



Technical Assistance Consultant's Report

Project Number: 48414-001/TA 8950-UZB
June 2020

Uzbekistan: Third CAREC Corridor Road Investment Program (Financed by the Technical Assistance Special Fund)

Prepared by SHELADIA Associates Inc. USA in association with Infrastruktura Lohiya Byurosi LLC Uzbekistan (CBI)

For Government of Uzbekistan
Committee for Roads

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Asian Development Bank

PPTA FOR THIRD CAREC CORRIDOR ROAD INVESTMENT PROGRAM, PHASE 1

Funded by:

Executing Agency:

Asian Development Bank

Committee for Roads of the Republic of Uzbekistan



Consultant's Final Report



June 2020



**SHELADIA Associates Inc. USA in association with
Infrastruktura Loyiha Byurosi LLC, Uzbekistan (CBI)**

Volume I, Main Report

ADB TA 8950 – UZBEKISTAN

**PROJECT PREPARATORY TECHNICAL ASSISTANCE FOR THIRD
CAREC CORRIDOR ROAD INVESTMENT PROGRAM, PHASE 1**

CONSULTANT'S FINAL REPORT FOR

Kashkadarya Regional Road Project (Karshi – Kitab Road)

**Noise and Vibration Studies on
A380, km 228 – km 315 and Karshi – Kitab Road**

**Karakalpakstan Road Project
A380, km 964 – km 1204 (Kungrad to Daut-Ata section)**

June 24, 2020

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**SHELADIA Associates Inc. USA in association with
Infrastruktura Loyiha Byurosi LLC, Uzbekistan (CBI)**

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List of Abbreviations

AASHTO	American Association of State Highway Transport Officials
AC	Asphalt Concrete
ADB	Asian Development Bank
AM	Aide Memoire
ASTM	American Standard Testing Methods
BOQ	Bill of Quantities
CBI	Consulting Bureau for Infrastructure (Infrastruktura Loyiha Byurosi LLC)
CBR	California Bearing Ratio
CR	Committee for Roads of the Republic of Uzbekistan under the Ministry of Transport
DPR	Detailed Project Report
EA	Executing Agency
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
FS	Feasibility Study
IBA	Important Bird and Biodiversity Area
IA	Implementing Agency
IEE	Initial Environmental Examination
LHS	Left Hand Side
LTP	Lead Technical Professional
MFF	Multi-tranche Financing Facility
NH	National Highway
NPV	Net Present Value
NSDP	Net State Domestic Product
O/D	Origin/Destination
PCU	Passenger Car Unit
PSA	Poverty and Social Assessment
PPTA	Project Preparatory Technical Assistance
QA	Quality Assurance
QAR	Quality Assurance Reviewer
RDI	Road Design Institute (Yo'l Loyikhasi Byurosi LLC)
RHS	Right Hand Side
ROW	Right of Way
RRF	Republican Road Fund of the Republic of Uzbekistan
SH	State Highway
SCEEP	State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection
ShNK	Architectural Rules and Regulations
SPS	ADB's Safeguard Policy Statement (2009)
SHELADIA	SHELADIA Associates Inc.
TA	Technical Assistance
TOR	Terms of Reference
TRTA	Transaction Technical Assistance
URM	Uzbekistan Resident Mission
VC	Video Conference
VDF	Vehicle Damage Factor

A. Knowledge Summary

1. The Asian Development Bank (ADB) is funding the “Third CAREC Corridor Road Investment Program” – Technical Assistance (TA) 8950-UZB to help the Uzbek Government to upgrade parts of the road network, reduce poverty, support women and communities in the project regions and develop capacity of governmental authorities.
2. The initial investment program was proposed as a Multi-tranche Financing Facility (MFF), which would rehabilitate 364 km of international highways in the Republic of Karakalpakstan and the Khorezm and Kashkadarya regions of Uzbekistan. In the course of the TA implementation it was decided to implement former Tranches I and II as standalone projects and to exclude former Tranche 3.

List of project roads

Project name	Road sections	Road Category	Road length (km)
Kashkadarya Regional Road Project	4R79, km 28 – km 64	I	36
	K319, km 18 – km 30		12
	M39, km 1144 – km 1173		29
Karakalpakstan Road Project	M39, km 964 – km 1,204	II	240

3. Uzbekistan faced governmental changes at the end of 2016, which affected the implementation of the TA. Before the project was put on a temporary hold, the Consultant had completed the due diligence for the Kashkadarya Regional Road Project in November 2016.
4. In spring 2018, ADB requested the Consultant to carry out noise and vibration studies and update the IEEs of the Kashkadarya Regional Road Project and another 87 km section on A380 (Bukhara – Gazli, km 228 – km 315). These services were completed in July 2018.
5. TA activities for the Karakalpakstan Road Project – former tranche 2 – resumed at the end of 2018. A separate TOR for this standalone project was issued by ADB to reflect the current status of the design prepared by a national company.
6. Supply and installation of intelligent transport systems in a pilot section of A373 and supply and installation of WIM at 3 selected locations, 1 on M39 and 2 on A373 is included in the Karakalpakstan Road Project. To carry out the safeguards due diligence for these facilities was added to the scope of services of the TA.

7. As part of the safeguards due diligence activities the Consultant prepared gender action plans for each project and a community development plan for the two settlements adjacent to the Karakalpakstan road section. The plan proposes to establish two multi-purpose community centers, which among others will provide access to telemedicine facilities.
8. After it became evident that in the project area of the Karakalpakstan Road Project endangered species are present, a biodiversity and critical habitat assessment was undertaken to fully comply with the requirements of ADB SPS 2009. The Consultant recruited an international ecologist for these tasks and identified likely impact on saiga movement. The biodiversity assessment recommended mitigation measures and extensive monitoring during construction and operation and a biodiversity action plan was prepared for implementation.
9. In both projects being part of the TA after mobilization, it turned out, that the project documents were not fully available for review and/or not available in English. It should be assured, that the design preparation is completed before TA mobilization and that national design companies have English capacity, as delays have significant impact to Consultant's staffing schedule and resources.
10. The Kashkadarya Regional Road Project was originally intended to be implemented under national financing. ADB got involved when the project was ongoing. This created additional challenges with regard to the standards to be applied, especially for safeguards. Preferably, ADB should either provide TA's, which include the preparation of FS and DD documentations, or which are limited to due diligence after these documentations are available for review.
11. Permanent ongoing institutional changes in Uzbekistan, also in the road sector, complicated the execution of the TA. The establishment of a new PMU for each project does not contribute to capacity building and knowledge transfer, although some of the staff usually gets transferred to the new PMU.
12. National design companies lack quality management systems in place and prepare the bidding drawings and cost estimates according to national standards. It is essential to develop a schedule of unit rates or bid price evaluation data base to properly assess the bids.

B. Executive Summary

13. With the objective of promoting regional integration and boosting economic activity, the Asian Development Bank (ADB) proposed Multi-tranche Financing Facility (MFF) for the Third Central Asia Regional Economic Cooperation (CAREC) Corridor Road Investment Program. The MFF would rehabilitate 364 km of international corridor highways in the Republic of Karakalpakstan, Khorezm and Kashkadarya regions of Uzbekistan. A critical step in the development of the CAREC Corridor initiative, the Investment Program would provide the last “missing link” in connecting the CAREC corridors to the international border with Kazakhstan.
14. The TA activities of SHELADIA cover the due diligence of the detailed design including safeguards aspects, road safety audit and the economic analysis. The tasks also include the preparation of the bidding documents for the civil works and road maintenance and the terms of reference for the site supervision consultant. Technical due diligence activities were undertaken based on the detailed design documentation made available by RDI. The main goal was to ensure that the technical design solutions are in compliance with design guidelines in force in Uzbekistan and reflect good international practice. Environmental and social safeguard studies were undertaken to ensure that the project would comply with ADB safeguard policies and national laws. For the procurement of civil works a procurement plan including the procurement risk analysis and bidding documents were elaborated.
15. The initial MFF program contained three tranches, out of which the first tranche (Kashkadarya Regional Road Project) was processed as a standalone project in 2016 and the second tranche was the 240 km long section from km 964 to km 1,204 on A380 highway (Kungrad to Daut-Ata section). Governmental changes in Uzbekistan after September 2016 affected the initial overall project implementation schedule and civil works for the Kashkadarya Regional Road Project were not procured in 2017. In the course of the TA a number of additional tasks was assigned to the Consultant, which were not part of the original scope of works, to tailor the TA to actual project requirements.
16. In spring 2018 ADB assigned SHELADIA to undertake noise and vibration studies for the Kashkadarya Regional Road Project as well as for section from km 228 to km 315 on A380. Related environmental safeguards documents for both road sections were updated before the works were tendered.
17. Former tranche 2, the 240 km long road section from km 964 to km 1,204 on A380 highway (Kungrad to Daut-Ata section) was processed in 2019, also as a standalone project, under the Karakalpakstan Road Project. As another component the said project includes the installation of Weigh-in-Motion systems at 3 locations on M39 and A373. The Consultant prepared the safeguards documentation for them in autumn 2019.
18. Environmental screening for the Karakalpakstan Road Project revealed the possible existence of some endangered species, e.g. the Saiga antelope and birds, in the project area of the 240 km long road section. A biodiversity screening was undertaken and resulted in the need for a full biodiversity assessment, covering more than one season of the year. First field surveys were conducted in spring 2019 and followed by the second survey in autumn 2019. The related biodiversity assessment report was prepared in January 2020.
19. International and national experts of SHELADIA were mobilized as per actual requirements of the TA over its whole duration, starting in 2016 and ending in spring 2020. Project developments and government changes in Uzbekistan after the start of the TA in March 2016 caused adjustments to the initial timeframe of the TA and extensions of the contract as well as the anticipated deadline for completion.
20. Road designs were prepared by the national design company “Yul Loyikhasi Byurosi LLC” (Road Design Institute) according to national design standards. The same company elaborated Technical Specifications and Bills of Quantities. SHELADIA reviewed the complete documentation and prepared review reports and comments for consideration. Own surveys, for example traffic counts, were carried out as per ToR to verify data of the designer.
21. From 2016 to 2020 many institutional reforms took place in Uzbekistan and are continuing. The executing agency is the Committee for Roads under the Ministry of Transport of Uzbekistan.

C. Introduction

22. In 2016 the Government of Uzbekistan had requested for a project preparatory assistance (PPTA) to carry out due diligence and prepare a comprehensive design under the Third CAREC Corridor 2 Road Investment Program. The Asian Development Bank (ADB) financed the PPTA. The investment program was initially proposed as a Multi-tranche Financing Facility (MFF), which would rehabilitate 364 km of international highways in the Republic of Karakalpakstan and the Khorezm and Kashkadarya regions of Uzbekistan. The initial MFF program contained three tranches. In June 2016, the decision was approved to implement the Kashkadarya Regional Road Project (former tranche I) as stand-alone project to expedite its implementation.
23. Identified by the Government as a priority road development program (Resolution of the President of the Republic of Uzbekistan No 2313 on the Program of Development and Modernization of the Engineering-Communication and Road and Transport Infrastructure for the period 2015-2019, dated March 6, 2015), the output anticipated for the Kashkadarya Regional Road Project is the upgrading/construction of a regional road section connecting Karshi and Kitab (77 km), providing a shorter high capacity link between these two centers on A380 and M39 along 4R79, 4K319, 4R84 and M39 roads. The totally 127 km long design road sections will be constructed to a category I road in accordance with the design guideline ShNK 2.05.02-07.
24. The output anticipated for the Karakalpakstan Road Project are (i) the rehabilitation/construction of the international road section from km 964 to km 1,204 on A380 connecting to the Kazakh border; (ii) supply and installation of intelligent transport systems in a pilot section of A373; and (iii) supply and installation of WIM at 3 selected locations, 1 on M39 and 2 on A373. The 240 km long design road section will be constructed to a category II road in accordance with the design guideline ShNK 2.05.02-07.
25. To assist the Executing Agency in the preparation of the project, ADB has engaged SHELADIA Associates, Inc. (SHELADIA), in association with the Consulting Bureau for Infrastructure (CBI) to provide the required consulting services under the TRTA. The original PPTA consultancy contract, which was signed on 24th February 2016 following contract negotiations in the period 23-24 February 2016, has been extended till end of July 2020 and is still in force. The VO for the provision of services for the Karakalpakstan Road Project was issued by ADB in October 2018. It following was processed in 2019, also as a standalone project.
26. The TRTA (i) conducted technical due diligence reviewing the detailed engineering design and drawings to ensure consistency and sufficiency for bidding including road safety audit, BOQ and specifications; (ii) prepared social and environmental safeguards documents including preparation of EMPs; (iii) reviewed and updated the economic and financial analysis; (iv) updated the procurement assessment; and (v) assisted the Executing Agency in preparing bid documents including preparation of TOR for the site supervision consultant.
27. The TRTA (i) developed an investment program bankable by ADB loan; (ii) conducted due diligence for technical, economic, financial, social and environmental viability of the project; (iii) assisted the Executing Agency in developing required documentation for country resource allocation; and (iv) assisted the Executing Agency in procuring contracts and managing safeguard issues. As per June 2019 variation the Consultant also undertook the social and environmental due diligence for the proposed Weigh-In-Motion (WIM) axle load control stations.
28. The executing agency (EA) for the project is the Committee for Roads of the Uzbek Republic. The order to establish the Road Committee was given by the resolution of the President of Uzbekistan on February 1, 2019. A Project Management Unit (PMU) was established as implementing agency. After ADB's approval of the Karakalpakstan Road Project, it shall be implemented by the implementation agency, the PMU.
29. The figure below provides an overview of the location of the project areas for each of the projects under the PPTA.



Figure 1: Physical map of the Republic of Uzbekistan

C.1 Kashkadarya Regional Road Project

C.1.1 General Description of the Route

30. The overall 127 km long project road Karshi – Shahrisabz – Kitab consists of road 4R79 km 0 – km 64, road 4K319 km 30 – km 12, road 4R84 km 19 – km 14 and road M-39 km 1184-1144 km (in direction from Karshi to Kitab)", thereby contributing to the growth of internal and external transport in the region. This will ensure better economic and regional cooperation with neighboring countries.
31. Start of the project road is in the city of Karshi. Further, it passes through Karshi, Guzar, Kamashi, Yakkabag, Shakhrisabz and Kitab regions of the Kashkadarya province.
32. The 77 km of road sections to be financed by international financiers (ADB) are as follows:
 - Section 1, design km 28 to design km 76 (48 km)
 - Road 4R79 "Karshi city – Khanabad village – Chirokchi – Shakhrisabz city", km 28 – km 64 (36 km)
 - Road K319 "railway station Tanhoz – Yakkabog city – Esat village – Kazak village", km 18 – km 30 (12 km)
 - Section 2, design km 98 to design km 127 (29 km)
 - Road M39 "Almaty – Bishkek – Tashkent – Shakhrisabz - Termez" km 1144 – km 1173. (29 km)
33. The first two of the above-mentioned road sections form a coherent design section of 48 km length. The second design section of 29 km length is the one located on M39. Both roads were built in the 70s and 80s of the last century.

C.1.2 Major Nodes

34. There is a number of major junctions in the two ADB sections. They have been designed according to local standard and the layout drawings for them are contained in the FS of DI. The major junctions are shown in the following table.

Table 1: Major junctions in ADB sections of Kashkadarya Regional Road Project

Chainage	Type of Junction
Section 1, design km 28 to design km 76	
km 38.4	Cross Road
km 52.5	Cross Road
km 64.0	T-Junction
Section 2, design km 98 to design km 127	
km 100.34	Cross Road
km 101.54	Cross Road
km 101.98	Cross Road
km 112.94	T-Junction

35. On the next page an overview of the road sections in the Kashkadarya Regional Road Project by proposed financier is presented.

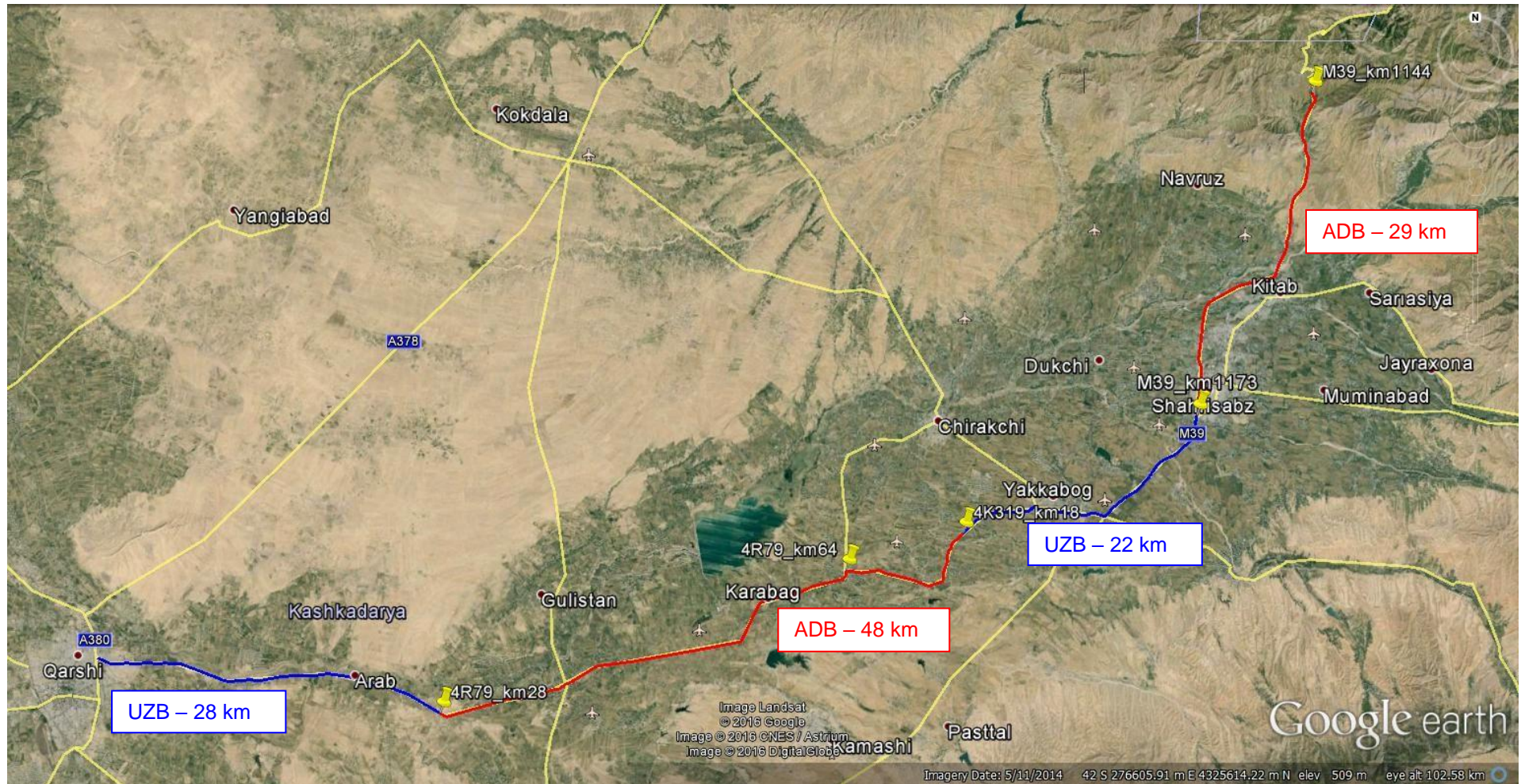


Figure 2: Overview of Kashkadarya Regional Road Project sections to be financed by Uzbek Government and ADB

C.1.3 Staff Mobilization

36. The SHELADIA Team was mobilized on March 17, 2016 as agreed with the ADB. A project kick-off meeting was held with ADB and PMU officials on March 22. The staff schedule had been planned assuming that all related FS and DD documents for the three tranches of the MFF are readily available. In April the consultant was informed that tranche 1 of the MFF is likely to be implemented as a stand-alone project. The schedule for deliverables was adjusted to assure timely submission to advertise the project in the last quarter of 2016.
37. ADB issued two variation orders to include the translation and update of the DD drawings for the Kashkadarya Regional Road Project into the scope of works of the consultant in September 2016. Accordingly, Sheladia team made necessary adjustments to the working and staff schedules to meet the revised deadlines and hired additional staff with the required expertise.
38. In November 2016 the Consultant demobilized from the field. It was expected, that the activities for the pending two tranches of the initial MFF would resume early 2017, but due to governmental changes, they faced a substantial delay.

C.2 Noise and Vibration Studies on A380, km 228 – km 315 and Karshi – Kitab Road

C.2.1 General Description of the Routes

39. Km 228 to km 315 road section on A380 starts at the outskirts of Bukhara city and for the first 30 km of the 87 km upgrade passes through populated areas, with the remainder in desert areas. From the start point behind Bukhara it runs northwestwards over a length of 87 km. On its way the road passes through Bukhara, Ramitan, Peshkun, and Zhandar regions of Uzbekistan. The route terminates at the approach of Gazli city. The project will upgrade the road section from a two-lane road to a four-lane dual carriageway with cement concrete pavement.
40. Karshi – Kitab Road is subject of the Kashkadarya Regional Road Project and described above.
41. The picture on the next page displays the route from km 228 to km 315 on A380.

C.2.2 Staff Mobilization

42. According to VO #5, issued by ADB in spring 2018, SHELADIA Team mobilized their international noise and vibration and environment experts to the field on March 20, 2018. They undertook a first field reconnaissance for the noise and vibration monitoring for both road sections, km 228 – km 315 on A380 and Karshi – Kitab road till the end of March, 2018.
43. Noise monitoring field works (long- and short-term measurements) were carried out in May 2018 and a vibration assessment was undertaken. The preparation of the updated IEE reports was completed in July 2018.



Figure 3: Overview of A380 km 228 – km 315 road section

C.3 Karakalpakstan Road Project

C.3.1 General Description of the Route and Locations

44. Start of the project road is at km 964 of A380 with design chainage km 0+000, at the end of the previous road section already contracted for rehabilitation. The project alignment follows the existing A380 road only in some sub-sections, namely from km 0 to approx. km 10, from km ca. 79 to km ca. 110 and from km ca. 219 to the end (km 240). In the other sub-sections, the design route mainly runs on an abandoned old gravel/earth road in various distance to the left of the existing A380. The DD was prepared in 40 km long sub-sections to expedite the design works, using a continuous design chainage throughout the full project road length.
45. Along with the improvements proposed in the Karakalpakstan Road Project, two new Weigh-in-Motion (WIM) facilities have been proposed, the first of them at km 2.7 of A373 road and the second at km 817.9 of M39 road. Both are located at the approaches to Tashkent from two different directions. The existing WIM at km 192.4 of A373 road will be improved by addition of a sorter system in front of the facility. It is located at the edge of Chinor settlement, some 15 km behind Angren city.

C.3.2 Major Nodes

46. There are no junctions with other major roads in the whole 240 km long project road section. However, minor roads connecting the railway stations located left from the project alignment to A380 are being crossed. At these locations new junctions have been designed according to local standard and the layout drawings for them are contained in the DD of RDI. Junctions included in the design of RDI are shown in the following table.

Table 2: Junctions along the Karakalpakstan Project Road

Chainage	Type of Junction
A380, km 964 to km 1204	
km 0.769	Cross Road
km 1.877	Cross Road
km 5.194	Cross Road
km 8.969	T-Junction
km 37.484	Cross Road
km 43.678	Cross Road
km 66.168	Cross Road
km 85.221	Cross Road
km 109.562	T-Junction
km 134.222	Cross Road
km 156.269	Cross Road
km 180.360	Cross Road
km 196.493	Cross Road
km 198.825	T-Junction
km 198.970	T-Junction
km 201.149	Cross Road
km 219.760	T-Junction
km 236.211	T-Junction
km 239.627	T-Junction

47. On the following two pages the route of the 240 km long road section of the Karakalpakstan Road Project and the locations of the WIM are displayed.



Figure 4: Overview of Karakalpakstan Road Project location

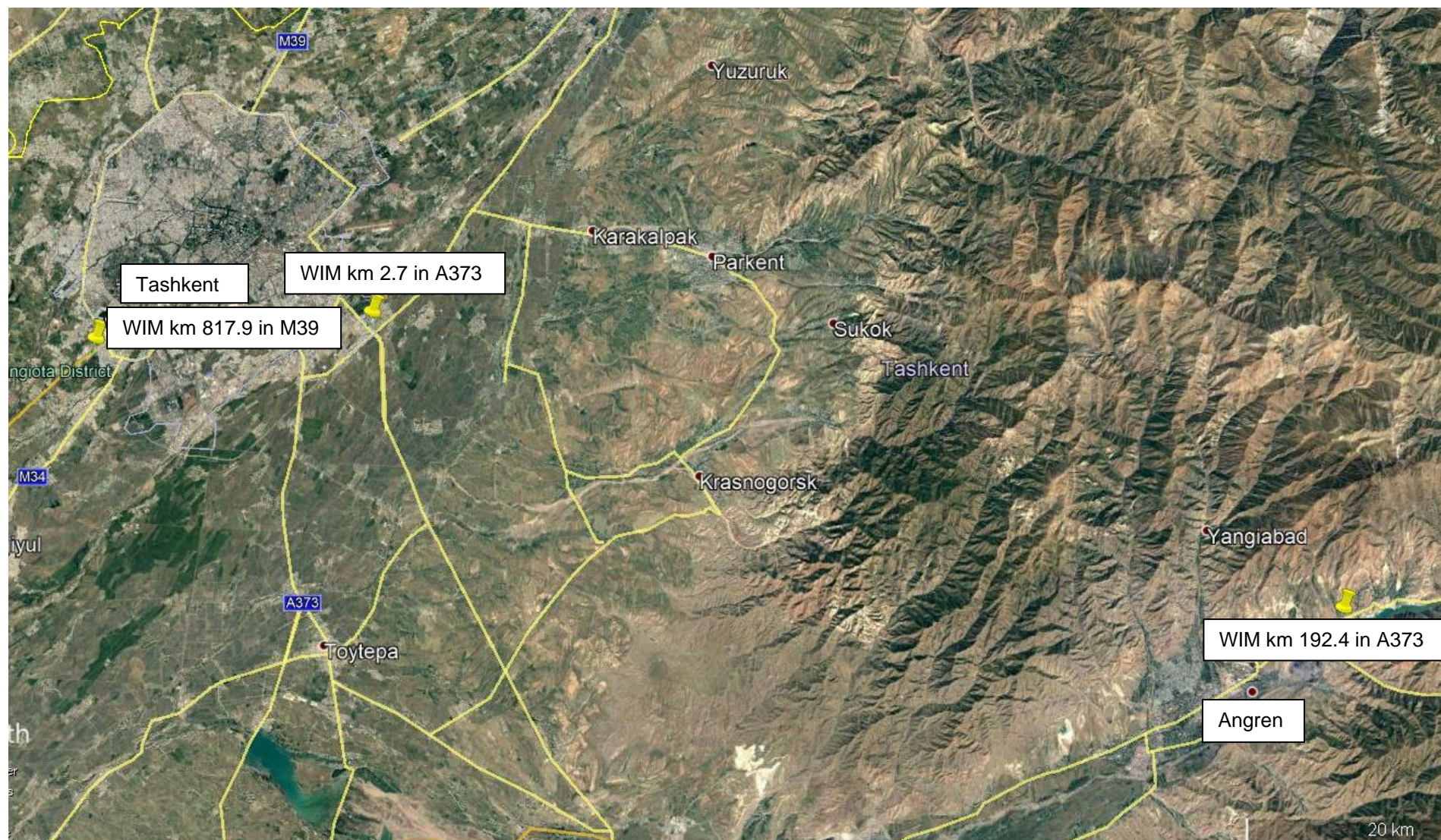


Figure 5: Overview of WIM locations in M39 and A373

C.3.3 Staff Mobilization

48. The SHELADIA Team Leader, Mr. Thomas Voigt was mobilized on November 12, 2018 to the field to accompany the ADB consultation mission with regard to the 240 km road section from km 964 to km 1,204 on A380 (Kungrad to Daut-Ata section). Before his arrival to Tashkent, the documentation of the 2017 FS was collected from home by support of the local partner, the Consulting Bureau for Infrastructure (CBI), in electronic format to already familiarize with the project road section in general. Introductory meetings with the local staff and PMU were not deemed to be necessary, because having completed the PPTA for the Kashkadarya Regional Road Project in 2016, all key persons of PMU, ADB and the Consultant know each other. During the ADB consultation mission a work space for the Team Leader was provided in the "Poytakht" Business center, 16, Sh. Rashidov Ave., Tashkent, Uzbekistan on 9th floor at PMU office.
49. During the field input till November 29, 2018 first DD plan and profile drawings, cross section drawings, typical cross section and other typical drawings were submitted by RDI to the Consultant. The Consultant started with a first review of them and shared comments with RDI for consideration. After returning back home, further DD drawings were received from RDI by electronic means, so that the Consultant continued reviewing the initial DD drawings. Suggestions for revision were shared with RDI by email subsequently in the first half of December 2018.
50. The SHELADIA Team Leader was mobilized on December 17, 2018 as agreed with the ADB for the next field input. He has mobilized to the site and has quickly initiated meetings with the staff of the local partner, the Consulting Bureau for Infrastructure (CBI). All national experts of CBI were aware of their principal tasks and were ready to give needed inputs at any time. Support staff was mobilized for translation and office administration tasks. Other key members of the team have mobilized as agreed taking into account the updated work and personnel schedules as well as the availability of the DD and other needed documents in English.
51. For the social and environmental safeguards due diligence activities related to the WIM, assigned to SHELADIA TEAM under VO #9 in June 2019, national social and environment experts surveyed the proposed locations in August 2019. Findings were incorporated by the international experts in related documents, which were finalized in October 2019.
52. SHELADIA TL and the international ecological expert arrived to Tashkent in the second week of December, 2019. They were supported by 2 national experts during the week from December 9-13. Among other activities a field visit to the project area was conducted.

C.4 Structure of the Report

53. This Final Report comprises of seven chapters. A brief description of the content of each chapter is given below:
 - Chapter A: Executive Summary – gives a general overview of the tasks carried out under the TA.
 - Chapter B: Introduction – gives a brief introduction on project background performance of the study.
 - Chapter C: Kashkadarya Regional Road Project – describes the activities performed for this project and reports produced.
 - Chapter D: Noise and Vibration Studies on A380, km 228 – km 315 and Karshi – Kitab Road – explains the scope of works undertaken and incorporation of results in the related documentation.
 - Chapter E: Karakalpakstan Road Project – provides information on activities performed for this project and reports produced.
 - Chapter F: Biodiversity Assessment – summarizes the approach taken, scope of works carried out and findings of the biodiversity assessment.
 - Chapter G: Lessons Learnt – describes findings made in the course of the TA and proposals to improve preparation and implementation of future projects.

D. Kashkadarya Regional Road Project

D.1 Project Components

54. The PPTA covers technical, economic and financial, governance and social and environmental safeguards aspects. Technical due diligence activities were undertaken based on the detailed design documentation made available by the RRF. They comprise the 77 km long road sections proposed for ADB financing. The main goal was to ensure that the technical design solutions comply with design guidelines in force in Uzbekistan and reflect good international practice. Environmental and social safeguard studies were undertaken to ensure that the project would comply with ADB safeguard policies and national laws. Governance and institutional arrangement aspects studied including proposals for possible revisions shall lead to sustainable improvements in the procurement of civil works.

D.2 PPTA Performance

D.2.1 Consultant's Activities

D.2.1.1 Technical Due Diligence

55. SHELADIA Team collected all available FS and DD documentation from the Road Design Institute in Tashkent. Collected documents include:
- Design reports
 - Pavement structure calculations
 - Traffic data
 - Plan and profile drawings
 - Cross section drawings
 - Structural drawings
 - Standard drawings
 - Utility drawings
 - Marking and signing drawings
 - Bills of Quantities
 - Cost estimates
 - Technical Specifications
 - Geotechnical investigation reports
56. The collected documents were prepared by the designer based on relevant national standards and were available only in Russian. SHELADIA experts reviewed the proposed design solutions, checked them against national design guidelines and compared them with good international practice. Comments were submitted to the designer for consideration and incorporation. A road safety audit was conducted and the road safety audit report has been shared with the designer as well.
57. Cost estimates submitted by the designer were based on national standards and are resource-based. They do not provide a unit rate for the BOQ items. SHELADIA team prepared own cost estimates based on experience in similar projects in post-soviet countries to assess, if the project cost estimated by the designer is reasonable. Own traffic counts were conducted in May 2016 and traffic forecasts prepared by SHELADIA Team.

D.2.1.2 Economic and Financial Analysis

58. An economic analysis of proposed improvement of ADB-funded sections was undertaken using HDM-4 model for estimating the costs and benefits associated with both without and with the project scenarios. The traffic demand was estimated based on (i) the feasibility study

undertaken by the RRF in 2014, with updates in 2016¹ and (ii) further traffic assessment undertaken in 2016 by the PPTA consultants.

59. The economic costs of the project comprise (i) capital investment, which includes civil works, land acquisition and resettlement, physical contingencies, consulting services for construction supervision and social and environmental safeguard management, and (ii) incremental cost of road maintenance. The construction cost estimates were derived based on the detailed design and bill of quantities. Costs related to taxes, duties, and financing charges during implementation have been excluded. Financial costs were converted to economic costs in line with ADB guidelines in force back then.²
60. Main quantifiable economic benefits are vehicle operating cost (VOC) savings, savings in travel time, and road crash cost savings. They were determined and used in preparing the economic analysis. Not only the base case, but also all others considered in the sensitivity analysis proved to be viable.
61. The project road will not be tolled, i.e., it is non-revenue earning. The financial analysis, therefore, focused on financial sustainability. With concrete pavement, the project is expected to reduce the periodic and routine maintenance requirements considerably. With-project routine maintenance requirements were assessed to be well within the budget allocations by the RRF.

D.2.1.3 Financial Management and Plan

62. The financial management assessment (FMA) was conducted in June 2016 in accordance with ADB's Guidelines in force at that time for the Financial Management and Analysis of Projects³ and the Financial Due Diligence: A Methodology Note.⁴ The FMA considered the capacity of RRF and PMU, including fund flow arrangements, staffing, accounting and financial reporting systems, financial information systems, and internal and external auditing arrangements.
63. The RRF and PMU were assessed to have satisfactory financial management capability to (i) record the required financial transactions, (ii) provide regular and reliable financial statements, (iii) provide reliable monitoring reports, (iv) safeguard the financial assets. The RRF also had the capacity to handle the proposed project with its vast experience in executing several ADB projects. The minimum required policies and procedures were in place and the software 1C was widely used in the PMU who was implementing the project. External Audit of all existing projects were done by external agencies acceptable to ADB and no major issues reported on these audit reports. The RRF and PMU were meeting ADB's minimum financial management requirements for EAs back then.

D.2.1.4 Environmental and Social Impact Assessment

64. An environmental impact assessment of the project was prepared by the designer, covering the whole 127 km long road sections, according to the national requirements. SHELADIA Team translated and reviewed the document. It by far does not meet the requirements of ADB SPS (2009).
65. The Consultant collected all data relevant to the environmental assessment and undertook a number site visits. After the screening the rapid environmental assessment checklist was prepared. The project falls into category B with regard to environment. Therefore, an initial environmental examination (IEE) was conducted.

1 Republican Road Fund. 2015. *Feasibility analysis for "Reconstruction of motor road "Karshi–Shakhrisabz–Kitab" (including: m/r 4P79 – 0–64 km, m/r 4K319 – 12–30 km, m/r 4P84 – 14–19 km, m/r M-39 – 1,184–1,144 km)".* Tashkent.

2 ADB. 1997. *Guidelines for the Economic Analysis of Projects*. Manila.

3 ADB. 2005. *Financial Management and Analysis of Projects*. Manila. Available: <http://www.adb.org/Documents/Guidelines/Financial/default.asp>

4 ADB. 2009. *Financial Due Diligence: A Methodology Note*. Manila. Available: <http://www.adb.org/documents/financial-due-diligence-methodology-note>

66. Although the IEE focuses on the 77 km of road sections to be financed by ADB, it also includes the remaining 50 km under government funding as associated facilities to summarize the cumulative impact of the whole project as well.
67. Monitoring of air and water quality as well as noise modelling was undertaken, the results of which are included in the IEE. Public consultations were held in 3 settlements located along the road in line with ADB SPS to make participants aware of the project and to enable them expressing their opinion or raising concerns.
68. A climate change assessment was undertaken, identifying the climate change risks and vulnerability of the project. Projections for the medium scenario indicate a rise in temperature towards 2035 of 1.5 to 2 °C in the project area and an increase in precipitation by 42 mm, although being more uncertain than the temperature changes. Mitigation measures proposed are to use plastic joint profiles made of ethylene-propylene-diene monomer rubber (EPDM) and increase the capacity of drainage facilities. Even though traffic will increase on the project road, vehicle emissions are unlikely to contribute in any significant way to regional or global greenhouse gas levels.
69. As part of the IEE environmental management plans (EMP) were elaborated and related costs determined. The contractor has to prepare site-specific environmental management plans (SSEMP). Requirements for the preparation of them and for involvement of the site supervision consultant are also contained in the IEE.
70. The rehabilitation/upgrading of the project road sections to a category Ib road comprises widening of the existing ROW. Therefore, in some settlements land and structures had to be acquired. The impact of the project was determined by the designer and RRF had already accomplished the land acquisition before the government requested ADB for financial support of the 77 km road sections. Hence, ADB engaged the PPTA consultants to carry out a due diligence study instead of preparing a LARP for the 77 km ADB sections to determine (i) if land acquisition was initiated in anticipation of ADB support, and (ii) if due process was followed for land acquisition. The project is classified as category B for involuntary resettlement.
71. SHELADIA collected all available documents with regard to involuntary resettlement from RRF and reviewed them. National legislative documents related to land acquisition and resettlement were reviewed as well. According to information received from the respective district khokimiyats, a total of 160 households have been or will be affected by projected land acquisition. A census of was carried out of 152 available households for the due diligence interviews. Based on this information, it is determined that the average household size is 5.85 (average number of males 3.07 and the average number of females 2.78), and for the total number of 160 affected households, the total number of affected persons is deduced to be 936, comprising 491 males (52.5%) and 445 females (47.5%). With regard to resettlement
72. Three focus group discussions (FGDs) were undertaken in the affected areas with the affected communities with the objective of understanding the land acquisition undertaken and compensation provided and overall adequacy of the resettlement measures as well as the nature of grievances of the affected households and communities, if any. Residential households, non-residential households, and farmers constituted the 'focus' for the consultations. In addition, extensive meetings with other key stakeholders including community leaders and khokimiyat representatives at the district level were carried out.
73. Based on the information received during FGDs and the socio-economic surveys, the Consultant conducted a poverty and social analysis. Findings were incorporated in the summary poverty reduction and social strategy.

D.2.1.5 Procurement Documentation and Support

74. The 77 km long road sections proposed for ADB financing were split into two packages. Civil works package 1 comprises 48 km of road sections and package 2 29 km of road sections. The procurement plan was prepared and coordinated with PMU and ADB according to the packages. Bidding documents were prepared for international competitive bidding, using the single stage two envelope procedure.
75. SHELADIA collected procurement data from previous transport sector projects, held meetings with PMU and ADB URM representatives and prepared the procurement risk assessment and

risk management plan according to ADB guidelines. The services rendered also include the preparation of the procurement plan for the civil works and consulting services such as for the construction supervision consultant, program management specialist and financial auditor.

D.2.1.6 Governance and Institutional Assessment

76. Another task performed under the PPTA is the preparation of a road sector assessment. This road sector assessment was based on a desk review of available information on the road sector in Uzbekistan and limited interviews conducted with the various institutions and stakeholders responsible for the delivery and management of roads in the country. The main objective was to identify critical gaps and make recommendations for priority reforms in the sector that would lead to greater efficiency and effectiveness in delivery of public sector services and implementation of development programs in the road sector.
77. Some of the key challenges facing the road sector in Uzbekistan by that time can be summarized as its geography, the slow pace of modernization and reforms, shortcomings in the planning and prioritization of investments in the road sector, insufficient budgeting, an underdeveloped construction industry and shortcomings in the human resource development.
78. The road sector assessment prepared by SHELADIA provides a road sector overview, information on regional integration, key challenges and opportunities, institutional policies and reforms and key recommendations for institutional and policy reforms.

D.2.1.7 Translation of DD Drawings

79. For international tenders it is essential to provide potential bidders with a detailed design in English. The designer however submitted the DD drawings only in Russian. ADB approached SHELADIA with the request to translate the complete set of DD drawings due to the lack of capacity of the designer. In September 2016 the related VO was issued.
80. A team comprising a senior CADD expert, two assistant CADD experts, two CADD assistants and a translator started to work on the translation immediately after the VO has been issued. Final DD drawings fit for use in the tender were handed over in soft copy in November 2016.

D.2.2 Reports Produced

81. In the course of the PPTA SHELADIA prepared and submitted reports as per reporting requirements in the TOR. The following documents were prepared for the Kashkadarya Regional Road Project:
 - Inception Report
 - Monthly Progress Reports
 - Interim Report
 - Design Review Report
 - Road Safety Audit Report
 - Draft Final Report
 - Final Report
 - Initial Environmental Examination
 - Social Due Diligence Report
 - Summary Poverty Reduction and Social Strategy
 - Road Sector Assessment
 - Financial Management Assessment
 - Procurement Risk Assessment and Risk Management Plan
 - Bidding Documents
 - Procurement Plan
 - TORs for Construction Supervision Consultant and various individual experts
82. In addition to the preparation of the above-mentioned reports, the Consultant provided the required input to various ADB documents, e.g. RRP and PAM.

E. Noise and Vibration Studies on A380, km 228 – km 315 and Karshi – Kitab Road

E.1 Project Components

83. In spring 2018 in order to provide an increased level of information to potential bidders for construction contractors, ADB requested SHELADIA that the noise and vibration assessments should be undertaken for two road projects – the 87 km long road section on A380 between km 228 and km 315 (Bukhara – Gazli) and the Karshi – Kitab Road. While the latter is subject of the above described Kashkadarya Regional Road Project, SHELADIA was not involved in the Bukhara – Gazli road section on A380 before. IEEs for the said road sections were to be revised incorporating baseline data and the results of noise and vibration assessment.

E.2 PPTA Performance

E.2.1 Consultant's Activities

84. Being the PPTA Consultant for the Kashkadarya Regional Road Project, SHELADIA was well familiar with Karshi – Kitab Road and tasks performed, for example the preparation of the IEE. For the Bukhara – Gazli road section on A380 all required information to perform the tasks of noise and vibration studies was collected and reviewed, especially the initial IEE prepared by another consultant. A work program was developed to efficiently perform the tasks under the study. Initial site visits were conducted to both project roads in March 2018, followed by noise measurements (long and short term) at selected locations in May 2018.
85. Environmental noise levels are measured using a sound level meter, usually connected via a cable to a microphone mounted on a tripod or a frame. When the microphone is positioned at the building façade, noise levels are referred to as 'façade' measurements, as distinct from those measured away from reflecting surfaces, which are referred to as 'free field'. Façade levels are generally taken to be 2.5dB higher than the equivalent free field measurement because of the effect of reflected noise from the building façade.
86. In road projects noise occurs mainly during two project phases, construction and operation. During construction the equipment emits noise, while during the operation phase noise is caused by the vehicles using the road. In comparison to the noise from operation, the noise from construction can be considered as short term and only occurs when the equipment is operated in the sub-section under construction. For both phases noise calculations were prepared. They are based on the noise monitoring results and also consider traffic forecasts for the operational phase.
87. Results of the noise calculations are presented in the construction and operational noise assessment reports, which are included in the updated IEEs. They provide details on locations of receptors and noise levels, noise contour plots and proposed mitigation measures.
88. The principal elements of the vibration assessment were to:
- Review existing methods for calculation of vibration from ground preparation and compaction;
 - Identify the lithology over which the roads run, and compare with the lithologies in other studies in which vibration levels from rollers have been reported;
 - Set vibration damage threshold levels for low, medium, high risk building classes and for fragile ancient monuments based on recognized International Standards;
 - Review and select appropriate criteria for the assessment of human response to vibration from construction activities;
 - Review the effectiveness of potential methods of mitigation of ground borne vibration from vibratory compaction;
 - Calculate for normal operation of the roller the distance from the edges of the new road to each vibration damage (cosmetic) contour for low, medium and high risk building classes;

- Re-calculate these distances taking into account the effectiveness of potential mitigation including for example use of low roller vibration settings;
 - Plot cosmetic and minor structural vibration damage threshold contours for high risk buildings on aerial photography of the scheme thus enabling buildings exceeding the respective thresholds to be identified by the contractor;
 - Prepare TORs for Construction Supervision Consultants and various individual experts.
89. All the above-mentioned tasks were undertaken as part of the vibration studies and are described in the vibration assessment reports. They were prepared separately for both road sections and form part of the updated IEEs.

E.2.2 Reports Produced

90. Under the noise and vibration studies SHELADIA experts elaborated and delivered the following reports:
- Construction and Operational Noise Assessment Reports
 - Vibration Assessment Reports
 - Updated IEEs
91. The updated IEEs also include updated EMPs.

F. Karakalpakstan Road Project

F.1 Project Components

92. The Government of Uzbekistan (the Government) requested the Asian Development Bank (ADB) to finance additional Technical Assistance (TA) services. The TA services comprise of due diligence of the A380 highway between km 964 and km 1,204 in the Republic of Karakalpakstan. As per the TOR, the following tasks were to be performed under the TRTA:
- Review detailed engineering design for sufficiency for bidding
 - Ensure safeguards is reviewed i.e. updating of the LARPs and incorporating EMPs which are fully consistent with the ADB's safeguards requirements
 - Calculate the EIRR for the project
 - Preparing a report setting out aspects of the detailed design that require amendment for the bidding
 - Agreeing these amendments with PMU and verify that the amendments have been incorporated into the drawings
 - To the extent necessary, advising PMU of the additional surveys and investigations required to ensure enough information for bidders
93. In the course of the TRTA, more tasks were added to the scope of works of the Consultant under the Karakalpakstan Road Project. They are related to the introduction of an Intelligent Transport System (ITS) and the supply and installation of Weigh-in-Motion (WIM) Systems. Both of them are not proposed in the 240 km road section on A380. SHELADIA was assigned to prepare the safeguards documentation for them. Since the introduction of ITS will be limited to the installation of equipment inside the existing ROW, no land acquisition is required and environmental impacts will be negligible. Therefore, the Consultant focused on the WIM.

F.2 TRTA Performance

F.2.1 Consultant's Activities

F.2.1.1 Technical Due Diligence

94. In October 2018 SHELADIA was assigned as Transaction Technical Assistant Consultants for the due diligence of the reconstruction of the section from km 964 to km 1,204 on A380 in the Republic of Karakalpakstan, which is referred to as Karakalpakstan Road Project. One of the TRTA activities of the consultant was to undertake the technical due diligence of the DD documentation prepared by RDI.
95. The TRTA Team Leader joined a consultation mission fielded by ADB in November 2018. As agreed in the meeting at RDI on November 16, the DD drawings were scheduled to be submitted to SHELADIA in 40 km long sub-sections, beginning on November 16. Thus, the last sub-section was due on December 17. However, the actual submission slightly deviated from the schedule to both sides. The Consultant undertook an initial review of the submitted drawings for plausibility and consistency with the design guidelines in force in Uzbekistan. Initial comments to the DD drawings were shared with RDI subsequently in a timely manner to enable them addressing the comments as deemed reasonable.
96. For the 240 km project road sections, a set of updated DD drawings was received by the Consultant from RDI on December 28, 2018. This set of DD drawings was prepared in consideration of the initial comments by SHELADIA. The DD documentation was however not yet complete. Missing information comprised among others:
- DD Design Report
 - EIA Report
 - Tables and maps of geotechnical investigations and laboratory test results
 - Topographical Report
 - Road inventory data

- Utility relocation drawings
 - Technical equipment drawings at the railway level crossing, if required
 - Hydrological calculations
97. In February and April 2019, most of the above-mentioned missing information was submitted. According to national legislation, the topographical report is classified as secret data and could not be shared. Hydrological calculations were not prepared by the designer because the project is located in flat terrain with very low precipitation and designated waterways could not be determined.
 98. The collected DD documents were prepared by the designer based on relevant national standards and initially were available only in Russian⁵. They were split in 6 sub-sections, each 40 km long, and have been subsequently submitted to the Consultant. SHELADIA experts reviewed the proposed design solutions, checked them against national design guidelines and compared them with good international practice. Comments were submitted to the designer for consideration and incorporation. A road safety audit was conducted and the road safety audit report has been shared with the designer as well.
 99. Although there is a current decree of the President of Uzbekistan to introduce good international practice for the preparation of Bills of Quantities and cost estimates, the cost estimates submitted by the designer were based on national standards and are resource-based. They do not provide a unit rate for the BOQ items. Taking into account the changes in the financial sector in the country after 2016, i.e. the introduction of the market exchange rate of the Uzbek Sum to the US\$ and related price adjustments in the construction sector, the preparation of own cost estimates became more difficult, since no data from recently tendered road projects could be made available.
 100. Own traffic counts of SHELADIA Team including O/D surveys were undertaken in March 2019. Based on them the traffic forecasts were developed, which were further used to undertake the economic analysis.

F.2.1.2 Economic and Financial Analysis

101. There is large investment potential in the Republic of Karakalpakstan and the gross regional product growth of Karakalpakstan of 10% per annum between 2010 and 2016 was primarily driven by industrial development and as a result, manufacturing's share in the Karakalpak economy grew from 14.6% in 2010 to 25.7% in 2016⁶. The report states that the regions industrial development will be driven by development of hydrocarbon deposits, metal mining and smelting projects, cement and vermiculite and several chemical manufacturing. Five large-scale projects are to be implemented in upcoming years, with a total worth of over 3.4 billion USD, in Karakalpakstan's hydrocarbon, energy and mining sectors. The project road corridor provides the primary road connectivity to the region and is one of the main trade corridors for Uzbekistan and thus an important component in realizing the development potential of the Republic of Karakalpakstan and the country.
102. Without the project, the road is expected to remain in poor condition, which will worsen over time. Maintenance will involve crack sealing, patching of damaged areas to the extent budget is made available and with the poor road structure and large heavy truck traffic, the road deterioration will be faster without reconstruction. With the project, the road will be upgraded to a 2-lane carriageway with cement concrete pavement and improved roadway design features and road safety features and roadside facilities. Currently there are very limited facilities for road users in this long road section and the proposed project is adding rest areas every 40 km. An economic analysis of proposed improvement of project road was undertaken using HDM-4 model for estimating the costs and benefits associated with both without and with the project scenarios.
103. The economic costs of the project comprise (i) capital investment, which includes civil works, land acquisition and resettlement, physical contingencies, consulting services for construction

⁵ After due consideration it was agreed, that the designer will prepare the final set of DD drawings in both languages, Russian and English.

⁶ "Invest in Karkalpakstan – Investment Guide 2018", Chamber of Commerce and Industry of Uzbekistan, Authority for Foreign Investment of the Republic of Uzbekistan and UNDP, Tashkent, 2018

supervision and social and environmental safeguard management, and (ii) incremental cost of road maintenance. The construction cost estimates are derived based on the detailed design and bill of quantities. Costs related to taxes, duties, and financing charges during implementation have been excluded. Construction was assumed to take place over a three-year period starting from 2020. All estimated project costs and benefits are measured in 2019 economic prices expressed in US dollars using the official exchange rate. Using the domestic price numeraire, traded goods are measured at their border prices multiplied by a shadow exchange rate factor (SERF) estimated at 1.04⁷, and non-traded inputs at domestic prices less indirect taxes to arrive at the total cost. A shadow wage rate factor (SWRF) of 0.6⁸ was estimated and applied to unskilled labor used in road construction. A SWRF of 1.0 was applied to skilled and professional labor. The total financial cost excluding taxes is estimated at US\$ 264.7 million and economic costs derived is US\$ 260.2 million or US\$ 1.08 million per kilometer.

104. The main quantifiable economic benefits are vehicle operating cost (VOC) savings, savings in travel time, benefits from improved road safety and environmental benefits from reduced vehicle emissions. The improvement in geometry, road signs and markings, improved layout of intersections are likely to reduce crashes. However, the improved road will likely increase the speed on the road and without directional segregation, may increase the probability for head-on collisions and severity of crashes. Considering the possibility of marginal positive and negative changes in road safety aspects, no benefit was considered in the analysis. The reduction in greenhouse gas emissions with improved level of service were estimated as part of the environmental impact assessment of the project and valued based on the global recommended value of \$36.3 per ton of CO2 equivalent in 2016 values⁹, increased by 2% in real terms annually.
105. An economic analysis of the project was carried out following the Asian Development Bank's (ADB) guidelines¹⁰ and by comparing transport costs for road agency and transport users "with" and "without" project options. The proposed project will be implemented as six contract packages over a 3-year construction period. The analysis compared the incremental benefits of reductions in VOCs, travel times and vehicle emissions resulting from the project with the initial investment costs and changes in operation and maintenance costs over a 33-year appraisal period (three years implementation and 30 years operation). The results of the economic analysis indicate that the project has a rate of return well above the opportunity cost of 9%.
106. The financial analysis has been conducted in accordance with ADB guidelines: Financial Management and Analysis of Projects (2005) and Financial Due Diligence: A Methodology Note (2005). The project is a non-revenue generating project and therefore the objective of the analysis is to ensure that the project is financially sustainable. The financial analysis also focused on assessing the capacity of the implementing agency to absorb the incremental operation and maintenance (O&M) cost associated with project. With concrete pavement, the project is expected to reduce the periodic and routine maintenance requirements considerably. In the with-project option, routine maintenance requirements are below the budget allocations by the government and no major/periodic maintenance requirement is anticipated during the analysis period.

F.2.1.3 Financial Management and Plan

107. The Financial Management Assessment (FMA) was conducted by an International Financial Management Specialist of Sheladia Associates Inc. USA during February 2019 in accordance with ADB's Guidelines for the Financial Management and Analysis of Projects¹¹ and Financial

7 Using the ADB simplified method based on merchandise imports of \$13,900 million, exports of \$13,300 million and estimated taxes on trade of \$973 million (import and export data from World Bank data and tax estimate based on weighted average tariff rates).

8 An approximation based on the ratio of wages for agricultural workers and construction workers obtained through local enquiry.

9 Intergovernmental Panel on Climate Change. *Fifth Assessment Report (AR5)*.

10 ADB. 2017. *Guidelines for the Economic Analysis of Projects*. Manila.

11 ADB. 2005. *Financial Management and Analysis of Projects*. Manila. Available: <http://www.adb.org/Documents/Guidelines/Financial/default.asp>

Due Diligence: a Methodology Note¹², and Technical Guidance Notes¹³. The assessment was an updating on the FMA for the Kashkadarya Regional Road Project, carried out during June 2016. The FMA considered the capacity of the PMU, including funds-flow arrangements, governance, staffing, budgeting, accounting and financial reporting systems, internal control procedures, financial information systems, and internal and external auditing arrangements.

108. The assessment has been carried out as a part of the due diligence of the proposed Karakalpakstan Road Project (Project) for ADB financing. Most of the staff of existing PMU implementing the Kashkadarya Regional Road Project is expected to join the Project PMU. The fiduciary assessment of the existing PMU was carried out to determine the degree to which the financial management arrangements are adequate to manage fiduciary risks and provide reasonable assurance that ADB funds will be used for their intended purpose, once existing PMU staff join Project PMU. The FM assessment found that: i) PMU has the required policies and procedures in place, and that (ii) the compliance with the Loan agreement L3355-UZB for timely audited project financial statement (APFS) submission has been complied with 2 months delay for FY2018 while being deferred for the FY2016 and FY2017. The assessment also identified the following risk areas: (i) lack of financial management capacity at PMU which may lead to delays in APFS submission deadlines compliance, (ii) missing financial management procedures manual, and (iii) absence of Internal Audit function. As a result, the overall financial management risk was assessed as moderate.

F.2.1.4 Environmental and Social Impact Assessment

109. Preliminary information of the project road environment was collected by SHELADIA's environmental experts during a site visit under the 2016 PPTA already. Based on this information and the joint site visit with ADB during the consultation mission in November 2018, no major environmental impacts were initially expected for this project. It was agreed, that noise and vibration studies are not required for the 240 km road section, because it does not pass any settlement. However, short term noise monitoring was carried out on April 1, 2019, at two locations of the project road.
110. As part of the rapid environmental assessment to guide in the environmental categorization of the proposed project, biodiversity screening was conducted early 2019 to determine whether the project will have significant impacts of biodiversity based on the location and scale of the proposed road improvement including re-aligned sections; road design, construction, and maintenance; and distances to areas and corridors known to harbor important biodiversity. The biodiversity impact screening initially involved the use of the Integrated Biodiversity Assessment Tool (iBAT).
111. Based on the iBAT screening, the proposed road is located in two grid cells, namely, 66001 and 66082 which contain 172 and 175 species, respectively, of birds, fishes, invertebrates, mammals, plants, and reptiles. Of these, iBAT identified 5 endangered and 1 critically endangered species based on IUCN Red List Category. Using the results of iBAT as field guides, the study team conducted a reconnaissance survey between 23-24 January, 2019 which included discussions with local officials, residents, police, and truck drivers.
112. Key expert interviews were conducted by the study team on 28-29 January, 2019 to provide better understanding on the biodiversity of the project area and further confirm iBAT and reconnaissance survey findings. The study team met Mr. Roman Danilovich Kashkarov, Birds Specialist of Uzbekistan Society for the Protection of Birds and Birdlife International and senior staff of the Academy of Science Institute of Zoology, and Mr. Khalillula Satimovich Sherimbetov, Specialist of Biodiversity (SCEEP) and team leader of the UNDP's Mainstreaming Biodiversity into the Uzbekistan's Oil and Gas Sector where among others they studied the ecology of Saiga near the project area. He confirmed the local observations expressed by the informants that along the project road near the international border Saigas used to move 3-5 years ago which coincides with the closure of sections of the border fence separating Kazakhstan and Uzbekistan due to the former railway project near the area. Mr. Kashkarov confirmed site findings that indeed the endangered and critically endangered bird

12 ADB. 2009. *Financial Due Diligence: A Methodology Note*. Manila. Available:

<http://www.adb.org/documents/financial-due-diligence-methodology-note>

13 ADB: 2015. *Financial Management Technical Guidance Note*

<https://www.adb.org/sites/default/files/page/82468/financial-management-assessment.pdf>

- species are inhabiting the immediate area of the road project. Further, he opined the high probability of bird nesting areas along the re-aligned sections included habitat of bird preys.
113. First level consultations were organized on March 20-21, 2019 in the two settlements adjacent to the project road – Jaslik and Karakalpakiya. Due to the peculiar road alignment and very sparse population, a single consultation meeting was not feasible nor recommended to demonstrate meaningful consultation as this will restrict participation of key stakeholders due to transportation cost. Discreet consultations were organized in Jaslik on 20.03.2019 namely in Mahalla, Women's committee, Kindergarten school, and Gas Company with 17, 24, 4, and 5 participants, majority of which were women. Another consultation was made in Karakalpakstan with 47 participants and all are women. The consultations were jointly held for environmental and social safeguards.
 114. Most of the impacts on environment are co-terminus with the construction stage, site specific, limited within the RoW, and are easily mitigated through good engineering and housekeeping practices. All site preparation works, excavation works, particularly at quarrying sites, will generate potential impacts that are local, temporary, and reversible. Potential significant environmental impacts identified during construction stage are the loss of productive soil from new borrow areas, dust emissions, generation of wastes, improper management of borrow areas, and inadequate clean-up operation, restoration and rehabilitation prior to decommissioning. Precautionary measures are sufficiently described in the EMP.
 115. The entire stretch is outside any legally protected areas. However, the project area is a known habitat of critically endangered species. The proposed project is classified as environment Category A in accordance with the ADB's SPS 2009. Secondary data review of the biodiversity indicated that 2 reptile, 29 birds, and 5 mammals of threatened species based on IUCN and Uzbekistan Red Book inhabit the Ustyurt plateau and may be found in the project area. Spring field surveys of species present in the project corridor were carried out on April 1st and 2nd in order to prepare the preliminary biodiversity assessment. 23 species of terrestrial vertebrates (one reptile, 16 birds, six mammals) were recorded during the observation period.
 116. ADB policy requires that an Environmental Impact Assessment (EIA) Report be prepared by the borrower in accordance with ADB EA requirements and that loans or grants are classified according to their potential impact on the environment. Since the proposed project requires re-alignment of sections that will pass through critical wildlife habitat it was classified as Environmental Category A project. Accordingly, the detailed EIA study, which includes the EMP, related costs and requirements to the contractor in preparing the SSEMP, was carried out in accordance with the ADB's "A Good Practice Sourcebook, Environment Safeguard, December 2012". The ADB Rapid Environmental Assessment (REA) Checklist for Roads and Highways has been completed for the project.
 117. Subsequent to the review of Draft EIA after submission in July 2019, ADB decided to undertake a more detailed ecological study to update the bio-diversity assessment and on completion of that study, the Draft EIA was updated based on the results of the updated biodiversity assessment in the final report. Chapter F of the document in hand provides more details on the biodiversity assessment.
 118. After the environmental impact assessment, ecological and biodiversity assessment were completed, second level public consultations were conducted in Jaslik and Karakalpakiya on March 18. During the consultations, participants were informed about the project, the environmental assessment, possible positive and negative impacts and mitigation measures taken for the latter. Due to the spread of COVID-19 the presentations were conducted by staff of the Karakalpakstan branch of CR under remote guidance of national SHELADIA safeguards experts from Tashkent. Questions of the 25 participants at each of the consultations were addressed during the presentation and no serious concerns about the project were raised. More details can be found in the EIA and Appendix G to it.
 119. SHELADIA Team also undertook required due diligence activities for the social safeguards. The national legislation related to involuntary resettlement was reviewed and compared with ADB SPS (2009). Census and socio-economic survey and consultations held along the project area confirm that there are no indigenous people in the settlements along the project road and further the project does not impact any indigenous peoples communities.
 120. Since the project road passes a very sparsely populated area, land acquisition and resettlement requirements are very limited. The acquisition of land will cause economic

displacement to 2 families, comprising of 1 structure owner who would be losing the rental income derived from the commercial building that will be affected and 1 tenant who is having a restaurant in the affected commercial building. Further, 1 motel-owner will face non-significant impact by way of temporary disruption during shifting of water and gas supply pipeline to his motel as part of utility shifting. In addition to the identification of the impact, the LARP prepared by SHELADIA determines the implementation budget for the resettlement plan.

121. A grievance redress mechanism (GRM) was elaborated as part of the LARP. It determines how grievances shall be filed and solved at the various instances. The GRM is also to be followed for grievances related to environmental issues.
122. The poverty and social assessment study was conducted in a participatory manner involving the community of Jaslik and Karakalpakiya. Consultations were held with all major stakeholders in the project, such as makhalla (local women's community), business women's association, teachers, khokiyamat and cross section of residents of Jaslik and Karakalpakiya to understand the local needs, priorities and demands and responses to the proposed project. In order to achieve the objectives of the study, a set of tools and techniques were used to elicit information from the various stakeholders.
123. A socio-economic sample survey was carried out to assess the socio-economic condition of the people of Jaslik and Karakalpakiya, the two settlement that are in the project area. The sampling methodology adopted was simple random sampling (srs) with proportional allocation. In all 324 sample households were surveyed, spread over the two settlements. The survey was carried out between 21 March 2019 and 29 March 2019.
124. After the collected data was analyzed, the Consultant prepared the Poverty and Social Assessment Report and the Gender Action Plan.

F.2.1.5 Procurement Documentation and Support

125. The overall 240 km long road section had been designed in 40 km long sub-sections. After due consideration, 2 packages with 3 lots, each 40 km long, were determined as preferred option to tender the civil works. Civil works package 1 comprises the road sections from km 964 to km 1,084 and package 2 from km 1,084 to km 1,204. The procurement plan was prepared and coordinated with PMU and ADB according to the packages. Bidding documents were prepared for international competitive bidding, using the single stage single envelope procedure.
126. SHELADIA collected procurement data from previous transport sector projects, held meetings with PMU and ADB URM representatives and prepared the procurement risk assessment and risk management plan according to ADB guidelines. Being a relatively new requirement for the procurement support, the Consultant elaborated the Strategic Procurement Planning. The services rendered also include the preparation of the procurement plan for the civil works and consulting services such as for the construction supervision consultant.

F.2.1.6 Transport Sector Assessment Update

127. Under the task of updating the transport sector assessment, the Consultant collected and reviewed relevant data, e.g. road network data, sector organization, planning and financing, expenditure etc. During the past few years from 2016, when comprehensive governmental changes in Uzbekistan started, many reforms were launched.
128. The transport sector assessment update analyses sector performance, problems and opportunities. It further describes the government's sector strategy. The document prepared was submitted to ADB as input to the RRP.

F.2.1.7 Weigh-in-Motion Systems

129. The design, installation, and operation of the WIM system is anticipated to have less adverse impacts on environment than the road project. Few of the impacts are irreversible, and

mitigation measures are easily designed and implemented. The impact assessment of the WIMs is included in project EIA.

130. SHELADIA undertook site visits to the proposed WIM locations and collected data on land ownership and use. It became evident, that the land (1.67 ha) at the locations of the two proposed new WIM belongs to Uzavtoyul regional departments and is free from encumbrance. The improvements proposed for the third existing WIM facility involve only installation of equipment within the available facility. The impacts of the installation of the WIM are summarized in the LARP.

F.2.2 Reports Produced

131. In the course of the TRTA SHELADIA prepared and submitted reports as per reporting requirements in the TOR. The following documents were prepared for the Karakalpakstan Road Project:
 - Inception Report
 - Interim Report
 - Road Safety Audit Report
 - Draft Final Report
 - Final Report
 - Environmental Impact Assessment including EMP and Framework Plans
 - Land Acquisition and Resettlement Plan
 - Summary Poverty Reduction and Social Strategy
 - Gender Action Plan
 - Road Sector Assessment Update
 - Financial Management Assessment
 - Procurement Risk Assessment and Risk Management Plan
 - Strategic Procurement Planning
 - Bidding Documents
 - Procurement Plan
 - TORs for Construction Supervision Consultant and various individual experts
132. In addition to the preparation of the above-mentioned reports, the Consultant provided the required input to various ADB documents, e.g. RRP and PAM.

G. Biodiversity Assessment

G.1 Preliminary Biodiversity Impact Assessment

133. The initial identification the biodiversity of the project site was undertaken in January 2019, using the Integrated Biodiversity Assessment Tool (iBAT) as required by the ADB. iBAT was developed by the Bird Life International, Conservation International, International Union for the Conservation of Nature (IUCN), and UN Environment World Conservation Monitoring Centre (UNEP-WCMC). iBAT is a screening tool that allowed the identification of threatened species in the project area based on an array of databases that includes the: IUCN Red List of Threatened Species, Key Biodiversity Areas (priority sites for conservation) and Protected Planet/The World Database on Protected Areas (covering nationally and internationally recognized sites, including IUCN management categories I–VI, Ramsar Wetlands of International Importance and World Heritage sites)¹⁴.
134. Through iBAT, the project road was identified to be located in 2 grid cells namely; 66001 and 66082. Within these cells, a total of 17 threatened species are likely to be found of which 11 are birds, 1 fish, 1 invertebrate, and 4 mammals which indicates the project area maybe a critical habitat and need particular attention in the conduct of the environmental assessment.
135. Secondary data review of the biodiversity indicated that 2 reptile, 29 birds, and 5 mammals of threatened species based on IUCN and Uzbekistan Red Book inhabit the Ustyurt plateau may be found in the project area. The analysis of fauna representatives and landscape properties of the project area indicated the following:
 - The A-380 highway is an important element in migration for almost all species of birds observed. Gulls, Starlings and Larks move to the North almost along the road, since they find food or water in its vicinity. Birds of prey are attracted by the increased number of food objects – rodents along the mound. Some rodents and reptiles die under the wheels of vehicles and thus, become affordable food for birds of prey and gulls.
 - Terrain irregularities of the clay desert of Ustyurt plateau allows the accumulation and preservation of moisture in dry periods, protection from flooding and snow drifts in the period of abundant rainfall, favorable conditions for burrows and good view. Such features make the mound of the project road, quarries and mounds over gas pipelines as attractive for common species of rodents: Large Souslik, Great Gerbil and Libyan Jird. These rodents and animal road kills attract birds of prey and mammals on the carriageway and increases risk of death and injury from vehicular collision.
 - About 10 km North-West of the village Jaslik the project road passes near a well-preserved Haloxylon forest, which is about 5 km long and 1 km wide. According to our observations, this is the only Haloxylon forest remained throughout the entire road alignment and should be preserved to the extent possible.
 - The power transmission line running north-east almost parallel to the road for 2 km, and in several points cross the road, provide a good roosting area and nesting area for birds of prey being attracted by the abundance of rodents along the road which increases the risk of injury and mortality.
 - The existing road embankment is littered with solid household waste - plastic bottles and used plastic bags. This garbage is carried by wind over long distances, entangled in the bushes and disrupts the view of the natural landscape. Plastic bags can scare rare birds who stop to rest during migration. Food waste contained among the garbage can contribute to an increase in the number of rodents and attract land-based predators to the embankment of the highway, creating the threat of death from motor vehicles for them. Some species (steppe turtles, feathered predators, small passerines, etc.) may become entangled in plastic waste, using them to build nests.
136. A screening of the threatened species based on the desk review, public and expert consultations, use of the Integrated Biodiversity Assessment Tool, and field study allowed the identification of 17 priority biodiversity values that were subjected to a preliminary biodiversity impact assessment. Risk levels posed by the project was initially assessed for the identified

¹⁴ <https://www.iucn.org/theme/business-and-biodiversity/our-work/business-approaches-and-tools/integrated-biodiversity-assessment-tool-ibat-business>

priority species based on the IUCN impact of consequence and the likelihood of occurrence. The preliminary biodiversity assessment was conducted based on the spring field surveys of species present in the project corridor on April 1st and 2nd. 23 species of terrestrial vertebrates (one reptile, 16 birds, six mammals) were recorded during the observation period. Findings form part of the EIA, which was submitted to ADB in July 2019.

137. Subsequent to the review of Draft EIA, ADB decided to undertake a more detailed ecological assessment to comprehensively address possible impacts and mitigation measures as per requirements of SPS (2009).

G.2 Ecological Impact Assessment

G.2.1 Study Approach and Methodology

138. The ecological assessment has been undertaken in line with the requirements of the ADB Safeguard Policy Statement (SPS), 2009 and has been guided by the International Finance Corporation (IFC) Guidance Note 6 (IFC GN6) and the *Good Practices for Biodiversity Inclusive Impact Assessment and Management Planning*¹⁵ prepared by the Multilateral Financing Institutions Biodiversity Working Group (2015) that includes the ADB as illustrated in the following figure:

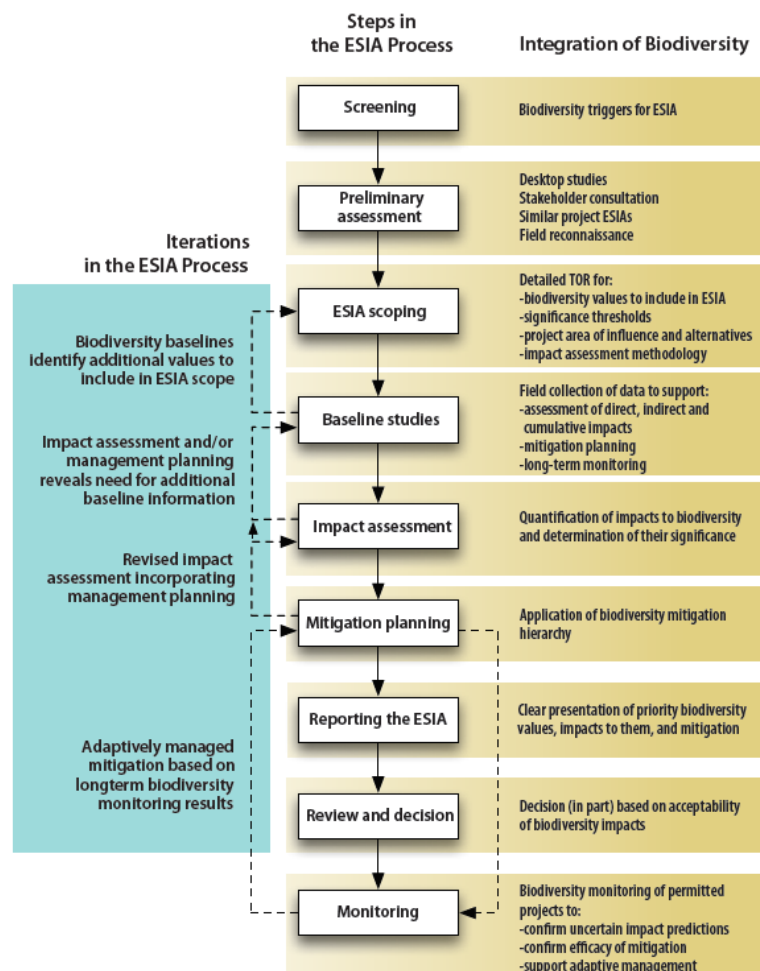


Figure 6: Outline of ESIA process including impact assessment and mitigation planning

15 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 Group <https://publications.iadb.org/en/good-practices-biodiversity-inclusive-impact-assessment-and-management-planning>

139. A precautionary approach was taken to biodiversity screening for the ecological assessment. This helped identify sensitive areas, determine species and ecosystems potentially present in the Project area, identify data gaps and decide on valued environment components. For example, if a species has been recorded in the wider area, and the habitat is considered suitable for the species, it is presumed that the species is present in the site.
140. A precautionary approach has also been applied to the Critical Habitat Assessment (CHA), supplemented with ecologically appropriate areas of analyses (EcAoAs). Further biodiversity assessments and monitoring are proposed as part of the Project Biodiversity Action Plan (BAP). Information from the 2016 IEE, the draft EIA from July 2019, Rapid Biodiversity Assessments (RBA), secondary data reviews as well as from consultations with key national and international experts was used to prepare the ecological assessment report.

G.2.2 Existing Conditions

141. The 240 km long project road is located in the Republic of Karakalpakstan. It runs through the Ustyurt plateau, which is a semi-arid, raised plateau surrounded entirely by chinks (extensive cliffs or escarpments), is 200,000 km² in size, and bounded by the Caspian lowland in the north, the Aral Sea in the north east, the Mangyshlak Peninsula in the West, and the Karakum and Kyzylkum deserts in the south. More detailed information on landscape, climate, precipitation and settlements is provided in the ecological assessment.
142. 98.54% of the route alignment for the project road will follow either existing or abandoned road, constituting modified habitat. Only 1.46% (3.5 km) of the project route alignment will impact upon natural habitat. There are two protected and designated areas on the Ustyurt plateau which have ecological importance in relation to the project road. These protected and designated areas do not fall within the Area of Influence (Aol) of the project, and are not expected to be directly impacted by the project, however species supported by them are known to occur in the Aol.
143. The first protected area in vicinity of the project road is the Saigachy reserve with an area of 628,000 ha. It was gazetted in 1991 by the State Committee of Karakalpakstan primarily to help safeguard and restore the population of critically endangered Ustyurt Saiga antelope (*Saiga tatarica*) and their traditional breeding places. Originally designated as a temporary reserve for 10 years (renewed in 2001 and 2011) the reserve has since been re-designated and expanded and is now divided into six strictly protected zones and a buffer area.
144. Sudochie Important Bird and Biodiverstiy Area (IBA) is 46,467 ha in size and is located approximately 15 km from the southernmost point of the project road alignment. Sudochye Lake IBA is an important area for many waterbird species, including threatened species such as the White-headed Duck and Lesser White-fronted Goose, and triggers IBA criteria A1, A3, A4i, and A4iii.
145. The ecological assessment provides a comprehensive overview of flora and fauna in the project area. Although endemism rates are low at around 8% (or 400 species), the flora of Uzbekistan is represented by over 4,800 species of vascular plants from 650 genera and 115 families¹⁶. The Ustyurt Plateau itself supports over 700 species of vascular plants, with northern areas of the plateau having the greatest diversity. In total over 300 species of vertebrates are found in the Ustyurt plateau, including threatened species and Central Asian endemics such as the Central Asian Tortoise, Stepperrunner, Severtzov's Jerboa and Tamarisk Gerbil. Biodiversity screening for the project identified 334 mammals, birds, and reptiles that could potentially occur in the project Aol.

G.2.3 Impact Assessment

146. In this section the types of impact of the project are discussed. Impacts associated with the construction and operation of the new road may include:
 - **direct impacts:** associated with the physical footprint of project activities and infrastructure plus the area affected by disturbance and emissions;

¹⁶ <http://enrin.grida.no/htmls/uzbek/report/english/animal.htm>

- **indirect (including induced) impacts:** associated with the physical footprint or emissions/disturbance of non-project activities caused or stimulated by the project; and
 - **cumulative impacts:** other impacts occurring in the project landscape (related and unrelated to the project), including land use/population trends and foreseeable developments.
147. The Consultant presents a table of generic construction impacts and mitigation and a table of generic operational impacts and mitigation in the report. Both tables provide information on the source of impact, the effect of it and proposed mitigation.

G.2.4 Critical Habitat Assessment

148. **Critical Habitat (CH)** is considered to be the most significant and highest priority areas of the planet for biodiversity conservation. It takes into account both global and national priority setting systems and builds on the conservation biology principles of 'vulnerability' (degree of threat) and 'irreplaceability' (rarity or uniqueness). The ADB Safeguard Policy Statement (SPS) (2009) states that CH is a subset of both natural and modified habitat that deserves particular attention, and includes areas with high biodiversity value.
149. Critical Habitat Assessment (CHA) is a process to identify those areas of highest biodiversity value which are considered particularly sensitive to impacts and where special attention must be paid. The project type, impacts and proposed mitigation are not considered relevant in the identification of CHA and both natural and modified habitats may contain areas that could qualify as CH.
150. The process followed for the project is based on the IFC GN6. It is assumed that prior to this process being followed some biodiversity screening will have been undertaken to determine biodiversity present in the project area. Details are provided in the ecological assessment report
151. Following the analysis, the potential for the project to impact any CH features was assessed and requirements for mitigation in project design and/or specific species or habitat action plans were determined.
152. The project was assessed to be implemented in critical habitat for the saiga antelope. Thus, the assessment provides comprehensive data, that was collected on this species. Whilst the project road does not encroach on either the strictly protected zone or the buffer area of the reserve, it does run at least 22 km from the south west border.
153. There are presently 13 people responsible for the management of Saigachy Reserve, constituting 10 rangers and 3 administrative staff. Resources of the reserve include 4 cars and a field base, and the rangers carry out daily monitoring for poachers and species identification. According to consultation with Saigachy Reserve staff in December 2019, recent monitoring suggests there is 1 remaining herd of saiga in the reserve of approximately 15 individuals. Threats to the Ustyurt Saiga include habitat fragmentation, the border crossing fence between Uzbekistan and Kazakhstan, poaching, diseases and climate change.
154. Saiga numbers in Uzbekistan are currently extremely low. However, based on typical saiga population growth rates of 1.4x annually, with ongoing efforts to make existing habitat fragmentation (e.g. border fence) more porous, even the small local population of 15 animals could grow to some 6,000 individuals within the project timescale.
155. A species list, results of the April 2019 monitoring, results of December 2019 consultations, the Sudochie lake designation and the critical habitat assessment results are presented in appendices to the ecological assessment report.

G.2.5 Reports Produced

156. In the course of the study the Consultant prepared and submitted reports as per reporting requirements in the TOR. The following documents were prepared under the ecological assessment:
- Ecological Assessment Report
 - Biodiversity Action Plan

- Biodiversity Management and Monitoring Plan
- TOR for Biodiversity Experts

H. Lessons Learnt

H.1 The Consultant

157. The Consultant mobilized in November 2018. After mobilization, it turned out, that the project documents were not fully available for review. They were subsequently submitted, with a final submission of the DD documentation in April 2019. It should be assured, that the DD preparation is completed before TA mobilization, as delays have significant impact to Consultant's staffing schedule and resources.

H.2 ADB

158. Based on current experience in a number of projects, it is highly recommended, that ADB assures, that the project documentation is actually completed by the designer before the Consultant mobilizes. The Consultant suggests, that ADB requests a copy of the signed contract between the designer and the client prior to the start of TA's. This will allow an assessment of the design progress since contract signature.

H.3 Committee for Roads / PMU

159. For projects under funding of international financing institutions and the involvement of international consultants, it is essential to have preparation of FS and DD documentations by local design companies with English capacity. Otherwise, international consultants will face difficulties to efficiently carry out their activities especially during the design review.
160. CR should request the submission of the full FS and DD documentation from the national designer companies including a soft copy as part of the contract. This will support an efficient submission of data to all involved parties.
161. The establishment of a new PMU for each project does not contribute to capacity building and knowledge transfer. CR should reconsider the organization structure of PMU's.

H.4 Road Design Institute

162. RDI has a lot of experience in the preparation of FS and DD documentations according to national standards. However, the compilation of the DD documentation lacks a consistent structure of some parts of the project, e.g. the railway level crossing and utility relocation design. RDI shall give clear instructions to the sub-consultants related to the structure of the design documentation, the language and software to be used etc.
163. It is of utmost importance to establish a quality management system at RDI. There is no common regulation how records of revisions are kept, how documents have to be named, how drawings are to be produced, which formats shall be used and so on. Quantities of works should be solely given in the BoQ and not on the drawings.
164. Further assistance to build capacity of RDI could be in the form of seminars, workshops, on-the-job training, etc. Another step might be a jointly with an international consulting company prepared FS and DD of one selected project in the near future.