REPUBLIC OF NORTH MACEDONIA – PUBLIC ENTERPRISE FOR STATE ROADS

A2 MOTORWAY: BUKOJCHANI – KICHEVO SECTION

FRAMEWORK BIODIVERSITY MANAGEMENT PLAN

FEBRUARY 2021

CONFIDENTIAL

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1 INTRODUCTION

1.1 BACKGROUND

1.1.1. WSP UK Ltd. (WSP) was commissioned by European Bank of Reconstruction and Development (EBRD) to provide biodiversity support in relation to the development of a 10.7 km long sub-section of A2 Bukojchani - Kichevo motorway (hereafter the 'Project').

1.1.2. 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]. To satisfy PR6, a Framework Biodiversity Management Plan (FBMP) is required to demonstrate how the delivery of subsequent detailed mitigation proposals will be technically feasible. These measures will later be described within a Project BMP to be implemented as part of the overall Project delivery. This report should be read in conjunction with the following:

- A2 Motorway Bukojchani - Kichevo Section: Environmental and Social Impact Assessment: Chapter 15 Biodiversity[2].

1.2 REPORT PURPOSE

1.2.1. This report provides an outline framework of mitigation and monitoring commitments that are required to be delivered within the BMP to ensure the Project remains compliant with PR6[3] 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 ultimate purpose of this report is to provide detail that demonstrates how delivery of the subsequent BMP will be technically feasible.

[1] European Bank of Reconstruction and Development (2014). Performance Requirement 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

[2] PESR (2020). A2 Motorway Bukojchani - Kichevo Section: Environmental and Social Impact Assessment: Chapter 15 Biodiversity. Disclosed December 2020.

[3] 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*.'

2 ROLES AND RESPONSIBILITIES

2.1 INTRODUCTION

2.1.1. A key component of the successful delivery of this FBMP is the full understanding of roles and responsibilities required under this plan. It is the responsibility of Public Enterprise for State Roads (PESR) to ensure that all relevant Project staff and contractors adhere to the requirements of the final BMP, together with all other relevant obligations as included within the ESIA, ESMP and ESAP.

2.1.2. PESR will be responsible for ensuring appropriate approvals are obtained from EBRD for updates to the BMP as required to ensure its efficacy as the Project develops. PESR will engage an appropriate qualified environmental/biodiversity specialist 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, 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 contractors have been engaged.

Table 2-1 - Summary of Indicative Roles and Responsibilities

Role	Responsibilities
PESR Project Implementation Unit / Supervising Engineer	▪ Overseeing and monitoring the implementation of the BMP; and ▪ Monthly reporting to the EBRD.
Contractor	▪ Overall responsibility for: • implementation of the BMP; • updating and ongoing approval of the BMP; • instilling and maintaining strong culture of environmental/biodiversity awareness and protection on the Project; and • stakeholder liaison. ▪ Ongoing and regular liaison with environmental/biodiversity specialists on the Project to remain informed on performance. ▪ Ensuring sub-contractors comply with requirements. ▪ Weekly reporting to PESR
Environmental Engineer	▪ Responsibility for environmental management during construction; ▪ Production/management of environmental documents and procedures; and ▪ Regular audits of environmental performance across the site during construction.
Ecological Clerk of Works (ECoW)	▪ Pre-construction checks (including nesting bird checks);

Role	Responsibilities
	▪ Identification and maintenance of exclusion zones around ecological sensitivities; ▪ Delivery of Toolbox Talks (TBT) to contractors; ▪ Regular (monthly to begin with but at a frequency deemed appropriate by the ECoW) audits of construction activities to ensure compliance with ecological mitigation/commitments.
Biodiversity Specialist(s)	▪ Undertake field surveys of the CH and PBF habitats; and receptor sites. ▪ Help identify local plant sources. ▪ Help identify other stakeholders, local contacts and Non-Governmental Organisations (NGOs) and facilitate engagement.

3 BIODIVERSITY MANAGEMENT

3.1 INTRODUCTION

3.1.1. This section provides details of the aims of the BMP together with objectives required to be met in order to deliver these aims. Management actions to deliver the aims then follow.

3.2 AIMS & OBJECTIVES

3.2.1. **Table 3-1** below lists the aims and objectives that form the basis of the BMP. These will be developed further within the final BMP.

Table 3-1 – BMP Aims & Objectives

Aim ref.	Description	Associated objective(s)
A	Secure a Net Gain outcome for the following Critical Habitat (CH): - Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*.	A1: Assess habitat loss. A2: Source replacement plants. A3: Identify suitable receptor sites. A4: Demonstrate feasibility of achieving Net Gain for this CH.
B	Secure a No Net Loss outcome for the following Priority Biodiversity Features (PBF) impacted by the Project: - Riparian willow-poplar belt (*Salix alba* and *Populus alba* galleries); and - Pannonian-Balkanic turkey oak-sessile oak forests.	B1: Assess habitat loss. B2: Produce an inventory of replanting requirements. B3: Identify suitable receptor sites. B4: Demonstrate feasibility of achieving No Net Loss for these PBF.
C	Improve the condition of the Zajaska River (PBF) for Macedonian trout *Salmo macedonicus* (and other aquatic ecology).	C1: Improve water quality of the Zajaska River.
D	Implement biodiversity good practice during construction of the Project.	D1: Minimise impacts to biodiversity during construction activities.

3.3 FEASIBILITY REVIEW

3.3.1. This section presents evidence/detail against the above objectives to demonstrate how they can be delivered through the BMP and are technically feasible.

A1: ASSESS HABITAT LOSS

3.3.2. A 're-survey' of areas to be lost to the Project has been undertaken in December 2020 by an in-country botanical expert. The aim of this was to accurately quantify the direct losses for each relevant habitat type and apply a condition value for these habitats (required to inform Net Gain/No Net Loss calculations). Following this (during a more optimal survey window in spring/summer 2021) a detailed botanical survey will be completed that accurately describes the species composition of the habitats that will be lost.

3.3.3. As well as visiting the region to survey, the in-country botanical expert has been appointed to identify relevant stakeholders and NGOs to collaborate on the Project. The specialist has relevant experience working on a similar EBRD project on revegetation and rehabilitation plan at the area of the River Zletovska Crossing project.

A2: SOURCE REPLACEMENT PLANTS

3.3.4. The information collected from A1 will be used to create an inventory of replanting requirements. The materials required for replanting will be included in the Bill of Quantities. This will inform detailed discussions with organisations capable of providing plants to be replanted under the BMP. At present, discussions with State Forestry Department PE National Forests (PENF) have commenced.

3.3.5. PENF has confirmed that they do not produce alder *Alnus glutinosa* seedlings; however, discussions with the Macedonian Ecological Society (MES) have revealed that they are able to source this species.

A3: IDENTIFY SUITABLE RECEPTOR SITES

3.3.6. In order for the BMP to be successfully implemented, an appropriate (total) area to be replanted will be identified. To do this, discussions have begun with state departments to secure these areas.

3.3.7. PENF local branch offices in Gostivar/Kichevo have confirmed there is not enough state-owned land for replanting of alluvial alder forest adjacent to the Project. An off-site option will therefore be required and this has been identified following initial discussions with MES. MES are currently working on a project to restore riparian vegetation in co-operation with the State Forest Department along the Bregalnica River, near the village of Sofilari (approximately 100km east of Kichevo) and have suggested this site as a suitable receptor site for replanting under the BMP. **Figure 3-1** shows the location of this receptor site.

Figure 3-1 - Off-site replanting receptor location (c. 100km east of Kichevo)

3.3.8. The area secured for replanting has been provisionally calculated using the findings of the 're-survey' undertaken in December 2020 (set out in A1) and metric calculations (set out in A4).

3.3.9. The land required for replanting will be secured by the PESR and will be maintained as the specified habitat type in the long-term (i.e. for the lifetime of the Project), through commitments secured from the landowners by PESR. PESR will be responsible for securing agreements with MES/State Forest Department for the management of areas required under the BMP in perpetuity.

A4: ACHIEVE NET GAIN FOR CH LOSS

3.3.10. The Good Practice Principles from the Business and Biodiversity Offsetting Programme (BBOP Principles - Forest Trends (www.forest-trends.org)) has been used as a basis for developing an agreed approach to delivering a Net Gain. To measure whether the Project may achieve Net Gain in CH, a metric is required to compare the loss of biodiversity caused by the Project and any new habitat creation or enhancement required to offset this loss. A method based on the approach developed by the UK Government (a The Biodiversity Metric 2.0 - JP029 (naturalengland.org.uk)), has been developed and tested using best practice and case studies from similar environments. This is known as a Quality Hectares (QH) approach and attributes a value to an area of habitat by converting it to biodiversity units. QH units reflect the area of habitat and its condition.

3.3.11. The formula proposed for calculating QHs is as follows:

Quality Hectare Units = Critical or Natural Habitat Area x Habitat Condition

3.3.12. Calculating the impact on CH in this way allows for a clear assessment of what is needed to deliver No Net Loss or Net Gain. This information will then be used to inform the environmental mitigation design and evidence how the mitigation hierarch has been followed, first avoiding, the minimising and, as a last resort, compensating for any impacts. This will clarify the need for any additional offsets and will provide clear evidence of how the PS6 standard has been met.

3.3.13. Habitat condition assessments were undertaken during December 2020 for the areas of CH to be lost to the Project. Habitat condition scores have been input to the above calculation to quantify the QH units and therefore identify the exact area of CH to be replanted to achieve a Net Gain. Habitat condition assessments and QH calculations for each area of CH are detailed in **Table 3-2.**

Table 3-2 - Quality Hectare Unit calculations for each area of CH

ID	Critical Habitat	Sensitivity	Habitat Condition	Area (ha)	QHU	Description (Dec 2020)
8	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	Very High	Poor Score: 1	0.23	0.23	Shrubland with domination of *Salix fragilis* completely overgrown with climbing shrub *Clematis vitalba* and *Rubus spp*. Highly degraded and modified natural habitat. Invasive black locust *Robinia pseudoacacia* is quite common here, around 20% of vegetation cover.
14	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	Very High	Good Score: 3	0.18	0.55	Riparian black alder belt along the Zajaska Reka stream. Tree layer is composed of *Alnus glutinosa* (as a dominant tree), then *Salix alba* and *Populus tremulla*. Trees are well developed with tall and thick stems. The most common bush species is *Sambucus racemosa*. Invasive species have not been observed.
15	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	Very High	Good Score: 3	0.38	1.14	Same with previous one, well developed riparian black alder belt. Tree composition is from black alder, aspen and white willow, *Salix fragilis* appears in same places, while the most common bushes are *Humulus lupulus, Sambucus nigra* and *S. racemosa*. The invasive species *Amorpha fruticosa* is quite rare.
16	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	Very High	Good Score: 3	4.47	13.42	Well-developed riparian black alder woodland. Tree layer is composed of *Alnus glutinosa*, whereas *Salix alba*, *S. amplexicaulis, Rubus discolor, Clematis vitalba, Humulus lupulus, Sambucus nigra* etc. occur in small groups or individually near the river.

3.3.14. The total biodiversity value of CH to be lost (based on the findings of A1 and metric calculations set out in B4), termed the Quality Hectare Unit, is summarised in **Table 3-3**. Aligning with the Environmental and Social Impact Assessment[2], replanting of CH will be required at a 2:1 ratio to achieve a Net Gain.

Table 3-3 – Total baseline CH Quality Hectare Units to be lost

Critical Habitat	Quality Hectare Unit	Net Gain Area
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	15.34	30.68ha

3.3.15. Critical Habitat in the far south of the Project was assigned a poor habitat condition score (**Table 3-2**). There may be an alternative opportunity to enhance this habitat to a better condition through management of invasive black locust, management of overgrown shrub, and replanting of alder (in addition to replanting, to achieve a Net Gain). Other areas of CH intersected by the Project were assessed to be in very good condition, therefore it would not be possible to achieve an increase in biodiversity units within these areas of CH.

3.3.16. Based on discussions with PENF and MES and following metric calculations (set out in A4), there will be adequate receptor site resource to support a replanting programme that will achieve a Net Gain. The specifics of this resource will need to be agreed in detail through ongoing discussions with PENF (and MES) and this will be reported within the BMP. The adequacy of the receptor site resource was confirmed by email on 22nd January 2021.

B1: ASSESS HABITAT LOSS

3.3.17. A 're-survey' of areas to be lost to the Project has been undertaken in December 2020 by an in-country botanical expert. The aim of this was to accurately quantify the direct losses for each relevant habitat type and apply a condition value for these habitats (required to inform Net Gain/No Net Loss calculations). Following this (during a more optimal survey window in spring/summer 2021) a detailed botanical survey will be completed that accurately describes the species composition of the habitats that will be lost.

3.3.18. The in-country botanical expert will also identify relevant stakeholders and NGOs to collaborate on the Project. The specialist has relevant experience working on a similar EBRD project on revegetation and rehabilitation plan at the area of the River Zletovska Crossing project.

B2: SOURCE REPLACEMENT PLANTS

3.3.19. The information collected from B1 will be used to create an inventory of replanting requirements. The materials required for replanting will be included in the Bill of Quantities. This will inform detailed discussions with organisations capable of providing plants to be replanted under the BMP.

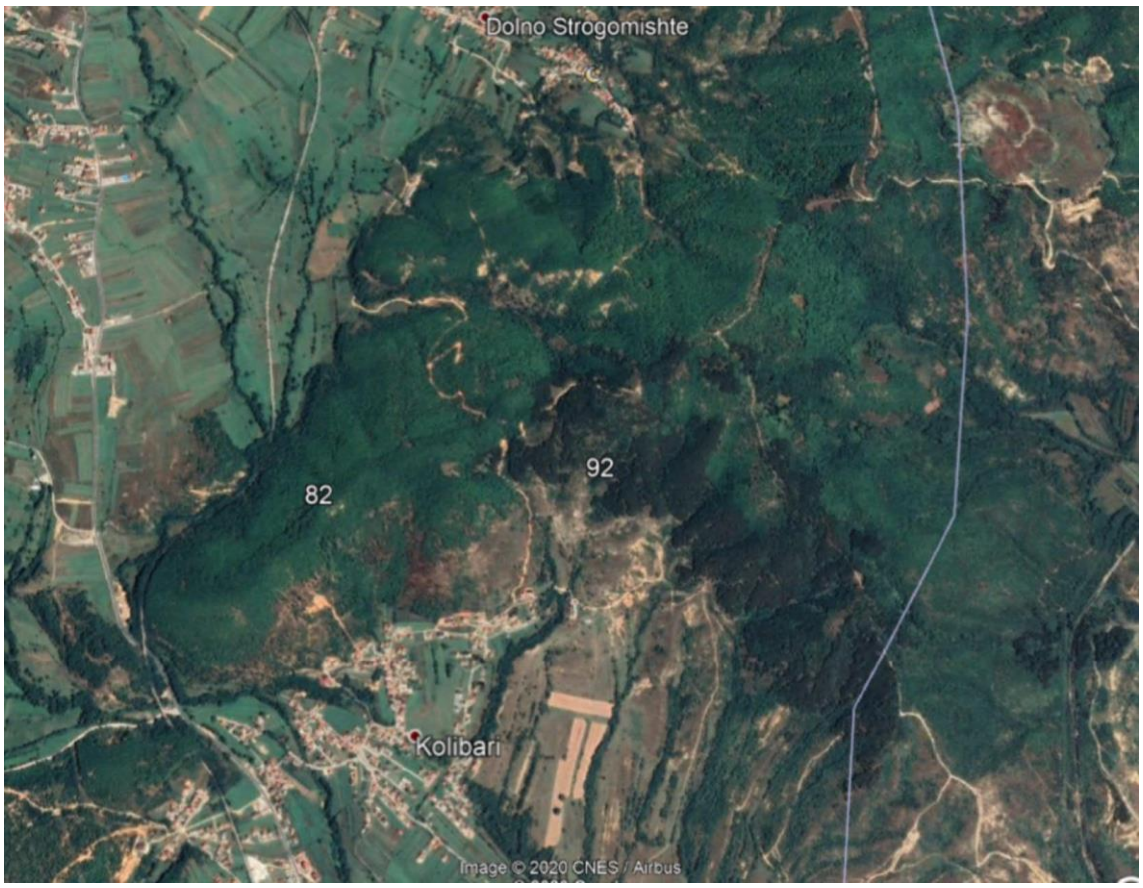
3.3.20. Early discussions with PENF have identified that oak *Quercus frainetto* and willow tree seedlings can be grown in PENF nurseries. The quantity of oak and willow seedlings, and other species required to replicate PBF woodlands, will be determined using the results of B1 and metric calculations (set out in B4).

3.3.21. Further, engagement with the in-county botanical specialist and MES will inform additional sources where required.

B3: IDENTIFY SUITABLE RECEPTOR SITES

3.3.22. Recent discussions with PENF have taken place to identify receptor sites for afforestation. Two state-owned land parcels (no. 82 and 92 illustrated on **Figure 3-2** below) have been identified for possible planting of oak nearby the Project. These land parcels are understood to be near existing areas of PBF Pannonian-Balkanic turkey oak-sessile oak forests.

Figure 3-2 - Turkey oak-sessile oak replanting areas



3.3.23. The land required for replanting will be secured by the PESR and will be maintained as the specified habitat type in the long-term (i.e. for the lifetime of the Project), through commitments secured from the landowners by PESR.

3.3.24. The area secured for replanting has been provisionally calculated using the findings of the 're-survey' undertaken in December 2020 (set out in A1) and metric calculations (set out in A4).

3.3.25. The land required for replanting will be secured by the PESR and will be maintained as the specified habitat type in the long-term (i.e. for the lifetime of the Project), through commitments secured from the landowners by PESR. PESR will be responsible for securing agreements with MES/State Forest Department for the management of areas required under the BMP in perpetuity.

B4: ACHIEVE NO NET LOSS FOR PBF LOSS

3.3.26. The metric set out in A4 has been applied to demonstrate how a No Net Loss of the relevant PBF habitats will be achieved. The same steps will be followed sequentially to quantify Quality Hectare Units. Calculating the impact on PBF habitats will allow for a clear assessment of what is needed to deliver No Net Loss or Net Gain. This information will then be used to inform the environmental mitigation design and evidence how the mitigation hierarch has been followed, first avoiding, the minimising and, as a last resort, compensating for any impacts. This will clarify the need for any additional offsets and will provide clear evidence of how the PS6 standard has been met with regards to PBF.

3.3.27. Habitat condition assessments were undertaken during December 2020 for the areas of PBF to be lost to the Project. Habitat condition scores have been input to the above calculation to quantify the QH units and therefore identify the exact area of PBF to be replanted to achieve a No Net Loss. Habitat condition assessments and QH calculations for each area of PBF are detailed in **Table 3-4.**

Table 3-4 - Quality Hectare Unit calculations for each area of PBF

ID	Priority Biodiversity Feature	Sensitivity	Habitat Condition	Area (ha)	QHU	Description (Dec 2020)
1	Pannonian-Balkanic turkey oak-sessile oak forests	High	Moderate Score: 2	0.21	0.41	Native Italian and Turkey oak forest, mainly coppiced, clearcutting 3 years ago. A few remained oak trees are taller than 5m and usually attacked by a semi-parasite plant - yellow mistletoe *Loranthus europaeus*. Fresh cutting is also noticed. No invasive plants registered. Tree species composition: Italian oak *Quercus frainetto* and Turkey oak *Quercus cerris*, then *Acer campestre*, *Cornus mas, Rosa spp, Rubus fruticosus*, and *Juniperus communis*. The oak is intermixed with planted Scots pine at about 70m.
2	Pannonian-Balkanic turkey oak-sessile oak forests	High	Moderate Score: 2	0.56	1.11	A small fragment of mixed deciduous forest, remnants of the surrounding oak forest (*Quercus frainetto, Q. cerris*), mixed with *Carpinus orientalis, Acer campestre, Cornus mas, Crataegus monogyna* and overgrown with *Prunus spinosa*, *Rubus fruticosus* and *Rosa galica*. There are several oak trees taller than 5m and wider than 20cm. Fresh cutting is also present. Such vegetation type does not constitute a specific plant community.
3	Pannonian-Balkanic turkey oak-sessile oak forests	High	Moderate Score: 2	0.40	0.80	Similar to the previous one, a fragment of a former oak forest that has been modified. A few remnant oak trees overgrown with shrubs: *Prunus spinosa, Rubus fruticosus* and *Rosa galica*.
4	Pannonian-Balkanic turkey oak-sessile oak forests	High	Moderate Score: 2	0.15	0.30	Similar to the previous one. A few remaining oak trees overgrown with shrubs: *Prunus spinosa, Rubus fruticosus* and *Rosa galica*. There are also several trees of cherry plum *Prunus cerasifera* mixed with oak trees and shrubs.

ID	Priority Biodiversity Feature	Sensitivity	Habitat Condition	Area (ha)	QHU	Description (Dec 2020)
5	Pannonian-Balkanic turkey oak-sessile oak forests	High	Good Score: 3	0.26	0.77	Fragment of native Italian and Turkey oak forest, trees with complete canopy cover, a diverse age and height structure of the trees, invasive species not observed and there are fallen branches/stems and wood of over 20cm diameter. Dominant tree species are Italian oak *Quercus frainetto* and Turkey oak *Quercus cerris*.
7	Riparian willow-poplar belt (*Salix alba* and *Populus alba* galleries)	High	Moderate Score: 2	0.39	0.79	Riparian willow belt along Sushica stream. Highly degraded and modified natural habitat. Tree layer composed of remnant *Salix alba*, some of them older and taller than 5m. Fresh cuttings are also present, especially branches of living willow trees. Habitat is invaded by shrubs, densely overgrown with *Rosa* spp., *Rubus fruticosus, Prunus spinosus, Clematis vitalba* and also some invasive species such as black locust and *Ailanthus altissima* (less than 10% of the vegetation cover).
9	Pannonian-Balkanic turkey oak-sessile oak forests	High	Good Score: 3	10.61	31.82	Well-developed native Italian and Turkey oak forest, trees with complete canopy cover, a diverse age and height structure of the trees, invasive species not observed and there are fallen branches/stems and wood of over 20cm diameter. Dominant tree species are Italian oak *Quercus frainetto* and Turkey oak *Quercus cerris* and the following species also appear: *Carpinus orientalis, Acer campestre, Fraxinus ornus*.
13	Riparian willow-poplar belt (*Salix alba* and *Populus alba* galleries)	High	Moderate Score: 2	0.25	0.50	Riparian willow belt along Strogomishka Reka stream. Highly degraded and modified natural habitat. Tree layer composed of remnant *Salix alba* and several *Alnus glutinosa* trees, some of them older and taller than 5m. Fresh cuttings on willows are also present. Invasive black locust is quite common here, which account approximately 30% of the vegetation cover.

3.3.28. The total area required for replanting has been based on the findings of B1 and metric calculations (set out in B4) and is summarised in **Table 3-5**. This follows a like-for-like replacement in terms of area and habitat condition.

Table 3-5 – Total baseline PBF Quality Hectare Units to be lost

Priority Biodiversity Feature	Quality Hectare Unit
Pannonian-Balkanic turkey oak-sessile oak forests	35.21
Riparian willow-poplar belt (*Salix alba* and *Populus alba* galleries)	1.29

3.3.29. An alternative option to compensate for direct loss may be to enhance/restore existing areas of PBF habitats that have been degraded. A number of PBF habitats to be intersected have been assessed to be in a moderate condition; these areas may present opportunities for enhancement to a good condition. For example, PB habitats ID 7 and 13 are areas of riparian willow-poplar belt (*Salix alba* and *Populus alba* galleries) that could be enhanced through management of invasive black locust observed at both locations (**Table 3-4**). Any such habitat management will be in addition to the replanting described within B4 above.

3.3.30. Based on discussions with PENF and MES and following metric calculations (set out in B4), there will be adequate receptor site resource to support a replanting programme that will achieve No Net Loss.

C1: IMPROVE WATER QUALITY – ZAJASKA RIVER

3.3.31. Pollution prevention measures will be implemented during the construction phase. The success of these measures will be captured through ongoing water quality monitoring (as described within a **Water Resources Management Plan**).

3.3.32. Improvements to water quality and further net gains for aquatic habitats will be sought through the improvement of the riverbank environment by removing existing sources of pollution/sedimentation around the Project. This will be discussed and agreed with the Ministry of Environmental and Physical Planning (MOEPP), who are responsible for water management consent, and with relevant local landowners and stakeholders and will form a commitment.

3.3.33. Litter collection exercises will be undertaken by the contractor at regular intervals for the duration of construction, focussing on the bridge crossing locations. As a minimum, monthly inspections will be undertaken by the contractor to physically remove litter (and dispose of it at an appropriate waste facility) from the Zajaska River.

D1: MINIMISE IMPACTS TO BIODIVERSITY

3.3.34. An Ecological Clerk of Works (ECoW) will be appointed by the contractor to support delivery of mitigation measures throughout the construction phase. The ECoW will be responsible for advising on general animal welfare good practice, including by undertaking pre-construction checks and destructive searches to minimise risks of animal mortality during construction. The ECoW will also deliver Toolbox Talks (TBT) to Project contractors to communicate good ecological practice (e.g. such as securing works areas, covering excavations, preventing access to non-works areas, etc.). The ECoW will regularly audit construction activities to ensure compliance with ecological

mitigations and commitments; monthly audits to begin with, then at a frequency deemed appropriate by the ECoW.

3.3.35. A **Water Resources Management Plan, Land Restoration Plan** and **Woodland Clearance Plan** will be prepared to complement the BMP, and they will elaborate the measures for these plans that are set out in the ESMP.

3.3.36. The following tasks are to be completed within specific timeframes during the construction phase to minimise biodiversity impacts:

- Tree and vegetation clearance will be undertaken outside of the breeding bird season.
- In-river works will be undertaken outside of the Macedonian trout spawning season.

3.3.37. **Precautionary Method of Works** (PMoW) will be prepared for breeding birds, reptiles and amphibians. The PMoWs will contain the following specifications to enable vegetation clearance to be undertaken in a sensitive manner:

- Vegetation clearance will be undertaken under the supervision of an experienced ecologist.
- The supervising ecologist will provide a Toolbox talk to contractors working on site, to explain the ecological sensitivities present and working methods to be used to protect these.
- The timings of work to avoid the breeding bird season.
- Specification on the machinery to be used to clear vegetation.
- The location of features on site which may be used by reptiles and amphibians, which should be retained where possible, for example hibernacula, ponds or basking locations. This will include methods for protecting these features during construction works, including fencing off these locations.
- The procedure for when a breeding bird, reptile or amphibian is discovered during construction works.

3.3.38. The riparian vegetation around the bridge areas will be restored and vegetated with native plant species that are attractive to local fauna and with plantation patterns designed to lead the animals towards the wildlife crossings.

3.3.39. The mitigation measures to minimise the effect of fragmentation mainly consist of the establishment of enough wildlife crossings to increase the permeability of the Project alignment as follows:

- Afforestation activities to be performed in line with the Net Gain/No Net Loss principle, secured through A1-A4 and B1-B4 above.
- The undersides of bridges will be vegetated to create vegetal screens that hide the bridges structure (e.g. shrubs and small trees in the area of the abutments).
- Box and pipe culverts will provide for connectivity of habitats and will not create obstacles for migration of animal species; and
- Fenced areas will be vegetated with native plant species that are attractive to local fauna and with plantation patterns designed to lead the animals towards the wildlife crossings.

3.3.40. Underpasses will be installed at important animal crossing points, as informed by additional walkover survey effort to be completed during 2021. Specific locations will be detailed within the BMP with crossing point structures (e.g. box and pipe culverts) comprising standard road engineering solutions.

3.3.41. Pre-construction checks will be undertaken by the Environmental Engineer and/or biodiversity expert to both map and supervise the clearance of the route in advance of construction works. Their role will include identification of areas that need translocation, bird nesting areas, and locations where schedules need to be altered etc.

4 MONITORING AND ADAPTIVE MANAGEMENT

4.1 INTRODUCTION

4.1.1. 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 be finalised within the BMP to ensure an effective monitoring strategy is adopted.

4.2 MONITORING

4.2.1. During the construction phase, the ECoW will facilitate monitoring of good practice mitigation measures.

4.2.2. Monitoring of areas to be afforested will be undertaken annually by a botanical expert, until it can be determined that the trees planted have successfully established. A minimum of 5 years monitoring will be committed through the BMP. Monitoring will seek to identify any issues hindering the growth of trees (e.g. grazing pressure) and recommend appropriate further actions to mitigate perceived issues.

4.2.3. Implement monitoring of water quality (visual detection of turbidity increase, analysis – both upstream and downstream of worksites - which could affect watercourses).

4.3 REPORTING

4.3.1. Monitoring surveys will be reported on an annual basis to EBRD. Recommendations included in the annual monitoring reports will be used to update this BMP where appropriate.

4.4 ADAPTIVE MANAGEMENT

4.4.1. 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, the contractor will be responsible for rectifying this through appropriate adaptive management, to the approval of EBRD.

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