



European Bank
for Reconstruction and Development



**KAZAKHSTAN: BEINEU-BOZOY-SAKSAULSK
ROADS - PROJECT FEASIBILITY ASSESSMENT
PR 017140**

Biodiversity Management Plan

October 2026

Disclaimer

This Biodiversity Action Plan (BMP) has been developed as part of the Environmental and Social Impact Assessment (ESIA) for the Beineu-Bozoy-Saksaulsk Road Construction Project (hereinafter 'the Project'). The assessment is based on information drawn from multiple sources, including the detailed design documentation, report from field visit, meeting records, relevant publications, various databases, and data collected by the ESIA team.

Verifying all sources with complete certainty is extremely challenging; therefore, validation has been undertaken primarily through careful review and logical assessment of the available information. Every effort has been made to ensure that all information used in the ESIA has been accurately presented.

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List of Abbreviations

BMP	- Biodiversity Management Plan
BOMP	- Biodiversity Offset Management Plan
CH	- Critical Habitat
EAAA	- Ecologically Appropriate Area of Analysis
EBRD	- European Bank for Reconstruction and Development
EIA	- Environmental Impact Assessment
ESAP	- Environmental and Social Action Plan
ESIA	- Environmental and Social Impact Assessment
ESHS	- Environmental, Social, Health, and Safety
ESMP	- Environmental and Social Management Plan
ESMS	- Environmental and Social Management System
ESP	- Environmental and Social Policy
ESR	- Environmental and Social Requirement
EU	- European Union
E&S	- Environmental and Social
GIP	- Good International Practice
ME	- Ministry of Environment
NG	- Net Gain
NNL	- No Net Loss
OHS	- Occupational Health and Safety
OHSMP	- Occupational Health and Safety Management Plan
PAP	- Project Affected Person
PBF	- Priority Biodiversity Features
PIU	- Project Implementation Unit
PR	- Performance Requirement
SDA	- Spoil Disposal Area
SDMP	- Spoil Disposal Management Plan
SPA	- Spoil Disposal Area
SSESMP	- Site-Specific Environmental and Social Management and Monitoring Plan

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1. Introduction

The construction of the 559-km Beineu-Bozoy-Saksaulsk (BBS) Road to Category II technical standards will form part of the Transport Corridor Europe-Caucasus-Asia (TRACECA), transport corridor, facilitating overland trade between China and Western Europe via Kazakhstan. The BBS Road will enhance the transport and logistics potential of the Mangystau and Aktobe regions by improving the road's technical standards, increasing its capacity, and reducing travel times. As part of the "Centre-West" Transport Corridor, the road will also contribute to the development of modern transport infrastructure, thereby supporting improved regional connectivity and more efficient movement of people and goods.

The European Bank for Reconstruction and Development (the "EBRD" or the "Bank") has considered providing a sovereign-guaranteed loan to JSC¹ National Company "KazAvtoZhol" (the "Company", the "Client", or "QAJ"), a 100% state-owned national road operator in Kazakhstan, to finance the design, construction and maintenance of Lots 1 to 4 (km 0+000 to km 160+000; approximately 161.5 km) of the BBS Road Project, including its components (such as access roads, road maintenance units, and other ancillary infrastructure).

The Bank engaged a consultant (the "Consultant") to undertake the **Environmental and Social Impact Assessment (ESIA) and prepare the full ESIA disclosure package for Lots 1 to 7 (km 0+000 to km 286+000)** of the Project in accordance with the EBRD Environmental and Social Policy (ESP, 2024) and the Environmental and Social Requirements (ESRs). **Under a Reliance Letter agreed between EBRD, the Consultant and the World Bank, the World Bank may rely on these ESIA deliverables, in the same way as EBRD, for its own financing, appraisal and supervision of Lots 5 to 7.**

The Project has the potential to result in significant adverse future environmental and/or social impacts. Accordingly, under the EBRD Environmental and Social Policy (ESP, 2024), it has been classified as a **Category 'A'** project. As such, **the Project is subject to a comprehensive ESIA, together with the preparation of associated environmental and social documentation.** This document - **the Biodiversity Management Plan ('BMP')** – is part of the ESIA package for the Project. The ESIA disclosure package will be made publicly available for a minimum period of 120 days prior to the Project being considered for approval by the EBRD Board of Directors.

The 559 km BBS Road is financed by the EBRD, the International Bank for Reconstruction and Development (IBRD) / World Bank, the Asian Development Bank (ADB), and the Republic of Kazakhstan, through the Development Bank of Kazakhstan (DBK), with the road divided into four financing sections (lot groups), each allocated to a different financier:

- EBRD: Lots 1 to 4 (km 0+000 - km 160+000),
- IBRD / World Bank: Lots 5 to 7 (km 160+000 - km 286+000),
- ADB: Lots 8 to 10 (km 286+000 - km 410+000),
- DBK: Lots 11 to 14 (km 410+000 - km 559+166).

¹Joint Stock Company

2. Need, Purpose and Scope of the BMP

The BBS Road Construction Project will be implemented in the Northern Ustyurt, home to temperate desert and semi-desert ecosystems, an area of high biodiversity. As presented in the ESIA, the CHA has revealed biodiversity values assessed as PBFs and CH that will potentially be adversely affected by the Project. According to the EBRD ESR 6, this requires mitigation and, as a last resort, offsetting. This requirement underpins the need for a Biodiversity Management Plan (BMP).

Purpose of the BMP is to compile all proposed biodiversity-mitigation measures associated with the BBS Road Project, in accordance with the mitigation hierarchy, in one document.

The BMP provides a biodiversity summary based on the ESIA including a description of the legal framework for biodiversity conservation, an outline of the Project and the findings on biodiversity values and impacts on them. In accordance with EBRD ESR 6, a set of mitigation measures is presented in tabular form, comprising objectives, specific actions, timelines, assigned responsibilities, and monitoring indicators. The remaining residual impacts on PBFs and CH are then assessed. Finally, the BMP outlines a precautionary approach and offsetting framework to achieve no net loss/net gains for priority biodiversity features (PBFs) and critical habitat (CH) as well as commitments to conduct seasonal field surveys.

This BMP is developed based on the ESIA conducted for the BBS Road Project. The ESIA is based on a review of literature and publicly available spatial databases; however, current field data are unavailable. Therefore, the identification of impact receptors and the impact assessment are considered preliminary and require updating once reliable field data are obtained during the relevant season (April-June). This BMP will be updated following the completion of the ESIA.

The BMP has been informed by the Project's biodiversity baseline, the EIA as part of the national Feasibility Study, national biodiversity experts, available national-level reports and international biodiversity guidelines. The BMP will need to be updated if changes to the Project design occur and prior to the commencement of road construction works. Any update of the BMP should be agreed with the EBRD and a "no objection" should be obtained from the Client.

3. Legal and Regulatory Framework for Biodiversity

3.1 National Requirements

Kazakhstan's national legislation on biodiversity relies primarily on the Environmental Code of 2021², which mandates an ecosystem approach and integrates the mitigation hierarchy (avoidance, minimization, mitigation, and compensation) for development projects.

The Law on Protection, Reproduction, and Use of Wildlife³ is aimed at ensuring the conditions for the conservation of wildlife and its biological diversity (art.2-1). It regulates impacts on animal habitats and mandates protective measures against the fragmentation of migratory paths upon planning and carrying out of any activity (art.12, art.17).

The Law on Specially Protected Natural Areas⁴ is aimed at preservation of the state natural reserve fund and natural ecosystems (art. 2-1). It restricts or heavily regulates road routing through national parks, nature reserves, and state ecological corridors (art. 40, 48 and 79).

The Forest Code⁵ states that the forest is one of the most important components of the biosphere, which has global environmental, social and economic significance (art. 2 and 3). In particular, it regulates the removal of any forest resources (art.51) and incorporates "forest ecosystem services" which hold developers financially accountable for clearing wooded areas (art.105).

The Government of the Republic of Kazakhstan has adopted the Concept for the Conservation and Sustainable Use of Biological Diversity for 2026–2035⁶ - a strategic framework guiding the country's efforts to protect nature, restore vital ecosystems, and ensure the sustainable use of biodiversity.

Kazakhstan is set to introduce its first mandatory environmental standards for the country's road sector from January 1, 2027, establishing unified ecological requirements for every stage of a road's lifecycle, from design and construction to maintenance, repair, and operation. The regulation will include provisions to protect biodiversity. Road planners and builders will be required to consider wildlife habitats, migration routes, fish spawning grounds, and bird nesting sites when designing and carrying out projects. Protective measures such as wildlife fencing and warning signs will have to be installed to reduce environmental impacts⁷.

3.2 Ratified International Agreements

Kazakhstan is a signatory/party to several international agreements related to biodiversity (**Table 1**).

²<https://adilet.zan.kz/rus/docs/K2100000400>

³ The Law of the Republic of Kazakhstan No. 593 "On Protection, Reproduction and Use of Animal World" dated 9 July, 2004. Available at <https://adilet.zan.kz/eng/docs/Z040000593>

⁴ The Law of the Republic of Kazakhstan dated 7 July 2006 № 175 "On Specially Protected Natural Areas". Available at <https://adilet.zan.kz/eng/docs/Z060000175>

⁵ The Forest Code of the Republic of Kazakhstan dated 8 July, 2003 № 477. Available at [Forest Code of the Republic of Kazakhstan — NDLS «Adilet» https://adilet.zan.kz/eng/docs/K030000477](https://adilet.zan.kz/eng/docs/K030000477)

⁶ Resolution of the Government of the Republic of Kazakhstan dated 31 December 2025 No. 1206, available at <https://www.undp.org/media/1654486/download?inline>

⁷ <https://qazinform.com/news/kazakhstan-to-make-environmental-standards-mandatory-for-road-projects-f68c2e>

Table 1 - List of ratified by the RK international agreements applicable for the project

International agreements (convention or protocol)	Description
Convention on Wetlands of International Importance - (Ramsar 1971)	The Ramsar Convention is an intergovernmental treaty aiming to maintain the ecological character and plan the sustainable use of Wetlands of International Importance. The Ramsar Convention officially entered into force for Kazakhstan on May 2, 2007
The Convention on the Conservation of Migratory Species of Wild Animals (1979) (Bonn Convention)	The objective of the Bonn Convention, which was adopted in 1979, is to ensure the conservation of land, marine and air migratory species over the whole of their area of distribution. The Bonn convention entered in force for Kazakhstan on May the 1st, 2006.
Convention on International Trade in Endangered Species (CITES) (1973)	This convention is designed to ensure that international trade in animals and plants does not threaten their survival in the wild. The CITES officially entered into force for Kazakhstan on April 19, 2000.
The Convention on Biological Diversity (1992)	The three main objectives of the Convention are: the conservation of biological diversity; the sustainable use of the components of biological diversity; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. The Convention on Biological Diversity officially entered into force for Kazakhstan on December 5, 1994.
UN Convention to Combat Desertification, Paris (1994)	This Convention is the sole legally binding international agreement linking environment and development to sustainable land management. The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found. The United Nations Convention to Combat Desertification officially entered into force for Kazakhstan on October 7, 1997.
Convention on Environmental Impact Assessment in a Transboundary Context, Espoo Convention (1991)	The Convention sets out the obligations of the Parties to carry out an environmental impact assessment of certain activities at an early stage of planning. Before permitting an industrial project, the country to decide on the project ("country of origin") must notify any countries which could be affected by the transboundary impacts of a project located in another country ("affected parties"). The affected party and the public in the affected area must be able to express their views and comments about the

International agreements (convention or protocol)	Description
	proposed project. This is a separate procedure which is additional to any relevant national permitting process. The permitting state must take these comments into account in its final decision and communicate it to the affected country and the public. The projects subject to consultations under the Convention are those listed in Appendix I including 'large dams and reservoirs'. The Espoo Convention officially entered into force for Kazakhstan on April 11, 2001

3.3 EBRD Requirements

The main requirements of the EBRD for its own activities are formulated in the Bank's ESP (2024), while the requirements for the E&S aspects of the Client-borrower's activities are set out in the ESRs. The ESP sets E&S requirements for the EBRD clients' activities to achieve sustainable results, with the *ESR1: Assessment and Management of Environmental and Social Risks and Impacts* being the umbrella PR for the other requirements. The one relevant regarding Biodiversity is the *ESR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources* which determines the requirements for the conservation of biological and landscape diversity in the development area. ESR 6 requires the borrower to characterise the state of biodiversity, identifying sensitive species and habitats, and developing measures to avoid / reduce impacts. ESR 6 defines criteria for critical habitat screening and requires developing a BMP where significant adverse impacts on biodiversity are expected.

3.4 Good International Practice (GIP) Guidelines

Specific E&S requirements applicable to the Project are set out in the EBRD's Sub sectoral Environmental and Social Guidelines: Building and Construction Activities (2010)⁸. They elaborate on typical E&S risks related to construction, operation, maintenance and decommissioning of facilities.

The following biodiversity guidelines were used for the BMP development:

- EBRD's Guidance Note ESR6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (Guidance Note ESR6, EBRD, 2025)⁹,
- Hardner, J., R.E. Gullison, S. Anstee, M. Meyer. 2015. Good Practices for Biodiversity Inclusive Impact Assessment and Management Planning. Prepared for the Multilateral Financing Institutions Biodiversity Working Group¹⁰,

⁸<https://www.ebrd.com/downloads/policies/environmental/construction/buidling.pdf>

⁹[EBRD Environmental and Social Requirement 6 Guidance note Biodiversity conservation and sustainable management of living natural resources.pdf](https://www.ebrd.com/downloads/policies/environmental/construction/buidling.pdf)

¹⁰<https://publications.iadb.org/publications/english/document/Good-Practices-for-Biodiversity-Inclusive-Impact-Assessment-and-Management-Planning.pdf>

- Biodiversity Offsets: a User Guide. World Bank Group. October, 2016¹¹,
- A Cross-sector Guide for Implementing the Mitigation Hierarchy. Prepared by The Biodiversity Consultancy. Cross-sector Biodiversity Initiative, 2015¹²,
- Kirk A.Olsen. Saiga Crossing Options Guidelines and Recommendations to Mitigate, Barrier Effects of Border Fencing and Railroad Corridors on Saiga Antelope in Kazakhstan¹³,
- Edgar, P., Foster, J. and Baker, J. (2010). Reptile Habitat Management Handbook. Amphibian and Reptile Conservation, Bournemouth¹⁴
- Elizabeth Fairban, Marcel Huijser, and Florence Deffner. Technical Guidance: Mojave Desert Tortoise Conservation and Recovery Measures Along Roads. Center for Large Landscape Conservation¹⁵.

3.5 Applicable EU Directives

- Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora¹⁶,
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds¹⁷.

According to the EBRD Guidance Note on ESR6, if species and their habitats are listed in the annexes to these Directives, this serves as a criterion for identifying priority biodiversity features and critical habitats under the Critical Habitat Analysis (CHA). However, this criterion applies only to EU Member States. Therefore, it is not used in the ESIA prepared by the Consultant and in this BMP.

¹¹<https://documents1.worldbank.org/curated/en/344901481176051661/pdf/110820-WP-BiodiversityOffsetsUserGuideFinalWebRevised-PUBLIC.pdf>

¹²<https://www.icmm.com/en-gb/guidance/environmental-stewardship/2015/implementing-mitigation-hierarchy>

¹³[https://www.cms.int/sites/default/files/publication/Kirk Olson Saiga Crossing Options English.pdf](https://www.cms.int/sites/default/files/publication/Kirk%20Olson%20Saiga%20Crossing%20Options%20English.pdf)

¹⁴<https://dnu7gk7p9afoo.cloudfront.net/Files/37.-edgar-p.-foster-j.-and-baker-j.-2010.-reptile-habitat-management-handbook-amphibian-and-reptile-conservation-bournemouth.pdf>

¹⁵<https://largelandscapes.org/resource/technical-guidance-mojave-desert-tortoise-conservation-and-recovery-measures-along-roads/>

¹⁶<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01992L0043-20250714>

¹⁷<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02009L0147-20190626>

4. Project Description

The alignment of the Beineu-Bozoy-Saksaulsk (BBS) Road and its planned connections with Kazakhstan's existing road network are shown in **Figure 1**. The proposed BBS Road crosses the Mangystau, Aktoobe and Kyzylorda regions. **Figure 2** provides a more detailed overview of the road alignment, showing its distribution across the three regions and the respective sections to be financed by the EBRD, IBRD, ADB and DBK.

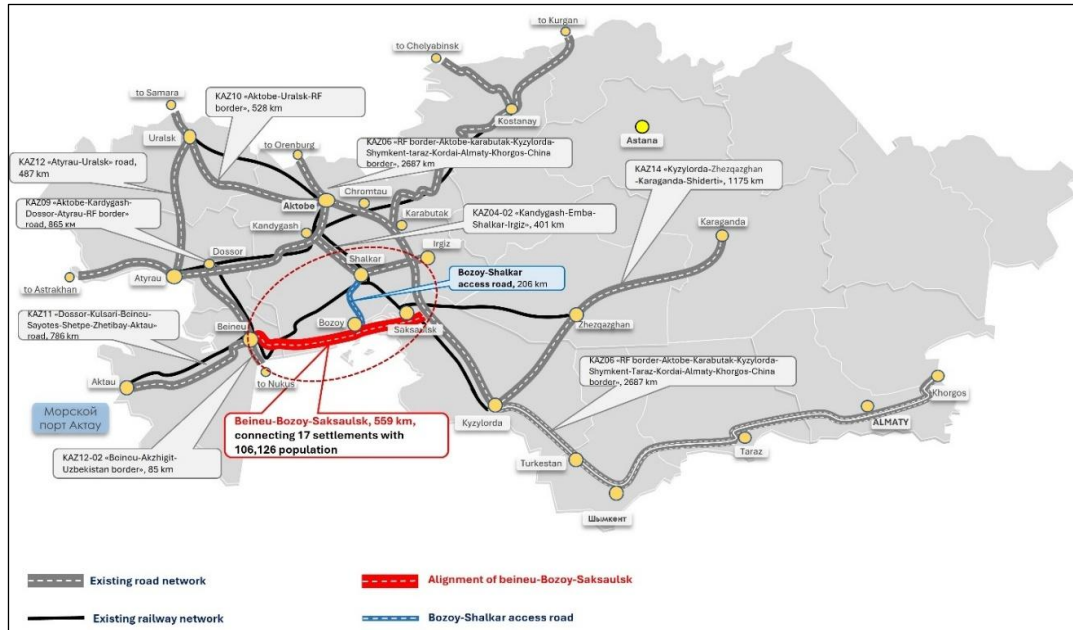


Figure 1 - Existing road network in the wider Project area and the location of the BBS road

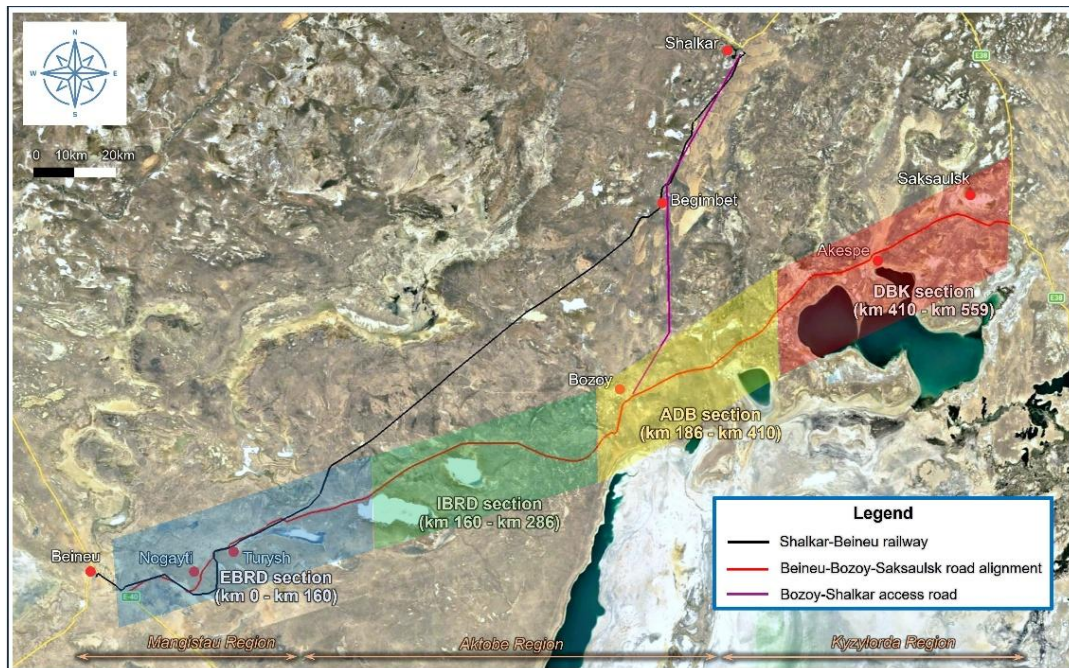


Figure 2 - BBS road alignment and division of the EBRD-, IBRD-, ADB-, and DBK-financed sections

Currently, travel between Saksaulsk and Beineu requires a journey of approximately 1,460 km via the existing Saksaulsk-Irgiz-Karabutak-Khromtau-Aktobe-Kandyagash-Dossor-Kulsary-Beineu route. The proposed 559-km Beineu-Bozoy-Saksaulsk Road will reduce the road distance between the two settlements by approximately 900 km. Based on an assumed average travel speed of 81 km/h, including allowances for stops, the new road is expected to shorten the overall journey time by approximately threefold.

At the broader regional level, the BBS Road will shorten the Kazakhstan section of the TRACECA corridor by approximately 900 km. It will also improve connectivity between Beineu and Astana via the Centre-West Transport Corridor, reducing the travel distance by approximately 950 km and travel time by around 11 hours.

The Project concept presented in the local Feasibility Study envisages the development of the **Category II Beineu-Bozoy-Saksaulsk (BBS) Road** in two phases.

Phase I comprises the construction and reconstruction of the 559.2 km BBS Road, divided into 14 construction sections, including the construction of grade-separated interchanges. Of the total road length, approximately 125 km is located in Beineu District of Mangystau Region, 245 km in Baiganin and Shalkar Districts of Aktobe Region, and 189.2 km in Aral District of Kyzylorda Region.

Phase II includes the installation of Intelligent Transport Systems (ITS), the construction and rehabilitation of Road Maintenance Facilities (RMFs), and the construction or rehabilitation of access roads to settlements.

The access road component has a total length of approximately 240.5 km and comprises:

- a 1.5-km Category V access road to Turysh rural settlement;
- a 206-km Category IV access road to Shalkar town; and
- a 33-km Category IV access road to Saksaulsk rural settlement.

The road maintenance component comprises the construction of new Road Maintenance Facilities (RMFs) north of Turysh village in Beineu District, north of Shalkar (2.7 ha), and north of Akespe village in Aral District (2.7 ha), as well as the rehabilitation of the existing RMF in Shalkar.

5. Biodiversity Values

Biodiversity values for this Project are defined as the species that qualify as Priority Biodiversity Features (PBFs) and Critical Habitat (CH).

The final results of the Critical Habitat Assessment (CHA) are presented in **Table 2**: PBFs comprise 103 species, including five plant species and 98 animal species (one reptile, 89 birds, four mammal, and four insect species, CHs include one ungulate species - *Saiga tatarica*.

Table 2 - CHA Findings: Summary Table of PBFs and CHs identified in the footprint area as per EBRD ESR6

No	Criterion	Features (species)
Priority Biodiversity Features as per EBRD PR6 (\$12)		
2b, 12ii	Species within the area of impact with an IUCN Global Red List status of Vulnerable (VU), Endangered (EN), or Critically Endangered (CR)	<u>Reptiles (x1)</u> <i>Testudo horsfieldii</i> (VU) <u>Birds (x11)</u> <i>Haliaeetus leucoryphus</i> (EN) <i>Neophron percnopterus</i> (EN) <i>Falco naumanni</i> (VU) <i>Falco cherruq</i> (EN) <i>Aquila heiaca</i> (VU) <i>Aquila nipalensis</i> (EN) <i>Pelecanus crispus</i> (VU) <i>Chettusia gregaria</i> (CR) <i>Limicola falcinellus</i> (VU) <i>Chlamydotis undulata</i> (VU) <i>Streptopelia turtur</i> (VU) <u>Mammals (x3)</u> <i>Vormela peregusna</i> (VU) <i>Ovis vignei</i> (VU) <i>Gazella subgutturosa</i> (VU) <u>Insects (x2)</u> <i>Saga pedo</i> (VU) <i>Hoplitis (Megalosmia) fulva</i> (VU)
2c, 12.ii	Species in the area of impact with national or regional status of EN or CR ¹⁸	<u>Plants (x3):</u> <i>Tulipa biflora</i> Pall. (<i>Tulipa sogdiana</i>) (I) <i>Xylosalsola chiwensis</i> (Popov) Akhani & Roalson (<i>Salsola chiwensis</i>) (II) <i>Tulipa borszczowii</i> Regel (II) <u>Birds (x15)</u> <i>Haliaeetus leucoryphus</i> (I) (already triggering cr.12 ii.b) <i>Haliaeetus albicilla</i> (II) <i>Falco cherruq</i> (I) (already triggering cr.12 ii.b) <i>Falco peregrinus</i> (I) <i>Circaetus gallicus</i> (II)

¹⁸To apply Criterion 2 in relation to national listing, we consider Categories I and II of the Red Data Book of the Republic of Kazakhstan to be broadly comparable to the CR and EN categories of the IUCN Red List.

No	Criterion	Features (species)
4a, 12ii		<i>Aquila heliaca</i> (II) (already triggering cr.12 ii.b) <i>Aquila chrysaetos</i> (II) <i>Bubo bubo</i> (II) <i>Pelecanus onocrotalus</i> (I) <i>Pelecanus crispus</i> (II) (already triggering cr.12 ii.b) <i>Platalea leucorodia</i> (II) <i>Plegadis falcinellus</i> (II) <i>Phoenicopterus roseus</i> (II) <i>Chettusia gregaria</i> (I) (already triggering cr.12 ii.b) <i>Chlamydotis undulata</i> (II) (already triggering cr.12 ii.b) <u>Mammals (x1)</u> <i>Equus hemionus</i> (II) <u>Insects (2)</u> <i>Lucanus cervus</i> (II, CR) <i>Palaeophilotes panope</i> (II, CR)
	All migratory species in the area of impact	<u>Birds (x87)</u> <u>All species included in Annex I (Table 1), excluding two non-migratory species - <i>Bubo bubo</i> and <i>Chlamydotis undulata</i></u> <u>Mammalia (x2)</u> <i>Gazella subgutturosa</i> <i>Ovis vignei</i> (already triggering cr.12 ii.b)
	12.iii Significant biodiversity features identified by a broad set of stakeholders or governments	<u>Plants (x4)</u> <i>Tulipa biflora</i> Pall. (<i>Tulipa sogdiana</i>) (already triggering cr.12 ii.c) <i>Xylosalsola chiwensis</i> (Popov) Akhani & Roalson (<i>Salsola chiwensis</i>) (already triggering cr.12 ii.c) <i>Oreosalsola arbusculiformis</i> (Drobow) Sennikov (<i>Salsola arbusculiformis</i>) <i>Xylosalsola richteri</i> (Moq.) Akhani & Roalson (<i>Salsola richteri</i>)
Critical Habitats as per EBRD PR6 (§14)		
4a, 14.iv	All migratory species within the area of impact Threshold: EAAA supports, on a cyclical or otherwise regular basis, ≥ 1 % of the global population at any point of the species' lifecycle	<u>Mammals (x1)</u> <i>Saiga tatarica</i>

6. Summary of Potential Impacts

As presented in the ESIA, the Project will be implemented in the rich biodiversity area where valued (priority) species were identified.

The impacts of the Project on biodiversity will occur during both construction and operation / maintenance. The construction phase involves land grading and road construction, operation phase – traffic and road maintenance. The methodology of impact assessment, including the identification of impact characteristics and significance matrix are detailed in the methodology section of the ESIA. As different species and their groups respond differently to different impacts, their sensitivity as receptors was considered during assessment.

The following potential impacts on biodiversity (including PBFs and CHs) could result from the Project activities during:

1. Construction phase:
 - Destruction (loss) of habitats due to vegetation clearance, excavation, top-soil removal, grading and transportation;
 - Flora species loss due to vegetation clearance, excavation, top-soil removal, grading and transportation;
 - Disturbance to fauna species by noise, vibration and light pollution from construction machinery, traffic and lighting of the construction area;
 - Loss of habitats of sedentary animals and associated risk of mortality due to excavation, top-soil removal, grading and transportation;
 - Loss of foraging habitats for medium and large mammals due to excavation, top-soil removal and grading;
 - Loss of foraging and resting habitats for birds due to excavation, top-soil removal, grading, and transportation;
 - Loss of breeding, foraging and wintering habitats of invertebrates and associated risk of mortality of their overwintering stages due to vegetation clearance, excavation, top-soil removal, grading, and transportation;
 - Barrier effect of road construction on migrating mammals (ungulates, predators, and, to a certain extent, Central Asian tortoise).

During the field visit in August 2026, the initial stages of road construction near the settlement of Bozoy were already recorded. Vegetation clearance and land planning are underway using graders and other construction machinery.

2. Operation and maintenance phase:
 - Disturbance to fauna species due to noise, vibration and light pollution, associated with road traffic;
 - Animal mortality due to vehicle collisions;
 - Barrier effect of the road on migrating mammals (ungulates, predators, and to a certain extent, Central Asian tortoise);
 - Increased access to areas along the road.

The assessment is completed for each predicted impact at the construction and operation phases and per each group of biodiversity receptors, which were combined based on their

ecological characteristics; in some cases, impacts on individual species are assessed where possible.

Because this assessment is based on a desktop analysis, and current field data are not available, the identification of receptors and assessment of impacts are preliminary and predictive in nature. For the same reason, it is impossible to quantify habitat loss for the species.

Table 3 - Assessment of impacts on the identified biodiversity features (PBFs and CHs)

Code	Receptor	Key impacts identification	Impact significance
	Plants <i>Tulipa biflora</i> Pall. (<i>Tulipa sogdiana</i>) <i>Xylosalsola chiwensis</i> (Popov) Akhani & Roalson (<i>Salsola chiwensis</i>) (<i>Tulipa borszczowii</i> Regel <i>Oreosalsola arbusculiformis</i> (Drobow) Sennikov (<i>Salsola arbusculiformis</i>) <i>Xylosalsola richteri</i> (Moq.) Akhani & Roalson (<i>Salsola richteri</i>)	Destruction of plants and their habitats due to vegetation clearance.	Significant
	Sedentary animals Reptilians: <i>Testudo horsfieldii</i>	Destruction of tortoise's habitats Risk of mortality due to vegetation clearance, land grading, excavation works; Vehicle collisions (during construction and operation of the road) Possible barrier effect of the road construction and operation	Significant
	Mammals – temporary visitors: <i>Vormela peregusna</i> <i>Ovis vignei</i> <i>Gazella subgutturosa</i> <i>Equus hemionus</i>	Loss of foraging habitats, barrier effect, and risk of mortality during road operation	Moderate
	Mammals: <i>Saiga tatarica</i>	Long-term barrier effect on the Ustyurt population in terms of cumulative effect in conjunction with the Shalkar-Beineu railway	Significant
	Birds: 89 species (see Annex 1, Table 1)	Loss of foraging and resting habitats	Moderate
	Insects: <i>Saga pedo</i> <i>Hoplitis (Megalosmia) fulva</i> <i>Lucanus cervus</i> <i>Palaeophilotes panope</i>	Destruction of habitats, increased mortality of individuals due to vegetation clearance, land grading excavation works,	Significant

7. Mitigation Measures

According to the EBRD ESR6, the mitigation hierarchy should be applied, where impact avoidance is the first choice. If avoidance is not possible, adverse impacts have to be minimised or mitigated. And, as a measure of last choice, offsetting may be applied, if significant residual impacts remain after all previous efforts.

Mitigation measures were developed in the ESIA in terms of the priority features groups. In the current BMP, developed measures are presented in the table with monitoring targets (indicators), timeframe and responsible parties.

Mitigation measures, including the capture and relocation of animals, as well as the protection of natural habitats, are included in the offset measures (see the Offsetting strategy). Field studies during the appropriate season are essential; these studies are included in the BMP and are aimed at confirming the identification of habitats, the presence of priority species, and at assessing the significance of the Project area for them.

This BMP forms part of the tender documentation for the Project. All mitigation contained in this BMP at the pre-construction and construction phase will be included in the Terms of Reference and contract of the Construction Contractor and cascaded into contracts of relevant subcontractors as appropriate. Hiring professional zoologists will be required to implement surveys and relocation of animals.

Project Lenders will be kept updated on BMP implementation progress via regular E&S Monitoring Reports (by independent external monitoring consultants).

All mitigation contained in this BMP at the operation and maintenance phase will be included in the Client's operation plan.

The matrix of the mitigation measures is presented in **Table 4**.

Table 4 - Mitigation measures

Measures, actions	Timeframe	Responsible	Indicator
BMP1 (avoidance measures)			
Objective: Avoid destruction of plants due to construction works			
<i>Pre-construction and construction phase</i>			
A1. Survey the area to identify and map priority plant species and their habitats; if any of the identified species could be threatened, ensure the replanting of individual plants using species-specific methods, or the protection of their habitats	Prior to the commencement of any pre-construction preparations	Botanist (with support of the Client or the construction contractor)	Report, maps
1. Survey the project footprint area and adjacent areas within the Aol in April-May to identify five PBF species – tulips and saltwort species	First year, best time - April - May	Botanist	Report, maps
2. If the habitats of these species are located outside the footprint area, but within the Aol, mark these habitats on the ground and include them in the construction master-plan as “no-go” zones.	Prior to any excavation works		Marked areas
3. Monitor the «no-go» zones	During construction		Monitoring report
			Report, map

Measures, actions	Timeframe	Responsible	Indicator
- If relocation of tulips is required: survey areas, adjacent to the road right-of-way to identify suitable habitats - Develop a relocation protocol and carry out the relocation. - Monitor the relocated plants in the new locations; <i>If the habitats of priority saltwort species are located within the project footprint area and will be destroyed, quantify the affected habitats, survey the surrounding areas and develop an offset for the anticipated losses.</i>	First year, April-May First year Two years after		Developed relocation protocol, safely relocated plants Monitoring reports, percent of survived plants
BMP2 (avoidance measures) Objective: Avoid destruction of insect habitats due to construction works <i>As the priority insect species are associated with plants, it is reasonable to combine activities to mitigate impacts on plants and insects</i>			
<i>Pre-construction and construction phase</i>			
A2. Survey the area to identify and map the habitats of priority insect species (four PBF species) and other protected insects. If these habitats could be threatened, ensure their protection.	Prior to the commencement of any pre-construction preparations	Entomologist (with support of the Client or the construction contractor)	Report, maps
- Survey the project footprint area and adjacent areas within the Aol in April-May to identify four PBF species as well as other protected insects, if any. - If the habitats of these species are located outside the project footprint area, but within the Aol, mark these habitats on the ground and include them in the construction master-plan as "no-go" zones. - Monitor the «no-go» zones. <i>If the habitats of priority insect species are located within the project footprint area and will be destroyed, quantify the affected habitats, survey the surrounding areas and develop an offset for the anticipated losses.</i>	First year, best time - April - June Prior to any excavation works During construction works	Entomologist	Report, maps Marked areas Monitoring report
BMP3 (avoidance measures) Objective: Avoid mortality of Central Asian Tootoise and other sedentary animals due to construction works			
<i>Pre-construction and construction phases</i>			
A3. Survey the Aol to identify the Central Asian Tortoise, other sedentary animals and their habitats. If animals or their habitats are found to be at risk, ensure the relocation of animals, or the protection of their habitats.	Prior to the commencement of any pre-construction preparations	Zoologist (with support of the Client or the construction contractor)	
Actions			

Measures, actions	Timeframe	Responsible	Indicator
1. Survey the footprint area and adjacent areas (within the Aol) in April-May to identify Central Asian Tortoise, other sedentary animals (rodents, reptiles), their habitats. 2. If the habitats of these species are located outside the footprint area, but within the Aol, mark these habitats on the ground and include them in the construction master-plan as "no-go" zones to fence 3. Monitor the «no-go» areas 4. If relocation of tortoises is required, survey areas surrounding the road to identify suitable habitats with sufficient capacity to support the species. 5. Develop a relocation protocol and carry out the relocation using safe, species-specific methods. 6. Monitor the relocated animals in the new locations. <i>If relocation of tortoise is required, quantify the affected population, survey the surrounding areas and develop an offset for supporting the relocated animals</i>	First year, best time - April-June Prior to any excavation works During construction First year First year For three years after	Zoologist	Report, maps Marked zones Monitoring report Report, maps Developed relocation, safely relocated and settled animals Monitoring report, percent of settled animals
BMP4 (avoidance measures)			
Objective: Avoid destruction of the habitats of priority bird species due to construction works			
<i>Pre-construction and construction phases</i>			
A4. Survey the Aol to identify bird habitats and protect them	Prior to the commencement of any pre-construction preparations	Ornitologist (with support of the Client or the construction contractor)	
Actions 1. Survey the Aol in April-June (and September-October) to identify bird habitats used for stopover, foraging and breeding, as well as bird congregation areas. 2. If such habitats are identified outside the footprint area, mark them on the ground and include them in the construction master-plan as "no-go" zones. 3. Monitor the «no-go» zones <i>If the breeding habitats or congregation areas of priority bird species are located within the project footprint area and will be destroyed, quantify the affected habitats, survey the surrounding areas and develop an offset for the anticipated losses</i>	First year, best time - April-June Prior to any excavation works During construction	Ornitologist	Report, maps Marked zones Monitoring report
BMP5 (reduction measures)			
Objective: decrease direct impacts of the construction works and the road operation on medium and large animals			

Measures, actions	Timeframe	Responsible	Indicator
<i>Pre-construction phase</i>			
R1. Survey the Aol to identify mammals and signs of their presence, design wildlife crossings	During the construction preparation	the Client - overall responsibility	
Actions: 1. Survey the Aol to identify mammals, signs of their presence, animal migration routes and congregation areas. 2. If dens, migration routes or congregation areas are identified, mark them on the ground and include them in the construction master-plan as "no-go" zones. 3. Design open-span crossings (at-grade passages) for ungulates (primarily, <i>Saiga tatarica</i>) at the identified locations, including four crossings in Mangistau oblast and ten crossings in Aktobe oblast (see Annex 2 for details). Proposed technical parameters of these at-grade passages: embankment slope 1:10, a width at least 1-2 km, 60 km road sign before each crossing. Design fencing at the edges of the road crossings, as well as locations for road signs and traffic cameras 4. Design additional wildlife crossings (underpasses) for predators, ungulates and other animals. Cattle drives planned under the Project can also be adapted for use by wild animals. 5. In cooperation with the operator of the Shalkar–Beineu railway, conduct a survey of the railway area to determine suitable locations for wildlife crossings over the railway, taking into account the proposed locations of the road crossings.	First year, Spring Prior to any excavation works During road design During road design	Mammologist The Client, contractor - design company, mammologists The Client, contractor - design company, mammologists The Client, mammologists	Report, maps Markes zones Desined crossings and associated infrastructure Designed crossings Identified locations
<i>Construction phase</i>			
R2. Construct the designed road infrastructure	During construction works	Construction contractor, the Client - overall responsibility;	
Actions: 1. Construct the designed road infrastructure and equip the crossings with camera traps 2. Establish a Biodiversity Coordination Unit (BCU) in cooperation with the operator of the Shalkar–Beineu railway to plan, design and construct/update the railway crossings.	During construction works First-second- year	Supervision Engineer, mammologist The Client	Consutucted infrastructure Crossings planned, desinged and under construction

Measures, actions	Timeframe	Responsible	Indicator
<i>Operation and maintenance phase</i>			
R3. Maintain, monitor and manage the crossings	During operation	The Client	Species and number of animals crossed the road through the crossings, collision rate per species
Actions: 1. Maintain the constructed crossings in proper condition. 2. Monitor the operation of the crossings and animal-vehicle collisions and implement adaptive management measures as necessary 3. GPS animal tracking of <i>Saiga tatarica</i> to monitor patterns of their movement in vicinity of the road and railway 4. Cooperate with the operator of the Shalkar–Beineu railway during the construction of the railway crossings	During operation	The Client, Supervision person The Client, BCU	Crossings in proper conditions Constructed the railway crossings
BMP6 (reduction measures)			
Objective: decrease direct impacts of the construction works, operation and employee on fauna			
<i>Pre-construction phase</i>			
R4. Develop the Worker Code of Conduct for employees of the construction company to prevent poaching and 'Procedures to prevent harm to animals during construction works'	During the construction preparation	Construction contractor, overall responsibility	Developed and approved documents
Actions: 1. Develop the Worker Code of Conduct for employees focusing on prevention of poaching and protection of animals during construction 2. Develop 'Procedures to prevent harm to animals during construction works', including a Chance Find Procedure, focusing on impact from excavating 3. Incorporate "no-go" areas into the construction master plan 4. Approve the documents by the construction contractor order 5. Train personnel and subcontractors on the documents' application	During the construction preparation Each new staff worker; all personnel - two times a year	Construction contractor, mammologist, herpetologist, ornitologist Construction contractor, Supervision Engineer	Developed documents Approved documents Trained personnel and sub-contractors
<i>Construction phase</i>			
R5. Prevent any harm to animals and poaching during construction by applying the developed documents (see R1) and fencing «no-go» areas	During construction works	Construction contractor - overall responsibility; the Client supervision	Absence of cases of harm to animals, cases of poaching

Measures, actions	Timeframe	Responsible	Indicator
Actions: 1. Fence «no-go» areas in the AoI 2. Apply the "Procedures" during construction works including, among others: - Start construction works from one edge of the construction sections, this approach will allow the remaining animals to leave, - Start vegetation clearance and construction works after the breeding season - not earlier than August (i.e. avoid these between March - July to avoid impacts to breeding animals) or confirm absence of breeding animals through an survey; this will prevent/reduce mortality of animals including offspring, - Strictly respect the limited project footprint areas, speed limitations, - qualified and experienced zoologist is to be engaged to supervise the excavation works - should any animals be found, procedures on capture and translocation must be followed, 3. Apply and monitor compliance with the Worker Code of Conduct of employee to prevent poaching during construction	During construction works During construction works	Supervision Engineer, Zoologists Supervision Engineer	Number of discovered animals, Number of saved and relocated animals Number of poaching cases
R6. Develop the Worker Code of Conduct for employees of the road operator to prevent poaching and 'Procedures to observe, treat and save encountered animals during operation'	At the finishing construction works	The Client	Developed documents
Actions: 1. Develop the Worker Code of Conduct for employees focusing on prevention of poaching and saving animals during operation 2. Develop the 'Procedures to observe, treat and save encountered animals during operations' 3. Approve the documents 4. Educate and train hired personnel on the documents' application	At the operation preparation phase Just after personnel hired, further - two times a year	The Client - responsible person, mammologist, herpetologist, ornitologist Supervision Engineer	Developed documents Approved documents Trained personnel
<i>Operation and maintenance phase</i>			
R7. Prevent poaching and save animals during the road operation and maintenance	During operation	The Client	Absence of cases of harm to animals, cases of poaching
Actions: 1. Monitor presence of animals in the road right-of-way, and assess the road infrastructure in terms of animal protection 2. If observed animal is at risk or harmed, implement animal saving actions according to the developed protocol (see R3), contact a responsible person/zoologist	During operation	The Client, Supervision Engineer	Number / species of animals discovered at risk or harmed, number of

Measures, actions	Timeframe	Responsible	Indicator
3. If changes to the road infrastructure or traffic conditions are required, implement appropriate adaptations 4. Apply and monitor compliance of the road operator with the Worker Code of Conduct to prevent poaching			saved animals cases of poaching' efficiency of the road infrastructure

8. Residual Impact

The residual impact, remaining impact after the implementation of the mitigation measures is assessed as follows:

Minor or negligible residual impact: considered as negligible or minor/acceptable residual impacts for which additional measures are not necessary,

Moderate or major residual impact: unacceptable unless they can be offset by other positive impacts of the project.

In case of moderate or major residual impacts on 1) PBFs, additional measures will be designed to achieve "no net loss" and on 2) CHs net gain is required (through offsets as per EBRD ESR6 definitions). The final significance of the residual potential impacts after avoidance and reduction measures is presented in **Table 5**.

Table 5 - Assessment of residual impacts

	Receptor	Key impacts identification	Impact significance	Mitigation measures	Residual impact	Offset needed
Plants <i>Tulipa biflora</i> Pall. (<i>Tulipa sogdiana</i>) <i>Xylosalsola chiwensis</i> (Popov) Akhani & Roalson (<i>Salsola chiwensis</i>) (<i>Tulipa borszczowii</i> Regel <i>Oreosalsola arbusculiformis</i> (Drobow) Sennikov (<i>Salsola arbusculiformis</i>) <i>Xylosalsola richteri</i> (Moq.) Akhani & Roalson (<i>Salsola richteri</i>)		Destruction of plants and their habitats due to vegetation clearance	Significant	A1	Minor Moderate	No Yes - if the habitats of priority species are located within the project footprint area and will be destroyed
Sedentary animals Reptilians: <i>Testudo horsfieldii</i>		Destruction of tortoise's habitats Risk of mortality due to vegetation clearance, land grading, excavation works and vehicle collisions during road construction and operation Barrier effect	Singificant	A3, R4-R7	Minor Moderate	No Yes - if the habitats of the species are located within the project footprint area and will be destroyed
Mammals - temporary visitors: <i>Vormela peregusna</i> <i>Ovis vignei</i> <i>Gazella subgutturosa</i> <i>Equus hemionus</i>		Loss of foraging habitats, barrier effect, and risk of mortality during road operation	Moderate	R1-R7	Minor	No
Mammals: <i>Saiga tatarica</i>		Long-term barrier effect on the Ustyurt population as a cumulative impact in conjunction with the Shalkar-Beyneu railway	Significant	R1-R3	Minor - at the construction stage; Moderate - at the opetration	Yes - if demonstrated connectivity loss remained after crossings' construction

	Receptor	Key impacts identification	Impact significance	Mitigation measures	Residual impact	Offset needed
					stage, long-term effect (because the effectiveness of the proposed railway and road crossings is unclear)	
	Birds: 89 species (see Annex 1, Table 1)	Loss of foraging, resting and, possibly, breeding habitats (to be confirmed)	Moderate	A4	Minor Moderate	No Yes - if the habitats of priority resident bird species are located within the project footprint area and will be destroyed
	Insects: <i>Saga pedo</i> <i>Hoplitis (Megalosmia) fulva</i> <i>Lucanus cervus</i> <i>Palaeophilotes panope</i>	Destruction of habitats and increased mortality of individuals due to vegetation clearance, land grading and excavation works	Significant	A2	Minor Moderate	No Yes - if the habitats of priority insect species are located within the project footprint area and will be destroyed

9. Precautionary approach and offsetting framework

Because seasonal field surveys were not conducted, it is not currently possible to quantify habitat loss, conduct a loss/gain analysis, or calculate the required net gain. Consequently, a precautionary approach has been applied assuming the permanent loss of all suitable PBF habitats within the Project footprint area. Additionally, all suitable PBF habitats located within the temporary land-use areas are considered temporarily affected.

Habitat mapping and the overlap with the Project footprint were used to quantify potential habitat losses. These preliminary data indicate potential overall losses, without differentiation by species. Accordingly, preliminary mitigation measures and offsetting pathways have been developed based on a precautionary approach.

Spring field surveys will allow the quantification of habitat loss, affected populations and residual impacts, as well as the updating of proposed mitigation measures and the development of offset projects.

According to the project data the total area of permanent land take is 1,200 ha. However, the majority of the road alignment traverses previously disturbed areas, with dirt roads within the road footprint area, as shown in satellite imagery and reflected in the habitat mapping (see the ESIA report). Native or semi-native habitats within the Project footprint occur exclusively along the eastern section of the route. This section has a total length of approximately 47.5 km and a right-of-way width of 42 m, resulting in a potential permanent loss of 199.5 ha of native habitat.

Temporary land requirements are preliminarily estimated at approximately 25%¹⁹ of the permanent land take (subject to confirmation during detailed design and construction planning), representing an estimated temporary disturbance area of 300 ha.

Based on these spatial calculations, the precautionary approach framework has been developed (Table 6).

Table 6 - Precautionary approach framework

Receptor	Main impact pathway	Precautionary impact assumption	Potential mitigation measures	Likely offset trigger/ approach	Pre-construction requirements
PBF plants	Permanent loss of native habitats and flora	199,5 ha of suitable habitat is assumed to be permanently lost, along with associated flora; to be verified or refuted via field survey	Avoidance, translocation	Confirmed habitat and floral loss / habitat restoration and protection	Spring botanical survey to quantify affected habitats (ha) and populations
Central Asian Tortoise (<i>Testudo horsfieldii</i>)	Permanent habitat loss, fragmentation, and mortality risk	All habitats intersected by the road are assumed fragmented; 199,5 ha of suitable	Avoidance, seasonal construction restrictions, translocation,	Confirmed habitat loss, fragmentation, and mortality risk/habitat	Spring reptile survey, including assessment of baseline habitat connectivity

¹⁹This figure is taken from the World Bank road project in South-Kazakhstan oblast
https://documents1.worldbank.org/curated/en/335961468091497292/pdf/E20900EA0v60P000Box365782B02888799.pdf?utm_source=chatgpt.com

Receptor	Main impact pathway	Precautionary impact assumption	Potential mitigation measures	Likely offset trigger/ approach	Pre-construction requirements
		habitat will be lost; up to 400 tortoises may die (assuming a conservative density of 2 individuals per hectare) ²⁰	construction of dedicated wildlife crossings	enhancement, support, and protection	
PBF insects	Permanent habitats loss	199,5 ha of suitable habitats will be lost	Avoidance integrated with plant habitat protection	Confirmed habitat loss / restoration and protection integrated with botanical offsets	Spring entomological survey
PBF birds	Permanent habitat loss and disturbance	Up to 199,5 ha of suitable habitat will be lost; assume no significant breeding areas affected	Seasonal restrictions, avoidance	Confirmed breeding or congregation habitat within the footprint area / habitat protection if significant breeding areas are affected	Seasonal surveys (spring breeding and autumn migration)
PBF ungulates, CH <i>Saiga tatarica</i>	Barrier effect and loss of ecological connectivity	The entire 286 km road length contributes to a new linear barrier; 14 dedicated wildlife crossings are proposed across the alignment	Construction of open-span wildlife crossings; post-construction monitoring and adaptive management; coordination with railway operators	Residual barrier effect and connectivity loss/ improvement of open-span crossings, adaptive management	Monitoring to assess the crossings' effectiveness, baseline connectivity assessment
Other medium/large mammals	Barrier effect and vehicle collision risk	Movement across the road corridor will be restricted along its entire length	Installation of wildlife crossings and exclusion fencing, adaptive management	Significant residual collision risk, barrier effect and fragmentation/improvement of wildlife crossings and adaptive management	Species validation surveys; monitoring to assess crossings' effectiveness
PBF plants, insects, birds,	Temporary disturbance, partial habitat	300 ha of temporary affected area; up	Avoidance by establishing designated	Confirmed habitat loss, fragmentation,	Spring surveys for plants, insects, reptiles and birds

²⁰<https://doi.org/10.54944/br164ci25>

Receptor	Main impact pathway	Precautionary impact assumption	Potential mitigation measures	Likely offset trigger/ approach	Pre-construction requirements
Central Asian tortoise	destruction, tortoise mortality risk.	to 600 tortoises potentially affected (assuming a density of 2 individuals per hectare)	"no-go" zones, reptile fencing, habitat restoration, translocation, development and enforcement of the Worker Code of Conduct, including standard operating procedures to prevent harm to wildlife during construction works, and a Chance Find Procedure	tortoise mortality risk/ habitat enhancement, support, and protection	

The offsetting strategy aims to achieve No Net Loss (NNL) or Net Gain (NG) for biodiversity values based on four key approaches.

Biodiversity Protection Approach (Averted loss) (plants, insects, tortoises, and birds): The Project will result in the complete loss of the above-mentioned habitats, located within the road right-of-way. At the same time, similar habitats are present in the surrounding areas. These similar habitats will be protected to prevent their degradation or destruction in the future due to potential threats such as overgrazing, off-road driving, and hunting.

Restoration and Enhancement Approach (plants, insects, tortoises, and birds): Suitable habitats, similar to the lost, located outside the road right-of-way, will be restored and enhanced, if necessary, to provide sustainable habitats for the species concerned, including translocated plants (tulips) and animals (tortoises).

Adaptive Management of Wildlife Crossings (ungulates and other migratory animals): If the constructed crossings do not provide adequate opportunities for migration and connectivity, they will be improved or new crossings will be constructed.

The Biodiversity Management Plan (BMP) will be supplemented with offset projects once the field survey results confirming the need for offsetting are available.

10. Pre-Construction Surveys

As discussed in the previous section, pre-construction surveys are a prerequisite for determining whether offsetting is required. Offsetting, in turn, is mandatory under EBRD ESR 6 if the destruction of priority species' habitats is expected.

The following field surveys will be conducted at the pre-construction stage within the Project footprint area and adjacent areas within the Aol and its surroundings:

1. Habitats survey: To verify habitat mapping based on satellite imagery and, if habitats formed by saltwort species protected in Mangistau Oblast are identified, quantify the affected habitats (in spring).
2. Botanical survey: To verify vegetation types and flora list, define EAAAs for PBF, assess whether habitats of protected tulip and saltwort species (PBF) are located within the Project footprint area and will be destroyed; quantify the affected habitats and survey the surrounding areas to identify suitable habitats for tulips translocation and the protection of saltwort species (in spring),
3. Reptile survey: To identify Central Asian tortoises and their habitats, assess habitat connectivity and fragmentation resulting from road construction, and define EAAAs. If habitats are located outside the footprint area, but within the Aol, they will be marked on the ground and included in the construction master-plan as "no-go" zones. If tortoise habitats are located within the footprint area and translocation is required, the number of potentially affected animals will be estimated and areas surrounding the road right-of-way will be surveyed to identify suitable habitats with sufficient capacity to support the species or determine whether habitat enhancement is necessary (in spring).
4. Breeding and migration bird surveys: To verify presence of bird species identified in the ESIA through desktop analysis, and identify their habitats, define EAAAs for PBF, and, if breeding habitats or important congregation areas of priority bird species are located within the Project footprint area and will be destroyed, quantify the affected habitats and survey the surrounding areas to identify suitable habitats for their protection (in spring; an additional autumn migratory survey is recommended).
5. Entomological survey: To verify the presence of insect species identified in the ESIA through desktop analysis and identify their habitats, define EAAAs for PBF, and, if habitats of priority insect species are located within the Project footprint area and will be destroyed, quantify the affected habitats, and survey the surrounding areas to identify suitable habitats (in spring).
6. Mammal survey: To identify ungulates, and, where possible, predators, document signs of their presence, animal migration routes and congregation areas, and, if dens, herds, migration routes or congregation areas are identified, mark them for inclusion in the construction master-plan as "no-go" zones and take them into account when planning and constructing wildlife crossings.

The habitat, botanical, reptile and entomological surveys can be conducted concurrently, as they are all related to plant communities and their associated fauna.

These surveys will verify habitat mapping and confirm the presence of priority species. Their results will allow an assessment of the importance of the Project area for these species and the

significance of the Project' impacts on them. Quantification of habitat loss will enable a loss/gain analysis to determine the measures required to achieve NNL for PBF.

The survey results will form the basis for refining the proposed mitigation measures (see [Section 7](#)) and, if necessary, developing offset projects under the offsetting strategy (see [Section 9](#)).

11. Biodiversity monitoring

After the completion of the field studies, a robust baseline will be established. Only after that can the BMP be updated. Reliable and high-quality monitoring and evaluation are the keys to adaptive management. Adaptive management is a good practice that is necessary to ensure the efficiency of the mitigation and offsetting.

For the PBFs and CH, it is proposed to establish the long-term joint-monitoring of indicator species and their habitats with the involvement of the national/local key specialists/stakeholders. The following two types of monitoring will be maintained: 1) the monitoring of mitigation measures and 2) the monitoring of species and their habitats. The monitoring system will be reflected in the monitoring part of the updated BMP or in separate Biodiversity Monitoring and Evaluation Program (BMEP).

Annex 1 - CHA Findings: Summary Table of PBFs (bird species) identified in the footprint area as per EBRD ESR6

No	Latin name	English name	Category in the RoK Red Data Book	Category in the IUCN Red List	Listed in Appendices 1, 2 of the CMS ²¹
1	<i>Haliaeetus leucoryphus</i>	Pallas's Fish-eagle	I	EN	I
2	<i>Haliaeetus albicilla</i>	White-tailed eagle	II	LC	I
3	<i>Neophron percnopterus</i>	Egyptian vulture	III	EN	I
4	<i>Falco naumanni</i>	Lesser kestrel		VU	I
5	<i>Falco cherruq</i>	Saker falcon	I	EN	I
6	<i>Falco peregrinus</i>	Peregrine falcon	I	LC	II
7	<i>Circaetus gallicus</i>	Short-toed eagle	II	LC	II
8	<i>Aquila heliaca</i>	Eastern Imperial Eagle	II	VU	I
9	<i>Aquila nipalensis</i>	Steppe eagle	V	EN	I
10	<i>Aquila chrysaetos</i>	Golden eagle	II	LC	II
11	<i>Bubo bubo</i>	Eurasian eagle-owl	II	LC	
12	<i>Pelecanus onocrotalus</i>	Great white pelican	I	LC	I
13	<i>Pelecanus crispus</i>	Dalmatian pelican	II	VU	I
14	<i>Platalea leucorodia</i>	Eurasian spoonbill	II	LC	II
15	<i>Plegadis falcinellus</i>	Glossy ibis	II	LC	II
16	<i>Phoenicopterus roseus</i>	Greater flamingo	II	LC	II
17	<i>Chettusia gregaria</i>	Sociable lapwing	I	CR	I
18	<i>Limicola falcinellus</i>	Broad-billed sandpiper		VU	II
19	<i>Chlamydotis undulata</i>	African houbara	II	VU	
20	<i>Streptopelia turtur</i>	European turtle dove		VU	II
21	<i>Buteo rufinus</i>	Long-legged buzzard		LC	II
22	<i>Falco tinnunculus</i>	Common Kestrel		LC	II
23	<i>Cygnus olor</i>	Mute Swan		LC	II
24	<i>Tadorna ferruginea</i>	Ruddy Shelduck		LC	II

²¹The Convention on the Conservation of Migratory Species of Wild Animals (CMS)

No	Latin name	English name	Category in the RoK Red Data Book	Category in the IUCN Red List	Listed in Appendices 1, 2 of the CMS ²¹
25	<i>Tadorna tadorna</i>	Common Shelduck		LC	II
26	<i>Anas clypeata</i>	Northern Shoveler		LC	II
27	<i>Anas penelope</i>	Eurasian Wigeon		LC	II
28	<i>Anas crecca</i>	Eurasian Teal		LC	II
29	<i>Anas platyrhynchos</i>	Mallard		LC	II
30	<i>Anser anser</i>	Greylag Goose		LC	II
31	<i>Anas acuta</i>	Northern Pintail		LC	II
32	<i>Tadorna ferruginea</i>	Ruddy Shelduck		LC	II
33	<i>Tadorna tadorna</i>	Common Shelduck		LC	II
34	<i>Netta rufina</i>	Red-crested Pochard		LC	II
35	<i>Aythya nyroca</i>	Ferruginous Duck		NT	I
36	<i>Aythya fuligula</i>	Tufted Duck		LC	II
37	<i>Circus aeruginosus</i>	Western Marsh Harrier		LC	II
38	<i>Pandion haliaetus</i>	Osprey		LC	II
39	<i>Charadrius dubius</i>	Little Ringed Plover		LC	II
40	<i>Vanellus vanellus</i>	Northern Lapwing		LC	II
41	<i>Vanellus leucurus</i>	White-tailed Lapwing		LC	II
42	<i>Arenaria interpres</i>	Ruddy Turnstone		LC	II
43	<i>Himantopus himantopus</i>	Black-winged Stilt		LC	II
44	<i>Tringa ochropus</i>	Green Sandpiper		LC	II
45	<i>Tringa glareola</i>	Wood Sandpiper		LC	II
46	<i>Tringa nebularia</i>	Common Greenshank		LC	II
47	<i>Tringa totanus</i>	Common Redshank		LC	II
48	<i>Actitis hypoleucos</i>	Common Sandpiper		LC	II
49	<i>Xenus cinereus</i>	Terek Sandpiper		LC	II
50	<i>Calidris minuta</i>	Little Stint		LC	II
51	<i>Calidris ferruginea</i>	Curlew Sandpiper		LC	II
52	<i>Lymnocyrtus minimus</i>	Jack Snipe		LC	II
53	<i>Gallinago gallinago</i>	Common Snipe		LC	II
54	<i>Pluvialis squatarola</i>	Grey Plover		LC	II

No	Latin name	English name	Category in the RoK Red Data Book	Category in the IUCN Red List	Listed in Appendices 1, 2 of the CMS ²¹
55	<i>Charadrius hiaticula</i>	Common Ringed Plover		LC	II
56	<i>Charadrius leschenaultii</i>	Greater Sand Plover		LC	II
57	<i>Charadrius asiaticus</i>	Caspian Plover		LC	II
58	<i>Charadrius alexandrinus</i>	Kentish Plover		LC	II
59	<i>Sternula albifrons</i>	Little Tern		LC	II
60	<i>Chlidonias niger</i>	Black Tern		LC	II
61	<i>Phalaropus lobatus</i>	Red-necked Phalarope		LC	II
62	<i>Glareola pratincola</i>	Collared Pratincole		LC	II
63	<i>Glareola nordmanni</i>	Black-winged Pratincole		LC	II
64	<i>Coracias garrulus</i>	European Roller		LC	II
65	<i>Motacilla flava</i>	Western Yellow Wagtail		LC	II
66	<i>Motacilla flava feldegg</i>	Black-headed Wagtail		LC	II
67	<i>Motacilla alba</i>	White Wagtail		LC	II
68	<i>Oriolus oriolus</i>	Eurasian Golden Oriole		LC	II
69	<i>Acrocephalus agricola</i>	Paddyfield Warbler		LC	II
70	<i>Acrocephalus dumetorum</i>	Blyth's Reed Warbler		LC	II
71	<i>Acrocephalus scirpaceus</i>	Eurasian Reed Warbler		LC	II
72	<i>Hippolais rama</i>	Sykes's Warbler		LC	II
73	<i>Hippolais pallida</i>	Eastern Olivaceous Warbler		LC	II
74	<i>Hippolais languida</i>	Upcher's Warbler		LC	II
75	<i>Sylvia nisoria</i>	Barred Warbler		LC	II
76	<i>Sylvia communis</i>	Common Whitethroat		LC	II
77	<i>Sylvia curruca</i>	Lesser Whitethroat		LC	II
78	<i>Sylvia mystacea</i>	Menetries's Warbler		LC	II

No	Latin name	English name	Category in the RoK Red Data Book	Category in the IUCN Red List	Listed in Appendices 1, 2 of the CMS ²¹
79	<i>Sylvia nana</i>	Asian Desert Warbler		LC	II
80	<i>Phylloscopus trochiloides</i>	Greenish Warbler		LC	II
81	<i>Muscicapa striata</i>	Spotted Flycatcher		LC	II
82	<i>Oenanthe pleschanka</i>	Pied Wheatear		LC	II
83	<i>Oenanthe finschii</i>	Finsch's Wheatear		LC	II
84	<i>Oenanthe deserti</i>	Desert Wheatear		LC	II
85	<i>Oenanthe isabellina</i>	Isabelline Wheatear		LC	II
86	<i>Cercotrichas galactotes</i>	Rufous-tailed Scrub Robin		LC	II
87	<i>Luscinia svecica</i>	Bluethroat		LC	II
88	<i>Panurus biarmicus</i>	Bearded Reedling		LC	II
89	<i>Parus bokharensis</i>	Turkestan Tit		LC	II

Annex 2 - Description of the open-span crossings proposed for wild animals (ungulates), primarily for Saiga tatarica

Twenty-four crossing locations in three regions were identified as part of the ESIA under the national FS. These crossings were proposed to facilitate the migration of *Saiga tatarica* and *Gazella subgutturosa* across the Project Road. The locations were identified in August 2025 by specialists from the state regional forestry and wildlife inspectorates, the state enterprise "Okhostzooptom", and ACBK, based on previously obtained data on Saiga migrations, an ecological assessment of the territories including terrain characteristics, and the presence or absence of other anthropogenic objects nearby.

The locations of these crossings (crossing zones) were confirmed by ACBK specialists during the field study conducted in August, 2026. These locations were mapped ([Figure A.1](#)), and their coordinates are presented in [Tables A.1-3](#).

Based on consultations with ACBK' specialists, spatial and technical parameters of the proposed crossings were defined. These crossing should be designed as open-span wildlife passages - wide, open passages through the road embankment.

The basic principle of this design is that animals should perceive the passage not as a tunnel or enclosed engineering structure, but as an extension of the open landscape. Therefore, the passages should:

- have the widest possible open cross-section;
- provide clear visibility of the opposite side and the horizon;
- be aligned as closely as possible with the direction of animal movement;
- maintain natural vegetation or vegetation that is as close to natural as possible;
- avoid elements inside or immediately in front of the entrance that create visual or physical barriers;
- have smooth (gentle), open approaches on both sides;
- be at the same visual level as the surrounding natural landscape, as far as technically feasible; and
- have no permanent fencing directly on the approaches.

The key principle is to ensure clear visibility through the passage. Saiga must be able to see beyond the road before entering the crossing. This is particularly important for group movement, as animals must be able to pass through simultaneously or in a continuous stream, without congregating at a narrow entrance.

In general, these crossings should take the form of wide, gently sloping embankments. The preliminary design parameters are as follows:

- width 500 - 1000 m,
- embankment slope 1:10,
- road signs indicating a speed limit of 60 km / h²², installed in advance of each crossing.

²² A speed of 70 km/h is considered the threshold for preventing Saiga-vehicle collisions. Taking into account the 10 km/h speeding tolerance applied in the country, a posted speed limit of 60 km/h is proposed to support compliance with this threshold.

A rational approach would be to construct several experimental crossings initially, rather than all proposed crossings at once, and then assess their use by Saiga and other ungulates.

The same approach is recommended for crossings along the Shalkar-Beyneu railway. Planning, design and effectiveness monitoring should be coordinated and implemented simultaneously for both the road and the railway.

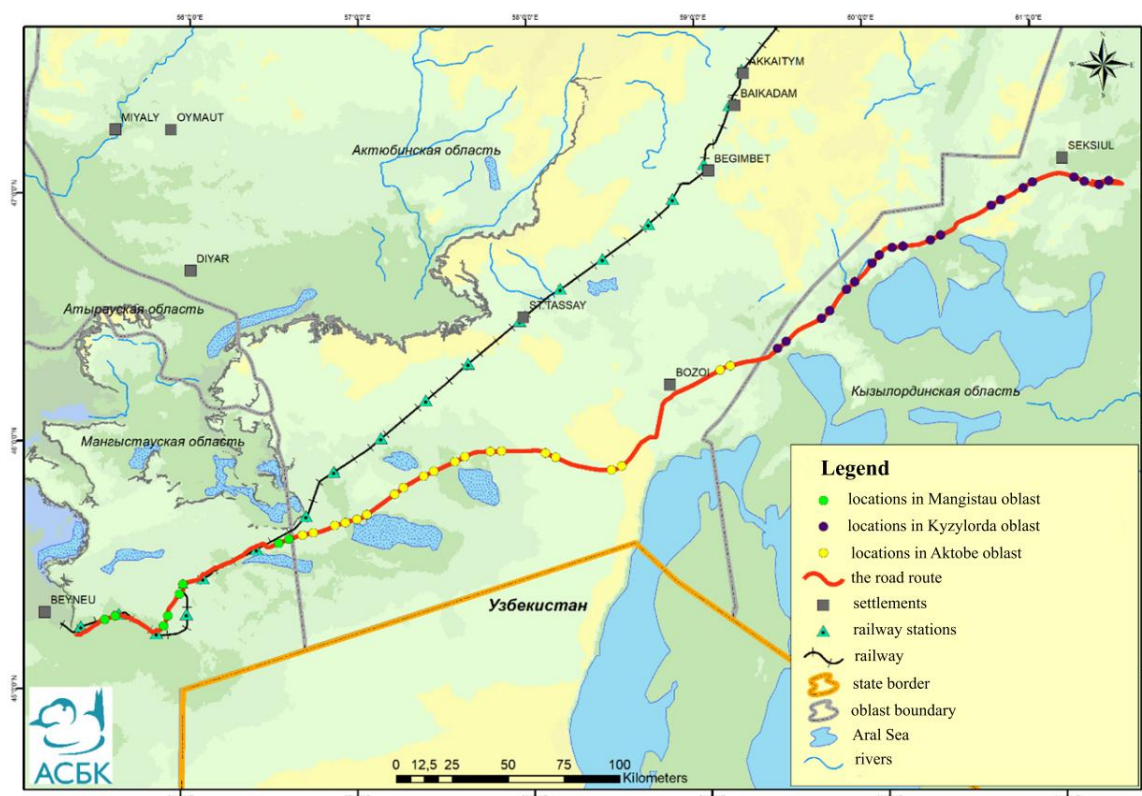


Figure A.1 - Proposed locations for the road crossings

Table A.1 - Wildlife Migration Crossing Zones in the Mangystau region

№	Crossing zones, km	Coordinates		Length, km	Wild animals
		Beginning	End		
1	15+235 - 20+235	45°17'6.92"N 55°33'18.21"E	45°17'59.79"N 55°36'55.01"E	5,0	<i>Saiga tatarica</i> , <i>Gazella subgutturosa</i>
2	45+120 - 50+120	45°15'48.82"N 55°53'24.71"E	45°18'12.55"N 55°54'56.26"E	5,0	
3	61+500 - 66+500	45°23'30.46"N 55°58'48.59"E	45°25'54.01"N 55°59'59.27"E	5,0	
4	115+500 – 120+500	45°36'2.30"N 56°32'44.73"E	45°37'2.44"N 56°36'19.04"E	5,0	

Table A.2 - Wildlife Migration Crossing Zones in the Aktobe region

№	Crossing zones, km	Coordinates		Length, km	Wild animals
		Beginning	End		
1	126+800 – 131+800	45°38'3.06"N 56°40'56.10"E	45°38'38.38"N 56°44'41.55"E	5,0	<i>Saiga tatarica</i>
2	142+000 – 147+000	45°40'24.22"N 56°52'3.91"E	45°41'8.06"N 56°55'45.92"E	5,0	
3	152+300 – 157+300	45°41'52.28"N 56°59'42.29"E	45°42'59.24"N 57° 3'10.64"E	5,0	
4	172+700 – 177+700	45°47'57.03"N 57°12'42.25"E	45°49'31.79"N 57°15'50.09"E	5,0	
5	188+200 – 193+200	45°52'20.32"N 57°22'51.54"E	45°53'28.68"N 57°26'21.82"E	5,0	
6	203+600 – 208+600	45°55'47.09"N 57°33'41.98"E	45°56'57.73"N 57°37'10.90"E	5,0	
7	220+400 – 225+400	45°58'12.92"N 57°45'59.21"E	45°58'13.01"N 57°49'51.50"E	5,0	
8	245+300 – 250+300	45°57'41.10"N 58° 5'6.35"E	45°56'32.32"N 58° 8'36.60"E	5,0	
9	276+200 – 281+200	45°53'19.88"N 58°27'53.03"E	45°54'14.63"N 58°31'28.44"E	5,0	
10	347+400- 352+400	46°16'52.62"N 59° 6'20.73"E	46°17'52.97"N 59° 9'55.52"E	5,0	

Table A.3 - Wildlife Migration Crossing Zones in the Kyzylorda region

№	Crossing zones, km	Coordinates		Length, km	Wild animals
		Beginning	End		
1	548+000 – 553+000	45°57'59.36"N 61°21'50.28"E	45°58'49.42"N 61°25'17.26"E	5,0	<i>Saiga tatarica</i>
2	536+100 – 541+000	47°0'12.14"N 61°13'11.32"E	46°59'2.30"N 61°16'44.60"E	5,0	
3	511+500 – 516+500	46°58'13.00"N 60°54'59.71"E	46°59'31.66"N 60°58'25.82"E	5,0	
4	495+100 – 500+100	46°54'21.85"N 60°43'27.87"E	46°55'37.22"N 60°46'56.71"E	5,0	
5	463+200 – 468+200	46°46'40.77"N 60°21'33.66"E	46°47'41.98"N 60°25'11.88"E	5,0	
6	445+500 – 450+500	46°45'11.29"N 60°7'57.00"E	46°45'24.59"N 60°11'51.70"E	5,0	

№	Crossing zones, km	Coordinates		Length, km	Wild animals
		Beginning	End		
7	433+430 – 438+430	46°41'31.79"N 60°0'40.07"E	46°43'29.81"N 60°3'20.99"E	5,0	
8	417+125 – 422+125	46°35'30.27"N 59°51'26.86"E	46°37'15.48"N 55°54'25.11"E	5,0	
9	399+800 – 404+800	46°28'42.55"N 59°42'18.43"E	46°30'27.67"N 59°45'14.93"E	5,0	
10	375+700- 380+700	46°21'47.54"N 59°26'37.29"E	46°23'21.18"N 59°29'45.24"E	5,0	