	8.376
ROAD 22	1.578	2.245	-667
ROAD 23	1.667	670	997
ROAD 24	2.500	561	1.939
ROAD 25	347	101	246
ROAD 26	2.147	80	2.067
ROAD 27	513	133	380
ROAD 28	28.672	3.346	25.326
ROAD 29	6.212	58	6.154
PYLON THEMEDS	336	0	336
total	**109.970**	**21.210**	**88.760**

According to the above table, excavations amounting to 109.970m^3 are required from the construction work of the proposed projects, of which 21.210m^3 will be used for the necessary excavations. Therefore, the excess of the excavation products to be managed amounts to 88.760m^3.

Surplus materials resulting from the construction phase, which cannot be used in re-operation operations, will be deposited in an environmentally licensed repository or in landfills or in areas where other projects are carried out, which have approved environmental conditions and in which such materials can be used either in inactive quarries or through alternative management systems.

In any case, account must be taken of the legislation in force, namely 36259/1757/E103/2010 "Measures, conditions and programmes for the alternative management of waste from excavations, constructions and demolitions (waste from excavations, construction and demolition)" (Government Gazette 1312 B' 2010), as amended and in force.

For the construction needs of the project and due to its nature, since it is developed linearly, the location of a construction site will not be required. The machinery required for the construction of the project will come daily to the area and will not require the construction of construction facilities, i.e. offices, warehouses of materials, workshops, storage areas of machinery, concrete production complexes, etc. The storage of the machines will take place within the installation site of the Agios Nikolaos HVC or the adjacent Power Stations of MYTILINEOS S.A. / Electrical & Natural Gas Business Sector.

The mechanical equipment required for the construction of the proposed projects is limited to the classical machinery for the construction of technical works such as:

- excavator - JCB: for the excavation needs that will take place.
- trucks: for the transport of the necessary raw materials in the project area, but also for the transport of excavation materials.
- concrete transport trucks (barrels): for the construction needs of the foundation projects.
- loader: for loading needs in trucks and unloaded from trucks, bulky and heavy-weight materials.
- small loader (devil): for loading needs in trucks and unloaded from trucks.
- vibratory plate: for condensation needs during the construction of the project.
- special cranes on an appropriate vehicle: for the construction needs of the pillars.
- conductor's winch: for the integration of the transmission line.

In case a permanent construction installation is required, before the start of construction, it will be submitted to the competent environmental authority, Technical Environmental Study (T.E.S.) in accordance

with the requirements of para. Article 7 of Law 4014/2011, with a view to the approval of the construction site.

6.4.4 Necessary Construction Materials

For the construction of the air transport line the main materials planned to be used and the supply of which will be carried out by legally operating companies, are:

- Foundation concrete.
- Steel parts of towers and tissues.
- Pipelines for the wiring of (T.L.), which include cable of aluminum wires on the outer layers and plated steel wires in the center Floors .
- Insulators, made of porcelain, glass or synthetic materials.

Any loan materials that will be required for the construction needs of the proposed project (sand, gravel, etc.), these will be obtained from legally operated quarries in the area.

6.4.5 Liquid waste outflows

In the construction phase of the projects under study, it is envisaged to produce the usual liquid waste produced in construction projects, taking into account that the pillars consist of pre-fabricated parts, which are not manufactured in the project area.

Chemical toilets will be installed for the collection of urban wastewater, which will be produced by the staff working on the construction of the projects. Considering a construction site of 10 persons, a sewage supply equal to: 50 l/ person/ day x 10 persons = 500 l/ day or 0.5 m^3/day.

The waste water collected will be made available by means of specialized tankers at the nearest, in-service Wastewater Treatment Facility. Used Waste Oils (UWO) resulting from construction machinery and equipment will be collected and stored in a temporary waste water storage area until they are delivery to approved lubricating oil waste collectors. In the construction area there is no provision for washing or maintenance of the construction machinery, as it will be done either in specialized workshops.

6.4.6 Surplus or waste materials or solid waste

As detailed in section 6.4.3 from the construction of the proposed project, i.e. from the configuration of the squares for the installation of the pillars, from the opening of the new forest road and from the construction work of the pillars, earthworks are planned, i.e. excavations and earthworks.

Excavations amounting to 109.970m^3 are required from the construction work of the proposed projects, of which 21.210m^3 will be used for the necessary excavations. Therefore, the excess of the excavation products to be managed amounts to **88.760m^3.**

Surplus materials resulting from the construction phase, which cannot be used in re-operation operations, will be deposited in an environmentally licensed repository or in landfills or in areas where other projects are carried out, which have approved environmental conditions and in which such materials can be used either in inactive quarries or through alternative management systems.

In any case, account must be taken of the legislation in force, namely ministerial decision 36259/1757/E103/2010 "Measures, conditions and programmes for the alternative management of waste from excavations, constructions and demolitions (waste from excavations, construction and demolition)" (Government Gazette 1312 B' 2010), as amended and in force.

In addition, it is expected that small quantities of solid waste, of household waste type, will be produced by the personnel working on the site during the construction phase of the project. This waste will be collected and disposed of in the bins of the area's municipal waste collection system.

Other waste that may be produced in the construction phase of the projects, such as damaged spare parts or materials from mobile equipment (for example tyres, rubber or metal pipes, etc.), will be delivered - returned to suppliers.

Finally, waste such as: mineral oils, petroleum lubricants, oil tankers, spare parts for machinery, batteries - accumulators of cars, trucks, car consumables, trucks, such as pads, oil filters, air filters, etc., will be collected in suitable watertight containers and removed by authorized management companies.

6.4.7 Emissions of pollutants into the air

During the construction phase of the project, small-scale emissions of gaseous pollutants are expected to occur in the immediate area, mainly including emissions of particulate matter (dust) during earthworks and exhaust emissions from the operation of excavating and construction machinery, etc.

Emissions of particulate matter.

The dust emission will come from excavations and work on the construction of new buildings, the use of cement, sand and other fine-grained aggregates. Dust is also created by the movement of vehicles on the construction site on non-paved surfaces, as well as by the loading and unloading of materials.

Emissions of particulate matter are not expected to affect concentration limit values in the atmosphere, according to JMD 14122/549/E.103/2011 (Government Gazette 488/B'/30-03-2011), as it will be small-scale taking into account that:

- Appropriate prevention and control measures (for example wetting, covering piles) will be taken, which minimize dust emission.
- All work to be carried out will be limited spatially within the extension of the installation site.
- The earthworks are carried out piecemeal during the construction phase and will last for a limited period of time.

Project machinery exhaust emissions

The quality of the exhaust gases emitted depends on the type of engine, its size, the condition of the machinery and vehicles and their operating conditions. The construction vehicles and machinery to be used are expected to be diesel-powered and depending on their category will meet the statutory exhaust emission limits, in accordance with JMD D13/0/121/2007 (Government Gazette 53/B'/24-01-2007). The expected exhaust emissions during construction work are not expected to be high due to the fragmentary use and limited duration of the construction phase and therefore the limit values for the concentration of pollutants in the atmosphere are not expected to be exceeded in accordance with JMD 14122/549/E.103/2011 (Government Gazette 488/B'/30-03-2011) and JMD 22306/1075/E.103/2007 (Government Gazette 920/B'/08-06-2007).

6.4.8 Noise and vibration emissions

During the construction of the project noise emissions are expected mainly due to the operation of excavating and construction machinery, which will be of relatively low intensity and duration due to the fact that:

- The construction machinery used will meet the noise emission limits, in accordance with JMD 37393/2028/2003 (Government Gazette 1418/B/01-10-2003), as amended and in force.
- The use of the machines will be patchy during the construction period of the project.

- Appropriate noise reduction measures will be taken, such as appropriate planning of construction work to avoid as far as possible the concentration and simultaneous operation of many machinery on the site, etc.

The potential sources of vibration during the construction of the project come from the movement of construction machinery and excavations for the foundation of the installations. These vibrations are not expected to be substantially noticeable.

6.4.9 Electromagnetic radiation emissions

The construction of the projects under study is not related to the production of significant levels of electromagnetic radiation.

6.5 OPERATION PHASE

6.5.1 Detailed description of the operation and management of the project

The new (T.L.), after its construction, will be transferred free of charge to independent electricity transmission operator S.A., as provided for by the relevant legislation. During the operation of the project under study, regular inspection and maintenance of the computer equipment and cleaning of the project area, as well as maintenance work, will be carried out if required. During the operation of the projects, control and supervision will be carried out by remote control, remote control and remote control or on-the-spot.

Periodic checks will be carried out in the area of the overhead transmission line, consisting of cleaning the insulators by aerial or ground means of control of the pylons.

Ground access for the maintenance of the Air Transport Line (insulator washing, control of pylons) will be by aerial and/or ground means where possible.

6.5.2 Inputs of materials, energy and water during the operation of the project

The nature of the project under study does not require inputs of materials, nor does it require significant energy and water consumption.

6.5.3 Liquid Waste Outflows

Due to the nature of the project under study, this is not related to the outflow of significant amounts of

wastewater. Any liquid waste resulting from the maintenance of the computer equipment will be collected and delivered to companies authorized to manage it.

6.5.4 Solid Waste Outflows

Due to the nature of the project under study, this is not related to the outflow of significant quantities of solid waste. During the operation of the projects, solid waste will periodically be generated from the maintenance work of the project's equipment. Such waste, if hazardous, will be delivered to authorized companies for proper disposal. If they are not hazardous, they will either be recycled or used (for example metal materials) or if they fall into the category of municipal waste they will be disposed of in landfills.

6.5.5 Emissions of pollutants and greenhouse gases into the air from the operation of the project

In the operational phase of the projects under study, no significant emissions of gaseous pollutants into the atmosphere are expected. The project under study concerns the transmission of electricity and not its production, which is related to emissions of gaseous and particulate pollutants.

6.5.6 Noise and vibration emissions from the operation of the project

Noise during the operational phase of the project is limited to the appearance of the Corona effect on the surface of the transmission lines when the intensity of the electric field on the surface of the conductor exceeds the dielectric strength of the air. It takes the form of intermittent or continuous evacuations. Corona discharges begin if they occur with the progressive rise of the voltage in the form of sacrificial, a few millimeters long starting from spikes, anomalies or protrusions on the surface of the conductor, or from the oxidation, moisture or pollution points of its surface, i.e. where either the electric field (condensation of dynamic lines) is strengthened or the dielectric strength of the pipeline environment is reduced.

When the voltage of the conductor reaches a value of U (the start voltage of the Corona effect), the discharges become continuous and cover the conductor in the form of luminous glamour. The tendency to display the sacrificial is much lower than the U trend, under which the appearance of glamour begins. Pure glamour is accompanied by smooth noise and does not cause radio parasites, on the contrary the thysans are accompanied by a trig and are a cause of radio disturbances. If the conductor has a surface that is completely smooth and clean, then it is possible that no thymuses appear at all, but as soon as the voltage reaches the U limit, the luminous glamour appears.

The Corona effect is influenced by the condition of the surface of the lines, as well as by atmospheric conditions, i.e. rain, air density, humidity as well as wind. With regard to aging lines, it has been observed that Corona losses decrease over time. In conditions of high rainfall, the reduction of losses of aging lines can reach up to 25 to 33%, compared to new pipelines. This is because it has been observed that new conductors are hydrophobic, while ageing hydrophilic.

6.5.7 Electromagnetic radiation emissions, with reference to the power and frequencies of emissions

In the environment of electrical energy devices (lines and substations), electrical and magnetic fields of extremely low frequency (ELF) are created, which are integrated into non-ionizing electromagnetic radiation, i.e. those which are incapable of causing biological effects due to ionization. ELF fields are different from electromagnetic waves, such as radio waves emitted by radio and television antennas, as well as mobile phone antennas.

The size of the generated magnetic field in the single-line environment depends on the current on the line. The size of the current in a line is not stable, but varies widely over the course of a day, displaying daily, weekly and annual cycles, causing a corresponding variation in the generated magnetic field. The maximum current values over the course of a day and therefore the maximum values of the generated magnetic field from the line depend on the type of consumers served by the line and the peak hours. The sizes of the electrical and magnetic fields produced in the environment of a line, in addition to the size of currents and voltages, also depend on the specific technical characteristics of the construction of the line, such as:

- The distance of the lines from the earth.
- The layout of the phases on the dual-circuit lines and.
- The distance between the current lines of the line.

In view of the above factors, the following table gives the maximum values of electrical and magnetic fields that can be displayed just below a line, taking into account the most unfavorable conditions of currents, phase and distance arrangements, as well as standard electrical and magnetic field values resulting from measurements by the Office of Non-Ion radiation of the Hellenic Atomic Energy Commission (EEAE) just below and 25m next to each line.

Table 6.8: Values of electrical and magnetic fields at a height of 1,5m from the ground in the environment of overhead power lines.

		Magnetic field (μT)	Electric field (V/μ)
400kV lines (metal pillars)	Maximum value (under conductors)	25	6.000
	Standard value (under conductors)	1 - 4	2.000 - 4.000
	Standard price (25m side by side)	0,5-2	200-500
150kV lines (metallic tissues)	Maximum value (under conductors)	10	1.200
	Standard value (under conductors)	0,3 - 1,5	500 - 1.000
	Standard price (25m side by side)	0,05-0,2	50 - 100
Lines 20kV (wooden columns)	Maximum value (under conductors)	5	700
	Standard value (under conductors)	0,2 - 0,5	200
	Standard price (25m side by side)	0,01-0,05	10 - 20

6.6 OPERATION POSITION - REMOVAL

6.6.1 Estimate downtime

The project under study, by its nature, has a long life span estimated to be more than 50 years.

6.6.2 Removal of permanent structures, removal of equipment and materials and ways of disposal (procedures, timetable)

At the end of the operation of the project, the existing facilities will be removed and the site restored to its former state. Of the materials that will result from the dismantling of the pillars, those that may be used in the future will be stored. The rest of the materials will be recycled. The steel to be dried and then used as scrap.

6.6.3 Restoration of the project's occupying area and new use of the site

The restoration work, in the event of the closure of the project, essentially includes all the necessary actions to integrate the intervention site into the wider environment. Necessary work to be taken in the squares of the pillars is the removal of all electromechanical equipment and the removal - delivery of all solid waste that may have remained on site to competent and appropriate bodies. Where and where necessary, appropriate plantings will be carried out.

6.7 EXECUTIVE CONDITIONS AND RISKS FOR THE ENVIRONMENT

The nature of the project under study, as described in the sections of this Chapter, leads to the conclusion that its operation does not pose risks of explosion or escape of dangerous substances into the environment in the event of an accident or abnormal conditions.

In any case during the construction phase of the project under study, accident avoidance will be achieved by applying all the measures to protect workers provided for in the applicable legislation for projects of this category and size. Any accidents during the construction phase of the project are due to:

- The existence of excavations (open structures).
- In the fall of objects.
- In the movement of construction machinery and material transport vehicles.

The measures to be taken when installing equipment for the safety of personnel shall be detailed and in full consistency and in line with the provisions of the legislation in force. Particular attention should be paid to:

- the maximum load of safe crane operation.
- maximum load of trucks.
- the maximum permissible drive gradients of vehicles.
- ensuring the stability of the roads under construction before the passage of heavy vehicles, as well as the removal of dangerous rocks for detachment and fall.
- the minimum distances between the moving parts of the crane and the fixed objects of the surrounding area.
- adequate and stable support for lifting machinery on the ground.
- strict control of all machinery before use.
- the use of the necessary groundings and protection systems of electrical systems and .
- the use of qualified, trained and experienced personnel (especially with regard to electrical and high-level work).

With regard to the operational phase of the project, exceptional situations may arise on the above-ground Transport Lines within the field, due to environmental factors such as lightning, fire, humidity, insulator pollution but also from failure of insulation or even insulation material itself. In such cases there is an error

in the system and over-exaggerations, i.e. an error in the system. trends higher than those prevailing under normal conditions. The excesses, although they last a while, exert severe dielectric stresses on the insulations. System insulations are designed to withstand these excesses, but regular maintenance and appropriate measures such as insulator washing, regular control and use of appropriate insulator coating materials are required.

Emergencies include fairly rare cases of pylon falls due to particularly adverse weather conditions, such as high-intensity tornado winds and earthquakes) that are likely to cause temporary network outages. If appropriate measures are taken, such as fire safety measures with fire-fighting systems and the maintenance of safety gaps, no risks to the environment are expected (fire).

7 ALTERNATIVE SOLUTIONS

Three (3) alternatives to the location of the project were considered for the project under consideration, namely three different routes of the new electricity transmission line, including the proposed one, as well as the zero solution. Alternatives to the size and technology of the project were not considered, due to the nature of the project under study concerning the connection of the HVC of Agios Nikolaos with the Distomo HVC, in connection with the new 826MW power station with the Agios Nikolaos HVC. In particular, the project under study concerns the connection of the Agios Nikolaos HVC with the Distomo HVC with a High Voltage electricity transmission line, so both the size and the technology of the project are only important.

7.0 ALTERNATIVE SOLUTIONS TO THE POSITION OF THE WORK

The alternatives examined with regard to the location of the project under study and in particular the alternative routes of the 400kV electricity transmission line for the connection of the Agios Nikolaos HVC with the Distomo HVC, concern mainly the principle of engraving, near Agios Nikolaos HVC and are presented below:

Alternative 1 – proposed solution

The proposed electricity transmission line (Figure 7.1 – red line) has a total length of about 14.000m and consists of forty-two (42) pillars. As mentioned above, the alternatives examined concern the principle of drawing up the electricity transmission line, in a location close to the Agios Nikolaos HVC, as this section is adjacent to the premises of the alumina-aluminum production plant (briefly the "Aluminium of Greece" or "AGA" plant) of the business sector Metallurgy of Mytilineos S.A.

For this part of the electricity transmission line, alternative 1 – proposed solution has a total length of 6.750m and consists of twenty-three (23) pillars. This section of the transmission line begins from pillar P19 of the electricity transmission line and after a journey of approximately 6.750m is completed at Agios Nikolaos HVC. With the choice of this solution the new power transmission line will have a total length of 14.000m and will consist of forty-two (42) pillars.

Figure 7.1: Satellite imagery extract showing the proposed – alternative 1 of the new 400kV electricity (T.L.) with a red line, while an orange and green line reflects alternatives 2 and 3, respectively.

Alternative 2

(Figure 7.1 – orange line) has a total length of 6.950m and consists of twenty-two (22) pillars. This route of the transmission line begins from pillar P19 of the proposed electricity transmission line and after a route

of approximately 6.950m is completed at Agios Nikolaos HVC. With the choice of this solution the new power transmission line will have a total length of 14.200m and will consist of forty-one (41) pillars.

Alternative 3

(Figure 7.1 – green line) has a total length of 6.100m and consists of twenty (20) pillars. This route of the transmission line begins from pillar P19 of the proposed electricity transmission line and after a route of approximately 6.100m is completed at Agios Nikolaos HVC. With the choice of this solution the new power transmission line will have a total length of 13.350m and will consist of thirty-nine (39) pillars.

Table 7.1: Characteristics of alternative electricity transmission line routes.

Alternatives	length (m)	Pillars	Total Length (m)	Total Pillars
Alternative 1 - proposed	6.750	23	14.000	42
Alternative 2	6.950	22	14.200	41
Alternative 3	6.100	20	13.350	39

Since all the alternatives examined with regard to the route of the electricity transmission line do not vary significantly in terms of the total length and number of pillars of the new transmission line, the following criteria were taken into account in choosing the best solution:

- the harmonious integration of the line into the environment (environmental criteria).
- the fulfilment of technical requirements for the safe operation and easy construction and maintenance of the line.
- visual nuisance in the man-made environment.
- residential development and proximity to urban centers.
- the terrain.
- the proximity to the premises of the aluminium-aluminium production plant of AGA.

After examining the above criteria, comparing all the alternatives with each other and taking into account that:

- With the choice of alternative 3, the route of which follows mostly milder gradients and smoother morphology, the effects on the natural environment are as small as possible, compared to the other alternatives. Of the other two roads, Alternative 2 goes through particularly intense morphology and the choice of which will have the greatest impact on the natural environment.

- The technical requirements for the safe operation and easy construction and maintenance of the line, are more favorable to alternative 3, followed by alternative 1 and alternative 2 presents the greatest difficulties taking into account the morphology, terrain and accessibility of the area.
- None of the alternatives considered have a significant impact on the visual nuisance of the area.
- Looking at all the alternatives, the total length of the proposed diversion, as well as the total length of the new gates, do not show any significant differences in the cost of construction of the proposed projects.
- Looking at all the alternatives, there are no problems with the proximity of the engravings under study to the settlements of the region.
- The variations in morphology and anaglyph of the region, in alternative 3 are milder, while in alternative 2 they are more pronounced.
- Alternative 3, in view of this proximity to the facilities of ate's alumina-aluminum production plant and taking into account a possible future expansion of these plants, is rejected.

as the **most prevalent solution** for the diversion of the existing electricity transmission line, **alternative 1** – proposed.

Table 7.2: Comparative evaluation of alternatives.

ALTERNATIVE SOLUTES Σ	ENVIRON MENTAL CRITERIA	TECHNICAL REQUIREME NTS	OPTICAL LOCATIO N	OIKONO-MIKA KPITHPIA	GUARANTEE WITH HOMES	TERRAIN	GUARANT EE WITH AGA
Alternative 1 - proposed	+	+	+	+	+	+	+
Alternative 2	-	-	+	+	+	-	+
Alternative 3	++	++	+	+	+	++	--

In conclusion, on the basis of the above, although Alternative 3 is the most prevalent taking into account environmental criteria and the impact during the construction phase on the natural environment, the terrain and morphology of the area, as well as the technical requirements for the safe operation and easy construction and maintenance of the line, it is rejected due to its proximity to the AGA aluminium-aluminium plant. Therefore, of alternatives 1 and 2, alternative 1 – proposed, is the solution which has advantages (+ positive sign) in all the criteria examined.

7.1 THE "DO NOTHING" ALTERNATIVE

In the case of the zero solution there is no provision for the construction of the new 400kV High Voltage Electricity (T.L.), which will connect the Agios Nikolaos HVC, with the Distomo HVC, as part of the connection of the New 826MW Power Station with the Agios Nikolaos HVC.

Considering that the Agios Nikolaos HVC already serves the Power Station with a rated power of 444,48MW by not implementing the project under study (new (T.L.) between Agios Nikolaos HVC – Distomo HVC does not ensure the absorption of the full power of the two (2) power plants by the System, as confirmed and considered necessary by independent electricity transmission operator S.A., in the Connection Offer of the new Station 826MW, attached and referred to in previous chapters (implementation of an enhanced association scheme of the Agios Nikolaos HVC with the Distomo HVC and the selection of completely separate and independent roads for the main and backup connection).

In this case, no negative effects on the natural environment are expected, as there are no de-glyses of existing vegetation, since no new areas will be occupied.

However, negative effects on the social and economic environment at local and hyperlocal level are expected, since the non-implementation of the proposed projects entails the non-implementation of the country's energy policy and, by extension, the European Union.

As mentioned in Chapter 4 of this environmental impact assessment, all the proposed projects are fully compatible with the country's energy policy and the fight against climate change as it is linked to the gradual withdrawal of lignite plants, the use of natural gas as a bridge fuel, for the 100% transition to RES.

The dual connection option ensures the functionality of the connection even in error conditions (N-1 criterion), but upgraded with the choice of separate and independent routes, it now ensures that in case of error or maintenance of one connection road there is the possibility through the independent backup road, the safe passage of all power, while allowing maintenance crews to work safely in the off-mode runway o. At the same time, spatial independence ensures that in the event of external interference in one circuit (for example landslide, lightning strike or other natural disaster), the availability of the other circuit will not be affected. The above provisions are now necessary and essential for the stability and functionality of the System taking into account the upgraded importance of Agios Nikolaos HVC for the National System, due to the increased more dependent Electrical Production in it.

On the basis of the above, the 'do nothing solution, the non-implementation of the proposed project, was rejected.

8 EXISTING CONDITION OF THE ENVIRONMENT

This chapter records, analyses and evaluates the current parameters of the natural and man-made environment in the study area, as well as their evolution trends.

8.1 STUDY AREA

The study area is located in the municipality unit (MU) of Kyriaki and Distomo , of the Municipalities of Levadea and Distomo - Arachova - Antikyra, respectively of Viotia (MU). Viotia (MU) has an area of 2.952k^{m2} and borders north with (M.U.) Fthiotida, west with (M.U.) Fokida, south is bordered by the Corinthian Gulf and borders (M.U.) Attica and east is bordered by the Evia (M.U.) and borders Evia. Boeotia is a lowland and very fertile area. The mountainous area is very small. In detail the distribution of soil in categories is as follows: 40% lowland, 38% semi-mountainous and 22% mountainous.

The figure below shows the wider area of Viotia (MU), while a red circle indicates the study area.

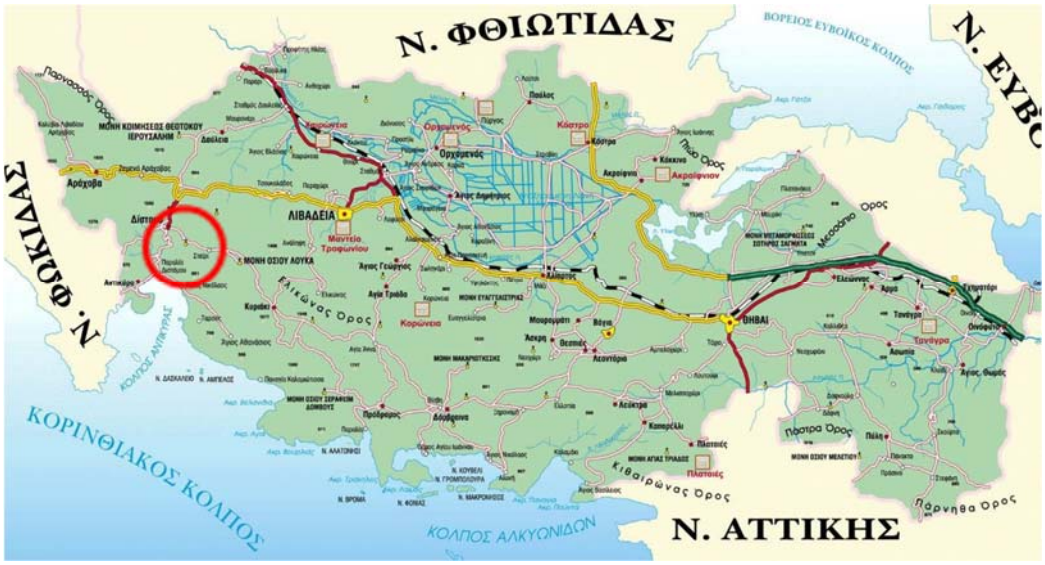


Figure 8.1: Map of Viotia , where the red circle encloses the study area.

The study area of the project under study is defined in accordance with Decision 170225/2014 (Government Gazette 135B/27-01-2014) as follows: "For linear projects or activities of subcategory A2, 500m from their axis for areas outside the boundaries of settlements or city plans."

According to the above, the study area occupies an area of about 14.6km^2, as depicted in the project entitled "Map of Orientation and Study Area" (Project No. IP-1) and in the satellite imagery extract (google earth) below.

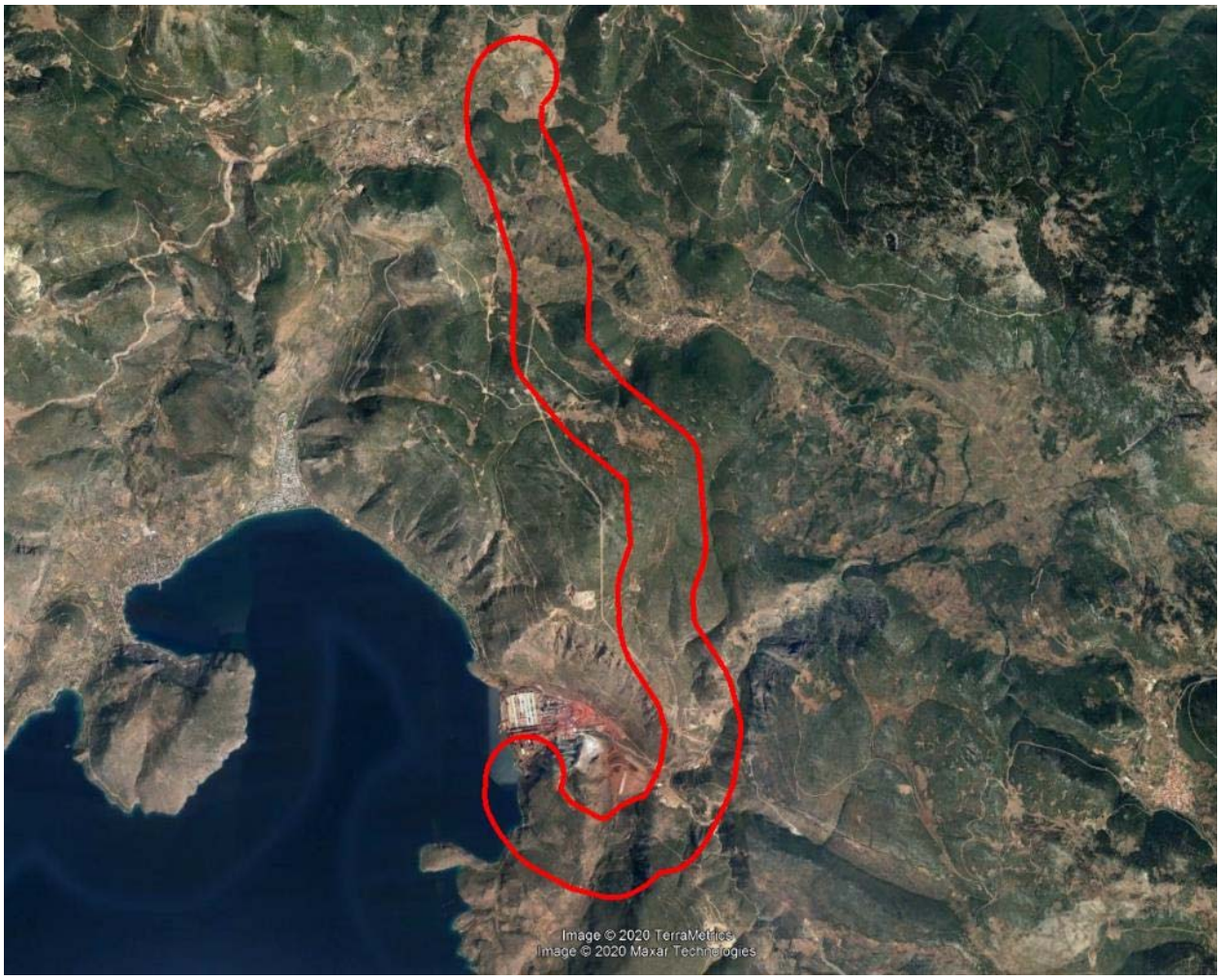


Figure 8.2: Satellite imagery extract (google earth), showing in red the outline of the study area.

8.2 CLIMATE AND BIOCLIMATIC FEATURES

The climate of Viotia is dry, with mild winters and cool summers. Rainfall is greatest in the mountainous western part and decreases in the east.

The values of the climatic variables shown below come from the weather station Antikyra, whose available meteorological data - from the National Observatory of Athens - are from June 2009. This weather station is located at an altitude of +336m.

The following figure shows in bar charts the average monthly rainfall heights recorded at the antikyra weather station, for the period June 2009 – August 2020. The average super-annual precipitation is 517,5mm, with the highest prices in the winter months and late autumn. The wettest month occurs in

February, with an average monthly rainfall height of 72,7mm, while the month with the least rainfall is August, with an average monthly rainfall height of 8,5mm.

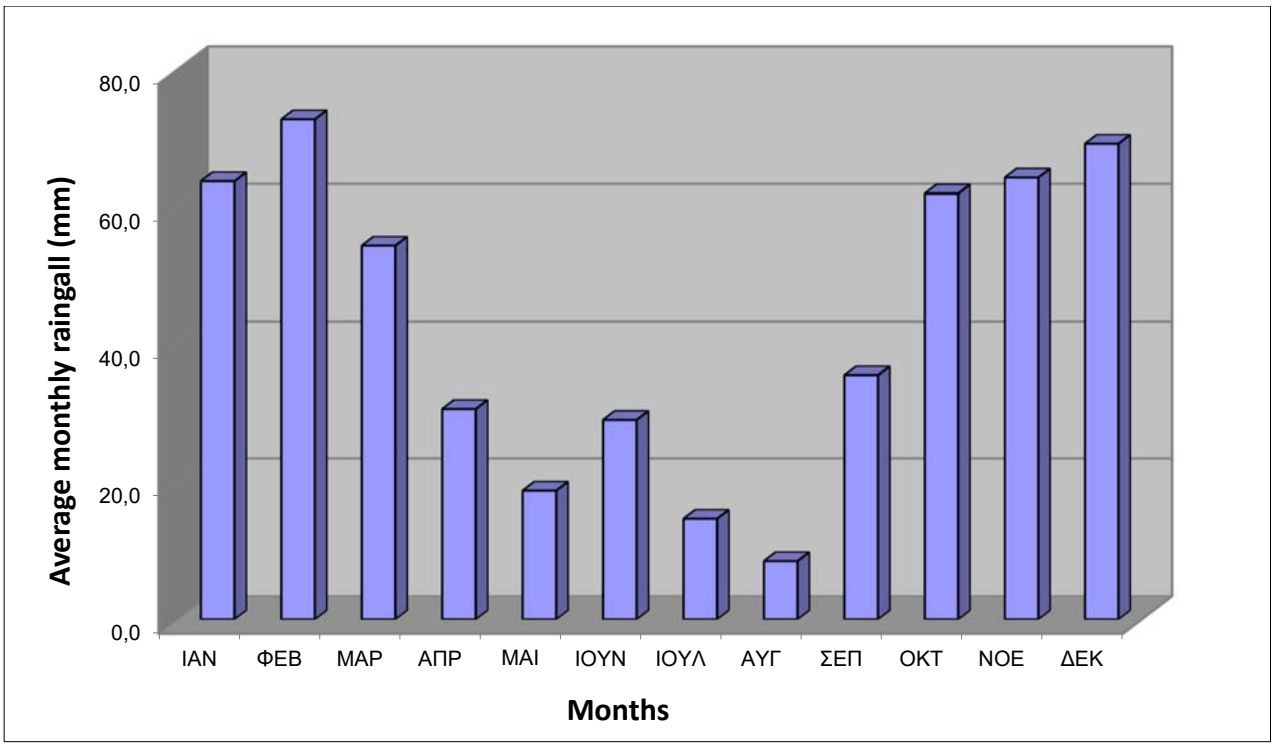


Figure 8.3: Average monthly rainfall heights of antikyra weather station.

In the following figure, the average monthly temperatures for the period mentioned above are presented in a bar chart. The average monthly temperature of the region is 17,6°C and takes its average minimum value in January (9,6°C) and the average maximum in the month of August (27,4°C).

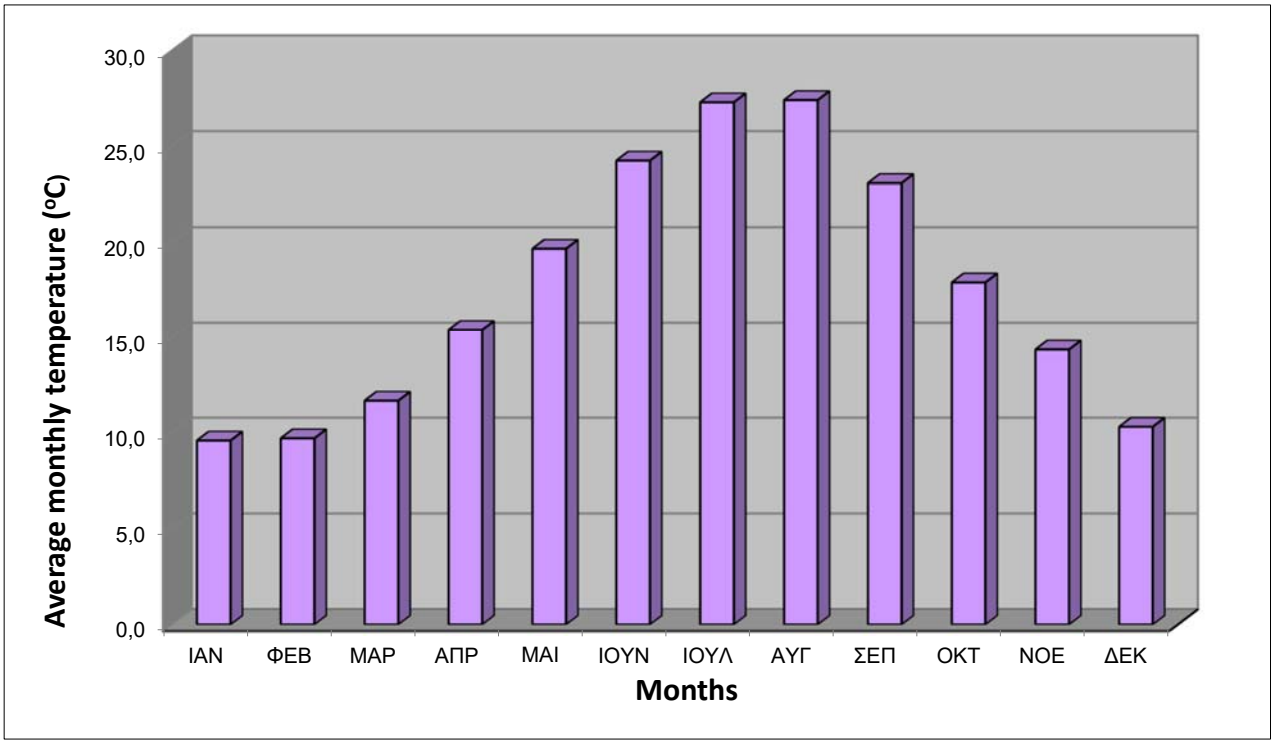


Figure 8.4: Average monthly temperatures of the Antikyra weather station.

Ombrothermal Diagram.

The rain-thermal chart shows the course of the average monthly temperatures and average monthly rainfall of an area. The intersection points of the two curves formed by the average monthly temperature and precipitation values constitute the dry thermal period. During the dry thermal period the minimum value of the average monthly rainfall is observed, in combination with the maximum value of the average monthly temperature.

Looking at the rain thermal diagram of the Antikyra meteorological station shown in the following figure, a water deficit (dry period) is found in the water balance of the area in the period from early April to mid-September, while in the rest of the period there is an excess of water (wet period).

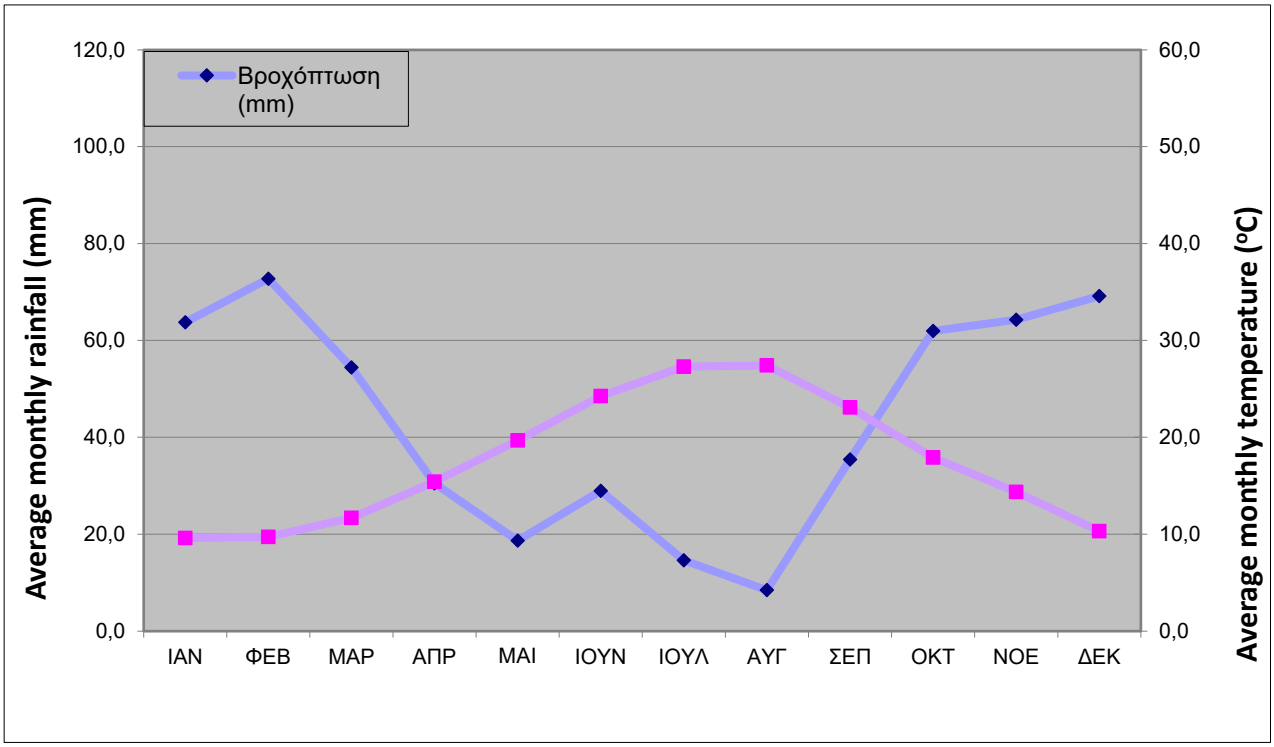


Figure 8.5: Ombrothermal diagram of the weather station Antikyra.

Anemological data.

The anemological data used come from the meteorological station of the National Meteorological Service (NMS) in Patras. The selection of this station was based mainly on its proximity to the area concerned and the longer range of available registrations.

In more detail, the anemological data of the M.S. of Patras relate to records from the period between 1955 and 2003 and are given in a percentage-tabulated form of annual frequencies, for the displayed intensities of the various wind addresses. The data have come from daily measurements at 06:00, 12:00 and 18:00 each day (i.e. 3 measurements per day), for the whole year, for the relevant reference period. The following table contains the station's anemological data.

Table 8.1: Anemological data (national meteorological service) of the meteorological station of Patras from the period 1955-2003.

ΕΘΝΙΚΗ ΜΕΤΕΩΡΟΛΟΓΙΚΗ ΥΠΗΡΕΣΙΑ
HELLENIC NATIONAL METEOROLOGICAL SERVICE

Όνομα Σταθμού	Κωδικός Σταθμού	Γεωγ.Μήκος Σταθμού	Γεωγ.Πλάτος Σταθμού	Ύψος Σταθμού (m)	Περίοδος
ΠΑΤΡΑ	16717	37.95°	23.34°		1/1/1956 ΕΩΣ 31/12/2004

ΕΤΗΣΙΑ

Διεύθυνση Ανέμου	N	NE	E	SE	S	SW	W	NW	CLM	SUM
Bf 0	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	26,568	26,568
Bf 1	2,095	3,765	4,498	4,134	1,957	3,865	3,296	3,062	0,001	26,673
Bf 2	3,105	3,981	1,595	2,286	1,491	5,496	3,439	3,384	0,005	24,782
Bf 3	2,521	2,053	0,298	0,468	0,745	3,810	1,315	1,662	0,000	12,872
Bf 4	1,548	1,035	0,126	0,163	0,353	1,883	0,514	0,536	0,000	6,158
Bf 5	0,529	0,370	0,064	0,036	0,111	0,727	0,135	0,136	0,000	2,108
Bf 6	0,127	0,176	0,036	0,019	0,022	0,241	0,067	0,040	0,000	0,728
Bf 7	0,010	0,015	0,001	0,003	0,008	0,025	0,014	0,008	0,000	0,084
Bf 8	0,001	0,006	0,000	0,000	0,000	0,001	0,004	0,000	0,000	0,012
Bf ≥ 9	0,001	0,006	0,001	0,000	0,000	0,004	0,004	0,000	0,000	0,016
SUM	**9,938**	**11,406**	**6,619**	**7,107**	**4,687**	**16,051**	**8,789**	**8,828**	**26,575**	**100,00**

Below are the histograms of frequencies and maximum recorded intensities for M.S. Patras.

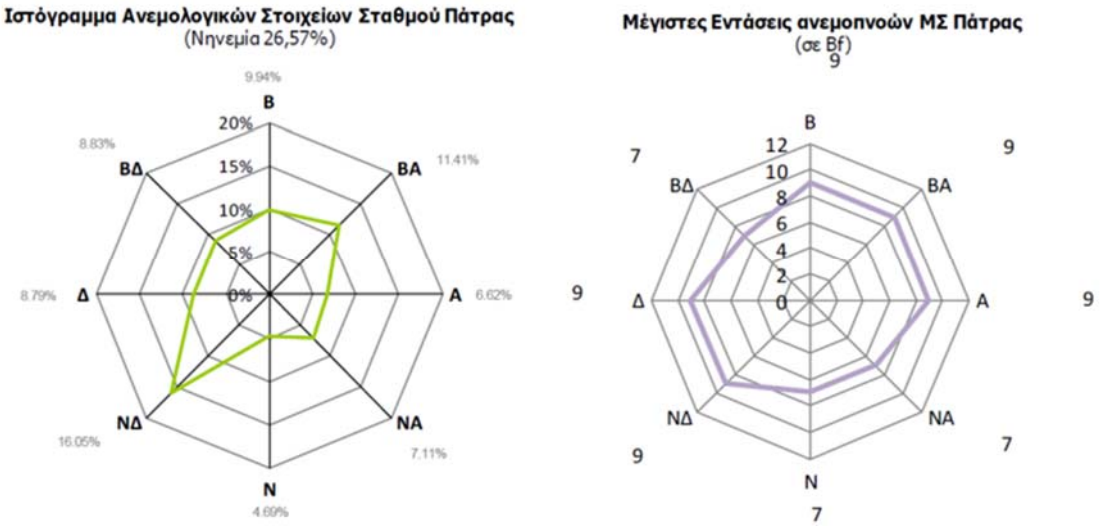


Figure 8.6: Histogram of frequencies and maximum tensions for M.S. Patras (1995-2003).

The analysis of the above data shows the following conclusions:

- Dominant and dominant winds in the area of interest are the winds of the wider northern sector (NW,

B and BA) with an incidence rate of 8,82%, 9,94% and 11,4 % per year, respectively (total 30,16% or ~ 110 days/year) with a maximum recorded intensity of 9 Bf (for B and BA) and 7 BF for ND.

- Remarkable are the winds of the SW sector with a frequency of 16.09% per year (~58 days / year) with a maximum recorded intensity of 9 Bf.
- D winds have a remarkable presence with an appearance rate of 8.8% per year and a maximum recorded intensity of 9 Bf.
- West and East winds appear with a higher average intensity (excluding wind gusts) at 9 Beaufort, but have a lower incidence over the year.
- In terms of winds, the area appears to be characterised by a relative distribution of both frequencies and intensities.

Bioclimatic elements.

Natural vegetation is the biological expression of the environment and first of all of the climate, because plants are the only living organisms that are native and therefore are in direct contact with the climatic parameters which they reflect. The result of the synthesis on the one hand of climatic parameters and on the other hand of the correlation between them constitute the concept of bioclimate.

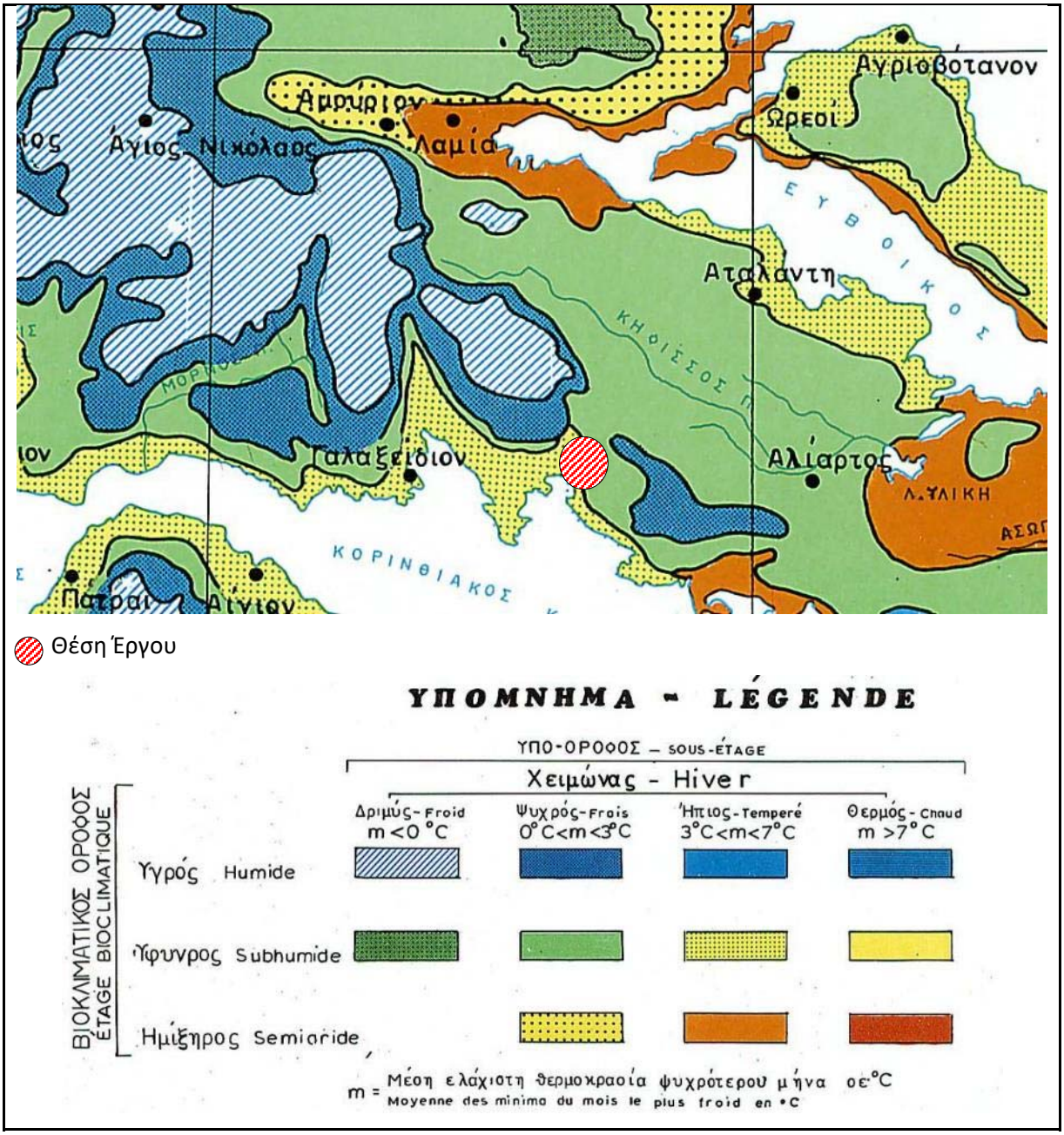
For the investigation of bioclimate and the determination of the isoclimatic regions of Greece, G. Mavromatis used two methods:

- the distinction of the bioclimatic floors of the Mediterranean bioclimate based on the climatic type of emberger's Ombrothermal pyliqué Q2 and the emberger - sauvage climate chart.
- The distinction of the characters of the Mediterranean bioclimate according to UNESCO-FAO and the rain thermal diagrams of bagnouls - gaussen to determine the duration and intensity of the dry season, after calculation of the dry thermal index Xm .

The product of this work was the Bioclimatic Maps of Greece (editions of the Institute of Forest Research 1978), which depicts the Bioclimatic Floors, the Characters of the Mediterranean Bioclimate and the Phytoso-Social Structures of each region. According to these maps the area of the project belongs between the semi-dry and wet climate floor with mild winter (Figure 8.7). The Mediterranean bioclimate character of the region is weak Thermo-Mediterranean to intense mediterranean -Mediterranean (Figure 8.8). The region is dominated by the Mediterranean physique (Figure 8.9).

Q_2=1000P/[(M+m)/2x(M-m)], where P the annual rainfall height in mm, M and m the average maximum

warmer month heats and minimum colder month heats respectively in absolute degrees. Xm=[Jm-(Jp+Jr,p/2)]*fh, where Jm the days of the month, Jp the rain days of the month, Jr,p the dew and fog days of the month and fh the relative humidity factor of the month.



Θέση Έργου

Figure 8.7: Bioclimatic floors (source: Mavromatis, 1978).

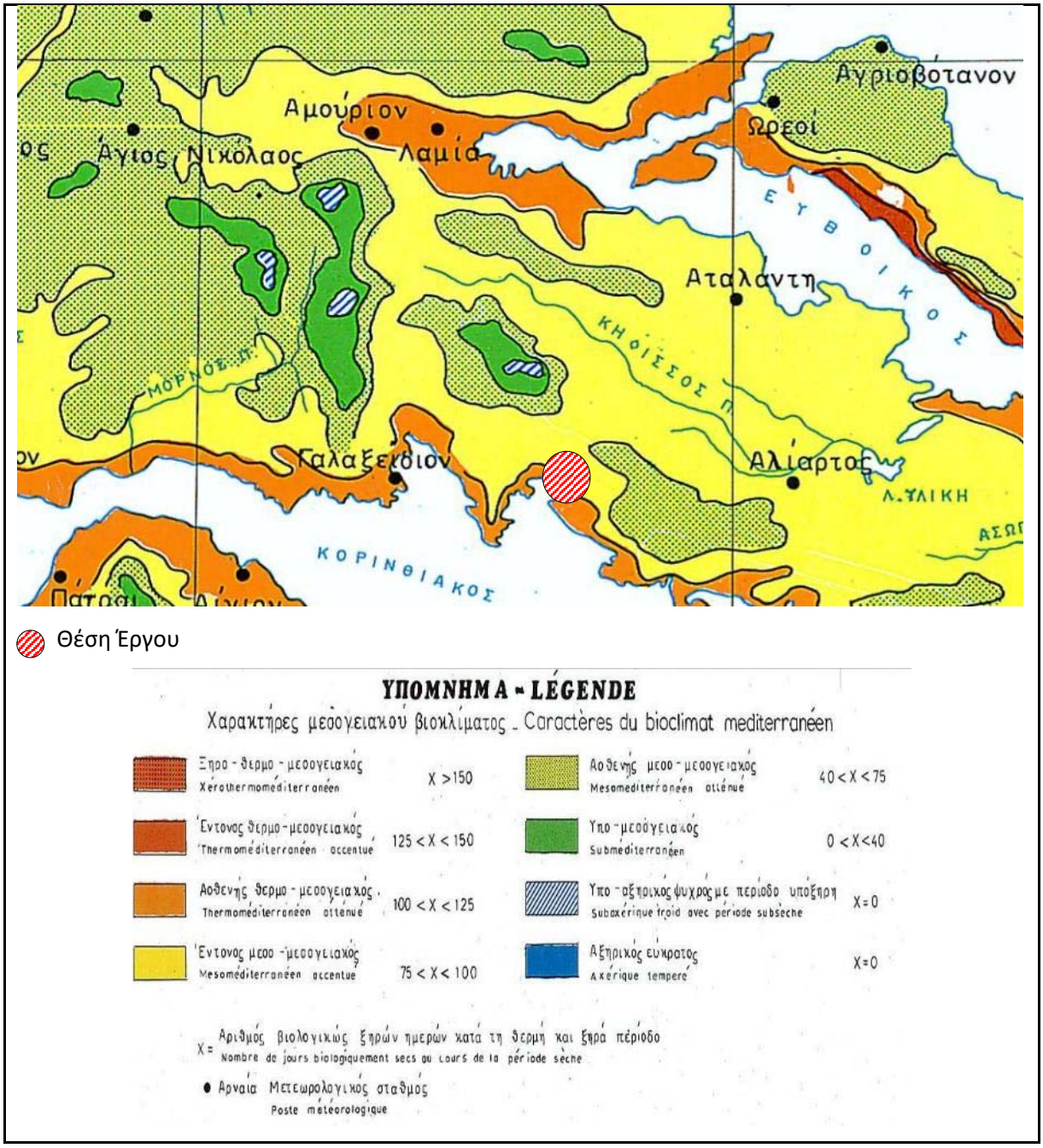


Figure 8.8: Mediterranean Bioclimatic Characters (source: Mavromatis, 1978).

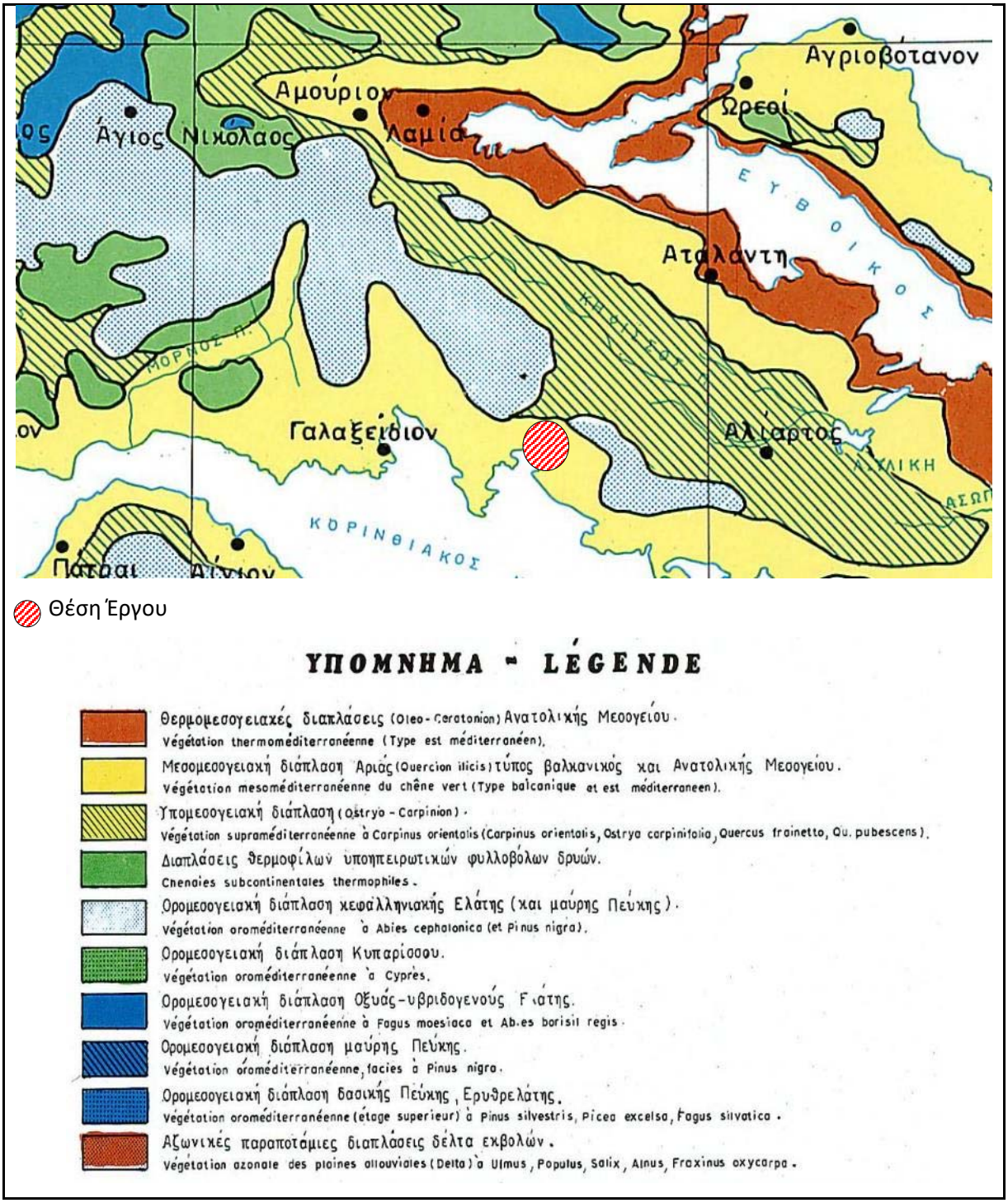


Figure 8.9: Phytoso-social structures (source: Mavromatis, 1978).

8.3 MORFOLOGICAL AND TOPIOLOGICAL CHARACTERISTICS

8.3.1 Recording of the overall reference landscape and individual sections of the

Viotia is a fertile lowland area and only 22% of its territory is mountainous. The basins of Viotia are surrounded by Elikos, Parnassos, Kithairon, Neraidolakoma, Messapio and Chlomos. The Municipality of Aliartou is located in the center of Viotia (MU) and the relief presents a wide variety. At the same time, it has mountain volumes, hilly areas and large lowland areas.

The study area is bounded SW from the Corinthian gulf, south of the hill Makria Pezoula with a peak of + 319m, east of the mountain Amalia with a peak of + 891m, north of the cut ridge with a peak of + 632m and west of the hill Patoma with a peak of + 432m . Other mountains that dominate the area are Kapsala with a peak of + 595m, Kounouklias at + 688m and Spilia at + 610m. The above mountains are extensions of the mountains of Parnassos and Elikonas.

An important stream within the study area is the Kalogerikos stream, which runs through the premises of the Alumina - Aluminium Production Plant.

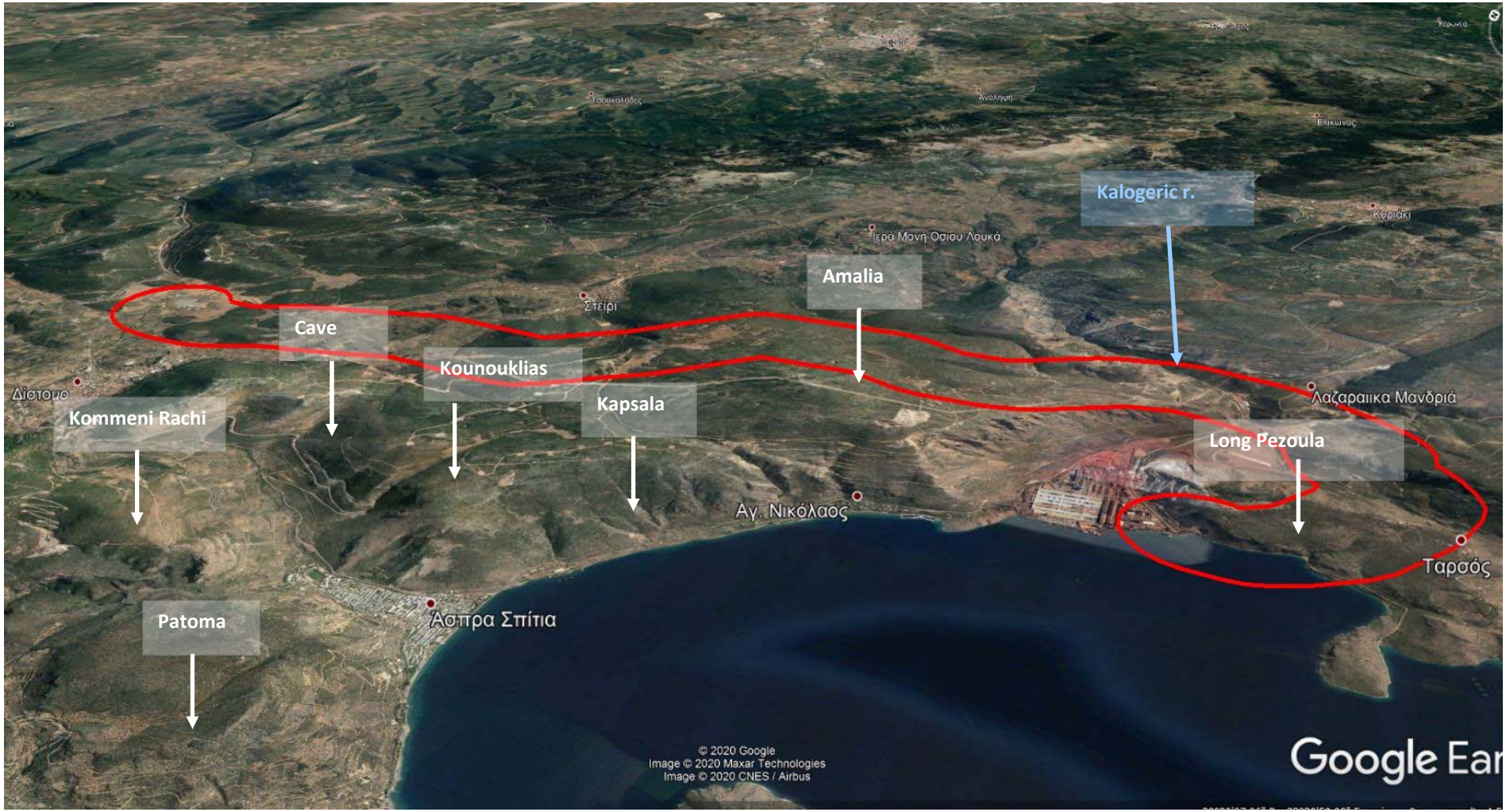


Figure 8.10: Morphological representation of the study area. A red border shows the study area.

8.3.2 Areas related to the European Landscape Convention, ratified by L. 3827/2010

The European Landscape Convention, also known as the Florence Convention, as ratified by the Greek State by Law 3827/2010 "Cancelation of the European Landscape Convention" (Government Gazette 30/A/25.10.2010), sets itself the objective of promoting the protection of landscapes, their management and their design and the organization of European cooperation in local matters.

Each State must legally recognize landscapes as an essential component of the human environment, as an expression of the diversity of their common cultural and natural heritage, and as the foundation of their identity, and establish and implement landscape policies aimed at the protection, management and design of landscapes.

As part of a review of the Regional Spatial Framework of the Region of Central Greece, various "Landscape Zones" were proposed for which general protection/management guidelines are given and which include:

- International landscape zones.
- National and international value landscape zones.
- Regional and national value landscape zones.
- Regionally value landscape zones
- International value - Particularly degraded zones.
- Regional value - Particularly degraded zones.
- International cultural routes.

Figure 8.11: Excerpt from Charter P.2d "Environment, Cultural Heritage and Landscape" of the Review of the Regional Spatial Framework of the Region of Central Greece.

For the above landscape areas, based on the Review of the Regional Spatial Framework of the Region of Central Greece, general management guidelines are given such as:

- Establishment of a special control of integration into the landscape in the context of the issuance and implementation of building permits, and other technical projects, with the approval of EPAE

- Promote the extraction of underground holdings and promote the restoration of landscapes with specific policies and programmes.
- Avoid building on land gradients greater than 45% except in landslide areas where gradients are limited to 20%.
- Promotion of road signalling projects protected as Landscapes, position signalling and value-data studies on a regional planning scale to identify specific protection rules that will feed the underlying design.

Closer to the study area, based on the Regional Spatial Framework of the Region of Central Greece, is the International Landscape Zone "Antikyra Bay – Industrial Coast of Bauxite" (Figure 8.11 –(9/D)]. For this area, on the basis of deliverable 2 of the Evaluation, Review & Specialization are proposed:

- Strict control of the diffusion of construction and
- industrial activity in urban planning.
- Completion of GSP design.

The following table lists the assessment of the International Value of the Landscape Zone "Antikyra Bay – Industrial Coast of Bauxite", based on the current B.C.C.S.A.A.:

QUALITY OF STATES		PRESSES & MOVE	FEATURE OF LOCATIONS	DIRECTIONS		
Sustainable Development Factors	**Degradation Factors**			**Restoration of Conservation of Special Management of Landscape Protection**	**Feature Development**	**Spatial planning of GSPs, SSOAP, ZOEs, ICM**
• World-wide declared (UNESCO) Cultural landscape of the monastery of St. Luke • Standard industrial settlement White Houses	Mining activity		International value	The management of the module must follow its planned co-existence with the strong but interesting presence of the activities of the Aluminium industry of Greece (Mining and port)	• General Directions • Highlight as a tourist destination of the industrial settlement "White Houses"	General Directions

8.3.3 Project-related spatial outbursts

Within the study area, there are no project-related locale flare-ups.

8.3.4 Elements of the importance and vulnerability of the landscape

Important factors to be taken into account concerning the installation of the project under study are the dominant elements of the landscape, the variable factors (atmospheric conditions, distance, observer position, etc.), as well as the visual vulnerability and absorbing capacity of the landscape.

Visual vulnerability refers to whether the various actions of man are evident within the landscape. Disturbances in higher parts of a landscape are more evident than those occurring in lower places. In contrast, in low positions any disturbance is much less apparent although the details of the operation are more noticeable because the observation distance tends to become shorter. However, it is possible to cover disturbances from vegetation and geomorphic formations (Hatzistathis and Ispikosdis 1995).

The visual absorbing capacity of the landscape is the relative, natural ability of a landscape to accept organized development or management activities and even to maintain its visual character and the integrity of the quality of its view. Factors affecting this ability of the earth or landscape to absorb modifications are slope, vegetation, observation distance, soil, landscape diversity and human activities (Hatzistathis and Ispikos 1995).

In the case of the project under study, its distance from residential areas is sufficient to avoid negative effects due to visual nuisance and noise.

8.4 GEOLOGICAL, TEKTONIC AND EDAFOLOGICAL FEATURES

8.4.1 Geological characteristics

Geotectonically the study area is located in the wider area of the Parnassos- Gionas zone. The Parnassos-Gionas zone was considered to be a site, locally surrounded in the ocean area of Subpelagenic – Pindos (Neothes) and associated with the "High Karst" zone of the former Yugoslavia. The disappearance of the zone in Macedonia and Thessaly is probably due to its coverage of the incubated covers of the internal Greek zones.

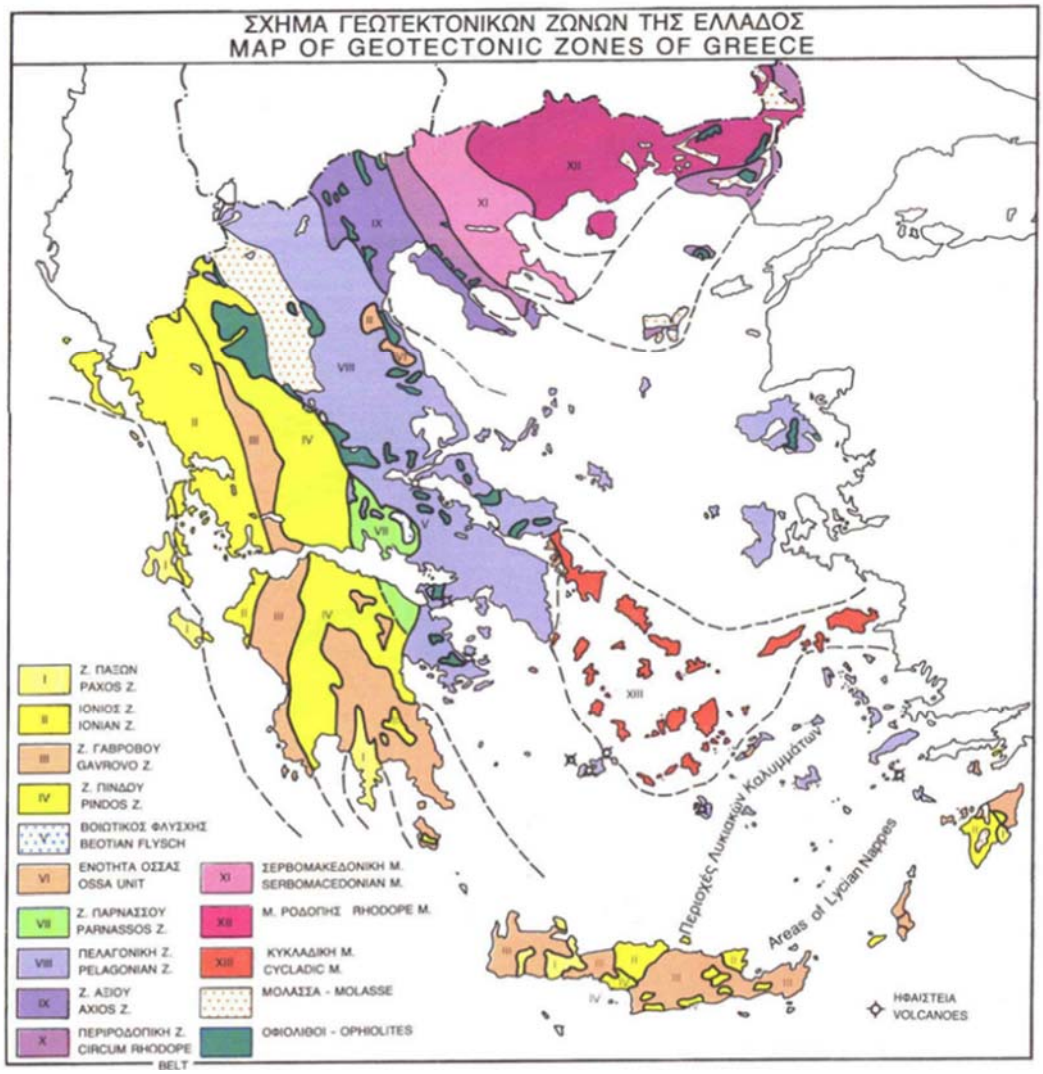


Figure 8.12: Map of Geotectonic Zones of Greece.

Paleogeographically, the Parnassos-Giona zone was located in the immediate vicinity of the inner zones, thus accepting the distant influence of the early (paleo-alpine) serogenetic phenomena that affected them. As a result of the upward movements was the creation of a coastal environment in the area of the zone, suitable for bauxitogenesis but also capable of forming sedimentary discrepancies between limestones, without stopping sedimentation. The final emergence of the zone took place in Ano Okaino after the deposition of puss.

The basic alpine sedimentation of the zone is limestone, a fasting phase with a deposition thickness of 1.800m. A key element of the evolution of the zone are the three bauxite horizons.

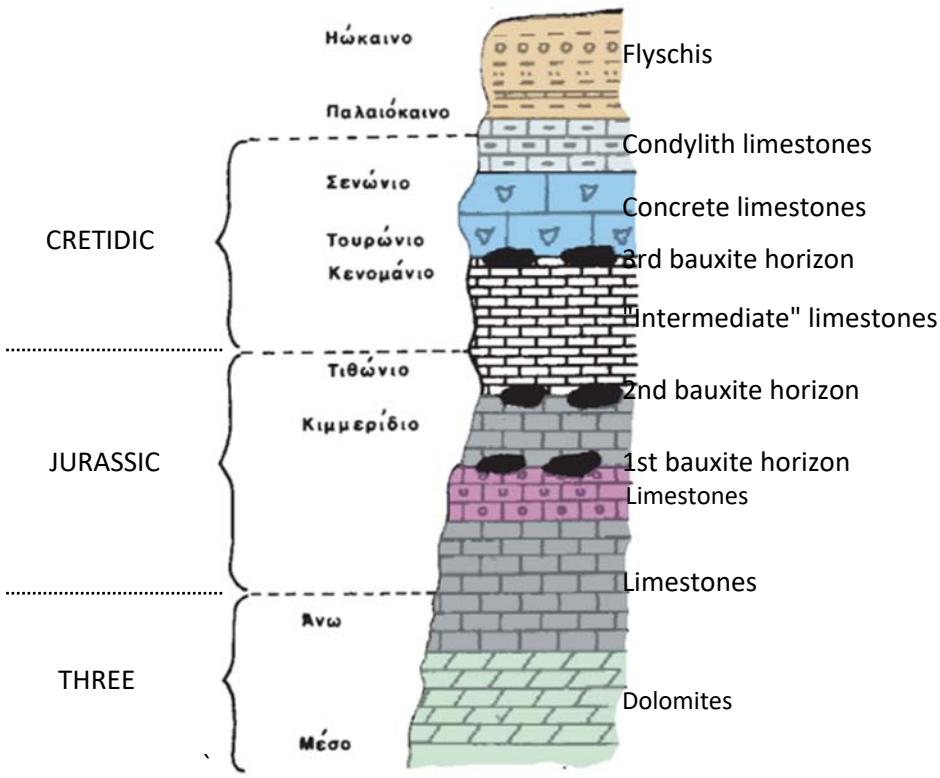


Figure 8.13: Stratigraphic column of the Parnassos - Gionas zone.

According to the geological map of the I.G.M.E , scale 1:50,000, F.C. Delphi & Livadia, the formations found in the wider study area are then described from the younger to the older.

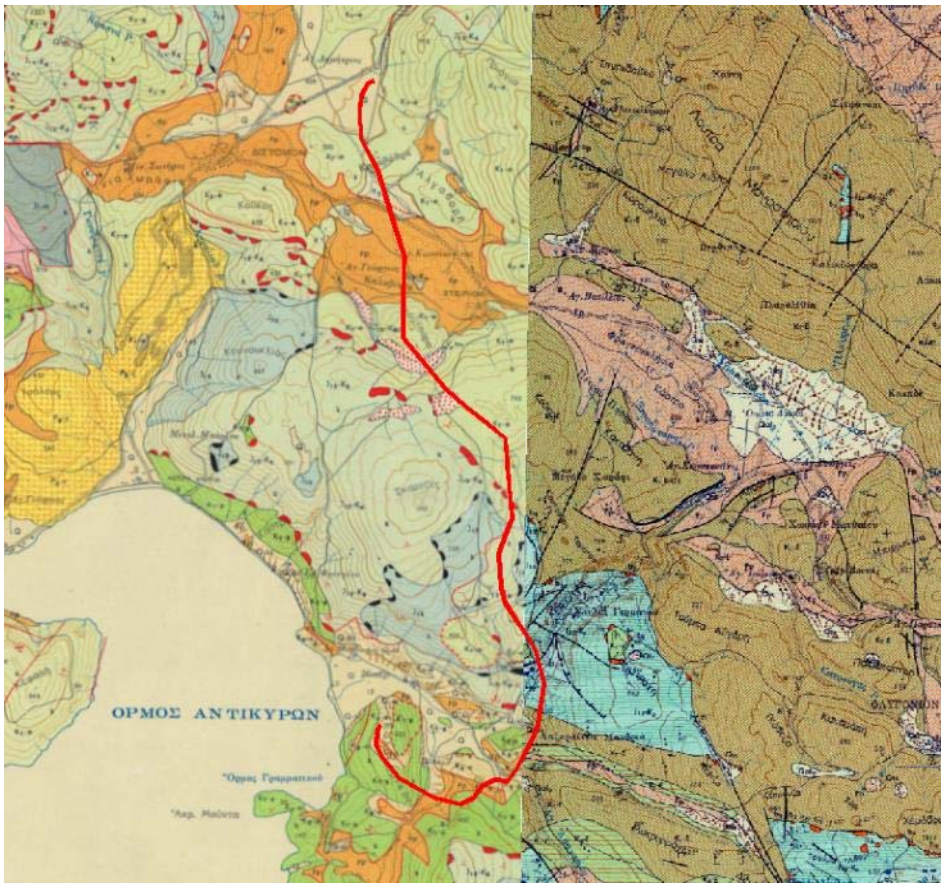
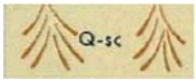


Figure 8.14: Extract of geological map of I.G.M.E F.C. Delphi & Livadia, where with red line is presented the under study (T.L.) electricity 400kV.

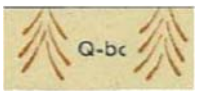
METAL REQUIREMENTS

Quadrant

Modern predations



Unconnected lateral crowns and crowns



Coherent lateral crowns

Secondary bauxite deposits

Tertiary

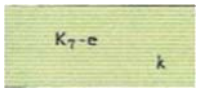
Crokalopagi: limestone mainly crokalopagi with limestone binder

PARNASSOU SERIES - GIONAS

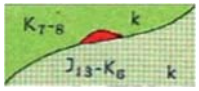
- **Flysche indivisible,** aged Paleogenic, which is a system of rocks which includes from the oldest to the newest:
- Limestone slate.
- Sandstones.
- Conglomerates.

Limestones, aged Sedon - Paleo-new: thin-layered, evolving into warts in the upper layers. They are subject to agreement with the red slates of the puss and are subject to agreement with the ruptin limestone.

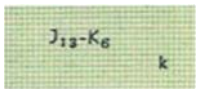
Limestones, of the age of Tronium - Sedonium: ruptator, usually microcrystallic, which in the upper layers fall into white crystalline limestones characterized by fragments of ruptists. They form the roof of the bauxites of the upper horizon.



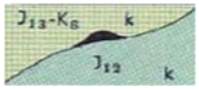
Limestones, aged Upper Cretaceous



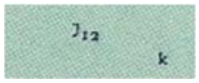
Upper horizon bauxites: usually red chestnuts, oolithic texture, dispersion type mainly. At the top of the case, white and aluminum-rich usually appear.



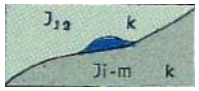
Limestones intermediate, aged Tithonio – Kenomanium: interlayered to thin-layered, are located between the upper and middle bauxite horizons. The immediate subjects of bauxites are usually white, microcrystallites with corals. Limestones and urns follow. The lower layers of this series contain abundant gasteropods and a multitude of corals and usually fall close to contact in margaic limestones.



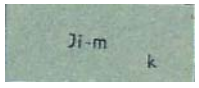
Medium-horizon bauxites: erythrophae, amorphous and pisolithic texture. Mostly bammic type.



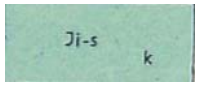
Limestones, aged Jurassic - Kimmere: chubby, styre, dark with light spots in places.



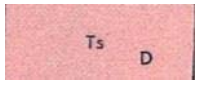
Lower-horizon bauxites: red-skinned with a pisolithic dispersion texture.



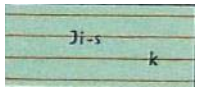
Limestones, aged Medium and Lower Jurassic: usually dark, vitmound, with irregular spots, light color, often oolithic.



Limestones, aged Jurassic, about 500m thick.



Dolomites crystalline, aged Upper Triad.



Jurassic limestones, thin-layered with keratoliths. In the upper layers they go to dolomite limestones.

Local occurrences of red shale, aged Jurassic, with sedimentary mangania.

The proposed engraving of the electricity transmission line passes through the formation of modern pretachs (Q), the formation of the puss (Fp) and limestones (K7-e, J13-K6, J12, K8-e, K7-8).

8.4.2 Masonic characteristics

The tectonics of the wider region include mainly tangential movements, in the form of tectonic covers, in which the zone An. Greece is pushed over the outer zone of Parnassos-Giona.

In particular, the intense tangental tendencies developed during alpine serogenesis caused the zone to finally rise and fall, while during the relief phase that followed systems of correct fractures were created. The effects of the above tectonic phases are decisive, in terms of the position of geological formations within the present morphological terrain of the region and the mechanical strength of these.

A particular feature in the zone are the short-term emerging and interpolation of the three main bauxite horizons.

8.4.3 Seismicity

The country's seismological bodies have proposed its separation into three Categories of Seismic Risk Zones. According to the Greek Earthquake Regulation (EAC 2000), as amended by the decisions of the Minister of Environment, Spatial Planning and Public Works D17a/67/1/FN275/03 (Government Gazette 781/B/16-6-03) and D17a/115/9/FN275/03 (Government Gazette 1154/B/12-8-03), the area is part of seismic hazard zone II (medium seismic hazard), with a maximum expected seismic ground acceleration A= 0.24g, where g = gravity acceleration.

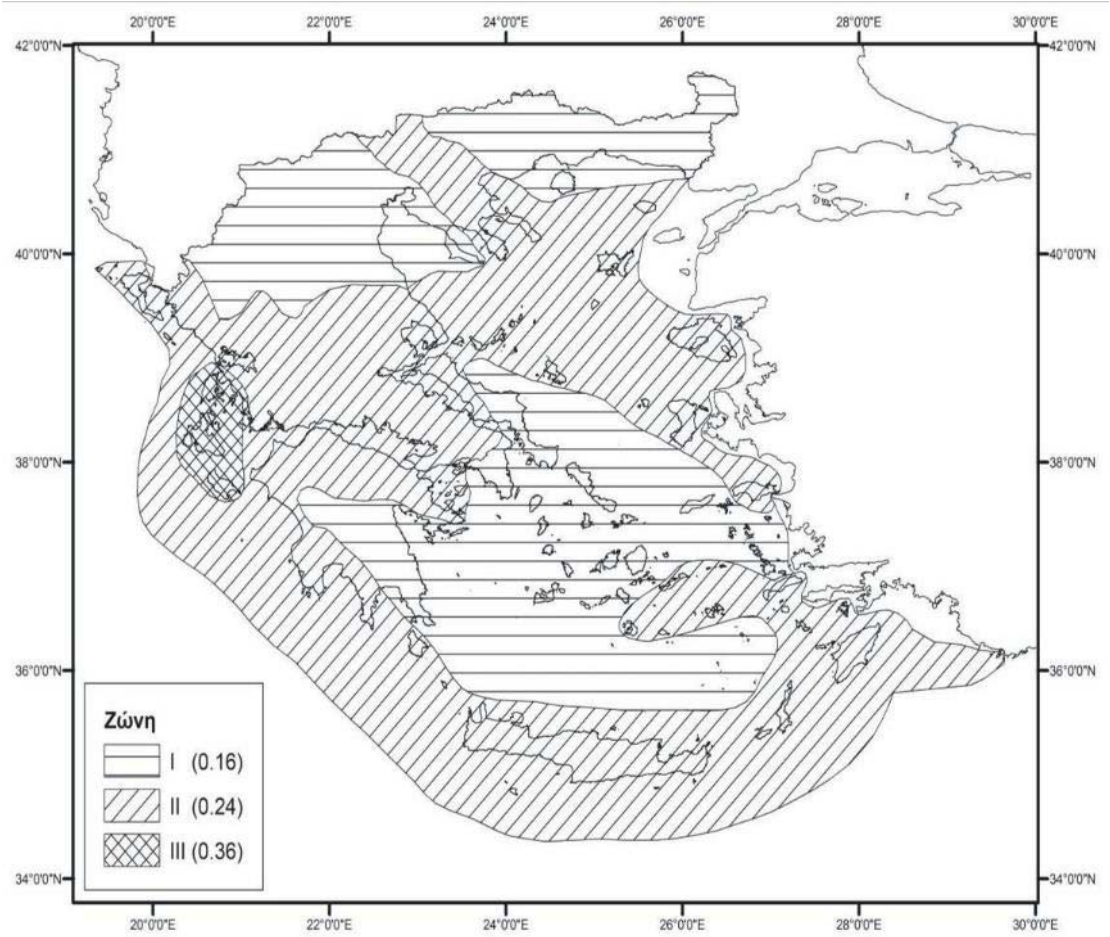


Figure 8.15: Map of Seismic Hazard Zones of Greece.

Based on the available data of the Geodynamic Institute of the National Observatory of Athens, the following figure shows the seismic events with magnitude Ms ≥ 3.0 Richter, which occurred in the wider region, within a 30km radius of the project under study, during the period 1964 - March 2019. Based on the available data, the largest earthquake of 5.4 Richter intensity occurred on 08.04.1970 at a distance of about 10.3km from the area of the factory under study, with a focal depth of 10km in the maritime area of the Corinthian Gulf.

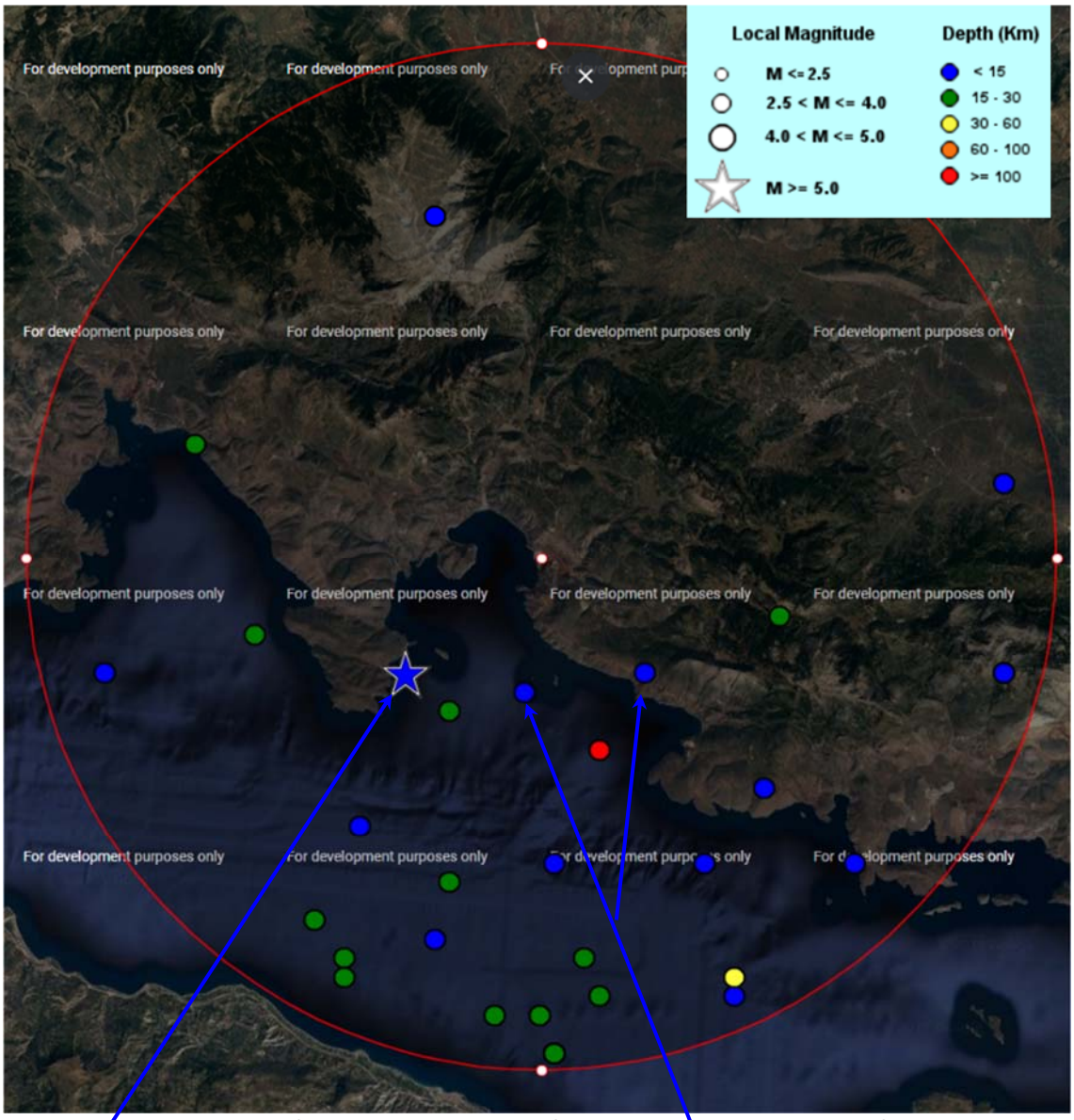


Figure 8.16: Seismic activity of the wider study area for the years 1964-2019 and for earthquakes above 4.0 Richter.

Stronger

Χρόνος Γένεσης: 1970/04/08 13:50:28 (GMT)
Μέγεθος: 5.4 ML
Γεωγρ.Πλάτος: 38.30°B
Γεωγρ.Μήκος: 22.60°A
Βάθος: 10.0 χμ
Επίκεντρο: 28.2 χμ ΔΝΔ της Λειβαδιάς
Απόσταση από το κέντρο: 10.3 χμ

closer

Χρόνος Γένεσης: 1989/05/07 10:46:47 (GMT)
Μέγεθος: 4.1 ML
Γεωγρ.Πλάτος: 38.29°B
Γεωγρ.Μήκος: 22.68°A
Βάθος: 1.0 χμ
Επίκεντρο: 23.4 χμ ΝΔ της Λειβαδιάς
Απόσταση από το κέντρο: 8.1 χμ

Χρόνος Γένεσης: 1999/06/25 07:42:14 (GMT)
Μέγεθος: 4.3 ML
Γεωγρ.Πλάτος: 38.30°B
Γεωγρ.Μήκος: 22.76°A
Βάθος: 11.0 χμ
Επίκεντρο: 18.0 χμ ΝΝΔ της Λειβαδιάς
Απόσταση από το κέντρο: 9.4 χμ

8.4.4 Soil Characteristics

Based on the Soil Charter of Greece (Institute of Soilology – Lipasmatology and Climatology of the Ministry

of Agriculture), which was drawn up on the basis of existing data and work of the Institute of Soilology of Lipasmatology and Climatology, the Institute of Chemistry and Agriculture "N. Kanelopoulos" and the former Geological Service of C.L.P., the soils found in the study area are shown in the following figure:.

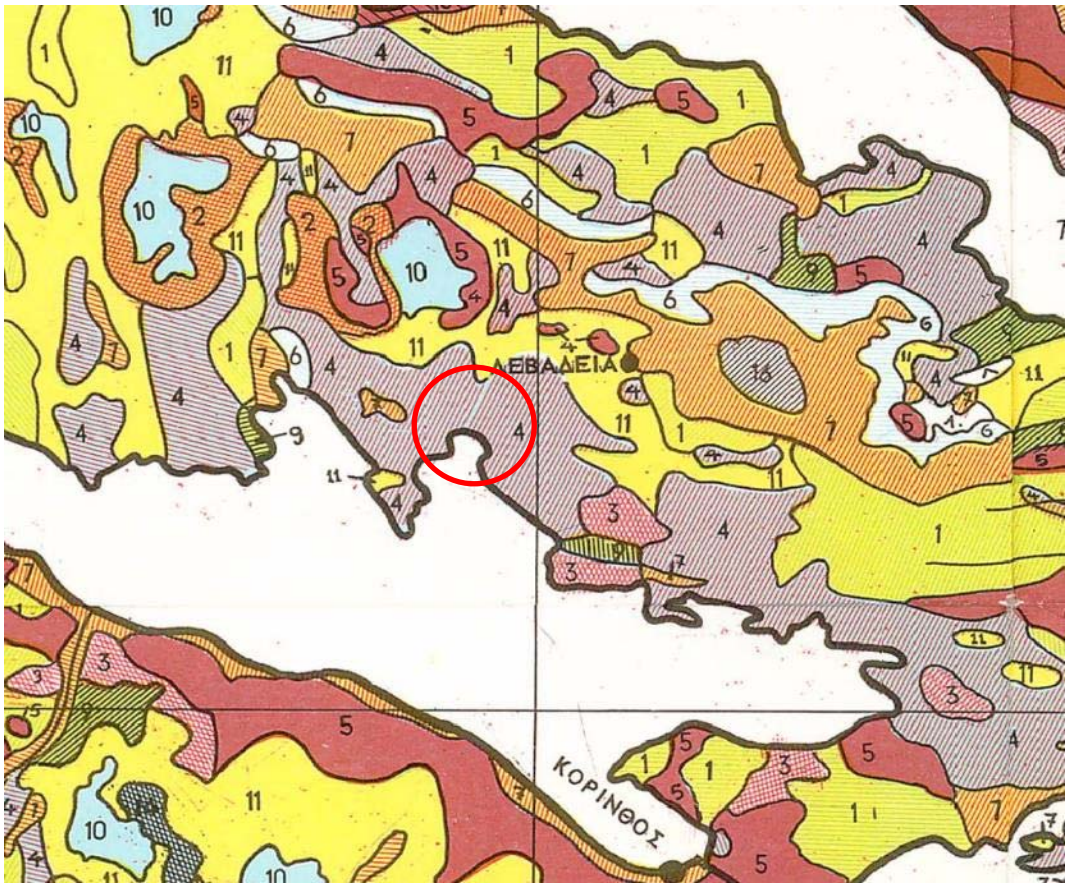


Figure 8.17: Extract of a soil map of Greece, where the red circle encloses the study area.

The soils found in the study area are the following:

Limestone Redzine and Orphn Mediterranean

The main soil types found in the study area are the following:

1. **C2C7-919-1-G2BN**: type of soils that occurs in hard limestones on steep slopes and at the bottom of slopes. In terms of soil characterization it is a rock with no corrosion and steep surface slope. From an ecological point of view they are included in the area of broadleaf leaves and a moderate degree of anthropogenic effect on vegetation with northern and southern exposures.
2. **A7A8-111-1-G9EE**: type of soils presented elsewhere at the bottom of the aisles and in an open valley.

In terms of soil characterization it is deep with no corrosion and light surface gradient. From an ecological point of view they are included in the area of unleaf broadleaf and for cultivated land with flat exposures.

3. **C5C7-825-1-G2NN**: type of soils presented in hard limestones in the middle and bottom of the aisles. In terms of soil characterization it is rock and shallow with no to moderate erosion and moderate surface gradient. From an ecological point of view they are included in the area of leafy broadleaf and a moderate degree of anthropogenic effect on vegetation with northern and southern exposures.

8.5 NATURAL ENVIRONMENT

8.5.1 General information

The chloride composition of the wider area of the project is included in the coverage limits of the Oleo Ceratonion sub-area (olive and carob sub-area), the Mediterranean Vegetation Zone Quercetalia ilicis (Dur leaf belt), according to the classification of phytosocial units by Braun – Blanquet.

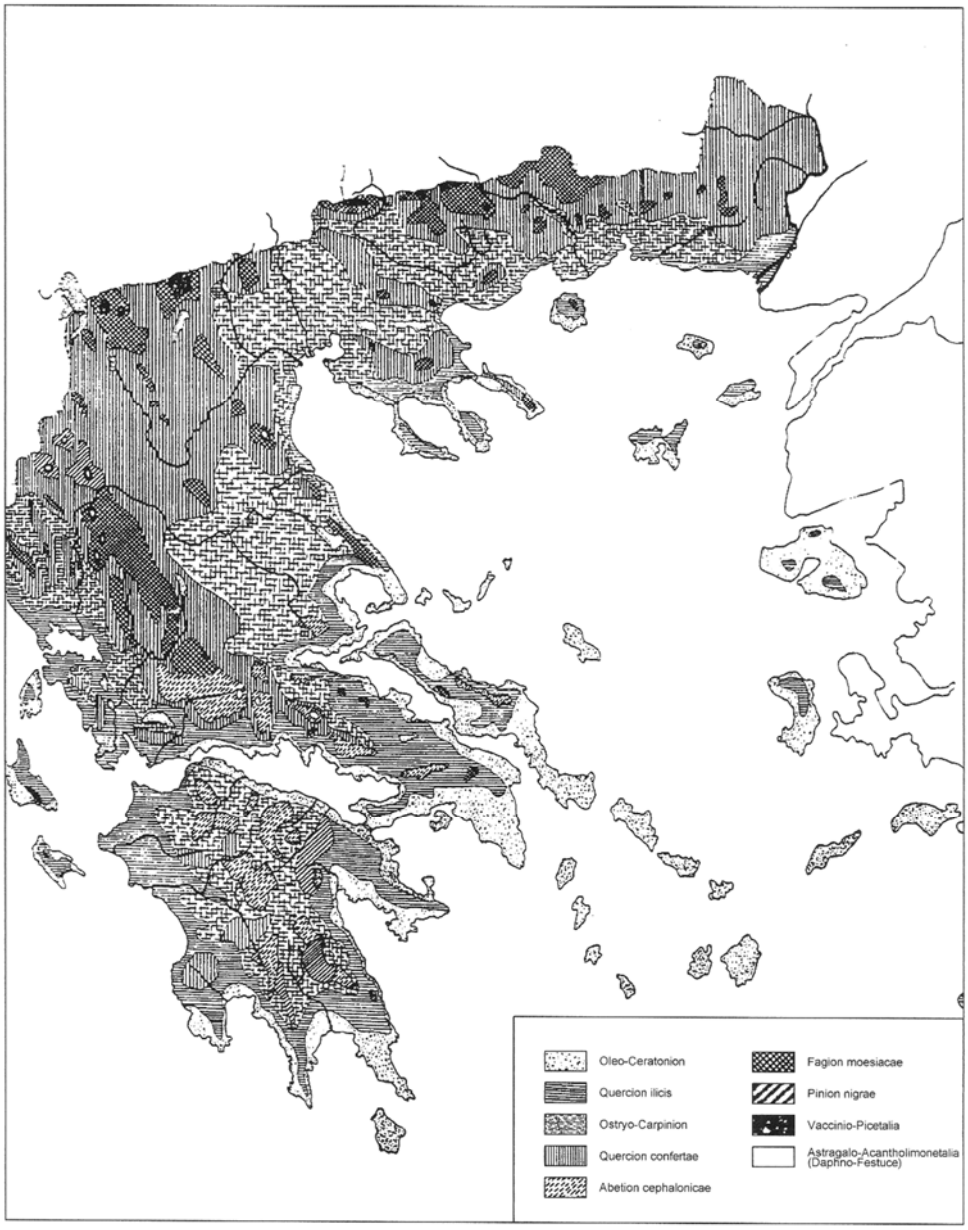


Figure 8.18: Map of Phytosocial Structures of Greece v. S. Dafi (classification of units according to the Braun-Blanquet system).

The Quercetalia ilicis zone occupies West Greece, Ann. Greece and NE Greece and consists of two sub-areas. On a large scale, the coastal, hilly and sub-mountainous vegetation sub-area **Oleo Ceratonion (olive and carob sub-area**) to which the study area belongs is found. This zone is found from sea level up to 700-800m and appears in exhibitions facing south. The main characteristics included are schinos (Pistacia lentiscus) and wildebeth (Oela oeaster). On a much smaller scale is found the sub-area Quercion Ilicis, which appears above the Oleo Ceratonion and in place of the aria. The position of the main characteristic species in this sub-area is occupied by the querqus coccitera. The immediate study area has few species of tree

vegetation populations, bushy vegetation is characterized as rich, while finally herbaceous vegetation shows populations with moderate or relatively low frequency.

The Oleo Ceratonion sub-area occurs in the driest SOUTH and Eastern Greece (up to Pelion), in the islands of the South Aegean, in the lower positions of the legs and south Of Halkidiki and in some islands of the Ionian Sea.

This sub-column can be distinguished in two growth areas:

- In the lower, warmer of Oleo-Ceratonietum and in the relatively colder of Oleo - Ientiscetum. The first growth area extends to the lower region of Crete and the islands of the southern Aegean, to the South Peloponnese and Attica. In these areas natural plant society has long been degraded and when the areas are not cultivated agriculturally, they are covered by compounds of toast (garique, tomilaris) in which they dominate, thorny, semi-thames, such as: Poterium spinosum (Sarcopoterium the thorny), Genista acanthoclanda (Genista the thorn branch), Euphorbia acanhtothamnos (Euphoria the thorn) etc., as well as various lips (Lamiaceae), such as: Corydothymus capitatus (Head thyme) , Salvia officinalis (Salvia the Pharmaceutical, Sage), Salvia pomifera (Salvia the Apple, Wild Sage), Phlomis fruticosa (Asfaka), Balotta acetambulosa (Lychnaraki) etc.
- At higher altitudes and further north horizontally, the growth space of Oleo - Ientiscentum appears. He presents his greatest spread in the South and Eastern Peloponnese, Attica, Eastern Greece up to Pelion and at the feet of Halkidiki. In this growth space appear, despite the dryness of the climate, wonderful clusters of Pinus halepensis (Pine the Aleppo), which spreads beyond the boundaries of Oleo – Ientiscentum. The plants found are the following: Olea europaea var. Silvestris (Agrielia), Pistacia Ientiscus (Schinos), Erica manipuliflora (Heather the vertebral), Myrtus communis (Myrtos the common), (in wetter places), Quercus coccistera (Drys the granules Ronicera etrusca (Honeysuckle), Rosa sempervirens (Wild Rose), Smilax aspera (Arcudovatos), Styrax officinalis (Styrax the Pharmaceutical, Sturaki), Rubia peregrine (Rizari) etc. And from an agricultural point of view, the cultivation of olives, citrus fruits, peanuts, etc. dominates.

The dominant vegetation of the area is bushy, followed by meadows and crops. The rocky areas in the area are found only in places where woody vegetation does not grow, i.e. in places with vertical rocks – rectangles.

The fauna of the wider region, is the usual fauna of the Greek countryside with species such as foxes (Vulpes vulpes), jackals (Lupuella spp.), badgers (Meles meles), weasels (Mustella nivallis), hares (Lepus Europaeus)

etc. Birds such as otus scops, urura epops, carya (Corvus monentula) and magpie (pica pica) make up the birdlife of the region.

8.5.2 Areas of the National Protected Areas System

With regard to the areas of the National System of Protected Areas, in accordance with No. 50743/2017 JMD (Government Gazette 4432B/15.12.2017) revised the national list of areas of the European Natura 2000 Ecological Network.

The nearest protected areas of the European Ecological Network Natura 2000 (Directive 92/43/EEC) to the project under study are the following:

- "Corinthian Gulf" (GR 2530007) which has been designated as a Special Conservation Zone (SCI) and is located at a distance of approximately 100m west of the electricity (T.L.) under study.
- "Parnassos National Park" (GR 2410002) which has been designated as a Special Protection Zone (SPA) and is located at a distance of about 1.600m NW of the electricity under study.
- "Southeastern Parnassos-Parnassos National Park-Tithoreas Forest" (GR 2450005) which has been designated as a Special Conservation Zone (SCI) and is located at a distance of approximately 9.500m NW of the electricity under study.

Figure 8.19: A google earth extract showing the 400kV electricity (T.L.) under study. The protected lines of the European Ecological Network Natura 2000 (green shading) and the Wildlife Refuges (brown shading) of the area are also reflected.

Also, in the wider area of activity are located the following Wildlife Refuges:

- "Agioi Pantes (Delphi - Desfina - Chrysos)" (Government Gazette 343 / B / 1987), at a distance of about 16km West of the HV. electric power.
- "Latsoudi (Distomo - Steirio)" (Government Gazette 961 / B / 1995), at a distance of about 6,0km East of the HV electric power.
- "Asprochoma-Psilo-Prontoli-Kelari (Arachova)" (Government Gazette 1043 / B / 1976), at a distance of approximately 9,8 km NW of the HV. electric power

In any case, the electricity transmission line under study does not fall within areas of the National Protected Areas System.

8.5.3 Forests and forest areas

For the study area there are no ratified or posted forest maps. In any case, in accordance with Chapter 6 of L. 998/1979 "**Allowable interventions in forests, forest areas and public areas referred to in points (a) and (b) of paragraph 5 of Article 3 of this Law'**, in particular in accordance with paragraph 5 of Article 53 'Infrastructure projects', the installation of power stations by conventional fuel and accompanying works only on public land referred to in points (a) and (b) of Article 3(5) of Law 998/1979 and in the absence thereof in forested areas and forests.

Also, in accordance with Article 46 'Extraordinary nature of permissible interference with resused land', in public and private forests and woodlands declared resusperable, **no intervention provided for in the provisions** of Chapter 6 of Law 998/1979 or by any other provision, **with the exception of those referred to in Article 48(1) is permitted, paragraphs 1**, 3, 4 and **5 of Article 53 (installation of conventional fuel power stations and their accompanying works)**, paragraph 1 of Article 54, paragraph 1 of Article 55 and paragraph 5 of Article 57 of Chapter 6, and the provisions of Article 16 of Law 998/1979.

Also, in accordance with Article 45(5) of Law 998/1979, for national and regional road, irrigation and water supply projects as well as **networks for the transmission and distribution of natural gas**, petroleum products and **electricity in forests, forest areas and public areas referred to in points (a) and (b) of Article 3(5)** of Law 998/1979, **in the case of no definitive technical studies have been carried out, the competent forestry authority shall, in this case, give an opinion on the dossier of the Environmental impact Assessment (EIA)** taking into account the limitations and conditions laid down by forestry legislation for the implementation of those projects on those areas. At the completion of the final studies of the projects, the project operator is obliged to submit to the competent forestry authority the relevant dossier for the adoption of a designation act.

In any case, after the finalization of the project design, a request for the issuance of a designation act will be submitted to the competent forestry office. However, based on the above, the project under study is compatible with the provisions of forest legislation

8.5.4 Other important natural areas

There are no other significant natural areas in the immediate intervention area other than those mentioned in the previous sections

8.6 ANTHROPOGENIC ENVIRONMENT

8.6.1 Spatial Planning - Land Uses

As mentioned above, the project under study falls within the administrative boundaries of the Municipality Unit (MU) Distomo of the Municipality Unit (MU) of Distomo - Arachova - Antikyra, but also of the Municipality of Kyriaki, the Municipality of Levadeon of Viotia (MU), for which the General Urban Plans (GSPs) of MU Distomo and MU Kyriaki have been approved, respectively.

G.U.P. MUNICIPALITY UNIT (MU) Distomo of the Municipality of Distomo - Arachova - Antikyra.

According to Decision 3124/128532 (Government Gazette 432/A.A.P./31.12.2012) "Approval of a General Urban Plan (G.U.P.) of Municipal Unity (MU) of Distomo , Municipality of Distomo - Arachova - Antikyra", approved the G.U.P. concerning the entire area through which the electricity transmission line under study passes.

The following is an excerpt of the project entitled "Land Uses and Environmental Protection" (Plan No. P.2) of the approved G.U.P. of MU Distomo indicating the electricity T.L. under consideration.

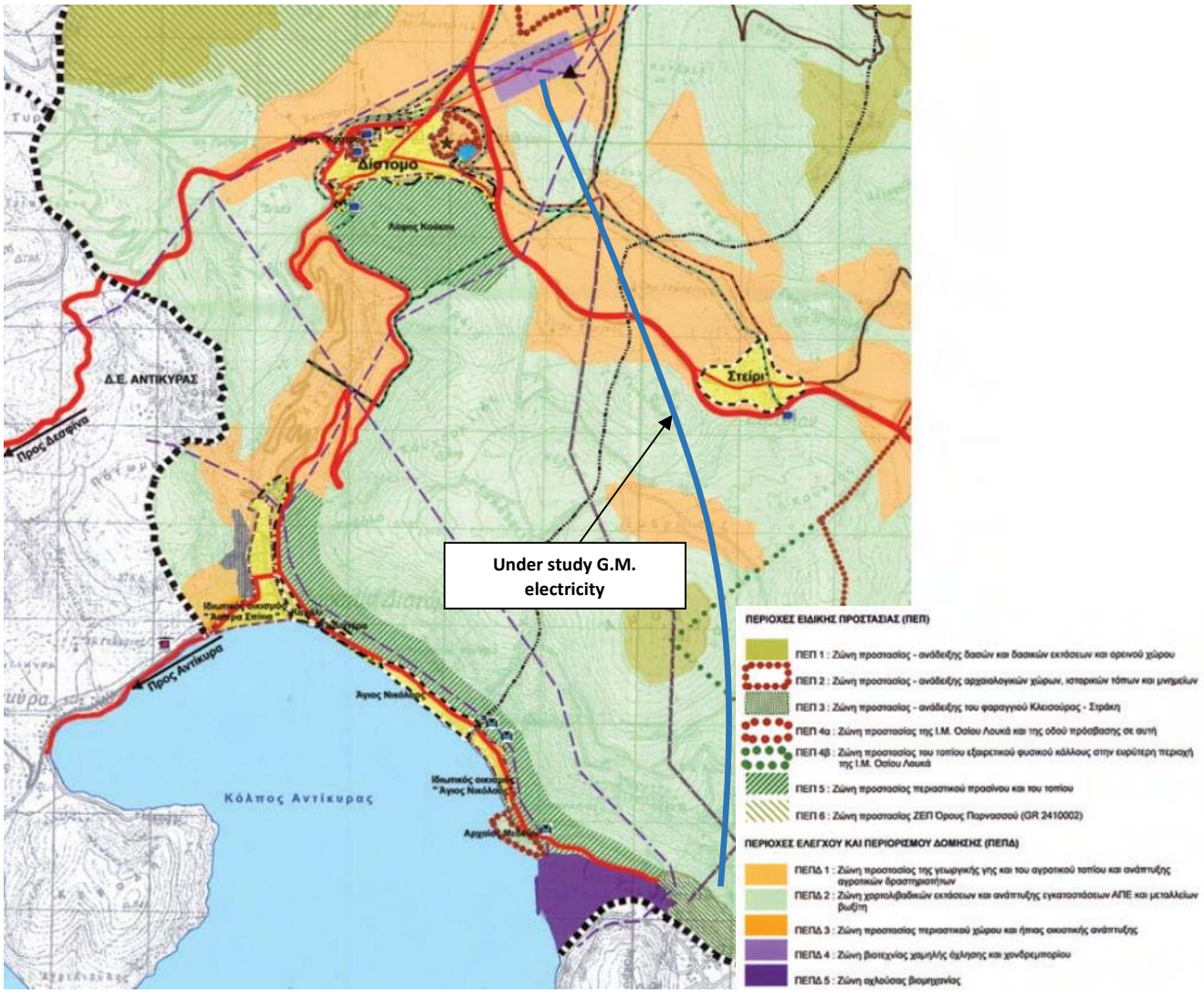


Figure 8.20: Excerpt from a project entitled "Land Uses and Environmental Protection" (Plan No. P.2) of the approved GIS of MU Distomo, where the blue curve indicates the route of the proposed T.L. electric power.

According to the organization of land uses and environmental protection of the I.E., the route of the proposed electricity transmission line passes mainly through the Areas of Control and Restriction of Construction (PEPD):

- PEPD 1: Zone for the protection of agricultural land and the rural landscape and the development of agricultural activities (the smallest part of the T.L. under consideration falls).
- PEPD 2: Zone of grassland and development of RES facilities and bauxite mines (falls for most of the T.L.

In both the PEPD1 and the PEPD2 zone, technical infrastructure installations and networks are permitted, inter alia.

G.U.P. MUNICIPALITY UNIT (MU) Kyrakiou Municipality of Levadeon.

According to Decision 3529/149006 (Government Gazette 273/A.A.P./12.12.2016) "Approval of the General Urban Plan (G.U.P.) of the Community of Kyriaki, Municipality of Levadeon", approved the G.U.P. of the current (MU) Kyriaki concerning the entire area of the (MU), from which the electricity transmission line under study passes, in the area near the Agios Nikolaos HVC.

The following is an excerpt of the project entitled "Land Uses and Environmental Protection" of the approved G.U.P. of the M.U. Kyriaki, which indicates the area through which the electricity (T.L.) under study passes.

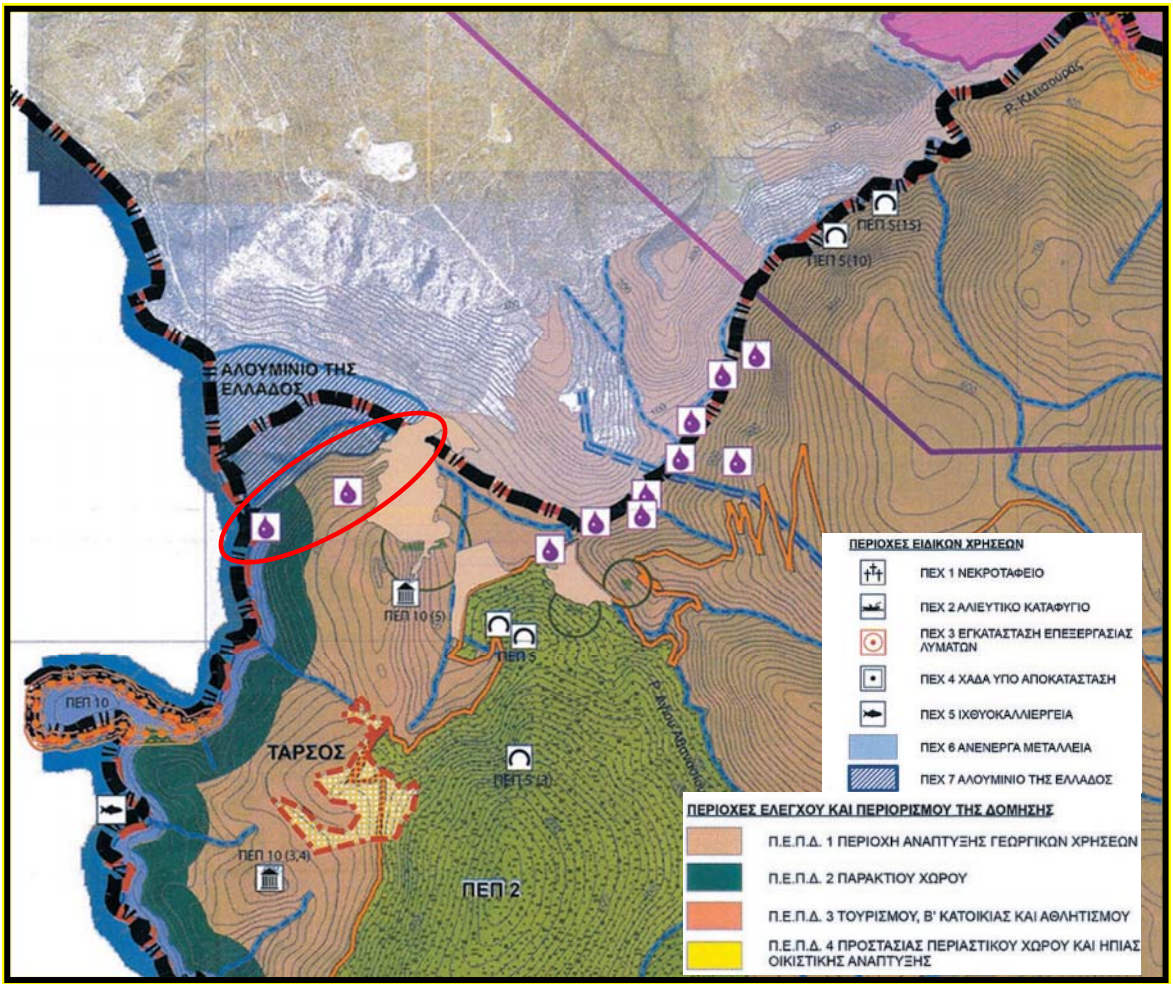


Figure 8.21: Excerpt of a project entitled "Land Uses and Environmental Protection" (Plan No. P.2) of the approved G.U.P. of the I.E. Kyriaki, where the red ellipse includes part of the electricity under study.

According to the organization of land uses and environmental protection, part of the electricity under study passes through the Areas of Control and Restriction of Construction (PEPD):

- PEPD 1: Area of development of agricultural uses.
- PEPD 2: Coastal area.

Both in the area of development of agricultural uses and in the area of coastal area, among others, the facilities and the networks of technical infrastructure are allowed.

8.6.2 Structure and functions of the anthropogenic environment

The nearest settlements in the project under study are:

- Tarsos, located at a distance of about 150m South of the electricity under study. The settlement of Tarsos was established by No. 3149/16.11.1987 Decision of the Prefect of Viotia (Government Gazette 1187/D/14.12.1987).
- Steiri is located about 1,000m east of the electricity sector under study. The settlement of Steiri was institutionalized with the No. 3354/27.07.1986 Decision of the Prefect of Viotia (Government Gazette 926/D/06.10.1986).
- Distomo, located at a distance of about 1,000m west of the electricity sector under study. The settlement of Distomo was established by No. 36642/20.06.1972 Decision of the Prefect of Viotia (Government Gazette 156/D/07.07.1972).

Figure 8.22: Google Earth extract showing the project under study, as well as the nearest demarcated settlements.

8.6.3 Cultural heritage

An important archaeological site of the area is **the remains of the wall of the acropolis of Fokikos Medeon**, which is built on the hill of Agios Theodoros, at a distance of 1.500m NW of the electricity transmission line under study.

The low walled hill of Agioi Theodoroi, on the east coast of the gulf of Antikyra, has been identified by scholars with the ancient city of Fokikos Medeon. At the time Pausanias visited it, the city was deserted. The citadel is surrounded by strong fortification from the east, north and west sides of the hill, while the steep southern sides of the hill offer natural fortification on the side of the sea. The walls, dating back to the 4th century BC, are constructed according to the irregular isostructure system of wallwork, without binders in the joints with large stonework.

The first excavations were carried out in 1907 by the archaeologist Georgios Sotiriadis, while in the 1960s a part of an extensive ancient cemetery was excavated with uninterrupted use from the Meso-Hellenic era (2100/2000 – 1600 BC) until the 2nd century BC In 1966 on the north side of the hill a vaulted tomb was revealed, preserving its built road, while the dome is not preserved. A characteristic feature of the monument is the existence of a small side room.

A similar archaeological site, through which part of the electricity under study passes, is the **monastery of St. Luke**, which was built in the 10th century and belongs to the list of UNESCO World Heritage Sites. It is built on the western slopes of Elicus, under the citadel of ancient Styrio and is one of the most important monuments of the Mid-Byzantine period in Greece. The church was dedicated to St. Luke (29 July 896 - 7 February 953), whose remains have been in the Monastery since 1986, when it was transferred from Venice.

The year 2012 and with the 85715/20176/2942/288/20-20 8-2012 (Government Gazette 287/13.9.2012), Zones A of Absolute Protection and Zone B of Protection of the Monastery of St. Luke, Regional Unit of Viotia were established. The protection zones of this archaeological site are indicated in the satellite imagery extract below. A small part of the electricity transmission line under study, about 1,300m, as well as four pillars (P17, P18, P19 and P20) fall within the Protection Zone B of this archaeological site, but a long way from the Protection Zone A of this (about 2km).

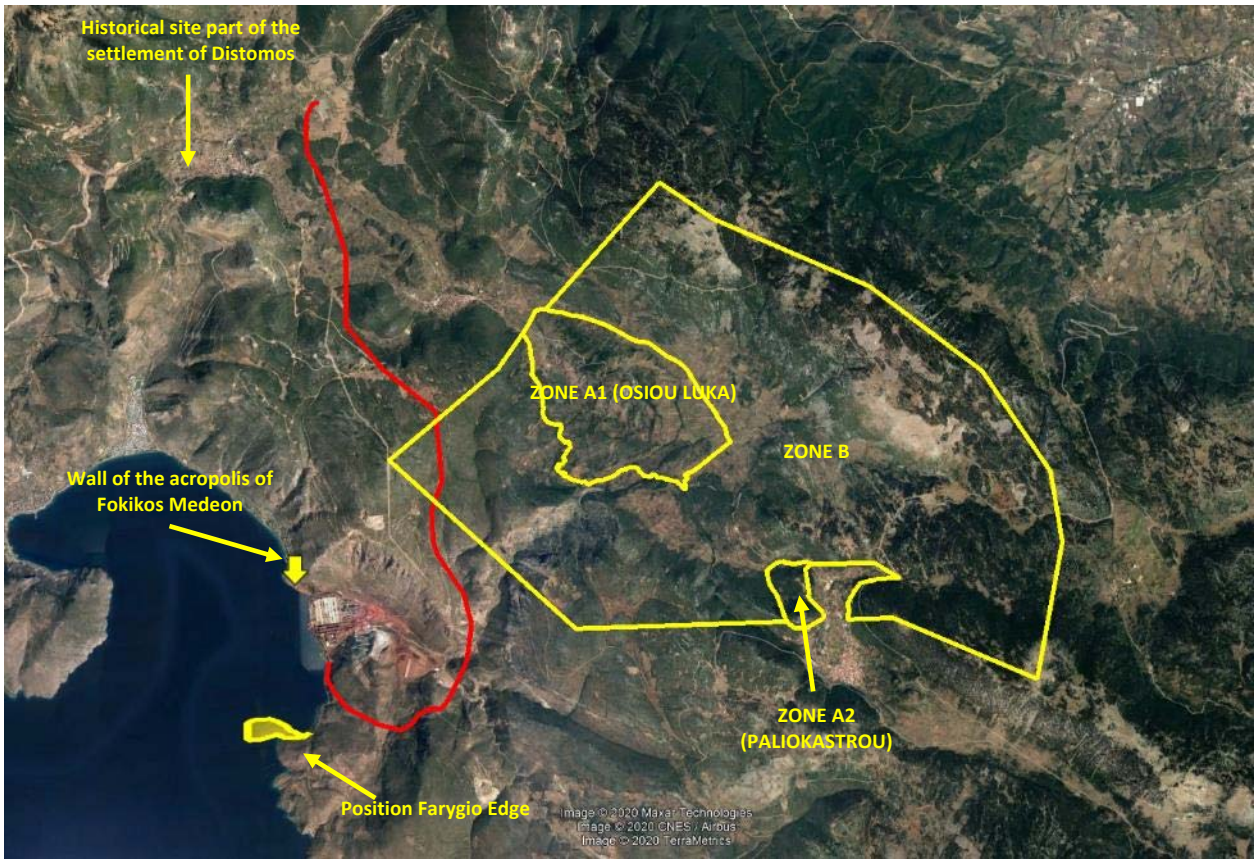


Figure 8.23: A satellite imagery extract (google earth), showing the 400kV electricity under study and yellow capturing the archaeological sites of the area.

At a distance of about 700m SW of the (T.L.) study declared by JMD/A/F43/22714/1420 (Government Gazette 603/B/22.05.2001) as an archaeological site the **location Farygio** A tip (Puntas Tarsos area – Aspra Spitia of Viotia) for the protection of the surviving settlement remains of the late Roman empire. These are ruins of houses, a new ancient water tank and a wall that runs through the neck of the Punta Peninsula.

Finally, it is stated that according to the JMD/301374/31104/2846 (Government Gazette 168/A.A.P./08.08.2018) of the Ministry of Culture and Sport, part of the settlement of Distomo has been designated as a historical site, because it is directly linked to historical memory at local and national level, as it is a place of sacrifice and martyrdom of the civilian inhabitants of Distomo during the Second World War. The distance of the new electricity transmission line from this part of the settlement is about 2-3km.

8.7 SOCIAL - ECONOMIC ENVIRONMENT

8.7.1 Demographic situation and trends

The project under study and the study area are mainly located within the administrative boundaries of the Communities of Styrio and Kyriaki, the Municipal Units (M.U) of Distomo and Kyriaki respectively, the Municipalities of Distomo - Arachova - Antikyra and Levadeon respectively, both of the Regional Unit (R.U.) of Viotia.

According to the institutional framework "New Architecture of Self-Government and Decentralized Administration – Kallikrates Programme" of Law 3852/2010 (Government Gazette 87/A/07-06-2010), which is valid from 01-01-2011, the administrative division of Greece has been reformed and the boundaries of the self-administrative units, the way in which the institutions are elected and their responsibilities have been redefined. According to the above institutional framework, the new Municipality of Levadeon, based in Livadia, came from the union of the Municipalities of Levadea, Charonia, Dalia, Koronia and the Community of Kyriaki, which were abolished. The new Municipality of Distomo - Arachova - Antikyra based in Distomo came from the union of the Municipalities of Arachobis, Distomo and the Community of Antikyra, which were abolished.

The Municipality of Levadeon has a population of 31.315 inhabitants (2011 census) and consists of twenty (20) Communities. The Municipality of Distomo - Arachova - Antikyra has a population of 8.188 inhabitants (2011 census) and consists of three (4) Communities: Antikyra, Arachobis, Distomo and Styrio. The Municipalities of Levadeon and Distomo - Arachova - Antikyra, are administratively subject to the Decentralized Administration of Thessaly and Central Greece and in particular to the Region of Central Greece which, according to the new institutional framework for Local Government 1st and 2nd degree, consists of five (5) Regional Units (M.U.): Viotia, Evia, Evritania, Fthiotida and Fokida. The new Municipality of Levadeon consists of five (5) Municipal Units (M.U): Levadeon, Chireonia, Dalia, Koronia and Kyriaki. The new Municipality of Distomo - Arachova - Antikyra consists of three (3) Municipal Units (M.U): Distomo , Arachova and Antikyra.

The populations of the Communities of Kyriaki and Distomo , according to the 2011 census (EL.STAT.), are presented in the table below.

Table 8.2: The Communities of Kyriaki and Distomo with their populations (census 2011) (source: EL.STAT.).

Communities	D.C. & P.C.	population
Kyriakiou	Kyriakiou	2,298
	Total M.U	**2,298**
Distomo	Distomo	3,192
	Styrio	689
	Total M.U	**3,881**

The following table shows the evolution of the population over time, for each I.E.

Table 8.3: The Communities of kyriaki and Distomo with the evolution of the population over time (years 1991, 2001 and 2011) (source: EL.STAT.).

M.U	Communities	population		
		1991	2001	2011
Kyriakiou	Kyriakiou	2,482	2,161	2,298
Total MUNICIPALITY UNIT (MU)		**2,482**	**2,161**	**2,298**
Distomo	Distomo	4,556	3,561	3,192
	Styrio	922	826	689
Total MUNICIPALITY UNIT (MU)		**5,478**	**4,387**	**3,881**

The following table shows the percentage change in the Communities of kyriaki and Distomo , according to the data in the figures for the years 1991 to 2011.

Table 8.4: Percentage population change of the Communities of the I.E. of Kyriaki & Distomo .

MUNICIPALITY UNIT (MU)	Communities	Percentage population change (%)	
		1991 - 2001	2001 - 2011
Kyriakiou	Kyriakiou	-12.93	6.34
Total MUNICIPALITY UNIT (MU)		**-12.93**	**6.34**
Distomo	Distomo	-21.84	-10.36
	Styrio	-10.41	-16.59
Total MUNICIPALITY UNIT (MU)		**-19.92**	**-11.53**

According to data from the National Statistical Office, the population of Kyriaki in the decade 1991 - 2001 decreased by 12.93% and in the decade 2001 - 2011 showed an increase of 6.34%. Distomo in the decade 1991 - 2001 showed a decrease of 19.92% and in the decade 2001 - 2011 it showed a decrease of 11.53%.

8.7.2 Productive structure of the local economy

According to the data of the 2011 census (greek statistical authority) in the Municipality of Levadeon, of the total permanent population (31.315 inhabitants) the employees are 10.673 people. In the Municipality of Distomo - Arachova - Antikyra the number of employees amounts to 2693 people. The following table shows employment by productive sector for the two Municipalities.

Table 8.5: Employees by sector of production activity.

municipality	primary	Secondary	tertiary	Total employees
Levadeon	1,259 (12%)	2,539 (24%)	6,875 (64%)	**10,673**
Distomo - Arachova - Antikyra	151 (6%)	1,083 (40%)	1,459 (54%)	**2,693**

8.7.3 Employment data

Of the total of 31.315 inhabitants (2011 census) of the Municipality of Levadeon, 13.088 people constitute the economically active population of the Municipality. Of these, 2.415 are unemployed, while 10.673 are employed in the primary, secondary and tertiary sectors of employment. In the primary sector 11.8% of employees are employed, in the secondary sector 23.8% are employed and finally 64.4% are employed in the tertiary sector. The economically inactive population of the Municipality of Levadeon amounts to 18.227 people and concerns students - students (4.465 persons), pensioners (7.589 persons), persons dealing with household (3.811) and others (2.362 persons).

Table 8.6: Economically active and inactive population, employed by sector of economic activity and unemployed of the Municipalities of Levadea and Distomo - Arachova - Antikyra (source: EL.STAT., census 2011).

municipality	total	Financially active						Financially inactive
		Total financial active	Απασχολούμενοι				unemployed	
			Total employees	primary sector	secondary sector	tertiary sector		
Levadeon	31.315	13,088	10,673	1,259	2,539	6,875	2,415	18,227
Distomo - Arachova - Antikyra	8.188	3,269	2,693	151	1,083	1,459	576	4,919

Of the total of 8,188 inhabitants (2011 census) of the Municipality of Distomo - Arachova - Antikyra, 3,269 people constitute the economically active population of the Municipality. Of these, 576 people are

unemployed, while 2,693 are employed in the primary, secondary and tertiary sectors of employment. In the primary sector 5.6% of employees are employed, in the secondary sector 40.2% and finally 54.2% are employed in the tertiary sector. The economically inactive population of the Municipality of Distomo - Arachova - Antikyra amounts to 4,919 people and concerns students - students (1.191 people), pensioners (1.820 people), persons involved in domestic (1.370) and others (538 persons).

8.7.4 Per capita income

The following diagram has been created by greek statistical authority (EL.STAT.) data and shows the gross domestic product per capita of Viotia (MU) for the period 2000 - 2017.

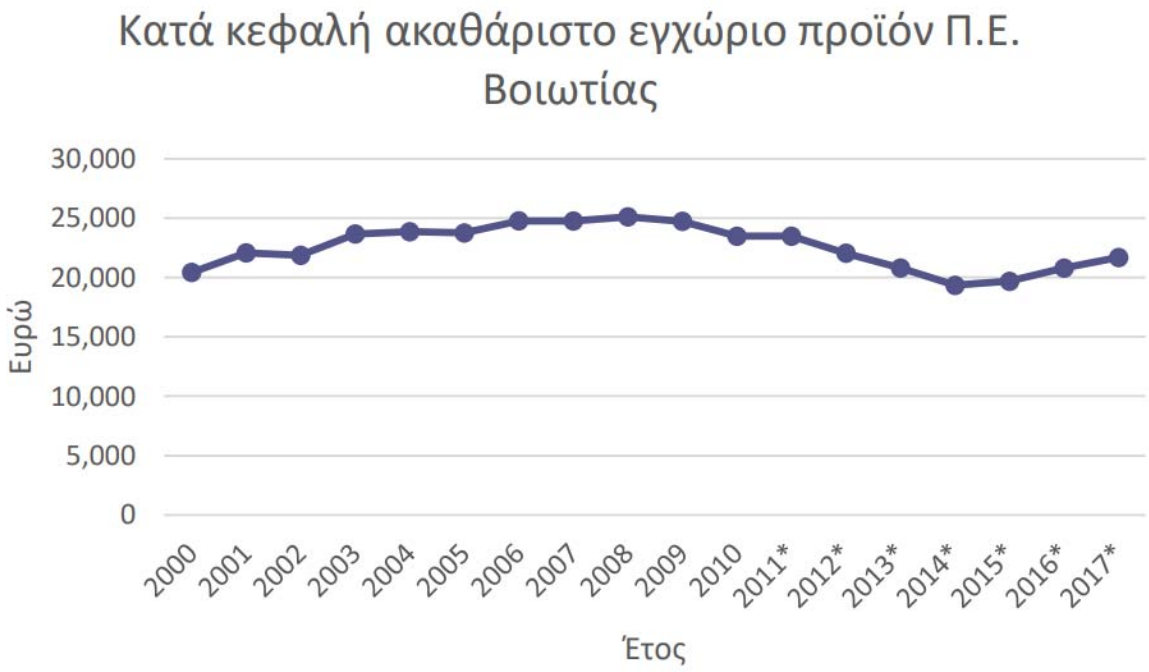


Figure 8.24: Per capita gross domestic product for (M.U.) **Boeotia for the period 2000 - 2017.**

As shown above, per capita income has been on the rise from 2000 to 2008, and then declined until 2014 mainly due to the impact of the global economic crisis on the Greek economy. Since 2014 it appears to be recovering, reaching 21,678 euros in 2017.

8.8 TECHNICAL SUBSIDIES

8.8.1 Land, sea and air transport infrastructure

Road network.

In more detail, the Region of Central Greece is crossed by the Patras-Athens-Thessaloniki-Evzoni road axis, as well as by the main railway line of the country. This is an important factor in enhancing the competitiveness of the Region at national level and confers similar characteristics on enterprises operating in the field of.

The National Network that crosses the Region amounts to 1.191 kilometers, while the provincial network covers 3.473 kilometers. The situation of the intra-provincial road network presents problems and significant weaknesses, making road communication quite difficult during the winter months.

More specifically, the Region of Central Greece includes the following Main Roads:

- Athens - Lamia - Thessaloniki (patras-athens-thessaloniki-evzoni).
- Patras-athens-thessaloniki-evzoni - Chalkida - Kimi.
- Lamia - Amfissa - Antirio - Patras.
- Lamia - Karditsa - Trikala - Panagia/Igoumenitsa (E65).
- Thebes - Eleusis (PATRAS-ATHENS-THESSALONIKI-EVZONI).

In addition, the following Secondary Roads are included:

- Thebes - Livadia - Itea (Delphi bypass).
- Lamia - Karpenisi - Agrinio.
- Patras-athens-thessaloniki-evzoni - Glyfa. Edipsos/Istia - Chalkida.
- Aliveri - Karystos.
- Livadia - Lamia - Dodokos.

As far as Viotia (MU) is concerned, its road network occupies 550km of provincial network and 123km of secondary national network.

Rail network.

The length of the Greek rail network amounts to about 2.450km, with a density of 18km per 1,000k^{m2}, which is also the smallest in Europe (the corresponding value in the EU of 15 is 44, while in the EU 25 is 50km). This significant lag is largely due to the lack of conditions for the development and operation of rail transport. However, the Region of Central Greece has a strategic role in the railway network, which takes the form of a central trunk with branches, rather than the form of an integrated interregional network.

The railway infrastructure of the Region is developed in the northwest - south-east direction, along the upgraded international line Piraeus - Athens - Thessaloniki - Idomeni, which also traffics most of the total transport project (approximately 50%) of the OSE and serves most of the main urban centers of the Region, mainly after upgrading the line to Chalkida with its suburban type connection with Athens. In addition to this main axis, the railway network of the Region is complemented by its branches from Inoi to Chalkida and from Lianokladi to the port of Stylida.

Waterage.

The role of the commercial/passenger ports of the Region of Central Greece is limited to meeting the needs of its island area and has corresponding importance. The subsystems of maritime (coastal) transport play a decisive role in the interconnection of the islands of the region, which are few but have a developed / developing tourist character, with the continental area. In the area of the facilities of MYTILINEOS S.A., there is a port, to meet the needs of the company's units (transportation of raw materials, finished products, etc.).

Air transport.

In the Region of Central Greece there is only one airport, that of Skyros that connects the island with Athens (Operational Programme of Central Greece 2012 - 2014).

8.8.2 Environmental infrastructure Systems

According to the Special Secretariat for Water, in the wider study area, the nearest Wastewater Treatment Facility (EL) with code EL2410040110 is located south of Arachova and about 9km NW of the transport line under study. The body of the unit is the Municipality of Distomo - Arachova - Antikyra and its operation began on 13.02.2002. The settlements served by biological cleaning through the sewerage network, the settlement of Arachova the biological cleaning does not accept or process industrial sewage. The capacity

of the constructed facility is 7,330 inhabitants equivalent. The average annual supply of the installation is 1,600^{m3}/day, while the maximum is 2,200^{m3}/day.

It is also mentioned that in the settlement of White Houses or Distomo Beach there is a biological urban wastewater treatment plant that covers the needs of this settlement and the municipal unit of Antikyra.

Finally, within the industrial facilities of the factory of ATE operates a biological station, which accepts through a sewage network the urban sewage of the existing activities of Mytileneos S.A.

With regard to the disposal of municipal waste, both the Municipality of Levadeon and the Municipality of Distomo - Arachova - Antikyra deposit their mixed waste in the Livadia landfill. The collection of recyclable packaging materials is carried out by the Municipalities, while their transhipment is carried out by the Fodsa 1st (MU) N. Viotia and the materials to be recycled are driven by the Livadia landfill to the KDY Formariou.

Also, in and near the study area, in particular within the Alumina and Aluminium Production Plant of AGA, the following environmental infrastructure systems are identified:

- the installation for the treatment of liquid industrial waste from the various plant facilities.
- the urban wastewater treatment plant of the plant.
- the site of disposal of inert waste.
- landfill for hazardous waste.
- the place where bauxite residues are dispose of.

Figure 8.25: Satellite imagery extract showing the study area with a red outline, showing the environmental infrastructure systems of the alumina and aluminum plant.

8.8.3 Water, electricity, gas and telecommunications networks

The communities of Distomo and Styrio have an autonomous water network and together with the network of the community of Kyriaki are mainly supplied by the water pipeline of Mornos. Since there are no surface waters in the area, the remaining needs (industrial and urban) are covered by drilling.

Within the study area and close to the projects under study, the following electricity installations are located:

i. The High Efficiency Electricity and Heat Cogeneration Station (STHYA) of MYTILINEOS S.A., with a rated capacity of 334MW, with natural gas fuel.

ii. The Independent Power Station of MYTILINEOS S.A. / Electrical & Natural Gas Business Sector, with a rated power of 444.48MW with natural gas fuel.

iii. The construction and operation of a new Power Station (P.S.) of MYTILINEOS S.A. / Electrical & Natural Gas Business Sector, with a rated power of 826MW, with natural gas fuel.

Also, in the wider area there are a number of high and ultra-high voltage transmission lines, as well as substations and ultra-high voltage centres, as presented in the Extract of the Charter of the Ten-Year Development Program (D.P.) of the National Electricity Transmission System 2021-2030.

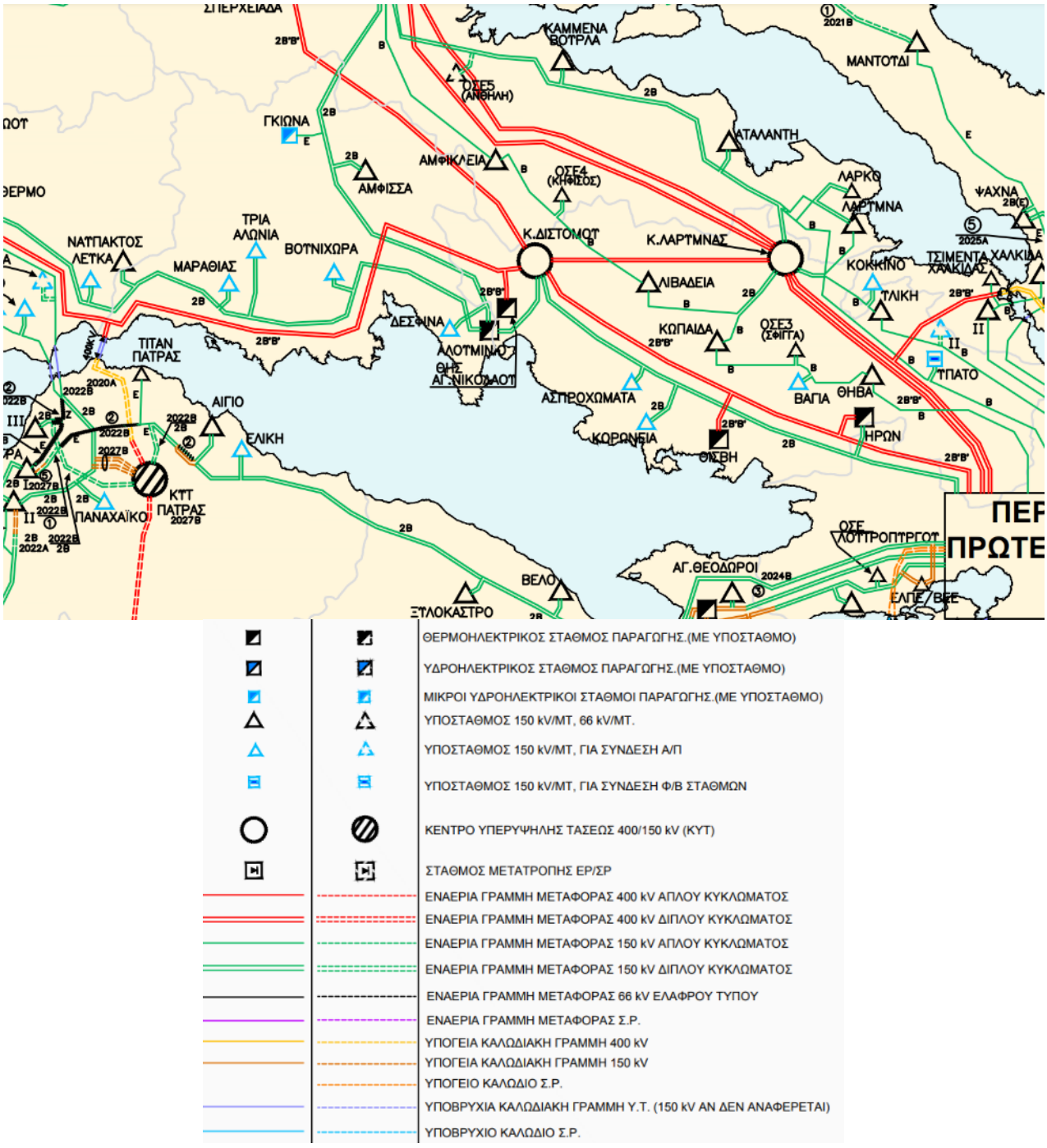


Figure 8.26: Extract Map of the Ten-Year Development Programme (ICP) of the National Electricity Transmission System 2021 - 2030.

Natural gas networks in the study area under consideration are located an existing branch of high-pressure natural gas of the EFA, from the Mavroneri - Antikyra pipeline of diameter DN 500 (20΄), which covers the energy supply of the power plants of the region.

Finally, the study area is connected to telecommunications networks and no specific problems are recorded.

8.9 Anthropogenic pressures

8.9.1 Existing sources of pollution

The main anthropogenic pressures in the environment of the study area concern the following:

- The movement of vehicles on the road network, resulting in the emission of CO, NOx and hydrocarbons from petrol engines and additional smoke and SO_2 from diesel engines.
- The heating of the houses, resulting in the emission of CO, SO_2 and particulate matter (mainly soot) during the winter months.
- The use of water resources to ensure the supply of drinking water to settlements.
- The "Aluminium of Greece" plant – the business sector Metallurgy of Mytileneos S.A., which has been operating in the region since 1966, and the power plants of the same company, fully complying with the prescribed conditions of their environmental terms approvals (emission limits, etc.).

8.9.2 Exploitation of natural resources

In the study area there is no extensive exploitation of any natural resource.

8.10 ATMOSFAIRIC ENVIRONMENT - AIR QUALITY

8.10.1 Main sources of pollutant emissions into the air

This section describes the air quality in the study area, based on the record and measurements systematically carried out by the "Aluminium of Greece" plant – the business sector Metallurgy of Mytileneos S.A. The main sources of pollutant emission in the atmosphere of the study area, in addition to the emission sources of that plant and the Power Plants, they also concern:

- the movement of vehicles on the road network resulting in the emission of CO, NOx and hydrocarbons from petrol engines and additional smoke and SO2 from diesel engines.
- heating of dwellings, resulting in the emission of CO, SO2 and particulate matter (mainly soot) during the winter months.

8.10.2 Assessment and evaluation of the existing quality of the ambient environment

The factory "Aluminum of Greece" – the business sector Metallurgy of Mytileneos S.A. has installed in the area and operates an air quality measurement station in the Monastery of Osios Loukas, about 2,5km northeast of the facilities under study.

The station continuously records values for nine (9) total parameters. five (5) relate to meteorological parameters: relative humidity (RH,%), wind direction (WD, deg), wind speed (WS, m/s), precipitation (rain, mm), temperature (T,oC) and the rest to pollutants SO_2 (μg/m3), NOX (μg/m3), NO2 (μg/m3), PM10 (μg/m3).

The annual arithmetic averages of the parameters recorded by the station are shown in the following table and **no exceedance of the permitted limits is observed.**

Table 8.7: Measurements from St. Luke's Station (annual prices).

parameter	Unit of Measure	Value (annual arithmetic average)	Average annual price (μg/Nm3)
NO_X	μg/Nm^3	8.14	30
NO_2	μg/Nm^3	5.96	40
SO_2 (χειμερινή περίοδος)	μg/Nm^3	5.54	20
PM_{10}	μg/Nm^3	14.47	40
temperature	°C	16.57	-
Relative humidity	%	59.02	-
Wind direction	deg	158.15	-
	dir	NA	-
Wind speed	m/s	1.70	-

8.10.3 Changes over time and evolutionary trends

Quantitative and qualitative changes in the emission of gaseous pollutants and air quality are not expected in the study area.

8.11 ACOUSTIC ENVIRONMENT - VIBRATIONS

8.11.1 Main sources of environmental noise or vibration emission

The main source of noise in the study area is the factory "Aluminum of Greece" – the business sector Metallurgy of Mytileneos S.A., which operates in the area since 1966, respecting the limits laid down by its Environmental Conditions, as well as the Power Stations of Mytileneos S.A., which similarly respect the prescribed limits of their Environmental Conditions. Other sources of noise and vibration do not exist in the

area, which develops away from large urban centres. Minor source of noise in the study area is the movement of vehicles.

8.11.2 Assessment and evaluation of the existing quality of the acoustic environment

The quality of the acoustic environment of the area is considered very good.

8.11.3 Timeless changes and trends in evolution

No changes in the emission of environmental noise or vibrations are expected over time, as there are no other sources of environmental noise emission in the study area.

8.12 ELECTROMAGNETIC FIELDS

In April 2018, measurements were made of the levels of the low-frequency electrical and magnetic field in the environment of the power plants in Agios Nikolaos, the exposure of which is attached to a corresponding Annex to this study.

This report of the EAE was prepared at the request of MYTILINEOS S.A. The measurements were carried out by a branch of the Office of Non-Ionized Radiation of the EEAE with a view to recording the levels of low-frequency electrical and magnetic fields for the verification of compliance or not with Presidential Decree 120/2016 (Government Gazette 203/A/26.10.2016) "Harmonization with Directive 2013/2016/ 35/EU 'on minimum health and safety requirements with regard to the exposure of workers to risks arising from natural factors (electromagnetic fields) and repealing Directive 2004/40/EC' which harmonized national law with Directive 2013/35/EU of the European Parliament and of the Council of 26 June 2013.

The measurements were carried out according to the Hellenic standardization organization ELOT IEC 61786: 2003, Measurements of magnetic and electric fields of low frequencies in relation to human exposure - Specific specifications for instruments and instructions for measurements

Series of measurements relating to magnetic induction and electric field intensity were carried out at points where it was considered by the EEAE step that measurements had to be carried out in order to check the most 'burdened' electrical and magnetic fields, positions and conditions of public exposure and to check compliance with the safe exposure limits set out in the legislation in force. as well as in other posts indicated by the applicant. In particular, measurements were made of the levels of the low-frequency magnetic and electrical field in the environment of the Combined Cycle Unit of thermal power station, while

measurements of the levels of the low-frequency magnetic field were made at points where electrical equipment is installed and in the environment of voltage lifting transformers. Measurements of low-frequency magnetic and electrical field were also carried out in places where medium- and low-voltage electrical equipment is installed, as well as in medium- and low-voltage cable transit areas serving the installation. Finally, measurements of the low-frequency magnetic field were carried out at various jobs within the power company's premises. In total, the measurements were carried out at 44 locations.

On the basis of the results obtained from the measurements carried out and taking into account the action levels for the exposure of workers to low-frequency electrical and magnetic fields, as defined by **Presidential Decree 120/2016 (Government Gazette 203/A/26.10.2016**), the following are stated:

- The values of low levels of action (AL) for the size of magnetic induction as defined in DP 120/2016 have not been exceeded. More specifically, the values obtained by magnetic induction B (μT) at all measuring positions range from 0,94% to 27% of the values of low action levels specified in Table B2 on pp. 9287 of PD 120/2016 for the frequency range 5Hz to 32kHz.
- The values of high levels of action (AL) for the size of magnetic induction as defined in DP 120/2016 were not found to be exceeded. More specifically, the values obtained by magnetic induction B (μT) at all measuring positions range from 0,64% to 18,6% of the values of high action levels specified in Table B2 on pp. 9287 of PD 120/2016 for the frequency range 5Hz to 32kHz.
- The values of low action levels (AL) for the size of the electric field intensity as defined in DP 120/2016 were not found to be exceeded. More specifically, the values obtained by the intensity of the electric field E (V/m) at all measuring positions (except position K42) range from 8.44% to 59,5% of the values of the low action levels specified in Table B1 on pp. 9286 of PD 120/2016 for the 5Hz to 32kHz frequency range. The corresponding value at the measuring position K42 was below the lower end of the measurement value interval of the instrument used.
- The values of high action levels (AL) for the size of the electric field intensity as defined in DP 120/2016 were not found to be exceeded. More specifically, the values obtained by the intensity of the electric field E (V/m) at all measuring positions (except position K42) range from 7,9% to 35,8% of the values of the high action levels specified in Table B1 on pp. 9286 of PD 120/2016 for the 5Hz to 32kHz frequency range. The corresponding value at the measuring position K42 was below the lower end of the measurement value interval of the instrument used.

In line with the conclusions of the EEAE measurement report, it can be reported that low and high action (AL) values for magnetic induction and electric field intensity have not been exceeded, as defined by

Presidential Decree 120/2016 (Government Gazette 203/A/26.10.2016) "Harmonization with Directive 2013/35/EU "on minimum health and safety requirements with regard to workers' exposure risks arising from natural factors (electromagnetic fields) and repealing Directive 2004/40/EC' which harmonized national law with Directive 2013/35/EU of the European Parliament and of the Council of 26 June 2013.

8.13 Waters

8.13.1 Management Plans

8.13.1.1 Management Plan for the River Basins of the Water Department of Eastern Central Greece

The Water District of Eastern Central Greece (YD07), has an area of 12,291k^{m2} and includes the entire Regional Units of Evia (and Skyros), Viotia and Sporades, large parts of (M.U.) Fthiotida (87.2%) and Fokida (42.2%) and small parts of (M.U.) West Attica (8.2%), East Attica (13%) and Magnesia (1%). Most of the Water District is characterized as lowland to semi-mountainous. The main lowland areas of the YD are the valleys of Sperchios and Boeotic Kifissos - Kopida, while smaller are the plains of Istia and Artakis in Evia. The lakes of the water department are Yliki (20k^{m2}), Paralimni (11k^{m2}) and Dystos (5k^{m2}).

In accordance with Decision No. For example: oc.902 (Government Gazette 4673/B/29.12.2017) approved the 1st Review of the River Basin Management Plan of the Water District of Eastern Central Greece and the corresponding Strategic Environmental impact assessment. According to the approved SDSP of the Eastern Central Greece (**YD EL07**), this consists of seven (7) River Basins (RB), which are presented in the table below.

Table 8.8: Water catchment areas of Eastern Central Greece (YD EL07).

Λεκάνη Απορροής Ποταμού (ΛΑΠ)	Έκταση ΛΑΠ (km^2)
Σπερχειού (EL0718)	2.315
Εύβοιας (EL0719)	3.681
ΒΑ Παραλίας Καλλιδρόμου (EL0722)	919
Βοιωτικού Κηφισού (EL0723)	2.719
Άμφισσας (EL0724)	786
Ασωπού (EL0725)	1.362
Σποράδων (EL0735)	497
ΣΥΝΟΛΟ έκτασης ΥΔ 07	**12.279**

The 400kV high-voltage electricity transmission line under study falls under the River Basins (RB) of Asopos (EL0725) and RB of Boeotic Kifissos (EL0723).

Figure 8.27: Satellite imaging extract, showing the electricity transmission line under study, as well as the limit of RB Asopos (EL0725), RB Amfissa (EL0724) & RB Boeotic Kifissos (EL0723).

8.13.1.2 River Basin Flood Risk Management Plan of the Water District of Eastern Central Greece

As part of Greece's adaptation of the Community Directive 2007/60/EC on flood risk assessment and management, the Preliminary Flood Risk Assessment (FRA) was carried out by the special secretariat for water(SSW) in 2012. The FRA defined the Potentially High Flood Risk Zones (HFRZ), collected information on flood events from the relevant risk and disaster management bodies at local and central level, evaluated and recorded their data in territory-specific spreadsheets. In particular, the Preliminary Flood Risk Assessment included the following stages:

- The recording of historic floods with their main characteristics and the identification of significant historical floods based on their consequences.
- Identify areas where flooding is likely to occur and assess the potential negative effects of future flooding, taking into account historical flood data and changes in flood conditions since then.
- Determining Potentially High Flood Risk Zones.

According to the 1st Revision of the FRA under Directive 2007/60/EC, pursuant to the special secretariat for water(SSW)/ministry of environment, energy and climate change JMD 31822/1542/e103, the study area does not fall within a Potentially High Flood Risk Zone, as shown in the following figure:

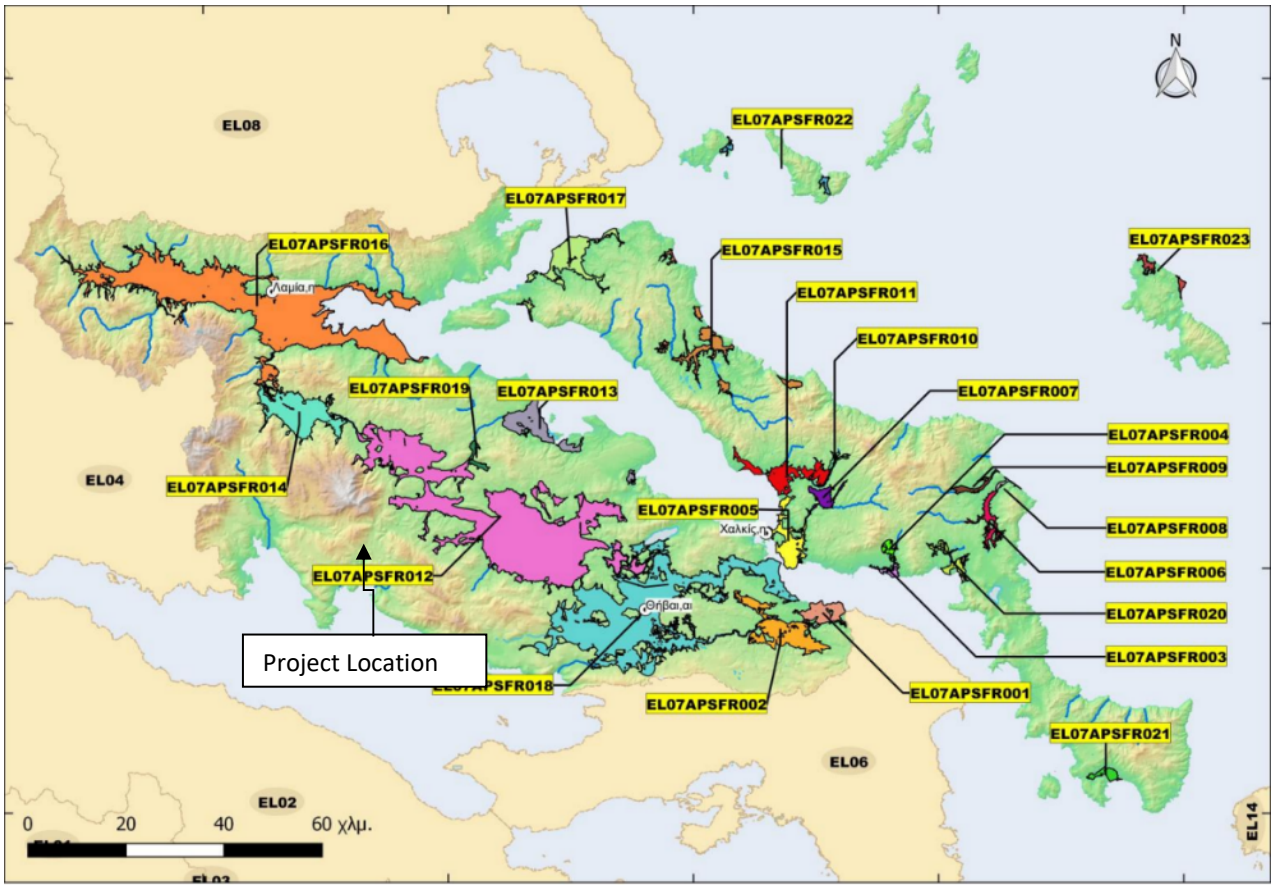


Figure 8.28: Excerpt from the Map of Potentially High Flood Risk Zones, based on the 1st Review of the FRA.

In accordance with the Decision of the European Commission, the Court of First ministry of environment and energy/GR special secretariat for water (SSW)/41375/328/2018 (Government Gazette 2682/B/06.07.2018) approved the River Basin Flood Risk Management Plan of the Eastern Central Greece Water District (EL07) and the corresponding Environmental impact assessment Strategy. The Flood Risk Management Plan is structured in two stages as follows:

- Stage 1: Preparation of Flood Risk Maps and Flood Risk Maps.
- Stage 2: Preparation of Flood Risk Management Plans (MSPs), Preparation of Strategic Environmental Impact Studies (SEIS) and Consultation.

In particular, flood risk maps have been prepared and approved for each flood risk management plan(FRMP), based on the spatial distribution of the flood flood surface for each recovery period (T=50, 100 and 1000 years). Flood Risk Maps based on the spatial distribution of the flood surface from river flows compiled correspond to the following scenarios:

- floods with a high probability of exceeding a 50-year reset period,
- floods with an average probability of exceeding a 100-year recovery period,
- floods with a low probability of exceeding a 1000-year reset period.

As detailed in section 5.2.3.2, the project under study does not fall into a flood zone for any period of restoration (T=50, T=100 and T=1000).

8.13.2 Surface water

From the River Water Systems (RWS) recorded under the Management Plan, closer to the study area is the Klisouras stream (EL0725R000300028N). The power transmission line under study runs through that stream. The Klisouras stream ends up in the sea area on the eastern coast of Antikyra Bay. According to the approved management plan, the length of the Klisouras stream amounts to 8.03km and its catchment area to 135.8k^{m2}. According to the Management Plan, the ecological status of the stream is classified as moderate and its chemical status as good.

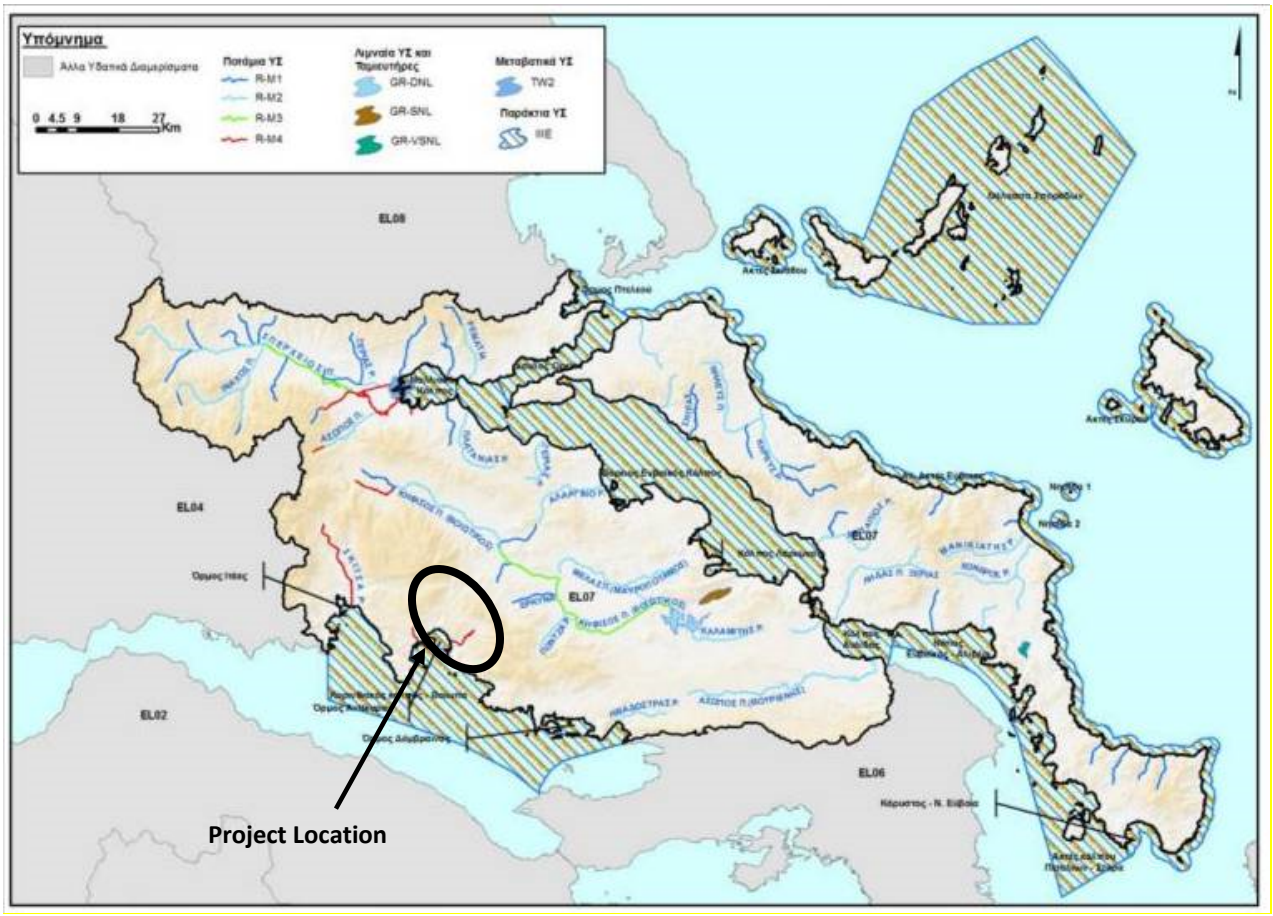


Figure 8.29: Extract Map of Surface Water Systems (SWS) in YD EL07.

In the immediate area of the project under study, the Coastal YS Bay of Antikyra (EL0724C0017N) is recorded, whose ecological and chemical status are classified as good.

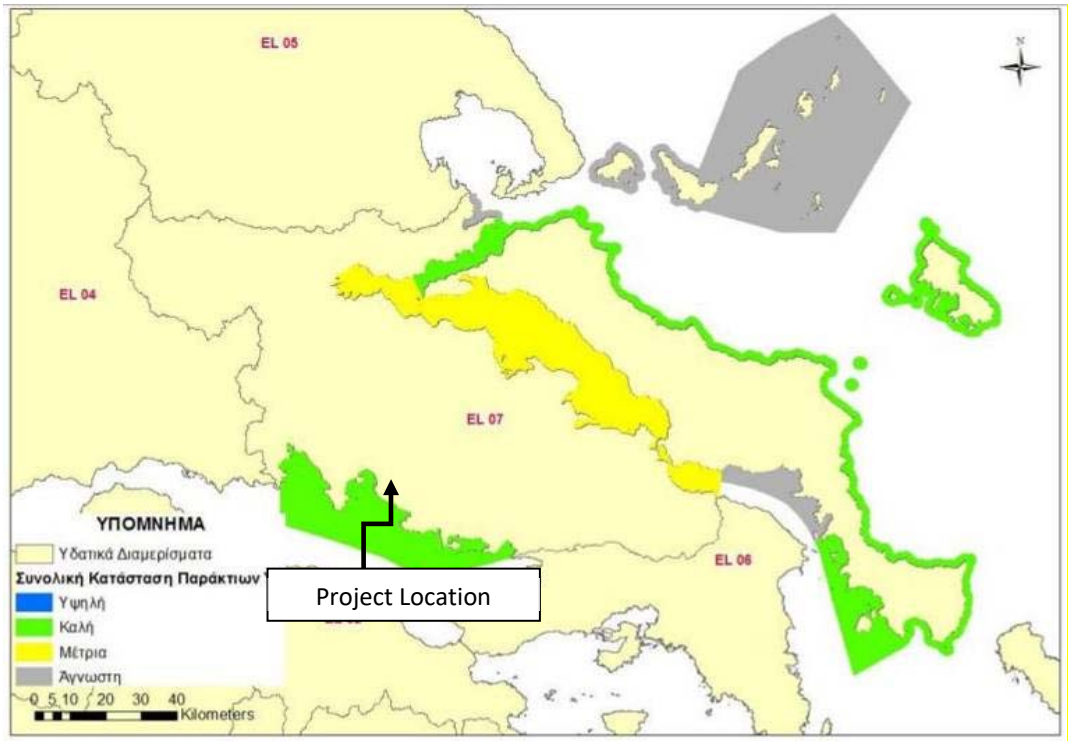


Figure 8.30: Classification of the overall status of coastal water systems of Eastern Central Greece (EL07).

In the study area there is no surface water system that falls within an area intended for water abstraction for human consumption and has been included in the Register of Protected Areas.

8.13.3 Groundwater

With regard to groundwater, the study area is located the Underground Water System (UWS) "Antikyra - Kithairon". (EL0700230). The UWS "Antikyra - Kithairon" (EL0700230), an area of 900k^{m2}, develops in the masses of carbon rocks that form the southern coastal region of the Aat Water District. From the Gulf of Itea to Fokida to Porto Germeno in Attica. It is a particularly extensive area in which many important aquifers, mainly karstic form, are developed, which are in direct hydraulic communication with the sea, where they are unloaded with large coastal and brackish sources.

The supply of the system is made by the direct injection of meteoric water, which moves in depth through the karstic network.

Discharges of the system are made in places laterally in autogenic materials, but its most important discharge, which characterizes the system, takes place in the coastal zone towards the sea. The sea level

forms a base level of the karst aquifer with which it is in direct hydraulic communication. Coastal brackish sources of high supply are gushing across the coastline.

The average annual supply of the system is 200×106m3/year, while total receipts are estimated at 9.51×106^{m3}/year. The quantitative status of the ministry "Antikyra - Kithairon" (EL0700230), as shown in the extract of the map below, is characterized as good.

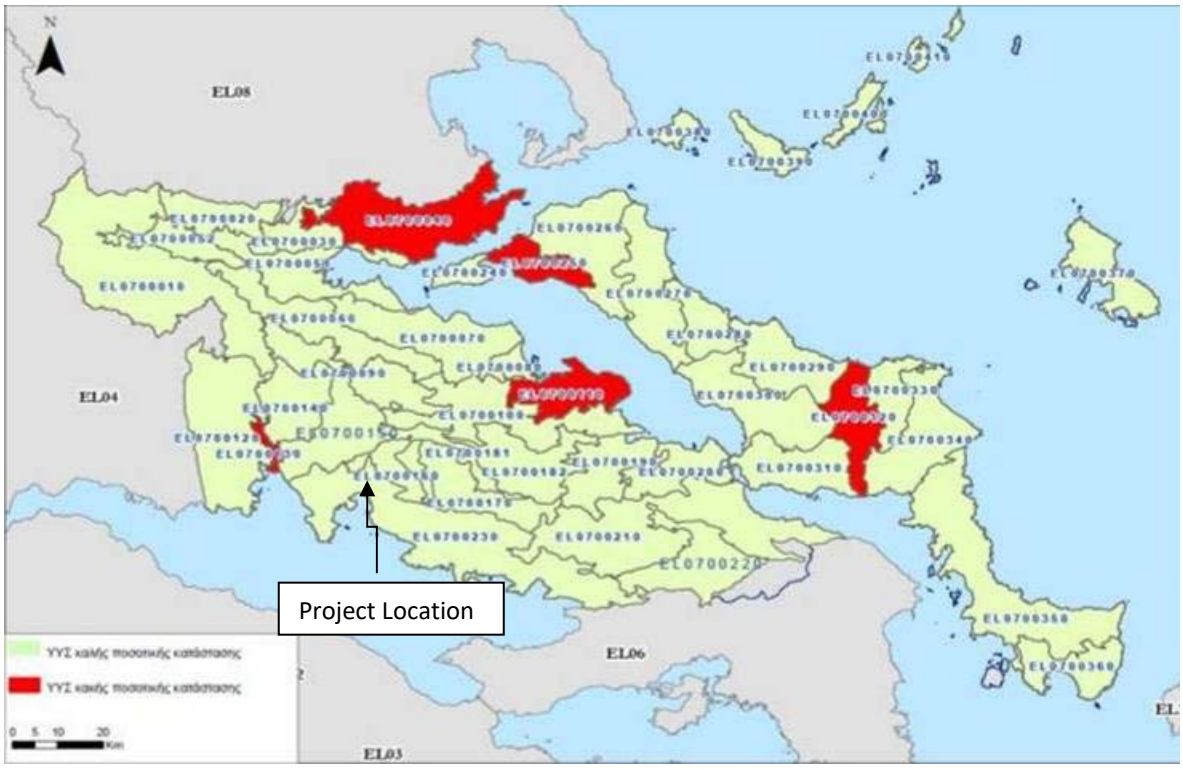


Figure 8.31: Quantitative status of Groundwater Systems (GS) in HR EL07.

Similarly, the chemical status of the ministry "Antikyra - Kithairon" (EL0700230), as shown in the extract of the map below, is characterized as good.

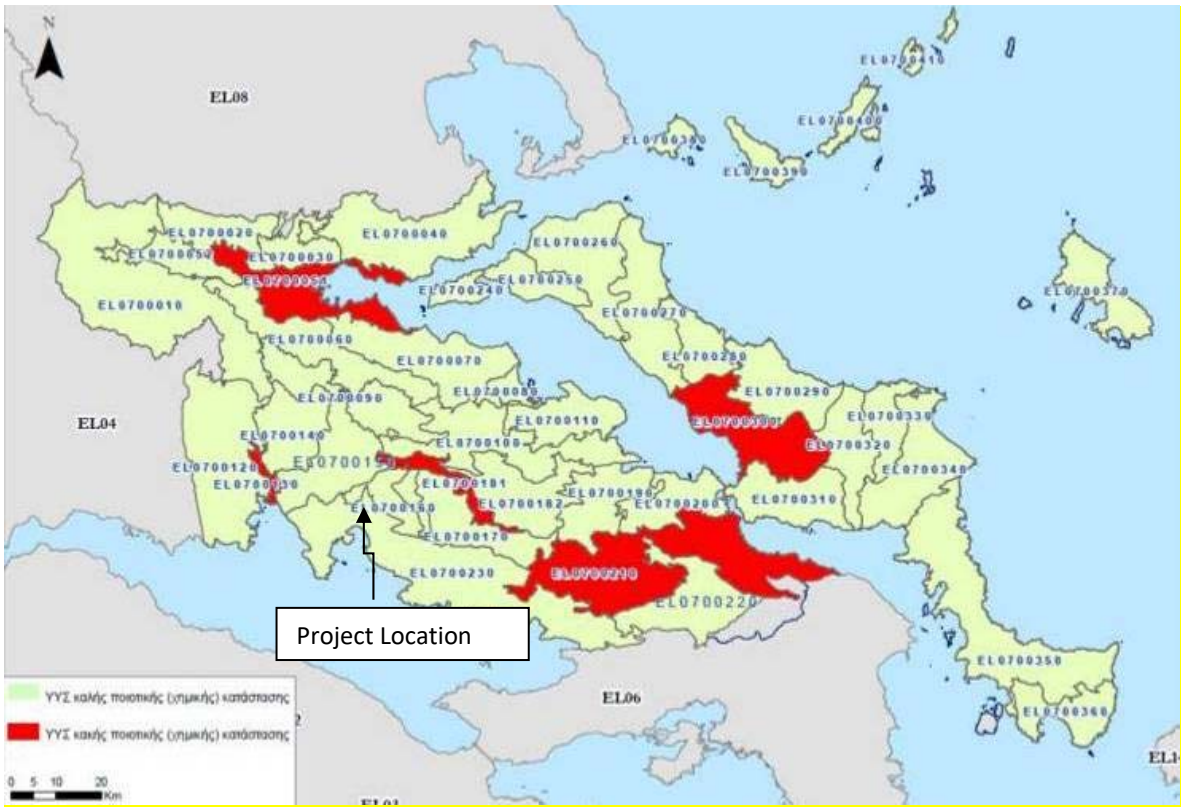


Figure 8.32: Chemical status of Underground Water Systems (UWS) in HR EL07.

In the study area there is no underground body of water falling within an area intended for the abstraction of water for human consumption and has been included in the Register of Protected Areas.

8.14 DANGERS TO HUMAN HEALTH, CULTURAL HERITAGE AND / OR THE ENVIRONMENT, MAINLY DUE TO ACCIDENTS OR DISASTERS

This section presents the risks to human health, cultural heritage and/or the environment due to natural disasters or technological accidents/disasters that may occur in the study area and cause adverse effects on the environment.

The assessment of vulnerability in the study area to major accidents and natural disasters is carried out following changes in EU legislation. The revised Directive 2014/52/EU entered into force on 16 May 2017 as incorporated into The Greek Legislation by hr. Eco. 1915 (Government Gazette 304/B/2018) and declares the need to assess the "expected significant negative impact" of the project on the environment resulting from the vulnerability of the project to risks of major accidents and/or natural disasters related to the project.

Natural disaster is the probability of a potentially catastrophic event within a time period and in a specific geographical area. The United Nations (UN) defined natural disasters in 1992 as serious disturbances in the functioning of society, causing widespread human, material or environmental losses that go beyond society's ability to deal with them with their own resources.

The literature lists various ways of separating and classifying natural disasters, depending on the etiology and gravity. The World Health Organization classifies natural disasters into the following categories:

- Hydrological, such as floods.
- Geophysical: earthquakes, volcanic eruptions and landslides belong to this category.
- Meteorological, such as storms and storms.
- Climatic, such as extreme very high or very low temperatures, natural fires.
- Biological, caused by exposure of living organisms to pathogenic microorganisms.

With regard to the time scale of occurrence of natural phenomena, the size-frequency relationship reflects the intensity of the disasters that can be caused by a particular catastrophic event, as a result of its magnitude on the frequency of its occurrence. In general, large-scale events do not take place so often that they are considered to be the most important, while the most frequently occurring phenomena are usually of lesser intensity. The average consequences are therefore calculated by multiplying the magnitude of the event by the frequency of their occurrence.

In Greece, the most common natural disasters are due to earthquakes, heavy rainfall and floods, fires that can lead to deforestation of areas that when they have large slopes favor the creation of landslides and heat waves.

In addition to natural disasters, however, there are also technological disasters, which are basically regarded as man-made.

Technological disasters are usually due to technological risks, which are not in principle adequately addressed, or to technological events (accidents) caused by human errors, equipment failures, organizational or administrative malfunctions, etc. and are beyond control. But they can also be the result of other natural disasters (earthquakes, lightning, heavy rainfall, etc.) or deliberate human actions. In general, technological disasters are considered not to occur with a high frequency (i.e. they have very little chance of occurring) but have potentially very serious consequences.

Technological disasters, depending on their intensity and intensity, can cause loss of life or injuries (both to workers at the site of the accident and to those who are, permanent or passing 'close' - see the relevant directives on the concept of 'close'- at the site of the accident population), destruction of property, disruption of social and economic life and degradation of the environment.

The usual classification of technological accidents is as follows:

- Chemical accidents in industrial installations: they take place in industrial installations (production, treatment or storage) resulting in serious environmental pollution from the release of heavy metals and toxic chemicals.
- Accidents involving the transport of dangerous goods: occur during the transport of hazardous materials by various means of transport (road, rail, sea, air).
- Transport accidents: road, rail, sea, air. It is conventional transport accidents, which usually cause loss of life and injuries, but do not have a major impact on the environment.
- Dam collapse: they occur rarely and have great effects, both on loss of life and on the environment.
- Nuclear accidents: they are usually associated with the release of radioactive elements into the environment and have long-term effects on both human health and the environment.

Although environmental disasters are generally not a daily occurrence and are therefore not often responsible for deaths or material disasters, their potential for potential unexpected catastrophic losses makes them of great importance and determines their character. Environmental disasters have some common characteristics:

- The source of the catastrophic event is clear and creates characteristic effects (for example flooding causes drowning deaths).
- The warning time is usually short.
- The greatest number of losses caused, either in human lives or in assets, occur immediately after the phenomenon has taken place.
- The risk of exposure is largely unintentional, usually due to finding populations in dangerous areas.
- The disaster has such intensity and scale that it requires an immediate response.

In the following sub-sections, both natural and technological disasters related to the study area are presented in detail.

Risks of flooding

In the recently approved River Basin Flood Risk Management Plan of the Water District of Eastern Central Greece (EL07) [ministry of environment and energy/grspecial secretariat for water(SSW)/41375/328/2018 (Government Gazette 2682/B/06 .07.2018)] the following were assessed and reflected:

- **Flood vulnerability**, which is defined as a set of conditions and procedures that determine the extent to which an area is vulnerable to the effects of flooding. These conditions and procedures relate to natural, and anthropogenic factors (social, economic, environmental, etc.) that can increase or mitigate the degree of vulnerability.
- **Flood hazard**, which is defined as the possibility of a flood of a certain intensity, is expected to occur over a specific period of time and in a certain spatial area. Flood risk is often assessed based on the depth and flow rate of the flood in a certain flood area.
- **Flood risk** is defined as a combination of the likelihood of flooding and the potential negative consequences for human health, the environment, cultural heritage and economic activities associated with this flood (Article 2, Directive 2007/60/EC). The flood risk in practice is determined on the basis of the following equation::

  Flood Risk = Flood Risk × Flood Vulnerability

In the context of greece's adaptation with the Community Directive 2007/60/EC on flood risk assessment and management, in 2012 the Preliminary Flood Risk Assessment was carried out by the Special Secretariat for Water in accordance with Articles 4 and 5. In particular, the Preliminary Flood Risk Assessment included the following stages:

- The recording of historic floods with their main characteristics and the identification of significant historical floods based on their consequences.
- Identify areas where flooding is likely to occur and assess the potential negative effects of future flooding, taking into account historical flood data and changes in flood conditions since then.
- Determining Potentially High Flood Risk Zones.

In the context of Greece’s adaptation with the Community Directive 2007/60/EC on flood risk assessment and management, in 2012 the Preliminary Flood Risk Assessment was carried out by the Special Secretariat for Water in accordance with Articles 4 and 5. In particular, the Preliminary Flood Risk Assessment included the following stages:

- The recording of historic floods with their main characteristics and the identification of significant historical floods based on their consequences.
- Identify areas where flooding is likely to occur and assess the potential negative effects of future flooding, taking into account historical flood data and changes in flood conditions since then.
- Determining Potentially High Flood Risk Zones.

More specifically, areas where flooding is likely to occur are those that meet at least one of the following two restrictions:

- are located in alluvial deposits.
- located on ground with a slope of less than 2%

Similarly, areas with potential negative effects on future floods were defined as those containing:

- cities and settlements.
- industrial and commercial zones.
- agricultural land with significant economic value.
- production units that may cause pollution
- protected areas.
- cultural heritage sites.
- infrastructure (road, rail network, ports, airports, hospitals, major dams).

According to the Approved SDG of the Water District of Eastern Central Greece (EL07) [ministry of environment and energy/special secretariat for water(SSW)/41375/328/2018 (Government Gazette 2682/B/06.07.2018)], as shown in the following figure the area of the project under study does not fall under flood risk management plan(FRMP).

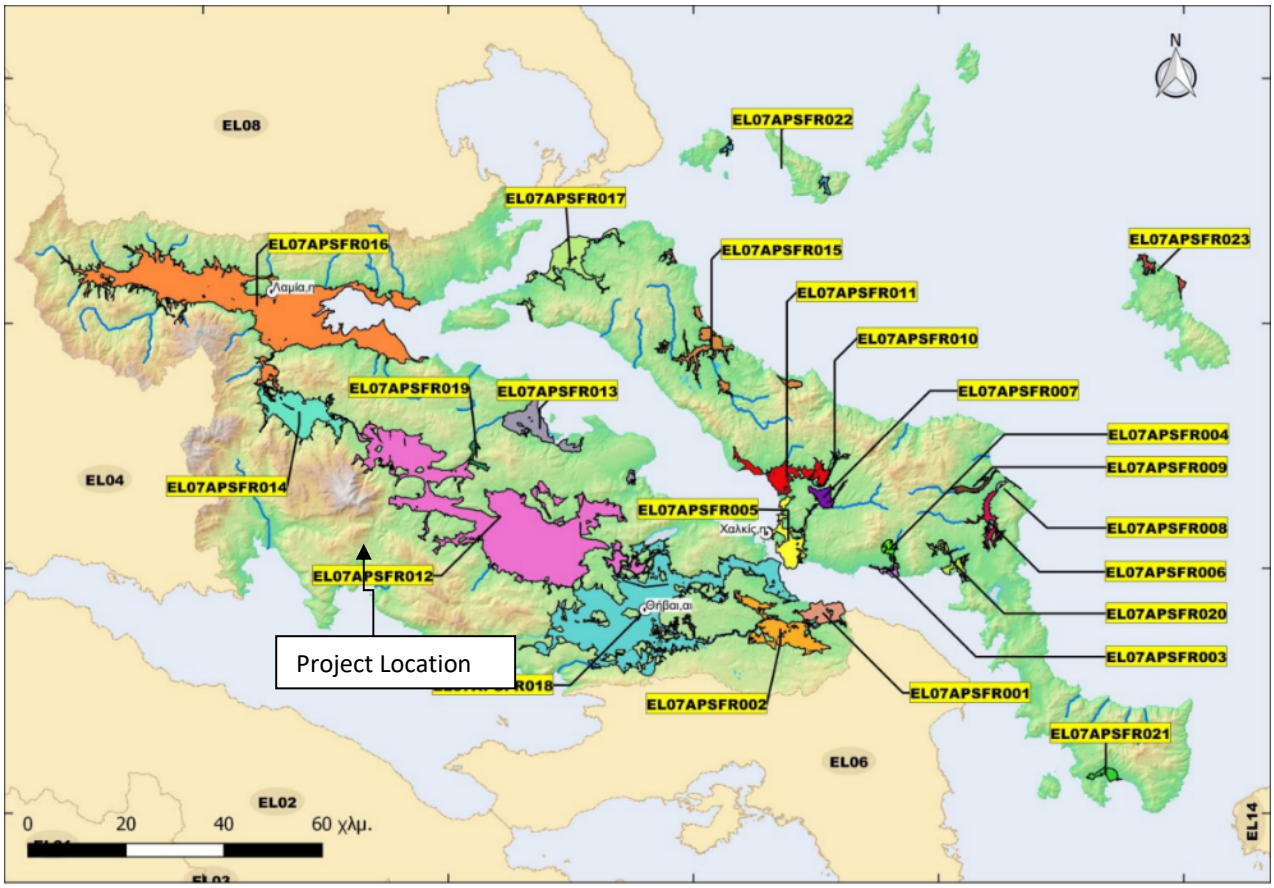


Figure 8.33: Excerpt from the Map of Potentially High Flood Risk Zones, based on the 1st Review of the FRA.

As detailed in section 5.2.3.2, the project under study does not fall into a flood zone for any period of restoration (T=50, T=100 and T=1000).

Risks from earthquakes

The Greek area is located at the boundary of contact and convergence of the African lithospheric plate and the Euro-Asian plate. This is why active tectonics in the field is intense, with Greece showing the greatest seismicity in Europe, as half of the energy coming out of earthquakes across Europe (ESPON) is released, 2006).

The earthquake is a phenomenon that occurs without clear warning, cannot be prevented and, despite its short duration, can cause great material damage to human infrastructure, resulting in serious injuries and loss of life.

Greece ranks first in Europe in terms of seismicity and sixth in the world. Its geographical location coincides with an area of our planet where large geotectonic phenomena take place, such as the convergence of the African with the Euro-Asian lithospheric plate, resulting in the great seismicity observed in this region.

The country's seismological bodies have proposed the separation of Greece into three Categories of Seismic Risk Zones. According to the Greek Earthquake Regulation (EAC 2000), as amended by the decisions of the Minister of Department of Environment and Spatial Planning D17a/67/1/FN275/03 (Government Gazette 781/B/16-6-03) and D17a/115/9/FN275/03 (Government Gazette 1154/B/12-8-03), the area is included in seismic hazard zone II (average seismic hazard) with a maximum expected seismic ground acceleration A= 0.24g, where g = gravity acceleration.

Figure 8.34: Map of Seismic Hazard Zones of Greece.

According to the digital database on the active faults of Greece (NOAfaults), the following active faults are identified in the immediate area of the project under study:

- Kalogerikos Fault.
- White House Rift.
- Anti-cancel fracture.
- Kirfis Rift.

The Kalogerikos fault is adjacent to the power transmission line under study. It has an address NW – TO with a length of 3,68km, a 124th line and a 60th slope to the SW.

The White House fault is located about 2,6km west of the electricity transmission line under study. It has a direction ne – SW with a length of 4,62km, a 30th line and a 60th slope to the south. The Antiyron fault is located about 4,5km west of the electricity transmission line under study. It has a direction NE – SW with a length of 6,63km, a 31st line and a 70th slope to the south. The Kirfis fault is located about 1,5km NW of the electricity transmission line under study. It has an address NE - SW with a length of 4,79km, a 29th line and a 60th slope to the south.

Figure 8.35: Satellite imagery extract from the digital database on the active faults of Greece (NOAfaults), showing the location of the project under study, as well as the active faults of the wider region.

Based on the available data of the Geodynamic Institute of the National Observatory of Athens, the following figure shows the seismic events with magnitude Ms ≥ 3.0 Richter, which occurred in the wider region, within a 30km radius of the project under study, during the period 1964 - March 2019. Based on the available data, the largest earthquake of 5,4 Richter intensity occurred on 08.04.1970 at a distance of about 10,3km from the area of the factory under study, with a focal depth of 10km in the maritime area of the Corinthian Gulf.

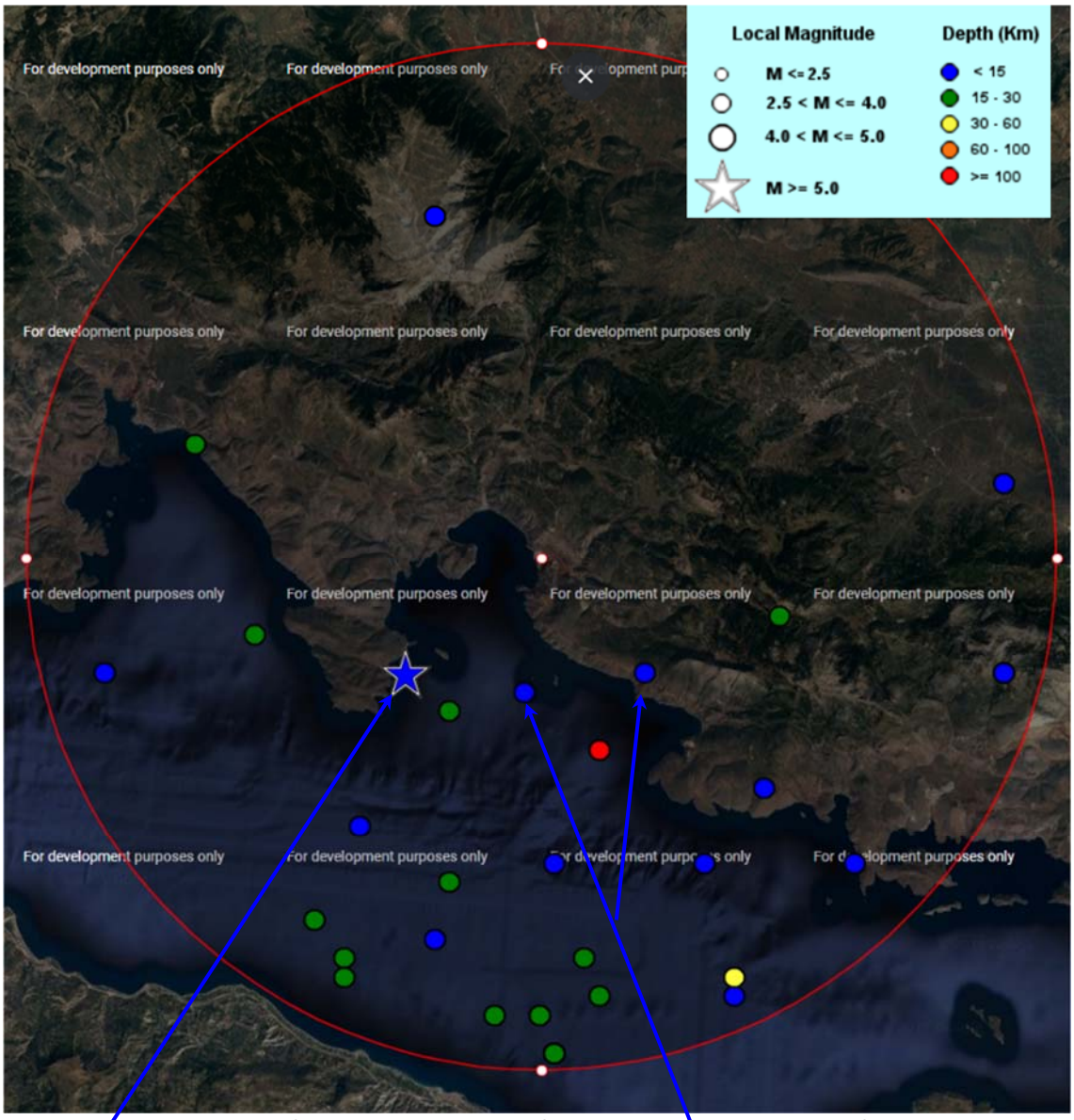


Figure 8.36: Seismic activity of the wider study area for the years 1964-2019 and for earthquakes over 4.0 Richter.

Stronger

Χρόνος Γένεσης: 1970/04/08 13:50:28 (GMT)
Μέγεθος: 5.4 ML
Γεωγρ.Πλάτος: 38.30°B
Γεωγρ.Μήκος: 22.60°A
Βάθος: 10.0 χμ
Επίκεντρο: 28.2 χμ ΔΝΔ της Λειβαδιάς
Απόσταση από το κέντρο: 10.3 χμ

closer

Χρόνος Γένεσης: 1989/05/07 10:46:47 (GMT)
Μέγεθος: 4.1 ML
Γεωγρ.Πλάτος: 38.29°B
Γεωγρ.Μήκος: 22.68°A
Βάθος: 1.0 χμ
Επίκεντρο: 23.4 χμ ΝΔ της Λειβαδιάς
Απόσταση από το κέντρο: 8.1 χμ

Χρόνος Γένεσης: 1999/06/25 07:42:14 (GMT)
Μέγεθος: 4.3 ML
Γεωγρ.Πλάτος: 38.30°B
Γεωγρ.Μήκος: 22.76°A
Βάθος: 11.0 χμ
Επίκεντρο: 18.0 χμ ΝΝΔ της Λειβαδιάς
Απόσταση από το κέντρο: 9.4 χμ

In any case, all the construction structures of the project under study will be constructed under the current earthquake regulation and all seismic protection measures will be applied.

Risks from fires

Regardless of the causes of forest fires, some natural, geomorphological and meteorological factors have a significant impact on their action. In particular, the sun's radiation, air temperature and soil surface may facilitate the process of setting fires. Further, the altitude of the area affects the temperature and humidity of the area, factors important for the spread of fire. At the same time, the intensity of the fire increases as it moves upward in the prane, as the hot gases warm up the impending vegetation. Finally, vegetation itself plays a decisive role in the risk of starting the fire, bearing in mind that vegetation species exhibit a different degree of susceptibility.

Forest fires in Greece occur mainly in the "Mediterranean zone", i.e. in areas with an altitude of less than 600m. , particularly in years where favorable conditions prevail for their manifestation. The land of the installation under study is of an industrial nature and the area surrounding the plant is of no particular ecological interest. In the surrounding areas of the premises of the activity and within the boundaries of its land there are point sparse toast and bushy areas with sclerophyllic vegetation.

According to the results of the analysis of the forest fires of Greece for a relatively long period (1983-2008 or 1983-2006 as appropriate) by (K. Tsangari, G. Karetsos & N. Proutsos, 2011):

- The largest numbers of incidents and burned areas are reported in the Peloponnese with 19% and 27% of the respective totals of the country. The fires of the Regional Units of Kefalonia, Ilia and Ioannina account for 17% of the total. The burned areas of the Regional Units of Ilia, Attica, Larissi and Evia amount to 25% of the total of the country, with the Regional Unit of Ilia having suffered the greatest disasters (1.275.000 st. for the period 1983-2008 or 49,039 str. per year).
- The most severe fires occur in the Aegean, Thessaly and the Peloponnese (with average intensities greater than 500 acres of burnt area per incident) and at the level of Regional Units in (M.U.) Arcadia, Dodecanese and Larissa (1.079.80 and 783 acres of burnt area per incident). Less serious are the fires in the Regional Units of Evritania, Xanthi and Imathia (average intensities of 45,99 and 105 acres of burnt area per incident).

The particularly dangerous areas of the country for the outbreak of forest fires and woodlands are mentioned in DP 575/1980, adopted pursuant to Art. 25 of Law 998/1979 and are shown in the following

map, showing that the entire study area does not fall within the areas of forests and woodlands susceptible to fires.

Figure 8.37: Areas of forests & woodlands susceptible to fires declared dangerous by P.D. 575/1980.

Detailed fire data for Viotia (MU) exist only for the period 1983-1997, with 375 records, while the period 1998-2005 is covered by aggregated annual data of incident numbers and burned areas. In particular:

- The total number of burned areas of (M.U.) amounts to 265.160 ^{m2}, as a result of 571 incidents that have occurred over time in the region throughout the 23 years.
    - On average, about 26 incidents occur in (M.U.) each year and 12.053 acres agricultural and forest vegetation. The average fire intensity reaches 464 str. burnt area per incident.

Average fire intensity (burned area per incident)	464
Average annual loss of land (st.)	12.053
Average annual number of incidents	26
Average intervention time (min)	32
Average extinguishing time (min)	843

- The total analytical record shows that 88% of the burnt areas (174.898 ^{m2}) were forested, while the remaining 12% were agricultural, with cereals predominantly affected and a corresponding 6.9%.

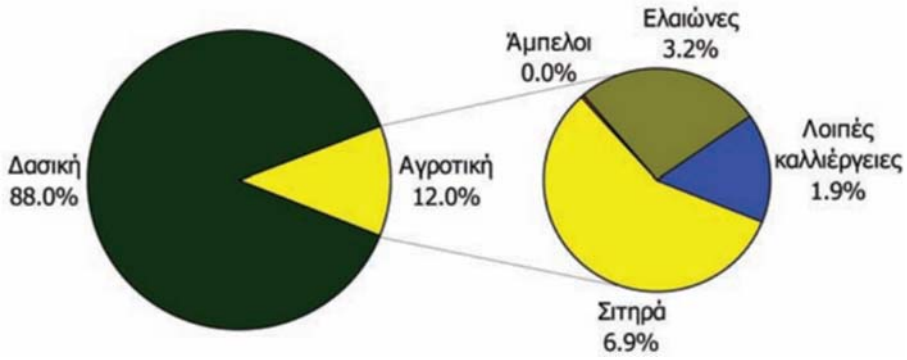


Figure 8.38: Burnt areas by type of vegetation in Boeotia.

- From the available data, (M.U.) appears fifth in the ranking based on the total number of recorded incidents in the geographical department of Central Greece, since the total number of incidents corresponds to 9.8% of the apartment. From the ranking based on the burned areas, (M.U.) also occupies the fifth place, with 9.7% of the burned areas of the apartment, while from the rating with the average fire intensity comes third after Fthiotida and Attica.

- Of the total occurrences, 10 have caused burned areas of more than 5.000 acres. and no more than 10.000 str.
- Over time, the largest fire caused 9.507 acres of damage. (of which 8,807 ^{m2} were forested) and was presented on 11/9/1993 at 17:50, possibly by malicious arson, but without identifying the perpetrator. Prevailing meteorological conditions were relatively favorable for the onset and development of the fire, as the relative humidity was low (40%), the temperature high (30oC), while very strong Eastern winds prevailed (7.1-9.0 BF)
- However, the worst fire for forest vegetation occurred on 29/8/1995 at 12:30 p.m., from an unknown cause and burned 9.500 acres, of which 9.000 it was woodland. The meteorological conditions at the time were quite favorable for the spread of the incident, since the relative humidity ranged from 40%, the temperature to 31oC and moderate northerly winds of 1.1-4.0 BF. The territorial gradients in the area of occurrence of the incident were slightly increased (20-40%).

Risk due to pollution, as may result from an accident

According to the data of the 1st Review of the River Basin Management Plan of eastern Central Greece, point and diffuse sources of pollution are identified in the project area..

In particular, the point sources of pollution of the Eastern Central Greece HYDR concern Wastewater Treatment Facilities estuary of sewerage networks to a natural recipient, large hotel units, livestock units, aquaculture / fish farming and leaks from CSDs and landfills.

The diffuse sources of pollution of the Ministry of Eastern Central Greece concern agricultural activities, transport, urban waste water that does not result in SLE, livestock farming (pastoral and stable) and water burden from other sources.

The following figure shows the point sources of pollution in the East Solid SD, which in the study area mainly concern industrial activities.

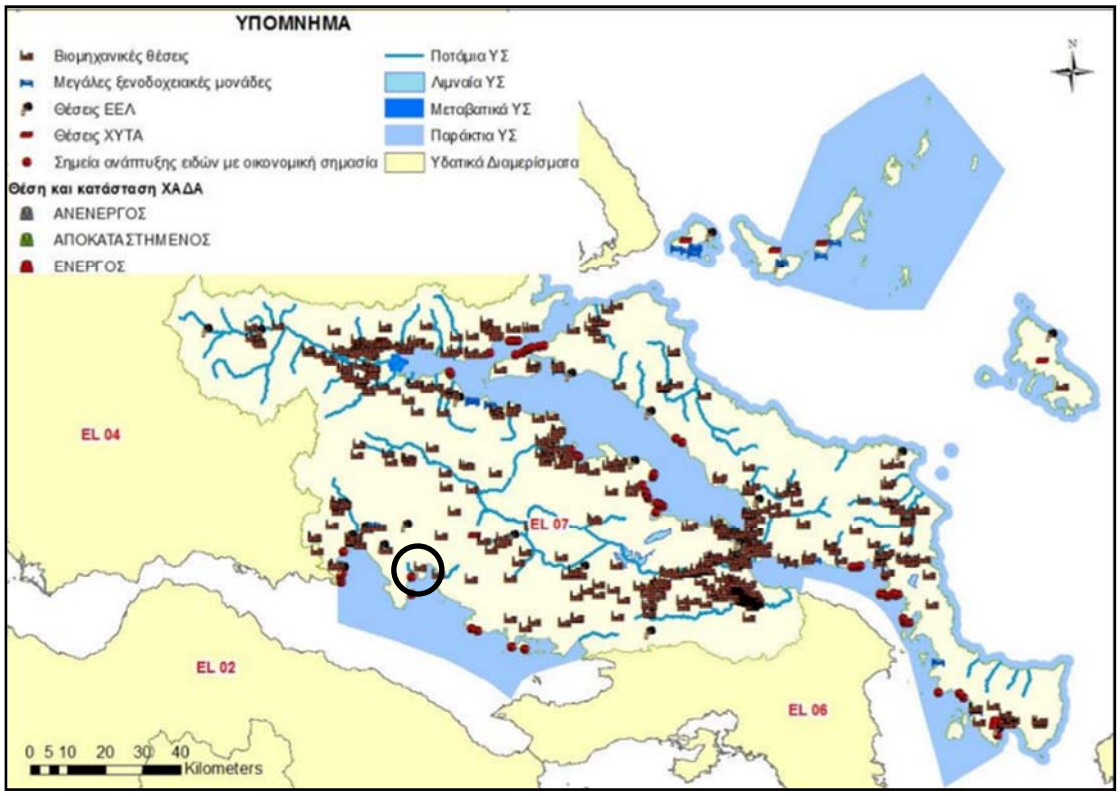


Figure 8.39: Point sources of pollution in the Ministry of Eastern Central Greece. The black circle encloses the wider study area.

Risks to the environment and/or human health may arise in the event of an accident at one of the existing plants operating in the wider area, as mentioned above, which may be related to an episode of pollution due to the diffusion of substances into the environment, such as waste from production processes. An accident may occur either in one of the existing plants or during the transport of waste, for final disposal. In the event of an accident, the operator of the respective installation shall be responsible for informing the authorities and taking immediate measures to reduce pollution (use of adsorbent materials, etc.).

Risks due to serious technological/industrial accidents

A major accident (large-scale technological accident, AME or a large-scale industrial accident, VME - 172058 GG 354/B/17-2-2016 – Seveso III) is defined as a major leakage, fire or explosion resulting from uncontrolled situations during the operation of any installation and which poses major risks to human health and/or the environment and which is related to one or more hazardous substances.

The project under study **does not fall within the scope of the joint ministerial decision 172058/2016 and does not involve risks that could cause a "Large Area Industrial Accident".**

8.15 ENVIRONMENT DEVELOPMENT STATEMENTS

On the basis of the data presented in the above paragraphs, the following conclusions are drawn:

- With regard to the anthropogenic environment, the settlements found in the study area are small and the population in the Municipal Units where the project under study is located in the decade 2001 - 2011 is as follows: in the (MU) Kyriaki there is an increase in the population of 6.34% , while in (MU) Distomo there is a decrease of 11.53%.
- Within the study area there are no environmental infrastructure systems such as Waste Landfill or Wastewater Treatment Facilities, other than the Alumina and Aluminum Production Plant's ELS.
- In the wider region there is a developed provincial and road network, but it does not have high traffic loads that could be related to the deterioration of one or more quality parameters of the atmospheric environment of the study area.
- For surface water found in the study area, both the ecological and chemical conditions show no signs of deterioration.
- The underground bodies of water of the region, show good quantitative and qualitative condition.

In conclusion, environmental trends in the study area without the project under study are assessed consistently.

9 ENVIRONMENTAL IMPACT ASSESSMENT AND EVALUATION

9.1 METHODOLOGICAL REQUIREMENTS

Environmental impact is defined as a change in environmental conditions or an equivalent change in the environmental parameters prevailing in an area. The change in environmental conditions may be positive or negative (i.e. to enhance or degrade the quality of the environmental parameter in question), reversible or irreversible and direct or indirect. A prerequisite for the acceptance of a project is not to result in permanent negative effects on the environment, while the resulting intermediate changes are made at such a rate as to prevent the environment from absorbing them.

Thus, in order to make an assessment of the environmental impact of a project, the environmental parameters, which suffer the effects, must first be defined, then the changes in their quality must be assessed and, finally, the minimization and remedial actions must be described.

The parameters of the environment which, in accordance with the requirements of No. Eco. 170225 Decision of the Ministry of Environment (Government Gazette 135/B/27-01-2014) it is proposed that they be examined concerning climatic and bioclimatic characteristics, morphological and landscape characteristics, geological, tectonic and soil characteristics, the natural environment and the man-made environment. In addition, the socio-economic effects, the effects on technical infrastructure, air quality, noise effects, water and electromagnetic field impacts are examined.

This environmental impact assessment shall be submitted in accordance with Article 4 of Act 4014/2011. The projects proposed in this Environmental impact assessment concern the following:

- Construction of a new Transmission Line (T.L.) of 400kV high voltage electricity, total length of about 14km.
- Construction of forty-two (42) new High Voltage pillars.
- Opening of a forest road, with a total length of about 8.700m, to serve the construction and operation needs of the new electricity transmission line.
- Configuration of a plot of development of cable systems, below the terminal pillar (P42) of (T.L.) electricity, area 1.265m2. Execution of work – addition of equipment to connect the development plot of cable systems with the Agios Nikolaos HVC.
- Connection of the new (T.L.) to the Distomo HVC (connection of the terminal pillar of (T.L.) to the terminal, the available gateway, to the Distomo HVC.

9.2 IMPACTS RELATING TO CLIMATE AND BIOCLIMATIC FEATURES

- ***Construction phase***

The project under study is not expected to have a negative impact on the climatic and bioclimatic characteristics of the study area during the construction phase. The construction of the projects under study is not related to large-scale deforestation of forest vegetation or dry areas covered by surface water or concrete of large surfaces, which could result in changes in the microclimate of the area.

The de-final work that will take place during the construction phase of the new electricity transmission line, of the new forest road construction and the development plot of cable systems, concern:

- deforestation of the order of 625m^2 (25m × 25m) per pillar, for thirty-one (31) squares, which entails total deforestation of about **19,375m^2** (31 new pillars × 625m^2).

- deforestation of 400m^2 (20m × 20m) per pillar, for eleven (11) squares, which implies total deforestation of about **4,400m^2** (11 new pillars × 400m^2).
- deforestation of **72,125m^2** for the opening of the new forest road, in order to allow access to the new pillars.
- deforestation of **1,265m^2** for the configuration of the new cable system development plot.

In conclusion, the construction of the proposed projects is not related to deforestation of a single area of significant area covered by natural vegetation or emissions of significant quantities of gaseous or particulate pollutants, which may affect the microclimate and bioclimatic characteristics of the study area.
The effects on the climatic and bioclimatic characteristics of the region, during the construction phase of the projects under study, are classified as **neutral**.

- ***Operating phase***

The operation of the project under study is not related to increased production of gaseous pollutants or an increase in ambient temperature. On the contrary, it indirectly contributes to the penetration of cleaner forms of electricity generation, as it is an accompanying project of a Natural Gas Power Plant, indirectly contributing to the fight against climate change.

The effects on the climatic and bioclimatic characteristics of the region, from the operation of the project under study, are classified as **neutral**.

9.3 IMPACT ON MORPHOLOGICAL AND TOPIOLOGICAL CHARACTERISTICS

9.3.1 Changes in the image of the wider region

- ***Construction phase***

During the construction phase of the proposed projects no significant negative effects on the landscape of the study area are expected from the presence of the construction machinery and the required equipment. Also, no area of high aesthetic value will be affected or impact on vegetation outside the project area.

With regard to electricity transmission lines, it should be noted that the impact on the landscape and aesthetic environment of the project's road area is mainly related to the following:

- the construction work of the project.
- vegetation on the platforms of the pillars and access roads.

- the presence of metal conductors and pillars.

The opening of the new forest road, which concerns a total length of 8,700m, includes the construction work and the corresponding vegetation drainages, but they are considered to be non-significant, as their opening will take place with the minimum possible interventions in the environment and in the aesthetics of the landscape.

In any case, the construction of both the transmission lines and the new road construction will take place over a limited period of time, in which case the effects caused on the aesthetic environment during construction are considered local level.

During the construction phase of all the proposed projects, interventions will be carried out in the morphology of the soil, since excavation and configuration work will be required. In addition, the equipment and activities of the construction site, by the very nature of their object, entail the appearance of phenomena of visual nuisance and burden of the aesthetics of the environment.

By taking measures of good practice and planning of work, the immediate coverage and wetting of excavation materials and the strict restriction of excavations at the site of the projects, the impact on the local and morphological characteristics of the area, from the construction work will be of a low intensity and temporary nature, as well as fully treatable and reversible after the construction of the projects under study.

Therefore, the impact on the image of the wider area during the construction phase of the projects under study is considered to be **negative** in terms of their type, in terms of their size, in terms of their duration in the **short term**, and in terms of their treatment **fully treatable.**

- ***Operating phase***

During the operation of the project, small-scale impacts on the morphological and local characteristics of the area are expected, due to the nature of the proposed projects. The new electricity transmission line, about 14km long, with the new forty-two (42) pillars, as well as the access roads to be opened to the squares of the new pillars, may change on a small scale the geomorphology of the landscape and the terrain of the area, but without altering the aesthetics of the landscape.

In particular, these effects are due to the presence of pylons installed on straight or damaged roads and to the development of overhead cables, suspended from pillar to pillar. In general, however, it is considered that the electrical lines have been integrated, due to their long-term presence, into the landscape of the Greek countryside, but also into the landscape of each developed country. Their image is interwoven with meeting electricity needs, the economy of an area and the modernization of the way of life. In the best aesthetic result, the well-designed engraving of the road contributes :

- Appropriate treatment of soil morphology and physical barriers to ensure minimal visual contact.
- Avoid parallel development of lines with roads of considerable traffic.
- Integration of the appropriate design parameters into the individual elements of the structure that will minimize visual nuisance.
- Avoid crossing overhead lines in or near settlements.

It should also be noted that the impact on morphological and topological characteristics will focus on the locations of the towers and will be particularly limited to the rest of the area along the new transmission line and new access roads.

In any case, there are no substantial changes in the morphological and local characteristics of the area since the implementation of the proposed projects, in relation to the originally environmentally licensed project.

The impact on the image of the wider area during the operational phase of the project under study is considered to be **negative** in terms of their type, in terms of their size, in terms of their **long-term duration**, and in terms of their treatment that is **un treatable.**

9.3.2 Evaluation of landscape changes

The picture that will emerge from the operation of the project under study is that of the modern technological infrastructure, whose presence has prevailed for many years in several parts of the countryside of our country, but also of all the developed countries of the world and is interwoven with the transfer of electricity and the modern way of life.

9.3.3 Chances of breaking the horizon line and the natural shapes and colors of the landscape.

The project under study is not expected to cause disruption of the horizon line and the natural shapes and colors of the landscape. The transmission line does not create a visual barrier, taking into account the sequential distance between the towers and their technical characteristics (metal structures not consisting of solid sections), ensuring that they are integrated into the landscape of the wider area. Neutral colors and careful design of the pillars of (T.L.) help not to cause disruption of the colors of the landscape in the area of location of the proposed projects.

9.3.4 Compatibility of imminent changes in relation to the European Landscape Convention, which was ratified by Law 3827/2010

As already mentioned above, the projects under study are not expected to have a significant negative impact on the landscape of the study area or the wider area, so there is no question of the incompatibility of the changes that will be caused to the landscape by the implementation of the proposed projects in relation to the European Landscape Convention, which was ratified by Law 3827/2010 (A' 30**).**

9.4 IMPACT RELATED TO GEOLOGICAL, TEXTONIC AND SOIL CHARACTERISTICS

9.4.1 Alteration, division of the outer surface of the rocks

- ***Construction phase***

The potential changes related to the alteration/ partitioning of the external surface of the rocks found in the site area of the project under study, relate to the following:

- the operation of the construction sites, transport, assembly and installation machinery of the pillars, as well as the other individual structures of the project.
- work on cleaning and shaping the squares where the pillars will be installed.
- the installation and operation of the pillars and.
- the work of opening the forest road.

For the **installation of the foundations of the pillars**, it is necessary to create a flat surface area (square) of approximately 625^{m2} (25m×25m) per pillar, for thirty-one new (31) pillars and an area of 400^{m2} (20m×20m) per pillar, for eleven new (11) pillars. Therefore, the total occupancy area of forty-two (42) new squares for the installation of the pillars will amount to **23.775^{m2}** (31 new pillars × 625^{m2} + 11 new pillars × 400^{m2}). The construction of the foundations will be carried out by modern technical methods using reinforced concrete piles or other conventional foundation methods.

The new forest road construction to be opened for access to the locations of the new pillars will have a total length of 8.700m. The deck width of the new roads will be 4.0m or 5.0m on a case-by-case basis. The total area of occupation of these roads will be **72.125^{m2}**. These areas are mostly bushy vegetation. The proposed access zones are linked to existing routes offering the desired accessibility to the proposed projects from the wider area.

Effects on the morphological and soil characteristics of the intervention area are expected during the construction phase of the **aerial section of (T.L.)**, due to the development of construction activities and the operation of the transport, assembly and installation machinery of the pillars, as well as due to the other structures accompanying the construction work. Of course, these changes are expected to be locally limited (per square location) and short-term, given the nature of the work required to build a electricity (T.L.), and will only take place during the construction phase.

The installation of the new pillars requires the landscaping of the existing ground in order to facilitate the foundation, assembly, and deposition of construction materials. As mentioned above, the dimensions of the squares will be 20m × 20m or 25m × 25m depending on the case. For the configuration of the areas of the squares, the existing altitudes of the area were taken into account, while the table below presents the earthworks required for the configuration of the installation squares of the new pillars.

Table 9.1: Table of dirt to form squares.

PLATES	EXPENDITURE (m^3)	BUSINESS (m^3)	EXCESS (m^3)
Π1	0	0	0
Π2	35	20	15
Π3	234	60	174
Π4	298	81	217
Π5	908	59	849
Π6	92	63	29

PLATES	EXPENDITURE (m^3)	BUSINESS (m^3)	EXCESS (m^3)
Π7	122	112	10
Π8	203	227	-24
Π9	355	13	342
Π10	327	163	164
Π11	823	416	407
Π12	1.238	10	1.228
Π13	246	31	215
Π14	135	114	21
Π15	190	166	24
Π16	140	153	-13
Π17	250	215	35
Π18	247	33	214
Π19	213	215	-2
Π20	450	113	337
Π21	663	110	553
Π22	225	196	29
Π23	301	13	288
Π24	604	557	47
Π25	203	268	-65
Π26	587	79	508
Π27	1.740	57	1.683
Π28	686	33	653
Π29	238	283	-45
Π30	2.589	0	2.589
Π31	535	46	489
Π32	410	120	290
Π33	660	147	513
Π34	1.884	0	1.884
Π35	808	62	746
Π36	471	26	445
Π37	368	62	306
Π38	408	65	343
Π39	807	53	754
Π40	884	17	867
Π41	517	52	465
Π42	6	156	-150

PLATES	EXPENDITURE (m^3)	BUSINESS (m^3)	EXCESS (m^3)
total	**22,100**	**4,666**	**17,434**

According to the above table, excavations amounting to 22.100m^3 are required for the configuration of the installation squares of the new pillars, while the required excavations amount to 4.666m^3. Therefore, **the excess of excavation materials from the configuration of the installation squares of the new pillars amounts to 17,434m^3.**

Excavations and foundations required for the installation of the new pillars will not exceed 1.5m in depth. Earthworks for the installation of high-voltage pylons require excavations, for foundation work. For each pillar about 15m^3 bazaars are created for each foot of the pillar and a total of 60^{m3} for each pillar. Of the 60m^3 or so 52m^3 will be used to re-build the foundations of the pillar. About 8^{m3} reinforced concrete is needed to establish a pillar. **Since forty-two (42) new pillars will be installed, the excess amount of excavation work for the foundation of the pillars amounts to: 8m^3 × 42 = 336m^3.**

The opening work of the new road construction provides for earthworks, i.e. excavations and earthworks, which are detailed in the table below.

Table 9.2: Table of dirt of roads under opening.

road	EXPENDITURE (m^3)	BUSINESS (m^3)	EXCESS (m^3)
ROAD 1	305	149	156
ROAD 2	310	15	295
ROAD 3	2.746	1.006	1.740
ROAD 4	546	96	450
ROAD 5	162	140	22
ROAD 6	305	38	267
ROAD 7	729	287	442
ROAD 8	730	479	251
ROAD 9	5.757	1.539	4.218
ROAD 10	3.293	372	2.921
ROAD 11	345	9	336
ROAD 12	131	49	82
ROAD 13	148	7	141
ROAD 14	253	73	180

road	EXPENDITURE (m^3)	BUSINESS (m^3)	EXCESS (m^3)
ROAD 15	592	119	473
ROAD 16	1.328	249	1.079
ROAD 17	7.772	1.236	6.536
ROAD 18	1.708	69	1.639
ROAD 19	3.548	1.557	1.991
ROAD 20	3.315	362	2.953
ROAD 21	9.875	1.499	8.376
ROAD 22	1.578	2.245	-667
ROAD 23	1.667	670	997
ROAD 24	2.500	561	1.939
ROAD 25	347	101	246
ROAD 26	2.147	80	2.067
ROAD 27	513	133	380
ROAD 28	28.672	3.346	25.326
ROAD 29	6.212	58	6.154
total	**87.534**	**16.544**	**70.990**

According to the above table, the excavations resulting from the road construction work amount to 87.534m^3, of which 16.544m^3 will be used for construction. Therefore, the excess of the excavation products to be managed amounts to **70.990m^3.**

The total excess of excavations from the implementation of the proposed projects amounts to: 17.434m^3 + 336m^3 + 70.990m^3 = **88.760m^3**

The surplus materials that will arise in the construction phase and cannot be used in the re-construction work, will be deposited in an environmentally licensed repository or landfills or in areas where other projects are carried out, which have approved environmental conditions and in which such materials can be used or in inactive quarries or through alternative management systems.

In any case, account must be taken of the legislation in force, namely HR 36259/1757/E103/2010 "Measures, conditions and programmes for the alternative management of waste from excavations, constructions and demolitions (waste from excavations, construction and demolition)" (Government Gazette 1312 B' 2010), as amended and in force.

The effects on the external surface of the rocks during the construction phase of the projects under study are considered to be **negative** in terms of their type, in terms of their size, in terms of their duration in the **short term**, and in terms of their treatment **fully treatable**.

- ***Operating phase***

The operation of the proposed project, due to its nature, may not cause changes in the outer surface of the rocks. The negative effects on the morphology of the area of location of the overhead section of the lines, due to the required de-cleaning of the existing vegetation at the locations where the pillars of the (T.L.) and access roads are planned, relate to the construction phase of the project and have already been presented above.

Therefore, the effects on the outer surface of the rocks during the operational phase of the projects are considered to be **neutral**.

9.4.2 Possible destruction of special geological characteristics

The proposed projects, due to their nature, are not expected to cause the destruction of specific geological characteristics, since the proposed interventions concern surface projects which should be based and not underground projects. Therefore, the effects associated with the destruction of specific geological characteristics during the construction phase of the project are considered **neutral**.

9.4.3 Possible occurrence of geological phenomena of special importance

- ***Construction phase***

The construction of the proposed projects is not related to the construction of pits or land of significant size, which may cause unstable situations in the territory of the site of the projects.

Therefore, the effects associated with the occurrence of geological phenomena of special importance during the construction phase of the project are considered **neutral**.

- ***Operating phase***

The operation of the proposed projects is not related to the application of significant loads in the territory of the project location area, which may cause unstable situations. As a result, no relevant negative effects are expected.

Therefore, the effects associated with the occurrence of geological phenomena of special importance during the operational phase of the project are considered **neutral**.

9.4.4 Effects on the quality characteristics of the soils of the study area

9.4.4.1 Probability of soil pollution

- ***Construction phase***

In the construction phase of the projects under study, it is envisaged to produce the usual liquid waste produced in construction projects, taking into account that the pillars consist of pre-fabricated parts, which are not manufactured in the project area.

Chemical toilets will be installed for the collection of urban wastewater, which will be produced by the staff working on the construction of the projects. Considering a construction site of 10 persons, a sewage supply equal to:
50 l/ person/ day x 10 persons = 500 l/ day or 0.5 m^3/day.

The waste water collected will be made available by means of specialized tankers at the nearest, in-service Wastewater Treatment Facility. Used Waste Oils (UWO) resulting from construction machinery and equipment will be collected and stored in a temporary waste water storage area until they are delivery to approved ALE collectors. In the construction area there is no provision for washing or maintenance of the construction machinery, as it will be done either in specialized workshops.

For the disposal of liquid waste, The Commission shall apply to the disposal of waste water. No. E1b/221/1965 (B' 138) Health Provision (D.C.) on the disposal of waste water and industrial waste, as amended by Nos. No. C1/17831/07.12.1971 (B' 986), C4/1305/02.08.1974 (EC B' 801) and D.YG2/G.P. 133551/30.09.2008 P.D. Law 4042/2012 "Criminal protection of the environment - Harmonization with Directive 2008/99/EC - Framework for the production and management of waste - Harmonization with Directive 2008/98/EC - Regulation of issues of the Ministry of environment, energy and climate change".

The collection and rational management of the site's waste water ensures that the possibility of pollution of the soils of the study area is minimized. Measures will be taken to prevent soil pollution in the event of

a leakage of fuel and mineral machinery. Both during construction and after work, waste materials will be removed and care will be taken to avoid soil pollution from machine leaks, etc.

The effects associated with soil pollution during the construction phase of the projects under study are considered to be **negative** in terms of their type, in terms of their size, in terms of their duration in the **short term,** and in terms of their treatment **fully treatable.**

- ***Operating phase***

During the operational phase of the project, the soil characteristics of the area are not expected to be affected to any extent, either due to lubricant leaks (insulators operate without oils), or due to dust emissions from the operation of the machinery used for the maintenance of the pillars and the transmission line. During and after maintenance work, care shall be taken to prevent soil pollution from possible leaks of machinery.

The effects related to soil pollution during the operational phase of the project are considered to be **neutral**.

9.4.4.2 Soil quality degradation

In the context of the planned projects, no negative effects are expected due to long-term deposition of materials in the form of piles of.

The effects associated with the degradation of soil quality during the construction and operation phase of the project are considered to be **neutral**.

9.4.4.3 Soil erosion

- ***Construction phase***

During the construction phase of the proposed projects, it is estimated that the projects under study will have a weak negative impact related to soil erosion, compression and sealing, taking into account the limited extent of occupation of the projects and their dispersion in the area, as due to the nature of the project (linear work) it is envisaged to disperse the intervention areas (squares and access roads) along the lines.

The effects of soil erosion during the construction phase of the proposed projects are considered to be **negative** in terms of their type, in terms of their size, in terms of their **short-term duration**, and in terms of their treatment **partially treatable.**

- ***Operating phase***

Due to the nature of the project under study, no effects from soil erosion are expected during this phase and are therefore considered to be **neutral**.

9.5 IMPACTS ON THE NATURAL ENVIRONMENT

9.5.1 Effects on flora, fauna and ecosystems

- ***Construction phase***

The main effects expected on ecosystems, vegetation and flora species are mainly due to the occupation of the proposed projects and relate to the following tasks:

- the operation of the construction sites, transport, assembly and installation machinery of the pillars, as well as the other individual structures of the project.
- work on cleaning and shaping the squares where the pillars will be installed.
- installation and operation of the pillars.
- work on the integration of (T.L.) and.
- the work of opening the forest road.

In particular, the irreversible effects on the natural environment from the construction of the proposed projects are limited to the area of occupation of the projects. In particular, the proposed interventions concern the following:

- construction of forty-two (42) new pillars, of an area of approximately 625m^2 (25m×25m) per pillar, for thirty-one new (31) pillars and an area of 400m^2 (20m×20m) per pillar, for eleven new (11) pillars. Therefore, the total occupancy area of forty-two (42) new squares for the installation of the pillars will amount to 23.775m^2 (31 new pillars × 625m^2 + 11 new pillars × 400m^2).
- the development plot of the cable systems, below the terminal pillar (P42) of (T.L.) electricity, area 1.265m^2. opening of a new forest road - to serve the construction needs of the new transmission line - with a total length of about 8.700m.
- The area of occupation of the new roads, as documented in the following table, amounts to approximately 72.125m^2

Table 9.3: Area of squat of squares for the seat of the pillars.

A/A	Length (m)	Width (m)	EXPENDITURE OF CONSTRUCTION (m^2)
Π1	25,00	25,00	625,00
Π2	25,00	25,00	625,00
Π3	25,00	25,00	625,00
Π4	25,00	25,00	625,00
Π5	25,00	25,00	625,00
Π6	25,00	25,00	625,00
Π7	25,00	25,00	625,00
Π8	25,00	25,00	625,00
Π9	25,00	25,00	625,00
Π10	25,00	25,00	625,00
Π11	25,00	25,00	625,00
Π12	25,00	25,00	625,00
Π13	25,00	25,00	625,00
Π14	25,00	25,00	625,00
Π15	25,00	25,00	625,00
Π16	25,00	25,00	625,00
Π17	25,00	25,00	625,00
Π18	25,00	25,00	625,00
Π19	25,00	25,00	625,00
Π20	25,00	25,00	625,00
Π21	25,00	25,00	625,00
Π22	25,00	25,00	625,00
Π23	20,00	20,00	400,00
Π24	25,00	25,00	625,00
Π25	25,00	25,00	625,00
Π26	20,00	20,00	400,00
Π27	20,00	20,00	400,00
Π28	20,00	20,00	400,00
Π29	20,00	20,00	400,00
Π30	25,00	25,00	625,00
Π31	25,00	25,00	625,00
Π32	25,00	25,00	625,00
Π33	25,00	25,00	625,00
Π34	25,00	25,00	625,00
Π35	20,00	20,00	400,00

A/A	Length (m)	Width (m)	EXPENDITURE OF CONSTRUCTION (m^2)
Π36	25,00	25,00	625,00
Π37	20,00	20,00	400,00
Π38	20,00	20,00	400,00
Π39	25,00	25,00	625,00
Π40	20,00	20,00	400,00
Π41	20,00	20,00	400,00
Π42	20,00	20,00	400,00
Total	-	-	**23.775**

Table 9.4: Area of occupation of each road section to be opened.

ROAD	Length (m)	Width (m)	CONSTRUCTION (m^2)
ROAD 1	105,00	5,00	671,00
ROAD 2	65,00	5,00	376,00
ROAD 3	510,00	5,00	3.710,00
ROAD 4	135,00	4,00	813,00
ROAD 5	180,00	4,00	919,00
ROAD 6	145,00	4,00	687,00
ROAD 7	220,00	4,00	1.549,00
ROAD 8	250,00	4,00	1.622,00
ROAD 9	820,00	5,00	6.825,00
ROAD 10	225,00	5,00	2.297,00
ROAD 11	50,00	5,00	325,00
ROAD 12	60,00	5,00	338,00
ROAD 13	45,00	5,00	249,00
ROAD 14	90,00	5,00	542,00
ROAD 15	125,00	5,00	954,00
ROAD 16	245,00	5,00	1.984,00
ROAD 17	960,00	5,00	7.595,00
ROAD 18	160,00	5,00	1.457,00
ROAD 19	410,00	4,00	3.691,00
ROAD 20	265,00	4,00	2.467,00
ROAD 21	610,00	4,00	5.316,00
ROAD 22	100,00	4,00	1.442,00
ROAD 23	215,00	4,00	2.057,00
ROAD 24	305,00	5,00	2.725,00

ROAD	Length (m)	Width (m)	CONSTRUCTION (m^2)
ROAD 25	105,00	5,00	749,00
ROAD 26	190,00	5,00	1.500,00
ROAD 27	165,00	5,00	1.050,00
ROAD 28	1.675,00	5,00	15.987,00
ROAD 29	270,00	4,00	2.228,00
Total	**8.700,00**	**-**	**72.125,00**

On the basis of the above**, the proposed projects will occupy an area of:** 23.775m^2 + 1.265m^2 + 72.125m^2 **= 97.165m^2**

In addition, it is stated that the implementation of the displacement and connection projects of the transmission line will require a easement zone of 50m (25m on either side of the route of the line at the intervention points), which in total amounts to an area of 695.115m^2. This zone also includes the new pillars of intervention.

In any event, in accordance with article 45(8) of Law 998/1979, as amended and in force, a reforestation or afforests of an area of the same area as that for which an operation will be carried out will be carried out for the project under study, at the suggestion of the competent forestry service and following the preparation and approval of a reforestation study.

The effects that may be caused on fauna species during the construction phase of the proposed projects are separated from those due to habitat occupation and those that cause nuisance to fauna living in the immediate area of the project under study.

At local level during the construction phase it is possible for some of the existing fauna species in the area to be temporarily removed from the project area due to their noise and human presence, without further repercussions.

Temporary nuisance for most species of fauna during the construction phase is estimated to be fully reversible and transient in nature. In addition, it is worth noting that the projects will be implemented in part so that any nuisance is detected in different locations during the work, thereby further reducing its importance.

At the end of the construction phase it will be possible to physically re-separate almost the entire area that has been disturbed and is not occupied by technical works. Furthermore, taking into account the wide spread area of most species in relation to the limited extent to be taken over by the projects to be built, it can be safely concluded that the relevant effects will not be significant for most species of fauna.

The effects on the flora and fauna of the region, from the construction of the projects under study, are considered **negative** in terms of their species, in terms of their size, in terms of their duration in the **short term**, and in terms of their treatment **partially treatable.**

- ***Operating phase***

During the operational phase of the proposed projects, due to their nature, there will be no impact on the vegetation and flora species of the area. During the operation of the project, no effects on the natural environment of the area are expected, either due to lubricant leaks or due to dust emissions from the operation of the machinery used for the maintenance of the pillars and the transmission line. During and after maintenance work, care will be taken to avoid soil pollution and, by extension, vegetation of the area from possible leaks of mechanical equipment.

Regarding the fauna of the area, it is noted that there is insufficient literature from the Greek area on the risk of impacts and electric shocks of birdlife species on high voltage power transmission lines. However, foreign literature is available which reports on the possible impact of impact or electric shock on important bird of prey in high-voltage power line development areas (Marcus 1972, Ferrer et al. 1991, Bayle 1999, Van Rooyen 2000, Barabashen 2005, Mastina 2005, Cartron et al. 2006, Harnerss 1998, 2000, 2008, Rollan et al. 2010 , Rubolini et al. 2001, Shobrak 2012).

According to the Hellenic Ornithological Society, where the main migration corridors of Greece have been depicted, the immediate area of intervention is adjacent but does not fall within a migration corridor (as shown in the Figure below).

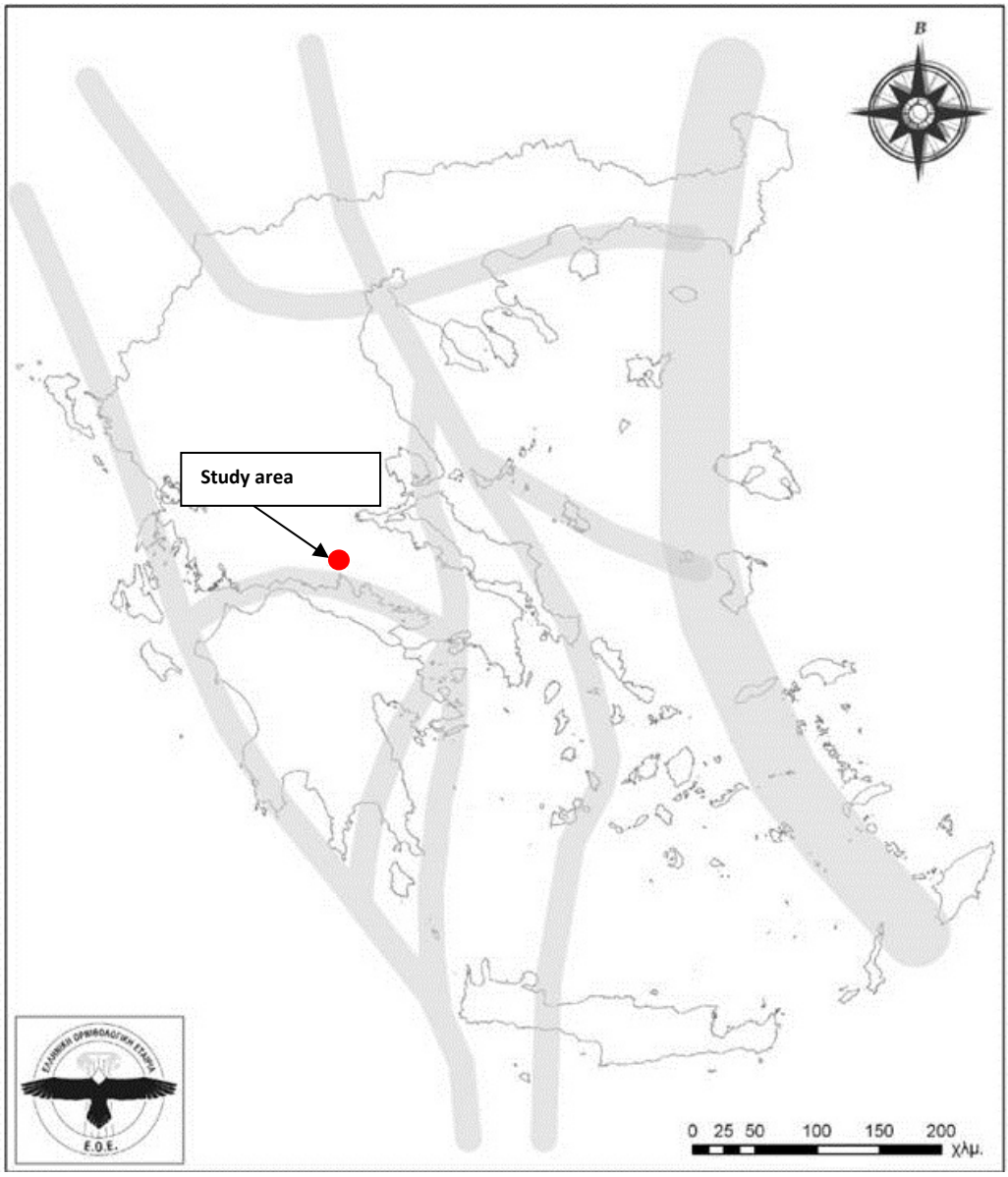


Figure 9.1: Excerpt from a map of the Hellenic Ornithological Society, showing the main migration corridors of Greece and indicating the study area.

In any case, the effects on birdlife in the area are not considered significant for the project under study, the following shall be taken into account:

- The overhead cables of the transmission line are at a great distance from each other, so the risk of electric shock is minimized even for large birds.
- The diameter of the overhead cables is quite large and therefore the cables are visible from a long distance.
- The area is not characterized by a high frequency of fog phenomena.

- The area is not a protected area and in particular a Special Protection Zone for birdlife, so it is estimated that the movement of birds in the area is not particularly increased.
- The area does not fall within one of Greece's main migration corridors.

The effects on the flora and fauna of the region are characterized in terms of their species as **negative**, in terms of their size, in terms of their **long duration**, and in terms of their **treatment treatable.**

9.5.2 Impact on areas of the national system of protected areas

As mentioned above, the project under study does not fall within the protected areas.

9.5.3 Impacts on forests and forest areas

For the study area there are no ratified or posted forest maps.

In any case, in accordance with Chapter 6 of L. 998/1979 "Allowable interventions in forests, forest areas and public areas referred to in points (a) and (b) of paragraph 5 of Article 3 of this Law', in particular in accordance with paragraph 5 of Article 53 'Infrastructure projects', **the installation of power stations by conventional fuel and accompanying works only** on public land referred to in points (a) and (b) of Article 3(5) of Law 998/1979 and in the absence thereof in forested areas and forests.

In any case, as mentioned in section 9.5.1, the main effects expected on the vegetation and flora of the area and, by extension, on any forest areas, are mainly due to the occupation of the proposed projects and relate to the following:

- the operation of the construction sites, transport, assembly and installation machinery of the pillars, as well as the other individual structures of the project.
- work on cleaning and shaping the squares where the pillars will be installed.
- installation and operation of the pillars.
- work on the integration of (T.L.) and.
- the work of opening the forest road.

The effects on the forests and woodlands of the area are characterized in terms of their species as **negative**, in terms of their size, in terms of their **long-term duration**, and in terms of their treatment **partially treatable.**

9.6 IMPACTS ON THE HUMAN ENVIRONMENT

9.6.1 Spatial Planning - Land Uses

The project under study belongs administratively to the Region of Central Greece, to the Regional Unit (R.U.) of Viotia, to the Municipalities of Levadeon and Distomo - Arachova - Antikyra (as formed pursuant to Law 3852/2010) and in particular, to the Municipal Units (M.U) of Kyriaki and Distomo , respectively.

According to Decision 3124/128532 (Government Gazette 432/31.12.2012) "Approval of the General Urban Plan (GIS) of the Municipal Unit of Distomo, Municipality of Distomo - Arachova - Antikyra", the proposed project passes through the Areas of Control and Building Restriction (PEPD) PEPD 1" Zone of protection of agricultural land and rural landscape and development of agricultural activities (falls the smallest part of the HV under consideration) "and PEPD" 2 "Zone of grassland areas and development of RES facilities and bauxite mines (falls under the largest part of the HV under consideration)". Both in the PEDP1 zone and in the PEDP2 zone, the facilities and the technical infrastructure networks are allowed, among others.

According to Decision 3529/149006 (Government Gazette 273/12.12.2016) "Approval of the General Urban Plan (G.U.P.) of the Community of Kyriaki, Municipality of Levadeon", part of the project under study falls under the Areas of Control and Restriction of Construction (PEPD) PEPD 1 "Agricultural Development Area" and PEPD 2 "Coastal Area".

Facilities and technical infrastructure networks are permitted in both the agricultural development area and the coastal area.

The impact on spatial planning and land uses in the area, from the operation of the proposed project, is characterized as **neutral**.

9.6.2 Structure and functions of the anthropogenic environment

- ***Construction phase***

The construction of the proposed projects is not expected to cause the unity of the urban fabric to be broken up in the urban and extra-urban area. In the construction phase of the projects, all necessary

measures will be taken to limit the emission of noise and gaseous or particulate pollutants, which may adversely affect the environment of the settlements found in the study area.

In conclusion, the impact of the construction of the proposed projects on the structure and functions of the anthropogenic environment are **weak negative** and **short-term** and **partially manageable** by taking appropriate measures.

- ***Operating phase***

The operation of the project under study is not expected to have an impact on the structure and main environmental characteristics of the nearest settlements.

Also, no changes are expected to occur in the installation, dispersion, density or rate of growth of the permanent population of the project area.

The impact on the structure and functioning of the anthropogenic environment of the region, from the operation of the proposed project, is characterized as **neutral**.

9.6.3 Cultural heritage

The year 2012 with the /85715/20176/2942/288/20-8-2012 JMD (Government Gazette 287/AAP/13.9.2012), Zones A of Absolute Protection and Zone B of Protection of the Monastery of St. Luke, Regional Unit of Viotia were established. A small part of the electricity transmission line under study, about 1.300m, as well as four pillars (P17, P18, P19 and P20) fall within the Protection Zone B of this archaeological site, but a long way from the Protection Zone A of this (about 2km). In accordance with the above Decision, no permitted activities are defined for Zone B of the archaeological site in question However, the permitted activities of Zone A of absolute protection state, inter alia, that 'The maintenance and decentness of existing infrastructure networks, as well as the installation of above-ground or underground networks of general interest, shall be permitted, provided that no direct or indirect damage to monuments is caused and after the prior approval of the services of the Ministry of Public Health is ensured'. Considering that the project under study is a conditional permissible activity even in Zone A of absolute protection, it is possible to get through Zone B protection of the Monastery of St. Luke.

In any case, no impact on the cultural environment of the region is expected from the operation of the project under study.

9.7 SOCIAL - ECONOMIC IMPACTS

- ***Construction phase***

Positive effects on the social and economic environment of the region are expected during the construction of the proposed projects. On the one hand, supplies of construction materials will be secured as much as possible by companies in the region and, on the other hand, the jobs created will be filled as much as possible by the potential of the study area.

The socio-economic impact of the region during the construction phase of the proposed projects is characterised as **positive**.

- ***Operating phase***

The expected benefits of the operation of the project under study in the social- economic environment of the region are:

- ✓ Covering the country's electricity needs and ensuring the use of different sources.
- ✓ To promote the country's environmentally friendly policy on the use of cleaner primary energy sources, limiting greenhouse gas emissions.
- ✓ Economic development at both local and national level.
- ✓ Strengthening local employment and developing the local economy.

Therefore, the socio-economic impact of the region, during the operational phase of the proposed project, is characterised as **positive**.

9.8 IMPACTS ON TECHNICAL INFRASTRUCTURE

- ***Construction phase***

New access roads will be opened for the construction of the proposed projects to meet construction needs, totalling around 8.700m. These roads will link the locations of the proposed pillar squares with the existing agroforest road network.

It should be noted that the existing road network has low traffic and all necessary safety measures (construction markings, etc.) will be taken to ensure traffic safety on the existing road network and at the locations associated with it by the proposed roads.

During the construction of the new electricity transmission line, all safety measures provided for in the relevant regulations and specifications will be observed in direct communication and consultation with independent electricity transmission operator. It should be noted that for these interconnection projects the definitive terms of association, which are attached to a corresponding Annex at the end of the issue, have been approved by the independent electricity transmission operator. Also, after its construction, (T.L.) will be transferred free of charge to independent electricity transmission operator S.A., as provided for by the relevant legislation, by being included in the System.

Therefore, the impact of the construction of the proposed projects on technical infrastructures is considered to be **negative** in terms of their type, in terms of their **moderate size**, in terms of their duration in the **short to long term**, and in terms of dealing with them **manageable** by taking appropriate measures.

- ***Operating phase***

During the operational phase of the proposed project, no impact on the technical infrastructure of the region is expected.

The impact on the technical infrastructure of the region, from the operation of the project under consideration, is characterized as **neutral**.

9.9 RELATIONSHIP WITH HUMANITARIAN PRESSURES IN THE ENVIRONMENT

9.9.1 Consideration of the possibility of over-amplification of one or more of the anthropogenic pressures on the environment

The operation of the licensed activity under consideration is not related to the production of gaseous, liquid and solid waste, but also to the exploitation of natural resources and the water potential of the study area.

Therefore, no strengthening of the already recorded anthropogenic pressures is expected.

9.9.2 Possibility of creating new pressures on the environment

There is no increase in the already recorded anthropogenic pressures.

9.10 IMPACTS ON AIR QUALITY

- ***Construction phase***

During the construction phase of the projects under study, low-intensity effects on the atmospheric environment of the region are expected, which are related to:

- dust emissions from vehicles to be used for the construction work of the proposed projects.
- exhaust emissions from these vehicles.

The impact of the construction of the project includes the creation of dust from the excavations, landings and deposits of construction materials. In particular, as far as dust is concerned, this is mainly due to the alienation and pulverization of the surface of the materials in the excavation site. It may also be due to disturbances in soil materials characterized by low consistency, during excavations and other earthworks, as well as the transport and distribution of soil and other easily crushed materials. More generally, the amount of dust to be produced depends mainly on the extent of the area where the excavations are to be carried out - which due to the nature of the project is limited - on the volume and type of materials that will result from them, the way of excavation and finally, on the climatic conditions prevailing in the area during the construction period of the project.

In addition, it is possible to create on the spot some unpleasant odors from the combustion of motor oil and from the operation of construction machinery.

The above effects are not considered capable of degrading the quality of the atmosphere in the project area, as they will be temporary and reversible. The burden on the atmospheric environment of the area during the construction of the project is expected to be negligible and temporary (only during construction).

Therefore, the effects on the atmospheric environment during the construction phase of the projects under study are considered to be **negative** in terms of their type, in terms of their size, in terms of their **short-term duration**, and in terms of their treatment that is **partially treatable.**

- ***Operating phase***

No negative effects on air quality (**neutral effects**) are expected during the operational phase of the project, as the project will not contribute to the production of gaseous emissions. It will also not contribute to the

release of dust particles or odours. Finally, any effects of vehicle movements to perform maintenance or repair work are considered negligible.

9.11 IMPACTS FROM NOISE AND VIBRATION

- ***Construction phase***

During the construction phase of the proposed projects, a temporary, local charge is expected to be placed on the acoustic environment of the immediate study area, as noise from point sources, i.e. construction equipment, is to be emitted. A small percentage of the contribution to the burden on the acoustic environment will be due to the movement of trucks producing construction materials and the operation of machinery for the work carried out, but it will not be a particular problem, due to the small number of vehicles.

It is also noted that the expected increase in noise will not place a significant burden on the man-made environment, as the residential units of the area, the residences and activities of the inhabitants develop at a relatively large distance from them in relation to the activity under study (nearest settlement tarsos 150m, census 2011 - 17 inhabitants). The effect also applies to any wildlife species, in particular those that are sensitive to noise levels. For this reason, although high noise intensities exceeding statutory limits are not expected, measures should be taken at the construction stage, in particular by rational planning of construction work, as detailed in Chapter 10.

Therefore, the effects of noise during the construction phase of the projects under study are considered to be **negative** in terms of their type, in terms of their size, in terms of their duration in the **short term**, and in terms of their treatment **fully treatable.**

- ***Operating phase***

Noise during the operational phase of the project is limited to the appearance of the Corona effect on the surface of the transmission lines when the intensity of the electric field on the surface of the conductor exceeds the dielectric strength of the air.

It takes the form of intermittent or continuous evacuations. The average value of noise from the CORONA effect under the Lines and in wet weather can reach a minimum of up to 50db, as much as about the operating noise of an electric refrigerator. Since the (T.L.) under study is not in direct proximity to settlements, no effects from the corona phenomenon are expected.

The effects on the acoustic environment of the region, from the operation of the project, are characterized as **neutral**.

9.12 IMPACTS ON ELECTROMAGNETIC PENSIONS

- ***Construction phase***

During the construction phase of the project under study no electrical and magnetic fields are expected and therefore no effects of any kind are expected.

- ***Operating phase***

Electrical and magnetic fields are not only created around the transmission (high voltage) and distribution lines (medium and low voltage) of electricity, but their existence in the surrounding area is interwoven with the very use of electricity. Around any electrical element develops electric and magnetic field, the sizes of which depend for a given position only on voltage and current intensity, respectively.

As the intensity of these fields weakens as the distance from the source that creates them increases, in many cases the use of household electrical appliances results in exposure to magnetic field (magnetic induction) values higher than those that could come from adjacent electrical lines, since in all possible places of residence people have significant safety distances.

The electrical and magnetic fields generated by the power transmission line function are low frequency (50 Hz). The intensity of these fields rapidly weakens as the distance from the source that creates them increases and therefore any visual contact with electrical lines does not automatically result in an electrical or magnetic field charge.

In any case, in accordance with Annex 4.11 of the Ministry of Health. 170225/2014 (Government Gazette 135/B/27-1-2014) within a radius of 100m from the boundaries of the transmission lines there are no sensitive recipients (for example institutionalized settlements), nor sensitive uses (FOR EXAMPLE schools, hospitals, nursing homes, etc.), in order to require an assessment of the impact of electromagnetic fields on them.

The health effects of magnetic and electrical fields during the operational phase of the project are classified as **neutral**.

9.13 IMPACTS ON WATERS

- ***Construction phase***

The construction phase of the proposed projects cannot:

- in any way affect issues that have been set as priorities or objectives of the measures of the approved Management Plan of the Eastern Central Greece Basins.
- have a negative impact, in relation to those provided for in the approved River Basin Flood Risk Management Plan of the Water District of Eastern Central Greece.
- affect the groundwater of the study area.

The potential impact on the aquatic environment from the construction phase of the projects under study concerns the quality status of surface water and is mainly related to accidents, for which the design includes preventive measures and the maintenance/implementation of good construction practices..

In conclusion, in the aquatic environment the effects during the construction phase of the projects under study are classified as **neutral**.

- ***Operating phase***

During the operational phase of the project under consideration no impact is expected on the quantity and quality of surface and groundwater.

Therefore, the impact on the waters of the region from the operation of the proposed project is characterized as **neutral**.

9.14 ASSESSMENT OF THE IMPACTS ON RISKS OF SUBJECTS OR CONTROLS RELATING TO THE WORK

The project under study **does not fall under the provisions of the Staff Regulations 172058/2016** (Government Gazette 354/B/2016) on "Determination of measures and conditions to address risks from large-scale accidents in installations or units; in view of the existence of dangerous substances, in compliance with the provisions of Directive 2003/105/EC 'amending Council Directive 96/82/EC on the

treatment of the risks of major accidents related to dangerous substances' of the European Parliament and of the Council of 16 December 2003".

It is considered that the project under study cannot result in large-scale accidents and that there are no significant risks to human health, cultural heritage and the environment from its operation.
However, the following sections shall assess any impact of the project vulnerability on natural disasters.
Destruction can be defined as "the degree of loss of a good or many goods resulting from the action of a natural phenomenon given size" and measured on a scale from 0 (no loss) to 1 (maximum loss). When the danger becomes visible and imminent then a clear distinction is made between the threat. Thus, the sequence of situations relating to a disaster is as follows:
a catastrophic event ->threat ->threat ->consequences

In general, disasters are defined as "threats to people and to what is valuable" and risks as the "quantitative and occasional probabilities that make the consequences of disasters harmful".

The concept of risk can be attributed on the basis of the following three components:

1) the elements exposed to risk, i.e. population, property, economic activities, public goods, etc., elements which are threatened with destruction in a particular region.
2) the specific risk, which is the degree of losses likely to be caused by the action of a specific natural phenomenon.
3) It can be expressed as the product of natural disaster on vulnerability. the total risk, which reflects the number of lives likely to be lost, the number of injured, the damage to property and the cost of stopping the various activities caused by the action of a specific natural phenomenon.

As mentioned in Section 8.14, in the study area the potential risks of serious disasters that the project may face are:

- Floods.
- Earthquakes.
- Forest Fires.
- Pollution from an accident.

The impact of the project's vulnerability on each of the above risks is presented in detail below.

Floods

The most dangerous and abrupt type of flooding is that caused by heavy rainfall in a short period of time, usually less than 6 hours and usually characterized by violent torrents flooding urban roads or mountain valleys, sweeping everything in front of them. Sudden flooding is very dangerous because it can happen within seconds with little warning.

Their main feature is their extremely sudden appearance. The factors contributing to this type of flooding are the intensity of rainfall, their duration, surface conditions, soil morphology and the slope of the reception basin.

Sudden flooding occurs in mountainous or hilly areas due to the steep morphology of their soil. However they can also occur in lowland areas, where the slope is too small to allow direct water runoff, but accumulates it in lower areas such as underground crossings or underground.

Predictions of flash flooding are one of the most difficult problems meteorologists face at the moment.

The effects of flooding may be immediate, caused by the flood itself or indirect, caused by the defragmentation or malfunction of services and systems associated with it.

As mentioned above, the study area does not fall into a flood zone for any recovery period (T=50, T=100 and T=1000) and therefore the probability of such phenomena is very low.

Earthquakes

The genesis of earthquakes is particularly associated with pronounced phageogenic tectonics. The largest seismic event in the wider region, based on available data from the Geodynamic Institute of the National Observatory of Athens, is the earthquake of 5.4ML on the Richter scale that occurred on 08.04.1970 at a distance of about 10.3km SW of the project under study and 28.2km SW of Livadia, at a focal depth of 10km. The closest to the project under study seismic tremors, of magnitude over 4.0 Richter are:

- Seismic vibration of 4.1ML degrees on the Richter scale, occurring on 07.05.1989, at a distance of about 8.5km SW of the project under study and 23.4km SW of Livadia with a focal depth of 1.0km.
- Seismic vibration of 4.3ML on the Richter scale, occurring on 25.06.1999, at a distance of about 9.5km SOUTH of the project under study and 18.0km SW of Livadia with a focal depth of 11.0km.

The study area, according to the R&D.A."s Seismic Hazard Zones Map, is part of seismic hazard zone II (medium seismic hazard) with a maximum expected seismic ground acceleration A= 0.24g, where g = gravity acceleration.

The direct impact of a potential earthquake on the environment and, by extension, on the project depends on two main factors: the intensity of the earthquake and the vulnerability of the natural environment. Only the most powerful earthquakes (M>7.0, Intensity > XI) cause significant changes in the landscape of a large area and have a significant impact on it.

It is stated here that the earthquakes that took place in the past, focusing on the area under study, did not cause any damage or other problems to the construction of the project. All the construction structures of the project have been constructed with the applicable earthquake regulation and all seismic protection measures have been taken into account.

Forest fires

Fires are an intense natural phenomenon which can be particularly destructive. It is considered one of the large-scale natural phenomena that man is not yet able to control. The threat is even more acute for regions with Mediterranean ecosystems, such as Greece, with immeasurable ecological, economic and social consequences.

The onset of fires is caused by natural and man-made causes. The main causes of the fires are:

- the various agricultural activities and especially the burning of dry grasses.
- Discarding lit cigarettes or lighting a fire in the woods.
- Dumping garbage in the woods.
- Uncontrolled burning of waste.
- Malicious actions (arson).
- Various activities in holiday homes.
- Accidents (traffic accidents, damage to agricultural machinery, engine sparks, etc.).

Human activities result in fires occurring so often that the strength of ecosystems is depleted. Moreover, the regeneration and preservation of the ecological values of ecosystems is made even more difficult by the disruption caused by infrastructure - especially roads and settlements.

The rate of spread of a fire increases exponentially by increasing wind speed. With a wind speed of 10km/h a fire in a sandy area moves at a speed of 0.5km/h, while at 20km/h wind speed the fire spread speed becomes 0.75km/h and at 40km/h the spread speed reaches 1.75km/h.

The environmental impact resulting from the outbreak of a forest fire is:

- Destruction of the ecosystems of the wider region.
- Burden of air quality with substances dangerous to humans and the environment.
- Damage to surrounding land uses.

9.15 IMPACT SUMMARY

The following table summarizes the environmental impact on the natural and man-made environment of the study area, during the construction phase of the proposed project, but also from the operation of the project. In particular, color encoding is used in which the positive edge of the variance range of each property is shown in green, with white the neutral state and with yellow the negative edge.

Table 9.5: Summary environmental impact table of the project.

Impact Category		Impact characterization during the construction phase of the projects under study	Impact characterization during the operational phase of the projects under study
Climate and Bioclimatic Characteristics		Neutral	Neutral
Morphological - Toxicological Characteristics			
▪	Changes in the image of the wider region	Negative, weak, short-term, fully treatable	Negative, weak, long-term, un treatable
▪	Assessment of local changes	Neutral	Neutral
▪	Probability of disruption of the horizon line and the natural shapes and colors of the landscape	Neutral	Neutral
▪	Compatibility of upcoming changes in relation to the European Landscape	Neutral	Neutral

	Convention, ratified by L. 3827/2010		
Geological, Masonic and Soil Characteristics			
■	Alteration, partitioning of the outer surface of the rocks	Negative, weak, short-term, fully treatable	Neutral
■	Possible destruction of special geological characteristics	Neutral	Neutral
■	Possible occurrence of geological phenomena of special importance	Neutral	Neutral
■	Probability of soil pollution	Negative, weak, short-term, fully treatable	Neutral
■	Soil quality degradation	Neutral	Neutral
■	Soil erosion	Negative, weak, short-term, partially treatable	Neutral
Natural Environment			
■	Effects on flora, fauna and ecosystems	Negative, weak, short-term, partially treatable	Negative, weak, long-term, treatable
■	Impact on areas of the national system of protected areas	Neutral	Neutral
■	Effects on forests and woodlands	Negative, weak, long-term, partially treatable	Negative, weak, long-term, partially treatable
Anthropogenic Environment			
■	Spatial Planning - Land Uses	Neutral	Neutral
■	Structure and Functions of the Anthropogenic Environment	Negative, weak, short-term, partially treatable	Neutral
■	cultural heritage	Neutral	Neutral
Socio-economic Impact		Positive	Positive
Impact on Technical Infrastructure		Negative, moderate, short-term, treatable	Neutral
Association with anthropogenic pressures in the environment		Neutral	Neutral
Effects on air quality		Negative, weak, short-term, partially treatable	Neutral
Effects of noise or vibration		Negative, weak, short-term, fully treatable	Neutral

Effects related to electromagnetic fields	Neutral	Neutral
Effects on water	Neutral	Neutral

10 TREATMENT OF THE ENVIRONMENTAL IMPACT

According to the specialized contents of Chapter 10, of Annex 2 of sub. 170225 Decision of the Ministry of Foreign Affairs (Government Gazette 135 B / 27-01-2014), this chapter must contain a detailed description of the additional measures proposed to address its significant adverse effects on the environment, in addition to those that have been integrated in its design.

This Chapter will therefore follow the thematic structure also followed in Chapter 9 and will develop only the corresponding environmental instruments that may be affected on the basis of the prior documentation of the impact of the proposed projects.

10.1 GENERAL TREATMENT MEASURES - GOOD PRACTICE TECHNIQUES

This paragraph analyses general guidelines for good practice in the construction of the proposed projects. In order to prevent, and optimally address, potential environmental impacts during the construction phase of the proposed extension projects, the following basic principles will be followed:

i. Implementation of an organized timetable for the individual work to be required, with the main aim of carrying out parallel construction work on the individual projects.

ii. Issuance of all the authorizations and approvals provided for by the applicable legislation of the competent Services before the start of work.

iii. Use of modern mechanical equipment with international specifications and regular maintenance based on the manufacturer's instructions.

iv. Implement all necessary measures to limit the potential impact of waste generated (solid, liquid), air pollutant emissions and noise emissions.

v. The various excavations should not remain uncovered for long periods of time.

vi. The deposits of materials in piles should be made from the minimum possible height and the piles should not be more than 4m high.

vii. Determination of solid waste collection points, regular cleaning of the site, sorting at source and management in accordance with the applicable legislation for each waste stream (for example P.D. 82/2004 for oils, JMD 13588/725/2006 on hazardous waste, etc.).

viii. For hazardous waste that may arise during the construction phase, the contractor should ensure their separate collection. They should be managed in accordance with the provisions of JMD 13588/725/2006 (FKE 383/B/2006).

ix. Any other waste resulting from and subject to alternative management provisions shall be collected separately under the responsibility of the contractor and disposed of in approved systems as provided for in the relevant legislation.

x. Take appropriate measures to prevent fuel and lubricants from leaking from machinery failures. Availability of adsorbent materials (for example sand, shaving, etc.) on site for collection of liquids in case, despite control and proper operation measures, a leak occurs. Immediate remediation and restoration of soil, management of impregnated materials as referred to in the current legislation on hazardous waste.

xi. Explicit prohibition of all forms of combustion of materials (garbage, tires, oils, etc.) in the project area.

xii. Use of a protective cover on all trucks carrying powdery materials to and from the construction site.

xiii. Wetting of soil and materials during movements and depositions in order to reduce the dust emitted.

xiv. All machinery and equipment used in construction should be in good condition and regular maintenance should be carried out.

xv. Reduction of emissions of air pollutants and noise of machinery, construction site vehicles, etc., using new technology machinery and which will be maintained preventively according to manufacturers' specifications.

xvi. In order to deal with noise during the construction phase, the use of new technology construction machinery, which will be CE-labelled and the guaranteed sound power level, will be used.

xvii. Establish maximum speed limits, for reasons of avoiding dusting but also for safety reasons.

10.2 MEASURES TO TREAT THE IMPACT ON CLIMATE AND BIOCLIMATIC CHARACTERISTICS

No adverse effects on the climatic and bioclimatic characteristics of the area are expected from the construction and operation of the projects under consideration and therefore no response measures are required.

10.3 MEASURES FOR IMPACTS ON FORMOLOGICAL AND LOCATIONAL FEATURES

The construction work of the projects under study is estimated to have only a limited negative impact on the topographical and morphological data of the region. In order to reduce these effects, the following are proposed:

- The bandwidth of the project's occupation zone should be limited to what is strictly necessary for the construction of the project.

- For the entire project and before the construction phase, the areas of occupation should be demarcated, so that any excavations that will be carried out are limited to what is strictly necessary and to avoid unnecessary excavations, excavations and de-excavations.
- All kinds of waste materials will be collected and removed from the project site and disposed of in accordance with the applicable provisions.
- After the completion of the construction work, the removal of all materials and equipment that have been transferred to the intervention area for the needs of the project will take place.
- As regards urban waste, no special measures are required in the construction of the projects. The volume of waste produced by workers during the construction of the projects will be quite small, so they can be collected in waste bins and removed, together with the other solid waste generated, in the waste collection areas of the area.
- After the completion of the constructions of the project, the affected areas will return to their previous form. As part of the restoration, the contractor is obliged to remove and remove from the construction sites, any temporary installation that exists, waste, tools, scaffolding, machinery, surplus materials, useful or useless, temporary installations of machinery, etc. and to repair or repair parts areas that have suffered damage or morphological alterations from the execution of the project, in a reasonable time, however less than the performance of the project in operation.

10.4 MEASURES FOR IMPACTS ON GEOLOGICAL, TEKTONIC AND EDAFOLOGICAL FEATURES

The treatment of the effects on geological and soil characteristics concerns the proper management of excavations and excavation products and the possibility of reusing them. For the construction needs of the proposed projects and in particular from the configuration of the new platforms for the seat of the pillars, but also from the opening of the new forest road construction to serve the needs of the proposed projects, excavations of the order of 109.970^{m3} will be carried out, of which a quantity of 21.210^{m3} will be used for the re-construction needs. The excess excavations, which will amount to 88.760^{m3}, will be managed in accordance with the current Legislation and in particular joint ministerial decision 36259/1757/E103/2010 (Government Gazette 1312/B/2010) where waste from excavations and demolitions (waste from excavations, construction and demolition) can be taken for alternative management, to authorized management centers.

Soil pollution can occur by accident or negligence in the operation of the construction machinery of the project. According to P.D. 82/2004 (Government Gazette 64 A/2.3.2004) "Replacement of JMD98012/2001/1996 "Determination of measures and conditions for the management of the mineral oils

used (B 40)''. Measures, conditions and programme for the alternative management of lubricating oil waste', JMD 13588/725/06 (Government Gazette 383/B/28.3.06), JMD 24944/1159/06 (Government Gazette 383/B/28.3.06), JMD 24944/1159/06 (Government Gazette 383/B/28.3.06), JMD 24944/1159/06 (Government Gazette 383/B/28.3.06), JMD 24944/1159/06 (Government Gazette 383/B/28.3.06). GG 791/B/30.6.06) and JMD 8668/2.3.07 (Government Gazette 287/B/07), as applicable, prohibit the pollution of surface and groundwater from all types of oils; fuel, etc., as well as the discharge of second-hand oils into the soil. The mineral oils to be used must be kept in closed containers in a covered area, while the mineral oils used or their leaks are collected and made available to legal collectors and recipients.

The construction site for the needs of the project should be kept in a clean and work-appropriate condition throughout their use. At the end of the work it should be restored to its previous state and any damages repaired.

Additional measures to be taken to minimize the impact on the geological and soil characteristics of the intervention area are as follows:

- The deposition of excavations to be reused as soil material should be carried out in a way that does not allow corrosion and material disposal phenomena.
- Excavation materials shall be transported by means of means of transport with appropriate covers in order to prevent their dispersion or diffusion on the roads.
- Earthworks to be avoided during days of heavy rainfall.
- An effort should be made to ensure that the routes of the cars serving the construction sites do not pass through the centers of the settlements and areas of residence.
- For all waste and waste resulting from construction activities during the construction of projects (solid and liquid) appropriate management should be applied to avoid pollution of the area (soil, subsoil, surface and groundwater) from uncontrolled disposal or from any leaks.
- Prohibit all forms of burning of materials (garbage, tires, oils, etc.) in the project area.

10.5 MEASURES FOR RESPONSIBILITY OF IMPACTS IN THE PHYSICAL ENVIRONMENT

The general measures to address the impact on plant communities and flora during the construction of the proposed project are summarized as follows:

- The bandwidth of the project's occupation zone should be limited to what is strictly necessary for the construction of the project.

- For all waste and waste resulting from construction activities during the construction of the projects (solid and liquid, hazardous or not, appropriate management should be applied in order to avoid pollution of the area (soil, subsoil, surface and groundwater) from their uncontrolled disposal or from any leakage.
- Any excavations of foundations and technical works to be carried out should be limited to what is strictly necessary and that unnecessary excavations, excavations and de-excavations should be avoided.
- Interventions in forest areas should be carried out in accordance with the conditions, conditions and procedure laid down by the Forest Legislation. The use of these areas should relate exclusively to the project covered by this study. Any deforestation or general deterioration in natural vegetation shall be limited to the minimum extent possible and exclusively within the approved area of occupation of the project, i.e. within the limits of the premises for which an installation protocol has been issued in the case of a forest character, or the possibility of their lawful use in the case of a non-forest character (for example by purchase) has been ensured., licensing by the owner, expropriation, creation of easement, etc.). The logging, grubbing-up and more generally any deterioration of forest trees, as well as the disposal of logging products, should be carried out in accordance with the provisions of forestry legislation.
- During earthworks, a reduction in dust dispersion is required, with soil wetting, in the event of adverse atmospheric weather conditions.
- At the end of the construction of the proposed projects, all types of construction facilities will be removed.
- In accordance with paragraph 8 of Article 45 of Law 998/1979, as amended and in force, a reforestation or afforesis of an area of the same area as that for which an operation will be carried out will be carried out for the project under consideration, at the suggestion of the competent forestry service and following the preparation and approval of a reforestation study.

10.6 MEASURES FOR RESPONSIBILITY OF IMPACTS IN THE HUMAN ENVIRONMENT

In order to minimize the possible impact on the social and economic environment of the wider region, measures should be taken aimed at the following:

- Ensuring smooth movement of vehicles in the area during the construction phase of the project.
- Compensation of owners for the expropriation of the areas of seat of the pillars and for the repair of any kind of damage caused during the construction stage of the project.

- Satisfaction of technical requirements for safe operation and easy construction and maintenance of the line.
- Compliance with the anti-seismic protection rules for the seat of the pillars.
- Coverage of the needs of the project to staff, by the residents of the settlements located near the construction department of T.L.

10.7 MEASURES FOR THE RESPONSIBILITY OF SOCIAL-ECONOMIC IMPACTS

As positive effects are expected on the social-economic environment, from the construction and operation of the project under study, no response measures are required.

10.8 MEASURES FOR RESPONSIBILITY OF IMPACTS IN TECHNICAL SUBSIDIES

In order to address any impact on existing technical infrastructure from the construction of the projects under consideration, the following measures are proposed:

- Any intervention in an existing infrastructure project should be carried out in accordance with a relevant study and in cooperation with the relevant Public Utilities Organizations, in order to ensure the smooth operation of the infrastructure project concerned.
- Smooth movement of vehicles in the project area during the construction phase of the project (placement of construction markings) should be ensured.
- Satisfaction of technical requirements for safe operation and easy construction and maintenance of the line.
- Compliance with the anti-seismic protection rules for the seat of the pillars.

10.9 MEASURES FOR RESPONSIBILITY OF IMPACTS RELATING TO HUMAN PRESSURE IN THE ENVIRONMENT

As no impact on anthropogenic pressures on the environment is expected from the construction and operation of the project under study, no response measures are required.

10.10 MEASURES FOR RESPONSIBILITY OF IMPACTS ON AIR QUALITY

The main effects on the atmosphere of the project area concern the gaseous pollutants to be produced by the construction machinery, as combustion products of motor oil and the production of dust, as an excavation product.

By applying the fixed measures provided for by existing legislation and good construction practice, the effects of exhaust emissions from vehicles and machinery and from the release of dust emissions due to

earthworks and the deposition of various materials can be fully addressed. In addition to the measures referred to in paragraph 10.1, these measures are as follows:

- All vehicles – and in particular heavy vehicles – participating in construction work should have the required emission control certificate (the so-called 'exhaust card'), which should be renewed before its expiry, so that emissions of gaseous pollutants are within the permitted limits.
- Provision should be made for the implementation of a maintenance programme for all construction machinery on a regular basis by qualified personnel.
- As provided for in the current legislation, all transport of loose materials (soil, gravel, sand, cleaning materials, etc.) requires cover of all cargo, so as not to endanger those who move behind or around the truck. This measure makes a significant contribution to limiting dust emissions.
- Truck engines should be switched off when they are in a stop (for example when they are loaded). This measure is part of good construction practice as it contributes to fuel savings and reduces emissions of gaseous pollutants.
- During dry periods of the year, construction routes should be wet. This measure, which restricts dust emissions, is required both for reasons of environmental protection and good construction practice, in order to ensure satisfactory visibility on and around construction routes.

Other important measures to limit dust emissions are as follows:

- Trucks and other heavy machinery will be moved to and from the site via existing paved roads where possible.
- Disposals or disposals of materials in/from piles should be minimized. Materials should be deposited in piles from the minimum possible height (depending on the machine used) and in no case more than 4m.
- The planning of the project so that the excavation products are driven within the shortest possible time to the site and their systematic wetting during dry periods of the year if they are stored for a long period of time (for example more than one month).
- The planning of the project so that the stored quantities of aggregates for the needs of the project are limited to the most necessary and their systematic wetting during dry periods of the year if they are stored for a long period of time (for example more than one month). This measure makes a significant contribution to limiting dust emissions.

10.11 MEASURES FOR RESPONSIBILITY OF IMPACTS FROM THORYS AND DONATIONS

During the construction of the project an increase in noise is expected in the area of execution of the work, which will be mainly due to the operation of the machinery

In order to better deal with nuisances, it is proposed to use state-of-the-art equipment that meets the noise emission specifications, to comply with the specifications for the proper operation of the machinery, to regularly maintain the mechanical equipment, to comply with the permitted sound power levels based on the joint ministerial decision 37393/2028/2003, as amended by 9272/471 (Government Gazette 286/B/2-3-2007) and to take measures to protect workers from exposure to noises that may in any way harm their health. Provision of protective equipment (for example earplugs) to any worker who, due to the nature of his work, is often exposed to high noise levels.

In order to reduce noise nuisances, care should be taken to ensure that all relevant provisions of Greek legislation are complied with and noise levels do not exceed the permitted limits. In the alternative, in order to reduce as much as possible, the impact on the acoustic environment during the construction phase of the project, it is proposed to take into account the following measures:

- Selection of site location and planning of work in order to cause the least possible harassment.
- Work that causes significant noise (excavations, etc.) to stop quiet hours.
- Installation where necessary of temporary sound curtains in the areas of immediate proximity to dwellings.
- Avoiding the simultaneous operation of construction machinery.
- Intermittent machines should be closed during intermediate periods, which are not in operation. Priority selection of equipment of low sound emission or similar conversion (for example with silencers) equipped with an EC type-certificate.
- Regular maintenance of all machinery - vehicles of the construction site.

During the operational phase of the project under study, the average value of the noise from the CORONA effect under the Lines and in wet weather can reach up to 50db, as much as about the operating noise of an electric refrigerator. Since the (T.L.) study is not in direct proximity to settlements, no effects from the corona phenomenon are expected.

10.12 MEASURES FOR RESPONSIBILITY OF IMPACTS RELATING TO ELECTROMAGNETIC PENSIONS

Within a radius of 100m from the boundaries of the transmission lines there are no sensitive recipients (for example institutionalized settlements), but also sensitive uses (for example schools, hospitals, nursing homes, etc.) and therefore no effects from magnetic and electrical fields are expected during the construction and operation phase of the project under study. Therefore, no measures are proposed to deal with any effects related to electromagnetic fields.

10.13 MEASURES FOR RESPONSIBILITY OF IMPACTS IN WATERS

During the construction and operation phase of the project under consideration, no impact is expected on the quantity and quality of surface and groundwater and therefore no specific response measures are proposed beyond what has been mentioned including general guidelines for good practice in the construction work of the proposed projects referred to in section 10.1.

10.14 RESPONSIBILITY OF IMPACTS ON RISKS OF SUBJECTS OR DESTRUCTIONS RELATING TO THE PROJECT

The project under study is **not subject to the provisions of the Staff Regulations 172058/2016** (Government Gazette 354/B/2016) on "Determination of measures and conditions to address risks from large-scale accidents in installations or units; in view of the existence of dangerous substances, in compliance with the provisions of Directive 2003/105/EC "amending Council Directive 96/82/EC on the treatment of the risks of major accidents related to dangerous substances" of the European Parliament and of the Council of 16 December 2003".

It is considered that the project under study cannot result in large-scale accidents and there are no significant risks to human health, cultural heritage and the environment from its operation and therefore no corresponding response measures are proposed.

THESSALONIKI, DECEMBER 2020

PROJECT OPERATOR	ENVIRONMENTAL STUDY ENGINEER

11 ENVIRONMENTAL MANAGEMENT & MONITORING

11.1 ENVIRONMENTAL MANAGEMENT

The successful implementation of the Environmental Management System consists mainly in meeting the relevant environmental legal requirements. The proposed Environmental Management System (EA) concerning the project under study and having the following main objectives is presented below:

- Control of the impact of construction and operation, in accordance with the provisions of this Environmental impact assessment.
- Reliable and with sufficient frequency monitoring of the sizes characterizing the environmental impact of the project under study.
- Faithful observance of the project construction schedule.
- Implementation of the environmental conditions of the Environmental Conditions Approval Decision of the project and all preventive and remedial measures proposed in this study.
- Continuous improvement in environmental performance.
- Implementation and observance of the monitoring programme proposed in this study.
- Effective protection of the environment.

11.2 ENVIRONMENTAL MONITORING

This section proposes an environmental impact monitoring programme both during the construction phase and during the operational phase of the project under study, in order to ensure effective protection of the environment.

In the **construction phase**, the project operator must monitor the implementation of environmental conditions. To this end, the environmental monitoring officer shall ensure that data relating to the conformity of construction work with environmental conditions are collected. Third parties will ensure that they collect and make available to the environmental monitoring officer the relevant data relating to their liability tasks. In particular, during the construction phase it is proposed to monitor the following parameters:

- Monitoring the management of materials resulting from the excavation work of the projects.
- Monitoring of the de-clarifications made for the construction needs of the project, in order to limit them to what is absolutely necessary.

- Monitoring compliance with measures to limit dust emitted (wetting of materials, bare surfaces and transportable excavation products and materials, heavy vehicle cover).
- Monitoring compliance with measures relating to the reduction of gaseous and particulate pollutants.
- Monitoring of noise emissions generated by the construction of projects by implementing noise level measurements within the boundaries of the construction areas.
- Monitoring the collection and management of municipal waste and waste.

During the **operational phase** of the proposed project it is proposed to monitor the electromagnetic radiation levels of the Electricity Transmission Line. In particular, it is proposed to carry out measurements of the level of the electric and magnetic field, which will be carried out under the responsibility of the operator of the Transmission Line, in the first year after the start of operation of the line and then repeated every five years. The points to be selected should be located in or near residential tissues. Measuring instruments must be accompanied by calibration certificates Measurement instruments shall be accompanied by calibration and compatibility certificates in accordance with Directive 89/336/EEC and relevant Regulations EN 55055, EN 61000-4-2, ENV 50140.

12 CODE OF RESULTS AND PROPOSALS FOR THE APPROVAL OF ENVIRONMENTAL CONDITIONS

This chapter presents the Draft Decision approving environmental conditions of the project including the environmental conditions and the monitoring programme proposed to be the necessary condition for the implementation and operation of the project under study, in order to ensure the greatest possible protection of the environment and compliance with applicable environmental legislation.

DECISION

SUBJECT: *Environmental Terms Approval for the project: "Transmission Line (T.L.) of electricity 400kV, for the connection of the Agios Nikolaos HVC with Distomo HVC, in Viotia (MU)".*

THE REPRESENTATIVE GENERAL DIRECTOR OF COUNTRY AND ENVIRONMENTAL POLICY OF THESSAL ADMINISTRATIVE - GREECE

Considering:

1. Law 1650/1986 on the protection of the environment (A' 160), as amended and in force.
2. Law 4014/2011 (A' 209) "for the environmental licensing of projects and activities, regulation of arbitrariness in connection with the creation of an environmental balance and other provisions of competence of the Ministry of Foreign Affairs and Security of the European Union". Environment' as amended and in force.
3. The Law 4042/12 (Government Gazette 24/A/13-2-2012) "Criminal protection of the environment − Harmonization with Directive 2008/99/EC − Framework for the production and management of waste − Harmonization with Directive 2008/98/EC − Regulation of matters of the Ministry of Environment, Energy and the Department of Environment. Change'.
4. The Law 998/1979 (A' 289) "on the protection of forests and woodlands in general of the country", as amended and in force.
5. The Law 3028/2002 (A' 153) for the protection of Antiquities and Cultural Heritage in general.
6. The N. 3852/2010 (A' 85) "New architecture of Self-Government and Decentralized Administration - Kallikrates Programme".
7. The Law 4685/2020 (Government Gazette 92/A) "Modernization of environmental legislation, incorporation into Greek legislation of Directives 2018/844 and 2019/692 of the European Parliament and of the Council and other provisions».

8. P.D. 138/10 (Government Gazette 231 A/27-12-2010) "Organization of the Decentralized Administration of Thessaly - Central Greece.
9. JMD 3060 (FOR) 238/2002 (B' 512) referring to measures to protect the public from the operation of low-frequency electromagnetic field emission devices.
10. JMD 21398/2012 (B' 1470) for the establishment and operation of a website for the posting of environmental terms approval.
11. Ministerial decision 15277/2012 (B' 1077) "Specialization of procedures for the incorporation into the GNOS of the intervention authorization provided for by the provisions of the Forest Legislation, for projects and activities of categories A and B of JMD 1958/2012 (B' 21), as amended and codified by No. 37674/27.7.16 ministerial decision (B' 2471) Decision, in accordance with Article 12 of L. 4014/2011».
12. The P.D. 48963/5.10.2012 (B' 2703), setting out specifications for the content of environmental conditions approval decisions in accordance with Article 2(2)(b) of Regulation (EC) No 48963/5.10.2012 (B' 2703). 7 of 4014/2011.
13. The No. 167563/2013 (B' 964) JMD for the specification of the procedures and specific criteria for the environmental authorization of the projects and activities referred to in Articles 3, 4, 5, 6 and 7 of Laws 4014/2011.
14. The JMD. 1649/2014 (B' 45) "Specialization of consultation procedures and ways of informing the public and participation of the public concerned in public consultation in the environmental licensing of projects and activities...".
15. P.D. 170225/2014 (B' 135) "Specialization of the contents of the environmental licensing dossiers of category A projects and activities of ministerial decision 1958/2012».
16. Ministerial decision 115973/6088/2014 (B' 2961) "Determination of supporting documents for the adoption (A) of a decision approving an intervention and (B) an act of an informational nature".
17. The No. 37674/2016 ministerial decision (B' 2471) "Amendment and codification of ministerial decision 1958/2012 - Classification of public and private works and activities into categories and subcategories in accordance with Article 1(4) of Law 4014/21.9.2011 (A' 209) as amended and in force».

DECIDE

The approval of the following environmental conditions and restrictions for the installation and operation of a new Transmission Line (T.L.) of electricity 400kV, for the connection of the Agios Nikolaos HVC with the

Distomo HVC, as part of the connection of the new 826MW power station with the Agios Nikolaos HVC, in Viotia (MU).

A. DESCRIPTION OF ACTIVITIES

A.1) Type and size of activity

- The project concerns: New Transmission Line (T.L.) of high voltage electricity 400kV, total length about 14km.
- Forty-two (42) new high voltage pylons.
- New forest road construction, with a total length of about 8,700m, to serve the construction and operation needs of the new electricity transmission line.
- Land development of cable systems, area 1.265m^2.
- Projects–equipment for connecting the development plot of cable systems with the Agios Nikolaos HVC.
- Connection of the new T.L. to the Distomo HVC (connection of the terminal pillar of T.L to the terminal, the available gateway, to the Distomo HVC).

A.2) Group, subcategory and type in which the project is classified

The project is classified in subcategory A2 of the 11th group "Energy Transfer, Fuels and Chemicals', a/a 10 'Air Lines for the Transmission of Electricity with their accompanying installations (super-high voltage substations and centres)', of the Ministry of Energy 37674/2016 MD (B' 2471) "Amendment and codification of the Ministry of Energy 1958/2012 - Classification of public and private works and activities into categories and subcategories.

A.3) Coordinates of the project and the intervention area

The geographical coordinates (GGRS '87) of the pillars of the 400kV High Voltage Transmission Line are as follows:

A/A	GGRS ΄87	
	X (m)	Y (m)
ΙΚΡΙΟΜΑ	385.280,033	4.254.960,755
Π1	385.188,969	4.254.929,034
Π2	385.099,975	4.254.766,161
Π3	385.069,571	4.254.529,026
Π4	385.087,470	4.254.130,000

A/A	GGRS ΄87	
	X (m)	Y (m)
Π5	385.329,340	4.253.676,500
Π6	385.469,253	4.253.221,747
Π7	385.578,057	4.252.868,106
Π8	385.710,694	4.252.436,999
Π9	385.707,103	4.252.208,105
Π10	385.700,985	4.251.818,125
Π11	385.692,190	4.251.257,500
Π12	386.035,640	4.250.841,691
Π13	386.304,870	4.250.515,740
Π14	386.613,053	4.250.264,003
Π15	386.930,583	4.250.004,630
Π16	387.173,750	4.249.806,000
Π17	387.202,987	4.249.435,743
Π18	387.227,783	4.249.121,720
Π19	387.264,440	4.248.657,500
Π20	387.171,251	4.248.393,462
Π21	387.083,030	4.248.143,498
Π22	387.094,087	4.247.908,760
Π23	387.106,170	4.247.652,240
Π24	387.166,063	4.247.443,000
Π25	387.363,499	4.247.138,299
Π26	387.597,551	4.246.777,166
Π27	387.730,082	4.246.268,516
Π28	387.639,609	4.245.672,927
Π29	387.568,024	4.245.491,850
Π30	387.316,306	4.245.010,152
Π31	387.196,250	4.244.873,420
Π32	387.015,780	4.244.882,930
Π33	386.844,060	4.244.799,410
Π34	386.715,994	4.244.635,334
Π35	386.529,860	4.244.527,647
Π36	386.142,902	4.244.627,561
Π37	385.957,659	4.244.729,189
Π38	385.631,526	4.244.908,517
Π39	385.406,084	4.245.194,306
Π40	385.311,054	4.245.373,533

A/A	GGRS ΄87	
	X (m)	Y (m)
Π41	385.324,934	4.245.618,455
Π42	385.365,005	4.245.675,007

B. INSTITUTIONAL BASIC FEATURES OF THE WORK OR ACTIVITIES AND THE REQUIREMENTS OF THE ENVIRONMENT

B.1) Spatial Planning and Land Uses

The location of the project under study is within the General Urban Plan (G.U.P.) of the Municipal Unit (M.U) of Distomo and of the General Urban Plan (G.U.P.) of the Municipal Unit (M.U) of Kyriaki.

According to Decision 3124/128532 (Government Gazette 432/A.A.P./31.12.2012) "Approval of the General Urban Plan (G.U.P.) of the Municipal Unit (MU) of Distomo , Municipality of Distomo - Arachova - Antikyra", part of the electricity transmission line passes mainly through the Areas of Control and Restriction of Construction (PEPD):

- PEPD 1: Zone for the protection of agricultural land and the rural landscape and the development of agricultural activities (falls the smallest part of the TL under consideration)
- PEPD 2: Zone of grassland and development of RES facilities and bauxite mines (falls the largest part of the T.L.)

According to Decision 3529/149006 (Government Gazette 273/A.A.P./12.12.2016) "Approval of the General Urban Plan (G.U.P.) of the Community of Kyriaki, Municipality of Levadeon", part of the electricity transmission line passes through the Areas of Control and Restriction of Construction (PEPD):

- PEPD 1: Area for the development of agricultural uses
- PEPD 2: Coastal area

B.2) Elements of environmental sensitivity of the area

The Electricity Transmission Line:

- Located at a distance of 150m from the settlement of Tarsos and 1.000m from the boundaries of the settlement of Distomo .
- It does not fall within an area within the NATURA 2000 Network.

- Part of the electricity transmission line under study, about 1.300m, as well as four pillars (P17, P18, P19 and P20) fall within the Protection Zone B of this archaeological site, but a long way from the Protection Zone A of this (about 2km).

Γ. DEFINITIONAL PRICES OF EXPENDITURE IN THE STEAM, IN THE WATERS IN THE TERRITORY, STATION OF VEHICLE AND DONATIONS AND ENVIRONMENTAL QUALITY

Γ.1. Quality of the Atmosphere

1. The air quality limit and guide values refer to the following provisions:
   I. JMD 22306/1075/E103/2007 (Government Gazette 920/B/2007) "Determination of target values and limits for the assessment of arsenic concentrations, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air, in compliance with the provisions of Council Directive 2004/107/EC "On arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air" of 15 December 2004 of the European Communities».
   II. JMD 14122/549/E. 103/2011 (Government Gazette 488/B/30.3.2011) "Measures to improve air quality, in compliance with the provisions of Directive 2008/50/EC "On air quality and cleaner air for Europe" of the European Parliament and of the Council of the European Union of 21 May 2008».
2. For point emissions of solids in suspension (dust) from construction sites of the project, the limit of 100 mg/^{m3} laid down in Article 2(2)(b) shall apply. (d) 1180/1981 (Government Gazette 293/A/1981) "Regulation of matters relating to the establishment and operation of industries, crafts, all kinds of mechanical installations and warehouses and the safeguarding of the environment in general».

Γ.2. Waste

1. Liquid waste applies:
   I. No. E1b/221/1965 (B' 138) Sanitary provision on the disposal of waste water and industrial waste, as amended by Nos. No C1/17831/7.12.1971 (B' 986), C4/1305/2.8.1974 (B' 801) and D.YG2/G.P. oc.133551/30.9.2008 (B' 2089).
   II. The specific provisions that may apply to the project area.

2. The lubricating oils will be managed in accordance with the provisions of P.D. 82/25-2-04 (Government Gazette 64/A/2-3-04).

Γ.3. Specific noise and vibration level limit values in accordance with applicable provisions

1. For noise emissions of equipment used outdoors during the construction and operation of the project, the provisions of JMD 37393/2028/2003 (Government Gazette 1418/B/2003) "Measures and conditions for noise emissions to the environment from equipment for outdoor use shall apply.».
2. For the maximum permitted noise limits of construction sites and installations of the project, the provisions of Article 3 of P.D. 1180/1981 (Government Gazette 293/A/1981) shall apply.).
3. Noise during the operation of installations should comply with the provisions of DP 1180/1981, as well as ministerial decision 2640/270 (Government Gazette 689/B/18.8.78), ministerial decision 56206/1613 (Government Gazette 570/B/9.9.1986), ministerial decision 69001/1 1921 (Government Gazette 51/B/18.8.1988), ministerial decision 765/1991 (Government Gazette 81/B/21.2.1991), ministerial decision A5/2375/78 (Government Gazette 698B).

Γ.4. Exposure to changing electrical and magnetic fields of low frequencies:

For the electrical and magnetic field of transmission lines and voltage transformers, the basic limitations and reference levels of the reference number 3060/(FOR)/238/2002 (Government Gazette 512B/25-04-2002) JMD (joint ministerial decision) "Measures to protect the public from the operation of low-frequency electromagnetic field emission devices" [(Correction of Errors (F.E.K. 759B/19-06-2002)].

D. CONDITIONS, MEASURES AND RESTRICTIONS TO BE TAKEN FOR THE MINIMISATION AND RESPONSIBILITY OF POTENTIAL ENVIRONMENTAL IMPACTS

Δ.1. General

1. The project operator and any legally liable person shall bear full responsibility for compliance with the environmental conditions, measures and restrictions imposed by this Decision (environmental terms approval).
2. The project operator shall designate a person responsible for monitoring compliance with the environmental conditions, measures and restrictions laid down in this Decision (environmental terms approval), and shall communicate its name to the competent environmental authority.
3. In the construction phase of the project, the construction contractor is responsible for the implementation of the monitoring programme. In the operational phase of the project, the project manager is responsible.
4. In the process of approval, supervision and receipt of the project, take all necessary actions and take all necessary measures to ensure compliance with environmental conditions, and the possibility of

dealing with and remedying unpleasant environmental situations due to actions or omissions in violation of environmental conditions.

5. The project operator shall not be exempted from the obligation to comply with provisions of existing environmental legislation, irrespective of the existence of an explicit reference to the specific environmental conditions.

The developer must, during the construction process, take all necessary measures to ensure:

- Compliance with environmental conditions by the manufacturer in the part concerning him
- The possibility of dealing with and remedying unpleasant environmental situations due to actions or omissions of the manufacturer in violation of environmental conditions.

D.2. CONSTRUCTION PHASE

1. In general, excavations for the construction of the works should be limited to what is strictly necessary. To limit interference with the natural environment only within the necessary construction zone of the project and to de-de-escalate as little as possible from the existing vegetation. No further intervention and any form of construction in the wider area of the project without the legal approvals.
2. Excavation products should be used to meet the various needs of the project (for example geomorphological smoothing of individual sites/parts of the project, plantings, etc.) in order to limit the alteration of the existing soil morphology.
3. Excavation products should be used to meet the various needs of the project (FOR EXAMPLE geomorphological smoothing of individual sites/parts of the project, plantings, etc.) in order to limit the alteration of the existing soil morphology.
4. Surplus materials resulting from the construction phase, which cannot be used in re-construction operations, will be deposited in an environmentally licensed repository or in landfills or in areas where other projects are carried out, which have approved environmental conditions and in which such materials can be used either in inactive quarries or through alternative management systems; under the current legislation, i.e. P.D. 36259/1757/E103/2010 "Measures, conditions and programmes for the alternative management of waste from excavations, construction and demolitions (waste from excavations, construction and demolition)" (Government Gazette 1312 B' 2010), as amended and in force.
5. Any installations and work resulting from the technical design of the project following the adoption of the environmental terms approval, for example construction facilities, repositories, specialization of technical measures and conditions of the environmental terms approval of the project, etc. are approved by the department of environment and spatial planning of Central Greece with the

submission and evaluation of a Technical Environmental Study in accordance with paragraph 2 of Article 7 and para. 11 of Art. 11 of L. 4014/2011 and joint ministerial decision 36259/1757/E103/2010 (Government Gazette 1312/B) "Measures, conditions and programme for the alternative management of waste from excavations, constructions and demolitions (waste from excavations, construction and demolition).

6. The disposal of surplus materials, as well as any solid construction waste, shall be prohibited at points in the hydrographic network and in uncontrolled waste disposal areas of the local TDAs.
7. Materials required for the construction of the project may be obtained from legally operated quarries in the area which should have the necessary decision approving environmental conditions and a license to operate and provided that they are accurately complied with, as well as from quarries – loan rooms which may be created, in accordance with the provisions in force, to which the provisions of para. 3 of Art. 7 of L. 4014/2011.
8. In order to suppress dust to be installed and maintained in order to function effectively, a system for wetting piles of inert.
9. In no case shall the particulate emission exceed the legal limit of 100mg/N^{m3}.
10. The new forest roads will be shared and the forest products to be produced will be managed by the Forest Service.
11. To take measures to protect vegetation close to the projects to be built.
12. Implement the provisions of Law 3028/2002 (Government Gazette 153/A/28-6-2002) on the protection of Antiquities and cultural heritage in general.
13. All kinds of rubbish, waste materials, old spare parts, machinery, oils, etc. must be collected and removed from the site of the activity and disposed of in accordance with the provisions in force for the management of hazardous and non-hazardous waste (JMD 13588/725/2006). It is forbidden to burn any form of materials (rubbers, oils, etc.) in the area of the project. Any municipal waste water shall be disposed of in accordance with the relevant health provisions (P/D/E1b/221/1965).
14. The management of hazardous waste will be carried out in accordance with the provisions of the legislation in force, namely JMD U.S. 13588/725/2006 (Government Gazette 383/B/28- 3-2006) and JMD U.S. 24944/1159/2006 (Government Gazette 791/B/30-6-2006), as amended by JMD 8668/2007 (Government Gazette 287/B/2-3-2007).

D.3. OPERATION PHASE

1. Measurements of the level of the electrical and magnetic field should be carried out. Measurements will be made under the responsibility of the operator of (T.L.) in the first year after the start of

operation of the line and then repeated every five years. The measuring instruments shall be accompanied by calibration and compatibility certificates in accordance with Directive 89/336/EEC and the relevant Regulations EN 55055, EN 61000-4-2, ENV 50140.

2. The limits of the Magnetic and Electrical Field should meet the requirements of the Council Recommendation of 12 July 1999 'limiting public exposure to electromagnetic fields (0 Hz - 300 GHz)', in accordance with the Directive of the ICNIRP/1998 (International Commission for protection against non-ionizing radiation) - guidelines for limitation exposure to time - varying electric, magnetic and electromagnetic fields (Health Physics, April 1998 Volume 74 No.4) and those referred to in JMD 3060/2002 (FOR) 238 (B' 512).
3. Keep a record of the maintenance work carried out on the 400kV air transport line (type of operations, date of completion, materials used).
4. During the operation of the network and maintenance/rehabilitation work, all measures of health and safety of workers must be observed, in compliance with the provisions of the legislation in force.
5. Take all appropriate technical measures to reduce noise caused by the corona effect

E. TIME SPACE POWER OF ENVIRONMENTAL TERMS APPROVAL – CONDITIONS FOR RENOVATION - AMENDMENT

1. The above mentioned environmental conditions shall apply for fifteen (15) years from the date of signature of this Agreement and provided that they are complied with accurately. After that date the developer must be provided with a new decision approving environmental conditions, in accordance with the relevant provisions.
2. The operator of the project or activity, in good time before the expiry of the environmental terms approval, must return at a later request to the environmental licensing authority in order to comply with the provisions of Article 5 of Law 4014/2011.
3. The environmental terms approval shall remain in force provisionally and after its expiry until a new renewed or amended decision has been adopted, but provided that the obliged body requests its renewal or amendment in good time at least two months before its expiry, submitting the necessary supporting documents to that end.
4. In order to modernize, improve, extend or modify the project as described in the M.(M.U.) and implemented under the terms and limitations of the environmental terms approval, compliance with Article 6 of Law 4014/2011 is required.
5. In the event that regular and exceptional environmental inspections identify serious environmental degradation problems or if environmental impacts that were not foreseen by the environmental

impact assessment are observed and the environmental terms approval, additional environmental conditions shall be imposed or the terms of the environmental terms approval shall be amended as provided for in Article 2(1) in conjunction with Article 6 of Law 4014/2011, not excluding any compensatory measures or charges within the meaning of Article 17(1) of Law 4014/2011.

ST. OTHER PROVISIONS

1. The environmental terms approval does not cover safety issues in the face of large-scale accidents or the safety and hygiene of personnel, nor does it exempt the obliged entity from the obligation to supply it with other permits, which may be provided for by the legislation in force, it shall be issued without considering the title deeds of the site of implementation of the project or activity, as well as the conditions and restrictions on the construction of the land and shall not entail the legalization of any arbitrary existing structures for which the provisions of the legislation in force on arbitrary constructions apply. The above elements were examined and listed in the environmental impact assessment, under the responsibility of the project or activity.
2. The environmental terms approval shall be without prejudice to the fact that it is not contrary to urban planning and other specific provisions which may prevail over it.
3. The environmental terms approval is also an authorization for intervention within the meaning of the sixth chapter of Law 998/1979 as amended and in force, in accordance with Article 12 of Law 4014/2011 and Article 3 (paragraphs 2 and 3) of the 15277/2012 Ministerial Decision. Before the installation for the execution of the project, the beneficiary company must pay the consideration for the use of the forested areas.

Z. CONTROL OF THE ENVIRONMENTAL CONDITIONS OF THE ENVIRONMENTAL TERMS APPROVAL.

1. The environmental terms approval, the relevant satisfied and the dossier accompanying it must be available at the site of the project or activity in question and must be presented by the obliged body to each competent audit body in accordance with the legislation in force.
   - The obliged entity shall be obliged to:
   - keep data (invoices, contracts, various documents, data registers, etc.), on the basis of which it will demonstrate compliance with the environmental conditions of the environmental terms approval. These elements should be located in the area of the project or activity.
   - allow entry to any competent audit body.
   - provide all the required information and information .

- facilitate control and comply with the recommendations of the competent audit bodies to comply with the provisions of existing environmental legislation.

2. Any issues arising in the implementation of the environmental terms approval which are not covered by the terms thereof shall be resolved on the basis of the legislation in force (national and Community) and where this is not possible on the basis of the relevant endorsed environmental impact assessment or the dossier accompanying it.
3. In the event of any pollution or other deterioration of the environment or a breach of the terms of the environmental terms approval, the persons responsible for the project or activity shall be subject to the penalties provided for in Articles 28; 29 and 30 of Law 1650/86, as amended by Law 3010/02, Law 4014/2011 and Law 4042/2012 and in force.

H. PUBLICATION OF THE ENVIRONMENTAL TERMS APPROVAL

The publication required by law of the environmental terms approval shall be carried out by posting it on the special website, at the www.aepo.Ministry of Environment, Energy and Climate Change.gr web address (as referred to in Article 19a of Law 4014/2011, as well as in the JMD 21398/2012). In accordance with this Decision, it is provided for in the provisions of Art. 8 of L. 3200/55 [L. 2503/97 (Government Gazette 107/A), Article 1(2)] appeal to the Environment Minister within thirty (30) days of the date on which it is notified or becomes aware of it.

13 ADDITIONAL DATA

13.1 SPECIFIC STUDIES

The fact that the installation site of the project is outside the NATURA 2000 area did not require the preparation of a Special Ecological Assessment.

The final forest road study will be submitted to the competent forestry authority for approval, following the adoption of the Environmental Terms Approval Decision of the project. However, in order to provide the best possible description of the activity, the detailed description of the accompanying road works (paragraph 6.2.1) and their indicative plans are included in this environmental impact assessment.

13.2 EXPENDITURE PROBLEMS AND AMENDMENTS RESOLVED

No specific problems or difficulties occurred in the preparation of this environmental impact assessment. The existing specifications of Greek legislation and the European Union have been used for the drafting of this environmental impact assessment. Data from various websites as well as the study team's experience from previous approaches to Environmental Impact Studies were also used.

In any case, an effort has been made for this study to satisfactorily meet both the formal requirements of the legislation and the essential requirements of the project and its impact on the environment.

14 PHOTOGRAPHIC DECISION

Photo 1: General view of the Distomo HVC, within which pillar P1 will be installed.P1

Photo 2: General view of the installation area of Pillar P8.

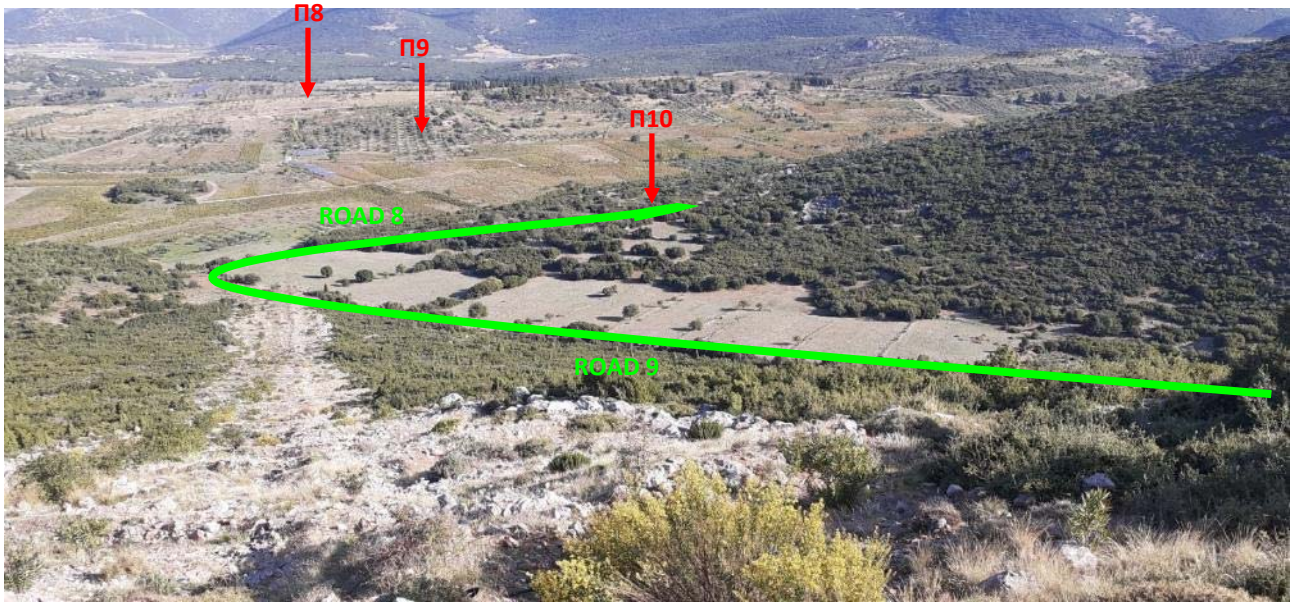


Photo 3: General view of the wider transit area of the electricity transmission line under study, indicating the installation locations of pillars P8, P9 and P10. A green line reflects the route of roads 8 and 9.

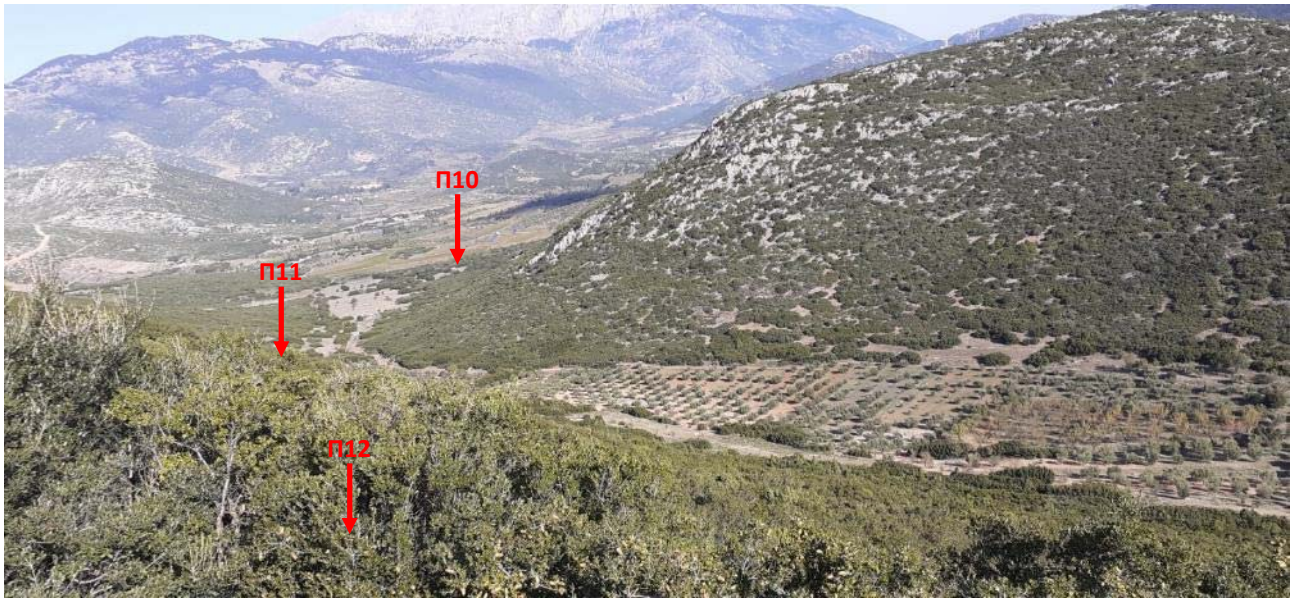


Photo 4: General view of the wider transit area of the electricity transmission line under study, indicating the installation locations of pillars P10, P11 and P12.

Photo 5: General view of the installation area of Pillar P13.

Photo 6: General view of the transit area of the Electricity Transmission Line under study.

Photo 7: General view of the installation area of Pillar P15.

Photo 8: General view of the installation area of Pillar P17.

Photo 9: General view of the installation area of Pillar P23.

Photo 10: General view of the installation area of pillar P27.

Photo 11: General view of the installation area of Pillar P33.

Photo 12: General view of the installation area of pillar P37.

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