Pilot testing of the CAMP guidelines on strategic environmental assessment for the CAMP pilot study area

Final report

16 February 2008

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0. Non technical summary

Map 1: Satellite imagery of the study area

This report aims to test the Guidance for conducting Strategic Environmental Assessments (SEA) elaborated within the CAMP Cyprus by Jiri Dusik (CAMP International SEA Consultant) under the overall guidance by Ms. Joanna Constantinidou (CAMP National Coordinator, Environment Service), Mr. Glafkos Constantinides (CAMP Task Manager) and Ms. Christina Pantazi (CAMP National Director, Environment Service)

The report is largely derived from information provided by Mr. Panicos Nicolaides (CAMP National SEA Consultant) which has been further developed by Jiri Dusik and verified through consultations with numerous national authorities involved in CAMP activity on SEA (see chapter 6 for details).

The primary objective of this pilot SEA aims to demonstrate SEA process and to provide inputs for finalising of this proposed guidance. This report does not represent any form of formal SEA which may have any immediate formal implications fort the relevant plans or formal decision-making by relevant authorities. It also does not replace any formal EIA studies required under the EIA directive.

This pilot SEA analyzes impacts of two different plans -- one being the Larnaca Local Plan and the second one being the Policy Statement for the Countryside -- in the CAMP pilot study area. The CAMP pilot area covers the southern half of the in Larnaca city to Cape Kiti (see the Map 1 on the left).

The fact that this SEA focuses on impacts of two different plans which were already formally adopted and are being implemented is indicative of an informal nature of this pilot assessment. Any formal SEA conducted in accordance with the Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment (hereafter SEA Directive) would have to be undertaken for a single plan during its elaboration and would have to be completed before its adoption.

The key issues, cumulative impacts of the Plan and the proposed mitigation measures can be summarized as follows.

Issues	Key cumulative impacts of the Plan and other future developments	Proposed mitigation and enhancement measures to be considered in the Plan
Biodiversity in the Larnaca Salt Lakes (Natura 2000 site)	• Salt-lakes may be significantly adversely impacted if the water balance regime in salt-lakes will become disturbed by the reduction of freshwater inflow to the lakes. Such reduction in the inflow is already caused by the documented reduction in rainfall in the last few decades (attributed to climate change) and is further enhanced by the reduction of freshwater inflow due to urbanization of the surrounding areas. The full implementation of the Management Plan for the Lake may partly mitigate or offsets these impacts, however more attention needs to be given to water balance regime in salt-lakes. • The lake ecosystem will continue to be affected by noise generated by the road transport and by the expansion of Larnaca International Airport. The nature and magnitude of this impact on migratory species is uncertain and this issue needs to be carefully monitored.	1. Implementation of the Management Plan for the Salt Lake and its further revision to fulfill the provisions of the Habitats Directive. 2. Implementation of a detailed monitoring program to monitor impacts of ongoing developments on migratory species (especially impacts of changes in the water quality and impacts due to increasing noise in the study area) 3. Adoption of additional measures if the monitoring programme indicates that migratory species in the Lakes are negatively affected
Quality of coastal surface waters	• If limited housing units and tourist facilities are developed and if a controllable drainage system is implemented in the area, no major impacts are expected in the surface fresh waters. • Some minor local adverse impacts on the surface fresh waters will continue because of the ongoing agricultural activities.	4. Plan for the construction of a drainage system that will help remove pollutants before they enter the river bed (use of screening facilities, use of detention ponds)
Quality and quantity of ground waters	• Continuation of agricultural activities in the area would likely bring negative impacts on local aquifers due to lowering the ground water levels. and enhancing the sea intrusion in the area. This would keep the concentrations of chlorides and nitrates at very high levels. • Development of the Housing Zones according to the Proposed Plan is expected to bring positive impacts since the agricultural activities will be eliminated in the area, thus the quantities of pumped ground water from local wells will be eliminated therefore the ground water level will rise and the nitrates pollution will be also minimized. If a central sewerage system is implemented, then development of housing will not lead to any significant adverse impacts on the local aquifers.	5. Implement a central sewerage system in the area to protect the aquifer from releases of sewage in absorption pits.

Aesthetics Quality	• If the plans are not implemented, the visual and aesthetics destruction will continue. In this case, the status quo would prevail and amenity and open spaces in the study area would be lost. • The lack of landscaping protection, planning and management in the plans will allow the housing development that will be based on individuals' needs and likings. These negative impacts are anticipated to increase unless permitting of housing development gives a greater attention to ensuring aesthetics quality that fits the regional context.	6. The following should be incorporated in the proposed plan: "landscaping protection" - actions shall be taken to conserve and maintain the significant or characteristic features of a landscape; "landscape planning" - actions shall be taken to enhance, restore or create landscapes; "landscape management"- actions shall be taken to ensure the regular upkeep of a landscape, so as to guide and harmonize changes which are brought about by social, economic and environmental processes. All the above will finally result to the individual and social-well being improving at the same time the quality of life everywhere. 7. There is a need to promote wider public and organisational understanding of sustainability. Increase awareness among professionals, civil society, private organizations and public authorities and promote training programs for professionals in private and public sector, and associations concerned with regards to landscape protection, management and planning. 8. Develop and use relevant targets and indicators
Public access to beaches	• Likely significant negative impacts on the beach access and beach quality will occur if significant sea level rise occurs or if new regulations with regards to building design and sitting are not enforced.	9. Take into consideration climate change (scenarios for sea level rise and extreme weather conditions) 10. Protect, expand and enhance a system of public coastal access that achieves the following: • Eliminate the trend of maintaining dense housing development and other kinds of man-made structures by the shoreline and public beaches • Maximize public access to and along the shoreline and public beaches by providing corridors of access • Implement Local Plan policies relating to Area Schemes for the waterfront areas which include provisions for pedestrian and bicycle trails by the shoreline and the public beaches • Provide access to coastal view corridors • Protect environmentally sensitive habitat areas 11. Update and enforce local regulations accordingly 12. Develop and use relevant targets and indicators

Noise levels	• The noise levels will be increasingly exceeded in the residential zones through the eastern and northern parts of the study area. More people will be affected by excessive noise levels, but the scale of this impact could not be predicted within this study due to its nature and time constrains	13. Explore the possibility of limiting the use of the airport during the night hours. 14. Implement a pay premium scheme for the frequent flyers. 15. Limit the permits on housing units in the affected area. 16. Develop and use relevant targets and indicators
Ancient monuments, churches and trees	• No impacts on existing ancient monuments are expected if applicable regulations are enforced. However, there is a low risk for negatively affecting cultural heritage in cases where construction is carried out in areas that are not protected by the Department of Antiquities and the presence of ancient monuments is unknown.	17. Develop local regulations on the protection of ancient monuments and protected trees in cases where development is carried out in areas that are not protected by the Department of Antiquities and where the presence of ancient monuments is unknown.
Coastal erosion	• Future coastline erosion is uncertain as it will depend mainly on adverse impacts of the actual climate changes that (which may significantly affect entire character of the shoreline) and on effectiveness of counter-measures in form of back-water structures. The plan further existing risks of increased coastal erosion given the risks associated with mainly: • Loss of vegetation along the coast • Increase in beach quarrying to satisfy construction industry • Increase of impermeable surface areas along the coast therefore increasing water runoff and erosion • Possible increase in illegal breakwaters or groins	18. Take into consideration climate change (scenarios for sea level rise and extreme weather conditions) 19. Assign coastal protection areas 20. Develop more stringent regime for permitting or licensing of residential and tourism developments along the coast 21. Monitor erosion along the coast
Seismic Risks	• The plan is implemented in a high seismicity risk area. The increased development within the study area will increased risk of damage in case of seismic events	22. Improve & update the Seismic Code for Reinforced Concrete Structures in Cyprus

1. Introduction to this report

The pilot SEA used trend analysis -- an interpretation of changes over time in the key environmental issues with and without the relevant plans -- as the primary analytical tool. The trends analysis focused on key issues of concern (see Chapter 4 for details) and it traced key trends in the study area over the past years and with an outlook of 5-10 year ahead with and without the relevant plans. Selected trends were analyzed through maps illustrating spatial dimensions of key issues addressed and through accompanying assessment of the past trends and expected future impacts of the relevant plans. The report focuses on the key issues of concern and suggests possible measures to prevent, reduce or offset expected negative impacts.

The SEA employed the following analytical steps:

(i) Identification of approx. 40 specific environmental concerns considered by the local stakeholders as important for development of the study area;
(ii) Consolidation of issues list into 11 key environmental issues,
(iii) Outline of the past and future trends in 11 environmental issues in the study area without the relevant plans
(iv) Outline of the expected future trends in 11 key environmental issues with the proposed plans;
(v) Formulation of a comprehensive set of recommended measures for preventing, reducing or off-setting negative impacts of the proposed hydropower plan and for enhancing any expected positive impacts.

This report provides all information required by the SEA Directive except item 'outline of the reasons for selecting the alternatives dealt with' and item 'the measures concerning monitoring' which could not be elaborated within the scope of this study. The table 1 below indicates relationship between the chapters of this report and the relevant requirements of the SEA Directive.

Table 1: Relationship between the chapters of this report and the relevant requirements of the SEA Directive

Contents of the Environmental Report as outlined in Annex I of the SEA Directive	Relevant chapters of this report
(a) an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes;	See Chapter 2
(b) the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme;	Addressed for each issue of concern separately in Chapter 5
(c) the environmental characteristics of areas likely to be significantly affected;	See Chapter 3
(d) any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC;	Chapter 5 describes -- separately for each issue of concern – any existing environmental problems which are relevant to the plan.

(e) the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation;	The relevant environmental protection objectives and related environmental consideration are described in the Chapter 4. Chapter 5 summarizes -- separately for each issue addressed – the way those objectives and any environmental considerations have been taken into account during the preparation of the relevant plans.
(f) the likely significant effects[1] on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors;	Chapter 5 describes -- separately for each issue of concern – the likely significant effects of the relevant plans.
(g) the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme;	Chapter 5 describes -- separately for each issue of concern – the recommended mitigation and enhancement measures.
(h) an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information;	Not addressed in this study due to its nature due to time constraints.
(i) a description of the measures envisaged concerning monitoring;	Not addressed in this study due to its nature and time constraints.
(j) a non-technical summary of the information provided under the above headings.	See Non-technical summary

[1] These effects should include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects.

2. An outline of the contents, main objectives of the plans subject to this SEA and their relationship with other relevant plans and programmes

2.1. Outline of the contents of the plans subject to this SEA

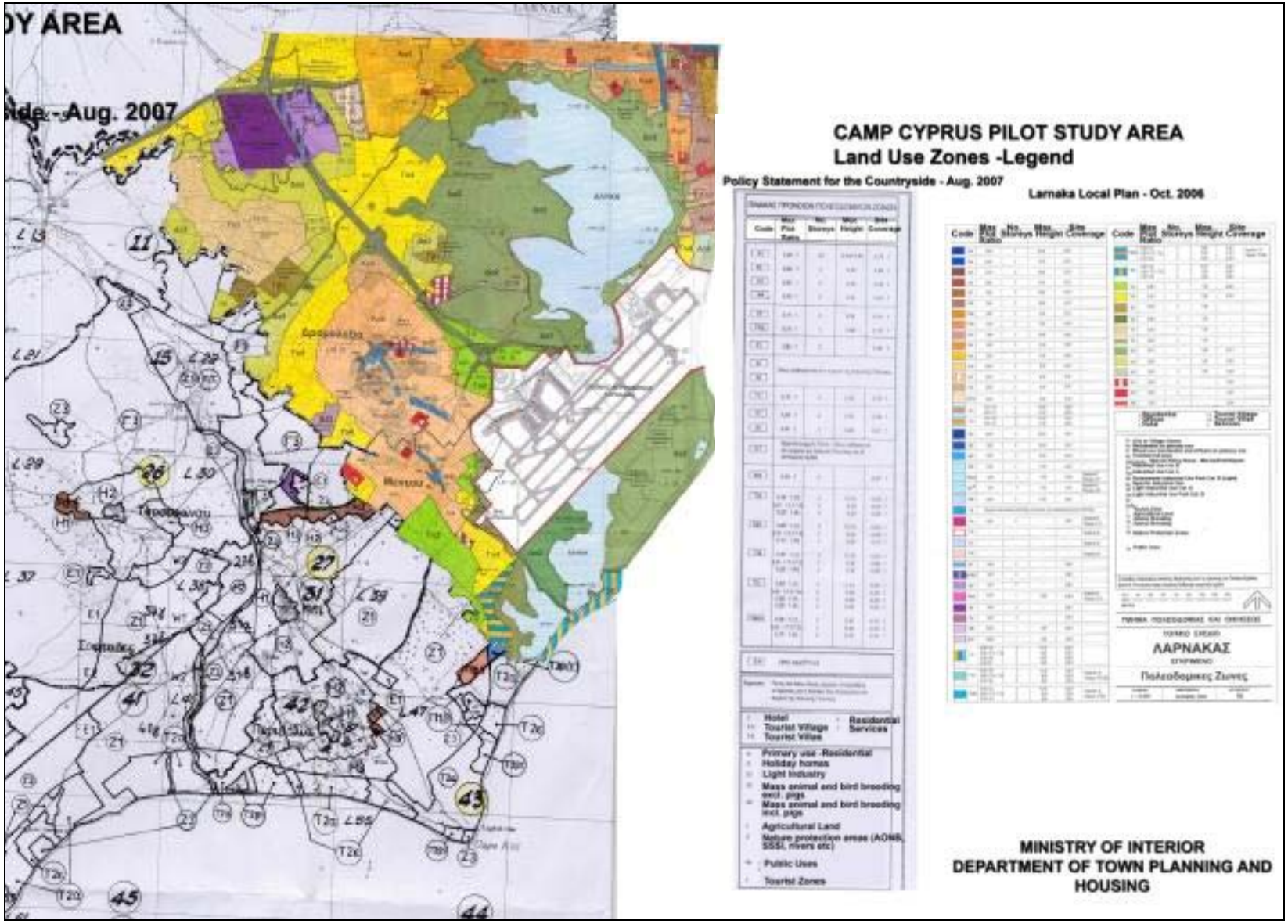
Both plans - the Larnaca Local Plan and the Policy Statement for the Countryside - generally define thematic policies that stipulate the following overall developments objectives for the study area:

Housing Policy	Some of the main provisions of urban housing policy address the designation of areas for residential development, their differentiation according to development densities, building heights and floor areas permitted, the elaboration of parameters concerning non-residential uses considered compatible with residential ones and the requirements under which such uses may be permitted, as well as the provision of incentives to promote specific housing policy objectives, such as the encouragement of integrated residential development.
Tourism Policy	Due to the significance of the tourism sector to the economy of Cyprus, tourism spatial policy expresses not only the need to control the undesirable side-effects of mass tourism development, but also the priorities and objectives of the government Strategic Tourism Plan, prepared by the Cyprus Tourism Organisation in consultation with a wide spectrum of stakeholders, the objectives and priorities of which are based on the attraction of quality tourism with longer stays and higher spending, the increase of tourist arrivals, the improvement of seasonality and the diversification of the tourist product, including further development of special interest tourism. Consequently, apart from basic functional and organisation concerns for tourist establishments, tourism spatial policy provisions address the control of intensity and quality of tourist development, the integration of amenities in tourist area design considerations and the improved integration of these areas into the overall urban fabric, as well as the encouragement of tourist product diversification through the promotion of a healthy mix of uses in tourist areas. Relevant measures and provisions also cover the designation of tourist zoning in coastal areas, the conditions for the mix of uses, location and organisation requirements for mixed use destination resorts, conditions for the tourist use of architectural heritage, conditions for the permission of retail, recreation and entertainment development within tourist areas etc. Tourism development is governed by specifically formulated basic design parameters and is bound by a set of published approval and implementation procedures with the involvement of the Cyprus Tourism Organisation at various stages.
Transportation Policy	This is formulated in cooperation with other competent Government agencies, including the Public Works Department and other services of the Ministry of Communications and Works, partly through the deliberations of a national ad hoc umbrella committee for the examination of traffic problems. This has become necessary since transportation networks at the national, regional and local levels fall under the jurisdiction of various authorities. Thus, transportation policies formulated within Development Plans have become an invaluable tool for the coordination and integration of all relevant policies at local and conurbation levels.

	Transportation spatial policy is expressed through the designation and publication of a hierarchy of primary, secondary and tertiary road networks to which several other spatial policies correspond, the formulation and implementation of traffic management and public transport policies, as well as through the designation of adequate parking, pedestrian and bicycle routes.
Commercial Policy	Considering the predominance of the tertiary sector in the economy, commercial spatial policy is directed towards two main objectives: On one hand, the efficient allocation of commercial activity in a multi-centred urban system based on market dynamics, and on the other hand, the protection of public amenities and the image of the urban environment from the negative impacts of commercial development. Specific policy measures and provisions are in place for the Central Business District, several designated Regional Retail Centres , three distinct types of Activity Corridors (classed according to their role within the transportation network and the types of activity permitted), Local Retail Centres and historic urban cores in satellite towns, as well as the organisation and location of specialised retail development, in particular that of department stores, commercial complexes and hypermarkets. Moreover, this policy contains measures and provisions that address the infiltration of retail uses in non-commercial areas, the location of convenience stores at the neighbourhood level, the organisation and location of office space, the location of petrol stations etc.
Industrial Policy	With the gradually diminishing economic importance of the secondary sector and in view of its inherent structural weaknesses, industrial spatial policy expresses not only the need for the protection of public amenities and the environment, but also the priorities and objectives of the government Strategic Development Plan, the current industrial policy of which is based on the attraction and development of high technology industries, the restructuring and support of existing industries, the improvement of productivity, and the attraction of foreign investment. To this effect, measures and provisions have recently been introduced in relation to Research and Development Centres and enterprise incubators, through the designation of Mixed Zones of Industrial and Commercial Activities. Industrial development is already categorised according to its environmental impact and is constrained, where indicated, within designated Industrial Areas. Specific sets of additional provisions cover workshops, warehouses and high-tech development, while measures are stipulated for the upgrading of the urban environment within existing Industrial Areas and the protection of adjacent non-industrial uses.
Agricultural Policy	Clearly, agricultural policy does not feature prominently within spatial plans for the main urban areas, although there are specific and stringent provisions for the location of animal and poultry farms, abattoirs etc. On the contrary, in spatial plans for quasi-rural municipalities surrounded by large agricultural areas, as well as in the Policy Statement for the Countryside, relevant spatial policy integrates the agricultural policies of the Ministry of Agriculture, Natural Resources and the Environment, concentrating on the protection of prime agricultural land and irrigation resources.
Environmental Policy	National policy concerning the environment is formulated and implemented by the Environment Service of the Ministry of Agriculture, Natural Resources and the Environment, although other government agencies may be responsible for specific areas, such as the

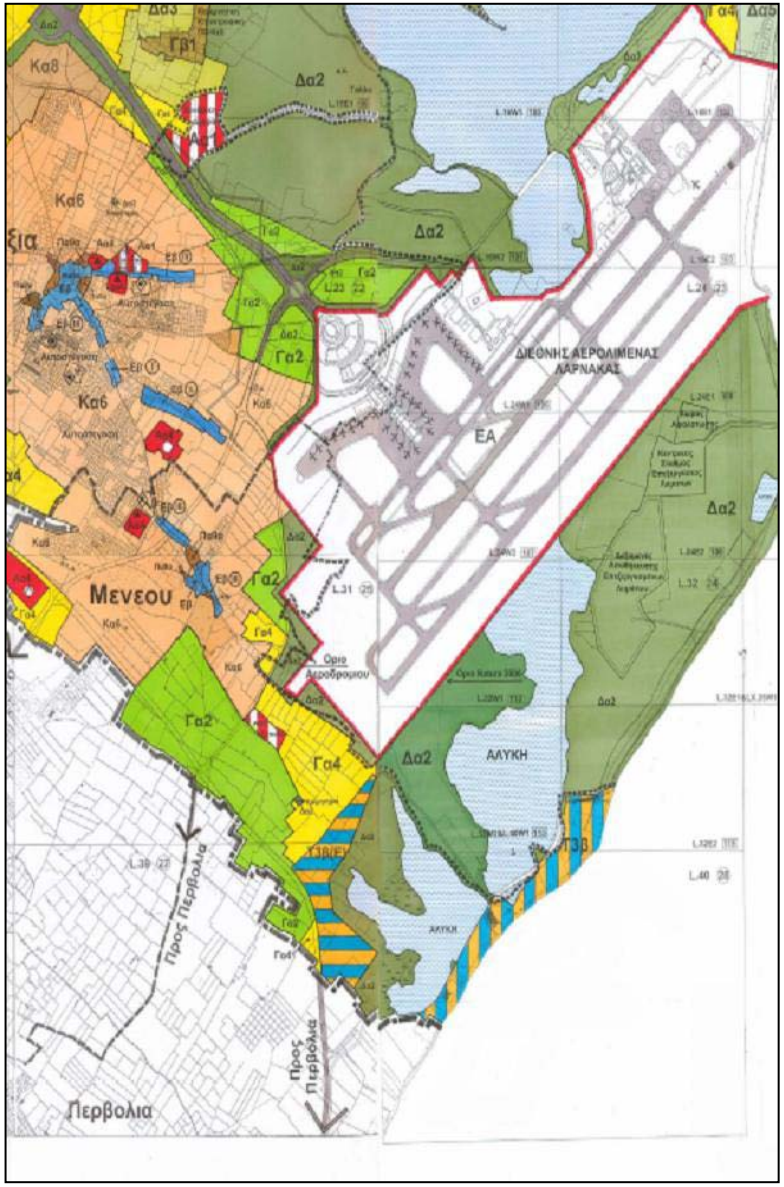
	Department of Forests, and the Department of Fisheries and Marine Research within the same Ministry, the Game Fund Service within the Ministry of the Interior, the Department of Work Inspection for air quality etc. Spatial ramifications of environmental policy are expressed both through the designation of protected natural areas, as well as through control procedures in place for the approval of various types of development, including industrial and large-scale commercial, mines and quarries and so forth, in order to meet environmental quality objectives. Thus, all such development is bound by published approval and implementation procedures to establish its possible impact on the environment, involving consultation with competent authorities as defined on the provisions of the 2005 EIA Law. To assess the impact of urban policy itself on the environment, the precepts of Strategic Environmental Assessment are currently being incorporated into the planning system.
Conservation Policy	Conserving the island's architectural heritage is one of the most important missions of the Department of Town Planning and Housing. In addition to the formulation of area-specific integrated conservation policies within each Development Plan, often accompanied by sets of restoration and intervention guidelines according to local parameters, the Department independently promotes an active programme of incentive provision for the rehabilitation of listed buildings and structures by the private sector. Based on the provisions of the 1972 Town and Country Planning Law, as well as legislation concerning the establishment of a Special Conservation Fund, the package of incentives currently available to owners includes, in addition to direct grants that cover up to 50% of the acknowledged restoration cost, generous tax deductions, such as exemption of restoration costs and rents obtained thereupon from income tax, refund of property transfer fees and exemption from the property tax, as well as transfer of development rights, that is of the remaining unused permitted plot ratio of listed properties within urban regions to specified commercial and tourist areas.
Landscape Policy	This is the newest in a spectrum of thematic policies addressing issues of natural and cultural heritage. Although a landscape protection policy had been included in the Policy Statement for the Countryside (PSC) since the early 1990s, an updated policy on the protection, management and planning of landscapes, based on the Florence Convention, is under preparation for inclusion in the revised PSC.
Other Spatial Policies	In a similar manner, a wide spectrum of other spatial policies is integrated within Development Plans, where appropriate. Such policies concern sports and recreation, cultural infrastructure, antiquities and archaeological sites, public utilities, public works, mines and quarries, specialised development, development outside designated areas and so forth.

The development in the north east site of the area of interested is regulated by the Local Plan of Larnaca. The rest of the area is regulated by the Policy Statement for the Countryside (Dilosi Politikis) of the Town Planning and Housing Department that identifies the rules for development in rural areas of Cyprus (Dilosi Politikis). The key land-uses in the study area are summarized on the Map 2 below.



Map 2: Key land-uses in the study area

2.2 Specific development objectives for area covered by the Local Plan of Larnaca



Map 3. Area of interest that falls with in the Local Plan of Larnaca

The latest Local Plan of Larnaca has been issued in October 2003. This Plan is expected to control the development in the area at least until the year 2010. The finalisation of a new Local Plan will involve the contribution of various authorities including the Town Planning Board, the Town Planning and Housing Department, the Local Authorities (municipality of Larnaca) as well as the Council of Ministers. The development of a new Local Plan usually takes a period of one to two years and requires a long process of approvals and discussions between the competent authorities, the government and the Local Authorities. It should be noted that individuals have the right to protests any articles and provisions of the Local Plan.

Most of the area that falls within the Local Plan of Larnaca (see map below) is designated as Protected Area (ΔΑ2) whereas a small part of the area south of the Larnaca International Airport is designated as a Tourist Area. For the Tourist Area the Local Plan of Larnaca indicates that the buildings should respect the environmentally sensitive character of the area (Larnaca Salt Lakes). Additionally the Local Plan indicates the following objectives:

- All necessary measures should be taken for the protection of the quality of the water sources of the area.
- The buildings in the area should be of high aesthetic value
- The buildings should be constructed at a distance of at least 15 meters from the protected area
- The location of the buildings should be so selected that the does not obstruct the main view towards the sea and the Salt Lakes
- Overcrowding of buildings will not be allowed
- The hotels in the area should not have been more than two floors
- Three floor hotels will be allowed only in the case that one of the floors is designated for common use by the residents
- The plot division of land in the area will not be allowed

For the protected areas designated as ΔΑ2 the following town planning regulations apply:

- The maximum coefficient of building coverage is restricted to less than 1%
- Maximum height of buildings 5.0 meters

2.3 Specific development objectives for area outside the Local Plan of Larnaca

As shown on Map 2, the rest of the study area falls within the remits of the Policy Statement for the Countryside issued in December 1996 and the associated Town Planning Zones established in 2002. The last review of the Town Planning Zones Zones was in August 2007.

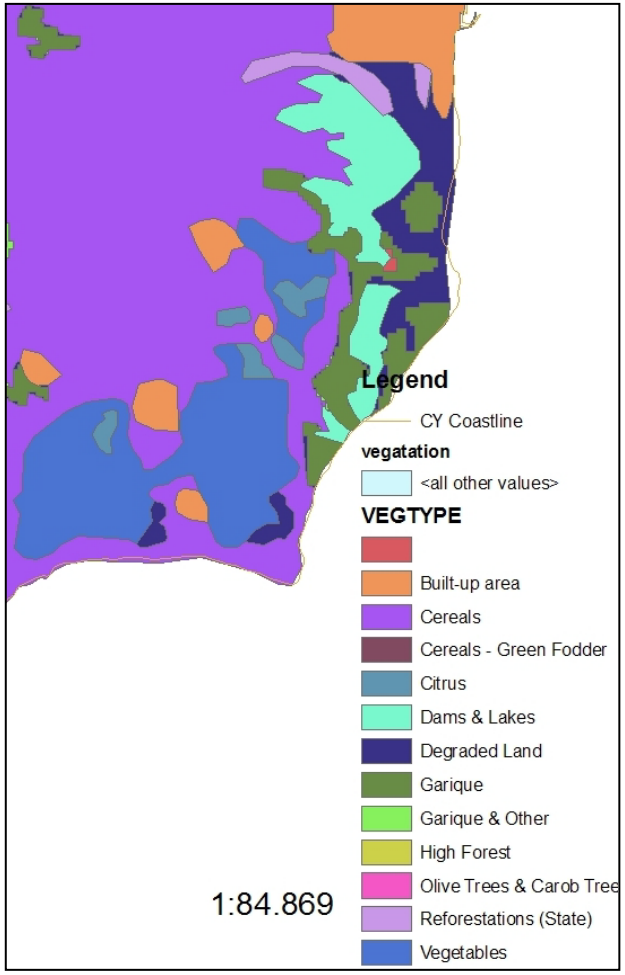
Most of the zones that are closer to the shore are designated as tourist zones (T2α, T2ε, T2β1, T3β). The allowable development in these areas includes hotels, tourist villages, other tourist installations and housing units. The building high in these areas is restricted for hotels at maximum three floors and in all other cases at two floors.

The areas beyond the tourist zones are designated as agricultural zones (Γ3) and in areas that are close to the center of villages as housing zones (H1, H2, H3, H4). Areas with designation H1 have the maximum building coverage coefficient (70%) and H3 the smallest (25%)

Several pockets in the area are designated as protected areas (Z1, Z3). The protected areas are usually related with local riverbeds, important archeological sites, fertile agricultural land, important geological features and other important environmental features. The maximum coefficient of building coverage in the protected areas is restricted to less than 6% for Z1 zones and 1% for Z3 zones.

3. Environmental characteristics of the areas likely to be significantly affected by the relevant plans

3.1 Introduction



Map 4: Main vegetation types in the study area

The CAMP pilot study area is situated on the south eastern coast of Cyprus and it provides a suitable example of common development issues that may arise within costal zone management.

Most of the area under study could be generally considered that holds a healthy environment at least in the areas that are far from the centre of the local communities. Exception to the above is the area that encloses the Larnaca International Airport and the nearby areas.

The study area may be subdivided into two sub regions:

- Sub-region 1 covers northern coastal area, Larnaca salt lakes and surroundings.
- Sub-region 2 covers the area from south of the Larnaca International Airport to Cape Kiti.

Key environmental characteristics of each of these sub-regions are shortly outlined in the rest of this chapter. The description of the current environmental potentials and problems in the whole study is provided in the Chapter 5 which offers a detailed analysis of the main environmental trends for each of the key issues addressed within this SEA.

The main vegetation types in the study area are presented in the Map 4 (left).

3.2 Overall environmental characteristic of Sub-region 1

Map 4: Area close to the Larnaca International Airport

Northern coastal area of the study site is characterized by the presence of high pressures on the environment as a result of dense urban development (both tourist and residential), and from coastal structures such as the Larnaca Port and Marina, the Larnaca International Airport and the construction of vertical breakwaters along the coast.

The area surrounding Larnaca salt lakes is characterized by the presence of moderate density urban development to the north and northeast, the Larnaca International Airport to the east and mostly agricultural land to the west. The area of the Airport suffers from noise pollution because of the flight patterns particularly towards the northwest direction.

The most important environmental parameter close in the study area is the Larnaca Salt Lake. The Salt Lakes area is a complex of wetlands comprising of 1 Large Lake and 3 smalls ones named Aerodromio, Orfani and Soros, which are the second in size and importance in Cyprus after the salt lake of Akrotiri in Limassol. The Larnaca Salt Lake complex was declared as a protected area by a decision of the Council of Ministers in 1997. It is considered one of the most important wetlands of Cyprus and it has been declared as a Ramsar site, Natura 2000 site, Special Protected Area under the Barcelona Convention and an Important Bird Area (IBA).

3.3 Overall environmental characteristic of Sub-region 2

Map 5: Satelite picture of area south of the Larnaca International Airport.

This area is characterized by moderate pressure on the environment as a result of moderate to low density tourist and residential development.

However, in some cases and particularly the areas that are close to the shore, north and west of Pervolia Village, are subject to dense development of buildings (mostly secondary residences) that in some cases restrict the view and access to the beach. The satellite pictures below indicate two areas in which the overcrowding problem is obvious and extensive.

Map 6: Satellite picture of area north of Kiti village.

The housing construction close to the shore in this area is not as extensive, but the trend of using the shore plots for housing purposes is strong.

It expected that the development of new housing in the area will attract other uses like restaurants, commercial buildings, grocery stores and similar facilities that will serve the local residents. This trend has already been observed in the area of Pervolia village.

Based on the above observations, it can be concluded that several town planning measures to control the development in the plots that are located close to the shore are required to control or guide development in the area based on the principles of sustainable development.

4. The relevant environmental protection issues and objectives addressed within this SEA

The table below summarizes the key environmental issues in the study area and the relevant environmental protection objectives established at international, EU or national level. These issues and objectives were used for determination of specific guiding indicators addressed within this SEA process.

Environmen-tal themes[2]	Key environmental issues in the study area	Relevant environmental objectives established at international, EU or national level	Specific issues addressed by assessment performed within this pilot SEA
Bio-diversity including fauna and flora	Biodiversity in the Larnaca salt lakes	• Protect the environmentally sensitive areas with particular attention to Natura 2000 sites and ecosystem functioning • Protect migratory species • Protect endangered species/habitats	• Loss and degradation of the Natura 2000 site and of other valuable ecosystems surrounding this area (including water balance issues) • Migratory species • Endangered species/habitats • Invasive species (acacia)
	Marine biodiversity	• Establish conditions for the conservation of marine biodiversity (habitats and species) including a Protected Area in Cape Kiti area	• Presence of *Posidonia* meadows and other listed habitats/species in the pilot area
Water resources	Quality of coastal surface waters	• Keep the good quality of bathing waters by controlling discharges. • Protect the quality of coastal waters by controlling both discharges (ie Larnaca wastewater treatment plant, industrial units such as the desalination facilities) and point sources of pollution (i.e. aquaculture)	• Bathing waters • Urban and industrial discharges • Point sources of pollution • Non-point sources of pollution
	Quality of surface fresh-waters	• Keep development away from Tremithos River and Kiti Dam	• Chemical / biological water quality of local river (Tremithos river) during raining season • Chemical / biological water quality of releases from Kiti dam
	Quality and quantity of ground waters	• Stop sea intrusion into local aquifer • Improve quality of ground water in local aquifer (Kiti aquifer)	• Water quality in local wells • Sea intrusion levels and extent of affected area • Quantities of pumped ground water from local wells • Agricultural activities in the area (plants, needs of water, usage of pesticides, fertilizers)

[2] SEA Directive, Annex 1, item (f).

Population and human health	Noise levels (mainly from planes)	• Keep noise levels to acceptable levels for housing areas	• Noise levels at least within the housing areas that are close to the Larnaca International Airport facilities
Architectural & archaeolo-gical heritage	Ancient monuments, churches and trees	• Protect ancient monuments and churches and ancient trees	• Physical condition of ancient monuments and trees
Landscape	Aesthetic quality	• Minimize impact on the existing natural environment to the extent possible. • Visual quality of the landscape shall be consistent to the extent possible. • Emphasize and enhance the existing natural context and landscape to the full extent possible. • All structures shall be carefully detailed and designed so as to achieve the greatest level of aesthetic quality and fit within the regional context. • Existing trees and rock outcroppings shall be preserved to the greatest extent possible. • Aesthetics elements shall be fully integrated with the overall landscape design. • Keep the good quality of bathing waters by controlling discharges. • Protect the quality of coastal waters by controlling both discharges (i.e. Larnaca wastewater treatment plant, industrial units, desalination facilities) and point sources of pollution (i.e. aquaculture)	• Planning, form, scale and sitting of new developments • Parks, greenways, and nature preserves • Urban design, town and city squares, waterfronts, pedestrian schemes, and parking lots • Coastal and offshore developments
	Limitation of public access to beaches (public open space)	• Assure maximum public access to and along the public beaches and the shoreline from the nearest public roadways.	• Building design and sitting regulations to protect and provide public access to the shoreline through property development regulations of the Town Planning Zones that control building placement. • New development in waterfront commercial areas (where they provide public access easements to and along the waterfront)

Soil and geology	Coastal erosion	• Stop or minimize coastal erosion and beach erosion • Preserve beach and shoreline quality	• The natural phenomena driving coastal erosion will get worse in the future because of climate change and due to: - changes in river sediment loads to coast - reduction in beach areas/ coastal land - changes in soil quality of coastal land
	Land & mineral resources	• Sustainable use of land • Protect important mineral resources from any other development	• Planning, form, scale and siting of new developments
	Seismic risks due to geological foundation	• Minimize seismic risks	• Damages to buildings and infrastructure due to seismic activity

The SEA did not focus on issues related to air quality and certain aspects of population and human health (e.g. demographic trends and social and socio economic conditions) as these were not deemed significant given the features of the study areas and the nature of the planning documents being assessed.

5. Trends in key environmental issues with and without the proposed plan

5.1 Biodiversity including fauna and flora

Theme:	Bio-diversity including fauna and flora
Issue:	Biodiversity in the Larnaca Salt Lakes (Natura 2000 site)
Indicators or guiding questions:	• Loss and degradation of the Natura 2000 site and of other valuable ecosystems surrounding this area • Migratory species • Endangered species • Invasive species (acacia)
Analysis of past trends and current situation	

Introduction

Larnaka Salt Lakes constitute one of the largest wetland systems of Cyprus and represent one of the most distinctive landmarks of the study area. It is a complex network of four salt lakes (three of them interconnected) of different sizes. The salt lakes cover an area of about 1761 ha of which 670 ha is covered with water when the lake is fully flooded. The lake is surrounded by nearly 300ha of natural halophytic scrubland. The total surface area of the lakes adds up to 2.2 km².

The main salt lake is situated south of Larnaca and east of Meneou and Dromolaxia villages. The boundary of the state forest from Kamares as far as the road Larnaca-airport forms part of north eastern boundaries of the site.

Larnaca Salt Lake

Larnaca Salt Lake (in winter) with Hala Sultan Tekke

Besides its picturesque beauty, the following elements indicate the ecological quality and importance of the site:

- The variety of extended and representative halophilous wetland habitat types. These habitats occur only at few sites in Cyprus.
- The site is one of the most important migratory passages through Cyprus. The avifauna of the site with more than 85 species of water-birds with estimated populations between 20,000-38,000. The lake is the haunt of 2-12,000 flamingoes (*Phoenicopterus ruber*) The most famous is the species Phoenicopterus ruber which overwinters there from November till the end of March, or even later if conditions allow, feeding off populations of the brine shrimp *Artemia salina*.. The site is very important for *Grus grus, Charadrius alexandrinus, Larus ridibundus, Himantopus himantopus, Burhinus oedicnemus, Hoplopterus spinosus, Oenanthe cypriaca* and *Sylvia melanothorax*.
- The rest of the vertebrate fauna of the site includes 19 species of amphibians and reptiles while the invertebrate fauna includes 63 important insects.
- A very small population of *Ophrys kotchyi* grows in the site but there is a profusion of several other orchid species.

Key functions of the ecological system of the lakes ecosystem function are influenced by two main factors:

- Food web system in the salt lakes: Three species play a major role in the food-web system- *Dunaliella salina, Artemia salina* and *Branchinella spinosa*. *Dunaliella salina* is the base of the food chain in the main lake, while the brine shrimp *Artemia salina* and *Branchinella salina* serve as the main food supply of the Flamingo. Their life cycles are dependent on salinity fluctuations. A minimum salinity (hence the importance of freshwater input into the lake) is needed to enable *Artemia* and *Branchinella* cysts to hatch and set off their life cycle. In the water the plant *Zannichellia palustris* a submerged perennial or ephemeral herb is also found in the fresh and brackish water.
- Salinity and its fluctuation: The annual precipitation in the area ranges between 300-350mm per year and therefore the region can be characterized as semi arid. Thus the system is sensitive to the hydrological cycle of the lake. During the winter months the lake fills with water whilst in the summer the water evaporates, leaving a crust of salt and a haze of grey dust. The salt lakes are recharged by direct rainfall and by surface runoff from the catchment area that mostly extends to the north. Some seawater seepage into the lake is possible due to the partly leaky character of the sifty sand lenses -- the soils in the area are either alluvial deposits consisting of sands, silts, clays and gravels or terrace deposits consisting of calcarenites, sands and gravels.

Key trends and their drivers

The area is presently coming under threat from development for tourism and the encroachment of both the Airport and the Larnaca suburbs. The lakes to the south of the Larnaca Integrational Airport and east of the road from Meneou to Spyros beach are a Permanent Game Reserve, and hold the Larnaca Sewage-Treatment Plant and the Larnaca Desalination Plant. The main lake to the north and west of the main road is also a Permanent Game Reserve. Salt harvested from this lake used to be one of the island's major exports but this activity topped altogether in 1986 as the island imports most of this commodity.

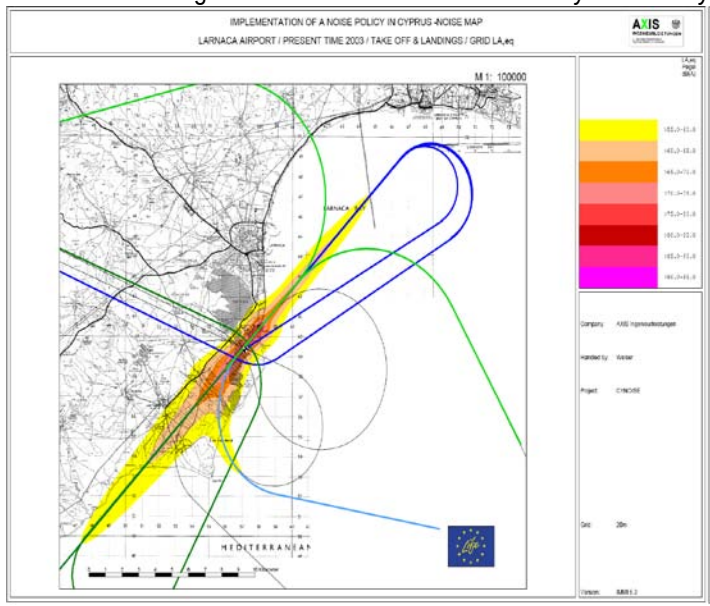
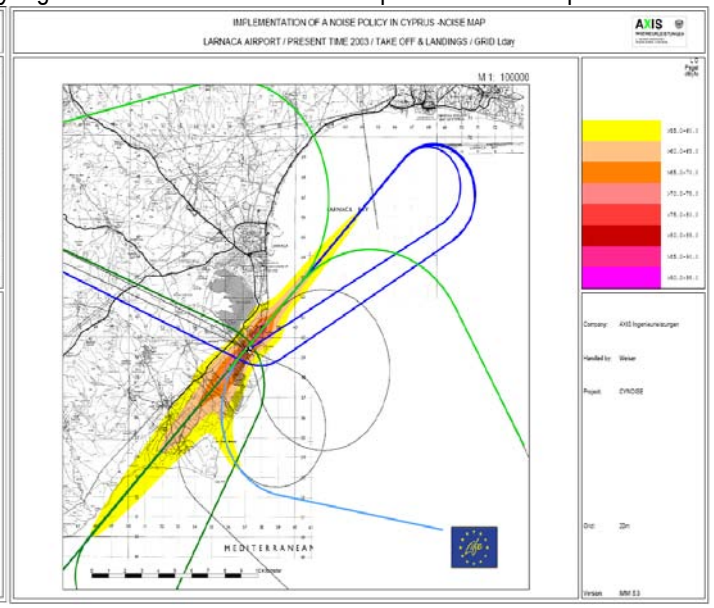
These development pressures have so far resulted in:

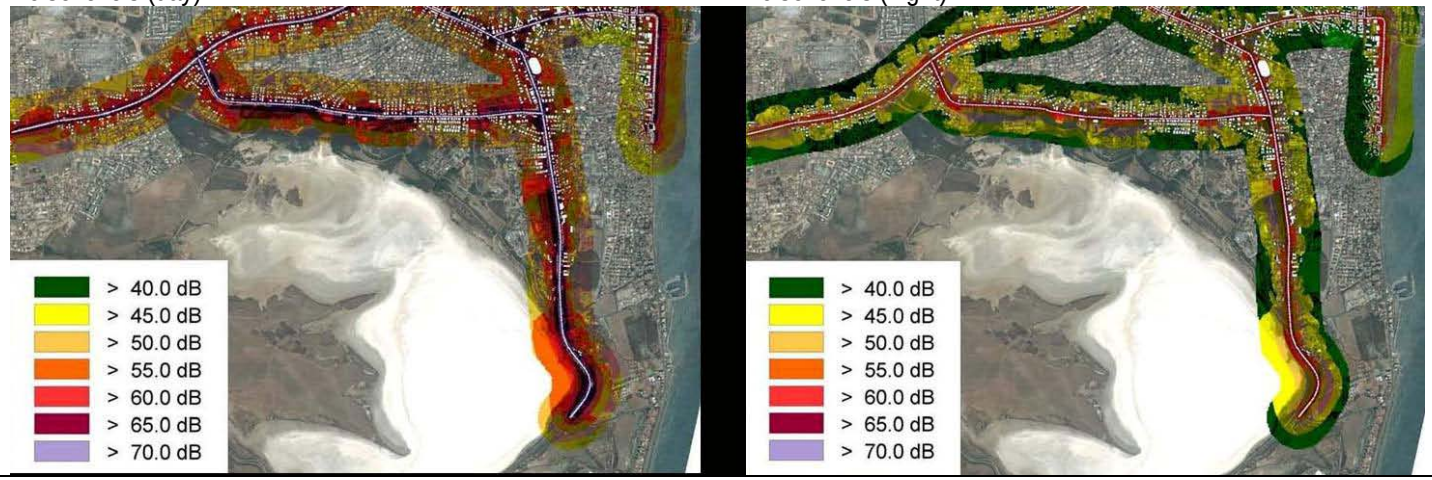
- Irreversible habitat loss: the Larnaca Airport, the Larnaca Sewerage Treatment Plant, tourist development and a network of paved and unpaved roads have already claimed a substantial part of the wetland habitats.
- Degradation of habitat quality: grazing, cultivation and the passage of vehicles through the marshes on the other hand, are undermining the habitat's quality causing degradation of the habitats as well as erosion
- Disruption in the water cycle in salt lakes and its impact of the food-web system. The lakes are recipients of surface rainwater runoff from the city of Larnaca and the developments in the study area may disrupt the water cycle in salt lakes. The reduction of freshwater inflow to the lakes stems not only from the

documented reduction in rainfall in the last few decades but is also, inevitably and perhaps critically, worsened by the reduction of freshwater inflow into the lake caused by the urbanization of the surrounding area - estimates of the quantities are partly at least available for some areas (calculations of storm water drainage system). Climate change projections foresee a worsening on the situation. The critical point will be reached when the salinity does not drop enough to allow the hatching of the brine shrimp cysts. Decline in shrimp populations will have directly corresponding impacts on food supply for flamingos and other migrating bird species. This is happening already in some years (at least 1991 and probably 2008) but the data available at present do not allow precise analysis and modelling of this trend.

- Invasion of foreign species. The area witnesses gradual spread of Acacia sp. which invades and replaces the native habitats Some efforts are currently taken through the LIFE Programme to counter this trend.

Future trends without the proposed plan

Key factors that will influence future trends	Likely expected positive or negative impacts of these factors on the given trend
Noise from the expansion of Larnaca International Airport	The annual capacity of the current Airport is 4.5 million passengers but the terminal itself will be rebuilt some 500-700m west of current facilities, adjacent to the new control tower, with new aprons and jet ways. The old terminal building is slated to be partially demolished and refurbished as a cargo centre. Noise levels in the study area will continue to rise due and may affect the migratory species. Some of the results of the calculation for the noise levels in Larnaca International Airport are indicated below. From the diagrams it is clear that certain areas with housing units and the salt lakes are already affected by high noise levels because of the operation of the airport.  

Road transport	The lake ecosystem will continue to be affected by noise generated by the increasing road transport. The maps below indicate that parts of the northern top shore and part of the eastern shore of the main lake and its surrounding natural halophytic scrubland are subject to noise levels exceeding 50 dB during the day time and 45 dB during the night. Noise levels (day) Noise levels (night) 
Construction of the Larnaca storm water drainage system.	At present a large part of the Larnaca Western area drains in the salt lakes. It thus appears that storm drainage management options can have a significant impact on the lakes. Disposal of the storm water at sea may have impacts of water availability and the duration each year during which the lake area is flooded. This is a vital aspect for the survival of many of the species hosted in the area. On the other hand, diverting the water to the lake may have other impacts from intensified peak flows due to a more efficient drainage regime than at present and increased inflow of urban area related pollutants (hydrocarbons, oils, particulates etc).
Spread of Acacia sp., which gradually invades and replaces the native habitats	Invasion of foreign species is becoming an increasing problem not confined only within the study area. It is therefore suggested that a policy is formulated for the systematic identification of threatened areas and for the control of spread or even the removal of invasive species where replacement of priority habitats is found.

The Management Plan of the Larnaca Salt Lakes	The Town Planning Department in cooperation with the relevant departments has prepared a Management Plan for the Larnaca Salt Lakes, which states that the lakes and the surrounding land should be protected. The Management Plan was approved by the Council of Ministers several years ago and some of its provisions were already implemented, including e.g.: • Establishment of a protection zone around the lake • Establishment of a Committee that manages the area • Relocation of any facilities that disturb the environment of the lake (e.g. relocating the shooting club) In addition to the above, the following actions should be implemented under Management Plan over the next few years • Cleaning of the area from solid wastes (garbage) • Minimization of access roads through the use of fencing • Landscaping of the area with selected species • Construction of paths, bicycle routs and pedestrian routes at pre-selected areas • Implementation of sporting facilities • Setting up of an Environmental Information Centre	
Impacts of the proposed plan		
Components of the plan	Expected environmental risks (negative impacts) and environmental opportunities (positive impacts) of the given component of the plan	Proposed mitigation and enhancement measures
Construction of new housing units and tourist facilities	A large section of the area is already a designated tourist zone in which development can be expected to occur in the next years. There is a risk that pressures from various groups might influence future decisions and will promote the development of areas that are now protected or are with in the protected zone of the lake.	Full implementation of the Management Plan for the Larnaca Salt Lakes. Implementation of a detailed monitoring program for the protection of the area. Supplement protection measures when the quality of the environment of the Lakes is negatively affected
Cumulative effects of the plan on the issue addressed in the assessment		
• Salt-lakes may be significantly adversely impacted if the water balance regime in salt-lakes will become disturbed by the reduction of freshwater inflow to the lakes. Such reduction in the inflow is already caused by the documented reduction in rainfall in the last few decades (attributed to climate change) and is further enhanced by the reduction of freshwater inflow due to urbanization of the surrounding areas. The full implementation of the Management Plan for the Lake may partly mitigate or offsets these impacts, however more attention needs to be given to water balance regime in salt-lakes. • The lake ecosystem will continue to be affected by noise generated by the road transport and by the expansion of Larnaca International Airport. The nature and magnitude of this impact on migratory species is uncertain and this issue needs to be carefully monitored.		
Proposed mitigation and enhancement measures		
• Implementation of the Management Plan for the Salt Lake and its further revision to fulfill the provisions of the Habitats Directive. • Implementation of a detailed monitoring program to monitor impacts of ongoing developments on migratory species (especially impacts of changes in the water quality and impacts due to increasing noise in the study area) • Adoption of additional measures if the monitoring programme indicates that migratory species in the Lakes are negatively affected		

5.2 Water resources

Theme:	Water resources
Issue:	Quality of coastal surface waters
Indicators or guiding questions:	• Bathing waters • Urban and industrial discharges • Point sources of pollution • Non-point sources of pollution

The area is near the Larnaca Fishing shelter and much fishing is taking place with small boats. However fishing in the area is not extensive because of the absence of areas with rich fishing grounds.

Quality of coastal water in the area is important to tourist activities and to local visitors that use part of the area for bathing. The quality of the coastal water is also important because of the presence of the desalination plant that uses sea water to produce potable water for parts of Larnaca and Nicosia districts. The bathing waters of the Larnaca area have been monitored for their quality over the last few years with satisfactory results.

Over the last decade two major industrial facilities have been constructed in the area; the Water Desalination Plant that produces potable water and the Larnaca Wastewater Treatment Plant (see satellite picture below). The desalination plant discharges brine in the sea at a distance from the shore (more than 750 meters). No major impacts have been identified by this activity. The desalination plant outfall is however causing problems to marine biodiversity (Posidonia beds)

The Wastewater Treatment Plant does not discharge any treated or partly treated effluent in the sea. Part of the treated effluent is used for agricultural activities in the area. One of the options in the future is to use an outfall to discharge treated effluent in cases of emergency in the sea. This option will be considered on the ongoing design for the expansion of the wastewater treatment plant. The design of the new wastewater treatment plant facilities is expected to be finalised in 2008 and the construction by 2010.

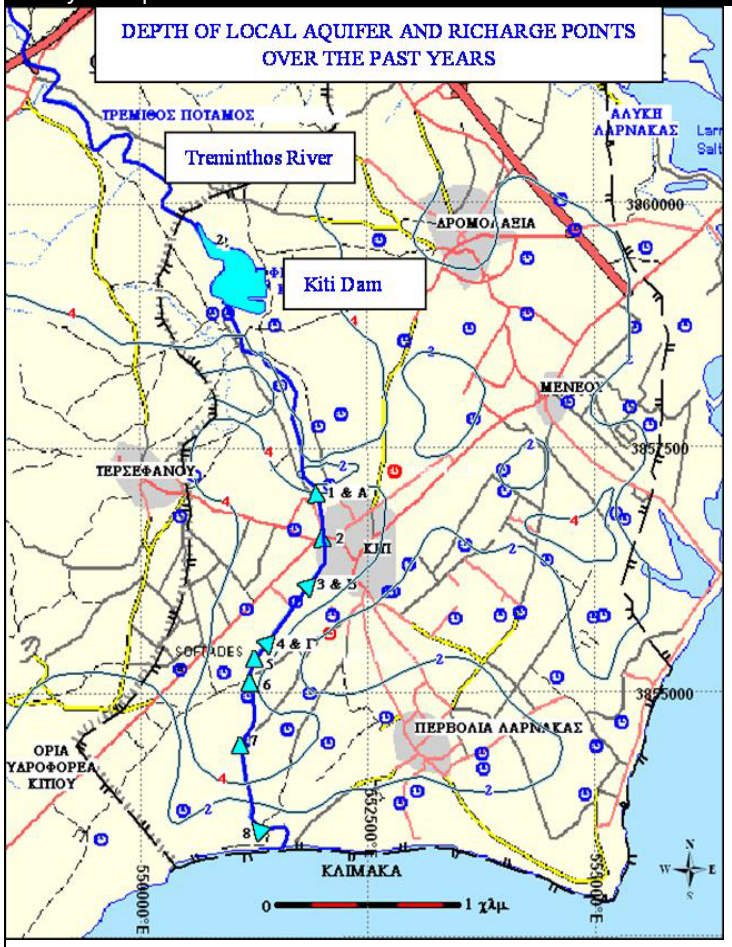
The Larnaca International Airport is in the process of expanding and new facilities will be in operation in the next two years. However no discharges form the airport are released in the sea, thus no impact on the coastal waters is anticipated from the expansion of the Airport.

The local communities in the area and the individual housing units are not allowed to discharge sewage in the coastal waters. All of the bigger housing complexes that are close to the shore have their own wastewater treatment facilities and do not discharge any sewage or treated effluent in the sea. The local communities are expected to be served with a central sewerage system by the year 2012. The design of the local sewerage collection system was finalized in the year 2006.

Future trends without the proposed plan		
Key factors that will influence future trends	Likely expected positive or negative impacts of these factors on the given trend	
Expansion of the Larnaca Wastewater Treatment Plant	No negative impacts anticipated unless a treated effluent sea outfall is constructed. If the outfall is constructed local impacts to coastal water quality might be observed. The impact will depend on the quality and quantity of the treated effluent released in the coastal waters and to the depth from the sea level and distance from the shore of the discharge	
Construction of central sewerage system for the local communities	Positive impacts anticipated since no sewage will be discharge in the ground and thus improve the quality of the local aquifer which is connected with the coastal waters.	
Construction of new housing units and tourist facilities.	Minor effects on coastal waters from accidental sewerage releases	
Impacts of the proposed plan		
Components of the plan	Expected environmental risks (negative impacts) and environmental opportunities (positive impacts) of the given component of the plan	Proposed mitigation and enhancement measures
Full development of the housing and tourist areas with a central sewage system	If major tourist activities are allowed close to the shore, then the risk of polluting the coastal waters from accidental spills is increasing. These spills might be in the form of sewage, fuels from central heating systems or major restaurants and other materials used in tourist facilities (lubricants from boats, detergents from laundry facilities). The implementation of the plan offers an opportunity to positively affect the coastal waters, since agricultural activities that release nutrients and pesticides will be minimized.	Ensure the implementation of the central sewerage system in the area before full development occurs. Avoid using a sea outfall for the Larnaca Wastewater Treatment Plant (except as an emergency outfall). Properly desing the Plant for the such use, should it become inevitable.
Full development of the housing and tourist areas without a central sewage system	Major negative impacts will be observed in the area if the planed central sewerage system is not implemented or if its implementation is delayed. The impacts will be mostly in the form of pollution of the coastal water with sewage components like nutrients, and coliform bacteria.	
Cumulative effects of the plan on the issue addressed in the assessment		
The tourist and housing development are not likely to result in any major impacts since a central collection sewerage system is planed. Minor and localized impacts from accidental spills might be observed but if a central sewerage system is implemented in the area no major impacts are expected in the coastal waters. Some local impacts in coastal waters are anticipated from the expansion of the Larnaca wastewater treatment plant in the case the sea outfall would be used.		
Proposed mitigation and enhancement measures		
• Ensure the implementation of the central sewerage system in the area before full development occurs • Avoid using a sea outfall for the Larnaca Wastewater Treatment Plant (except as an emergency outfall). Properly desing the Plant for the such use, should it become inevitable.		

Theme:	Water resources
Issue:	Quality of surface fresh waters
Indicators or guiding questions:	• Chemical / biological water quality of local river (Tremithos river) during rainy season • Chemical / biological water quality of releases from Kiti dam

Analysis of past trends and current situation



The surface fresh water in the area is related to the presence of Treminthos river. The map below indicates the study area and the relation of Treminthos river with the local communities.

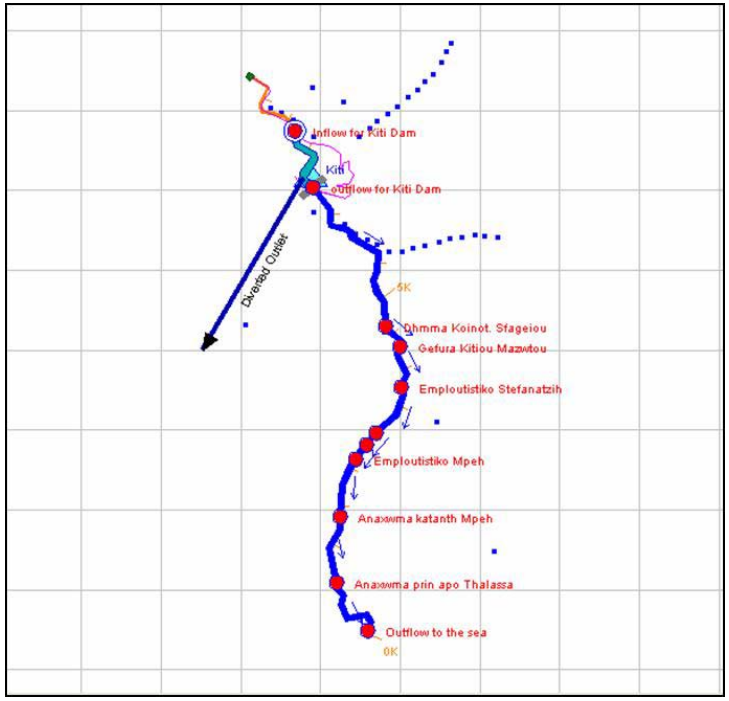
At some point Treminthos river was running freely to the sea. Water is available in the river only during the rainy season which usually starts in November and ends up in April. In the 1970s a dam was constructed in the area (Kiti Dam) which restricted the flow of the river. The fresh water of the dam has been used and it is used today for agricultural activities in the study area. Several local "Associations" were developed to manage the rights for irrigation water from the dam. Approximately 60% of the fresh water is directed in the Kiti area, 30% in the Pervolia area and 10% in the Tersephanou area. The irrigation area covered by the dam's water is about 280 hectares.

With the construction of the dam, the running water rarely ends in the sea (few times in the last 40 years). Therefore the sources of fresh water in the area are limited.

The flow from the dam is regulated from the Water Development Department of the Ministry of Agriculture, Natural Resources and the Environment. The river and the dam feed the local aquifer with substantial amounts of water. It has been estimated that the recharge could reach in some cases the amount of 2 million cubic meters per year. The water that ends up in the local aquifer is pumped extensively from local wells and is used for irrigation purposes.

The river bed is very narrow in most cases and the wetted part does not exceed the 5 meters width. A graphical representation of the river, with all its important

features, is indicated on the attached map and pictures of the river bed are indicated below.



Future trends without the proposed plan	
Key factors that will influence future trends	Likely expected positive or negative impacts of these factors on the given trend
Construction of limited new housing units and limited tourist facilities.	Minor effects on surface fresh water (both on quality and quantity
Continuation of agricultural activities	Minor effects on quality of surface fresh water. These effects are due to the release of unused fertilizers and pesticides within the river bed through rainfall.

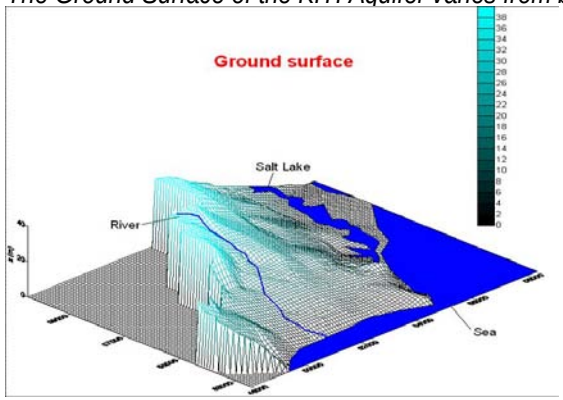
Impacts of the proposed plan		
Components of the plan	Expected environmental risks (negative impacts) and environmental opportunities (positive impacts) of the given component of the plan	Proposed mitigation and enhancement measures
Full development of the housing and tourist areas	The runoff in the area will increase because of the surfacing of the area with impervious surfaces (concrete and asphalt surfaces. Quality of runoff will worsen because of the presence of pollutants from human activities If major tourist activities are allowed close to the river then the risk of polluting the river from accidental spills is increasing.	Construction of a drainage system that will help remove pollutants before they enter the river bed (use of screening facilities, use of detention ponds)
Cumulative effects of the plan on the issue addressed in the assessment		
• If limited housing units and tourist facilities are developed and if a controllable drainage system is implemented in the area, no major impacts are expected in the surface fresh waters. • Some minor local adverse impacts on the surface fresh waters will continue because of the ongoing agricultural activities.		
Proposed mitigation and enhancement measures		
• Plan for the construction of a drainage system that will help remove pollutants before they enter the river bed (use of screening facilities, use of detention ponds)		

Theme:	Water resources
Issue:	Quality and quantity of ground waters
Indicators or guiding questions:	• Water quality in local wells • Sea intrusion levels and extent of affected area • Quantities of pumped ground water from local wells • Agricultural activities in the area (plants, needs of water, usage of pesticides, fertilizers)

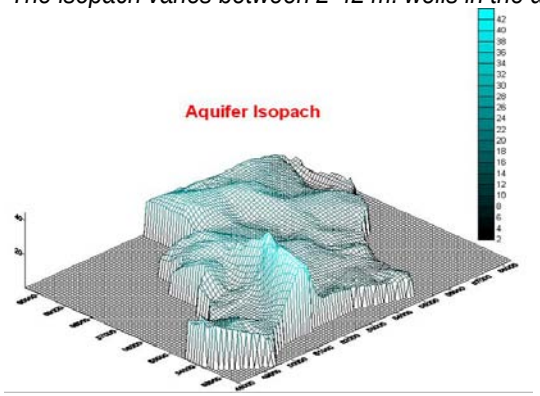
Analysis of past trends and current situation

An understanding of the quality and quantity availability of ground waters in the area on how the system was changing in time and how it reacted to changes in environmental conditions and use is presented below:

The Ground Surface of the KITI Aquifer varies from between 0 to 38 m

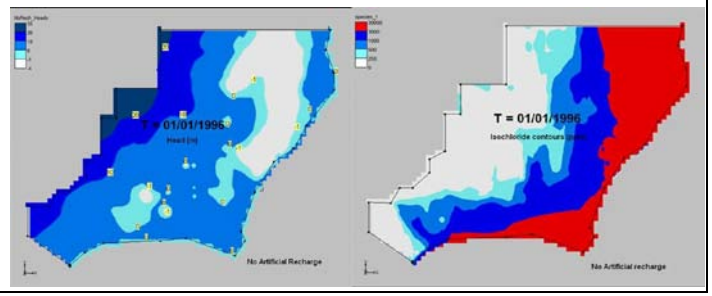


The isopach varies between 2-42 m: wells in the area are used for irrigation purposes.



From the above Graphical Representation it is clear that the ground water level that had been recorded by the observation wells was gradually rising with time. The ground water level of the aquifer starts from approximately 0m by the sea area and it finally rises up to 20m inland towards the northwest direction.

The graph on the left indicates the Chemical Characteristics of the KITI Aquifer with regards to "Chlorides" as recorded in 1996 which clearly identifies that the concentrations in chlorides are really high especially in the southeast area which is close to the sea and the salt lake, a phenomenon that is mostly due to pumping of ground water from local wells resulting to the sea intrusion. The range of chlorides concentrations varies between 0 (inland northwest direction) to 30000 ppm (southeast direction).



The Chemical Characteristics of the KITI Aquifer with regards to "Nitrates – NO3" as recorded in 1996 identifies that the concentrations in nitrates are high especially in the southwest and towards inland, a phenomenon that is mostly due to the agricultural activities of the area. The range of nitrates concentrations varies between 0 (northwest direction southeast direction) to 100-170 mg/l (southwest direction and inland).		
Future trends without the proposed plan		
Key factors that will influence future trends	Likely expected positive or negative impacts of these factors on the given trend	
Continuation of agricultural activities in the area	Negative impacts anticipated since there will be a continuation of pumping quantities of ground water from local wells, thus lowering the ground water level in the aquifer and enhancing the sea intrusion in the area. This will keep the concentrations of chlorides and nitrates at very high levels. There is also a possibility of further damage of the chemical consistency of the local aquifer in nitrates.	
Impacts of the proposed plan		
Components of the plan	Expected environmental risks (negative impacts) and environmental opportunities (positive impacts) of the given component of the plan	Proposed mitigation and enhancement measures
Development of the Housing Zones according to the Proposed Plan	The impact is expected to be positive since the agricultural activities will be eliminated in the area, thus the quantities of pumped ground water from local wells will be eliminated therefore the ground water level will rise and the nitrates pollution will be also minimized. If a central sewerage system is implemented, then development of housing will not lead to any significant adverse impacts on the local aquifers.	Implement a central sewerage system in the area to protect the aquifer from releases of sewage in absorption pits.
Cumulative effects of the plan on the issue addressed in the assessment		
• Continuation of agricultural activities in the area would likely bring negative impacts on local aquifers due to lowering the ground water levels. and enhancing the sea intrusion in the area. This would keep the concentrations of chlorides and nitrates at very high levels. • Development of the Housing Zones according to the Proposed Plan is expected to bring positive impacts since the agricultural activities will be eliminated in the area, thus the quantities of pumped ground water from local wells will be eliminated therefore the ground water level will rise and the nitrates pollution will be also minimized. If a central sewerage system is implemented, then development of housing will not lead to any significant adverse impacts on the local aquifers.		
Proposed mitigation and enhancement measures		
• Implement a central sewerage system in the area to protect the aquifer from releases of sewage in absorption pits.		

5.4 Landscape

Theme	Landscape
Issue:	Aesthetics Quality
Indicators or guiding questions:	• Planning, form, scale and sitting of new developments • Parks, greenways, and nature preserves • Urban design, town and city squares, waterfronts, pedestrian schemes, and parking lots • Coastal and offshore developments

Analysis of past trends and current situation

High quality scenery, especially scenery with natural-appearing landscapes, enhances people's lives and benefits society. The quality of aesthetics and landscaping has an important role in the cultural, ecological, environmental and social fields. It is an important part of the quality of life for people everywhere and is the key element of individual and social well-being. The physical environment of the study area could be considered aesthetically attractive because of the presence of the seashore and the salt lake. Therefore, it could have been expected that the local authorities should regulate in some degree the aesthetics of the design for housing units and other facilities in the area.

The current town planning plan for the study area does not incorporate any major provisions for landscape protection, planning and management with regards to the human-made constructions, housing estate development and environmental restoration, since all the man-made structures where constructed according to the individuals' needs and likings. Therefore the design of buildings with regards to aesthetics is left to the individual architect and only minor items are regulated by the Town Planning Authority. These items that are specifically identified in the local plans and include minor control measures include control features like construction materials, and location of pipes and cables.

The Town Planning Authority has however identified the need for "good" aesthetic because in the local plans there is a general provision that states that the design of houses should respect the environmental conditions and the existing situation. Therefore, the housing units and other developments in the area, in some cases, do not aesthetically match with each other creating an unpleasant situation to any observer.

Future trends without the proposed plan

Key factors that will influence future trends	Likely expected positive or negative impacts of these factors on the given trend
No landscaping protection, no planning and no management	Negative impacts are anticipated to increase and there will be a continuation of visual and aesthetics destruction. This due to the fact that the landscaping and the overall development is not be based on visual quality and this trend will continue unless permitting of housing development gives a greater attention to ensuring aesthetics quality that fits the regional context.

Impacts of the proposed plan

Components of the plan	Expected environmental risks (negative impacts) and environmental opportunities (positive impacts) of the given component of the plan	Proposed mitigation and enhancement measures
Landscaping Policies in the main text of the Local Plan and its Appendix E.	Landscaping Policies in the main text of the Local Plan and its Appendix E have so far not been adhered to. If this trend continues and the housing development is based on individuals' needs and likings, the visual and aesthetics destruction will continue.	Incorporate landscaping protection policies.

Planning, form, scale and sitting of new developments Parks, greenways, and nature preserves Urban design, town and city squares, waterfronts, pedestrian schemes, and parking lots Coastal and offshore developments	Siting of new developmnet, parks, nature reserves waterfront development is regulated by several policies both in the main text of the Local Plan (Chapters 7, 10,13) and in Appendix E regarding. However, they have so far not been fully implemented and adhered to.	Strengthen the existing planning and management policies in the proposed plan.
Cumulative effects of the plan on the issue addressed in the assessment		
Visual and aesthetics destruction is expected to continue if the plans are not implemented. In this case, the status quo would prevail and amenity and open spaces in the study area would be lost. The lack of landscaping protection, planning and management in the plans will allow the housing development that will be based on individuals' needs and likings. These negative impacts are anticipated to increase unless permitting of housing development gives a greater attention to ensuring aesthetics quality that fits the regional context.		
Proposed mitigation and enhancement measures		
• The following should be incorporated in the proposed plan: "landscaping protection" - actions shall be taken to conserve and maintain the significant or characteristic features of a landscape; "landscape planning" - actions shall be taken to enhance, restore or create landscapes; "landscape management"- actions shall be taken to ensure the regular upkeep of a landscape, so as to guide and harmonize changes which are brought about by social, economic and environmental processes. All the above will finally result to the individual and social-well being improving at the same time the quality of life everywhere. • There is a need to promote wider public and organisational understanding of sustainability. Increase awareness among professionals, civil society, private organizations and public authorities and promote training programs for professionals in private and public sector, and associations concerned with regards to landscape protection, management and planning. • Develop and use relevant targets and indicators		

Theme:	Landscape	
Issue:	Public access to beaches	
Indicators or guiding questions:	• Implement building design and sitting regulations to protect and provide public access to the shoreline through property development regulations of the Town Planning Zones that control building development • Require new development in waterfront commercial areas to provide public access easements to and along the waterfront.	
Analysis of past trends and current situation		
The existing situation with regards to the public access to the beaches in the study area does not provide enough protection or any kind of enhancement due to the rapid development growth. Some access is now available, but this will be minimized to unacceptable levels if no mitigation measures are implemented for the future.		
Future trends without the proposed plan		
Key factors that will influence future trends	Likely expected positive or negative impacts of these factors on the given trend	
Enforcement of the local regulations for the protection and provision of public access to the public beaches and the shoreline	The access to the beach is now in acceptable levels and no major impacts are anticipated if the local regulations are enforced.	
Coastal erosion	Future coastline and beach quality can be significantly influenced by the expected sea level raise or erosion occurring during extreme weather conditions (stronger waves due to extreme winds, increased run-off during heavy rains, etc.)	
Impacts of the proposed plan		
Components of the plan	Expected environmental risks (negative impacts) and environmental opportunities (positive impacts) of the given component of the plan	Proposed mitigation and enhancement measures
Construction of housing units and other facilities by the shoreline	Negative impacts are expected if new regulations with regards to building design and sitting are not enforced.	Protect, expand and enhance a system of public coastal access in order to: • Eliminate the trend of maintaining dense housing development and other kinds of man-made structures by the shoreline and public beaches • Maximize public access to and along the shoreline and public beaches by providing corridors of access • Include pedestrian and bicycle trails by the shoreline and public beaches • Provide access to coastal view corridors • Protect environmentally sensitive habitat areas Update and enforce local regulations accordingly.
Cumulative effects of the plan on the issue addressed in the assessment		
• Likely significant negative impacts on the beach access and beach quality will occur if significant sea level rise occurs or if new regulations with regards to building		

design and sitting are not enforced.
Proposed mitigation and enhancement measures
1. Take into consideration climate change (scenarios for sea level rise and extreme weather conditions) 2. Protect, expand and enhance a system of public coastal access that achieves the following: • Eliminate the trend of maintaining dense housing development and other kinds of man-made structures by the shoreline and public beaches • Maximize public access to and along the shoreline and public beaches by providing corridors of access • Implement Local Plan policies relating to Area Schemes for the waterfront areas which include provisions for pedestrian and bicycle trails by the shoreline and the public beaches • Provide access to coastal view corridors • Protect environmentally sensitive habitat areas 3. Update and enforce local regulations accordingly 4. Develop and use relevant targets and indicators

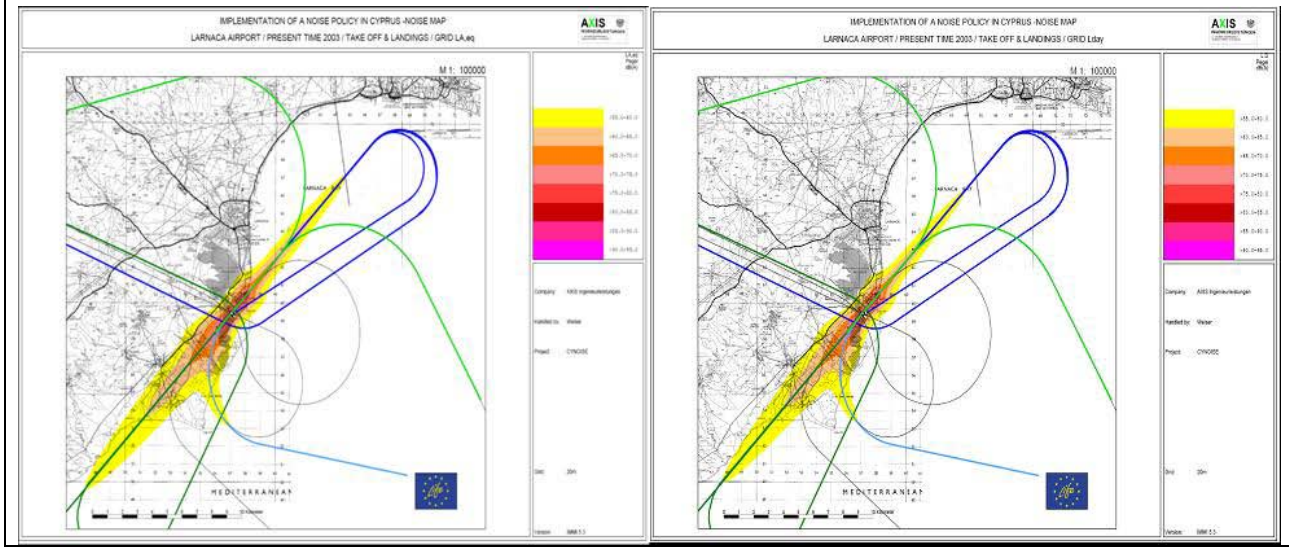
5.5 Population and human health

Theme:	Population and human health
Issue:	Noise levels
Indicators or guiding questions:	• Excessive noise levels

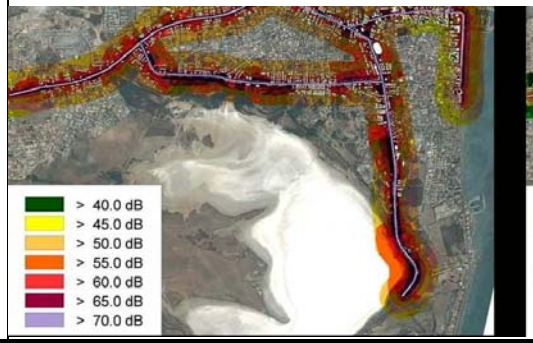
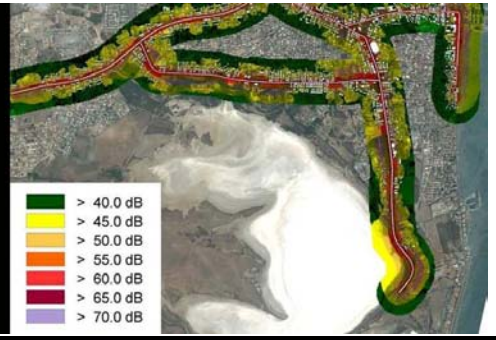
Analysis of past trends and current situation

Larnaca International Airport which neighbours the Larnaca Salt Lake was hastily developed at the end of 1974 after the invasion of Cyprus by Turkey in the summer of the same year and the enforced closure of Nicosia International Airport. The airport is 8 km (4 miles) from central Larnaca on a site which had been previously used as an airfield in the 1930's and subsequently as a military installation by the British. The airport opened in February 1975 as a prefabricated set of buildings comprising a departures and arrivals hall and a control tower and a runway that was initial too short for jet aircraft.

At present, Larnaca Airport is used for general, civil and military aviation. It has one passenger terminal, one cargo terminal, twenty one aircraft stands and 500 short term parking spaces. It is open 24 hours a day. However Cyprus's status as a major tourist destination and as a hub for travelling between Europe and the Middle East, means that numbers have steadily risen to over 5 million passengers a year. This is double the capacity the airport was first designed for. As such it was decided to develop the airport further and increase its capacity. Already completed elements of the expansion include a new control tower, fire station, runway extension, and additional administrative offices. The surrounding road network was improved by upgrading the B4 road and by completing the A3 Motorway. A new Junction has been constructed near by the new Terminal. The annual capacity of the current airport is only 4.5 million passengers but the terminal itself will be rebuilt some 500-700m west of current facilities, adjacent to the new control tower, with new aprons and jet ways. The old terminal building is slated to be partially demolished and refurbished as a cargo centre.



The main noise source in the area of the airport is the aircraft noise. A model was constructed to estimate noise levels in the area of the airport. The information used for this model was provided by the Civil Aviation Department of Cyprus. Some of the results of the calculation for the noise levels in Larnaca airport are indicated on the attached map. From the diagrams it is clear that certain areas with housing units and the salt lakes are affected by high noise levels because of the operation of the airport.

Future trends without the proposed plan		
Key factors that will influence these trends	Likely expected positive or negative impacts of these factors on the given trend	
Road transport	Noise levels (day)  Noise levels (night) 	The lake ecosystem is partly affected by noise generated by the road transport. The maps below indicate that parts of the northern top shore and part of the eastern shore of the main lake and its surrounding natural halophytic scrubland are subject to noise levels exceeding 50 dB during the day time and 45 dB during the night.

Impacts of the proposed plan		
Components of the plan	Expected environmental risks (negative impacts) and environmental opportunities (positive impacts) of the given component of the plan	Proposed mitigation and enhancement measures
Expansion of the use of Larnaca International Airport	The planes flight corridor is expected to be extended at the second phase into 3.5km, thus more planes will flight in and out of the airport because of the expansion of its activity. Therefore the effected area might remain the same but the noise levels will increase and more people will be affected by higher noise levels. This expectation however needs to be substantiated with the help of new noise maps for the planned expansion of the airport.	• Explore the possibility of limiting the use of the airport during the night hours. • Implement a pay premium scheme for the frequent flyers. • Limit the permits on housing units in the affected area. • Develop and use relevant targets and indicators

Cumulative effects of the plan on the issue addressed in the assessment
The noise levels will be increasingly exceeded in the residential zones through the eastern and northern parts of the study area. More people will be affected by excessive noise levels, but the scale of this impact could not be predicted within this study due to its nature and time constrains.

Proposed mitigation and enhancement measures
• Explore the possibility of limiting the use of the airport during the night hours. • Implement a pay premium scheme for the frequent flyers. • Limit the permits on housing units in the affected area. • Develop and use relevant targets and indicators

5.6 Cultural architectural and archaeological heritage

Theme:	Cultural architectural and archaeological heritage
Issue:	Ancient monuments, churches and trees
Indicators or guiding questions:	• Physical condition of ancient monuments and trees

Analysis of past trends and current situation

Ancient monuments: The Larnaca area and the study area in particular are rich in Ancient Monuments. The rich history of the area includes the old city of Kitium which was a principal Phoenician city in Cyprus, located close to modern Larnaca. The earliest remains at Kitium are those of an Aegean colony of the Mycenaean Age (c. 1400-1100 BC). The biblical name Kittim, representing Kitium, was also used for the whole island. A Phoenician dedication to the god "Baal of Lebanon," found at Kitium, suggests that the city may have belonged to Tyre; and an official monument of the Assyrian king Sargon II indicates that Kitium was the administrative centre of Cyprus during the Assyrian protectorate (709 - 668 BC). During the various Greek revolts from 499, to 353 BC, Kitium led the side loyal to Persia and it remained an important city even after Alexander the Great conquered Persia. Kitium suffered repeatedly from earthquakes, however, and in medieval times its harbour became silted and the population moved to Larnaca. The modern town of Larnaca on the bay between Capes Kiti and Pyla overlays much of ancient Kitium, a birthplace of the Greek philosopher Zeno, the founder of Stoicism and its modern name recalls the many tombs under its soil.

Ancient monuments are protected by local regulations and are under the supervision of the Department of Antiquities, Ministry of Communications and Works. During the planning process for the construction of hotels or complexes of houses in the area and for the development of facilities within the sea there several provision including site surveys by the Department of Antiquities. Town planning licenses are not issued for any specific development that affects any ancient monument. This is done in order to take all appropriate measures to preserve and protect the cultural heritage of coastal zones, including the underwater cultural heritage. The official ancient monuments within the study area are listed below.

Old trees – nature monuments: Trees nature-monuments or Giant Trees, are significant elements of Cyprus natural and cultural heritage. Trees nature-monuments means trees or high shrubs with unusually large dimensions and age that generally exceed two or three centuries. Within the framework of the systematic effort of the Department of Forests, which is the responsible department for the protection of tree monuments, has declared more than 200 trees monuments all over the island. Some of these are located in the Larnaca area. The management of protected trees is carried out by the Department of Forests and the cutting down of these trees is prohibited.

Future trends without the proposed plan

Key factors that will influence these trends	Likely expected positive or negative impacts of these factors on the given trend
Enforcement of local regulations for the protection of ancient monuments and protected trees	No impacts on existing ancient monuments are expected if applicable regulations are enforced.

Impacts of the proposed plan		
Components of the plan	Expected environmental risks (negative impacts) and environmental opportunities (positive impacts) of the given component of the plan	Proposed mitigation and enhancement measures
Construction of housing units and other facilities	There is a low risk for negatively affecting cultural heritage in cases where construction is carried out in areas that are not protected by the Department of Antiquities and the presence of ancient monuments is unknown.	Enforce and update local regulations
Cumulative effects of the plan on the issue addressed in the assessment		
No impacts on existing ancient monuments are expected if applicable regulations are enforced. However, there is a low risk for negatively affecting cultural heritage in cases where construction is carried out in areas that are not protected by the Department of Antiquities and the presence of ancient monuments is unknown.		
Proposed mitigation and enhancement measures		
• Develop local regulations on the protection of ancient monuments and protected trees in cases where development is carried out in areas that are not protected by the Department of Antiquities and where the presence of ancient monuments is unknown.		

5.7 Soil and geology

Theme:	Soil and Geology
Issue:	Coastal erosion
Indicators or guiding questions:	• River sediment loads to coast • Reduction in beach areas/ Coastal land • Soil quality of coastal land

Analysis of past trends and current situation

The phenomenon of coastal erosion is a largely natural phenomenon in the study area and it is attributed to strong winds, wave energy and loss of sediments. However, this phenomenon has been steadily increasing and enhanced during the last three decades, due to human activities. The main activities that attributed to this effect are:

- Construction of river dams and sediment trapping that limit the sediment transportation to the beach
- Extensive beach quarrying
- Rapid development along the coastal zone
- Increase in man made structures such as groins and breakwaters along the coast

The length of the coastline within the study area is about 8 Km. In its greatest extend, the beach is narrow and erodible and is composed mainly of "soft" material (loose sand and gravel) in small sandy beaches. Therefore, the vulnerability of the coast of the study area to erosion is considered to be extremely high. It is estimated that approximately 30-100cm of beach are lost every year due to coastal erosion. The map below indicates the twelve areas that were examined by the Department of Public Works of the Ministry of Communication and Works for erosion problems.

The study area was included in the MEDSPA program carried out by the Government in the period 1993-1996 for the monitoring of erosion along the coast where beach profiles every 500m were monitored once a year for erosion. The Department of Public Works is involved extensively in the implementation of projects that aim at the protection of the coast from erosion and in the implementation of projects that relate to the mooring of ships.

Currently, there are General Plan Studies for coastal projects in three different areas of the island. These areas are found near the cities of Larnaca, Limassol and Paphos. The implementation of these projects has already begun in Larnaca and Limassol. Six breakwaters have been constructed in the region of Oroklini/Pyla and fourteen breakwaters have been constructed in the wider region of the city of Limassol. At the moment, General Plan Studies for three more areas are being prepared. Those areas are: Chrysochou Gulf, Zygi-Kiti and Kato Pyrgos

The General Plan for the Zygi-Kiti area is finalized and the construction of fifteen parallel breakwaters will begin in 2008. In the long run, the goal of the Department of Public Works is to prepare General Plans Studies for all the regions in Cyprus facing erosion problems. In addition, the Coastal Unit of the Department works on defining and understanding the dynamic behavior of the coastal system around Cyprus by monitoring a number of parameters, by analyzing and interpreting the relevant data and by formulating policies for coastal protection and improvement measures.

Future trends without the proposed plan		
Key factors that will influence future trends	Likely expected positive or negative impacts of these factors on the given trend	
Climate change	Future coastline erosion can be significantly influenced by the expected sea level raise or extreme weather conditions (stronger waves due to extreme winds, increased run-off during heavy rains, etc.)	
Continuation of agricultural activities in the area	There are no significant impacts on coastal erosion associated with agricultural activities	
Backwater structures	If the backwater structures are constructed, they will likely significantly reduce the beach erosion and will make the area more attractive for housing developments.	
Impacts of the proposed plan		
Components of the plan	Expected environmental risks (negative impacts) and environmental opportunities (positive impacts) of the given component of the plan	Proposed mitigation and enhancement measures
Rapid increase in residential and tourism developments along the coast	Negative impacts anticipated since there the plan will increase development and construction along the coast. Potential impacts include: • Loss of vegetation along the coast • Increase in beach quarrying to satisfy construction industry • Increase of impermeable surface areas along the coast therefore increasing water runoff and erosion • Possible increase in illegal breakwaters or groins	• Develop more stringent regime for permitting or licensing of residential and tourism developments along the coast Assign coastal protection areas Monitor erosion along the coast
Cumulative effects of the plan on the issue addressed in the assessment		
Future coastline erosion is uncertain as it will depend mainly on adverse impacts of the actual climate changes that (which may significantly affect entire character of the shoreline) and on effectiveness of counter-measures in form of back-water structures. The plan further existing risks of increased coastal erosion given the risks associated with mainly: • Loss of vegetation along the coast • Increase in beach quarrying to satisfy construction industry • Increase of impermeable surface areas along the coast therefore increasing water runoff and erosion • Possible increase in illegal breakwaters or groins		
Proposed mitigation and enhancement measures		
• Take into consideration climate change (scenarios for sea level rise and extreme weather conditions) • Assign coastal protection areas • Develop more stringent regime for permitting or licensing of residential and tourism developments along the coast • Monitor erosion along the coast		

Theme:	Soil and Erosion	
Issue:	Seismic Risks	
Indicators or guiding questions:	Damages to buildings and infrastructure due to seismic activity	
Analysis of past trends and current situation		
Cyprus lies within the second largest earthquake-stricken zone of the earth, but in a relatively less active sector. This zone stretches from the Atlantic Ocean across the Mediterranean Basin, through Greece, Turkey, Iran, and India as far as the Pacific Ocean. The energy released by the earthquakes in this zone represents 15% of the universal seismic energy. Earthquakes in Cyprus are concentrated on the south coast, in a zone which is referred to as the Cyprian Arc and where Eurasian and African plates collide. The geological foundation of the study area in conjunction with its high seismicity, label the study area as a high seismicity risk area		
Future trends without the proposed plan		
Key factors that will influence future trends	Likely expected positive or negative impacts of these factors on the given trend	
None	No effect on the seismic activity is anticipated	
Impacts of the proposed plan		
Components of the plan	Expected environmental risks (negative impacts) and environmental opportunities (positive impacts) of the given component of the plan	Proposed mitigation and enhancement measures
Increase in residential and tourist and use within the study area	The increased development within the study area will increased risk of damage in case of seismic events	Improve/update the Seismic Code for Reinforced Concrete Structures in Cyprus
Cumulative effects of the plan on the issue addressed in the assessment		
The plan is implemented in a high seismicity risk area. The increased development within the study area will increased risk of damage in case of seismic events		
Proposed mitigation and enhancement measures		
Improve & update the Seismic Code for Reinforced Concrete Structures in Cyprus		

6. Key authorities consulted in the SEA process

National authorities involved in CAMP activity on SEA that were consulted during elaboration of this report include:

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TEAM EXPERTS Mr Andreas Assiotis, Ministry of Interior Ms Alexia Georgiadou, Department of Town Planning and Housing Ms Stavrini Theodosiou, Coastal Unit / Department of Public Works Mr Andreas Chrysostomou, Department of Merchant Shipping Mr Michael Savvides, Department of Lands and Survey Ms Myroula Hadjichristoforou, Department of Fisheries and Marine Research Mr Thomas Kyriakou, Department of Forestry Mr Spyros Stephanou, Department of Water Development Ms Panayiota Hadjigeorgiou, Department of Water Development Mr Christodoulos Hadjigeorgiou, Department of Geological Survey Mr Antonis Toumazis, Cyprus Scientific and Technical Chamber Mr Lefteris Embedoklis, Larnaca Municipality Mr Christoforos Panteli, Community of Pervolia
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