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The Name of
the Job

Mersin-Adana-Osmaniye-Gaziantep Yüksek Standartlı Demiryolu Hattı
İnşaatı ile Elektromekanik Sistemlerinin Temini

Construction of Mersin-Adana-Osmaniye-Gaziantep Hight Standard
Railway Line With Supply Of Electromechanical Systems

Rapor Adı
Report Name

: BIODIVERSITY MANAGEMENT PLAN

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1 INTRODUCTION

1.1 Background

Republic of Turkey Ministry of Transport and Infrastructure (MoTI) intends to construct a new high-standard railway between Mersin and Gaziantep (hereafter the 'Project'), situated in the Mediterranean and Southeastern Anatolia regions of Turkey. Lenders are considering financing the Project. Therefore, the Project has been developed in accordance with the policy and requirements of the Lenders (i.e., IFC standards). As part of the Project, a framework for a Biodiversity Management Plan (BMP) has been identified.

The Project is being developed in alignment with IFC Performance Standards, including Performance Standard 6 (PS6) on Biodiversity Conservation and Sustainable Management of Living Natural Resources.

This BMP should be read in conjunction with the supplementary terrestrial ecology surveys, aquatic survey and Critical Habitat Assessment reports as well as ESIA's biodiversity section.

While preparing this BMP for the MAG Project, the BMP prepared for the Halkalı-Ispartakule-Çerkezköy Railway Line Project in the scope of its ESIA studies was also used together with the outcomes of the MAG specific ESIA, supplementary ecological surveys and reporting e.g., Critical Habitat Assessment.

1.2 Report Purpose

This report provides a framework of mitigation and monitoring commitments, required to be provided to ensure that the Project is in compliance with PS6 and international good practice about biodiversity. These commitments are derived from the outcomes of the Project's Environmental and Social Impact Assessment (ESIA) and Critical Habitat Assessment (CHA).

This report is a living document and hence, should be updated to reflect increased understanding of Project program and design throughout construction and operation (until agreed otherwise by Project Lenders) and should also be informed by new information as it becomes available (e.g., as obtained from ongoing/pre-construction surveys or as received from pertinent stakeholders).

1.3 Ongoing Review

This BMP should be finalized as part of the delivery of PS6 elements of the Environmental and Social Action Plan (ESAP). For instance, outcomes of the committed ecological surveys to be done in Spring 2022 (i.e., vegetation season). This must be completed before starting construction activities on the Project.

2 ROLES AND RESPONSIBILITIES

2.1 Introduction

A key aspect of the successful implementation of the BMP is the proper understanding of roles and responsibilities described within this plan. It is the responsibility of AYGM to ensure that all relevant Project staff and contractors adhere to the requirements of the BMP, together with all other relevant obligations as included within the ESIA, supplementary ecological studies including CHA, and ESAP.

AYGM will be responsible for ensuring that the BMP is updated, to ensure its efficacy as the Project develops, and that updates are submitted for approval to the Lenders and/or their Technical Advisors (TA's) as mentioned in the ESMMP. AYGM will award a proper qualified Environmental Supervisor in the Project to facilitate compliance with the BMP. Where necessary, additional technical specialists will also need to be contracted to discharge specific components of the BMP, e.g. in relation to botany, hydrobiology, ornithology, etc.

In Table 3-1, an indicative breakdown of roles and responsibilities is included. This will be updated as the Project design programme is finalised, and critically, once the Contractor has been engaged.

Please refer to the E&S Governance and ESMMP documents in order to follow the structure of the implementation of the requirements of this BMP together with the other aspects of successful E&S governance. In those documents, roles and responsibilities of different parties are presented.

2.2 Headquarter Infrastructure HSE Manager

Responsible for managing infrastructure projects regarding health, safety and environmental issues.

2.3 HEADQUARTER E&S MANAGER:

Responsible for managing infrastructure and superstructure projects regarding environmental and social governance issues and member of the Executive E&S Committee on behalf of the REC.

2.4 PIU (PROJECT IMPLEMENTATION UNIT)

- PIU Department Manager (Superstructure / Civil Engineer) will be responsible for overseeing the implementation of all health, safety and social measures, as specified within the disclosure package of the Project, and regular reporting to AYGM PIU.



- PIU Physics Engineer who is responsible for supervising health and safety for the Project.
- PIU Environmental Engineer (Environmental Issues Coordination Staff) will be responsible for overseeing the implementation of all environmental and biodiversity measures, as specified within the disclosure package of the Project, and regular reporting to AYGM PIU.

2.5 EXECUTIVE ENVIRONMENTAL AND SOCIAL MANAGEMENT COMMITTEE

- Executive E&S Committee Project Manager (Department Head / Branch Manager /Head of Department) will be ultimately responsible for overseeing the activities undertaken by the AYGM/TCDD specialists (listed below), overseeing the implementation of mitigation measures and management procedures specified within the disclosure package of the Project, and overseeing the preparation and implementation of a CESMP, which will be based on this ESMP.
- Executive E&S Committee Environmental, Health and Safety, and Social (EHSS) Manager (Specialist / Engineer) will be responsible for overseeing all matters that relate to environment, health, safety and social aspects of the Project. Also, s/he will be appointed to be responsible for supporting the implementation of the SEP, by conducting regular consultation with affected communities on any concern regarding the Project. CLOs will also have responsibility for disseminating the Project disclosure package as described in the SEP. They will also conduct regular inspections of records relating to grievances received and their resolution. S/He will report regularly to AYGM PIU.

Further technical staff may be required during the course of the Project, who will be assigned internally by the AYGM, either by means of permanent or temporary basis until the completion of relevant tasks under the Project whilst they undertake their current responsibilities.

3 BIODIVERSITY MANAGEMENT

3.1 Introduction

This section provides details of the outline aims of this BMP together with objectives required to be met in order to deliver these aims.

3.2 Aims and Objectives

Table 3-1 below lists the aims and objectives that form the basis of the BMP. These will be subject to change as required through ongoing management of the BMP.

Table 3-1. BMP Aims and Objectives

References	Description	Associated Objective(s)
1.	To prevent adverse impacts to integrity of any Protected Areas.	1a: Reduce collision risk to those qualifying bird species and assemblages associated with the protected areas. 1b: Restore/compensate habitats lost to the Project from within the Protected Areas
2.	To achieve no net loss or net gain (as required) of important biodiversity during construction.	2a: Minimise loss of important habitats. 2b: Achieve no net loss of forest habitats. 2c: Minimise impacts to important flora 2d: Achieve a net gain in the population of CR and EN species 2e: Manage risk of introduction or spread of invasive species. 2f: Minimise impacts to important fauna. 2g: Achieve a net gain for Critical Habitats
3.	To minimise impacts to biodiversity during construction.	3a: Maintain good practice animal welfare measures. 3b: Maintain connectivity between fragmented habitats. 3c: Protect the aquatic environment during in-channel works.
4.	To minimise impacts to biodiversity during operation.	4a: Minimise impacts to important fauna 4b: Manage risk of introduction or spread of invasive species. 4c: Maintain good practice animal welfare measures. 4d: Maintain connectivity between fragmented habitats.
5.	To enhance biodiversity	5a: Enhancement biodiversity within the Project expropriation corridor.

4 MANAGEMENT ACTIONS

4.1 Introduction

This Section presents the actions and targets required for management of biodiversity requirements in line with the aims and objectives in Chapter 3. These actions are indicative at this stage and will be refined by AYGM and/or contractor as part of the finalising process of the BMP based on upcoming surveys in Spring 2022 and comments of the Lenders. The actions and targets are presented chronologically within Table 4-1.



Table 4-4-1. BMP Actions

Aim	Objective	Action	Target	Responsibility
1	1a	<p>1a(i): Screening at flight activity 'hot-spots' with adapted Project fencing. Poles will be erected at 1m intervals, increasing the height of the Project fencing to 3m to minimise flight activity at potential collision height (PCH). Each pole will also be fitted with red/white ribbon to further divert bird flights upwards.</p> <p>Adapted fencing should be provided at all tunnel entrances and exits.</p> <p>Where ongoing monitoring identifies this measure as not being wholly successfully, the height of the screening should be increased accordingly.</p> <p>1a(ii): Whenever necessary, actions recommended above in Action 1a(i) can be improved. As the final mitigation, reducing the travel speed can be considered against the bird collision risk areas.</p>	<p>Adapted fencing should be in place prior to the Project becoming operational.</p> <p>The action will be considered successful should operational monitoring confirm no significant impacts to IBA bird populations as a result of collision mortality.</p> <p>Train speed management should be adopted immediately upon operation of the Project as required.</p> <p>The action will be considered successful should operational monitoring confirm no significant impacts to IBA bird populations as a result of collision mortality.</p>	<p>Contractor (adapted fencing)</p> <p>TCDD Transport (monitoring)</p> <p>AYGM</p>
	1b	<p>1b(i): Restoration of habitat to Amonos Mountains where the Project bisects the IBA-KBA. This measure will be included within a Habitat Restoration Plan (HRP) to be produced for the Project in advance of construction, delivered as part of the BMP.</p>	<p>Restoration should occur post-construction.</p> <p>This action will be considered a success once habitat restoration/compensation has been completed and monitoring has confirmed its successful establishment.</p>	AYGM
2	2a	<p>2a(i): Micro-siting of construction activities to avoid the most sensitive habitats/features on the ground. This will be undertaken by the Project ECoW and informed by findings from pre-construction surveys in advance of construction activities. Micro-siting should include (but is not limited to) avoidance of the following features:</p> <ul style="list-style-type: none"> • Mature trees; • Hedgerows and/or other green corridors; and • Natural/semi-natural habitats: woodland, wetland, scrub, shrubland, lowland meadows. 	<p>Micro-siting will be an ongoing process during construction.</p> <p>The action will be considered successful should pre-identified areas of increased biodiversity value be avoided and/or protected during construction; confirmed through post-construction monitoring.</p>	Contractor
	2b	<p>2b(i): In the first baseline report, 45 endemic plant species were determined from the literature, and 39 in the second desk study. In the botanical field</p>	<p>Micro-siting will be an ongoing process during construction.</p>	Contractor



Aim	Objective	Action	Target	Responsibility
		study, endemic <i>Helleborus vesicarius</i> , <i>Onosma mutabilis</i> , <i>Sideritis cilicica</i> were detected. Field studies should be carried out in Spring 2022 and critical plant studies should be completed.	The action will be considered successful should pre-identified rare plants/assemblages be avoided/protected during construction; confirmed through post-construction monitoring.	
		2b(ii): A Biodiversity Action Plan (BAP) will be produced for <i>Helleborus vesicarius</i> , <i>Onosma mutabilis</i> , <i>Sideritis cilicica</i> (if encountered) given its status as a Critical Habitat trigger species. The BAP will be a standalone document that fully details the mitigation management and commitments required for this species in order that the Project remains compliant with PS6. The BAP will be a dynamic and collaborative document in which all relevant stakeholders are actively involved in perpetuity.	The BAP must be 'live' and adopted in advance of construction.	AYGM
		2b(iii): An Invasive Species Management Plan (ISMP) will be produced that details measures required to manage any risk of the introduction/spread of invasive species during construction of the Project. The ISMP must be adhered to at all times by the contractor, and all sub-contractors. The ECoW will oversee its delivery during construction.	The ISMP will be produced and approved in advance of any construction activities. This action will be considered a success once construction has been completed and invasive species have been prevented from being introduced/spread during construction activities.	AYGM
3	3a	3a(i): Micro-siting of construction activities to avoid the most sensitive fauna including associated habitats/features (e.g. their places of shelter) where practical. This will be undertaken by the ECoW (with support from technical specialists as required) and informed by findings from pre-construction surveys. Micro-siting should include (but is not limited to) avoidance of the following features: <ul style="list-style-type: none"> Hyena burrows and burrow complexes Other burrows, places of shelter used by fauna Bat roosts Reptile hibernacula/shelters (including those of the spur-thighed tortoise) Egyptian Vulture nest site(s) All bird nests Micro-siting should also consider disturbance and therefore be applied to achieve a distance around sensitive receptors at which no significant	Micro-siting will be an ongoing process during construction. This action will be considered a success should pre- identified sensitive fauna be avoided/protected during construction; confirmed through post-construction monitoring as well as watching briefs.	Contractor

Aim	Objective	Action	Target	Responsibility
		<p>disturbance response will be elicited. Suitably experienced technical specialists will need to be consulted to advise on appropriate distances for the different receptors identified/confirmed during pre-construction walkovers. The ECoW will be responsible for overseeing adherence to these buffer distances.</p> <p>Where micro-siting is not possible, the ECoW will advise on an appropriate course of action to ensure impacts to sensitive biodiversity are minimised. This may include (but is not restricted to) the following:</p> <ul style="list-style-type: none"> • Exclusion buffer (of a distance considered appropriate by the ECoW) around sensitive features when in use (e.g. active bird's nest). • Watching brief of sensitive receptors to monitor disturbance response, with the ECoW given authority to stop works as appropriate (explicitly in the case of imperial eagle and for other species at the discretion of the ECoW). • Enabling works (e.g. vegetation clearance) in advance of works to avoid seasonally present, sensitive receptors from being present during construction. • Provision of animal/bird deterrents to reduce the risk of sensitive biodiversity returning/being present within an area subject to disturbance. • Pre-construction searches and local translocation of sensitive fauna such as reptiles and amphibians. • Provision of artificial bat roosts where it has not been possible to avoid loss/disturbance to an existing roost during construction. Such features should be in place in advance of construction and their locations informed by pre-construction surveys. The ECoW/suitably experienced specialist will translocate any bats present bats to artificial roost sites immediately prior to relevant construction activities. Note: this should be done by a suitably experienced bat-worker given the potential for disease transmission when handling bats. 		
		<p>3a(ii): Works should be timed to avoid periods of greatest receptor sensitivity. In particular, this applies to birds while they are nesting and as such construction activities around important nest sites/nesting habitat (as informed through pre-construction surveys) should be timed to avoid the months March-June inclusive).</p>	<p>Sensitive timing of works will be undertaken throughout construction.</p> <p>In combination with 3a(i), this action will be considered a success should pre- identified sensitive fauna be avoided/protected through</p>	Contractor



Aim	Objective	Action	Target	Responsibility
		The ECoW (along with appropriate technical specialists, such as ornithologists, as required) should advise the Contractor (who will advise the Project programmers) of works locations where sympathetic timing should be incorporated.	sensitive timing of works; confirmed through construction and post-construction monitoring. This is explicitly applicable to imperial eagle, white-headed duck and waterbirds associated with IBAs given their elevated PS6 status.	
		<p>3a(iii): The Project will make a material contribution to the ongoing management of both Seyhan Dam Lake and Yumurtalık Basin for the benefit of birds, in particular white-headed duck. The specifics of such a contribution should be agreed in advance of construction activities and informed through consultation with relevant stakeholders and should include, as a minimum, material support in the production of a Wintering Waterbird Management Plan for Seyhan Dam Lake and Yumurtalık Basin.</p> <p>Both sites are currently under some level of conservation management, although it has been recognised that capacity and resource is a limiting factor to this management.</p> <p>With this in mind, it is wholly feasible that Net Gains can be secured as a result of input from the Project.</p> <p>The above initiative will be detailed within the Project BAP, to the approval of the Project Lenders.</p>	<p>Financial support or provision of personnel time to assist with conservation management in line with ongoing conservation initiatives at the two sites.</p> <p>This action will be considered a success once conservation management as contributed to by the Project has been undertaken; AYGM should report on progress on an annual basis from the start of this support and relevant stakeholders should be invited to input to such reporting.</p>	AYGM
4	4a	<p>4a(i): Good practice animal welfare measures should be adopted throughout construction. These should include (but are not limited to):</p> <ul style="list-style-type: none"> Catenary wire supporting structures/tubes should be capped throughout the Project to prevent animals accessing these structures and becoming trapped Securing active construction sites to minimise risk of harm/trapping Minimising the use and spread of lighting Limiting vehicle movements and speed Toolbox talks <p>All of the above will be the responsibility of the ECoW to oversee.</p>	<p>Good practice animal welfare measures should be adopted throughout construction.</p> <p>The action will be considered a full success if high animal welfare standards are maintained through constructions, as confirmed through ECoW observations/monitoring.</p>	Contractor
	4b	4b(i): Construction work should adhere to the best practice pollution prevention guidance outlined by the Construction Industry Research and Information Association guidance.	Aquatic environment protection measures should be adopted throughout construction.	Contractor

Aim	Objective	Action	Target	Responsibility
		<p>Specific measures are not limited to, but must include the following:</p> <ul style="list-style-type: none"> Construction materials should be stored and maintained away from watercourses. Silt fences or similar should be placed around exposed ground and stockpiles, and early revegetation of the completed elements of the scheme should be undertaken to reduce further erosion. Surface water runoff from the construction sites into the watercourses should be avoided and a system of cut-off ditches, silt fencing and/or bunds should be installed if required. Chemicals and fuels should be stored in secure containers located away from watercourses or water bodies. No refuelling of plant or machinery should take place near the watercourse. Noise and vibration should be controlled and kept to the minimum necessary to prevent potential negative effects on fish. Lighting used for construction should be switched-off when not in use and, where possible, positioned so as not to spill on to watercourses. <p>Should any part of a watercourse need to be impounded during the works, then a fish translocation should be carried out to remove fish from the impoundment. Expert advice must be sought by the ECoW in advance of any translocation requirement.</p> <p>Biosecurity measures will be implemented during the construction phase to prevent the spread of invasive non-native species (INNS). Biosecurity is defined as a set of precautions that aim to minimise the risk of moving non-native species, parasites and diseases. Measures must include:</p> <ul style="list-style-type: none"> The briefing and training of workers on good biosecurity practices appropriate to their role. Equipping workers with the necessary equipment, Personal Protective Equipment (PPE) and materials to implement biosecurity control measures. This will most frequently comprise disinfectant tablets, sprayers and brushes to clean and disinfect equipment and PPE prior to leaving site. <p>Should any dead or visibly injured fish be observed during construction the Contractor should stop works and notify the ECoW immediately. The Contractor will not continue works until the ECoW has confirmed that it is acceptable to do so.</p>	<p>The action will be considered a full success if protection of the aquatic environment is maintained through constructions, as confirmed through ECoW observations/monitoring.</p>	



Aim	Objective	Action	Target	Responsibility
5	5a	<p>5a(i): Planting of native plants (of local provenance where possible) should be undertaken across the expropriation corridor. Planting should consist of low-growing species (e.g. herbaceous plants) to minimise/dissuade use by nesting birds. Particular focus should be on species that are attractive to invertebrate species.</p> <p>No planting of tall shrubs or trees is proposed within the 50m railway corridor for the project (25m either side of the centreline of the Project). This is to avoid disruption from potential vegetative contact with the power supply and catenary posts.</p>	Successful planting across relevant areas of the restored expropriation corridor.	Contractor



5 MONITORING AND ADAPTIVE MANAGEMENT

5.1 Introduction

This section presents a summary of the provisional monitoring requirements required to be delivered under the BMP, together with the pathways to inform adaptive management on the Project. This section will need to be finalised once the rest of the BMP is complete in order to ensure an effective monitoring strategy is adopted.

Monitoring is limited to survey work collected during construction and operation. Survey work undertaken pre-construction (and used to inform the BMP) is not considered here.

5.2 Monitoring

5.2.1. Bird Surveys

Bird surveys will be split into construction and operational monitoring. Surveys will be completed by suitably experienced ornithologists, preferably one with experience of the Project to date.

Construction monitoring will comprise survey effort undertaken around key ornithological sensitivities to identify the potential for significant disturbance to occur. In terms of individual species, this is considered to be limited to monitoring imperial eagle nest sites at this stage. Additional monitoring around all nest sites (where sufficient avoidance through timing of works/micro-siting has not been possible) will also be undertaken as advised the ECoW.

Operational monitoring will comprise flight activity surveys at pre-identified areas of highest potential risk. Surveys will be completed during migration and overwintering periods for waterbirds and during the breeding season for imperial eagle and will monitor the success of mitigation designed to prevent birds from crossing the railway at PCH.

Bird survey effort should follow methods already deployed on the Project (e.g., in line with methods described within SNH 2017).

Additional operational monitoring will comprise survey effort to record collision mortality. While some of this will be picked up through the flight activity monitoring described above, carcass searching will provide further information on bird mortality. Carcass searching should be focussed around areas where mitigation to minimise collision risk is being implemented.

Additional locations for operational monitoring may become apparent as pre-construction work progresses and will be reported within the BMP.

Carcass searching should be done in line with strict health and safety controls and only where demonstrably safe to do so and in accordance with a formal health and safety risk assessment.

5.2.1. Botanical Surveys

The Environmental Supervisor will ensure that botanical surveys are undertaken by a suitably experienced botanist, preferably one that has been involved on the Project to date. Surveys will be undertaken on an annual basis within the appropriate flowering seasons for the six rare plant species confirmed as being present at the Project site and which will be subject to targeted translocation of individual plants.

Botanical surveys will also include a check of areas subject to compensatory planting/restoration required to mitigate losses to oak/hornbeam woodland and habitat within the IBAs. Surveys will include (but are not limited to) the following:

- Planting success (i.e. continued presence of saplings, etc.); and
- Evidence of degradation/damage, e.g. from herbivores.

Given the timescales required to monitor success (or otherwise) of this mitigation, the monitoring surveys will be undertaken on an annual basis for the first five years initially. Monitoring beyond this point should then be reviewed and tailored according to the conditions at this point but as a minimum should be no less frequent than every three years until such time that the rare plants have become fully established and show evidence of naturally increasing their numbers, and the woodland habitat has become fully established.

5.2.3. General Biodiversity Walkovers

The Environmental Engineer (Construction) and TCDD Transport (Operation) will ensure that general biodiversity walkovers will be completed with decreasing frequency from the start of construction and then restarting once the Project is operational. These surveys will be undertaken by a suitably experienced ecologist, preferably one that has been involved in the Project to date. Findings from the walkovers will inform changes required to this BMP in terms of adaptive management and adapted operational mitigation.

Surveys of the chainages listed within Table 4-1 will be undertaken, comprising monthly walkovers during the first year (Year 1) of operation, and then with decreasing frequency (to be confirmed following Year 1 surveys). Additionally, should any areas of increased perceived collision risk significance be identified during pre-construction surveys, these will be added to this monitoring component.

Survey effort will comprise monitoring of these areas to assess the adequacy of the mitigation, and inform any amendments required to ensure continued efficacy of these measures. Surveys will include a search for animal carcasses along the railway within these pre-identified sections, with carcasses identified to species level where possible.



5.3 Reporting

Monitoring survey outcomes and associated recommendations to update this BMP will be reported to the Project Lenders TA on a monthly basis.

5.4 Adaptive Management

Adaptive management will be informed by findings from the monitoring described above. Where it is identified that targets associated with the BMP actions are not being met, AYGM (Construction) / TCDD Transport (Operation) will be responsible for rectifying this through appropriate adaptive management, to the approval of the Project Lenders. As a brief indication of what this may comprise, the following measures could feasibly be deployed:

- Increased fauna crossing points installations;
- Increased planting, and/or refined planting locations;
- Supplementary seed-collection and plant propagation;
- Targeted limits on train speeds; and
- Increased INNS management.

Although not currently considered required, additional, measures may be required to address issues associated with birds nesting on catenary structures. Any such initiative should be informed by appropriate survey effort to identify where nests are being established.



6 MONITORING, ASSURANCE AND VERIFICATION

Key success indicators (KPIs) of this procedure will be monitored, verified and evaluated by the relevant parties in accordance with their responsibilities set forth in the E&S Governance document, within the scope of the MAOG-RECU-GB-GNL-IS-PRG-0007-0 HSE Monitoring, Assurance and Verification Procedure.