



Project ANTEA:

**Development of Cement Production
Plant and Associated Quarrying
Activities, Albania**

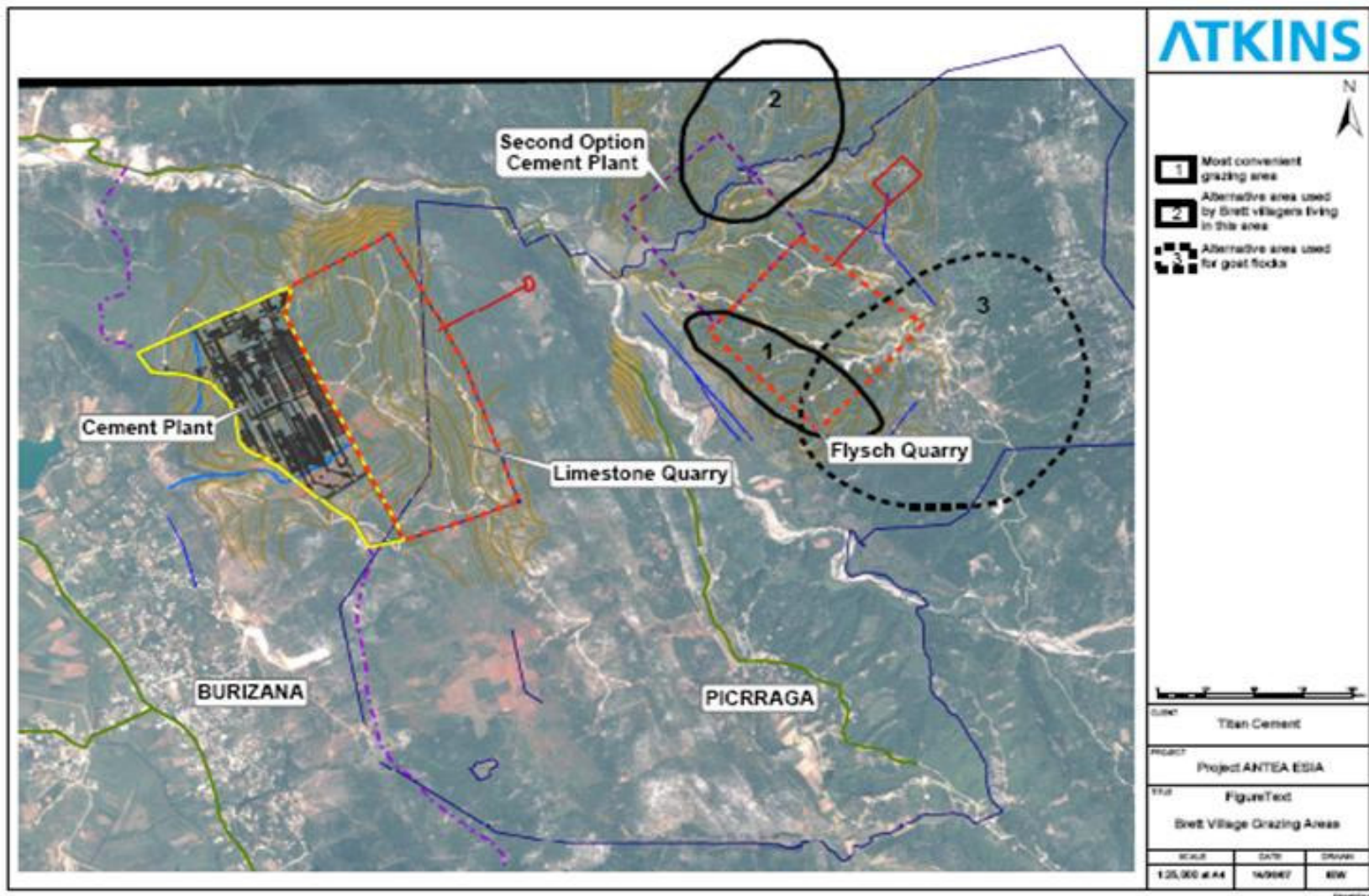
**Environmental and Social Impact
Assessment (ESIA)**

APPENDICES

APPENDIX 1: INSTALLATION LAYOUT

APPENDIX 2: SOCIO ECONOMIC ASSESSMENT APPENDICES

APPENDIX 2.1: BRETT VILLAGE GRAZING AREAS

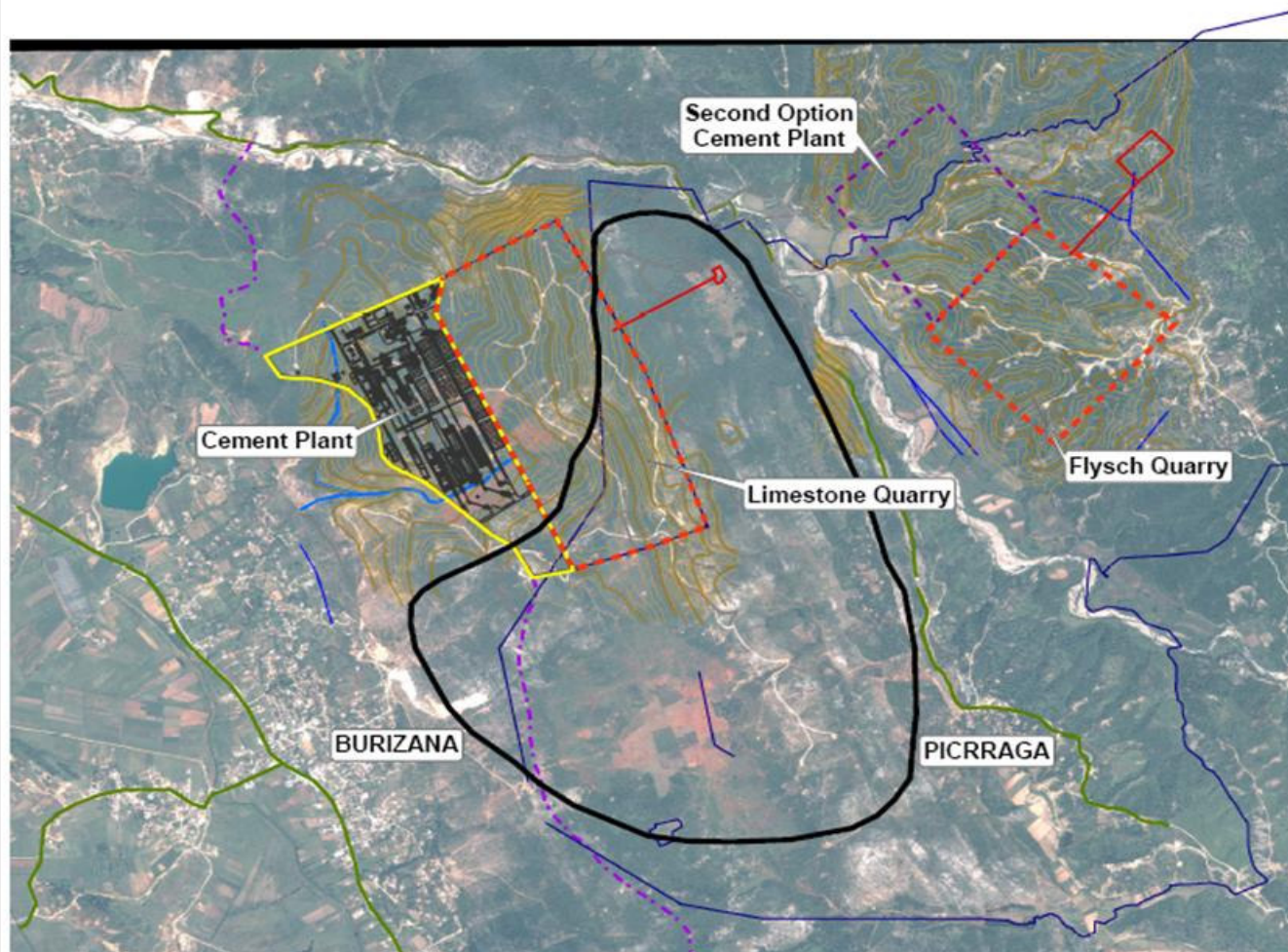


APPENDIX 2.2: PICRRAGE GRAZING AREAS

ATKINS



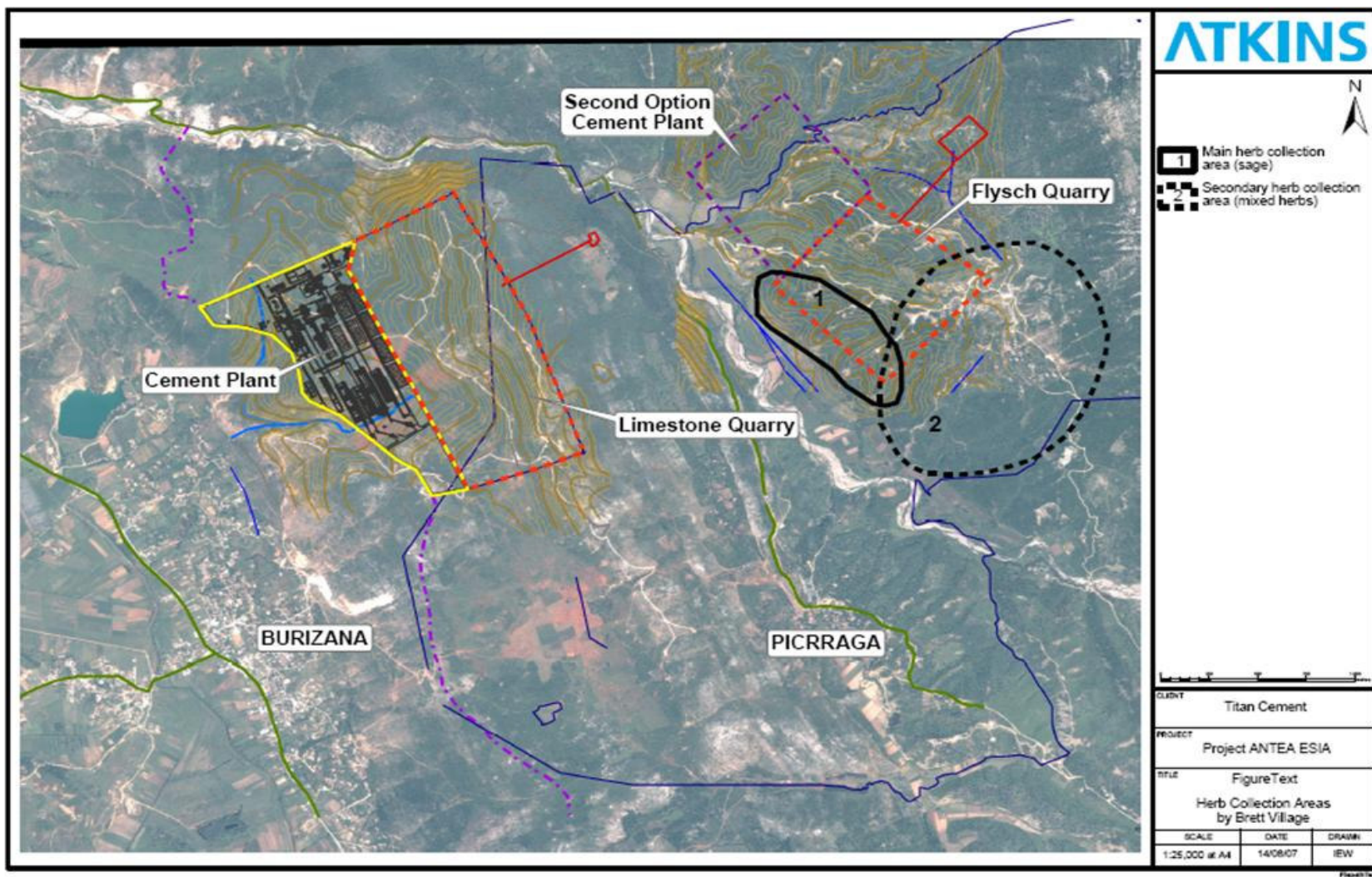
 Grazing area Piorage, used by small ruminants



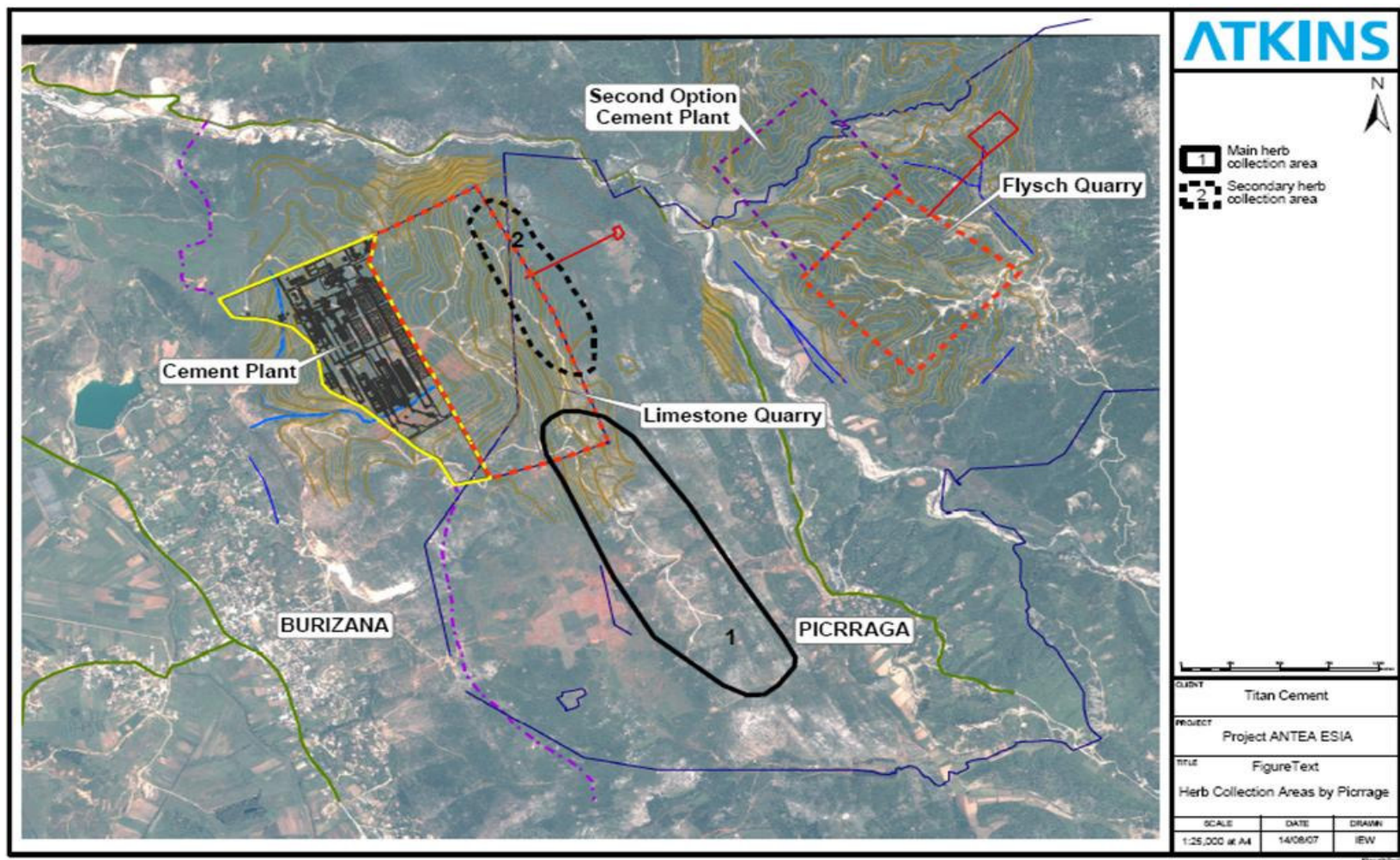
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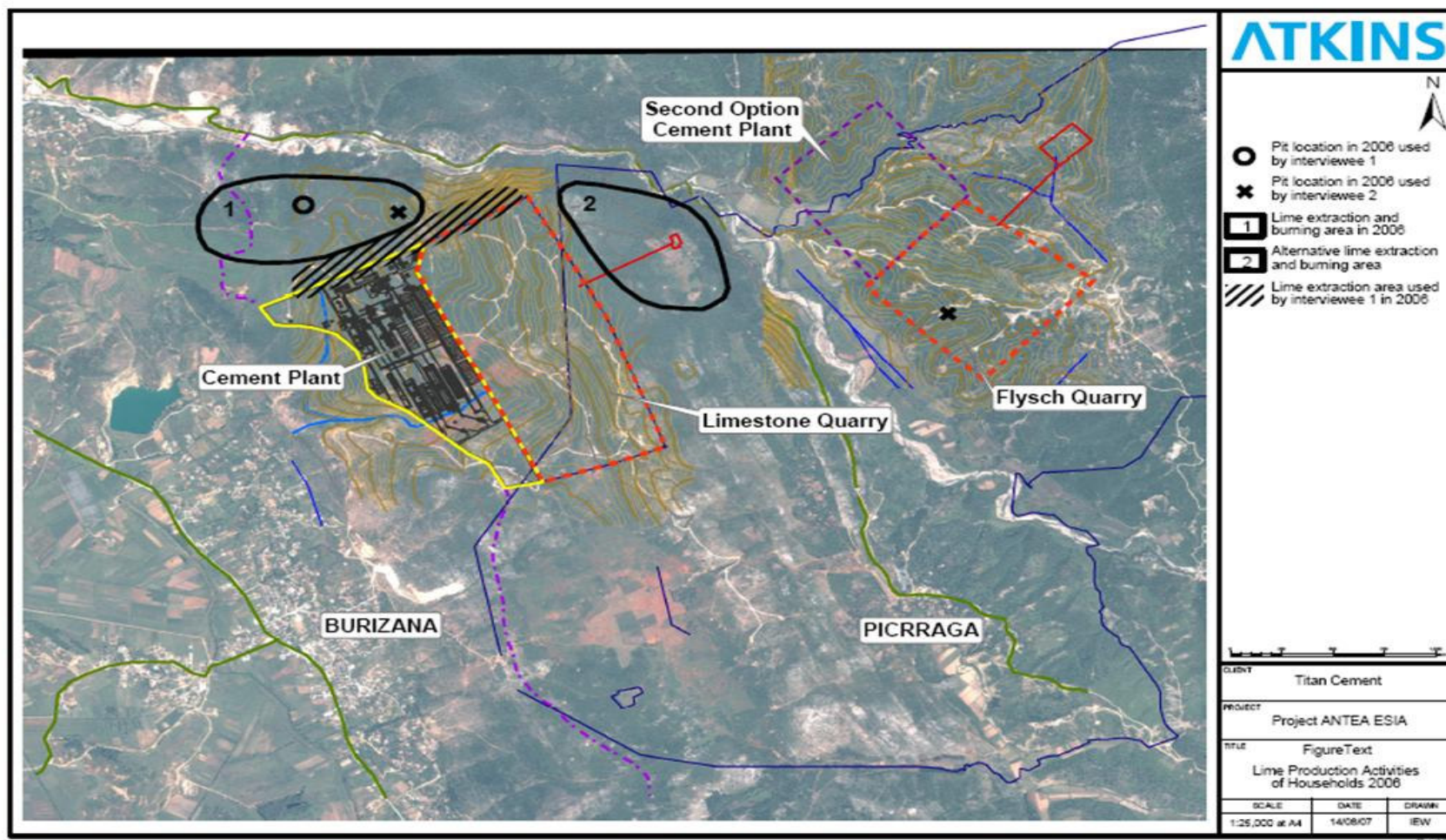
APPENDIX 2.3: BRETT VILLAGE: HERB COLLECTION AREAS



APPENDIX 2.4: PICRRAGE: HERB COLLECTION AREAS



APPENDIX 2.5: LIME PRODUCTION ACTIVITIES OF HOUSEHOLDS - 2006



APPENDIX 2.6: BASE LINE DATA COLLECTION METHOD AND STAKEHOLDER CONSULTATION

The information for the socio economic aspects of the baseline and impact assessment was collected in three stages. These were:

- Initial start up visit to the site, and meetings with officials, community representatives and preliminary identification of key stakeholders
- Consultation and investigation to collect information on infrastructure, services and livelihoods and to assess the scope of the social impacts. This stage included:
 - (i) The collection of statistics from Local Government offices,
 - (ii) Expert views from local officials and community representatives;
 - (iii) Identification of potential project affected persons related to the quarries and cement work sites;
 - (iv) Discussion with 17 residents from the four villages. These people included farmers, lime-burners and herb gatherers and discussion on project understanding and perception with other local residents (including women and young people);
 - (v) Village cross-sectional walks (Thumaya, Piccraghe);
 - (vi) Site visit to limestone quarry and cement plant site.
- ESIA consultation to confirm base line data, assess impacts and potential mitigation and compensation measures. This involved:
 - (vii) Case studies with 8 representative PAPs including vulnerable households in Piccraghe and Brret to understand and assess the scale of the potential impacts on household income and activities and to identify and understand preferred mitigation and compensation measures. One person in Thumaya was interviewed in relation to the route of the new road and effect on household income;
 - (viii) Discussion with local authority officials (Commune Chairman, Municipal Mayor, Director of District Health Services, community representatives) to identify and clarify processes and preferences for mitigation and compensation measures in relation to the construction camp, new road, and livelihood impacts of the project;
 - (ix) Discussion with Antea and Titan representatives on plans for quarry and plant employment, future community engagement and

consultation, impact assessment and mitigation measures for affected livelihoods and compensation for those losing land and property.

The consultation and case study work was undertaken using both individual interviews, to obtain detailed responses, and small meetings. Different approaches to verify information were undertaken depending on the circumstances of the interviews. The interviews were for the most part undertaken with and collaborated by other family members and interested parties (part of a kinship group and / or herb gathering group). These people, men and women of different age and family status, provided a range of views. Where budgetary information on lime burning was requested, information was verified through independent interviews and checked against earlier information. Group activities such as herb gathering attracted other household members and herb gatherers who formed part of the same gathering group. A list of interviews undertaken at each of the stages is provided in Appendix 6.

Summary check list of questions used for scoping and the forms used for income assessment and check list of questions used for activity analysis and other discussions on mitigation measures and compensation processes are available on request.

APPENDIX 2.7: LIME BURNING ACTIVITIES

This Appendix describes the general nature of lime burning activities and goes onto to provide a case study illustrating labour use by activity and costs and returns to the activity.

Lime production as undertaken by interviewees who in 2006 had pits near to the project site, consists of 6 main activities. These are extraction or quarrying, wood (or bush) cutting, constructing/repairing and loading the pit, watching and feeding the pit as it burns, unloading the lime from the pit and marketing it.

The size, number of pits and the number of times each pit is used in a year, varies from household to household. Interviewees reported that their pits would take 60-80m³ / load. Table 10.1 provides information on the use of hired and domestic labour used in producing and burning a single load of lime.

Table 1 Labour use in lime production

Labour Activity	No. Family Labour	No. Hired Labour	No. days / person	Total days	Labour cost ALL	Labour cost €
Extraction	3	-	5.0	15	-	-
Wood cutting	3	1	7.5	30	7,500	61
Loading pit	3	-	10.0	30	-	-
Burning /cooling	3	3	6.0	36	18,000	146
Unloading pit	3	1	1.5	6	1,500	12
Total			30.0	117.0	27,000	220

Note: Hired labour works an 8 hour day, family labour generally works a 12 or 13 hour day.

Source: Consultant, based on interview data

In this case study the producer /head of household and his sons worked as a single economic unit producing lime from three pits, 9 loads in total. Table 10.2 provides an estimate of the return or margin per load/ household after payment of input costs. This provides a return of €2900 - €3450 / male family member depending on whether taxes are or not paid. This income was earned over a 7 month period between January and September. However the daily rate when estimated is equivalent to € 7-8 /day based on an 8 hour day.

Table 2 Budget for lime production

	Price ALL	Quantity	Total ALL	Total Euro
Revenue / load				
Lime /kg*	8	24,000	192,000	1,561
Costs / load				
Labour /day	1,000	27	27,000	220
Transport cost /kg	1	24,000	24,000	195
Tax /load of wood	10,000	1	10,000	81
Tax on extraction/load	10,000	1	10,000	81
Total money cost excl tax			51,000	415
Net revenue excl. tax			141,000	1,146
Income /family member			47,000	382
Family days		90	1,567	13
Family 8hr day		135	1,044	8
Total money cost incl. tax			71,000	577
Net revenue incl. tax			121,000	984
Income /family member			40,333	328
Family days			1,344	11
Family 8hr day			896	7
Return on 9 loads excl. tax			1,269,000	10,317
Return on 9 loads incl. tax			1,089,000	8,854

Source: Consultant, based on interview data

The case study household is one of 4 such family units¹ working close to the project site. This case study reported extracting some of the limestone used from the border area of the project site area. The borders of the site area are not clearly defined or known by residents.

Other lime burners interviewed said that they were not using the project site area for lime extraction in 2006. All lime workers interviewed on this and previous visits explained that lime pits were constructed near to the source of fuel, and preferably by the source of lime. However the source of fuel and access to the road were the main determinants for the location of the pit. Provided the pit is by the road limestone can be obtained from areas with road access. Fuel is the limiting factor. The lime burners nearest the project site had practices that differed from those along the main Burizana / Kruja road. Those on the main road have no nearby wood and are obliged to purchase fuel (logs and planks) rather than cutting brush wood. Wood is a limiting factor.

The other problem increasingly faced by lime burners near the project site is remoteness from the market. In years prior to 2006, buyers came to buy and collect their lime. In 2006 in order to market the product in a timely manner, the producers in

¹ The head of the four family units are brothers

this area had to hire transport (a cost of approximately ALL 1 /kg of lime) to take the product to the main market areas.

In 2007, none of the interviewees from this area reported producing lime. This was due to a variety of factors including: availability of temporary employment with Antea during winter and spring and family member absence undertaking migrant working in Greece.

APPENDX 2.8: SMALL RUMINANT PRODUCTION

Interviews were undertaken with two households one with a herd of 80 goats (Picrrage) and the other with a smaller flock of 40 sheep (Brret). They were asked to indicate the areas that their animals grazed. This is shown on location maps in Appendices 2.1 and 2.2.

Based on discussion of the area and its landmarks It was estimated that an area between 15%-25% between

Information gained from the goat herd indicates that from a herd of 80 goats composed of:

Table.1 – Example of goat herd structure

	<1yr	1-2 yr	Adult
Male	17	0	1
Female	18	8	40
Total	35	8	41
Sales (consumption)	15 (8)	0	0
Birth rate (twinning rate)	-	-	75% (20%)
Mortality Rate	10%	Na	na

Source: Case study interview

Two cases are examined affecting productivity the case where it is assumed that a reduction of 25% of grazing area will reduce Metabolisable Energy (ME) intakes of existing flocks by an equivalent amount.

Case 1: Assume a 40 kg female yielding half a kg milk per day. Maintenance requirements are 6.75 MJ ME and milk production requires 3.74 MJ per day. Total requirements are 10.48 MJ ME. Reducing ME intake by 25% = 7.86 MJ ME. Maintenance must remain the same (this takes priority over milk). Therefore $7.86 - 6.74 = 1.12$ MJ ME which is sufficient for 0.15 Kg milk, this is equivalent to a 70% reduction in milk yield. Other effects of reduced nutrition on birth rates, growth rates and weights, and on health could also be expected but are not identified.

Case 2: If is assumed there is a 15% reduction in land and on nutrition the same process results in ME available for milk production on 2.2 ME, resulting in a yield of 0.3kg/ female and a reduction of 42% in milk yield. Again other impacts on birth rates, growth rates and weights, and on health could also be expected but are not identified.

Dairy production and products account for 30-50% of the income generated by the herd. Hence the impact of a 25% reduction in area and nutrition would be between 21-35% of income, and a 15% reduction in area and nutrition would be between 12-21% of income.

Based on similar scenarios the effect on growth of kids can also be estimated.

These estimates are subject to the assumption that the current grazing areas is fully stocked i.e. it is not being under grazed.

APPENDIX 2.9: DETAILS OF OFFICE OF REGISTRATION OF IMMOVIABLE PROPERTIES

**REPUBLIC OF ALBANIA
OFFICE OF REGISTRATION OF IMMOVABLE PROPERTIES
LOCAL OFFICE OF REGISTRATION OF IMMOVABLE PROPERTIES KRUJE
Tel: 0511 42 33**

No. 312 Prot.

Kruje on 30/05/2007

Ref. Response to Inquiry

TITAN/ ANTEA CEMENT Sh.A.

In response to your inquiry for the juridical status of the property No. 84. ZK. No. 3857 Picrrage Village, Municipality of Kruja.

The procedure of initial registration has been completed in year 2000.

According to the law on parcels, the property 84 is qualified as Type: "Fruit trees area of 171977 m², Owner: "Co ownership".

The table no.1 "Owners list" HAS THE NOTE "These land owners have refused this parcel because this is a degraded land.

(attached the List).

.....

The Registrar

Fatmir SHANI

Documents attached:

1. Extract from the BOOK OF PARCELS (Property 84 reproduced below refers to the land discussed in the above text.)
2. Table No. 1 relates 93 names to property No. 84 - the note at the right corner of the table: "*These owners have refused this parcel because it is degraded*"

District of KRUJA

Commune of KRUJA

Village PICRRAGE

Cadastral Zone 3957

BOOK OF PARCELS

No. of property	Type of property	Area in m2	Area divided	Name, Fathers Name, Surname Owner or Utilizer	In utilization	Part in %	Class of land	No. of property act	No. of. Property Document	Map Index	Notes Special description
.....											
84	Tree fruits	171977		Co- ownership						K-34- 88- (89C)	See Tab. 1

Only the relevant plot is included

Copy of names attached to list of book of parcels referring to plot 84

Figure 1 - Copy of names attached to list of book of parcels referring to plot 84

Tabela No 4 (Parcelas No 84)			
1	Agnes Klapen Soma	33	Agnes Auf Mita
2	Agnes Klapen Soma	34	Agnes Auf Mita
3	Agnes Klapen Soma	35	Agnes Auf Mita
4	Agnes Klapen Soma	36	Agnes Auf Mita
5	Agnes Klapen Soma	37	Agnes Auf Mita
6	Agnes Klapen Soma	38	Agnes Auf Mita
7	Agnes Klapen Soma	39	Agnes Auf Mita
8	Agnes Klapen Soma	40	Agnes Auf Mita
9	Agnes Klapen Soma	41	Agnes Auf Mita
10	Agnes Klapen Soma	42	Agnes Auf Mita
11	Agnes Klapen Soma	43	Agnes Auf Mita
12	Agnes Klapen Soma	44	Agnes Auf Mita
13	Agnes Klapen Soma	45	Agnes Auf Mita
14	Agnes Klapen Soma	46	Agnes Auf Mita
15	Agnes Klapen Soma	47	Agnes Auf Mita
16	Agnes Klapen Soma	48	Agnes Auf Mita
17	Agnes Klapen Soma	49	Agnes Auf Mita
18	Agnes Klapen Soma	50	Agnes Auf Mita
19	Agnes Klapen Soma	51	Agnes Auf Mita
20	Agnes Klapen Soma	52	Agnes Auf Mita
21	Agnes Klapen Soma	53	Agnes Auf Mita
22	Agnes Klapen Soma	54	Agnes Auf Mita
23	Agnes Klapen Soma	55	Agnes Auf Mita
24	Agnes Klapen Soma	56	Agnes Auf Mita
25	Agnes Klapen Soma	57	Agnes Auf Mita
26	Agnes Klapen Soma	58	Agnes Auf Mita
27	Agnes Klapen Soma	59	Agnes Auf Mita
28	Agnes Klapen Soma	60	Agnes Auf Mita
29	Agnes Klapen Soma	61	Agnes Auf Mita
30	Agnes Klapen Soma	62	Agnes Auf Mita
31	Agnes Klapen Soma	63	Agnes Auf Mita
32	Agnes Klapen Soma	64	Agnes Auf Mita
33	Agnes Klapen Soma	65	Agnes Auf Mita
34	Agnes Klapen Soma	66	Agnes Auf Mita
35	Agnes Klapen Soma	67	Agnes Auf Mita
36	Agnes Klapen Soma	68	Agnes Auf Mita
37	Agnes Klapen Soma	69	Agnes Auf Mita
38	Agnes Klapen Soma	70	Agnes Auf Mita
39	Agnes Klapen Soma	71	Agnes Auf Mita
40	Agnes Klapen Soma	72	Agnes Auf Mita
41	Agnes Klapen Soma	73	Agnes Auf Mita
42	Agnes Klapen Soma	74	Agnes Auf Mita
43	Agnes Klapen Soma	75	Agnes Auf Mita
44	Agnes Klapen Soma	76	Agnes Auf Mita
45	Agnes Klapen Soma	77	Agnes Auf Mita
46	Agnes Klapen Soma	78	Agnes Auf Mita
47	Agnes Klapen Soma	79	Agnes Auf Mita
48	Agnes Klapen Soma	80	Agnes Auf Mita
49	Agnes Klapen Soma	81	Agnes Auf Mita
50	Agnes Klapen Soma	82	Agnes Auf Mita
51	Agnes Klapen Soma	83	Agnes Auf Mita
52	Agnes Klapen Soma	84	Agnes Auf Mita
53	Agnes Klapen Soma	85	Agnes Auf Mita
54	Agnes Klapen Soma	86	Agnes Auf Mita
55	Agnes Klapen Soma	87	Agnes Auf Mita
56	Agnes Klapen Soma	88	Agnes Auf Mita
57	Agnes Klapen Soma	89	Agnes Auf Mita
58	Agnes Klapen Soma	90	Agnes Auf Mita
59	Agnes Klapen Soma	91	Agnes Auf Mita
60	Agnes Klapen Soma	92	Agnes Auf Mita
61	Agnes Klapen Soma	93	Agnes Auf Mita
62	Agnes Klapen Soma	94	Agnes Auf Mita
63	Agnes Klapen Soma	95	Agnes Auf Mita
64	Agnes Klapen Soma	96	Agnes Auf Mita
65	Agnes Klapen Soma	97	Agnes Auf Mita
66	Agnes Klapen Soma	98	Agnes Auf Mita
67	Agnes Klapen Soma	99	Agnes Auf Mita
68	Agnes Klapen Soma	100	Agnes Auf Mita

APPENDIX 2.10: INFORMATION ON REFUSED LANDS

This Appendix provides information from World Bank, (2006) Status of Land Reform and Real Property Markets in Albania, Appendix 8. Agricultural, Forest and Pasture Land Holding, page 72.

Refused agricultural lands

A separate sub-category of agricultural lands are the fields, which families have refused to take in private ownership during the initial division of collective and state farm lands. Generally, these lands encompass mountain fields, remote from villages, and poor quality, terraced hillsides, which have been degraded by erosion. These lands remain under state ownership with control exercised by the General Directorate of Forests and Pastures of the Ministry of Agriculture and Food.¹⁵ Communal administrations have taken control of these lands by right of use.¹⁶ In the process of inventory and transfer of state lands, the communes will take ownership of these lands, with power to transfer them into private ownership or into subordinate rights of use by citizens. The refused lands may also be available for transfer in restitution or as alternative land grants to fulfil restitution claims.

In order for decisions to be made on the status of refused lands, it is necessary to inventory and assess their quality, value and suitability for use. The law prohibits any sale or lease of these lands prior to the determination of restitution claims, for which some of this land may provide alternative land grants to satisfy restitution claims.¹⁷

After determination of the restitution claims, these lands will become available for redistribution or sale to rural families. Since the quality of most of these lands is poor, however, it is unclear whether rural families will want to take ownership and control unless changes are made in the status of these lands. It may be necessary to re-categorize some of these lands from agricultural to pasture or forest, or to categories of land for housing or other development. If they remain in agricultural designation, it may be necessary to exempt the land from taxation, reflecting its low productivity.

¹⁵ Law no. 8047 of 14 December 1995, *On Refused Agricultural Lands*.

¹⁶ Law no. 8312 of 26 March 1998, *On Undistributed Agricultural Land*.

¹⁷ Law no. 8047, Article 4.

APPENDIX 2.11: LAND PURCHASE ACQUISITIONS FOR THE NEW ROAD

Table 1 - Land purchases and acquisition for the new road.

TABLE OF EXPROPRIATIONS FOR THE ROAD THAT CONNECTS THE NEW CEMENT PLANT WITH THE TIRANA-SHKODRA HIGHWAY

No. of Cadastral Zone	No. of Cadastral Parcel	Name of the Owner	Length of Road (ml)	Surface for Expropriation (m ²)
K-34-88-(86-B)	72/6	Commune of Thumana	80.00	400
	72/7	Commune of Thumana	145.00	725
	72/1	Commune of Thumana	86.00	430
	34/8	Commune of Thumana	275.45	1,377.26
	37/1/1	Aleksander Mitrushi (private)	28.77	345.28
	37/11/1	Ali Elezi (private)	33.92	407.03
	37/2/1	Kole Mitrushi (private)	31.34	376.02
	37/3/1	Leke Mitrushi (private)	40.34	484.11
	37/8/1	Beram Lika (private)	35.89	430.68
	44/3/1	Prone Komunale (private)	161.42	1,937.06
	41/1	Haxhi Elezi (private)	19.12	229.49
	41/3	Zenel Elezi (private)	33.63	403.61
	41/7	Petrit Koci (private)	17.39	208.63
	pa numur	Commune of Thumana	103.62	1,243.42
	41/5	Commune of Thumana	32.20	386.44
	41/6	Commune of Thumana	64.08	768.94
	41/8	Commune of Thumana	31.54	378.42
	41/9	Commune of Thumana	249.90	2,998.85
K-34-88-(87-A)	41/9	Commune of Thumana	259.00	3,108.00
	447	Commune of Thumana	371.76	3,717.60
	448	Commune of Thumana	83.43	834.30
	449	Commune of Thumana	45.82	458.20
	450	Commune of Thumana	227.84	2,278.40
	453	Commune of Thumana	90.69	906.90
	475/1	Commune of Thumana	80.15	801.50
	454	Commune of Thumana	172.54	1,725.40
K-34-88-(87-B)	454	Commune of Thumana	232.15	2,321.50
	478/5	Commune of Thumana	13.15	131.50
	478/4	Commune of Thumana	22.36	223.60
	478/3	Commune of Thumana	50.60	506.00
	478/2	Commune of Thumana	22.22	222.20

	478/1	Commune of Thumana	18.21	182.10
	479	Commune of Thumana	252.50	2,525.00
	191/0	Commune of Thumana	205.85	2,470
K-34-88-(87-D)	191/0	Commune of Thumana	824.52	9,894.24
K-34-88-(88-C)	191/0	Commune of Thumana	243.58	2,923.00
Total			4,686	48,760

Note: This information is provisional pending the confirmation of the final road route and design. Nine private households will be directly affected by the land acquisition.

APPENDIX 2.12: STAKEHOLDER LIST

Table 1 - Summary Analysis of Stakeholder

Organisation/ representative	Contact	Interest /concerns
User Local herb gathers Local graziers Local lime smelters Local quarrying	via village head via village head via village head via village head	implications for herb collection Implications for grazing Potential access to limestone and smelt site Potential access to limestone prevented - greater distances to travel
Residents Local households - Brret & Picrrage Local households - Burizana & Thumaya	via village head via village head	employment, dust, noise, smoke, visual aspects traffic - lorry speed / safety, noise, fumes, employment, visual aspects, land and property expropriation and compensation
Regulator Regional dept. environment (Durres) Ministry for labour Ministry of Health (and dept. Occupational health & safety) Ministry of Economic Affairs and Ministry of Economic Development Ministry Environment	via Antea Cement +355 4 251008 Bulevardi "Bajram Curri" nr. 1 Tirane, Tel +355 43 62937 Tirana Tel. +355 42 301 33 Mr Ali Klodian, T. 355 682 081 348	EIA requirements and EIA content Provision of information on employment requirements Occupational health and safety requirements - provision of national guidelines, possible specialist consultee by Environment Ministry Potential revenue from exports and increased sea traffic EIA specification, guidance, EIA content - impacts and mitigation
Research / NGO University, Faculty of Natural Sciences, Botanical Garden, Tirana Tirana University, Faculty of Natural Sciences, Department of Biology, Section of Zoology-Ecology, Tirana University - mining / geology University - civil engineering	Prof. Kozma BUZO, +355.4.225287 Prof. Nikolla PEJA, 355.4.232083, +355.4.232120. Polytechnic University of Tirana, Tel: +355 42 279 14/96 Faculty of Civil Engineering. Tirana, Tel: 00355 4	Technical comments and possible future jobs/consultation for students and staff, leads in field studies Teaching institution - may provide comments and may be interested in possible future jobs/consultation for students and staff re monitoring etc.. Technical comments and possible future jobs/consultation for students and staff Technical comments and possible future jobs/consultation for students and staff

	224970.	
Kruja Ecology Club Association of Biologists, Universiteti i Tiranes, Fakulteti i Shkencave Natyrore	Muharremi Goci T. 0682 554 422 Ilia Mekerezi, Board Member, T. (355-4) 225-454, imikerezi@yahoo.com	Local awareness, nature protection Technical comments and possible future jobs/consultation for students and staff
Local Government and Village representatives Mayor - City Hall Kruja Chairman - Thumaya Commune Director Health Services, Kruja District Dures Municipal council Dures Port Authority	Ismail Dani Tel. 355 511 2170 via Antea Cement via Antea Cement	Main interests in potential employment direct & indirect, and local business tax Interest in new road and benefits to local economy and land requirements in relation to commune and residents Health of temporary work force, additional demands on services, potential for health impacts on local residents. Health and working conditions. Traffic and congestion Logistics and service requirements for port operations, and revenue and jobs from increased sea freight trade
Brrer Village - village representative Burizana Village - village representative Picrrage Village - village representative	z Suleyman Jrodna z Tomoin Sama	Main interests in potential employment direct & indirect and if there are implications for improved village funds from municipal council Main interests in potential employment direct & indirect, possible impacts from traffic, roads and transport logistics and to have information on any other potential impacts (noise, dust etc) Main interests in potential employment direct & indirect and if there are implications for improved village funds from municipal council
Local business - Burizana	via Community Representative	increased business - catering / food shops
Limestone quarry - Burizana Local business - Thumaya	 via Chairman and Community Representative	sales of limestone for works construction / road changes (improvement /congestion) increased business - catering / food shops
Employees and Employee Organisations Trade Union Federation of Industrial Workers of Albania	Kol Nikollaj, , +355 43 74 717 / 355 42 565 29, fspish@yahoo.com	Potential future jobs, contractual conditions and scale of requirements by Titan

INDEPENDENT TRADE UNION OF MINES AND METALLURGY OF ALBANIA - ITUMM	Asllan Mishku, Bulevardi Deshmoret e Kombit, P.O. Box 2991, Tirana	Potential future jobs, contractual conditions and scale of requirements by Titan
Foreign Workers - work camp	n/a	Working and living conditions, terms of employment and pay

APPENDIX 2.13: STAKEHOLDERS INTERVIEWED DURING SCOPING AND ESIA INVESTIGATION

Table.1 People consulted during the scoping visit 28/05/07 - 4/06/07

Name /Description of persons	Position
Lulzim Guni	Mayor of Kruja municipality
Ismail Dani	Former mayor of Kruja municipality
Ylli Lamaj	Former mayor of Kruja municipality
Gezim Keqi	Chairman of Thumaya Commune
Natasha Cela	Director of primary health care, Kruja municipality
Mimoza Bushi	Director of primary health care, Thumaya Commune
Hysni Lama	Community leader, Burizana village
Ramazan Mana	Community leader, Thumaya village
Tomorr Sana	Community leader, Picrrage village
Sulejman Kulla	Community leader, Brret village
Lutfi Zalla	Director of Forests and Environment, Kruja district
Muharrem Goci	Ecologist Club of Kruja
Sabri Karaj	Director of Agriculture and Food, Kruja district
Resident of Thumaya	Villager of Thumaya, trader with land near the road to be constructed by ANTEA cement
Residents of Picrrage *	Picrrage: 6 residents including 3 young people (i.e <18 years) and 2 women (herb gatherers), 1 man (farmer and lime burner)
Residents of Brett *	Brett: 2 women and 1 man (farmer and lime burner,)
Residents of Burizana*	Burizana: 3 women and 4 men.
Teuta Dobi	ANTEA cement Sh.A

* names with held.

Table 2 – Summary of consultation with PAPs and other stakeholders during ESIA study

Date	Representatives met	Meeting purpose and key comments	Summary of actions and/or key outcomes
17/07/2007	2 lime burners* (Picrrage) with current/ previous activities in the project site area	Lime burner interviews with lime burners who historically have been 2 or 4 households to use the project area. Identification on household activities, income and lime burning economic budget estimation, current and previous use of the proposed project area.	Proposed site for works is no longer used. It is too far from the road and the more accessible wood sources. Lime activities undertaken last in 2006. household 1, may have extracted some lime from borders of project area in 2006. Verification by Titan with boundary walk would clarify.
	2 herb gatherers*, individual interviews with commentary from and collaboration from 2 other herb gatherers	Interviews with 2 herb collectors to identify areas of collection, quantities collected main sources of income and household activity, impacts of project on the herb activity and ideas for compensation or other income sources.	2 herb areas identified. The secondary herb area borders /enters project area and may reduce gathering potential. No identification of alternative cash income except from a job from Antea. They prefer that a man or child is given the job. All households gave this as their preferred option.
	Grazier* Picrrage with small herd of goats	Identification of main grazing areas used by his and other large flocks in village. Identification of income from flock (livestock sales and dairy products) and scope and desire to increase flocks size, and/or level of production. Discussion on scope for potential supply to the work camp, attitude to joining with others to market larger quantities, impacts on normal sales and customers.	Grazing area covers a small part of the proposed project site - to be estimated from map. Interest in increasing herd size is tempered by need to employ more labour, and sons interest in working the flock and possibility of alternative work.
	Community Representative, Picrrage	Verification of main herb gatherers, graziers and lime producers and vulnerable households who might be affected by the project. Discussion on knowledge of work camp.	As well as being community representative, the interviewee was the village agent for the herb wholesaler last year. Knowledge of work camp is limited at the time of the visit. This could be because details are still being worked out by Titan and the contractor.

18/07/2007	Lulzim Guni, Mayor of Kruja	Clarification of land issue raised by Brett villagers at various meetings in 2006 and 1/2007. Discussion on work camp, potential community problems and issues, means of resolution and level of knowledge of camp and potential opportunities to supply camp.	No problems identified, and did not feel experience in Fusche Kruja provided any reasons for concern. Benefits from the project identified in terms of improved road infrastructure, and 24 hour electric power and jobs to local people. Content that any project impacts relating to lorry transport and pollution would be mitigated. Re land issue this is being resolved by the Check level Commission for Territorial Regulation in Durres. He and the vice mayor are members of this but have no information to clarify the issue or to provide background information.
	Adrian Matta, Head of Public Primary health Care for Kruja district	Discussion on health issues related to quarrying and cement works, and on health issues and required provision of services related to the work camp.	Records in the area are poor and unreliable in terms of disease incidence and problems (including STD). No evidence of health issues from Fusche Kruja camp. Most mundane incidents treated at the camp, only larger emergencies arrived at the hospital. Potential for STD's recognised in larger centres, unlikely to be an issue in smaller area. Very keen to offer staff for preventative services of awareness campaigns, provided Antea can provide key inputs/materials required. Any awareness work should be undertaken by local existing health network. Training can be given to staff as train trainers through specialist institution in Kruje. Work camp should have own medical staff at least to diagnose problem and specialist help needed and maintain records.
	Gezim Keqi, Chairman Village of Thumaya	Discussion on new road, affected population, and benefits and disadvantages for population of Thumaya	Final road route not confirmed. A list of possible PAPs supplied but those actually affected will depend on final road location. Better infrastructure and increased traffic should improve commercial opportunities.
	Lavdrim Lusha, Thumaya Health Centre	To understand facilities and capacity of local health centre	
	Hysni Lama Community representative Burizana	Benefits and disadvantages of new road and work camp and implications for local population	Limited information received to date and no particular views.

	Thumaya, resident potentially affected by new road	To understand discussion to date with potential PAPs, to understand stakeholder view of road and potential impacts and means by which settlements are being derived	Process of discussions outlined. Road may cut land into two parts. For the interviewee this is an opportunity rather than hindrance as expects road to provide good commercial opportunities and land values to rise. Local example of national road (1 km distance) and price changes 2001 to date provided
	Community representative Thumaya	Site visit of road and cemetery and discussion of local perception & interests on road	
19/07/2007	Herb gatherer*, Picrrage Contributions from other (male) family members.	Confirm understanding on impacts on herb gatherers, understand preferences for compensation if appropriate and potential issues relating to employment for women	Employment is preferred compensation measure - however, preferences for jobs for young people and men rather than for older people or women. Some women may be interested to work in the factory but this depends on husband, safe access, convenient hours, and family and child care responsibilities.
	Herb gatherer*, and husband and daughter, Brett village	Identify location of main herb collection areas and any impacts from the flysch quarry. Discuss mitigation measures.	Sage herb main herb collected and is found in quarry area. Other herbs in a radius around village. Other sources of sage require longer time to walk and will depend on other villages agreeing to collection on their village lands. Compensation through employment in the new works would be acceptable. the daughter felt strongly that training programmes for young people to improve their opportunities were needed - however not necessarily due to the cement works. handicrafts are already undertaken by some in the village. The relative financial benefits of the

* names with held.

Appendix 2.14: Households Income Study

Table 1: Summary result of income study of households undertaking activities on land which will be used for cement works and quarries

H/H ref.	Village	H/H size (adult)	Children	Herbs	Lime	Large Flock	Permanent job	Temporary job	Migration (No. s)	Garden /orchard	Small stock /cow	Other	total	Incl garden
1	Picrrage	7	4	-	900,000	-	-	200,000	1	x	x		1,100,000	1,300,000
2	Picrrage	4	0	550,000	400,000	-	-	73,800		x	x		1,023,800	1,223,800
3	Picrrage	3	0	450,000	-	-	-	-	-	-	x		450,000	450,000
4	Picrrage	5	0	10,000	-	-	120,000	-	1	x	x		130,000	330,000
5	Picrrage	6	3	100,000	-	500,000	-	-		x	x		600,000	800,000
6	Thumaya	5	0	-	-	-	-	-		x	x	600,000	600,000	1,160,000
7	Picrrage	5	2	350,000	-	-	-	-	2 sons*	x	x		350,000	550,000
8	Brret	4	1	600,000	-	-	-	450,000	1	x	250,000	105,000	1,405,000	1,605,000
9	Brret	5	0	250,000	-	250,000	-	-	1	x	x		500,000	800,000

All households have a garden except household 3, and all have small stock and one or more cows. In hill areas gardens / agriculture is estimated to provide production to the value of ALL 200,000 /year.

CONFIDENTIAL APPENDIX

List of project affected people

Piccrage

Herb gatherers

- Vulnerable herb gathers
 - Rabie Shkenilai
 - Gjyste Sang
 - Lima Matie
 - Shegere Sang
 - Shkute Sang
 - Xhenile Sang

- Other herb gathers collecting more than ALL 100,000
 - Behile Sang

Others to be identified by Wholesaler records

- Graziers pasturing in the affected area
 - Sefer Hidri
 - Lik Caraci
 - Hyser Hidri (Selnom)
 - Vath Myrta

- Lime producers - confirmation required of quarrying activity in 2006 for the 3 Danji Brother households. Quarrying and production activities of Mr Petrit Danji established as being outside of project area, quarry activities of Mr Hasan Danji need clarification as identified as being inside or close to the border of the project area. Activities of the other two brothers still require confirmation.

Brret

- Herb gathers
 - Naze Kulla
 - Zoje Kulla

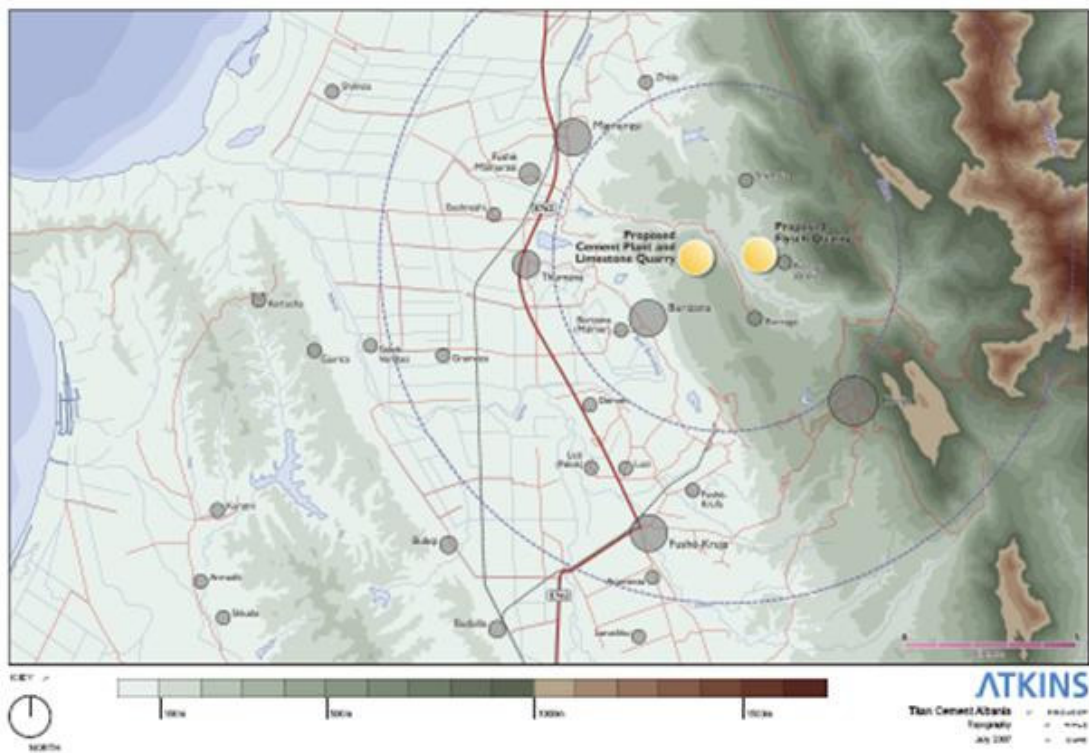
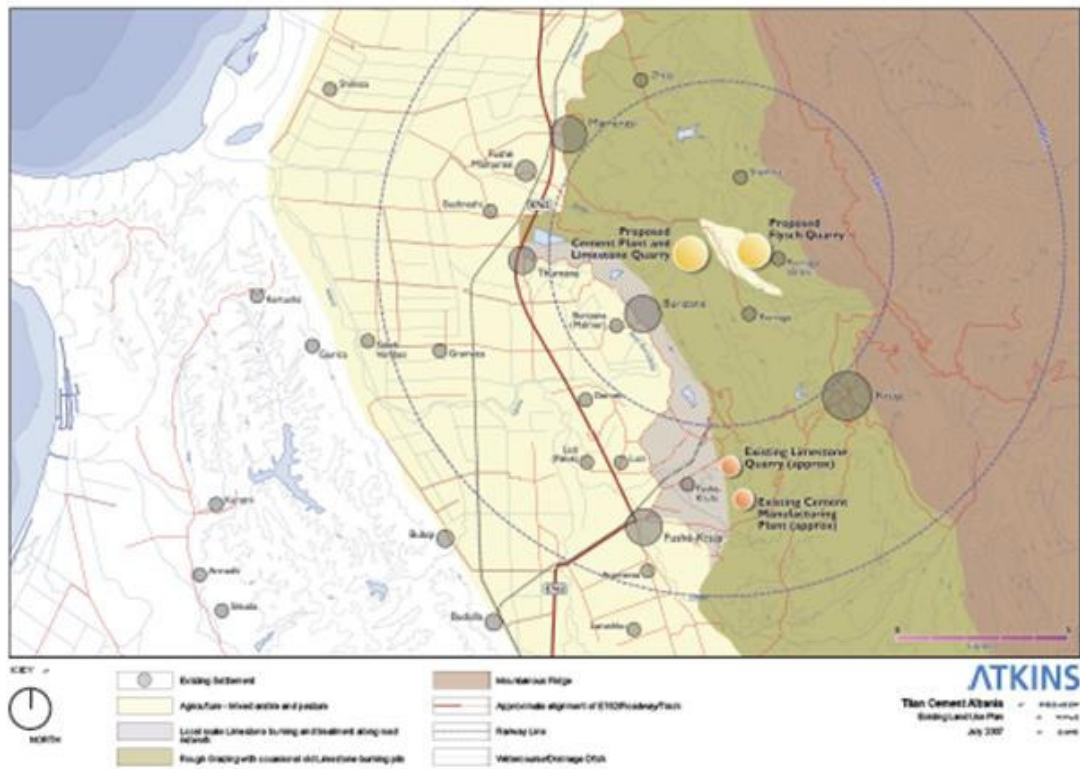
- Hane Kulla
- Hike Zhafa
- Sofie Reci
- Hane Lusha

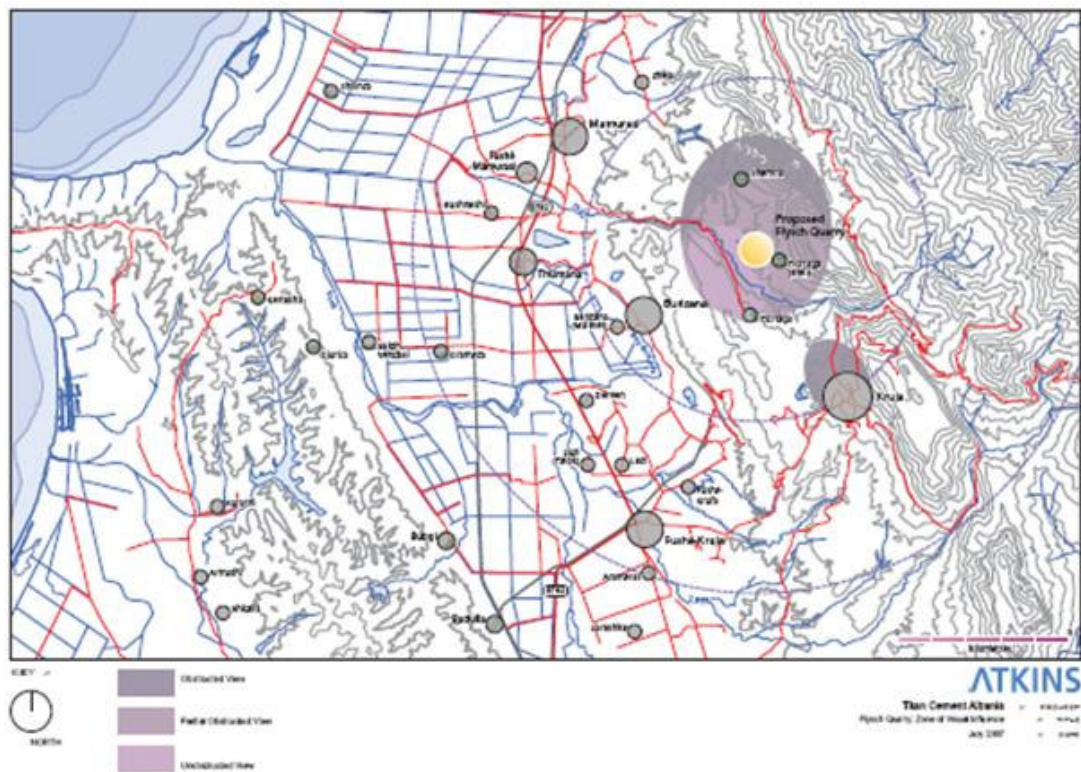
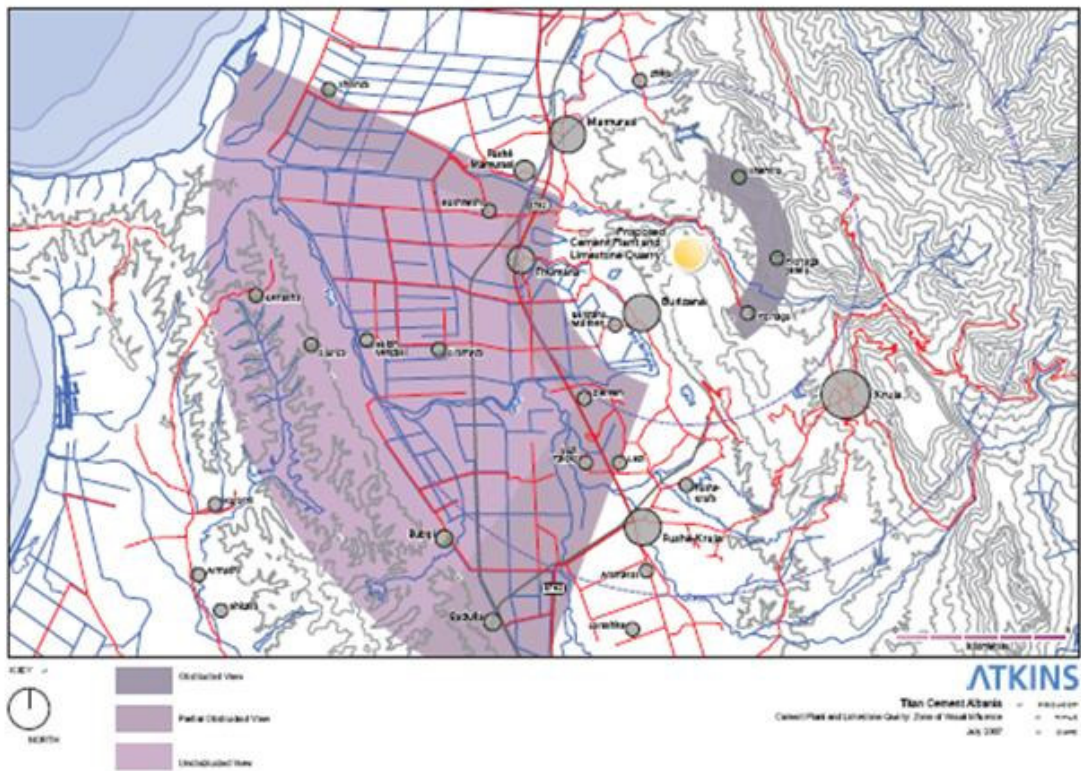
To be confirmed by herb wholesaler.

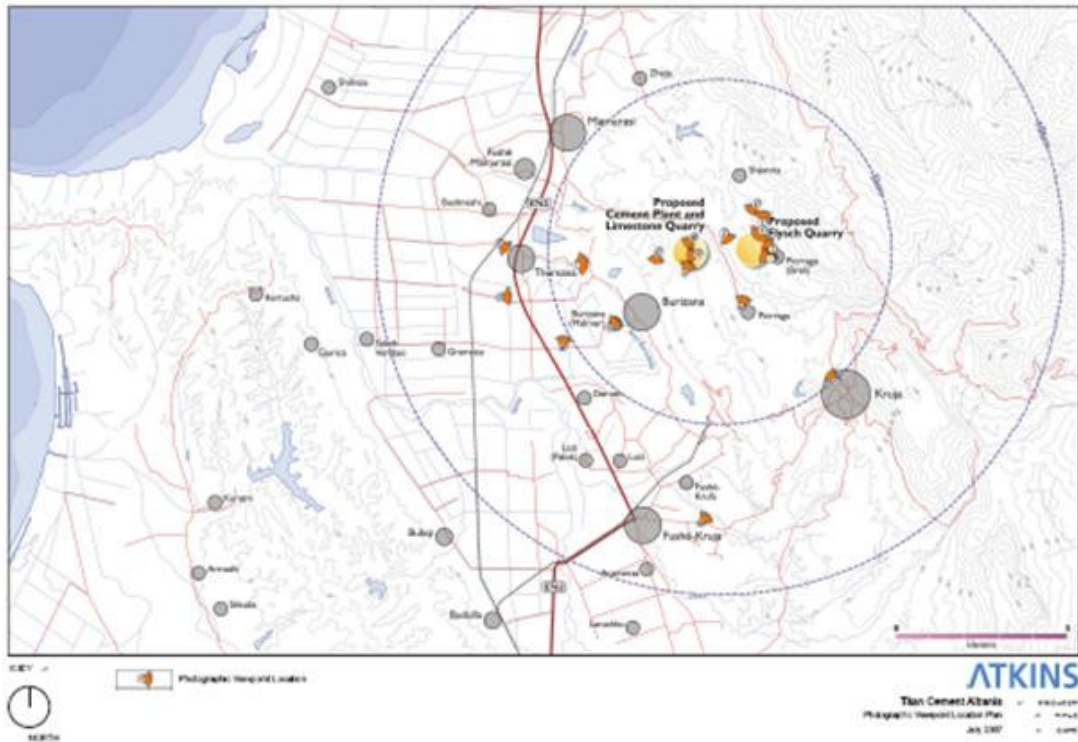
- Graziers

- Islam Reci
- Haxhi Kulla
- Suleymani Jrodna

APPENDIX 3: LANDSCAPE ASSESSMENT APPENDICES







Viewpoint 01.7
View south from the road between Pienarog and Shkalla over the Drita Valley and Flyash deposits



Viewpoint 02.1
View south from Pienarog over the Drita Valley and Flyash deposits



Viewpoint 03.1
View south from the base of the Drita Valley over the Flyash deposits





Image 04.7
View north from the road between Portage Fork and Shesha looking up the Drage Valley



Image 05.1
View south from the road between Portage Fork and Shesha looking over Portage Fork toward Kijiga and Portage



Image 05.2
View south from the road between Portage Fork and Shesha looking over the Drage Valley and the Flycatcher deposit

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Image 07.1
View from the old National Road southeast toward Barbana and the western Drage Valley Kijiga



Image 08.1
View north across the agreed depression containing the proposed location for the Cement Manufacturing Facility and Limestone Quarry



Image 08.2
View north across the proposed location for the Cement Manufacturing Facility and Limestone Quarry toward the agricultural plateau below

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Photograph 10.1
View east across the proposed location of the Cement Manufacturing Facility and Limestone Quarry



Photograph 10.2
View east from the top of the limestone plateau and proposed location of the Cement Manufacturing Facility over Buzova and the agricultural plain below



Photograph 10.3
View east from Oriza valley towards the Oriza valley village

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Photograph 10.4
View east from the agricultural plain looking towards Buzova and the Oriza valley village



Photograph 10.5
View east from the agricultural plain looking towards Buzova and the Oriza valley village



Photograph 10.6
View east from the agricultural plain looking towards Buzova and the Oriza valley village

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Image and 10.7
View north from Poranga over the Oriza Valley and Flysch deposits



Image and 10.7
View north from Poranga over the Oriza Valley and Flysch deposits



Image and 10.7
View from the agricultural plains of the existing quarry to the south west of Kula

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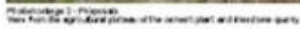
Photomontage 1 - Existing Conditions
View of the Oriza Flysch deposits within the Oriza River valley



Photomontage 1 - Proposed
View of the Oriza Flysch deposits showing the working area of the flysch quarry

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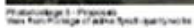
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APPENDIX 4: ECOLOGY ASSESSMENT APPENDICES

APPENDIX 4.1: GENERAL OVERVIEW OF BORIZANA VEGETATION AND ENVIRONMENTAL IMPACTS ON IT

(Prof. Dr. Arsen Proko)

1. Geomorphology

Borizana's area is located on the central part of the Kruje- Dajti Ghat. The average width of the Kruje-Dajti Ghat is c.a. 10-15 km.

The relief is one of the most important natural elements of Borizana's area, which is related to the morphologic and morphogenetic complexity of the area. The natural boundaries of the area are formed by two tectonic zones, called, in term of this EIA, flysch and limestone zone, each with a different structure and lithology.

2. Lithology (Geology)

The lithology of the area can be sub-divided into two distinctive complexes, namely terrigen rocks (flysch) and carbonate rocks (limestone and limestone-dolomite).

The major and central part of the study area is composed of limestone. These rocks are very conspicuous with steep ridges, escarpments, cliffs, and well-developed karstic elements. These are in sharp contrast with the area composed of terrigen rocks, (argil, alevrolite and mergel), which are very susceptible to erosion, especially on steep slopes. The relief is very fragmented due to a high density of rivers, streams and gullies.

3. Tectonics

The formation of the abovementioned rocks occurred during the Paleogenic period. During the following Oligo-Miocenic period, the area incurred a division and movement towards the west, taking a sin-clinal configuration. The tectonic longitudinal detachments, which came in contact with the terrigen rocks, have created many strips of destruction and subsequent erosion, evolving in the present relief. The direction of these wrinkled structures is from northwest to southeast, the same direction as those of tectono-orogenic dinaric alpine in the north of Albania.

The structural units in the area are still subject to a continuous rising tendency due to tectonic dynamics, which explain the explosive morphological evolution and the complex character of the present relief of the area. The morphological evolution is further amplified by a continuous descent of the terrigen unit by high erosion level.

The vegetation (or rather lack of it) also plays a morphologic role. Human interventions over a period of many years have resulted in degradation and deforestation, thus reducing the vegetation's protective function. Degradation is most evident near villages and on agricultural land on steep slopes.

4. Climate of Borizana's area

The climate of Albania is very diverse. This due to its geographic position, high altitudinal range and, especially, the hilly and mountainous relief, characterized by profound valleys and deep gorges.

There are four distinguishing climatic zones divided into 13 climatic sub-zones, which strongly contribute to the country's vegetation types.

The general climate of Borizana' is characterized by wet, cold winters and dry, hot summers. Borizana' area, both flysch and limestone areas, belong the hilly climatic zone (3).

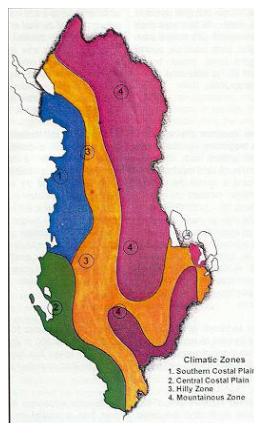


Fig. 1. Climatic zones

Using meteorological data from the meteorological stations of Tirana Airport, the climate of Borizana's area (Gausson index) is as follows:

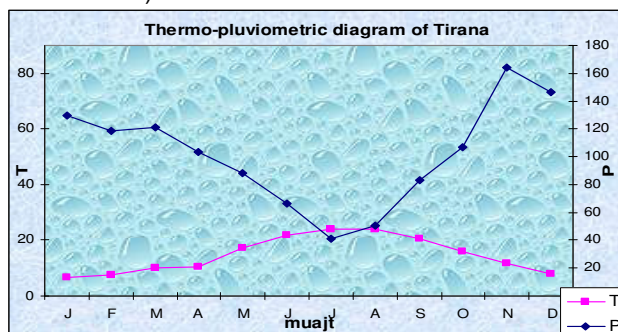


Fig. 2. Thermo-pluviometric diagram (Gausson index) based on the Tirana Meteorological station data. The climate is typical Mediterranean with 1.5 – 2.0 months dry period during the summer. Of particular morphologic importance are the high amplitudes of mean annual temperatures ranging from 15-22 degrees Celsius in the summer to temperatures below zero in the winter. Physic and mechanic destruction of rocks during summer's drought and winter's frost result in the formation of conveyance incrustation, especially at penetrable limestone rocks and sandy (flysch) rocks. Rainfall plays also an important role in the morphologic process, particularly its irregular annual distribution, which is typical for the Mediterranean climate. Rainfall is concentrated mostly in the cold winter period (60-70% of the annual precipitation), with the possible occurrence of exceptionally high daily precipitation up to 237 mm in 24 hours. Such heavy rains result in flash floods, creating strongly meandering rivers with regular occurrence of river breaching and flooding. Rainfall is also highest during spring, and due to the high run off on the steep slopes, these combined factors causes accelerated erosion in particular in those areas with alienated crust and soils composed of argil, alevrolite and mergel. The larger rivers are mostly located on impenetrable terrigen rocks. Evergreen broadleaved forests and scrub grow in region with a pronounced Mediterranean rainy winter climate, in other words, with warm dry summers and cool, moist winters. Hard frosts are absent, and in thermo-Mediterranean region frost in general is rare. The precipitation peaks are mainly in November/December and in February/March. During the summer months—in the dry areas already starting in May and lasting until and including September—there is little or no precipitation. In the case of pronounced relief the windward-leeward effects provide for local climatic differentiation. To this can be added fluctuations in the distribution and the sum of annual precipitation. The mean annual precipitation at sea level lies between 1000 mm, and 1200 mm. The mean temperature of the warmest month lies between 25 and 28 °C, that of the coldest month between 6 and 13°C. Especially on the exposed coasts wind is a decisive factor for the vegetation and its structure: it lessens the

competitiveness of hygrially demanding woody evergreen species and locally hinders the formation of the tree habit, even without anthropogenic influence. This results in the favouring of low scrub and shrub forests.

The climatic conditions of the area are strongly linked with the hilly-mountain relief, the nearness to the sea (c.a. 20km), and the general wind direction from northwest to southeast. Due to this geographic position, the area is characterized by the hilly and pre mountain Mediterranean climate with cold, wet winters and warm, dry summers.

2. Phyto-climatic Zone

A line between Shkodra and Leskovik divides Albania's territory into two different parts with regard to vegetation:

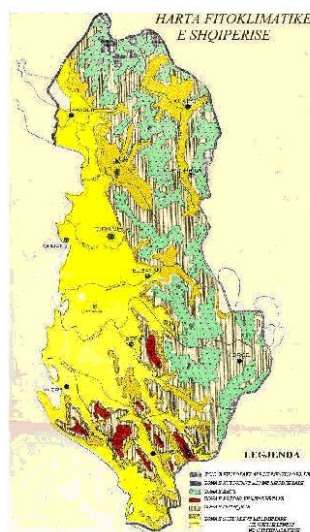


Fig. 3. Map of Albanian phyto-climatic zones

- The Southwestern part, which is characterised by typical Mediterranean vegetation, dominated by evergreen trees, coastal, Mediterranean forest and shrubs, especially of *Quercion ilicis* Br.-Bl. 1936. Does not missing in this part: macquis, shibliak, pseudo-macquis, garrigues and friganes formation and Mediterranean mountainous pastures, usually as the degraded stages of the potential vegetation (*Quercetum ilicis* Br.-Bl. 1947).
- The Northeastern part, which is characterised by typical Central European Vegetation dominated by deciduous trees. A large proportion of Albanian forest is found here, particularly beech (*Fagus sylvatica* L.) and white fir (*Abies alba* Mill.), oaks (*Quercus* sp. L.) and black pine (*Pinus nigra* Arn.) forests. These forests are mainly found at a considerable distance from populated areas, partly as the result of the lack of infrastructure, for forest harvesting, has left them verging. This makes them extremely important as biogenetic reserves. Borizana's areas (flishy and limestone), taken in consideration on the framework of this EIA, is situated in the first horizontal zone, where the vegetation is predominantly compound by evergreen shrub and low forests.

Vertical points of view there are distinguished four altitudinal phyto-climatic belts.

- The belt of sclerophyllous Mediterranean forest and shrub, predominantly consisting of evergreen tree and shrub species. The natural distribution range of Mediterranean evergreen broadleaved forests and scrub in Albania comprises the majority of the western hilly zone, the low elevation and coastal regions, with the exception of the mountainous and immediate coastal areas. The most important are individuals of Holly oak (*Quercus ilex* L.), Strawberry-Tree (*Arbutus unedo* L.),

Briar Tree Heath (*Erica arborea* L.), Broa-Leaved Phillyrea (*Phyllirea latifolia* L.), Terebint-Tree (*Pistacia terebinthus* L.), Common Myrtle (*Myrtus communis* L.), Red Barried Juniper (*Juniperus oxycedrus* L.).

- Termophyllous oak forests predominantly made up of broadleaf oak species, usually Hungarian Oak (*Quercus frainetto* Ten.), Turkey oak (*Quercus cerris* L.), and Macedonian oak (*Quercus trojanae* Webb.) or degradatiob stages of Oak forests like mixed formations of Oriental Hornbeam (*Carpinus orientalis* Miller.), Flowering Ash (*Fraxinus ornus* L.), Prickly Juniper (*Juniperus oxycedrus* L.), Blackthorn Tree (*Prunus spinosa* L.), Almond Pear Tree (*Pyrus amygdaligormis* Vill.), Christ's Thorn (*Paliurus spina-cristi* Miller.), Hawthorn (*Crataegus monogyna* Jacq.) etc. This belt is located between the Sclerophyllous Mediterranean forest and shrub belt and mesophyllous broadlives forest belt (Beech Forest Belt). The altitude varies from 500 m. to 1100 m. above sea level. It is important to emphasise that being situated in the most populated zone it is susceptible to damage by human activity, especially by intensive harvesting and over grazing.
- Vegetation of the mesophyllous broadlives forest belt (beech belt) dominated by Beech forests (*Fagus sylvatica* L.), hop hornbeam (*Ostrya carpinifolia* Scop.), Hornbeam (*Carpinus betulus* L.), Chestnut (*Castanea sativa* L.) and small eco-systems of Black pine (*Pinus nigra* Arn.) and Bosnian pine (*Pinus leucodermis* Antoine).
- Alpine Pastures or Mediterranean Mountainous pastures belt, characterized by the interesting grass plant eco-systems.

Both areas, included on our project study (EIA), are concentrate on the first altitudinal vegetation belt; this of Sclerophyllous evergreen forest and shrub (Typical evergreen Mediterranean vegetation).

1.1 3. Mediterranean sclerophyllous forests and scrub of Albania

The formation "Mediterranean sclerophyllous forests and scrub" in Borizana's areas includes communities of xeromorphic evergreen tree and shrub species, especially of the genera *Quercus* L., *Pinus* L. (reforestation), *Juniperus* L., *Olea* L. and *Pistacia* L..

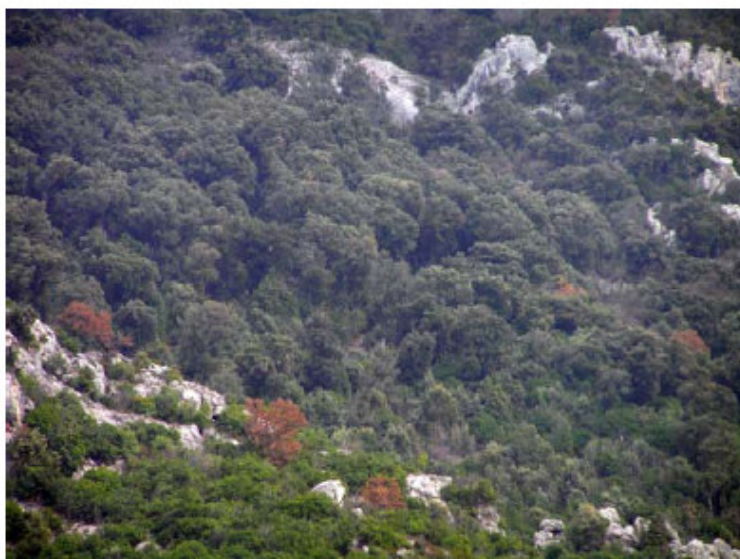


Fig. 4. Holm oak forest (*Quercus ilex* L.)

The dominance of a single tree or shrub species is not common. Sclerophyllous forests and scrub occur on two varieties of substrates (flishy and limestone) on all slopes and expositions, though sites influenced by groundwater tend to be avoided.

Stand structure depends on the abiotic site factors and the species composition, but especially on the current and previous use of the stand. Most evergreen broadleaved forest species can grow as trees or shrubs, depending on external influences. Stands with a dense canopy (even rare) are dark and tend to be species-poor. The sparse undergrowth of such dense forests and thickets is composed of scattered small shrubs, grasses, lianas, geophytes, ferns and seedlings of the trees and shrubs.



Fig. 5. Typical evergreen Mediterranean shrub (Macchia)

Open stands are much more common. These occur naturally on steep slopes, though as a rule they arise from various forms of use, such as removal of timber, fires and overgrazing. Stands degraded through unregulated logging possess scrub or bush forest structure (macchia, maquis).

Stands that are patchy and opened up by grazing or inter-digitated with dwarf shrub and herbaceous vegetation are referred to as garrigue. Grazed woodlands consist of single-stemmed rather than coppiced multi-stemmed trees, have a more open canopy, and never stand structure and an internal architecture rich in ecotonal effects.



Fig. 6. Typical garrigue.

Mediterranean evergreen broadleaved forests of Borizana's area have a long history of anthropogenic destruction and degradation. In areas favourable for agriculture, this began already during the Neolithic period; in agriculturally less favourable regions it occurred especially during times of human population growth through the extensive, unregulated removal of timber and grazing with goats and sheep.

They were to be replaced by various cultural landscapes. Secondary small shrub communities (referred to, depending on region, as tomillares, phrygana or batha) arose in areas that were extensively grazed. If a regressive syndynamic pattern persisted, geophyte- and annual-rich dry grasslands and heaths developed.

With the receding pressure of human use in recent times, one can observe self-regenerating evergreen broadleaved vegetation. The dynamic potential of such stands, especially the temporal process of progressive succession and the corresponding climax forest community, are to a great extent site-dependent and are still not understood in detail.



Fig. 7. Broadleaved oaks regenerate after the protection

The tree composition of Mediterranean evergreen broadleaved forests is mainly rather uniform. A single species typically dominates the canopy, often one of the evergreen oak species (subgenus *Sclerophyllodrys*). The holm oak (*Quercus ilex* L.) is most competitive in sub-humid regions. The kermes oak (*Quercus coccifera* L.), in drier regions, with somewhat colder winters, replaces holm oak (*Quercus ilex* L.). The latter species is more tolerant of browsing than the Holm oak.

Kermes oak (*Quercus coccifera* L.) forms shrub formations while it grows less than 2m.

In meso-Mediterranean regions and especially in the transition zone to sub-Mediterranean climates, deciduous species begin to play a greater role. This includes especially oak species such as Pubescent Oak (*Quercus pubescens* Willd.), Turkey oak (*Quercus cerris* L.), Hungarian oak (*Quercus frainetto* Ten.), Flowering Ash (*Fraxinus ornus* L.) and Oriental ornbeam (*Carpinus orientalis* L.).

Grazed oak forests and macchia with anthropogenically lower proportions of oak often possess a dense evergreen shrub layer, which can be composed of Briar Tree Heath (*Erica arborea* L.), Broa-Leaved Phillyrea (*Phyllirea media* L.), Wig Tree (*Cotynus coggygia* Scop.), Strawberry tree (*Arbutus unedo* L.). Much less widely distributed than the Holm oak (*Quercus ilex* L.) or Kerme oak (*Quercus coccifera* L.) communities are the forests composed of *Quercus* L. species of the subgenus *Cerris*.



Fig. 8. Degraded vegetation of *Erica arborea*, *Phyllirea media*,

While anthropogenically thinned sclerophyllous forests can exhibit high numbers of species in a small area, stands that have gone for a longer time without or with only minimal disturbance are dense and conspicuously species-poor. Especially shade-tolerant and consequently widely distributed under the canopy of dense evergreen broadleaved forests are ferns and fern allies Wall Rue (*Asplenium onopteris* L.), Lesser Clubmoss *Selaginella selaginoides* Link.), evergreen, sometimes climbing sub-shrubs and lianas Butcher's Broom (*Ruscus aculeatus* L.), Narrow-Leaved Asparagus (*Asparagus acutifolius* L.), Thorny Smilax (*Smilax aspera* L.), Wild Maddesr (*Rubia peregrine* L.), Madder (*Rubia tinctorum* L.) and geophytes; Sowbread (*Cyclamen hederifolia* Aiton), Jack-in-the-Pulpit (*Arisarum vulgare* O. Targ.-Tozz.) and Italian Arum (*Arum italicum* Miller.). In the shelter of lower growing sclerophyllous shrubs grow bunchgrasses, whose stalks can exceed the shrubs in height.

The formation of Mediterranean evergreen broadleaved forests and scrub corresponds for the most part with the phytosociological class *Quercetea ilicis* Br.-Bl 1947.. Meso-Mediterranean *Quercus* L. and *Pinus* L. forests are assigned to the order *Quercetalia ilicis*

Br.-Bl. 1936. The order *Pistacio lentisci-Rhamnetalia alaterni* consists of shrub communities as well as *Pinus L.* and *Juniperus L.*

Evergreen broadleaved forests are often regarded as the “number one” zonal vegetation of the Mediterranean region. Palynological finds however suggest evergreen oak forests first following increased Neolithic land use. Furthermore, the site-specific potential natural vegetation of today should not be equated with the vegetation of the Neolithic period, that had been only little influenced by humans. Considerable soil erosion—with and without the involvement of humans—has fundamentally changed the conditions for forest growth and structure. Site-appropriate regeneration of forests in areas where they have been degraded or have disappeared depends on soil characteristics and moisture regime, relief and local climate, the diaspore bank and possible disturbance.



Fig. 9. After vegetation degradation, soil erosion.

Observations on evergreen broadleaved forest stands in advanced succession allow one to conclude that stands would continue to develop towards greater participation of deciduous oaks. The regeneration potential of evergreen broadleaved woody species is generally better in meso-Mediterranean regions than in thermo-Mediterranean (respectively in fishy than limestone zone).

The condition of the Mediterranean sclerophyllous forests and scrub is different for the individual zonal types. However, for most forest communities it is poor, despite broad-scale progressive successional trends. Some forest communities are practically unknown in a half-ways undisturbed state.

More widespread and characteristic is the “half-evergreen” holm oak forest type, with a strong element of deciduous species in the tree layer Flowering Ash (*Fraxinus ornus L.*), hop hornbeam (*Ostrya carpinifolia Scop.*) and shrub layers Horse Vetch (*Hippocrepis emerus* subsp. *emeroides*, Cornelian Cherry (*Cornus mas L.*), etc.).

On lower slopes in the immediate vicinity of the coast, particularly if limestone is present, one can assume reduced competitiveness of the holm oak.



Fig. 10. Degraded vegetation of "half-evergreen" forest type

4. Dynamism of vegetation

On the description of potential vegetation, Albanian forest vegetation is rich in forest types, which represents the climax stages. At the same time, as the result of a permanent perturbation (intensive harvesting and overgrazing) and fires, Borizana's vegetation is characterized by the presence of the degraded stages.

To know the degradation process and bio-indicators of degradation is very important in terms of intervention for the rehabilitation of the forest ecosystems, respecting the dynamic stages (on the positive sense) and using native species for the afforestation and reforestation activities.

To understand the dynamic position of the different degraded stages, let see the dynamic schemes of xerophyllous evergreen forest (Holm oak forest-*Quercetia ilicis* Br.-Bl. 1947), by perturbations (left) and by catastrophes-fires (right).

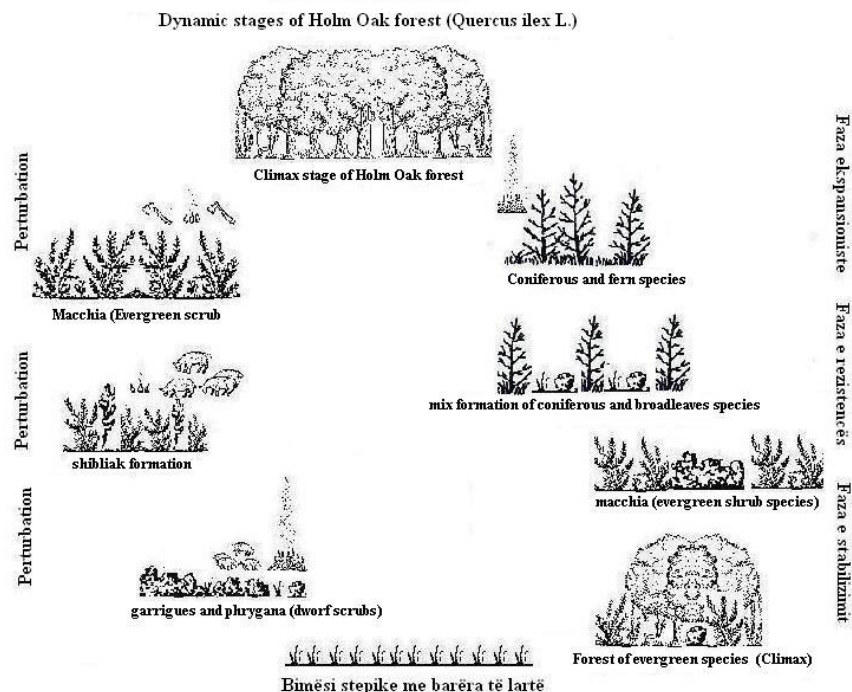


Fig. 11. Dynamic stages of Sclerophyllous Mediterranean Forests (A.Proko)

As the climax stage, the Holly oak (*Quercus ilex* L.) forests take place. On the study areas there are not remains any climax patchy of Holm oak, but rare individuals spread on the most conserved areas. As the result of traditional using and perturbation, this forest type is substituted by the typical Mediterranean scrubs, macchia (second stage). This vegetation type mainly is structured by Strawberry tree (*Arbutus unedo*), White Heath (*Erica arborea*), Terebint Tree (*Pistacia terebinthus*), Macedonian oak (*Quercus trojana*), Judas tree (*Cercis siliquastrum*). Common Myrtle (*Myrtus communis*) Red Juniper (*Juniperus oxycedrus* L.) etc. This type of vegetation is common on the flishy area.

Then, as the result of further intensive harvesting and overgrazing, the garrigues vegetation, composed, especially, by the thorny and sclerophyllous scrub, substitutes maquis vegetation. As the most important species could mentioned Kermes oak (*Quercus coccifera* L.), Flowering Ash (*Fraxinus ornus* L.), Christ's Thorn (*Paliurus spina-christi* Miller.), Blackthorn tree (*Prunus spinosa* L.), Almond Pear Tree (*Pyrus amygdaliformis* Vill.), Fierthorn (*Pyracantha coccinea* M.J. Roemer.) Juniper tree (*Juniperus oxycedrus* L.), Hawthorn (*Crataegus monogyna* Jacq.), Pomegranate (*Punica granatum* L.), Broa-Leaved Phillyrea (*Phyllirea media* L.), Eastern Hornbeam (*Carpinus orientalis* Miller.) etc. This is called as the third stage of degradation and is very common in sites, both flishy and limestone as well.

The forth degradation stage of this vegetation series belong sclerophyllous dwarf and scrub vegetation compound by Common Sage (*Salvia officinalis* L.), Evergreen Rose (*Rosa sempervirens*), Elm Leaf Blackberry (*Rubus ulmifolius*), Alatern (*Rhamnus alaternus* L.), Rock-Rose (*Cistus incanus* L.) Sage-Leaved Rock Rose, (*Cistus salviefolius* L.), Spanish Broom (*Spartium junceum* L.), Radiant Broom (*Genista radiata* (L.) Scop.), White-Felted Germander (*Teucrium polium* L.), Viscous Fleabane (*Inula viscose* (L.) Aiton.), etc. This vegetation type mosly is very common on the limestone area

The stepic and grassland vegetation, compound generally by high gramineae plants, Heath False-Brome (*Brachypodium pinnatum* (L.) P. Beauv), Brush Grass (*Chrysopogon gryllus* (L.) Trin), (*Putoria calabrica* (L. fil.) DC), Soapwort (*Saponaria calabrica* Guss.), Thyme (*Thymus sp* L.), must to be considered as the last dynamic stage. It's characterized by a high level of erosion phenomenon and it's typical only on the limestone area.



Fig. 12. Last stage of the degradation (stepic vegetation)

The degradation of the forest vegetation is accompanied always with the erosion and desertification phenomenon, reflected on the floristic composition.

5. The most important values of Borizana's vegetation

It is important to stress out the high level of biodiversity on Burizana' areas because the phyto-climatic zone (gradient of the biodiversity) and variability of ecosystems because the different agricultural practices and land use.

- On the area there are meet c.a. 450 vascular plant species, distributed in 63 families, from which 15 families are represented only by a specie and 11, only bi 2 species.
- Taking in consideration biological and chorological form of species, biological and chorological spectrum on the graphs below are represented:

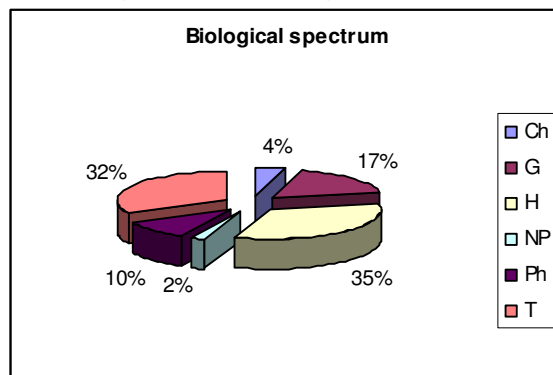


Fig. 13. Biological spectrum of Borizana's area

The biological form of plants concerns the position of the vegetative buds during unfavorable periods of its life cycle, and used for categorization of vegetation by Raunkier. The flora of the Borizana is dominated by Hemicryptophytes (H), Terophytes (T) and Geophytes (G). The low level of Phanerophytes (Ph) is an indication of the presence of high levels of degradation.

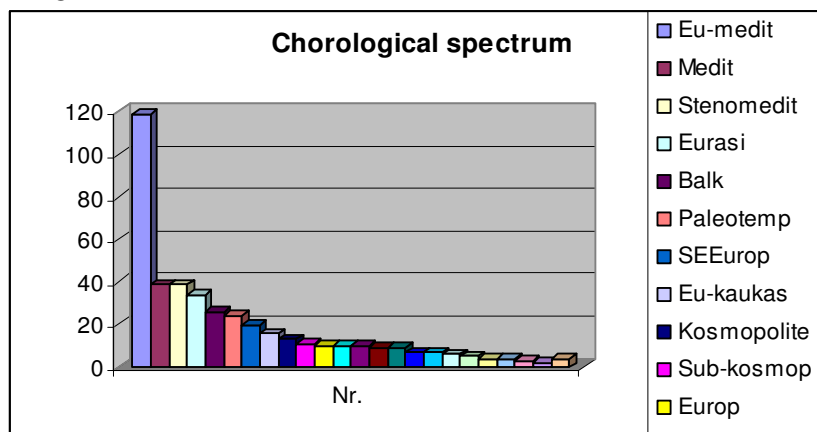


Fig. 14. Chorological form

The analysis shows a high presence of chorological units correlated with Mediterranean climate, and of species with a Mediterranean prevalent area (Eur-medit), which are closely connected with the processes of degradation.

- Five species are sub-endemic species

The plant families, which are well represented by the species occurring in the National Park are Leguminosae, Graminae, Compositae, Labiatae, Rosaceae, Orchidaceae, e, Cruciferae, Caryophyllaceae. Several families are represented by only one or two species, often rare or

endangered species, such as Amaryllidaceae, Araceae, Aristolochiaceae, Cornaceae, Cupressaceae, Asclepidaceae, Dioscoreaceae, Gesneriaceae, and Rutaceae (see Table below).

Table 1. Number of species per family

Family	Nr. of species	Family	Nr. of species
Amaryllidaceae	1	Caprifoliaceae	4
Araceae	1	Plantaginaceae	4
Aristolochiaceae	1	Saxifragaceae	4
Asclepidaceae	1	Cistaceae	5
Cornaceae	1	Fagaceae	5
Corylaceae	1	Guttiferae	5
Cupressaceae	1	Juncaceae	5
Dioscoreaceae	1	Linaceae	5
Gesneriaceae	1	Convolvulaceae	6
Lentibulariaceae	1	Crassulaceae	6
Polygonaceae	1	Geraniaceae	6
Rutaceae	1	Iridaceae	6
Solanaceae	1	Malvaceae	6
Thymelaceae	1	Primulaceae	6
Ulmaceae	1	Cyperaceae	8
Apocynaceae	2	Rubiaceae	8
Athyriaceae	2	Euphorbiaceae	9
Ericaceae	2	Ranunculaceae	9
Gentianaceae	2	Boraginaceae	10
Hypolepidiaceae	2	Umbelliferae	10
Orobanchaceae	2	Campanulaceae	12
Papaveraceae	2	Schrophulariaceae	13
Rhamnaceae	2	Cruciferae	15
Salicaceae	2	Liliaceae	15
Valerianaceae	2	Caryophyllaceae	17
Violaceae	2	Orchidaceae	18
Aceraceae	3	Rosaceae	22
Dipsacaceae	3	Labiatae	26
Equisetaceae	3	Compositae	35
Oleaceae	3	Gramineae	37
Asplenaceae	4	Leguminosae	52

The visual aspect of the vegetation being in a degraded state (small diameter trees, presence of many bushes) is also confirmed by the presence of many thorny species, such as *Prunus spinosa*, *Pyrus amygdaliformis*, *Paliurus spina-cristi*, *Rosa sempervirens*, *Rosa canina*, *Rubus ulmifolius*, *Ononis spinosa*, *Pyracantha coccinea*. and pro-aridity as *Salvia officinalis*, *Inula viscosa*, *Cistus incanus*, *Cistus salvifolius*. The major cause for degradation is overgrazing by domestic livestock, fire wood production and the traditionalist of lime production.

On Borizana's area are present also a number of threatened and endangered species (see table below). These endangered species have been identified based on the Red List of Albania. Based on the IUCN categorisation there are 13 species which should be given due attention for *in-situ* conservation.

Table 2. Redlist of Burizana'a area

Nº	Species	Threatened status (IUCN)				
		Ex ?	E	R	K	nt
1.	Agrimonia eupatoria L.		x			
2.	Dictamnus albus L.		x			
3.	Hypericum perforatum L.		x			
4.	Laurus nobilis L.		x			
5.	Orchis sp. divaricata (L.) R. Br.		x			
6.	Origanum vulgare		x			
7.	Quercus ilex		x			
8.	Salvia officinalis L.		x			
9.	Cerastium grandiflorum Waldst et Kit.			x		
10	Chamaecytisus tommasinii (Vis) Roth			x		
.						
11	Fritellaria macedonica Bornm.			x		
.						
12	Pedicularis brachyodonata Schlosser et Vuk			x		
.						
13	Ramonda serbica Pancic			x		
.						
	Total species	0	8	5	1	

6. The sources of degradation on the past

Economic development during the past 50 years has had a strong impact on the biological and landscape diversity of Borizana's area.

This is primarily because it was based upon unstable development practices in agriculture, forestry, industry, and urbanization. As is described the vegetation of burizana's areas is much degraded and represented by advanced degradation stages. The reasons of this degradation are:

a. Agricultural practices have been the major factor with the strongest impacts on biological and landscape diversity and degradation.

- Deforestation for opening up new land during socialist period as result, decrease of forest area (especially on the flishy area).
- Terracing and the creation of fruit tree plantations (especially on the flishy area).
- Over greasing

The human interference without considers the consequences on environment, brought the following results:

- Extensive erosion phenomenon (in both sides; flishy and limestone)
- An increase in the quality of an unproductive areas of land (in both sides; flishy and limestone),
- Degraded and impoverished biological and landscape diversity (in both sides; flishy and limestone),
- Abandoned or deserted lands (in both sides; flishy and limestone)

b. Intensive forestry. Due to the lack of alternatives fuel resources for heating and cooking has affected forest degradation and biodiversity. The level of harvesting has been more than two time more that annual growth. As the result are caused:

- Decrease forest productivity
- Incapability to fulfil the ecological functions of forest
- Genetic degradation of isolated populations of mammals.
- On the planning process for the forest management there was a lack of concern for wildlife protection.

c. Industry. It's important to stress out that this zone is well known for the lime production with traditional methods, using especially fire wood and other materials. This brought:

- High level of gases discharges (SO₂, NO₃, etc.)
- Discharge of liquids and solids generated by this old technology.
- Exploited without criteria, especially illegal logging of natural resources.
- Pollution of land and air,
- Deformity of the landscape's harmony.

d. Hunting. Uncontrolled hunting and high number of hunters in this zone (even coming from outside) are the major form of disturbance on landscape and Biodiversity. This brought:

- Reduction in population of some species (brown bear, lynx, eagles etc.)
- Consequences during the period of reproduction.
- Abandonment of nests.
- Abandonment of young.
- Interruption of reproduction and reproduction "memory".

7. The further environment impacts because quarries building up.

Although very degradation level of vegetation, on this region exist the continuity of the natural vegetation, which by different measurements and sustainable forestry may be rehabilitate. On the other hand this area, for many years, has fulfilled the needs of indigenous population in fire wood, grazing and lime production as well as in medicinal plant collection and hunting. The former forests have played an important role on air and water quality as well as in carbon sequestration process.

On the actual situation this area has not any good importance regarding endemic species or biodiversity conservation.

The planed industrial activity will provide good incomes and benefits for the indigenous people but at the same time will create some environmental impacts like:

- Decrease of the forest and pasture area and thus increasing of the human pressure on the rest of areas, as the result further degradation of the vegetation.
- Fragmentation of the ecosystems and losing of some sub-endemic and medicinal plants (see species list).
- Decrease of the beauty of the nature and deformity of the landscape's harmony,
- Disturbance for the wild fauna,
- Decrease of the natural resources in disposition of community (especially fire wood and pastures).
- Increase of air pollution
- Increase of the noise, because the using of big machines, and the intervention on the tranquillity of the life.

Action Plan

Parallel with the industrial activity planed, it is important:

- Rehabilitation of the forest by the implementation of the sustainable forestry and silvo-pastoral systems.
- Afforestation and reforestation of the degraded areas with native species and especially Holm oak (*Quercus ilex* L.), Turkey oak (*Quercus cerris* L.), Macedonian oak (*Quercus trojana* Webb.), Hungarian oak (*Quercus frainetto* Ten.).
- Activities regarding the soil protection from the erosion phenomenon, which some time is very advanced.
- Employment of indigenous people on the new industrial activities, which are starting.

APPENDIX 4.2: BURIZANA FIELD NOTESField Survey Results – Limestone Quarry and Plant Area7th March 2007

A walkover survey was undertaken utilising tracks through the study site that had recently been created to allow vehicular access to the developers. The tracks were walked at a steady pace, stopping at regular intervals to listen for calling and singing birds and check for field signs of notable species. Where gaps in the vegetation allowed the area off the tracks was walked and surveyed for the presence/ absence of notable species. The site was covered as comprehensively as time and access through the vegetation allowed.

All records, including field signs, were recorded into notebooks. No maps were available to transfer records directly onto in the field.

Weather conditions

Cloud Cover: 6/8

Rain: 0

Wind: SSW2-3

Temperature: 16°C

Visibility: 3km

ResultsVEGETATION (see separate report)

Photo1: Soil Erosion

BIRDS

The following is a comprehensive list of species recorded either at or seen from the study site. All seen and heard records are included. The survey was undertaken before the breeding bird survey had begun and potential summer/ breeding migrants had not arrived in the southern Mediterranean at the time of the survey. As such the survey list comprises only resident species or lingering winter visitors.

Common Buzzard *Buteo buteo*

A single dark phase bird was noted ranging throughout the study site during the survey. The bird was observed 'still' hunting from a number of suitable perches within the study site

Eurasian Sparrowhawk *Accipiter nisus*

A single female was noted in flight at the study site.

Common Kestrel *Falco tinnunculus*

A single male was observed hunting at the study site.

Wood Pigeon *Columba palumbus*

Two registrations of an individual and a single flock (5) noted in flight at the study site

Eurasian Collard Dove *Streptopelia decaocto*

Three individuals noted in flight at the study site.

Little Owl *Athene noctua*

A single individual noted perched alongside the access track at the study site.

White Wagtail *Motacilla alba alba*

Individuals noted around the livestock drinking hole at the site entrance.

Winter Wren *Troglodytes troglodytes*

Commonly recorded from scrub habitat at the study site.

European Robin *Erithacus rubecula*

Commonly recorded at the study site.

Common Stonechat *Saxicola torquata*

Commonly recorded throughout the study site. The species is an early breeder and several individuals were noted carrying nesting material.

Song Thrush *Turdus philomelos*

A single record of two individuals calling continuously from dense scrub surrounding the plant area at the study site.

Common Blackbird *Turdus merula*

Two individuals noted calling from dense scrub surrounding the plant area at the study site.

Blackcap *Sylvia atricapilla*

A single record of an individual skulking in dense scrub along the access track at the study site. The record might be of a returning summer migrant but equally could be that of a wintering individual.

Sardinian Warbler *Sylvia melanocephala*

Common and widespread with singing and displaying males holding territory throughout the study site.

The species is a common and widespread bird along the Mediterranean coast and occurs just into Asia in Turkey. Unlike most warblers it is not particularly migratory and is primarily a resident.

Cetti's Warbler *Cettia cetti*

Two individuals heard calling from dense scrub at the study site.

Common Chiffchaff *Phylloscopus collybita*

Present in small numbers (4-6 individuals recorded) at the study site with birds heard calling from dense scrub. These individuals relate to either wintering individuals or newly arrived passage migrants.

Goldcrest *Regulus regulus*

Recorded sporadically from dense scrub in association with mixed flocks of feeding birds including Firecrest and Blue Tit.

Firecrest *Regulus ignicapillus*

Commonly recorded at the study site from areas of dense scrub. Small parties of birds noted roaming with a mixed species flock of feeding birds.

Great Tit *Parus major*

Two individuals noted from dense scrub both associating with a mixed species flock of feeding birds.

Blue Tit *Parus caeruleus*

Between three and four individuals were present at the study site amongst a mixed species flock of feeding birds that roamed the study site.

Long-tailed Tit *Aegithalo caudatus*

Two individuals were present amongst at the study site amongst a mixed species flock of feeding birds that roamed the study site.

Common Magpie *Pica pica*

A single individual was noted in flight at the study site.

House Sparrow *Passer domesticus*

Small parties of between 3 and 6 individuals were recorded in flight at the study site.

Common Chaffinch *Fringilla coelebs*

Individuals and small parties (maximum count 7) recorded in flight at the study site.

REPTILES

Suitable habitat for reptiles exists across the entire study site. During the walkover survey a visual search of suitable basking spots was undertaken and brash piles, stones, rubble and existing refugia were examined.

Balkan Green Lizard *Lacerta trilineata*

A single individual of this species was well observed basking alongside the access track at the study site in close proximity to an area of dense scrub.

Dalmatian/ Balkan Wall Lizard *Podarcis milisellensis/ taurica*

A single individual of one of these species was not positively identified to a specific species but was observed basking on stones in open stony ground at the study site.

Viviparous Lizard *Lacerta vivipara*

Individuals commonly recorded basking amongst open stony ground at the study site.



Photo 2: Reptile Habitat

AMPHIBIANS

A number of water bodies were present at the study site. A livestock drinking pool near the plant area being by far the largest (approximately 200m² in area) and a series of roadside puddles/ pools that had been created by the tires of heavy plant and machinery along the study site access tracks that had allowed rain water to gather and collect.



Photo 3: Plant area with drinking pool in background

Common Frog *Rana temporaria*

Individuals present at the livestock drinking pool

Marsh Frog *Rana ridibunda*

Common at the livestock drinking pool and at track-side pools and puddles.

BATS

There area was unsuitable for bats roosts. There were no mature trees or building that could support bats. There was no opportunity to survey during the night as part of an activity survey to establish the use of the site by foraging bats.

MAMMALS

The site is intensively grazed by goats and horses. There was no evidence of any further mammal activity throughout the study site during the walk-over survey, although time and access was limited.

INVERTEBRATES

All records were noted during the walk-over survey.

Lepidoptera

Hungarian Glider (common around road side pools), Small White (common), Large White (occasional), Green-veined White (common), Large Tortoiseshell (single registration), Peacock (two registrations) and Speckled Wood (three registrations).

Orthoptera

Bush-crickets (common)

Field Survey Results – Flysch Quarry

8th March 2007

A walkover survey was undertaken utilising tracks through the study site that had recently been created to allow vehicular access to the developers. The tracks were walked at a steady pace, stopping at regular intervals to listen for calling and singing birds and check for field signs of notable species. Where gaps in the vegetation allowed the area off the tracks was walked and surveyed for the presence/ absence of notable species. The study site bordered a small village where remnants of the oak woodland that would once have dominated the area was still present in gardens and small orchards. This area was typically more biologically productive. The site was covered as comprehensively as time and access through the vegetation allowed.



Photo 4: Boundary of the study site (track running across the picture)



Photo 5: Site boundary

All records, including field signs, were recorded into notebooks. No maps were available to transfer records directly onto in the field.

Weather conditions

Cloud Cover: 1/8

Rain: 0

Wind: SSW34-4

Temperature: 18°C

Visibility: 3km

Altitude: 386m

Results

VEGETATION (see separate report)

BIRDS

The following is a comprehensive list of species recorded either at or seen from the study site. All seen and heard records are included. The survey was undertaken before the breeding bird survey had begun and potential summer/ breeding migrants had not arrived in the southern Mediterranean at the time of the survey. As such the survey list comprises only resident species or lingering winter visitors.

Golden Eagle *Aquila chrysaetos*

A sub-adult bird was observed in flight soaring on thermals 1km west of the study site along the steep escarpment west of the village of Picrraga.

Common Buzzard *Buteo buteo*

A bird was noted in flight at the study site.

Common Kestrel *Falco tinnunculus*

A single male in flight at the study site was the only record.

Wood Pigeon *Columba palumbus*

Individuals noted as present at the study site

Lesser Spotted Woodpecker *Dendrocopos minor*

A single male bird was noted feeding in an orchard directly adjacent to the study site.

Eurasian Crag Martin *Ptyonprogne rupestris*

Individuals observed feeding to the west of the study site. Suitable breeding habitat (steep cliff faces with cavities and caves) exists along the steep escarpment west of the study site. The species is partially resident along the Mediterranean coast.



Photo 5: The study site with escarpment beyond

Grey Wagtail *Motacilla cinerea*

Individuals noted along the river (River Drojes?) leading to the study site.

Winter Wren *Troglodytes troglodytes*

Commonly recorded from scrub habitat at the study site.

White-throated Dipper *Cinclus cinclus*

A single individual noted in flight along the River Drojes (?).

Hedge Accentor *Prunella modularis*

Two individuals noted in scrub bordering orchard adjacent to the study site.

European Robin *Erithacus rubecula*

Commonly recorded at the study site.

Black Redstart *Phoenicurus ochruros*

A male and female were present along an access track at the study site along a section to adjacent village housing and buildings.

Common Stonechat *Saxicola torquata*

Commonly recorded throughout the study site.

Mistle Thrush *Turdus viscivorus*

A single bird noted at the study site.

Sardinian Warbler *Sylvia melanocephala*

Common and widespread with singing and displaying males holding territory throughout the study site.

The species is a common and widespread bird along the Mediterranean coast and occurs just into Asia in Turkey. Unlike most warblers it is not particularly migratory and is primarily a resident.

Cetti's Warbler *Cettia cetti*

A single individual heard calling from dense scrub at the study site.

Common Chiffchaff *Phylloscopus collybita*

A single individual was heard to call from dense scrub at the study site. This individual will relate to either a wintering individual or newly arrived passage migrants.

Firecrest *Regulus ignicapillus*

Commonly recorded at the study site from areas of dense scrub.

Coal Tit *Parus ater*

An individual was observed in gardens adjacent to the study site and further individuals were heard calling amongst a mobile flock of Firecrest at the study site.

Blue Tit *Parus caeruleus*

A single bird was recorded at the study site with up to three individuals noted in the orchards and gardens adjacent to the study site.

Sombre Tit *Parus cinctus*

A single bird was observed feeding at the orchard/ gardens adjacent to the study site.

Common Magpie *Pica pica*

Up to four individuals recorded at the study site and adjacent orchard/ gardens.

Eurasian Jay *Garrulus glandarius*

A single registration of a bird in flight at the study site.

Common Raven *Corvus corax*

Individual birds noted soaring along the escarpment west of the study site.

House Sparrow *Passer domesticus*

Common at the study site along the border with the adjacent village and gardens.

Common Chaffinch *Fringilla coelebs*

Commonly recorded at the study site and in gardens of the adjacent village.

European Greenfinch *Carduelis chloris*

Birds noted at gardens and orchards adjacent to the study site. Small flocks (<10) noted in flight at the study site.

Cirl Bunting *Emberiza cirlus*

At least three pairs were noted in the orchards and gardens adjacent to the study site.

NOTE: With reference to both the limestone quarry and Flysch study sites, the bird of prey activity was notable by its virtual absence, in habitat where you would have expected much greater activity and considering that the conditions were perfect for any birds of prey in the area to be on the wing and in active display? Hunting? Lack of prey (hunting?)

REPTILES

Suitable habitat for reptiles exists across the entire study site. During the walkover survey a visual search of suitable basking spots was undertaken and brash piles, stones, rubble and existing refugia were examined.

Viviparous Lizard *Lacerta vivipara*

Individuals recorded basking amongst open stony ground at the study site.

AMPHIBIANS

A number of water bodies were present at the study site consisting of roadside puddles/pools that had been created by the tires of heavy plant and machinery along the study site access tracks that had allowed rain water to gather and collect.



Photo 6: Typical access track through study site where pools form

Common Frog *Rana temporaria*

Individuals present at the livestock drinking pool

Balkan Stream Frog *Rana graeca*

Individuals of this species were noted along a watercourse/ spring adjacent to the study site. Typical habitat for a species associated with cold running streams and mountainous areas.

Marsh Frog *Rana ridibunda*

Common at the livestock drinking pool and at track-side pools and puddles.

BATS

The adjacent village and associated building looked suitable for roosting bats as does the steep rocky escarpment with associated crevices and caves to the west of the study site.



Photo 7: Escarpment west of study site

The access track to the site also had a number of man made tunnels which looked suitable for roosting bats. These were checked as thoroughly as time allowed but were deemed unsafe by local guides to enter too far. The study site itself lacked suitable roosts although would presumably be a potential foraging area for bats.

There was no opportunity to survey during the night as part of an activity survey to establish the use of the site by foraging bats or to ascertain which if any of the suitable roosts was being utilised by bats.

MAMMALS

The site is intensively grazed by goats and horses. There was no evidence of any further mammal activity throughout the study site during the walk-over survey, although time and access was limited.



Photo 8: Grazed areas

INVERTEBRATES

All records were noted during the walk-over survey.

Lepidoptera

Hungarian Glider (common around road side pools), Small White (common), Large White (occasional), Green-veined White (common), Large Tortoiseshell (occasional) and Blue sps. (occasional).



Photo 9: Small White (Pieris rapae)

Orthoptera

Bush-crickets (common)

APPENDIX 4.3: FAUNA OF BURIZANA AREA

Table 1: Mammals of Burizana Area

No.	Taxonomic Order	Scientific name	Albanian local name (English common name)	Presence	Habitat
1	Erinaceomorpha (Gymnures and hedgehogs)	<i>Erinaceus concolor</i>	Iriqi (Eastern european Hedgehog)	+	Hedges and shrubs
2	Soricomorpha (Insectivores)	<i>Talpa caeca</i>	Urithi i verber (Mediterranean mole)	+	Meadows, arable land
3		<i>Talpa stankovici</i>	Urithi i Stankovicit (Stankovic's mole)	+	Meadows, arable land
4		<i>Crocidura suaveolens</i>	Hundgjat i kopshteve (bicolored shrew)	+	Hedges, shrubs
5		<i>Crocidura leucodon</i>	Hundgjat i livadheve (bicolored shrew)	+	Open terrains, meadows
6	Chiroptera (Bats)	<i>Rhinolophus ferrumequinum</i>	Lakuriq nate hundpatkua i madh (greater horseshoe bat)	+	Cave-dweller, open terrains and wetlands
7		<i>Rhinolophus blasii</i>	Lakuriq nate hundpatkua i Blasius-it (Blasius' horseshoe bat)	+	Cave-dweller, open terrains and wetlands
8		<i>Rhinolophus euryale</i>	Lakuriq nate hundpatkua i mesdheut (Mediterranean horseshoe bat)	+	Cave-dweller, open terrains and wetlands
9		<i>Rhinolophus hipposideros</i>	Lakuriq nate hundpatkua i vogel (Lesser Horseshoe bat)	+	Cave-dweller, open terrains and wetlands
10		<i>Myotis myotis</i>	Lakuriq nate veshmiu i madh (mouse-eared bat)	+	Cave-dweller, open terrains and wetlands
11		<i>Myotis blythi</i>	Lakuriq nate veshmiu i vogel (lesser mouse-eared bat)	+	Cave-dweller, open terrains and wetlands
12		<i>Myotis capaccinni</i>	Lakuriq nate gishta gjate (European 'trawling' bat)	+	Cave-dweller, open terrains and wetlands
13		<i>Miniopterus schreibersi</i>	Lakuriq nate i Schreibersi-it (Schreibers's long-fingered bat)	+	Cave-dweller, open terrains and wetlands
14		<i>Pipistrellus savii</i>	Pipistrelli i SavAnnex II-it (Savi's Pipistrelle)	+	Open terrains around villages
15		<i>Pipistrellus kuhli</i>	Pipistrelli i Kuhl-it (Kuhl's pipistrelle)	+	Open terrains around villages
16		<i>Pipistrellus pipistrellus</i>	Pipistrelli i zakonshem (common pipistrelle)	+	Open terrains around villages
17		<i>Vespertilio murinus</i>	Lakuriq nate dyngjyresh (Parti-coloured bat)	+	Maquis and shrublands
18	Lagomorpha (Hares)	<i>Lepus europaeus</i>	Lepur i murme (Brown hare)	+	Open terrains, shrubs, meadows
19	Rodentia (Rodents)	<i>Sciurus vulgaris</i>	Ketri (Red squirrel)	+	Chestnut forest, mixed forest of beech, fir and pine
20		<i>Muscardinus avellanarius</i>	Gjumashi i lajthise (Common dormouse)	+	Woodlands and shrubs
21		<i>Microtus thomasi</i>	Miu i Thomas-it (Thomas's pine vole)	+	Meadows, open terrains
22		<i>Apodemus flavicollis</i>	Miu gush-verdhe (yellow-necked field mouse)	+	Woodlands, forests
23		<i>Apodemus mystacinus</i>	Miu i shkembiti (broad-toothed field mouse)	+	In rocky terrains, shrubs

No.	Taxonomic Order	Scientific name	Albanian local name (English common name)	Presence	Habitat
24		<i>Apodemus sylvaticus</i>	Miu bisht-gjate (long-tailed field mouse)	+	In all types of vegetation
25		<i>Mus musculus</i>	Miu i shtepise (house mouse)	+	Sinanthropic species
26		<i>Mus spicilegus (abbotti)</i>	Miu i maqedonise (Steppe mouse)	+	Meadows
27	Carnivora (Carnivores)	<i>Canis lupus</i>	Ujku (Grey wolf)	+	Forests, woodlands, shrublands, subalpine meadows
28		<i>Vulpes vulpes</i>	Dhelpra (Red fox)	+	In all types of vegetation
29		<i>Meles meles</i>	Baldosa (Eurasian badger)	+	Forests, woodlands, and shrubs around villages
30		<i>Mustela nivalis</i>	Nuse lale (least weasel)	+	Open terrains, hedges and shrubs
31		<i>Mustela putorius</i>	Qelbesi (domestic ferret)	+	Shrublands
Note: (+) Present; (+?) Presumed to be present, but not yet recorded					

Table 2: Bird Species of Burizana Area

No.	Latin name	Albanian local name (English common name)	Ecotype	Presence	Nesting
1.	<i>Tachybaptus ruficollis</i>	Kredharaku i vogel (little grebe)	W	+	
2.	<i>Anas penelope</i>	Kryekuqe e madhe (Eurasian wigeon)	W	+	
3.	<i>Anas platyrhynchos</i>	Rosa e vendit (mallard)	W	+	
4.	<i>Aythya ferina</i>	Kryekuqe (common pochard)	W	+	
5.	<i>Mergus serrator</i>	Zhytes i mesem me çallme (red-breasted merganser)	W	+	
6.	<i>Aquila chrysaetos</i>	Shqiponja e maleve (golden eagle)	R	+	+
7.	<i>Aquila pomarina</i>	Shqiponja e vogel e rosave (lesser spotted eagle)	M	+	
8.	<i>Falco tinnunculus</i>	Skifteri kthetra-zi (common kestrel)	R	+	+
9.	<i>Falco subbuteo</i>	Skifteri I drureve (Eurasian hobby)	S	+	+?
10.	<i>Falco peregrinus</i>	Krahethati (peregrine falcon)	R	+	+
11.	<i>Accipiter gentilis</i>	Gjeraqina (northern goshawk)	R	+	+
12.	<i>Accipiter nisus</i>	Gjeraqina e shkurter (Eurasian sparrowhawk)	R	+	+
13.	<i>Pernis apivorus</i>	Huta grenxangrenese (European honey buzzard)	S	+	+
14.	<i>Buteo buteo</i>	Huta (common buzzard)	R	+	+
15.	<i>Hieraaetus fasciatus</i>	Shqiponja e vogel (Bonelli's eagle)	S	+	+?
16.	<i>Hieraaetus pennatus</i>	Shqiponja bishtvizuar (booted eagle)	M	+	
17.	<i>Gyps fulvus</i>	Shkaba (Eurasian griffon)	M	+	
18.	<i>Neophron percnopterus</i>	Kali i qyqes (Egyptian vulture)	S	+	+
19.	<i>Circaetus gallicus</i>	Shqiponja gjerperngrenese (short-toed eagle)	S	+	+
20.	<i>Alectoris graeca</i>	Thelleza e malit (rock partridge)	R	+	+
21.	<i>Perdix perdix</i>	Thellenxa e fushes (grey partridge)	R	+	+
22.	<i>Coturnix coturnix</i>	Shkurta (common quail)	S	+	+
23.	<i>Charadrius alexandrinus</i>	Vraponjesi gushebardhe (Kentish plover)	S	+	+

No.	Latin name	Albanian local name (English common name)	Ecotype	Presence	Nesting
24.	<i>Actitis hypoleucos</i>	Qyrylyku i vogel (common sandpiper)	S	+	+
25.	<i>Columba palumbus</i>	Guaku (common wood-pigeon)	R	+	+
26.	<i>Columba livia</i>	Pellumbi i eger i shkembrit (common pigeon)	R	+	+
27.	<i>Columba oenas</i>	Pellumbi i eger (stock dove)	R	+	+
28.	<i>Streptopelia turtur</i>	Turtulli (European turtle-dove)	S	+	+
29.	<i>Streptopelia decaocto</i>	Kumria (Eurasian collared-dove)	R	+	+
30.	<i>Cuculus canorus</i>	Qyqja (common cuckoo)	S	+	+
31.	<i>Bubo bubo</i>	Bufi (Eurasian eagle-owl)	R	+	+
32.	<i>Athene noctua</i>	Kukuvajka (little owl)	R	+	+
33.	<i>Strix aluco</i>	Kukuvajka e pyjeve (tawny owl)	R	+	+
34.	<i>Tyto alba</i>	Kukuvajka mjekerroshe (barn owl)	R	+	+
35.	<i>Asio otus</i>	Bufi veshegjate (long-eared owl)	R	+	+
36.	<i>Otus scops</i>	Gjoni (Eurasian scops owl)	S	+	+
37.	<i>Caprimulgus europaeus</i>	Dallendyshe nate (Eurasian nightjar)	S	+	+
38.	<i>Apus melba</i>	Dejka gjoks-bardhe (alpine swift)	S	+	+
39.	<i>Apus apus</i>	Dejka (common swift)	S	+	+
40.	<i>Alcedo atthis</i>	Bilbil uji (kingfisher)	R	+	+
41.	<i>Merops apiaster</i>	Grille (european Bee-eater)	S	+	+
42.	<i>Upupa epops</i>	Pupeza (Eurasian hoopoe)	S	+	+
43.	<i>Dryocopus martius</i>	Qukapiku i zi (black woodpecker)	R	+	+
44.	<i>Picus viridis</i>	Qukapiku i gjelber (Eurasian green woodpecker)	R	+	+
45.	<i>Dendrocopos syriacus</i>	Qukapiku i zakonshem larosh (Syrian woodpecker)	R	+	+
46.	<i>Dendrocopos major</i>	Qukapiku larosh i madh (great spotted woodpecker)	R	+	+
47.	<i>Dendrocopos medius</i>	Qukapiku larosh i mesem (middle spotted woodpecker)	R	+	+
48.	<i>Dendrocopos minor</i>	Qukapiku larosh i vogel (lesser spotted woodpecker)	R	+	+
49.	<i>Dendrocopos leucotos</i>	Qukapiku larosh kurriz bardhe (white-backed woodpecker)	R	+	+
50.	<i>Jynx torquilla</i>	Kokedredhesi (northern wryneck)	S	+	+
51.	<i>Alauda arvensis</i>	Lauresha (sky lark)	R	+	+
52.	<i>Galerida cristata</i>	Dervishi (crested lark)	R	+	+
53.	<i>Lullula arborea</i>	Drenja (wood lark)	R	+	+
54.	<i>Ptyonoprogne rupestris</i>	Dallendyshe e gureve (Eurasian crag martin)	R	+	+
55.	<i>Hirundo daurica</i>	Dallendyshe kerbishte kuqe (red-rumped swallow)	S	+	+
56.	<i>Hirundo rustica</i>	Dallendyshe bisht gershere (barn swallow)	S	+	+
57.	<i>Delichon urbica</i>	Dallendyshe bisht bardhe (northern house martin)	S	+	+
58.	<i>Riparia riparia</i>	Dallendyshe lumi (collared sand martin; bank swallow)	S	+	
59.	<i>Anthus spinoletta</i>	Drenja e malit (water pipit)	W	+	
60.	<i>Anthus trivialis</i>	Drenja e pyllit (tree pipit)	S	+	+
61.	<i>Anthus pratensis</i>	Drenja e luadhit (meadow pipit)	W	+	
62.	<i>Certhia brachydactyla</i>	Rrotulluesi gishtshkurter (short-toed treecreeper)	R	+	+
63.	<i>Certhia familiaris</i>	Piku rrotullues (Eurasian treecreeper)	R	+	+?
64.	<i>Motacilla cinerea</i>	Bishtatundesi i malit (grey wagtail)	R	+	+

No.	Latin name	Albanian local name (English common name)	Ecotype	Presence	Nesting
65.	Motacilla alba	Bishtatundes i bardhë (white wagtail)	R	+	+
66.	Cinclus cinclus	Mellenje uji (white-throated dipper)	R	+	+
67.	Troglodytes troglodytes	Cinxami (winter wren)	R	+	+
68.	Prunella modularis	Dredhuesi gusheperhime (dunnock; hedge sparrow)	R	+	+?
69.	Prunella collaris	Dredhuesi i alpeve (alpine accentor)	R	+	+?
70.	Sylvia communis	Bilbilthi i perhime (greater whitethroat)	S	+	+
71.	Sylvia melanocephala	Bilbilthi kokezi gushebardhe (Sardinian warbler)	R	+	+
72.	Sylvia cantillans	Bilbilthi gushekuq (subalpine warbler)	S	+	+
73.	Sylvia atricapilla	Bilbilthi kokezi (blackcap)	R	+	+
74.	Erithacus rubecula	Gushekuqi (European robin)	R	+	+
75.	Luscinia megarhynchos	Bilbili (common nightingale)	S	+	+
76.	Phoenicurus ochruros	Bishtkuqi zeshkan (black redstart)	R	+	+
77.	Phoenicurus phoenicurus	Bishtkuqi i mureve (common redstart)	S	+	+
78.	Saxicola torquata	Ceku kokezi (common stonechat)	R	+	+
79.	Oenanthe oenanthe	Bishtbardha e gurit (northern wheatear)	S	+	+
80.	Oenanthe hispanica	Bishtbardha e gurit (black-eared wheatear)	S	+	+
81.	Monticola solitarius	Tusha blu (blue rock thrush)	R	+	+
82.	Monticola saxatilis	Tusha bishtkuqe (common rock thrush)	S	+	+
83.	Regulus regulus	Mbretthi (goldcrest)	R	+	+
84.	Regulus ignicapillus	Mbretthi vetull-bardhe (firecrest)	R	+	+
85.	Muscicapa striata	Mizakapesi i perhime (spotted flycatcher)	S	+	+
86.	Ficedula semitorquata	Mizakapesi krahevizuar (semi-collared flycatcher)	S	+	+
87.	Ficedula albicollis	Mizakapesi qafebardhe (collared Flycatcher)	M	+	
88.	Ficedula hypoleuca	Mizakapesi i zi (pied flycatcher)	M	+	
89.	Turdus merula	Mellenja (common blackbird)	R	+	+
90.	Turdus pilaris	Tusha e madhe e fushes (fieldfare)	W	+?	
91.	Turdus iliacus	Tusha vetullbardhe (redwing)	W	+	
92.	Turdus philomelos	Tusha kengetare (song thrush)	R	+	+
93.	Turdus viscivorus	Tusha e malit (mistle thrush)	R	+	+
94.	Hippolais olivetorum	Perqeshesi i madh i ullinjve (olive-tree warbler)	S	+	+
95.	Hippolais pallida	Perqeshesi i vogel i ullinjve (olivaceous warbler)	S	+	+
96.	Phylloscopus collybita	Fishkellenjes i vogel (common chiffchaff)	R	+	+
97.	Phylloscopus sibilatrix	Fishkellenjes i madh (wood warbler)	S	+	+
98.	Parus lugubris	Trishtili i madh i murrme (sombre tit)	R	+	+
99.	Parus palustris	Trishtili i vogel i murrme (marsh tit)	R	+	+
100.	Parus cristatus	Trishtili me çafke (crested tit)	R	+	+
101.	Parus caeruleus	Trishtili i kalter (blue tit)	R	+	+
102.	Parus major	Trishtili i madh (great tit)	R	+	+
103.	Parus ater	Trishtili i zi (coal tit)	R	+	+
104.	Aegithalos caudatus	Trishtili bishtgjate koke bardhe (long-tailed tit)	R	+	+
105.	Sitta europea	Zvarritesi i drureve (nuthatch)	R	+	+
106.	Sitta neumayer	Zvarritesi i shkrepave (western rock nuthatch)	R	+	+
107.	Tichodroma muraria	Zvarritesi krahekuq (wallcreeper)	R	+	+

No.	Latin name	Albanian local name (English common name)	Ecotype	Presence	Nesting
108.	Lanius collurio	Larashi kurrizkuq (red-backed shrike)	S	+	+
109.	Lanius senator	Larashi kokekuq (woodchat shrike)	S	+	+
110.	Sturnus vulgaris	Cerloi, gargulli (European starling)	R	+	+
111.	Oriolus oriolus	Bengu (Eurasian golden-oriole)	S	+	+
112.	Garrulus glandarius	Grifsha (Eurasian jay)	R	+	+
113.	Pica pica	Laraska bishtgjate (common magpie)	R	+	+
114.	Pyrrhocorax graculus	Sterqoka e malit (alpine chough; yellow-billed chough)	R	+	+
115.	Corvus corax	Korbi (common raven)	R	+	+
116.	Corvus c. cornix	Sorra (hooded crow)	R	+	+
117.	Corvus frugilegus	Korbi sqepbardhe (rook)	W	+	
118.	Passer montanus	Harabeli i fushes (Eurasian tree sparrow)	R	+	+
119.	Passer domesticus	Harabeli i shtepise (house sparrow)	R	+	+
120.	Fringilla coelebs	Avdosa (chaffinch)	R	+	+
121.	Fringilla montifringila	Zborakes i malit (Brambling)	W	+	
122.	Serinus serinus	Zoë bari sqepshkurter (European serin)	R	+	+
123.	Carduelis spinus	Cirla dimerake (Eurasian siskin)	W	+	
124.	Carduelis chloris	Verduni (European greenfinch)	R	+	+
125.	Carduelis carduelis	Gardalina (European goldfinch)	R	+	+
126.	Carduelis cannabina	Kerpngrenesi (Eurasian linnet)	R	+	+
127.	Pyrrhula pyrrhula	Kuqalashi çafkeze (Eurasian bullfinch)	W	+	
128.	Loxia curvirostra	Sqep kryqi (red crossbill)	W	+	
129.	Coccothraustes coccothraustes	Sqeptrashia (hawfinch)	R	+	+
130.	Miliaria calandra	Cerla e zakonshme (corn bunting)	R	+	+
131.	Emberiza cia	Cerla e malit (western rock bunting)	R	+	+
132.	Emberiza cirlus	Cerla gushegjelber (Cirl bunting)	R	+	+
133.	Emberiza citrinella	Cerla verdhashe (yellowhammer)	R	+	+
134.	Emberiza melanocephala	Cerla kokezeze (black-headed bunting)	S	+	+

Note: R-resident; W-wintering; S-summer visitor; M-migratory

Table 3: Threatened Bird Species of Burizana Area

No.	Latin name	Local name	National threat status	Habitat
1.	<i>Aquila chrysaetos</i>	Shqiponja e maleve (golden eagle)	EN	Cliff, Rocky and open mountain terrains
2.	<i>Falco tinnunculus</i>	Skifteri kthetra-zi (common kestrel)	VU	Cliff, Rocky and open terrains
3.	<i>Falco peregrinus</i>	Krahethati (peregrine falcon)	VU	Cliff, Rocky and open terrains
4.	<i>Accipiter gentilis</i>	Gjeraqina (northern goshawk)	VU	High forests and openings
5.	<i>Accipiter nisus</i>	Gjeraqina e shkurter (Eurasian sparrowhawk)	EN	Cliff, Rocky and open terrains
6.	<i>Hieraaetus fasciatus</i>	Shqiponja e vogel (Bonelli's eagle)	CR	Cliff, Rocky and open terrains
7.	<i>Gyps fulvus</i>	Shkaba (Eurasian griffon)	CR	Cliff, Rocky and open terrains
8.	<i>Neophron percnopterus</i>	Kali i qyqes (Egyptian vulture)	VU	Cliff, Rocky and open terrains
9.	<i>Circaetus gallicus</i>	Shqiponja gjerperngrenese (short-toed eagle)	VU	High forests with openings
10.	<i>Bubo bubo</i>	Bufi (Eurasian eagle-owl)	CR	Cliff, Rocky and open terrains
11.	<i>Tyto alba</i>	Kukuvajka mjekerroshe (barn owl)	VU	Old buildings
12.	<i>Merops apiaster</i>	Grille (European bee-eater)	EN	Wetlands
13.	<i>Jynx torquilla</i>	Kokedredhesi (northern wryneck)	LRnt	Forest
14.	<i>Prunella collaris</i>	Dredhuesi i alpeve (alpine accentor)	DD	Cliffs
15.	<i>Muscicapa striata</i>	Mizakapesi i perhime (spotted flycatcher)	DD	Shrublands
16.	<i>Hippolais olivetorum</i>	Perqeshesi i madh i ullinjve (olive-tree warbler)	DD	Shrublands
17.	<i>Parus palustris</i>	Trishtili i vogel i murrme (marsh tit)	DD	Forest
18.	<i>Tichodroma muraria</i>	Zvarritesi krahekuq (wallcreeper)	EN	Cliffs

Table 4: Amphibians and Reptiles Of Burizana Area

Scientific name	Local name	Presence
Amphibians		
<i>Salamandra salamandra</i>	E bukura e dheut (fire salamander)	+
<i>Triturus cristatus</i>	Tritoni kreshtak (great crested newt)	+
<i>Triturus vulgaris</i>	Tritoni i rendomte (smooth newt)	+
<i>Bombina variegata</i>	Bretkosa barkverdhe (yellow-bellied toad)	+
<i>Bufo bufo</i>	Thithlopa (Common Toad)	+
<i>Bufo viridis</i>	Thithlopa e gjelber (European green toad)	+
<i>Hyla arborea</i>	Verore (common tree frog)	+
<i>Rana balcanica</i>	Bretkose e zakonshme (greek march frog)	+
<i>Rana dalmatina</i>	Bretkose kercimtare (agile frog)	+
<i>Rana graeca</i>	Bretkose e perrenjve (Balkan stream frog)	+
<i>Rana temporaria</i>	Bretkose e kuqerremte e malit (Common frog)	+?
Reptiles		
<i>Emys orbicularis</i>	Breshkujza (European pond turtle)	+
<i>Mauremys caspica</i>	Breshkujze (Caspian turtle)	+?

Scientific name	Local name	Presence
<i>Testudo hermanni</i>	Breshka e zakonshme (Hermann's tortoise)	+
<i>Algyroides nigropunctatus</i>	Hardhuca me luspa te medha (Dalmatian Algyroides)	+
<i>Lacerta trilineata</i>	Zhapiu me tri viza (Balkan green lizard)	+
<i>Lacerta viridis</i>	Zhapiu i gjelbert (Eastern green lizard)	+
<i>Lacerta agilis</i>	Zhapiu i shkathet (Sand lizard)	+?
<i>Podarcis muralis</i>	Hardhuca e mureve (Common wall lizard)	+
<i>Podarcis taurica</i>	Hardhuca e livadheve (Balkan wall lizard)	+
<i>Podarcis melisellensis</i>	Hardhuca e vogel e gjelber (Dalmatian wall lizard)	+?
<i>Ablepharus kitaibelii</i>	Zhapiu kembevogel (Snake-eyed skink)	+?
<i>Ophisaurus apodus</i>	Bullari (European legless lizard)	+
<i>Anguis fragilis</i>	Kakzogza (Slow worm)	+
<i>Coluber jugularis</i>	Shigjeta e gjate (Black whip snake)	+
<i>Coluber gemonensis</i>	Shigjeta e shkurtër (Balkan whip snake)	+
<i>Coluber najadum</i>	Shigjeta e holle (Dahl's whipsnake)	+
<i>Coronella austriaca</i>	Gjarperi zi (Smooth snake)	+
<i>Elaphe longissima</i>	Bolla e shtëpise (Aesculapian snake)	+
<i>Elaphe quatuorlineata</i>	Bolla me kater vija (Four-lined snake)	+
<i>Elaphe situla</i>	Bolla laramane (Leopard snake)	+
<i>Natrix tessellate</i>	Gjarpri i vogel i ujit (Dice snake)	+
<i>Vipera ammodytes</i>	Neperka (Long-nosed viper)	+
<i>Vipera berus</i>	Neperka e malit me viza te nderprera (adder)	+?
<i>Vipera ursinii</i>	Neperka e malit me viza te panderprera (steppe viper)	+?
Note: (+) Present; (+?) Presumed to be present, but not yet recorded		

Table 5: Insects of Burizana Area

Order	No.	Species	Habitat
Odonata			
Dragonflies	1	<i>Calopteryx virgo</i>	Springs and streams
	3	<i>Lestes sponsa</i>	Springs and streams
	4	<i>Platynemis pennipes</i>	Springs, streams and water reservoirs
	5	<i>Pyrrhosoma nymphula</i>	Streams,
	6	<i>Ischnura pumilio</i>	Streams, water reservoirs
	7	<i>Caliaeschna microstigma</i>	Springs and streams
	8	<i>Onychogomphus forcipatus</i>	Streams,
	9	<i>Somatochlora metallica</i>	Water reservoirs
	10	<i>Crocothemis erythraea</i>	Water reservoirs
	11	<i>Cordulegaster bidentatus</i>	Springs and streams
	12	<i>Orthetrum anceps</i>	Streams and water reservoirs
Orthoptera			
Grasshoppers	1	<i>Gryllus campestris</i>	Open shrublands and meadows
& Crickets	2	<i>Tettigonia caudata</i>	Meadows
	3	<i>Decticus verrucivorus</i>	Meadows
	4	<i>Psophus stridulus</i>	Open shrublands and meadows
	5	<i>Stauroderus scalaris</i>	Open shrublands and pastures
Hemiptera			
Bugs	1	<i>Corixa sahlbergi</i>	Wetlands
	2	<i>Sigara nigrolineata</i>	Wetlands
	3	<i>Notonecta glauca</i>	Wetlands
	4	<i>Notonecta maculata</i>	Wetlands
	5	<i>Hydrometra stagnorum</i>	Wetlands
	6	<i>Dicyphus albonasulus</i>	Meadows
	7	<i>Acetropis josifovi</i>	Meadows
	8	<i>Stenodema sericans</i>	Meadows

Order	No.	Species	Habitat
	9	Stenodema virens	Meadows
	10	Notostris erratica	Meadows
	11	Megaloceroa recticornis	Meadows
	12	Adelphocoris lineolatum	Meadows
	13	Adelphocoris vandialis	Meadows
	14	Calocoris angularis	Meadows
	15	Calocoris annulus	Meadows
	16	Calocoris cinctipes	Meadows
	17	Stenotus binotatus	Meadows
	18	Lygus gemellatus	Meadows
	19	Lygus pratensis	Meadows
	20	Lygus rugulipennis	Meadows
	21	Orthops basalis	Meadows
	22	Cyphodema instabile	Meadows
	23	Polymerus unifasciatus	Meadows
	24	Capsodes infuscatus	Meadows
	25	Halticus apterus	Meadows
	26	Orthocephalus saltator	Meadows
	27	Globiceps fulvicollis	Meadows
	28	Plagiognathus fulvipennis	Meadows
	29	Criocoris crassicornis	Meadows
	30	Aptus mirmicoides	Meadows
	31	Nabis feroides	Meadows
	32	Nabis pseudoferus	Meadows
	33	Nabis rugosus	Meadows
	34	Rhinocoris iracundus	Meadows
	35	Aradus betulae	Meadows
	36	Lygaeus pandurus	Meadows
	37	Lygaeus saxatilis	Meadows
	38	Nysius graminicola	Meadows
	39	Macroplax fasciata	Meadows
	40	Coreus marginatus	Meadows
	41	Coriomeris denticulatus	Meadows
	42	Coriomeris spinolai	Meadows
	43	Camptopus lateralis	Meadows
	44	Corizus hyoscyami	Meadows
	45	Liorhyssus hyoscyami	Meadows
	46	Rhopalus parumpunctatus	Meadows
	47	Stictopleurus abutilon	Meadows
	49	Odontotarsus robustus	Meadows
	49	Graphosoma lineolatum	Meadows
	50	Aelia acuminata	Meadows
	51	Aelia rostrata	Meadows
	52	Staria lunata	Meadows
	53	Holcostethus sphacelatus	Meadows
	54	Palomena prasina	Meadows
	55	Carpocoris purpureipennis	Meadows
Coleoptera Beetles	1	Lucanus cervus	Broadleaf forests
	2	Dorcus parallelipipedus	Oaklands
	4	Aphodius inquinatus	Meadows
	5	Geotrupes vernalis	Meadows
	6	Geotrupes silvaticus	Meadows
	7	Geotrupes spiniger	Meadows
	8	Scarabaeus affinis	Meadows
	9	Scarabaeus sacer	Meadows
	10	Cacobius scheberi	Meadows
	11	Cacobius hispanus	Meadows
	12	Oryctes nasicornis	Meadows
	13	Pentodon idiota	Meadows

Order	No.	Species	Habitat
	14	Amphimallon italicus	Meadows
	15	Anisoplia agricola	Meadows
	20	Cetonia aurata	Shrublands, broadleaf forests and meadows
	21	Potosia aeruginosa	Meadows
	26	Leptura cordigera	In all forest formations
	27	Leptura dubia	In all forest formations
	29	Judolia erratica	Beach and pine forests
	30	Strangalia maculata	In all type of vegetations
	31	Strangalia pubescens	In all type of vegetations
	39	Purpuricenus kaehleri	Meadows and pastures
	40	Purpuricenus ephippium	Meadows and pastures
	41	Plagionotus dentritus	Meadows and pastures
	42	Xylotrechus rusticus	Meadows and pastures
	43	Clytus lama	Meadows and pastures
	44	Clytus rhamni	Meadows and pastures
	45	Monoschamus sartor	Meadows and pastures
	46	Monoschamus sutor	Meadows and pastures
	50	Dorcadion aethiops	Meadows
	51	Acanthocinus aedilis	Meadows
	52	Anaethetis testacea	Meadows
	53	Agapanthia cunerea	Shrublands
	54	Agapanthia kibryi	Shrublands
	55	Phytoecia affinis	Shrublands
	56	Phytoecia nigricornis	Shrublands
	57	Oberea oculata	Shrublands
Lepidoptera			
Butterflies & Moths	1	Carcharodus flocciferus	Meadows
	2	Spialia sertorius	Meadows
	3	Pyrgus malvae	Meadows
	4	Thymelicus acteon	Meadows
	5	Ochlodes venatum	Meadows
	6	Parnassius apollo	Meadows
	7	Parnassius mnemosyne	Meadows
	8	Iphiclydes podalirius	Meadows
	9	Papilio machaon	Meadows
	10	Leptidea sinapis	Meadows
	11	Aporia crataegi	Shrublands
	12	Pieris brassicae	Meadows
	13	Pieris rapae	Meadows
	14	Pieris manni	Meadows
	15	Pontia daplidice	Meadows
	16	Anthocaris cardamines	Shrublands and meadows
	17	Euchloe ausonia	Shrublands and meadows
	18	Colias crocea	Shrublands and meadows
	19	Gonepteryx cleopatra	Shrublands and meadows
	20	Gonepteryx rhamni	Shrublands and meadows
	21	Neozephyrus quercus	Forests and meadows
	22	Strymon acaciae	Forests and meadows
	23	Strymon ilicis	Forests and meadows
	24	Strymon spini	Forests and meadows
	25	Callophrys rubi	Forests and meadows
	26	Lycaena phlaeas	Forests and meadows
	27	Heodes ottomanus	Meadows
	28	Thermolycaena alciphron	Meadows
	29	Thermolycaena thersamon	Meadows
	30	Syntarucus pirithous	Meadows
	31	Celastrina argiolus	Meadows
	32	Glauopsyche alexis	Meadows
	33	Maculinea alcon	Meadows

Order	No.	Species	Habitat
	34	Scolitantides orion	Meadows
	35	Polyommatus icarus	Meadows
	36	Polyommatus eroides	Meadows
	37	Aricia agestis	Meadows
	38	Plebejus argus	Meadows
	39	Libythea celtis	Meadows
	40	Pararge aegeria	Meadows
	41	Lasiommata maera	Meadows
	42	Lasiommata roxelana	Meadows
	43	Coenonympha tullia	Meadows
	44	Coenonympha pamphillus	Meadows
	45	Pyronia tithonus	Meadows
	46	Pyronia cecilia	Meadows
	47	Maniola jurtina	Meadows
	48	Erebia medusa	Meadows
	49	Melanargia galahea	Meadows
	50	Melanargia larissa	Meadows
	51	Brintesia circe	Forest edges and meadows
	52	Arethusana arethusa	Forest edges and meadows
	53	Chazara briseis	Thin stands and shrublands
	54	Neochiparchia statilinus	Thin stands and shrublands
	55	Hipparchia semele	Thin stands and shrublands
	56	Hipparchia fagi	Thin stands and shrublands
	57	Charaxes jasius	Shrublands
	58	Argynnis paphia	Forest and shrubland edges
	59	Fabriciana adippe	Forest and shrubland edges
	60	Fabriciana niobe	Meadows
	61	Issoria lathonia	Meadows and shrublands
	62	Brenthis daphne	Meadows
	63	Brenthis hecate	Meadows and thin stands
	64	Clossiana euphrosyne	Meadows and forest edges
	65	Azuritis reducta	Shrublands
	66	Nymphalis antiopa	Forest edges
	67	Vanessa io	In all types of vegetation
	68	Vanessa atalanta	In all types of vegetation
	69	Cynthia cardui	In all types of vegetation
	70	Polygonia egea	Meadows
	71	Polygonia c-album	Meadows
	72	Cinclidia phoebe	Meadows
	73	Didymaeformia didyma	Meadows
	74	Euphydryas aurinia	Meadows
Bombyces & Sphinges (Hawkmoths)	75	Zygaena purpuralis	Meadows
	76	Malacosoma neustria	Forest area
	77	Dendrolimus pini	Pine forests
	78	Phyllodesma tremulifolia	Forest and shrubs
	80	Eudia pavonia	Forest and shrubs
	83	Macroglossum stellatarum	Shrubs and forests
	84	Phalera bucephala	Shrubs and meadows
	86	Harpyia milhauzeri	Broadleaf forest
	87	Lymantria dispar	Broadleaf forest
	88	Arctia villica	Broadleaf forest

APPENDIX 5: TRANSPORT STUDY

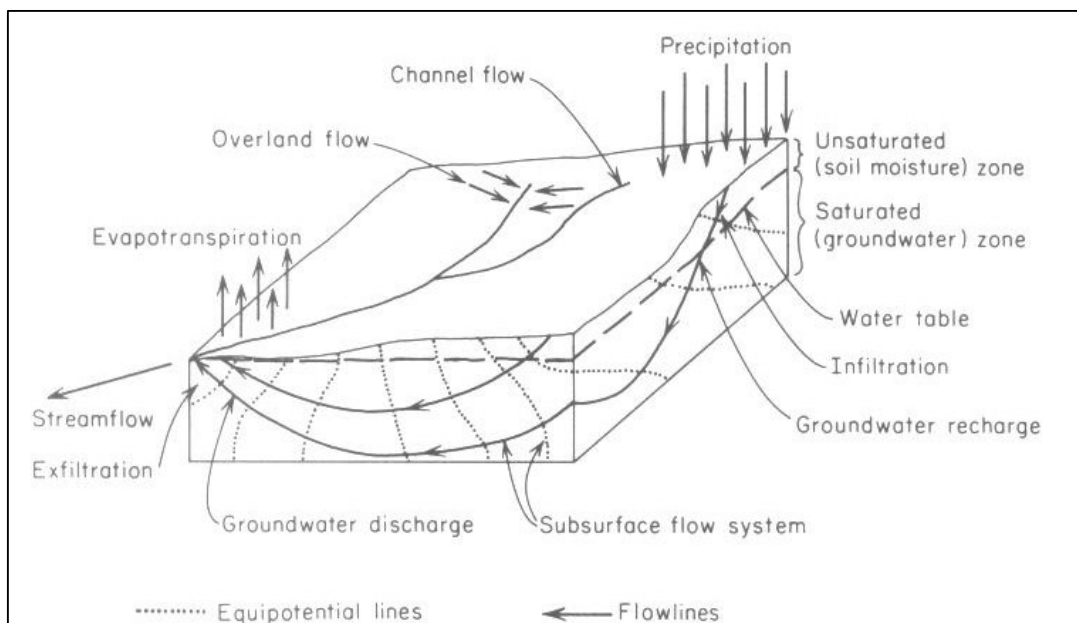
APPENDIX 6: HYDROGEOLOGY CONCEPTUAL MODEL

CONCEPTUAL MODEL FOR GROUNDWATER AVAILABILITY ASSESSMENT

Introduction

1. The following conceptual model applied for groundwater availability assessment at the examined area of cement plant and quarries is developed within the general context of the hydrological cycle on a watershed. A schematic representation of the principal components of the hydrological cycle is given in Figure 1.

Figure 1: Hydrological Cycle Representation ²



2. Inflow to the hydrologic system arrives as precipitation, in the form of rainfall or snowmelt. Outflow takes place as streamflow (or runoff) and as evapotranspiration, a combination of evaporation from open bodies of water, evaporation from soil surfaces and transpiration from the soil by plants. Precipitation is delivered to streams both on the land surface, as overland flow to tributary channels, and by subsurface flow routes, as interflow of baseflow following infiltration into the soil.
3. Figure 1 indicates that a watershed must be envisaged as a combination of both the surface drainage area and the parcel of subsurface soils and geologic formations that underlie it. Subsurface hydrological processes are very important, as the nature of

² **Groundwater**, R. Alan Freeze, John A. Cherry, Prentice Hall, Englewood Cliffs, NJ 07632

subsurface materials controls infiltration rates and infiltration rates influence the timing and spatial distribution of surface runoff.

Principal Assumptions

4. Based on current hydrometeorological data for the examined area of cement plant and quarries (*see par. 4.42*), the following coefficients can be estimated:

Annual Runoff Coefficient: $\alpha = \frac{P - ET_r}{P} = 0.5 \text{ (1)}$,

where: P - annual precipitation (mm), ET_r – Real Evapotranspiration.

Coefficient of evapotranspiration: $e = \frac{ET_r}{P} = 0.50 \text{ (2)}$

Coefficient of Infiltration: $i = \frac{I}{P} = 0.17 \text{ (3)}$, where I - infiltration.

Coefficient of direct runoff: $\alpha_d = \frac{R_d}{P} = 0.33 \text{ (4)}$,

where: R_d – direct (superficial) runoff.

5. Further, mean annual precipitation for the examined area amounts to 1,278 mm (*see par. 4.41*). This figure refers only to rainfall and not to snowmelt contribution to precipitation.
6. We have limited our estimates at the near field catchment area of River Droje, which occupies a surface area of 24 km² within the following boundaries: to the west - the settlement of Shperdheti, to the south - the city of Kruje and Kruje mountains, to the east – the mountain Rakshanit and to the north – the settlement of Shemria and the northern part of Droje plains up to the settlement of Shperdheti.
7. Current water exploitation, for water supply or irrigation purposes, in the wider area of Rinas – Thumane amounts up to 500-600 lt/sec or 15-18 million m³ annually.
8. Based on the production capacity of the examined cement facility, water requirements amount approximately to 1,200 m³/day or 438,000 m³ annually.
9. The catchment area of River Droje, as well as the respective aquifer feeding groundwater table is expanded in a greater area compared to the near field catchment area of River Droje under examination. The interactions (i.e. due to groundwater flow mechanisms or aquifers' exact dimensions) between the aquifer of Droje and the adjacent aquifers that affect groundwater reserves cannot be readily defined within the scope of the current ESIA study; however, based on the analysis of Chapter 4 (both

geological and hydrogeological), it appears that groundwater reserves are enhanced by adjacent aquifers.

Assessment

10. By solving the equation (2) for the estimation of infiltration coefficient as per the factor of infiltration, and taking annual precipitation of 1,278 mm, we conclude that:

$$I = i * P \rightarrow$$

$$I = 0.17 * 1,278 \text{ mm/yr} \rightarrow$$

$$I = 217.26 \text{ mm/yr or } 0.22 \text{ m/yr}$$

11. The above figure represents the mean annual water quantity that percolates through the upper layers of the ground during rainfall. This water quantity after saturating the topsoil layer is further penetrating to groundwater table as recharge of existing water reserves. Based on the above, infiltration rate across the near field catchment area of River Droje and subsequent groundwater recharge are estimated as follows:

$$Q_I = 0.22 \text{ m/yr} * 24 \text{ km}^2 = 5,280,000 \text{ m}^3/\text{yr}$$

Assuming that a percentage 5% of infiltration rate is consumed in order to maintain topsoil moisture content (up to the saturation point), groundwater recharge rate is then equal to:

$$Q_R = 95\% * Q_I \rightarrow$$

$$Q_R = 5,016,000 \text{ m}^3/\text{yr}$$

12. The above figure indicates that on annual basis groundwater reserves at the examined area are enhanced per 5 million m³ of water as a result of rainfall percolation to the ground.
13. Given that:
- Snowmelt contribution to precipitation is not taken into account.
 - Estimations refer to the near field area of River Droje, which does not coincide to the actual size of the respective aquifer.

- Baseflow contribution to infiltration from adjacent aquifers is not taken into account.

It is clear that actual groundwater recharge rate will be greater than the above numerical estimation.

14. Water requirements for the operation of the cement plant (i.e. 438,000 m³/yr) is not anticipated to negatively affect current or future condition of groundwater table at the examined area. A quantitative comparison of cement plant water demand to the current water exploitation rate of 15-18 million m³/yr of the Region or the estimated rate of groundwater recharge of 5 million m³/yr further qualifies the above statement.

APPENDIX 7: ROAD SAFETY ASSESSMENT STUDY