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Executive Summary

This report evaluates the environmental and social impacts of the Hazrat Shahjalal International Airport (HSIA) Expansion Project in Dhaka, which adds a modern passenger terminal (Terminal 3) to accommodate rising travel and cargo demand through 2030. The project includes the new terminal building, expanded aircraft parking aprons, and upgraded road and utility connections.

The assessment focuses on five key issues and establishes practical solutions to safeguard neighboring communities and the surrounding environment:

1) Land Use and Relocation: The expansion takes place entirely within existing airport-owned property, requiring no acquisition of private land, homes, or farms. A few existing security barracks and expired commercial business leases on site will be relocated through fair administrative procedures and grievance support.
2) Noise Management: Quieter rotary drilling techniques will replace noisy hammer pile drivers during foundation work. To protect nearby neighborhoods such as Uttara and Nikunja, flight operations will follow international noise standards, supported by a dedicated community complaints desk and smooth descent flight paths.
3) Air Quality and Dust: Dust will be controlled during construction by regular water spraying on unpaved site roads and using tarps over transport trucks. A new multi-story car park will reduce curbside vehicle idling, while energy-efficient terminal designs will lower overall power emissions.
4) Bird Strike Prevention: Open water ponds and tall grass on the airfield attract birds, posing serious collision risks to airplanes. The main internal pond will be drained and filled, drainage ditches will be enclosed, and grass will be kept trimmed to deter birds from crossing active runways.
5) Road Traffic and Safety: Heavy construction trucks will use separate internal routes to avoid worsening congestion on the main Dhaka–Mymensingh Highway. Dedicated elevated access ramps and an underground walkway connecting directly to future train and bus stations will separate airport visitors from everyday highway traffic.

A dedicated Environmental Management Unit will oversee site compliance and conduct regular air, water, and noise checks to ensure the airport operates safely, cleanly, and responsibly alongside surrounding communities.

Chapter 1. Project Background

Section 1.1 Project Identification and Administrative Framework

The Hazrat Shahjalal International Airport (HSIA) Expansion Project (Phase 1 / Terminal 3) is located in Kurmitola within northern Dhaka. The administrative governance structure comprises four primary institutions:

1) **Project Sponsor:** Civil Aviation Authority, Bangladesh (CAAB) under the Ministry of Civil Aviation and Tourism (MOCAT), executing engineering and safeguard compliance via a Project Implementation Unit (PIU).
2) **Administrative Line Ministry:** Ministry of Civil Aviation and Tourism (MOCAT), providing inter-ministerial coordination and state approvals.
3) **Regulatory Authority:** Department of Environment (DoE), Ministry of Environment, Forest and Climate Change (MoEFCC), enforcing the Environment Conservation Act (ECA) 1995 and Environment Conservation Rules (ECR) 1997.
4) **Financing Agency:** Japan International Cooperation Agency (JICA), funding the project under Official Development Assistance (ODA) loan agreements governed by the JICA Guidelines for Environmental and Social Considerations (2010).

Section 1.2 Development Objective (D.O.) and Proposed Activities

In accordance with EIA concepts, the Development Objective (D.O.) is distinguished from the physical works: the D.O. is meeting regional air traffic demand through 2030 and preventing economic bottlenecks, while the Activity is the terminal and airfield expansion, accomplished through discrete site-level Actions.

01

Development Objective (Why)

Meeting international passenger and cargo demand through 2030

Averting regional aviation bottlenecks

02

Primary Civil Activities (What)

Construction of Passenger Terminal 3

Airside aprons

Taxiways

03

Associated Actions

Demolition of expired tenant leases

Screwed steel piling

Utility relocation

Drainage diversion

Section 1.3 Scope of Physical Works

The physical footprint of the Phase 1 expansion is confined entirely within the designated boundary of HSIA, requiring no acquisition of private agricultural, commercial, or homestead land.

The following table delineates the components comprising the project.

Table 1 Physical Components and Scope of Works for HSIA Expansion (Phase 1)

Component	**Scale / Footprint**	**Function and Safeguard Repercussion**
Passenger Terminal 3	3 stories; ~220,000 m^2	12.0 mppa capacity; features energy-efficient HVAC and LED arrays.
Parking Apron	~520,000 m^2 concrete	Wide-body stands; requires apron runoff oil-water separators.
Taxiway Network	~95,000 m^2 (rapid-exit & connecting)	Reduces runway occupancy time (ROT) and aircraft idling emissions.
Cargo Complex	~42,200 m^2	Isolates import/export logistics freight from passenger terminals
Multi-Level Parking	~62,000 m^2 + pedestrian tunnel	Alleviates curbside traffic delays on arterial access roads.
Utility Infrastructure	STP (~3,000 m^2), Substation (~7,000 m^2)	Dedicated on-site biological sewage treatment and power distribution.



Figure 1 General Layout Plan of HSIA Terminal 3 Expansion and Associated Airside/Landside Works

Section 1.4 Regulatory Screening and Legal Framework

Under the three-tier framework of Bangladesh (Screening > IEE > Detailed EIA):

1) **National Environmental Screening:** Under ECR 1997 (Schedule I, Item 60: "Engineering works: capital above 10 hundred thousand Taka"), the project is categorized as Red.
2) **Statutory Clearances:** Red category projects require a two-tier clearance from DoE:
    a. *Site Clearance Certificate (SCC):* Granted upon DoE approval of the Feasibility Study, initial IEE, and EIA Terms of Reference (ToR).
    b. *Environmental Clearance Certificate (ECC):* Issued upon approval of the full ESIA report and Environmental Management Plan (EMP), subject to mandatory annual renewal.
3) **Multilateral Lender Screening:** Screened as Category B under JICA Guidelines (2010), as works are restricted to the existing airport boundary with reversible, site-specific impacts. However, national law mandates a full EIA to satisfy Red Category criteria.
4) **Acoustic Standards Harmonization:** Airport noise is statutorily exempt under the domestic Noise Pollution (Control) Rules 2006. To ensure compliance with international safeguards, ICAO Annex 16 (Aircraft Noise) standards are adopted as the assessment benchmark.

Section 1.5 Scoping Framework and Project Boundaries

Scoping was executed prior to baseline field surveys using interaction matrices, checklists, and stakeholder consultations to delineate study limits and screen out low-priority parameters:

1) **Temporal Timing:** In compliance with national EIA guidelines, scoping was completed less than two months before field surveys to prevent seasonal baseline distortion.
2) **Direct Area of Influence:** Confined to the internal 802-hectare HSIA property boundary (T3 site, apron, internal haul routes, and tenant leaseholds).
3) **Indirect Area of Influence (Zone of Influence):** Encompasses a 10 km radius around the runway midpoint, covering the surrounding urban airshed, approach/departure flight paths, regional road links (Dhaka-Mymensingh Highway), and drainage basins.

Section 1.6 Environmental Base Map (10 km Radius)

As mandated by DoE guidelines for detailed EIA reports, an Environmental Base Map covering a minimum 10 km radius was compiled to map spatial receptors:

1) **Aeronautical Layout:** Active Runway 14-32, taxiways, navigational aids, and the Terminal 3 footprint.
2) **Acoustic & Social Receptors:** Dense urban settlements surrounding the site (Uttara to the north, Nikunja to the south, Turag to the west), including residential schools and hospitals beneath flight paths.
3) **Institutional Zones:** Dhaka Cantonment military reservation and Army Golf Club to the south/southwest.
4) **Hydrology & Wetlands:** Internal airfield retention pond, surface drainage canals, and western low-lying wetlands discharging into the Turag River basin.
5) **Surface Transportation:** Dhaka-Mymensingh Highway, Airport Railway Station, and regional arterial intersections.

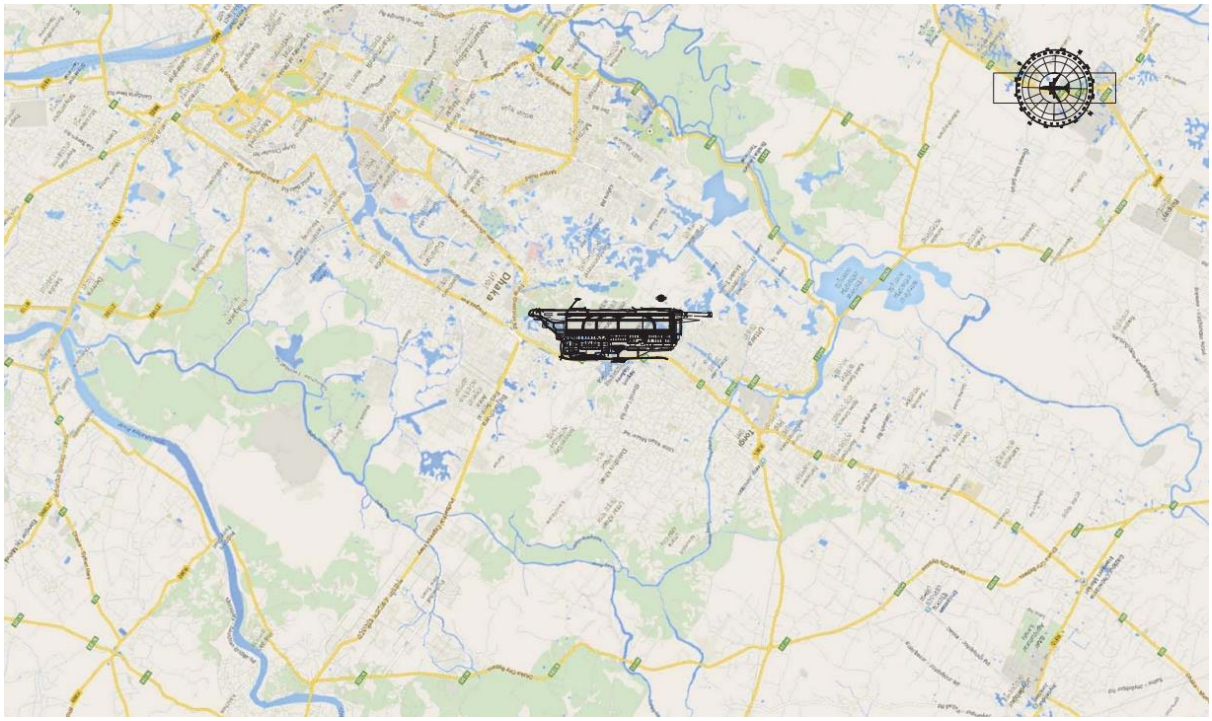


Figure 2 Environmental Base Map of HSIA and Surrounding Influence Zone (Scale 1:50,000)

Chapter 2. Baseline Environment

Section 2.1 Baseline Concept

In Environmental Impact Assessment (EIA), an environmental impact represents an identified deviation from the baseline situation caused by project activities. The baseline reflects existing biophysical, social, and economic conditions in the absence of the proposed intervention. In accordance with ESIA principles, the baseline cannot be characterized as a static "snapshot"; it must account for cyclical variability (such as monsoon water levels) as well as secular temporal trends (such as regional traffic growth and background airshed deterioration).

This chapter establishes the environmental setting across the 802-hectare Hazrat Shahjalal International Airport (HSIA) site (Direct Influence Area) and the surrounding 10 km radius (Indirect Influence Area), directly fulfilling Component 2 of the Department of Environment (DoE) EIA framework.

Section 2.2 Physical Environmental Setting

Subsection 2.2.1 Topography, Subsurface Soils, and Climate

HSIA sits on the flat alluvial deltaic plain of northern Dhaka, with ground elevations ranging from 4.0 m to 10.0 m above Public Works Datum (PWD). Subsurface stratigraphy is categorized into cohesive clays (C-1 to C-4) and non-cohesive sands (S-1 to S-4):

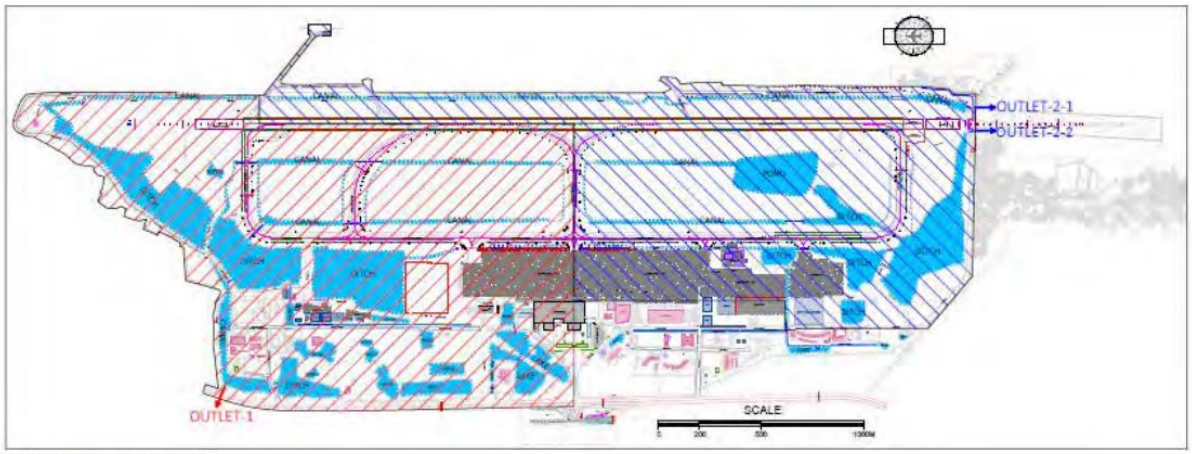
1) **Surface Formations (C-1, C-2, S-1):** Shallow deposits of soft to medium-stiff clay (C-2) dominate the airside, presenting consolidation settlement risks under heavy taxiway pavements. Localized loose sand layers (S-1, Borehole RWBH-29) present potential liquefaction vulnerability under seismic events.
2) **Bearing Stratum (S-4):** Very dense sand is uniformly distributed below -30 m PWD, providing the competent bearing layer for the Terminal 3 foundation piles.

The local tropical monsoon climate experiences heavy rainfall concentrated between June and October (accounting for 70% of annual precipitation), with an annual average of 77.5 precipitation-induced work suspension days.

Subsection 2.2.2 Hydrology and Internal Drainage System

HSIA forms an independent, diked hydrological catchment isolated from outside floodwaters. Runoff is segregated into two drainage networks:

1) **Northern System:** Drains the runway and primary airfield turf through interconnected open trapezoidal ditches into an internal regulating retention pond, discharging northwest into the Turag River floodplain.
2) **Southern System:** Channels apron, administrative, and parking runoff through covered masonry culverts to a southeastern perimeter outfall.



Source: JICA Study Team

Figure 3 Surface Water Drainage Network and Retention Pond Locations at HSIA.

Section 2.3 Acoustic Baseline and Ambient Air Quality

Subsection 2.3.1 Acoustic Environment and Aircraft Noise Baseline

The acoustic baseline consists of ambient urban roadway noise coupled with intermittent, high-energy aircraft noise:

1) **Perimeter Background Noise:** 24-hour equivalent ambient levels range between 54.8 dB and 58.6 dB along the airport boundary, dominated by traffic along the eastern highway.

2) **Aircraft Flight Contours:** Cumulative day-evening-night metrics reach 75 dB at the airport boundary along the primary approach and departure paths of Runway 14-32.
3) **Regulatory Context:** Although airport noise is statutorily exempted under the Bangladesh Noise Pollution (Control) Rules 2006 and ECR 1997, international safeguards require benchmarking against ICAO Annex 16 aircraft noise metrics.

Subsection 2.3.2 Ambient Air Quality

Ambient air monitoring indicates that the baseline airshed is heavily burdened by airborne particulate matter (PM_{10} and $PM_{2.5}$), primarily generated by regional vehicle exhaust, industrial brick kilns, and resuspended road dust.

Parameter	Baseline Concentration at HSIA	National Standard (DoE ECR 1997)	Compliance Status
PM_{10} (24-hr)	142.50 – 148.52 µg/m^3	150 µg/m^3	Near Saturation
$PM_{2.5}$ (24-hr)	71.54 – 76.68 µg/m^3	65 µg/m^3	Non-Compliant
SO_2 (24-hr)	8.12 – 9.01 µg/m^3	365 µg/m^3	Compliant
NO_x (Annual)	55.10 – 58.12 µg/m^3	100 µg/m^3	Compliant
CO (8-hr)	2.0 – 3.0 mg/m^3	10.0 mg/m^3	Compliant

Section 2.4 Biological Environment

Airfield vegetation consists entirely of maintained turf grass, weeds, and landscaped perimeter shrubs, with no endangered flora, ecologically critical areas, or pristine forests present.

However, open retention reservoirs, standing water in open ditches, and unpaved runway shoulders provide foraging, drinking, and resting grounds for urban avifauna. Dominant resident species include the Black Kite (Milvus migrans), House Crow (Corvus splendens), Common Myna (Acridotheres tristis), and Cattle Egret (Bubulcus ibis). These populations intersect the landing and departure corridors of Runway 14-32, constituting an active baseline bird-strike risk under ICAO Annex 14 aerodrome safety specifications.

Section 2.5 Land Use, Socio-Economic Profile, and Landside Traffic

Subsection 2.5.1 Land Use, Encroachments, and Property Boundaries

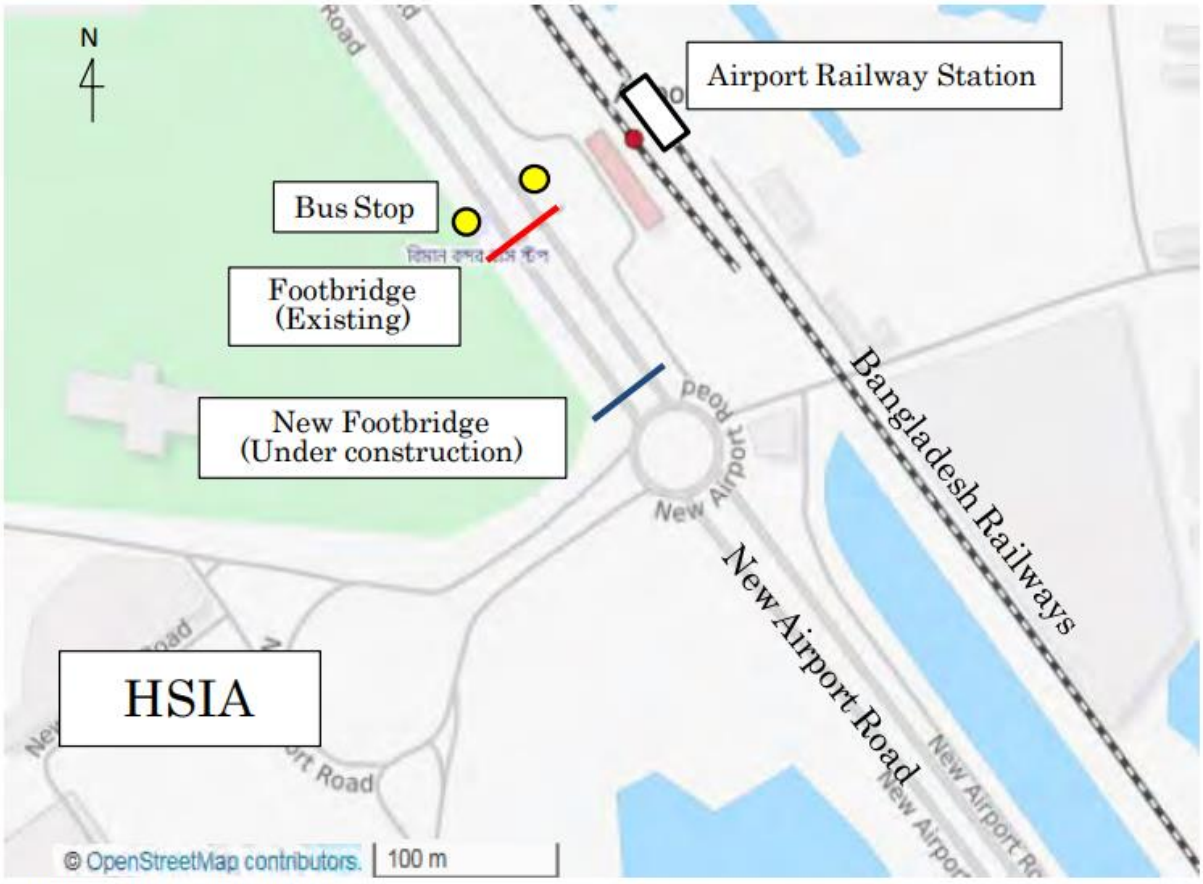
Surrounding land use is defined by dense urban development: Uttara Model Town to the north, Dhaka Cantonment to the south, Turag wetlands to the west, and the Dhaka–Mymensingh corridor to the east. Building height limitations (Obstacle Limitation Surfaces) are enforced along both runway approaches.

The Phase 1 expansion requires zero private land acquisition, as the works are entirely situated within the existing 802-hectare CAAB property.

Subsection 2.5.2 Landside Transportation and Traffic Bottlenecks

HSIA connects to the urban core exclusively via the New Airport Road segment of the Dhaka–Mymensingh Highway (N3), an 8-lane divided arterial route. The existing landside transportation baseline suffers from three primary bottlenecks:

1) **Intersection Weaving:** An unsignalized roundabout in front of HSIA forces airport traffic to merge directly into heavy regional inter-city flows, causing frequent peak-hour gridlock.
2) **Transit Spillover:** A northbound public bus stop located 160 m north of the roundabout causes severe curbside lane blockages, forcing commuters into active travel lanes.
3) **Pedestrian Crossings:** The Airport Railway Station directly opposite HSIA generates Dhaka's largest commuter volumes. Commuters routinely cross the high-speed highway at grade instead of using distant overhead pedestrian bridges, degrading the roadway Level of Service (LOS) and creating persistent accident hazards.



Source: JICA Study Team

Figure 4 Existing Landside Access Transportation Bottlenecks and Conflict Nodes at HSIA

Chapter 3. Impact Assessment & Mitigation

Section 3.1 Assessment Methodology

In accordance with standard EIA principles, environmental impacts are assessed using a three-step method: Identify, Predict, and Judge. Potential interactions between project activities and environmental components are identified, their quantitative or qualitative magnitude is predicted, and their significance is judged based on regulatory criteria and proposed mitigation effectiveness. Impacts are characterized by attributes including nature (direct or indirect), duration (short-term construction vs. long-term operation), spatial extent, and reversibility.

Section 3.2 Land Acquisition, Encroachments, and Resettlement

1) **Impact Characterization:** Because the expansion is confined entirely within the existing 802-hectare HSIA boundary, zero acquisition of private land is required, avoiding large-scale involuntary resettlement.
2) **Site Encroachments:** The Terminal 3 footprint directly conflicts with five existing internal installations.
3) **Mitigation Measures:** CAAB facilities are relocated internally through inter-departmental transfers. Expired private leases are resolved through legal eviction procedures and negotiated administrative handovers.

Section 3.3 Acoustic Impacts and Noise Abatement

1) **Construction Phase:** High-intensity, intermittent noise generated by demolition, earthworks, and foundation piling poses short-term disturbance to on-site personnel and boundary areas. The use of rotary screwed steel piling instead of impact pile driving substantially attenuates peak acoustic shockwaves.
2) **Operational Aircraft Noise:** Expanded flight movements up to 2030 will generate repetitive noise along the approach and takeoff funnels of Runway 14-32, exposing residential receptors in Uttara and Nikunja to noise levels exceeding 75 dB.
3) **Mitigation Measures:** During construction, contractors must deploy low-noise machinery fitted with acoustic enclosures and mufflers. For operations, CAAB will establish a dedicated Noise Complaint Section, enforce ICAO Annex 16 noise compliance on visiting aircraft, and encourage noise-preferential continuous descent flight procedures.

Section 3.4 Air Quality and Atmospheric Emissions

1) **Construction Phase:** Bulk excavation of 760,000 m^3 of topsoil and heavy diesel vehicle movements will release fugitive dust (PM_{10} and $PM_{2.5}$), worsening northern Dhaka's already saturated baseline airshed.
2) **Operational Emissions:** Aircraft Landing and Takeoff cycles, auxiliary power units, and landside vehicle queues contribute localized nitrogen oxides (NO_x), carbon monoxide (CO), and greenhouse gases.
3) **Mitigation Measures:** Unpaved hauling routes and active earthwork sites will receive regular water sprinkling and cleaning. A 62,000 m^2 Multi-Level Car Parking facility will be constructed to streamline passenger pick-up and eliminate emissions from idling curbside vehicles. Energy-efficient HVAC and LED installations will minimize operational electricity and carbon footprints.

Section 3.5 Bird Strike Hazard Management

1) **Impact Risk:** The presence of an open storm water retention pond and drainage canals adjacent to the active runway provides foraging and roosting grounds for kites, crows, and egrets. This creates a severe collision hazard for arriving and departing aircraft under flight safety standards.
2) **Mitigation Measures:** The internal retention pond within the Phase 1 development area will be drained and filled with sand, and open ditches will be replaced with covered concrete box culverts. Airfield turf grass will be systematically maintained at controlled heights (15–20 cm) to deter feeding birds, supported by daily runway patrols using auditory and visual deterrents.

Section 3.6 Landside Traffic and Transportation

1) **Impact Identification:** Heavy construction haul trucks and future operational traffic generated by 12 million annual passengers will overwhelm the Dhaka-Mymensingh Highway, worsening gridlock at the existing unsignalized roundabout and bus stops.
2) **Mitigation Measures:**
    a. *Construction Hauling:* Dedicated internal haul routes will segregate heavy site machinery from public road networks.
    b. *Elevated Grade Separation:* A dedicated landside elevated access road and service interchange will segregate incoming and outgoing traffic directly onto the national expressway.
    c. *Pedestrian Integration:* An underground pedestrian corridor linking Terminal 3 directly to future transit stations (BRT/MRT) will eliminate hazardous at-grade pedestrian highway crossings.

Chapter 4. Environmental Management Plan

Section 4.1 Objectives and Scope of the EMP

Environmental Impact Assessment (EIA) is an ongoing decision-making process rather than a static product. The Environmental Management Plan (EMP) translates EIA findings into an actionable framework of mitigation, monitoring, and institutional measures designed to eliminate, offset, or reduce adverse impacts to acceptable levels. Adopting an EMP reflects the core management principle that "good environmental management means good project management", preventing construction delays, avoiding community disputes, and ensuring regulatory compliance.

Section 4.2 Environmental Mitigation Measures

Mitigation measures address the primary environmental and social concerns identified across the project lifecycle, forming auditable commitments embedded into construction contracts:

1) **Air Quality and Dust Control:** During construction, active unpaved haul routes will receive regular water sprinkling, topsoil stockpiles will be limited in height and covered, and vehicle tires will be washed at site exits. During operation, a multi-level car park will prevent curbside idling emissions, while energy-efficient terminal lighting and air conditioning will curb indirect greenhouse gas emissions.
2) **Acoustic Management:** Contractors must deploy machinery fitted with acoustic mufflers and utilize low-noise foundation piling methods. Operationally, CAAB will establish a dedicated Noise Complaint Section to log community feedback, enforce ICAO Annex 16 aircraft noise guidelines, and encourage continuous descent flight procedures to reduce residential disturbance.
3) **Water Quality and Waste Management:** A dedicated on-site Sewage Treatment Plant (STP) will treat domestic blackwater and greywater to national discharge standards before releasing effluent into regional canals. Drainage from fuel storage and apron zones will pass through oil-water separators to trap potential fuel spills.
4) **Bird Strike Hazard Mitigation:** Aviation safety risks will be eliminated by backfilling the open airfield retention pond and replacing open drainage ditches with covered concrete box culverts. Airfield grass will be maintained at controlled heights (15–20 cm) to deter feeding birds, supported by regular runway wildlife patrols.
5) **Landside Traffic Management:** Construction truck traffic will be restricted to dedicated internal haul routes to prevent local road congestion. Operational passenger traffic will be separated via elevated access roads and an underground pedestrian corridor connecting directly to regional public transit.

Section 4.3 Institutional Arrangements and Capacity Building

For large infrastructure projects, an Environmental Management Unit (EMU) should be instituted directly within the Project Implementation Unit (PIU) to supervise day-to-day environmental performance.

1) **Implementation Responsibilities:** The EMU will review contractor compliance, conduct periodic site audits, coordinate with the Department of Environment (DoE), and update the EMP as conditions evolve.
2) **Capacity Building & Training:** Site personnel and contractors will receive structured training in personal protective equipment (PPE) compliance, workplace safety, emergency spill response, and public health awareness.
3) **Grievance Redress Mechanism (GRM):** A Grievance Redress Committee will be established to provide an accessible dispute forum for neighboring residents regarding noise, drainage, or traffic concerns.

Section 4.4 Environmental Monitoring Plan (EMoP)

The monitoring plan outlines specific parameters, locations, and measurement frequencies to ensure early detection of impacts and assess mitigation effectiveness.

Environmental Component	Parameter to be Monitored	Monitoring Location	Method & Frequency	Implementing Responsibility
Air Quality	Particulate matter (PM_{10}, $PM_{2.5}$), NO_x, SO_2	Worksite boundary and adjacent residential areas	Certified air sampler; Quarterly (24-hr)	Contractor / Certified Lab
Noise & Vibration	Equivalent noise level, Aircraft noise	Site perimeter and nearest community receptors	Sound level meter; Monthly continuous logging	Contractor / EMU
Water Quality	pH, suspended solids, BOD, oil and grease	STP outfall and oil-water separator basins	Water sampling and laboratory analysis; Monthly	Facility Operator / Certified Lab
Bird Hazards	Bird flock density, strike incidence	Runway strips and drainage areas	Visual inspection and airfield logs; Daily	Wildlife Hazard Unit

Environmental Component	Parameter to be Monitored	Monitoring Location	Method & Frequency	Implementing Responsibility
Traffic & Access	Vehicle queue lengths, intersection delays	Main airport access road and entry intersections	Traffic count observation; Semi-annually	Traffic Management Cell

Monitoring records will be compiled into quarterly performance reports, submitted to the Department of Environment (DoE) for clearance renewals, and integrated into project evaluation reviews. EMP monitoring and training expenses will be integrated directly into the overall project budget.