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ÇINAR®
ENGINEERING
CONSULTANCY INC.

ÇUKUROVA REGION AND İSKENDERUN BAY RAILWAY CONNECTION PROJECT

CRITICAL HABITAT ASSESSMENT/BIODIVERSITY MANAGEMENT PLAN

CNR-ADN-CHA-BMP-002

Rev.05

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ABBREVIATIONS & DEFINITIONS

AoI	Area of Influence
BMP	Biodiversity Management Plan
CBD	Convention of Biological Diversity
CHA	Critical Habitat Assessment
CR	Critically Endangered
DGII	General Directorate of Infrastructure Investments
EN	Endangered
EOO	Extent of Occurrence
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	The World Bank Environmental and Social Standard
GN	Guidance Note
IAS	Invasive Alien Species
IUCN	International Union for Conservation of Nature
IVMP	Integrated Vegetation Management Plan
PIU	Project Implementation Unit
RoW	Right of Way
SEP	Stakeholder Engagement Plan
SSC	Species Survival Commission
VU	Vulnerable

APPENDICES

Appendix-1	Tentative Table Of Contents For The Integrated Vegetation Management Plan (IVMP)
Appendix-2	**Monitoring and Evaluation Program**
Appendix-3	**Invasive Alien Species Procedure**

1 INTRODUCTION

The Biodiversity Management Plan (BMP) for Çukurova Region and İskenderun Bay Railway Connection Project has been developed to provide a clear outline of actions and methods required to mitigate likely impacts of the Project on biodiversity. This BMP therefore:

- Covers identified biodiversity value and potential Project-related impacts.
- Incorporates the requirements of the ESIA findings, Turkish environmental legislation and international standards.
- Assigns responsibilities for the implementation of this BMP.
- Details site-specific control measures to be adopted to manage impacts on natural habitats and species of high conservation concern along the Project route.

The General Directorate of Infrastructure Investments (DGII) is committed to adopt an adaptive management approach in implementation of this BMP, meet requirements of applicable laws and Project standards, and make updates to the strategies developed in this document as necessary.

1.1 Scope

This BMP covers planned construction and operation activities of the Project and is applicable to DGII staff, contractors and sub-contractors. Contractors are required to ensure that all BMP requirements are adopted within their own management plans.

1.1.1 Biodiversity Values

Biodiversity values that are subject to mitigation measures and management strategies within the scope of this BMP are listed in Table 1.

Table 1: Biodiversity Values of the Study Corridor

Critical Habitat	Natural Habitats	Flora Species of High Conservation Concern	Fauna Species of High Conservation Concern
Coastal stable dune grassland (grey dunes) Coastal dune heaths	Permanent mesotrophic lakes Water-fringing reedbeds Reedbeds normally without free-standing water Maquis Eastern garrigues	*Sternbergia pulchella* *Cyclamen persicum* *Hyacinthella millingenii* *Echinops dumanii* *Astragalus antiochianus* *Alopecurus adanensis*	*Acanthodactylus schreiberi* *Testudo graeca* *Trionyx triunguisFalco vespertinus* *Vormela peregusna* *Lutra lutra* *Myotis bechsteinii* *Nyctalus lasiopterus* *Barbastella barbastellus* *Myotis capaccinii* *Nyctalus leisleri*

1.1.2 Potential Impacts on Biodiversity Values

Potential impacts on biodiversity due to planned Project activities include:

- Habitat loss (loss of feeding, nesting, breeding areas) and degradation
- Habitat fragmentation
- Barrier effect and restricted fauna movement
- Animal mortality (due to collision, electrocution, wire strikes and rail entrapment)
- Light, noise and vibration disturbances

- Air, soil and water pollution
- Soil erosion
- Changes to local hydrology
- Fire hazards
- Introduction of invasive alien species

1.2 Objective

The main objective of the BMP is to develop strategies to manage impacts on biodiversity, minimizing losses and disturbance to habitats and species, as well as to the ability of wildlife to traverse habitat corridors. Biodiversity management objectives for the Project are given in Table 2.

Table 2: Biodiversity Management Objectives

Objective	Target	Performance Indicator
Protect coastal stable dune grassland (grey dunes), coastal dune heaths, and associated *Echinops dumanii, Astragalus antiochianus* and *Acanthodactylus schreiberi* populations	No Project activity outside the designated construction sites will be conducted.	No reported incidents of activity outside approved construction areas. Monitoring reports on the statuses of habitats and species' populations.
Monitor *Sternbergia pulchella, Hyacinthella millingenii, and Cyclamen persicum* population	These species cluster outside the railway line, but inside the AoI. .Bulbs of the species were collected and re-located. For an offset requirement in case translocation fails, the translocated habitats will be monitored.	Monitoring reports on translocation success. Offset strategies developed and implemented, if required.
Minimize extent of vegetation clearance in natural habitats	No vegetation clearance will be undertaken outside the Project footprint.	No reported incidents of vegetation clearance outside the Project footprint. Monitoring reports on the integrity natural habitats.
Minimize impacts of habitat fragmentation	Interaction between the newly formed railway green corridor and natural habitats will be allowed to create a habitat continuum. Significant locations for wildlife crossings will be identified, and appropriate methods to prevent animal crossings will be implemented.	Wildlife crossings designed and located at areas crucial to animal passage. Different methods implemented so that animals do not enter the RoW.
Minimize injury or mortality of fauna species	On-site speed limits will be enforced and the Project personnel will receive necessary trainings.	Reported incidents on fauna injuries or death due to Project activities. On-site traffic management in place.
Relocation of *Testudo graeca*	The tortoise will be re-located, when it will be observed in the construction area.	Reported on re-location of fauna species.
Raise awareness among internal and external stakeholders on biodiversity and conservation priorities	Trainings/meetings will be organized to inform internal and external stakeholders within the scope of the Stakeholder Engagement Plan (SEP).	Reports on trainings, information disclosure meetings and attendants. SEP being implemented and updated as necessary.
Implement the Biodiversity Monitoring and Evaluation Program	Sustainable management of biodiversity.	Periodically monitoring reports

1.3 Roles and Responsibilities

Implementation of strategies and mitigation measures set forth in this BMP is under the responsibility of DGII. The Project Implementation Unit (PIU) of the DGII, and the Environmental and Social Management team within, is responsible for actions related to biodiversity values and conservation measures addressed in the Environmental and Social Impact Assessment (ESIA) and BMP. Contractors and sub-contractors, who will be undertaking the Project activities during land preparation, construction and operation phases will be appointing their own qualified personnel to manage biodiversity related issues.

The main responsibilities in implementation of the BMP are as the following:

- Ensuring compliance with Project standards
- Implementing biodiversity conservation measures and management controls
- Monitoring implementation success of the BMP
- Identifying adverse impacts on habitats and species, and taking additional measures as necessary

In conducting biodiversity studies, besides the DGII and contractor/sub-contractor staff, external experts will also be appointed. Biodiversity experts are responsible for conducting additional field surveys, evaluating results and addressing necessary measures within the scope of the BMP, developing strategies for implementation of the Biodiversity Monitoring and Evaluation Program, and reporting all of these studies to DGII and contractors/sub-contractors.

2 LEGISLATIVE FRAMEWORK

The legislative framework for Çukurova Region and İskenderun Bay Railway Connection Project was developed to cover not only the Turkish Environmental and Social Legislation, but also the Labor Law and Regulations, the World Bank Environmental and Social Standards (ESSs) and Environmental Health and Safety Guidelines. In line with the institutional and legal framework set for the Project, national legislation and international standards pertaining to biodiversity studies are presented in this section.

2.1 National Legislation

The Environmental Law No. 2872 aims at protection of the natural environment in line with the sustainable development principles. Its framework was extended with Law 5491 entering into force on April 26, 2006 amending the Environmental Law, to cover fundamental principles of biodiversity conservation. Article 6 of the Law states the importance of protecting biodiversity, and introduces penal sanctions against damage to the environment, including the destruction of biological diversity, when detected through inspection and audits. The regulations issued on the basis of the Environment Law specify rules on the prevention of pollution and on environmental impact assessment. The laws and regulations for conservation of habitats and species in Türkiye and national strategy documents prepared to implement statutory biodiversity conservation principles, which have been set forth by the related law and regulations are presented in Table 3.

Table 3: National Legislation

Turkish Laws and Regulation	National Strategy Documents
▪ Law on National Parks ▪ Forestry Law ▪ Law for the Protection of Cultural and Natural Assets ▪ Terrestrial Hunting Law ▪ Law on Fisheries ▪ Law for the Protection of Animals ▪ Pasture Law ▪ Regulation on Conservation of Wetlands ▪ Regulation on Fisheries ▪ Regulation on Protection of Wildlife and Wildlife Development Areas	▪ National Biological Diversity Strategy and Action Plan ▪ National Environmental Action Plan ▪ National Plan for In-Situ Conservation of Plant Genetic Diversity ▪ National Agenda 21 Programme ▪ National Wetland Strategy ▪ Turkish National Forestry Programme ▪ National Science and Technology Policies 2003-2023 Strategy Document ▪ Turkish National Action Programme Against Desertification ▪ National Environmental Strategy ▪ National Rural Development Strategy ▪ National Biological Diversity Strategy and Action Plan

The National Biological Diversity Strategy and Action Plan, whose most recent update was completed in 2007, is a response to the obligation to prepare a national strategy for the purpose of guiding the implementation of the Convention on Biological Diversity (CBD). The aim of this Strategy is to identify and assess Türkiye's biological diversity in brief, to determine a generally agreed strategy for conservation and to propose the actions required for achieving the goals of Biodiversity Conservation in Türkiye. The Strategy defines the current legal responsibilities concerning biological diversity, underlines the importance of international cooperation intended for policy-making and the importance of the necessary research conditions to develop ecosystem management, and includes a definition and assessment of Türkiye's biological diversity and the strategies and priority action plans towards the goals.

2.2 International Standards

The World Bank Environmental and Social Standard (ESS) 6

The main objective of ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources is conservation and protection of biodiversity and living natural resources in reaching sustainable development. It is important to maintain ecological functions of habitats and the biodiversity they support. Biodiversity often underpins ecosystem services as well. Therefore, impacts on biodiversity can adversely impact ecosystem services as well. The World Bank addresses requirements related to ecosystem services in ESS1: Assessment and Management of Environmental and Social Risks and Impacts. The main objectives set out in ESS6 are as the following:

- To protect and conserve biodiversity and habitats.
- To apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity.
- To promote the sustainable management of living natural resources.
- To support livelihoods of local communities, including Indigenous Peoples, and inclusive economic development, through the adoption of practices that integrate conservation needs and development priorities.

ESS6 requires that biodiversity-related risks and impacts as such; ecosystems affected, species affected, ecosystems services affected, protection status, site ownership and control, baseline threats, and potential project-related risks and impacts, are described in the environmental and social impact assessment.

3 CRITICAL HABITAT ASSESSMENT

3.1 Critical Habitat Concept

As stated by ESS6, habitats constitute “a terrestrial, freshwater or marine geographical unit or airway that supports assemblages of living organisms and their interactions with the non-living environment”. To meet ESS6 requirements, clients would have different obligations for different kinds of habitats. This enables to provide a better understanding of specific species and habitat requirements and establish meaningful management units to define a mitigation strategy. These habitat types are modified, natural and critical, which can be a subset of natural or modified habitats. These habitat types refer to the biodiversity value of a given area, as determined by species, ecosystems and ecological processes, and are required to be identified within a project’s area of influence (AoI) to define habitat-specific ESS6 requirements accordingly.

Modified habitats, in the most general sense, are those that have been subject to some form of alteration, often resulting in agricultural land. Despite the fact that some modified habitats might lose all of their natural characteristics, it is still required to minimize further impacts. Natural habitats are composed of plant and/or animal species that are mostly of native origin, where human activity has not been significant enough to modify ecological functions and species composition within. In areas of natural habitat mitigation measures are required to be designed to achieve no net loss of biodiversity.

Critical habitats are those that are of high biodiversity value. Both natural and modified habitats may contain high biodiversity values qualifying as critical habitat. While habitat types are defined by the degree of human-induced modification, this is not necessarily an indicator of the biodiversity value of a habitat as per ESS6.

Critical habitat criteria as put forward by ESS6 that forms the basis of critical habitat assessment are as follows:

Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species

Criterion 2: Endemic or restricted-range species

Criterion 3: Migratory or congregatory species

Criterion 4: Highly threatened and/or unique ecosystems

Criterion 5: Key evolutionary processes

ESS6 requires the Borrower (client) not to implement any project activities in areas of critical habitat unless all of the following are demonstrated:

- No other viable alternatives within the region exist for development of the project in habitats of lesser biodiversity value;
- All due process required under international obligations or national law that is a prerequisite to a country granting approval for project activities in or adjacent to a critical habitat has been complied with;
- The potential adverse impacts, or likelihood of such, on the habitat will not lead to measurable net reduction or negative change in those biodiversity values for which the critical habitat was designated;
- The project is not anticipated to lead to a net reduction in the population of any Critically Endangered, Endangered, or restricted-range species, over a reasonable time period;
- The project will not involve significant conversion or significant degradation of critical habitats. In circumstances where the project involves new or renewed forestry or agricultural plantations, it will not convert or degrade any critical habitat;

- The project's mitigation strategy will be designed to achieve net gains of those biodiversity values for which the critical habitat was designated; and
- A robust and appropriately designed, long-term biodiversity monitoring and evaluation program aimed at assessing the status of critical habitat is integrated into the Borrower's management program.

It should also be noted that Critical Habitat Assessment is independent of a project's potential impacts on biodiversity value within its AoI or an extended area. The outcome of the Critical Habitat Assessment does not indicate a particular impact associated with project activities or requirement for a mitigation measure. Rather it provides a thorough analysis of the existing biodiversity value in a given area and informs the applicability of ESS6 requirements. For the project-related impacts a mitigation hierarchy is to be applied and measures are required to be defined for different phases of a project.

3.2 Critical Habitat Methodology

In order to identify the statuses of species that have been identified based on literature data and assessed through expert judgement, besides the IUCN Red List of Threatened Species utilized to determine endangered and critically endangered species, other criteria were also used in critical habitat assessment, wherever applicable. In determining "highly threatened and unique ecosystems", IUCN Red List categories for ecosystems were used as the main reference.

Since international, even European biodiversity assessments do not always cover Turkish habitats and species, experts' judgment was often consulted to interpret data. Since international, even European biodiversity assessment do not always cover Turkish habitats and species, experts' judgment was often consulted to draw conclusions on the current statuses of biodiversity components. Local expert judgment was also referred to due to the fact that there are no officially established or widely accepted national evaluations on threat and conservation statuses of habitats and species in Türkiye.

Criterion 1: Critical (CR) and/or Endangered (EN) Species

Species threatened with global extinction and listed as Critically Endangered (CR) and Endangered (EN) on the IIUCN Red List are considered as part of Criterion 1. Critically Endangered species face an extremely high risk of extinction, while Endangered species face a very high risk of extinction in the wild.

Quantitative data on potential critical habitat triggering species' populations were assessed based on the Guidance Note (GN) 6 (2019) thresholds, which not only consider global conservation priorities but also nationally or regionally significant concentrations of species. Accordingly;

(a) areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (≥0.5% of the global population and (≥5% reproductive units of a CR or EN species);

(b) areas that support globally important concentrations of an IUCN Red-listed Vulnerable species, the loss of which would result in the change of the IUCN Red List status to EN and meet these thresholds;

(c) as appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species, trigger designation of critical habitat.

In determining CR and EN species at the Biodiversity Study Area, the IUCN Red List of Threatened Species, European Red Lists, and the only IUCN correspondence in Türkiye; the Red Data Book of Turkish Plants have been utilized as the main references. Regional statuses

of species, supported by expert judgment on species' current population trends in Türkiye, have also been assessed.

Criterion 2: Endemic and/or Restricted-Range Species

The updated version of the GN 6 (2019) defines the term endemic as restricted-range, which refers to a limited extent of occurrence (EOO) as such:

- For terrestrial vertebrates and plants, a restricted-range species is defined as those species which have an EOO less than 50,000 km2.
- Form marine systems, restricted-range species are provisionally being considered those with an EOO of less than 100,000 km2.
- For coastal, riverine and other aquatic species in habitats that do not exceed 200 km width at any point, restricted-range is defined as having a global range less than or equal to 500 km linear geographic span.

An area can be designated as critical habitat, if it holds ≥10 percent of the global population size and ≥10 reproductive units of an endemic and/or restricted-range species. Terrestrial and freshwater species identified at the Biodiversity Study Area were assessed with respect to their EOOs and population sizes, based on the IUCN Red List, IUCN European assessments, and expert judgment.

Criterion 3: Migratory or Congregatory Species

Migratory species are defined as any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem). Congregatory species are those, whose individuals gather in large groups on a cycle or otherwise regular and/or predictable basis according to PS6. The thresholds are as the following:

(a) areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle.

(b) areas that predictably support ≥10 percent of the global population of a species during periods of environmental stress.

The significant groups of migratory and congregatory species that are potential critical habitat triggers in the area are birds. Migration and breeding surveys were performed and assessments for Criterion 3 has been made in the following sections. ***Criterion 4: Highly Threatened or Unique Ecosystems***

To identify highly threatened or unique ecosystems, World Bank requires the Client to use the IUCN Red List of Ecosystems (RLE) where formal assessments have been performed, and if not to use assessments using systematic methods at the national/regional level, carried out by government bodies, recognized institutions and/or other relevant qualified organizations. The thresholds are:

(a) areas representing ≥5 percent of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN.

(b) other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning.

As Burnaz Dunes KBA has been appointed the IUCN Protected Area Management Category Ia, it meets critical habitat criteria. "Coastal stable dune grassland" and "coastal dune heath" habitats have been assessed as potential critical habitat triggers as per Criterion 4.

Criterion 5: Key Evolutionary Processes

Evolutionary processes are defined as structural attributes of a region, such as its topography, geology, soil, temperature, and vegetation and combinations of these variables can influence evolutionary processes that give rise to regional configurations of species and ecological properties. The significance of structural attributes in a landscape that may influence evolutionary processes are required to be determined on a case-by-case basis, and determination of habitat that triggers this criterion will rely on scientific knowledge.

Examples to spatial features associated with evolutionary processes can be listed as; landscapes with high spatial heterogeneity, ecotones, edaphic interfaces, connectivity between habitats, and sites of demonstrated importance to climate change adaptation either for species or ecosystems.

The Biodiversity Study Area is not associated with key evolutionary processes. Neither it hosts flora and/or fauna species that have distinct evolutionary histories with populations that show proven phylogenetic divergence from other species' other known populations.

3.3 Critical Habitat Triggering Biodiversity Features

Criterion 1: Critical (CR) and/or Endangered (EN) Species and Criterion 2: Endemic and/or Restricted-Range Species

CR, EN, VU and endemic species that were identified during the site surveys and are also presumed present based on literature data were assessed against the IUCN Red List, European Red Lists, and The Red Data Book of Turkish Plants, in terms of their global and regional threat statuses. To reach an understanding on the current statuses of species in the area, expert judgement was also consulted. Endangered and endemic species that are potential critical habitat triggers are presented in Table 4.

Table 4. Potential Critical Habitat Triggering Taxa as per Criterion 1 and 2

Biodiversity Feature	IUCN Red List Category	Endemic / Restricted-Range
Plants		
Echinops dumanii	CR	Endemic
Astragalus antiochianus	CR	Endemic
Alopecurus adanensis	CR	Endemic
Sternbergia pulchella	EN	-
Cyclamen persicum	VU	-
Hyacinthella millingenii	VU	-
Reptiles		
Acanthodactylus schreiberi	EN	Endemic
Testudo graeca	VU	-
Trionyx triunguis	VU	-
Birds		
Falco vespertinus	VU	-
Mammals		
Vormela peregusna	VU	-
Lutra lutra	NT	-
Myotis bechsteinii	NT	-
Nyctalus lasiopterus	VU	-
Barbastella barbastellus	NT	-
Myotis capaccinii	VU	-
Nyctalus leisleri	LC	Endemic

Biodiversity Feature	IUCN Red List Category	Endemic / Restricted-Range
IUCN Category: **CR: Critically Endangered** **EN: Endangered** **VU: Vulnerable** **NT: Near Threatened** **LC: Least Concern**		

According to Table 4. Potential Critical Habitat Triggering Taxa as per Criterion 1 and 2), 17 species were evaluated as potential critical habitat triggering species.

The endemic *Echinops dumanii* (IUCN: CR) population in the Biodiversity Study Area was identified to be about 150 individuals, which represents 5-10% of its known population in Türkiye. Since the Biodiversity Study Area holds more than 0.5% of the species' global population, the dune habitats are designated as critical habitat for *Echinops dumanii*. However, due to the route change, there will be no Project-related impacts on the dune habitats and species populations, which area was determined as Critical Habitat due to *Echinops dumanii. Astragalus antiochianus,* and *Acanthodactylus schreiberi*.

The endemic *Astragalus antiochianus* (IUCN: CR) population was identified to be about 200 individuals, which represents 2-3% of its known Türkiye population. Therefore, it meets Criterion 1 numerical thresholds. However, due to the route change, there will be no Project-related impacts on the dune habitats and species populations, which area was determined as Critical Habitat due to *Echinops dumanii. Astragalus antiochianus,* and *Acanthodactylus schreiberi*.

The endemic *Alopecurus adanensis* species has not been observed/identified within the Project area and Biological Study Area. The distribution area of this species is outside the Project footprint. Therefore, this species does not meet the Critical Habitat Criterion. The species is represented by 100 individuals outside the Biological Study area. This constitutes 2-3% of the Turkish population.

The Rare species *Sternbergia pulchella* has been assessed to be Endangered, based on expert judgement within the scope of the ESIA studies. The population of about 100 individuals identified on the Project route is one of the two known locations of the species and represents about 20% of its population in Türkiye. IUCN's global population assessment on the species estimates that there is a total of 4500-5000 individuals scattered across Türkiye, Syria and Lebanon. Yet, due to lack of adequate data on the species, and precise locations of the populations outside Lebanon, it is categorized as Data Deficient by the Red List. The species does not meet the Critical Habitat Criterion. While the population of *Sternbergia pulchella* identified along the project route represents approximately 2% of its global population, it has not been designated as Critical Habitat due to several factors beyond population percentage alone. According to Criterion 1, Critical Habitat may be triggered if a site supports more than 0.5% of a species' global population, particularly for species assessed as Endangered. However, the Critical Habitat designation also requires the site to play a pivotal role in sustaining the species' overall viability, such as supporting critical life cycle stages or being essential for the species' recovery and survival on a broader scale. For *Sternbergia pulchella*, although this population is significant within Türkiye, it is not confirmed to be crucial for the species' regional or global persistence. Additionally, the species is categorized as Data Deficient (DD) on the IUCN Red List, indicating gaps in population and habitat data, particularly outside Lebanon. Without precise information on the distribution and viability of other populations in the species' range (including unknown populations in Syria and Turkey), it remains uncertain whether this population segment is essential for species resilience. Furthermore, appropriate mitigative measures, such as bulb translocation and conservation monitoring outside the Area of Influence (AoI), have been implemented to reduce any adverse

impacts on this local population, supporting conservation goals without necessitating Critical Habitat designation.

The Rare species *Cyclamen persicum* has been assessed to be Vulnerable, based on expert judgement within the scope of the ESIA studies. The second known locality of this species is the project area and the habitats in which they spread are extremely sensitive. The Biodiversity Study Area does not hold significant population of these species based on expert judgement. The loss of these habitats will not cause a change in the Red List category and therefore available data suggest that these Vulnerable species do not trigger Critical Habitat Criterion. In order to reduce the pressure on the species and the population, the bulbs of *Cyclamen persicum* were collected and transported to areas outside the AoI. These areas will be monitored to achieve biodiversity conservation.

The Rare species *Hyacinthella millingenii* has been assessed to be Vulnerable within the scope of the ESIA studies. The second known locality of this species is the project area and the habitats in which they spread are extremely sensitive. The Biodiversity Study Area does not hold significant population of these species based on expert judgement. The loss of these habitats will not cause a change in the Red List category and therefore available data suggest that these Vulnerable species do not trigger Critical Habitat Criterion. In order to reduce the pressure on the species and the population, the bulbs of *Hyacinthella millingenii* were collected and transported to areas outside the AoI. These areas will be monitored to achieve biodiversity conservation.

Population of the Endangered *Acanthodactylus schreiberi* in the Biodiversity Study Area meets Criterion 1 thresholds and triggers critical habitat. The Burnaz Dunes are the only habitat for *Acanthodactylus schreiberi* in Türkiye. Therefore, the dune habitat are considered as Critical Habitat. In line with the mitigation hierarchy, in order to avoid potential impacts of the Project, alternative routes were considered by the DGII and the line was redesigned so that it does not pass through the dune habitat. Although Burnaz KBA has been assessed as part of the ESIA as it is located within the Biodiversity Study Area, there will be no Project-related impacts on the dune habitats and species populations they support.

Although the *Testudo graeca* species is classified as Vulnerable by the IUCN, it has a wide distribution throughout Türkiye. Simultaneously, agricultural activities put pressure on the species. The species was discovered in the Project area, specifically in the Burnaz Springs section. Because of its widespread distribution in Türkiye, the species does not meet the Critical Habitat Criterion. However, in order to ensure the species' survival and continuity, it must be transported prior to the studies. Necessary precautions, which were listed in the BMP will be implemented.

The vulnerable species *Trionyx triunguis* was not observed during field surveys in the Biodiversity Study Area. The *Trionyx triunguis* is a fresh and brackish water species distributed in lentic ecosystems of Africa and the eastern Mediterranean. It has also regularly been recorded in coastal waters. In the eastern Mediterranean *Trionyx triunguis* has been recorded in coastal and brackish waters of Greece, Turkey, Syria, Lebanon, Israel and Egypt, with the largest reproduction areas being found in Turkey and Israel. The distribution area of this species is outside the Project footprint. Therefore, this species does not meet the Critical Habitat Criterion.

Falco vespertinus is listed as Vulnerable according to the IUCN. *Falco vespertinus* is a bird of prey. This bird is found in eastern Europe and Asia although its numbers are dwindling rapidly due to habitat loss and hunting. It is migratory, wintering in Africa. In the Project area, *Falco vespertinus* finds less stopover habitats during its migratory journey between breeding grounds in Eastern Europe and wintering areas in Southern Africa. The population size of *Falco vespertinus* is significantly smaller compared to its global population. The global population of Red-footed Falcons is estimated to be between 300,000 to 800,000 individuals. In contrast,

the population size in Turkey is much smaller and is primarily composed of migratory individuals passing through the country during their migration between breeding grounds in Eastern Europe and wintering areas in Southern Africa. Therefore, this species does not meet the Critical Habitat Criterion.

The vulnerable species *Vormela peregusna*, a small carnivorous mammal known for its distinctive marbled coat is distributed outside the Biodiversity Study Area. This region's semi-arid landscapes, comprising open fields, grasslands, and sparse woodlands, provide essential foraging and denning opportunities for the species. However, *Vormela peregusna* faces numerous threats, including habitat loss due to agricultural expansion, urban development, and infrastructure projects. Additionally, the use of pesticides in agricultural areas reduces the availability of prey, such as small mammals and insects, which are vital for the polecat's diet. Therefore, this species does not meet the Critical Habitat Criterion. The available data indicates that these VU species do not trigger critical habitat because, based on expert judgement, the biodiversity research region does not include a significant population of these species and project actions will not alter their threat categories. Additionally, this species will not be directly impacted by the Project because of the shift in the railway line.

The Near Threatened Eurasian Otter (*Lutra lutra*) relies on the freshwater ecosystems. The region's rivers, streams, and wetlands provide essential resources for the otter, including clean water, abundant fish populations, and dense riparian vegetation for shelter and breeding. The lakes in the Burnaz Dunes outside the Biodiversity Study Area are important locations for the *Lutra lutra*. Therefore, this species does not meet the Critical Habitat Criterion.

The bat species *Myotis bechsteinii* (IUCN: NT), *Nyctalus lasiopterus* (IUCN: VU), *Barbastella barbastellus* (IUCN: NT), *Myotis capaccinii* (IUCN: VU), and *Nyctalus leisleri* (IUCN: LC, endemic) were identified in garden surroundings. There were no nesting areas for the bat species in the project route. Therefore, it has been evaluated that the bat species will not be affected by the planned railway. Therefore, this species does not meet the Critical Habitat Criterion.

As a result of the evaluations made, the Criterion evaluations of the triggering species are listed in the table below.

Table 5. Triggering species evaluation

Biodiversity Feature	IUCN Red List Category	Endemic / Restricted-Range	Criterion
Plants			
Echinops dumanii	CR	Endemic	Criterion 1
Astragalus antiochianus	CR	Endemic	Criterion 1
Reptiles			
Acanthodactylus schreiberi	EN	Endemic	Criterion 1
IUCN Category: **CR: Critically Endangered** **EN: Endangered**			

A Critical Habitat Map showing the locations of Triggering Species is presented in Figure 1. The Critical Habitat is specified according to *A. schreiberi*. The railway line will not pass through the Critical Habitat and no project-related activities will be performed in the Critical Habitat Area to avoid impacts on species and habitats.

Although, *Sternbergia pulchella*, *Cyclamen persicum*, and *Hyacinthella millingenii* meet the Criterion 2, the population diversity in and outside the Project AoI is stable and according to expert judgement it was not declared as Critical Habitat. In order to reduce the pressure on the

species and the population, the bulbs of these species were collected and transported to areas outside the AoI.

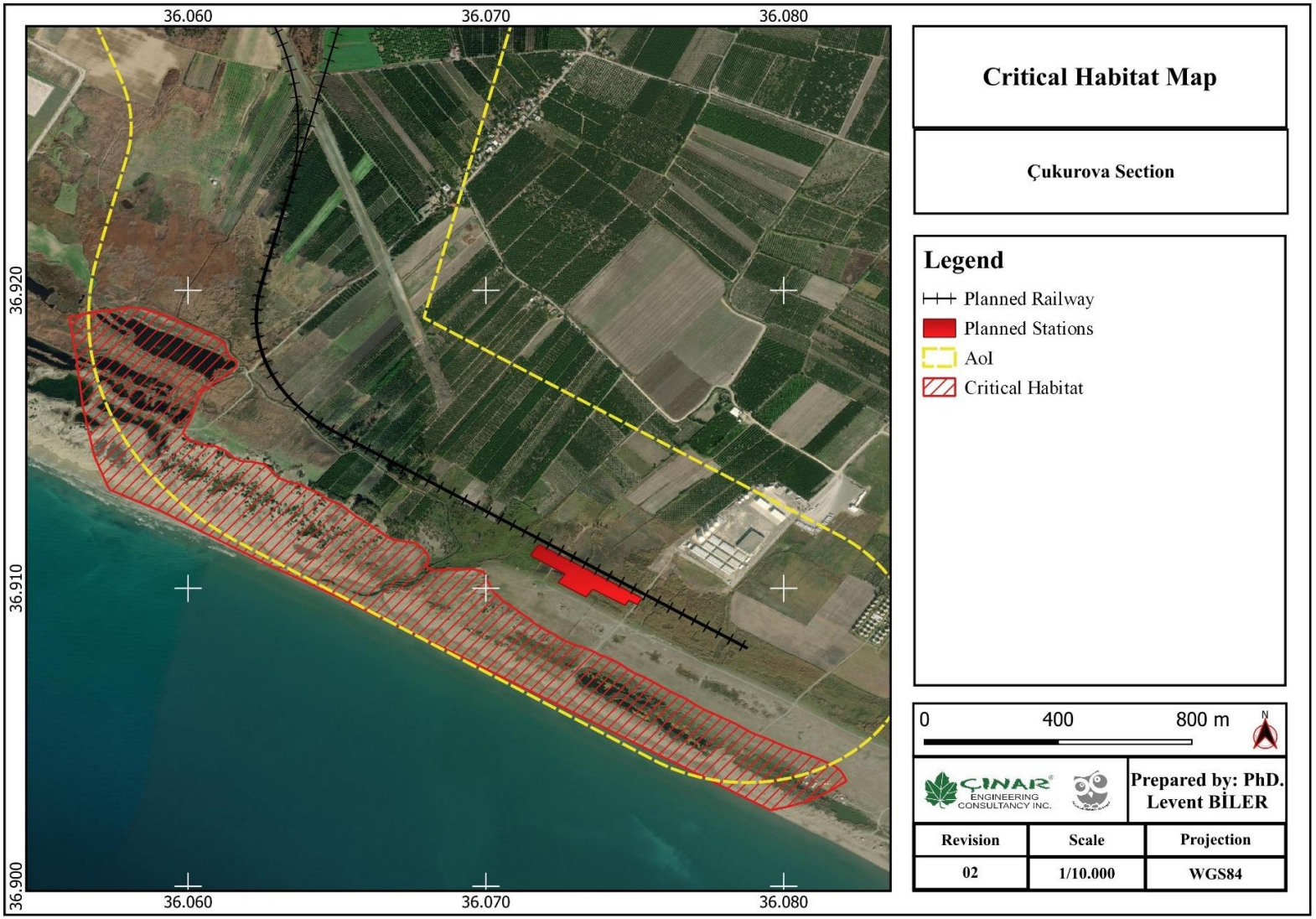

Figure 1. Critical Habitat Map

Criteria 3: Migratory or Congregatory Species

The study area and AoI does meet the critical habitat criteria according the "Criterion 3: Migratory or congregatory species based on direct observations. The Çukurova area locates on one of the major flyways of soaring birds and also for most of the species using the Black Sea-East Mediterranean Flyway. Actions for migratory birds are considered within the scope of the BMP, which is prepared separately.

The potential triggering species Red-Footed Falcon (*Falco vespertinus*) was evaluated according to Criteria 3. The Biodiversity Area does not regularly support migratory or congregatory species at any point in their lifecycle. Additionally, it does not sustain more than 10 percent of the global population of any species during periods of environmental stress. Therefore, this species do not trigger Critical Habitat Criteria 3.

Criterion 4: Highly Threatened or Unique Ecosystems

Coastal and terrestrial habitats identified in the Biodiversity Study Area were first evaluated in terms of their corresponding EUNIS codes and Habitats Directive Annex I statuses. Then, those that are potential critical habitat triggers were assessed against the European Red List of Habitats. Considering the current statuses of habitats in Türkiye, and major threats they are facing, based on expert judgment, a national assessment in line with the Red List criteria (Janssen, 2016) was also made and presented in Table 6.

Table 6. Potential Critical Habitats as per Criterion 4

Habitat Description	European Red List		National Assessment	
	Category	Criterion	Category	Criterion
B1.4: Coastal stable dune grassland (grey dunes)	EN	B1, B2	EN	B1
B1.5: Coastal dune heaths	-	-	EN	A3, CD1
C1.2: Permanent mesotrophic lakes, ponds and pools	NT	CD1	LC	-

Coastal stable dune grassland (grey dunes)" has been assessed to be Endangered (Janssen, 2016), due to its extent of occurrence (B1), extent of occupancy (B2) and reduction in its abiotic and/or biotic quality (CD1) both at the European and Turkish scales.

"Coastal dune heaths" habitat in the area is different than the European B1.5 habitats in terms of its species composition. However, considering it should be evaluated with habitats of the same class, it has been considered as a Habitats Directive provisional Annex I habitat. Since the European Red List does not provide an assessment for this habitat in Türkiye, the habitat has been assessed at the national scale. Based on present and future (next 50 years) reduction in its quantity (A2b) and reduction in the habitat's abiotic and/or biotic quality (CD1) it is categorized as Endangered. It has not been possible to identify how much of the global extents of these two habitats are represented in the area. However, considering their relatively narrow range and threats they have been facing, the dune habitats in the Biodiversity Study Area have been designated as critical habitat.

In line with ESS6 provisions, and following the mitigation hierarchy, potential impacts on critical habitat have been avoided within the scope of the Project. Alternative routes were considered by the DGII and the railway line was redesigned so that it does not pass through the critical habitat. Besides, no project-related activities will be performed in the critical habitat area to avoid impacts on species and habitats. Therefore, it expected that there will be no Project-related impacts on the critical habitat and species populations it supports.

Although "Permanent mesotrophic lakes, ponds and pools" does not meet Criterion 4 thresholds, it is still considered as priority habitats as natural habitats supporting significant assemblages of flora and fauna, as well as ecosystem functions. Potential impacts of the Project on natural habitats are further discussed in line with the mitigation hierarchy.

4 MITIGATION MEASURES AND MANAGEMENT CONTROLS

In line with the provisions of ESS6, biodiversity impact assessment within the scope of the ESIA has been conducted following the mitigation hierarchy. The main objective of Project biodiversity studies is to develop and implement mitigation measures and actions in order to achieve no net loss in natural habitats and species of high conservation concern, and net gains in critical habitat. Potential impacts on critical habitats triggered by coastal biodiversity features identified within the scope of the Project will be avoided.

4.1 Critical Habitat

The critical habitat was declared due to Criterion 1 triggering species *Acanthodactylus schreiberi, Echinops dumanii* and *Astragalus antiochianus*. There will be no direct impacts on critical habitat, due to route change. The following general management controls will be implemented to ensure that the dune habitats and associated *Echinops dumanii*, *Astragalus antiochianus* and *Acanthodactylus schreiberi* populations are conserved:

- Clearly identify the extent of areas to be cleared and areas that must not be cleared or damaged.
- Train the Project personnel on the significance of the habitat and species' populations, appoint biodiversity experts to provide necessary information.
- No construction works will be performed in the Critical habitat. All construction activities will be planned outside the Critical Habitat.
- No project related activities will be performed in the defined Critical Habitat and necessary precautions (such as marking the critical habitat, fencing or any other as appropriate) will be taken in this respect. Storage of any project related waste and/or machinery in Critical Habitat will be avoided.
- Indirect impacts on the grey dune and dune heath habitats, as well as *Echinops dumanii, Astragalus antiochianus* and *Acanthodactylus schreiberi* populations they support, and also on the mesotrophic lake habitat will be avoided in line with the related environmental management plans (waste management plan, pollution prevention plan).
- The project personnel will be informed on the sensitivity of the habitats and the Directorate General of Infrastructure Investments (DGII) will train internal staff to be able to provide advice to contractors with input and advice, if required, and enable an informed overview of the biodiversity input from the contractors. Workers will be made aware of the ecological sensitivities of the areas and will be trained in mitigation for unforeseen events, including the presence of uncommon habitats and species. Health and safety recommendations regarding poisonous or otherwise dangerous plants or animals will also be provided by Biodiversity Specialists through toolbox talks and trainings. Emergency numbers will be provided in case of attacks or injuries that may occur by wildlife.
- Monitor critical habitat throughout construction and operation phases of the Project. If any Project-related impact is reported, take necessary measures under the supervision of experts (see Appendix 2).

4.2 Natural Habitats & Flora and Fauna Species of High Conservation Concern

Management controls and measures to avoid and/or minimize impacts on biodiversity include:

- Reduce construction footprint in natural habitats and limit vegetation clearance, particularly at creek crossings and within riparian habitats. Plan construction works within water systems to be conducted in drier periods to avoid further impacts.

- Where possible, locate all construction facilities such as equipment storage, offices, access tracks, etc. within already cleared areas.
- Appoint flora and fauna experts while undertaking vegetation clearance in natural habitats.
- Plan for land clearance considering breeding and nesting periods of fauna of high conservation concern.
- Restrict clearing of trees with nests.
- Restore and rehabilitate natural habitats outside the construction corridor upon completion of construction works using native plant species.
- Design the railway to minimize plant growth in the track area, providing lateral barriers to plant migration.
- Conduct daily inspections prior to commencement of works to ensure fauna are relocated or otherwise leave the site.
- Facilitate fauna passage around the construction footprint.
- Enforce on-site speed limits.
- If any pits/trenches remain open after daily site works are completed, ensure they are securely covered by barriers or, if possible, fauna ramps to provide access to animals.
- Implement relocation techniques for each fauna of high conservation concern, as applicable, under expert supervision, prior to commencement of land preparation.
- Use appropriate methods to prevent animal entrance into the RoW, including fences, chemical repellents, lights and reflectors, and physical barriers such as trees and noise barriers.
- Regularly check and maintain fauna crossings and take additional measures as necessary.
- Ban all forms of hunting and poaching. Report any illegal activities to authorities.
- Keep a registry for fauna strike and mortality during construction and operation.
- Minimize impacts on water and soil quality through implementation of the related management plans; Waste Management Plan, Pollution Prevention Plan, Construction Impacts Management Plan.
- Manage emergencies including natural hazards, fire and spills through implementation of the Emergency Preparedness and Response Plan.
- Minimize noise and vibration-related nuisance to animals in line with the provisions of the Pollution Prevention Plan, Construction Impacts Management Plan.
- Implement dust suppression techniques in line with the Pollution Prevention Plan, Construction Impacts Management Plan.
- Use appropriate lighting in work areas and use protective guards while employing directional lighting.
- Train all Project personnel on significance of biodiversity in the area. Prepare protocols to be implemented when wild animals are encountered on the site.
- Implement the Biodiversity Monitoring and Evaluation Program (provided in Appendix-2) to assess success of mitigation measures and make management interventions, as necessary.
- Conduct the Invasive Alien Species (IAS) Management Procedure, which was prepared and given separately for control and management of IAS (see Appendix-3).
- Develop and implement an Integrated Vegetation Management Plan (IVMP) during the operation phase of the Project to ensure not only integrity of habitats and species but also fire control, safety, and visibility. A tentative Table of Contents for the Plan is presented in APPENDIX-1: Tentative Table Of Contents For The Integrated Vegetation Management Plan (IVMP), which is to be developed in line with the following main principles:
    - Limit the introduction and spread of invasive species
    - Promote and maintain a healthy native plant community

- Implement the IVMP to benefit species associated with conservation efforts
- Increase habitat connectivity
- Manage the railway RoW as a movement corridor for wildlife
- Raise awareness and knowledge on integrated vegetation management, including its benefits, activities and implementation among the Project personnel

5 TRAINING, REPORTING AND MONITORING

5.1 Training

DGII and Project contractor are responsible to ensure all Project personnel and sub-contractors are informed about the biodiversity values and conservation priorities. Project staff is also required to complete trainings, which will cover their roles and responsibilities in terms of BMP implementation, site-specific measures to be taken, and compliance with related environmental plans, Project standards, and protocols, based on their specific jobs. A general framework for a training on biodiversity is to include:

- General information on habitats and species of high conservation concern, and related visuals
- Project standards
- Management controls, procedures and protocols to implemented at the site
- Methods to be followed in responding incidents related to biodiversity features
- Reporting requirements

5.2 Reporting

Internal reporting requirements for biodiversity conservation principles and on-site implementation of management controls that are outlined in the BMP are to be specified by DGII, which contractors/sub-contractors will follow. The BMP is required to be updated with any additional set of data that become available throughout the course of the Project. Following the construction biodiversity surveys, not only necessary updates will be made within the scope of this BMP, but also significant flora and fauna assemblages throughout the Project construction sites and their specific monitoring requirements will be identified. External experts, who will be responsible for biodiversity studies within the scope of the Project, will report their assessments on implementation of mitigation measures, management controls and monitoring strategies, as well as their site-specific findings to DGII. Biodiversity management and monitoring results addressed in the BMP will be shared with all interested parties within the scope of the SEP. The Biodiversity Monitoring and Evaluation Program is given in Appendix-2.

5.3 Monitoring Issues

A Project-specific Biodiversity Monitoring and Evaluation Program is developed to assess effectiveness management of impacts on biodiversity (see Appendix 2). Biodiversity features to be monitored through the Program will be identified during construction surveys, and biodiversity monitoring parameters will be determined and/or revised to reflect on the characteristics of the habitat and species composition in the area.

Biodiversity monitoring strategies will be developed in line with the Project standards and conservation objectives, and will cover land preparation, construction and operation phases of the Project. Based on monitoring results on the statuses of biodiversity features at different phases of the Project, additional measures will be taken as necessary. A general framework for periodical monitoring studies to be conducted throughout the Project, and biodiversity features to be monitored are as the following:

- Status of critical habitat
- Status of natural habitats and species of high conservation concern, implementation of related management controls
- Success of translocation

- Mitigation measures on restricting impacts on natural habitats to the construction corridor
- Effectiveness of wires and crossings used to prevent animal mortality
- Management of environmental issues, significance of impacts on biodiversity
- Presence of invasive alien species in the area
- Changes in populations of target fauna species to be identified through pre-construction surveys
- Status of post-construction restoration areas

Monitoring reports presenting outcomes for each monitoring period will be prepared by external experts and submitted to DGII. Management controls that are required to be developed based on monitoring results will be addressed within the scope of the BMP.

The specific Monitoring and Evaluation Program, which includes mitigation measures and respective monitoring program is provided in Appendix-2. The BMP will be updated during the construction phase as a result of monitoring surveys conducted, if needed.

APPENDIX-1: Tentative Table Of Contents For The Integrated Vegetation Management Plan (IVMP)

INTEGRATED VEGETATION MANAGEMENT PLAN (IVMP) FOR

CUKUROVA REGION AND ISKENDERUN BAY RAILWAY CONNECTION PROJECT

TABLE OF CONTENTS

APPENDIX-2: Monitoring and Evaluation Program

Ref	Phase	Topic	Sub-Topic	Location	Measure/Action	Responsible Party*	Timeline and Frequency	Verification Process	Compliance Indicator
MEP-01	Pre-Construction, Construction Phase and Operation	Biodiversity - General	Interaction with other plans	-	This BMP will be applied in conjunction with all other relevant management plans.	D, C, T	Before construction and during Construction and Operation Phases	Internal audit program and record	-
MEP-02	Pre-Construction and Construction Phase	Biodiversity - General	Training	-	The Directorate General of Infrastructure Investments (DGII) should train internal staff to be able to provide advice to contractors with input and advice, if required, and enable an informed overview of the biodiversity input from the contractors. Workers will be made aware of the ecological sensitivities of the areas and will be trained in mitigation for unforeseen events, including the presence of uncommon habitats and species. Health and safety recommendations regarding poisonous or otherwise dangerous plants or animals will also be provided by Biodiversity Specialists through toolbox talks and trainings. Emergency numbers will be provided in case of attacks or injuries that may occur by wildlife.	C (under the supervision of D) by B	Before construction and once for everyone who will start work	Field verification, monitoring reports, training records	Annual Biodiversity Report
MEP-03	Land preparation and construction	Habitat	Critical habitat: Grey dunes (B1.4)	Burnaz dunes - Critical habitat	Whether or not the habitat will be impacted by the works to be done will be determined through observation and reported once completed by a Botanist. In this context, if any habitat impact is observed as a result of construction, appropriate precautions will be taken.	C (under the supervision of D) by B	Twice a year (in spring and autumn) until the construction is completed	Field verification, monitoring reports	Biannual Biodiversity Report
MEP-04	Land preparation and construction	Habitat	Critical habitat: Coastal dune heaths (B1.5)	Burnaz dunes - Critical habitat	Whether or not the habitat will be impacted by the works to be done will be determined through observation and reported once completed by a Botanist. In this context, if any habitat impact is observed as a result of construction, appropriate precautions will be taken.	C (under the supervision of D) by B	Twice a year (in spring and autumn) until the construction is completed	Field verification, monitoring reports	Biannual Biodiversity Report
MEP-05	Land preparation and construction	Habitat	Natural habitats: Ponds (C1.2)	Burnaz dunes - Critical habitat	Whether or not the habitat will be impacted by the works to be done will be determined through observation and reported once completed by a Botanist. In this context, if any habitat impact is observed as a result of construction, appropriate precautions will be taken.	C (under the supervision of D) by B	Twice a year (in spring and autumn) until the construction is completed	Field verification, monitoring reports	Biannual Biodiversity Report
MEP-06	Land preparation and construction	Species of high conservation concern and habitat	*Sternbergia pulchella* population	36,9468°-36,04646° collected area; re-located area 36,94652°-36,02756° (100 m radius)	The area where the species is distributed and the re-located area will be monitored and reported by a Botanist. If the population in the re-located area decreases according to the monitoring results, the bulbs will be collected and the study will be repeated.	C (under the supervision of D) by B	Once a year (in March) until the construction is completed	Field verification, monitoring reports	Annual Biodiversity Report

Ref	Phase	Topic	Sub-Topic	Location	Measure/Action	Responsible Party*	Timeline and Frequency	Verification Process	Compliance Indicator
MEP-07	Land preparation and construction	Species of high conservation concern and habitat	*Cyclamen persicum* population	36,94758°-36,04908° collected area; re-located area 36,94602°-36,02680° (50 m radius)	The area where the species is distributed and the re-located area will be monitored and reported by a Botanist. If the population in the re-located area decreases according to the monitoring results, the bulbs will be collected and the study will be repeated.	C (under the supervision of D) by B	Once a year (in March) until the construction is completed	Field verification, monitoring reports	Annual Biodiversity Report
MEP-08	Land preparation and construction	Species of high conservation concern and habitat	*Hyacinthella millingenii* population	36,92351°-36,97144° collected area; re-located area 36,92085°-36,9665° (50 m radius)	The area where the species is distributed and the re-located area will be monitored and reported by a Botanist. If the population in the re-located area decreases according to the monitoring results, the bulbs will be collected and the study will be repeated.	C (under the supervision of D) by B	Once a year (in March) until the construction is completed	Field verification, monitoring reports	Annual Biodiversity Report
MEP-09	Land preparation and construction	Species of high conservation concern and habitat	*Echinops dumanii* population	Burnaz dunes - Critical habitat	The species is located within critical habitat. No work will be carried out in this area. But in case of an accident, the population of the species in the area will be counted and its seeds will be collected and delivered to the gene bank. The population status will be monitored by a Botanist.	C (under the supervision of D) by B	Once a year (between May-June) during construction phase.	Field verification, monitoring reports	Annual Biodiversity Report
MEP-10	Land preparation and construction	Species of high conservation concern and habitat	*Astragalus antiochianus* population	Burnaz dunes - Critical habitat	The species is located within critical habitat. No work will be carried out in this area But in case of an accident, the population of the species in the area will be counted and its seeds will be collected and delivered to the gene bank. The population status will be monitored by a Botanist.	C (under the supervision of D) by B	Once a year (between May-June) during construction phase.	Field verification, monitoring reports	Annual Biodiversity Report
MEP-11	Land preparation and construction	Habitat	Invasive alien species	Project area and AoI	Implementing the Invasive Alien Species Procedure. In this context, monitoring studies will be carried out and reported annually by a Botanist. In this context, if any invasive species is detected, the necessary measures for eradication will be recommended and the process will be carried out.	C (under the supervision of D) by B	Yearly once in vegetation period until construction is completed	Field verification, monitoring reports	Annual Biodiversity Report
MEP-12	Land preparation and construction	Species of high conservation concern and habitat	*Testudo graeca* population	Project area and AoI	Fencing and turtle stuck (suggested to be installed) will be monitored, and *Testudo graeca* specimen in the construction area will be removed and re-located outside the construction area.	C (under the supervision of D) by B	Between April and September during construction phase monthly once	Field verification, monitoring reports	Biannual Biodiversity Report
MEP-13	Land preparation and construction	Species of high conservation concern and habitat	*Acanthodactylus screiberi* population	Burnaz dunes - Critical habitat	Monitoring of *Acanthodactylus schreiberi* species by an Expert Herpetologist.	C (under the supervision of D) by B	Between April and September during construction phase once a month	Field verification, monitoring reports	Biannual Biodiversity Report
MEP-14	Land preparation and construction	Species of high conservation concern and habitat	Bird Migration Monitoring	Burnaz Spring Groundwater Protection Area	It includes the carrying out and reporting of at least 15-day/period bird migration monitoring studies by an Ornithologist and his/her assistant during migration periods twice a year, in spring and autumn during construction phase. The results will be evaluated and if there are any further measures to be taken, they will be reported, and the current BMP will be updated.	C (under the supervision of D) by B	Twice a year (in spring and autumn) until the construction is completed	Field verification, monitoring reports	Biannual Biodiversity Report

Ref	Phase	Topic	Sub-Topic	Location	Measure/Action	Responsible Party*	Timeline and Frequency	Verification Process	Compliance Indicator
MEP-15	Operation	Habitat	Critical habitat: Grey dunes (B1.4)	Burnaz dunes - Critical habitat	Following the construction, observation studies will be conducted twice a year (in spring and autumn) to determine whether there has been any impact on the habitat by a Botanist. Following the one-year study, the need for ongoing monitoring of the areas will be re-assessed.	T by B	Twice a year (in spring and autumn) for one year in operation phase	Field verification, monitoring reports	Biannual Biodiversity Report
MEP-16	Operation	Habitat	Critical habitat: Coastal dune heaths (B1.5)	Burnaz dunes - Critical habitat	Following the construction, observation studies will be conducted twice a year (in spring and autumn) to determine whether there has been any impact on the habitat by a Botanist. Following the one-year study, the need for ongoing monitoring of the areas will be re-assessed.	T by B	Twice a year (in spring and autumn) for one year in operation phase	Field verification, monitoring reports	Biannual Biodiversity Report
MEP-17	Operation	Habitat	Natural habitats: Ponds (C1.2)	Burnaz dunes - Critical habitat	Following the construction, observation studies will be conducted twice a year (in spring and autumn) to determine whether there has been any impact on the habitat by a Botanist. Following the one-year study, the need for ongoing monitoring of the areas will be re-assessed.	T by B	Twice a year (in spring and autumn) for one year in operation phase	Field verification, monitoring reports	Biannual Biodiversity Report
MEP-18	Operation	Species of high conservation concern and habitat	*Sternbergia pulchella* population	36,9468°-36,04646° collected area; re-located area 36,94652°-36,02756° (100 m radius)	The area where the species is distributed and the re-located area will be monitored and reported by a Botanist. If the population in the re-located area decreases according to the monitoring results, the bulbs will be collected and the study will be repeated.	T by B	Once a year (in March) for one year in operation phase	Field verification, monitoring reports	Annual Biodiversity Report
MEP-19	Operation	Species of high conservation concern and habitat	*Cyclamen persicum* population	36,94758°-36,04908° collected area; re-located area 36,94602°-36,02680° (50 m radius)	The area where the species is distributed and the re-located area will be monitored and reported by a Botanist. If the population in the re-located area decreases according to the monitoring results, the bulbs will be collected and the study will be repeated.	T by B	Once a year (in March) for one year in operation phase	Field verification, monitoring reports	Annual Biodiversity Report
MEP-20	Operation	Species of high conservation concern and habitat	*Hyacinthella millingenii* population	36,92351°-36,97144° collected area; re-located area 36,92085°-36,9665° (50 m radius)	The area where the species is distributed and the re-located area will be monitored and reported by a Botanist. If the population in the re-located area decreases according to the monitoring results, the bulbs will be collected and the study will be repeated.	T by B	Once a year (in March) for one year in operation phase	Field verification, monitoring reports	Annual Biodiversity Report
MEP-21	Operation	Habitat	Invasive alien species	Project area and AoI	Once the project is put into operation, annual invasive species monitoring will be carried out for one year to determine whether there are any impacts resulting from the project.	T by B	Once for one year in operation phase	Field verification, monitoring reports	Annual Biodiversity Report
MEP-22	Operation	Species of high conservation concern and habitat	Bird Migration Monitoring	Burnaz Spring Groundwater Protection Area	It includes the carrying out and reporting of at least 15-day/period bird migration monitoring studies by an Ornithologist and his/her assistant during migration periods twice a year, in spring and autumn during operation phase for one year.	T by B	Twice a year (in spring and autumn) for one year in operation phase	Field verification, monitoring reports	Biannual Biodiversity Report

* D: DGII, C: Contractor, T: TCDD, B: Biodiversity Specialist (specific expert that will be needed)

APPENDIX-3 Invasive Alien Species Management Procedure