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AYGM

HALKALI-ISPARTAKULE-CERKEZKOY RAILWAY LINE

Biodiversity Management Plan

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CONTENTSHATA! BELGEDE BELİRTİLEN STİLDE METNE RASTLANMADI.

TABLES

APPENDICES

1 INTRODUCTION

1.1 BACKGROUND

1.1.1. The Turkish General Directorate of the Infrastructural Investment (AYGM) intents to construct a new high-speed rail between Halkali and Cerkezkoy (hereafter the 'Project'), situated in the Marmara region of Turkey. The European Bank for Reconstruction and Development (EBRD) and the Asian Infrastructure Investment Bank (AIIB), collectively called the 'Lenders', are considering financing the Project. The Project has therefore been developed in accordance with the Lenders policy and requirements.

1.1.2. As part of the Project the requirement for a **Biodiversity Management Plan** (**BMP**) has been identified.

1.1.3. The Project is being developed in alignment with EBRD Performance Requirements, including Performance Requirement 6 (PR6) on Biodiversity Conservation and Sustainable Management of Living Natural Resources[1].

1.1.4. This BMP has been revised following additional bird and plant surveys completed during 2021.

1.1.5. This BMP should be read in conjunction with the following reports:

- AYGM Halkali – Cerkezkoy High Speed Railway: **ESIA Chapter 8: Biodiversity**
- AYGM Halkali – Cerkezkoy High Speed Railway: **ESIA Appendix L: Critical Habitat Assessment**
- AYGM Halkali – Cerkezkoy High Speed Railway: **Pre-construction Bird Survey Report**
- AYGM Halkali – Cerkezkoy High Speed Railway: **Pre-construction Plant Survey Report**

1.2 REPORT PURPOSE

1.2.1. This report provides a framework of mitigation and monitoring commitments that are required to be delivered to ensure the Project remains compliant with PR6[2] and international good practice on biodiversity. These commitments are derived from the outcomes of the Project **Environmental and Social Impact Assessment** (**ESIA**) and **Critical Habitat Assessment** (**CHA**).

1.2.2. This report is a live document throughout construction and operation (until agreed otherwise by Project Lenders) and should be updated to reflect increased understanding of Project programme and design 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 relevant Project stakeholders).

[1] EBRD. 2014. Performance Requirement 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

[2] PR6 requires provision of a BMP to *'…capture all actions necessary to achieve desired project outcomes (such as no net loss/net gain) on biodiversity.'*

1.3 ONGOING REVIEW

1.3.1. This **BMP** should be finalised as part of delivery of PR6 elements of the **Environmental and Social Action Plan** (**ESAP**). This should be completed prior to commencement of construction activities on the Project. Beyond this, an ongoing review mechanism will be established whereby the **BMP** can be updated to reflect the ongoing biodiversity management as per **paragraph 1.2.2**.

1.3.2. As part of this revision, this BMP includes updated information following the bird and plant surveys completed during 2021. Additional updates will be made as required, following completion of ongoing pre-construction surveys.

2 ROLES AND RESPONSIBILITIES

2.1 INTRODUCTION

2.1.1. A key component of the successful delivery of this BMP is the full understanding of roles and responsibilities required under 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**, **CHA** and **ESAP**.

2.1.2. AYGM will be responsible for ensuring the BMP is updated, as required, to ensure its efficacy as the Project develops, and that updates are submitted for approval to the Lenders Technical Advisor (TA) as specified in the **ESMP**. AYGM will engage an appropriate qualified Environmental Supervisor on 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, ornithology, etc.

2.1.3. An indicative breakdown of roles and responsibilities is included in **Table 2-1** below. This will be updated as the Project design programme is finalised, and critically, once the Contractor has been engaged.

Table 2-1 - Summary of Indicative Roles and Responsibilities

Role	Responsibilities
Project Implementation Unit (PIU)	
AYGM / PIU	▪ Overall responsibility for overseeing: • the implementation of the BMP; • the submission of updates for the ongoing approval of the BMP; • instilling and maintaining strong culture of environmental / biodiversity; • awareness and protection on the Project during construction; and • the overall stakeholder liaison process for the Project. ▪ Responsible for ensuring roles and responsibilities are clearly identified and allocated within the PIU and within the Contractor's (and sub-contractor's) organisations. ▪ Appointing technical specialists to effectively audit the implementation of environmental measures and processes, including an Environmental / Biodiversity Specialist and Community Liaison Officers (CLOs). ▪ Ongoing and regular weekly liaison with the Environmental Lead on the Project to remain informed on performance during construction. ▪ Provision of recommendations to address any non- compliance identified during construction. ▪ Monthly reporting to the Project Lenders during construction.
PIU Manager	▪ Ultimately responsible for overseeing the activities undertaken by the PIU specialists, overseeing the implementation of mitigation measures and management procedures specified within the disclosure package of the

Role	Responsibilities
	Project, and overseeing the preparation and implementation of **CESMP** and **OESMP** (as detailed in the **ESMP**).
Environmental / Biodiversity Specialist	▪ Embedded within the Project Implementation Unit and will be responsible for ensuring the specified 2021 surveys are implemented, and the BMP is refined, for inclusion in the Contractors tender package. ▪ Will oversee the Contractors delivery of the BMP, once they are appointed. ▪ Review delivery of the BMP with regards overall compliance against Lender requirements, national legislation, etc. ▪ Liaise with the PIU CLOs to undertake and assist with relevant stakeholder consultation ▪ Undertake regular liaison with the Contractors Environmental Lead and ECoW to ensure general biodiversity good practice on the Project during construction ▪ Recommend measures to address areas of non-compliance and monitor their implementation. ▪ Support AYGM in the provision of internal capacity building and environmental training within the PIU. ▪ Provision of monthly environmental reports, including BMP updates, when required, to the Lenders during construction.
Supervision Consultant's Environmental Expert	▪ Responsible for supervising the Contractor to ensure that recommendations and requirements, as set out in the BMP are applied. ▪ Responsible for continuous monitoring of the processes and activities undertaken by the Contractor, and specifying measures to be implemented by the Contractor, to address any areas of non-compliance.
Contractor	
Contractor	▪ Responsibility for: • the implementation of the BMP during construction; • updating the BMP during construction; • programming and overseeing the pre-construction surveys; • instilling and maintaining strong culture of environmental / biodiversity awareness and protection on the Project site during construction; and • stakeholder liaison. ▪ Appointing technical specialists including an Environmental Lead and Ecological Clerk of Works (ECoW). ▪ Ensuring the provision of regular reporting to the PIU Environment / Biodiversity Specialist on the Project, to ensure they remain informed on performance during construction. This will include data to inform the monthly reporting to the Project Lenders.
Environmental Lead	▪ Point of contact between the Contractor and technical specialist(s) appointed to undertake pre-construction surveys or provide ad hoc support. ▪ Manage capacity building across the Project team(s).

Role	Responsibilities
	▪ Manage training programme across the Project to ensure all operatives receive up to date training as required to effectively deliver the BMP during construction. ▪ Manage incident reporting and adaptive management in response to incidents (as required) during construction. ▪ Document incidents as they occur and report to the Environmental Expert. ▪ Provision of data to the Environmental Expert to inform monthly reporting.
Ecological Clerk of Works (ECoW)	▪ Work with the Environmental Lead to ensure general biodiversity good practice on the Project. ▪ Undertaking daily inspections / review of works areas, especially with regards construction good practice (e.g. animal welfare, pollution control etc.) during construction. ▪ Site supervision and watching briefs. ▪ Provision of toolbox talks. ▪ Provision of ad hoc advice regarding biodiversity sensitivities during construction, including advice on micro-siting of works. ▪ Oversee any removal of animals, if required. ▪ The ECoW will have the authority to stop works at any point should they consider that the potential ecological impacts associated with a particular activity are unacceptably high. ▪ Input to monthly reporting.
Lenders	
Lenders	▪ Provide advice on environmental aspects of the Project, and approvals.
TCDD Transport	
TCDD Transport (Operation)	▪ Overall responsibility for overseeing: • The implementation of the operational aspects of the BMP, including operational monitoring. ▪ Quarterly environmental and social reporting to the Project Lenders during Project operation, including progress on BMP implementation.

3 BIODIVERSITY MANAGEMENT

3.1 INTRODUCTION

3.1.1. 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

3.2.1. **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

Aim Ref.	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 oak-hornbeam woodland. 2c: Minimise impacts to important flora 2d: Achieve a net gain in the population of *Centaurea hermannii* and *Lathyrus undulatus* 2e: Manage risk of introduction or spread of invasive species. 2f: Minimise impacts to important fauna. 2g: Achieve a net gain for white-headed duck Critical Habitat
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

4.1.1. This section presents the biodiversity management actions and targets required to be delivered the Aims and Objectives listed within **Section 3**. These actions are indicative at this stage and will reviewed / refined by AYGM as part of the finalising process for the BMP (and to the approval of the Lenders TA). In particular, drawings which illustrate the spatial extent of the implementation of the **BMP** will be required.

4.1.2. The actions and targets for each Aim and Objective are presented chronologically within **Table 4-1**.

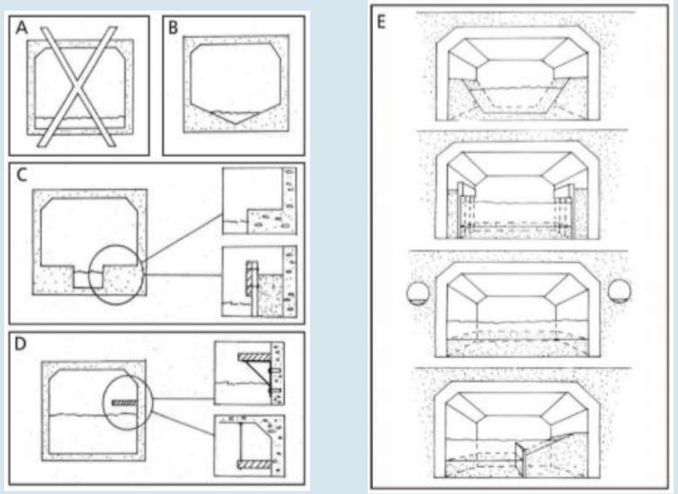
Table 4-1 - BMP Actions

Aim	Objective	Action	Target	Responsibility
1	1a	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. Adapted fencing should be provided (at present and to be updated following additional survey work) at the following chainage locations: ■ 0+000 to 1+000 ■ 7+000 to 8+000 ■ 25+000 to 30+000 Where ongoing monitoring identifies this measure as not being wholly successfully, the height of the screening should be increased accordingly.	Adapted fencing should be in place prior to the Project becoming operational. The action will be considered successful should operational monitoring confirm no significant impacts to IBA bird populations as a result of collision mortality.	Contractor (adapted fencing) TCDD Transport (monitoring)
		1a(ii): As required, more innovative mitigation measures should be explored where Action 1a(i) is not possible or proved successful. This may include train speed management/restrictions at collision 'hot spots' as a last resort measure.	Train speed management should be adopted immediately upon operation of the Project as required. The action will be considered successful should operational monitoring confirm no significant impacts to IBA bird populations as a result of collision mortality.	AYGM
	1b	1b(i): Restoration of habitat to the north of Büyükçekmece Lake where the Project bisects the IBA. Where this is not possible post-construction, an equivalent area of habitat should be improved within the IBA further south (e.g. to the immediate south of the feeder channel to the east of Catalca). 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 and as specified in the **ESAP**	Restoration should occur post-construction. This action will be considered a success once habitat restoration/compensation has been completed and monitoring has confirmed its successful establishment.	AYGM
2	2a	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: ■ Mature trees; ■ Hedgerows and/or other green corridors; and ■ Natural/semi-natural habitats: woodland, wetland, scrub, shrubland, lowland meadows.	Micro-siting will be an ongoing process during construction. 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.	Contractor
	2b	2b(i): A detailed botanical survey of the currently classified G1.A oak-hornbeam habitat type will be undertaken across areas where this habitat will be lost. This will inform the **HRP**. This survey (and all recommended pre-construction survey effort) is summarised within Appendix B. 2b(ii): An **HRP** will be produced based upon findings from surveys described in 2b(i) together with a review of all other habitats being lost or affected (e.g., as per 1b(i)). This will include the trees and associated flora required to recreate the G1.A habitat lost to construction. This planting should be located within an area where it will be afforded long-term protection and at a level that ensures at least like-for-like replacement of the area lost. At present, it is assumed that the large expanse of coniferous forest north of İnceğiz will be a suitable replanting location given its size and proximity to G1.A habitat (see Figure B-1 within Appendix B). This should be	Survey effort should be undertaken during an appropriate growing season (i.e., spring 2022) by a suitably experienced botanical surveyor. Compensatory planting will need to be approved as part of the overall landscape/planting plan approval process. The planting will be considered a success once the woodland habitat has become established, as identified through monitoring.	AYGM

Aim	Objective	Action	Target	Responsibility
		formalised through discussions with AYGM and the State Forest Department and detailed within the **HRP** to the approval of the Project Lenders.		
	2c	2c(i): Micro-siting of construction activities to avoid the most sensitive flora. This will be undertaken by the Project ECoW / Environmental Lead and informed by the results of plant surveys completed in 2021. The species to be considered currently comprises the following: ▪ Rare plants: *Cirsium poycephalum, Centaurea hermannii, Crocus olivieri* subsp*. Istanbulensis*, *Crocus pestalozzae, Galanthus x valentinei*, *Ferulago confusa, Leucojum aestivum, Symphytum tuberosum subsp. nodosum, Lathyrus undulatus and Heptaptera triquetra.*	Micro-siting will be an ongoing process during construction. The action will be considered successful should pre-identified rare plants/assemblages be avoided/protected during construction; confirmed through post-construction monitoring.	Contractor
		2c(ii): Individuals of the species identified in 2c(i) (excluding *Cirsium polycephalum, Ferulago confusa, Hepteptera triquetra, Symphytum tuberosum subsp. nodosum*) will be collected where residual risk of their loss remains; this should be undertaken outside of the plants' growing season when individuals are dormant These individuals will be translocated outwith the Project footprint to suitable habitat where the plants will be able to become established in the long-term. This should be done in consultation with (or overseen by) suitably experienced botanists (such as representatives of Nezahat Gokyigit Botanical Gardens). Receptor sites should be chosen based on their long-term protection; at present it is assumed that these will comprise land owned by the State Forest Department. Details in this regard should be provided within the Project **HRP**.	Plants will be translocated pre-construction, In combination with 2c(iii) this action will be considered successful once a population of at least the current ZoI estimate has become established. Where possible an increase in the number of specimens should be targeted.	AYGM (for the production of the **HRP**) Contractor for implementation
		2c(iii): Seeds of the species identified in 2c(i) will be collected and propagated by suitably experienced botanists (such as representatives of Nezahat Gokyigit Botanical Gardens) or ECoW. The resulting plants will be planted in appropriate locations across the Project ZoI. Receptor sites should be chosen based on their long-term protection; at present it is assumed that these will comprise land owned by the State Forest Department. Details in this regard should be provided within the Project **HRP**.	In combination with 2c(ii) this action will be considered successful once a population of at least the current ZoI estimate has become established. Where possible and increase in the number of specimens should be targeted.	AYGM (for the production of the **HRP**) Contractor for implementation
	2d	2d(i): Individual specimens of *Centaurea hermannii* and *Lathyrus undulatus* will be collected where residual risk of their loss remains; this should be undertaken outside of the plants' growing season when individuals are dormant. These individuals will be translocated outwith the Project footprint to suitable habitat where the plants will be able to become established in the long-term. Receptor sites should be chosen based on their long-term protection; at present it is assumed that these will comprise land owned by the State Forest Department. Details in this regard should be provided within the Project **HRP**.	In combination with 2d(ii) this action will be considered a success once an overall population of twice the current estimated population has become successfully established. This will be confirmed through ongoing monitoring.	AYGM (for the production of the **HRP**) Contractor for implementation
		2d(ii): Seeds of *C. hermannii* and *Lathyrus undulatus* will be collected and propagated by suitably experienced botanists (such as representatives of Nezahat Gokyigit Botanical Gardens) or ECoW. The resulting plants will be planted in appropriate locations across the Project ZoI. Receptor sites should be chosen based on their long-term protection; at present it is assumed that these will comprise land owned by the State Forest Department. Details in this regard should be provided within the Project **HRP**.	In combination with 2d(i) this action will be considered a success once an overall population of twice the current estimated population has become successfully established. This will be confirmed through ongoing monitoring.	AYGM (for the production of the **HRP**) Contractor for implementation

Aim	Objective	Action	Target	Responsibility
		2d(iii): A **Biodiversity Action Plan** (BAP) will be produced for *C. hermannii* and *Lathyrus undulatus* 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 PR6. The **BAP** will be a dynamic and collaborative document in which all relevant stakeholders are actively involved in perpetuity. The **BAP** will cross-reference the **HRP** where appropriate.	The **BAP** must be 'live' and adopted in advance of construction. This action will be considered a success once the **BAP** has been approved by the Lenders TA.	AYGM
	2e	2e(i): 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
	2f	2f(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: ▪ European ground squirrel burrows and burrow complexes ▪ Marbled polecat burrows ▪ Other burrows, places of shelter used by fauna ▪ Bat roosts ▪ Reptile hibernacula/shelters (including those of the spur-thighed tortoise) ▪ Eastern imperial eagle 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 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. 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: ▪ 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	Micro-siting will be an ongoing process during construction. In combination with 2f(ii), 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
		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.		
		2f(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). Complementing this, targeted avoidance of construction activities from November to early-March should also be adopted where possible around Büyükçekmece Lake. This should take priority over avoidance of the nesting season here. 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. A summary table of programme considerations in this regard is provided within Appendix C.	Sensitive timing of works will be undertaken throughout construction. In combination with 2f(i), this action will be considered a success should pre-identified sensitive fauna be avoided/protected through 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 Büyükçekmece Lake given their elevated PR6 status.	Contractor
		2f(iii): Crossing points/trenches will be installed at targeted locations within the Project as informed by current findings and findings from pre-construction surveys. At present, the following chainages are considered to be most important in terms of underpass installations: ▪ Between chainages 7+000 and 8+000. ▪ Between chainages 19+000 and 27+000. ▪ Between chainages 34+000 and 38+000. The above installations will be complemented with fencing either side which will have the dual purpose of minimising crossing attempts over the live tracks and also directing animals to the underpasses to maximise their use. A dedicated crossing points plan should be produced by AYGM (to the approval of the Project Lenders) in advance of construction activities. The ECoW will be responsible for overseeing successful installation. In addition, mammal ledges will be installed within culverts at the following change locations: ▪ Between chainages 22+000 and 30+000. ▪ Between chainages 39+000 and 42+000. ▪ Between chainages 53+000 and 69+000. In all cases, the underpasses should be designed/installed to ensure they are available for use all year round, in particular this means avoiding any areas prone to flooding (see **ESIA Chapter 11: Surface Water Environment**); ideally the underpass should be located on an embankment to overcome such issues. Other design recommendations are as follows: ▪ Underpass diameter of around 1.5m to make it accessible for a variety of animals (and to aid ongoing maintenance) ▪ Rectangular tunnels are preferred, with prefabricated concrete structures suitable ▪ The bottom of the tunnel/structure should be filled with a natural substrate (e.g. sand, rocks) to provide a horizontal movement surface ▪ A minimum gradient of 1% should be achieved where any waterlogging risk exists	Installation of appropriate crossing points will be completed during construction. This action will be considered a success should installations be readily used by animals crossing the railway and should collision mortality of sensitive fauna be avoided as a result; confirmed through operational monitoring.	Contractor

Aim	Objective	Action	Target	Responsibility
		▪ The tunnel should be located within a recess in the fenceline to guide animals to them As an additional measure to the above, culverts adapted with the dual purpose of allowing safe passage by small animals will be used. This is achieved by using a culvert design that has dry passage beneath the railway at all times (e.g. as achieved through ledges). Indicative designs for such a structure are included in **Figure 2f** overleaf.  **Figure 2f - Adapted Culvert Design Options[3]** 4.1.6. Further to the above, where adapted culverts are not feasible, modifications will be made to the designs of watercourse crossings to incorporate mammal ledges to facilitate safe movement along watercourses at targeted locations (most notably where the potential exists for otter to be present). Specifically, these are between chainages: 0+000 to 1+000; 7+000 to 15+000; 22+000 to 24+000; 26+000 to 28+000; and 54+000 to 65+000. As above, the specifics of this measure should be updated through delivery of the **BMP** as part of the **ESMP**.		
	2g	2g(i): The Project will make a material contribution to the ongoing management of both Büyükçekmece Lake and Küçükçekmece 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 (e.g. Doga) and should include, as a minimum, material support in the production of a **White-headed Duck Management Plan** for Büyükçekmece Lake and Küçükçekmece Basin. 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.	Financial support or provision of personnel time to assist with conservation management in line with ongoing conservation initiatives at the two sites. 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 (e.g. Doga) should be invited to input to such reporting.	AYGM

[3] Iuell. B. 2003. Wildlife and Traffic: A European Handbook for Identifying Conflicts and Designing Solutions

Aim	Objective	Action	Target	Responsibility
		With this in mind, it is wholly feasible that Net Gains can be secured as a result of input from the Project. The above initiative will be detailed within the **BAP**, to the approval of the Project Lenders.		
3	3a	3a(i): Good practice animal welfare measures should be adopted throughout construction. These should include (but are not limited to): ▪ 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 All of the above will be the responsibility of the ECoW to oversee.	Good practice animal welfare measures should be adopted throughout construction. The action will be considered a full success if high animal welfare standards are maintained through constructions, as confirmed through ECoW observations/monitoring.	Contractor
	3b	3b(i): Retention of connecting/green corridors should be achieved as per measures described within 2a(i). Furthermore, the planting described within 1a(i) should be designed to provide connectivity within the wider landscape where possible. Planting should make use of species of local/regional provenance.	Retention/restoration of green corridors will be undertaken during construction. This action will be considered a success once all features agreed as part of the landscaping/planting plan have become successfully established.	
	3c	3c(i): Construction work should adhere to the best practice pollution prevention guidance outlined by the Construction Industry Research and Information Association guidance[4]. Specific measures are not limited to, but must include the following: ▪ 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 of 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. 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.	Aquatic environment protection measures should be adopted throughout construction. The action will be considered a full success if protection of the aquatic environment is maintained through constructions, as confirmed through ECoW observations/monitoring.	Contractor

[4] CIRIA (2015). Environmental good practice on site (fourth edition) (C741). Charles, P., Edwards, P. (eds). CIRIA, London.

Aim	Objective	Action	Target	Responsibility
		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: ▪ 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. 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.		
4	4a	4a(i): Adapted fencing around flight activity hotspots should be achieved as per action 1a(i) but extending to species of requisite sensitivity outwith the IBA; at present this comprises imperial eagle. The exact nature and extent of this action will be informed by ongoing survey effort and detailed within this BMP to be approved by the Project Lenders.	Adapted fencing should be in place prior to the Project becoming operational. The action will be considered successful should operational monitoring confirm no significant impacts to bird populations as a result of collision mortality.	Contractor (fencing) TCDD Transport (monitoring)
	4b	4b(i): See 2e(i).	-	-
	4c	4c(i): Anti-perching structures should be installed upon catenary structures within sections considered to pose a risk to imperial eagles, based upon results from surveys undertaken in 2021.	Anti-perching structures should be installed prior to the Project becoming operational. The action will be considered successful should operational monitoring confirm no significant impacts to imperial eagle populations as a result of electrocution.	Contractor (anti-perching structures) TCDD Transport (monitoring)
5	5a	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. This action should be developed in consultation with relevant stakeholders, such as Nezahat Gokyigit Botanical Gardens. Note: 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.	Successful planting across relevant areas of the restored expropriation corridor.	Contractor

5 MONITORING AND ADAPTIVE MANAGEMENT

5.1 INTRODUCTION

5.1.1. 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.

5.1.2. 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

BIRD SURVEYS

5.2.1. 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.

5.2.2. 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 (including all active/inactive nest sites identified during 2021 surveys). 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.

5.2.3. Operational monitoring will comprise flight activity surveys at pre-identified areas of highest potential risk (currently for waterbirds around east of Küçükçekmece Basin and around the channel north of Büyükçekmece Lake, and in the vicinity of the imperial eagle territory identified). Ongoing consultation with Doga will inform the need to extend these surveys to other areas (e.g. around other imperial eagle nest sites). 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.

5.2.4. Bird survey effort should follow methods already deployed on the Project (e.g. in line with methods described within SNH 2017[5]).

5.2.5. 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, most notably at the following chainages:

- 0+000 to 1+000.

[5] SNH. 2017. Recommended bird survey methods to inform impact assessments of onshore wind farms.

- 7+000 to 8+000.
- 25+000 to 30+000.

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

5.2.7. 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.

BOTANICAL SURVEYS

5.2.8. 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.

5.2.9. 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 Büyükçekmece Lake IBA. 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.

5.2.10. 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.

GENERAL BIODIVERSITY WALKOVERS

5.2.11. 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.

5.2.12. Surveys of the chainages listed within 2f(iii) 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.

5.2.13. 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 (in particular those of higher significance species (as per the ESIA) such as European ground squirrel, marbled polecat, spur-thighed tortoise, otter, etc.) along the railway within these pre-identified sections, with carcasses identified to species level where possible.

5.3 REPORTING

5.3.1. 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

5.4.1. 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.

5.4.2. 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.

Appendix A

IMPACT ASSESSMENT SUMMARY

Topic	Baseline Summary	Phase	Potential Impact(s)	Effect (without mitigation)	Mitigation Measures	Residual Effects (after mitigation)
Protected Areas	There are three IBAs crossed by the Project.	Construction	Habitat Loss Disturbance	Neutral to Minor (Not Significant)	Compensatory planting of oak-hornbeam woodland. ECoW Sympathetic timing of works	Neutral (Not Significant)
		Operation	Disturbance Collision Mortality	Neutral (Not Significant) to Moderate (Significant)	Adapted fencing to divert flying birds. Limiting train speeds.	Minor (Not Significant)
Habitats	A mixture of agriculture, woodlands/scrub and built-up areas across the ZoI. Includes an area of higher sensitivity oak-hornbeam woodland.	Construction	Habitat Loss	Minor (Not Significant)	Micrositing to avoid areas of greatest biodiversity interest. Compensatory planting of oak-hornbeam woodland to ensure no net loss for this habitat.	Neutral (Not Significant)
Rare Plants	Common and widespread floral assemblage across the ZoI. Ten rare plant species (including endemics) recorded from across the ZoI. *Centaurea hermannii and Lathyrus undulatus* assessed as a Critical Habitat trigger species.	Construction	Loss of Plants Spread of Invasive Species	Moderate to Large (Significant)	Translocation of plants and propagation of individuals to increase overall numbers. Invasive Species Management Plan. ECoW.	Minor Beneficial (Not Significant)
Notable Fauna	Notable species of increased conservation value include European ground squirrel, marbled polecat, bat species and spur-thighed tortoise.	Construction	Disturbance Injury/Mortality	Minor (Not Significant)	Micrositing to avoid areas of greatest biodiversity interest. ECoW	Minor (Not Significant)
		Operation	Disturbance Collision Mortality	Minor (Not Significant)	Maintaining habitat connectivity and reducing collision risk through trench installation.	Neutral (Not Significant)
General Fauna	Common and widespread faunal assemblage across the site but including some species of slightly elevated conservation such as fire-bellied toad.	Construction	Disturbance Injury/Mortality	Minor (Not Significant)	Micrositing to avoid areas of greatest biodiversity interest. ECoW	Minor (Not Significant)
		Operation	Disturbance Collision Mortality	Minor (Not Significant)	Maintaining habitat connectivity and reducing collision risk through trench installation.	Neutral (Not Significant)
Birds	Common and widespread bird assemblage across the study areas. Notable/threatened species include white-headed duck, imperial eagle, common pochard and red-breasted goose.	Construction	Disturbance Injury/Mortality	Moderate (Significant)	Targeted bird surveys. Flight activity surveys. Timing of works.	Minor (Not Significant)
		Operation	Disturbance Collision Mortality	All species, excluding the imperial eagle – Minor (Not Significant)	Adapted fencing to divert flying birds.	Minor (Not Significant)

Topic	Baseline Summary	Phase	Potential Impact(s)	Effect (without mitigation)	Mitigation Measures	Residual Effects (after mitigation)
				Imperial eagle – Large (Significant)		

Appendix B

SURVEY & MONITORING REQUIREMENTS

Table B-1 - Ongoing Survey Requirements: 2022 Update

Survey	Outline Methods	Timing[6] and current status
Rare Plants	Botanical survey within suitable habitat to identify all rare plants (of the six species identified and *Lathyrus undulatus*) requiring translocation.	During growing season (March to June) in 2021. **Completed in 2021.**
Habitats	Habitat surveys across areas of G1.A habitat to be lost during construction.	During growing season (March to June) in 2021. **Not yet started. Recommended to be undertaken in 2022, during growing season (March to June).**
European Ground Squirrel	Walkover survey to identify burrows of European ground squirrel across habitat within chainages 6+000 and 8+000.	During main active season in 2021 (broadly June to mid-August). **Not yet started. Recommended to be undertaken in 2022, during main active season in (broadly June to mid-August).**
Rare Animals	Walkover survey across woodland/scrub habitat in/around the Terkos Basin KBA. Surveys to focus on identifying key sensitivities such as bat roosts, marbled polecat dens and at watercourse crossing locations for otter shelters.	During broad active season in 2021 (March to July). **Not yet started. Recommended to be undertaken in 2022, during broad active season (March to July).**

[6] Timing specifics should be informed through consultation with in-country specialists.

Survey	Outline Methods	Timing[6] and current status
Birds – Spring Migration	Vantage Point (VP) surveys at the four VP locations surveyed during August/September 2020 repeating methods deployed here.	Monthly surveys, March to May 2021 inclusive. **Completed in 2021.**
Birds – Breeding Season	Surveys of potential imperial eagle territories (informed after consultation with Doga) to confirm occupation within 1km of the Project[7]. VP surveys around confirmed imperial eagle territories repeating methods deployed during June 2020 surveys.	Monthly surveys, March to July 2021 inclusive. **Completed in 2021.**
Pre-works Surveys	Walkover across new works areas immediately in advance of vegetation clearance work. Fauna removed/relocated locally, as encountered with a particular focus on sensitive biodiversity such as reptiles and marbled polecat. Exclusion zones established as required (at discretion of ECoW).	Programmed to be undertaken in advance of vegetation clearance work. **To be undertaken immediately prior to commencement of works.**

[7] Avoid duplication here if Doga are continuing their monitoring of all imperial eagle territories.

Table B-2 - Monitoring Requirements

Survey	Outline Methods	Frequency
Rare plants	Botanical surveys at translocation receptor sites.	Post-translocation surveys in years 1, 2, 3, 5, 7 and 10. Surveys beyond year 10 to be undertaken as required.
Habitats	Botanical surveys across habitat restoration/replanting areas (as per **HRP**). Provisional G1.A replanting area illustrated within Figure B-1 below.	Post-restoration/replanting surveys in years 1, 2, 3, 5, 7, 10, 15, 20. Surveys beyond year 20 to be undertaken as required.
Fauna	Monitoring of use of animal underpasses (e.g., through deployment of camera traps).	Twice-yearly post operation during spring/summer. To be undertaken in years 1-5 inclusive.
Carcass Searching	Walkover surveys at representative locations (including at flight activity hotspots, wooded/scrub habitat around Terkos Basin KBA and other pre-identified areas of increased biodiversity interest) to identify collision mortality carcasses. Searches should be undertaken in the morning and repeated over two consecutive days. Specific timing within the year should coincide with maximum perceived risk for each animal group – e.g., for birds around the Büyükçekmece Lake hotspot, this should be during the winter migration months.	Post-operation in years, 1, 2, 3, 5, 7 and 10.
Bird Surveys	VP surveys at the four VPs used during August/September 2020. Monitoring flights around the Project during construction and operation. 36 hours of survey effort during the non-breeding season. VP surveys around confirmed imperial eagle territory where this overlaps with the Project (e.g., as per VP locations from June 2020), and others following consultation with Doga.	During construction (36 hours during each of breeding/non-breeding seasons). During operation in years 1, 2, 3, 5, 7 and 10.
Construction Monitoring	Specific monitoring of nest sites during construction, as required. In particular this may be required should any imperial eagle nest sites be identified within 1km of the Project. Monitoring will occur during construction activities while such nest sites are active and	During construction activities between March-July inclusive for nesting birds and October to February inclusive for wintering birds.

Survey	Outline Methods	Frequency
	will inform adaptive mitigation (e.g., such as temporary cessation of works, etc.). Monitoring of wintering birds at each IBA during construction activities (where it has not been possible to avoid such activities) to monitor bird behaviour and inform adaptive mitigation should significant disturbance impacts be identified (e.g., through temporary cessation of works).	
IBA Monitoring	Ongoing monitoring of conservation management that the Project will contribute towards. To be discussed/agreed with relevant stakeholders (e.g., Doga).	Monitoring to align with/be part of ongoing conservation monitoring at Büyükçekmece Lake and Küçükçekmece Basin.

FIGURE B-1

[FIGURE TO BE INSERTED AS A PDF]

Appendix C

CONSTRUCTION PROGRAMME CONSTRAINTS

Table C-1 – Construction Constraints Summary

Biodiversity constraint	Programme consideration
Nesting birds	Construction activities that require the clearance of scrub/woodland vegetation to be timed to avoid March-July (inclusive) where possible. In particular this should apply to scrub/woodland habitat around the Terkos Basin KBA (chainages 52+000 to 69+000) but activities should also be informed by additional habitat survey effort during 2022. Where this is not possible, required vegetation clearance should take place pre-emptively (i.e. significantly prior the planned construction activities) within the preceding non-breeding season so as to remove nesting bird features in advance of their use (remaining cognisant of other sensitivities associated with vegetation clearance such as bat roosts).
Wintering birds	Where possible construction activities around Büyükçekmece Lake and Küçükçekmece Lake (specifically between chainages 25+000 and 28+000) should be timed to avoid wintering months when IBA are present (October to February inclusive). Where this not possible, monitoring of disturbance impacts should take place during construction, with works ceasing in the case of significant disturbance being observed.

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