TEIAS

TURKEY POWER TRANMISSION CO.

380 kV KARABIGA - CAN – SOMA (TPS) ENERGY TRANSMISSION LINE PROJECT

CANAKKALE PROVINCE, BIGA, CAN, YENICE DISTRICTS; BALIKESIR PROVINCE, BALYA, IVRINDI, SAVASTEPE DISTRICTS; MANISA PROVINCE, SOMA DISTRICT

encon

ENCON ENVIRONMENTAL CONSULTANCY CO.

☐ **EIA Report** ☒ **Final EIA Report**

ANKARA, 2005

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PROJECT NAME	380 kV KARABIGA - CAN – SOMA (TPS) ENERGY TRANSMISSION LINE PROJECT
Address of the Project Site: (Province, District, Locality)	CANAKKALE PROVINCE, BIGA, CAN, YENICE DISTRICTS; BALIKESIR PROVINCE, BALYA, IVRINDI, SAVASTEPE DISTRICTS; MANISA PROVINCE, SOMA DISTRICT
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Date of Submission (*) **Decision No and Date(**)**	**February 2005** **……. …../…./200...**

TABLE DEPICTING PERSONNEL PLEDGED TO BE EMPLOYED WITHIN THE SCOPE OF COMMUNIQUÉ THE COMPETENCY CERTIFICATION

Project Client : TEIAS, Turkish General Directorate of Power Tranmission Co.

Location of the Project Site: Canakkale Province, Biga, Can, Yenice Districts; Balikesir Province, Balya, Ivrindi, Savastepe Districts; Manisa Province, Soma District

Project Name: 380 kV Karabiga - Can – Soma (TPS) Energy Transmission Line Project

Date of Submission: 24 December, 2004

Competency Certification Number: 08

Personnel to be Employed within the Scope of the Relevant Communiqué Item	Name Surname	Profession	Responsible from Chapter, Page, Appendix	Signature
Environmental Engineer (5-a)				
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	Buket Mesta	M.Sc.Environmental Engineer	IV - V	
	Derya Erzi	B.Sc.Environmental Engineer	IV – V	
	Esra Atlı	M.Sc.Environmental Engineer	Whole Report	
	Mine Artug	M.Sc.Environmental Engineer	IV – V	
	Selale Ataberk	M.Sc.Environmental Engineer	IV – V	
	Ozge Ozdemir	B.Sc.Environmental Engineer	Whole Report	

Personnel to be Employed within the Scope of the Relevant Communiqué Item	Name Surname	Profession	Responsible from Chapter, Page, Appendix	Signature
Engineering and Architectural Faculties, physics, chemistry, biology, departments of arts and sciences and personnel graduated from geology, hydrogeology, zoology, archeology, veterinarian, public administration, economics, management, and sociology departments (5-b)				
	Burak Aksoy	Geological Engineer	IV	
	Assoc. Prof. Zafer Ayas	Biologist	IV-V App.-C	
	Ph.D.Okan Bilkay	Mechanical Engineer	Whole Report	
	Prof. Zeki Aytac	Biologist	IV-V App.-C	
	Erdinc Durmus	Biologist	IV-V, App.-C	
	Goktug Evin	Hydrogeological Engineer	IV, App.-B	
	Arzu Gencer	M.Sc. Landscape Architect	Whole Report	
	Sibel Sivrikaya	Hydrogeological Engineer	IV, App.-B	
	Filiz Toprak	Mining Engineer	IV	

Personnel to be Employed within the Scope of the Relevant Communiqué Item	Name Surname	Profession	Responsible from Chapter, Page, Appendix	Signature
Personnel whose profession is determined by the EIA Scoping Review and Evaluation Commission				
	Suayip Balta	M.Sc. Forestry Engineer	IV-V	
	Sevim Ergun	Geodesy Photogrammetry Engineer	IV-V , App.-B	
	Zaim Umit Ozkefeli	Electric-Electronic Engineer	V	
Coordinator of Report (5-c)				
	Tolga Balta	M.Sc.Environmental Engineer	III, V	
	Ph.D. Haluk Ceribasi	Environmental Engineer	III, V	
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DEFINITION AND PURPOSE OF THE PROJECT

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(The definition, economic life, the purposes of service, the fields of the market or service and the importance and the necessities in scale of the country, region and/or province with respect to economic and social considerations in this field of the activities of the project)

Establishing and operating an energy transmission line (ETL), that passes through Biga, Can and Yenice, Districts of Canakkale Province, Balya, Ivrindi and Savastepe, the Districts of Balikesir, Soma, Districts of Manisa, has 380 kV with single circuit conductor of 3B 954 MCM and approximately 158 km long, is planned in the project. After the completion of the environmental impact assesment and ensuring the financial resource form World Bank, the line, that is planned to be constructed by Turkey Power Tranmission Co. (TEIAS), would have an economic life of 30 years. The 1/25.000 scale topographic map of the project route is given in Appendix B.

The frequently occuring failures and the incapacity in meeting the electric need of the existing 154 kV energy transmission line, that transports electric between Biga, Districts of Canakkale and Soma, Districts of Manisa, causes economical losses at the region. In addition, as it is defined at the Electric Market Customer Services Regulation, that is published at the Official Gazette dated 25 September 2002 and no. 24887, the juridical person, who undertakes the distribution action, should serve as to offer enough, good quality and continuous electrical energy to all customers, and besides, should ensure good quality and continuous electrical energy to people, that are served, except the special reasons of force majeure or programmed cuttings. For these reasons, a new 380 kV energy transmission line is taken into agenda in addition to the existing 154 kV energy transmission line for not to cause environmental and economical losses. The project became important on account of preventing the faults and the cuttings and avoiding the local economical loss.

The 380 kV Karabiga – can – Soma Thermal Power-Station (TPS) ETL Project is planned to start from Kiyi Gemi Transformer Station (TS), that is located at the Degirmencik Village, and end at Soma Thermal Power-Station, that is located at the Soma District. The basic flowchart of the project is given in Appendix B.

It is planned to develop/strengthen the existing Kiyi Gemi TS, that the line would be connected to, after the construction phase of the project is finished. the line, that ends at 1,084 MW Soma TPS, is important on account of ensuring continuous energy to customers all around Turkey, especially West Anatolia and the foundation of the project would influence the regional economy and indirectly the Turkish economy positively. The energy production – transmission system map of the region, that shows the project position is presented in Figure I.1.

The social and economical policy is stated at the five years progress plan, that is prepared by State Planning Organization (DPT). At the Eighth Five Year Progress Plan that covers the years between 2001 and 2005, it is emphasized that offering cheap, reliable and good quality of electrical energy to all customers at all time that is needed is one of the most important purposes in order to provide sustainable economical and social development in national scale. In addition, it is stated at the Eighth Five Year Progress Plan, that the electrical energy need of Turkey increases 10% until the last fourty years and the need would reach to 285 billion kWh until 2010, that was 118.5 billion kWh in 1999 (DPT, 2001). For this reason, to meet the increasing demand of the country for energy, the electrical energy projects become more important. The annual electrical energy need and production in Turkey for the years 1989 – 2010 is presented at Table I.1.

Table I.1. The Annual Electrical Energy Need And Production in Turkey (GPO, 2001)

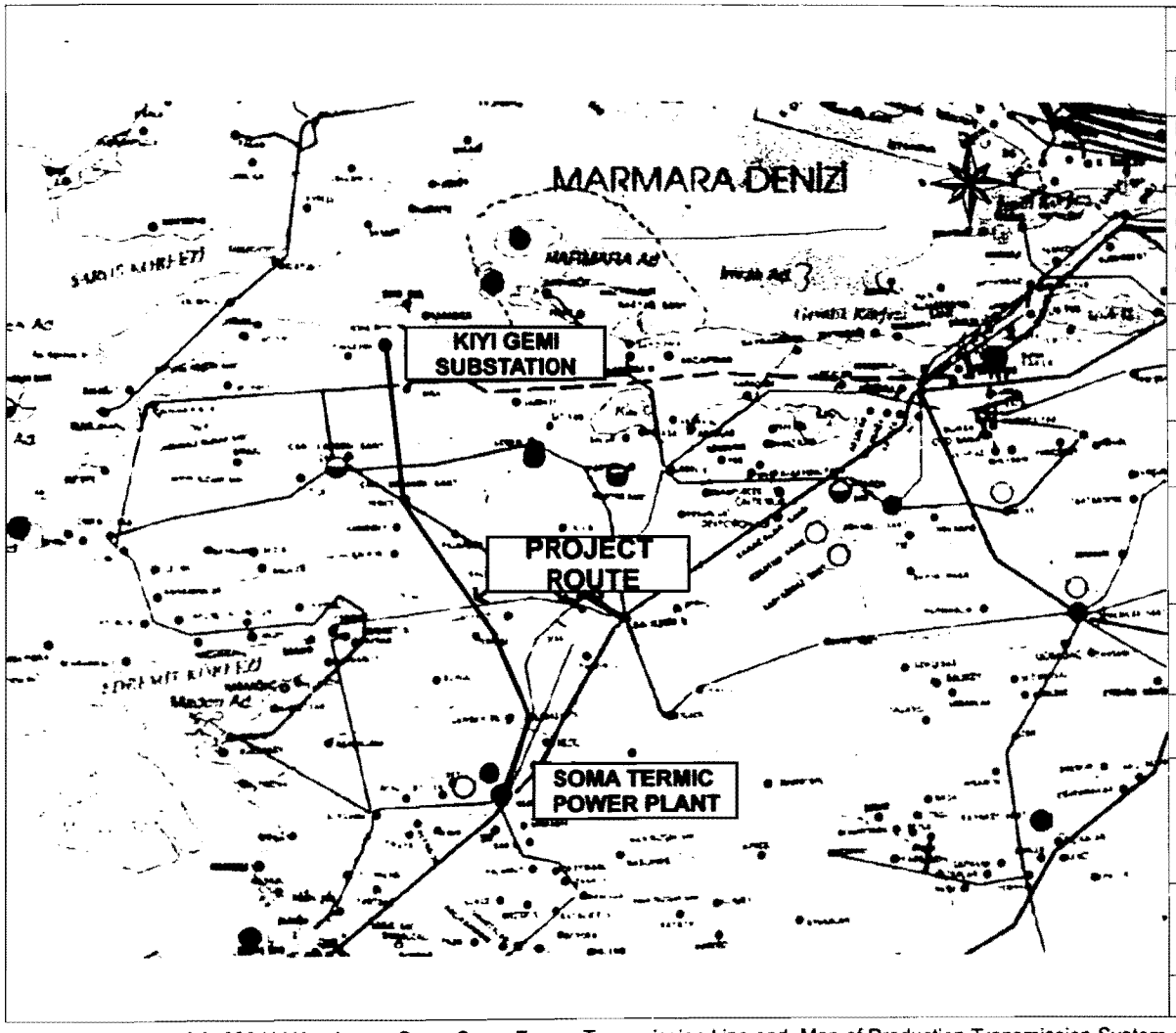
Year	Electrical Energy Need (GWh)	Electrical Energy Production (GWh)
1989	52,602	52,043
1990	54,408	57,543
1994	77,717	78,322
1995	85,645	86,248
1997	100,738	103,300
1998	108,799	111,020
1999	118,485	116,440
2000	126,800	124,200
2005 (Estimated)	195,100	193,900
2010 (Estimated)	285,000	-

The electrical energy consumption per person of the provinces Balikesir, Canakkale and Manisa and some other provinces to compare is presented at Table I.2. As it is seen from the table the electrical energy consumptions of the provinces discussed are around the average of Turkey. But, especially in Canakkale Province the electrical energy consumption per person is a bit high when it is compared with the other provinces and the average of Turkey.

For this reason, the project, that would ensure to meet the existing energy demand of the three provinces and form the substructure for the future investments, has a special importance.

Table I.2. The Electrical Energy Consumption per Person for Some Provinces (TEİAŞ, 2002)

The Electrical Energy Consumption per Person In Province			
Province	Electrical Energy Consumption (kW/h)	Province	Electrical Energy Consumption (kW/h)
Balikesir	**1,296**	Istanbul	1,761
Canakkale	**1,828**	Izmir	2,858
Manisa	**1,162**	Kars	567
Adana	1,556	Kocaeli	5,333
Adiyaman	849	Kahramanmaras	1,525
Ankara	1,199	Mardin	710
Antalya	2,010	Mugla	1,883
Artvin	830	Mus	289
Bilecik	6,666	Nevsehir	1,361
Edirne	1,544	Nigde	1,146
Elazig	770	Tekirdag	3,562
Eskisehir	1,512	Usak	1,674
Erzurum	543	Zonguldak	3,429
Gaziantep	1,875	Yalova	3,880
Giresun	639	Karabuk	2,038
Hatay	1,753	Duzce	933
Isparta	1,078	**Turkey**	**1,479**



Map of Production - Transmission System of Turkey 2000

Lines	380 kV	154 kV	66 kV
Energy facilities-constructed and in operation	▬▬	▬▬	▬▬
Energy facilities – under construction or in the construction programme	- -	- -	- -

POWER PLANT (PP)

●	Hydraulic PP of TEIAS – in operation	●	Autoproducer PP (Hydraulic) – working parallel to the system
◒	Hydraulic PP – under construction	●	Production company PP – in operation (Hydraulic)
○	Important Hydraulic PP - in the construction programme	◒	Production company Hydraulic PP – has a contract signed by Ministry of Energy and Natural Resources
●	Termic PP of TEAS – in operation	●	Responsible company PP – in operation (Hydraulic)
◒	Termic PP of TEAS – under construction		Existing YI and YİD PP
○	Termic PP of TEAS – in the construction programme		YI and YID PP - under construction
	Autoproducer PP (termic) – working parallel to the system		YI and YİD PP - in the construction programme

Not to Scale

Figure I.1. 380 kV Karabıga – Can – Soma Energy Transmission Line and Map of Production Transmission System of the Region

NOT MUCH OF A MAP IN TERMS OF FEATURES - ALSO IN TURKISH

CHAPTER II

LOCATION OF THE PROJECT SITE

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II.1. The Projection of the Line Route on the Land Usage Map, The Distance From The Residential Areas

The route of the project, that is about 158 km long, passes through the provinces, Canakkale, Balikesir and Manisa. Biga, Can and Yenice, Districts of Canakkale Province, Balya, Ivrindi and Savastepe, Districts of Balikesir, Soma, District of Manisa are the Districts that are in the route of the planned project. The route starts from about 1 km to the Sea of Marmara. The list of the residential areas, that are close to the project route, is given in Table II.1. The 1/25.000 scale topographic map of project route is presented in Appendix B.

5 km corridor is assessed for the route of the transmission line within the scope of the Environmental Impact Assessment Studies. When the approximate route, that is determined by Turkey Power Tranmission Co. (TEIAS), is examined, it is established that the line passes through Kalatepe 1st Degree Archaeological and Natural Site. By taking the route to the south of 1st Degree Archaeological and Natural Site at this region, an alternative route to the route, that is determined by TEIAS, has been produced. The details of this route, that is named as Alternative 1, is given below. All the data assessed within the scope of this project is obtained from the studies carried out on the route determined as Alternative 1. The map of the alternative line is presented in Appendix B.

Table II.1. The Residential Areas that are In the Survey Area

Alternative 1

Km	Residential Area	Direction	Distance to The Route (m)
0+000	Degirmencik / Biga	west	1,250
6+125	Beyoba Parish / Biga	west	250
10+250	Eskibalikli / Biga	west	500
13+625	Karacaali / Biga	east	750
14+000	Baliklicesme (Sub-district Center) / Biga	west	2,500
16+800	Goktepe / Biga	east	1,500
19+250	Gundogdu (Sub-district Center) / Biga	west	1,500
22+000	Danisment / Biga	west	1,000
28+000	Cihadiye / Biga	west	1,250
28+600	Yanic / Biga	west	2,500
34+500	Celtik / Biga	west	1,250
42+000	Hacilar / Can	east	100
38+375	Altikulac / Can	east	2,000
44+500	Yeniceri / Can	west	2,000
40+350	Maltepe / Can	east	2,500
43+000	Comakli / Can	east	2,500
46+900	Yaykin / Can	east	500
48+450	Sameteli / Yenice	west	750
52+750	Calkoy / Yenice	northeast	1,250
55+875	Cinarcik / Yenice	south	1,000
56+250	Asagikaraasik / Yenice	north	2,300
59+000	Davutkoy / Yenice	north	2,100
62+500	Nevruz / Yenice	northeast	300
63+500	Cakiroba / Yenice	northeast	2,500
64+500	**Yenice District**	**west**	**1,500**
66+000	Seyvan / Yenice	northeast	750
69+750	Namazgah / Yenice	southwest	1,100
73+650	Baskoz / Yenice	northeast	2,500
73+950	Gundogdu / Yenice	northeast	750
74+000	Kayatepe / Yenice	southwest	1,000
75+425	Bayatlar / Yenice	southwest	2,100
77+450	Korukoy / Yenice	northeast	1,000
81+250	Boynanlar / Yenice	southwest	100
84+000	Altiparmak / Yenice	northeast	1,500
84+000	Hasanlar / Yenice	southwest	1,500
85+700	Alancik / Yenice	southwest	400
86+500	Pinar Quarter / Balya	northeast	900

Km	Residential Area	Direction	Distance to The Route (m)
87+750	Diboba Quarter / Balya	northeast	1,500
87+850	Haciyusuflar Quarter / Balya	southwest	500
89+000	Yaylacik / Balya	southwest	2,000
92+500	Bengiler / Balya	northeast	400
94+000	Cigdem / Balya	southwest	2,500
95+000	Haciisalar Parish / Balya	southwest	1,400
96+000	Habipler / Balya	southwest	2,500
97+500	Kasikci / Balya	northeast	500
99+250	Goktepe / Balya	northeast	250
102+250	Medrese / Balya	northeast	1,750
102+750	Akbas / Balya	southwest	1,400
106+250	Gomenic / Balya	northeast	2,500
106+800	Kocabuk / Balya	southwest	600
107+200	Soganbuku / Ivrindi	northeast	1,000
110+000	Akcal / Ivrindi	northeast	1,000
110+875	Akcaloren / Ivrindi	northeast	250
111+000	Kirazkoy / Ivrindi	northeast	2,250
111+375	Komurcu / Ivrindi	southwest	750
114+975	Buyukfindik / Ivrindi	southwest	1,000
115+500	Yaren / Ivrindi	northeast	2,000
116+750	Erdel / Ivrindi	east	500
117+250	Ada Quarter / Ivrindi	east	1,250
118+000	Kucukfindik / Ivrindi	west	1,600
118+375	Alikose Quarter / Ivrindi	west	700
121+000	Cukuroba / Ivrindi	west	2,000
122+000	Isadere / Savastepe	southwest	750
123+500	Eyerci / Savastepe	southwest	1,250
124+500	Incirli Quarter / Savastepe	southwest	2,000
124+600	Pinarli Quarter / Savastepe	southwest	1,000
124+250	Beykoy / Savastepe	northeast	700
125+000	Kurukabaagac / Savastepe	southwest	750
126+250	Akpinar / Savastepe	northeast	200
127+000	Koledere / Savastepe	east	1,250
127+250	Ciftlikdere/ Savastepe	southwest	2,250
128+800	Cali Quarter / Savastepe	east	1,000
129+450	Karacalar / Savastepe	east	1+100
135+200	**Savastepe District**	**east**	**1,500**
138+000	Kurudere / Savastepe	west	1,000
138+590	Karacam / Soma	west	2,000
144+450	Kiziloren / Soma	southeast	2,000
145+875	Kumkoy / Soma	west	500
146+800	Heciz / Soma	west	1,500
147+000	Kucukisiklar / Soma	west	2,500
150+000	Beyce / Soma	east	1,000
152+625	Hatunkoy / Soma	southwest	1,500
155+625	Fatih Quarter / Soma	southwest	1,250
157+000	Istasyon Quarter / Soma	southwest	800
157+000	Menderes Quarter / Soma	southwest	250
157+200	Ataturk Quarter / Soma	southwest	1,500
157+700	Linyit Quarter / Soma	southwest	1,500
157+700	Yeni Quarter / Soma	southwest	1,250
157+700	**Soma District**	**southwest**	**2,000**

The project ends at Soma Transformer Station located in Soma District. A thermal power-station of Garp Lignite Enterprise and the coal washing and loading plants are located in the same area. Soma Thermal Power-Station, which started to work in the second half of 1950's, is one of the first thermal energy producing facilities of Turkey. The coal sector, especially lignite, has an important share in the primary energy production of Turkey. 33,5% of the electrical energy production of Turkey is acquired from thermal power-stations (www.yerel.org.tr).

Is this a Turkish guideline for TL? How was this 5Km decided?

II.2. The Locations of the Activity Units of the Project (The presentation of the locations in the project area of all the administrative and social units, the technical infrastructure units and the other units, if exists, on the booking plan)

380 kV Karabiga – Can – Soma TPS Energy Transmission Line is an energy transmission line construction project, that starts from Biga (Canakkale) and ends at Soma (Manisa) along a 158 km route. It is envisaged by TEIAS that the environmental study would be performed in an area of total 5 km width, 2,5 km at the right and left of the lines each, along the route. With the help of these studies, which are performed in the area, the regions that would be risky in terms of public health and safety, and the regions, that have an importance from the ecological, social and cultural point of view, would be determined and passage of the line from these regions would be prevented. The construction works would be performed along a route, that has a width of 50 m, in the project discussed. 526 towers are planned to be fixed for the energy line, that would be established. 200 m^2 of area for the towers and 400 m^2 of area for the angle point would be expropriated. In addition to this, an area of 50 m width along 158 km would be expropriated for the easement. The surface areas of the fields, that would the easements be taken and expropriated are given in Table II.2. The energy production/transmission system map of the region that shows the location of the project is given in Figure I.1.

However area is 15 Has per tower for 501 towers

Table II.2. The Surface Areas of the Fields, That Would The Easements Be Taken and Expropriated

		Area that would be Expropriated	Quantity	Area
Tower Type	Towers	200 m^2	501	100,200 m^2
	Angle Point	400 m^2	25	10,000 m^2
The Total Area that would be xpropriated =				110,200 m^2 ~ 11 ha
Easement (158 000* m x 50 m) =				7,900,000 m^2 790 ha

** 158 km (158 X 1000) =158,000 m*

Approximately 11 ha of field would be expropriated for the towers and the activities would continue inside this area. In addition easement would be taken for the fields that the electrical wires would pass.

The works for constructing the energy transmission line can be defined as the infrafitting, the upperfitting and the wiring of the towers. At the infrafitting, the base of the towers would be placed into four hollows and concreted after putting iron bars around the base of the tower for fixing. The infrastructure needed for earthing prepared at this phase. 1 electrode, if the ground resistance is below 20 ohms, and 4 electrodes, if the ground resistance is above 20 ohms, would be placed. At the upperfitting, after placing the base of the towers to the hollows, electric tower would be constructed by bolting the galvanized steel pylons to each other. After the construction of the tower, the insulators would be fixed to these pylons. For the wiring process a wiring machine would be used, during wiring, protection wires would be wired from the tower of the towers for protection from thunderbolts. various bird repellents would be attached to the towers for keeping the birds away from the energy transmission line. — A little more specific

Firstly the use of the field would be changed at the areas, that the towers would be installed in the construction work. The construction work would be concentrated especially in the areas that the towers would be installed, so the destruction of the 50 m corridor along the route is not under discussion. But during wiring, which is the last phase of the line construction, the works would be performed for a short period of time inside this corridor.

Totally 526 towers are planned to be installed along the route and 200 m^2 of area for the towers and 400 m^2 of area for the angle point is needed, so approximately 11 ha of area would be used along the route during the construction works. But since there would be no inconvenience to continue the agricultural activities at the fields, that would be under the wires after installing the towers, there would be no change in the use of the fields during the operation phase.

How much of the area is actually farmed?

Within the scope of the environmental impact assessment studies, the land use capability classes and current land use map, that shows the alternative route and prepared by the forestry map, is presented in Appendix B. The field properties of the regions of the route, which the line would pass, is explained below.

Km 0+000 – 10+000

The planned route of the project starts from 750 m south of Kiyi Gemi Transformer Station. It is planned to develop/strengthen the Kiyi Gemi TS before the project is finished. After the work of strengthening is finished, the connection of the ETL, which is planned in the project, and the TS would be established. The general view of the Kiyi Gemi Transformer Station is given in Figure II.1. The altitude changes between 100 / 150 m in the region, that the project starts and has a distance of about 1 km from the Sea of Marmara. The line that is planned along the first 10 km part of the project, extends perpendicular to the existing 154 kV line (Figure II.2 and Figure II.3). There are 2 centers of population again in the first 10 km part. The first of them is Degirmencik Village, that is 1,250 m away from the line, that was located in the west at the starting point of the project. In this part, Soguksu Stream cuts the line at Km 2+250 and Salihlikahve Stream cuts the line at Km 3+925. Dutluk Stream is parallel to the line between Km 2+000 and Km 5+000 and Kemer Creek, that enters the 5 km survey area at around Km 5+800, is parallel to the line until Km 7+000. Beyoba Quarter is located in Km 6+125. The village, that is 250 m away from the line, is located in the east of the line. Kocabogaz Stream cuts the route at Km 9+75.

Km 10+000 – 20+000

In this area, which is the second 10 km of the route, the topography becomes smooth and the altitude changes between 40/50 m at most times. At this part, that the distance between the surface curves enlarges, the plains and the meadows are formed. At Km 10+250, in the west of the route, Eskibalikli Village is located. After this Karacaali, Baliklicesme, Goktepe, Gundogdu population centers are located at Km 13+625, Km 14+000, Km 16+800, Km 19+250 respectively. The nearest population center to the route is Eskibalikli Village that is 500 m away from the route. Kocabogaz Stream flows parallel in the east of the line between Km 9+800 ile Km 12+000. Baglik Stream cuts the line at Km 13+375. Moreover, there are incontinuous streams in the area. At the same time there is a canal that is used for agricultural watering on the Karacaali road (Figure II.4).

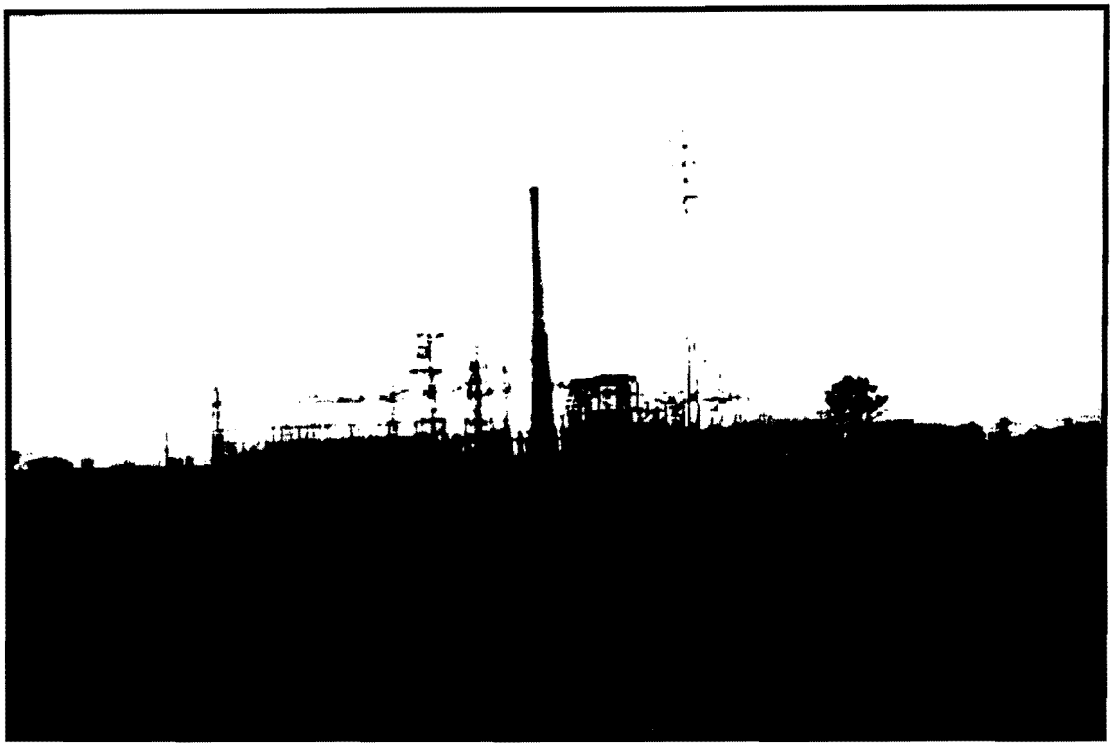


Figure II.1. The General View of the Kiyi Gemi Transformer Station

Figure II.2. General View of Route Between Km 0+000 – 10+000 Where It is Perpendicular Existing 154 kV Line

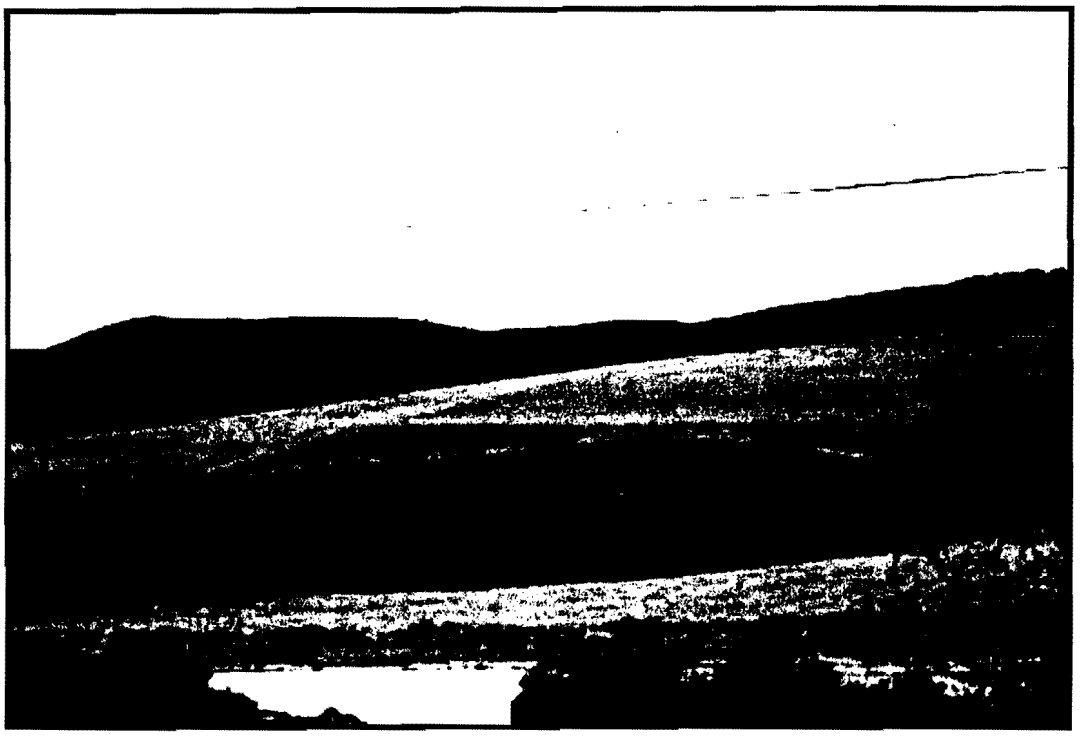


Figure II.3. General View of Line's Prospective Route Between Km 0+000 – 10+000

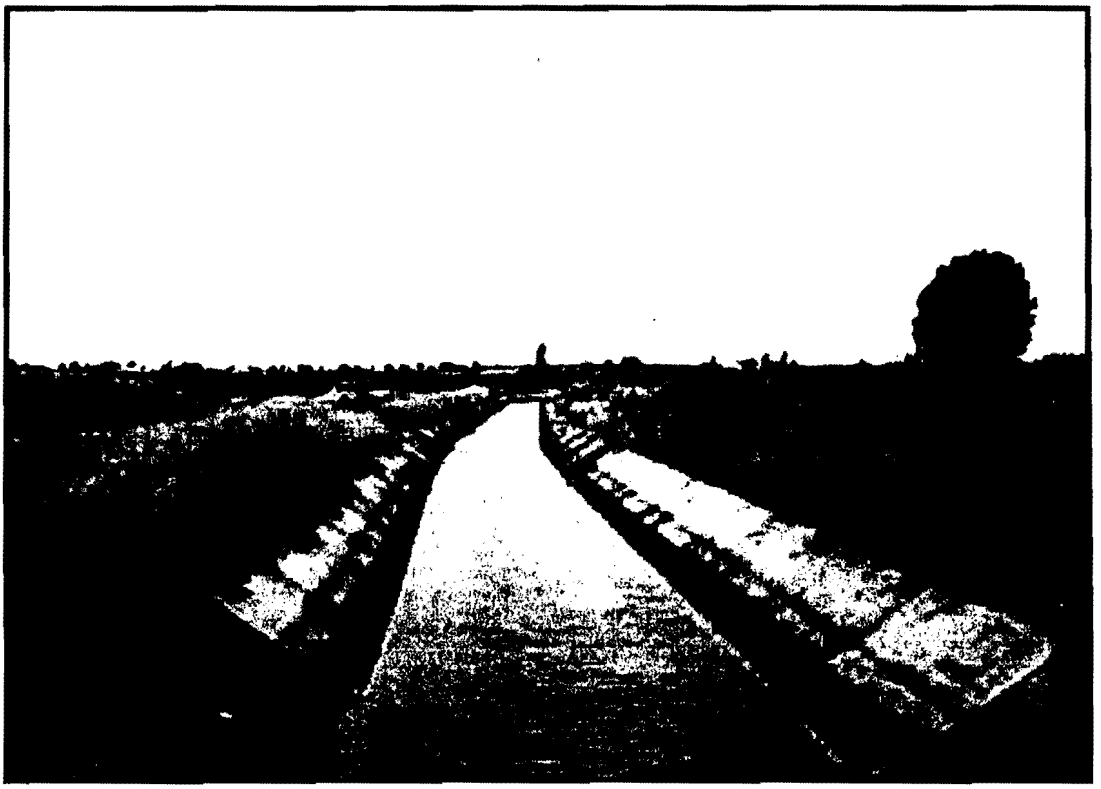


Figure II.4. Irrigation Canal on the Karacaali Road

Km 20+000 – 30+000

The topography remain smooth in the areas, that the approximate route passes, from Km 20+000 to Km 27+000. While the altitude changes between 30/40 m in this interval, after Km 27+000, the elevations increases upto 100/300 m at the topography, that diplays changes like hills, valleys and ridges.

The first population center in this interval is Danisment, that is located at Km 24+300 and 1 km away from the line. Koca Creek divides the route into two parts at Km 24+300. Canbogazi Stream is one of the most important surface stream in this interval. Canbogazi Stream cuts the line at Km 25+250 and continues to flow parallel to the route at the west side of the line until Km 29+000. Beside thesea lot of incontinuous streams cut the route or flow parallel in this region. Cihadiye and Yanic population centers are located Km 28+000 and Km 28+600 respectively. Both of the population centers, that are located in the west of the line, are outside of the impact area of the project. The planned line, that is along the part between Km 20+000 – 30+000, is parallel to the existing 154 kV Canakkale / Biga ETL (Figure II.5 and Figure II.6).

Km 30+000 – 45+000

The altitude changes between 100 and 300 m between these kilometers. There are 6 population centers in this interval, that the surface shapes are active. Celtik Village is located in the west of the line at Km 34+500. In the east of the line Altikulac, Maltepe, Hacilar and Comakli population centers are located at Km 38+375, Km 40+350, Km 42+000, Km 43+000 respectively. However, Yeniceri Village is located at Km 44+500 and 2 km away at west direction. Hacilar Village is the nearest population center, that is 100 m away from the route, out of the population centers, that are located at the east side of the line. Yeniceri population center is located at Km 44+500. Yeniceri Coal Mine, that belongs to Kalan Madencilik Co., is located close to the population center. The mine, which was operated by surface mining before, is an underground mine at present.

In this part of the route Tekke Stream (dried stream) and Kavak Stream (dried stream) cut the line at Km 31+200 and Km 33+400 respectively. Maden Stream (dried stream) flows parallel at the east side of the line between Km 31+200 and Km 33+000. Karamislar Stream (dried stream) at Km 35+675, Gozem Stream (dried stream) at Km 40+000, Kocaburun Stream (dried stream) at Km 40+425 and at 41+420, Erputluk Stream (dried stream) at Km 43+975 and at Km 44+500 cut the line. Can Creek is the biggest surface stream in this interval. This creek, that enters into the survey area at Km 44+600, cuts the line at Km 42+750.

Km 45+000 – 60+000

The altitude changes between 250 – 500 m in this region. In this area, that heterogeneous structure is observed in topography, Yaykin, Semeteli, Calkoy, Cinarcik, Asagikaraasik, Davutkoy population centers are located at Km 46+900, Km 48+450, Km 52+750, Km 55+875, Km 56+250, Km 59+000 respectively. The distance of the nearest population center (Yaykin Village), that are discussed, is 500 m. The distant appearance of Calkoy Village and the approximate route of the planned line is presented in Figure II.7 and Figure II.8.

Figure II.5. A View of the Route Parllel to Existing 154 kV Line Between Km 20+000 – 30+000 (1)

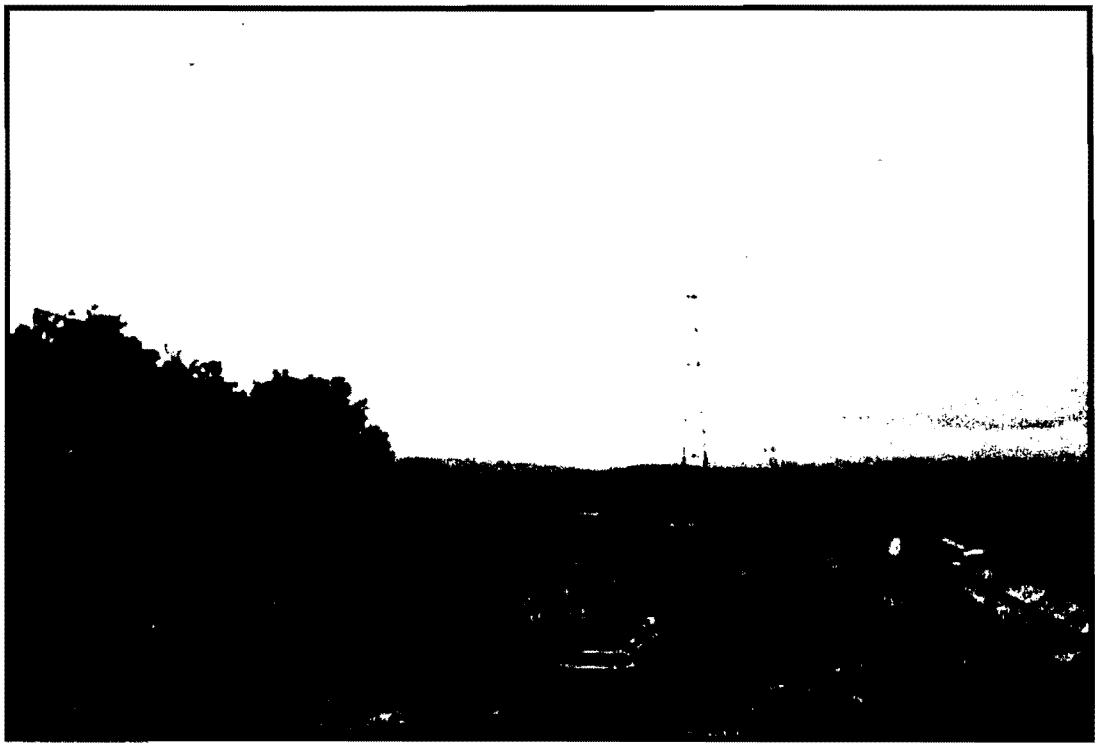


Figure II.6. A View of the Route Parllel to Existing 154 kV Line Between Km 20+000 – 30+000 (2)

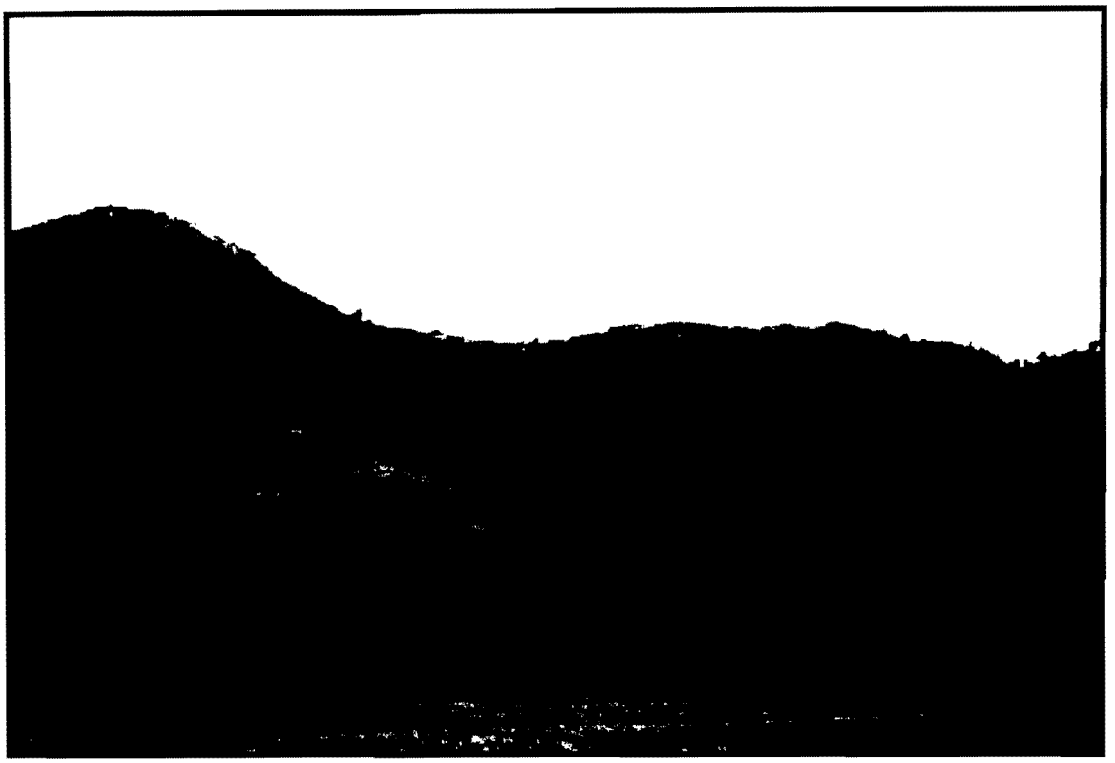


Figure II.7. A View of the Calkoy Village From a Distance

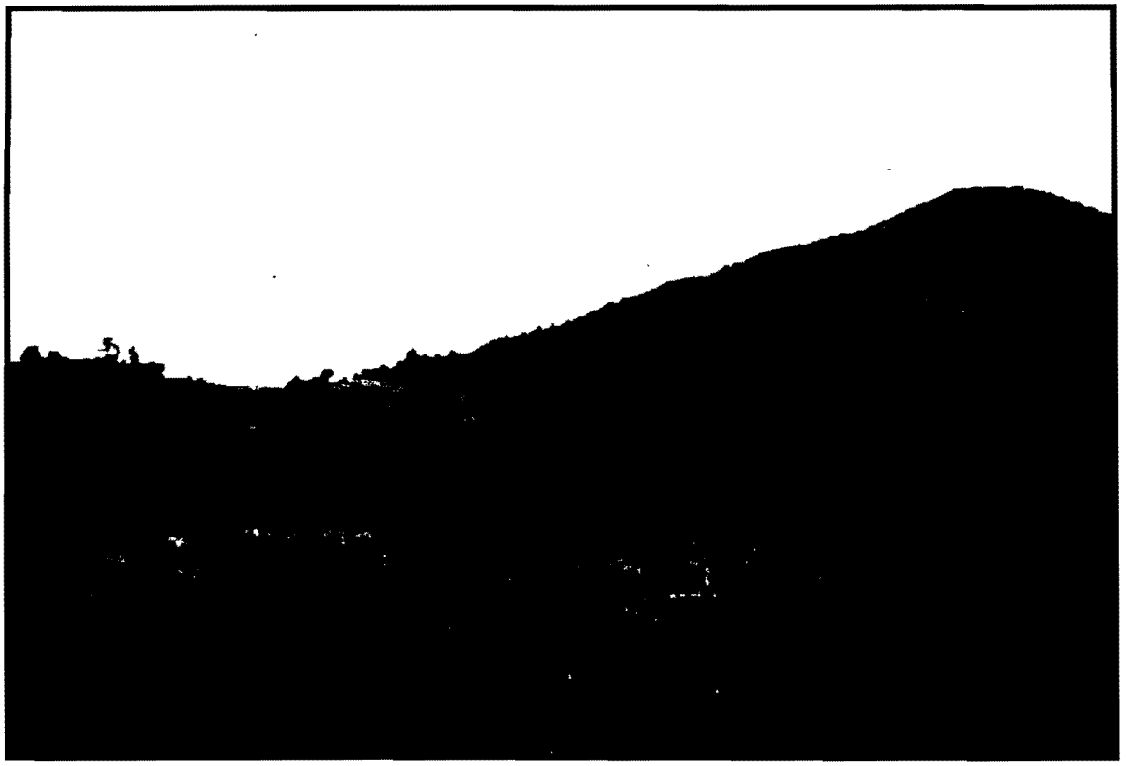


Figure II.8. Approximate Route of the Planned Line in the Vicinity of Calkoy Village

In this part Adaburun, Cukur and Kanli Streams (dried stream) cuts the line at Km 47+000, Km 47+950, Km 50+375. Karaaydin Stream cuts the line at Km 56+425 and flows parallel in the north side of the line until Km 58+200. The appearance of a pond, that is used for watering, at the same kilometer is given in Figure II.9. Saya, Kiran, Salcaalan Dried Streams, that are located at the south of the line, combine at Km 59+850, at the north of the line. Akpinar Stream, that is at the south of the line, flows parallel and approximately 2 km away from the line around Km 60+000.

Km 60+000 – 75+000

In this interval of the project route, there are 7 villages and 1 district. The villages Nevruz, Cakiroba, Seyvan, Namazgah, Baskoz, Gundogdu and Kayatepe are located at Km 65+500, Km 63+500, Km 66+000, Km 69+750, Km 73+650, Km 73+950 and Km 74+000 respectively. Yenice District is located 1,500 km south of the line at Km 64+500. Between Km 68+000 and Km 71+000, the slope ratio in the topography is lower than the other regions in this interval. The general variable property in the topographic structure is the same in this region. The altitude changes between 250/400 m. The line, that is planned for the interval between Km 60+000 and Km 75+000, proceeds parallel to the existing 154 kV line, that is presented in Figure II.10.

Kizik Stream (dried stream) divides the line into two at Km 61+400 in the north/south direction. In this interval the streams, that are defined as dried streams similarly, Sarp, Bicki, Kurt, Ufak and Ayval cut the line at Km 62+500, Km 68+750, Km 69+400 Km 69+425 and Km 73+750 respectively. Beside these at Km 63+800 a watering canal cuts the line.

Km 75+000 – 90+000

In the 5 km wide corridor between Km 78+000 and Km 82+000, in south/southeast direction the slope ratio decreases. Between Km 75+000 and Km 82+000 the altitude changes between 250/350 m but beyond this it increases up to 600 m. The population centers in this part are Bayatlar at Km 75+425, Korukoy at Km 77+450, Boynanalar at Km 81+250, Altiparmak and Hasanlar at Km 84+000, Alancik at Km 85+700, Pinar Quarter at Km 86+500, Diboba Quarter at Km 87+750, Haciyusuflar Quarter at Km 87+850 and Yaylacik Village at Km 89+000. Boynanalar, that is 100 m away from the line, is the nearest population center to the line out of these population centers.

Koca Creek, that enters into the survey corridor around Km 76+500, is the most important surface water in this interval. Koca Creek cuts the route around Km 76+550. Also in this interval a lot of dried streams cut the route. Patlak, Sirma, Yalama, Salman, Doseme and Katman are some of these, that cut the route at Km 77+500, Km 77+100, Km 83+750, Km 84+500, Km 88+750 and Km 89+400 respectively. Km 81+000 the dried streams Olucak and Camdere lie parallel to the route.

Figure II.9. A View of the Irrigation Pond Between Km 45+000 – 60+000

Figure II.10. A View of the Planned Route Between Km 60+000 – 75+000

Km 90+000 – 105+000

In this area the altitude changes between 400/600 m. Bengiler, Cigdem, Habipler, Kasikci, Goktepe, Medrese, Akbas Villages and Haciisalar Quarter are located at Km 92+500, Km 94+000, Km 96+000, Km 97+500, Km 99+250, Km 102+250, Km 102+750 and Km 95+000 respectively.

Koca Creek cuts the route again at Km 92+875. Beside these, 6 dried streams, that are inside the survey area, cut the route. These are Camtarla at Km 94+675, Comren at Km 95+300, Gumuslu at Km 96+300, Gurgen at Km 98+125, Camdere at Km 100+450 and Armutlubogazi at Km 104+000.

Km 105+000 – 120+000

In this part of the route there are 11 villages and 2 Quarters. Ada and Alikose Quarters are located at Km 117+250 and Km 118+375 respectively. The villages are Gomenic at Km 106+250, Kocabuk at Km 106+800, Soganbuku at Km 107+200, Akcal at Km 110+000, Akcaloren at Km 110+875, Kirazkoy at Km 111+000, Komurcu at Km 11+375, Buyukfindik at Km 114+975, Yaren at Km 115+500, Erdel at Km 116+750 and Kucukfindik at Km 118+000.

Koca Creek cuts the route for the fourth time at Km 106+325 and flows towards east direction. Some surface waters, that are qualified as dried streams, cut the route also in this interval. These are Akyar Stream at Km 107+300, Kanarya Stream at Km 108+050, Sarlak Stream at Km 110+375, Kazakli Stream at Km 111+000, Gunburdek Stream at Km 113+250 and Karakulak Stream at Km 114+650. Cataloluk Stream and Kovanlik Stream flow parallel to the route between Km 115+000 and Km 117+000.

Km 120+000 – 135+000

In the interval discussed 4 quarters and 8 villages are determined. The parishes İncirli, Pinarli and Kurukabaağac, that are located at Km 124+500, Km 124+600 and Km 125+000 respectively, are at the southwest of the line. However Cali Quarter is located at the east of the line at Km 128+800. Beside these the villages Cukuroba, İsadere, Eyerci, Beykoy, Akpinar, Koledere, Ciftlikdere and Karacalar are located at Km 121+000, Km 122+000, Km 123+500, Km 124+250, Km 126+250, Km 127+000, Km 127+250 and Km 129+450 respectively. In this interval, that the altitude changes between 400 – 600 m, at the areas, that remain at the east of the line, the elevation differences decrease after Km 130+000. A general view of Akpinar Village, that is one of the population areas in this region, is presented in Figure II.11.

The branches, that form Karakuz Stream (dried stream) by combining, cut the route three times at Km 120+000, Km 120+400 and Km 120+750. Also Dede and Kizilcikli Streams, that are defined as dried streams, cut the route at Km 120+600 and Km 122+000 respectively. Ciftlikderesi and Kozludere forms Citalan Stream, that flows parallel at the west side of the line between Km 129+500 and Km 133+000, by combining at Km 129+500. İnce Stream, that is defined as dried stream, cuts the line at Km 133+000.

Km 135+000 – 145+000

The slope decreases in the region, that the altitude changes between 250-350 m. Between Km 138+000 and Km 145+000 the topographic curves become rare and the smooth areas increase. Savastepe District is located at the east and 1.5 km away from the line at Km 135+200. There are villages Kurudere at Km 138+000, Karacam at Km 138+590 and Kiziloren at Km 144+450.

Km 145+000 – 158+000

In the last section of the project there are 5 villages, 6 quarters and 1 district. The villages are Kumkoy at Km 145+875, Heciz at Km 146+800, Kucukisiklar at Km 147+000, Beyce at Km 150+000 and Hatunkoy at Km 152+625. The distant view of Beyce Village and the existing 154 kV energy transmission line, that is parallel to the planned line in this region, can be seen in Figure II.12. Fatih Quarter at Km 155+625, Istasyon and Menderes Quarters at Km 157+000, Ataturk Quarter at Km 157+200 and Linyit and Yeni Quarters at Km 157+700 are determined. Soma Thermal Power-Station, that is located at Soma District where the project ends, is located at the Km 157+750. A view of Soma TPS is given in Figure II.13.

In this region of the route Sazlik Stream (dried stream) cuts the route at Km 145+000. Pinarcik Stream and Kumkoy Stream flow parallel to the route between Km 145+000 and Km 147+000 and between Km 145+800 and Km 147+250 respectively. At Km 147+750 Kumkoy and Pinarcik Streams combine and form Kocatas Stream. Yenipinar Stream (dried stream) at Km 154+250 and Havizli Stream at Km 154+750 cut the route. Bakir Creek enters into the 5 km survey corridor at the west side at Km 156+000 and flows through the center of Soma District. It approaches to the southwest of the route by 1 km and flows out of the survey corridor.

Figure II.11. A View of the Akpinar Village Between Km 120+000 – 135+000

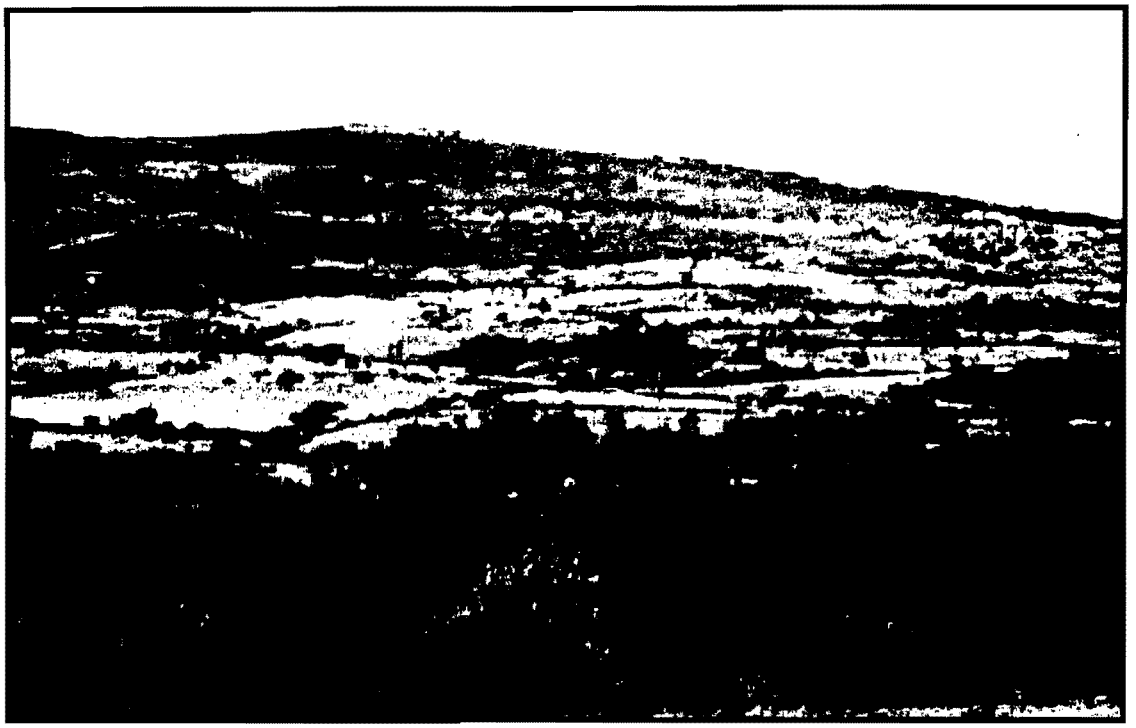


Figure II.12. A View of the Beyce Village From a Distance Between Km 145+000 – 158+000

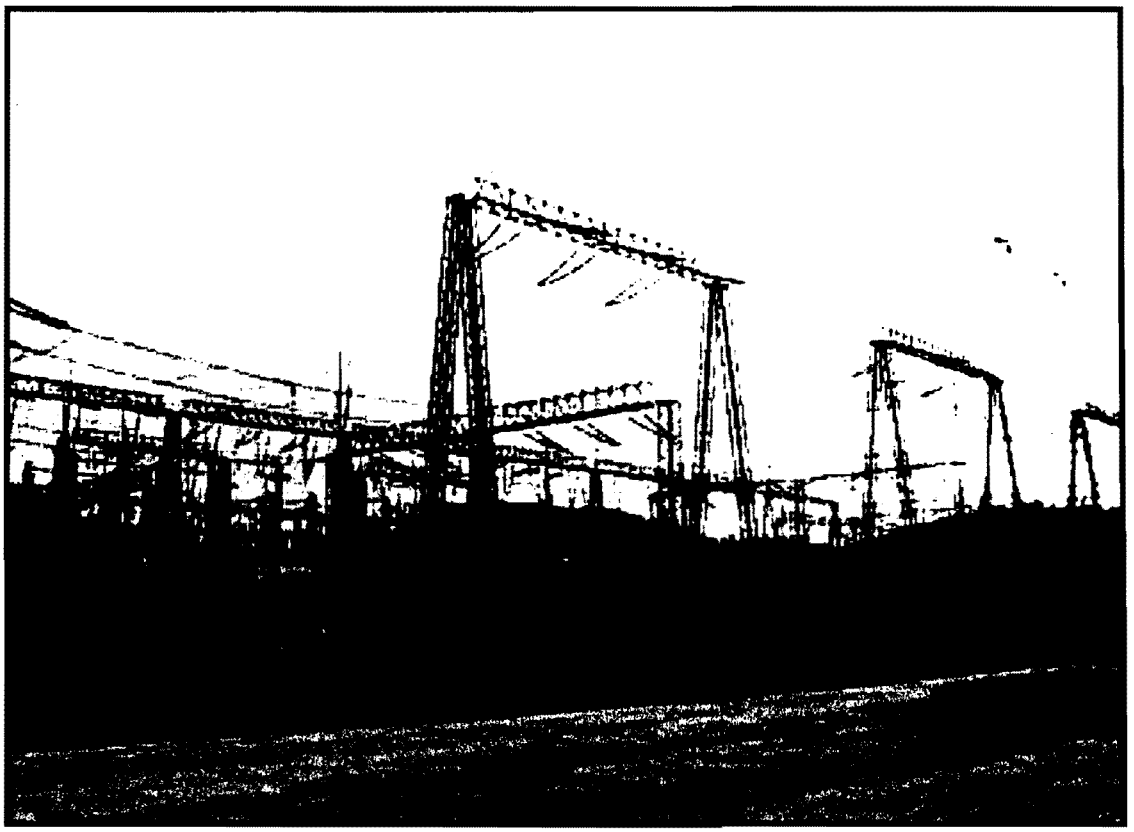


Figure II.13. A View of Soma Thermal Power-Station

Just village names, elevations, and names of stream crossings – not identifiable infrastructure

CHAPTER III

ECONOMICAL AND SOCIAL DIMENSIONS OF THE PROJECT

CHAPTER III. ECONOMICAL AND SOCIAL DIMENSIONS OF THE PROJECT

III.1. Financial Resources Related to the Project

Widespreading The High Voltage Electricity Transmission Line Study, which is taken into account by Government Planning Organization in the "Strengthening the Site Structures Programme", has importance in ensuring infrastructure for a lot of sectors like industry, trade, agriculture, education and health for the three provinces, that are in advance in the classification of economical and social development.

The 380 kV Karabiga – Can – Soma TPS Energy Transmission Line, which is taken into programme by Turkey Power Tranmission Co. (TEIAS), that is linked to Energy and Natural Resources Ministry, is a project that would be achieved by TEIAS by the World Bank credit. The cost of the project would be approximately 150,000 YTL/km. The project is about 158 km longand the total cost of the energy transmission line is about 23,700,000 YTL.

III.2. Flowchart or Time Table of the Project

The line that is planned to be started to construct by TEIAS in 2005, would have an economic life of 30 years. The project would be offered by TEIAS to the World Bank to ensure the financial support for the investment in case of taking "EIA positive" decision from Ministry of Environment and Forestry, that its EIA studies began in September 2004.

Survey, expropriation and establishment stages will be initiated by ensuring the financial resources from World Bank.The locations of the towers would be determined along the line, which is determined in the EIA studies, the designing and expropriation studies would be performed. The construction work that is planned to be started in winter 2005 is expected to last one and a half years. The time table of the project is presented in Table III.1.

Table III.1. The Time Table of the 380 kV Karabiga - Can - Soma TPS ETL Project

Year	2004				2005				2006				2007			
Works / Period	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
EIA Procedure																
Ensuring the financial support from the World Bank																
Survey distribution expropriation																
Sub-assembly																
Upper-assembly																
Wiredrawing																
Performing necessary tests																
Operation															→	

III.3. Cost-Benefit Analysis of the Project

The costs of the project can be generalized as

- The cost of expropriation
- Ensuring the materials
- The cost of construction work (personnel employing, personnel needs, transportation, the fuel, that would be used for construction machinery, etc.)
- The cost of the precautions taken to minimize the environmental impacts, (waste disposal, reclamation of land etc.), environmental damage
- Operation costs
- Closure/renewal costs.

The Karabiga – Can – Soma TPS Energy Transmission Line, that is about 158 km long, has a total cost of 23,700,000 YTL. But the environmental damage costs is not included in this total, because of the difficulties in calculating like almost all investment projects.

Unlike the energy production plants, it is not possible to set the prices of this type of projects since the energy transmission lines aim to transmit the produced energy. But this project became important on account of preventing the losses caused by the cuttings due to the incapacity of the existing 154 kV line and by this way preventing the environmental, timing and economical losses in regional scale. Another benefit of the project is that the project would have a positive effect on the socio-economical structure of the region due to the personnel that would be employed at the region.

III.4. Other Economic, Social and Infrastructure Activities Which are not within the Frame of the Project, but are Designed by the Owner of the Project or Other Firms in Relation with the Project

The project, that starts form the Kiyi Gemi Transformer Station (TS), that is located at Biga, Canakkale, ends at Soma Thermal Power-Station (TPS), that is located at Soma, Manisa. Kiyi Gemi Power-Station is the starting point of the project, as it can be seen at the basic flowchart in Appendix B, and it is planned to develop/strengthen this power-station after the construction phase of the 380 kV line is finished.

There are two existing transformers, that have powers of 160 MW and 180 MW, and four feeders, that belong to Icdas Celik Enerji Tersane Ulasim Sanayi Tesisi (ICDAS Co.), which is located in the Kiyi Gemi Plant that is the starting point of the project. As it is stated above, it is planned to strengthen the ICDAS Plant, for this purpose a new coal-burning unit is planned to join to the plant. After constructing Icdas Coal Burning Unit, that would be started in two months and finished in the year 2005, two empty feeder would be attached at the switchyard, the burning power-station would be connected to the first feeder, the other feeder would be left empty. It is planned to connect the 380 kV Karabiga – Can – Soma TPS Electrical Energy Transmission Line, that would be finished at the end of the project, to the empty feeder.

There would be no variation due to the project at the Soma Thermal Power-Station, where the project ends. Annually 8,000 tones of coal is recently being used in the power-station, that has a power of 1,034 MW. After the construction works, the energy transmission line would be connected to the existing Soma Transformer Station. In this respect, 380/154 kV energy is conducted at the Soma Transformer Station that the line would be connected to.

III.5. Expropriation

The construction works would continue along a route, that has a width of 50 m, at the project discussed. 526 towers are planned to be fixed for the energy line, that would be established. 200 m^2 of area for the towers and 400 m^2 of area for the angle point would be expropriated. In addition to this, an area of 50 m width along 158 km would be expropriated for the easement. The surface areas of the fields, that would the easements be taken and expropriated are given in Table III.2 and types and number of the towers in agricultural, foerstry, pasture lands and surface areas of the fields to be expropriated according to provinces are presented in Table III.3.

Table III.2. The Surface Areas of the Fields, that Would the Easements be Taken and Expropriated

		Area that would be Expropriated	Quantity	Area
Tower Type	Towers	200 m^2	501	100,200 m^2
	Angle Points	400 m^2	25	10,000 m^2
The Total Area that would be xpropriated =				110,200 m^2 ~ 11 ha
Easement (158 000* m x 50 m) =				7,900,000 m^2 790 ha

** 158 km (158 X 1000) =158,000 m*

Table III.3. Types and Number of the Towers in Agricultural, Foerstry, Pasture Lands and Surface Areas of the Fields to be Expropriated According to Provinces

Canakkale					
			Agricultural Land	Forest Land	Pasture Land
Tower Type	Tower	Number	169	113	-
		Area to be Expropriated (m^2)	33800	22600	-
	Angle Point	Number	7	6	-
		Area to be Expropriated (m^2)	2800	2400	-
Balikesir					
			Agricultural Land	Forest Land	Pasture Land
Tower Type	Tower	Number	52	70	30
		Area to be Expropriated (m^2)	10400	14000	6000
	Angle Point	Number	3	4	1
		Area to be Expropriated (m^2)	1200	1600	400
Manisa					
			Agricultural Land	Forest Land	Pasture Land
Tower Type	Tower	Number	34	9	-
		Area to be Expropriated (m^2)	6800	1800	-
	Angle Point	Number	2	-	-
		Area to be Expropriated (m^2)	800	-	-
Total Area to be Expropriated* (m^2)			104600 m^2		

* Types and number of the towers in surface waters, shrubberies settlemnets and their areas to be expropriated are not shown in this table.

Approximately 11 ha of field would be expropriated for the towers and the activities would continue inside this area. In addition easement would be taken for the fields, that the electrical wires would pass. The expropriation studies that are planned to start after the EIA period is finished, are planned to continue until the winter period of the year 2005.

For the forests, that are on the way of the probable route, it would be obeyed to the variations in the Article 17 of the 6831 numbered Forest Law. All the nexcessery permits regarding the forestry areas on the route would be obtained from the General Directorate of Forestry and other related Local Directorates of Forestry. For the pastures, those are on the way of the probable route, according to the Article 14 of the 4342 numbered Pasture Law, before starting the investment actually, permits would be taken from the Provincial Directorates of Agriculture of the Ministry of Agriculture and Rural Affairs for changing the allocation purpose of the pasture areas discussed.

Along the route, agriculture can be continued after the construction phase in the agricultural areas, which are below the energy transmission wires and the areas, that the easement had been taken. According to the Expropriation Law, expropriations would be done for ownership and also for easements according to the expropriation plan and the prices of the fields would be paid to the people entitled. The construction phase would not start until the expropriation processes finish.

III.6. Other Matters

There are not any other information and document to give in this chapter.

How much forest
How much is agriculture
any thing else? eg. Mtadel alca, Ramsar sits
etc.

CHAPTER IV

DETERMINATION OF THE AREA THAT WOULD BE AFFECTED FROM THE PROJECT, AND EXPLANATION OF THE EXISTING ENVIRONMENTAL PROPERTIES INSIDE THE AREA

CHAPTER IV. DETERMINATION OF THE AREA THAT WOULD BE AFFECTED FROM THE PROJECT AND EXPLANATION OF THE EXISTING ENVIRONMENTAL PROPERTIES INSIDE THE AREA

IV.1. Determination of the Area that Would Be Affected From the Project, (It would be explained how and accordingt to what the impact area had been determined and the impact area would be shown on the map)

Karabiga – Can – Soma Energy Transmission Line is a construction and operation project of an energy transmission line, which starts from Canakkale Province Biga District and ends at Manisa Province Soma District along a 158 km route. The construction works would be performed along a route that has a width of 50 m in the project discussed. 526 towers are planned to be fixed for the energy line that would be established. 200 m^2 of area for the towers and 400 m^2 of area for the angle point would be expropriated. In addition to this, an area of 50 m width along 158 km would be expropriated for the easement. The surface areas of the fields that would the easements be taken and expropriated would be approximately 11 ha. The detailed information about expropriation is given in Chapter III.5.

e.g. ? what are they ?

The environmental impacts due to the construction of the project have similar properties with other construction works. The environmental impacts of the energy transmission lines would be caused by the emission at the construction works and the activities like grazing of soil and digging hollows for the tower feet in general. The impacts of this type of activities would be effective up to 100 m of the route. Consequently, it is expected that totally 200 m of area, 100 m at the right and left of the route, would be affected during the construction phase.

A study was performed at a total 5 km of area, 2,5 km at the right and left of the line along the route to determine, prevent, or take below the limit values the environmental impacts. For these reasons as stated in Chapter VII, along the route it was kept away from the areas, which have importance from ecological, social and cultural aspects, and the population centers and the alternative, which minimizes the impcts of the line, was selected.

such as ?

In the operation phase of the project discussed maintenance works would be performed every 6 months. Except this, there would be no human activities along the line. Consequently, the environmental impact of the line would be very limited in the operation phase. Since the agricultural activities would be continued and the trees would be let to grow up to a level beneath the transmission line, at this phase the impacts on land usage would decrease. The electrical field and the magnetic field due to the operation of the energy transmission line are expected to be low that would not have impacts on health and environment as stated in Chapter V.2.4.

IV.2. The Properties of the Physical and Biological Environment and the Usage of the Natural Resources

IV.2.1. Meteorological and Climatic Properties

In this section the meteorological conditions in the project area and the vicinity are evaluated. In this study, the results of the continuous measurements that were done by State Meteorological Institute (SMI), were analyzed and the results were presented in the related graphs and tables.

The data taken from the observation stations of the State Meteorological Institute around the project area, which are located at Savastepe, Yenice, Soma, Ivrindi, Balya and Can, were used. These stations are small climate stations, which measure the parameters like temperature, wind speed and direction three times a day. The data recorded at Savastepe Station that has an altitude of 300 m, between 1985-2003, at Yenice Station that has an altitude of 275 m, between 1986-1990, at Soma Station that has an altitude of 200 m, between 1975-2003, at Ivrindi Station that has an altitude of 260 m, between 1986-2000, at Balya Station that has an altitude of 230 m, between 1983-1992 and at Can Station that has an altitude of 100 m, between 1976-1994 are given below.

Air Temperature

The average annual air temperture data determined at the reference periods for six SMI stations are presented in Table IV.1. The average temperature at the project field is around 13.7°C. At six stations the average maximum monthly temperatures are around 30.7°C and all recorded in July. The average minimum monthly temperatures at Yenice, Soma, Ivrindi and Can SMI stations, those occur in January, are 0.5°C, 2.3°C, -0.7°C and 0.4°C respectively. These values at Savastepe and Balya SMI stations, those occur in February, are 2.1°C and 0.6°C respectively. The graphical representation of the average temperatures recorded at these stations are presented in Figure IV.1.

Table IV.1. Average Temperature Data (°C)

Station	Annual Average	Monthly Maximum	Monthly Minimum
Savastepe SMI	14.4	31.7 (July)	2.1(Febrauary)
Yenice SMI	12.9	30.6 (August)	0.5 (January)
Soma SMI	15.3	33.2 (July)	2.3 (January)
Ivrindi SMI	13.1	30.5 (July)	-0.7 (January)
Balya SMI	13	28.5 (August)	0.6 (Febrauary)
Can SMI	13.4	30.1 (August)	0.4 (January)

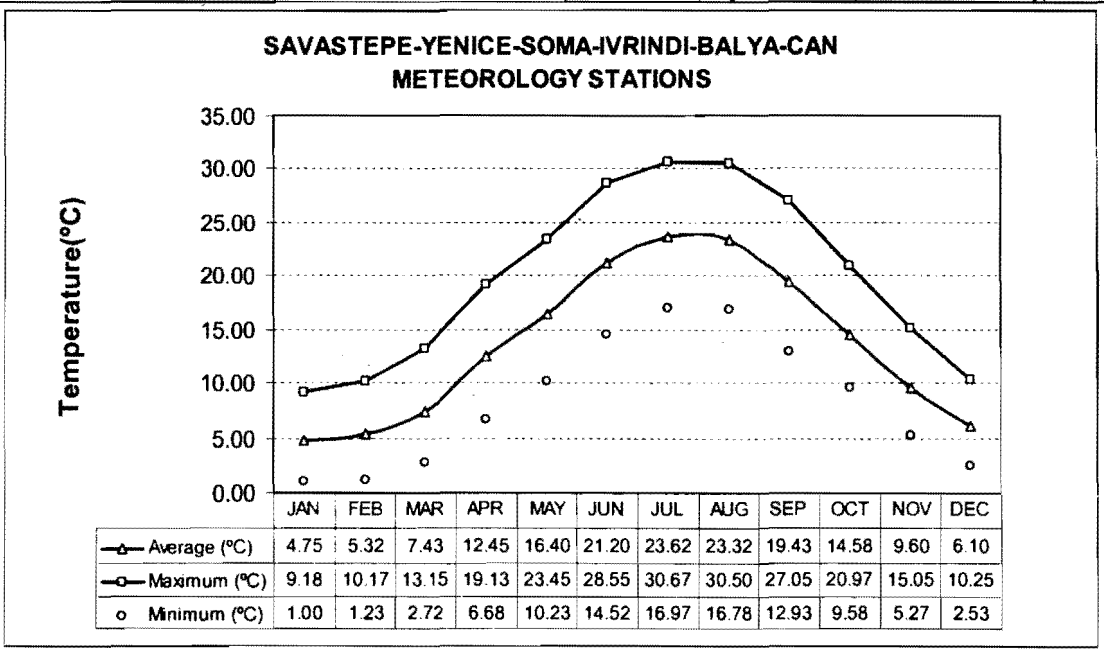


Figure IV.1. The Average, Minimum and Maximum Monthly Temperatures At The Project (Average of Savastepe, Yenice, Soma, Ivrindi, Balya and Can SMI Stations)

Relative Humidity

The average relative humidity at Savastepe, Yenice, Ivrindi, Balya and Can Stations changes between 60% (summer) and 75% (winter). The relative humidity values at Soma Station are lower (around 44% in summer, 66% in winter). The graphical representation of monthly relative humidity changes according to the monthly average relative humidity data recorded at the stations are given in Figure IV.2.

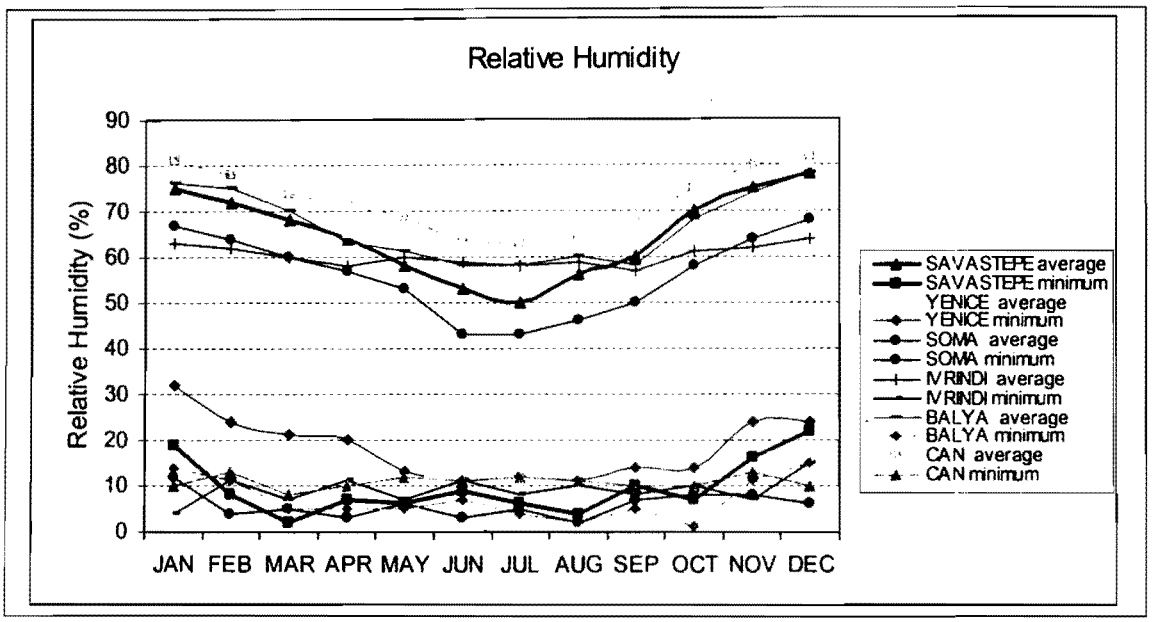


Figure IV.2. The Average and Minimum relative Humidities at Savastepe, Yenice, Soma, Ivrindi, Balya and Can SMI Stations

Cloudiness

The annual average cloudiness (scale: 0-10) at Savastepe, Yenice, Soma, Ivrindi, Balya and Can stations are measured as 4.6, 5.1, 3.9, 4.9, 5.7 and 5.2 respectively. The number of cloudless days at Savastepe Station (cloudiness: between 0.0-1.9) was recorded as 111 and 30% of time the weather is cloudless; at Yenice Station 104 cloudless day was recorded in a year and 28% of time the weather is cloudless; at Soma Station 157 cloudless day was recorded in a year and 43% of time the weather is cloudless; at Ivrindi Station 85 cloudless day was recorded in a year and 23% of time the weather is cloudless; at Balya Station 69 cloudless day was recorded in a year and 19% of time the weather is cloudless; at Can Station 79 cloudless day was recorded in a year and 22% of time the weather is cloudless (Figure IV.3).

Cloudy/useless

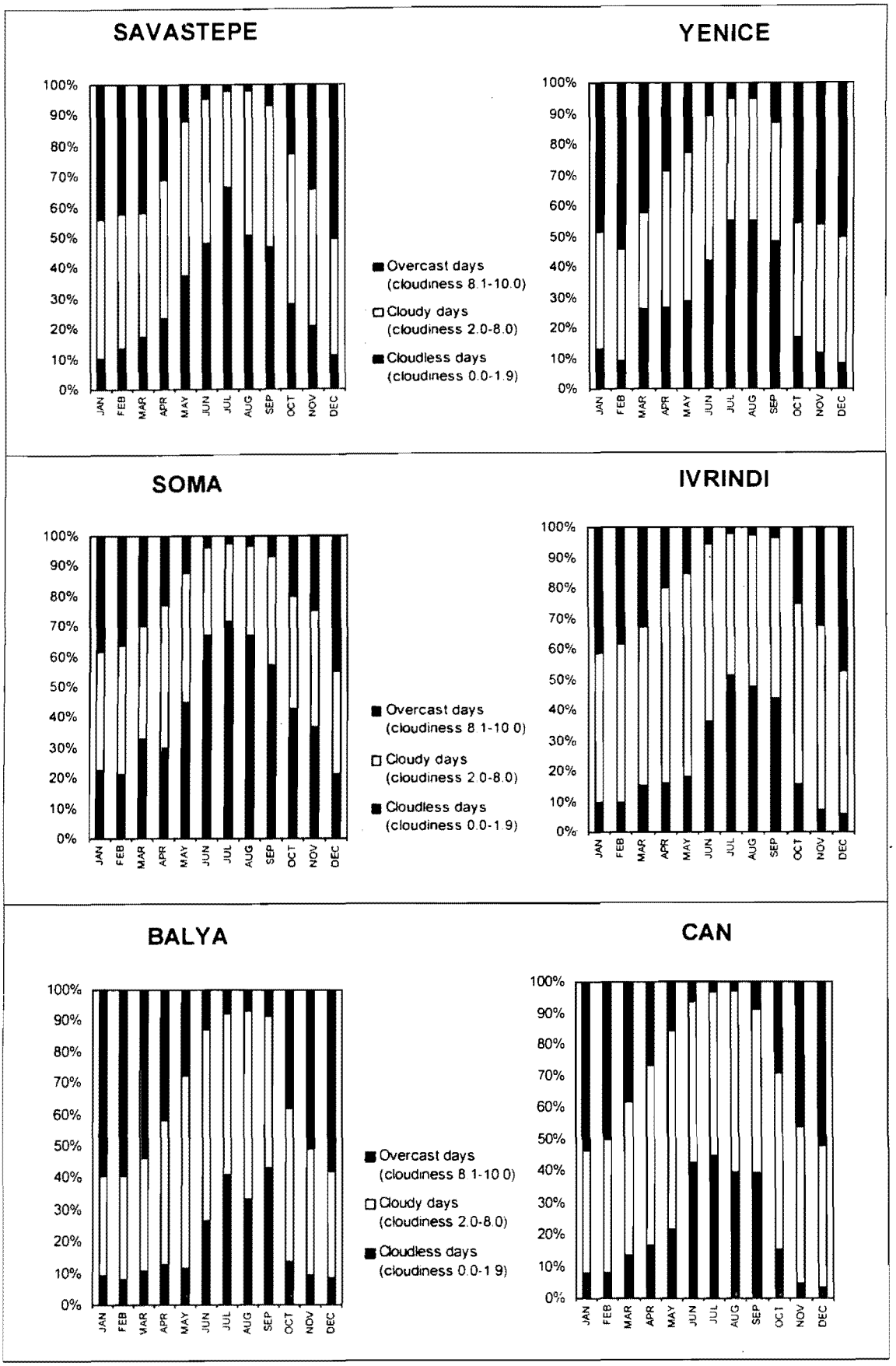


Figure IV.3. The Average Cloudiness at Savastepe, Yenice, Soma, Ivrindi, Balya and Can SMI Stations

Rainfall

The average annual rainfall amounts at Savastepe, Yenice, Soma, Ivrindi, Balya and Can stations are 700.8 mm, 874.3 mm, 668.6 mm, 575.3 mm, 560.7 mm and 639.8 mm respectively. The data collected from six stations are summarized in Table IV.2 and the observed average monthly rainfalls are given in Figure IV.4.

Savastepe Station: The maximum and minimum average monthly rainfall values are determined as 120 mm (December) and 5.5 mm (August) respectively. The maximum daily rainfall was observed as 92.9 mm in November. The average number of haily, frosty and snowy days in a year are 1.0, 17.2 and 8.8, respectively.

Yenice Station: The maximum and minimum average monthly rainfall values are determined as 183.9 mm (December) and 9 mm (September) respectively. The maximum daily rainfall was observed as 102.8 mm in November. The average number of haily, frosty and snowy days in a year are 0.6, 29.2 and 8.2, respectively.

Soma Station: The maximum and minimum average monthly rainfall values are determined as 101.4 mm (January) and 3.6 mm (August) respectively. The maximum daily rainfall was observed as 77.5 mm in January. The average number of haily, frosty and snowy days in a year are 0.5, 25.3 and 5.3, respectively.

Ivrindi Station: The maximum and minimum average monthly rainfall values are determined as 111.2 mm (December) and 1.0 mm (August) respectively. The maximum daily rainfall was observed as 95.0 mm in November. The average number of haily, frosty and snowy days in a year are 0.1, 25.6 and 6.9, respectively.

Balya Station: The maximum and minimum average monthly rainfall values are determined as 115.8 mm (November) and 1.9 mm (August) respectively. The maximum daily rainfall was observed as 99.0 mm in November. The average number of haily, frosty and snowy days in a year are 0.7, 18.6 and 10.2, respectively.

Can Station: The maximum and minimum average monthly rainfall values are determined as 101.3 mm (November) and 10.9 mm (August) respectively. The maximum daily rainfall was observed as 93.8 mm in October. The average number of haily, frosty and snowy days in a year are 1.3, 34.4 and 10.6, respectively.

Table IV.2. Rainfall Data (mm)

Station	Annual Average	Monthly Maximum	Monthly Minimum	Daily Maximum	The annual average at haily, frosty and snowy days
Savastepe SMI	700.8	120 (December)	5.5 (August)	92.9 (November)	27.0
Yenice SMI	847.3	183.9 (December)	9.0 (September)	102.8 (November)	38.0
Soma SMI	668.6	101.4 (January)	3.6 (August)	77.5 (January)	31.1
Ivrindi SMI	575.3	111.2 (December)	1.0 (August)	95.0 (November)	32.6
Balya SMI	560.7	115.8 (November)	1.9 (August)	99.0 (November)	29.5
Can SMI	639.8	101.3 (November)	10.9 (August)	93.8 (October)	46.3

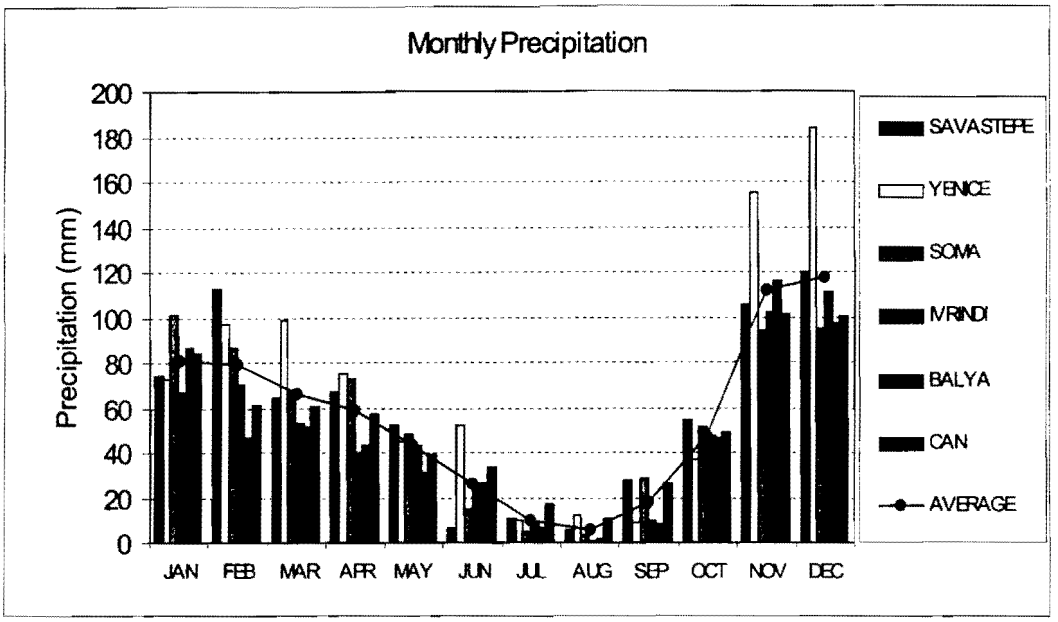


Figure IV.4. Average Monthly Rainfall At Savastepe, Yenice, Soma, Ivrindi, Balya and Can SMI Stations

Wind

The main wind directions and strengths at six stations are represented in Figure IV.5 and Figure IV.6. The weak and medium strength north winds dominate at Savastepe, Ivrindi and Balya Stations. The wind is in the north direction 51.63% of time at Savastepe Station, 38.28% of time at Ivrindi Station and 48.75% of time at Balya Station. The main wind direction is south east at Yenice Station. The wind is in the south east direction 36.58% of time at this station. At Soma Station the north west wind is observed at medium strength most of the time. The main wind direction is south east at Can Station and the observed winds are in this direction 44.08% of time. The maximum wind speed is 2.1 beaufort at Savastepe Station, 2.2 beaufort at Yenice Station, 2.4 beaufort at Soma Station, 1.9 beaufort at Ivrindi Station, 2.6 beaufort at Balya Station and 2.8 beaufort at Can Station.

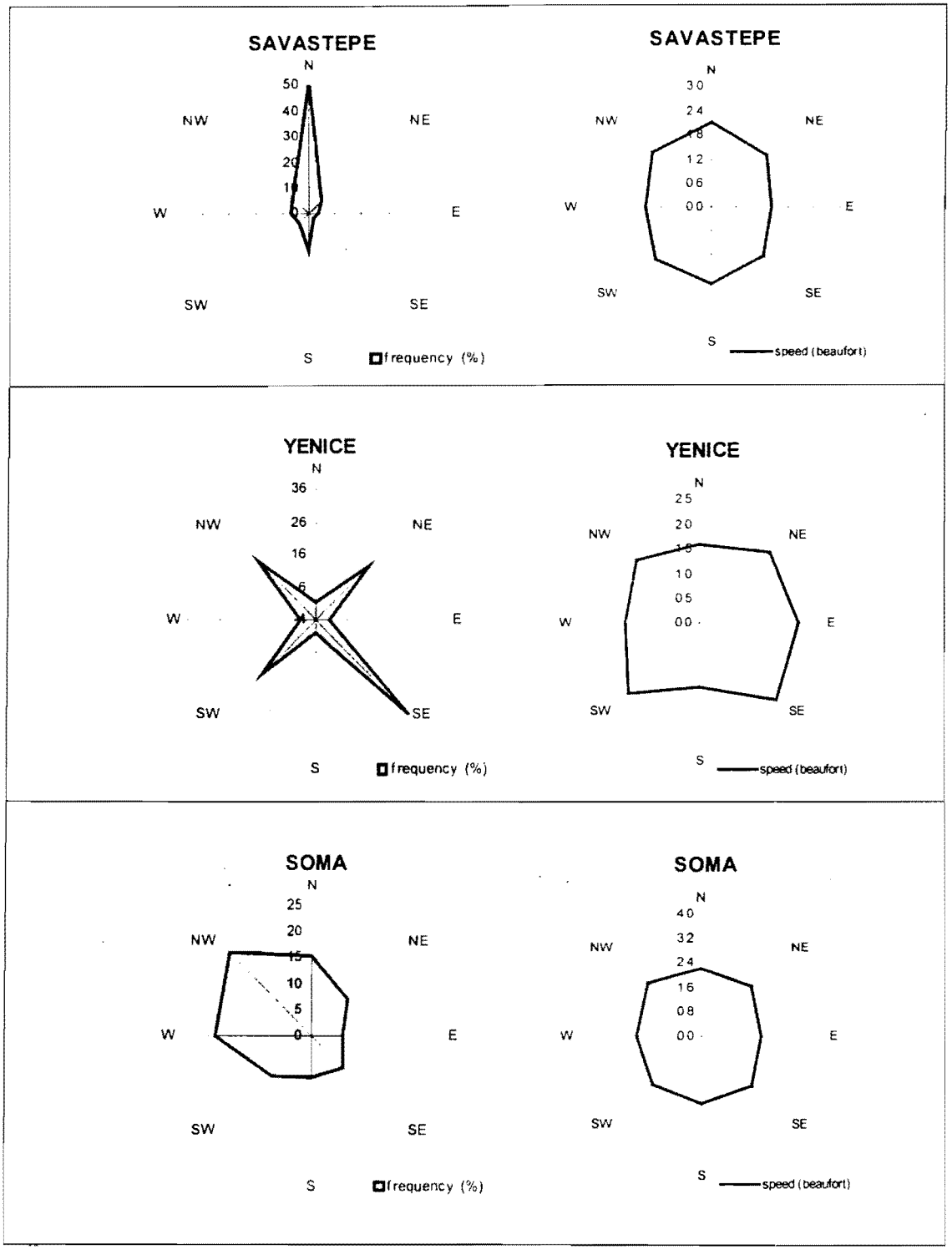


Figure IV.5. Wind Speed and Direction At Savastepe, Yenice, Soma SMI Stations

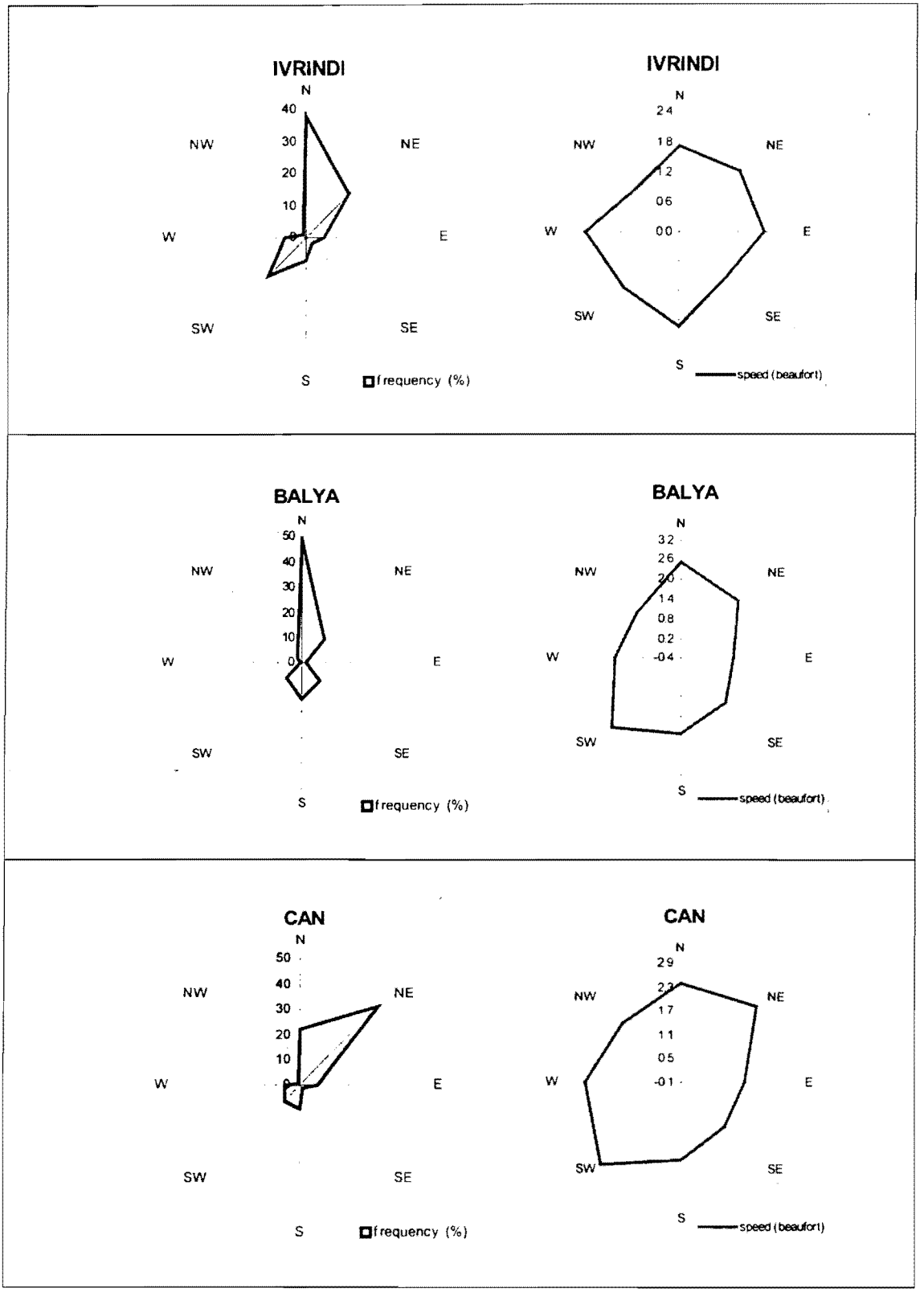


Figure IV.6. Wind Speed and Direction At Ivrindi, Balya and Can SMI Stations

IV.2.2. The Geological Properties of the Line Route (1/25000 scaled geological maps and sections of tectonic movements, topographic properties, mineral resources, landslide, unique formations; avalanche, flood and rock fall)

The project area starts from Canakkale Province Biga District and after Can and Yenice it passes through Ivrindi, Balya and Savastepe Districts of Balikesir and ends at Manisa Province Soma District. The region has a wide range from the stratigraphic point of view and a distribution from Palaeozoic to Tertiary can be observed. The region that is very affluent in faulting is inside the 1st degree seismic zone.

Geological Properties (Landslide, Unique Formations, Avalanche, Flood, Rock Fall Risk etc.)

The difference in land shapes is due to the erosion and the different resistance of various rock types in erosion. Despite the region is inside the drastic grade landslide zone, the surface shapes do not have a very high topography at the project area along the line route. But at some places, in case of excessive rainfall, flood and mud flows could be seen at the slope of the high hills. According to the surveys performed, in the area the surface movements like mass slides, conglomerates, landslides along the hillsides could be observed.

Topography

The region has an altitude between 50 – 70 m from the topographic point of view. The topography is variable and the altitude increases in south direction. The general topographic view of the project line and the close vicinity is presented in Figure IV.7.

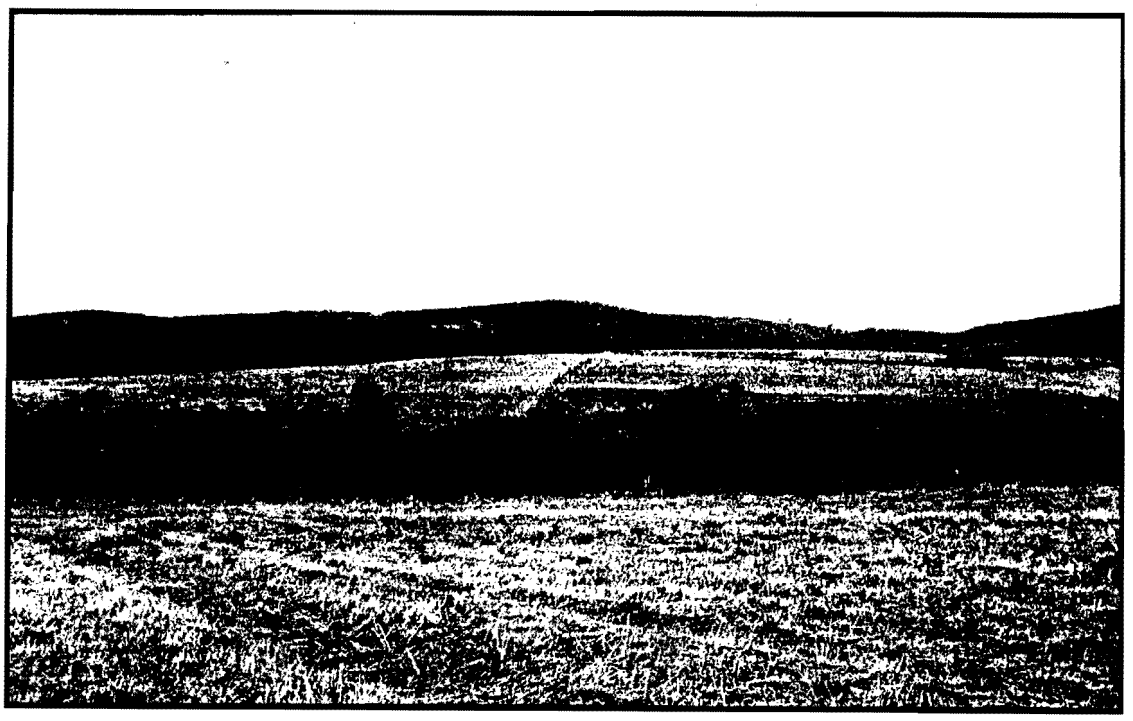


Figure IV.7. The General Topographic View of the Project Line and the Close Vicinity

Stratigraphy

In the region the formation named as Paleozoic is formed with the units of conglomerate, sandstone, limestone and graywacke. Metamorphics are located below them and young age granite intrusions cut these units and go through them. The age of them could not be determined exactly but can be estimated to be between Pre-Cambrian and Permian. Then Permian age limestones and limestone blocks come over these.

Generally the Mesozoik units are located at the east and southeast of Can. These units are formed by graywacke and spillite, which metamorphized very low and contain Permian and Carboniferous aged limestone blocks inside Trias between Biga – Can. These are followed inharmonious by Eocene aged units. Eocene flysch is formed by conglomerate, sandstone, limestone lithologies from top to bottom. Eocene aged fossils have been found and it was observed that they contain limestone, sandstone and conglomerate.

In the region Neogene is represented with terrestrial facies. Usually formations are seen as phyroclastic and as in the semi-layers containing ash. In Neogene region, clay marls are at the below, decomposed limestones with clay are above these and also marl with gray clay and yellow sandstone are at the south of the region and at the top there are limestones with clay and marls.

Formations, containing sand gravel and sometimes blocks, passing through others laterally or vertically are named as Quaternary aged. In the region Quaternary represented with conglomerate. Metamorphic rocks are seen between Karabiga – Lapseki in the region and are formed with kinds of gneiss, amphibolite, and different types of schists, quartz, metaconglomerate, metagraywache, marble and semi cyrstallized limestones. These metamorphic rocks, which are named as old foundations, mostly are cut by aplite dike, granite and granodiorite. The metamorphics which exist at the north of Can are formed of kinds of gneisses, schist and cyrstallized limestones lenses. These metamorphic rocks are covered with base conglomerates which are Eocene aged. Stratigrafical profile and the map of the project area and the vicinity are shown in Figure IV.8 and Figure IV.9 (Pamir - Erentoz, 1973).

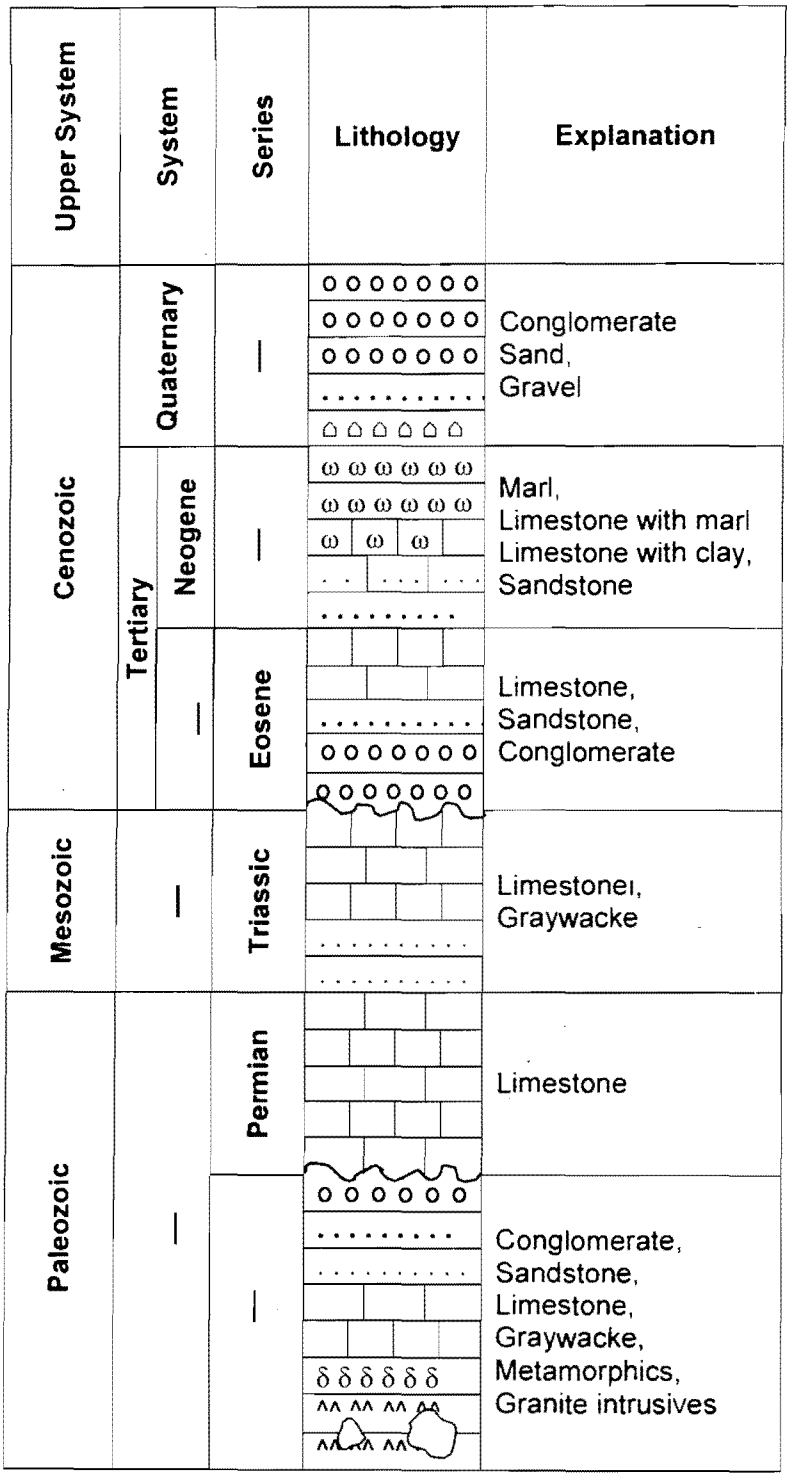


Figure IV.8. Stratigraphic Section of the Project Route and the Close

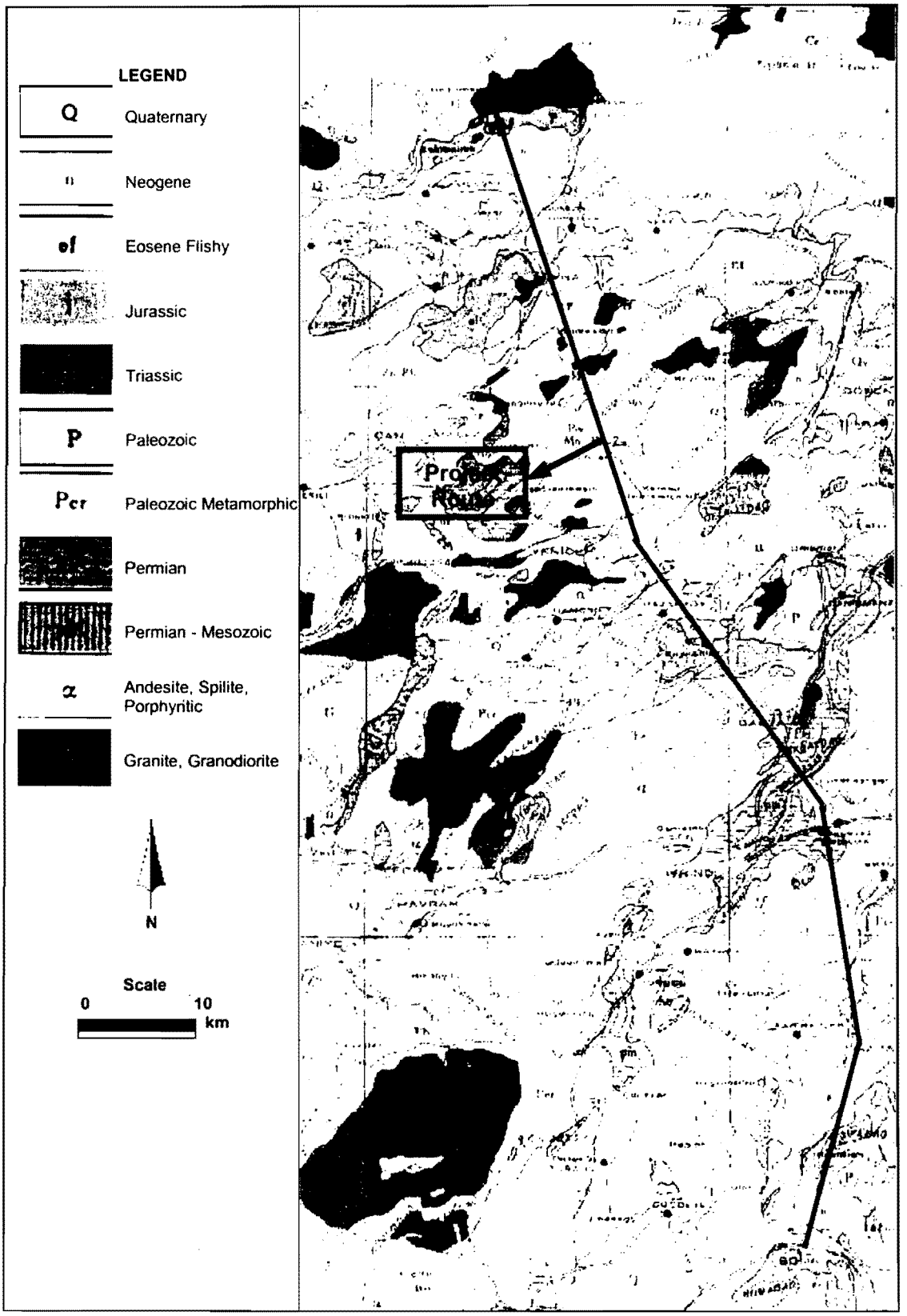


Figure IV.9. Geological Map of the Project Route and the Stratigraphical Section View (MTA, 1973)

Tectonic Geology and Tectonic

The volcanic rocks and hot water springs determine the fault system of the region at which there are a lot of small and big faults. Along Can – Biga fault Tepekoy Hot Spring and Can Hot Spring are located.

Faults and Overthrusts

The region is inside the 1st degree seismic region along the route that the line passes. Especially east and southeast of Can is inside the impact area of the fault zones. Can – Biga Fault Zone, Sarikoy Fault Zone, Yenice – Gonen Fault and Manyas Fault that is a long fault zone, are present at this area. Beside these at the east a branch of North Anatolian Fault is located at the northwest of the area that the line passes. The fault line map of the route of the energy transmission line project and its close vicinity is given in Figure IV.10.

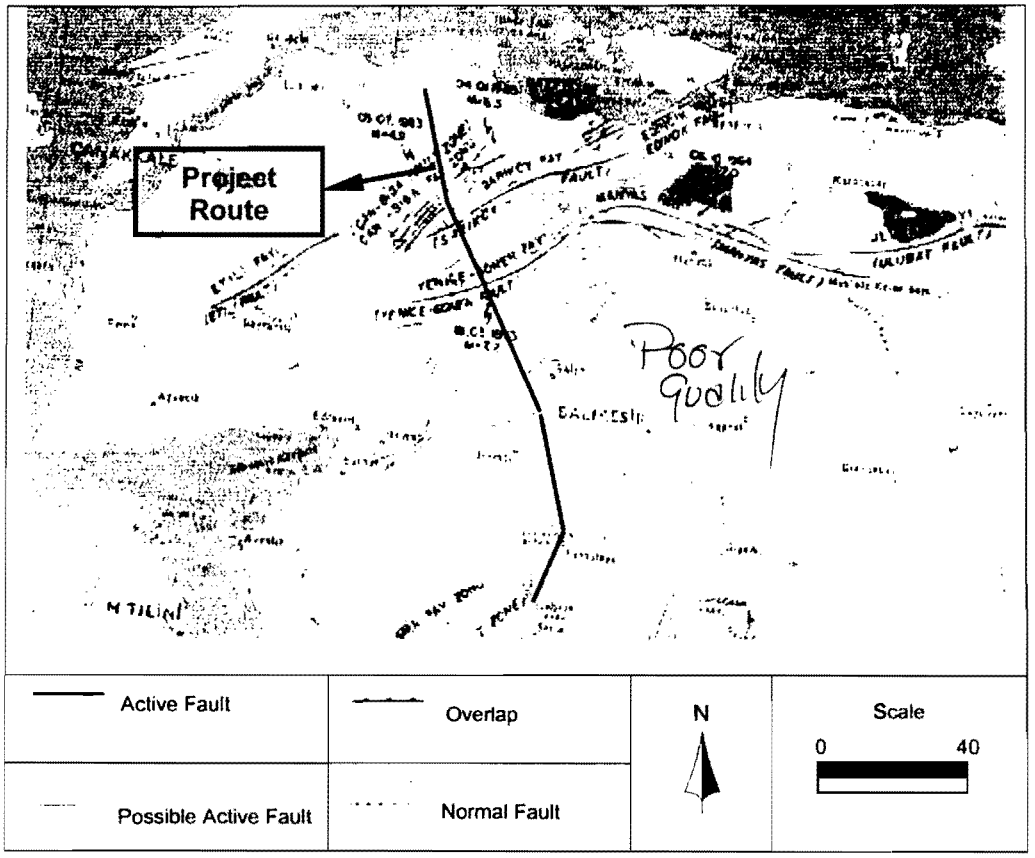


Figure IV.10. The Fault Line Map of The Project Route And Its Close Vicinity

Natural Disaster Condition and Seismicity

The area that the line passes, is inside the 1st degree seismic region at the Turkish Seismic Regions Map of Turkish Earthquake Research Department of Ministry of Public Works. Turkish seismic regions are graded according to the acceleration values as below.

- 1. Degree seismic region: expected acceleration value higher than 0.40 g
- 2. Degree seismic region:expected acceleration value between 0.40 g and 0.30 g
- 3. Degree seismic region: expected acceleration value between 0.30 g and 0.20 g
- 4. Degree seismic region: expected acceleration value between 0.20 g and 0.10 g
- 5. Degree seismic region: expected acceleration value lower than 0.10 g

The seismic region maps of Canakkale, Balikesir and Manisa Provinces, which are located on the project route, are presented in Figure IV.11, Figure IV.12 and Figure IV.13 respectively (www.deprem.gov.tr).

At the project line route and its close vicinity, the last earthquake that has an intensity of higher than 5, is an earthquake, which had an intensity of 7 and occured in 1964. No big earthquakes occured after 1964. The earthquakes higher than 5 and occured at the project line and its close vicinity are given in Table IV.3 (www.boun.edu.tr).

Table IV.3. The Earthquakes Higher Than 5 and Occured At the Project Line and Its Close Vicinity

No	Date	Time	Location	Intensity	*Mag* Ms	Life Loss	Damaged Buildings
1	04.01.1935	16:41	Erdek (BALIKESIR)	VIII	6.4	5	600
2	22.09.1939	02:36	Dikili (IZMIR)	IX	6.6	60	1235
3	15.11.1942	19:01	Bigadic (BALIKESIR)	VIII	6.1	16	2187
4	06.10.1944	04:34	Ayvalik (BALIKESIR)	IX	6.8	30	5500
5	18.03.1953	21:06	Yenice (CANAKKALE)	IX	7.2	265	6750
6	06.10.1964	16:31	Manyas (BALIKESIR)	IX	7.0	23	5398

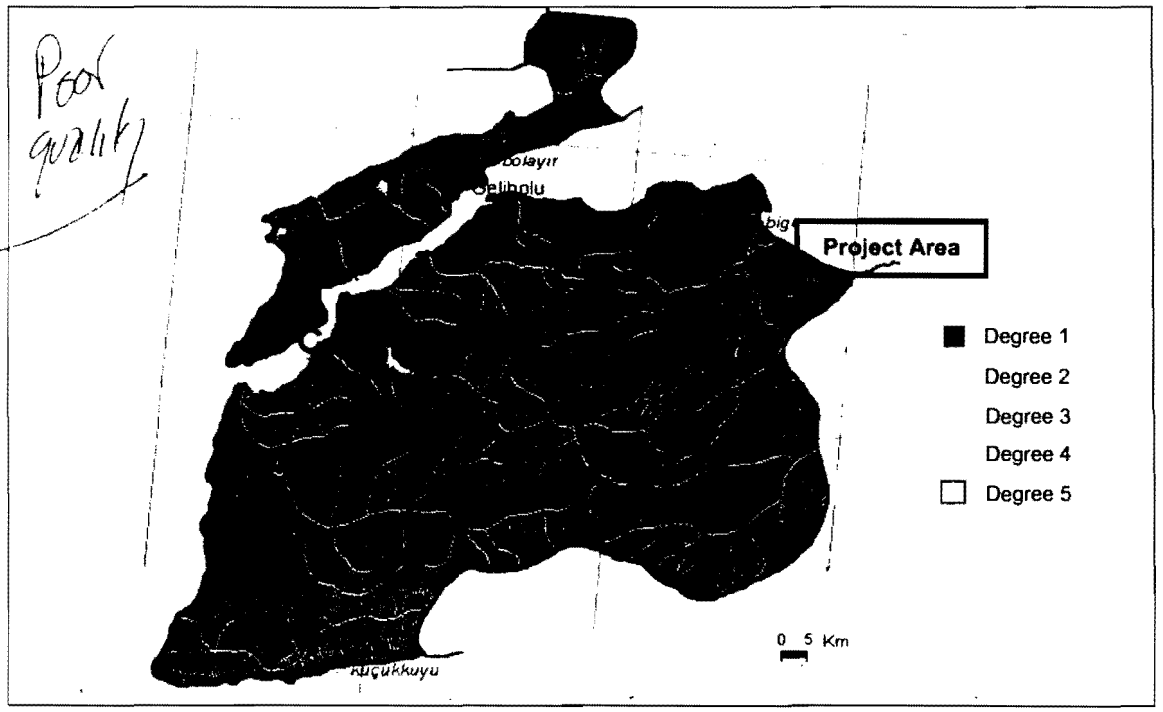


Figure IV.11. The Seismic Region Map of Canakkale Province

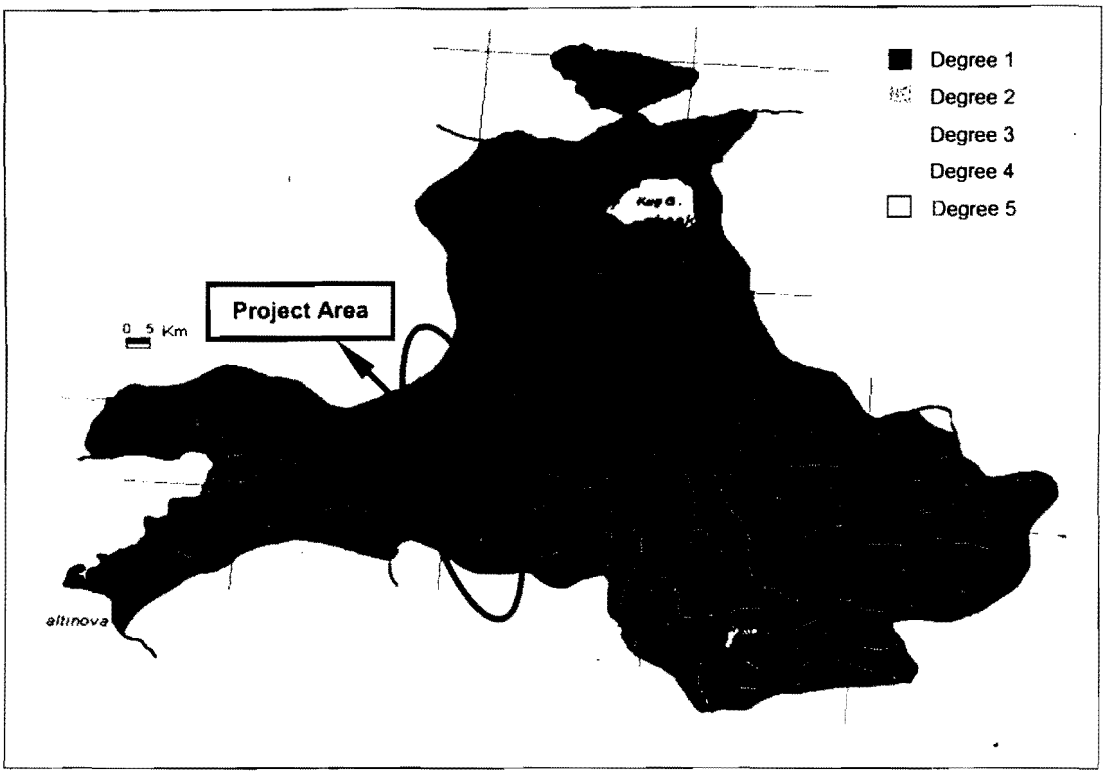


Figure IV.12. The Seismic Region Map Of Balikesir Province

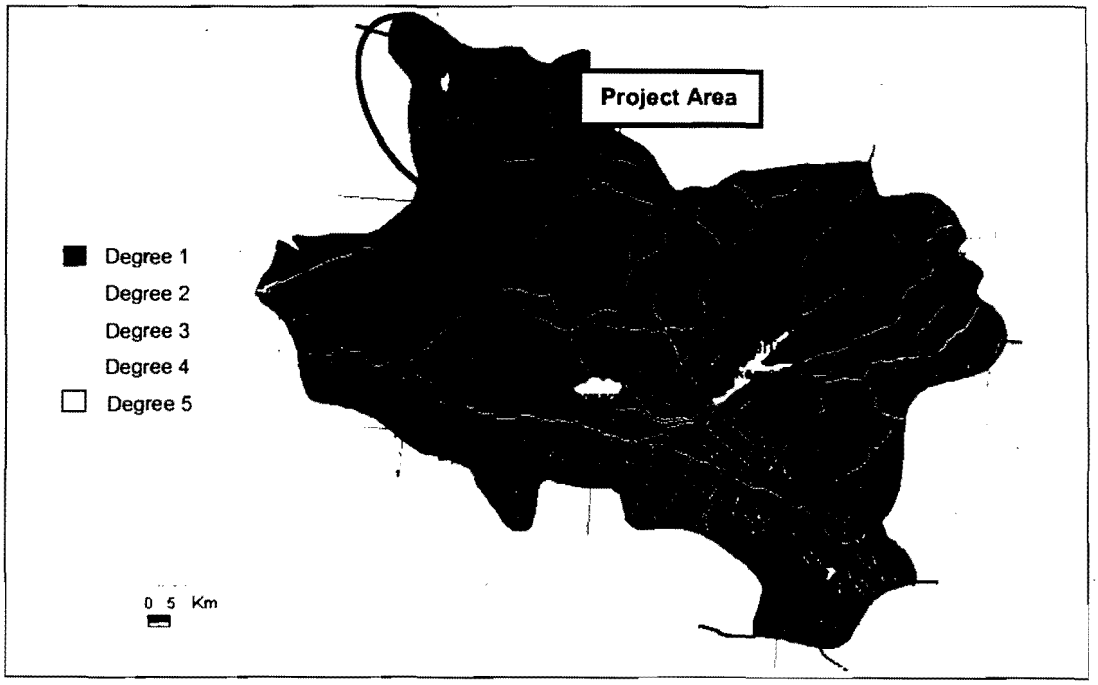


Figure IV.13. The Seismic Region Map Of Manisa Province

IV.2.3. The Hydrogeological Properties of the Underground and Thermal Water Sources of the Line Route (water levels, amounts, allowable amounts of withdrawal, flow of the sources, existing and planned usage)

The nearest reservoirs to the project route are Can – Biga Reservoir that has a capacity of 18.5 $x10^6$ m^3, Gonen Sarikoy Reservoir that has a capacity of 29 $x10^6$ m^3, Pazarkoy Kalkim Reservoir that has a capacity of 5.5 $x10^6$ m^3, Edremit – Armutova Reservoir that has a capacity of 64.5 $x10^6$ m^3, Balikesir Plain Reservoir that has a capacity of 36.8 $x10^6$ m^3 and Sindirgi – Bigadic Plain Reservoir that has a capacity of 22 $x10^6$ m^3. The underground water research study map that shows the locations of the reservoirs discussed, can be seen in Figure IV.14 (DSI, 1991).

How far are the reservoirs from the TL or SS

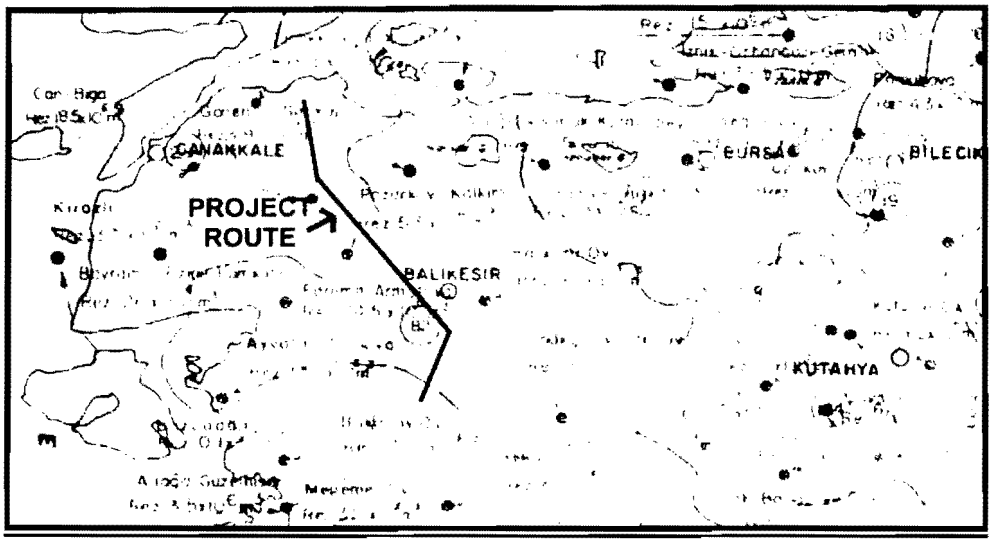


Figure IV.14. Groundwaters Located At The Project Route and The Close Vicinity (DSI, 1991)

The water quality measurement results of the wells, which are located on the project route and were opened by DSI in different years for surveying or for a pay, are given below in Table IV.4, Table IV.5, Table IV.6, Table IV.7 and Table IV.8.

Table IV.4. The Water Quality Measurement Results of the 54151 Numbered DSI Well Opened at Canakkale Province In 1999

Well No	Location	Depth (m)	Static level (m)	Dynamic level (m)	Output (L/sn)
54151	Biga District	152	15.25	43.8	5.17
Water chemistry					
PH	7.42	SO^{-2}_4 (meq/L)	0.48		
EC$x10^6$ (µmhos/cm)	531	%Na	44.46		
Na^{+1}(meq/L)	2.61	SAR	2.028		
K^{+1}(meq/L)	0.04	Hardness (Fs°)	16.6		
Ca^{+2}(meq/L)	2.82	Fe (mg/L)	-		
Mg^{+2}(meq/L)	0.49	Boron (mg/L)	0.71		
CO_3^{-2} (meq/L)	0	Nitrite	0.006		
HCO^{-1}_3 (meq/L)	4.38	Ammonia	0.03		
Cl^- (meq/L)	0.67	Organic matterl (mg O_2/L)	0.69		

What on earth does this code with the T.L.

Water level depth

When the values given in Table IV.4 are compared with Water Pollution Control Regulation (31 December 2004 dated, No:25687)and the Quality Criteria of the Continental Water Sources Classes, all the criterions of the well discussed are generally at I. Class underground water class, but the chlorine concentration is at the Class II groundwater class with a very slight difference. Consequently this source could be used as drinking water and at food industry by refining the excess amount of chlorine. Also it can be said that this source is at the medium level salinity, low sodium water class by taking pH, electrical conductivity, sodium adsorption rate (SAR) and sodium percentage into consideration. Consequently this source could be used for irrigation all types of plants without performing special studies for salinity control at the areas, which have medium drainage.

Table IV.5. The Water Quality Measurement Results of 53182 Numbered DSI Well Opened At Canakkale Province in 1998

Well No	Location	Depth (m)	Static level (m)	Dynamic level (m)	Output (L/sn)
53182	Can District	-	-	-	-
Water chemistry					
PH I		6.95	SO^{-2}_4 (meq/L)		1.22
EC×10^6 (µmhos/cm)		1016	%Na		12.94
Na^{+1}(meq/L)		1.52	SAR		0.659
K^{+1}(meq/L)		0.06	Hardness (Fs°)		53.2
Ca^{+2}(meq/L)		6.36	Fe (mg/L)		-
Mg^{+2}(meq/L)		4.27	Boron (mg/L)		0.8
CO_3^{-2} (meq/L)		0	Nitrite nitrojen (mg/L)		-
HCO^{-1}_3 (meq/L)		10.25	Ammonium nitrogen (mg/L)		-
Cl^- (meq/L)		1.06	Organic matter (mg O_2/L)		-

When the values given in Table IV.5 are compared with Water Pollution Control Regulation (31 December 2004 dated, No:25687) and the Quality Criteria of the Continental Water Sources Classes, all the criterions of the well that is located in Can District, are generally at Class I groundwater class, but the chlorine concentration is not at the Class I groundwater class. As the well located in Biga District, this source could also be used as drinking water and at food industry by refining the excess amount of chlorine. Also it can be said that this source is at the high level salinity, low sodium water class by taking pH, electrical conductivity, sodium adsorption rate (SAR) and sodium percentage into consideration. For this reason this source could not be used at the areas that has limited drainage. Salinity should be controlled. Besides, plants resistant to salt should be used at this type of areas.

Table IV.6. The Water Quality Measurement Results of 40023 Numbered DSI Well Opened At Balikesir Province in 1990

Well No	Location	Depth (m)	Static level (m)	Dynamic level (m)	Output (L/sn)
40023	Balya District	-	6.2	-	2
Water chemistry					
PH	7.08		SO^{-2}_4 (meq/L)		0.59
EC×10^6 (µmhos/cm)	500		%Na		17.808
Na^{+1}(meq/L)	0.85		SAR		0.586
K^{+1}(meq/L)	0.06		Hardness (Fs°)		21
Ca^{+2}(meq/L)	2.9		Fe (mg/L)		-
Mg^{+2}(meq/L)	1.3		Boron (mg/L)		0.71
CO_3^{-2} (meq/L)	0		Nitrite		0.013
HCO^{-1}_3 (meq/L)	3.78		Ammonia		0.1
Cl^- (meq/L)	0. 7		Organic matter (mg O_2/L)		-

When the values given in Table IV.6 are compared with Water Pollution Control Regulation (31 December 2004 dated, No:25687) and the Quality Criteria of the Continental Water Sources Classes, all the criterions of the well that is located in Balya District, are generally at Class I underground water class like the other wells except the chlorine concentration. For using the water of this source as drinking water, refining the excess amount of chlorine and besides ensuring the required oxygen concentration by ventilation should be performed. Also it can be said that this source is at the medium level salinity, low sodium water class by taking pH, electrical conductivity, sodium adsorption rate (SAR) and sodium percentage into consideration. Consequently also this source could be used for irrigation all types of plants without performing special studies for salinity control at the areas, which have medium drainage.

Table IV.7. The Water Quality Measurement Results of 49123 Numbered DSI Well Opened At Balikesir Province in 1995

Well No	Location	Depth (m)	Static level (m)	Dynamic level (m)	Output (L/sn)
49123	Ivrindi District	86	6.2	25.6	3
Water chemistry					
PH	8.4		SO^{-2}_4 (meq/L)		34.09
EC×10^6 (µmhos/cm)	2916		%Na		36.012
Na^{+1}(meq/L)	10.65		SAR		3.336
K^{+1}(meq/L)	0.82		Hardness (Fs°)		21
Ca^{+2}(meq/L)	14.06		Fe (mg/L)		-
Mg^{+2}(meq/L)	6.32		Boron (mg/L)		0.15
CO_3^{-2} (meq/L)	0		Nitrite		0
HCO^{-1}_3 (meq/L)	0.5		Ammonia		1.11
Cl^- (meq/L)	0. 95		Organic matter(mg O_2/L)		0.32

When the values given in Table IV.7 are compared with Water Pollution Control Regulation (31 December 2004 dated, No:25687) and the Quality Criteria of the Continental Water Sources Classes, the sodium, chloride and sulphate concentrations of the well that is located in Ivrindi District, are at Class III groundwater class. Consequently the usage place of this water would be determined by the refining level in economic, technological and health aspects. On the other hand it can be said that this source is at the very high level salinity, low sodium water class by taking pH, electrical conductivity, sodium adsorption rate (SAR) and sodium percentage into consideration. This type of water could be used for irrigation in case of ensuring special conditions like permeable soil, sufficient drainage, irrigation amply to ensure a complete washing and selecting plants very resistant to salt.

Table IV.8. The Water Quality Measurement Results of 28545 Numbered DSI Well Opened At Manisa Province in 1981

Well No	Location	Depth (m)	Static level (m)	Dynamic level (m)	Output (L/sn)
28545	Soma District	130	9.08	11.59	60.24
Water chemistry					
PH	7.7	SO^{-2}_4 (meq/L)	0.15		
$EC \times 10^6$ (µmhos/cm)	705	%Na	31.034		
Na^{+1}(meq/L)	2.18	SAR	1.378		
K^{+1}(meq/L)	0.07	Hardness (Fs°)	25		
Ca^{+2}(meq/L)	2.4	Fe (mg/L)	-		
Mg^{+2}(meq/L)	2.6	Boron (mg/L)	0.15		
CO_3^{-2} (meq/L)	0	Nitrite nitrogen (mg/L)	0		
HCO^{-1}_3 (meq/L)	6.1	Ammonium nitrogen (mg/L)	0		
Cl^- (meq/L)	1	Organic matter (mg O_2/L)	0.8		

When the values given in Table IV.8 are compared with Water Pollution Control Regulation (31 December 2004 dated, No:25687) and the Quality Criteria of the Continental Water Sources Classes, the chloride concentration of the well discussed are at Class II groundwater class and the other criteria are at the Class I groundwater class. Consequently as stated before, by refining the excess amount of chlorine and the refining techniques, which would ensure the required oxygen, the water could be used as drinking water and in food industry. On the other hand it can be said that this source is at the medium level salinity, low sodium water class by taking pH, electrical conductivity, sodium adsorption rate (SAR) and sodium percentage into consideration. Consequently this source could be used for irrigation all types of plants without performing special studies for salinity control at the areas, which have medium drainage.

The total of $Ca+^2$ and $Mg+^2$ values given in the tables is equal to the overall hardness and the total of the carbonate (CO_3^{-2}) and bicarbonate (HCO^{-1}_3) ions is equal to the overall alkalinity. In case the hardness is larger than the total of carbonate and bicarbonate alkalinities, the equivalence part of the hardness to the total alkalinity is called as "Carbonate hardness" and the rest is called as "NonCarbonate hardness". If the hardness is less than or equal to the total of bicarbonate and carbonate alkalinities, all hardness would be carbonate hardness and there would be no noncarbonate hardness. Carbonate hardness is called as temporary hardness at the same time. The reason of this is that the sediment that

What does this have to do w. a TL?

is formed after evaporation, contains ($CaCO_3$) essentially and it could be removed by using acid. In the perpetual (permanent) hardness, which is the difference between the total hardness and the carbonate hardness, the sediment that is formed after evaporation, can not be removed by using acid.

At the wells, which are located at Biga, Can, Balya and Soma Districts, the total hardness is less than the total alkalinity. Consequently the hardness of the wells is the carbonate hardness (Carbonate hardness = Total hardness) and this hardness can be removed by using acid. At the well that is located at Ivrindi District, the total hardness is larger than the total alkalinity and for this reason 91% of the total hardness is formed by permanent hardness (Carbonate hardness = Total alkalinity). This type of hardness can not be removed by using acid, softening techniques should be used. The water that has hardness >300 mg/L $CaCO_3$, is classified as very hard water, the water that has 150 mg/L $CaCO_3$< hardness <300 mg/L $CaCO_3$, is classified as hard water, the water that has hardness 50-150 mg/L $CaCO_3$, is classified as medium hard water and the water that has hardness <50 mg/L $CaCO_3$, is classified as soft water. According to this classification, the water of the wells, which are located at Biga, Balya Ivridi and Soma Districts, are in the hard water class and the water of the well, which is located in Can District, is in the very hard water class. Using hard waters at home causes more soap and cleaning products consumption. Hard waters causes soap sediments, which are very hard to clean, at the places they touch. Besides, electrical and fuel consumption increases because of the calcination. The hard water should be soften before using for drinking and at home (Reynolds, 1997).

According to Turkish Geothermal Inventory, which was prepared by General Directorate of Mineral Exploration and Research (MTA) in 1996, only at Can District geothermal sources exist at the portion of the project route that passes through Canakkale Province. The three geothermal areas originate from three different sources. In Balikesir Province, out of the districts that are on the project route, one source is present at only Balya District. This source is used as thermal spring and for heating the thermal spring plant. The inventory of the sources discussed can be seen in Table IV.9 (MTA, 1996).

Table IV.9. The Geothermal Energy Sources of the Districts of Canakkale and Balikesir Provinces Located on the Project Route

		SOURCE				
Geothermal Area Name	**Thermal Water Source Name**	**Temperature (°C)**	**Output (lt/sn.)**	**Potantial (MWt)**	**Usage Area**	**Plant**
Canakkale Province						
CAN	Can	40	-	-	At the thermal spring and heating the thermal spring plant and the city partially	Thermal Spring
CAN-KIRKGECIT	Kirkgecit	60	5	0,52	At the thermal spring and heating the thermal spring plant	-
CAN-ETILI-TEPEKOY	Etili-Tepekoy	30-52	2,8	0,20	At the thermal spring and heating the thermal spring plant	-
Balikesir Province						
BALYA-ILICA (SAMLI)	Pools and Sand Baths	56-60	3.3	0.35	At the thermal spring and heating the thermal spring plant	Thermal Spring

IV.2.4. The Hydrological Properties, Existing and Planned Use of Surface Water Sources (Drinking, usage, irrigation water, electricity generation, dam, lake, pond, production of water products, water way transportation plants, water and/or coast usage for turism, sports etc, other uses)

There are small and large surface waters, which cut the route or flow parallel, at some points in the project area and its close vicinity. The names of these surface waters, the location, where they cut the route, and the intervals that they flow parallel, are given in Table IV.10.

Table IV.10. The Surface Waters Located At The Project Area

The Name of The Surface Water	Km that The Surface Water Cuts The Line	The Km and The Direction that The Surface Water Flows Parallel
Soguksu Stream (dried stream)	Km 02+250	-
Salihkahve Stream	Km 03+925	-
Dutluk Stream	-	Km 2+000 - Km 5+000
Kemer Creek	-	Km 5+800 - Km 7+000
Kocabogaz Stream	Km 09+750	9+800 - 12+000,east
Baglik Stream	Km 13+375	-
Koca Creek	Km 24+300, Km 76+550 Km 92+875 and Km 106+325	-
Canbogazi Stream	Km 25+250	Km 25+250 - Km 29+000, west
Tekke Stream (dried stream)	Km 31+200	-
Kavak Stream (dried stream)	Km 33+400	-
Maden Stream (dried stream)	-	Km 31+200 - Km 33+000, east
Karamislar Stream (dried stream)	Km 35+675	-
Gozem Stream (dried stream)	Km 40+000	-
Kocaburun Stream (dried stream)	Km 40+425 and Km 41+420	-
Erputluk Stream (dried stream)	Km 43+975 and Km 44+500	-
Can Creek	Km.42+750	-
Adaburun Stream	Km 47+000	-
Cukur Stream	Km 47+950	-
Kanli Stream (dried stream)	Km 50+375	-
Karaaydin Stream	Km 56+425	Km 56+425 - Km 58+200, north
Akpinar Stream	-	~ Km 60+000
Kizik Stream (dried stream)	Km 61+400	-
Sarp Stream (dried stream)	Km 62+500	-
Bicki Stream (dried stream)	Km 68+750	-
Kurt Stream (dried stream)	Km 69+400	-
Ufak Stream (dried stream)	Km 69+425	-
Ayval Stream (dried stream)	Km 73+750	-
Patlak Stream (dried stream)	Km 77+500	-
Sirma Stream (dried stream)	Km 77+100	-
Yalama Stream (dried stream)	Km 83+750	-
Salman Stream (dried stream)	Km 84+500	-
Doseme Stream (dried stream)	Km 88+750	-
Katman Stream (dried stream)	Km 89+400	-
Olucak Stream (dried stream)	-	~ Km 81+000
Camdere Stream (dried stream)	-	~ Km 81+000
Camtarla Stream (dried stream)	Km 94+675	-
Comren Stream (dried stream)	Km 95+300	-
Gumuslu Stream (dried stream)	Km 96+300	-
Gurgen Stream (dried stream)	Km 98+125	-
Camdere Stream (dried stream)	Km 100+450	-
Armutlubogazi Stream (dried stream)	Km 104+000	-
Akyar Stream (dried stream)	Km 107+300	
Kanarya Stream (dried stream)	Km 108+050	
Sarlak Stream (dried stream)	Km 110+375	
Kazakli Stream (dried stream)	Km 111+000	
Gunburdek Stream (dried stream)	Km 113+250	
Karakulak Stream (dried stream)	Km 114+650	
Cataloluk Stream	-	Km 115+000 – Km 117+000
Kovanlik Stream	-	Km 115+000 – Km 117+000
Dede Stream	Km 120+600	-

The Name of The Surface Water	Km that The Surface Water Cuts The Line	The Km and The Direction that The Surface Water Flows Parallel
Kizilcikli Stream	Km 122+000	-
Citalan Stream		Km 129+500 - Km 133+000, West
İnce Stream (dried stream)	Km 133+00	-
Yagcili Dere	Km 139+800	-
Sazlik Stream (dried stream)	Km 145+000	
Pinarcik Stream		Km 145+000 - Km 147+000
Kumkoy Stream		Km 145+800 - Km 147+250
Yenipinar Stream (dried stream)	Km 154+250	-
Havizli Stream (dried stream)	Km 154+750	-

The most important river of Soma Basin is Bakircay that flows from east to west. Bakir Creek enters into the 5 km survey corridor at Km 156+000 at the west side and passes through Soma District Center. It passes 1 Km at the southwest of the route and leaves the survey corridor. There are a lot of creeks, which combine to this river from north and south. One of the most important of these is Yagcili Creek. Sevisler Dam, which started to operate in 1981 on Yagcili Creek, is one of the dams, which are used for drinking water. Savastepe Dam is an other dam that is near to the project area. The dam, which has a distance of 3-3,5 km to the route, is one of the three dam lakes of the province.

Kocacay comes out from the Madra mountain, combines with Dadalar Creek at Gungormez location and flows to Manyas Lake. The flow of the creek is irregular, it increases in winters due to the rainfalls and it decreases in summers or dries completely. The 28 year average flow of this creek that was measured by EIE, is 132 m^3/s and the total drainage area of the creek is 21,611 km^2 (EIE, 1996). The Kocacay forms the fertile İvrindi Plain by widening its valley at the lower regions of Madra Mountain. The Kocacay Delta is formed at the point, where the Kocacay flows to the Sea of Marmara. Kocacay Delta has historical, regional wetland properties; it has an important property due to its forests, rich fish flora and lodging to thousands of local and migratory birds. The area that is under protection of the Ramsar Aggrement, is the reproduction basin of the oceanic snake fishes. The Dalyan and Poyraz Lakes, which are sustained by Kocacay that has a total area of 194 hectare at the west side of the delta and formed by the combination of Susurluk Creek, Karadere that is the discharge of Manyas Lake, the discharge of Ulubat Lake and Nilufer Creek, has 600 hectare reed-beds, the 730 hectare forests, formed by common ashes, common alders and willows, and a sand-dune zone that has a very composite flora. At the east side of the delta there are Arapciftligi Lake, agricultural areas, fruiting gardens, sand-dunes, reed-beds and mud plains covered with sea cherry-beans and tamarisk (www.tbmm.gov.tr).

IV.2.5. Minerals and Fossil Fuel Sources

According to the Turkish Geothermal Inventory that was prepared by General Directorate of Mineral Exploration and Research in 1996, the important minerals of the three provinces located on the route and their locations can be seen in Table IV.11.

Table IV.11. The Mineral Deposits in Canakkale, Balikesir and Manisa Provinces and Their Locations (MTA, 1996)

DEPOSITS	SYMBOL	CANAKKALE	BALIKESIR	MANISA
GOLD	(Au)	• Akbaba Site • Sahinli Site • Kartaldag Site	• Havran Bed • Kepsut-Beykoy Site	• Salihli-Sart Bed • Salihli-Bozdag Bed
ANTIMONY	(Sb)	–	• Erdek-Tatlisu Site • Ivrindi-Gozlucayir, Yaylakiran, Korucu Site • Kucukyenice	
ASBESTOS	(Asb)	• Dombaycilar Qrt (Alakeci), Biga (Cakirli, Degirmencik), Kizilviran, Cakirli Beds	–	• Salihli (Hacihidir) Site
COPPER-LEAD-ZINC	(Cu-Pb-Zn)	• Biga-Maden, Sarkat river bed • Yenice-Culfa, Alan Dere, Kurttasi, Kalkim, Arapucan Site • Bayramic-Kustepe Site • Can, Lapseki-Dogancilar, Degirmendere, Kundakcilar Sites	• Ayvalik-Maden Island (Pindos Island) copper-lead-zinc site • Dursunbey-Gugu-Demirboku Ridge copper-lead-zinc site • Dursunbey-Kulat Farm copper-lead-zinc site • Edremit-Altinoluk lead-zinc-pyrite Site • Havran-Kozcagiz (Fazlica) copper-lead-pyrite-zinc site • Balya Mine (Ari Ortamagra-Sarisu-Hastane Hill) copper-lead-zinc site	• Selendi-Rahmanlar Village
BORON	(B)		• Bigadic Bed	
BARİTE	(Ba)	• Lapseki - Kurudere Site	–	
BENTONiTE	(Ben)	• Bayramic (İckursunlu) Site	–	
MERCURY	(Hg)	–	• Gonen-Sarikoy Site • Savastepe-Sogucak Site	• Alasehir-Kozluca, Bahcedere Site
CEMENT RAW MAT.		• Gelibolu Site	–	• Alasehir and Soma Site
IRON	(Fe)	• Yenice-Camova Site • Bayramic-Kuscayiri Site	• Havran-Eymir Bed • Ayvalik-Ayazmant Bed • Samli Bed • Edremit-Yasyer Site	
GYPS		–	• Susurluk Site	–
GRAPHITE	(Grf)	• CanakkaleRegion Biga-Yuvalar Bed	–	–
SILVER	(Ag)	• Kartaldag-Kirazli Bed	–	–
DYSTENE	(Dis)	–	–	• Manisa-Demirci Site
FELDSPAT	(Fld)	–	–	• Manisa Province - Demirci
PHOSPHATE	(P)	–	–	• Demirci-Ragillar, Kale Tepe Site
KAOLIN	(Kao)	• Can-Yayakoy, Bahadirli, Akpinar Site. • Catlikara-Tasagil T. Site • Catlikara-Amanca, Karatepe • Bayramic-Sogutgedigi Site • Bayramic-Karaibrahimler Cam T.	• Sindirgi-Duvertepe Site • Sindirgi-Mumcu Site • Ivrindi-Kucukyenicekoy Site • Gonen-Ilicaoba, Sogut Koyu Site • Ayvalik-Alibeytepe, 69 Rakimli Hill, Kucuk Koy Direnli Hill Site	• Gordes (Gunesli, Doganpinar, Kobaklar)

Table IV.11. The Mineral Deposits in Canakkale, Balikesir and Manisa Provinces and Their Locations (MTA, 1996)

DEPOSITS	SYMBOL	CANAKKALE	BALIKESIR	MANISA
CLAY		• Yenice-Yariskoy, Candere Site • Camyagankoy Site • Bayramic-Amancakopektasi Site	• Balya-Bengiler Site • Balya-Koyuneri Site • Gonen-Sebepli Eriklialan Site	
LIMESTONE	(Lms)	–	• Bandirma-Mamun Village	–
CHROME	(Cr)		• Dursunbey (Durubeyler, Cakirca Village, Catalcam)	
SULPHUR	(S)		• Taskoy, Gonen (Alacaoluk, Findikli, Gaybular Koyu), Kobaklar ve Musluk Villages	
QUARTZ	(Q)	• Ezine-Ahlatoba, Camlica, Gokceici, Kemerdere Site	–	
SAND-GRAVEL		–	–	• Akhisar-Gokceahmet, Dingiller Village Site • Akhisar-Golmarmara-Gordes River • Gordes-Samanlik Creek Site
SULPHUR	(S)			• Manisa-Demirci-Irisler Site
MANGANESE	(Mn)	• Can, Kumarlar Site • Lapseki-ilyasli Site	• Bigadic-Turfullar Site • Edremit-Sahviren Site • Dursunbey-Karaagac and Gokcedag Sites	• Muradiye (Sumbuller, Maltepe), Kula (Papuclu)
MAGNESITE	(Mag)	• İntepe (Karantina Village)	• Dursunbey-Camharman, Sarimsak Village	• Saruhanli-Heybeli Site
MARBLE	(Mr)	• Ezine (Bergaz, Geyikli, Tavakli) Site	• Marmara Island • Cayustu Koyu-Kumru Tuyu • Manyas-Kocoglu Koyu-Manyas • Ayvalik-Bagyuzu Koyu-Ayvalik Granite • Bigadic-Cayustu Koyu-Balikesir Onyx Marble	• Demirci-Borlu, Saraycik Village-Demirci Onyx Marble • Gordes-Comakli Dag, Kovancili Sites
MOLYBDENUM	(Mo)	• Biga (Dikmenkoy), Yenice (Sofular, Cakiroba), Bayramic (Tongurlu)	• Havran (Kalabak Village) Site	
NİCKEL	(Ni)	–	–	• Turgutlu-Caldag Site
WOLFRAMITE	(W)	• Yenice (Hamdibey Koy, Adapires, Kireclik Creek, Cakiroba)		–
PERLİTE	(Per)	–	• Balikesir-Savastepe-Guvemkoy • Balikesir-Sindirgi-Gozorenkoy Site	–
PYROPHYLLİTE	(Prf)	–	–	• Demirci-Usumus Site
TALC	(Talc)	–	• Near Kepsut-Orenli, Serceoren, Yaylabasi talc beds inside Paleozoic aged metamorphic schists	
TİTANIUM	(Ti)	–	–	• Demirci-Kulalar Site • Gordes-Salur Site • Sart-Mersindere Site • Esme-Umurbab Site
BRICK-TILE		• Sutluce ve Yenikoy Site	–	• Salihli, Turgutlu, Alasehir and Hacilar Site
URANIUM	(U)	• Ayvacik-Kucukkuyu Sites	–	• Salihli-Koprubasi Site

Table IV.11. The Mineral Deposits in Canakkale, Balikesir and Manisa Provinces and Their Locations (MTA, 1996)

DEPOSITS	SYMBOL	CANAKKALE	BALIKESIR	MANISA
WOLFRAMITE	(W)	-	• Havran-Kalabak Koyu	-
WOLLASTONITE	(Wo)	-	• Susurluk-Yaylacayir Koyu Site • Kepsut-Serceoren Koyu Site	-
ZEOLİTE	(Zeo)	-	-	• Gordes-Arkatli Damlari, Gunesli, Evciler, Findicak, Kirankoy, Olduk, – Kusluk, Akdere Sites
EMERY		-	-	• Akhisar-Akcaalan Site
LIGNITE		• Can, Can, Yenice Orencik, Karlikoy, Cirpilar	• 4 mine sites in Dursunbey	• 11 mine sites in Soma District • Akcaavlu Dualar • Gordes Citak

IV.2.6. The Properties and the Usage Conditions of the Soil (The use capability classification of the soil, erosion, pasture, meadow, the existing usage conditions of the oil etc.)

The field usage conditions and the soil properties of the project route are determined according to the Land Use Maps of KHGM dated 1998, 1999. The determined field usage and soil property groups are presented in Table IV.12. According to Table IV.12, agricultural areas, forests, and the nonagricultural areas like heathlands, pastures, population centers and water surfaces, are the basic field usage types.

On the route the basic field usage is agriculture. The share of agriculture in the existing field usage is 49.84%. Along the project route it is seen that the field usage capability of the agricultural areas, at which the nonirrigated and irrigated agriculture are performed, the vineyards and the olive groves are I, II, III, IV, VI and VII generally. As it is known, there are eight - field usage capability classes and soil damages and classifications increase from Class I to Class VIII. The first four classes has the ability to grow up well the culture plants and meadow-pasture plants by a well soil control. At the other classes growing needs more work and even at VIII. class fields in spite of taking products with effective and expensive improvement works, the products taken can not meet the investments. It is seen that the irrigated agriculture is performed at the fields, those have Class I and II usage capability, and the nonirrigated agriculture is performed at all types of usage capability. The olive groves are present at III. class agricultural soils, but the vineyards are seen at the fields, those have Class I and Class IV usage capability. At the 5 km corridor that is defined as survey corridor, in general the defined uses of the fields are irrigated agriculture at the alluvial soil. The big soil groups present at the region can be seen in Table IV.12 in more detail. These are noncalcareous brown forest soil, noncalcareous brown soil, red mediterranean soil, brown forest soil and red brown mediterranean soil (KHGM, 1999 /a/b/c) .

As it is seen in Figure IV.15 the percentages of the shrubberies, forests, pastures, agricultural areas, settlement, surface water and the undefined areas in the 5 km survey area at the right and left of the route, are 22.13%, 18.22%, 3.79%, 49.84%, 3.33%, 0.65% and 2.03% respectively. The Map of the land use capability classes of the project route discussed and the current land use is given in Appendix B.

All of the 50 m construction corridor, in which the construction works would be performed, would not be adversely effected during construction. The most important effect is expected at the projection of the tower feet. The works performed in the regions, which have high erosion risk, could increase the erosion class or erosion rate. For this reason after the construction works, the 50 m corridor would be taken to its former condition to prevent the increase in erosion rate. There would be compress on the soil due to the machinery and people loads at the areas that have empty soil surface without vegetation. At this type of areas the soil would be loosen and would be left in a porous structure. This loosening works would be performed perpendiular to the slope of the area. By this way the absorption of the surface water by the soil more easily would be ensured, the surface flow speed would decrease and the sediment transportation would slow down. Besides, the erosion precautions, which would be taken in the areas that the service roads would be constructed, is given in Chapter V.1.4.

I think they are doy something to keep the soil porous after it has been compressed duy const – to maintain original so as not to increase runoff – not here[47] they are doing this is not explained?

Table IV.12. Land Use Characteristics and Main Soil Groups in the Project Area (KHGM, 1998, 1999)

Current Land Use	Soil Capability Class	Main Soil Groups	Risks	Total Area (ha)	%
Agricultural areas and vineyards					
Irrigated Agriculture	I, II	• Alluvial Soils • Colluvial Soils • Brown Forest soil without lime	• Slope and erosion • Soil insufficiency (stoney, salty and alkaline) • Poor Drainage, flood risk	2,650.19	3.24
Irrigated Agriculture (Insufficient)	I, II, IV	• Alluvial Soils • Colluvial Soils • Brown Forest soil • Vertisoles • Brown Forest soil without lime	• Slope and erosion • Soil insufficiency (stoney, salty and alkaline) • Poor Drainage, flood risk	4,201.50	5.14
Rain-fed Agriculture (without fallowing)	I, II, III, IV, VI, VII	• Alluvial Soils • Colluvial Soils • Brown Forest soil • Vertisoles • Brown Forest soil without lime • Brown soil without lime • Reddish Mediterranean soil • Reddish Brown Mediterranean soil • Rendzina • High mountain pasture soil	• Slope and erosion • Soil insufficiency (stoney, salty and alkaline)	32,030.60	39.17
Rain-fed Agriculture (with fallowing)	II, III, IV	• Rendzina • Brown Forest soil	• Slope and erosion • Soil insufficiency (stoney, salty and alkaline)	941.98	1.15
Vineyard	I,VI	• Brown Forest soil • Brown Forest soil without lime • Reddish Brown Mediterranean soil	• Slope and erosion • Soil insufficiency (stoney, salty and alkaline)	792.01	0.97
Olive grove	III	• Alluvial Soils • Rendzina	• Slope and erosion • Soil insufficiency (stoney, salty and alkaline)	142.89	0.17
Agricultural areas and vineyards (total)				**40,759.17**	**49.84**
Pastureland					
Pastureland	VI, VII	• Brown Forest soil without lime • Brown soil without lime	• Slope and erosion • Soil insufficiency (stoney, salty and alkaline)	3,096.20	3.79
Pastureland (total)				**3,096.20**	**3.79**

Tablo IV.12. Land Use Characteristics and Main Soil Groups in the Project Area (continued)

Current Land Use	Soil Capability Class	Main Soil Groups	Risks	Total Area (ha)	%
Forestry Areas					
Forest	II, III, IV, VI, VII	• Colluvial soil • Brown Forest soil without lime • Hydromorphic Alluvial soil • Brown Forest soil • Rendzina • Reddish Brown Mediterranean soil	• Slope and erosion • Soil insufficiency (stoney, salty and alkaline)	18,094.20	22.13
Shrubbery	II, III, IV, VI, VII, VIII	• Brown Forest soil without lime • Brown soil without lime • Reddish Mediterranean soil • Brown Forest soil • Reddish Brown Mediterranean soil	• Slope and erosion • Soil insufficiency (stoney, salty and alkaline)	14,898.21	18.22
Forestry Areas (total)				**32992.41**	**40.35**
Settlements					
Settlements				2724.13	3.33
Settlements (total)				**2724.13**	**3.33**
Surface water					
Sea				504.39	0.62
Reservoir				28.07	0,03
Surface water (total)				**532.46**	**0.65**
Other					
Data deficient				1,662.06	2.03
Other (total)				**1,662.06**	**2.03**
Total study area				**81,738.38**	**100.00**

Soil Capability Class:
I – II – III – IV Areas suitable for agricultural purposes (cultivated)
V - VI – VII Areas unsuitable for agricultural purposes (cultivated)
VIII Areas unsuitable for agricultural purposes

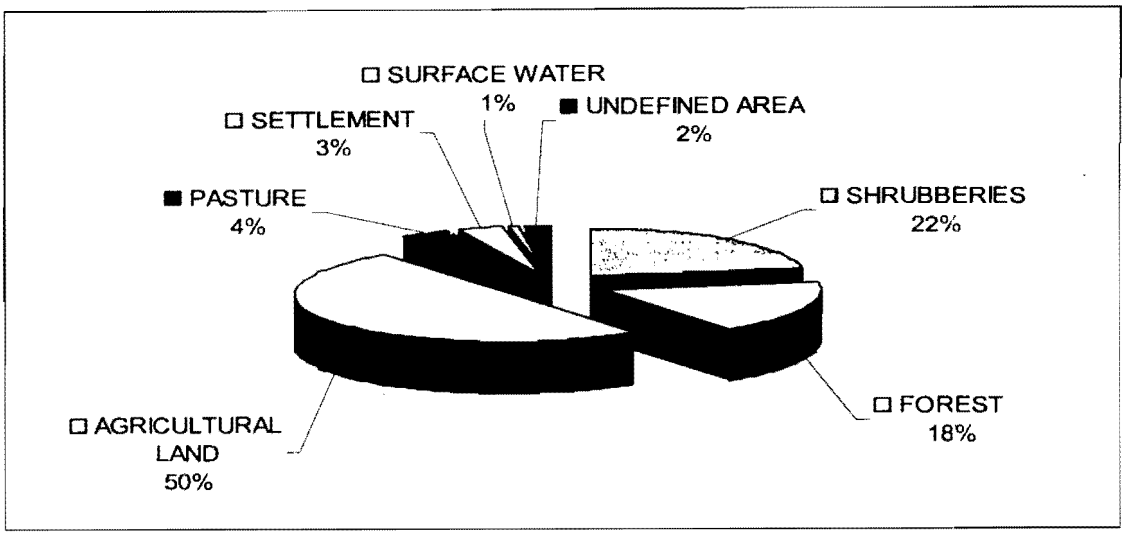


Figure IV.15. The Land Use Along The Project Route

IV.2.7. Agricultural Areas (Agricultural development project areas, special product plantation areas, the size of the irrigated and nonirrigated agricultural areas, product designs and the annual production amounts)

Balikesir, Canakkale, and Manisa Provinces that the route passes from are the most important provinces of Turkey due to their agricultural production potentials. The different climate types, which are seen in Balikesir Province, and the high quality soil in agricultural aspects make it possible to produce a lot of products like fruits, vegetables, citrus fruits, olive, tobacco, cotton, leguminosae and sunflower (KHGM, 1999/a). The suitability of the climatic and edaphic conditions of Balikesir cause producing different products in different seasons. Agriculture is the basic economic activity in Canakkale Province. Like Balikesir Provice, the variety of the products is the most important property of the agriculture in Canakkale. Different products like leguminosae, cereals, sunflower, fruit, vegetable, vineyard and tobacco are produced (KHGM, 1999/b). The agriculture of Manisa has importance in Turkish agriculture. The seedless dry grape, tobacco, cotton, olive and cherry are the most important products produced in the province. At the same time these products have important exportation values (http://manisa.meb.gov.tr/).

The Maps of the land use capability classes and the current land use of the project route is given in Appendix B. The percentages of the heathlands, forests, pastures, agricultural areas, population centers, water surfaces and the undefined areas at the 5 km survey area at the right and left of the route, are 22.13%, 18.22%, 3.79%, 49.84%, 3.33%, 0.65% and 2.03% respectively.

At the agricultural areas on the route, irrigated agriculture, agriculture with insufficient irrigation, without fallowing nonirrigated agriculture and nonirrigated agriculture with fallow are performed and there are vineyards and olive groves. The percentages of agricultural areas on the route is presented in Figure IV.16.

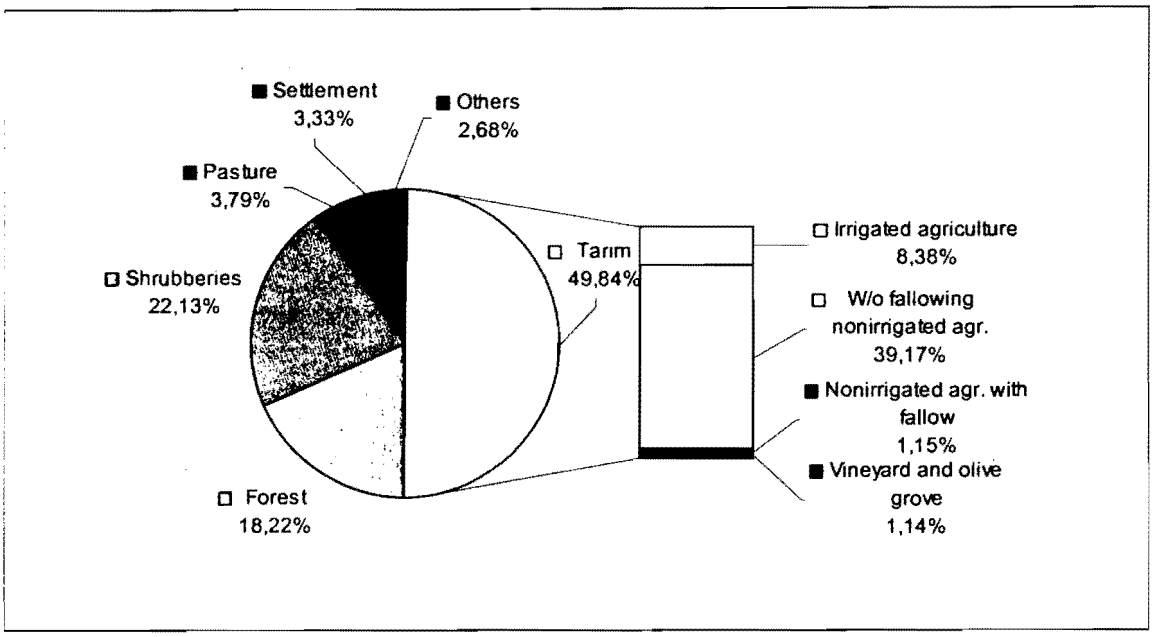


Figure IV.16. The Land Use and the Agricultural Areas at the Project Route and Its Close Vicinity

As it can be seen in Table IV.12 given in Chapter IV.2.6, the irrigated agricultural areas in the the project route and its close vicinity are Class I, II and IV agricultural fields. The nonirrigated agricultural areas near the route are Class I, II, IV, VI and VII agricultural fields. Olive groves are at III. class agricultural fields and vineyards are at Class I and IV agricultural fields. At these areas erosion probem and soil insufficiency exist in general.

The annual production amounts of the basic agricultural products, produced in the provices which are located on the project route, are given in Table IV.13 for Balikesir Province, Balya, Ivrindi, Savastepe Districts and Manisa Province, Soma District and in Table IV.14 for Canakkale Province, Biga, Can and Yenice Districts.

Table IV.13. The Annual Production Amounts of The Basic Agricultural Products Produced At Balikesir Province, Balya, Ivrindi, Savastepe Districts and Manisa Province, Soma District (DIE, 2003)

Product Type	Product Name	Balikesir			Manisa
		Balya Production (tons/year)	Ivrindi Production (tons/ year)	Savastepe Production (tons/ year)	Soma Production (tons/ year)
Grains	Wheat	20,811	26,631	10,598	12,348
	Barley	10,360	8,057	635	37,88
	Rye	140	1,261	196	95
	Oats	230	1,534	36	97
	Maize (dry)	208	482	91	499
Oily Seed	Sesame	51	63	7	20
	Cotton seed	-	-	-	464
	Sunflower	102	80	69	-
Leguminous	Broad Beans	124	2561	541	832
	Chickpea	372	2978	715	819
	Bean (dry)	207	73	592	165
	Lentil (green)	-	24	60	-
	Peas	-	15	-	-
Fodder Plants	Clover	267	41	89	121
	Sainfoin	305	3	-	14
	Maize	-	7,033	98	-
	Fodder Beat	223	330	412	429
Fruit	Pear	100	151	82	66
	Quince	20	67	13	41
	Apple	300	130	80	88
	Plum	80	165	76	31
	Oleaster	2	7	-	18
	Apricot	2	12	2	28
	Cherry	7	22	16	37
	Cornelian Cherry	9	6	-	-
	Peach	10	20	14	23
	Sour Cherry	2	3	15	12
	Pistacio Nut	7	4	21	2
	Walnut	130	105	28	39
	Almond	40	13	18	31
	Chestnut	40	1,631	-	-
	Mulberry	6	28	-	70
	Fig	3	9	18	45
	Pomegranate	-	-	13	18
	Grape	1,800	320	300	492
	Grape (seedless)	200	9	-	60
	Olive	-	-	1,710	11,922
Lumped Plants	Onion (dry)	2,000	2000	3,000	504
	Garlic (dry)	375	300	400	40
	Potatoes	201	301	-	-

Table IV.13. The Annual Production Amounts of The Basic Agricultural Products Produced At Balikesir Province, Balya, Ivrindi, Savastepe Districts and Manisa Province, Soma District (DIE, 2003) (Continued)

Product Type	Product Name	Balikesir			Manisa
		Balya Production (tons/year)	Ivrindi Production (tons/ year)	Savastepe Production (tons/ year)	Soma Production (tons/ year)
Vegetables	Cabbages	150	375	195	101
	Celery	-	-	-	90
	Lettuce	25	7	133	160
	Spinach	50	450	70	140
	Leeks	-	-	150	150
	Parsley	80	600	-	-
	Green beans	50	120	450	74
	Green broad beans	8	-		-
	Kidney bean	2	48	38	72
	Pea	-	-	-	44
	Cow pea	2	80	32	91
	Okra	2	48	18	51
	Pumpkin	100	600	64	154
	Melon	1200	2750	2400	13,634
	Water melon	1500	2750	2100	2,640
	Squash	120	80	40	-
	Cucumber	365	702	238	140
	Egg plant	90	325	280	120
	Tomatoes	2500	30,000	22,000	22,000
	Sweet Pepper	10	400	44	374
	Green Pepper	350	6,230	495	834
	Garlic (Green)	5	-	-	-
	Onion (Green)	15	15	100	84
	Cauliflower	-	120	110	70
	Radish	25	-	-	125

Table IV.14. The Annual Production Amounts of the Basic Agricultural Products Produced At Canakkale Province, Biga, Can and Yenice Districts (DIE, 2003)

Product Type	Product Name	Canakkale		
		Biga Production (ton/year)	Can Production (ton/year)	Yenice Production (ton/ year)
Grains	Wheat	94,422	22,286	24,858
	Barley	12,432	3,955	4,623
	Rye	84	518	21
	Oats	6,390	5,623	4,920
	Maize (dry)	8,000	229	50
	Rice	8,786	-	-
Oily Seed	Sesame	16	32	-
	Sunflower	3,897	2	-
Leguminous	Okra	277	136	133
	Chickpea	596	274	28
	Beans (dry)	642	260	395
	Fodder beet (grain)	18	-	854
Fodder Plants	Clover	2,670	347	-
	Fodder beet	721	192	9,612
Fruit	Pear	495	417	48
	Quince	62	186	26
	Apple	383	296	226
	Plum	342	593	25
	Medlar	20	14	6
	Apricot	22	-	-
	Cherry	170	56	133
	Cornelian Cherry	10	-	12
	Peach	110	85	64
	Sour cherry	18	10	21
	Pistacio nut	1	-	12
	Walnut	240	98	53
	Almond	24	43	-
	Chestnut	10	-	60
	Mulberry	25	63	37
	Fig	30	38	-
	Pomegranate	3	-	-
	Nut	-	4	-
	Grape	1,800	494	1,768
	Strawberry	-	-	3
	Olive	466	-	-
Lumped Plants	Onion (dry)	1,500	405	-
	Garlic (dry)	350	-	-
	Potatoes	1,005	760	578
	Animal Beet	8,026	-	-

Table IV.14. The Annual Production Amounts of the Basic Agricultural Products Produced At Canakkale Province, Biga, Can and Yenice Districts (DIE, 2003) (Continued)

Product Type	Product Name	Canakkale		
		Biga Production (tons/year)	Can Production (tons/year)	Yenice Production (tons/ year)
Vegetable	Cabbages	375	380	215
	Sugar Beet	4,364	-	-
	Lettuce	324	104	50
	Spinach	350	75	200
	Leeks	100	225	700
	Parsley	30	-	-
	Green beans	700	375	300
	Broad bean	130	-	5
	Kidney bean	-	-	76
	Pea	60	80	-
	Cow pea	12	92	30
	Okra	50	54	-
	Pumpkin	150	-	650
	Melon	3,000	374	300
	Water melon	5,000	3,150	2,000
	Squash	600	156	-
	Cucumber	915	1,040	1,321
	Egg plant	250	583	262
	Tomatoes	100,000	13,750	40,000
	Sweet Peppers	200	187	100
	Green Peppers	8,000	10,500	25,000
	Garlic (Green)	60	-	195
	Onion (Green)	160	-	-
	Cauliflower	200	-	-
	Carrot	100	75	-
	Radish	180	-	-

Balikesir Province produces 14.46% of the Turkish olive production. Balikesir has a share of 7.93% in cauliflower and asparagus production. Ivrindi District has a share of 31% in walnut, hazelnut and chestnut that are in the hard corticated fruit category, production and has a share of 15% in leguminous production of the province.

Canakkale Province produces 1.270% of the Turkish grain production. Biga District, Can District and Yenice District have percentages of 33.5%, 8.4% and 8.8% in the grain production of Canakkale Province, respectively. In stone seed fruit production it meets 6.29% of Turkey. Besides, it has a share of 5.87% in olive-growing in Turkey. Biga District has an important share in onion, garlic and potatoes production of Canakkale Province. This share is about 60% of the production of the province. Besides the district meets the 20% of the production of the vegetables, whose fruits are eated, in Canakkale Province.

30% of grape production of Turkey is performed in Manisa Province. Its share in olive production of Turkey is about 14%. It share in asparagus and cauliflower is 9.12% in the country. Besides, it meets 15% of the cotton production of the country.

IV.2.8. Protection Areas (National parks, natural parks, wetlands, natural monuments, protection areas, wild life protection sites, biogenetic reserve areas, biosfer reserves, natural sites and monuments, archeological, historical and cultural sites, specially protected areas, special protection areas, tourism areas and centers, areas in the coverage of pasture law)

Along the route and the 5 km survey corridor, there is not any area that is related to 2873 numbered National Parks Law and the article of "National Parks", "Natural Parks", "Natural Monuments" and "Nature Protection Areas". But the National Parks, Natural Parks and Nature Protection Areas determined in Balikesir, Canakkale and Manisa Provinces are listed in Table IV.15.

Table IV.15. The National Parks, Natural Parks and Nature Protection Areas Located in Balikesir, Canakkale and Manisa Provinces

	National Park	Natural Park	Nature Protection Area
Balikesir	Kazdagi National Park	Ayvalik Islands Natural Park	Gurgen Mountain Nature Protection Area
	Kuscenneti National Park		
Canakkale	Gelibolu Historical National Park		
	Troya Historical National Park		
Manisa	Spil Mountain National Park		

Manisa-Soma Sifadag Wild Life Protection Site is located inside the 5 km survey area of the route and the most important species located in the area is "roe-deer". The area starts from Yagcili Town at the north and continues towards south to the hillsides of Dededagi Hill and Daztepe. There is a Wild Life Protection Site at Balikesir Province, Savastepe District, Saribeyler Town, Doleciktepe Location. At the same time this area is determined as the area in which hunting is forbidden for 2004-2005 by Central Hunting Commission (http://195.142.144.2/dmp/sube/KorunanAlan/YHGS.htm).

The other Wild Life Protection Sites , which are near to the route or the survey corridor, are; the areas the Balikesir province boundary following the Sogutcuk-Belen village road in Manisa Province, Soma District at the north and at the south from the Uzunahir Village to the highway that connects the Akcaavlu, Dualar village roads to Soma District; and the areas those cover Kumegrek, Celebi Cay and Gurgan mountain series located at Canakkale Bayramic and Katrandag and Babadag series of Karakoy, Cirpilar and Evciler regions of Bayramic Directorate of Forestry Management. This area ends at the south of Hatunkoy village boundary, which is located in the survey corridor (http://195.142.144.2/dmp/sube /KorunanAlan/YHYS.htm).

The areas, at which hunting is forbidden by Central Hunting Commission, are the area between Cihadiye and Geredeli Villages at Biga District, the area between Cakilkoy and Zeybekcayiri Villages at Can District and the area between Namazgah and Hidirlar Villages at Yenice District in Canakkale Province.

There is not any Wild Life Protection Site, Wild Life Development Area or an area, at which hunting is forbidden by Central Hunting Commission, in the survey corridor in Balikesir Province.

In addition to these, along the 5 km survey area of the project, there is not any area, which is determined under the the title of "Specially Protected Areas" of No.2872 Environment Law (http://195.142.144.2/dmp/sube/KorunanAlan/YHGS.htm, 2004).

According to No.2863 Cultural and Natural Assets Protection Law, within the coverage of "Cultural Assets", "Natural Assets", "Site" and "Protection Areas" titles, there is an ancient population center, which is a 1st Degree Archeological Site, at Km 58+000 at Canakkale Province, Yenice District, Davutkoy in the impact area of the project and Kaletepe, which is a 1st Degree Natural and Archeological Site, at Km 53+000, where the line passes through, at Yenice District, Calkoy. In addition to these, UyucekTepe Tumulus that is declared as an archeological site, is located between Km 139+000 and 140+000 beside the Yagcili Creek at Manisa Province, Soma District. The detailed information about the cultural asset is given in Cultural Inventory in Table IV.16 as stated above (T.C. TKB, 2004), (www.kulturturizm.gov.tr, 2004).

Savastepe Dam is the nearest dam to the project area and the project line is not in the boundaries of The Unconditional Protection, Short Distance or Medium Distance Protection Areas, which are defined at the 17. Article of Water Pollution Control Regulation (31 December 2004 dated, No:25687), of the dam. But some part of the line enters into The Long Distance Protection Area boundaries.

In addition, at the pasture areas located inside the survey corridor of the project route, within the coverage of the energy transmission line project a change in the allocation purpose would be performed by TEIAS according to the 14. article of 4342 numbered Pasture Law.

The survey of the areas, those have importance in scientific studies and/or are the living environment of the species, which are in danger or could be in danger, and the endemic species of our country, continue. Within the coverage of EIA, detailed information about the species around the project area and their danger status would be given.

Table IV.16. Cultural Inventory (Ministry of Culture and Tourism, General Directorate of Cultural Assets and Museums, 2004)

Province-District	Name	Address	Group	Type	km	Direction	Dist. (km)
Canakkale-Biga	Agakoy Graveyard	In the borders of Agakoy and Pekmezli Villages	Archeological Site	Graveyard	19	E	3
Canakkale-Biga	1st Degree Archeological Site	Bakacak Village	Archeological Site	Archeological Site	26	W	2.75
Canakkale-Can	Ancient Settlement 1st Degree Natural and Archeological Site	Altikulac Village	Other	Ancient city - Natural and Archeological Site	38	E	2
Canakkale-Can	Fortress and Vicinity 1st Degree Natural and Archeological Site	Comakli Village	Other	Natural and Archeological Site	43	E	2.70
Canakkale-Can	Ancient Settlement 1st Degree Natural and Archeological Site	Comakli Village, Above Caltepe-Dedetepe	Other	Natural and Archeological Site	45	E	3.25
Canakkale-Yenice	Ancient Settlement 1st Degree Archeological Site	Davutkoy	Archeological Site	Settlement	58	NE	0.5
Canakkale-Yenice	Tumulus 1st Degree Natural and Archeological Site	Davutkoy	Other	Natural and Archeological Site	60	NE	1.70
Canakkale-Yenice	Graveyard 1st Degree Natural and Archeological Site	Davutkoy	Other	Natural and Archeological Site	60	NE	1.70
Canakkale-Yenice	Kaletepe 1st Degree Natural and Archeological Site	Calkoy	Other	Natural and Archeological Site	53	-	0
Balikesir-Ivrindi	Gomenic Fortress	Fortress site of Gomenic	Military	Fortress	106	NE	2
Balikesir-Savastepe	Incidere Mound	Savastepe	Archeological Site	Mound	133-134	E	2
Manisa-Soma	Uyucek Mound	Along Yagcili creek	Archeological Site	Mound	139-140	NW	0.1-0.2
Manisa-Soma	Urban Site	Center	Urban Site	Urban site	157	SW	2

All in the Project area ?

IV.2.9. Forest Areas (Tree types, amounts, forest type, area covered, size and closeness; their present and planned protection and/or use purposes, the field survey evaluation form taken from Regional Directorate of Forestry), the probable adverse effects to the forest areas, the definition of the mitigations which would reduce the effects, and the forest areas located on the route would be shown on the 1/25.000 scaled forest map.

When the project route and its close vicinity is evaluated according to the field uses, which are determined according to Land Use Map of the Provinceof of General Directorate of Rural Affairs, the forest area is formed by heathland and forest areas with a rate of 40.35%. 18.22% of it is determined as forest area and heathland areas have a percentage of 22.13. Mostly the oak forests form the forest cover at the 5 km survey corridor. Beside these, black pine, calabrian pine and stone pine are the fundamental species on the route. When the project route is examined, it is determined that 30.03 km, 17.63 km and 2.6 km of the line passes through forest areas in Canakkale, Balikesir and Manisa Provinces, respectively. The forest map of the project area is presented in Appendix B.

During the studies, the properties of the present forest wealth inside the 5 km survey corridor are determined by the forest maps taken from General Directorate of Forestry, The Investigation and Evaluation Forms of the EIA Report taken from Canakkale, Balikesir and Izmir Regional Directorates of Forestry and the field studies.

To be evaluated in the EIA process, The Investigation and Evaluation Form of the EIA Report was taken from Canakkale, Balikesir and Izmir Regional Directorates of Forestry. According to the information taken from Canakkale Regional Directorate of Forestry Biga, Can and Yenice Directorate of Forestry Management the forest areas at the area discussed is 243 ha. 115 ha of this is defined as forest area and the rest 128 ha is defined as nonforest area. At the forest area, which is formed by the tree types like calabrian pine, black pine, oak etc., the operation types are afforestation area, grove area, degraded bog and copse areas. The calabrian pine, degraded oak bog, oak bog, degraded calabrian pine, black pine-calabrian pine and the tree species grow up along the river are defined as the forest types of the region in the report. The forestry areas that have been assessed do not fall into a special area such as: forestry area for seed, national park, wild life habitat, game animal production area, protected forest, tourism area, specially protected area, military area, and natural/archeological site.

Acoording to The Investigation and Evaluation Form of the EIA Report, which was prepared by Balikesir Regional Directorate of Forestry, the operation types of the forest areas are bog, degraded grove and grove. Black pine, calabrian pine and oak are present in the region. The forest types are degraded black pine, degraded oak, calabrian pine, pine-degraded oak, pine-degraded black pine and oak. For the region discussed there is not any application to the Balikesir Regional Directorate of Forestry. The requested area is not a burnt area and a separated area for regeneration, which are determined at the 18. article of No.6831 Forest Law. According to the report the requested area is not inside the seed forest, national park, hunting wild life, hunting production area, turism area, special environment protection region, military forbidden region and area. It is stated by the regional directorate that the route of the energy transmission line should be clean to prevent the forest fires.

According to The Investigation and Evaluation Form of the EIA Report, which was prepared by Izmir Regional Directorate of Forestry, Akhisar Directorate of Forestry Management, Soma and Goktepe Local Directorate of Forestry Management, the tree types, mostly calabran pine and oak, are afforestation area, grove forest, degraded copse and copse areas. 271,000 m^2 of the area that was investigated by regional directorate at a width of 30 m, is defined as forest area and 283,500 m^2 of area is defined as nonforest area. An application was made by Telekom for the area discussed. It is stated that the requested area is only in the areas, those are defined as Cza symbol, in the afforestation area that is determined at the 18. article of the Forest Law (burnt area, separated area for regeneration or afforestation areas and whether in the dam basin or not). The requested area, is not inside the seed forest, national park, hunting wild life, hunting production area, protection forest, tourism area and special protected area.

According to the decision of the Regional Directorates of Forestry of the three provinces, from which the energy transmission line passes, there is not any objection in the passage of the energy transmission line.

According to the data obtained from the forest maps, the types and the properties of the trees, which are in the 217 ha forest area, inside the 50 m construction corridor of the Energy Transmission Line is shown in Table IV.17.

Table IV.17. The Tree Types, Covered Areas and Their Lengths Along The Route At The 50 m Construction Corridor

Tree Types and Properties	Covered Area (ha)	Length (Km)
Degraded oak copse	33.38	6.68
Turkish pine	70.63	14.13
Stone pine	1.63	0.33
Pine	0.88	0.18
Oak copse	20.75	4.15
Oak	6.38	1.28
Degraded oak	45.75	9.15
Pine degraded oak	23.75	4.75
Pine degraded black pine	10.75	2.15
Forest woods	6.13	1.23
Degraded black pine	6.38	1.28
Black pine Turkish pine	15.50	3.10
Black pine	25.13	5.03
Black pine oak	1.50	0.30
Degraded black pine oak	13.75	2.75
Degraded Turkish pine oak	5.00	1.00
Degraded deciduous forest	6.25	1.25
Degraded Turkish pine	2.13	0.43
Degraded deciduous trees	1.75	0.35
Rocky areas with degraded deciduous trees	4.75	0.95

As it is seen in Table IV.17, there are tree species like calabrian pine, oak, stone pine, black pine etc. inside the construction corridor. Beside this, there are also forest woods, tree groups, which are defined as degraded and copse, in the corridor. The probable effects of the line on the forest, the amount of tree that would be cut, and the precautions, which should be taken at the areas discussed are explained in Chapter V for the project discussed.

IV.2.10. Flora and Fauna (Species, endemic especially local endemic plant species, the animal species which live in nature, the species which are under protection by the national and international regulations, rare and endangered species and their living environments, the names of the hunting animals, their populations and the decisions of central hunting commission taken for them), displaying the vegetation types and the sampling areas at the project area on a map, the required protection precautions, which should be taken for the livings affected from the activities of the project (at the construction and the operation phases)

A detailed flora and fauna study was performed in the project area and its close vicinity. At the field studies a corridor that has a total width of 5 km (at the right and left of the line), along the project route that has a length of around 158 km and starts from Canakkale Province Biga District Degirmencik Village and ends at Soma Thermal Power Station (Manisa), was investigated. The fauna species were examined as mammiferous species, bird species, reptiles, amphibians and fish species separately.

Flora

The survey area covers the area, from which the 158 km electricity line passes, and covers Canakkale Provice Biga-Can-Yenice Districts, Balikesir Province Balya-Ivrindi-Savastepe Districts and Manisa Province Soma District. At the field studies performed, it is observed that the area does not have a hilly topography and the altitude changes between 100-600 m along the line. Along the line at some places maquis vegetation and the planted forests scattered between them that represents the Mediterranean plant cover, the forests of *Quercus pubescens* and *Qurcus trojana*, which are types of *Quercus*, the forests of *Pinus brutia* around Balikesir - Soma and the agricultural areas are present.

Methodology

To determine the flora of the area, a survey trip was organized to the region. The flora of the working area was determined according to the previous studies performed in the area and the plants collected and the observations performed in this field trip.

The danger categories and the protection status of all the species found are determined by the literature surveys performed. The results of this study and the detailed information about the species are presented in Appendix C, Table C.1. The species are presented with their Turkish names (if exists) according to their phylogenetic orders (Pteridophyta, Gymnospermae, Angiospermae), phytogeography region, conditions of endemism and national/global danger categories/protection status, their spread altitudes inside the working area, their habitats and their plenty conditions inside the area in the floristic list. The danger class for flora types are evaluated according to "Red Data Book of Turkish Plants" (Ekim et al., 2000) that is based on the classification system of Red List (1994, ver. 2.3) of IUCN (International Union for the Conservation of Nature and Natural Resources), 2004 list (http://www.cites.org) of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) and BERN Convention (2002) (http://conventions.coe.int). None of the determined species take part in Red Data Book of Turkish Plants, BERN and CITES lists.

IUCN Red List Classification System (Red Data Book of Turkish Plants) :

EX : Extinct
EW : Extinct in the wild
CR : Critically endangered
EN : Endangered
VU : Vulnerable
LR : Lower risk
cd : conservation dependent
nt : near threatened
lc : least concern
DD : Data deficient
NE : Not evaluated

Findings

The region that the line passes represents the Mediterranean plant cover. During the field studies performed in the area, especially floristic compositions of maquis and forest vegetations are determined. As a result of the studies 141 taxons, which are at species and subspecies level and belong to 36 families, are determined. None of the species determined in the area is endemic for our country. The products cultivated at the agricultural areas at the region in general are; olive and maize around Canakkale, sugar-beet and cotton around Balikesir and cotton around Soma. But along the whole line, vegetable culture is performed. There is tobacco cultivation around Balikesir. Firstly the line was evaluated separately and then the common plant types were given and finally the whole list was given as a table.

Degirmencik Village

The south west of the Degirmencik Village, which is the starting point of the area, is covered with maquis plant cover. But there are afforestation areas, which are formed by *Pinus brutia* and *Pinus maritima*, in this area. There is *Quercus coccifera* shrubs in the area. The species determined in the area are:

Quercus coccifera, Qercus trojana, Crocus pallasi Goldb. subsp. *pallasii, Cistus creticus, Centaurea sostitialis, Centaurea virgata, Carthamus tinctoria, Xanthium spinosa, Bellis sylvestris, Pistacia lentiscus, Genista tinctoria, Chamaecytisus austraicus, Anthyllis hermaniae, Spartium junceum, Sarcopoterium spinosum, Arbutus andrachne, Arbutus unedo, Erica arborescens, Lavandula stoechas, Inula graviolens* (L.) Desf., *Asparagus officinalis, Polygonum arenarium, Juniperus excelsa, Cupressus sempervirens* (planted), *Amygdalus communis, Pyrus elaeagnifolia, Viscum album, Teucrium chamaedris, Stachys cretica, Pinus brutia* (planted), *Pinus maritima* (planted), *Pinus pinea* (planted)

Vicinity of Balikli Cesme

There are olive groves and *Palirus spina-christii* shrubs in this region.

Eskibalikli Village

Most of the area is used for agriculture. In the areas, which are not used for agriculture: *there are Pyrus elaeagnifolia, Quercus robur subsp. robur, Quercus coccifera, Palirus spina-christii, Crateagus monogyna, Rosa canina, Asparagus officinalis, Echium italicum, Eryngium campestre* var. *virens, Centaurea sostitialis, Circium creticum subsp. creticum, Olea europea* (culture).

Karacaali Village

Along the line in the vicinity of the village, greengrocering (irrigated agriculture) and maize cultivation are performed. At the unused areas between agricultural fields: *there are Quercus pubescens, Quercus trojana, Quercus coccifera, Bellis sylvestris, Centaurea sostitialis, Circium creticum subsp. creticum, Cardopatium corymbosum, Carthamus lanatus, Palirus spina-christii, Eryngium campestre var. virens, Rosa canina, Pyrus elaeagnifolia subsp. elaeagnifolia, Asparagus officinalis, Crocus pulchellus, Olea europea (culture).*

Karacaali, Goktepe, Gundogdu and Danisment

In most of the portions of this part of the line that passes from the population centers there are agricultural fields. But in the unused parts of the plains there are *Palirus spina-christii* shrubs and *Bellis sylvestrises* between them. Along the irrigation canals, which are between the agricultural fields, and at the moist areas; there are common and moisture-loving plants like *Acer campestre, Fraxinus angustifolia, Populus alba, Salix alba, Rubus sanctus, Abutilon theophrastii, Xanthium spinosum, Datura stramonium.* At the sides and inside the fields there are single *Quercus robur*s. In these areas cultivation of vegetables like pepper and maize are performed.

Danisment, Bakacak, Derekoy, Dikmen, Hacilar and Can

Also in this part of the line dense agriculture is performed. At some elevated places, there are especially *Quercus coccifera* shrubs and around Hacilar Village *Quercus pubescens* forests. Most of the parts of this forests are also degraded, there are open areas inside the forests and crop agriculture is performed at this areas. At the bottom of the forests there are species like *Ruscus angustifolius, Lonicera caucasica, Alnus glutinosa, Acer campestre, Rosa canina, Jasminum fruticans.*

At the sides of the streams there are a lot of trees like *Platanus orientalis, Salix alba and Populus alba* in these areas.

Can – Yenice

There are *Pinus nigra* forests in this part of the line, which has an altitude around 230-250 m but its altitude increases upto 500 m. There are *Rubus sanctus* and *Cistus creticus* species inside these forests and *Quercus coccifera, Phyllaria latifolia* shrubs and *Pistasia lentiscus* species are located in the open areas and at the sides of the forests.

Between Yenice – Balya

There are mostly *Pinus brutia* forests in this part of the line. Besides there are composite forests in some parts of this area. In these areas there are *Quercus pubescens, Juniperus exelc*a and *Platanus orientalis*es and *Populus alba*s along the streams. Also in moist areas there are *Rubus* sanctus. In the regions, where the forests are degraded excessively, it is possible to see *Quercus coccifera* shruberries and maquis species. Agriculture is performed in the areas inside the village fields and it is not possible to talk about the natural cover.

Vicinity of Gundogdu Village (Yenice)

At this part of the line there are generally agricultural areas and there are degraded *Quercus pubescens* and *Pinus brutia* forests at some places. Besides, *Palirus spina-christii* shrubs are located at the open hills and plains.

Alancik – Kuzupinari

This area is made up of calcareous bed-rock and there is a *Quercus pubescens* copse and shrubs like *Creatagus monogyna, Pyrus eleagnifolia, Prunus spinosa, Phyllaria latifolia, Rosa canina* and *Rubus sanctus* inside the copse.

Kuzupinar –Haciyusuflar

These regions are used as agricultural fields, which were converted from the forest areas. There are shrubbery areas containing *Quercus pubescens, Quercus trojana, Juniperus foetidissima, Creatagus monogyna, Pyrus elaeagnifolia, Prunus spinosa, Phyllaria latifolia, Rosa canina* and *Rubus sanctus.* Besides, there are a little amount of *Pinus pinea* planting areas.

Cakallar- Kocacay

Like the others this area is also formed by the degraded oak forests. At the sides of the streams there are *Platanus orientalis.*

Akcaloren

In this areas there is a copse *Quercus pubescens* forest. The big part of the area is used as agricultural fields, which were converted from the forest areas. The Aktas Hill and its vicinity, which is made up of calcareous bed-rock, is covered with *Quercus coccifera* shrubs.

Komurculer - Buyuk findik Village

This is the region in which the natural *Pinus brutia* forests are located most frequently. The coverage is about 100% in this area. There are *Juniperus oxycedrus* and rarely *Quercus pubescens* at the bottom of the forest.

Savastepe – Danisment

This region is formed by the areas, in which the *Pinus brutia* forest continues. There are *Quercus pubescens, Quercus infectoria* at the open parts of the forests. *Asparagus officinalis, Ruscus acutifolia, Echinops microcephala, Dactylis glomerata var. hispanica, Eryngium campestre var. virens, Juniperus oxycedrus* are located at the bottoms. The other parts of the area are used for agriculture.

Beyce – Hatun koy – Soma

At this part of the line *Quercus pubescens* degraded forest and *Quercus coccifera* shrubs exist and the area is used mainly for agriculture. Cotton and olive groves are the most common agricultural products in the area.

The State of the Plants in the Area According to Danger Class and Endemism

None of the 141 taxons, which are at species and subspecies level, determined in the area is endemic for our country. The usage of the most parts of the line for agriculture and being under pressure of the non-agricultural areas due to pasturing could be the reason. Besides, the frequent forest texture could be the reason for the low plant diversity.

The General Evaluation

As a result of the field studies and observations performed, 141 plant species, which are at species and subspecies level, are determined. None of these plants are endemic for our country. Only raising the transmission towers a few meters at Can – Yenice, Yenice – Balikesir, Komurculer – Buyuk findik, Savastepe – Danisment and Goktaslar regions, where the *Pinus brutia* (Calabrian pine) forests are very dense, would prevent the damage given to the forest formation at these places.

Fauna

In fauna studies about 158 km construction area and a corridor, which has a total width of 5 km at the right and left of the line, were surveyed. In the faunal field studies performed, it was observed that the project area has habitats (living environments), which are preferred by terrestrial vertebrate fauna species, which has especially moving abilities, to feed and to walk around, and the fauna species in colonies were not found. The terrestrial and aquatic fauna species in the working area and its close vicinity were taken up in mammal, bird, reptile and amphibians categories and the findings were evaluated for each category separately.

Methodology

The principles of the faunal studies performed by taking the ecological properties and the protection status of the line route into consideration are summarized below.

- During the faunal studies, the field, questionnaire, literature and office works were performed successively for determining the fauna species of the energy transmission line route and its close vicinity.
- The faunal field studies were performed at the energy transmission line and at a 5 km width corridor. The study area was widened in case of a probability of a different fauna species due to the variable topography and/or vegetation structure.
- Literature survey and meetings were performed with the local community in order to expose the faunal condition of the project route.
- It was also made use of the habitats, which are suitable for the animal species' choices and the nest-young-footprint (especially in defining the birds and the macro mammiferous species), excrement-food waste (especially in defining mammals), derm-antler-turtle shell and bone residues.
- At the faunal field studies hunting-collection-killing have not performed during the determination of the species in the area. The reasons of this are listed below:
  - ✓ Preventing the damages and the destruction of the rare-sensitive animal species in the area,
  - ✓ Protection of the reptiles according to the No. 4915 Terrestrial Hunting Law and Central Hunting Commission Decisions and the forbidden to hunt and collect,
- Because of the reasons listed above, the observations (by using high technology optical devices) performed were used in the species determination of the mammals and the birds. In the determination of smaller mammals, reptiles, amphibians and fish species, traps, nets and living traps were used and the animals, of which the species determination was performed, were released to the nature.
- In the determination of the fauna species, catching by nets and traps were not used in the determination of the birds. In the determination of the birds line and point counting methods were used. The observations and the lifeless materials that are present in nature, (especially dead reptile individuals and/or derm, turtle

shell residues) were used for especially reptile and small mammal species. The literatures related to the fauna species of this area, the museum materials collected before and the animal samples, which were filled by the local community and amateurs, were used while preparing the lists.

- For fauna studies, the field observations were performed by travelling, by walking and/or by a vehicle during the survey trips in the area and the area was examined by using 1/25.000 scaled maps during the studies. Besides, during the map studies GPS was also used for determining the altitutes and geographical coordinates. The observations were started early in the mourning and continued until the sunset. A lot of animals come out at night

Related to the activity area, data about biotopes, biogenetic protection areas, endemic species, endangered species, wild life habitats were collected and evaluated in the area. The determined fauna species were evaluated according to the lastest version of IUCN (International Union for the Conservation of Nature and Natural Resources) list, IUCN 2003 list, CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) 2004 list and BERN Convention (2002). The purpose of CITES, which is one of the criteria evaluated and an international convention signed by 164 countries (includes Turkey), is preventing the extinction of the trading wild species. CITES, which is based on the sustainability of commerce by protecting the ecological sources, was signed in 1973 and became valid in 01 July 1975. Turkey supports this convention in 1996.

The BERN Convention, which was signed by 26 members (includes Turkey) of Europian Council, is a wide range treaty that was prepared to protect the Europian nature and includes subjects like protection of biologic variability and natural habitats, development of national policies for protection of wild flora and fauna, mitigations against pollution, encouragement for environmental protection educations and encouragement for the researches and studies related to these purposes (European Council,1979). Within the coverage of BERN Convention, Appendix 2 includes the fauna species, which need "certain protection" and Appendix 3 includes "species under protection".

On the other side IUCN Red List pays attention to the species, which are really endangered. A species in the IUCN is listed in the IUCN Red List after the population of this species and the reasons of the decrease in the population are investigated. Since the IUCN Red List depends on the investgation results more, some countries give more importance to the species listed in IUCN than the species listed in Bern Convention. 1994 categories (ver. 2.3) and 2001 categories (ver 3.1) of IUCN Red List (2003) are:

IUCN Red List Categories and Criterions, 1994 (ver. 2.3)		IUCN Red List Categories and Criterions, 2001 (ver. 3.1)*	
EX	: Extinct	EX	: Extinct
EW	: Extinct in the wild	EW	: Extinct in the wild
CR	: Critically endangered	CR	: Critically endangered
EN	: Endangered	EN	: Endangered
VU	: Vulnerable	VU	: Vulnerable
LR	: Lower risk		
	cd : Conservation dependent	NT	: Near threatened
	nt : Near threatened	LC	: Least concern
	lc : Least concern		
DD	: Data deficient	DD	: Data deficient
NE	: Not evaluated	NE	: Not evaluated

** In the recent years to form a more clear and easily used system in the IUCN Red List Categories and Criterions, a large scaled scrutinizing process is performed. As a result the categories were revised and accepted by IUCN Council in February 2000 and the revised Categories and Criterions (IUCN Red List Categories and Criterions version 3.1) were published in 2001.*

In addition to these, the danger conditions of the fauna species were determined according to the classification in the publications of Ali Demirsoy (1988, 1992, 1996, 2002), who has a lot of important studies and can reflect the local conditions better. The danger categories defined by this researcher are presented below:

E : Endangered
Ex : Extinct
I : Indeterminate
K : Insufficiently known
nt : not threatened
O : Out of danger
R : Rare
V : Vulnerable

Findings

Mammals

17 mammal species were determined in the area. The danger categories and protection status are evaluated and presented in Appendix C, Table C.2.

Within the coverage of Bern Convention, 1 mammal species takes part in Appendix 2 (The Fauna Species, which Need Certain Protection) and 6 mammal species take part in Appendix 3 (The Fauna Species, which Need Protection) of these species. According to IUCN; 13 mammal species are in "LR/lc" category; 3 mammal species are in "LR/nt" category and 1 mammal species is in "NT" category. There is not any mammal species within the coverage of CITES.

As a result of the evaluation performed according to the decisions prepared for National Parks and Hunting Wild Life General Directorate Central Hunting Commission (CHC) 2004-2005 hunting season, it is seen that 5 mammal species are in Appendix-1, namely the wild animal under protection list of Environmental and Forestry Ministry, 1 mammal species is in Appendix-2, namely the hunting animals under protection by Central Hunting Comission, and 4 mammal species are in Appendix-3, namely the list of hunting animals, which could be hunted in determined periods, of Central Hunting Comission. The remaining mammal species do not take part in any classifications.

Mitigations

In the construction phase, in spite of being out of the impact area, to decrease the negative effects on *Capreolus capreolus* (roe deer) and the other mammal species located in Wild Life Protection Site (Manisa province), no service roads woud be constructed in this region during the reproduction season (July - end of August), the workers would be informed by the contractor firm, the machinery and personnel would not go out of the construction area and the mitigations determined for not to pass the limit values of noise and dust formation would be applied regularly.

In the operation phase of the project, having no chemical wastes of the energy transmission line, the alternative areas for the species in close vicinity, the moving abilities of the mammal species, no limitations of the feeding, walk around, lodging and reproduction areas and activities of these species by the activities were evaluated as they would not create any relative negativity from environmental aspect.

How would this be monitored
is entered?

Birds

In the ornithological observations and investigatons, the 1/25.000 scaled physical maps of the area were used and during the investigations the areas, which would be studied according to the topographic data in the squares of these maps, were studied in 1 km^2 grids. In ornithological observations monocular telescopes (Nikon 20-60 x 80 mm) and binoculars (Pentax 16 x 24) were used. No hunting or catchings were performed for identifications.

103 bird species of 11 Groups - 32 Families were determined in the study area and its vicinity. The danger categories and protection status were evaluated and presented in Appendix C, Table C.3.

Within the coverage of Bern Convention, 56 bird species take part in Appendix 2 (The Fauna Species, which Need Certain Protection) and 21 bird species take part in Appendix 3 (The Fauna Species, which Need Protection) of these species. Within the coverage of Bern Convention nearly all bird species in Turkey (around 95 %) take part in different status danger categories. Despite the bird species determined in the project area are species included to the categories of Bern Convention, they are the broad spreading species of our country and west palearctic zoogeographic region. 12 of the determined bird species were taken under protection within the coverage of CITES Appendix-2.

According to the revised danger categories of IUCN (2001- ver.3.1), all bird species were included in IUCN lists. All 103 bird species determined in the area take part in LC category according to IUCN.

As a result of the evaluation performed according to the decisions prepared for National Parks and Hunting Wild Life General Directorate Central Hunting Commission (CHC) 2004-2005 hunting season, it is seen that 79 bird species are in Appendix-1, namely the wild animal under protection list of Environmental and Forestry Ministry, 13 bird species are in Appendix-2, namely the hunting animals under protection by Central Hunting Comission, and 11 bird species are in Appendix-3, namely the list of hunting animals, which could be hunted in determined periods, of Central Hunting Comission. The remaining bird species do not take part in any classifications.

Evaluation of the Area From the Birds and Migration of Bird of prey Point of View

The birds are known as the most moving livings of the animal kingdom. The birds determined in the project area and its close vicinity could use different areas for feeding, lodging and reproduction.

The project line is one of the most important migration ways of especially birds of prey (Canakkale Strait). After the reproduction season the north populations of the birds of prey migrate to south latitudes due to the negative climatic conditions, food shortage and threat of competition and predation. The area is a subsidiary air corridor, which is used by some birds of prey during their migration. The main air corridor is Bosphorus.

The birds of prey species that fly until the beginning of September can make long migrations by using the thermal air flows formed by the reflections especially from terrestrial atmospheres. The thermal air flows are formed in daytime and above the lands generally. The line that a lot of birds of prey enter Turkey during their migration is Bosphorus and Artvin-Borcka. The birds of prey, which passes along this line by using the air flows, fly towards the Anatolia Plateau.

The migration flies of the birds of prey is in daytime, over the high plateaus and altitutes, more than 100 m above from the surface generally. During the field observations, it seen that the areas at the project line are not used for staying but as a "Transit Passing Corridor" by the migrating birds.

The height of the towers of the energy transmission line that would be constructed is 30 m. The height of the electrical wires between the towers is changing between 15 - 25 m depending on the topography. According to the knowledge and observations about the birds of prey migrations given above, this case would not cause any problems from the flying altitute of the birds of prey (> 100 m) during migration point of view. During these observations it was observed that the flying altitute of the birds of prey are about 250 - 300 m.

Mitigations

It is known that the birds use the energy transmission line towers as perch and/or nest and by this way they prepare teritorrial protection areas and watch their hunts. It is reported that in some cases this action of the birds causes some negativities for the birds and the transmission lines. To prevent this disadvantage taking some precautions, which would prevent the nesting of the big birds (ie. stork) and the birds of prey, especially on the towers would be useful. For this reason bird repellents would be attached to the towers at places, where the bird passages are intensive.

In the operation phase of the project, having no chemical wastes of the energy transmission line, the alternative areas for the species in close vicinity, the moving abilities of the bird species, no limitations of the feeding, walk around, lodging and reproduction areas and activities of these species by the activities were evaluated as they would not create any adverse effect from environmental aspect.

Reptiles

10 reptile species, which were determined by the field observations performed in the project area and its close vicinity, literature records and meetings made with the local community, and the danger categories and the protection status of these species are presented in Appendix C, Table C.4. These reptile species determined in the area, prefer stony places and shrubs as habitat generally. All the determined reptile species are species those are under protection by Bern Convention.

The Annex-2 of the convention lists the species, which are under certain protection and the Annex-3 ensures protection for all the species those are not in Annex-2. As a result all the reptile species are seen as under protection within the coverage of this convention.

Within the coverage of Bern Convention, 6 reptile species take part in Appendix 2 (The Fauna Species, which Need Certain Protection) and 4 reptile species take part in Appendix 3 (The Fauna Species, which Need Protection) of these species. Beside these, *Natrix natrix* (aquatic snake) was taken under protection by IUCN in LR/lc statute.

As a result of the evaluation performed according to the decisions prepared for National Parks and Hunting Commission of General Directorate of National Parks and Wild Life (MAK) 2004-2005 hunting season, it is seen that all reptile species are in Appendix-1, namely the wild animal under protection list of Ministry of Environment and Forestry.

Mitigations

In the operation phase of the project, having no chemical wastes of the energy transmission line, the alternative areas for the species in close vicinity, the moving abilities of the reptile species, no limitations of the feeding, walk around, lodging and reproduction areas and activities of these species by the activities were evaluated as they would not create any environmental adverse effect.

Amphibians

In the field observations performed in the project area and its close vicinity, 3 amphibian species determined as a result of the literature records and questionnaires and the danger and protection status of these species are presented in Appendix C, Table C.5. The amphibian species, which are determined in the area, prefer aquatic – semiaquatic and moist areas for habitat.

Within the coverage of Bern Convention, 1 amphibian species takes part in Appendix 2 (The Fauna Species, which need certain protection) and the other 2 species take part in Appendix 3 (The Fauna Species, which need protection) of these species. According to IUCN ver.2.3 (1994) criterions the species, which are not in any danger category, are evaluated in LC category in ver.3.1 (2001). The species determined in the area are in this category (LC).

Mitigations

In the operation phase of the project, having no chemical wastes of the energy transmission line, the alternative areas for the species in close vicinity, the moving abilities of the amphibian species, no limitations of the feeding, walk around, lodging and reproduction areas and activities of these species by the activities were evaluated as they would not create any adverse effect from environmental aspect. In addition, mitigation measures would be taken during the construction and operation phases of the project according to the international agreements and the decisions of the Central Hunting Comission regarding the conservation of the fauna species under protection.

IV.2.11. The Areas Having Valuable Landscape and Recreation Areas, The Areas which have Unique Geological and Geomorphological Formations

The 380 kV Karabiga - Can – Soma TPS ETL Project starts from Canakkale Province Biga District, passes through Balikesir Province and ends at Manisa Province Soma District. The length of the energy transmission line is approximately 158 km. The route along the 158 km line has a variable topography and the altitute changes berween 100 – 600 m.

The population centers are in well-arranged and regular structure along the 158 km energy transmission line. The population centers on the project route are located near the streams and on the plain areas. The main land use determined inside the 5 km area, at which the studies would be performed, are agriculture, forest and pasture. Besides, there are vineyards and olive groves. The land use, shape the general landscape of the project area. Most part of the project route are forest areas and agricultural fields. The industrial plants, which are related to the cultivated products in these agricultural fields, are the other components that shape the landscape character of the area. A view of Pinarli Quarter, one of the population centers on the route, is presented in Figure IV.17 and a view of the agricultural fields on the route is presented in Figure IV.18.

Another component that affects the landscape character of the project area is the topographic structure. The movement observed in the topographic structure gives a natural screening potential to the area. The other components, which affect the character of the region, are the dominant vegetation types and the surface cover. The vegetation types observed in the 5 km survey corridor are oak (*Quercus sp.*), Calabrian pine (*Pinus brutia*) and Black pine (*Pinus nigra*) groups. Along the route cattle breeding is performed in most of the districts and the meadow areas are used for pasturing and related to this a compressed vegetation is observed.

The regions, at which the forest cover is intense and there is no degraded forest area, form attractive structures visually. The irrigation pond and the forest texture located on the route are presented in Figure IV.19 and the views of the Stone pine *(Pinus pinea)* forest are presented in Figure IV.20. Beside these impressive visual structures, ICDAS Co. that is located near the Kiyi Gemi Transformer Station, at which the project starts, has an important effect on the landscape character since it is the biggest industrial plant of the vicinity. Soma Thermal Power Station, at which the project ends, presents an overwhelming structure visually and also affects the environmental quality by its industrial view. The views of Kiyi Gemi Transformer Station at the foreground and ICDAS Co. at the background are presented in Figure IV.21 and the views of Soma Thermal Power Station are presented in Figure IV.22.

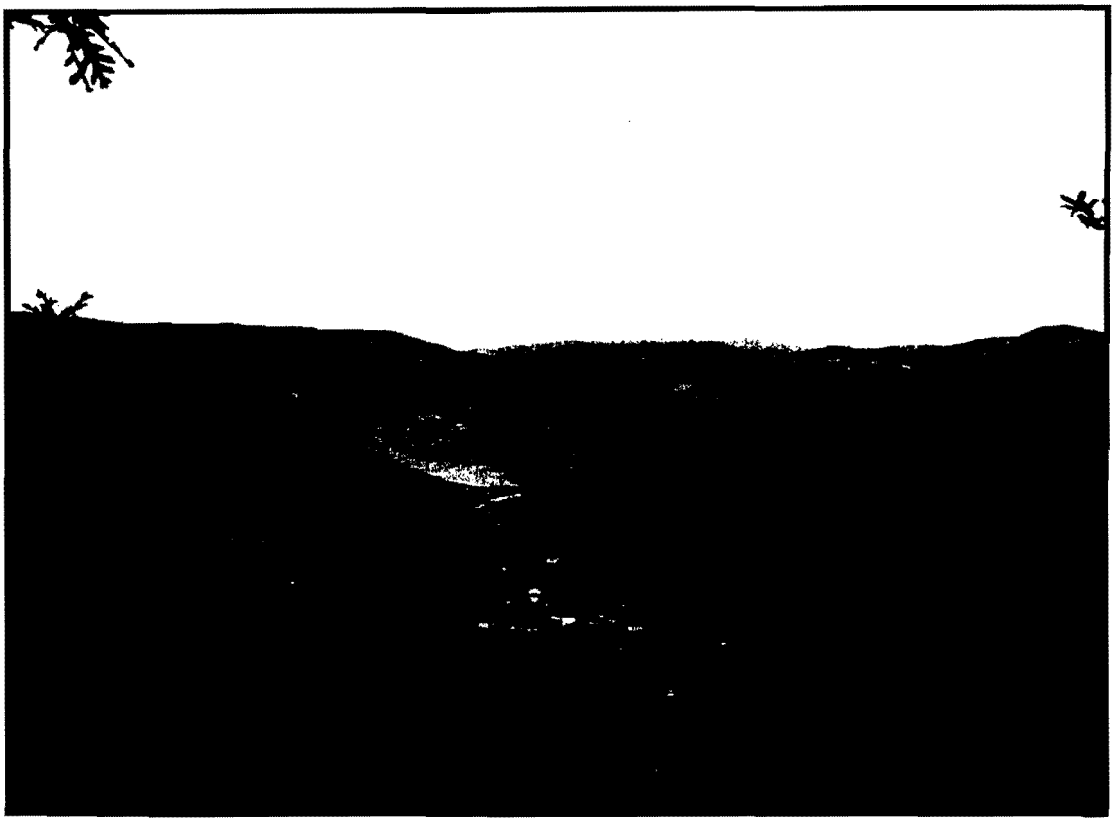


Figure.IV.17. A View of Pinarli Quarter, one of the Settlement on the Route

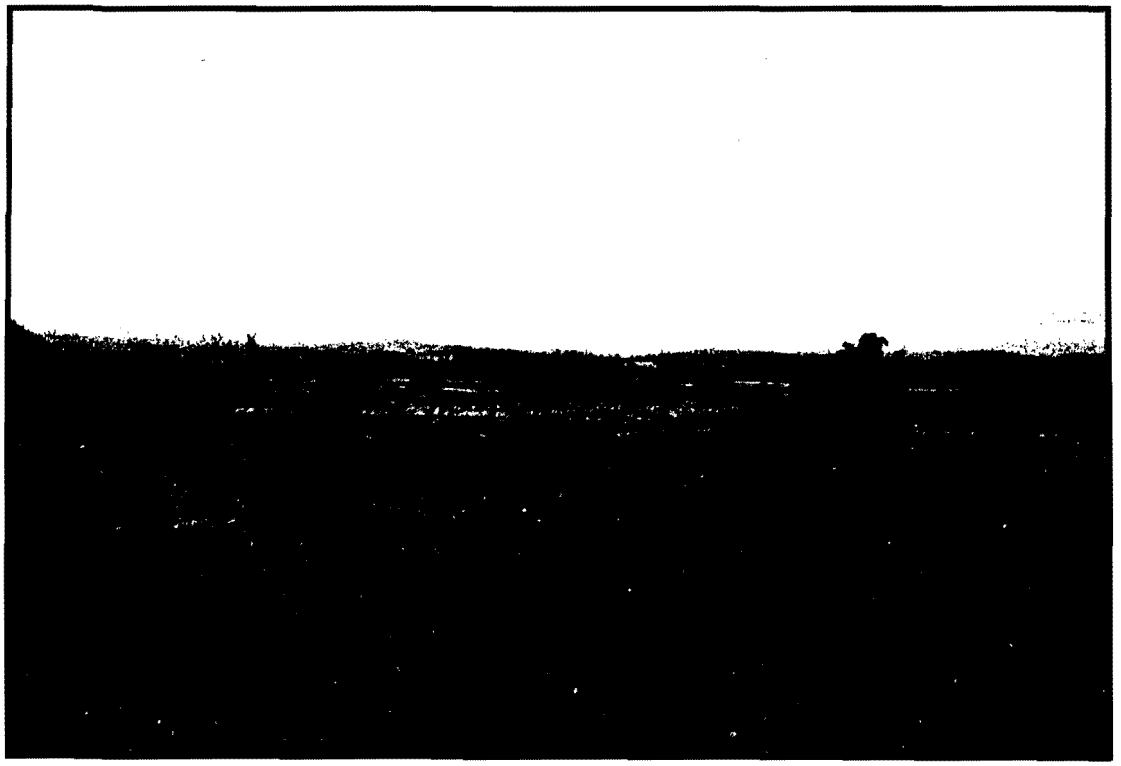


Figure.IV.18. A View of the Agricultural Fields on the Route

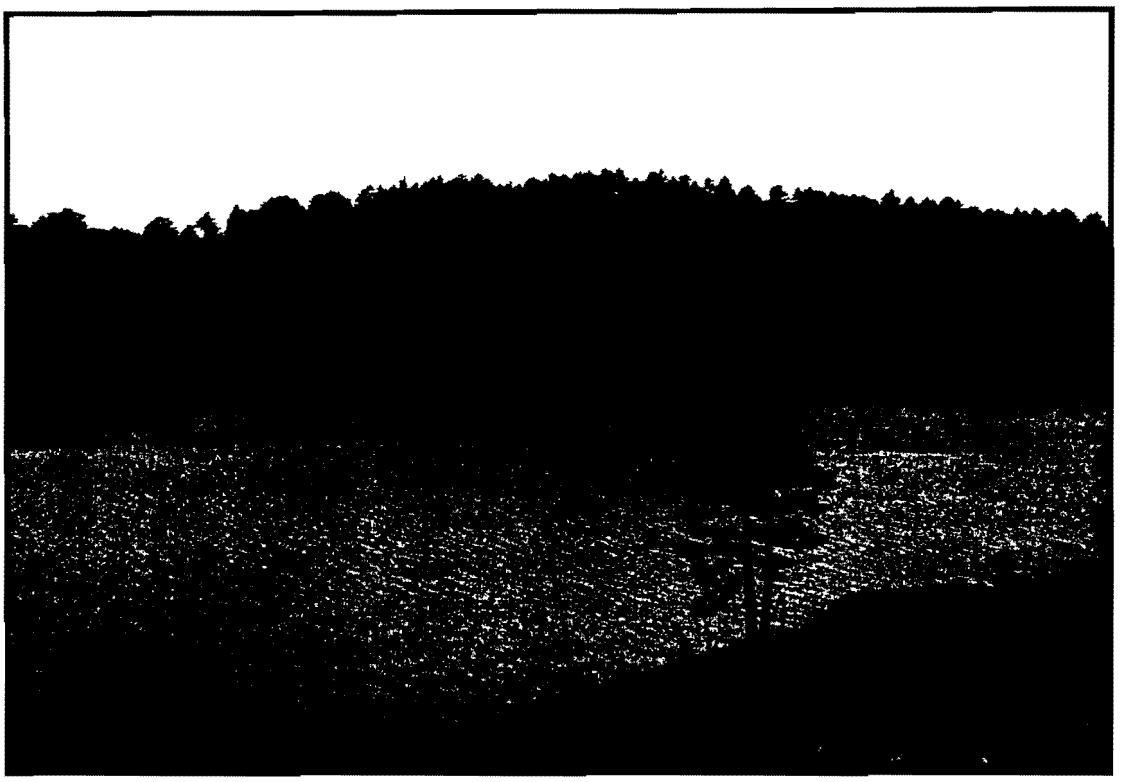


Figure IV.19. The Irrigation Pond and The Forest Texture Located on the Route

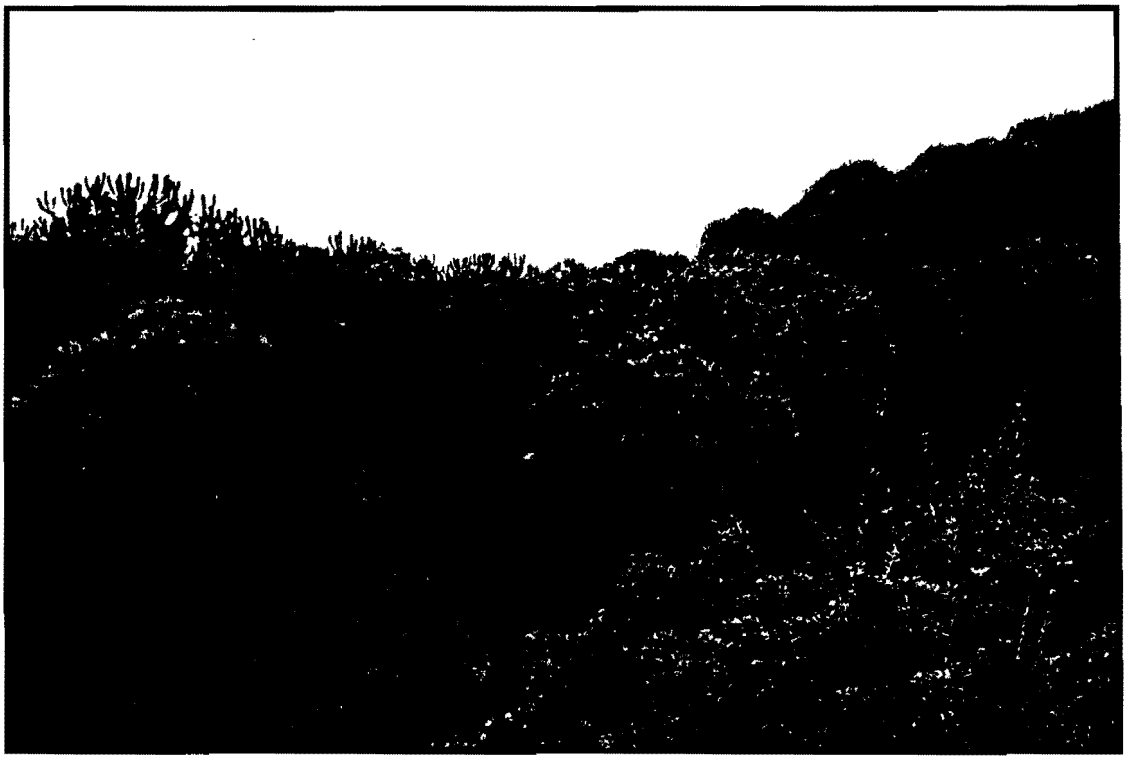


Figure IV.20. The Views of the Stone Pine *(Pinus pinea)* Forest

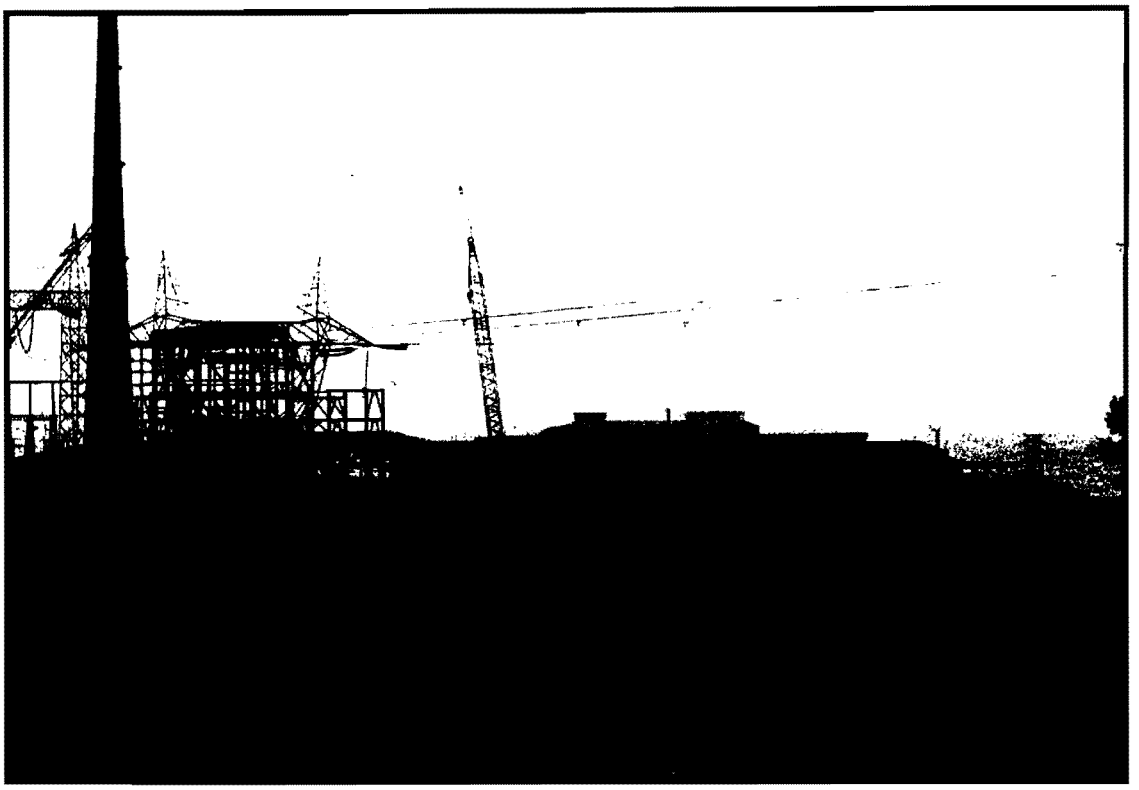


Figure IV.21. The Views of Kiyi Gemi Transformer Station at the Foreground and ICDAS Co. at the Background

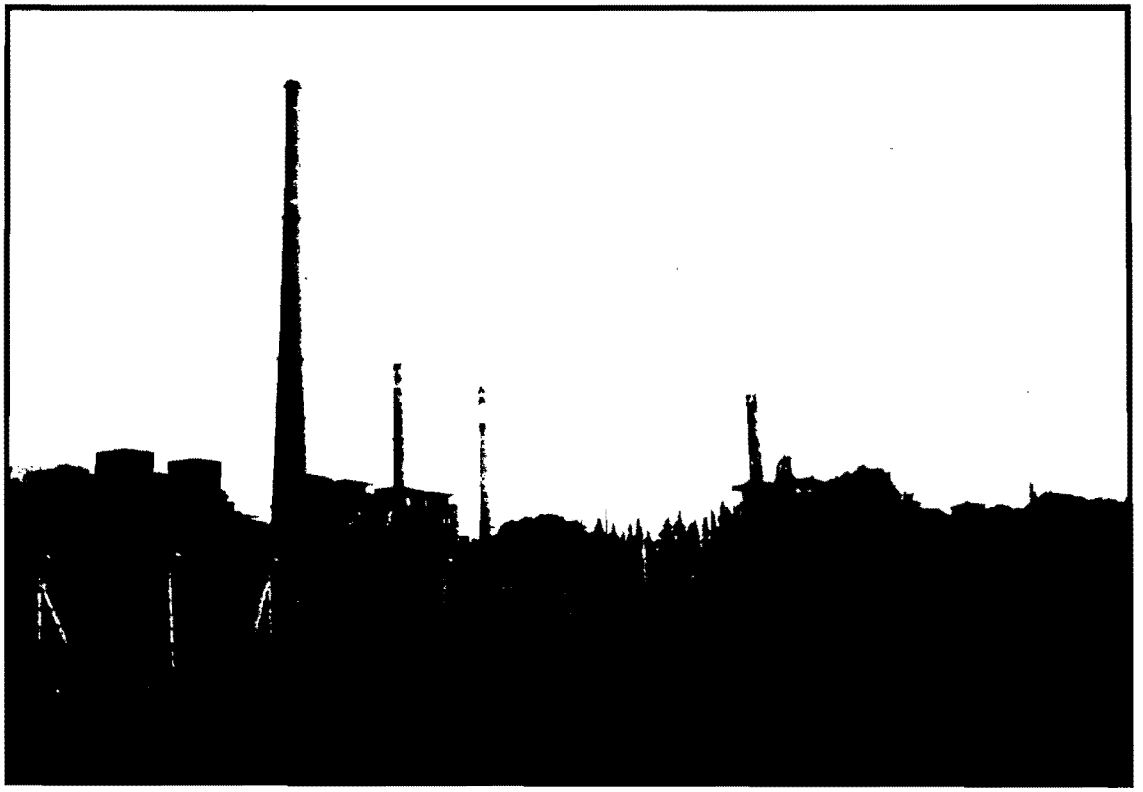


Figure IV.22.. Soma Thermal Power Station

IV.2.12. The Areas those are Under Control of Competent Establishments of Government (Military forbidden areas, the areas assigned to the public institutions and organizations, the areas limited by No. 7/16349 Cabinet Judgement, which was Published in the Official Gazette dated 25.09.1978 and No. 16415, etc.),

On the route of the energy transmission line, beside the forest areas those are under control of General Directorate of Forestry, there are not any "Areas those are Under Control of Competent Establishments of Government" or limited areas stated in the "Approval of the limited areas as the restricted areas to prevent all kinds of attacks to the seas", which was published in the Official Gazette dated 25.09.1978 and No. 16415 and put into force by No. 7/16349 Cabinet Judgement.

IV.2.13. Other Properties

In this section there are not any other properties related to the project route.

IV.3. The Properties of the Socio-Economical Environment

The population centers located in the project area and its close vicinity are the regions, in which the probable socio-economical effects would be felt mostly, in the construction and operation phases of the project. The planned energy transmission line passes through Canakkale Province, Biga, Can, Yenice Districts, Balikesir Province, Balya, Ivrindi, Savastepe Districts and Manisa Province, Soma District. The other population centers located on the project route and its 500 m vicinity are Beyoba Quarter, Eskibalikli Village, Hacilar Village, Yaykin Village, Nevruz Village, Alancik Village, Haciyusuflar Quarter, Bengiler Village, Kasikci Village, Goktepe Village, Akcaloren Village, Erdel Village, Akpinar Village, Kumkoy and Menderes Quarter. The locations of these population centers, which are located in the project area and its close vicinity, on the route are given in Chapter II in more detail.

To evaluate the socio-economical effects and to determine the existing socio-economical structure of the region discussed, the results of the 2000 census that was obtained from State Institute of Statistics (DIE) were evaluated.

IV.3.1. Economical Properties (The main sectors forming the economical structure of the region, where the energy would be transmitted)

According to the results of the 2000 census, the distribution and working areas of the populations those are active (working) economically in Canakkale Province, Biga, Can and Yenice District Centers, Balikesir Province, Balya, Ivrindi and Savastepe District Centers; and Manisa Province, Soma District Centers can be seen in Table V.18 (DIE, 2000).

Most of the people in Balikesir Province, Balya, Ivrindi, Savastepe Districts are working in public service. In these districts, the people working in public service have percentages of 41%, 39%, 36% respectively out of the total working population. The second biggest economical activity is the production industry in Balya District (21%), the wholesale and retail trade and the restaurant and hotel operation in Ivrindi District (20%) and agricultural and hunting activities in Savastepe District (21%). Similarly, the main economical activity is public service in Canakkale Province, Biga District. The wholesale and retail trade, the restaurant and hotel operation and the production industry follows this activity. The number of people working in public service has a percentage of 30% out of the total working population. The percentages of trade, restaurant and hotel operation and

the production industry are 25% and 24% respectively. The production industry is the main economical activity in Can and Yenice Districts. The people in this sector are 47% of the total working people in Can District and this value is 33% in Yenice District. In both of the districts the public service follows the production industry with rates 17% and 24% respectively. The extraction industry is the main economical activity in Manisa Province, Soma District with a rate of 26%. The public service follows this activity with a rate of 22%.

Table IV.18. The Distributions of the Population those are Active Economically to the Sectors in Balikesir Province, Balya, Ivrindi and Savastepe Districts, Canakkale Province Biga, Can and Yenice Districts, Manisa Province Soma District (DIE, 2000)

Economical Activities		BALIKESIR			CANAKKALE			MANISA
		Balya	Ivrindi	Savastepe	Biga	Can	Yenice	Soma
Agriculture, Hunting	M	45	116	307	183	161	125	260
	F	5	37	73	42	56	28	165
Extraction Industry	M	1	5	153	19	829	6	3609
	F	0	1	1	1	35	1	44
Production Industry	M	101	126	114	1672	3845	261	1008
	F	13	12	7	182	1000	304	77
Electricity-Gas-Water	M	5	16	24	68	30	13	1285
	F	1	1	0	0	0	0	49
Construction Works	M	19	61	111	514	534	121	920
	F	0	0	1	10	11	0	5
Wholesale and Retail	M	53	238	228	1699	852	229	1826
Trade, Restaurant, Hotel	F	10	15	22	209	160	30	239
Transportation, Communication	M	28	85	60	377	522	64	949
and Storage	F	0	2	2	23	14	1	14
Financial Institutes, Insurance	M	26	37	51	265	233	35	375
	F	9	6	14	93	66	19	126
Public service	M	160	392	533	1774	1343	397	2344
	F	63	87	132	547	412	77	810
Unknown	M	2	7	8	28	40	8	40
	F	0	0	0	7	4	6	6
TOTAL ECONOMICALLY ACTIVE POPULATION		**541**	**1244**	**1841**	**7713**	**10147**	**1725**	**14151**
	M	**440**	**1083**	**1589**	**6599**	**8389**	**1259**	**12616**
	F	**101**	**161**	**252**	**1114**	**1758**	**466**	**1535**

**M: male; F: female*

IV.3.2. Population (The urban and rural population in the region, population movements; migrations, population increase rates, other information)

The population-age distributions of Balikesir Province, Balya, Ivrindi and Savastepe Districts, Canakkale Province, Biga, Can and Yenice Districts and Manisa Province, Soma District, where the construction and operation activities of the project would be performed, are presented in Table IV.19, Table IV.20 and Table IV.21 and Figure IV.23, Figure IV.24 and Figure IV.25, respectively.

Table IV.19. The Age Distribution of Balikesir Province, Balya, Ivrindi and Savastepe Districts (DIE, 2000)

Province	Balikesir					
District	Balya		Ivrindi		Savastepe	
Age	Number of people	%	Number of people	%	Number of people	%
0-14	401	20.93	1483	25.69	2758	26.81
15-29	500	26.10	1434	24.85	2917	28.35
30-59	720	37.57	2128	36.87	3509	34.11
60-85+	295	15.40	725	12.56	1086	10.56
Unknown	0	0.00	2	0.03	18	0.17
Total	1916	100	5772	100	10288	100

Table IV.20. The Age Distribution of Canakkale Province, Biga, Can and Yenice Districts (DIE, 2000)

Province	Canakkale					
District	Biga		Can		Yenice	
Age	Number of people	%	Number of people	%	Number of people	%
0-14	6405	23.25	6712	23.24	1295	23.60
15-29	7495	27.21	8230	28.50	1477	26.92
30-59	10945	39.73	12014	41.60	2151	39.20
60-85+	2699	9.80	1920	6.65	562	10.24
Unknown	5	0.01	2	0.01	2	0.04
Total	27549	100	28878	100	5487	100

Table IV.21. The Age Distribution of Manisa Province Soma Distrcit (DIE, 2000)

Age	0-14	15-29	30-59	60-85+	Unknown	Total
Number of people	17674	15305	23603	4075	17	60674
%	29.13	25.22	38.90	6.72	0.03	100

What on earth does this have to do with a TL

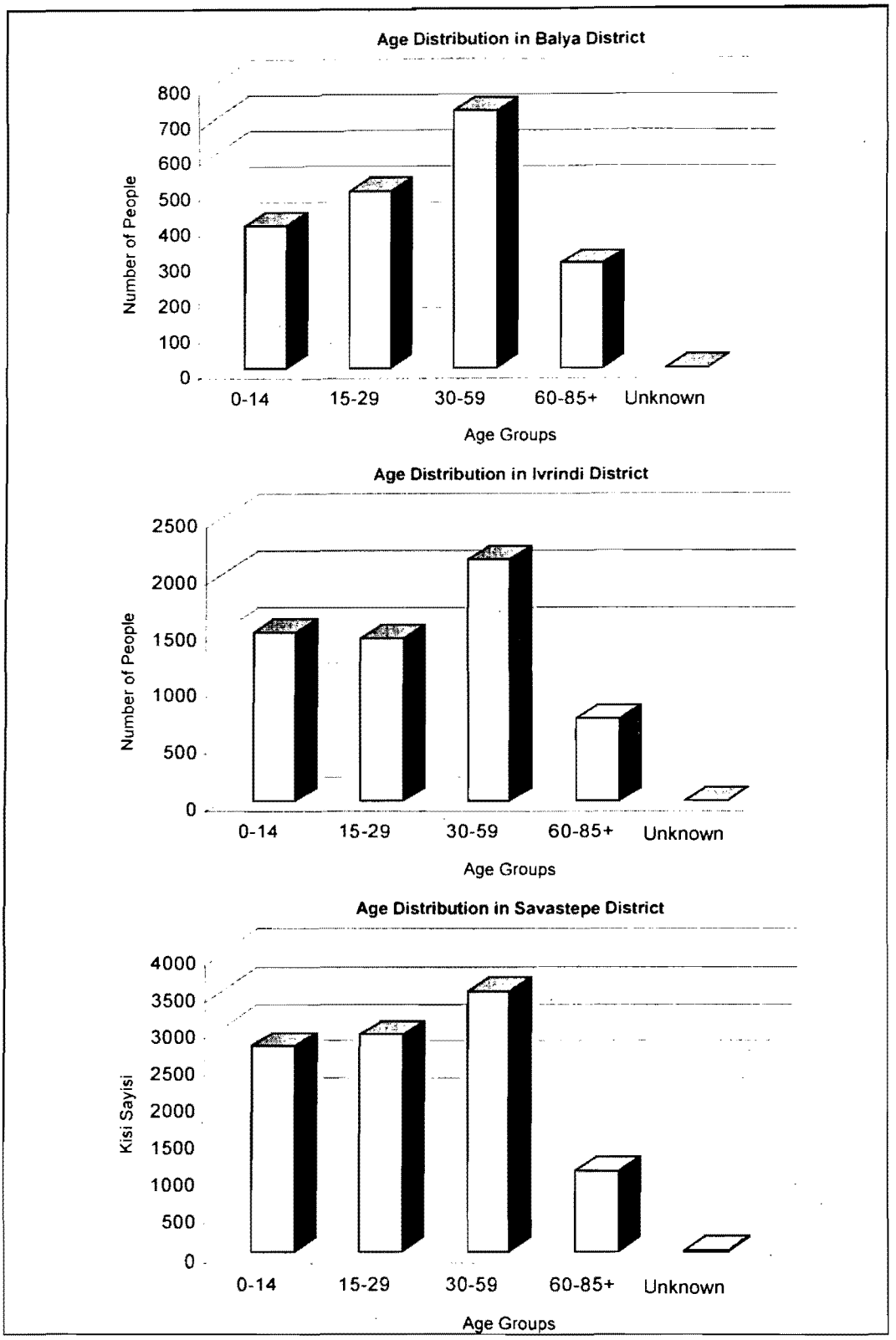


Figure IV.23. Age Distributions in Balıkesir Province, Balya, Ivrindi and Savastepe Districts

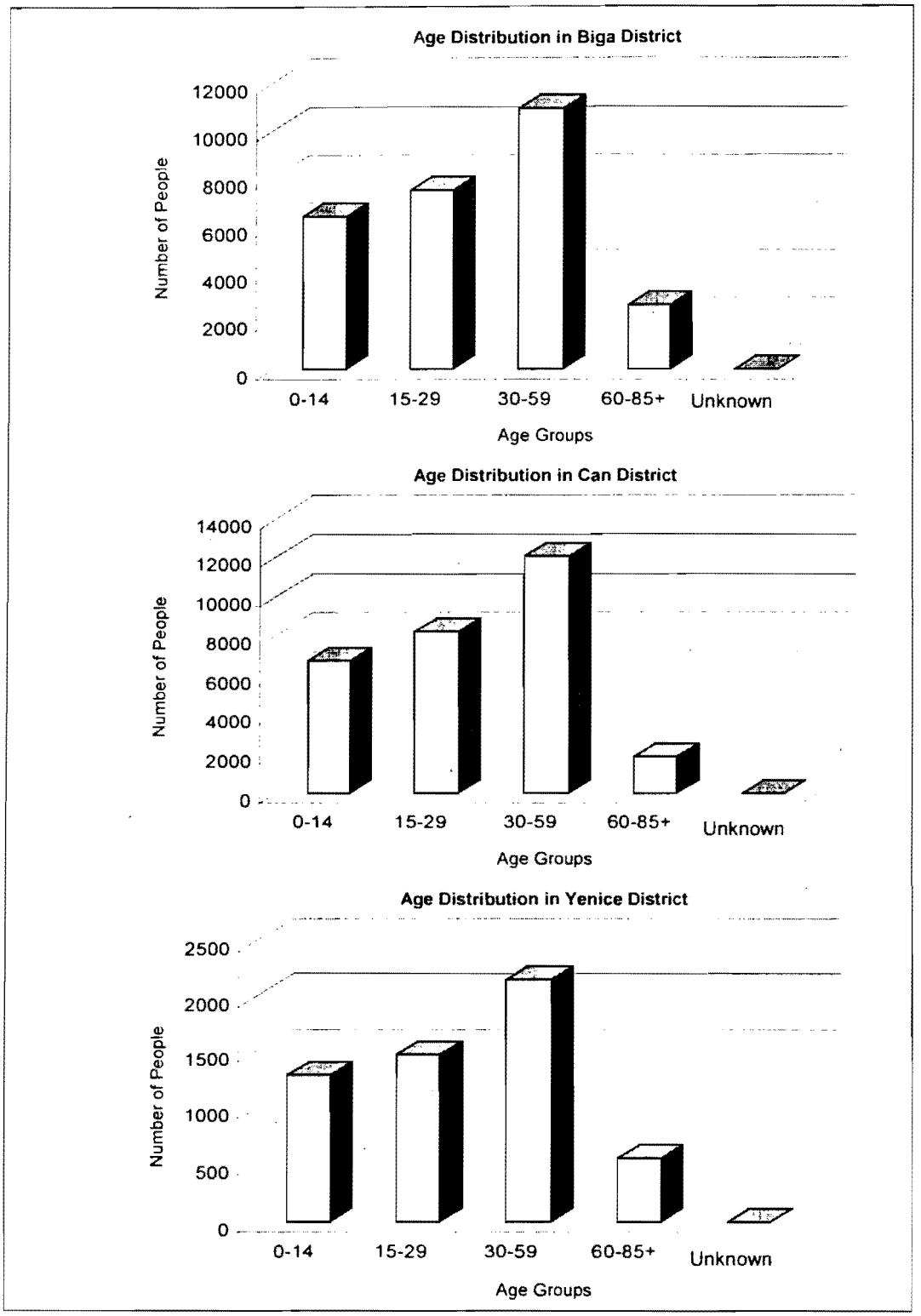


Figure IV.24. Age Distributions in Canakkale Province Biga, Can and Yenice Districts

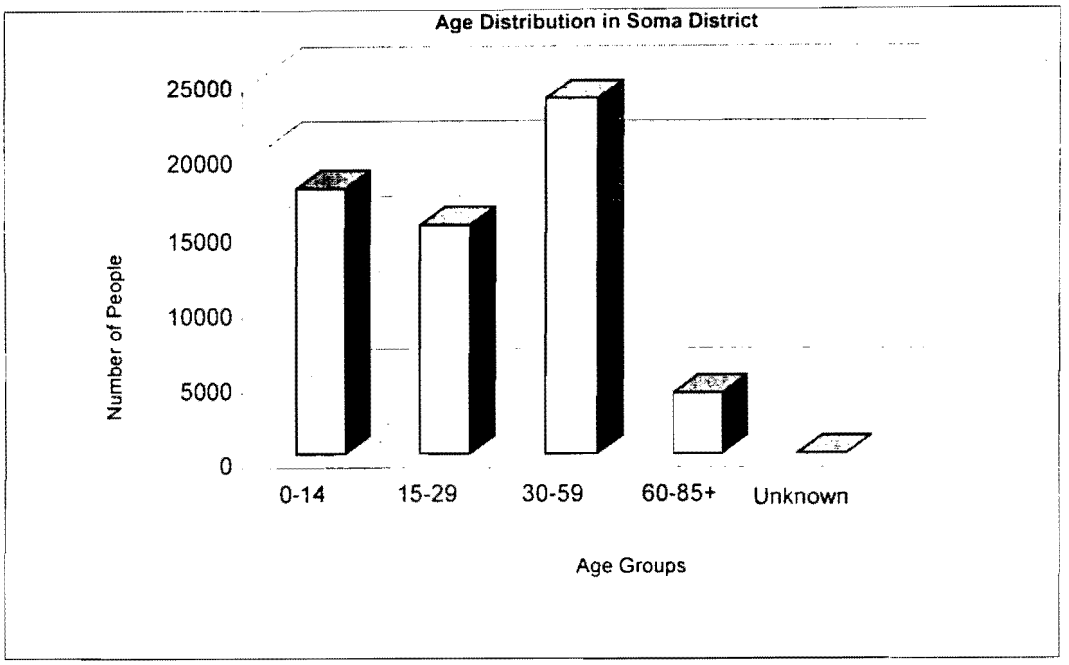


Figure IV.25. Age Distributions in Manisa Province Soma District

As it can be seen from the graphics in the Figure IV.23, when the age distributions of Balikesir Province, Balya, Ivrindi and Savastepe Districts, it is observed that district populations include 30-59 age group mostly around 30% and 0-14 and 15-29 age groups have about 25% share. Beside these the lowest number of people the population are at above 60 age group and have rates of 15.40%, 12.56% and 10.56% in Balya, Ivrindi and Savastepe Districts respectively.

A similar distribution is observed in Canakkale Province, Biga, Can and Savastepe Districts as it can be seen in Figure IV.24. In the districts the above 60 age group is the smallest population group and 30-59 age group is the largest group with a rate of 40%. Beside these, 0-14 and 15-29 age groups have 25% share.

Similarly in Manisa Province Soma District 30-59 age group is the largest group with a rate of 39%. 0-14 and 15-29 age groups follow this age group with rates of 29% and 25% respectively. Like in the other districts, also in Soma District above 60 age group has the lowest number of people.

The old population is very low compared with the young population, it shows that the life duration in the region is not very high or the migration rate is very high. To investigate the population movements in Balikesir, Canakkale and Manisa Provinces in more detail, the population increase rates, which were calculated based on 1990 and 2000 censuses, are given in Table IV.22. As it can be seen in this table, the population of the villages are decreasing due to the reasons like having better health, education and job opportunities and the population of the cities are increasing. In addition to this, the population is in an inrease trend in all the three provinces when the total population is examined.

Table IV.22. The Annual Population Increase Rates of Balikesir, Canakkale, Manisa Provinces (DIE, 2000)

	1990 General Census Results			2000 General Census Results			Annual Population Increase Rate ‰		
	Total	City	Village	Total	City	Village	Total	City	Village
Balikesir	974,274	468,758	505,516	1,076,347	577,595	498,752	9.96	20.87	-1.35
Canakkale	432,263	168,629	263,634	464,975	215,571	249,404	7.29	24.55	-5.55
Manisa	1,154,418	590,374	564,044	1,260,169	714,760	545,409	8.76	19.11	-3.36

According to industrialization Balikesir and Manisa Provinces take part in the first 25 cities in Turkey. In addition to this, Marmara and Aegean Regions, from which the project route passes, are industrialized regions, at which the production sector depends on industrialization beside the agricultural production. The migration from rural areas to urban areas increases due to the new job opportunities exist in the industrialized provinces. Similarly Canakkale Province, which is one of the most important cities of Marmara Region, is the 24th out of the 81 provinces in the ordering of socio-economical development in Turkey (http://www.dpt.gov.tr/a, 2004). Also here the population increase rate is decreasing due to the migrations from rural areas to urban areas. It is expected that this case would cause an increase in electricity consumption in the urban areas, in which the economical sectors depend on industry. The electricity consumption according to the sectors in Balikesir, Canakkale and Manisa Provinces in 2002 and the comparison of these with the whole country are presented in Table IV.23.

Tablo IV.23. The Comparison of the Electricity Consumption of Sectors and Per Capita of Balikesir, Canakkale, Manisa Provinces and Turkey (TEIAS, 2002)

	Balikesir		Canakkale		Manisa		Turkey	
Sector Consumption	MWh	%	MWh	%	MWh	%	MWh	%
Dwelling	398,528	28.2	149,124	17.4	335,841	22.7	23,559,425	22.9
Trade	173,495	12.3	57,838	6.8	128,310	8.7	10,867,292	10.6
Official Bureau	78,300	5.5	29,146	3.4	39,718	2.7	4,580,529	4.4
Industry	420,030	29.8	503,658	58.9	707,281	47.8	50,489,392	49.0
Agricultural Irrigation	11,866	0.8	19,813	2.3	108,508	7.3	2,749,780	2.7
Illumination (Paid)	22,812	1.6	32,437	3.8	-	-	2,159,969	2.1
Illumination (Free)	84,596	6.0	-	-	58,092	3.9	2,943,952	2.9
Other	221,791	15.7	63,350	7.4	100,675	6.8	5,597,523	5.4
Turkey Total Share	1,411,418	1.4	855,366	0.8	1,478,424	1.4	102,947,861	100.0

According to Table IV.23, the total electricity consumption of Balikesir and Manisa Provinces equal to 1.4% of electricity consumption of Turkey and in Canakkale Province this value decreases to 0.8%. In addition to this, the electricity consumption per capita in the three provinces discussed is close to the average electricity consumption per capita of Turkey (1,479 kWh). This value was determined for Balikesir, Canakkale and Manisa Provinces as 1,296 kWh, 1,828 kWh and 1,162 kWh respectively (Chapter I, Table I.1). In Balikesir, Canakkale and Manisa Provinces the main electricity consumption exist in industry sector like in Turkey generally and the electricity consumption of dwellings follows this. The industry sector of Balikesir Province uses 30% of the total electricity consumption of the province and the electricity consumption of the dwellings is about 28% of the total consumption. On the other hand, the main source of the electricity consumption of Canakkale Province is the electricity consumption due to industry. The electricity consumption of the dwellings is 17% of the total consumption and this value is 59% for industry. Similarly also in Manisa Province most of the electricity consumption is due to industry. The electricity consumption of the dwellings follows this. The electricity consumption of the industry is 49% of the total electricity consumption and the electricity consumption of the dwellings is 23% of the total consumption. In each of the provinces the electricity consumption of industry has a big share in the total electricity consumption and this indicates the industrialization levels of these provinces.

IV.3.3.The Social Infrastructure Services of the Region (Education, health and cultural services and using conditions of these services)

The current informations about the number and the distribution of the educational institutions in Balikesir, Canakkale and Manisa Provinces include data of year 2000, which was prepared by DIE. As it can be seen in Table IV.24, there are 662 educational institutions in Balikesir Province. 63% of these schools are located in rural areas and 37% are in urban areas. The rate of primary education institutions is 82% of the educational institutions in Balikesir Province. Despite the primary education institutions in rural areas are 2.5 times of the urban areas, it is opposite for the intermediate education institutions. There are two types of intermediate education institutions as the professional and technical high schools and the general high schools. 81% of the intermediate education institutions are in the urban areas.

There are 22 educational institutions in Balikesir Province Balya District. 23% of these schools are in rural areas and 77% are in urban areas. In Balya District the rate of the primary education institutions is 95% of the educational institutions. Like in the Balikesir Province, also in Balya District the primary education institutions in rural areas are 4 times of the urban areas. There is only one general high school in urban areas and there is not any intermediate education institutions in rural areas.

There are 43 educational institutions in Balikesir Province Ivrindi District. In Ivrindi District the rate of the primary education institutions is 91% of the educational institutions. 90% of the primary education institutions are in rural areas and 2 of the 4 high schools of the district are in rural areas and the other 2 are in urban areas.

There are 13 educational institutions in Balikesir Province Savastepe District. 46% of these schools are in rural areas and 54% are in urban areas. In Savastepe District the rate of the primary education institutions is 69% of the educational institutions. Despite the primary education institutions in rural areas are 2 times of the urban areas, there are two general high schools and two professional and technical high schools in urban areas and there is no intermediate education institution in rural areas.

There are 271 educational institutions in Canakkale Province. The rate of the primary education institutions is 74% of the educational institutions. 64% of the primary education institutions are in rural areas and 53% of the total educational institutions are in rural areas. The number of high schools in urban areas are nearly 4 times of the rural areas.

There are 46 educational institutions in Canakkale Province Biga District. In Biga District the rate of the primary education institutions is 72.3% of the educational institutions. 61% of these schools are in rural areas and 39% are in urban areas. There are 10 high schools in the district and 80% of these are in urban areas.

There are 27 and 22 educational institutions in Canakkale Province Can and Yenice Districts respectively. The primary education institutions have the largest share with a rate of 73%. The number of the primary education institutions are equal in urban and rural areas in Can District and 81% of the primary education institutions are in rural areas in Yenice District. In Can District there is not any high schools in rural areas and there are 7 high schools in urban areas. In Yenice District there are totally 6 high schools, 3 in the rural and 3 in the urban areas.

There are 875 educational institutions in Manisa Province. 70% of these schools are in rural areas and 30% are in urban areas. The rate of the primary education institutions is 86% of the educational institutions and 76% of these primary eduction institutions are in rural areas. 39% of the intermediate education institutions are general and 61% are professional and technical high schools. 89% of these are in urban areas.

There are 47 educational institutions in Soma District. The rate of the primary education institutions is 81% of the educational institutions. 60% of these schools are in rural areas and 40% are in urban areas. The number of the intermediate education institutions are equal in urban and rural areas in the district. The rate of the intermediate education institutions is 29% of the total educational institutions.

The literacy status in Balikesir, Canakkale and Manisa Provinces and Balya, Ivrindi, Savastepe, Biga, Can, Yenice and Soma Districts are presented in Table IV.25, Table IV.26 and Table IV.27. Except Manisa Province, the literacy rates of males are higher in the other provinces and districts.

In Balikesir Province the rate of college graduates is 5.7% out of the literates. This rate increases to 7.1% in Balya Distrcits and decreases to 4.4% in Ivrindi District and 4.3% in Savastepe District. 19% of the literates are not graduates of any educational institution in Balikesir Province and Balya, Ivrindi and Savastepe Districts.

Similarly in Canakkale rovince and Can and Yenice Districts the rate of college graduates is 5.7% out of the literates. This rate increases to 7.2% in Biga District. 18% of the literates are not graduates of any educational institution in these population centers.

The number of college graduates in Manisa Province and Soma District are relatively less than the other provinces and districts located on the route (3.5%). Besides, 22% of the literates are not graduates of any educational institution in these population centers and this rate is higher than the other provinces and districts.

Table IV.24. The Number and Distribution of the Educational Institutions of Balikesir, Canakkale and Manisa Provinces and Balya, Ivrindi, Savastepe, Biga, Can, Yenice and Soma Districts (DIE, 2000)

			Number of Schools		
			Rural	Urban	Total
Balikesir	Primary education		393	150	543
	Intermediate education	General	10	38	48
		Professional and Technical	13	58	71
Balya	Primary education		17	4	21
	Intermediate education	General	-	1	1
		Professional and Technical	-	-	-
Ivrindi	Primary education		35	4	39
	Intermediate education	General	2	1	3
		Professional and Technical	-	1	1
Savastepe	Primary education		6	3	9
	Intermediate education	General	-	2	2
		Professional and Technical	-	2	2
Canakkale	Primary education		129	71	200
	Intermediate education	General	-	-	--
		Professional and Technical	-	-	-
		Total	14	57	71
Biga	Primary education		26	10	36
	Intermediate education	General	-	-	-
		Professional and Technical	-	-	-
		Total	2	8	10
Can	Primary education		10	10	20
	Intermediate education	General	-	-	-
		Professional and Technical	-	-	-
		Total	-	7	7
Yenice	Primary education		13	3	16
	Intermediate education	General	-	-	-
		Professional and Technical	-	-	-
		Total	3	3	6
Manisa	Primary education		573	181	754
	Intermediate education	General	8	39	47
		Professional and Technical	5	69	74
Soma	Primary education		24	14	38
	Intermediate education	General	3	1	4
		Professional and Technical	1	4	5

Table IV.25. The Literacy States in Balikesir Province and Balya, Ivrindi and Savastepe Districts (DIE, 2000)

Literacy Status		Balikesir	Balya	Ivrindi	Savastepe
Literate	*M**	464105	847	2431	4305
Total	*F**	*405453*	*715*	*2206*	*3999*
Literate without any diploma	M	89685	151	459	901
	F	84668	123	451	859
Primary school graduate (5 years)	M	204552	307	891	1328
	F	218095	370	1206	1692
Primary school matching graduate	M	21185	60	131	483
	F	15462	35	104	554
Junior high school graduate	M	40968	103	318	629
	F	20999	34	113	278
Junior high school matching graduate	M	2300	9	8	29
	F	880	0	4	4
High school graduate	M	47368	98	351	502
	F	35729	70	191	399
High school matching graduate	M	25907	53	124	179
	F	11812	36	71	101
College graduate	*M*	31976	65	145	252
	F	17379	46	61	108
Unknown	*M*	164	1	4	2
	F	429	1	5	4
Illiterate	*M*	*30996*	*54*	*139*	*225*
	F	*83491*	*144*	*419*	*752*

**M: male; F: female*

Table IV.26. The Literacy States in Canakkale Province and Biga, Can and Yenice Districts (DIE, 2000)

Literacy Status		Canakkale	Biga	Can	Yenice
Literate	*M**	211017	12047	13727	2370
Total	*F**	*175064*	*11300*	*11501*	*2256*
Literate without any diploma	M	36786	2104	2181	460
	F	34363	2131	2161	443
Primary school graduate (5 years)	M	98579	4762	5711	939
	F	98890	5737	6294	1268
Primary school matching graduate	M	7804	597	591	154
	F	6184	498	598	103
Junior high school graduate	M	17927	1118	1424	237
	F	6946	527	477	77
Junior high school matching graduate	M	1052	69	144	9
	F	333	31	28	3
High school graduate	M	22014	1553	1379	271
	F	15139	1269	960	178
High school matching graduate	M	12499	754	1287	124
	F	5685	502	496	94
College graduate	*M*	14303	1088	1007	174
	F	7389	601	465	88
Unknown	*M*	53	2	3	2
	F	135	4	22	2
Illiterate	*M*	*14075*	*470*	*413*	*106*
	F	*30965*	*1283*	*936*	*282*

**M: male; F: female*

Table IV.27. The Literacy States in Manisa Province and Soma District (DIE, 2000)

Literacy Status		Manisa	Soma
Literate	*M**	*529110*	25481
Total	*F**	*541584*	*24743*
Literate without any diploma	M	116753	5906
	F	112091	5967
Primary school graduate (5 years)	M	269573	10692
	F	253642	13493
Primary school matching graduate	M	15706	1050
	F	12097	774
Junior high school graduate	M	40272	2427
	F	17717	1243
Junior high school matching graduate	M	1772	87
	F	662	43
High school graduate	M	39799	2173
	F	30345	1899
High school matching graduate	M	21012	1964
	F	11284	659
College graduate	*M*	24086	1177
	F	13447	645
Unknown	*M*	137	5
	F	299	20
Illiterate	*M*	*37686*	*997*
	F	*118172*	*3067*

**M: male; F: female*

According to the data of DIE of year 2000, the total actual number of the hospital beds is 2490 in Balikesir Province. 70% of the bed capacity belong to Health Ministry. One of the state hospitals is in Ivrindi District, which is on the project route. In the province, at which there are 20 hospitals totally, the number of hopitals belong to SSK and private institution is 7.

In Canakkale Province, which is back of Balikesir Province with regard to the population values and development rate, the number of hospitals and beds are lower than the other provinces on the route. In Canakkale Province the total number of beds is 900 and the number of hospitals is 11. 9 of these hopitals belong to Health Ministry, 1 belongs to SSK and 1 of them is a private hospital. There are a hospital of Ministry of Health in each of Biga, Can and Yenice Districts.

In Manisa Province, which is at the 25th place of the socio-economical development ordering of Turkey according to the Socio-Economical Performance Indeces of the Provinces study prepared by State Planning Organization (DPT, 2003), there are 25 hospitals. The total actual number of these are 2688. The rate of the hospitals of Ministry of Health is 64% out of the total hospitals. Besides, there is also a hospital of SSK in Soma District. In addition to these there is Salihli Cevsav Hospital, which has no actual bed capacity, and a Health Application and Research Center that belongs to Celal Bayar University in Manisa Province. The information about the number of state and private hospitals and their bed capacities in Balikesir, Canakkale and Manisa Provinces can be seen in Table IV.28.

Table IV.28. The Number of State and Private Hospitals and Their bed Capacities in Balikesir, Canakkale and Manisa Provinces (DIE, 2002)

Provinces	Hospitals of Ministry of Health		Other Hospitals		Total Number of Beds
	Institution number	Number of beds	Institution number	Number of beds	
Balikesir	13	1734	7	756	2490
Canakkale	9	698	2	211	900
Manisa	16	1772	9	916	2688

IV.3.4. The Urban and Rural Land Use in the Project Area and Its Close Vicinity (The distribution of the population centers, the existing and planned usage areas, the industrial regions in this range, dwellings, turism areas etc.),

Balikesir province is suitable for every kind of industrial work during the whole year on account of the climatic conditions. The transportation by the highways and sea is easy in the province. Balikesir University educates the qualified workers, foremen, technical and managerial personnel for the industry.

In Balikesir the sectors are not collected in the central district unlike the other provinces of Turkey, distributed homogeneously to the districts. For this reason each district is developed in various sectors. For example agricultural machinery, cement, synthetic sack and generators are located in the central district; oliveoil in Ayvalik-Edremit, white meat and dung in Bandirma; milk and milk products in Manyas-Gonen, Susurluk and the central district.

Besides Balikesir province has a big turism potential since it has shores to the Marmara and Aegean Seas. At Aegean shores (Alibey Island, Sarimsakli) - Burhaniye (Oren) - Edremit (Akcay, Altinoluk) and at Marmara shores Gonen (Denizkent) Bandirma, Erdek and Marmara (Avsa, Turkeli) are the turism regions. Besides, thermal springs, Kuscenneti National Park, Kaz Mountains and Kapidag are the other turism areas of the region. Kapidag (Erdek), Alacam Plateau (Dursunbey), Hisartepe (Bigadic), Hanlar Plateau (Edremit), Madra Mountain (Ivrindi), Sindirgi Kertil and Sidan Plateau are tracks of mountain climbing and trekking (http://www.balikesir.gov.tr/a, 2004).

Agriculture is the most important activity in the economy of Canakkale Province, but in recent years the industry branches related to agriculture are developed and the industry share in the economy increases. The Seramik and Kalebodur Factories located in Can, Cement Factory located in Ezine and the factories producing frozen food, vegetables and water products in the center are the important production units. The frozen and dried food, water products, bean, cement, mine ore, ceramics and square faience are the most exported products. The substructure studies in the Biga and Canakkale Organized Industry Regions were finished and the allocation of the plots to the investors continues. Besides there are 886 offices are operating in 7 small industrial estates.

Canakkale Province has an important cultural turism potential with its historical monuments and natural beauties. Canakkale Province has Gelibolu Peninsula Historical National Park, at which there are a lot of martyries, monuments and cemeteries, and the ancient civilization centers like Troy and Assos and has an important place in native and foreign turism.

Also Manisa province is one of the important agricultural production centers of Turkey. Most of the population is employed in agriculture sector. Manisa is at the 1st place in grape and tobacco production and at the 2nd place in the total agricultural products. The traditional and agricultural industry structure of Manisa was started to change in 1970's. Establishing the Organized Industry Region in the center, the encouragements to the investments and exportation, accelerate the transformation of the capital obtained from agricultural and trade sectors to the industry. There are 90 industrial plants in Manisa Organized Industry Region and about 14.000 people are employed (http://manisa.meb.gov.tr/, 2004).

Manisa Province is an affluent province on account of historical, natural and folkloric worths. Kula houses are the most beautiful examples of Ottoman Architecture. Besides, Spil Mountain beside its recreation property is a suitable area for climatism, trekking, mountain climbing and hillside parachute.

IV.3.5. Income (The distribution to the branches of industry in the region that the energy is transmitted etc.)

Balikesir is the transition province between Marmara Region, which is the industry and trade center of Turkey, and Aegean Region, which is the affluent agriculture and trade region. In Balikesir, which has the climatic properties of Marmara and Aegean Regions, various types of agricultural products are produced. In addition to this it has an importance all over the world on account of its affluent mine resources. Bandirma, which is its port at Marmara Sea, connects the province to Istanbul region and to the foreign countries. All of these properties cause an active trade in Balikesir (http://www.balikesir.gov.tr/b, 2004).

In Balikesir Province, which is at the 15th place of the socio-economical development ordering of Turkey according to the Socio-Economical Performance Indeces of the Provinces study prepared by State Planning Organization, agriculture is an important sector. According to the same report, the share that Balikesir ensures with its agricultural production in Turkey is at the 3rd place out of 81 provinces (http://www.dpt.gov.tr/b, 2003). As it can be seen in Table IV.29, olive growing is an important sector and 14.46% portion of olive production of Turkey is ensured in this province. There is no olive growing in Balya and Ivrindi Districts and Savastepe District ensures 0.41% of olive production of Balikesir Province. In addition to this, Balikesir has a share of 7.93% in cauliflower and asparagus production of Turkey and 1.40% of this share is produced in Ivrindi District. Besides, the district ensures 31% of walnut, hazelnut and chestnut, which includes in hard shell fruit category, production and 15% of leguminosae production of the province.

The economy of Balya District depends on agriculture. But because of the unproductive fields, limited production could be performed. The main agricultural products are wheat, barley and maize (http://www.balikesir.com/a, 2004).

Savastepe District has transition type property since it is located at the southmost of Marmara Region and some part enters the Aegean Region. The main agricultural products of the district are wheat, barley and leguminous and little amounts of beet, grape, tobacco, cotton, sunflower and sesame are produced (http://www.balikesir.com/ b, 2004). Despite most of the population is working in public service in each of the districts, agriculture and cattle breeding are important sectors. The agricultural production data of year 2003 obtained from DIE are given in Table IV.29, Table IV.30 and Table IV.31.

Table IV.29. Fruit Production of Balikesir Province, Balya, Ivrindi and Savastepe Districts in 2003 and the Comparison with the Production of Turkey (DIE, 2003)

	Balya Fruit Production Rate (Ton)	Ivrindi Fruit Production Rate (Ton)	Savastepe Fruit Production Rate (Ton)	Balikesir Fruit Production Rate (Ton)	Fruit Production Rate of Turkey (Ton)	Percentages in Turkey (%)			
						Balya	Ivrindi	Savastepe	Balikesir
Fruits with soft seed (Pear, quince, apple, etc.)	420	348	175	15376	3097000	0.01	0.01	0.01	0.50
Fruits with hard seed (Plum, apricot, cherry, etc.)	112	235	123	25479	1605900	0.01	0.02	0.01	1.59
Citrus fruits (Lemon, orange, tangerine)	-	-	-	7094	2487650	-	-	-	0.29
Fruits with shell (Walnut, Chestnut, etc.)	217	1753	67	5655	789000	0.03	0.22	0.01	0.72
Grape and graplike fruits (Strawberry, mulberry, fig, grape, etc.)	2009	366	331	40650	5611820	0.04	0.01	0.01	0.73
Olive	-	-	1014	245718	1700000	-	-	0.01	14.46

Table IV.30. Vegetable Production of Balikesir Province, Balya, Ivrindi and Savastepe Districts in 2003 and the Comparison with the Production of Turkey (DIE, 2003)

	Balya Vegetable Production Rate (Ton)	Ivrindi Vegetable Production Rate (Ton)	Savastepe Vegetable Production Rate (Ton)	Balikesir Vegetable Production Rate (Ton)	Vegetable Production Rate of Turkey (Ton)	Percentages in Turkey (%)			
						Balya	Ivrindi	Savastepe	Balikesir
Leafy vegetables (Cabbages, lettuce, spinach, etc.)	305	1432	548	50978	1696600	0.02	0.08	0.03	3.00
Leguminous vegetables (Bean, pea, kidney bean, etc.)	62	248	520	32576	709000	0.01	0.03	0.07	4.59
Vegetable- fruit (Pumpkin, melon, tomatoes, etc.)	6237	43885	27679	912557	20678500	0.03	0.21	0.13	4.41
Bulbous lumped vegetables (garlic, carrot, radish, etc.)	45	15	100	10993	826580	0.005	0.002	0.01	1.33
Other vegetables (Cauliflower, etc.)	20	120	110	8572	108107	0.02	0.11	0.10	7.93

Table IV.31. Crop Production of Balikesir Province, Balya, Ivrindi and Savastepe Districts in 2003 and the Comparison with the Production of Turkey (DIE, 2003)

	Balya Crop Production Rate (Ton)	Ivrindi Crop Production Rate (Ton)	Savastepe Crop Production Rate (Ton)	Balikesir Province Crop Production Rate (Ton)	Crop Production Rate of Turkey (Ton)	Percentages in Turkey (%)			
						Balya	Ivrindi	Savastepe	Balikesir
Grains (Wheat, barley, rye, etc.)	31749	37965	11556	562409	30658000	0.1	0.12	0.04	1.83
Leguminous (Bean, fodder beat, etc.)	703	5651	1908	37198	1558050	0.05	0.36	1.22	2.39
Industrial plants (Sugar beet, cotton, etc.)	-	-	-	77970	13645539	-	-	-	0.57
Oily seed (Sesame, sunflower, etc.)	153	143	76	26930	2358780	0.006	0.06	0.03	1.14
Lumped plants (Onion, garlic, potatoes)	2576	2601	3400	104716	7308000	0.04	0.034	0.05	1.43
Fodder plants (Clover, maize,etc.)	795	7407	599	92668	5962600	0.01	0.12	0.01	1.55

In Balikesir Province industry dependent on agriculture was developed due to the spread of the agriculture to a wide area. Balikesir industry was not developed as Bursa and Istanbul industries, but in 1996 the industry sector's share in the gross domestic product of the province was about 18%. 8.14% of the active population works in production industry.

In Balikesir the sectors are not collected in the central district unlike the other provinces of Turkey, distributed homogeneously to the districts. For this reason each district is developed in various sectors. For example agricultural machinery, cement, synthetic sack and generators are located in the central district; oliveoil in Ayvalik-Edremit, white meat and dung in Bandirma; milk and milk products in Manyas-Gonen, Susurluk and the central district. Besides, Balikesir Organized Industry Region, which was established on 450 hectare area and divided into two parts, is located at the 7. km of Balikesir-Savastepe road. In addition to this there are 4 modern industrial plants in Ivrindi District and 2 flour factories and dairy farms, at which the milk products are produced, in Savastepe district (http://www.balikesir.gov.tr/a, 2004).

In Canakkale Province despite most of the population is working in public service and production industry, the main economical activity is agriculture. Besides, the importance of agriculture increases because the industry mainly depends on agriculture in the province. In addition to this, Canakkale is very important for agriculture since it is in South Marmara Region, where the most productive areas of Turkey are located.

The products of the arable fields are the most important source of income for more than 70% of the villagers of Canakkale. The villages, where gardening and greengrocering are performed, are 50% of the total villages. Grains cover the biggest area in the total planted areas. Mostly the planting of wheat, barley, oats and rye are performed. The main

agricultural fields are located in Bayramic, Biga, Can and Yenice Districts. The rate of Canakkale Province in grain production is 1.270% of Turkey and the rates of Biga, Can and Yenice Districts are 33.5%, 8.4% and 8.8% respectively.

Besides, Canakkale is one of the shareholders in the production of certain leguminosae like Bursa and Balikesir. Mostly the production of pea, broad bean and kidney bean are performed. Due to its productive fields and temperate climate, it is possible to produce fruits in Canakkale. In stone seed fruit production, it produces 6.29% of Turkey. In addition to this, olivegroving performed in the province has a share of 5.87% in Turkey. Olivegrowing is the main source of income of the Ayvacik and Ezine villages. The Agonya tobacco produced in Yenice District is a desired tobacco kind and for this reason its production becomes important. The suitable climate and soil structure of the province enable to produce grapes, which are very suitable for wine and brandy production (http://www.canakkaletso.org.tr/a, 2004).

Great booze and cigarettes!

Biga District has a great importance in onion, garlic and potato production performed in Canakkale Province. This rate is about 60% of the production of the province. Besides the district produces 20% of the vegetables, whose fruits are eaten, of the Canakkale Province. As it can be seen in Table IV.32, Table IV.33 and Table IV.34, the district ensures most of the fruit, vegetable and grain production of the province.

Table IV.32. Fruit Production of Canakkale Province, Biga, Can and Yenice Districts in 2003 and the Comparison with the Production of Turkey (DIE, 2003)

	Biga Fruit Production Rate (Ton)	Can Fruit Production Rate (Ton)	Yenice Fruit Production Rate (Ton)	Canakkale Fruit Production Rate (Ton)	Fruit Production Rate of Turkey (Ton)	Percentages in Turkey (%)			
						Biga	Can	Yenice	Canakkale
Fruits with soft seed (Pear, quince, apple, etc.)	960	913	306	76885	3097000	0.03	0.03	0.01	2.48
Fruits with hard seed (Plum, apricot, cherry, etc.)	672	744	255	45650	1605900	0.04	0.05	0.02	6.29
Citrus fruits (Lemon, orange, tangerine)	-	-	-	354	2487650	-	-	-	0.01
Fruits with shell (Walnut, Chestnut, etc.)	275	145	125	4801	789000	0.03	0.02	0.02	0.61
Grape and graplike fruits (Strawberry, mulberry, fig, grape, etc.)	1858	595	1808	45571	5611820	0.03	0.01	0.03	0.81
Olive	466	-	-	99788	1700000	0.03	-	-	5.87

Table IV.33. Vegetable Production of Canakkale Province, Biga, Can and Yenice Districts in 2003 and the Comparison with the Production of Turkey (DIE, 2003)

	Biga Vegetable Production Rate (Ton)	Can Vegetable Production Rate (Ton)	Yenice Vegetable Production Rate (Ton)	Canakkale Vegetable Production Rate (Ton)	Vegetable Production Rate of Turkey (Ton)	Percentages in Turkey (%)			
						Biga	Can	Yenice	Canakkale
Leafy vegetables (Cabbages, lettuce, spinach, etc.)	1179	784	1165	12378	1696600	0.07	0.05	0.07	0.73
Leguminous vegetables (Bean, pea, kidney bean, etc.)	902	547	411	8207	709000	0.13	0.08	0.06	1.16
Vegetable- fruit (Pumpkin, melon, tomatoes, etc.)	118165	29794	69633	591178	20678500	0.57	0.15	0.34	2.86
Bulbous lumped vegetables (garlic, carrot, radish, etc.)	500	75	195	5483	826580	0.06	0.01	0.02	0.66
Other vegetables (Cauliflower, etc.)	200	-	-	2205	108107	0.19	-	-	2.04

Table IV.34. Crop Production of Canakkale Province, Biga, Can and Yenice Districts in 2003 and the Comparison with the Production of Turkey (DIE, 2003)

	Biga Crop Production Rate (Ton)	Can Crop Production Rate (Ton)	Yenice Crop Production Rate (Ton)	Canakkale Crop Production Rate (Ton)	Crop Production Rate of Turkey (Ton)	Percentages in Turkey (%)			
						Biga	Can	Yenice	Canakkale
Grains (Wheat, barley, rye, etc.)	130114	32611	34472	388674	30658000	0.42	0.11	0.11	1.270
Leguminous (Bean, fodder beat, etc.)	1672	670	1410	14599	1558050	0.11	0.04	0.09	0.94
Industrial plants (Sugar beet, cotton, etc.)	4364	-	-	9055	13645539	0.03	-	-	0.07
Oily seed (Sesame, sunflower, etc.)	3913	34	-	24300	2358780	0.17	0.001	-	1.03
Lumped plants (Onion, garlic, potatoes)	10881	1165	578	18070	7308000	0.15	0.02	0.01	0.25
Fodder plants (Clover, maize,etc.)	3391	539	9612	25658	5962600	0.06	0.01	0.16	0.43

Mostly industry depend on agriculture was developed in Canakkale. Especially since the last 25 years development is observed in some sub industry branches. The industries dependent on agriculture are made up of vegetable, fruit, sea products and milk

products, flour, fodder, oil and drink sub branches. Except nourishment, the industry dependent on stone and soil is also developed. The main industrial products of the province are tinned food, dried vegetable, cement, products of ceramics industry and milk products (http://www.canakkaletso.org.tr/b, 2004).

There are Organized Industry Regions in Canakkale Province and Biga District and there are 7 small industrial estates in the province. The production place of Canakkale Seramik, which is known all over the country, is located in Can District. In Yenice District there is a Tomato Sauce Factory, where the bean, green and red pepper and tomato produced in the district are processed and which is an institution of Industrial Development Cooperation of Davutkoy.

Despite Canakkale Province is in the Marmara Region, where the industry develops rapidly, the industry capital that came from other provinces finds Balikesir and Bursa more attractive. Besides there are limited number of state enterprises that could be the pioneer for the development of the industry of the province.

Canakkale Province is an important tourism area with its historical monuments and natural beauties. The Gelibolu Peninsula Historical National Park, at which there are a lot of martyries, monuments and cemeteries remaining from Canakkale War, and the ancient civilization centers like Parion, Priapos located in Biga District, Troy and Assos have important places in native and foreign turism. Besides Yenice District is a candidate for being one of the most important hunting turism centers with wild pig hunting (http://www.canakkale.net/, 2004).

According to the Socio-Economical Performance Indeces of the Provinces Report, the agricultural production of Balikesir Province is at 5th place out of 81 provinces. The modern agriculture methods are used in the province and the province is at the first places of Turkey in grape and tobacco production (http://www.dpt.gov.tr/c, 2003). Manisa Province produces about 30% of the grape production of Turkey. Especially the Manisa Sultani grape is famous and grape creates new employment opportunities for the province. About 220 thousand tons of seedless dry grape equals to 73% of the production of Turkey. There are 23 seedless dry grape enterprise in the province. In Soma District there is not very much grape production and it meets 0.041% of the grape production of the province.

The share of the province, which is famous with the Akhisar olives especially, in the total olive production of Turkey is about 14%. The share of Soma District in this production is 0.7% of the country and 5.1% of the Province. In the province there are 192 olive enterprises to process the olives that are produced for using directly and for taking oil.

The other important exporting product of the the province is the Salihli Cherry that is very famous. 26810 tons of production is performed in 3741 ha of area. With the production of oleaster, apricot, plum, wild apricot, sour cherry and peach, which are in the same category, 2.84% of Turkey is produced in Manisa.

Besides, the tobacco produced in Akhisar Village is very well-known as Aegean Tobacco in Turkey. About 42 thousand tons of good quality tobacco production is performed. This meets 25% of the production of the country (http://manisa.meb.gov.tr/, 2004).

The melon, watermelon, marrow, aubergine, etc., which are in the category of the vegetables, whose fruits are eaten, production of Manisa Province is about 5.18% in Turkey. 3.7% of the production of the vegetables, whose fruits are eaten, of the province

is produced in Soma District. The melon produced especially in Kirkagac District is well-known in the country. The products, which attract attention with their production rates in Manisa Province, are cauliflower and asparagus. The rate of the province in asparagus and cauliflower production is 9.12% of the country. Besides, the cotton produced in the province meet 15% of the production of the country. There are 58 cotton gin enterprises for processing of the cotton. The fruit, vegetable and grain production amounts of Manisa Province and Soma District are given in Table IV.35, Table IV.36 and Table IV.37.

Table IV.35. Fruit Production of Manisa Province and Soma District in 2003 and the Comparison with the Production of Turkey (DIE, 2003)

	Soma Fruit Production Rate (Ton)	Manisa Fruit Production Rate (Ton)	Fruit Production Rate of Turkey (Ton)	Percentages in Turkey (%)	
				Soma	Manisa
Fruits with soft seed (Pear, quince, apple, etc.)	195	19696	3097000	0.01	0.64
Fruits with hard seed (Plum, apricot, cherry, etc.)	149	45640	1605900	0.01	2.84
Citrus fruits (Lemon, orange, tangerine)	-	-	2487650	-	-
Fruits with shell (Walnut, Chestnut, etc.)	72	5480	789000	0.01	0.69
Grape and graplike fruits (Strawberry, mulberry, fig, grape, etc.)	685	1653073	5611820	0.01	29.46
Olive	11922	234458	1700000	0.70	13.79

Table IV.36. Vegetable Production of Manisa Province and Soma District in 2003 and the Comparison with the Production of Turkey (DIE, 2003)

	Soma Vegetable Production Rate (Ton)	Manisa Vegetable Production Rate (Ton)	Vegetable Production Rate of Turkey (Ton)	Percentages in Turkey (%)	
				Soma	Manisa
Leafy vegetables (Cabbages, lettuce, spinach, etc.)	641	69153	1696600	0.04	4.08
Leguminous vegetables (Bean, pea, kidney bean, etc.)	281	14696	709000	0.04	2.07
Vegetable- fruit (Pumpkin, melon, tomatoes, etc.)	39947	1071498	20678500	0.19	5.18
Bulbous lumped vegetables (garlic, carrot, radish, etc.)	209	6634	826580	0.03	0.80
Other vegetables (Cauliflower, etc.)	70	9861	108107	0.06	9.12

Table IV.37. Crop Production of Manisa Province and Soma District in 2003 and the Comparison with the Production of Turkey (DIE, 2003)

	Soma District Crop Production Rate (Ton)	Manisa Province Crop Production Rate (Ton)	Crop Production Rate of Turkey (Ton)	Percentages in Turkey (%)	
				Soma	Manisa
Grains (Wheat, barley, rye, etc.)	16827	407748	30658000	0.05	1.33
Leguminous (Bean, fodder beat, etc.)	1816	17688	1558050	0.12	1.34
Industrial plants (Sugar beet, cotton, etc.)	359	69728	13645539	0.002	0.51
Oily seed (Sesame, sunflower, etc.)	484	81653	2358780	0.02	3.46
Lumped plants (Onion, garlic, potatoes)	544	28220	7308000	0.01	0.39
Fodder plants (Clover, maize,etc.)	564	26238	5962600	0.01	0.44

There are Organized Industry Regions and Small Industrial Estates in the province. There are 90 industrial establishments in the Organized Industry Region locared in the center and about 14000 people are employed in these establishments. It is planned to establish Organized Industry Regions in Akhisar, Salihli, Turgutlu and Kula Districts.

Soma District has the best quality lignite coal of Turkey. On account of reserve it is at the 2nd place after Elbistan. There is also a thermal power station in the district.

Manisa Province attracts native and foreign turists in the Mesir Macunu Festivals, which have been performed for 500 years in the province. Nowadays Mesir Macunu, which is started to make by the prayer ceremony at the Sultan Kulliyesi in the Nevruz day, is distributed to the community by the sports, social and cultural activities in the third or fourth sunday of april. In these periods the economy becomes active due to the native and foreign turists those came to the festival (http://manisa.meb.gov.tr/, 2004).

The production of milk, wool, leather, meat, egg and honey, which were produced in Balikesir Province, Balya, Ivrindi and Savastepe Districts in 2003, are presented in Table IV.38, Table IV.39, Table IV.40, Table IV.41, Table IV.42 and Table IV.43 respectively. In Balikesir the sectors of milk and milk products mainly meat, poulterering (especially in recent years) and egg have an important place. Especially the milk and milk products factory, which is established on 67,000 m^2 area, operates in Susurluk District and processes the milk that is collected from the center, villages and the surrounding districts and put the milk and milk products on the market. The factory employs about 250 people, has an important effect on the development of milk cattle breeding in Susurluk District and besides contributes to the economical development of the villages. Besides, there are a lot of dairy farms beside the 2 meat combines. In the district a lot of animals with the animals those came from the other districts are cut and sent to the surrounding provinces mainly Istanbul and Ankara. There is no culture and hybrid cattle breeding in Balya, Ivrindi and Savastepe Districts but Balikesir Province meets 11.5% and 10% of the production of Turkey respectively. Besides, the province meets 7.7% of the egg production of the country. But in honey production, it does not have a big share like in egg and milk production. Its share in honey production is 1.86% and in sealing-wax production 3.02%.

Table IV.38. Milk Production of 2003 in Balikesir Province, Balya, Ivrindi and Savastepe Districts (DIE, 2003)

	Balya District Production (Ton)	Ivrindi District Production (Ton)	Savastepe District Production (Ton)	Balikesir Province Production (Ton)	Production of Turkey (Ton)	Percentage in Turkey (%)			
						Balya	Ivrindi	Savastepe	Balikesir
Goat	399.90	655.84	208.91	9170.51	247349.53	0.16	0.27	0.08	3.71
Sheep (Merino)	-	-	516.78	2084.14	14979.77	-	-	3.45	13.91
Sheep (Domestic)	2748.33	3064.23	199.02	22362.18	754979.18	0.36	0.41	0.03	2.96
Water buffalo	-	-	-	371.19	48778.09	-	-	-	0.76
Cattle (Culture)	29504.46	11907.63	3823.67	238147.31	3215858.82	0.92	0.37	0.12	7.41
Cattle (Hybrid)	1835.57	7008.54	6452.86	96160.51	4568251.76	0.04	0.15	0.14	2.10
Cattle (Domestic)	216.87	3191.60	416.55	12735.32	1730027.38	0.01	0.18	0.02	0.74

Table IV.39. Wool Production of 2003 in Balikesir Province, Balya, Ivrindi and Savastepe Districts (DIE, 2003)

	Balya District Production (Ton)	Ivrindi District Production (Ton)	Savastepe District Production (Ton)	Balikesir Province Production (Ton)	Production of Turkey (Ton)	Percentage in Turkey (%)			
						Balya	Ivrindi	Savastepe	Balikesir
Goat	1.9	4.7	1.1	53.9	2740.6	0.07	0.17	0.04	1.97
Sheep (Merino)	-	-	41.4	198.8	2332.6	-	-	1.77	8.52
Sheep (Domestic)	99.2	148.8	10.9	1135.5	44123.5	0.22	0.33	0.02	2.57

Table IV.40. Leather Production of 2003 in Balikesir Province, Balya, Ivrindi and Savastepe Districts (DIE, 2003)

	Balya Production (number)	Ivrindi Production (number)	Savastepe Production (number)	Balikesir Production (number)	Production of Turkey (number)	Percentage in Turkey (%)			
						Balya	Ivrindi	Savastepe	Balikesir
Goat	87	199	90	17758	620923	0.01	0.03	0.01	2.86
Sheep (Domestic)	788	1249	250	468780	3859092	0.02	0.03	0.01	12.15
Water buffalo	-	-	-	144	10473	-	-	-	1.37
Cattle (Culture)	-	-	-	33174	252813	-	-	-	13.12
Cattle (Hybrid)	-	-	-	54581	674637	-	-	-	8.09
Cattle (Domestic)	369	368	15	6342	800872	0.05	0.05	0.002	0.79

Table IV.41. Meat Production of 2003 in Balikesir Province, Balya, Ivrindi and Savastepe Districts (DIE, 2003)

	Balya District Production (Ton)	Ivrindi District Production (Ton)	Savastepe District Production (Ton)	Balikesir Province Production (Ton)	Production of Turkey (Ton)	Percentage in Turkey (%)			
						Balya	Ivrindi	Savastepe	Balikesir
Goat	1.7	3.8	1.7	247.1	11285.3	0.02	0.03	0.02	2.19
Sheep (Domestic)	17.3	27.5	5.5	6239.9	63006.0	0.03	0.04	0.01	9.90
Water buffalo	-	-	-	24.3	1709.2	-	-	-	1.42
Cattle (Culture)	-	-	-	6177.4	53900.4	-	-	-	11.46
Cattle (Hybrid)	-	-	-	12683.6	124615.5	-	-	-	10.18
Cattle (Domestic)	52.8	52.6	2.1	882.8	111939.4	0.05	0.05	0.002	0.79

Table IV.42. Egg Production of 2003 in Balikesir Province, Balya, Ivrindi and Savastepe Districts (DIE, 2003)

	Balya Production (x 1000)	Ivrindi Production (x 1000)	Savastepe Production (x 1000)	Balikesir Production (x 1000)
The Number of Eggs	5100	150	1440	975611
Percentage in Turkey	0.04	0.001	0.01	7.70

Table IV.43. Honey Production of 2003 in Balikesir Province, Balya, Ivrindi and Savastepe Districts (DIE, 2003)

	Balya Production (Ton)	Ivrindi Production (Ton)	Savastepe Production (Ton)	Balikesir Production (Ton)
Total Honey Production	89.3	115.0	23.4	1292.7
Total Sealing-wax Production	9.0	-	0.2	94.4
Percentage in Turkey (in Honey Production)	0.13	0.17	0.03	1.86
Percentage in Turkey (in Sealing-wax Production)	0.29	-	0.01	3.02

In Canakkale cattle breeding is one of the most important sources of income of the villagers and the agriculture sector is at the second place. The cattle breeding performed in the province can be divided into two as cattle breeding in plain shore line and cattle breeding in mountain and forest villages. The pastures and meadows covers 5% of the area inside the province. Since the plain shore line areas are more suitable for feeding the animals, the yield is higher. On the other hand Local Directorate Of Agricultural Management serves the breeders by breeding improved stallion animals. As it can be seen in Table IV.44, Table IV.45, Table IV.46, Table IV.47, Table IV.48 and Table IV.49, the productions of milk, wool, leather, meat, egg and honey, which are produced in the province, are not as high as Balikesir Province. In Yenice District beekeeping is performed by professional beehives, but these only meet the needs of the families.

Table IV.44. Milk Production of 2003 in Canakkale Province, Biga, Can and Yenice Districts (DIE, 2003)

	Biga Production (Ton)	Can Production (Ton)	Yenice Production (Ton)	Canakkale Production (Ton)	Production of Turkey (Ton)	Percentage in Turkey (%)			
						Biga	Can	Yenice	Canakkale
Goat	478.85	691.61	363.68	7438.33	247349.53	0.17	0.25	0.13	2.71
Sheep (Merino)	-	-	-	67.94	14979.77	-	-	-	0.45
Sheep (Domestic)	1427.69	1364.83	1084.86	14457.67	754979.18	0.19	0.18	0.14	1.19
Water buffalo	124.61	-	-	124.61	48778.09	0.26	-	-	0.26
Cattle (Culture)	73997.78	24005.66	5461.20	128178.79	3215858.82	2.30	0.75	0.17	3.99
Cattle (Hybrid)	-	3430.67	9183.10	27590.88	4568251.76	-	0.08	0.20	0.60
Cattle (Domestic)	63.99	-	613.61	5129.75	1730027.38	0.003	-	0.04	0.30

Table IV.45. Wool Production of 2003 in Canakkale Province, Biga, Can and Yenice Districts (DIE, 2003)

	Biga Production (Ton)	Can Production (Ton)	Yenice Production (Ton)	Canakkale Production (Ton)	Production of Turkey (Ton)	Percentage in Turkey (%)			
						Biga	Can	Yenice	Canakkale
Goat	3.5	4.5	2.5	57.6	2740.6	0.13	0.16	0.09	2.10
Sheep (Merino)	-	-	-	5.6	2332.6	-	-	-	0.24
Sheep (Domestic)	54.2	55.1	44.7	624.6	44123.5	0.12	0.12	0.10	1.42

Table IV.46. Leather Production of 2003 in Canakkale Province, Biga, Can and Yenice Districts (DIE, 2003)

	Biga Production (number)	Can Production (number)	Yenice Production (number)	Canakkale Production (number)	Production of Turkey (number)	Percentage in Turkey (%)			
						Biga	Can	Yenice	Canakkale
Goat	3250	955	1017	15080	620923	0.52	0.15	0.16	2.42
Sheep (Domestic)	4671	2730	1013	22513	3859092	0.12	0.07	0.03	0.58
Water buffalo	6	-	-	6	10473	0.06	-	-	0.06
Cattle (Culture)	1227	726	-	3252	252813	0.49	0.29	-	1.29
Cattle (Hybrid)	-	242	-	1813	674637	-	0.04	-	0.27
Cattle (Domestic)	192	72	799	1785	800872	0.02	0.001	0.1	0.22

Table IV.47. Meat Production of 2003 in Canakkale Province, Biga, Can and Yenice Districts (DIE, 2003)

	Biga Production (Ton)	Can Production (Ton)	Yenice Production (Ton)	Canakkale Production (Ton)	Production of Turkey (Ton)	Percentage in Turkey (%)			
						Biga	Can	Yenice	Canakkale
Goat	35.7	17.4	15.5	216.5	11285.3	0.32	0.15	0.14	1.92
Sheep (Domestic)	86.9	59.2	22.6	470.7	63006.0	0.14	0.09	0.04	0.75
Water buffalo	1.0	-	-	1.0	1709.2	0.06	-	-	0.06
Cattle (Culture)	198.2	125.3	-	544.4	53900.4	0.37	0.23	-	1.01
Cattle (Hybrid)	-	39.4	-	297.3	124615.5	-	0.03	-	0.24
Cattle (Domestic)	34.7	13.4	143.2	315.9	111939.4	0.03	0.01	0.13	0.28

Table IV.48 Egg Production of 2003 in Canakkale Province, Biga, Can and Yenice Districts (DIE, 2003)

	Biga District Production (x 1000)	Can District Production (x 1000)	Yenice District Production (x 1000)	Canakkale Province Production (x 1000)
The Number of Eggs	24720	6014	3026	51374
Percentage in Turkey	0.20	0.05	0.02	0.41

Table IV.49. Honey Production of 2003 in Canakkale Province, Biga, Can and Yenice Districts (DIE, 2003)

	Biga District Production (Ton)	Can District Production (Ton)	Yenice District Production (Ton)	Canakkale Province Production (Ton)
Total Honey Production	163.0	131.9	105.8	837.9
Total Sealing-wax Production	4.5	13.2	-	32.2
Percentage in Turkey in Honey Production	0.23	0.19	0.15	1.20
Percentage in Turkey in Sealing-wax Production	0.14	0.42	-	1.03

In Manisa Province the projects about developing the cattle breeding have been applied since 2003. To reproduce Saanen Goat, which has high milk and semen yield and does not give harm to forests, 127 Saanen Kid and 81 Saanen Stallion were distributed. Also 2550 turkeys and 82 beehives are collected by the governorship. Especially beekeeping was developed and an association was established (http://manisa.meb.gov.tr/, 2004). As it can be seen in Table IV.54, the egg production is developed in Manisa Province. The amount of eggs produced in the province meet 7.44% of Turkey. The production amounts of milk, wool, leather, meat, egg and honey, which are produced in the province, are given in Table IV.50, Table IV.51, Table IV.52, Table IV.53, Table IV.54 and Table IV.55.

Table IV.50. Milk Production of 2003 in Manisa Province and Soma District (DIE, 2003)

	Soma District Production (Ton)	Manisa Province Production (Ton)	Production of Turkey (Ton)	Percentage in Turkey (%)	
				Soma	Manisa
Goat	57.17	6068.91	247349.53	0.02	2.21
Sheep (Merino)	-	-	14979.77	-	-
Sheep (Domestic)	217.83	13369.56	754979.18	0 03	1.77
Water buffalo	-	58.13	48778.09	-	0.12
Cattle (Culture)	195.72	33341.18	3215858.82	0 01	1.04
Cattle (Hybrid)	2154.16	84123.89	4568251.76	0 05	1.84
Cattle (Domestic)	455.31	9761.42	1730027.38	0 03	0.56

CHAPTER V

IMPACTS OF THE PROJECT ON THE ENVIRONMENT AND THE MITIGATION MEASURES

Table IV.51. Wool Production of 2003 in Manisa Province and Soma District (DIE, 2003)

	Soma Production (Ton)	Manisa Production (Ton)	Production of Turkey (Ton)	Percentage in Turkey (%)	
				Soma	Manisa
Goat	0.9	70.3	2740.6	0.03	2.57
Sheep (Merino)	-	-	2332.6	-	-
Sheep (Domestic)	12.5	808.2	44123.5	0.03	1.83

Table IV.52. Leather Production of 2003 in Manisa Province and Soma District (DIE, 2003)

	Soma Production (Piece)	Manisa Production (Piece)	Production of Turkey (Piece)	Percentage in Turkey (%)	
				Soma	Manisa
Goat	754	13038	620923	0.12	2.10
Sheep (Domestic)	3867	80453	3859092	0.10	2.08
Water buffalo	20	20	10473	0.19	0.19
Cattle (Culture)	-	2550	252813	-	1.00
Cattle (Hybrid)	966	20438	674637	0.14	3.03
Cattle (Domestic)	584	5141	800872	0.07	0.64

Table IV.53. Meat Production of 2003 in Manisa Province and Soma District (DIE, 2003)

	Soma District Production (Ton)	Manisa Province Production (Ton)	Production of Turkey (Ton)	Percentage in Turkey (%)	
				Soma	Manisa
Goat	11.7	207.5	11285.3	0.10	1.84
Sheep (Domestic)	63.9	1251.5	63006.0	0.10	1.97
Water buffalo	2.4	2.4	1709.2	0.14	0.14
Cattle (Culture)	-	516.1	53900.4	-	0.96
Cattle (Hybrid)	176.5	3558.1	124615.5	0.14	2.86
Cattle (Domestic)	78.6	689.9	111939.4	0.07	0.62

Table IV.54. Egg Production of 2003 in Manisa Province and Soma District (DIE, 2003)

	Soma District Production (x 1000)	Manisa Province Production (x 1000)
The Number of Eggs	19	942277
Percentage in Turkey	0.00	7.44

Table IV.55. Honey Production of 2003 in Manisa Province and Soma District (DIE, 2003)

	Soma District Production (Ton)	Manisa Province Production (Ton)
Total Honey Production	26.3	751.7
Total Sealing-wax Production	3.3	27.5
Percentage in Turkey in Honey Production	0.04	1.08
Percentage in Turkey in Sealing-wax Production	0.11	0.88

The total fish productions of Balikesir, Canakkale and Manisa Provinces and the comparisons with the production of Turkey are given in Table IV.56. Only Biga has shore to the sea out of the districts, from which the energy transmission line passes, but except Manisa Province the other two provinces that the line passes have shores to the sea. As it can be seen in Table IV.56, more fish production is performed in Balikesir Province when it is compared with the other provinces. The rate is 1.33%. Canakkale Province and its vicinity cover the fish migration ways, which are formed in the opposite direction during the spawning season, from Blacksea to Marmara and the Mediterranean Sea, which is a fish canal. Like in Istanbul the local hunting area is Canakkale Strait. The local fishes like sardine, bluefish, bonito, chub mackerel and swordfish could be hunted. On the other hand the culture fishing is encouraged within the coverage of "Gokceada and Bozcaada Agricultural Development and Inhabiting Project". Also in Manisa Province fish production is performed in lakes, ponds and dams. The most important production centers are Golmarmara Lake, Demirkopru, Avsar and Sevisler Dam Lakes.

Table IV.56. Fish Production of Balikesir, Canakkale and Manisa Provinces and the Comparison with the Production of Turkey (DIE, 2003)

	Balikesir Total Fish Production (Ton)	Canakkale Total Fish Production (Ton)	Manisa Total Fish Production (Ton)
Total Fish Production (Ton)	595	410	411
Percentage in Turkey (%)	1.33	0.92	0.92

IV.3.6. Unemployment (The unemployed population in the region that the energy is transmitted and its ratio to the active)

As it is explained above an increase in population is observed in Balikesir, Manisa and Canakkale Provinces especially due to the migrations from villages to cities. The population data according to be active economically in the last week of Balikesir, Manisa and Canakkale Provinces according to the data of DIE of year 1990 can be seen in Table IV.57, Table IV.58 and Table IV.59.

Table IV.57. The Population According to the Activeness Economically In the Last Week of Balikesir Province (DIE, 1990)*

Population	TURKEY	MARMARA	BALIKESIR
Economically active in the last week	**24 726 601**	**5 572 971**	**484 368**
.....Male	16 073 560	4 125 076	308 209
.....Female	8 653 041	1 447 895	176 159
Economically inactive in the last week	**16 030 516**	**4 660 454**	**282 516**
.....Male	4 459 698	1 189 954	83 150
.....Female	11 570 818	3 470 500	199 366
Unknown	**26 314**	**4 603**	**170**
.....Male	15 467	3 167	106
.....Female	10 847	1 436	64

**Population of age 12 and above*

Table IV.58. The Population According to the Activeness Economically In the Last Week of Canakkale Province (DIE, 1990)*

Population	TURKEY	MARMARA	CANAKKALE
Economically active in the last week	**24 726 601**	**5 572 971**	**253 754**
.....Male	16 073 560	4 125 076	155 710
.....Female	8 653 041	1 447 895	98 044
Economically inactive in the last week	**16 030 516**	**4 660 454**	**95 845**
.....Male	4 459 698	1 189 954	26 996
.....Female	11 570 818	3 470 500	68 849
Unknown	**26 314**	**4 603**	**46**
.....Male	15 467	3 167	25
.....Female	10 847	1436	21

** Population of age 12 and above*

Table IV.59. The Population According to the Activeness Economically In the Last Week of Manisa Province (DIE, 1990)*

Population	TURKEY	AEGEAN	MANISA
Economically active in the last week	**24 726 601**	**3 651 445**	**607 016**
.....Male	16 073 560	2 348 396	372 516
.....Female	8 653 041	1 303 049	234 500
Economically inactive in the last week	**16 030 516**	**2 153 134**	**271 210**
.....Male	4 459 698	591 975	69 977
.....Female	11 570 818	1 561 159	201 233
Unknown	**26 314**	**3 605**	**193**
.....Male	15 467	1 924	111
.....Female	10 847	1 681	82

** Population of age 12 and above*

As it can be seen at this data, wheras the unemployment rate in Turkey is 39%, its 45.5% in Marmara Region and 37% in Aegean Region. This rate is 37%, 27% and 31% in Balikesir, Canakkale and Manisa Provinces respectively. As it can be seen at these rates, the province that the unemployment is the highest is Balikesir and the province that the unemployment is the lowest is Canakkale. Besides the unemployment rate of each province is lower than the unemployment rate of Turkey.

In Marmara Region 6.06% of the population that was economically inactive in the last week is in Balikesir Province and 2.05% is in Canakkale Province. 74.5% of the total unemployed population in Marmara Region is formed by females and this rate is 70.6% in Balikesir Province and 71.8% in Canakkale Province. In Aegean Region 12.6% of the population that was economically inactive in the last week is in Manisa Province. Like in Balikesir and Canakkale Provinces, also in Manisa Province unemployment is seen more in female population in provincial base. The rate of unemployed females is 74.2% in Manisa Province.

IV.3.7. Health (The existing endemic diseases in the region that the energy is transmitted)

There is not any disease that can be defined as endemic in each of the three provinces discussed. The list of the diseases, whose decleration are obligatory and obtained from Canakkale, Balikesir and Manisa Provincial Directorate of Health, is presented in Table IV.60. The disease statistical form given in the table covers the first nine months of 2004 for Canakkale and Manisa Provinces and the whole of year 2003 for Balikesir Province.

Table IV.60. The Existing Diseases in Canakkale, Balikesir and Manisa Provinces

	The Number of Occurance		
Existing Diseases	**Canakkale**	**Balikesir**	**Manisa**
Whooping-cough	1	14	11
Tetanus	-	2	1
Measles	102	29	281
Typhus	-	1	-
Typhoid fever	3	1	7
B. Dysentery	-	-	14
A. Dysentery	58	241	162
Hepatit-A	29	260	70
Hepatit B	6	37	52
Hydrophobia suspicion bites	1,148	1,586	1,302
Brusella	27	138	106
Anthrax	5	3	-
Meningitis	2	8	16
Scarlet fever	4	84	101
Streptococcus angina	22	29	2
Tuberculosis	139	195	202
Malaria	-	3	4
Syphilis	-	4	-

IV.3.8. Other Properties

There are not any other information and document to give in this chapter.

CHAPTER V. IMPACTS OF THE PROJECT ON THE ENVIRONMENT AND THE MITIGATION MEASURES

V.1. Activities During Land Preparation, Construction and Installation Stages, Impacts on the Physical and Biological Environment and the Mitigation Measures

In this chapter an evaluation is performed according to the data and findings, which were obtained from the field studies and literature surveys performed and explained in Chapter IV. The possible negative effects due to the construction studies are determined and the impact size and importance are evaluated.

V.1.1. Locations and Areas of Excavation, the Transportation, Storage and Usages of Materials and Explosives to be Used in Excavation During Land Preparation Stage

The excavation and fill processes would be performed while digging hollows for placing the tower feet during the land preparation. During excavation no inflammable, explosive, hazardous or toxic material would be used, only the work machinery and digging implements etc. would be used. The towers would be placed far from the continuous and discontinuous streams, which flows parallel or cut the route, as far as possible and no digging would be performed in watery places.

In energy transmission line projects after research and project the staking out the plot of land is applied by determining the angle points and the places of the tower feet. In the staking out the plot of land 1 central pile, 4 x 4 = 16 foot piles, 1 bracket pile, 2 direction piles (forward and backward) and 1 aliman (forward line pile) are driven. After these processes it is passed directly to the construction phase.

In the construction phase an excavation would be performed for the foundation hollows of the energy transmission line towers in the project area. For each of the transmission line tower 4 hollows would be dug. The depth of the hollows, in which the tower feet would be placed, are about 3 m and their dimensions would be 3 m x 3 m. Totally 526 towers would be st up along the line. The total excavation amount in this case is calculated below.

Hollow volume = 3 m x 3 m x 3 m = 27 m^3

The excavation amount for one tower = hollow volume x the number of feet
= 27 m^3 x 4 = 108 m^3

Total excavation amount= The excavation amount for one tower x number of towers
= 108 m^3 x 526 = 56,808 m^3

As shown above, the total excavation amount for 526 towers would be 56,808 m^3.

V.1.2. The areas that excavation wastes such as, soil, stone and sand would be transported or the purposes for which these wastes would be utilized

Within the coverage of the project the total excavation amount for 526 towers would be 56,808 m^3. The topsoil would be grazed and stored during digging hollows for the tower feet and after that the construction works would be started. The material that would formed during excavation would be used for filling processes and for levelling the area. For this reason there would be no excavation waste of the project.

The topsoil, that would be stored seperately from the excavation material, would be spread uniformly to the area that it had been grazed. For this reason, there would be a temporary effect during the construction works. In this matter the principles of Regulation on Excavation, Construction and Demolition Wastes, that became valid after published at the Official Gazette dated 18 March 2004 and No. 25406, would be followed.

V.1.3. How and Where Drainage and Flood Prevention Activities would be Carried Out

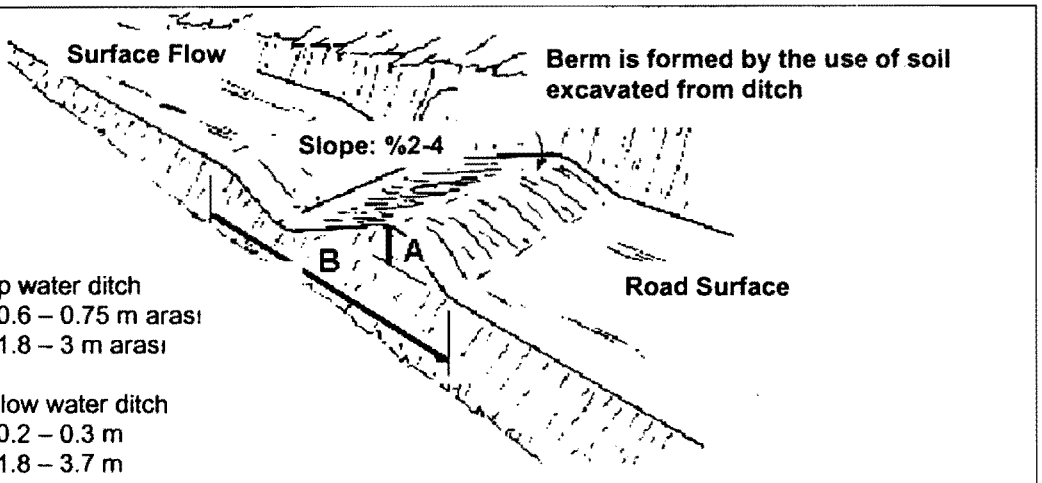
The Technical Specification of Turkey Power Tranmission Co. General Directorate (TEIAS) would be followed during selecting the locations of the tower feet in 380 kV Karabiga – Can – Soma TPS Energy Transmission Line. As explained in Chapter IV.2.4 there are a lot of continuous and discontinuous streams those cut the line or flow parallel. The tower feet would be placed away from these surface waters as far as possible and it would be kept away from the flood beds. Besides, as explained in Chapter V.1.14 in the areas those have erosion risk drainage canals would be constructed at the sides of the service roads and by this way the sediment transportation to the streams would be prevented.

V.1.4. The Processes related to the Construction of the Service Roads of the Transmission Lines and the Materials that would be used

In the construction of 380 kV Karabiga – Can – Soma TPS Energy Transmission Line the existing roads would be used as far as possible. Since the project is parallel to the existing 154 kV Balikesir II – Can Energy Transmission Line, it would be possible to use the service roads those are constructed before. The important points in case of constructing service road is inevitable are explained below.

- It would be kept away from the cultural areas determined on the project route.
- Drainage canals would be constructed at the sides of the service roads and by this way the sediment transportation to the streams would be prevented.
- The service roads would be watered when they are used and by this way the dust production would be prevented.
- It would be kept away from the areas those have surface water around.
- It would be kept away from the areas those have visual worth.
- It would be abstained from cutting trees.
- It would be kept away from the areas, where the topography and geological structure are not suitable.
- Instead of clearing the plant cover completely at the areas those would not be used again by constructing the service roads, pruning method would be used. By this method, at which the plants are pruned from 0-10 cm from the ground, removing the roots is prevented and the return of the area to its former condition is faster.
- At the private property areas it would be came to an agreement with the owner of the area and the works would be performed to return the area to its former condition if necessary.
- The erosion formation would be minimized. For this reason the surface flow diversion canals would be used at the areas, at which the service roads would be constructed. (These canals would be preferred at the regions, at which there is no plant cover, the erosion risk is high and besides the electric towers are parallel to the slope.) The diversion canals would be constructed perpendicular to the slope at these areas, and by this way the canals would hold the surface flow and the sediments coming from the upper levels of the slope. The diversion canals slow down the surface flow and ensure the settling of the sediments in these canals. The end of the canals would be directed to the natural flow of the water. The canals would be constructed by the rip-rap material.

• In the operation phase the roads those would not be used anymore would be closed. For this reason the compressed soil would be swelled and planted by using a seed mixture that is suitable to the natural plant cover of the area if necessary (at the areas those have high erosion risk and have visual worth etc.). If necessary the construction areas (for example. tower areas, service roads) would be returned to their former condition according to the demand of the local governments, field owners. The method that is used to return the area to its former condition includes returning the compressed soil to its natural contour or making it suitable to the topography and inseminating if necessary and constructing drainage canals and/or ducts to prevent erosion. The guide knowledge about constructing ducts is presented in Figure V.1.



Distance Between Ditches	
Road Slope (%)	Distance (m)
2	75
5	40
10	25
15	18
20	14
25	12
30	9
Reference: Kochenderfer 1970, s. 28	

Figure V.1. General Information About Ditches

Due to the economical aspects, constructing service roads is not a preferred method generally. But in case of constructing a service road is inevitable, it would be ensured for the road to be safe in work health and safety aspect beside the other components. The main machinery used for constructing a service road is bulldozer, grader and tractor.

V.1.5. The Processes related to the Construction of the Transmission Lines

The construction of the energy transmission lines includes the survey and project studies, the land preparation processes, the assembly and wiring phases respectively. construction period (assembly and wiring) is generally accepted as one week excluding the inevitables. The works performed in these phases are summarized below. The main

machinery used in the energy transmission line plant projects are truck, excavator, concrete-mixer, generator, forklift, bulldozer, crane truck, tractor, saw, water tank and wiring machine. Some of these machinery are presented in Figure.V.2.

Survey and Project: The approximate route of the planned line is drawn on the 1/25,000 scaled maps. The accuracy of the route drawn for the planned line is surveyed during the field studies performed later. As a result of these studies the certain line is determined by taking the components like plant, maintenance, operation conveniences, military areas, airports, government reproduction farms, parallelism to the existing ETL, motorways, railways, reconstructed areas, mine and coal areas, bog, flood bed, landslide areas, forest, orchard, poplar grove, special environment protection areas, dam, pond and irrigation canals etc. and the environmental impact assessment studies performed in this phase into consideration. After the adjudication of the project the plan-profile studies are performed and the expropriation studies required for ownership and easement are performed. Cultural properties / schools / hospitals

Preparation of the Construction Corridor: The preparation of the construction corridor would be different according to the plant cover and surface slope. In the areas, at which the slope is low and the plant cover is short, the plant cover would be pruned at the surface level. By this way the roots would not be distrubed and returning of the corridor that would not be used for maintenance works to its former condition would be easier. In the rough areas smoothing the construction corridor would be needed for work safety. In this case the pruned plants would be stored beside the construction corridor temporarily. By this method, at which removing the plant cover completely is not needed, returning of the area to its former condition would be faster and the habitat disturbance and the erosion potential would decrease. The pruned plant cover would be spread to the areas, which have no fire risk, to decrease erosion and to create habitat. These processes, which would be performed only at a width of 15 m along the line, would be performed only if the construction corridor is used as service road at the same time. It would be abstained from cleaning the corridor in deep valleys and wooded areas.

Assembly: The assembly processes can be examined as sub and super assembly.

Subassembly: The first process of the subassembly of the energy transmission line is opening the areas, at which the tower feet would be placed. The feet of the electric tower are placed in 4 different hollows those have a depth of about 3 m. The substructure for grounding is prepared in this phase. If the soil resistance is below 20 ohms 1 electrode and if it is above 20 ohms 4 electrodes are placed. The grounding electrodes are buried at a depth of 1.5 m. After finishing these processes the hollows are filled and the feet are concreted.

Superassembly: After the tower feet are placed in the hollows the electric towers are constructed by assembling the steel pylons to each other with bolts. After the construction of the towers the insulators are mounted to the towers. After the superassembly processes it is passed to the wiring process.

Wiring: The wiring and brake machine is used for wiring the electrical wires. These wires have three phases and single circuit. For the protection against lightning during wiring, "protection wires" are wired from the top of the towers.

All kinds of standard signs and written signboards like "Death Risk" are placed on the towers of the energy transmission line. After finishing all processes the line starts to operate after being tested.

Clening the Construction Corridor and Returning the Area to Its Former Condition: After finishing the construction works the service roads are the only connection to the construction corridor. According to the demand of the field owners the service roads those are not needed for maintenance works would be closed. All rubbish and construction wastes in the construction corridor would be collected. A seed mixture that is suitable to the natural plant cover of the area would be used in the areas, which would be covered by the plant cover to prevent erosion. According to the demands of the field owners, hedges, barriers and gates would be used for limiting the entrance to the service roads.

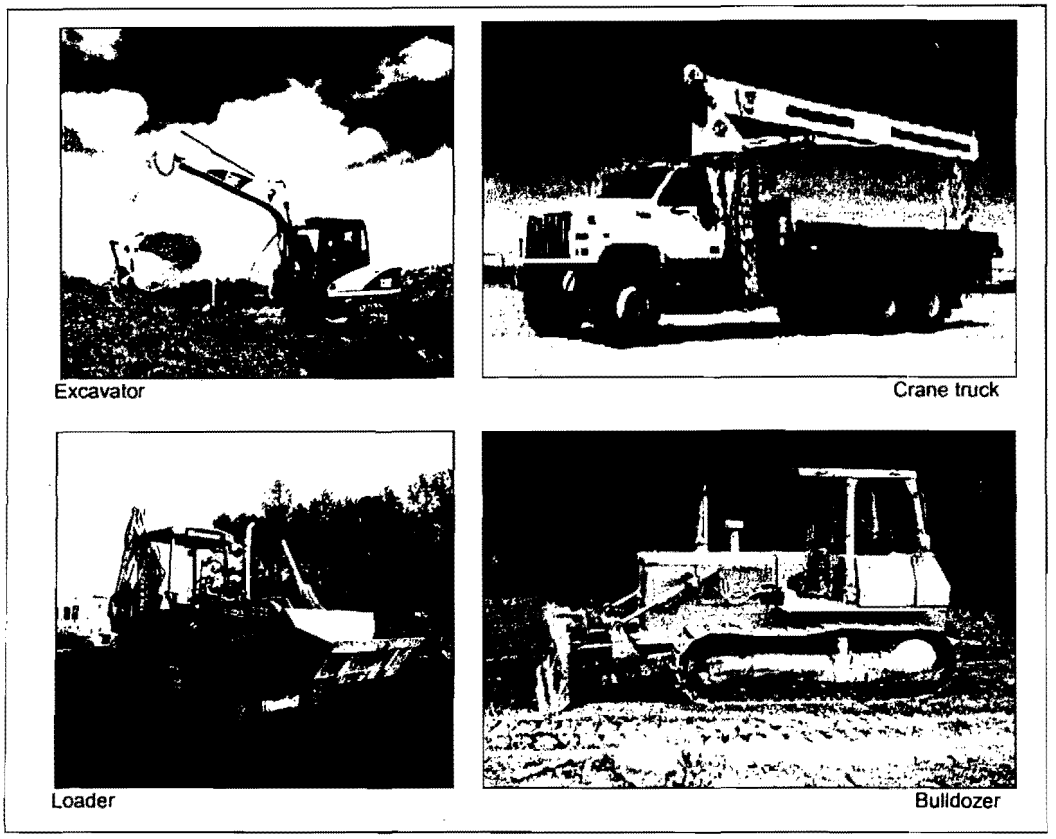


Figure.V.2. The Main Machinery Used in Energy Transmission Line Projects

The route should be chosen to avoid these areas

The General Mitigations In the Construction Works

- The construction machines could only use the construction corridor, the existing roads and the service roads those would be constructed.
- The towers would be placed away from ditches, cultural and historical areas and the places those have visual worth as far as possible.
- The construction works would be limited by the areas that the towers would be constructed, work site/depot areas and the service roads. To determine the construction corridor signs would be used in the areas like wild life protection sites and archeological sites. The required knowledge ~~and education~~ would be given to the workers not to give ~~any~~ harm to these areas. Permanent ~~paints~~ would not be used on rocks or plants for marking.
- At the areas ~~those~~ would not be used again, the plant cover would be protected as far as possible and by using pruning method instead of cleaning the plant cover completely, the harm given to the roots would be prevented and returning of the

area to its former condition would be easier. During the removal of the plant cover chemicals would not be used and the plant cover would not be burnt.

- If necessary the construction areas (for example. tower areas, service roads) would be returned to their former condition according to the demand of the local governments, field owners. The method that is used to return the area to its former condition includes returning the compressed soil to its natural contour or making it suitable to the topography and inseminating if necessary and constructing drainage canals and/or ducts to prevent erosion. how?
- Bird repellents would be mounted on the towers to prevent the nesting of the birds on the towers. e.g. chemicals, devices?
- The cultural and archeological areas would be taken into consideration during the construction works. In case of coinciding any cultural asset the related Cultural and Natural Assets Conservation Committee would be informed. That's it - no approvals?
- All the construction works would be performed in a way that gives the least harm to the plant cover, soil and topography and watering would be performed continuously to prevent the dust formation during the works. what "way" exactly?
- No wastes that could not be broken up biologically would be kept in the project area. The collected plants could be left in the area (could be spread to the area) or could be discarded with the solid wastes according to the demand of the field owners.
- The fluid wastes would be collected in the impermeable septic tanks and would not be discharged to soil or surface waters. For this subject the principles of Technical Methods Communiqué of Water Pollution Control Regulation and the principles of the Regulation about building hollows at the places, that the construction of drain canal is not possible would be followed. The solid wastes and the construction wastes would be collected separately and it would be ensured to be taken by the municipality or a licensed recycle plant. The potential hazardous wastes like paint, waste oil etc. would not be mixed with other wastes and collected at an area that does not have a contact with the soil and would be send to a licensed recycle or disposal plant. Related to the subject the declarations of Soma, Biga, Ivrindi and Yenice Municipalities are presented in Appendix A.
- In case of constructing the service road is inevitable, the route of the road would be determined in a way that minimizes all the effects including the visual effects.

Not much about worker camps –
garbage,
sewage
water supply
location (away from towns, surface waters etc)

V.1.6. Activities Spreading Dust During Construction Stage Such As Crushing, Grinding, Transportation and Storage (the evaluation of the impacts due to the project according to "Industrial Originated Air Pollution Control Regulation" that was published in the Official Gazette dated 07 October 2004 and No. 25606 and became valid)

When would the performed? Dury operat.?

The detonation, crushing and grinding processes would not be performed in the construction phase of the project. Consequently, during the project the dust (PM) would be formed due to excavation and fill works, the exhausts of the machinery used and their movements in the area. During the construction works most of the dust would be formed during the excavation and fill works. Consequently, for the calculation of maximum hourly emission due to the project the excavation and fill works were evaluated and also the dust emission due to the exhausts of the construction machinery and transportation vehicles and their movements in the area were taken into consideration.

Within the coverage of the project for each foot of the tower, a hollow of (3x3x3 m^3) 27 m^3 is required. It would take approximately 4 hours to open a hollow and excavator and tractor would be used for digging processes. The assumptions used to calculate the maximum hourly emission amount due to the project are stated below.

- At most two vehicles could work in the area (200 m^2 for towers, 400 m^2 for angle points) that the towers would be placed at the same time,
- The excavator and the tractor, which would be used during digging and filling, would work at the same time and the tractor would move inside the area,
- A carriage and a truck would be moving at the same time,
- The dust formation would be reduced about 70% by watering,

The assumptions discussed were made according to a conservative approach, consequently, the actual emissions would be lower than the emission values presented in Table V.4. The dust formations due to the exhausts of the heavy construction machines and transportation vehicles those would be used and the activities in the area and the total hourly dust emission value are presented in Table V.1, Table V.2, Table V.3 and Table V.4. The calculations were made according to the principles determined in the "Compilation of Air Pollutant Emission Factors, AP-42", South California Environmental Quality Management District that is prepared by EPA, "CEQA Air Quality Handbook" that is prepared by USA and "CEQA Guide" that is prepared by El Dorado County Air Pollution Control District.

Table V.1. Dust Emission due to the Exhausts of the Heavy Construction Machines Used in the Area

	Machine		
Parameter	**Excavator**	**Tractor**	
Number of machines	1	1	
PM Emission factor (kg/day) (in case of working 8 hours a day of the machines)	0.390	0.350	**Total**
PM Emission (kg/hour)	0.050	0.045	**0.095**

E = EF/8 hour x Pop
E = Emission formed in one hour (kg/hour)
EF = Emission factor (kg/day)
Pop = Number of machines

Source: El Dorado County APCD, 2001.

This is a waste - just use the area - and assume all vehicles use/ have valid emission levels (Turkish or EU) N/a old smoky trucks

Table V.2. Dust Emission due to the Exhausts of the Transportation Vehicles

	Vehicle		
Parameter	**Truck (diesel)**	**Carriage (petrol)**	
Number of Vehicles	1	1	
Traveled distance (km)	2	2	
PM Emission factor (gr/km/vehicle)	0.8	0.4	**Total**
PM Emission (kg/hour)	0.002	0.001	**0.003**

E = Q x EF x Pop
E = Emission formed in one hour (kg/hour)
EF = Emission factor
Q = Hourly activity (km/hour)
Pop = Number of vehicles

Source: USEPA, 1977.

Table V.3. Dust Emission due to the Construction Activities

Excavation and fill works					
Emission Factor	Hollow volume	Excavation amount (ton)	Excavation amount in one hour (ton)	Emission Control	**Emission (kg/hour)**
0.01kg/ton	27 m^3	27m^3 x 2.6 ton/m^3 = 70.2 ton	70.2 ton / 4 hour = 17.5 ton/hour	70%*	0.052

Dust due to the movement of the vehicles in the area			
Emission Factor	Number of moving vehicles in the area	Emission Control	**Emission (kg/hour)**
0.59 kg/vehicle-hour	1	70%*	0.177

Dust due to the movement of the vehicles on the stabilized road			
Emission Factor	Number of vehicles on the road x stabilized road length	Emission Control	**Emission (kg/hour)**
0.7 kg/km.vehicle	2 x 2 km	70%*	0.840

E=(Q*EF*(1-C/100))
E = Emission formed in one hour (kg/hour)
Q = Hourly activity
EF = Emission factor
C = Control activity

** It is assumed that 70% of the emission could be controlled by watering performed during the construction works.*

Source: SCAQMD, 1993, USEPA, 1977, USEPA, 1995

Table V.4. Total PM Emission due to the Project

Activity/vehicle	Dust Emission (kg/hour)
Dust emission due to the exhausts of the main construction machinery used in the area	
Excavator (1)	0.050
Tractor (1)	0.045
Total	**0.095**
Dust emission due to the exhausts of the transportation vehicles	
Truck (1)	0.002
Carriage (1)	0.001
Total	**0.003**
Dust emission due to the construction activities	
Excavation and fill works	0.052
Movement of the vehicles in the area (1 vehicle)	0.177
Movement of the vehicles on the stabilized road (2 vehicles)	0.840
Total	**1.069**
TOTAL	***1.167***

As it can be seen in Table V.4 the probable emissions in the construction phase of the project are quite low. According to the principles of "Industrial Sourced Air Pollution Control Regulation" that was published at the Official Gazette dated 07 October 2004 and no. 25606, the limit value (at the places except chimney), which needs additional study for the determination of air emission, is 1.5 kg/hour (for dust emission). Since the emission value presented in Table V.4 is below this limit value, an air modelling study is not needed.

Since the dust emission within the coverage of the project is below the limit value, there is no need for a special mitigation about this subject but during the construction works the dust formation would be reduced by watering during the processes of digging, filling, grazing and smoothing the soil. The topsoil and the excavation heaps, which would be formed during digging each hollow, would be compressed and these heaps would be watered with the whole area (The compression of the topsoil would be performed gently not to destroy its structure). The loading – unloading processes would be performed without winnowing and the speeds of the trucks would be limited. Besides it would be ensured to use new and well-kept vehicles and the personnel would use dust masks at the places those have intense dust.

V.1.7. The Amount and Properties of Solid Wastes Formed Within the Coverage of the Project and The Ways to Dispose Them

The excavation material formed during the grazing and excavation processes performed within the coverage of the project, as explained in Chapter V.1.2 would be used for filling processes and smoothing the area. The striped topsoil would be spread to the area after finishing the filling processes. Consequently there would be no excavation wastes in the construction phase and the solid wastes would be only the domestic solid wastes, packing wastes and construction wastes. 30 people would work during the construction of the project. The daily solid waste of one people is assumed as 0.7 kg and 30 people x 0.7 kg / day = 21 kg / day domestic solid waste is calculated.

- The domestic solid wastes would be collected to suitable containers in the worksite area and it would be ensured to be taken by the related municipality regularly. The declarations that the domestic solid wastes would be taken by Soma, Biga, Ivrindi and Yenice Municipalities are presented in Appendix A.
- The construction wastes would be collected in yellow colored temporary collection containers and the waste types would be written on them. These wastes would not be mixed with the domestic or hazardous wastes. These wastes those would not be used by the contractor firm would be ensured to be taken by the municipality or they would be sent to a licensed recycle or disposal plant by a licensed transportation firm. All correspondence related to this subject would be performed by the contractor firm.
- The usable packing wastes would be separated and the rest would be sold to the recycle plant.
- No wastes that are not biologically degradable would be kept in the project area. The pruned plant stems, branches etc. would be spread to the areas to create habitat (at the places, which have no fire risk). According to the demands of the field owners or local community these plant stems could be discarded with the other solid wastes.

About this subject the principles of the Package and Package Wastes Control Regulation, that became valid after published at the Official Gazette dated 30 July 2004 and no. 25538, the principles of · Regulation on Excavation, Construction and Demolition Wastes (Official Gazette dated 18 March 2004 and no. 25406), the principles of Solid Waste Control Regulation (Official Gazette dated 14 March 1991 and no. 20814), and the adjustments (Official Gazette dated 03 March 1991 and no. 20934, dated 22 February 1992 and no. 21150, dated 02 November 1994 and no. 22099, dated 15 September 1998 and no. 23464 and dated 18 August 1999 and no. 23790), and the principles of Soil Pollution Control Regulation published in the Official Gazette dated 10 December 2001 and no. 24609 would be followed.

V.1.8. The Water Amounts That would be Used Within the Project, Where and How the Water would be Provided, After Which Processes How the Waste Waters those would be Formed After Using These Water would be Discharged to Which Environments and the Properties of These Waters

The waste waters those would be formed during the construction of the energy transmission line would have domestic characteristic in general. For worksite/depot places priority to the places those were used as worksite area before would be given. Since there are a lot of population centers along the project route, the house would be rented in the population centers in the close vicinity for the stay of the workers as far as possible. By this way the domestic waste waters would be connected to the sewer system of the city. As stated before, 30 people are estimated to work for the energy transmission line project. If 150 L of water is assumed to be used by one person daily (Tchobanoglous, G., 1991), daily 4.5 m^3 of water would be used by 30 people. The water need would be met by the city networks at the places those are inside the boundaries of the municipalities or by providing from the nearest municipality and transporting by a tanker to the area at the places those are outside of the boundaries of the municipalities.

If it is assumed that all of the water used turn into waste water, during one year that the transmission line would be constructed 4.5 m^3/day domestic water would be formed. If the houses could be rent for the stay of the personnel, the waste waters would be discharged to sewer system directly. If establishing a worksite is needed, the waste water would be collected to the impermeable, closed and ventilated septic tanks those would be placed at a suitable place in the worksite area. The volume of the planned septic

tank is shown in Figure V.3. The septic tanks would be appropriate to Water Pollution Control Regulation (dated 31 December 2004 and No 25687 Official Gazette) and the Regulation on Pit Opening Where Sewer System Construction is not Applicable (dated 19 March 1971 and no 13783 Official Gazette). The water collected in the septic tanks would be taken by the nearest municipality regularly. The declarations that the waste waters collected in the septic tanks would be taken by Soma, Biga, Ivrindi and Yenice Municipalities are presented in Appendix A.

Keep away from high water table surface water (> XX m) etc.?

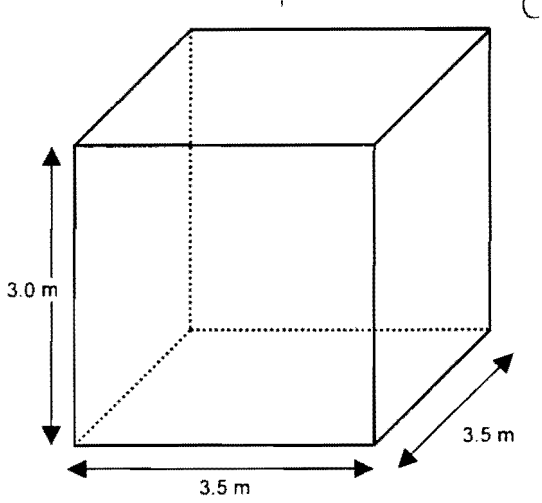
Daily waste water amount per person:
150 L/day = 0.15 m^3/day

Daily waste water amount for 30 workers:
0.15 m^3/day x 30 = 4.5 m^3/day

The total waste water amount in 7 days:
4.5 m^3/day x 7 = 31.5 m^3/day

The volume of the septic tank:

Length	= 3.5 m
Width	= 3.5 m
Height	= 3.0 m
Tank volume	= 36.75 m^3
Control volume	= 36.75 – 31.5 = 5.25 m^3



Not Scaled

Figure V.3. The Volume of the Planned Septic Tank

About 2,500 m^3 of water that would be used for construction works would remain inside the material so it would not form waste water. The water discussed would be provided from the population centers in the close vicinity.

V.1.9. Processes About Grounding of the Energy Transmission Lines

The most important purpose of the grounding process is protecting the people and the fauna species against electric shocks and it is a legal obligation. By grounding the leak flows and the static electricity on the equipment can be given to the ground.

The grounding process of the energy transmission lines would be performed according to the "Assembly Technical Specification" of TEIAS. In the grounding of grate based towers resistance is measured before placing any grounding device. If the earth resistance is below 20 ohms any grounding process is not needed. For all concrete and grate bases, which have an earth resistance higher than 20 ohms, an grounding pile or plate is placed at the center point of the tower and this pile or plate is connected to two feet at the opposite sides. As a result of this process if the earth resistance decreases below 20 ohms, no other grounding is performed. In case of the earth resistance is above 20 ohms, contropua (circular wire cables those are used when the grounding can not performed well) are added. Since an earth resistance of 20 ohms or contropua are mounted to all feet, this additions should be performed. The measurement of the resistance would be performed by insulated grounding plates. Chloride or conductivity slats would not be used.

In the grounding processes of the energy transmission lines within the coverage of the project the principles determined in Regulation on Grounding in Electricity Facilities that was published at the Official Gazette dated 21 August 2001 and No. 24500 would be followed.

V.1.10. Sources and Levels of Noise to Occur as a Result of the Activities which will be Carried out During Land Preparation and Construction of the Plants

The noise that would occur as a result of the activities performed during all stages from land preparation to the end of construction works would be due to the construction machinery working. The noise levels of the construction machinery those would be used during land preparation and the construction, were calculated by the method that was developed to determine the noise levels of the traffic and worksites and explained in "TEM Traffic and Construction Noise Control Report" (UNDP, 1990). To use in the calculations, the noise levels of the construction machinery from 15 m are taken from the report that was prepared by EPA in 1971 namely "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances". In the estimate of the construction noise, the equations developed for point, area and linear noise sources are used:

$L_{p,d} = L_{max} + 10 \log (t / T) + 20 \log (d_o / d)$ (1) point source

$L_{p,d} = L_{max} + 10 \log [(d_o^2 \times 3.14 \times B) / (d \times 180 \times A)]$ (2) area source

$L_{p,d} = L_{max} + 10 \log [(d_o^2 \times 3.14 \times Q \times B) / (d \times 180 \times V)]$ (3) linear source

$C_1 = 5 \times \log (d_o / d)$ (4) decrease in noise by the effect of the ground

$L_{p,d}$: noise level at a distance of d (dBA) (*for example. noise level at the receiver environment*)
L_{max} : maximum noise level of the source (dBA)
d_o : the distance that the maximum noise level of the source is given (m)
D : the distance of the receiver environment from the source (m)
T : the average working period of the source (min)
T : the calculation period (min)
B : the angle between the source axis and the receiver (90°)
A : the working area of the source (m^2)
Q : the vehicle movements in unit time (number of movements/3600 ses)
V : the average speed of the vehicle (m/sec)
C_1 : the decrease in noise by the effect of the ground

The cumulative noise level caused by using more than one construction machines is calculated by the help of the equation below.

$$\left(L_{p,d}\right)_{cum} = 10 \cdot \log \sum_{i=1}^{n} 10^{\frac{(L_{p,d})_i}{10}}$$ (5) cumulative noise level

The main noise sources in the land preparation and construction phases are the excavation and fill processes and the construction machinery used. The vehicles those would be probably used during the construction works and their noise levels are presented in Table V.5.

Table V.5. The Construction Machines those are used in Transformer Station and Energy Line and Their Noise Levels

Construction machine	Unit	Maximum noise level* (dBA)	Average noise level from 15 m (dBA)	Source type
Excavator	1	105	85	Point
Bulldozer	1	120	85	Area
Tractor	1	120	80	Area
Truck	1	85 (at 7.5 m)	88	Linear
Wiring machine	1	105	-	Linear
Hand tools (saw etc.)	1	-	75-85	Point
Crane	1	105	83	Area
Forklift	1	-	85	Area
Concrete mixer	1	115	85	Point
Generator	1	105	80	Point

* *The maximum noise level that is allowed in Noise Control Regulation for using the vehicle*

USEPA, 1971 — Insist on modern-low noise equipt that meets EU stds and of otherw!

While calculating the noise levels those would occur during the project works, the construction works could be divided into two parts as subassembly and superassembly. The main equipment used in the subassembly processes would be excavator, concrete mixer, generator, forklift, bulldozer, truck and tractor. But, within the coverage of the project working all the machines at the same time is impossible. Consequently for demonstrating the noise level that could occur in the project, the variation of the noise level, which would occur in case of working five of the construction machines together namely excavator, bulldozer, generator, tractor and truck, with distance is given in Table V.6 and Figure V.4.

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Table V.6. The Variation with Distance of the Noise Level that would Occur in case of Working an Excavator, a Bulldozer, a Generator, a Tractor and a Truck at the same time

Distance (m)	The Potential Noise Level of the Construction Works (dBA)
15	79.74
50	67.69
100	61.31
250	53.65
500	48.39
1000	43.44

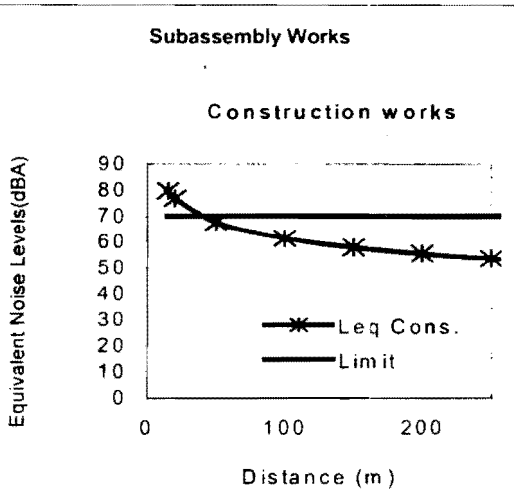

Figure V.4. The Variation of the Noise Level with Distance in the Construction Works

In superassembly phase of the construction works truck, crane, forklift, wiring machine and tractor would be used. But again during the superassembly processes, working of all machines at the same time has a low probability, consequently the actual noise level would be lower than the calculated value. For demonstrating the noise level

that could occur in the project, the variation of the noise level, which would occur in case of working all of these construction machines together, with distance is given in Table V.7 and Figure V.5.

Table V.7. The Variation with Distance of the Noise Level that would Occur in case of Working a Truck, a Crane, a Wiring Machine, a Tractor and a Forklift at the same time

Distance (m)	The Potential Noise Level of the Construction Works (dBA)
15	70.86
50	63.02
100	58.51
250	52.54
500	48.02
1000	43.51

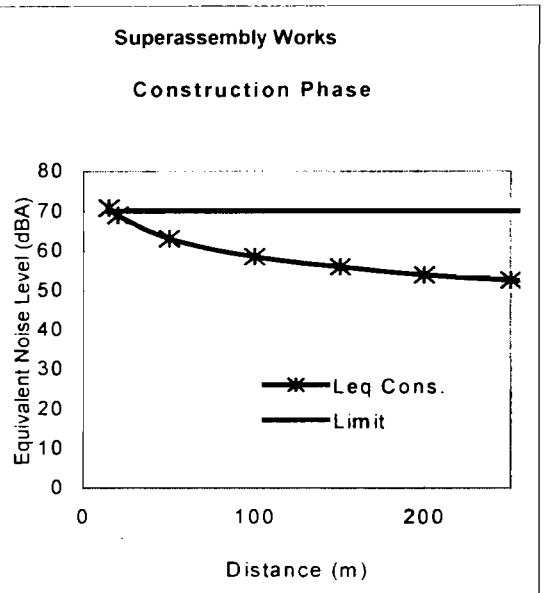

Figure V.5. The Variation of the Noise Level with Distance in the Construction Works

As it can be seen in Table V.7, the noise levels (63.02 dBA) calculated 50 m away from the area in case of working of these machines at the same time are below 70 dBA limit that is determined for continuous worksite noise in Noise Control Regulation. Moreover, when the fact that the distance of the nearest population centers are 100 m away from the line is taken into consideration, it is not expected for the construction of the energy transmission line to have an important effect. But, to minimize the effect especially at the places those are near to the population centers, the mitigations below would be taken.

- It would be ensured not to pass the maximum noise levels those are used in the calculations and determined in Noise Control Regulation by controlling the construction machines used regularly.
- The construction machines those make loud noise (generator etc.) would be placed far from the population centers and their noise levels would be reduced by a portable screen. It would be paid attention to use minimum number of machines at the same time.
- The people living in the population center around would be informed about the duration of the construction works and no works would be performed between 22:00 and 06:00.

For the control of the noises caused by the activities performed in land preparation and construction phases, Noise Control Regulation that became valid after being published in the Official Gazette dated 11 December 1986 and no. 19308, would be followed. For the protection of the workers from the noise, the principles determined in Regulation on Occupational Health and Safety and Regulation on Health and Safety Issues for Construction Works Regulation those are included in Labour Law would be followed and the required protective equipment would be given to the workers.

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V.1.11. Types and Number of Trees which would be Cut Down for Land Preparation and for Construction Area, Plant Species which would be Destroyed and Size of the Area where Such Activities would be Carried out

60.43 km of the project route pass from the forestry area. 30.73 km of this area is determined as degraded forest area and the rest 29.70 km is determined as forest area. As stated in Chapter V.1.12, a 50 m corridor is determined as construction area. This 50 m corridor is evaluated as the area, in which the forest texture would be effected from the project. The trees at the feet of the towers would be cut down, but if necessary cleaning an area of only 15 m width inside the construction corridor along the route could be performed. According to this, in forest areas along the 50 m corridor the degraded forest area (because of crushing, pruning, breaking, wearing out etc.) would be 153.65 ha and the forest area would be 148.50 ha. Within the coverage of the construction works tree cut would be performed at the tower feet in the forest areas. Within this context;

The area of cutting and pruning for the angle points in the forest area =
10 x 400 m^2 = 4000 m^2
The area of cutting and pruning for the towers in the forest area =
192 x 200 m^2 = 38,400 m^2
The total area of cutting and pruning in the forest area =
42,400 m^2 = 4.24 ha.

For the tree cuts those would be performed at the forest areas along the project route, approximately 12 trees would be cut for each tower in the degraded forest areas and averagely 32 trees would be cut for each tower in the forest areas. There are 98 towers located in the degraded forest areas. According to this, 1,176 trees would be cut. For 5 angle points those are located in the degraded forest area, 120 trees would be cut. For 94 towers those are located in the forest area, about 3,008 trees would be cut and 5 angle points 320 trees would be cut. About 4,624 tree cut would be performed along the route.

The tree types present in the 50 m construction corridor along the route are oak (*Quercus*), black pine *(Pinus nigra)*, calabrian pine (*Pinus brutia*) and stone pine *(Pinus pinea)*.

According to the opinion reports of Balikesir, Izmir and Canakkale Regional Directorates of Forestry, there is not any objection for the passage of the project from the forest areas. Besides,

- The construction corridor would be narrowed as far as possible in the forest and degraded forest areas and the towers would be placed in a way that they would cause minimum number of tree cuts as far as possible.

➢ The personnel and the construction machinery would only work in the construction corridor and it would be prevented to use the forest for recreation, hunting and resting by the personnel.

V.1.12. The Probable Impacts of the Project in Forest Areas, Mitigations Against these Impacts and Forest Fires, (the number of towers in the forest area, determining whether the transformer station is in the forest area or not)

It is probable that the 380 kV energy transmission line could have some impacts on the forest areas during the construction works and the operation period. As stated in Chapter IV.2.9, 40% of the 5 km corridor that is determined as the survey area of the project is defined as forest and shrubbery area (18.22% forest area and 22.13% shrubbery area).

At the parts of the energy transmission line those pass through the forest areas only at the tower feet, all vegetal textures and shruberries would be pruned in a way that they would not be longer than 10 cm. The tall trees would be cut down. No herbicide would be used during cleaning the plant cover at all and the plant cover would not be burnt. The topsoil would be grazed and stored aside during digging hollows for the tower feet and the subsoil would be excavation to a depth of 3 m and stored in a different place.

In the forest areas, for the impact area of the project, a 50 m corridor, 25 m at the right and 25 m at the left of the line, is determined as the area that the flora texture would be affected from the project. According to this, totally 60.43 km of the route passes through the forest area according to the selected alternative. 29.70 km of this area is determined as forest area and 30.73 km is determined as degraded forest area. Thus, according to the 50 m corridor that is determined as the area that the flora texture would be affected;

The length of the degraded forest area = 30,730 m
The length of the forest area = 29,700 m
The area that the flora texture could be affected = 50 m
The degraded forest area that the flora texture could be affected = 30,730 mx50 m
= 153.65 ha
The forest area that the flora texture could be affected = 29,700 m x 50 m
= 148.50 ha.

A temporary loss in flora would be observed due to the pruning of the plants. The vegetal plant species would cover the surface again by the topsoil that would be spread again after the construction works. Growing up of the tree types would not be let under the tower feet. The fauna species exist in the forest would be affected from the noise and the dust during the construction works. But this effect is a temporary effect that would be formed during the construction works. The impacts on flora and fauna species are explained in detail in Chapter IV.2.10, Chapter V.1.16, Chapter V.2.6 and Chapter V.2.7.

The height of the wires would change with the change in the topographic structure but, the towers those would be constructed within the coverage of the project would have an avarage height of 30 m. By cutting the top of the trees it would be ensured to grow up in horizontal for the trees those are under the wires against the fire risk at the energy transmission lines. By the controls performed by the maintenance crews every 6 months the plants those have probability of creating danger by growing up would be determined and pruned with the control of directorate of forestry management.

A few subjects, which would be paid attention during the construction and operation phases of the energy transmission line, have importance in minimizing the fire risk. It should be examined whether the earth resistance is suitable to the value calculated by the method determined in Regulation on Grounding in Electricity Facilities. The wiring and the brake machines those are used in wiring and the movable conductors should be grounded. All parts of the plants should be arranged in a way to prevent the cut off the short circuit flow, fire or the damage of the plants against the overcurrent effects. While limiting the working area during the construction works the dimesions of the equipment, manoeuvring possibilities of the construction machines and vehicles and the probability of breaking of the lines should be taken into consideration.

In the operation phase of the project the fire risk would be the most important risk that the forest areas could face with. The fires due to the transmission lines are caused in general by the lines those are not overhauled and defective. During the maintenance works pruning the plants those create danger by closing to the towers, removing the surface cover like dry grass etc. have importance in preventing the fires. The energy should be cut firstly in the fires occured at the energy transmission lines. Then it could be passed to the extinguishing works. Against the fire risk dry chemical dusty fire extinguishers should be used. Using water for fire extinguishing would cause the spreading out of the fire to wider areas due to the electrical leakages.

According to the opinion reports of Balikesir, Canakkale and İzmir Regional Directorates of Forestry, there is not any objection for the passage of the project from the forest areas. For the forest areas, from which the route would probably pass, the modifications of the 17. article of 6831 no. Forest Law would be followed.

V.1.13. Size of Agricultural Lands that would be Lost for Gaining Land and During Land Preparation, their Land Utilization Capabilities and Types of Agricultural Products, Land Utilization Permission for Non-agricultural Purposes

The main agricultural products and industrial products produced in the agricultural areas that the route pass through are types of (wheat, barley, oats, maize, rye, sunflower, tobacco, sesame, chickpea, bean), fruit (chestnut, olive, pear, apple, quince, plum, grape, walnut, peach) and vegetable (pepper, cucumber, sweet gourd, vegetable marrow, leek, cabbage, bean, aubergine). The map of the land utilization capabilities and the present land utilizations along the 5 km route that was determined as the survey area of the project is presented in Appendix B.

About 80.7 km of the alternative that was developed as Alternative 1 passes through the agricultural fields according to the Land Use Maps of the Province that was prepared by General Directorate of Rural Affairs. In the fields those were defined as agricultural fields along the route there are rain-fed agriculture fields without fallowing, irrigated agriculture fields, insufficient irrigated agriculture fields and vineyards. In the evaluations performed in this chapter, examinations are performed in the 50 m construction area, 25 m at the right and left of the route that is defined as Alternative 1.

By the expropriation works performed after the studies of determining the certain route, allocation purposes would be changed at the agricultural fields, where the tower feet would be placed, and it would be appealed for easement for 50 m length area 25 m at the right and left of the wires. In the project, at which the length of the line is about 158 km, 790 ha of area would be expropriated for easement. For the area that would be expropriated, the area beneath the towers (501 units) is about 10 ha and the area beneath the angle points (25 units) is about 1 ha. The total area that would be expropriated is about 11 ha.

The easement area = 790 ha
The area, at which the tower feet would be placed = 11 ha
Total expropriated area = 790 - 11 = 779 ha

About 12 angle points and 255 towers would be constructed in 80.7 km agricultural area. According to this;

The expropriated area for angle points = 12 x 400 m^2 = 4,800 m^2
The expropriated area for towers = 255 x 200 m^2 = 51,000 m^2
Total expropriated area in the agricultural areas = 55,800 m^2 = 5.58 ha

As stated above there are rain-fed agriculture fields without fallowing, irrigated agriculture fields, insufficient irrigated agriculture fields and vineyards in the agricultural fields along the route. The types of agriculture performed in the agricultural fields along the route, land utilization capabilities and the size of the agricultural fields are given in Table V.8.

Table V.8. The Agricultural Fields Present in the 50 m Construction Corridor Along the Route, Land Utilization Capabilities and Utilization Types

Type of Agriculture	Land Use Capability Class	Sizes of the Agricultural Areas (ha)
Irrigated agriculture	I, II	26.14
Irrigated agriculture (Insufficient)	I, II, IV	34.50
Rain-fed agriculture (Without fallowing)	I, II, III, IV, VI	330.99
Vineyard	I, VI	11.91

The expropriation works would be performed after the certain route determination studies. The construction works would not be started before the expropriation works had finished. The only difference in land utilization would be observed at the places that the tower feet would be placed. Only at these areas the agricultural activities could not be performed. To prevent the damages given to the agricultural areas because of the construction of the project:

- While digging hollows for the tower feet, firstly the topsoil would be grazed and the striped soil would be spread to the surface later.
- The construction works would be stopped during the reaping and planting periods as far as possible and the damages given to the agricultural products would be met by the contractor firm.
- The construction area would be enclosed at the regions of the agricultural areas to minimize the negative effects of the construction works on agricultural soil and products.

During the construction and operation phases of the project rules determined in the following regulations and laws will be obeyed:

- Law of Olive Cultivation (Reg. No: 22221, Law No: 4086)
- Law of Pasture Land (Law No: 4342)
- Law of Aquaculture Products (Law No: 1380)
- Regulation on the Conservation of Agricultural Lands (Reg. No: 25137)

What are the requirements under these laws?

V.1.14. Where and How the Accommodation and Other Technical/Social Infrastructure Needs of the Personnel, Who would Work in All Stages of the Project, would be Provided

The personnel of the contractor firm would be employed in the construction of 380 kV Karabiga – Can – Soma TPS Energy Transmission Line. It is planned to employ 30 people during the project. Renting houses would be preferred for the personnel those would come from the other regions. But if this alternative could not be possible, a worksite would be established at a suitable area close to the route. The fields, which are in VII. class of land utilization capability, would be preferred for the worksite of 380 kV energy transmission line discussed. The worksite would not be established in forest areas. The field would be returned to its former condition after the construction works had finished. Storing and staying would not be performed near the surface waters or the precautions would be taken in inevitable cases and especially flow of the sediments to surface water would be prevented. The close vicinity of the areas those have visual worth and natural or historical property would not be selected for the worksite. An area that was used as worksite would be preferred as far as possible.

The personnel would meet their main needs from the population centers in the close vicinity. The unqualified workers those would be employed from the region would use their own houses.

V.1.15. The Land Arrangements those would be Made for Creating Landscape Elements or for Other Purposes in the Project Area

The energy transmission lines create a striking structure in the regions those have pastoral landscape properties. The towers of the 380 kV energy transmission line those would have 30 m height would effect the visual quality of the natural landscape structure in a negative way. The energy transmission lines have a negative effect in both the construction and the operation phases by their metallic view and height. Because of their height, they can be seen from a lot of points.

The transmission lines are very bigger structures than the humans relatively and this makes it difficult to develop precautions against their visual effects. This negative visual effect of the energy transmission lines lasts throughout their life.

Beside the topography the visual cover property formed by the vegetal intensity is another characteristic that would decrease the perceptibility. The areas of tall trees can decrease the negative effect that is formed by the energy transmission lines visually. The perception becomes difficult especially from long distances.

To determine the effect of the probable change in the visual quality of the area by the construction of the project, the project components should be determined and their influence rates on the landscape vision should be defined. Each component of the project can be defined as a potential risk source. There are mainly 3 potential risk sources those affect the visual quality in the project discussed.

- ✓ The energy transmission line
- ✓ The service roads
- ✓ The worksite area

The Energy Transmission Line

The energy transmission line that is planned to have a height of 30 m from the ground is expected to create a division in the landscape visually. Along the project route an industrial vision is formed at the areas those have natural or agricultural conditions. At the same time the visibility of the energy transmission lines increase due to their heights. The surface shape that varies along the project route covers the appearance in valleys while increasing the visibility at hills, hillsides and ridges. This variable topographic structure can function as a natural cover element at some places according to the view angles. While the view can be perceived at a lot of points in the smooth areas that the line passes through, the visibility of the energy transmission line decreases in the regions those are covered by intense plant cover.

In the construction phase of the project the line would not be passed from any areas those have natural or cultural importance. The covering property of the nature would be used. It would be abstained from the perspectives those ensure wide view angles in the route of the transmission line as far as possible.

The Service Roads

Constructing service roads could be required in cases of communication by the existing roads is not possible. In these cases especially in the construction phase the first significant change occurs in the landscape due to the grazing of the plant cover. The visual effect is higher at the areas, where the plant cover is more intense. Beside this, some distortion would occur in the structure of soil along the service roads due to compression.

The construction of the service roads is costly for the contractor firm and the project owner. Besides, it is not suitable due to damaging the environmental properties. For this reason, service roads would not be constructed for the 380 kV energy transmission line since it is not inevitable and the roads constructed for 154 kV Balikesir II – Can Energy Transmission Line that is present and parallel to the line would be used. By this way the effects of the project on the topographic structure, plant cover, soil properties and water sources of the area would be prevented. If constructing a service road is inevitable, then the most important thing that should be taken into consideration is that the service road should cover the minimum surface area as far as possible. The service roads should be constructed suitable to the topography and the existing roads. In the construction of the service roads, the areas, which are in the view of the points those can be defined as panorama point should be kept away. The other subjects those should be taken into consideration are explained in Chapter V.1.4.

The Worksite Areas

In the project the alternative preferred for the accommodation of the personnel is house renting. But in cases that this is not possible, a worksite would be established. A similar state is in question for these types of areas like the service roads. The visual effect increases in places those have intense plant cover. The visual effect would continue during the construction works in these areas. For this reason, since the area is returned to its former condition, the effect would be temporary. While selecting place in worksite area, if the worksite structures would be placed in a way that the vegetal texture would be used as a screen, the perception of the bad views from the vicinity would become more difficult since the visual cover increases.

The fields, which are in VII. class of land use capability, would be preferred for the worksite of 380 kV energy transmission line discussed. The worksite would not be established in forest areas. The field would be returned to its former condition after the construction works had finished. Storing and staying would not be performed near the surface waters or the precautions would be taken in inevitable cases and especially flow of the sediments to surface water would be prevented. The close vicinity of the areas those have visual worth and natural or historical property would not be selected for the worksite/depot. An area that was used as worksite would be preferred as far as possible. While storing the materials it would be kept away from forming very high heaps in vertical direction.

V.1.16. Determination of the Magnitude and Distribution of the Effects on the Cultural and Natural Assets (Traditional urban texture, archeological values, natural values which needs protection) on the Project Route and its Vicinity

The cultural assets could decompose with time due to the natural or the external factors. The decomposition is formed by the contact of sulphide, nitrogen compounds, aerosols or dust paricles present in the environment naturally to the structure. According to the level of importance and protection of the cultural area, various precations could be taken to minimize the effect. Some of these are using new machines during the construction as far as possible and preferring the vehicles those use low sulphide fuels. Other precautions could be covering the structure during the activities, preventing its fall by the help of the supports or forming an alternative route for the areas those have national or international importance.

But, according to the cultural inventories that was prepared by Ministry of Culture and Tourism, General Directorate of Cultural Assets and Museums that is located in the boundaries of the activity area, all the cultural assets except Kaletepe 1st Degree Natural and Archaeological Site that is located in Calkoy are located outside of the impact area of the project. This site area is located on the approximate route that was prepared by TEIAS General Directorate. As explained in Chapter VII, for the cultural area not to affect from the activities in the construction and the operation phases, the line would not be passed from this region by determining an alternative route. Beside this, near Yagcili Creek there is Uyucek Tepe Tumulus that is outside of the impact area but the nearest cultural asset to the route. The archaeological site located in Soma District is 100-200 m away from the line. Besides, in Davutkoy Locality that is in Yenice District there is an Ancient Settlement (Km~59+000) that is a 1st Degree Archaeological Site. The detailed information about the other cultural assets located in the survey corridor is given in Table IV.16 (KTB, 2004). In the case of coinciding any cultural asset during the construction works, diractorate of Cultural and Natural Assets Conservation Committee of the Province would be informed. In the case of damaging any cultural asset during the construction works, it would be paid by the contractor firm.

The effects of the construction works on the natural asset can be defined as temporary effects. Only the tree cuts at the areas, where the tower feet would be placed, would be the permanent effect. Since there is not any endemic or endangered species in the region, there would not any problems in the continuity of the species. There would be an increase in the values of dust and emission of the vehicles with the construction works. But this effect is a short-term temporary effect. The detailed information about this subject is given in Chapter V.1.6. If the service roads would be constructed, the plants that are located in the projection of the road would be damaged. There could be an increase in erosion class during the construction works due to the compression of the soil. The

detailed information about this subject is given in Chapter V.1.4. During the construction works the fauna species would be affected temporarily due to noise. But this effect drops below the limit value that is determined in Noise Control Regulation after 50 m. The detailed information about this subject is given in Chapter V.1.10.

There is Manisa-Soma Sifadag Wild Life Protection Site in the 5 km survey corridor of the route and the most important species that exists in the field is "roe-deer". The field starts from Yagcili Town at the north and extends towards Dededagi Hill and Daztepe Ridges at the south. There is a Wild Life Protection Site in Balikesir Province, Saribeyler City, Doleciktepe Locality. At the same time this area is determined as the area in which hunting is forbidden in 2004-2005 season by Central Hunting Commission. In the construction phase, in spite of being outside of the impact area, to minimize the effects over *Capreolus capreolus* (roe-deer) and the other mammal species, those exist in the Wild Life Protection Site (Manisa Province), no service roads would be constructed, the workers would be informed by the contractor firm, machines and personnel would not go out of the construction area and the precautions would be regularly applied for not to exceed the limit value of the noise and dust production at the reproduction season (July-end of August).

The other Wild Life Protection Site, which are near to the route or the survey corridor, are; the areas the Balikesir province boundary following the Sogutcuk-Belen village road at Manisa Province, Soma District at the north and at the south from the Uzunahır Village to the highway, that connects the Akcaavlu, Dualar Village roads to Soma District; and the areas those cover Kumegrek, Celebi Cay and Gurgan mountain series located at Canakkale Bayramic and Katrandag and Babadag series of Karakoy, Cirpilar and Evciler regions of Bayramic Forestry Management. This area ends at the south of Hatunkoy Village boundary, which is located in the survey corridor

As stated above the impacts due to the construction of the project are effects those are defined as temporary effects except the tree cuts and it is not expected to have an important effect of these effects discussed to the natural and cultural assets when their impact areas are taken into consideration.

V.1.17. Activities Posing Risks and Dangers for Human Health and the Environment, which would be Carried out During All Stages from, Land Preparation to Commissioning

No detonations would be performed during the 380 kV Karabiga – Can – Soma TPS Energy Transmission Line Project and the machinery and the human power would be used in the excavation and fill processes. Consequently the accidents, those could occur during the construction phase of the project, would be the risks like wounding and fire due to the usage of heavy machinery or working at a high place like at the other construction works.

In these matters, Worker Health and Work Safety Rule, which became valid after being published in the Official Gazette dated 11 January 1974 and no. 14765, Regulation on Occupational Health and Safety, which became valid after being published in the Official Gazette dated 09 December 2003 and no. 25311, · Regulation on Health and Safety Issues for Construction Works, which became valid after being published in the Official Gazette dated 23 December 2003 and no. 25325, · Regulation on Health and Safety Requirements for the Operation of Work Equipment, which became valid after being published in the Official Gazette dated 11 February 2004 and no. 25370, Regulation on Basics and Methods of Workers Health and Safety Training, which became valid after being published in the Official Gazette dated 07 April 2004 and no. 25426, Regulation on

Health and Safety Signs, which became valid after being published in the Official Gazette dated 23 December 2003 and no. 25325, Regulation on Health and Safety Requirements for the Operation of Work Equipment n, which became valid after being published in the Official Gazette dated 11 February 2004 and no. 25370, those are in the coverage of Labour Law, which became valid after being published in the Official Gazette dated 10 June 2003 and no. 25134, would be followed.

- Before the project started a coordinator that would work about the work health and safety would be appointed and a work health and safety plan, in which the rules and emergency action mitigations are determined, would be prepared. All the workers would be informed about the plan that would be prepared in a clear form. The coordinator would perform the controls for ensuring the workers to work safely during the project and would guide the workers.

- During the construction the required signs and warning boards would be placed in the construction area.

- The personnel would be educated about subjects like figthing against fire, working at a high place and first-aid.

- The required personal protective equipment like helmet, glove, safety boot and ear protectors would be distributed to all personnel and it would be ensured that they are used by the workers.

- The technical controls and maintenance of the vehicles used would be performed periodically during the project.

- The fire extinguishing equipment and first-aid bag would be present in the vehicles used all the time.

- The required arrangements would be performed to prevent the entrance of the people except the people allowed.

Another subject that should be dealt with in this chapter is the hazardous wastes of the project. The wastes due to the material like oil, paint etc, that would be used for construction activities, and the materials like tin, barrel etc, that are contaminated by oil are in the category of hazardous waste. But within the scope of the project this type of waste would exist at very limited amount. In the project the precautions below would be taken to prevent the risks of the hazardous wastes for the people and the environment.

- Within the scope of the project experts and personnel that have knowledge about hazardous wastes would be employed and using protection equipment by the personnel would be ensured at all the works related to this type of wastes.

- The hazardous wastes would be collected in an impermeable area, labelled as visible and warning boards would be hanged. The field discussed would be whether closed or the top would be covered to protect effectively from rain and the sun. All the hazardous wastes would be collected at the containers, those would be placed in this area. Mixing of the different types of the wastes would be prevented.

- Waste oil containers would be red in color and "waste oil" label would be placed on them. Mixing of the other materials like water, petrol, fuel-oil, paint, detergent, solvent, antifreeze, engine oil etc. to these containers would be prevented.

- The hazardous wastes would be send to a licensed recycle or disposal plant periodically. The same application would be applied to all kinds of materials (oil, paint tins, barrels etc.), that have polluted or contaminated with this wastes, this wastes would not be fixed with solid wastes. Transportation of the wastes to the disposal plant would be arranged by a licensed transporter.

- In case of any pouring or contamination, the poured material would be cleaned by using absorbents like sand, wood-shavings etc. and it would be sent to the licensed disposal plant with other hazardous wastes.

In this matter, Hazardous Waste Control Regulation dated 27 August 1995, Waste Oil Control Regulation dated 21 January 2004 and The Soil Pollution Control Regulation, which became valid after being published in the Official Gazette dated 10 December 2001 and no. 24609, would be followed.

V.1.18. Other Activities

There is no other point to be considered in this section.

V.2. Activities in the Operation Phase of the Project, Impacts on the Physical and Biological Environment and the Mitigation Measures

In this section, an evaluation was performed according to the data and findings obtained by the field studies performed and the literature survey and explained in Chapter IV. The negative effects of the operation phase were determined, the impact size and importance were evaluated and the required mitigations were determined.

V.2.1.The Knowledge About the Properties, Dimensions, Capacities etc. of the Main Structures (Towers, insulators, conductors, towers etc.) Along the Line Route

The 380 kV Karabiga – Can – Soma TPS Energy Transmission Line would have single circuit conductor of 3 954 MCM and totally 526 towers (25 of them would be angle points) would be used for the line. The tower types that would be used in the construction of the line are 3A1, 3B1, 3C1, 3D, 3E and 3F. The types of the insulators that would be used are U100 BL, U160 BL and U210 BS. The insulators would be appropriate to the IEC standards and the conductors would be appropriate to the related ASTM Standards (ASTM B 232, ASTM B 230, ASTM B 498) or to the related Turkish Standards (TS 490,TS 434, TS 592, TS 730).

V.2.2. The Processes Performed, The Material Used and the Types, Amounts, Properties, Dimensions and Disposal of the Wastes that would exist for the Maintenance of the Line Route

After the commission of the energy transmission line, the maintenance of the route would be performed every six months by the maintenance crews by travelling along the line route. At most 2 carriages would be used for the maintenance of the line and the emission due to the exhausts of these vehicles would be at an unimportant level.

The usable material, that would be left after the maintenance and repairment works, would be sent to the material depots to transport them to the transformer station, that needs them. The material, that could not be used anymore (torn wires, broken insulators etc.) would be sold as scrap or sent to a licensed recycle or disposal plant of construction wastes.

The maintenance of the transmission lines are performed by the line maintenance crews and the material that are used by these crews and their properties are given in Table V.9.

Table V.9. The Maintenance Material of the Transmission Lines

Material	Property	Number of Units
Aluminium Ladder	Aluminium	1 Unit
Grounding Cable	Braided Bakır	12-15 Units
Line Rifle	Metal - Braided Copper	1 Unit
Helmet	Fibreglass	1 Unit/Person
Wrench Set	Metal	2 Sets
Safety Belt	Braided Linen	1 Unit/Person
Hand hack	Metal	1 Unit for 1.5, 3, 6 Tons each
Triphor	Metal	1 Unit for 1.5, 3, 6 Tons each
Pully	Metal	1 Unit for 1.5, 3, 6 Tons each
Snatch	Metal	At least 4 Units for 300, 477, 795, 954,1272 MCM Conductors, at least 2 Units for 50, 70, 96 mm^2 Protection Wires
Hydraulic Press	Metal	1 Unit for Each Crew
Hydraulic Scissors	Metal	1 Unit for Each Crew
Tree Cut Motor	Metal	1 Unit for Each Crew
Axe	Metal	At Least 2 Units
First-Aid Stretcher	Metal+Linen Fabric	1 Unit
Line Vehicle	Metal	1 Unit

V.2.3. Activities Posing Risks and Dangers for Human Health and the Environment which would be Carried out During the Operation Phase of the Project

The main risk in the operation phase of the project would be the risks that would caused by working with electricity and at a high place during the maintenance works that would be performed in every 6 months. Beside this, there would be a fire risk due to the electrical leakage.

As stated above the transmission line would be constructed according to the fire safety principles of Electrical High Voltage Plants Regelation, which is published at the Official Gazette dated 30 November 2000 and no. 24246, would be controlled regularly and the required maintenance, repairment and renewal works would be performed.

In the maintenance works of the project, Regulation on Occupational Health and Safety, that became valid after published at the Official Gazette dated 09 December 2003 and no. 25311, Regulation on Personal Protective Equipment, which became valid after being published in the Official Gazette dated 11 February 2004 and no. 25370, Regulation on Basics and Methods of Workers Health and Safety Training, which became valid after being published in the Official Gazette dated 07 April 2004 and no. 25426, Regulation on Health and Safety Signs, which became valid after being published in the Official Gazette dated 23 December 2003 and no. 25325, Regulation on Health and Safety Requirements for the Operation of Work Equipment, which became valid after being published in the Official Gazette dated 11 February 2004 and no. 25370 would be followed.

Can - what are the requirements -

The crews, which would perform the maintenance of the line, would be formed by the people, who have an education about subjects like fighting against fire, working at a high place and first-aid. During the maintenance works, the personnel would use the required personal protective equipment like helmet, insulating glove and insulating boot and the fire extinguishing equipment and the first-aid bag would be present. Beside this, during the maintenance works of energy transmission lines, Regulation on Occupational Health and Safety of TEIAS would be followed for general mitigations. To prevent the people of the region from coming near to the towers, the required warning boards would be placed on the constructed towers.

V.2.4. The Electric and Magnetic Fields that would Occur and Their Intensities, Impacts and the Mitigation Measures

The electric fields and the magnetic fields (EMA) are different facts those occur due to the natural causes or the human activities about electricity. The formation of EMAs due to natural causes is related with the climate conditions and the geomagnetic field of the world. The communication devices, electrical home devices and the usage of electricity generation and transmission systems are the examples of the human activities those cause EMAs.

The frequency of an electricity line is defined by the direction changing speed of its electric and magnetic field in each second. This changing frequency for the systems in USA is 60 per second and it is defined as 60 Hz. In Europe and Turkey the electricity frequency is 50 Hz. The radios and Communication devices have very much higher operation frequency that changes between 500,000 – 1,000,000,000 Hz. The knowledge given in this section is valid for EMAs caused by electrical communication systems having 50-60 Hz frequency.

The electric fields are formed due to voltage difference and become intensified with the increase in voltage. The intensity of the electric field is expressed in kilovolt at 1 meter (kV/m). The intensity of the electric field decreases rapidly as moving away from the source. The reason of this is the absorption of the electric field rapidly by the receivers in the environment like building, tree etc.

The magnetic field is the force that is applied by the moving and charged particles to other charged particles. The magnetic fields those form a circular and continuous field are formed due to the current passing through wires and cables and their power increases with the increasing current. The magnetic field decreses as moving away from the source but it could not be absorbed by most mterials. The power of the magnetic field is defined by Gauss (G) (TEIAS, 2001).

The health risks of EMAs have been researched for 30 years. It does not have an effect on health that was proved by the scientific studies performed until nowadays but, it does not mean that EMAs do not have an effect. For this reason some standards about EMAs were prepared by some countries and international institutions for prudence principle. The standards those were prepared by accepted by Non-Ionizing Radiation Committee (INIRC) of International Radiation Protection Association (IRPA) and accepted by United Nations World Health Organization (WHO) are presented in Table V.10.

Table V.10. The Limit Values Determined About Exposure to EMAs by Non-Ionizing Radiation Committee

The Reference Values of Exposure to 50/60 Hz Electromagnetic Field		
Exposure Conditions	**Electric Field (kV/m)**	**Magnetic Field**
Workers		
Full time	10	5 G (5,000 mG)
Short time*	30	50 G (50,000 mG)
Organs (Arm, leg etc.)	-	250 G (250,000 mG)
Community		
24 hour/day	5	1 G (1,000 mG)
A few hours a day	10	10 G (10,000 mG)
** For the fields at 10-30 kV/m level, field intensity (kV/m) x exposure time (hour), for full time should not pass the value 80. The magnetic field intensity that the whole body is exposed to two hours a day should not pass 50 G.*		

TEIAS, 2001

In our country the exposure limit values for EMAs those are caused by the transmission lines were determined by the standard namely "Exposure of People to Electromagnetic Fields – Low Frequencies (0 Hz – 10 Hz)" that is in the TS ENV 50166 – dated 01 April 1996 and no ICS 29020 edition of Turkish Standards Institute (TSE). These values those are the same with the European Union Standards are given in Table V.11.

Table V.11. The Limit Values Determined by Turkish Standards Institute About Exposure to EMAs

The Reference Values of Exposure to 50 Hz Electromagnetic Field			
Exposure Conditions	**Electric Field (kV/m)**		**Magnetic Field**
Workers	30	t(hour) ≤ 80/E(kV/m)*	16 G (16,000 mG)**
Community	10		6.4 G (6,400 mG)***
** t: time (hour), E: Electric field intensity (kV/m); Electric field intensity (kV/m) x exposure time (hour). should not pass the value of 80 for full time.* *** 250 G is acceptable for arms and legs.* **** 100 G is acceptable for arms and legs.*			

TEIAS, 2001

depends on distance

In our country a comprehensive study about EMAs those are caused by high voltage energy transmission lines was performed by TEIAŞ and TUBITAK National Metrology Institute in 2001. According to the results of the measurements taken in this study, the EMA intensities caused by the 380 kV transmission lines in our country are presented in Table V.12.

WHY DIDN'T YOU CALC. THIS – IT IS MUCH MORE IMPORTANT THAN NOISE, and all the other silly calc. done

Table V.12. The Measurement Interval For Electric and Magnetic Fields Caused by 380 kV Energy Transmission Lines

Plant type	Electric Field (kV/m)	Magnetic Field (mG)
380 kV Energy Transmission Line*	***1 - 3***	***35 – 60***
* The measurement was performed beneath the lines.		

TEIAS, 2001

As it can be seen in Table V.12, the values obatined from the measurments are much more lower than the limit values determined by WHO and TSE. For this reason, the electric and magnetic fields caused by the 380 kV Karabiga – Can – Soma TPS Energy Transmission Line would be unimportant.

V.2.5. The Impacts of the Line on Communication Plants (PTT lines, radios, TV transmitters etc.)

The impact of the energy transmission lines on the communication plants (PTT lines, radios, TV transmitters etc.) is due to corona effect. Corona means decomposing of the air to the charged particles due to the electric field around the conductors. Corona is formed when the electric field intensifies excessively at the bosses on the conductors (like blobs). Corona causes a little amount of ozone formation since it causes sounds those could be heard, radio and television interference, visible blue light and decomposition of the molecules. The engineers dealt with this subject fastidiously until the first half of the 20. century because of the economical losses due to energy loss and the noise effect. For this reason nowadays the deign criterions to prevent the corona effect are quite developed and this effect is observed only at the lines those have 500 kV and higher alternative currents and under negative climatic conditions (TEIAS, 2003).

Since the transmission line is 380 kV, it is not expected a noticable corona effect. The corona test would be applied to the devices to prevent the corona effect and the design criteria, those are defined at the Electrical High Voltage Plants Regelation, that is published at the Official Gazette dated 30 November 2000 and no. 24246, would be followed.

V.2.6. Determination of the Magnitude and Distribution of the Effects on the Cultural and Natural Assets (Traditional Urban Texture, Archeological Values, Natural Values Which Needs Protection) on the Project Route and its Vicinity

With the operation phase of the energy transmission line, its most important impact on the cultural assets would be the negativity that would be formed visually. For the 380 kV energy transmission line, Kaletepe 1st Degree Natural and Archaeological Site (Km~53+000) that is located in the vicinity of Calkoy and Uyucektepe Tumulus that was declared as an archaeological site and located beside the Yagcili Creek between and inside the boundaries of Manisa Province Soma District (Km 139+000 and Km 140+000) and has a distance of 100-200 m to the approximate line are the nearest cultural assets to the line along the route. Davutkoy Ancient City (Km~58+000) that is located in Canakkale Province, Yenice District and 500 m away from the line is the 3rd nearest cultural area to the line. As explained in Chapter VII, at which the alternatives were evaluated, the Alternative 1 was developed for Kaletepe Site Area, from which the approximate route passes, not to affect negatively from the construction and operation phases of the activity. So the route was taken 700 m south of the approximate route in this region. The other 2 cultural asset discussed are already outside the impact area. Electric field and magnetic field is not expected to have an important effect on the cultural asset discussed. The distance of the line from the cultural asset would be an important advantage for preventing the negative visual effect of the line. Beside these, an important effect is not expected in the operation phase of the project.

Sifadag Wild Life Protection Site is inside the 5 km survey corridor of the project area. In the construction phase, in spite of being outside of the impact area, to minimize the effects over *Capreolus capreolus* (roe-deer) and the other mammal species, those exist in the Wild Life Protection Site (Manisa Province), no service roads would be constructed, the workers would be informed by the contractor firm, machines and personnel would not go out of the construction area and the precautions would be regularly applied for not to exceed the limit value of the noise and dust production at the reproduction season (July-end of August). Besides, in the project area about 50% of the area is the agricultural area and this causes the extinction of the natural properties with the cultural areas. As a result of this no endemic species were found in the project area.

During the construction works of the project signs would be used to determine the natural and archaeological site areas and/or the construction corridor. The required information and education would be given to the workers for no to give harm to these areas. For signing no permanent paint would be used on rocks and plants.

V.2.7. The Impacts of the Project on Flora and Fauna that was Defined in Chapter IV.2.10 and the Mitigation Measures

As stated in Chapter IV.2.10 and V.1.16, no endemic species were foung in the 5 km corridor that is the survey area of the project. The compression over the vegetation in the vicinity, the intensity of the forest areas and widespread of the agricultural usage are important causes of this. So the most important and permanent impact on flora would be the tree cuts performed at the areas, where the tower feet would be placed. This impact affects the vegetation intensity to a level and also changes the vision. The pruning works that would be performed during the maintenance works of the project can be evaluated as an effect that changes the growing form of the plants. Especially in the forest areas that the pine-needle trees are located, growing up in horizontal direction is observed at the trees whose tops were pruned for not damaging the wires. The pine-needle trees could not develop their natural form any more. The prunings performed ensures more powerful shoot formation for leafed trees. All this formation affects the visual structure. During the construction activities in Can – Yenice, Yenice – Balikesir, Komurculer – Buyuk Findik, Savastepe – Danisment and Goktaslar Regions, in which the Pinus brutia (Calabrian Pine) forests are very dense, by raising the transmission towers a few meters, the forest formation in these areas would not be damaged.

Since the topsoil would be spread under the towers after the construction works, the plant parts like tubercle, onion, seed those were carried with the soil would be placed in their former places and ensure the continuity of the species. For this reason, the project is not expected to have a negative effect about species variety in the operation phase.

In the operation phase of the project, having no chemical wastes of the energy transmission line, the alternative areas for the species in close vicinity, the moving abilities of the mammal, reptile, amphibian and bird species, no limitations of the feeding, walk around, lodging and reproduction areas and activities of these species by the activities were evaluated as they would not create any relative negativity in the environmental impacts aspect. The detailed information about this subject is given in Chapter IV.2.10. Besides, the electromagnetic field caused by energy transmission lines having a frequency of 50-60 Hz does not have an important effect on human health, flora and fauna.

V.2.8. Other Activities

There is no other point to be considered in this section.

V.3. The Impacts of the Project on the Socio-Economical Environment

V.3.1. Expected Increases in Income with the Realization of the Project, Employment Opportunities, Population Movements, Migration, Education, Health, Culture, Other Social and Technical Infrastructure Services, and Changes in Utilization Patterns of these Services, etc.

The Marmara Region, in which Balikesir and Canakkale Provinces that the transmission line passes through are located, is the most crowded region of Turkey. The main reason of the population density is the migration to this region because of the developed industry and trade sectors. In relation to this, it is the region, in which the urbanization rate is the highest. In spite of locating in this region, Canakkale Province does not have an important population. Its population increase rate remained low due to the migrations until 1975's and including some of its villages by the other provinces in the vicinity. After this period, the population had an increase trend by the development of the industry beside agriculture. Especially in recent years the migration starts to the province center. Because of the reasons like being near to the big provinces, having an urbanization in good order, having natural assets, it attracts some population to the city. The population of the Balikesir Province is higher than Canakkale Province. Its industry comes after Bursa and İstanbul Provinces in Marmara Region. The sectors inside the province are not collected in the central district like other provinces in Turkey, it has a homogeneous distribution among the districts.

The Aegean Region, in which the Manisa District is located, has the 4th place in population after Marmara, Interior Anatolia and Black Sea Regions, but since its surface area is small, it is in the 2nd place in population density after Marmara Region. In addition to this, when the socio-economical development is taken into consideration, the region follows Marmara Region. The population of Manisa Province is almost equal to the population of Balikesir Province. Also in this province agriculture is the most important source of income and the agricultural industry is also developed.

In each of the three provinces the electricity consumption increases due to industrialization and urbanization. In addition to these as it can be seen in Table IV.23, the electricity consumption per capita of each of the three provinces is close to the average of Turkey. Especially in Marmara Region the energy generation is low but the consumption is the highest. On the contrary, Aegean Region is the region that has the highest number of thermal power-stations. In addition to this, hydroelectric energy generation is performed. By the transmission line that would be constructed in the project the energy transfer between these two regions would be easier. By this way the required energy needs would be met and besides additional job opportunities would be created. The 380 kV Karabiga-Can-Soma Thermal Power-Station (TPS) ETL Project is important in developing the urban substructure works, using the effective production techniques and parallel to this the service quality, product variety and the marketing of these products and besides preventing some of the problems in communication in the region.

There is migration in rural areas of each of the three provinces on the project route. The unemployment problem is the main reason of the migration of the local community. Creating new job opportunities and attracting the private sector to these regions are parallel to the technical substructure and the presence of qualified workers in the region. Besides it is important to develop and to adapt the substructure systems used to increase the quality of education, health and culture sectors that are the other causes of the migration to the present time.

The positive socio-economical effects of the project discussed would be local and regional and indirectly national but the environmental effects would be at local level. Consequently to inform the regional community and to take their opinions/recommendations, Participation of Community Meetings are performed at 1-2-3 December 2004 in accordance with the judgements of Regulation on Environmental Impact Assessment, that is published at the Official Gazette dated 16 December 2003 and no. 25318. In these meetings the regional community was informed about the project and the works performed, their opinions/recommendations were taken and their questions were answered by the related competents and experts of the organization, that prepared the EIA Report. The minutes of the meeting is presented in Appendix D.

V.3.2. Environmental Cost-Benefit Analysis

Some adverse environmental impacts would be observed along the route during the construction of the energy transmission line project. These adverse effects can be summarized as change in the land usage, visual effect, cleaning the plant cover and consequently the habitat loss, the discomfort due to noise and dust emission. The effects those were examined in Chapter V.1 in detail would be temporary and would be observed during the construction works only. Since the project completes an important substructure deficiency, its socio-economical effect should be positive. The personnel that would work in the project, especially the unqualified workers could be employed from the region. This would be a positive addition to the regional economy.

The electromagnetic field caused by energy transmission lines having a frequency of 50-60 Hz does not have an important effect on human health, flora and fauna. Consequently the most important effect of the project in the operation phase would be the change of land usage and the visual effect at the areas, where the tower feet would be placed.

A comparative benefit/cost analysis by taking environmental factors into consideration could be made between the proposed project and the no action alternative. The qualitative explanation of this study is presented in Table V.13.

As it can be seen in the table, the proposed project is more advantageous in a lot of aspects when it is compared with the no action alternative. Besides, by the realization of the project there would be no difference in the present use of the environment. As examined in the previous sections in detail, after the realization of the project about 5.5 ha of agricultural area would remain under the tower feet in the operation phase but the agricultural activities could be performed at these areas. Similarly about 4.2 ha of area would be the forest area that would be left under the tower feet and the tree cuts performed. But this loss is very small when the addition of the project especially to the regional and national economy is taken into consideration.

Table V.13. Comparative Environmental Benefit/Cost Analysis

Parameter	**Present Condition**	**Proposed Project**	**Explanations** **+ : advantageous according to others** **- : disadvantageous according to others** **× : same with the others**
Energy	-	+	It would be possible to supply continuous energy by the proposed project. It would be useful for meeting the increasing energy need of the region.
Economy	-	+	By the proposed project the energy need would be met and it would be enable the various investments by the increasing energy safety.
Operation costs	-	+	Except the maintenance works performed every 6 months, the proposed project would have no operation costs.
Service area	-	+	It would be ensured to transmit the energy that is generated in Soma Thermal Power-Station and Icdas safely to long distances. Thus by the development of the local and regional substructures, a safer and better quality service network could be formed in the service area of the 154 kV line.
Environmental factors	+	-	In case of realizing the proposed project, it would be exposed to the environmental impacts explained in Chapter V.1 and V.2 in detail.

CHAPTER VI

POTANTIAL AND ONGOING IMPACTS AFTER THE DECOMMISSIONING AND MEASURES TO BE TAKEN AGAINST SUBJECT IMPACTS

CHAPTER VI. POTENTIAL AND ONGOING IMPACTS AFTER THE DECOMMISSIONING AND MEASURES TO BE TAKEN AGAINST SUBJECT IMPACTS

The economic life of the 380 kV Karabiga - Can – Soma TPS Energy Transmission Line Project is 30 years. After the project completes the economic life, the renewal or completely removal of the line discussed would be needed. Since it would be more advantageous to regenerate an existing line than constructing a new line from both the economical and environmental points of view, it would generally be preferred to regenerate the line if the need for the transmission line still continues.

At the renewal work of the line, all towers, grounding systems, conductors, and insulators are controlled along the line and the necessary ones are renewed. The materials, those remain after the renewal of the line, would be transferred to the materials depots and the ones, that cannot be used, would be sold as scrap. The temporary environmental impacts, that would occur during the renewal of the line, would have the same characteristics and the same precautions would be taken.

If it is preferred to close down the enterprise, then all towers would be disassembled and land improvement studies would be performed. The materials, those remain after this process, would be transferred to the materials depots and the ones, that cannot be used, would be sold as scrap. Different from the renewal of the line, the construction waste that would be produced by breaking the concrete blocks of the feet of the towers, would be ensured to be taken by the nearest municipality or a licensed recycle and/or disposal plant. However the temporary impacts during these processes have similar characteristics with the construction of the line, after the process is finished no impacts would remain. If closing down the enterprise is under discussion, the studies for land improvement are explained below.

VI.1. Land Improvement

After the project completes the economic life of 30 years, if it is preferred to close down the enterprise, then all towers would be disassembled along the line. After that the concrete blocks at the feet of the towers would be broken and removed and the land improvement would be performed. The works for the land improvement are explained below.

- The topsoil would be stripped (10-50 cm) before digging the tower feet.
- The concrete blocks of the tower feet would be extracted and ensured to be taken by the nearest municipality or a licensed disposal/recycle plant.
- The space due to extracting the concrete blocks would be filled by aggregates or rock material and covered by base and topsoil, that is used during filling the tower feet. If there will not enough topsoil, it would be reinforced by the bought topsoil.
- Settling of filled area later would be taken into consideration and the topsoil would be placed, that would pass the ground level about 10 cm.
- An insemination by using a mixture, that is suitable for the natural vegetation, would be performed at the areas, that are near to the waterways and have a high risk of erosion.
- The service roads, those would not be needed after closing down the line, would be closed according to necessities and the requests of the people/municipality of the region. The activities of closing the service roads would be performed as explained in Chapter V.1.

VI.2. Other Activities

There is no other matter to be explained in this chapter.

CHAPTER VII

THE ALTERNATIVES OF THE PROJECT

CHAPTER VII. ALTERNATIVES OF THE PROJECT

The general principles, those are taken into consideration by Turkey Power Tranmission Co. (TEIAS) in determining the route of the energy transmission line, are explained below:

- Being parallel to the existing energy transmission line since it is suitable for the cultural asset and environmental impacts (By this way the environmental impacts are minimized),
- Following a line that is parallel to the existing transportation facilities like railways and highways,
- Keeping away from the sensitive areas and the areas that are dependent on organizations, as far as possible (the habitats of the species, that are under danger, flood areas, landslide areas, special environment protection areas, cultural and historical areas, quicksand, flood-plain, areas, those are exposed to landslide, forests, fruit-gardens, poplar graves, military fields, airports, Government Producing Farms, Poplar Institutes, mine fields, visual springs etc.),
- Keeping away from population centers and reconstructed fields as far as possible,
- Easiness of establishment, maintenance and operation.

According to these principles a corridor, which has a width of 5 km, is surveyed and an alternative is determined for the line that would be constructed. The map of the alternatives is presented at the Project Route Alternative Map in Appendix B. The alternatives discussed are assessed from the feasibility and the cost of the construction, environmental impacts and meeting the purpose and the necessities of TEIAS (ensuring continuous energy to the consumers) points of view and Alternative 1 is determined as the most suitable route from the environmental point of view. This route alternative is explained below:

Approximate route: The approximate route is the route that is determined by TEIAS and is 158 km long. The line, that starts from Kiyi Gemi Transformer Station (TS), that is located at Değirmencik Village, passes through Kaletepe 1st Degree Natural and Archaeological Site at Km 53. In general the line passes far from the population centers along the route, but it approaches about 100 m to Hacilar Village and Boynanlar Village at Km 42+000 and Km 81+250 respectively. Although these villages are the closest villages along the route, both of the villages would not be affected from the construction works. Since an area that is sensitive in ecological point of view was not determined along the route discussed and being deprived of endemic wealth of the region, the unique negative effect of the approximate route discussed is the passing through the cultural area that is explained above.

Alternative 1: Alternative 1 follows nearly the same way with the approximate route. The purpose of this alternative is keeping away from the 1st Degree Natural and Archaeological Site, that is on the route. For this reason the alternative discussed passes 700 m south of the 1st Degree Natural and Archaeological Site at Km 53. By taking the line to the south at this place, the line moves away more from the Ancient Population Center, that is located 500 m northeast of the line at Km 58+000. The route, that is taken to the south between Km 51+825 and Km 60+000, follows the same way with the approximate route at the other regions. In general the route passes far from the population centers. The points, that the population centers are closest to the line, are Hacilar Village and Boynanlar Village, that are located at Km 42+000 and Km 81+500 respectively, like in the approximate route. These villages are far enough from the line not to be affected from the

dust and noise due to the construction works. Besides, despite Sifadag Wild Life Protection Area, that is located in Manisa Province Soma District, is inside the 5 km corridor, the line passes far from this field.

No Action Alternative. No Action Alternative is prepared supposing that the project would not be achieved. As stated at the previous chapters, Marmara and Ege Regions, where the project is located, are the first and the second regions of Turkey according to density of population. Industry and trade are developed in these regions. Related to this, in both of the regions, migration and urbanization ratio are increasing. Increase in the urbanization ration and development of industry and trade causes an increase in electricity need in the region. The existing energy transmission line in the region cannot meet the increasing need and causes power-cuts. First of all this would affect the daily life negatively and also it would affect the development of the regions negatively in the future. Marmara Region is a region, that the energy production is low but the energy consumption is high. Beside this Ege Region is a region, that has the highest number of thermal power-stations. In addition to this hydroelectric energy production is performed in the region. By the energy line, that would be constructed, energy transfer between two regions would become easier.

Not including the no action alternative, the socio-economical effects of the approximate route and Alternative 1 would be similar. The planned project would ensure to create employment in the construction phase. A part of the personnel discussed would be employed from the region. A negative socio-economical effect, that is caused by the project, is not expected. Digging hollows for the feet of the towers could damage the area a bit. Since the project area is in the 1st degree earthquake region, this fact would be taken into consideration in the construction phase. Since the related precautions would be taken, the project is not expected to cause soil pollution. Because of the construction temporary and regional dust formation is expected. In the analysis performed it is seen that the daily maximum emission amount does not pass the value, that is defined in the Air Quality Protection Regulations, for Alternative 1 and the approximate route. Consequently the dust emission would be unimportant. The noise, that would be caused by construction works, would have a short time and temporary effect. Since the effect area of the construction works is defined as 100 m, only Hacilar and Boynanlar Villages, that are around 100 m of the line, would be affected from the construction works for a short time. The power of the electrical field and the magnetic field, those are caused by the line discussed, would be at low level, that could be compared with the electrical home devices. Consequently it is not expected to cause any medical problems. In the construction phase a temporary and a short term increase is expected in the traffic of the existing roads. Since the roads, that are constructed for 154 kV Energy Transmission Line and parallel to the line, would be used as service roads, creating a new cost to the region in the environmental point of view would be prevented.

The 380 kV Karabiga – Can – Soma TPS Energy Transmission Line Project is a project, that is taken into agenda and into investment program because of the problems occurring in the energy transmission in the region. The financial support of the project would be ensured from World Bank. If the no action alternative is selected for the project, that becomes important in preventing the losses caused by the power-cuts in the region and in transmitting the energy, that is produced at ICDAS and Soma Thermal Power-Stations to the required regions, the problems in transmitting the energy would continue and the energy that is produced at the thermal power-stations could not be transmitted to the required regions.

CHAPTER VIII

MONITORING PROGRAM

CHAPTER VIII. MONITORING PROGRAM

VIII.1. The Monitoring Program Suggested For The Construction of The Activity, The Operation of The Activity and The Monitoring Program and The Emergency Action Plan Suggested For After The Operation

Establishing and operating an Energy Transmission Line (ETL) passing through Biga, Can and Yenice villages of Canakkale Province, Balya, Ivrindi and Savastepe villages of Balikesir Province Soma village of Manisa Province, has 380 kV voltage with single circuit conductor of 3B 954 MCM and approximately 158 km long, is planned in the Energy Transmission Line project. After the approval of the Environmental Impact Assessment Report, which covers also the monitoring program of the project, and ensuring the financial resource from World Bank, the construction of the line will be initiated by Turkey Power Tranmission Co. (TEIAS).

The studies, which form the base of this monitoring program (the ecological properties of the project area and its close vicinity, the probable environmental impacts due to the activities of the project and the precautions to be taken, performing a detailed environmental impact assessment) are realized according to the "380 kV Karabiga-Can-Soma TPS ETL Project Consultancy Services Contract" (Contract), which was signed between TEIAS General Directorate, Energy Tranmission Lines Establishing Project, Expropriation and Environment Department (TEIAS) and ENCON Environmental Consultancy Co. (ENCON), and according to the format, that was sent by Ministry of Environment and Forestry and this program is prepared within the same scope.

The works within the coverage of the monitoring plan can be summarized as:

- Preparation of the Mitigation Plan,
- Preparation of the Monitoring Plan,
- Explanation of the Institutional Organizations those are related to the Application of the Monitoring Program,
- Presentation of the Meetings arranged with the Groups and Non-Governmental Organizations (NGO), which would be affected from the project.

The Description of The Working Area and The Mitigations Suggested For The Project

In the coverage of this monitoring program study, the route determination of the energy transmission line project discussed, the suggested mitigations in the construction and operation phases and the monitoring parameters are defined. The length of the project route is about 158 km and the impact area is a 5 km wide corridor, covering 2.5 km both at the right and left side of the route.

Literature and Field Surveys

To collect data about the project field, which are necessary to prepare an monitoring plan concordant to World Bank standards and the contract, field studies were planned and performed according to the experts, who are experienced in their professions, and the meetings made with the local community about the project. The monthly development reports of the applications of the field study program and the survey reports were presented to TEIAS. Besides, discussions were made with the local community and the Non-Governmental Organizations (NGO), which would possibly be

affected from the project. In these studies, those subjects were taken into consideration in evaluating the probable impacts and determining the necessary mitigations and the monitoring activities:

- Topography
- Meteorological properties
- Surface and underground water springs
- Land usage
- Vegetation and habitats
- Terrestrial flora and fauna
- The species that are endemic and under danger and/or protection
- The areas that are under protection and sensitive (Ex: wild life protection sites)
- Population centers
- Economical activities
- Historical and cultural areas and assets

A considerable part of the data discussed above was taken into consideration in the studies, but is not presented in the report, since they could be found in the Environmental Impact Assessment Report (EIA) and not directly related with preparing this chapter. In the following chapters, the precautions taken against the probable impacts due to the activities discussed and the data, which is directly related with the monitoring plan are presented.

A field study was realized according to the opinions of the experts, who would execute the studies and the literature survey performed. The meetings with the local community and the competents were made on 01, 02 and 03 December 2004.

In the meetings made with the related people, the villagers and the village headmen in the areas, those are around the activities, were interviewed. Within the scope of these studies, these people were informed about the planned activity, information about the existing socio-economical condition obtained and the opinions of these people were taken. At these meetings information about the project was given and the expectations and the anxieties of the local community were learned. The opinions, which were discussed at these meetings, were taken into consideration while preparing this monitoring program and some details about these meetings are presented in Chapter IX.

Present State

The detailed information about topography, meteorological properties, surface and underground water springs, hydrology and hydrogeology, land usage, population centers and sources of earning money could be found in the EIA Report. Besides, the species, which were determined at the biological field surveys, and the effects on flora and fauna is given in detail at the Chapter IV.2.10, V.1.16 and V.2.7 of the EIA Report. Consequently any data about these subjects is not given in this chapter, but these subjects would be examined when they are needed.

The Probable Effects, the Precautions Against the Negative Effects and the Monitoring Requirements

The precautions, which would be taken against the effects of the construction of the 380 kV energy transmission line that would be constructed in the boundaries of Canakkale (Biga-Can-Yenice Districts), Balikesir (Balya-Ivrindi-Savastepe Districts) and Manisa (Soma District) within the scope of the project are given in Table VIII.1.

The disposal of the wastewaters and the solid wastes, the noise level and the effects on the flora and the fauna should be controlled periodically according to national environment legislation to take precations to minimize the damage given to the environment in the land preparation and the operation phases of the project. During the realization of the project it will be controlled regularly whether the precautions, which were defined at the related parts of the report, have taken or not at both the land preparation and the operation phases. In principle, the priority is given first not to create any negative effects, then to minimize the existing effects and at last to compensate these when needed. The monitoring activities, which would be needed to ensure the efficiency of the precautions discussed, are presented in Table VIII.2.

Table VIII.1. Mitigations Plan

Phase	Subject	Mitigations	Responsible Institution
CONSTRUCTION	Cultural and Historical Assets	• Close vicinity of the areas, which have cultural properties, would not be selected as a work-site, • In case of coinciding any cultural asset, the related Cultural and Natural Assets Protection Committee would be informed.	Construction Contractor TEIAS
	Dust Formation due to the Movement and Exhaust of the Construction Machinery	• Watering would be performed, • It would be obeyed to the Industrial Originated Air Pollution Control Regulation, • Dust masks would be used, when needed, • Speed of the trucks would be limited, • No other mitigations would be needed, since the dust emission is under the limit value.	Construction Contractor TEIAS
	Noise due to the Construction Machinery	• The continuous work-site noise would be ensured to be under 70 dBA, • It would be obeyed to the Noise Control Regulation, • Portable folding screen would be used, • People, living at the population centers around, would be informed about the working durations and there would be no work between 22:00 - 06:00. • New machinery would be used as far as possible.	Construction Contractor TEIAS
	Wastewater of the Work-Sites	• Septic tanks would be constructed according to the Regulation on Pit Opening Where Sewer System Construction is not Applicable • Water collected in the septic tanks, would be emptied by the nearest municipality, • Water Pollution Control Regulation would be obeyed.	Construction Contractor, TEIAS Municipalities
	Solid Wastes at the Construction Areas and Work-Sites	• Solid wastes and construction wastes would be collected separately and it would be ensured to be taken by the municipality or a licensed recycle plant, • No wastes, which could not be broken down biologically, would be left at the construction area, • Obeying to the Solid Wastes Control Regulation, Soil Pollution Control Regulation, Regulation on Excavation, Construction and Demolition Wastes and Packaging and Packaging Waste Control Regulation.	Construction Contractor, TEIAS Municipalities

Table VIII.1. Mitigations Plan

Phase	Subject	Mitigations	Responsible Institution
	Territorial Habitat Deterioration and/or Loss	• Topsoil would be stripped and stored while openning hollows for the tower feet, • Excavation soil would be used for filling and leveling the field and no excavation wastes would be formed. • New habitats would be formed by spreading back the pruned vegetative structure to the areas, those have no fire risk. • No solid waste and liquid waste would be discharged to the soil surface.	Construction Contractor TEIAS
	Deterioration in the Floristical Structure and Loss of Agricultural Products	• Vegetative top soil would be spread again after the construction works, • Since the parts like root, seed, bulb of the plants would be protected by the pruning along the service roads, the threat for the plant diversity would be prevented. • No works would be performed at the reaping and sowing periods as far as possible, • Damage on the agricultural products due to the works would be paid by the contractor, • Construction areas would be enclosed at the agricultural areas.	Construction Contractor TEIAS
	Protection of Fauna Species	• Bird repellents would be placed at the towers at the required places. • At the reproduction period of the roe-deers (July-end of August) no service roads would be constructed, the workers would be informed by the contractor firm and no vehicles and personnel would leave the construction area, the precautions, which are determined not to pass the limit values in noise and dust formation, would be applied regularly.	Construction Contractor TEIAS
	Grounding, Health and Safety	• It would be obeyed to the Regulation on Grounding in Electricity Facilities, • All required protection equipments would be given to the workers, • Boards like "Attention", "No Entrance" would be placed, • The personnel would be educated about subjects like figthing against fire, working at a high place and first-aid, • It would be obeyed to the Regulation on Occupational Health and Safety, Regulation on Health and Safety Signs, Regulation on Personal Protective Equipment and Regulation on Health and Safety Requirements for the Operation of Work Equipment.	Construction Contractor TEIAS

Table VIII.1. Mitigations Plan

Phase	Subject	Mitigations	Responsible Institution
	The Risk of Erosion, Flood and Fire	• It would be kept away from the flood plains while constructing the tower feet, • To prevent the transportation of the sediments to the streams, drainage canals would be built near the service roads at the areas, which have erosion risk. • To prevent the fire risk, the dimensions of the devices, the possibilities of the maneuverings of the machinery and vehicles and the probability of breaking of the lines would be taken into consideration in drawing the boundaries of the working field.	Construction Contractor TEIAS
	Landscape effect	• Close vicinity of the areas, those have importance in visual aspects or have cultural property would not be selected as work-site, • Along the route of the transmission line, it would be kept away from the perspectives, which have wide angle of vision, as far as possible, • Concealing property of the nature would be used,	Construction Contractor TEIAS
OPERATION	Health and Safety	• The teams, which would perform the maintenance of the line, would be formed by the people, who have an education about subjects like fighting against fire, working at a high place and first-aid, • It would be obeyed to the Regulation on Occupational Health and Safety, Regulation on Health and Safety Signs, Regulation on Personal Protective Equipment and Regulation on Health and Safety Requirements for the Operation of Work Equipment.	TEIAS
	Fire Risk and Corona Effect	• Plants, growing close to the line and have a possibility of creating danger, would be determined and pruning work would be performed. • The line, that would be constructed according to the fire safety principles determined in the Regulation on Electricity Powered Current Facilities, would be controlled regularly and the necessary maintenance, repair and renewal works would be performed.	TEIAS Related Local Directorates of Forestry Management
	Electromagnetic Field (EMF)	• Limit value, which was determined at the standard of Turkish Standards Institude named as "Expösion of People to Electromagnetic Fields – Low Frequencies (0 Hz - 10 kHz)" will not be exceeded.	TEIAS
	Loss of Vegetation Species	• The parts of the plant like root, bulb, seed, which ensure the reproduction and carried with the soil by the re-spreading process, would be carried to their former place and would ensure the continuity of the species.	TEIAS

Table VIII.2. Monitoring Plan

Phase	**What** are the parameters, which would be monitored?	**Where** would the parameters be monitored?	**How** would the parameters be monitored/types of the monitoring equipment	**When** would the parameters be monitored - frequency of the measurements / continuous measurement?	**Why** would the parameters be monitored?	**The Institute that controls – frequency of the control**
CONSTRUCTION	Storing the Stripped soil	Field	Visual	Monthly	To prevent the loss of surface soil	Construction Contractor TEIAS Related Local Directorates of MOEF
	Storing the Excavated Material Suitably	At the construction areas and storage areas	Visual	Monthly	To prevent the formation of excavation waste	Construction Contractor TEIAS Related Local Directorates of MOEF
	Dust (particle material)	At the construction areas and the route of the trucks	Visual	Monthly	Ensuring to obey the Industrial Originated Air Pollution Control Regulation	Construction Contractor TEIAS Related Local Directorates of MOEF
	Noise Level	Around the population centers and construction areas	Measurement of the noise level by portable noise pressure level meter Visual for the usage of the protective equipment	Monthly at the construction areas According to the complaints of the community at the population centers	Ensuring to obey the Noise Control Regulation and the Regulation on Occupational Health and Safety	Construction Contractor TEIAS Related Local Directorates of MOEF
	Water Quality	At the construction areas (downstream of the septic tanks)	Analyzing at the laboratories of local community health institution by sampling	Monthly	Ensuring to obey the Water Pollution Control Regulation and the Regulation on Pit Opening where Sewer System Construction is not Applicable	Construction Contractor TEIAS Municipalities Related Local Directorates of MOEF

Table VIII.2. Monitoring Plan

Phase	**What** are the parameters, which would be monitored?	**Where** would the parameters be monitored?	**How** would the parameters be monitored/types of the monitoring equipment	**When** would the parameters be monitored - frequency of the measurements / continuous measurement?	**Why** would the parameters be monitored?	**The Institute that controls – frequency of the control**
5	Separation of Solid Wastes to Recycle and Reuse, Disposal to the Solid waste disposal site of the Municipality	At the construction and work-site areas	Visual	Weekly	Ensuring to obey the Solid Wastes Control Regulation and the Soil Pollution Control Regulation	Construction Contractor TEIAS Municipalities Related Local Directorates of MOEF
1	Protection of the New Cultural Asset, Which was Determined Along the Route and Could be Coincided	Along the 50 m construction corridor on the route	Would be monitored by an archaeologist, that would be employed by the contractor firm, in the construction phase	In case of coinciding a cultural asset	Obeying the Cultural and Natural Assets Protection Law	Provincial Culture and Museum Directorate (Controlled in case of coinciding a cultural)
9	Health and Safety Subjects	At the construction areas	Visual	Daily	Ensuring to obey the Occupational Health and Safety Regulation	Construction Contractor
6	Protection of the Fauna Species	On the wires along the route and at the Wild life development field	Placing bird repellents at the required places along the route of the line At the reproduction period of the roe-deers (July-end of August) no service roads would be constructed, the workers would be informed by the contractor firm and no vehicles and personnel would leave the construction area, the precautions, which are determined not to pass the limit values in noise and dust formation, would be applied regularly.	Daily	To prevent the nesting of the birds to the wires Not to disturb the roe-deers at their reproduction period	TEIAS Related Local Directorates of MOEF

Table VIII.2. Monitoring Plan

Phase	**What** are the parameters, which would be monitored?	**Where** would the parameters be monitored?	**How** would the parameters be monitored/types of the monitoring equipment	**When** would the parameters be monitored - frequency of the measurements / continuous measurement?	**Why** would the parameters be monitored?	**The Institute that controls – frequency of the control**
OPERATION	Regular Technical Controls of the Line, the Repair and the Renewal Works	Along the line route	By technical tests and standard maintenance works performed by control groups	Once a six month	To obey the fire security principles determined at Regulation on Electricity Powered Current Facilities, to repair the damaged and the worn parts, to minimize the accident risk and to prevent the cutoffs	TEIAS
	Control of the Plants, Which Get Close to the Line and Have a Possibility of Creating Danger	Along the line route	By the controls of control groups and/or Related Local Directories of Forestry Management	Once a six month	Because of the fire risk	TEIAS

This is ridiculous

Construction Phase:

The precautions determined to minimize the effects due to the construction activities include obeying the legislation related to the temporary effects like noise, dust, the wastewater and the solid wastes of the worksites and the worker health and work safety subjects. Building septic tanks, the precautions about dust control and ensuring protective equipment to the workers are some of these precautions.

The necessary security barriers would be built and the warning boards would be placed at work area during the construction works of the energy transmission line project discussed. All kinds of equipment and materials, which are needed for fire extinguish works, would be present and besides, the education about the precautions, which should be taken against fire danger, and the things, those should be done at a fire, would be given to the personnel. The necessary monitoring activities would be performed every 6 months to ensure the realization of these subjects.

In the construction phase, the workers will be controlled whether they obey the related judgements, which are defined in the Regulation on Occupational Health and Safety that is in the Labour Law, for protection from the noise due to the machinery or not. Besides, by performing the maintenance of the machinery it would be ensured that their noise would be under the limit value that is defined at the Noise Control Regulation, and the noise sources discussed would be controlled every 6 months regularly.

Not fit on old piece of junk

It is seen that the emissions due to the activities performed in the construction phase would not pass the limit value of the Industrial Originated Air Pollution Control Regulation and would not cause an important deterioration on the air quality. However the precautions, those should be taken, especially about dust generation are displayed. It should be controlled whether these precautions are taken or not at the related work areas in the construction phase. Moreover, TEIAS would inform the authorities, who will carry out the monitoring, about the stage of the construction activities on time.

In case of determining an area that is important from the cultural point of view, in any ways, the related institutions would be informed.

To prevent the erosion and flood risk, it would be kept away from the flood plains while installing the tower feet and to prevent the transportation of the sediments to the streams, drainage channels would be built near the service roads at the areas, which have erosion risk. Besides, during the contruction works, to prevent the fire risk, the dimensions of the devices, the possibilities of the maneuvering of the machinery and vehicles and the probability of breaking of the lines would be taken into consideration in drawing the boundaries of the working field.

The Grounding Regulations in the Electricity Plants would be followed in grounding the line.

Operation Phase:

Some of the precautions about health and safety are forming the teams, which would perform the maintenance of the line, by the people, who have an education about subjects like fighting against fire, working at a high place and first-aid; and following Regulation on Occupational Health and Safety, Regulation on Health and Safety Signs, Regulation on Personal Protective Equipment, Regulation on Health and Safety Requirements for the Operation of Work Equipment.

The line that would be constructed according to the principles determined in the Electrical High Voltage Plants Regulation to prevent the fire risk and corona effect, would be controlled regularly and the necessary maintenance, repair and renewal works would be performed. Besides, the plants, which get close to the line and have a possibility of creating danger, would be determined and pruning work would be performed.

It would not be passed the limit value (16 G for the workers, 4 G for the community), which was determined at the standard of Turkish Standards Institude named as "Exposion of People to Electromagnetic Fields – Low Frequencies (0 Hz - 10 kHz)".

Emergency Action Plan

The emergency action plans, those aim to minimize the damages and dangers by acting according to a program at an unexpected condition during the construction and the operation phases of the project, are the programs, that the necessary studies performed in accidents and the division of labour are defined.

The Emergency Action Plan that is given in Table VIII.3, covers the construction and the operation stages of the project. In this plan, it is noticeable that the necessary studies and many precautions, which should be taken, are the subjects, which should be taken care in the usual daily programs before any negative event happens. Besides, within the scope of the emergency action plan the firm that had undertaken the construction works, and the corporation, that would perform the maintenance and repair of the line during the operation phase, have the most important reponsibility. This plan, that should be made more detailed and updated, should be developed by the contractor firm. Also the corporation, that would be responsible from the maintenance and repair works during the operation phase, should make the plan more detailed and mature according to the changing conditions.

At all the studies, which would be performed within the scope of the plan discussed, it would be obeyed to the following laws and regulations.

Regulations on Occupational Health and Safety

- Labour Law
- Regulation on Occupational Health and Safety
- Regulation on Health and Safety Issues for Construction Works
- Regulation on Personal Protective Equipment
- Regulation on Health and Safety Requirements for the Operation of Work Equipment
- Regulation on Basics and Methods of Workers Health and Safety Training
- Regulation on Health and Safety Signs

Regulations on Environment

- Environmental Law
- Regulation on Excavation, Construction and Demolition Wastes
- Solid Waste Control Regulation
- Soil Pollution Control Regulation
- Water Pollution Control Regulation
- Regulation on Pit Opening where Sewer System Construction is not Applicable

- Industrial Originated Air Pollution Control Regulation
- Waste Oil Control Regulation
- Hazardous Waste Control Regulation
- Harmful Chemical Substances and Products Control Regulation
- Noise Control Regulation
- Medical Waste Control Regulation
- Regulation on Construction in Catastrophe Region
- Regulation on Environmental Impact Assessment
- Environmental Auditing Regulation
- Packaging and Packaging Waste Control Regulation

Regulations on Electricity

- Regulation on Electricity Powered Current Facilities
- Regulation on Grounding in Electricity Facilities
- Regulation on Projects for Electricity Energy Facilities

Table VIII.3. Emergency Action Plan

Phase	Condition	Matters, that would be Taken into Consideration
CONSTRUCTION	Accidents Due to Working at High Places;	• Required education should be given to the personnel before start working. • Subjects like who will work at where and do what daily etc. should be announced to the workers by the contractor firm at a detailed work program. By this way who is where and doing what would be known at an emergency. • A coordinator, that would be determined by the contractor firm before, should be employed at the work-site to make sure that the personnel use all the required protective devices and equipment suitably. • Before starting to work, personal protective equipment (especially safety belt and helmet) should be used. • It should be taken care for the protective devices and equipment used to be left as well-kept and ready to use all the time. • Works would be stopped at the unsuitable climate conditions. • It would be ensured that at least two people would work at the places where the communication is not possible. • The communication devices, like radio etc. should be made to be present to inform the team coordinator at any emergency. • All teams at the working group should report the daily developments before and after the work and at the end of the day the working personnel, materials and devices used should be counted, the devices and equipment, those need maintenance or renewal, should be determined and the required works should be performed about this subject. • A person, who is well educated about health, should be present at the work-site and the first-aid bag should be kept as ready to use.
	Accidents Caused by the Construction Machinery;	• Education should be given to the personnel, that would operate the construction vehicles, by the contractor firm, it would be paid attention for the personnel, that would be selected for this job, to be competent in physical and psychological aspects. • Dimensions of the vehicles and equipment, those would be used, should be taken into consideration in drawing the boundaries of the working fields. • At the works, those are performed by the excavation and loading vehicles, it should be taken care in stowing the material suitably and safely. • A person, outside of the vehicle, should take on the required control work by ensuring the communication with the operator of the vehicle while the loading and unloading works are performed at the working place. • Entrance of the foreigners to the construction area should be prevented and the vehicles should not be left as working when they are not in use. • At a probable accident all the working vehicles should be stopped and it should be interfered by the personnel, who is well educated about health and present at the area.

This is no more
a emergency actin plan
– I don't know what
it is – other than a
waste of paper

Table VIII.3. Emergency Action Plan

Phase	Condition	Matters, that would be Taken Into Consideration
	Accidents Caused by Dangerous Wastes;	• The experts and personnel, those have knowledge about dangerous wastes, would be employed in the project and it would be taken care for the personnel to use protective equipment at all the works about this kind of wastes. • Dangerous wastes would be collected at an impermeable area, labeled and the warning boards would be hanged. The field discussed would be whether closed or the top would be covered to protect effectively from rain and the sun. All the dangerous wastes would be collected at the containers, those would be placed in this area. Mixing of the different types of the wastes would be prevented. • Waste oil containers would be red in color and "waste oil" label would be placed on them. Mixing of the other materials like water, petrol, fuel-oil, paint, detergent, solvent, antifreeze, engine oil etc. to these containers would be prevented. • Dangerous wastes would be send to a licensed recycle or disposal plant periodically. Same application would be applied to all kinds of materials (oil, paint tins, barrels etc.), that have polluted or contaminated with this wastes, this wastes would not be fixed with solid wastes. Transportation of the wastes to the disposal plant would be arranged by a licensed transporter. • In case of any pouring or contamination, the poured material would be cleaned by using absorbents like sand, wood-shavings etc. and it would be sent to the licensed disposal plant with other dangerous wastes.
	Risks Due to Ignorance, Carelessness and Inexperience;	• All types of protective materials and equipment, those would be needed for the work, would be given with a protocol to each person and team and the usage of this equipment would be explained. • Works would be performed according to the daily work program and without informing the authorized person no work, which is not in the program, would be started. • Without taking sufficient safety precautions, works should not be started. • Personnel should not leave his work place without permission. • Related employees and the team chief/coordinator would be responsible from the usage, cleaning and protection of the protective equipment, which was given and informed how to use. • At the work place it would certainly be obeyed to the warning and danger boards. • In spite of taking all safety precautions, if the result of any work is suspicious due to unusual causes, the nearest competent authority would be informed.

Table VIII.3. Emergency Action Plan

Phase	Condition	Matters, that would be Taken Into Consideration
	Accidents Caused by the Poor Quality, Oldness or being Uncontrolled of the Used Material and/or Equipment	• The protective devices and equipment would be suitable to TSE (Turkish Standarts Institute), TSEK (Quality Compliance Certificate) or international standards. • At the works, which would be done by using equipment, it would be taken care of being suitable and safe to perform that work by those vehicles, materials and instruments. • The counting and controls of all the vehicle and equipment, which were taken at the start of the work, would be performed at the end of a workday. All devices and equipment, those need maintenance or renewal, should be determined and the required works should be performed about this subject. • It would be taken care of the periodical maintenance of the vehicles, it would be ensured to perform the maintenance works on time and the vehicles, which are out of order and defective, would not be used.
	Grounding, Health and Safety	• Regulation on Grounding in Electricity Facilities would be followed, • All necessary protective equipment would be given to the employees, • Suitable boards like "Attention", "No Entrance" etc. would be placed, • Educations about the subjects like fighting against fire, working at a high place and first-aid would be organized for the personnel, • Regulation on Occupational Health and Safety, Regulation on Health and Safety Signs, Regulation on Personal Protective Equipment and Regulation on Health and Safety Requirements for the Operation of Work Equipment would be followed.
OPERATION	Accidents Due to the Natural Disasters	• At any problems due to natural disasters, firstly the energy of the transmission lines would be cut. • Programs/action plans, those had been prepared in detail for the cases like this, would be prepared, controlled and updated regularly by the local governments, the associations, which are responsible from transmission and distribution of energy, and the related people. • By determining the person/people, who would control the situation and perform the necessary coordination and orientation at an emergency, a chart of division of labor would be prepared. • All the equipment and devices, those are needed for urgent interference, should be ready to use at any moment.

Table VIII.3. Emergency Action Plan

Phase	Condition	Matters, that would be Taken into Consideration
	Fire Risk	• The line, that would be constructed according to the fire safety principles determined in the Regulation on Electricity Powered Current Facilities, would be controlled regularly, the necessary maintenance, repair and renewal works would be performed. • To prevent the fire risk, the dimensions of the devices, the possibilities of the maneuvering of the machinery and vehicles and the probability of breaking of the lines would be taken into consideration in drawing the boundaries of the working field. • During a fire, the energy would be cut firstly. • Before cutting the electric current, watery fire extinguishers would not be used. • No action, that could cause a fire, would be performed; fire brigade and the related people would be informed in case of a fire. • Dry chemical dusty fire extinguishers would be used. • Plants, growing closer to the line and have a possibility of creating danger, would be determined and pruning work would be performed once a six month.
	Risks Due to the Maintenance Works	• Teams, which would perform the maintenance of the line, would be formed by the people, who have an education about subjects like fighting against fire, working at a high place and first-aid. • The working personnel would dress up according to their jobs. • There should be at least two people in the maintenance team in case of the communication is not possible. • Maintenance works would be performed by the supervision of an authorized chief and by taking safety precautions.

Institutional Coordinations

The responsible sides, which are related to the precautions and the monitoring activities to minimize the environmental impacts, are presented in the tables, those are related to the precautions and the monitoring plans. The environmental precautions, which would be taken in the construction phase, would be performed by the construction contractor coordinated with TEIAS or their consultants. The monitoring activities would be performed by the personnel or the consultants of the sides discussed and by the local competents at some stages.

Collecting monitoring data is the responsibility of TEIAS or the consultants of these institutions essentially, and the local competents, if needed. The data discussed, would be sent to the related units of TEIAS and Ministry of Environment and Forestry by periodic (for example 6 months) reports, which would be prepared by personnel or consultants.

The monitoring data would be collected at General Directorate of TEIAS. The analysis of these data would be performed by the experts, who are related to the project and the necessary environmental subjects, those should be adapted, of TEIAS or the consultants of these institutions. The analysis performed and the results obtained would let to evaluate the effect of the taken precautions on the expected negative effects. According to these results, the environmental mitigations plan would be changed or revised if needed.

Besides, in case of existing an unexpected state, that should be interfered at once, this state would be reported to the related units of TEIAS immediately and by this way it would be ensured to take the necessary precautions.

The decisions (changing the precautions, which would be taken to minimize the environmantal impacts, the revisions of the precautions and the monitoring plans, informing the related competents etc.) related to the results obtained at the stages discussed above would be taken by TEIAS:

The Meetings With The Groups and Non Governmental Organizations (NGO), which would be Effected From The Project

Establishing and operating an energy transmission line (ETL), that passes through Biga, Can and Yenice, Districts of Canakkale Province, Balya, Ivrindi and Savastepe, the Districts of Balikesir, Soma, District of Manisa, has 380 kV with single circuit conductor of 3B 954 MCM and approximately 158 km long, is planned in this study. Consequently, the effects of the project activities would be very limited on the local community and it is seen that the most of the probable effects would be positive. Due to the suggested activities a large scaled expropriation or a rehousing requirement would not exist. For this reason a detailed socio-economical study was not performed for the project activities, which would be performed in a limited area.

To take the opinions of the local community, participation of community meetings were performed in three provinces discussed. These meetings and activities were performed on 01, 02 and 03 December 2004.

The aim of these activities are informing the groups, which would probably be effected from the project activities, and obtaining information about their opinions and anxieties, if exists, about these activities and their results. A competent from Ministry of Environment and Forestry, competents from Ministry of Environment and Forestry

Provincial Directorates of Canakkale, Balikesir and Manisa, the village headmen of the villages, which are located inside the impact corridor and the interested people, who live in these villages, were invited.

These meetings were started by giving concise information about the activities, those would be performed, by the consultants, who prepared this report. After that knowledge about the area, economical activities and living standards were obtained from the participants. Then their questions about their expectations and anxieties about the project were answered. As a result of these meetings, it was determined that the anxieties of the regional community were not directly related to the project activities, which were examined within the scope of this report. Since the activities discussed would not effect the regional community or their fields and commodities directly, this type of reflection is normal.

Non Governmental Organizations were also invited to the meetings. South Marmara Natural and Cultural Environment Protection Society from Balikesir Province, Environmental Volunteers Society from Canakkale Province and Manisa Representation of Environmental and Cultural Assets Protection and Presentation Foundation (CEKUL) from Manisa Province were informed about the meetings. But they did not participated in the participation of community meetings.

VIII.2. In Case of Taking EIA Positive Certificate, The Program About Performing The Subjects At The Second Paragraph of The Title, "The Responsibilities of The Institutions/Organizations, that Took The Sufficiency Certificate" At The Sufficiency Announcement

As discussed in the related chapters, the activities related to the minimization of the environmental impacts and the monitoring, would be performed in and after the construction phase essentially. The main studies related to the environmental precautions and the monitoring would start with the start of the preparations for the construction of the project and continue until the construction activities would be completed. The monitoring activities after the construction stage of the project would be completed, should be performed according to this program by the institutions, which were determined in the mitigations plan and the monitoring plan.

According to the Competency Certification Communiqué dated 24.02.2004, after the EIA period monitoring studies should be performed in the starting and construction phases of the project. For the 380 kV Karabiga – Can – Soma TPS Energy Transmission Line Project, The Monitoring Reports of The Final EIA Report would be filled by performing monitoring once a six (6) month and presented to Ministry of Environment and Forestry.

CHAPTER IX

PUBLIC PARTICIPATION

CHAPTER IX. PUBLIC PARTICIPATION

For the 380 kV Energy Transmission Line Project, that passes through Canakkale, Balikesir and Manisa Provinces, to inform the local residents and to take their opinions/recommendations, Public Participation Meetings were performed at 1-2-3 December 2004 in accordance with the judgements of Environmental Impact Assessment Regulation, that is published in the Official Gazette dated 16 December 2003 and no. 25318. In these meetings the local residents were informed about the project and the works performed, their opinions/recommendations were taken and their questions were answered by the related competents and experts of the company, who prepared the EIA Report. The report of the meeting is presented in Appendix D.

The first one of the meetings, those are performed at three different population centers for three different provinces that the project passes through, was performed in Canakkale Province, Can District, Hacilar Village on 01 December 2004. The participation was very high especially on account of the number of village headman. The participation list of the meeting is presented in Appendix D. The questions about expropriation phase of the project formed the meeting agenda. The questions that were asked about ensuring the losses and the authorized corporation and the competent authority that would be applied for, for this subject, were answered by the competents of the firm, who prepared the EIA Report, and the Turkey Power Tranmission Co. (TEIAS).

The second meeting was performed in Balikesir Province, Ivrindi District, Soganbuku Village on 02 December 2004. In the meeting, the doubts about electromagnetic field were taken into agenda and detailed answers were given by the competents of TEIAS. Another subject, that was discussed during the meeting, was the reluctance of the people about the passage of the towers through the agricultural fields of the village, because of the difficulties in agricultural activities at the agricultural fiels after the towers are placed. About this subject it is defined by TEIAS that the agricultural works will not be performed in the reaping period and the damaged products are paid by the contractor firm, in addition it is stated that the price of the tower places are paid to the people entitled.

The third meeting was performed in Manisa Province, Soma District, Heciz Village on 03 December 2004. In this meeting, unlike the other meetings, the wish for employing the unqualified workers from the region was mentioned. In spite of not being within the scope of the meeting, the problems of the regional community related to TEDAS had importance in the meeting and the reluctance about the passage of the towers through the agricultural fields was declared by the local community.

In the meetings, those were performed at each province, it can be said that the anxieties of the regional community are similar in general. In addition when it is evaluated in general, the environmental impacts of the project are more limited than the many other activities especially in the operation phase and this considerably affects the interest of the community in the meetings. In the meetings, those were performed at each province, on the occasion of selecting the villages to perform the meetings and on the account of agricultural production is the most important source of living, most of the questions of the local community are about the agricultural anxieties.

In the meetings, in addition to the presentation performed by the firm, that prepared the EIA Report, the brochures prepared by the same firm were distributed. Some of the brochures, which were prepared in two types, include information about the project and some explain the general knowledge about the electric field and magnetic field and their impacts on the human and environmental health in a noncompound way. The brochures discussed are presented in Figure IX.1, Figure IX.2, Figure IX.3 and Figure IX.4

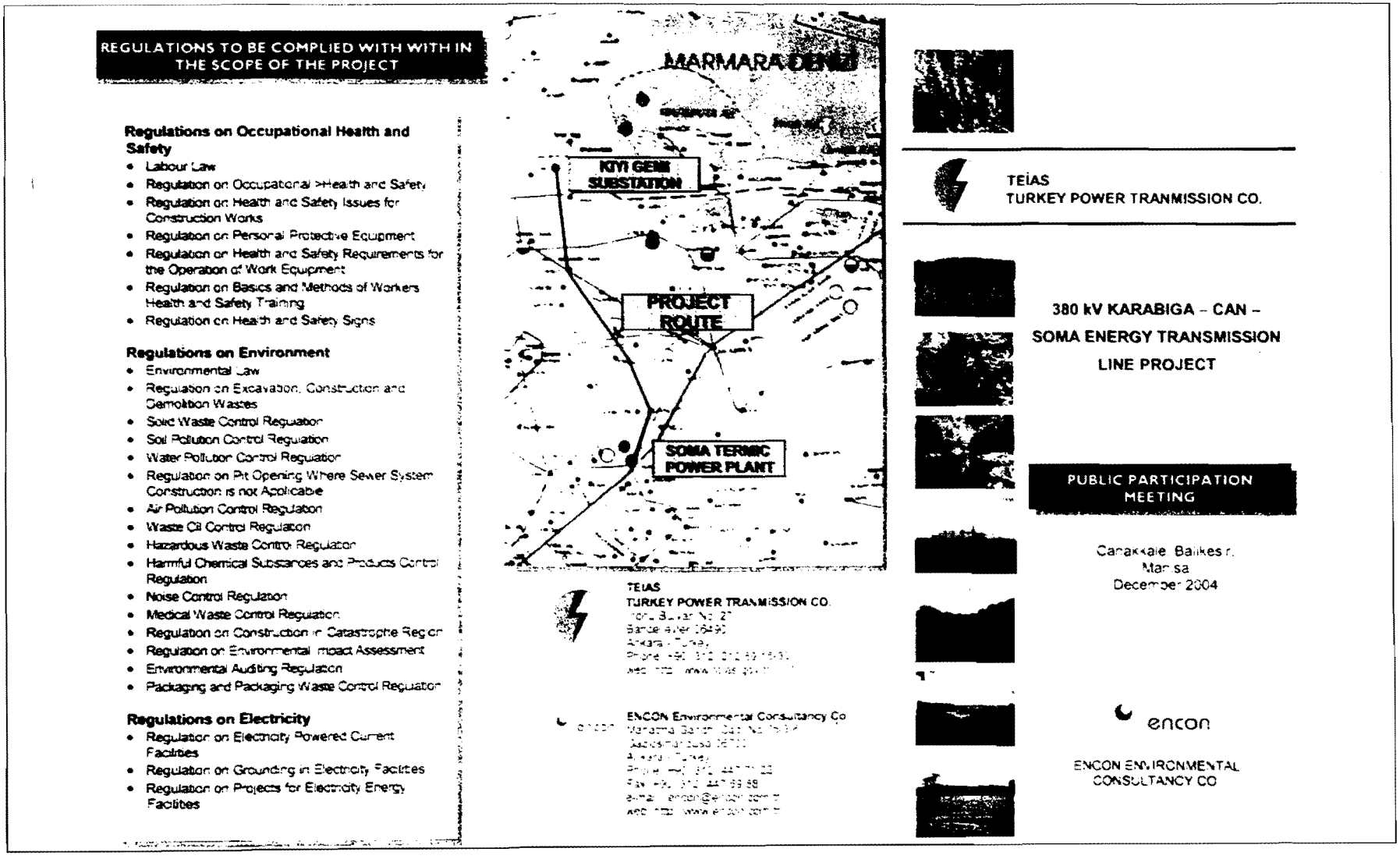


Figure IX.1. Public Participation Meeting – Project Information Brochure Front Page

380 kV KARABIGA - CAN - SOMA ENERGY TRANSMISSION LINE PROJECT

Project Description

The project consists of a transmission line of 380 kV and will be constructed by TEIAS. The transmission line will pass through Biga, Can and Yenice Districts of Canakkale Province, Bahya, Ivrindi and Savastepe Districts of Balikesir Province and Soma District of Manisa Province and will have an approximate length of 158 km.

Economic life of the project 30 years

Construction period 18 months

Stages of the Project:

1- Determination of the potential route

2-EIA studies

3-Survey, final route, expropriation studies

4-Construction phase

5-Operation phase

Aim and Importance of the Project

The project is important since it will provide good quality and uninterrupted power to the consumers in Turkey especially in the West Aegean Region. The realization of the project will have a positive effect on the regional economy and hence on the economy of Turkey.

POTENTIAL EFFECTS OF THE MITIGATION MEASURES

In the scope of EIA studies, a corridor of 5 km wide on the route is investigated. A wide investigation corridor was studied in order to minimize the impacts on current land use while planning the route, to avoid geological risks, to protect regions which have social or cultural importance. After the completion of the EIA studies, final route of the line and the posts will be determined and the expropriation studies will start.

Land Use

- ETL (Energy Transmission Lines), will pass as far away as possible from water resources and fields of historical and sightseeing values.
- The construction site will be enclosed by using barriers in places where it's essential to set up poles within the agricultural areas.
- Construction work will be avoided during plantation and harvest seasons.
- Any harm done to the crops during the construction process will be compensated.
- In the areas with high erosion risk, the construction corridor will be as narrow as possible and erosion control methods both temporary and permanent will be applied.
- The vegetated soil removed prior to the excavation will properly be replaced beneath the pole bases after the filling process is completed.
- The area will be left as found after the construction work.

Protective Fencing

- All project personnel will be subjected to training and warning signs and barriers will be used appropriately and there will be no hunting.
- Precautions will be taken so as to stop birds getting harm from the electricity lines.
- Poles will be placed as far away as possible from water resources. No solid waste will be disposed or wastewater will be discharged in the water resources.
- The lines will be passed in a way so as to avoid cutting down trees where possible.

Noise

- Residents of the area will be informed about the duration and times of the construction work.
- There will be no construction work between 8.00pm and 6.00am.
- All work machinery will regularly be checked and the maximum noise level declared in the Noise Control Regulations will not be exceeded.
- Minimum number of work machinery will be operated simultaneously.
- To prevent dust formation, there will be regular irrigation during the construction period.

Air Emission Levels

- No personnel or construction machinery/vehicles will leave the pre-determined construction area.
- All vehicles will oblige to speed limits.
- New machinery / vehicles will be used where possible.

Disposal of Wastes

- Wastewater of the personnel will be gathered in septic holes.
- Solid waste will be gathered in containers and will be arranged to be picked up by the nearest municipality.
- Construction waste will separately be collected and be arranged to either be picked up by the municipality or be sent to a licensed recycling or disposal company.
- Any soil waste caused by the excavation will be used in the filling process, therefore reducing the soil waste.
- Any hazardous waste such as paint, oil, etc. will be gathered in an appropriate area within the construction site and will be sent to a licensed recycling or disposal company.

Electromagnetic Field

- The magnitude of the electromagnetic field generated by the electricity transmission lines is at a level which is not hazardous for human health or natural life. However, in all cases, the lines will be placed as far away as possible from the residential areas.

Figure IX.2. Public Participation Meeting – Project Information Brochure Overleaf

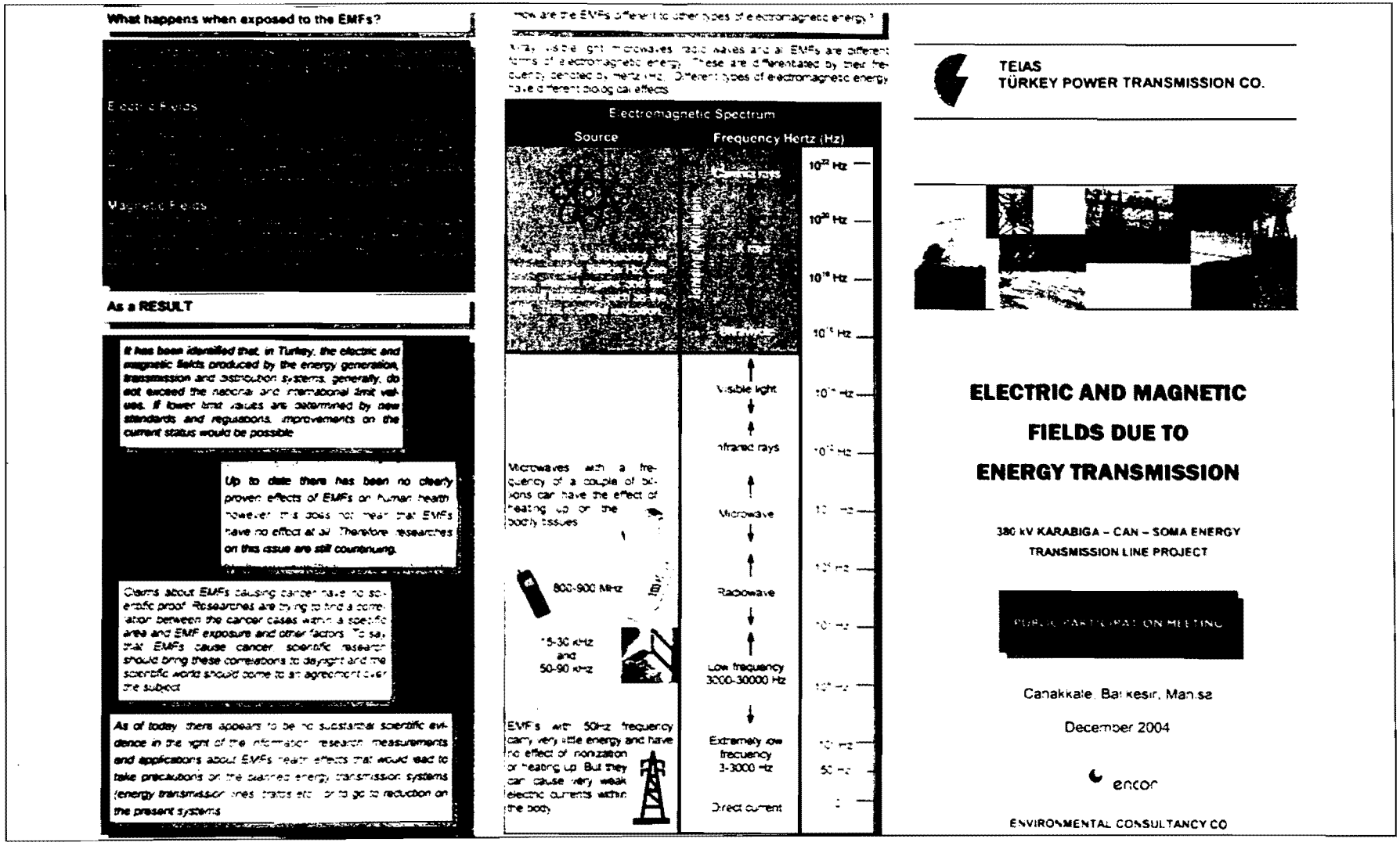
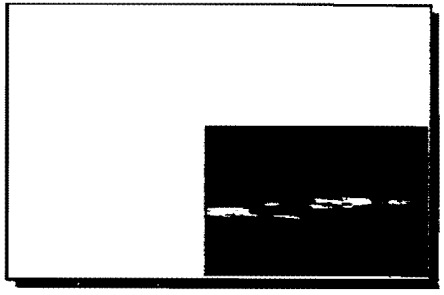
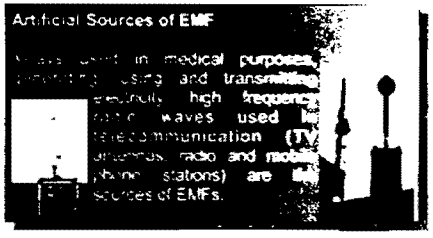


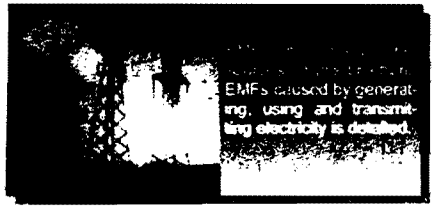
Figure IX.3. Public Participation Meeting – Electric and Magnetic Fields Due to Energy Transmission - Front Page

ELECTRIC AND MAGNETIC FIELDS DUE TO ENERGY TRANSMISSION

EMF (ElectroMagneticField)s though invisible are present everywhere. EMF can be produced by natural causes or by human activities related to electricity







This information given in this brochure is valid only for EMFs produced by energy transmission lines operating at power frequency.

Electric Fields, Caused by voltage difference and gets stronger with higher voltage. The magnitude of the electric field is noted by kilovolt per meter (kV/m) (1 kV/m = 1000 V/m). The magnitude decreases rapidly as one recedes from the source, since the electric field is weakened easily by the receptors in the surrounding area (such as buildings, trees etc.)

Magnetic Field is the force applied by moving charged particles to other charged particles. Circular and continuous, the magnetic field is caused by the current moving through the wires and cables and its magnitude increased with increasing current. Though reducing as receded from the source it cannot be screened by most substances. Its magnitude is noted by Gauss (G) (1G = 1000mG)

Electric and Magnetic Fields caused by the Electric Transmission and Distribution Lines

Electricity can be transmitted long distances by high voltage energy transmission lines. Electricity transmission and distribution lines, cables and home appliances are the fundamental sources of electric and magnetic fields

It has been revealed in mesaurements made by TEIAS and TUBITAK that the magnitude of the magnetic field caused by the 380 kV energy transmission lines varies between 35-60 mG and the magnitude of the electric field caused by the same lines varies between 1000-3000 V/m. However both magnetic and electric field magnitudes decrease rapidly as receded from the Line

The health risk that EMFs can constitute, is the subject of various researches for the last 30 years. Although up to date there has been no clearly proven effects on health this does not mean that EMFs have no effect at all

For this reason the definitely-safe exposure limits are determined by some countries and international organizations. The magnitudes of the typical electric and magnetic field produced by energy transmission lines, the magnitude of the EMFs caused by some home appliances and the 24 hour exposure limits accepted by the United Nations World Health Organization (WHO) and the Turkish Standarts Institute are shown in the table below.

As it can be seen from this table, the magnetic field caused by the transmission lines is comparable to those caused by the home appliances. It has been identified that the stronges electric fields environment are underneath the energy transmission lines. But electric fields are absorbed rapidly in nature. The magnitude of the fields 100-150m away from the line is decreased to the normal magnitudes of areas that do not have a line going through. Besides, building walls screen and weaken the electric fields massively

Electrical Appliance	Electric Fields Magnitude (v/m)	Magnetic Fields Magnitude (mG)
Stereo receiver	180	
Iron	120	1.2-3
Refrigerator	120	0.01-0.25
Mixer	100	
Hair-dryer	80	0.1-70
Color TV	60	0.4-20
Vacuum cleaner	50	20.-200
Electric oven	8	1.5-5
Electricity Tranmission Line (Under the line)	**1000-3000**	**35 - 60**
Limit value (WHO)*	**5,000**	**1,000**
Limit value (TSE)*	**10,000**	**6,400**

Limit value determined by World Health Organization (WHO) for 24 hours
Limit value determined by Turkish Institute of Standards TSE, for 24 hours

Figure IX.4. Public Participation Meeting – Electric and Magnetic Fields Due to Energy Transmission - Overleaf

CHAPTER X

CONCLUSION

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Exec Summary

CHAPTER X. CONCLUSION

Establishing and operating an energy transmission line (ETL), that passes through Biga, Can and Yenice, villages of Canakkale province, Balya, İvrindi and Savastepe, the villages of Balikesir, Soma, village of Manisa, has 380 kV voltage with single circuit conductor of 3B 954 MCM and approximately 158 km long, is planned in the project. By the line that is planned to be constructed by Turkey Power Tranmission Co. (TEIAS) by World Bank credit, would have an economic life of 30 years.

The 380 kV Karabiga – Can – Soma Thermal Power-Station (TPS) ETL Project is planned to start from Kiyi Gemi Transformer Station (TS), that is located at the Degirmencik village, and end at Soma Thermal Power-Station, Soma. It is planned to develop/strengthen the existing Kiyi Gemi TS that the line would be connected to after the construction phase of the project is finished. The project, that would ensure to meet the existing energy need of the provinces Canakkale, Balikesir and Manisa and would form an infrastructure for the future investments, has importance especially for the region.

The general principles, those are taken into consideration by TEIAS in determining the route corridor, are explained below:

- Being parallel to the existing energy transmission line since it is suitable for the cultural asset and environmental impacts (By this way the environmental impacts are minimized),
- Following a corridor that is parallel to the existing transportation facilities like railways and highways,
- Keeping away from the sensitive areas and the areas that are dependent on organizations as far as possible (the habitats of the species, that are under danger, flood areas, landslide areas, special environment protection areas, cultural and historical areas, quicksand, flood-plain, areas, those are exposed to landslide, forests, fruit-gardens, poplar graves, military fields, airports, Government Producing Farms, Poplar Institutes, mine fields, visual springs etc.),
- Keeping away from population centers and reconstructed fields as far as possible,
- Easiness of establishment, maintenance and operation

According to these principles a corridor, which has a width of 5 km, was surveyed and an alternative was determined for the line that would be constructed. The alternatives discussed are assessed from the feasibility and the cost of the construction, environmental impacts and meeting the purpose and the necessities of TEIAS (ensuring continuous energy to the consumers) points of view and Alternative 1 is determined as the most suitable route from the environmental and financial points of view.

All the works for the establishment of the project would be performed along a route, that has a width of 50 m, at the project discussed. 526 towers are planned to be fixed for the energy line that would be established. The works would be performed in the areas those are expropriated for the towers. In addition easement would be taken for the fields that the electrical wires would pass.

The probable effects of every sort of activities on environment, positive or negative, could exist according to the environmental properties and the properties of the project. The effects of an energy transmission line can be observed at the construction and operation phases.

The environmental effects those would be caused by the construction phase of the project have similar property with building works. The environmental effects of energy transmission lines are caused by the activities like liquids caused by the construction

works, solid wastes, emission, cutting trees, those coincide to the feet of the towers, stripping the soil and digging hollows for the feet of the towers, in general.

The construction of the energy transmission lines covers the survey and project studies, the processes of land preparation, assembly and wiring phases respectively. During all the construction works the construction machinery could only use the construction corridor, the existing roads and the service roads that would be constructed. The construction works would be limited by the areas, that the towers would be installed, the worksite/depot areas and the service roads and signs would be used to define the natural and archaeological sites and/or the construction corridor. The required information and education would be given to the workers not to give harm to these areas. Permanent paint would not be used on rocks or plants for signing purposes. The towers would be installed away from the water ways, cultural and historical areas as far as possible.

The total amount of excavation would be 56,808 m^3 for installing 526 towers in the project. During digging hollows for the feet of the towers the topsoil would be grazed and store, after that the excavation works would start. The materials that were extracted during the excavation processes would be used for filling processes and leveling the land. So any excavation waste would not exist during the project. The topsoil that would be stored seperately from the excavation material would be spred uniformly to the area that it had been stripped. By this way it is aimed not to affect the agricultural activities negatively around the feet of the towers especially at the areas that are in the agricultural fields. In this matter the principles of Regulation on Excavation Construction and Demolition Wastes, which was put into force after being published in the Official Gazette dated 18 March 2004 and no 25406, would be followed.

The solid wastes that would exist during the construction of the project would be limited by domestic solid wastes of the personnel, package wastes and construction wastes. The domestic solid wastes would be collected to the suitable containers and it would be ensured to be taken by the related municipality at specific intervals. The construction wastes would be collected in the yellow colored temporary accumulation containers and the type of the wastes would be written on them. These wastes would not be mixed with domestic or hazardous wastes. The wastes that would not be used by the contractor firm would be ensured to be taken by the municipality or sent to a licensed recycle or disposal plant by a licensed transportation company. The usable package wastes would be separated and the rest would be sold to the recycle plant. No biologically not degredable waste would be left in the construction area. The cut plant stems, branches etc. would be spred to the soil at the areas that would not be entered to create habitat (at the areas, that fire risk would not exist). According to the request of the field owners and regional community these plant stems could be thrown away with the other solid wastes.

In these matters the principles of the Packaging and Packaging Waste Control Regulation, which was put into force after being published in the Official Gazette dated 30 July 2004 and no 25538, the principles of Regulation on Excavation, Construction and Demolition Wastes, which was put into force after being published in the Official Gazette dated 18 March 2004 and no. 25406, the principles of Solid Waste Control Regulation, which was put into force after being published in the Official Gazette dated 14 March 1991 and no. 20814, and the adjustments, which was put into force after being published in the Official Gazette dated 03 March 1991 and no. 20934, dated 22 February 1992 and no. 21150, dated 02 November 1994 and no. 22099, dated 15 September 1998 and no. 23464 and dated 18 August 1999 and no. 23790, and the principles of Soil Pollution Control Regulation, which was put into force after being published in the Official Gazette dated 10 December 2001 and no. 24609, would be followed.

The wastewater, that would exist during the construction of the energy transmission line, would be domestic in general. 30 workers are envisaged for the energy transmission line project. Accepting that daily 150 L of water would be used by each person, daily 4.5 m^3 of water would be used by 30 people. Water would be ensured from the nearest municipality and taken to the area by tanker. Supposing that all of the daily water consumption would transformed into wastewater, 4.5 m^3/day of domestic wastewater would exist during one and a half years, that the transmission line would be constructed.

In the case of hiring residence for the personnel, the wastewater would be discharged directly to the drainage. If establishing a worksite would be necessary, the wastewater would be collected to watertight, closed, ventilated septic tanks, which are placed at a suitable place in the worksite area. The septic tanks would be suitable to the Water Pollution Control Regulation (Official Gazette dated 31 December 2004 and No.25687) and to the Regulation on Pit Opening Where Sewer System Construction is not Applicable (Official Gazette dated 19 March 1971 and no. 13783). The water, that is accumulated at the septic tanks, would be collected by the nearest municipality periodically. Since 2,500 m3 of water that would be used for the construction works would stay in the material, it would not create wastewater.

Since the most important purpose of the grounding process is to protect people and fauna species from electric shock, grounding is a legal obligation. In the grounding process of the energy transmission lines that are within the scope of the project the principles of the Regulation on Grounding in Electricity Facilities dated 21 August 2001 and no. 24500 would be followed.

The wastes due to the material like oil, paint etc that would be used for construction activities, and the materials like tin, barrel etc that are contaminated by oil are in the category of hazardous waste. But within the scope of the project this type of waste would exist at very limited amount. Within the scope of the project experts and personnel, that have knowledge about hazardous wastes, would be employed and using protection equipment by the personnel would be ensured at all the works related to this type of wastes. In addition for not to create risk in the human and environment points of view, the hazardous wastes would be collected at an impermeable area, labelled as they are visible and warning boards would be hanged. The hazardous wastes would be sent to the licensed recycle or disposal plant periodically. The same application would be applied to all kinds of materials (oil, paint tins, barrels etc.) that have polluted or contaminated with this wastes, this wastes would not be fixed with solid wastes. Transportation of the wastes to the disposal plant would be arranged by a licensed transporter. In this matter, Hazardous Waste Control Regulation dated 27 August 1995, Waste Oil Control Regulation dated 21 January 2004 and The Soil Pollution Control Regulation, which was put into force after being published in the Official Gazette dated 10 December 2001 and no. 24609, would be followed.

In the construction phase of the line, the existing roads would be used as far as possible. At the places, where the transportation is very difficult, walking of the personnel by carrying the materials would be possible. At the places, where openning the service roads are inevitable, it would be kept away from the determined areas, those have cultural, visual worth, cutting trees and the areas, those have surface water around. In spite of cleaning the vegetation completely, pruning method would be used. By this method removal of the roots is prevented and the turning of the field to its former situation is much more faster. The required precautions would be taken to decrease the erosion potential and to prevent the transport of the sediments. If erosion risk exists at the places, where the service roads would be constructed, surface flow deflection canals would be

used. Addition to these, works would be applied to turn the field to its former situation at the roads, those would not be used any more.

The detonation, crushing and grinding processes would not be applied in the construction phase of the project. Consequently the dust that would be formed during the project would be caused by the digging and filling works, the exhaust and the movement of the used machinery. Since in the project the dust emission would be below the limit value, there would be no need to take precautions about this subject. However during the construction works the dust formation would be decreased by watering during the processes like digging, filling, grazing, leveling the soil. The topsoil and excavation clamps, those would be formed during digging each hollow, would be pressed and these clamps would be also watered with the whole area (The topsoil would be pressed lightly for not to destroy the structure of the soil). The loading-unloading processes would be performed without winnowing and a speed limit would be applied to the trucks. In addition it would be ensured that the used machinery would be new and well-kept as far as possible and the personnel, that would work at the processes, that would create compact dust, would use dust masks. Besides during the construction and operation period of the project, the principles, that are determined in the Industrial Originated Air Pollution Control Regulation, that is published at the Official Gazette dated 07 October 2004 and No. 25606, would be followed.

The noise, that would occur due to the works from the preparation of the field until the end of the construction activities, would be caused by the machinery essentially. When the distance of the nearest village that would be 100 m from the line is taken into consideration, the construction of the energy transmission line is not expected to have an important effect. In addition the noise levels that are measured 50 m away from the area (63.02 dBA) is below the 70 dBA limit, that is determined at The Noise Control Regulation for continuous worksite noise. But some precautions would be taken to minimize the discomfort of the environment especially at the areas those are near to the population centers. By controlling the machinery used regularly, it would be ensured not to exceed the maximum noise levels that are the origin of the calculations and stated in the Noise Control Regulation. The construction machinery (generator etc.) that makes high noise would be placed away from the population centers as far as possible and their noise levels would be decreased by a portable screen. It would be taken care of working the least number of machines at the same time as far as possible. The people living in the population centers around would be informed about the working period of the construction work and the activities would be stopped between 22:00 and 06:00.

In addition for controlling the noise due to the activities performed in the construction phase, The Noise Control Regulation, which was put into force after being published in the Official Gazette dated 11 December 1986 and no. 19308, would be followed. The principles, that are determined at the Regulation on Occupational Health and Safety, that is in the coverage of Labour Law, and at The Regulation on Personal Protective Equipment, would be followed for the workers to be protected from the noise.

60.43 km of the route of the project passes through a forest area. 30.73 km of this area is determined as destroyed forest area and the rest 29.70 km is determined as forest area. Within the scope of the construction works it would be necessary to cut the trees at the forest areas, that the tower feet would be installed. Along the route approximately 4624 trees would be cut. Ministry of Environmental and Forestry determined that they have no objection for the passage of the project through the forest areas, at the opinion letters those came from the Canakkale, Balikesir and Manisa Regional Directorates of Forestry.

Along the route there exist all land use capability classes from I. class to VII. class. During the construction the total amount of land those are needed to expropriate (usage permission for a purpose other than agriculture) for installing the tower feet at the agricultural areas would be 5.58 ha.

By the route, that was selected as Alternative 1 as a result of the surveys, those were performed according to the cultural inventories, it was moved away from Kaletepe 1st Degree Natural and Archaeological Site, that is a cultural asset, that the approximate route passes through and located at Km 53+000 in Yenice District Calköy Village. Besides, all cultural assets are located outside the impact area of the project.

In addition Ancient Population Center (Km~59+000), that is a 1st Degree Archaeological Site and located at Davutköy Place, that is inside the boundaries of Yenice District. Beside this, UyücekTepe Tumulus that was declared as an archaeological site is located beside the Yagcili Creek between Km 139+000 and Km 140+000 and inside the boundaries of Manisa Province Soma District. The distance of the tumulus to the approximate line is between 100-200 m. In addition to these, in the case of coinciding any cultural asset during the construction works, Regional Directorate of Conservation of Cultural And Natural Assets of Ministry of Culture and Tourism would be informed. In the case of damaging any cultural asset during the construction works, it would be paid by the contractor firm.

None of the 141 taxons, those are at species and subspecies rank and were determined as a result of field studies and literature survey, are endemic for our country. The reasons of this could be the usage of most part of the line as agricultural area, the dense forests and the compression over the areas other than the agricultural areas due to pasturing. The damage of the flora fauna wealth because of the construction works would be caused by the fell of the trees, those are under the tower feet in the forests, pruning for the construction of the service roads and the cutting, wearing and breaking that would exist during the construction works. Beside these the plants, those create danger by closing to the line, would be pruned at the controls those would be performed every six months.

The most important species that exist in the Manisa-Soma Sifadag Wild Life Protection Arae, which is in the project survey corridor, but out of the impact area, is roe-deer. In the construction phase, in spite of being outside of the impact area, to minimize the effects over *Capreolus capreolus* (roe-deer) and the other mammal species, those exist in the Protection Arae (Manisa Province), no service roads would be constructed, the workers would be informed by the contractor firm, machines and personnel would not go out of the construction area and the precautions would be regularly applied for not to exceed the limit value of the noise and dust production at the reproduction season (July-end of August). Besides, in the operation phase bird repellents would be installed on the wires to prevent the birds from perching on the electric towers.

The accidents, those could occur during the construction phase of the project, would be the risks like wounding and fire due to the usage of heavy machinery or working at a high place like at the other construction works. In these matters, Code on Occupational Health and Safety, which was put into force after being published in the Official Gazette dated 11 January 1974 and no. 14765, Regulation on Occupational Health and Safety, which was put into force after being published in the Official Gazette dated 09 December 2003 and no. 25311, Regulation on Health and Safety Issues for Construction Works, which was put into force after being published in the Official Gazette dated 23 December 2003 and no. 25325, The Regulation on Personal Protective Equipment, which was put into force after being published in the Official Gazette dated 11 February 2004 and no. 25370, Regulation on Basics and Methods of Workers Health and

Safety Training, which was put into force after being published in the Official Gazette dated 07 April 2004 and no. 25426, Regulation on Health and Safety Signs, which was put into force after being published in the Official Gazette dated 23 December 2003 and no. 25325, Regulation on Health and Safety Requirements for the Operation of Work Equipment, which was put into force after being published in the Official Gazette dated 11 February 2004 and no. 25370, those are in the coverage of Work Law, which was put into force after being published in the Official Gazette dated 10 June 2003 and no. 25134, would be followed.

In the operation phase of the project discussed, maintenance works would be performed at every 6 months. Beside this, the human activity would not exist along the line so the environmental impact of the line would be very low in the operation phase. Since the agricultural activity under the line could be continued and the growing up of the trees would be allowed upto a specified length, the effect over the land usage would decrease at this stage. Two passenger cars would be used at most for the maintenance of the line, the emission amount due to the exhausts of these cars would be negligible.

The usable material, which would be left after the maintenance and repairment works, would be sent to the material depots to transport them to the transformer station, that needs them. The material that could not be used anymore (torn wires, broken insulators etc.) would be sold as scrap or sent to a licensed recycle or disposal plant of construction wastes.

The main risk in the operation phase of the project would be the risks that would caused by working with electricity and at a high place during the maintenance works that would be performed in every 6 months. Beside this, there would be a fire risk due to the electrical leakage. As stated above the transmission line would be constructed according to the fire safety principles of Electrical High Voltage Plants Regelation, which is published in the Official Gazette dated 30 November 2000 and no. 24246, would be controlled regularly and the required maintenance, repairment and renewal works would be performed.

The energy transmission line discussed would create an electromagnetic field around after it starts to operate. The high intensity electromagnetic field could have negative effects on human health. But, since the electromagnetic field of the electricity transmission lines having a frequency of 50-60 Hz have a low intensity, it is not expected to have a negative effect on human health or for other living organisms. Consequently the most important effects of the project in the operation phase would be the difference in the usage of the areas, where the tower feet are located, and their visual effect.

The effect of the energy transmission lines to plants those are related to communication (PTT lines, radio, TV transmitters etc.) is due to the corona effect. Corona means decomposing of the air to the charged particles due to the electrical field around the conductors. But, today the design criteria are quite developed to prevent the corona effect and this effect is only detected at the lines having 500 kV and above alternative current and under negative weather conditions. Since the transmission line discussed is 380 kV, it is not expected to have an important corona effect. The corona test would be applied to the devices to prevent the corona effect and the design criteria, those are defined at the Electrical High Voltage Plants Regelation that is published in the Official Gazette dated 30 November 2000 and no. 24246, would be followed.

A benefit/cost analysis was made between the suggested project and the no action alternative by taking the environmental factors into consideration and it is seen that the suggested project is more advantageous in many ways. Besides, by realizing the project there would not be any important change in the existing use of the environment. In the

circumstances if the environmental impacts are minimized by taking the environmental precautions determined in this report while realizing the project, the 380 kV Karabiga – Can – Soma TPS ETL Project is expected to ensure important assistance in meeting the regional and national electricity need and indirectly be a part of the sustainable development at local, regional and national scale.

According to the Competency Certification Communiqué dated 24.02.2004, after the EIA period observation studies should be performed in the starting and construction phases of the project. For the 380 kV Karabiga – Can – Soma TPS Energy Transmission Line Project, The Observation Reports of The Final EIA Report would be filled by performing observations once a six (6) month and presented to Ministry of Environment and Forestry.

APPENDICES

APPENDIX A

OFFICIAL LETTERS OBTAINED FROM GOVERNMENTAL ORGANIZATIONS

APPENDIX A. OFFICIAL LETTERS OBTAINED FROM GOVERNMENTAL ORGANIZATIONS

To receive their evaluation about the 380 kV Karabiga-Çan-Soma TES Energy Transmission Line Project, TEIAS requested EIA Inspection and Evaluation forms of the route by sending official letters to Canakakle, Balikesir Regional Forest Directorates, Izmir Regional Forest Directorate, Akhisar Forest Management Directorate.

According to the EIA Inspection and Evaluation forms prepared for all three cities, there appears to be no drawbacks from the Regional Forest Directorates and Regional Forest Management Directorates' point of view.

Besides, evaluations have been requested from the municipalities that are on the transmission line's route on residential wastewater collection from the septic tanks by vacuum trucks and residential solid waste disposal to disposal grounds.

In the evaluations received from Soma, Yenice and Ivirindi Municipalities, it has been stated that the wastewater will be collected and that the solid waste will be transported (subject to fee) to the disposal grounds. Biga municipality, not giving out information about solid waste disposal (due to the fact that disposal is being carried out by a private company) stated that waste water will be collected by a vacuum truck.

Appendix A.1. Republic of Turkey Ministry of Environment and Forestry Canakkale Regional Directorate of Forestry

İNCELEME VE DEĞERLENDİRME FORMU

İLİ	: Çanakkale
İLÇESİ	: Biga ,Can ,Yenice
KÖYÜ	: Değirmencik ve muhtelif köyler
MEVKİİ	: Muhtelif
ORMAN BÖLGE MÜDÜRLÜĞÜ	: Çanakkale
ORMAN İŞLETME MÜDÜRLÜĞÜ	: Biga ,Can ,Yenice
ORMAN İŞLETME ŞEFLİĞİ	: Biga ,Karabiga ,Çan , Asar, Soğucak, Pazarköy , Yenice
AİT OLDUĞU PARSELLER	: Bandırma H 18 a1,H18a2,H18a4,H18d1,H18d3,H18d4, Balıkesir I18a2,I18b1,I18b3,I18b4
1-Müracaat Sahibinin , a)Adı – Soyadı	: T E İ A Ş
b)Adresi	
2-Tesisin adı	: 380 kV KARABİGA-SOMA E.İ.H Güzergah planı
3-Sevi Adı	: Biga , Karabiga , Çan, Asar, Soğucak , Pazarköy,Yenice
4-Bölme Numaraları:	Karabiga-18 19 20 80 81-87-154-156-157-161-162- Çan-110-112-114-196-200-205-263 ,266-318-326 327-332-394-396-397-407-408-458-460 Soğucak-244-245-252-253-Yenice-27 30 31-33 34 36-41-42 46-91-92-170-171-172 Asar-22-25 56 57-87 88 141-142 143 Pazarköy-128-130 131 132-133-167-169 181-217-218-219-253 254 256

5-Meşceresinin ;
a)İşletme Şekli : Ağaçlandırma saha-Koru orm -Bozuk baltalık ve baltalık sahalar
b)Mevcut Ağaç Cinsleri :Kızılçam-Karaçam-Meşe v b
c)Meşçere Tipi : Çza-BmBt-MBt-Bçz-ÇkÇzçd-BDyt

6 TALEP SAHASI SINIR NOKTALARININ KOORDİNATLARI ;

	1.NOKTA	2.NOKTA	3.NOKTA	4.NOKTA	5.NOKTA	6.NOKTA	7.NOKTA
SAĞA (Y)	Haritasında gösterilmiştir.						
YUKARI (X) :							

	8.NOKTA	9.NOKTA	10.NOKTA	11.NOKTA	12.NOKTA	13.NOKTA
SAĞA (Y)						
YUKARI (X) :						

7-Orman Tahdit ve Kadastro Durumu	: Kısmen Yapılmıştır
8-Talep Sahasının Genel Alanı	: 2 432 250 M2 (81 075 M x 30 M genişlik)
a)Orman Sayılan Alan	: 1 151 250 M2 (38 375M x 30M genişlik)
b)Orman Sayılmayan Alan	: 1 281 000 M2 (42 700M x30M genişlik)
9-Talebin Amacı	: 380 kV Karabiga Soma E.İ.H nın Ulusal Elektrik Sistemine bir an önce bağlanmasıdır

10-Talep Sahasına Başka Bir Müracaatın
Yapılıp – Yapılmadığı : Yapılmıştır Çan ilçesi Semedeli Köyü Golet izin sahasından geçmektedir.Ayrıca Biga İlçesi Değirmencik'te İÇDAŞ'a verilmiş izinli su isale hattının üzerinden ve yine Biga İlçesi Beyoba köyünün kuzeydoğusundaki İÇDAŞ verilmiş yol izin güzergahının üzerinden geçmektedir

Appendix A.1. Republic of Turkey Ministry of Environment and Forestry Canakkale Regional Directorate of Forestry (Continued)

11-Talep Sahası Yeni 6831 Sayılı Orman Kanunu'nun 18 nci Maddesindeki Yangın Görmüş Orman Alanı – Gençleştirmeye Ayrılmış veya Ağaçlandırılan Sahalar ile Ilgili Hayvalarında Kalıp, Kalmadığı ,Ceza tutanağında kalan yerler Ağaçlandırma sahalarında kalmaktadır

12-Talep Sahasının Tohum Meşçeresi - Milli Park – Av Yaban Hayatı – Av Üretme Sahası – Muhafazalı Ormanı – Turizm Alanı – Özel Çevre Koruma Bölgesi – Askeri Yasak Bölge ve Sit Alanı İçerisinde Kalıp, Kalmadığı ,Kalmamaktadır

13-Ormancılık Çalışmaları ve Orman – Halk Münasebetleri Açısından Mahzuru Olup, Olmadığı , Yoktur.

14-Talep Sahasının Yakın Çevresindeki Orman Köylerinin Nüfusu – Hane Sayısı İle Tesisin En Yakın Köylere Olan Mesafesi (Orman Köyü Var İse Tesisin İçme Suyuna, Halk Sağlığına, Tarım Alanlarına, Hayvancılığa v.b.) Olabilecek Etkisi – Yerleşim yerlerinin üzerinden geçmemektedir

15-Talep Sahasının Yöredeki İstihdam Durumuna Etkisi – Yöre halkına montaj esnasında istihdam yaratacaktır.

16-Orman Yangınları Açısından Hassasiyet Derecesi ve Alınması Gerekli Tedbirler – Proje sahasının bir bölümü orman sınırlarının içerisinden geçmektedir.İzin alınması durumunda,yangınlara karşı önlem alınması ve tedbirli olunması, çalışmalar esnasında bu tesiste bulunan insan gücü ve makinelerden yangın anında faydalanma imkanı sağlanması gerekmektedir.

17-Orman Emvalinin Nasıl Değerlendirileceği , Çıkabilecek emvaller mevzuatımız gereğince idaremizce değerlendirilecektir.

NETICE VE KANAAT – 380 kV Karabiga Soma E.H.H. Güzergah Pisea gerçekleşmesi durumunda istihdam yaratacağı yurt ekonomisine ve sanayisinde olumlu yönde katkısı olacağından ENH tesisin kurulmasında idaremiz açısından sakınca bulunmamaktadır.

İş bu rapor tarafımızdan imza altına alınmıştır. 01.12.2001

İNCELEME HEYETİ

Fahriye BELEŞ – Kad. Mil. Şube Müd. | İsmail ÇETİN – Biga Orm. İşl. Müd. Yar. | Muzaffer ÖZCAN – Karabiga Orm. İşl. Şefi | Hüseyin ÖZDEMİR – Biga Orm. İşl. Şefi

Songül Çakır – Can Orm. İşl. Şefi | Ismail KIRIK – Sakarlı Orm. İşl. Şefi | Mustafa IŞIK – Yenice Orm. İşl. Şefi | Temel BULUT – Asar Orm. İşl. Şefi

ONAY
İbrahim YANIŞ
Biga Orman İşletme Müdürü

Appendix A.2. Republic of Turkey Ministry of Environment and Forestry Balikesir Regional Directorate of Forestry

T.C
ÇEVRE VE ORMAN BAKANLIĞI
ORMAN GENEL MÜDÜRLÜĞÜ
BALIKESİR ORMAN BÖLGE MÜDÜRLÜĞÜ

BALIKESİR
17.12.2004

SAYI :B.18.1.OGM.07.Ş.3.030-U / 2788
KONU :380 Kv Karabiga-Çan-Soma
TES EİH

TEİAŞ
TÜRKİYE ELEKTRİK İLETİM ANONİM ŞİRKETİ
GENEL MÜDÜRLÜĞÜ
ENERJİ İLETİM HATLARI PROJE TESİS KAMULAŞTIRMA VE
ÇEVRE DAİRE BAŞKANLIĞI
İnönü Bulvarı No:27 Bahçelievler
0690 ANKARA

Teşekkülünüzce tesisi ve işletmesi planlanan 380 kV Karabiga-Çan-Soma Enerji İletim Hattı (EİH)'na ait müracaatınız üzerine İnceleme ve Değerlendirme Formu tanzim edilerek ormanlık alanlar ekli haritalara işlenmiştir.

Bilgilerinize arz ederim.

İ. Tuncay GÖÇLÜKAN
Böl.Müd.

Eki : 1 takım İnceleme Değ.Formu
2 adet Harita

Appendix A.2. Republic of Turkey Ministry of Environment and Forestry Balikesir Regional Directorate of Forestry (Continued)

İNCELEME VE DEĞERLENDİRME FORMU

İ l i : Balıkesir — ORMAN BÖLGE MÜDÜRLÜĞÜ: Balıkesir
İ l ç e s i : Balya, İvrindi, Savaştepe — ORMAN İŞLETME MÜDÜRLÜĞÜ: Balıkesir
K ö y ü : İENH'na isabet eden köyler — ORMAN İŞLETME ŞEFLİĞİ: Balya, Çamlıca, İvrindi, Savaştepe
Mevkii :

1- Müracaat Sahibinin
Adı Soyadı : TEİAŞ
Adresi :

2- Madenin Cinsi ve Hangi Kanuna Tabi Olduğu : ENH

3- Seri Adı : Balya, Çamlıca, İvrindi, Savaştepe

4- Bölme Numaraları : Balya: 337,338,339, Çamlıca: 6,9,10,11,38,39,40,42,98,132,133,134,135, 191,193,262,264,266,267, İvrindi: 3,4,26,85,86,87,88,146,147,190,195, 237,238,280,281,310, Savaştepe: 10,11,12,51,74,106,107,142,143,158, 195 no'lu bölmeler

5- Meşcerenin
a) İşletme Şekli : Baltalık, Bozuk korı, Koru
b) Mevcut Ağaç Cinsleri : Çk, M, Çz,
c) Meşçere Tipleri : BÇk, BM, Çzb3, Çza, ÇBM, Çzc2, ÇBÇk, Mbc2

6- 1/25000 Ölçekli Meşçere Haritası Üzerinde ÇED raporunu konu sahanın izni noktalarının Koordinatları

	1. Nokta	2. Nokta	3. Nokta	4. Nokta
Sağa (X)	EKİ haritasındadır			
Yukarı (Y)				

7- 1/25000 Ölçekli Harita Üzerinde İşletme için izni istenen sahanın noktalarının Koordinatları

	1. Nokta	2. Nokta	3. Nokta	4. Nokta
Sağa (X)	Haritasında değildir			
Yukarı (Y)				

8- Orman Tahdit ve Kadastro Durumu : Orman Kadastrosu Yapılmıştır

İşletme Sahasının Genel Alanı
a) Orman Sayılan Alan
b) Orman Sayılmayan Alan

9- İzin İstenen Sahanın Alanı

10- Talebin Amacı : ÇED Belgesi alınacaktır

11- İzin Sahasında Başka Bir Maden Var Yapılıp Yapılmadığı : Yapılmamıştır

Appendix A.2. Republic of Turkey Ministry of Environment and Forestry Balikesir Regional Directorate of Forestry (Continued)

12- Talep Sahası sayın 6831 sayılı Orman Kanunu'nun 18. maddesindeki, Yangın görmüş orman alanı, Gençleştirmeye ayrılmış veya Ağaçlandırılan sahalarla Baraj havzalarında kalıp kalmadığı

- Yangın görmüş alan ve Gençleştirmeye ayrılmış alan değildir.

13- Talep Sahasının Tohum meşçeresi, Milli Park, Av Yaban Hayatı, Av Üreme Sahası, Turizm Alanı, Özel Çevre Koruma Bölgesi, Askeri Yasak Bölge ve Sit alanı içerisinde kalıp kalmadığı: Kalmamaktadır

14- Ormancılık çalışmaları ve Orman Halk münasebetleri açısından mahsuru olup olmadığı: Bulunmamaktadır

15- Orman Yangınları açısından Hassasiyet Derecesi ve Alınması Gerekli Tedbirler neler olmalıdır:
ENH'nın güzergahı temiz tutulmalıdır.

16- Orman Envanterinin Nasıl Değerlendirileceği: Orman envanteri İşletmesince değerlendirilecektir.

İnceleme ve Değerlendirme Komisyonu Tarafından Görüldü

Murat KARAN
İşletme Müh. Yrd. V.

Rahmi DOĞAN
K.A.M.Şefi

Suat İNAL
Çamurlu Orm İşl Şefi

Özgür TOPRAK
Yeni Orm İşl Şefi

Süleyman DEMİR
İvrindi Orman İşl. Şefi

Orman Bölge Müdürlüğünün görüş ve mütalaası: İzni verilmesinde sakınca yoktur.

Nevzat SAHİBAZOĞULLARI
Kad.Mülk.Şube Müdürü

TEKİRDAĞ BÖLGE MÜDÜRÜ
17.12.2004
İ. Timcay GÜL
Böl.Müd.

Appendix A.3. Republic of Turkey Ministry of Environment and Forestry İzmir Regional Directorate of Forestry

İNCELEME VE DEĞERLENDİRME RAPORU

İLİ	MANİSA
İLÇESİ	SOMA
KÖYÜ	HATUNKÖY VE MUHTELİF KÖYLER
ORMAN BÖLGE MÜDÜRLÜĞÜ	İZMİR
ORMAN İŞLETME MÜDÜRLÜĞÜ	AKHİSAR
ORMAN İŞLETME ŞEFLİĞİ	Soma ve Gölmarmara
AİT OLDUĞU PAFTALAR	Bakiyeler 31 ve 41 (1/25000)
1-MÜRACAAT SAHİBİNİN	
A – Adı Soyadı	TEİAŞ
B – Adresi	-
2- Tesisin Adı	380 KW Karabiga-Soma E.İ.H.Gölmarmara pilonu
3- Seri Adı	Soma – Göktepe
4- Bölme Numaraları	Soma (273,272,271,270,245,269,216,215,214,213,212, 211 Göktepe(270,255,236,212,214,180,181,156,155)

5- Meşçerenin
A- İşletme Şekli : Ağaçlandırma sahası, Koru ormanı, bozuk baltalık baltalık sahalar
B- Mevcut ağaç cinsleri : Kızılçam, Meşe vb
C- Meşçere Tipleri : Çad2,ÇaC1 ÇaC3 Çad,Çaa ,BÇ2M,Çzbç2,BÇZ, OT
6- TALEP SAHASI SINIR NOKTALARININ KOORDİNAT DEĞERİ

1.NOKTA 2.NOKTA 3.NOKTA 4.NOKTA 5.NOKTA 6.NOKTA 7.NOKTA
SAĞA (y) Hareketinde Gösterilmiştir
YUKARI(x)
8.NOKTA 10.NOKTA 11.NOKTA 12.NOKTA 13.NOKTA

SAĞA (Y)
YUKARI (X)

7- Ormanın Tahdit ve Kadastro Durumu	Kısmen Yapılmıştır
8- Talep Sahasının Genel Alanı	555.000 M2 (Yaklaşık 30 M. Genişlik)
a) Ormanın Sayılan alanı	271.500 M2 (Yaklaşık 30 M. Genişlik)
b) Ormanın sayılmayan alanı	283.500 M2 (Yaklaşık 30 M Genişlik)

9 - Talebin Amacı : 380 KW Karabiga - Soma EİH'nin Ulusal Elektrik sistemine bir an önce bağlanmasıdır

10- Talep Sahasının Başka Bir Müesseseye Yapılıp Yapılmadığı : Telekom adına verasl kablo hattı (Soma – Kazıköy -Büyükçukular ,Sevaştepe sahalı arası)

11 - Talep sahası yeni 6831 sayılı Orman Kanununun 16. maddesinde yazılı görünüş ormanı olarak -Genişletilmesine ayrılmış veya ağaçlandırılması zaruri bir Devlet mevzuatında kalıp kalmadığı (Eğer mevzuatında kalan varlar ağaçlandırma sahalarında kalmaktadır

12- Talep sahasının tabiatı muafiyeti – Milli park – Av yasağı bölgesi – Av üretme sahası – Natürel anıtı – Turizm alanı – Özel Çevre koruma bölgesi- [illegible] kalıp kalmadığı : Kalmamaktadır.

13 - Ormanın çalıştırılması ve orman halk münasebetleri açısından mahzurun olup olmadığı: Yoktur

14 - Talep sahasının yakın çevresindeki orman köylerinin ortalama [illegible] en yakın köyüne olan mesafeler (Ormanın köyü var ise tesisin adına sorulsun halk sağlığına , tarım alanlarının bölünmesine vb.) olabilecek etkisi : Verilecek verilmesi düşünülmektedir

15 - Talep sahasının yörenin mevcut durumu [illegible]

Appendix A.3. Republic of Turkey Ministry of Environment and Forestry Manisa Regional Directorate of Forestry (Continued)

yaratacaktır.

16 – Orman yangınının açısından hassasiyet derecesi ve alınması gerekli tedbirler : Talep sahasının bir bölümü orman sınırlarının içerisinden geçmektedir. İzni alınması durumunda yangınlara karşı önlem alınması ve tedbirli olunması, çalışmalar esnasında bu tesiste bulunan insan gücü ve makinelerden yangın esnasında faydalanma imkanı sağlanması gerekmektedir.

17- Orman Envanterinin nasıl değerlendirileceği : Çıkabilecek envanter mevzuatımız gereğince idaremizce değerlendirilecektir.

NETİCE VE KANAAT : 380 KW Karabiga –Soma E.İ.H güzergah planı gerçekleştiği durumunda istikdam yaratacağı, yurt ekonomisine ve sanayisinde olumlu yönde katkısı olacağından ENH tesisin kurulmasında idaremiz açısından sakınca bulunmamaktadır.

İşbu rapor tarafımızdan imza altına alınmıştır. 14/12/2004

İNCELEME HEYETİ

Salim GÜMÜŞ	Deniz KEKİÇ	Coşkun ÇANAKKALE	Coşkun ÇANAKKALE
Akbaba İşl.Md.Yrd	Kad.Müh.Şb.Müh	Orman İşletme Şefi	Orman İşletme Şefi V.

ONAY
A.Osman BAŞLI
Akbaba İşletme Müdürü

Appendix A.4. Republic of Turkey, Manisa Province, Soma Municipality, Municipal Police

Appendix A.5. Republic of Turkey, Manisa Province, Soma Municipality, Directorate of Public Works

T.C.
MANİSA İLİ
SOMA BELEDİYE BAŞKANLIĞI
Fen İşleri Müdürlüğü

SAYI : 153-2625
KONU :

SOMA
08.11.2004

ENCON
ÇEVRE DANIŞMANLIK LTD.ŞTİ.
Mahatma Gandhi Cad.No:75/3
06700 Gaziosmanpaşa-ANKARA

İLGİ : 05.11.2004 tarih ve E04.157 sayılı yazınız.

İlgi yazınızda bahsedilen 380 KV Karabiga - Can - Soma TEİAŞ Enerji İletim Hattı Projesi kapsamında kurulacak santiyelerde biri kecek evsel atıksuyun ucreti mukabilinde vidanjorle çekilmesi mumkündür.

Bilgilerinize rica olunur.

Hasan ERGENE
Başkan

Appendix A.6. Republic of Turkey, Biga Municipality, Directorate of Infrastructural Works

1870
BİGA
BELEDİYESİ

T.C.
BİGA BELEDİYE BAŞKANLIĞI
İnşa Yol Su Kanalizasyon İşleri Kontrol Amirliği

SAYI : 199 13.12.2004

KONU : Katı atık ve atık su bertarafı.

ENCON ÇEVRE DANIŞMANLIK LTD. ŞTİ.
Mahatma Gandhi Cad. No: 75/3 06700 Gaziosmanpaşa/ANKARA

İLGİ : 03.11.2004 tarih ve E04.151 sayılı yazınız.

İlgi yazınızda belirtmiş olduğunuz evsel katı atıkların toplanarak çöp sahasına götürülmesi işi Belediyemiz tarafından özel şirkete yaptırılmakta olup bu konuda herhangi bir bilgi verilemeyeceği. Foseptiklerde birikecek evsel atıksuyun vidanjörle çekilmesi işi ise ücreti tarafınızdan ödenmek üzere Belediyemiz vidanjör aracı ile karşılanabilecektir.

Bilgilerinize rica ederim.

Mehmet ÖZKAN
Belediye Başkanı

Appendix A.7. Republic of Turkey, İvrindi Municipality

T.C.
IVRINDI
BELEDIYE BAŞKANLIĞI

Sayı: 151 [illegible]

Konu: [illegible] ve atıksu bertarafı [illegible]

İVRİNDİ
[illegible] 2004

[illegible]
[illegible] DANIŞMANLIK LTD.ŞTİ.
ANKARA

[illegible].11.2004 tarihli yazınız.

İlçemiz sınırları içerisinde [illegible] tarafımızdan [illegible] yapılıyor [illegible] evsel atıklarının çöp sahasına [illegible] evsel atıksularında [illegible] ücreti karşılığında yapılacaktır.

Bilgilerinize rica olunur.

No: İlçe Merkezine 5 km mesafeye kadar

[illegible]
Belediye Başkanı

Appendix A.8. Republic of Turkey, Canakkale Province, Yenice Municipality

T.C.
ÇANAKKALE-YENİCE İLÇESİ
BELEDİYE BAŞKANLIĞI

SAYI : Çevre Sağ. 613 YENİCE,08.11.2004

KONU : Katı Atık ve Atıksu Bertarafı

ENCON ÇEVRE DANIŞMANLIK LTD.ŞTİ.

Gaziosmanpaşa/ANKARA

İLGİ : 03.11.2004 tarih ve E04.153 sayılı yazınız.

İlgi sayılı yazınız ile TEİAŞ tarafından gerçekleştirilmesi planlanan 380 kV'lik Karabiga Can-Soma TES Enerji İletim Hattı Projesi kapsamında İlçemiz sınırları içersinde şantiye kurulması planlandığı belirtilmekte ve bu şantiyede oluşacak evsel katı atıkların toplanması ve atık suların vidanjörle çekitilmesi hizmetlerinin Belediyemizce yapılıp yapılmayacağı sorulmaktadır.

İlçemiz sınırları içersinde kurulacak şantiyemizde oluşacak evsel katı atıkların toplanması ve çöp sahasına götürülmesi ile fosseptiklerde birikecek evsel katı atıkların vidanjörle çekilmesi hizmetlerinin Belediyemiz Meclisinin bu hizmetlerle ilgili belirlemiş olduğu bedel mukabilinde karşılanacaktır.

Bilgilerinize rica ederiz.

Veysel AKYAR
Belediye Başkanı

APPENDIX B

TOPOGRAPHICAL MAPS SHOWING PROJECT ROUTE

MAP SECTION SEE ORIGINAL

MAPSTOO LARGE TO SCAN

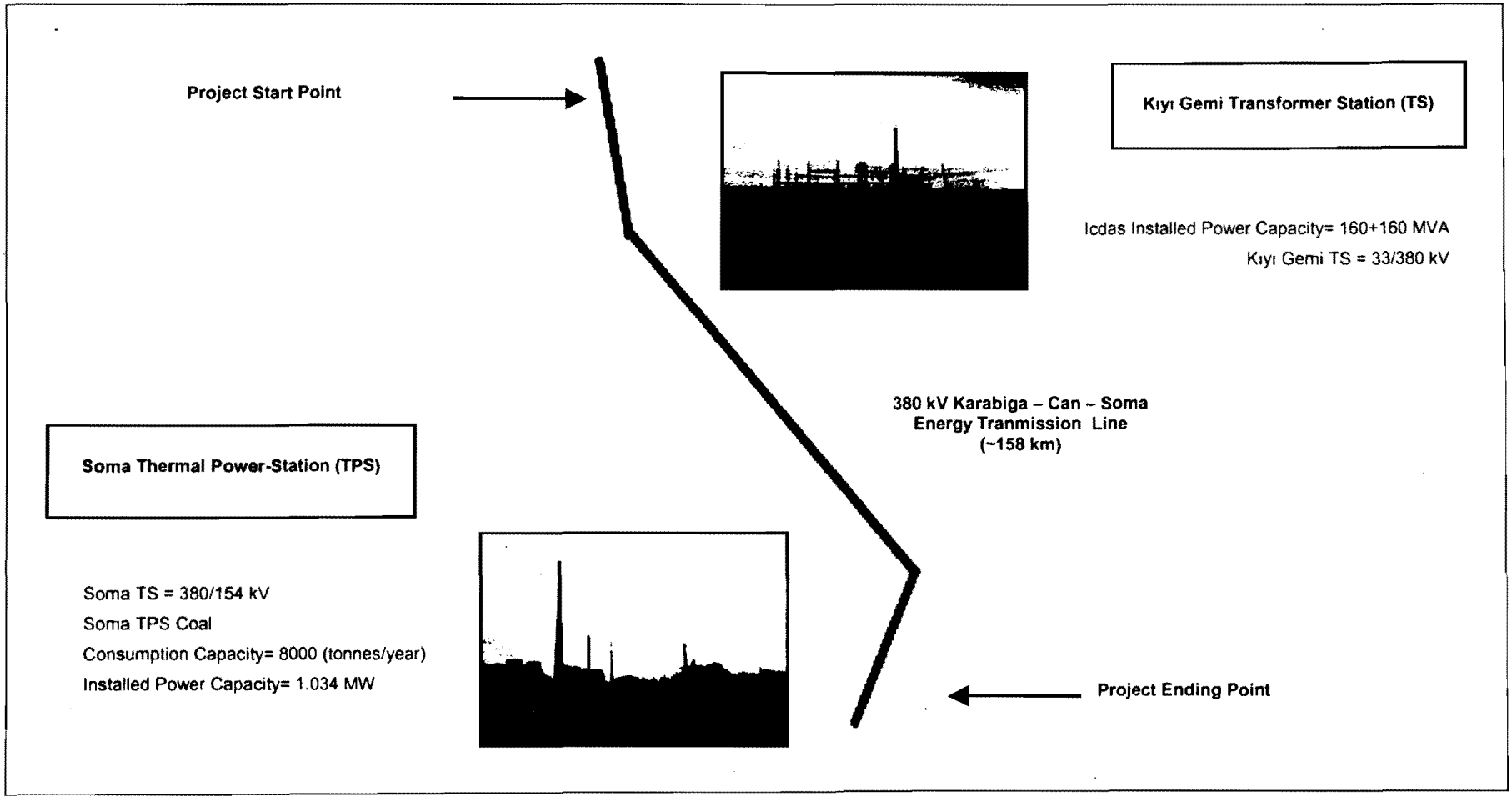


Figure B.5. Basic Flow Chart

APPENDIX C

DATA ON BIOLOGICAL ENVIRONMENT

LEGEND OF FLORA TABLE

P.G.R.
Phyto-Geographic Region

ENDEMISM
R: Regional Endemic
W: Widespread Endemic

T.S. (THREAT STATUS)
According to IUCN categories (Ekim vd., 2000)
EX: Extinct
EW: Extinct in the wild
CR: Critically endangered
EN: Endangered
VU: Vulnerable
LR: Lower risk
- **cd:** concervation dependent
- **nt:** near threatened
- **lc:** least concern

DD: Data deficient
NE: Not evaluated

HABITAT CLASSES
1: Agricultural Areas and Their Vicinities
2: Steppe
3: Rocky
4: Forest
5: Pasture

RELATIVE ABUNDANCE
1: Very Rare
2: Rare
3: Moderately Abundant
4: Abundant
5: Very Abundant

BERN (BERN CONVENTION)
Anx1 (Annex1): Strictly Protected Flora Species

CITES
App1 (Appendix 1): Species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
App2 (Appendix 2): Species not necessarily threatened with extinction, but their trade must be controlled to avoid utilization incompatible with their survival.
App3 (Appendix 3): Species protected in at least one country, and their trading is under control by CITES.

Table C.1. Flora Characteristic of Project Area and Vicinities

FAMILY	NO	TAXSON	COMMON NAME (TURKISH)	COMMON NAME (ENGLISH)	P.G.R	ENDEMISM		T.S.	BERN	CITES			ALTITUDE	HABITAT					RELATIVE ABUNDANCE				
						R	W		Anx1	App1	App2	App3	(m)	1	2	3	4	5	1	2	3	4	5
PINACEAE	1	*Pinus brutia* Ten	Kızıl çam	Red pine	Akdeniz				–	–	–	–	0-1200				x				x		
	2	*Pinus pinea* L.	Fıstık çamı	Stone pine					–	–	–	–	350				x				x		
	3	*Pinus maritaima*							–	–	–	–	100				x				x		
CUPRESSACEAE	4	*Cupressus sempervirens* L.	Servi	Cypress					–	–	–	–	300-1200				x			x			
	5	*Juniperus exelsa* Bieb.	Ardıç	Juniper	Geniş Yayılışlı				–	–	–	–	300-2400		x	x				x			
	6	*Juniperus oxycedrus* L subsp.*oxycedrus*	Ardıç	Juniper					–	–	–	–	0-1300		x					x			
ANACARDIACEAE	8	*Pistacia lentiscus* L.	Çitlenmik	Mastic tree	Akdeniz				–	–	–	–	0-200			x	x		x				
	9	*Pistacia terebinthus* L. subsp. *palaestina* (Boiss.) Engler	Çitlenmik						–	–	–	–	50-1500			x	x			x			
ACERACEAE	10	*Acer campestre* L. subsp. *campetre*	Akçaağaç	Field maple					–	–	–	–	0-1600				x		x				
	11	*Acer platanoides* L.	Çınar yapraklı akçaagaç	Norwey maple	Avrupa-Sibirya				–	–	–	–	50-1900				x		x				
ASCLEPIADACEAE	12	*Cionura erecta* (L.) Griseb.			Geniş Yayılışlı				–	–	–	–	0-1100		x					x			
	13	*Cynanchum acutum* L. subsp. *acutum*			Geniş Yayılışlı				–	–	–	–	0-1500	x	x					x			
	14	*Periploca graeca* L. var. *graeca*		Vine	Akdeniz				–	–	–	–	0-1200			x	x		x				
	15	*Vincetoxicum canescens* (Willd.) Deene subsp. *canescens*	Panzehir otu		Geniş Yayılışlı				–	–	–	–	300-1500		x	x				x			
BETULACEAE	16	*Alnus glutinosa* (L.) Gaertner var. *glutinosa*	Kızılağaç	Alder	Avrupa-Sibirya				–	–	–	–	0-1600		x		x		x				
BORAGINACEAE	17	*Asperugo procumbens* L.			Avrupa-Sibirya				–	–	–	–	800-2200	x	x						x		
	18	*Cynoglossum montanum* L.			Avrupa-Sibirya				–	–	–	–	300-2200		x						x		
	19	*Echium italicum* L.	Sığır dili		Akdeniz				–	–	–	–	0-1950		x	x				x			
	20	*Echium plantagincum* L.			Geniş Yayılışlı				–	–	–	–	0-2400		x					x			
	21	*Heliotropium dolosum* De Not			Geniş Yayılışlı				–	–	–	–	0-1640	x		x						x	
	22	*Heliotropium hirsutissimum* Greuter			Akdeniz				–	–	–	–	0-2200	x	x						x		
	23	*Lappula barbata* (Bieb.) Gürke			İran-Turan				–	–	–	–	830-3100	x	x					x			
	24	*Myosotis stricta* Link ex Roemer& Schultes	Unutma beni		Avrupa-Sibirya				–	–	–	–	100-1200					x		x			
	25	*Myosotis sylvatica* Ehrh. Ex Hoff. subsp. *nvularis* Vestergen			Oksın				–	–	–	–	1200-3000					x		x			
CAPRIFOLIACEAE	26	*Lonicera etrusca* Santi var. *etrusca*			Akdeniz				–	–	–	–	250-1500	x	x					x			
CISTACEAE	27	*Cistus creticus* L.	Laden	Pink rock rose	Akdeniz				–	–	–	–	0-1000			x	x			x			
	28	*Cistus laurifolius* L.			Geniş Yayılışlı				–	–	–	–	50-1200		x		x			x			
COMPOSITAE	29	*Bellis perennis* L.	Koyun gözü	Daisy	Avrupa-Sibirya				–	–	–	–	0-2000		x		x				x		
	30	*Bellis sylvestris* Cry.	Koyun gözü		Akdeniz				–	–	–	–	800		x		x				x		
	31	*Cardopatium corymbosum* (L.) Pers			Akdeniz				–	–	–	–	0-1700		x						x		
	32	*Carthamus lanatus* L.			Geniş Yayılışlı				–	–	–	–	0-2300	x	x	x						x	
	33	*Centaurea solstitialis* L. subsp. *solstitialis*	Peygaber çiçeği	Yellow starthistle					–	–	–	–	0-1900	x	x	x						x	
	34	*Centaurea virgata* Lam.	Peygaber çiçeği	Starthistle	Geniş Yayılışlı				–	–	–	–	100-2000	x	x						x		
	35	*Cirsium creticum* (Lam.) d'Urv. subsp. *creticum*			Geniş Yayılışlı				–	–	–	–	0-1300	x	x			x			x		
	36	*Echinops microcephalus* Sm.			Akdeniz				–	–	–	–	0-1000		x					x			
	37	*Inula graviolens* (L.) Desf.	Andızotu	Sweet inula	Akdeniz				–	–	–	–	0-800		x	x						x	
	38	*Xanthium strumarium* L. subsp. *cavanillesii* (Schow) D.love & P. Dans.	Kazık otu	Cocklebur	Geniş Yayılışlı				–	–	–	–	0-950	x	x							x	
CONVOLVULACEAE	39	*Convolvulus betonicifolius* Miller subsp. *betonicifolius*	Kahkaha çiçeği	Bindweed	Geniş Yayılışlı				–	–	–	–	30-1700	x	x							x	
	40	*Convolvulus cantabrica* L.	Kahkaha çiçeği	Bindweed	Geniş Yayılışlı				–	–	–	–	0-1700	x	x						x		
	41	*Convolvulus galaticus* Rostan ex Choisy.	Kahkaha çiçeği	Bindweed	Geniş Yayılışlı				–	–	–	–	800-2000		x						x		
	42	*Convolvulus holosericeus* Bieb. ssp. *holosericeus*	Kahkaha çiçeği	Bindweed	Geniş Yayılışlı				–	–	–	–	250-1700	x	x						x		
CUSCUTACEAE	43	*Cuscuta palaestina* Boiss. subsp. *palaestina*	Çin saçı	Strangle-weed	Geniş Yayılışlı				–	–	–	–	0-2700	x	x							x	
CYPERACEAE	44	*Bolboschoenus maritimus* (L.) Pallas var. *maritimus*			Geniş Yayılışlı				–	–	–	–	0-2000					x				x	

Table C.1. Flora Characteristic of Project Area and Vicinities

FAMILY	NO	TAXSON	COMMON NAME (TURKISH)	COMMON NAME (ENGLISH)	P.G.R	ENDEMISM		T.S.	BERN	CITES			ALTITUDE	HABITAT					RELATIVE ABUNDANCE				
						R	W		Anx1	App1	App2	App3	(m)	1	2	3	4	5	1	2	3	4	5
	45	*Carex otrubae* Podp.			Geniş Yayılışlı				–	–	–	–	0-2100				x	x				x	
	46	*Eleocharis palustris* (L.) Roemer & Schltes		Spike rush	Geniş Yayılışlı				–	–	–	–	0-2400		x					x			
ERICACEAE	47	*Arbutus andrachne* L.	Sandal ağacı	Stawberry tree	Geniş Yayılışlı				–	–	–	–	0-800				x					x	
	48	*Arbutus unedo* L.	Kocayemişli ağacı	Stawberry tree	Geniş Yayılışlı				–	–	–	–	0-300				x					x	
	49	*Erica manipuliflora* Solisb.	Püren	Besom health	Akdeniz				–	–	–	–	0-1550		x		x					x	
	50	*Pyrola chlorantha* Swartz.			Geniş Yayılışlı				–	–	–	–	1200-2100				x					x	
	51	*Rhodendron luteum* Sweet	Sarı orman gülü		Avrupa-Sibirya				–	–	–	–	400-2000				x					x	
FAGACEAE	52	*Castania sativa* Miller	Kestane	Chestnut tree	Avrupa-Sibirya				–	–	–	–	30-1500				x					x	
	53	*Quercus coccifera* L.	Kermes meşesi	Kermes oak	Akdeniz				–	–	–	–	0-1500			x	x					x	
	54	*Quercus pubescens* Willd	Tüylü meşe	Downy oak	Geniş Yayılışlı				–	–	–	–	0-1700				x					x	
	55	*Quercus robur* L. subsp. *robur*	Saplı meşe	Pedunculate oak	Avrupa-Sibirya				–	–	–	–	100-1000	x			x					x	
	56	*Quercus trojana* P. B. Webb	Makedonya meşesi	Mecedonian oak	Akdeniz				–	–	–	–	300-1800	x			x			x			
GENTIANACEAE	57	*Centaurium erythraea* Rafin subsp. *erythraea*	Kızılkaltaron	Centaury	Avrupa-Sibirya				–	–	–	–	0-900	x	x			x				x	
GERANIACEAE	58	*Erodium ciconium* (L.) L.'Herit		Filaree	Geniş Yayılışlı				–	–	–	–	0-1500		x							x	
	59	*Erodium hoefftianum* C.A. Meyer		Filaree	Geniş Yayılışlı				–	–	–	–	0-1400		x	x						x	
	60	*Geranium dissectum* L.	Sardunya çiçeği	Geranium	Geniş Yayılışlı				–	–	–	–	0-400		x							x	
	61	*Geranium lucidum* L.	Sardunya çiçeği	Geranium	Geniş Yayılışlı				–	–	–	–	0-1700		x							x	
	62	*Geranium molle* L. subsp. *molle*	Sardunya çiçeği	Geranium	Geniş Yayılışlı				–	–	–	–	0-500		x							x	
	63	*Geranium tuberosum* L. subsp. *tuberosum*	Sardunya çiçeği	Geranium	Geniş Yayılışlı				–	–	–	–	0-2500		x		x					x	
GLOBULARIACEAE	64	*Globularia trichosantha* Fisch.& Mey.			Geniş Yayılışlı				–	–	–	–	200-2500		x	x						x	
IRIDACEAE	65	*Crocus biflorus* Miller subsp. *biflorus*	Güz çiğdemi	Saffron	Akdeniz				–	–	–	–	200-3000		x		x					x	
	66	*Crocus cancellatus* Herbert subsp *mazziaricus* (Helbert)Mathew	Güz çiğdemi	Saffron	Akdeniz				–	–	–	–	50-2400			x	x			x			
	67	*Crocus pallasi* Goldb. subsp. *pallasii*	Güz çiğdemi	Saffron	Geniş Yayılışlı				–	–	–	–	70-2000			x	x					x	
	68	*Iris attica* Boiss. & Heldr.	Süsen	Iris	Akdeniz				–	–	–	–	400-1000		x	x						x	
	69	*Iris germanica* L.	Süsen	Iris					–	–	–	–	50-600	x						x			
	70	*Crocus pulchellus* Helbert.	Nevruz	Iris	Akdeniz				–	–	–	–	800-1500				x			x			
JUNCACEAE	71	*Juncus bufonius* L.		Toad rush					–	–	–	–	0-2350					x					
	72	*Luzula forsteri* (Sm.) Dc			Avrupa-Sibirya				–	–	–	–	0-2250		x		x					x	
LABIATAE	73	*Ajuga orientalis* L.			Geniş Yayılışlı				–	–	–	–	0-3000		x		x					x	
	74	*Lavandula stoechas* L. subsp. *stoechas*	Lavanta	Lavender	Akdeniz				–	–	–	–	0-700		x	x	x					x	
	75	*Stachys cretica* L. subsp. *smyrenaea* Rech. Fil.							–	–	–	–	0-1400		x		x					x	
	76	*Teucrium chamaedrys* L. subsp. *chamaedrys*	Dalakotu	Wall germander	Avrupa-Sibirya				–	–	–	–	0-1600		x							x	
LEGUMINOSAE	77	*Anthyllis hermanniae* L.		Silverbush	Akdeniz				–	–	–	–	0-400		x		x					x	
	78	*Chamaecytisus hirsutus* (L.) Link.							–	–	–	–	100-1600				x					x	
	79	*Genista tinctoria* L.	Boyacı otu	Woodwaxen	Geniş Yayılışlı				–	–	–	–	0-2200				x					x	
	80	*Spartium junceum* L.	Katır tırnağı		Akdeniz				–	–	–	–	0-600				x			x			
	81	*Trifolium campestre* Schreb.	Üçgül	Clover	Geniş Yayılışlı				–	–	–	–	0-2200		x		x						x
	82	*Trifolium nigrescens* Viv. subsp. *petrisavii* (Clem) Holmbe	Üçgül	Clover	Geniş Yayılışlı				–	–	–	–	0-1750		x		x						x
	83	*Trifolium polyphyllum* C.A. Meyer	Üçgül	Clover	Oksin				–	–	–	–	2300-2800		x		x	x				x	
	84	*Trifolium speciosum* Willd	Üçgül	Clover	Geniş Yayılışlı				–	–	–	–	50-1100				x	x				x	
LILIACEAE	85	*Asparagus officinalis* L.	Kuşkonmaz	Asparagus	Geniş Yayılışlı				–	–	–	–	0-1800		x		x				x		
	86	*Ruscus aculeatus* L. var. *angustifolius* Boiss.	Tavşan kirazı	Butcher's broom	Geniş Yayılışlı				–	–	–	–	30-1000				x					x	
LINACEAE	87	*Linum bienne* Miller	Yabani keten		Akdeniz				–	–	–	–	0-200	x	x							x	
LORANTHACEAE	88	*Viscum album* L.	Ökse otu	Mistletoe	Geniş Yayılışlı				–	–	–	–	50-2000	x			x						x

Table C.1. Flora Characteristic of Project Area and Vicinities

FAMILY	NO	TAXSON	COMMON NAME (TURKISH)	COMMON NAME (ENGLISH)	P.G.R	ENDEMISM		T.S.	BERN	CITES			ALTITUDE	HABITAT					RELATIVE ABUNDANCE				
						R	W		Anx1	App1	App2	App3	(m)	1	2	3	4	5	1	2	3	4	5
MALVACEAE	89	*Abutilon theophrastii* Medik.		Velvetleaf	Geniş Yayılışlı				–	–	–	–	50-1500	x					x				
	90	*Alcea pallida* Waldst.& Kit.	Hatmi	Hollyhock					–	–	–	–	300-1500	x	x							x	
	91	*Malva sylvestris* L.	Ebegümeci	Mallow					–	–	–	–	0-500	x	x							x	
OLEACEAE	92	*Fraxinus angustifolia* Vahl. subsp. *angustifolia*	Dişbudak	Ash	Avrupa-Sibirya				–	–	–	–	650-1750	x			x				x		
	93	*Jasminium fruticans* L.	Yasemin	Jasmine	Akdeniz				–	–	–	–	0-1500				x				x		
	94	*Olea europaea* L. var. *europaea*	Zeytin	Olive tree	Akdeniz				–	–	–	–	0-700	x		x						x	
	95	*Phyllaria latifolia* L.			Akdeniz				–	–	–	–	10-1350				x				x		
PEDALIACEAE	96	*Sesamum indicum* L.	Susam	Sesame	Geniş Yayılışlı				–	–	–	–	50-2000	x									x
PLATANACEAE	97	*Platanus orientalis* L.	Çınar	Plane tree	Geniş Yayılışlı				–	–	–	–	0-1100	x			x						x
POLYGONACEAE	98	*Polygonum arenarium* Waldst. & Kit.			Geniş Yayılışlı				–	–	–	–	0-1500	x	x							x	
	99	*Polygonum bellardii* All.			Geniş Yayılışlı				–	–	–	–	500-1800	x	x							x	
RHAMNACEAE	100	*Paliurus spina-christi* Miller	Karaçalı	Christ's-thorn	Geniş Yayılışlı				–	–	–	–	0-1400			x	x					x	
ROSACEAE	101	*Amygdalus communis* L.	Badem	Almond	Geniş Yayılışlı				–	–	–	–	150-1800			x	x					x	
	102	*Crateagus monogyna* Jacq. subsp. *monogyna*	Alıç		Geniş Yayılışlı				–	–	–	–	0-1800			x	x					x	
	103	*Prunus spinosa* L. subsp *dasyphylla* (Sch.) Domin	Erik	Sloe	Avrupa-Sibirya				–	–	–	–	0-1700				x				x		
	104	*Pyrus elaeagnifolia* Pallas subsp *elaegnifolia*	Ahlat	Oleaster-leaved pear					–	–	–	–	0-1250	x	x		x					x	
	105	*Rubus sanchtus* Schreber	Böğürtlen		Geniş Yayılışlı				–	–	–	–	0-1000	x			x					x	
	106	*Sarcopoterium spinosum* (L.) Spach	Abdes bozan		Akdeniz				–	–	–	–	10-1100			x	x				x		
SALIXACEAE	107	*Populus alba* L.	Akkavak	White poplar					–	–	–	–	0-2000	x			x				x		
	108	*Salix alba* L.	Aksöğüt	Red willow	Avrupa-Sibirya				–	–	–	–	50-2500	x			x				x		
SOLANACEAE	109	*Caspicum anuum* L.	Biber	Paprika					–	–	–	–	0-1000	x									x
	110	*Datura stramonium* L.	Şeytan elması	Jimsonweed	Geniş Yayılışlı				–	–	–	–	0-1000	x	x								x
	111	*Lycopersicon esculenthum* Miller	Dometes						–	–	–	–	0-2500	x									x
	112	*Mandragora autumnalis* Bertol			Akdeniz				–	–	–	–	50-1500	x	x				x				
	113	*Solanum dulcamara* L.			Avrupa-Sibirya				–	–	–	–	0-2300		x		x					x	
	114	*Solanum melongera* L.	Patlıcan	Aubergine					–	–	–	–	1500	x								x	
	115	*Solanum tuberosum* L.	Patetes	Potato					–	–	–	–	0-1500	x								x	
UMBELLIFERAE	116	*Eryngium campestre* L. var. *virens* Link	Şeker dikeni	Sea holly	Geniş Yayılışlı				–	–	–	–	0-1800	x	x	x	x					x	
	117	*Eryngium creticum* Lam.			Akdeniz				–	–	–	–	0-750	x	x						x		
	118	*Bifora radians* Bieb.	Kokar ot		Geniş Yayılışlı				–	–	–	–	700-1500	x	x	x						x	
	119	*Foeniculum vulgare* Miller	Rezene	Fennel	Geniş Yayılışlı				–	–	–	–	0-1200		x		x	x			x		
	120	*Tordylium aegaeum* Runem			Akdeniz				–	–	–	–	0-300		x							x	
	121	*Torilis leptophylla* (L.) Reichb.			Geniş Yayılışlı				–	–	–	–	0-2500										x
	122	*Antriscus nemorosa* (Bieb.) Sprengel							–	–	–	–	500-3200			x	x					x	
	123	*Sanicula europaea* L.	Devekulağı	Sanicle	Avrupa-Sibirya				–	–	–	–	0-2200				x					x	
	124	*Scandix pecten-veneris* L.							–	–	–	–	0-1000	x	x	x	x				x		
	125	*Echinophora tenuifolia* L. subsp. *sibthorpiana* (Guss.) Tutin			İran-Turan				–	–	–	–	0-1100	x	x								x
POACEAE	126	*Avena enantha* Durieu	Yulaf	Oat	Geniş Yayılışlı				–	–	–	–	0-1250	x	x							x	
	127	*Aegilops markgrafii* (Greuter) Hammer		Goat grass	Akdeniz				–	–	–	–	0-1200	x	x	x						x	
	128	*Aegilops biuncialis* Vis			Geniş Yayılışlı				–	–	–	–	0-2500		x							x	
	129	*Brachypodium sylvaticum* (Hudson) P. Beauv.		False brome	Avrupa-Sibirya				–	–	–	–	0-3000		x		x					x	
	130	*Bromus squarrosus* L.		Brome	Geniş Yayılışlı				–	–	–	–	200-2000	x	x		x	x					x
	131	*Calamagrostis pseudophragmites* (Hallaer fil.) Ko.			Geniş Yayılışlı				–	–	–	–	400-2800				x	x			x		
	132	*Dactylis glomerata* L. subsp. *hispanica* (Roth.) Nyman	Parmak otu	Orchard grass	Geniş Yayılışlı				–	–	–	–	0-2250	x	x	x	x	x					x
	133	*Festuca heterophylla* Lam.	Çayır otu	Fescue	Geniş Yayılışlı				–	–	–	–	400-2300		x							x	
	134	*Festuca valesiaca* Schreber ex Gaudin		Pseudovina	Geniş Yayılışlı				–	–	–	–	0-2250		x							x	

Table C.1. Flora Characteristic of Project Area and Vicinities

FAMILY	NO	TAXSON	COMMON NAME (TURKISH)	COMMON NAME (ENGLISH)	P.G.R	ENDEMISM		T.S.	BERN	CITES			ALTITUDE	HABITAT					RELATIVE ABUNDANCE				
						R	W		Anx1	App1	App2	App3	(m)	1	2	3	4	5	1	2	3	4	5
	135	*Hordeum bulbosum* L.			Geniş Yayılışlı				–	–	–	–	400-2300	x	x	x						x	
	136	*Koeleria nitidula* Velen			Geniş Yayılışlı				–	–	–	–	0-1600		x	x						x	
	137	*Oryza sativa* L.	Pirinç	Rice	Geniş Yayılışlı				–	–	–	–	0-300	x						x			
	138	*Poa bulbosa* L.		Bulbous	Geniş Yayılışlı				–	–	–	–	400-2000	x	x	x	x	x	x				x
	139	*Taeniatherum caput-medusae* (L.) Nevski subsp *crinitum* (Schreber) Melderis							–	–	–	–	400-2100		x		x	x				x	
	140	*Triticum aestivum* L.	Buğday	Wheat					–	–	–	–	15-2650	x								x	
	141	*Triticum baeoticum* Boiss subsp. *baeoticum*							–	–	–	–	100-1700	x	x							x	

LEGEND OF FAUNA TABLES

IUCN

1994 (ver. 2.3)
EX: Extinct
EW: Extinct in the wild
CR: Critically endangered
EN: Endangered
VU: Vulnerable
LR: Lower risk
cd: concervation dependent
nt: near threatened
lc: least concern
DD: Data deficient
NE: Not evaluated

2001 (ver. 3.1)
EX: Extinct
EW: Extinct in the wild
CR: Critically endangered
EN: Endangered
VU: Vulnerable
NT: Near threatened
LC: Least concern
DD: Data deficient
NE: Not evaluated

T.S. (A.D.)=THREAT STATUS (ALI DEMIRSOY)
E : Endangered
Ex : Extinct
I : In determinate
K : Insufficient known
nt : Widespread,abundant
O : Out of danger
R : Rare
V : Vulnerable

STATUS (N.TURAN)
Y : Native species
YG : Summer visitor species
KG : Winter visitor species
G : Transit migratory birds
N : Rare bird species

BERN (BERN CONVENTION)
EK2 : SPFS (Strictly Protected Fauna Species)
EK3 : PFS (Protected Fauna Species)

CITES
App1 (Appendix 1): Species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
App2 (Appendix 2): Species not necessarily threatened with extinction, but their trade must be controlled to avoid utilization incompatible with their survival.
App3 (Appendiz 3): Species protected in at least one country, and their trading is under control by CITES.

H.S. = HUNTING STATUS (According to Central Hunting Commission,2004-2005)
App1 (Appendix 1) : Wildlife species protected by Ministry of Environment and Forestry
App2 (Appendix 2) : Game animals protected by Central Hunting Commission
App3 (Appendix 3) : Game animals allowed to be hunted in predefined seasons by Central Hunting Commission

SOURCE: (O : Observation); **(L** : Literature); **(Q** : Questionnaire); **(H** : Habitat suitablity and traces)

POP. DEN. = POPULATION DENSITY: (A= 1-9 heads; **B=** 10-99 heads; **C=**100-999 heads)

Table C.2. Mammals Identified in the Study Area

MAMMALS			COMMON NAME (TURKISH)	COMMON NAME (ENGLISH)	IUCN	BERN		T.S.	H.S.			CITES			SOURCE	POP.
						Anx2	Anx3	(A.D)	App1	App2	App3	App1	App2	App3	O-L-Q-H	DEN.
1	INSECTIVORA															
	1	Erinaceidae														
		1	*Erinaceus concolor Martin, 1838*	Kirpi	Eastern European hedgehog	LR/lc	–	–	nt	x			–	–	–	O-L-Q-H	A
2	CHIROPTERA															
	2	Vespertilionidae														
		2	*Myotis myotis (Borkhausen, 1797)*	Farekulaklı Büyükyarasa	Large mouse-eared bat	LR/nt	x		V	x			–	–	–	L-H	A
		3	*Pipistrellus pipistrellus (Schreber, 1774)*	Cüce Yarasa	Pipistrelle	LR/lc		x	V	–	–	–	–	–	–	L-H	A
3	RODENTIA															
	3	Sciuridae														
		4	*Sciurus vulgaris (Linnaeus, 1758)*	Avrupa Sincabı	Eurasian red squirrel	NT		x	nt	x			–	–	–	O-L-Q-H	A
	4	Muridae														
		5	*Microtus arvalis* (Pallas, 1779)	Tarlafaresi	Common vole	LR/lc	–	–	nt	–	–	–	–	–	–	G-L-A-H	A
		6	*Cricetulus migratorius (Pallas, 1773)*	Cüce Avurtlak	Grey hamster	LR/nt	–	–	nt	–	–	–	–	–	–	L-H	A
		7	*Apodemus mystacinus (Danford ve Alston, 1877)*	Kayalık Orman Faresi	Broad-toothed Mouse	LR/lc	–	–	nt	–	–	–	–	–	–	L-H	A
		8	*Apodemus sylvaticus (Linnaeus, 1758)*	Orman Faresi	Wood mouse	LR/lc	–	–	nt	–	–	–	–	–	–	O-L-Q-H	A
		9	*Rattus rattus (Linnaeus, 1758)*	Evsıçanı	Black rat	LR/lc	–	–	nt	–	–	–	–	–	–	O-L-Q-H	A
		10	*Mus musculus* Linnaeus, 1758	Ev Faresi	House mouse	LR/lc	–	–	nt	–	–	–	–	–	–	O-L-Q-H	A
	5	Gliridae														
		11	*Dryomys nitedula* (Pallas, 1779)	Hasancık	Forest dormouse	LR/nt		x	R	x						O-L-Q-H	A
4	CARNIVORA															
	6	Canidae														
		12	*Canis aureus* (Linnaeus, 1758)	Çakal	Golden jackal	LR/lc	–	–	nt			x	–	–	–	L-Q-H	A
		13	*Vulpes vulpes* (Linnaeus, 1758)	Kızıl Tilki	Red fox	LR/lc	–	–	nt			x	–	–	–	O-L-Q-H	A
	7	Mustelidae														
		14	*Mustela nivalis* (Linnaeus, 1766)	Gelincik	Least weasel	LR/lc		x	nt		x		–	–	–	O-L-Q-H	A
		15	*Martes foina* (Erxleben, 177)	Kaya Sansarı	Beech marten	LR/lc		x	nt			x	–	–	–	L-Q-H	A
5	ARTIODACTYLA															
	8	Suidae														
		16	*Sus scrofa* (Linnaeus, 1758)	Yaban domuzu	Wild boar	LR/lc	–	–	nt			x	–	–	–	L-Q-H	A
	9	Cervidae														
		17	*Capreolus capreolus* (Linnaeus, 1758)	Karaca	Roe deer	LR/lc		x	nt/R	x			–	–	–	L-Q-H	A

Table C.3. Bird Species Observed in the Project Area

BIRDS			COMMON NAME (TURKISH)	COMMON NAME (ENGLISH)	IUCN	BERN		H.S.			CITES			STATUTE (N.TURAN)					SOURCE	POP.
						Anx2	Anx3	App1	App2	App3	App1	App2	App3	Y	YG	KG	G	N	O-L-Q-H	DEN.
1	CICONIIFORMES		LEYLEKSİLER																	
	1	CICONIIDAE	LEYLEKLER																	
		1 *Ciconia ciconia*	akleylek	white stork	LC	x		x			–	–	–		x				O	A
2	ACCIPITRIFORMES		YIRTICI KUŞLAR																	
	2	ACCIPITRIDAE	ATMACAGİLLER; KARTALLAR																	
		2 *Circaetus gallicus*	yılan kartalı	short-toed eagle	LC	x		x				x			x				O	A
		3 *Circus cyaneus*	gök delice	hen harrier	LC	x		x				x		x		x			O	A
		4 *Buteo rufinus*	kızıl şahin	long-legged buzzard	LC	x		x				x		x					O	A
		5 *Buteo buteo*	şahin	buzzard	LC	x		x				x		x					O	A
		6 *Neophron percnopterus*	beyaz akbaba	egyptian vulture	LC	x		x				x		x	x				O	A
		7 *Pernis apivorus*	arıcıl	honey buzzard	LC	x		x				x			x				O	A
	3	FALCONIDAE	DOĞANGİLLER																	
		8 *Falco tinnunculus*	kerkenez	kestrel	LC	x		x				x		x					O	A
		9 *Falco biarmicus*	bıyıklı doğan	lanner	LC	x		x				x		x					O	A
		10 *Falco subbuteo*	delice doğan	hobby	LC	x		x				x			x				O	A
3	GALLIFORMES		TAVUKLAR																	
	4	PHASIANIDAE	TAVUKSULAR																	
		11 *Alectoris chukar*	kınalı keklik	chukar partridge	LC		x			x	–	–	–	x					O	A
4	CHARADRIIFORMES		YAĞMURKUŞLARI																	
	5	SCOLOPACIDAE	ÇULLUKGİLLER																	
		12 *Tringa(Actitis) hypoleucos*	akkarın yeşilbacak	comman sandpiper	LC	x		x			–	–	–	x		x			O	A
5	COLUMBIFORMES		GÜVERCİNLER																	
	6	COLUMBIDAE	GÜVERCİNGİLLER																	
		13 *Columba livia*	kaya güvercini	rock pigeon	LC		x			x	–	–	–	x					O	B
		14 *Columba oenas*	mavi güvercin	stock dove	LC		x		x		–	–	–	x					O	B
		15 *Columba palumbus*	tahtalı güvercin	woodpigeon	LC	–	–			x	–	–	–	x					O	B
		16 *Streptopelia decaocto*	kumru	collared dove	LC		x		x		–	–	–	x					O	B
		17 *Streptopelia turtur*	üveyik	turtle dove	LC		x			x	–	–	–		x				O	B
6	CUCULIFORMES		GUGUKKUŞLARI																	

Table C.3. Bird Species Observed in the Project Area

BIRDS			COMMON NAME (TURKISH)	COMMON NAME (ENGLISH)	IUCN	BERN		H.S.			CITES			STATUTE (N.TURAN)					SOURCE	POP.
						Anx2	Anx3	App1	App2	App3	App1	App2	App3	Y	YG	KG	G	N	O-L-Q-H	DEN.
	7	CUCULIDAE	GUGUKKUŞUGİLLER																	
		18 *Cuculus canorus*	gugukkuşu	cuckoo	LC		x	x			–	–	–		x				O	A
7	STRIGIFORMES		GECE YIRTICILARI																	
	8	STRIGIDAE	BAYKUŞGİLLER																	
		19 *Asio otus*	kulaklı orman baykuşu	long-eared owl	LC	x		x				x		x					O	A
		20 *Athena noctua*	kukumav	little owl	LC	x		x				x		x					O	A
	9	TYTONIDAE	PEÇELİBAYKUŞGİLLER																	
		21 *Tyto alba*	peçeli baykuş	barn owl	LC	x		x				x		x					O	A
8	APODIFORMES		SAĞANLAR																	
	10	APODIDAE	EBABILGİLLER																	
		22 *Apus apus*	ebabil, karasağan	swift	LC		x	x			–	–	–		x				O	B
		23 *Apus (Tachymarptis) melba*	akkarınlı ebabil	alpine swift	LC	x		x			–	–	–		x				O	B
9	CORACIIFORMES		KUZGUNKUŞLARI																	
	11	MEROPIDAE	ARIKUŞUGİLLLER																	
		24 *Merops apiaster*	arıkuşu	beeather	LC	x		x			–	–	–		x				O	B
	12	CORACIIDAE	KUZGUNGİLLER																	
		25 *Coracias garrulus*	mavi karga	roller	LC	x		x			–	–	–		x				O	A
	13	UPUPIDAE	ÇAVUŞKUŞUGİLLER																	
		26 *Upupa epops*	ibibik	hoope	LC	x		x			–	–	–		x				O	A
10	PICIFORMES		AĞAÇKAKANLAR																	
	14	PICIDAE	AĞAÇKAKANGİLLER																	
		27 *Picus viridis*	yeşil ağaçkakan	green woodpecker	LC	x		x			–	–	–	x					O	A
		28 *Dendrocopus major*	büyük alaca ağaçkakan	great-spotted woodpecker	LC	x		x			–	–	–	x					O	A
		29 *Dendrocopus syriacus*	alaca ağaçkakan	syrian woodpecker	LC	x		x			–	–	–	x					O	A
		30 *Dendrocopus minor*	küçük ağaçkakan	lesser-spotted woodpecker	LC	x		x			–	–	–	x					O	A
11	PASSERIFORMES		ÖTÜCÜ KUŞLAR																	
	15	ALAUDIDAE	TARLAKUŞUGİLLER																	
		31 *Calandrella brachydactyla*	bozkır toygarı	short-toed lark	LC	x		x			–	–	–		x				O	B
		32 *Alauda arvensis*	tarla kuşu	sky lark	LC		x		x		–	–	–	x					O	B
	16	HIRUNDINIDAE	KIRLANGIÇGİLLER																	

Table C.3. Bird Species Observed in the Project Area

BIRDS			COMMON NAME (TURKISH)	COMMON NAME (ENGLISH)	IUCN	BERN		H.S.			CITES			STATUTE (N.TURAN)					SOURCE	POP.
						Anx2	Anx3	App1	App2	App3	App1	App2	App3	Y	YG	KG	G	N	O-L-Q-H	DEN.
		33 *Hirundo rustica*	is kırlangıcı	swallow	LC	x		x			–	–	–		x				O	B
		34 *Riparia riparia*	kum kırlangıcı	sand martin	LC	x		x			–	–	–		x				O	B
		35 *Delichon urbica*	pencere kırlangıcı	house martin	LC	x		x			–	–	–		x				O	A
	17	MOTACILLIDAE	KUYRUKSALLAYANGİLLER																	
		36 *Anthus campestris*	kır incirkuşu	twany pipit	LC	x		x			–	–	–		x				O	A
		37 *Anthus pratensis*	çayır incirkuşu	meadow pipit	LC	x		x			–	–	–			x			O	A
		38 *Anthus cervinus*	algerdan incirkuşu	red-throated pipit	LC	x		x			–	–	–				x		O	A
		39 *Motacilla flava spp*	sarı kuyruksallayan	yellow wagtail	LC	x		x			–	–	–		x				O	A
		40 *Motacilla alba*	Akkuyruksallayan	pied wagtail	LC	x		x			–	–	–	x					O	A
	18	TROGLODYTIDAE	ÇİT KUŞLARI																	
		41 *Troglodytes troglodytes*	çit kuşu	wren	LC	x		x			–	–	–	x					O	A
	19	TURDIDAE (MUSCICAPIDAE)	ARDIÇGİLLER																	
		42 *Cercotrichas (Erythropygia) gala*	kızıl çalıbülbülü	ruaus bush chats	LC	x		x			–	–	–		x				O	A
		43 *Enthacus rubecula*	kızılgerdanm	robin	LC	x		x			–	–	–	x					O	A
		44 *Luscinia megarynchos*	bülbül	nigtingale	LC	x		x			–	–	–		x				O	A
		45 *Luscinia svecica*	buğdaycıl, mavi gerdan	bluethroat	LC	x		x			–	–	–		x		x		O	A
		46 *Irania gutturalis*	akgerdan	white-throated robin	LC	x		x			–	–	–		x				O	A
		47 *Phoenicurus ochruros*	ev kızılkuyruğu	black redstart	LC	x		x			–	–	–	x					O	A
		48 *Phoenicurus phoenicurus*	dağ kızılkuyruğu	redstart	LC	x		x			–	–	–	x	x				O	A
		49 *Saxicola rubetra*	çayır taşkuşu	whinchat	LC	x		x			–	–	–				x		O	A
		50 *Saxicola torquata*	taşkuşu	stonechat	LC	x		x			–	–	–	x	x				O	A
		51 *Oenanthe oenanthe*	kuyrukkakan	wheather	LC	x		x			–	–	–		x				O	A
		52 *Oenanthe hispanica*	karakulak kuyrukkakan	black-eared wheather	LC	x		x			–	–	–		x				O	A
		53 *Oenanthe isabellina*	toprak renklı kuyrukkakan	isabelline wheather	LC	x		x			–	–	–		x				O	A
		54 *Turdus merula*	karatavuk	blackbird	LC		x			x	–	–	–	x					O	B
		55 *Turdus pilaris*	ardıç	field fare	LC		x		x		–	–	–			x			O	B
	20	SYLVIIDAE	ÖTLEĞENGİLLER																	
		56 *Cettia cetti*	setti bülbülü	cetti's warbler	LC	x		x			–	–	–	x					O	A
		57 *Acrocephalus scirpaceus*	saz ardıçkuşu	read warbler	LC	x		x			–	–	–		x				O	B
		58 *Hippolais olivetorum*	zeytinlik mukalliti	olive-tree warbler	LC	x		x			–	–	–		x				O	A

Table C.3. Bird Species Observed in the Project Area

BIRDS			COMMON NAME (TURKISH)	COMMON NAME (ENGLISH)	IUCN	BERN		H.S.			CITES			STATUTE (N.TURAN)					SOURCE	POP.
						Anx2	Anx3	App1	App2	App3	App1	App2	App3	Y	YG	KG	G	N	O-L-Q-H	DEN.
		59 *Hippolais pallida*	gri mukallit	olivceous warbler	LC	x		x			–	–	–		x				O	A
		60 *Sylvia cantillans*	aksakal ötleğen	subalpine warbler	LC	x		x			–	–	–		x				O	A
		61 *Sylvia hortensis*	orfe ötleğen	orphean warbler	LC	x		x			–	–	–		x				O	A
		62 *Sylvia atricapilla*	karabaş ötleğen	blackcap	LC	x		x			–	–	–		x		x		O	A
		63 *Phylloscopus collybita*	cif caf	chiff chaff	LC	x		x			–	–	–	x		x			O	B
		64 *Regulus regulus*	altıntavukçuk	goldencrest	LC	x		x			–	–	–	x					O	A
	21	MUSCICAPIDAE	SİNEKKAPANGİLLER																	
		65 *Muscicapa striata*	benekli sinekkapan	spotted flycatcher	LC	x		x			–	–	–		x				O	A
		66 *Ficedula hypoleuca*	kara sinekkapan	pied flycatcher	LC	x		x			–	–	–				x		O	A
		67 *Ficedula albicollis*	bandlı sinekkapan	collored flycatcher	LC	x		x			–	–	–		x		x		O	A
		68 *Ficedula semitorquata*	yarımbantlı sinekkapan	semi-collored flycatcher	LC	x		x			–	–	–		x		x		O	A
	22	TIMALLIDAE	BIYIKLIBAŞTANKARALAR																	
		69 *Panurus biarmicus*	bıyıklı baştankara	bearded tit	LC	x		x			–	–	–	x					O	B
	23	AGITHALIDAE	UZUNKUYRUK BAŞTANKARALAR																	
		70 *Aegithalos caudatus*	uzunkuyruk baştankara	long-tailed tit	LC		x		x		–	–	–	x					O	B
	24	PARIDAE	BAŞTANKARAGİLLER																	
		71 *Parus ater*	çam baştankarası	coal tit	LC	x		x			–	–	–	x					O	B
		72 *Parus caeruleus*	mavi baştankarası	blue tit	LC	x		x			–	–	–	x					O	B
		73 *Parus major*	büyük baştankarası	great tit	LC	x		x			–	–	–	x					O	B
	25	SITTIDAE	SIVACIKUŞUGİLLER																	
		74 *Sitta europaea*	sıvacı	nuthatch	LC	x		x			–	–	–	x					O	A
		75 *Sitta neumayer*	kaya sıvacısı	rock nuthatch	LC	x		x			–	–	–	x					O	A
	26	ORIOLIDAE	SARIASMAGİLLER																	
		76 *Oriolus oriolus*	sarıasma	golden oriole	LC	x		x			–	–	–		x				O	A
	27	LANIIDAE	ÇEKİRGEKUŞLARI																	
		77 *Lanius collurio*	çekirgekuşu	red-backed shrike	LC		x	x			–	–	–		x				O	A
		78 *Lanius minor*	karaalınlıçekirgekuşu	lesser gray shrike	LC		x	x			–	–	–		x				O	A
		79 *Lanius excubitor*	büyük çekirgekuşu	great gray shrike	LC		x	x			–	–	–		x				O	A
		80 *Lanius senator*	kızılbaşlıçekirgekuşu	woodchat shrike	LC		x	x			–	–	–		x		x		O	A

Table C.3. Bird Species Observed in the Project Area

BIRDS			COMMON NAME (TURKISH)	COMMON NAME (ENGLISH)	IUCN	BERN		H.S.			CITES			STATUTE (N.TURAN)					SOURCE	POP.
						Anx2	Anx3	App1	App2	App3	App1	App2	App3	Y	YG	KG	G	N	O-L-Q-H	DEN.
	28	CORVIDAE	KARGAGİLLER																	
		81 *Garrulus glandarius*	kestane kargası	jay	LC	–	–			x	–	–	–	x					O	B
		82 *Pica pica*	saksağan	magpie	LC	–	–			x	–	–	–	x					O	B
		83 *Corvus monedula*	cüce karga	jackdaw	LC	–	–			x	–	–	–	x					O	B
		84 *Corvus frugilegus*	ekinkargası	field raven	LC	–	–			x	–	–	–	x					O	B
		85 *Corvus corone cornix*	leşkargası	hooded	LC	–	–			x	–	–	–	x					O	B
		86 *Corvus corax*	karakarga	raven	LC		x		x		–	–	–	x					O	A
	29	STURNIDAE	SIĞIRCIKGİLLER																	
		87 *Sturnus vulgaris*	sığırcık	starling	LC	–	–		x		–	–	–	x					O	B
	30	PASSERIDAE	SERÇEGİLLER																	
		88 *Passer domesticus*	ev serçesi	house sparrow	LC	–	–			x	–	–	–	x					O	B
		89 *Passer montanus*	dağ serçesi	tree sparrow	LC		x		x		–	–	–	x					O	B
		90 *Passer hispaniolensis*	bataklık serçesi	spanish sparrow	LC		x		x		–	–	–	x					O	A
	31	FRINGILLIDAE	İSPİNOZGİLLER																	
		91 *Fringilla coelebs*	ispinoz	caffinch	LC		x		x		–	–	–	x					O	A
		92 *Carduelis chloris*	florya	greenfinch	LC	x		x			–	–	–	x					O	B
		93 *Carduelis carduelis*	saka	goldfinch	LC	x		x			–	–	–	x					O	B
		94 *Carduelis cannabina*	ketenkuşu	linnet	LC	x		x			–	–	–	x					O	B
		95 *Loxia curvirostra*	çaprazgaga kuşu	crossbill	LC	x		x			–	–	–	x					O	A
		96 *Coccothraustes coccothraustes*	kocabaş	hawfinch	LC	x		x			–	–	–	x		x			O	A
		97 *Pyrrhula pyrrhula*	şakrak	bullfinch	LC		x		x		–	–	–	x					O	A
	32	EMBERIZIDAE	KİRAZKUŞUGİLLER																	
		98 *Emberiza cia*	kaya kirazkuşu	rock bunting	LC	x		x			–	–	–	x					O	A
		99 *Emberiza hortulana*	kirazkuşu	ortolon bunting	LC	x			x		–	–	–		x				O	A
		100 *Emberiza caesia*	kızıl kirazkuşu	cretzschmar bunting	LC	x		x			–	–	–		x				O	A
		101 *Emberiza pusilla*	küçük kirazkuşu	little bunting	LC	x		x			–	–	–					x	O	A
		102 *Emberiza melanocephala*	karabaş kirazkuşu	black-headed bunting	LC	x		x			–	–	–		x				O	A
		103 *Miliaria (Emberiza) calandra*	tarla kirazkuşu	corn bunting	LC		x		x		–	–	–	x					O	A

Table C.4. Reptiles Identified in the Study Area

REPTİLES				COMMON NAME (TURKISH)	COMMON NAME (ENGLISH)	IUCN	BERN		T.S.	H.S.			CITES			SOURCE	POP.
							Anx2	Anx3	A.D.	App1	App2	App3	App1	App2	App3	O-L-Q-H	DEN.
1	SQUAMATA																
	1	Gekkonidae															
		1	*Cyrtopodion kotschyi Steindachner, 1870*	İnce Parmaklı Keler	Kotschy's Gecko	–	x		nt	x			–	–	–	G-L-H	A
	2	Lacertidae															
		2	*Lacerta parva Boulenger, 1887*	Cüce Kertenkele	Dwarf Rock Lizard	–	x		nt	x			–	–	–	G-L-H	A
		3	*Lacerta trilineata Bedriaga, 1886*	İri Yeşil Kertenkele	Balkan Green Lizard	–	x		nt	x			–	–	–	G-L-H	A
		4	*Lacerta viridis (Laurenti, 1768)*	Yeşil Kertenkele	Green Lizard	–	x		nt	x			–	–	–	G-L-A-H	A
		5	*Ophisops elegans Menetries, 1832*	Tarla Kertenkelesi	Snake-eyed Lizard	–	x		nt	x			–	–	–	G-L-A-H	A
	3	Colubridae															
		6	*Coluber schmidti Nikolsky, 1909*	Kırmızı Yılan	Large Whip Snake	–		x	nt	x			–	–	–	G-L-H	A
		7	*Eirenis modestus (Martin, 1838)*	Uysal Yılan	Asia Minor Dwarf Snake	–		x	nt	x			–	–	–	L-H	
		8	*Coronella austriaca Laurenti, 1768*	Avusturya Yılanı	Smooth Snake	–	x		nt	x			–	–	–	L-H	
		9	*Natrix natrix (Linnaeus, 1758)*	Yarı Sucul Yılan	Grass Snake	LR/lc		x	nt	x			–	–	–	G-L-H	A
		10	*Natrix tessellata (Laurenti, 1768)*	Su Yılanı	Dice Snake	–		x	nt	x			–	–	–	G-L-H	A

Table C.5. Amphibians Identified in the Study Area

AMPHIBIANS				COMMON NAME (TURKISH)	COMMON NAME (ENGLISH)	IUCN	BERN		T.S. (A.D.)	H.S.	CITES			SOURCE	POP. DEN.
							Anx2	Anx3			App1	App2	App3	O-L-Q-H	
1	ANURA														
	1	Bufonidae													
		1	*Bufo bufo (Linnaeus, 1758)*	Siğilli Kurbağa	Common Toad	LC		x	nt	–	–	–	–	O-L-H	A
		2	*Bufo viridis (Laurenti, 1768)*	Gece Kurbağası	Green Toad	LC	x		nt	–	–	–	–	O-L-H	A
	2	Ranidae													
		3	*Rana ridibunda Pallas, 1771*	Ova Kurbağası	Marsh Frog	LC		x	nt	–	–	–	–	O-L-H	A

APPENDIX D

PUBLIC PARTICIPATION MINUTES OF MEETING

Appendix D.1	Canakkale Public Participation Minutes of Meeting and Participation List
Appendix D.2	Balikesir Public Participation Minutes of Meeting and Participation List
Appendix D.3	Manisa Public Participation Minutes of Meeting and Participation List

APPENDIX D. PUBLIC PARTICIPATION MEETINGS

For the 380 kV energy transmission line project, that passes through Canakkale, Balikesir and Manisa Provinces, to inform the local residents and to take their opinions/recommendations, Public Participation Meetings were performed on 1-2-3 December 2004. In these meetings, the local residents were informed about the project and the works performed, their opinions/recommendations were taken and their questions were answered by the related competents and experts of the company, that prepared the EIA Report. Contents of these minutes of meetings are summarised below.

Canakkale Public Participation Minutes of Meeting

Within the 380 kV Karabiga - Can – Soma Energy Transmission Line Project, a public participation meeting has been organized by the Ministry of Environment and Forestry on 01.12.2004 in the Hacilar Village at the town of Can.

During the meeting the villagers had questions about the damage that may occur, the correspondent officials for the project and the path of the transmission line. They were informed that any damage will be compensated, any questions can be directed to the Provincial Directorate and that the path of the transmission

There was a question about the birds landing on the line and causing fire. The villagers were informed that all precautions will be taken to prevent such events. Moreover it was stated that these problems are under the responsibility of TEDAS (Turkish Electricity Distribution Co.) not TEIAS. Encon also told the villagers that their knowledge of the area can help for determining the route of the line in such a way to avoid going through agricultural area and/or areas with historical, cultural and natural values. Also the villagers were notified –in response to another question- that there is not enough financial resource to be able to combine the other two transmission lines that are already going through the area.

It was noted that the area that the line passes through will be expropriated. Also the villagers were informed that the distance between the poles is going to be between 350 m and 1km (under extreme conditions). Due to the fact that there were no further questions the meeting was ended.

Balikesir Public Participation Minutes of Meeting

Within the 380 kV Karabiga - Can – Soma Energy Transmission Line Project, a public participation meeting was organized by the Ministry of Environment and Forestry on 02.12.2004 in the Soganbuku Village at the town of Ivrindi.

Villagers voiced their worries about the magnetic field of the line, the potential harm to the crops, the difficulty of growing crops beneath the poles and the route of the line being unclear. The TEIAS official assured the villagers about these by pointing to the previously constructed lines. TEIAS noted that any damage to the crops will be paid, the lines will be high enough to avoid the effect of the magnetic field and the poles will be wide apart enough to grow crops in between.

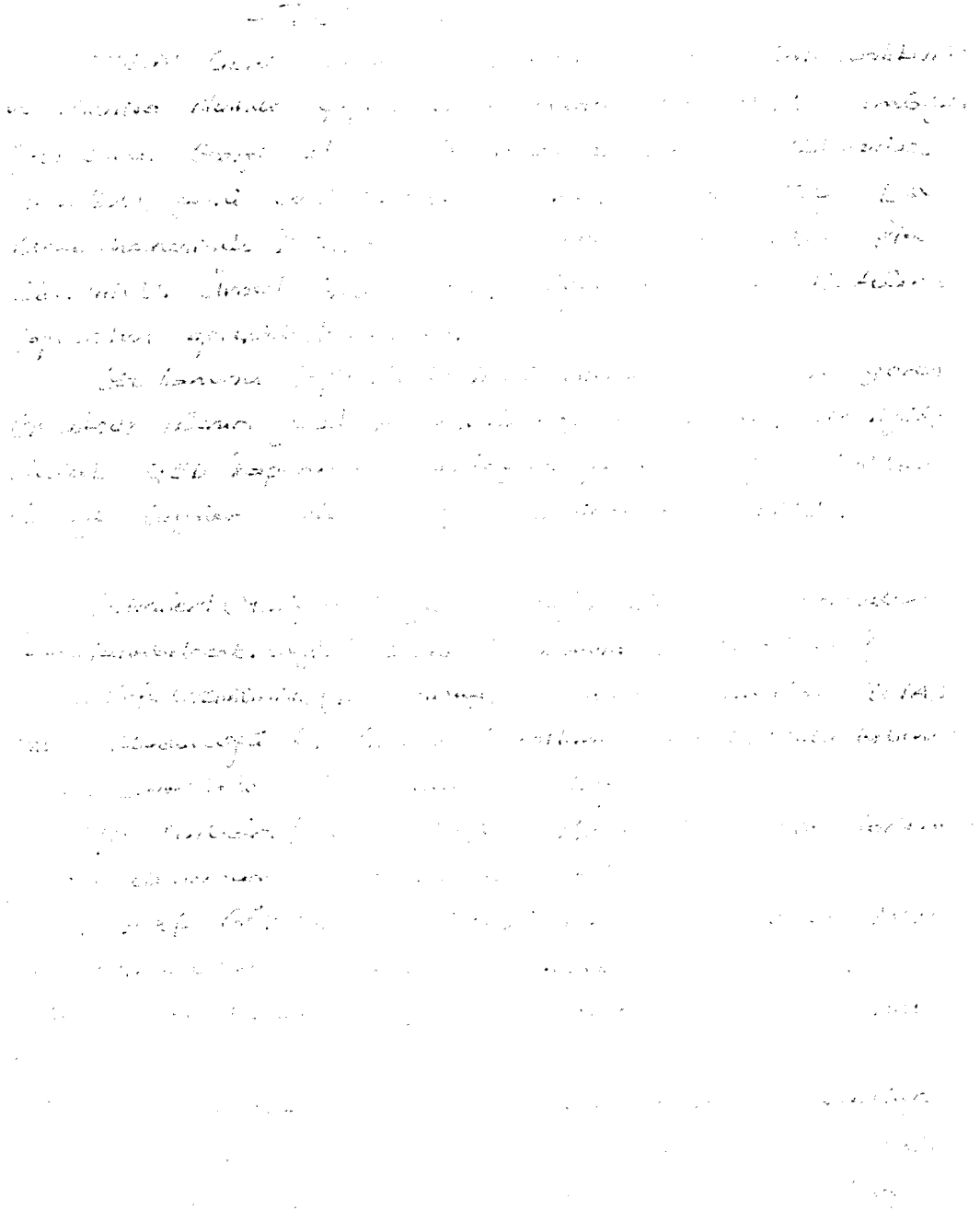
Manisa Public Participation Minutes of Meeting

Within the 380 kV Karabiga - Can – Soma Energy Transmission Line Project, a public participation meeting was organized by the Ministry of Environment and Forestry on 03.12.2004 in the Heciz Village at the town of Soma.

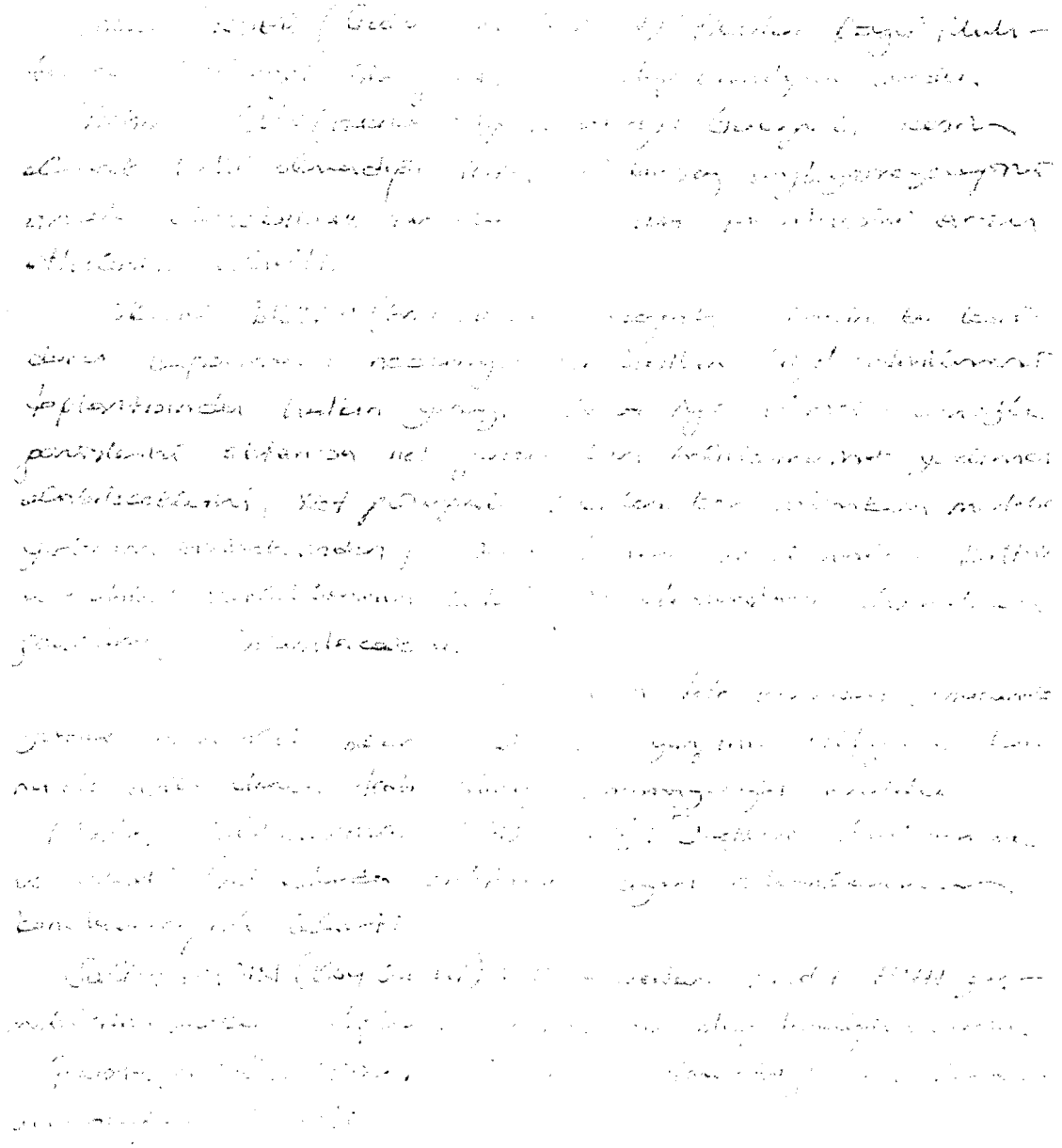
Firstly the villagers were given general information about the process. Then they were given the opportunity to ask questions and voice their thoughts. Questions were asked about the damage to the crops and whether there would be any chance of employment for the local. It was noted that any damage would be compensated and that there might be opportunities of employment.

The villagers were also concerned about power cuts. It was noted that any problems should be addressed to TEIAS. The villagers also requested to know the exact route of the line and that the line not to pass through their fields. They were informed that the definite route will be decided upon soon and that it might be subject to change before and during construction and the fields will be taken into consideration while arranging the route.

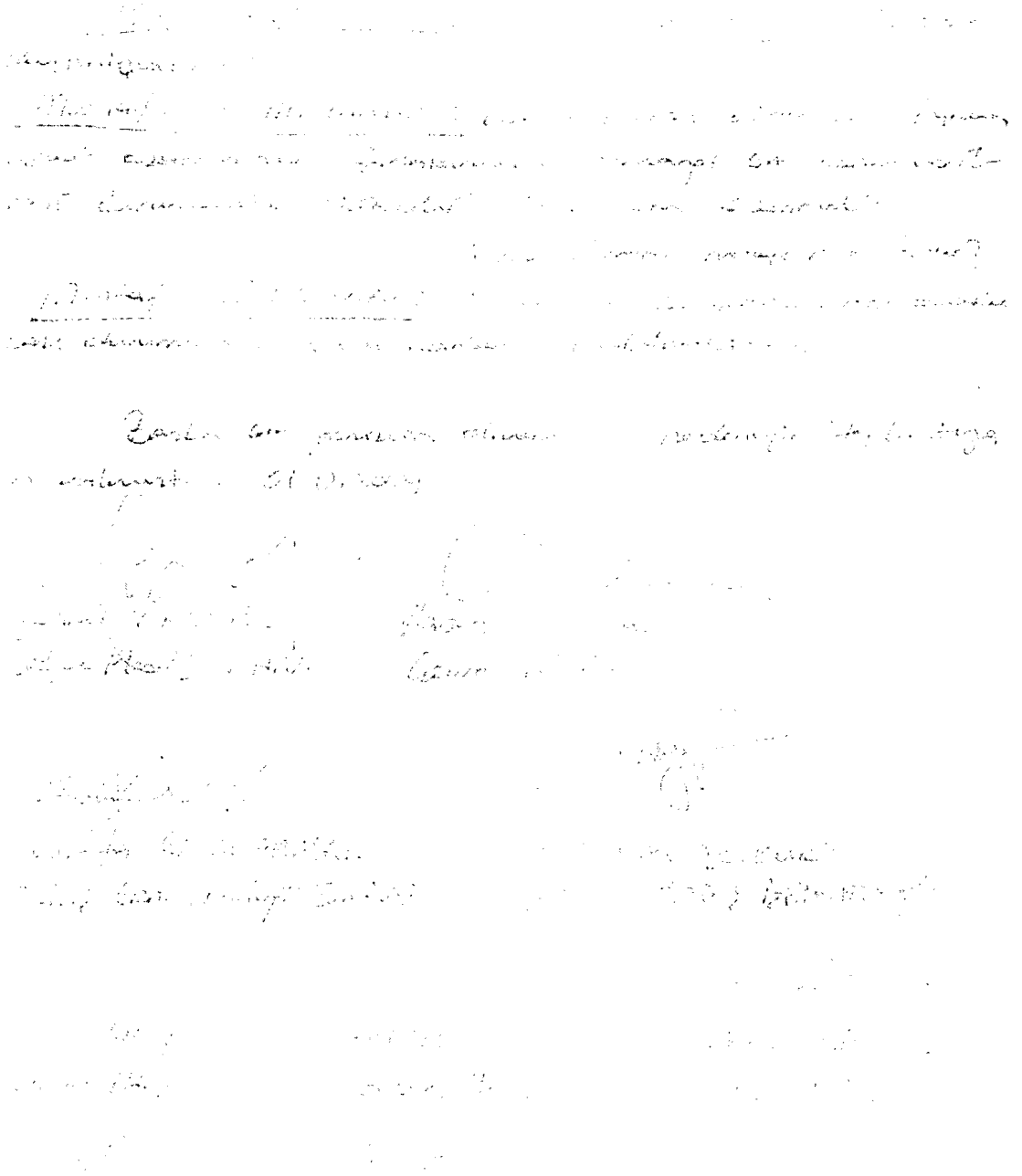
Appendix D.1. Canakkale Public Participation Minutes of Meeting and Participation List



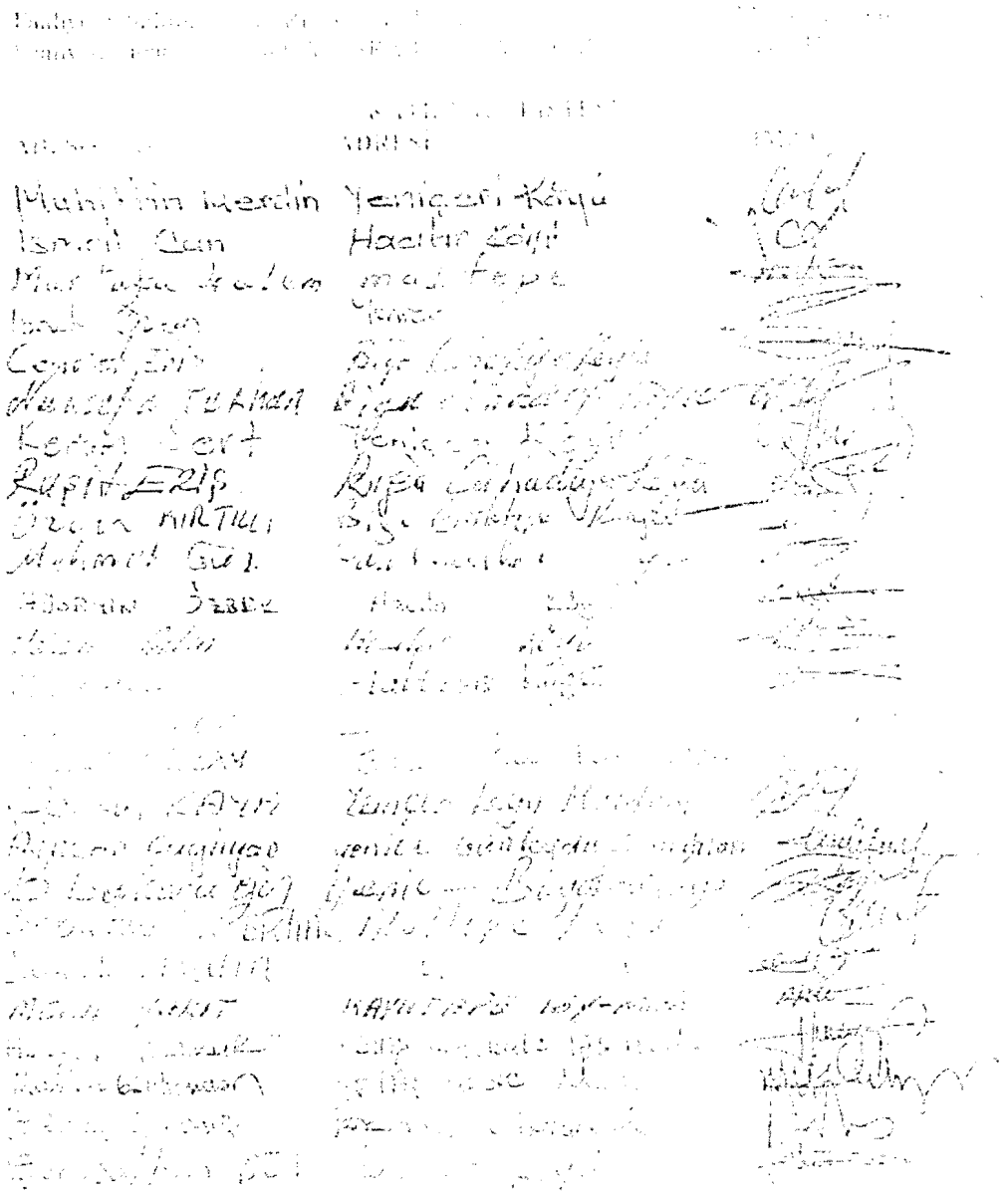
Ek D.1. Canakkale Public Participation Minutes of Meeting and Participation List (Continued)



Ek D.1. Canakkale Public Participation Minutes of Meeting and Participation List (Continued)



Ek D.1. Canakkale Public Participation Minutes of Meeting and Participation List (Continued)



APPENDIX D.2. Balikesir Public Participation Minutes of Meeting and Participation List

TUTANAK

TEİAŞ Etüd Müdürlüğü tarafından, Çanakkale, Balıkesir ve Manisa İlleri sınırları içerisinde yapılı planlanan "380 kV Karabiga Can Soma Enerji İletim Hattı" projesi için ÇŞİDB Yönetmeliğinin 8. maddesi gereğince düzenlenmiştir. Halkın Bilgilendirilmesi ve Görüşlerinin Alınmasına Yönelik toplantı 02.12.2004 tarihinde saat:11:00'da ilimiz evvelki ilçesi, Soğanbuku Köyü, Köy odasında gerçekleştirilmiştir.

Proje Sahibi ve raporu hazırlayan şirket tarafından faaliyet ile ilgili bilgi verilmesi ile toplantı başlamış, daha sonra halkın görüşlerinin alınmasına geçilmiştir.

Ek D.2. Balikesir Public Participation Minutes of Meeting and Participation List (Continued)

TEİAŞ Genel Müdürlüğü tarafından, Balıkesir [illegible] Manisa İlleri sınırları içerisinde yapımı planlanan "380 kV Karabiga-Çan-Soma Enerji İletim Hattı projesi" ile Halkın Bilgilendirilmesi ve Görüşlerinin Alınmasına yönelik [illegible] Tarihinde Saat 11.00'da [illegible], İvrindi İlçesi, Soğanbükü Köyü, Köy Kahvesinde gerçekleştirilen Toplantının Katılımcı Listesi

ADI-SOYADI	KURUMU/İKAMET YERİ	İMZA
Ercan Kayahan	Soğanbükü	
Sabri Yılmaz	Soğanbükü köyü	
Erkan Yılmaz	Soğanbükü köyü	
Sezen Eryılmaz	Soğanbükü köyü	
Bahattin SAYGI	Soğanbükü	
Veli ACAR	Gömeniç	
Polat Akbaş		
Mustafa Ceybun	Soğanbükü köyü	
Ceyhan Akyol	Soğanbükü	
Ercan Kaplan	Soğanbükü	
Hikmet Akkan	Soğanbükü	
Yakup Saygı	Soğanbükü	
Selim Bozbey	"	
[illegible]	[illegible]	
[illegible]	Demirtaş [illegible] Soğanbükü	
[illegible]		

Ek D.2. Balikesir Public Participation Minutes of Meeting and Participation List (Continued)

TEIAS Genel Müdürlüğü tarafından, Çanakkale, Balıkesir, Manisa İlleri sınırları içerisinde yapımı planlanan "380 kV Karabiga-Can-Soma Enerji İletim Hattı projesi, İçin Halkın Bilgilendirilmesi ve Görüşlerinin Alınmasına Yönelik 02.12.2004 Tarihinde Saat 11.00'da Birinci, İvrindi İlçesi, Sofuoğlu Köyü, Köy Kıraathanesinde gerçekleştirilen Toplantının Katılımcı Listesi

ADI-SOYADI	KURUMU/İKAMET YERİ	İMZA
Kemal Delikan	Sofuoğlu	
Gülsez Akyıldırım	Sofuoğlu	
Mutlu Kafaoğlu	TEIAS	
Mesut Nevin Özdemir	Akçal Köyü Muhtarı	
Arif Zeybek	Sofuoğlu	
Kebil Dizlek	TEIAŞ-Balıkesir	
Yusuf Gökçe		
Ayşe Demir	Ayvalık Belediyesi	
Okan Bilgin	Enerji ve Doğal Kaynaklar Bak.	
Erdinç Duman	Enerji ve Doğal Kaynaklar Bak.	

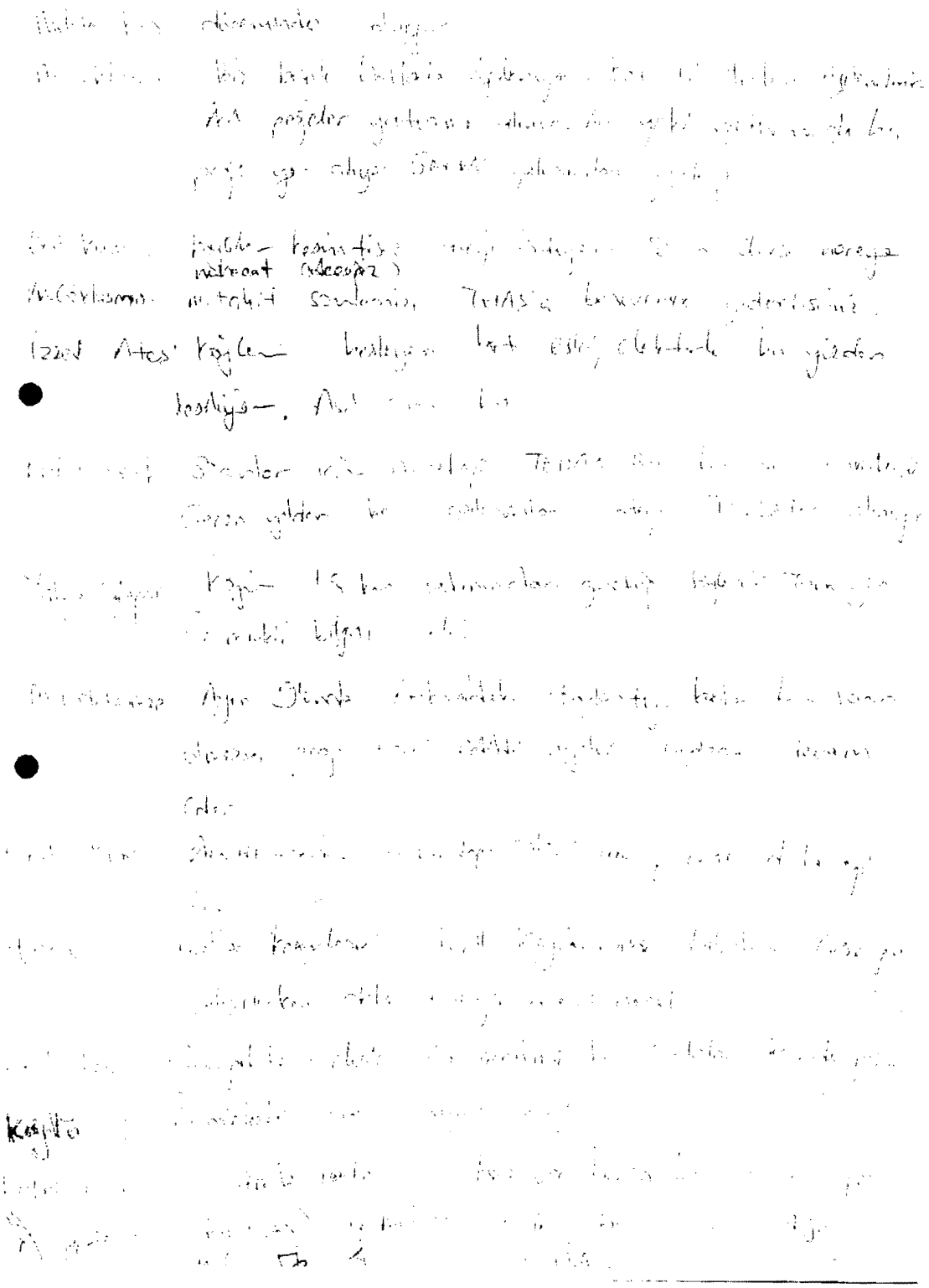
Ek D.3. Manisa Public Participation Minutes of Meeting and Participation List

MANİSA İLİ SOMA İLÇESİ [illegible]
TÜRKİYE ELEKTRİK İLETİM A.Ş. GENEL MÜDÜRLÜĞÜ
ARALINDAN GERÇEKLEŞTİRİLMESİ PLANLANAN
380 kV KARABİGA-CAN-SOMA TEK ENERJİ İLETİM HATTI PROJESİ

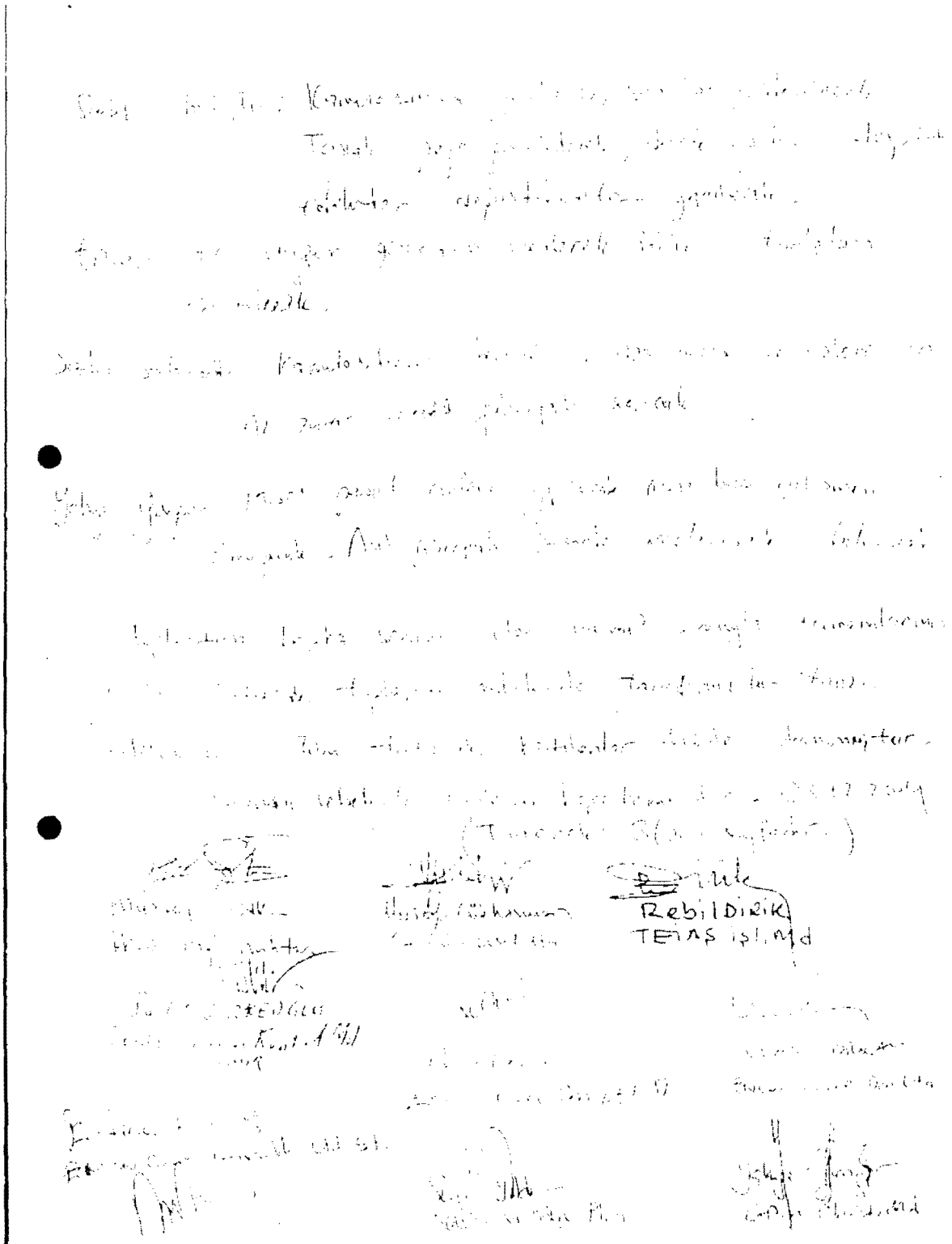
ÇED SÜRECİNE HALKIN KATILIMI TOPLANTISI TUTANAĞI

TOPLANTI TARİHİ 03.12.2004
TOPLANTI YERİ [illegible]
TOPLANTI SAATİ 11:00

Ek D.3. Manisa Public Participation Minutes of Meeting and Participation List (Continued)



APPENDIX D.3. Manisa Public Participation Minutes of Meeting and Participation List (Continued)



Ek D.3. Manisa Public Participation Minutes of Meeting and Participation List (Continued))

MANİSA İLİ, SOMA İLÇESİ HACIZ KÖYÜ
TÜRKİYE ELEKTRİK İLETİM A.Ş. GENEL MÜDÜRLÜĞÜ
TARAFINDAN GERÇEKLEŞTİRİLMESİ PLANLANAN
380 kV KARABİGA-ÇAN-SOMA TEK ENERJİ İLETİM HATTI PROJESİ

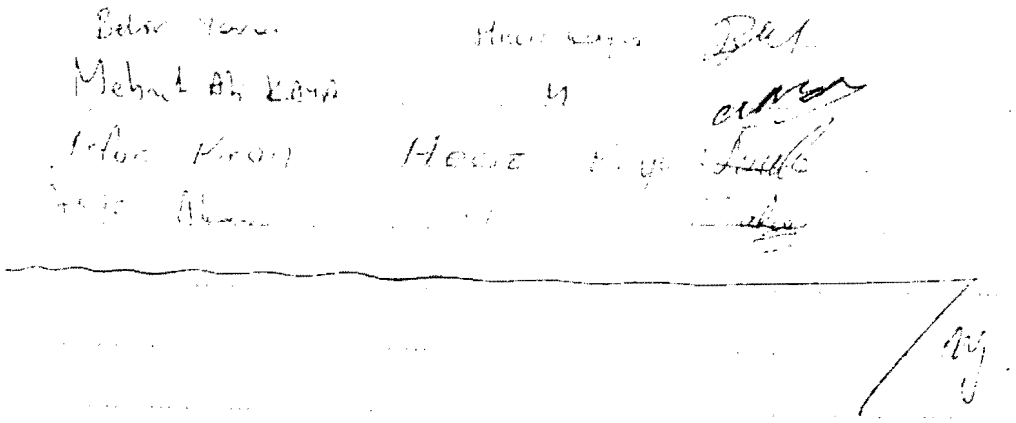
"ÇED SÜRECİNE HALKIN KATILIMI TOPLANTISI" KATILANLAR LİSTESİ

TOPLANTI TARİHİ	03.12.2004
TOPLANTI YERİ	[illegible]
TOPLANTI SAATİ	11:00

ADI-SOYADI	İSİ	İMZA
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Ek D.3. Manisa Public Participation Minutes of Meeting and Participation List (Continued)

380 KV KARABİGA-CAN-SOMA TES ENERJİ İLETİM HATTI PROJESİ



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Demirsoy, A., 1996/c. Turkiye Omurgalilari - Türkiye Omurgali Faunasinin Sistematik ve Biyolojik Ozelliklerinin Arastirilmasi ve Koruma Onlemlerinin Saglanmasi / Surungenler - Systematic and Biological Characteristics Research of Turkish Vertabrates and Providing Conservation Measures / Reptiles - Ministry of Environment and Forestry, Project No: 90-K-1000-90, Ankara.

Demirsoy, A., 1996/d. Turkiye Omurgalilari - Turkiye Omurgali Faunasinin Sistematik ve Biyolojik Ozelliklerinin Arastirilmasi ve Koruma Onlemlerinin Saglanmasi / Memeliler - Systematic and Biological Characteristics Research of Turkish Vertabrates and Providing Conservation Measures / Mammals - Ministry of Environment and Forestry, Project No: 90-K-1000-90, Ankara.

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- ✓ http://conventions.coe.int/Treaty/FR/Treaties/Html/104-3.htm

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Contribution to the Report	Chapter IV

TÜRKİYE CUMHURİYETİ

ANKARA ÜNİVERSİTESİ

FEN FAKÜLTESİ

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Ünvanı		Jeoloji Mühendisi

Burak Aksoy

dört yıllık öğrenimini başarıyla tamamlayarak 21.01.2001 tarihinde Lisans Diploması almaya hak kazanmıştır. Bu belge, ilgilinin başvurusu üzerine, diploması verildiğinde geri alınmak koşulu ile düzenlenmiştir.

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Tarih ve Numarası :

Prof. Dr. Cemal AYDIN
Dekan

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Contribution to the Report	All Report

ORTA DOĞU TEKNİK ÜNİVERSİTESİ

Esra Atlı

ÇEVRE MÜHENDİSLİĞİ

ÇEVRE YÜKSEK MÜHENDİSİ

YÜKSEK LİSANS

03 Eylül 2002

MIDDLE EAST TECHNICAL UNIVERSI

Esra Atlı

ENVIRONMENTAL ENGINEERING

MASTER OF SCIENCE IN
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Contribution to the Report	Chapter IV, V and Appendix C

Tarih : 29.11.1983

Diploma No
83_FBL_020

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Fen Bilimleri Enstitüsü

Bilim Doktorluğu Diploması

Biyoloji (Zooloji)

Anabilim Dalında Bilim Doktorluğu Öğretim Programını İçin Gerekli
Teorik ve Pratik Çalışmaları ve Sınavlarını Başarı ile Tamamlayan

ZAFER AYAŞ

Tamman Bütün Hak ve Yetkileri ile Bicilikte Bilim Doktorluğu Derecesini Almıştır.

Aslı Gibidir.

Rektör

Enstitü Müdürü

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Contribution to the Report	Chapter 4, Apenndix C

TÜRKİYE CUMHURİYETİ

GAZİ ÜNİVERSİTESİ
FEN BİLİMLERİ ENSTİTÜSÜ

DOKTORA DİPLOMASI

Zeki Aytaç

BİYOLOJİ

[illegible] DOKTORA PROGRAMINDA
[illegible] ÇALIŞMALARI BAŞARI İLE TAMAMLADIĞI
22 ŞUBAT 1990 TARİHİNDE

DOKTORA

DERECESİNİ
[illegible] BÜTÜN YETKİLERİ İLE BİRLİKTE
[illegible] MAYA HAK KAZANMIŞTIR

[illegible] CENGİZ [illegible]
[illegible] MÜDÜRÜ

[illegible]
REKTÖR

CURRICULUM VITAE

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Contribution to the Report	Chapter IV - V

09143

3259

T.C.

İSTANBUL ÜNİVERSİTESİ
ORMAN YÜKSEK MÜHENDİSLİĞİ
DİPLOMASI

01 NİSAN 2004

İstanbul Üniversitesi Orman Fakültesinde öğrenimini bitiren 1939 tarihinde Pazar'da doğmuş Hikmet oğlu Şiyaip Balta özel yönetmelik gereğince yapılan bütün imtihanları 31/10/92 tarihinde İyi derece ile başarmış olduğundan kanunların verdiği bütün hak ve yetkilerden faydalanmak üzere kendisine Orman Yüksek Mühendisliği diploması verildi

İstanbul Üniversitesi Rektörü

Prof Dr Nazım Terzioğlu

Orman Fakültesi Dekanı

Prof Dr İsmail Eruslan

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Office/home Adress Phone Number E-mail:	ENCON Çevre Danışmanlık Ltd. Şti. (ENCON Environmental Consultancy Co.) Mahatma Gandhi Cad. No:75/3 06700 - Gaziosmanpasa – Ankara (312) 447 71 22 (pbx) bilkay@encon.com.tr
Previous Experience	ENCON Environmental Consultancy Co. Managing Partner Middle East Technical University, Ankara, Turkey Research Assistant
Brief Background	He has experiences in more than 30 projects. Some of the most important projects which he has been working on are; • Establishment of an Environmental Impact Assessment Centre in Turkey • Efemcukuru Gold Mine Project, Efemcukuru, Izmir Environmental Impact Assessment (EIA) report • Kisladag Gold Mine Project, Kisladag, Usak Environmental Impact Assessment (EIA) Report • Environmental, Key Health and Safety Audit and also Due Diligence Study of OPET Petroleum Products Facilities. • Preconstruction Environmental Survey Works for the Works known as Pipeline and Block Valve Station Construction for Baku-Tbilisi-Ceyhan Crude Oil Pipeline Project • Artova - Sulusaray Highway Environmental Impact Assessment (EIA) Report • Kisladag Gold Mine Project, Kisladag, Usak Environmental Impact Assessment (EIA) Report • Ahiboz (Ankara) Electrical Equipment Production Facility • Adıyaman-Kahta Project, Çamgazi Irrigation Environmental assessment, Adıyaman • Bartin Project under Turkey Emergency Flood and Earthquake Recovery (TEFER) Project
Contribution to the Report	All Report

TÜRKİYE CUMHURİYETİ

ORTA DOĞU TEKNİK ÜNİVERSİTESİ

ANKARA

Okan Bilkay

FEN BİLİMLERİ
ENSTİTÜSÜ

MAKİNA MÜHENDİSLİĞİ

ENSTİTÜ ANABİLİM DALI DOKTORA PROGRAMINDA
GEREKLİ ÇALIŞMALARI BAŞARI İLE TAMAMLAYARAK

DOKTORA

DERECESİNİ TANINAN BÜTÜN YETKİLERİYLE BİRLİKTE
ALMAYA HAK KAZANMIŞTIR

07 Mart 2003

T.C. ORTA DOĞU TEKNİK ÜNİVERSİTESİ REKTÖRLÜĞÜ 1923

REPUBLIC OF TURKEY

MIDDLE EAST TECHNICAL UNIVERSITY

ANKARA

Okan Bilkay

HAVING SATISFACTORILY COMPLETED ALL REQUIREMENTS OF
THE DOCTORAL PROGRAMME IN THE DEPARTMENT OF

MECHANICAL ENGINEERING

IN THE GRADUATE SCHOOL OF
NATURAL AND APPLIED SCIENCES

HAS BEEN AWARDED THE DEGREE OF

DOCTOR OF PHILOSOPHY IN
MECHANICAL ENGINEERING

WITH ALL THE PRIVILEGES
CONNECTED THEREUNTO

March 7, 2003

CURRICULUM VITAE

Republic of Turkey Identification Number	23956272376
Name and Surname	Erdinc DURMUS
Father's Name	Osman
Birth of Place and Date	Artvin/1974
Profession	Biologist
Foreign Languages	English (intermediate), Georgian (good)
Education	Hacettepe University, Department of Biology. Ankara, Turkey Bachelor of Science Degree
Office/home Adress Phone Number E-mail:	Mahatma Gandhi Caddesi 75/3 (ENCON Environmental Consultancy Co.) Gaziosmanpasa/Ankara (312)4477122 edurmus@encon.com.tr
Previous Experience	ENCON Environmental Consultancy Co.
Brief Background	IN ENCON Environmental Consultancy Co. • Yusufeli Dam ve Hydroelectiric Power Station, Environmental Impact Assessment (EIA) Report • H-177 Packet EIA Studies, Environmental Impact Assessment Report and Project Inception Report • Akkopru Dam and HES Project, Environmental Impact Assessment (EIA) Report • Caldag Nickel Mine Project Environmental Impact Assessment (EIA) Report • Efemcukuru Gold Mine Project, Efemcukuru, Izmir Environmental Impact Assessment (EIA) Report • Preconstruction Environmental Survey Works for the Works known as Pipeline and Block Valve Station Construction for Baku-Tbilisi-Ceyhan Crude Oil Pipeline Project
Contribution to the Report	Chapter IV and V, Appendix C

Diploma No

99_321_012

Hacettepe Üniversitesi

Fen Fakültesi

Biyoloji Lisans Diplomasi

ERDINC DURMUS

Biyoloji Bölümünün Mezuniyet İçin Gerekli
4 Yıllık Teorik ve Pratik Çalışma ve Sınavlarını
18_1_1999 Tarihinde Başarıyla Tamamlamış ve Kendisine
Biyoloji Lisans Diplomasi ile Biyolog Unvanı Verilmiştir.

Rektör - Prosident

Prof. Dr. Süleyman Sağlam

Dekan - Dean

Prof. Dr. Ali Kalaycıoğlu

CURRICULUM VITAE

Republic of Turkey Identification Number	37972565374
Name and Surname	Sevim Ergün
Father's Name	Rais
Birth of Place and Date	Aydin / 1972
Profession	Geodesy Photogrammetry Engineer
Foreign Languages	German
Education	1995 / Yıldız Teknik University Geodesy Photogrammetry Engineer, Bachelor of Science Degree
Office/home Adress Phone Number E-mail:	Sehit Mustafa Bas. Cad. 21/4 Aydınlikevler / Ankara (312) 419 03 84 sevimcankaya@hotmail.com
Previous Experience	2002 – / GPS Map Construction Co. 1998 – 2002 / Aydin Cine Municipality 1998 / Aydin Municipality Cadastre Directorate 1996 – 1998 / Aydin Municipality
Brief Background	Sevim Ergun has been working several years on her own speciality. In addition to this, she has many experiences in design, application and digitalization of project. Some of her references projects are; • Bakü – Tibilisi – Ceyhan Crude Oil Pipe Line Project • Eskisehir Irrigation Project • Konya Karapinar Pastureland Application • Cine District Baseline Project • Aydin Province Baseline Project • Aydin City Informatory Project
Contribution to the Report	Chapter IV and V, Appendix B

18447

T.C.

YILDIZ TEKNİK ÜNİVERSİTESİ

21 HAZİRAN 2004

RAİF KIZI, 1972 GERMENCİK DOĞUMLU

SEVİM ÇANKAYA

1994-1995

EĞİTİM - ÖĞRETİM YILINDA

İNŞAAT FAKÜLTESİ

JEODEZİ - FOTOGRAMETRİ MÜHENDİSLİĞİ BÖLÜMÜNDEKİ

ÖĞRENİMİNİ BAŞARIYLA TAMAMLADIĞINDAN KENDİSİNE

JEODEZİ - FOTOGRAMETRİ MÜHENDİSLİĞİ DİPLOMASI

VERİLMİŞTİR

DEKAN

Prof.Dr.İ.Kutay ÖZAYDIN

Diploma Numarası

26189

REKTÖR V.

Prof.Dr.Behiç ÇAĞAL

Diploma Tarihi

14.8.1995

CURRICULUM VITAE

Republic of Turkey Identification Number	18247020962
Name and Surname	Arzu GENCER
Father's Name	Suat
Birth of Place and Date	Ankara / 1977
Profession	M.Sc. Landscape Architect
Foreign Languages	English
Education	1999-2002 / Ankara University, Department of Landscape Architecture, Ankara, Turkey Master of Science Degree 1995-1999 / Ankara University, Department of Landscape Architecture, Ankara, Turkey Bachelor of Science Degree
Office/home Adress Phone Number E-mail:	ENCON Çevre Danışmanlık Ltd. Şti. (ENCON Environmental Consultancy Co.) Mahatma Gandhi Cad. No:75/3 06700 Gaziosmanpasa – Ankara Tel : +90 (312) 447 71 22 (pbx) arzugencer@encon.com.tr
Previous Experience	2002-- ENCON Environmental Consultancy Co. Lanscape Architect 2001-2001 / Flora Urban Design Lanscape Architect 1999-2000 / Settar Yapi Co. Lanscape Architect
Brief Background	IN ENCON Environmental Consultancy Co. • Yusufeli Dam ve Hydroelectiric Power Station, Environmental Impact Assessment (EIA) Report • H-177 Packet EIA Studies, Environmental Impact Assessment Report and Project Inception Report • Akkopru Dam and HES Project, Environmental Impact Assessment (EIA) Report • Caldag Nickel Mine Project Environmental Impact Assessment (EIA) Report • Efemcukuru Gold Mine Project, Efemcukuru, Izmir Environmental Impact Assessment (EIA) Report • Preconstruction Environmental Survey Works for the Works known as Pipeline and Block Valve Station Construction for Baku-Tbilisi-Ceyhan Crude Oil Pipeline Project • Artova - Sulusaray Highway Environmental Impact Assessment (EIA) Report • Kisladag Gold Mine Project, Kisladag, Usak Environmental Impact Assessment (EIA) Report • Ceyhan-Yumurtalik State Highway Project Environmental Impact Assessment (EIA) Report • Simav - Selendi Highway Project, Kutahya, Environmental Impact Assessment (EIA) Report
Contribution to the Report	All Report

TÜRKİYE CUMHURİYETİ
Ankara Üniversitesi
Fen Bilimleri Enstitüsü

Yüksek Lisans Diploması

Arzu GENCER

Peyzaj Mimarlığı Anabilim Dalı
Yüksek Lisans Programı'nı tamamlayarak
Peyzaj Yüksek Mimarı
unvan ve yetkisi almaya hak kazanmıştır.

18.07.2002
Diploma No: 2712

Prof.Dr.Metin Olgun
Müdür

Prof.Dr.Nusret Aras
Rektör

23 MART 2004

CURRICULUM VITAE

Republic of Turkey Identification Number	11281055160
Name and Surname	Ozge OZDEMIR
Father's Name	Mehmet
Birth of Place and Date	Ankara, 1981
Profession	Environmental Engineer
Foreign Languages	English (good)
Education	2000-2004 / Anadolu Universty Department of Environmental Engineering, Eskisehir Bachelor of Science Degree in Environmental Engineering 1999-2000 / Anadolu University preparatory school, Eskisehir
Office/home Adress Phone Number E-mail:	ENCON Çevre Danışmanlık Ltd. Şti. (ENCON Environmental Consultancy Co.) Mahatma Gandhi Cad. No:75/3 06700 - Gaziosmanpaşa – Ankara (312) 447 71 22 (pbx) ozgeozdemir@encon.com.tr
Previous Experience	2004-- / ENCON Environmental Consultancy Co. Environmental Engineer
Brief Background	IN ENCON Environmental Consultancy Co; • 154 kV Yusufeli (HPS)-Tortum (HPS)-Oltu Energy Tranmission Line (EIA) Report, Artvin, Erzurum • Efemcukuru Gold Mine Project, Efemcukuru, Izmir Environmental Impact Assessment (EIA) Report.
Contribution to the Report	All Report

ANADOLU ÜNİVERSİTESİ

MÜHENDİSLİK-MİMARLIK FAKÜLTESİ

Lisans Diploması

Özge Özdemir

Mühendislik-Mimarlık Fakültesi Endüstri Mühendisliği Bölümündeki öğrenimini başarı ile tamamlayarak,

bu diploma almaya hak kazanmıştır. ASLI GİBİDİR

Prof. Dr. Hasan MUNSUZ
DEKAN

Prof. Dr. Engin ATAÇ
REKTÖR

CURRICULUM VITAE

Republic of Turkey Identification Number	12119909822
Name and Surname	Zaim Umit Ozkefeli
Father's Name	Orhan
Birth of Place and Date	Ankara / 1965
Profession	Electric-Electronic Engineer
Foreign Languages	English (fluent)
Education	1983-1989 / Middle East Tecnical University Bachelor of Science Degree in Department of Electirical -Electronics Engineering, Ankara
Office/home Adress Phone Number E-mail:	Mahmut Yaseri Street No: 8/2 Cankaya / Ankara 439 75 65 uozkefeli@superonline.com
Previous Experience	1996 / CNN Electirical-Electronics Co. General Manager 1994-1996 / Beta Group Assistant Manager 1993-1994 / Burc Electronic Sales Manager 1990-1993 / Merlin Gerin Sales Engineer
Brief Background	Umit Ozkefeli has worked in many projects about his own speciality.
Contribution to the Report	Chapter V

T.C.
ORTA DOĞU TEKNİK ÜNİVERSİTESİ

Eoin Umit Özbeyeli

MÜHENDİSLİK
FAKÜLTESİ

ELEKTRİK VE ELEKTRONİK MÜHENDİSLİĞİ BÖLÜMÜNÜN İSTENEN BÜTÜN DERS VE TASARIMLARI İLE

ELEKTRİK VE ELEKTRONİK MÜHENDİSİ

UNVANINI KAZANMIŞTIR

REPUBLIC OF TURKEY
MIDDLE EAST TECHNICAL UNIVERSITY
ANKARA

4390

Eoin Umit Özbeyeli

HAVING SATISFACTORILY COMPLETED ALL REQUIREMENTS
IN THE DEPARTMENT OF

ELECTRICAL AND ELECTRONIC ENGINEERING

IN THE FACULTY OF
ENGINEERING

IN THE SECOND SEMESTER OF THE ACADEMIC YEAR

HAS BEEN AWARDED THE DEGREE OF

BACHELOR OF SCIENCE IN
ELECTRICAL AND ELECTRONIC ENGINEERING

WITH ALL THE PRIVILEGES CONNECTED THEREIN

T.C.
ANKARA 28. NOTERLİĞİ
SURET
Aslına Uygundur
Tasdik Edilir.
ANKARA 28 NOTERİ
AYTEKİN

T.C.
ANKARA 28. NOTERLİĞİ

CURRICULUM VITAE

Republic of Turkey Identification Number	63094028428
Name and Surname	Sibel SIVRIKAYA
Father's Name	Mehmet
Birth of Place and Date	Izmir / 1980
Profession	Hydrogeology Engineer
Foreign Languages	English (fluent)
Education	Hacettepe University Ankara, Turkey Master of Science (M.Sc.) Degree in Hydrogeological Engineering. Hacettepe University Ankara, Turkey Bachelor of Science (B.Sc.) Degree in Hydrogeological Engineering, July 2003.
Office/home Adress Phone Number E-mail:	ENCON Çevre Danışmanlık Ltd. Şti. (ENCON Environmental Consultancy Co.) Mahatma Gandhi Cad. No:75/3 06700 – Gaziosmanpaşa – Ankara +90 (312) 447 71 22 (pbx) sibelsivrikaya@encon.com.tr
Previous Experience	ENCON Cevre Danismanlik Ltd. Sti., Ankara, Turkey Hydrogeology Engineer
Brief Background	IN ENCON Environmental Consultancy Co. • Yusufeli Dam ve Hydroelectiric Power Station, Environmental Impact Assessment (EIA) Report • Caldag Nickel Mine Project Environmental Impact Assessment (EIA) Report
Contribution to the Report	Appendix B

03 358 009

HACETTEPE ÜNİVERSİTESİ

MÜHENDİSLİK FAKÜLTESİ
JEOLOJİ (HİDROJEOLOJİ) MÜHENDİSLİĞİ
DİPLOMASI

SİBEL SIVRIKAYA

16.06.2003

JEOLOJİ (HİDROJEOLOJİ) MÜHENDİSLİĞİ

REKTÖR PRESIDENT

Prof. Dr.

ASLI GİBİDİR
2003

DEKAN DEAN

Prof. Dr. Selçuk GEÇİM

REPUBLIC OF TURKEY
HACETTEPE UNIVERSITY
ANKARA

FACULTY OF ENGINEERING
GEOLOGICAL (HYDROGEOLOGY)
ENGINEERING DIPLOMA

SIBEL SIVRIKAYA

HAVING SUCCESSFULLY COMPLETED
THE FOUR-YEAR
THEORETICAL AND PRACTICAL INSTRUCTION AND
EXAMINATIONS REQUIRED FOR GRADUATION FROM THE
DEPARTMENT OF GEOLOGICAL ENGINEERING
HYDROGEOLOGY OPTION ON

JUNE-16-2003

HAS BEEN AWARDED THE DEGREE OF

BACHELOR OF SCIENCE

IN

GEOLOGICAL ENGINEERING (HYDROGEOLOGY OPTION)

WITH ALL THE RIGHTS AND PRIVILEGES PERTAINING THERETO