Terms of Reference (TOR) for Consulting Services

Climate Risk Assessment and Design

Reconstruction of National Highway N-5 under Pakistan's Resilient Recovery, Rehabilitation and Reconstruction Framework Project

1. Introduction

The National Highway Authority (NHA) of Pakistan is preparing the "Reconstruction of National Highway N-5 under Pakistan's Resilient Recovery, Rehabilitation and Reconstruction Framework Project" to be financed by the Asian Infrastructure Investment Bank (AIIB or the Bank) and potentially other co-financiers. To support the Project preparation, the NHA has engaged an Engineering and Design (E&D) consultant, National Engineering Services Pakistan (Pvt.) Limited (NESPAK), for preparation of detailed design and Project PC-I. NESPAK's scope of work also includes a hydrology and hydraulics study and a climatology and geology study where a Climate Change Vulnerability and Risk Assessment (CVRA) is being carried out.

With the support of the Project Preparation Special Fund (PPSF) provided by AIIB, the NHA intends to engage an International Consultant (Consulting Firm) to enhance the climate assessments and related designs for the Project and conduct a Climate Risk Assessment (CRA) for the entire N-5 highway.

2. Project Description

The 1,819 kilometer long North-South National Highway (N-5) is the lifeline of Pakistan's economy. It connects the port city of Karachi in the south to the provincial capital of Peshawar in the northwest and extends all the way to the Afghanistan border. It serves most of the country's large urban centers and economic areas. The N-5 carries about 55 percent of the inter-city traffic and 65 percent of the freight and commercial traffic in Pakistan.

Despite its significance and economic importance, the N-5 faces infrastructure deficiencies and other constraints, which reduce the efficiency that a modern road network provides. At the same time, N-5 is extremely vulnerable to climate and climate-related threats as manifested during the 2022 floods. About 100 kilometers of crucial links of the N-5 were severely damaged in these floods, affecting cross-country traffic. In some sections of the N-5, the average daily traffic exceeds 60,000 vehicles, far exceeding the design capacity of the road. The higher-than-design traffic not only deteriorates the pavement quality, but also poses safety risks. As a result, most sections of the road have been assessed below 3 stars (with a 5-star maximum rating of the International Road Assessment Program), posing safety risks to vehicles and occupants.

The Project spans nine (9) sections of the N-5 highway, covering a total of 553 kilometers, as outlined in Table 1. It will be implemented in two phases, also detailed in Table 1. The final selection of sections for Phase 1 will be determined during Project preparation, and adjustments may be made to refine the start and end points of each section. Phase 1 construction is expected to begin in January 2026 and be completed by June 2030. Phase 2 construction is scheduled to start in April 2026, with completion anticipated by December 2030. The total estimated cost of the Project is approximately USD 833 million.

Table 1: Sections of the N-5 Highway Included in the Project

No.	Section	Road (Centerline) Length (km)	Preliminary Phasing
1	Hyderabad - Hala	56	2
2	Ranipur – Rohri	70	1
3	Okara - Manga	83	2
4	Lahore - Gujranwala	75	1
5	Gujranwala - Kharian	68	2
6	Kharian - Dina	41	2
7	Dina - Rawat	72	2
8	Rawalpindi – Burhan	48	1
9	Nowshera – Peshawar	40	1
10	Construction of 5 Bridges	-	1
Total		**553**	

The Project includes the following components, which could be further refined during the Project preparation:

1) **Reconstruction of Eight (9) Sections of the N-5 Highway**. This component involves several upgrades, including expanding the existing 4-lane dual carriageway to a 6-lane dual carriageway where necessary, constructing a 7.3-meter-wide service road (or as per the available right of way) in urban areas, and upgrading the road corridor with climate-resilient infrastructure through the addition of cross-drainage structures and other measures. It also includes widening and improving existing bridge structures, rehabilitating deteriorated road sections, and enhancing highway safety through geometric improvements, installation of road safety devices, pedestrian crossings, and dedicated U-turns, etc.

2) **Project Management Support and Institutional Capacity Development.** This component will provide support to the PIU of NHA through the hiring of consultants to strengthen the technical capacity for project management, procurement, monitoring, financial management (FM), and environmental and social activities, along with conducting institutional capacity building activities to enhance climate risk response, transportation operations and management capabilities.

3) **Supervision Consultants.** This **component** will finance the Supervision Consultant(s) (SC) required for this Project.

3. Objective of the Assignment

The main objective of this assignment is to comprehensively assess the climate risks of the Project and the entire N-5 highway to increase their resilience to climate risks. This assignment also intends to identify climate mitigation measures to reduce the Project's carbon footprint, assess the Project's Paris Agreement alignment and its qualification as Climate Finance, and calculate the Project's lifecycle greenhouse gases (GHG) emissions.

4. Scope of Services

The Consultant shall carry out the following tasks at a minimum:

Task 1: Assess the Paris Agreement alignment for the Project

- Assess the alignment of the Project components with the climate mitigation goals (BB1) of the Paris Agreement following AIIB's "Methodology for Assessing the Alignment of AIIB Investment Operations with the Paris Agreement" (https://www.aiib.org/en/about-aiib/who-we-are/partnership/_download/Methodology-for-Assessing-the-Alignment-of-AIIB-Investment-Operations-with-the-Paris-Agreemement.pdf).
- Assess the alignment of the Project components with the climate adaptation goals (BB2) of the Paris Agreement following AIIB's methodology (as indicated above).
- Develop a Paris Agreement Alignment Report summarizing the assessment results with transparent calculations (if any) and supporting data and materials.

Task 2: Assess the qualification as Climate Financing for the Project

- Assess the Project components' possible qualification as Climate Mitigation Finance and the percentage of Climate Mitigation Finance following the Joint Multilateral Development Banks (JMDBs) Common Principles for Climate Mitigation Finance Tracking (https://www.aiib.org /en/about-aiib/who-we-are/partnership/download/Revised-Common-Principles-for-Climate-Mitigation-Finance-Tracking-2023-12-05.pdf).
- Assess the Project components' qualification as Climate Adaptation Finance and the percentage of Climate Adaptation Finance following the JMDBs' Joint Methodology for Tracking Climate Adaption Finance (https://thedocs.worldbank.org/en/doc/20cd787e947dbf44598741469 538a4ab-0020012022/original/20220242-mdbs-joint-methodology-climate-change-adaptation-finance-en.pdf) and AIIB's latest proportional approach (will be provided by AIIB).
- Develop a Climate Finance Report summarizing the assessment results with transparent calculations and supporting data and materials.

Task 3: Conduct Climate Mitigation Analysis and Calculate scope 1, 2 & 3 lifecycle GHG emissions for the Project

- Conduct lifecycle GHG emission assessments, including scope 1, 2 & 3 emissions for baseline and Project scenarios with proposed mitigation strategies. The GHG assessments shall follow established and widely accepted principles and standards, such as the GHG protocol (https://ghgprotocol.org/), which is accepted for the International Sustainability Standards Board (ISSB) reporting. More specifically, the following steps should be taken at a minimum:
    a. Plan and define the GHG assessment approach. Consider a lifecycle approach, which includes the entire lifecycle of the Project, from planning, design & engineering, construction, operations and maintenance, to decommissioning and demolishment. This is considered as gross emission of the project.

b. Define the baseline and estimate the Project's baseline scope 1, 2 & 3 GHG emissions for the entire Project lifecycle.

c. Define Project scenarios with proposed mitigation strategies, measures, and designs and estimate the Project's scope 1, 2 & 3 GHG emissions for the whole Project lifecycle.

d. Work out the relative emissions as the difference between Project scenarios' GHG emissions and baseline GHG emissions following the UNFCCC harmonized standards for IFI GHG accounting (https://unfccc.int/climate-action/sectoral-engagement/ifis-harmonization-of-standards-for-ghg-accounting/ifi-twg-list-of-methodologies).

- Identify technically and financially feasible and practical climate mitigation strategies, measures, and designs and incorporate them into the design, construction, and operations of the Project. The Consultant shall work closely with NHA and the E&D consultant in developing, testing, and incorporating such strategies, measures, and designs into the Project.
- Establish a process and methodology for monitoring and evaluating the GHG assessment results to ensure reliability.
- Develop a Climate Mitigation and GHG Emission Report summarizing the results of this Task with supporting data and materials.

Task 4: Conduct Climate Adaption Analysis / Climate Risk Assessment (CRA) for the Project

- Review and provide recommendations to enhance the E&D consultant's Climate Change Vulnerability and Risk Assessment (CVRA) for the Project.
- Conduct any supplemental work needed to ensure the CVRA meets AIIB and international standards.

a. AIIB standard refers to the 3-Step mythology in section "B. ASSESSMENT FOR PAA UNDER BB2" (pages 16-22) of the "Methodology for Assessing the Alignment of AIIB Investment Operations with the Paris Agreement" (https://www.aiib.org/en/about-aiib/who-we-are/partnership/_download/Methodology-for-Assessing-the-Alignment-of-AIIB-Investment-Operations-with-the-Paris-Agreement.pdf).

b. International standards: the following provides two examples. The Consultant is encouraged to explore and adopt the best international methodologies.

i. European Union: Regional Adaptation Support Tool (https://climate-adapt.eea.europa.eu/en/mission/knowledge-and-data/regional-adaptation-support-tool)

ii. Inter-American Development Bank: Disaster and Climate Change Risk Assessment Methodology for IDB Projects: A Technical Reference Document for IDB Project Teams (https://publications.iadb.org/en/disaster-and-climate-change-risk-assessment-methodology-idb-projects-technical-reference-document)

- Develop technically and financially feasible and practical climate adaptation strategies, measures, and designs and incorporate them into the design, construction, and operations of the Project to increase the Project's resilience to disasters and climate risks. The Consultant shall work closely with NHA and the E&D consultant in developing, testing, and incorporating such strategies, measures, and designs into the Project.
- Develop a Climate Risk Assessment Report for the Project summarizing the results of this Task with supporting data and materials.

Task 5: Incorporate climate mitigation and adaptation measures into Project Design

- Review the E&D consultant's designs and ensure climate mitigation and adaptation measures are adequately and appropriately incorporated.
- Develop a Climate Mitigation and Adaptation Design Report summarizing the strategies, measures, and designs incorporated into the Project and their impact.

Task 6: Conduct Disaster and Climate Risk Assessment (DCRA) for the entire N-5 highway

- Conduct a comprehensive Disaster and Climate Risk Assessment for the entire N-5 highway following AIIB and international standards as provided in Task 4. This includes, among others, a Flood Susceptibility Analysis for the entire N-5 highway considering the climate change impacts, geological, meteorological, and hydrological factors to ensure safe, sustainable, and disaster-resilient road infrastructure.
- conduct a comprehensive road infrastructure audit for the entire length of N-5 leveraging Digital Elevation Models to identify potential vulnerable locations and suggest measures to improve the road drainage capacity according to revised hydrological requirements considering all factors influenced by climate change, restricted water ways, etc.
- Review national highway/road design standards and guidelines and recommend changes to increase highway resilience against disasters and climate change risks.
- Develop a Disaster and Climate Risk Assessment Report for the entire N-5 highway summarizing the results of this Task with supporting data and materials.

Task 7: Knowledge sharing and capacity building

- The Consultant shall conduct at least quarterly knowledge sharing and capacity building sessions, such as meetings, workshops, trainings, seminars, and/or conferences to share the analysis results and relevant experience with NHA, AIIB, and relevant stakeholders.
- Develop knowledge sharing materials such as presentations, reports, white papers, guidance, brochures, maps to support the knowledge sharing sessions.

5. Deliverables

The Consultant shall complete the Scope of Services within twelve (12) months of contract signing. The deliverables from Tasks 1, 2, 3, 4, 5, and partially 7, targeted for the Project as described in Section 2 of this TOR (i.e., selected sections of the N-5 highway), must be delivered within six (6) months of contract signing. This assignment's overall delivering

schedule is provided in Table 2. The Consultant shall develop their methodology based on the schedule.

All deliverables shall be in English.

Draft deliverables shall be delivered to NHA and AIIB for review at least three (3) weeks prior to the deadline provided in Table 2. The Consultant is encouraged to submit initial draft deliverables as early as possible.

Table 2: Deliverables and Schedule

Task	Key Deliverables	Format	Expected Deadline (months from contract signing date)
0	Work Plan	1 PDF report	0.5
1	Paris Agreement Alignment Report	1 PDF report Excel file(s)	2
2	Climate Finance Report	1 PDF report Excel file(s)	2
3	Climate Mitigation and GHG Emission Report	1 PDF report Supporting materials, Excel file(s)	4
4	Climate Risk Assessment Report for the Project	1 PDF report Supporting materials, Excel file(s)	6
5	Climate Mitigation and Adaptation Design Report	1 PDF report Supporting digital maps, drawings, Excel file(s)	6
6	Disaster and Climate Risk Assessment Report for the entire N-5 highway	1 PDF report Supporting digital maps, drawings, Excel file(s)	12
7	Knowledge sharing sessions and supporting materials	Meetings, workshops, trainings, seminars, and/or conferences; PPT/PDF file(s)	12

6. Consultant Qualifications

The following requirements are a broad description of the likely expertise needed for this consultancy assignment. The Consultant may propose additional experts as may be needed to fulfil this TOR. The Consultant may mobilize supporting experts and administrative staff, including editors, as necessary to execute the Scope of Services. The Consultant is encouraged to engage diverse team compositions, including a mixture of genders. The Consultant is expected to:

1) Be a firm or a consortium of them, with appropriate and sufficient capabilities, resources, and experience to execute the full extent of the Scope of Services to a very high quality;
2) Have demonstrated experience in:

a. Disaster and climate risk/adaptation assessment,
b. Paris Agreement Alignment assessment,
c. Climate finance analysis,
d. Climate mitigation assessment,
e. Carbon emissions accounting including lifecycle scope 1, 2 & 3 GHG emissions calculations for infrastructure, ideally roads and highways, and/or
f. Incorporating climate mitigation and adaption measures into engineering designs in the context of infrastructure projects, especially highway or road projects.

3) Have a proven record of completing at least one (1) similar assignment successfully in the past five (5) years.

The suggested Key Experts, their qualifications, and the estimated person-months of input are provided in Table 3.

Table 3: Key Experts, Qualifications, and Estimated Person-Months Input

No.	Position	Minimum Qualification Requirements	Estimated person-months
1	Project Manager	10+ year of relevant experience in climate assessment; Managed 1+ comparable projects in the last 5 years; Experience with international financial institutions (IFIs).	8
2	Senior Climate Adaptation Specialist(s)	7+ years of relevant experience in climate adaptation, disaster and climate risk assessment; Experience with international financial institutions (IFIs).	36
3	Senior Climate Mitigation Specialist	7+ years of relevant experience in climate mitigation; Experience with international financial institutions (IFIs).	6
4	Senior Carbon Accounting Specialist	7+ years of relevant experience in GHG calculations; Experience with international financial institutions (IFIs).	6
5	Senior Highway Design Engineer	7+ years of relevant experience in highway design; Experience with Pakistan's highway design standard and AASHTO (American Association of State Highway and Transportation Officials) standard.	4
	Total		**60**

7. Working Conditions

The Consultant shall provide safe and efficient working conditions and necessary equipment and tools to its project team working on this assignment. When traveling to Pakistan and carrying out field work, NHA could provide local guidance and assistance, but the Consultant should be responsible for their own safety and security.