

Almaty International Airport

Environmental and Social Impact Assessment
Report - Chapter 6

September 2025

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Almaty International Airport

Environmental and Social Impact Assessment Report - Chapter 6

September 2025

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Acronyms and abbreviations

Abbreviation / Acronym	Definition
AIS	Alien invasive species
ALA	Almaty International Airport
AoI	Area of Influence
CBD	Convention on Biological Diversity
C-ESMP	Construction Environmental and Social Management Plans
CITES	Convention on International Trade of Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals (CMS)
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESR6	Environment and Social Requirement 6
IBA	Important Bird and Biodiversity Area
IBAT	Integrated Biodiversity Assessment Tool
IFC	International Finance Corporation
IUCN	International Union for the Conservation of Nature
KBA	Key Biodiversity Area
PS6	Performance Standard 6
WHMP	Bird and Wildlife Hazard Prevention Program

6 Biodiversity

6.1 Introduction

- 6.1.1 This chapter of the Environmental and Social Impact Assessment (ESIA) provides a comprehensive overview of biodiversity within the Project area, located in the urban environment of Almaty, Kazakhstan. It presents the baseline ecological conditions based on secondary data, including habitat types, species presence, and legally protected areas. In addition to describing the existing biodiversity context, the chapter assesses the potential impacts of the Project on local flora and fauna. It also outlines appropriate mitigation measures to avoid and minimise adverse effects, in alignment with national environmental regulations and international best practice.

6.2 Methodology

- 6.2.1 The methodology described in section 4.7 of the **ESIA Chapter 4: ESIA scope and methodology** was followed. Bespoke biodiversity-related methodology is provided below.

Applicable guidelines and standards

- 6.2.2 The assessment has been undertaken considering relevant legislation, standards, and guidance as summarised in the sections below. As outlined in **ESIA Chapter 3: Policy, legal and institutional framework**, the International Finance Corporation (IFC) Performance Standards and the European Bank for Reconstruction and Development (EBRD) Environmental and Social Requirements have been followed to undertake this assessment. This specifically included IFC Performance Standard 6 (PS6) and EBRD Environment and Social Requirement 6 (ESR6): Biodiversity, Conservation and Sustainable Management of Living Natural Resources, as these relate to biodiversity.
- 6.2.3 In addition to the applicable overarching policy and legislation for the Project that is presented in **ESIA Chapter 3: Policy, legal and institutional framework**, additional policy and legislation which specifically relates to biodiversity for the Project is presented below.
- 6.2.4 National legislation and policy in Kazakhstan relating to biodiversity applicable to the Project is shown in Table 6.1.

Table 6.1: Relevant national legislation/policies in Kazakhstan relating to biodiversity

Legislative or policy instrument	Relevant details
Kazakhstan's Environmental Code No. 400-VI (2021)	For projects likely to affect the environment, the Environmental Impact Assessment (EIA) process must: Identify potential negative impacts on biodiversity through baseline studies and ecological assessments. Propose mitigation measures to avoid or minimise harm to ecosystems and species. Include monitoring plans to track biodiversity impacts during and after project implementation.
Forest Code (2006)	The Forest Code includes guidance on the ecologically protective functions of forests, conservation of their biological diversity, sustainable use of forest resources and forest ecosystem regeneration and restoration (including reforestation and afforestation). It regulates the ownership, use and management of the areas assigned to the Forest Fund, and establishes the legal framework for the protection, reproduction and improvement of the ecological and resource potential of the Forest Fund areas. It also prohibits the

Legislative or policy instrument	Relevant details
	introduction of invasive alien species and the collection of rare and endangered flora species within Forest Fund land.
Land Code (2003)	The Land Code primarily regulates land management but also includes chapters on the land of protected natural areas, the land of the state forest fund and the “reserve lands”.
Law on Protection, Reproduction and Use of Fauna (2019)	This Law regulates the protection of rare and endangered animal species, as well as the sustainable use and reproduction of game and fish resources. It contains provisions on the preservation of wildlife habitats, and concentration areas and migration routes of their populations.
Law on Specially Protected Natural Areas (2006)	The Law on Specially Protected Natural Areas establishes different categories of protected areas, their legal status, functional zonation pattern and protective regimes. A 2012 amendment included new articles on the Red Book of Kazakhstan and key ornithological areas. It regulates creation, expansion, protection, restoration, sustainable use and management of nature conservation areas and national nature reserves, which have ecological, scientific, historical, cultural and recreational value and are a component of national, regional and global ecological networks.
Ministry of Agriculture Order #18-02/1057 (2015)	All the trees in cities within Kazakhstan (including airports) are subject to protection irrespective of their conservation status. They cannot be cut without permission or paying a tariff as set out in The Government of RoK Decree #441, 2007. Often, as a condition of the construction permit, developers are obliged to plant and maintain seedlings to offset the impact from the city tree cover reduction.
The Government of RoK Decree #441 (2007)	This decree outlines basic tariffs for illegal logging, damaging trees and shrubbery (tariffs are doubled in protected areas), theft of wind-fallen trees and trees damaged by forest fires. The decree is applicable to public forests.

6.2.5 Relevant international regulations are listed below:

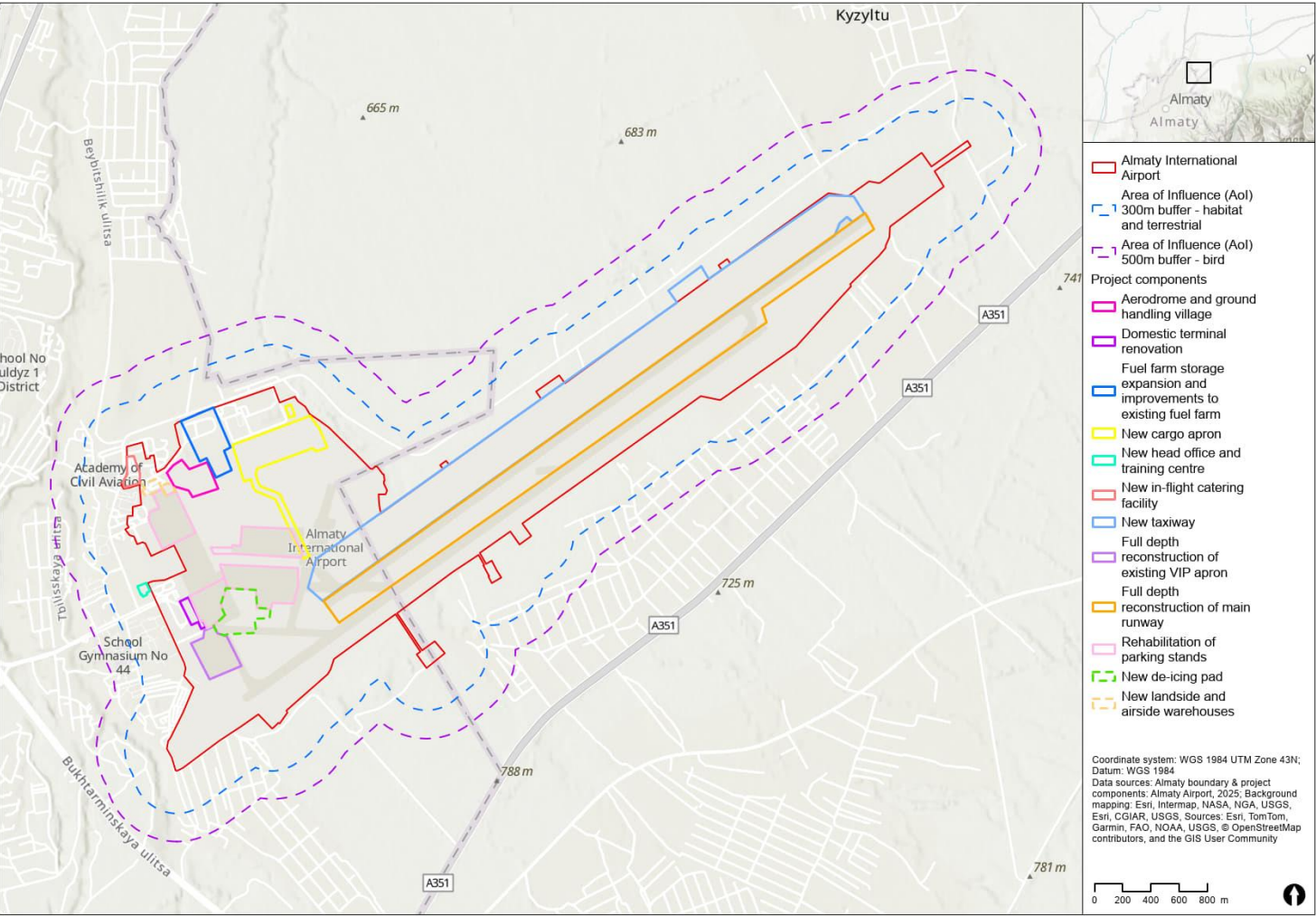
- Convention on Biological Diversity (CBD)
 - Ratified by Kazakhstan: 1994
 - Definition of Biodiversity: Variability among all living organisms and ecosystems.
 - Key Obligations:
 - Protect national biodiversity
 - Require EIAs for projects affecting biodiversity
 - Integrate biodiversity into environmental legislation and policy
- Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES)
 - Kazakhstan – member since 2000
 - Purpose: Regulate international trade to prevent species extinction
 - Appendices:
 - Appendix I: Species threatened with extinction – trade only for non-commercial purposes
 - Appendix II: Species that may become threatened – trade allowed with permits
 - Appendix III: Species needing international cooperation – trade allowed with documentation
- Convention on the Conservation of Migratory Species of Wild Animals (CMS)
 - Ratified by Kazakhstan: 2006
 - Purpose: Conserve migratory species and their habitats
 - Key Actions:
 - Protect endangered migratory species (Appendix I)

- Cooperate on species needing international efforts (Appendix II)
- IFC PS6
 - Focus: Biodiversity conservation and sustainable resource management
 - Objectives:
 - Protect biodiversity and ecosystem services
 - Promote sustainable use of natural resources
 - Requirements:
 - Assess biodiversity impacts
 - Consider stakeholder biodiversity values
 - Address threats like habitat destruction and invasive species
 - Habitat Categories:
 - Modified: Minimise degradation, enhance where possible
 - Natural: Avoid significant conversion unless justified and mitigated
 - Critical: No measurable adverse impacts allowed; strict mitigation required
- EBRD ESR6
 - Objectives:
 - Use a precautionary approach to biodiversity
 - Apply mitigation hierarchy to achieve no net loss or net gain
 - Maintain ecosystem services
 - Promote sustainable natural resource use
 - Critical Habitat Criteria:
 - Threatened/unique ecosystems
 - Habitats for endangered, endemic, or migratory species
 - Areas vital for evolutionary processes

Area of Influence for biodiversity

6.2.6 The Area of Influence (AoI) for biodiversity has been delineated based on the outcomes of the impact assessment, following an iterative evaluation of the Project's potential effects on ecological receptors. The spatial extent of the AoI reflects the anticipated reach of direct and indirect impacts identified during the assessment. As a result, a buffer of 300m has been established around the Project footprint to account for potential impacts on habitats, flora, mammals, and reptiles. For bird species, a wider buffer of 500m has been applied. These defined zones provide the basis for targeted mitigation planning and monitoring efforts. Figure 6.1 presents the defined Biodiversity AoI for the Project.

Figure 6.1: Biodiversity Aol for the Project



Data collection

6.2.7 The biodiversity baseline description has been developed based on secondary data, obtained from the references below, as well as primary data collected by the airport team, under the birds and wildlife management plan and monitoring:

- CBD website (<https://www.cbd.int/>).
- International Union for the Conservation of Nature (IUCN) Red List of Threatened Species (<http://www.iucnredlist.org>).
- Integrated Biodiversity Assessment Tool (IBAT) (<https://ibat-alliance.org/>).
- The Red List of Republic of Kazakhstan (<http://redbook.kz/en/index.html>).
- BirdLife International Data Zone (<http://www.birdlife.org/datazone/home>).
- Global Invasive species database (http://www.iucngisd.org/gisd/100_worst.php).

6.2.8 Previous studies undertaken at the airport, relevant to biodiversity, have been reviewed and include:

- The 2022 ESIA
- 'ANALYSIS – ornithological situation and collisions of aircraft with birds/wildlife animals at the Almaty airfield in 2024' (2025)¹
- Bird and Wildlife Hazard Prevention Program (WHMP) (2025)² – a program for preventing the dangerous presence of birds and other animals at the aerodrome and has been developed for the purpose of implementing reasonable measures to control risks posed by birds and other animals at Almaty International Airport. Measures as part of the program include eliminating elements that may attract birds and other animals, controlling the presence of birds and other animals at the aerodrome and in adjacent areas, and reducing risks associated with collisions with birds/other animals.
- Instruction for Maintenance and Protection of Green Spaces (2024)

Limitations and assumptions

6.2.9 The IBAT data used to inform the baseline was acquired in 2021. Given that IBAT species statuses are updated biannually, there is a possibility that some species' conservation statuses may have changed since the data was obtained. However, this limitation is addressed through ongoing wildlife hazard monitoring conducted at the airport. These monitoring activities provide updated records of species presence, abundance, and behaviour in the vicinity of the airport, helping to validate and refine the baseline biodiversity understanding and ensuring that the assessment remains aligned with current ecological conditions.

6.3 Baseline

Overview of biodiversity in Kazakhstan

6.3.1 Kazakhstan's vast territory supports a rich diversity of ecosystems and species, including forests, steppes, deserts, and mountains. The country is home to over 6,000 species of higher vascular plants, 5,000 fungi, and nearly 900 vertebrate species, many of which are threatened due to habitat loss and hunting. Endemism is notably high among fungi and plants, with 14% of higher plant species being unique to Kazakhstan. Alien invasive species (AIS), such as the myna bird, brown rat, and American mink, are impacting native fauna, and 26 of the country's

¹ Almaty International Airport (2025). ANALYSIS – ornithological situation and collisions of aircraft with birds/wildlife animals at the Almaty airfield in 2024

² Almaty International Airport (2025). Bird and Wildlife Hazard Prevention Program

150 fish species are invasive. Although Kazakhstan has a biodiversity conservation plan extending to 2030, it currently lacks a comprehensive AIS information and control system.

Current baseline

Legally protected and internationally recognised areas

- 6.3.2 The Project is located approximately 4.8km west of the 'Almaty State Nature Sanctuary (complex)' national designation and approximately 11km northwest of 'Big Almaty Gorge' Important Bird and Biodiversity Area (IBA) and Key Biodiversity Area (KBA). Almaty State Nature Sanctuary is classed as an IUCN Management Category IV protected area designated in 2001, and is measured at 5,424km². The Big Almaty Gorge IBA/KBA encompasses an area of 1,136.6km² and was designated for several bird species in 2007.
- 6.3.3 The Project area does not contain functionally linked habitat with the IBA and KBA or national designation and it is therefore unlikely that the key features of the IBA/KBA will be present within the Project area.

Habitats

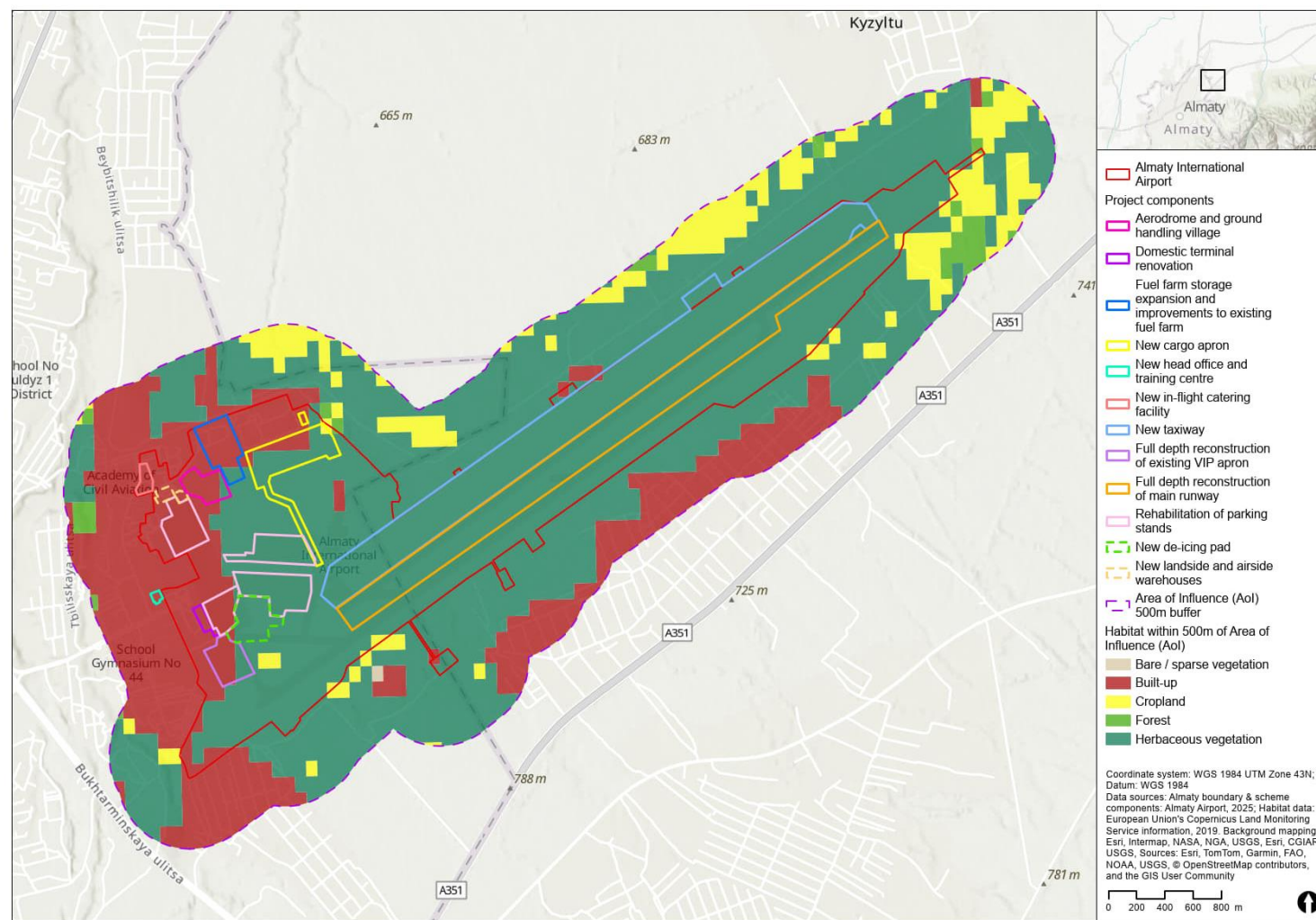
- 6.3.4 The Project footprint is located entirely within the boundaries of an existing operational airport and consists of fully modified habitat. The area is predominantly hardstanding, scattered with small, managed vegetated patches. These green areas are actively maintained to minimise the risk posed by wildlife to airport operations. There are no watercourses within the Project footprint; the nearest watercourse is the Malaya Almatinka River which borders the airport to the west. The Kotur-Bulak river crosses underneath the airport runways through a culvert.
- 6.3.5 The area to the west of the airport is primarily urban, comprising residential development with some industrial uses. To the north and south, the landscape transitions into agricultural land, interspersed with areas of shrub, scrub, and grassland.
- 6.3.6 Five habitat types were present within the footprint of the Project and the surrounding 500m buffer (data obtained from Copernicus³), these are presented in Table 6.2 and shown in Figure 6.2.

Table 6.2: Habitat types in the 500m Aol of the Project

Habitat type	Area (ha)
Herbaceous vegetation	1084.245437
Cropland	130.356765
Built-up	381.132366
Bare / sparse vegetation	0.886500414
Forest	22.562724

³ Copernicus, 2019. Available at: <https://land.copernicus.eu/en/products/global-dynamic-land-cover/copernicus-global-land-service-land-cover-100m-collection-3-epoch-2019-globe> [Last accessed: August 2025].

Figure 6.2: Habitat types in the 500m Aol of the Project



Almaty Airport ESIA | Biodiversity - Habitat within 500m Area of Influence (Aol) | 21 Aug 2025

Flora

- 6.3.7 During a field survey undertaken for the 2022 ESIA, the following tree and shrub species were identified within the Project Aol: cedar elm, ash, white poplar, sweet chestnut (*Castanea sativa*), weeping birch (*Betula pendula*), common lime tree (*Tilia vulgaris*), false acacia (*Robinia pseudoacacia*), black oak (*Quercus velutina*), cut-leaved maple (*Acer negundo*), yokewood (*Catalpa longissima*), scots pine (*Pinus sylvestris*), siberian spruce (*Picea obovata*), white cedar (*Thuja occidentalis*), common juniper (*Juniperus communis*), English elm (*Ulmus campestris*), common lilac (*Syringa vulgaris*), dog-rose (*Rosa canina*), panicked dogwood (*Cornus racemosa*), dikuscha currant (*Ribes dikuscha*), salmonberry (*Rubus spectabilis*) and various fruit trees. Their relevant abundance was not determined due to the absence of leaves, flowers and fruits at this time of year.
- 6.3.8 Due to the time of year and the snow cover, no herbaceous species were identified during the 2022 ESIA field survey. However, a previous site visit of the airport (as part of the Environmental and Social Due Diligence Assessment) identified xerophytic species such as feathergrass (*Stipa* sp.), fescue (*Festuca* sp.) and prairie june grass (*Koeleria macrantha*).
- 6.3.9 None of the plant species mentioned above are protected, threatened, endemic or rare, and no IAS were identified during the field survey.

Birds

- 6.3.10 The primary factors contributing to bird-aircraft collisions include the presence of bird migration routes over the airfield, nearby agricultural lands, and the existence of illegal waste dumps in the vicinity.
- 6.3.11 Based on the 2020 data provided by Almaty International Airport (ALA), and as presented in the 2022 ESIA, a list of birds occurring within the airport and their risk levels to aircraft has been collated (see Table 6.3). Two of significant risk (level 4), seven at high risk (level 3), nine at moderate risk (level 2) and 12 at low risk (level 1) were identified. The two species identified as of significant risk of bird strike (level 4) are long eared owl and European roller. However, according to the WHMP data for 2024, the risk associated with these species has since been reduced to moderate.

Table 6.3: Bird species known to occur within the airport and their associated risk of aircraft collision (2020)

Species name	Scientific name	Red List status ¹	Status	Collision Risk Assessment	Degree of collision risk
Long-eared owl	<i>Asio otus</i>	LC	Resident	Significant	4
European roller	<i>Coracias garrulus</i>	LC	Migrant	Significant	4
Rock dove	<i>Columba livia</i>	LC	Resident	High	3
Ring-necked pheasant	<i>Phasianus colchicus</i>	LC	Resident	High	3
Buzzard	<i>Buteo buteo</i>	LC	Migrant	High	3
Common kestrel	<i>Falco tinnunculus</i>	LC	Migrant	High	3
Eurasian sparrowhawk	<i>Accipiter nisus</i>	LC	Resident	High	3
Mallard	<i>Anas platyrhynchos</i>	LC	Migrant	High	3
Common pochard	<i>Aythya ferina</i>	VU	Migrant	High	3
European turtle dove	<i>Streptopelia turtur</i>	VU	Resident	Moderate	2
Carion crow	<i>Corvus corone</i>	LC	Resident	Moderate	2

Species name	Scientific name	Red List status ¹	Status	Collision Risk Assessment	Degree of collision risk
Hooded crow	<i>Corvus cornix</i>		Resident	Moderate	2
Barn swallow	<i>Hirundo rustica</i>	LC	Migrant	Moderate	2
Common blackbird	<i>Turdus merula</i>	LC	Resident	Moderate	2
Demoiselle crane	<i>Grus virgo</i>	LC; Cat V	Migrant	Moderate	2
Eurasian coot	<i>Fulica atra</i>	LC	Migrant	Moderate	2
European herring gull	<i>Larus argentatus</i>	LC	Migrant	Moderate	2
Black-headed gull	<i>Larus ridibundus</i>	LC	Migrant	Moderate	2
Magpie	<i>Pica pica</i>	LC	Resident	Low	1
Rook	<i>Corvus frugilegus</i>	LC	Resident	Low	1
Western jackdaw	<i>Coloeus monedula</i>	LC	Resident	Low	1
Common myna	<i>Acridotheres tristis</i>	LC	Resident	Low	1
Common starling	<i>Sturnus vulgaris</i>	LC	Migrant	Low	1
Great tit	<i>Parus major</i>	LC	Resident	Low	1
House sparrow	<i>Passer domesticus</i>	LC	Resident	Low	1
Eurasian tree sparrow	<i>Passer montanus</i>	LC	Resident	Low	1
White wagtail	<i>Motacilla alba</i>	LC	Migrant	Low	1
Eurasian siskin	<i>Carduelis spinus</i>	LC	Resident	Low	1
Grey-crowned goldfinch	<i>Carduelis caniceps</i>	LC	Resident	Low	1
Common chaffinch	<i>Fringilla coelebs</i>	LC	Resident	Low	1

Source: 2022 ESIA. Key: IUCN status: VU = Vulnerable, LC = Least Concern. Kazakhstan Red List status: Cat V = out of danger. Note 1: IUCN, 2021; National Red List.

6.3.12 Based on data collected through the ongoing Almaty Airport Bird and Wildlife Management Plan, a list of species present in the airport area and on the airfield has been compiled. This list is informed by direct observations as well as the collection and analysis of bird remains following wildlife strike incidents. From this dataset, and accounting for species' irreplaceability and vulnerability, the following key risk categories have been developed:

- High risk species: black kite (*Milvus migrans*), carrion crow (*Corvus corone*), domestic dog (*Canis* sp.), rock dove (*Columbia livia*). None of these species are considered threatened under the IUCN Red List but are deemed high risk due to their risk/probability of collision. In addition, the common pochard (*Aythya ferina*), black swift (*Cypseloides niger*) and European turtle-dove (*Streptopelia turtur*) are classified as Vulnerable (VU) under the IUCN Red List and are therefore included as high risk due to their irreplaceability.
- Moderate risk species: 26 species are included in this category. None of these species are considered threatened under the IUCN Red List.
- Very low risk: nine species fall under this category. None of these are considered threatened under the IUCN Red List.

Mammals

6.3.13 For the 2022 ESIA, no mammal species were recorded within the airport or the study area. A follow up survey in April 2021 noted yellow ground squirrels and jackals (*Canis aureus*) (both IUCN Least Concern). Ten ground squirrel burrows were recorded at the eastern end of the runway, and a jackal was seen outside the northern fence of the airport. Jackals feed at the numerous fly tipping locations around the airport and hunt pheasants and ground squirrels.

Reptiles

- 6.3.14 No reptiles were identified within the study area during the baseline surveys undertaken for the 2022 ESIA.

Critical habitat

- 6.3.15 Based on the baseline provided above, as well as the substantially modified nature of the habitats in the Aol, it is considered unlikely that the Project meets critical habitat thresholds as per the PS6 and ESR6 definitions.

Future baseline

- 6.3.16 Given the nature of the Project and its highly developed surroundings, it is assumed that the future baseline should not change significantly from the current baseline provided above. Monitoring of fauna should continue, and mitigation measures identified in Section 6.6 should be followed. Should residual impacts be identified after these measures are implemented, adaptive management should be considered.

6.4 Potential impacts

- 6.4.1 The main potential impacts from the Project on biodiversity receptors include:

- Construction
 - Increased noise levels from the demolition and re-construction of the main runway
 - Vegetation removal in small green spaces within the Aol associated with construction activities, leading to permanent loss of modified habitat
 - Increased artificial lighting and vibration from construction activities, vehicles and machinery leading to disturbance of wildlife
 - Injury and death of wildlife from vehicle movements
 - Increased emissions from construction equipment, machinery and vehicle movements
 - Dust emissions and deposition from land clearing, road works, extraction of material from quarries/borrow pits, material storage, loading/unloading/transportation of materials, wind blowing of stockpiles, etc. Dust deposition can degrade the habitats and affect species around the construction site.
 - Exposed excavations where wildlife may be entrapped
 - Pollution of soil and water from run-offs, accidental spills, wastewaters, sewage and cleaning of equipment, which may lead to degradation of habitats
 - Construction waste leading to habitat degradation
- Operation
 - Increased air and road traffic movements leading to:
 - An increase in noise, artificial lighting, and vibration leading to disturbance of wildlife
 - An increase in pollution and degradation of habitats
 - An increased risk of wildlife collision with road and air traffic

6.5 Assessment of effects

Construction phase effects

Habitats

- 6.5.1 All habitats within the AoI are considered to be modified. Vegetation clearance, dust emissions and other construction activities could affect habitats within the AoI.
- 6.5.2 Impacts on modified habitats within the AoI (considered to be **low** sensitivity) due to construction activities are considered to be of **minor** magnitude, with the resulting effect being **negligible** and **not significant**.

Flora

- 6.5.3 According to the 2022 ESIA, all species recorded within the Project footprint are common in Kazakhstan and are not protected or threatened (**low** sensitivity). Damage to flora species is considered to be an impact of **minor** magnitude, with the resulting effect being **negligible** and **not significant**.

Birds

- 6.5.4 Bird feeding grounds could potentially be present within the AoI due to the presence of insects accumulating in vegetated areas, leading to bird feeding activities in the airfield. Disturbance from the presence of people, artificial light spill and noise on bird species during construction in the AoI is of **minor** magnitude as the local context already includes an operational airport. The sensitivity of birds is **medium**, and therefore the significance of the effect is **minor adverse** and **not significant**.

Other faunal groups

- 6.5.5 No significant effects are anticipated for other faunal groups during the construction phase. Baseline data and field observations did not identify the presence of sensitive or conservation-significant species among mammals, reptiles or amphibians within the AoI. These groups are considered to be of **low** sensitivity, and construction activities are not expected to result in measurable impacts. Therefore, the resulting effect is **negligible** and **not significant**.

Operational phase effects

Habitats

- 6.5.6 All habitats within the construction footprint are considered to be modified and are of **low** sensitivity as they support limited biodiversity. No additional loss or impacts are expected on these habitats during operation. Given the impacts of **negligible** magnitude, the resulting effect will be **negligible** and **not significant**.
- 6.5.7 Impacts on other habitats within the AoI due to air and soil pollution related to operational activities are considered to be of **minor** magnitude, with the resulting effect being **negligible** and **not significant**.

Flora

- 6.5.8 As species identified are deemed to be of **low** sensitivity, the operational impacts including air and soil pollution on flora within the AoI are considered to be of **minor** magnitude, with the resulting effect being **negligible** and **not significant**.

Birds

- 6.5.9 Collision risk from air traffic: The risk categories used in the operational phase assessment build on the integrated framework introduced in Section 6.1.3, which considers species occurrence, vulnerability to collision, and irreplaceability (e.g. conservation status). This ensures that species identified as rare or threatened are appropriately prioritised in the impact assessment, even if their collision probability is lower. The categorisation used below reflects this combined approach, aligning aviation safety risk with biodiversity value.
- 6.5.10 The main threat identified to birds during operation is deemed to be bird strikes associated with air traffic. Based on the baseline data presented in Section 6.3.12, these are separated into three categories according to the risk categorisation. The data utilised is from the most recent findings on site (2024).
- High risk species: their sensitivity to collisions from air traffic is deemed to be **high**, and the magnitude of impact is considered **moderate**. The resulting significance is **major adverse (significant)**.
 - Moderate risk species: their sensitivity is deemed to be **medium**, and the magnitude of impact is **moderate**, resulting in a **moderate adverse (significant)** effect.
 - Very low risk species: their sensitivity is deemed to be **low**, and the magnitude of impact **moderate**, resulting in a **minor adverse (not significant)** effect.
- 6.5.11 Other operational activities: Other impacts such as disturbance caused by additional noise, artificial lighting, presence of people and the movement of vehicles will represent an impact of **minor** magnitude on birds during operation. Given the context of a fully operational airport already existing on site, the sensitivity of this receptor is deemed to be **low**. This results in a **negligible adverse** and **not significant** effect.

Other faunal groups

- 6.5.12 Operational activities are not expected to result in significant impacts on other faunal groups beyond birds. Species such as mammals, amphibians, and reptiles are either absent from the immediate airport environment or are considered to have **low** sensitivity to the types of disturbance associated with airport operations. Given the existing operational context of the airport and the limited suitability of the surrounding habitat for these groups, any potential impacts such as noise, lighting, or human presence are assessed as **negligible** and **not significant**.

Wildlife hazard risk to airport operations

- 6.5.13 Wildlife, particularly bird activity, presents a recognised operational risk to aviation safety due to the potential for bird strikes. This risk is being actively managed through the implementation of a Wildlife Hazard Management Plan (WHMP), which is currently in place and operating to satisfaction. The WHMP aligns with ICAO and EASA guidance, incorporating regular monitoring, deterrence measures, and adaptive management strategies to reduce the likelihood of wildlife-aircraft interactions.
- 6.5.14 The WHMP presents a review of bird collisions in the past year, with the most commonly recorded species including black crow (*Corvus corone*), rock pigeon (*Columba livia*), migratory swallows and black kite (*Milvus migrans*). Additional raptor species recorded include kestrel (*Falco tinnunculus*), sparrowhawk (*Accipiter nisus*), peregrine falcon (*Falcon peregrinus*), and long-eared owl (*Asio otus*), among others. These records are based on both direct observations and strike incident data.
- 6.5.15 While the WHMP provides a strong foundation for managing wildlife risks, some gaps remain, particularly in the systematic integration of species' irreplaceability (e.g. IUCN status) and

vulnerability into threshold-setting. To address this, adaptive management thresholds (see Table 6.4 for details) shall be refined to account not only for collision frequency but also for species conservation status and rarity. This will ensure that even infrequent collisions involving high-conservation-value species trigger appropriate mitigation responses. Ongoing monitoring under the WHMP will continue to inform updates to species risk categorisation and threshold values. Identified gap, such as limited seasonal data for migratory raptors, will be addressed through targeted surveys and coordination with ornithological experts.

- 6.5.16 Despite the effectiveness of current measures, wildlife hazards remain a residual operational risk due to the dynamic nature of wildlife behaviour and seasonal variability. In line with IFC Performance Standard 6 and international aviation safety frameworks, this risk is assessed using a likelihood vs. consequence matrix:

Likelihood: *Unlikely* – due to ongoing WHMP implementation and monitoring

Consequence: *Major* – due to the potential severity of a wildlife strike on aircraft safety

Risk Rating: *Moderate* – requiring continued mitigation and monitoring

- 6.5.17 The risk is considered to be reduced to **As Low As Reasonably Practicable (ALARP)** through the current WHMP. Ongoing evaluation and periodic updates to the plan will ensure continued alignment with best practice and regulatory expectations.

6.6 Mitigation

Construction phase biodiversity management

- 6.6.1 During the construction phase, biodiversity-related mitigation measures will be integrated into the Contractors' Construction Environmental and Social Management Plans (C-ESMPs). These C-ESMPs will be aligned with the overarching Environmental and Social Management Plan (ESMP) and will include specific actions to avoid, minimise, and manage potential impacts on biodiversity, in accordance with the mitigation hierarchy and the measures outlined in Table 6.4.

Operation phase wildlife management

- 6.6.2 ALA has developed management plans, detailed in the WHMP, to address increased insect presence due to vegetation, thereby reducing bird presence for feeding purposes. The wildlife management procedures in place to discourage bird species from the airport will continue during and after construction. As a result, no increased risk of bird strike is anticipated during the operation phase of the Project. Proposed mitigation measures for the Project's activities are provided in Table 6.4.

Table 6.4: Proposed mitigation measures for the Project

Type of measure	Project phase	Detail
Biodiversity	Construction	<ul style="list-style-type: none"> Store hazardous materials (e.g., fuel, chemicals) in bunded areas with spill kits and emergency procedures. Minimise dust and pollution via water spraying, covered stockpiles, damped internal roads, and speed limits (max 20 kph). Fence construction sites for security and wind control; clean soil from vehicle wheels before exit. Cover trucks transporting excavated soil to prevent dust dispersion. Cover or fence excavations to prevent wildlife access; monitor trenches and install escape routes where needed. Minimise noise and light disturbance; direct artificial lighting downward.

Type of measure	Project phase	Detail
		<ul style="list-style-type: none"> • If vegetation clearance is required during the bird breeding season (April–June), it is recommended that the Engineering, Procurement, and Construction (EPC) Contractor seeks confirmation or guidance from ALA's Wildlife Hazard Management team prior to proceeding. • Raise awareness among staff about wildlife protection and speed limits. • Reassess presence of AIS before works begin; contain and report any AIS found. • Prevent AIS spread via packaging, material movement, and vehicle wash-downs; source materials locally where possible.
Biodiversity – management of bird strikes	Operation	<p>Additional, non-habitat measures will continue to be implemented to reduce the bird strike risk. Currently implemented measures include:</p> <ul style="list-style-type: none"> • Regular bird watch patrols on stand-by • Regular cleaning of seeds and insects to reduce the likelihood of this being used by birds for feeding. • Use of chemical, acoustic or visual repellents. • Use of pyrotechnics in the form of yellow, green or red flares to scare birds away. • Use of propane thunder cannon, involving imitating shots through a 'clap' sound. This is utilised near the runway from March to the end of October. • Use of laser repellents used to scare birds away up to 4km. • Mechanical bird repeller – designed to scare away birds that are/appear to be in the path of an aircraft. • Firing of blank rounds to scare birds away by simulating a gunshot. • Use of bird signals to imitate predator calls. • Use of periodic distress calls of birds that need to be scared away. <p>These measures will continue to be implemented, and the results monitored to ensure their effectiveness is maintained.</p> <p>Adaptive management thresholds will be set by ALA. These thresholds should be quantitative and in line with PS6 requirements. Should the data/monitoring suggest these have been exceeded, adaptive management (e.g. deploying avian radar systems for real-time bird movement tracking) should be implemented as appropriate.</p>

6.7 Summary of residual effects

- 6.7.1 Residual effects are those that remain after mitigation and/or enhancement measures have been implemented. These are presented in Table 6.5.
- 6.7.2 In summary, minor adverse residual effects will be present for high and moderate risk bird species. It is proposed that continued monitoring of bird species present on site, as well as maintenance of a record of these and identification of those affected by bird strikes is undertaken. Should an increase in bird strikes be encountered, adaptive management should be undertaken.

Table 6.5: Summary of residual effects for biodiversity

Description of effect	Permanent or temporary	Sensitivity of receptor	Magnitude of impact	Significance of effect before additional mitigation	Additional mitigation	Residual effect	Proposed monitoring
Construction phase							
Pollution and permanent loss of terrestrial habitat and flora	Permanent	Low	Minor	Negligible – Not significant	N/A	N/A	N/A
Terrestrial wildlife – road traffic collision, fauna becoming entrapped in open excavations, artificial lighting and noise and vibration impacts.	Permanent	Low	Minor	Negligible – Not significant	Fence off open excavations, rescue entrapped animals, ensure the perimeter fence remains uncompromised, minimise artificial lighting, noise and vibration effects during works, and integrate a vehicle movement plan to minimise deaths from vehicle movements.	Negligible – Not significant.	During construction activities, as outlined in Section 6.6.
Birds - artificial lighting and noise and vibration impacts.	Permanent	Medium	Minor	Minor adverse	Implement measures to minimise noise and vibration disturbance to birds, implement artificial lighting shaders to prevent light spillage, carry out bird nesting checks 48 hours before vegetation clearance and implement a vehicle movement plan.	Negligible – Not significant	During construction activities, as outlined in Section 6.6.
Operational phase							
Pollution and permanent loss of terrestrial habitat and flora	Permanent	Low	Minor	Negligible – Not significant	N/A	N/A	N/A
Birds (high, moderate and low risk species) – air traffic strikes	Permanent	Low	Moderate	Moderate adverse	Regular bird watch patrols, use of chemical, auditory and visual deterrents for birds, and maintenance of vegetation and Use grass species that are less attractive	Minor adverse – Not significant	Continued monitoring of birds' populations within the airport by qualified ornithologists, and maintenance of a record of

Description of effect	Permanent or temporary	Sensitivity of receptor	Magnitude of impact	Significance of effect before additional mitigation	Additional mitigation	Residual effect	Proposed monitoring
					to birds, to minimise feeding habits in the Aol.		bird strikes and, where possible, identification of affected species. Should these experience a pattern of increase, adaptive management will be implemented.
Birds (other operational activities) – additional noise from increased airport capacity, artificial lighting, presence of people and movement of vehicles.	Permanent	Low	Minor	Negligible – Not significant	N/A	N/A	N/A
Terrestrial wildlife (other faunal groups) – additional noise from increased airport capacity, artificial lighting, presence of people and movement of vehicles.	Permanent	Low	Minor	Negligible – Not significant	N/A	N/A	N/A

