

Initial Environmental Examination

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Afghanistan: Panj Amu River Basin Sector Project

(Momin Abad, Yatem Tapa, and Qatak Jar Suub-projects Canal System – NCB004)

Prepared by the Ministry of Finance and the Ministry of Agriculture, Irrigation and Livestock for the Asian Development Bank.

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ACRONYMS

ADB	Asian Development Bank	OTJ	On-the-job Training
CPMO	Central Project Management Office (MAIL)	O&M	Operation and Maintenance
DAIL	Directorate of Agriculture, Irrigation, and Livestock	PARB	Punji Amu River Basin
EMP	Environmental Management Plan	PIC	Project Implementation Committee
EU	European Union	PMO	Project Management Office (MEW)
ES	Environmental Specialist	PPTA	Project Preparatory Technical Assistance
GIS	Geographic Information System	REA	Rapid Environmental Assessment
GoIRA	Government of the Islamic Republic of Afghanistan	RoW	Right of Way
HR	Head Regulator	RSP	Representative Sub-project
IA	Irrigation Associations	SSEMP	Site Specific Environmental Management Plan
IWRM	Integrated Water Resources Management	SWM	Solid Waste Management Plan
MAIL	Ministry of Agriculture, Irrigation, and Livestock	SBA	Sub-basin Agencies
MC	Main Canals	SBC	Sub-basin Councils
MEW	Ministry of Energy and Water	TOR	Terms of Reference
MOF	Ministry of Finance	TOT	Training of Trainers
MRRD	Ministry of Rural Rehabilitation and Development	WUA	Water User Association
NRM	Natural Resource Management	NEPA	National Environmental Protection Agency
		NWARA	National Water Affairs Regulatory Authority (Afghanistan)

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EXECUTIVE SUMMARY

1. This Initial Environmental Examination (IEE) for the combined Momin Abad, Qatak Jar and Yatem Teta subprojects under NCB-04 contract, submitted as part of the Panj-Amu River Basin Project Sector Project in Afghanistan. The PARB continues and expands upon a long-term programme support to improve water allocation, enhance on-farm water management and protection of watersheds across the Panj-Amu River basin since 2004.
2. The PARB is implemented with the Asia Development Bank (ADB) as co-financier and administrator in partnership with the European Union (EU), and is part of a long-term program of to the Government of the Islamic Republic of Afghanistan (GoIRA). The importance of the PARB Project is in its impact on the well-being of rural communities in the basin, and in its support for Afghanistan's sector investment plan, the \$1.1 billion National Water and Natural Resources Development Program. Project proponents therefore are the GoIRA, ADB, and the EU. The Project Executing Agency (EA) is the Ministry of Finance. The Implementing Agencies (IA) are the Ministry of Energy and Water (MEW) and the Ministry of Agriculture, Irrigation, and Livestock (MAIL).
3. The PARB project is fundamentally focused upon rehabilitation of existing infrastructure. As a result, it is expected that the major environmental impacts concern the site preparation including establishment of access roads, borrow pits, construction camps and the excavation and removal of established vegetation along existing canals. Management of waste and spoil, along with rehabilitation of the site is also identified.
4. This IEE has been prepared to identify and assess potential environmental impacts. Under the (ADB) the Project is classified as Environmental Category B. Category B projects require environmental assessment in the form of an initial environmental examination (IEE). IEE findings are then used to determine if an environmental impact assessment (EIA) is needed. If it is not, the IEE becomes the final environmental assessment report.
5. The IEE identifies each of these anticipated sources of impact, establishes an Environmental Management Plan (EMP), and accompanies the EMP with a Summary of Monitoring Requirements. Contractually, the Contractor will be obliged to prepare and submit to the employer's construction supervisor a Site Specific Environmental Management Plan (which will include a monitoring schedule), demonstrating the manner in which the Contractor will comply with the requirements of the clauses in the EMP including environmental protection and pollution control, and any particular environmental mitigation measures as stipulated in the Particular Specifications or Technical Specifications forming part of the Contract Documents.
6. Based on site surveys of the locations where structures will be built, and following a review of potential wider impacts after public consultation, the NCB-04 secondary canals are not expected to have significant adverse impacts, given the small scale of the works and the fact that it is basically an exercise in rehabilitation and upgrading of an existing irrigation system. Therefore, providing the EMP is followed and the contractor is diligent in following developing and implementing the SEMP, the environmental impact of NCB-04 subprojects is expected to be minimal. The greatest impact of any note is the removal of some trees which will need to be re- planted in numbers which reflect MAIL and NEPA policy.
7. The anticipated impacts and mitigation measures of this project have been discussed considering the following Three key phases of the project:
 - Design Phase
 - Construction Phase
 - Operation Phase

8. Consultation meetings were held with the potentially affected people, water association, Government authorities and etc., along the secondary canals. The objectives of the meetings were to share the project relevant information with communities and understand their concerns. The main concerns raised by the community elders were about the access to water, job opportunities for the local people and the resettlement compensation.

9. Impacts to ecological resources (wildlife, vegetation, aquatic biota, special status species, and their habitats) will be minimal and localized in all phases of the project because the secondary canals do not pass through ecological environmentally sensitive areas. But as this secondary canals do not pass through a protected area or on the bird's migration path this impacts on bird safety is considered as low.

10. The study results suggest that overall the project will have low environmental impacts if the proposed mitigation measures and EMP are implemented properly. The secondary canals work impacts such as site characterization, secondary canals path survey and monitoring are generally temporary and of relatively lesser magnitude. The possible impacts include ground clearing (removal of vegetative cover), vehicular and pedestrian traffic, and fugitive dust, acoustic noise, visual and drilling to characterize subsurface conditions (e.g., soils, depth to groundwater). The mitigation measures mentioned in the report will help reduce and avoid these negative impacts.

11. The EMP covers all the potential impacts and mitigation measure during design, construction, and operation phases of the subprojects. The CPMO will have the responsibility to implement the EMP during the design and construction phase.

12. This IEE reveals that there will be both positive and negative impacts due to the construction activities and normal operations after the proposed construction. Mitigation measures have been discussed to mitigate the expected negative impacts. The major positive impact of the project will be economic development and access to water for irrigation. The agriculture will grow and will create short and long-term job opportunities for people.

13. After analysis of all environmental and social aspects of the project, it can be concluded that the project will not have adverse environmental impacts in case all the mitigation measures mentioned in this IEE have taken into the consideration.

A. INTRODUCTION

1. Background

14. The Panj-Amu River Basin Project Sector Project (PARB), Afghanistan Project will support improved water allocation and availability, enhanced on-farm water management, and protection of watersheds in the Panj-Amu River basin, through construction of water conveyance and irrigation infrastructure at 21 priority subprojects (construction costs approximately \$50 million); the establishment, strengthening, and support of subproject water user associations (WUAs) and irrigator associations (IAs); training on on-farm water management and improved agronomic techniques; implementation of watershed management plans at sites adjacent to the priority subprojects; and improved basin water resources planning and management.

15. Since 2004, the European Union (EU) has supported the Government of the Islamic Republic of Afghanistan (GoIRA) in its reconstruction efforts by funding integrated water management programmes in the Panj Amu River basin. The NCB-04 subprojects continue this EU support in partnership with ADB as co-financier and administrator. This approach aims to improve Government's ownership of fund management and conform to EU policy in Afghanistan of moving funding on-budget or into co-financing arrangements, and to increase sustainability.

16. This IEE covers the NCB-04 (Momin Abad, Qatak Jar and Yatem Tapa) sub-projects which are located in Takhar province of Afghanistan.

17. **Momin Abad:** Located in the Northeast of Khwaja bahaiddin district of Takhar Province and just 12 KM far from the city of the Khwaja bahahuddin district of Takhar Province the head works for this canal has been done on the Dec 2016. Its length is 23.93 KM and command area is 2357 hectares.

18. **Qatek Jar:** Located in the Northwest side of Khawja bahuddin district of Takhar Province and just 11KM far from the district city. The head works has been completed on the Dec 2016. Its length is 48 KM and command area is 2950 hectares. The intake coordinate is N4141654 E549990.

19. **Yatem Tapa:** Located in the Northeast of Yatem Tapaand west side of Cha Ab district of Takhar Province and just 9 KM far from the city Yangi Qala of Takhar Province. The main intakes and head works has been constructed on the 2011 to 2018.Total length of canal I is 48 KM and command area is 9464 hectares. The intake coordinate is N4158612 E563064.

20. The NCB-04 (Yatem Tapa, Katek Jar and Momin Abad) subprojects continue this EU support in partnership with ADB as co-financier and administrator. This approach aims to improve Government's ownership of fund management and conform to EU policy in Afghanistan of moving funding on-budget or into co-financing arrangements, and to increase sustainability.

21. The importance of the PARB Project is in its impact on the well-being of rural communities in the basin, and in its support for Afghanistan's sector investment plan, the \$1.1 billion National Water and Natural Resources Development Program.

2. Purpose of Report

22. This Initial Environmental Examination (IEE) has been prepared for the NCB-04 (Momin Abad, Qatak Jar and Yatem Tapa) subprojects of the Panj-Amu River Basin Sector Project (PARB), Afghanistan. The IEE has been prepared to identify and assess potential environmental impacts and provide suitable mitigation measure to eliminate the potential environmental impacts or reduce to acceptable limits. Under the Asia Development Bank (ADB) the Project is classified as Environmental Category B. Category B projects require environmental assessment in the form of an initial

environmental examination (IEE). IEE findings are then used to determine if an environmental impact assessment (EIA) is needed. If it is not, the IEE becomes the final environmental assessment report.

3. Identification of Project and Project Proponents

23. The PARB continues and expands upon previous European Union (EU) support for irrigation development in the Panj-Amu Basin Sector Project. The Project will be financed through an ADB sector grant. It will have a seven-year implementation period and an estimated cost of \$76.75 million (\$50 million in EU funds and \$20 million in ADB funds and \$0.75 million in government in-kind contributions).

24. Project proponents are the GoIRA, ADB, and the EU. The Project Executing Agency (EA) is the Ministry of Finance. The Implementing Agencies (IA) are the Ministry of Energy and Water (MEW) and the Ministry of Agriculture, Irrigation, and Livestock (MAIL).

25. MEW will be responsible for (i) construction of civil works on main (primary) canals; (ii) establishment and strengthening of water user associations (WUAs) in such schemes; and (iii) strengthened water resources planning and management.

26. MAIL will be responsible for (i) construction of civil works on secondary and higher-order canals; improved on-farm water management (OFWM) including establishment and strengthening of irrigation associations (IAs), agricultural extension, land levelling etc; and improved watershed management.

4. Data Collection / Compilation

27. Baseline data referring to the physical, biological and the socio-economic environment have been collected from previous studies and through meeting of the following relevant authorities and agencies:

- (i) Takhar Sub-Basins Agencies
- (ii) Panj Amu River Basin Authority
- (iii) NEPA Kabul and NEPA Takhar province
- (iv) Department of Culture Takhar
- (v) Central Statistic Organization (CSO)
- (vi) Ministry of Agriculture, Irrigation and Livestock(MAIL)

28. Data gathering has been implemented during numerous meetings with international and national experts in Kabul, and Takhar.

29. Baselines survey for air, water, noise, flora and fauna for this IEE study were not conducted due to outbreak of COVID-19. The survey will be conducted and will be part of IEE study as appendix.

5. Scope of the IEE Study

30. The scope of this IEE should be, the potential environmental impacts of the planned project has been investigated. On the basis of the existing environmental situation in the Investigation area and the technical planning, the potential environmental impacts of the proposed project has been determined. Alternative routings and options, as well as appropriate mitigation and monitoring measures were considered to reduce possible adverse impacts to acceptable level.

31. The Objectives of the NCB-04 subprojects irrigation IEE study include:

- (i) the larger-scale longer-term environmental baseline description (climate, hydrology, history of human occupation etc.) and impacts (cumulative, environment-on- project);
- (vii) provinces or districts within which NCB-04 subprojects are located for baseline description relying on secondary census data;

- (viii) the irrigation schemes command area (within which selected civil works will be constructed, rehabilitated, and upgraded) for the remaining environmental baseline description and the IEE public consultation;
- (ix) the NCB-04 irrigation civil work command areas (of the specific irrigation infrastructure to be rehabilitated and upgraded) for assessment and management of irrigation- and agriculture-related impacts;
- (x) construction site and adjacent areas for assessment and management of construction impacts; and
- (xi) Potential quarry sites and adjacent areas for assessment and management of quarrying impacts.

a) Methodology

32. This IEE follows the methodology outlined in the ADB Guidelines; ADB Safeguard Policy Statement, June 2009 (SPS 2009) and environmental Laws of the Government of Afghanistan. The experiences of other studies in preparing IEE documentation for Irrigation sector have also been reviewed. This IEE is prepared based on review of preliminary design, collection of selected primary data, review of secondary data and information, field visit and stakeholder consultations.

b) IEE Information Sources and Limitations

33. A key limitation to the IEE study was the Outbreak of COVID-19 in all NCB-04 secondary canals areas which limited the data collection activity.

34. The field data and consultations were not carry out due to COVID-19 pandemic issue and will be carried out for this study before contractor mobilize for work. These updated field data and consultation will be part of IEE study as appendix.

c) Level of Detail and Comprehensiveness

35. The level of detail and comprehensiveness of an environmental assessment should be commensurate with project complexity and the significance of its potential impacts and risks. This IEE identifies and focuses on the limited potential impacts and risks of the NCB-04 subprojects, relatively small schemes of Momin Abad 2357 ha, Qatak Jar 2950 ha, and Yatem Tepa 9464 respectively, without a broad range of potential significant impacts and risks.

d) Structure of Report

36. This IEE follows the ADB guidelines for content of an IEE:

- (i) Introduction
- (ii) Policy, legal, and administrative framework
- (iii) Description of the project
- (iv) Description of the environment
- (v) Anticipated impacts and mitigation measures
- (vi) Environmental management plan (EMP, i.e. mitigation plan and monitoring plan)
- (vii) Public consultation and information disclosure
- (viii) Grievance redress mechanism (GRM)
- (ix) Findings and recommendations
- (x) Conclusion

B. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

37. The PARB project is embedded within the following framework, presented in brief outline format. For a detailed description of this framework refer to the IEE prepared for Sharwana, Seyaab and Farhad canals.

1. Afghanistan

2. Legal System

38. The following laws of GoIRA govern the way in which the environmental management of the project must be implemented, in order to proceed. Constitutional articles pertaining to environmental management are:

(i) 1. Article 40: Private Property

- (i) Property is immune from invasion.
- (ii) No person shall be forbidden from acquiring and making use of a property except within the limits of law.
- (iii) Nobody's property shall be confiscated without the provisions of law and the order of an authorized court.
- (iv) Acquisition of a person's property, in return for a prior and just compensation within the bounds of law, is permitted only for securing public interests in accordance with the provisions of law.
- (v) Inspection and disclosure of a private property are carried out only in accordance with the provisions of law.

(ii) 2. Article 51: Compensation

- (vi) Any person suffering undue harm by government action is entitled to compensation, which he can claim by appealing to the court.
- (vii) With the exception of situations stated in the law, the state cannot claim its right without the order of an authorized court.

(iii) 3. Article 15: Environment

- (viii) With the exception of situations stated in the law, the state cannot claim its right without the order of an authorized court.
- (ix) The state is obliged to adopt necessary measures for safeguarding forests and the environment.

3. International Environmental Agreements

39. The Constitution binds the state to abide by the UN charter, international treaties, international conventions that Afghanistan has signed, and the Universal Declaration of Human Rights (Article 7).

40. International agreements relevant to environmental management of water resources development to which Afghanistan is a party are (listed in order by the year in which each came into force):

- (i) Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1975) – international cooperation to control trade in species threatened with extinction or in danger of becoming so; in species whose trade interferes with regulation of trade in extinction-threatened species; and in species identified by a

- party under national-level trade control to prevent/restrict exploitation, for which international cooperation is needed;
- (ii) Convention on the Conservation of Migratory Species of Wild Animals (also called Convention on Migratory Species, CMS, and the Bonn Convention, 1983) – conserve terrestrial, marine and avian migratory species throughout their ranges;
- (iii) UN Convention on Biological Diversity (1993) – objectives are to conserve biological diversity; promote sustainable use of biological diversity; and (iii) seek more fair and equitable sharing of the benefits of genetic resource utilization;
- (iv) UN Framework Convention on Climate Change (1994) – aims to stabilize greenhouse gases in the atmosphere at levels that will not change climate systems in dangerous ways;
- (v) UN Convention to Combat Desertification (1996) – aims to combat desertification and mitigate drought effects in countries experiencing serious drought or desertification;
- (vi) Kyoto Protocol (2005) – extends the Convention on Climate Change;
- (vii) Paris Agreement on Climate change (2015).

(iv) 4. In addition, Afghanistan has signed but not ratified:

- (i) UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property (1970) – aims to protect cultural property against theft and promotes restitution of stolen items;
- (ii) Ramsar Convention on Wetlands (1975) – promotes conservation and sustainable use of wetlands;
- (iii) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1992) – aims to reduce movement of hazardous waste between nations, prevent transfer of such waste from developed to less developed countries (LDCs); minimize waste amounts and toxicity; promote environmentally sound management at or near generation sites; assist LDCs in environmentally sound management of their wastes; does not address radioactive waste;
- (iv) Memorandum of Understanding Concerning Conservation Measures for the Siberian Crane (1993) – aims to protect the species (*Leucogeranus leucogeranus*) through concerted, coordinated actions to prevent disappearance of remaining populations;
- (v) UNIDROIT Convention on Stolen or Illegally Exported Cultural Objects (1995) – attempts to fill gaps in the UNESCO convention by making the final owner of a stolen cultural item who cannot show due diligence responsible for restitution;
- (vi) UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2006) – safeguard, ensure respect for, and raise awareness at local, national, international levels, and provide international cooperation and assistance.

4. National Legislation, Policies, and Regulations

41. The GIROA adopted its first environmental framework, the Environment Act of 2005, with the goal of ensuring that environmental issues were addressed as an integral part of the development process, and the Act established the National Environmental Protection Agency (NEPA). Legislators continued this new theme, leading to the drafting of an enhanced Environmental Law in 2006, which was subsequently approved in 2007.

42. **Environment Act (2007)** sets forth national administrative roles and coordination with provincial authorities; establishes management frameworks for natural resource conservation, biodiversity, drinking water, pollution control, environmental education, and defines enforcement tools.¹

¹Taylor, D. A. 200). Policy: new environment law for Afghanistan. *Environmental Health Perspectives*, 114(3). <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1392251/>

43. **Regulation on evaluation of environmental and social impacts/Ministry of Justice (2017)** Official Gazette No. 1276 (9 December 2017); have 52 pages, 18 articles and 3 chapters, subject environmental protection, or environmental policy. And its classifications are Hierarchical classification (regulation), Public Law (The constitution) sectorial classification (environment), scientific classification (National Law). The sectorial classification of 2017 regulation are following in this IEE with other NEPA regulations.

44. **National Environmental Impact Assessment Policy** (2007) follows on from the Environment Law and sets forth a policy vision, principles, strategy, and process for environmental assessment in Afghanistan. The emphasis is on ensuring that projects with potentially significant impacts are identified to the national environmental regulator, the National Environmental Protection Agency (NEPA), and follow adequate due diligence procedures. The document provides a range of additional useful information on NEPA and environmental assessment in the Afghanistan context.

45. **Environmental Impact Assessment Regulations.** Official Gazette No. 939 (Mar 2008). Schedule I that list project types likely to have significant impacts (Category 1) or potentially adverse impacts (Category 2); and the industries likely to give rise to pollution. Schedule II provides the clearance certificate application form.

46. The definition of EIA as described in the **Environmental Law** is: 'EIA refers to the procedures used for evaluating the likely environmental and consequent social impacts, both beneficial and adverse, of proposed projects, plans, policies or activities where there is a possibility of significant adverse effects arising as a result, in order to improve the quality and development impact of such projects by identifying ways of improving project selection, siting, planning, design and implementation'.

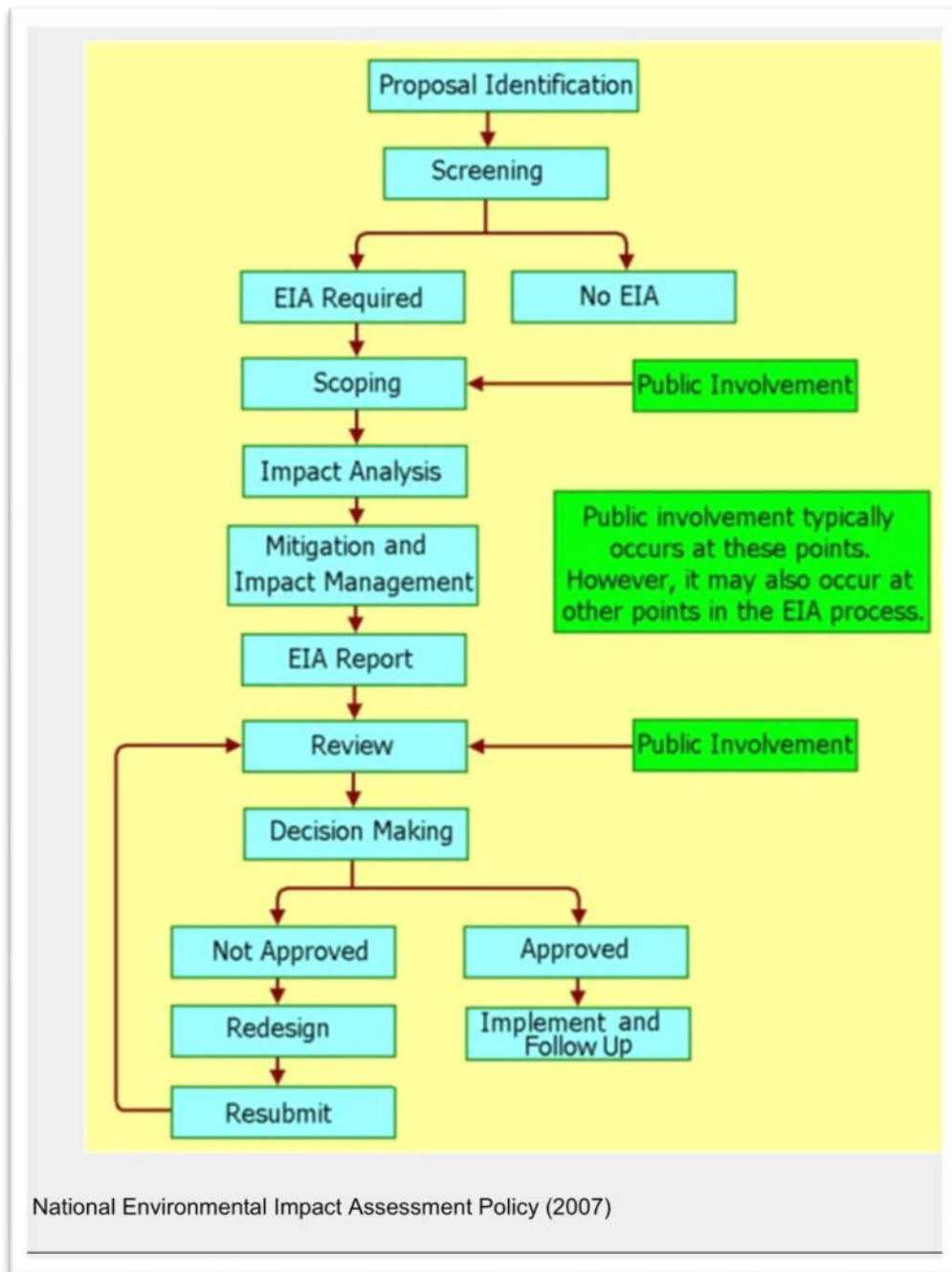
47. **National EIA Policy - An Integrated Approach to EIA in Afghanistan.** NEPA created this policy to provide guidance to project proponents while undertaking development projects that may have potential impacts on the environment. They also provide guidance on how the public should be consulted and define the roles and responsibilities of various stakeholders in that process.

48. NEPA developed this policy to stipulate broad guidelines for project proponents on integrating EIA into the process of development, and identified procedures to address environmental consequences and involve necessary institutions in the process of project implementation.

49. The systematic process to identify, predict and evaluate the environmental effects of proposed projects, plans or policies given in the National EIA policy is described in Figure 1. The policy also describes the timeline for approval of different stages of EIA process as shown in Figure 2.

50. Under Article 20 of the Environment Law, NEPA shall appoint an EIA Board of Experts to review, assess and consider applications and documents submitted by proponents for obtaining permits and make technical recommendations in regard to whether to issue permits, as well as the conditions that should be attached to any permit that is granted.

Figure 1: Schema for the EIA Process in Afghanistan.



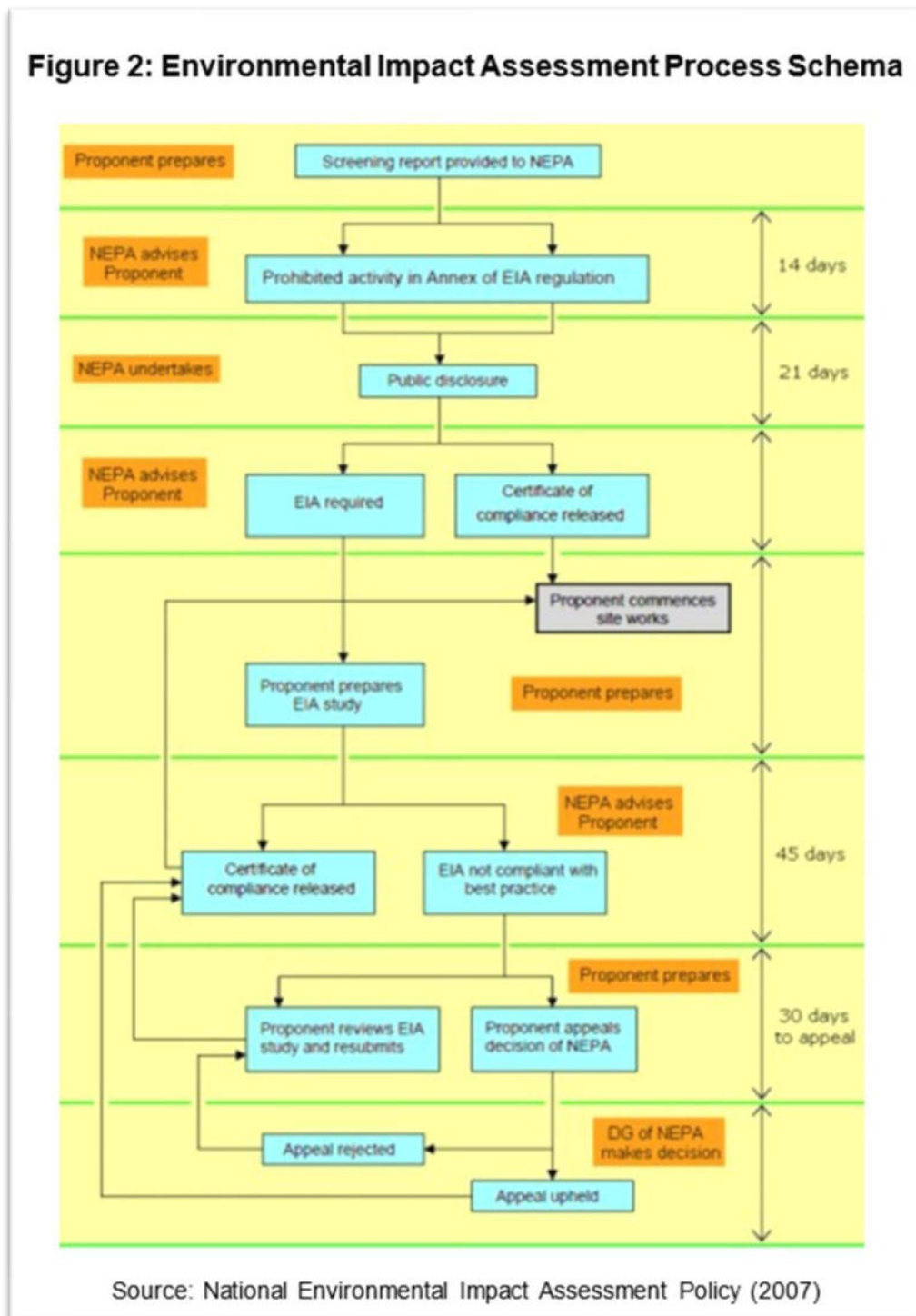
51. National EIA policy provides a project screening list which categorizes different projects based on the likelihood of the significance of the impacts stemming from particular projects. Projects with potentially adverse impacts are generally divided into the following two categories:

52. **Category 1 Activities:** Set out in the National EIA Policy 'Project Screening Lists', are those activities likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented, and that will impact a broader area than the sites or facilities subject to the physical works of the activity.

53. **Category 2 activities:** Set out in the National EIA Policy 'Project Screening Lists', are those activities likely to have potential adverse impacts on human environments or environmentally sensitive

areas that are less adverse than those of Category 1 activities, are site-specific, and in most instances are not irreversible.

Figure 2: Schema for the EIA Process in Afghanistan.



54. National EIA policy, Category 1, Section F: Water Supply and Treatment, states that water supply schemes and treatment plants with a total cost of \$400,000 USD as a project are likely to have significant adverse impacts.

55. Once the application form and other relevant documents are submitted to NEPA, according to the agency EIA regulations, NEPA will: (i) issue a Certificate of Compliance, with or without conditions, or (ii) advise the applicant in writing to review the technical reports and address the concerns of NEPA.

56. Administrative Guidelines for the Preparation of Environmental Impact Assessments (June 2008). These guidelines were prepared as a companion to the 2008 Regulations, to guide proponents on interacting with NEPA, on public consultation, and roles and responsibilities of stakeholders.

57. The Environmental Law establishes a clear legislative framework and defines the overarching role of NEPA as an independent agency for environmental governance in the country. NEPA has overall responsibility to address policy and legal issues as well as environmental management in coordination with other related departments.

58. In coordination with other government offices and external agencies, NEPA is in the process of drafting and updating environmental regulations and guidelines for the country's environmental management. Presently, there exist the following environmental laws, regulations, guidelines and policies:

- (i) Environmental Law (2005 and 2007), and;
- (ii) National Environmental Impact Assessment Policy "An Integrated Approach to Environmental Impact Assessment in Afghanistan," November 2007.

59. The Environment Act was approved by the Cabinet in December 2005. The Environment Act was developed by NEPA over a period of two years with the assistance of international experts, including extensive stakeholder consultation with concerned ministries, quasi-government agencies, civil society and other interested parties. The Environmental Law was approved by the National Assembly and became part of the Islamic Republic of Afghanistan Official Gazette No. 912, dated 25 January 2007.

60. The Act has been promulgated to give effect to Article 15 of the Constitution of Afghanistan and provide for the management of issues relating to rehabilitation of the environment and the conservation and sustainable use of natural resources, living organisms and non-living organisms.

61. The Environmental Law contains a specifically designed legal framework needed to sustainably manage Afghanistan's natural resources and rehabilitate its damaged environment. The law also clarifies institutional responsibilities and contains the compliance and enforcement provisions required to allow the Government to enforce the legislation. The law is a fundamental prerequisite to enable NEPA to fulfil its mandate. The primary objectives of the law are to:

- (i) Improve living conditions and protect the health of humans, fauna, and flora;
- (ii) Maintain ecological functions and evolutionary processes;
- (iii) Secure the needs and interests of present and future generations;
- (iv) Conserve natural and cultural heritages; and, facilitate the reconstruction and sustainable development of the national economy.

62. The Environmental Law (2007), Article 19, provides a legal framework for public consultation during environmental assessment.

63. Article 19, public participation²: Affected persons may express their opinion on a proposed project, plan, policy or activity, preliminary assessment, environmental impact statement, final record of opinion and comprehensive mitigation plan, before the approval of the project, plan, policy or activity, and the proponent must demonstrate to the NEPA that affected persons have had meaningful opportunities, through independent consultation and participation in public hearings, to express their opinions on these matters on a timely basis.

² The Environmental Law of the Islamic Republic of Afghanistan 2007.

64. NEPA shall not reach a decision on any application for a permit until such time that the proponent has demonstrated to the satisfaction of NEPA that copies of the document has been distributed to affected persons, informed the public that the document is being made available for public review by advertising the document and displaying a copy of it for inspection, and convened and recorded the proceedings of a public hearing.

65. After NEPA has reviewed the conditions set forth in item 3 above, NEPA shall reach a decision, inform the public of that decision and make available any relevant documentation or information for public review.³

66. In December 2014, the Access to Information Act was signed by the President of Afghanistan. It has four objectives:

- (i) To ensure the right of access to information for all citizens from the government and non-government institutions;
- (ii) To observe Article 19 of International Covenant on Civil and Political Rights (i.e. freedom to seek, receive and impart information and ideas of all kinds etc.) consistent with the tenets and provisions of Islam; Article 3, Afghanistan Constitution;
- (iii) To ensure transparency and accountability in the conduct of governmental and nongovernment institutions;
- (iv) To organize request processing and provision of information.

67. Water Law (2009). The Water Law states that water is owned by the public and that the Government is responsible for water protection and management. It assigns responsibilities to government institutions for management and protection of water resources, water ownership, and regulates water ownership fees, rights, permits, and usage.⁴

68. Afghanistan's water law is one component of the country's strategy to integrate its water systems and institutions. The water law recognizes the key role of local Water Users Associations in the protection and management of water resources. The MEW has responsibility for setting up Water User Associations (Article 10), and MAIL has the task of setting up Irrigation Associations (Article 11). Throughout years of conflict, NGOs developed and maintained strong links with rural communities in all provinces. The Afghanistan Urban Water Supply and Sewerage Corporation (AUWSS) proposes broadening their role to coach Water Users Associations and members of Community Development Councils in conservation techniques and water management systems. In particular, the AUWSS advocates end-user participation in decision making relating to water resource management, operation and maintenance of water supply systems and agreeing water use allocations.

69. Law on the Protection of Historical and Cultural Properties, Issue No. 828 (2004). After defining the material falling within its scope, the law sets forth the State's interest and rights in such materials, specifies prohibited and regulated activities involving such materials, and establishes enforcement measures such as penalties and fees.

70. Pesticide Regulations (1989). Afghanistan has had pesticide regulations since 1989, but they have never been enforced due to lack of resources. A draft Pesticide Law dating from 2009 has yet to be enacted.

71. Environmental Standards. Afghanistan has not established national environmental standards or guidelines for air quality, noise, or water quality in respect of human health, aquatic health, irrigation, soil, etc. In the absence of national standards, an accepted international practice is to follow the guidance provided by IFC (2007) Environmental, Health, and Safety Guidelines. The Ministry of

³ Unofficial English translation

⁴ Ahmad, T.2013. *Legislation on use of water in agriculture: Afghanistan*. <http://www.loc.gov/law/help/water-law/afghanistan.php>

Mining, for example, uses this publication in its environment, health, and safety regime. World Health Organization (WHO) standards are routinely used for drinking water quality.

72. The Law on Land Expropriation sets out the provisions governing the expropriation or acquisition of land for public interest purposes, such as the establishment/construction of public infrastructure or for acquisition of land with cultural or scientific values, land of higher agricultural productivity and large gardens.

(v) 6. Accordingly, the Law declares that:

- (i) Acquisition of a plot or portion of a plot land for public use is decided by the Council of Ministers and is compensated at fair value based on current market rates (Article 2).
- (ii) The right of the owner or land user will be terminated three months prior to the start of civil works on the project and after the proper reimbursement to the owner or person using the land has been made. (Article 6); and
- (iii) The value of land, value of houses and buildings on the land and value of trees and other assets on the land will be considered for compensation (Article 8;) and compensation is determined by the Council of Ministers.

5. Other Relevant Laws and Regulations

73. **Water Law (2009).** The Water Law states that water is owned by the public and that the Government is responsible for water protection and management. It assigns responsibilities to government institutions for management and protection of water resources, water ownership, and regulates water ownership fees, rights, permits, and usage.

74. Afghanistan's Water Law is one component of the country's strategy to integrate its water systems and institutions. The water law recognizes the key role of local water user associations in the protection and management of water resources. The MEW has responsibility for setting up water user associations (Article 10), and the Ministry of Agriculture, Irrigation and Livestock (MAIL) has the task of setting up irrigation associations (Article 11). Throughout years of conflict, non-governmental organizations (NGOs) developed and maintained strong links with rural communities in all provinces. The AUWSSC proposes broadening their role to coach Water Users Associations and members of Community Development Councils in conservation techniques and water management systems. In particular, AUWSSC advocates end-user participation in decision making relating to water resource management, operation and maintenance of water supply systems and agreeing on water use allocations.

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be considered for compensation (Article 8;) and compensation is determined by the Council of Ministers.

77. **Pesticide Regulations** (1989). Afghanistan has had pesticide regulations since 1989, but they have never been enforced due to lack of resources. A draft Pesticide Law dating from 2009 has yet to be enacted.

6. International Commission on Large Dam

78. The International Commission on Large Dams (ICOLD) was founded in 1928 to provide a forum for discussion and for the exchange of knowledge and experience in dam engineering for engineers and others concerned with the development of water resources. Its objectives are to encourage improvements in dam engineering in all its aspects, and in all phases of the planning, design, construction and operation of dams and associated works.

79. At Congresses and Symposia as well as in specially appointed Technical Committees, ICOLD gathers relevant information, and addresses questions concerning technical, environmental, social, economic and financial aspects of dam development, with particular emphasis on overall safety and compatibility with the environment, and then disseminates the results to its members.

80. ICOLD has about 90 member countries including Afghanistan.

81. Although ICOLD was initially mostly concerned with security, it became pretty early concerned with the subject of environment. Environment was first discussed during the 1973 Congress, one year after the first UN Environment Summit of Stockholm. The first Technical Committee devoted to the subject was created in 1977 and the first Technical Bulletin appeared in 1981. In 1997, ICOLD published a document that presents guidance for environmental Consideration, assessment and mitigation: "Position Paper on Dams and the Environment". It States: "Increased awareness of the natural environment and its endangered situation is one of the most important developments of the late 20th century."

82. Large dams are defined by ICOLD7 as those with a crest height of 15 m or more from the foundation and also those between 5-15 m high with a reservoir volume over 3 million m³. With a crest height of 60 m above foundation prior to the raise (73 m after) and a reservoir volume of 88 million m³ prior to the raise (882 million m³ after), Dahla Dam is categorized as a large dam.

Air Quality

83. **WHO Air Quality Guidelines (Global update 2005).** The WHO guidelines offer guidance on thresholds and limits for key air pollutants that pose health risks.

84. Afghanistan National Water Quality Standards have been prepared subsequently of WHO guidelines.

Figure 3: Afghanistan and WHO Air Quality Standards.

	Averaging Period	WHO Guideline value in $\mu\text{g}/\text{m}^3$	Afghanistan maximum allowable concentration value in $\mu\text{g}/\text{m}^3$
TSP	24 hours	-	300
Carbon monoxide (CO)	8 hours	-	10
	1 hour	-	30
	30 minutes	-	60
Lead (Pb)	1 year	-	0.5
Sulfur Dioxide SO₂	24 hours	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)	50
	10 minutes	5000 (guideline)	-
Nitrogen dioxide NO₂	1 year	49 (guideline)	40
	1 hour	200 (guideline)	80
Particulate Matter PM₁₀	1 year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)	70
	24 hours	150 (Interim target-1) 100 (Interim target-2) 74 (Interim target-3) 50 (guideline)	150
	1 year	35 (Interim target-1) 23 (Interim target-2) 15 (Interim target-3) 10 (guideline)	35
	24 hours	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)	75
Particulate Matter PM_{2.5}	1 year	35 (Interim target-1) 23 (Interim target-2) 15 (Interim target-3) 10 (guideline)	35
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)	100

Source: Afghanistan National Air Quality Standards and WHO Air Quality Standards 2005

Noise Levels

85. **IFC EHS Guidelines on Environmental Noise Management (2018).** The environmental health and safety (EHS) guidelines are technical references and measures that are generally considered to be achievable in new facilities with reasonable costs. IFC has set limits which noise impacts shall not exceed. When national standards differ from the EHS guidelines measures, the projects are required to follow the more stringent option.

Figure 4: Afghanistan and IFC EHS Noise management Standards.

Receptor	Afghanistan		IFC EHS	
	Day-time 7:00 – 22:00	Night-time 22:00 – 7:00	Day-time 7:00 – 22:00	Night-time 22:00 – 7:00
Residential, institutional, educational	55*	45*	55	45
Industrial, commercial	70*	70*	70	70

Note: * Interim figures for Afghanistan only - to be confirmed.

Source: International Finance Cooperation. 2018. Environmental, Health, and Safety Guidelines.

7. ADB

a) Policies

86. **Safeguard Policy Statement (2009).** SPS 2009 is ADB's safeguards policy document. It describes the common objectives and policy principles of ADB's safeguards and outlines the delivery process for ADB's safeguard policy. SPS 2009 promotes sustainability through protection of people and the environment from the adverse impacts of projects, and by supporting the strengthening of country safeguard systems. It presents a consistent, consolidated framework for environment, resettlement, and indigenous people's safeguards.

87. .

88. **Public Communications Policy (2011):** guides ADB's efforts to be transparent and accountable to the people it serves, which it recognizes are essential to development effectiveness. The policy recognizes the right of people to seek, access, and impart information about ADB's operations, and it aims to enhance stakeholders' trust in and ability to engage with ADB, through proactive disclosure, presumption in favour of disclosure, and recognition of the right to access and impart information and ideas, country ownership, limited exceptions, and the right to appeal.

b) Guidance

89. with minimum environmental and social impacts, and use resources and energy efficiently."

8. IFC Environmental, Health and Safety Approaches for Hydropower Projects

90. The Environmental, Health, and Safety (EHS) guidelines of the International Finance Cooperation (IFC) are technical reference documents with general and industry specific examples of good international industry practice⁵. The EHS guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology and reasonable costs. EHS guidelines shall be used for environmental assessments.

91. The following environmental impacts are addressed:

- (i) Terrestrial habitat alteration;
- (ii) Aquatic habitat alteration;
- (iii) Electric and magnetic fields;
- (iv) Hazardous materials;
- (v) Revegetation of disturbed areas with native plant species;
- (vi) Removal of invasive plant species during routine vegetation maintenance;
- (vii) Avian and Bat Collisions and Electrocutions;
- (viii) Aquatic habitat alterations due to associated access roads;
- (ix) Removal of riparian vegetation;
- (x) Sedimentation and turbidity of water courses;
- (xi) Electric and magnetic fields;
- (xii) Storage and use of hazardous materials (PCB in transformer stations);
- (xiii) Occupational health and safety.

92. The following mitigation measures are proposed:

- (i) Transmission infrastructure and access roads shall be sited out of terrestrial habitats;
- (ii) Avoidance of construction activities during the breeding season;
- (iii) Revegetation of disturbed areas with native plant species;

⁵ International Finance Cooperation (2018) Environmental, Health, and Safety Approaches for Hydropower Projects

- (iv) Avoiding clearing in riparian areas;
- (v) Avoiding use of machinery in the vicinity of watercourses;
- (vi) Aligning transmission corridors to avoid critical habitats (e.g. nesting grounds, migration corridors);
- (vii) Maintaining 1.5 meter (60-inch) spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware;
- (i) Providing alternative sources of water;
- (ii) Assuring provision of adequate environmental flows;
- (iii) Modifying operating regimes to ensure timely provision of critical services;
- (iv) Watershed management measures;
- (v) Providing fish passages/ladders and supporting fish hatcheries to ensure fishing livelihoods and fish populations are maintained.

93. Environmental impacts related to rehabilitation and construction of irrigation canals are discussed in Section F. Mitigation measures are proposed in this Section using IFC EHS guidelines accordingly.

9. Environmental Screening and Categories

a) ADB

94. ADB water resources projects and subprojects are screened using a rapid environmental assessment checklist filled out for the components. This checklist captures the type; location, sensitivity, scale, nature, and magnitude of potential environmental impacts, and availability of cost-effective mitigation measures. Based on the checklist findings, the project or component is assigned to one of the following ADB environmental categories.

95. **Category A** – likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An EIA, including an environmental management plan (EMP), is required. The raising of the Dahla Dam has been categorized as Category A, impacts are adverse and cannot be mitigated on site. An EIA report has been prepared accordingly. All hydropower developments are categorized as “Category A” according to ADB environmental assessment guidelines (2003).

96. **Category B** – Potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for Category A projects. An initial environmental examination (IEE), including an EMP, is required.

97. **Category C** – A proposed project is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.

b) Government of Afghanistan

98. NEPA brought the new regulation on Environmental and Social Impact Assessment in the beginning 2018 with annexes to follow while preparing the IEE and EIA reports. In addition to this regulation, other regulations that have been introduced recently are Noise Pollution Prevention and Control Regulation, Water Quality Prevention and Control Regulation; Hospital Waste Management Regulation. Regulation on Solid Waste (Domestic) Management and Hazardous Waste Management Regulations are in the final process of approval.

99. As per the Interim EIA Regulation 2008, (construction or upgrading of irrigation or drainage projects serving 15,000 ha or more) falls under Category I, requiring to prepare and submit the Screening Report to NEPA to determine whether the project needs to undertake the Environmental Assessment or can proceed with the approval of the Screening Report itself.

100. Recently in the beginning of 2018, NEPA promulgated the Environmental and Social Impact Assessment Regulation and as per this new regulation, irrigation projects with more than 15,000 ha command area put in Category II requiring to conduct IEE study.

101. As per this new regulation, the validity of environmental clearance is of three years and it is the responsibility of the project proponent to inform NEPA the date of initiation of the construction activities as well as the date of start of operation of the project. The proponent should submit monitoring report every year to NEPA during construction and operation of the project.

102. The proponent of the following projects shall require conducting the IEE study and preparing a report as per the prescribed format (Annex VI of regulation), and in accordance with the procedures outlined for IEE in this regulation, prior to application for environmental clearance to the authority or authorized concerned authority.

C. DESCRIPTION OF THE NCB-04 -PROJECT

1. The Project

103. The NCB-04 irrigation projects are located in Takhar Province. Figure 3 following pages illustrate the location of all sub-projects. The NCB-04 sub-projects (Momin Abad, Qatak Jar, Yatem Tepa) were selected from a shortlist of 21 candidate subprojects screened from a long list of 62 subprojects identified and prioritized by the Ministry of Energy and Water (MEW), the Panj-Amu River Basin Agency (RBA), and its Sub-Basin Agencies (SBAs). Short listing criteria included indicators of technical, economic, social and environmental viability and consistency with Project design. The process is described in more detail in the Environmental Assessment Review Framework (EARF).

a) Irrigation History

104. According to various sources, the history of irrigated agriculture in Afghanistan goes back more than 4,500 years to ancient settlement (ICARDA, 2002) and archaeological research claims a very early date for some of the irrigation canals in the region. Based on the age of artefacts recovered from settlements along the canals, farmers have been settled across the basin from 2500-1500 BCE.⁶ This history is significant to PARB as by default it flags the understanding and historical commitment of farmers to the importance of managing water. (Annex 6 offers further detail regarding archaeology of irrigation).

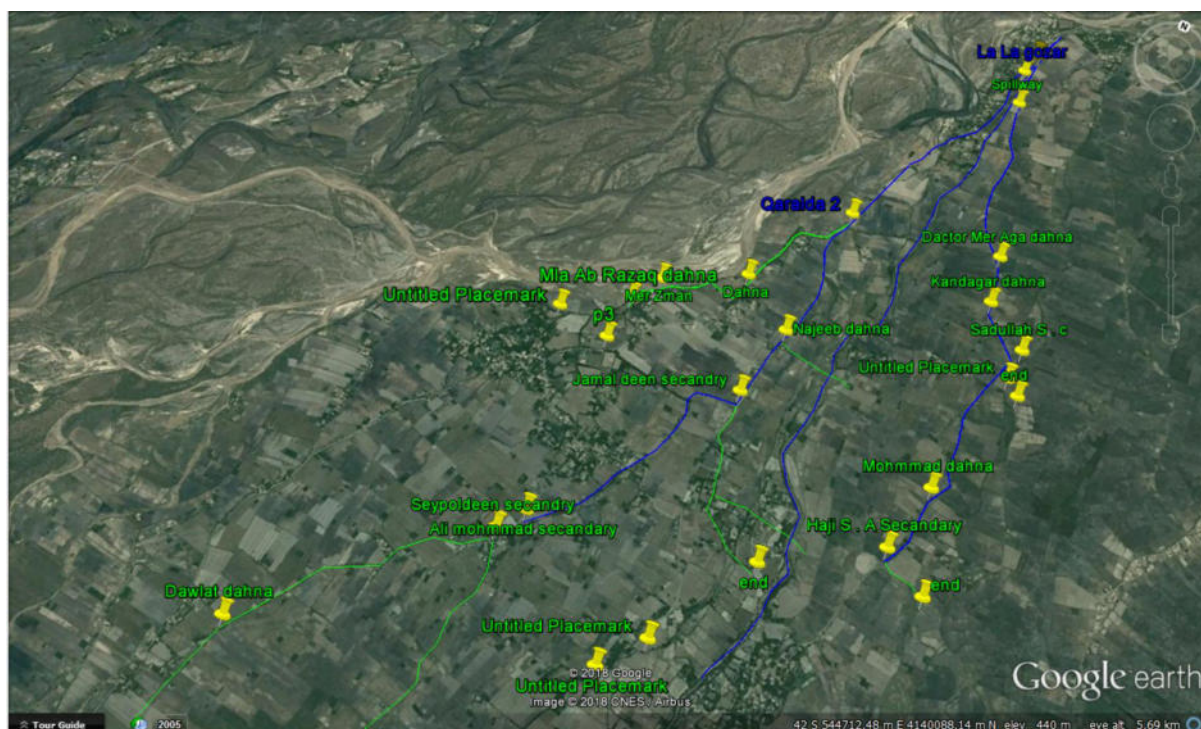
105. From a contemporary perspective, irrigation systems can be divided into two main categories: informal irrigation systems (surface water systems, karez, springs and wells) and formal irrigation systems. Informal systems are centuries-old and traditionally developed and managed by local communities within the constraints of local resources. They have undergone social and physical changes, and expand or contract based on water availability or challenges arising from years of conflict. Informal systems account for 88 percent of the country's irrigated area (Rout, 2008). Their prevalence largely results from widespread availability of both water resources from rivers and streams as well as adjacent land suitable for development, usually along river terraces and alluvial plains. Although relatively larger than many systems, NCB-04 are considered a long-term informal system developed to achieve local needs.

106. Although Afghanistan is located in a semi-arid environment, it is still rich in water resources mainly because of the Hindu Kush mountain range covered for a large part of the year with snow supplying over 80 percent of the country's surface water resources from altitudes of over 2000 m. The mountains function as natural water storage that supports perennial flow in all the major rivers (ICARDA, 2002).

107. Under a 1946 treaty with the Former Soviet Union Afghanistan agreed to take an entitlement of 9 km³/year of water from the Panj River, however it is estimated that Afghanistan uses only about 2 km³/year of the that entitlement. As a result, it is recognized that Afghanistan's water resources are still largely underused.

⁶ have been attached to Archi Main Canal and Archi Nahre Khona / Old Canal in the Lower Kokcha Irrigation Project, and 1500-500 BCE to the Rud-i-Sharawan canal, the main canal of Sharawan, one of the subprojects of the PARB

Figure 5: Collage of Map to Illustrates Project Locations



b) Description of Existing Irrigation Systems

108. The Momin Abad located in the Northeast of Khwaja bahauddin district of Takhar Province and just 12 KM far from the city of the Khwaja bahahuddin district of Takhar Province the head works for this canal has been done on the Dec 2016. Its length is 23.93 KM and command area is 2357 hectares. Its intake coordinate is N4198684 E546117.

109. The katek Jar located in the Northwest side of Khawja bahuddin district of Takhar Province and just 11KM far from the district city. The head works has been completed on the Dec 2016. Its length is 48 KM and command area is 2950 hectares. The intake coordinate is N4141654 E549990.

110. The Yangi Qala canal located in the Northeast of Yangi Qala and west side of Cha Ab district of Takhar Province and just 9 KM far from the city Yangi Qala of Takhar Province. The main intakes and head works has been constructed on the 2011 to 2018. Total length of canal I is 48 KM and command area is 9464 hectares. The intake coordinate is N4158612 E563064.

111. **Approach canals.** For Naqi the off take of this canal is located around 25 Km in the downstream of Gaw Kush canal Head work and started this canal from the Kata Khel village and stretched till the end portions of Zarkharid, Jalga and Qarawal Tapa villages all belongs to Kundu centre.

112. For Abdullah the off takes of this canal is located around 8 Km in the downstream of the canal Head work which is located in south side of Ali Abad district centre and flowing to north side.

113. The Gul Tepa canal irrigated some area of east side of Kunduz and some parts of Gul Tepa district started from Kunduz city and ended in East side of Gul Tepa District.

114. The waterways of the subproject area are the Arpoli main canal and its secondary branch and higher-order canals. The tail area of the Arpoli just above where it falls into the Amu River, in a normal water year is dry from mid-May to mid-Oct. (There are no natural or man-made lentic water bodies in the area, other than community cisterns.

115. The waterways of the subproject area are the Qaghni main canal and its secondary branch and higher-order canals. The tail area of the Qaghni just above where it falls into the Amu River, in a normal water year is dry from mid-May to mid-Oct. (There are no natural or man-made lentic water bodies in the area, other than community cisterns.

116. **Main canals.** The Abdullah main canal is located in Ali Abad district Head work of it is around 2 Km away to south side of Ali Abad district head Quarter and extended 11 Km and finished near Abgor Bagh of Ali Abad district. And irrigated 1367 Ha all its irrigation land belong to Ali Abad district And coordinate of intake is N36.5461, E68.884.

117. The Arpoli canal is located in the South of Darqad district of Takhar Province and just 6KM far from the centre Darqad of Takhar Province. The main intakes and head works has been constructed on the 2011 to 2018. Total length of canal is 15 KM and command area is 2000 hectares. The intake coordinate is N4132812 E541410.

118. The Qaghni main canal is canal located in the North of Darqad district of Takhar Province and just 15 KM far from the city of the Darqad district of Takhar Province. The total length is 8 KM, and command area is 1000 hectares. Its intake coordinate is N4145801 E544374 without any head works.

119. The Naqi canal irrigated north side agriculture land of kanam, South side irrigation land of Alchin, Chaqur Qishlaq and Gharaw, East side Khan Abad irrigation scheme sides and also to west side Kunduz city areas and Buze Qandahari.

120. **Distribution network.** The off takes from the canal do not have modern water control structures. All these traditional off takes, farmers emplace locally-available materials (sand, mud, brushwood) to raise water levels up to the off takes and to control flow rates.

121. **Drainage.** The schemes have no drainage network as such. Any surplus water reaching the end of the canal drains back into the river.

122. **Water access points.** No water access points are present on the main nor on the secondary canals.

123. **Operation and maintenance arrangements.** There are registered WUAs within the schemes which belong to established federations. These organizations manage the canal in collaboration with their SBA. Mirabs are responsible for O&M of the main canal, and kokbashis for O&M of the secondary and tertiary canals. O&M activities are very basic and carried out without measuring the flow (no staff gauges).

124. **Current water management issues.** Current water management problems identified by beneficiaries in collaboration with the SBA, and potential civil works solutions considered during Project preparation, are documented in **Annex 2**.

125. **Vulnerability of Infrastructure requiring constant maintenance.** As is illustrated in the photos assembled in **Annex 2**, the existing primary, secondary and tertiary canals are defined and lined using rock, clay/sand and brushwood. Canal structures are weak, vulnerable to flooding, and require hours of local labour to remedy the frequent breaks in the canals due to the impact of aggressive flooding.

126. Because of long time sedimentation, the NCB-04 canals beds are in general higher than the secondary canal beds. To make sufficient water available in the off-take canal, the farmers construct a local weir in the main canal every year using brushwood and sand bags.

127. A routine problem is that due to high sediment loads in water flows, sediments routinely build up in the canals, which requires manual cleaning. In some situations, the lack of available local labour is making impossible to maintain the flow of water and maintain the canals.

128. From the IEE perspective, the significance of the proposed NCB-04 sub-projects is the way in which both can improve upon the massive yearly impact upon the environment by the existing infrastructure and methods to maintain it. The demands upon local vegetation and the labour required to complete ongoing maintenance is a massive burden upon canal efficiency and environment.

129. The subprojects offer a greatly improved system layout and design, the resources required to implement and the subsequent logistics to maintain the successful operation. Impact on surrounding vegetation and important biomass will be greatly reduced.

c) Description of NCB-04 subprojects

130. **Long-term informal system rehabilitated:** The NCB-04 subprojects aim to take an area which has been long-term informal irrigation area and install infrastructure to improve efficiency, productivity and thus livelihoods and food security. Proposed NCB-04 Civil Works / Construction Activities include:

- Construction site clearance and preparation;
- (Re) excavation of foundations, borrow pits and canals;
- Management and disposal of excavation spoil;
- Temporary closure of irrigation canals;
- Temporary blockage of foot / vehicle paths / roads;
- Excavation of temporary canals (diversions);
- Sourcing construction materials from existing quarries or quarrying of such materials;
- Creation and management of on-site stockpiles of construction materials;
- Creation and disposal of solid and liquid waste;
- Operation and maintenance of vehicles and equipment;
- Creation of reinforced concrete structures;
- Decommissioning and clean-up of construction sites, including infilling temporary canals and borrow pits.

131. Of specific importance to this IEE is the amount of excavation, vegetation clearance and replanting required for each sub-site where construction of the rehabilitated canals will occur. These items are considered to be amongst the most important from the environmental management perspective.

132. **Operation.** Activities will comprise water management and irrigation through the new and upgraded irrigation structures with resultant knock-on changes to agriculture.

133. Proposed civil works for the project include:

- **Offtakes** – Upgrading of offtakes on the main canal;
- **Flow measurement infrastructure** – Provide a calibrated staff gauge at each upgraded offtake to support water distribution proportional to offtake command areas;
- **Cross-regulators** – Constructing cross-regulators in the main canal;
- **Head-regulators** – Constructing head-regulators in the main canal;
- **Water access points** – Provide two domestic water collection and two livestock water access points. Siting of watering points on the main canal will be determined during preconstruction in consultation with stakeholders.

d) Details for Structures and Construction

134. **Major construction.** Major on-site work proposed for the irrigation canals concerns the construction of masonry regulators to control the flow and direction of irrigation water. The regulators consist of a number of spans separated by piers and operated by steel gates which are routinely aligned at 90° to the weir to control silt entry into the canal (**Figures 6, 7 and 8** below illustrate these proposed cross and head regulators).

135. Each regulator is constructed to manage (i) water levels in the upstream canal and (ii) the discharge passing downstream in order to:

- Feed off-taking canals located upstream of the cross regulator;
- Help water escape from canals in conjunction with escapes;
- Control water surface slopes in conjunction with falls;
- Control discharge of a canal into another canal or lake.

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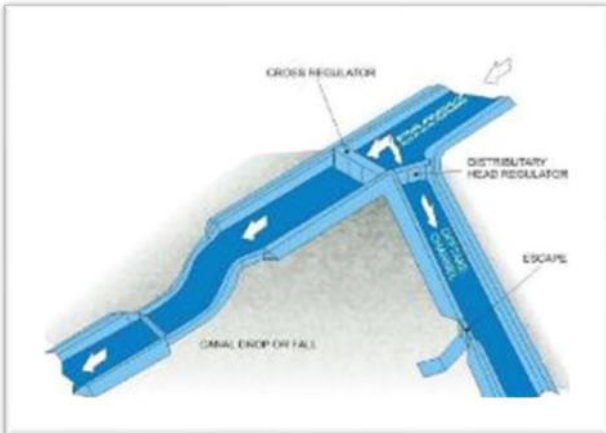


Figure 6: Schematic Lay-out of typical Cross and Head Regulator.



Figure 7: Typical Cross Regulator Front View.



Figure 8: Typical Head Regulator Front View.

136. Construction of each regulator is based on specific site conditions. Works begin with the site clearance which includes clearing of shrubs/grass and removal of trees, making sure that trees removal is minimum. For each site, construction drawings will clearly mark the earth excavation line and layout of the proposed structure.

137. **Temporary use of land:** Contractor will require access to land during construction. The community (WUA) will be requested to provide land during construction period to allow for (i) water diversion and (ii) storage. It is commonly required to establish a temporary diversion route to maintain irrigation during construction and this will require land. Secondly contractors will need common land for storage of materials and equipment (such as sand, gravel, stone, cement, reinforcement bars and geo-textile filters), and will prepare/maintain access roads to construction sites making sure no settlement is disturbed. Site access, excavation, soil and vegetation removal and site rehabilitation will all be the responsibility of the contractor. The Minimal impact on adjoining farmer land is also expected.

138. **Site Specific construction materials:** Collection of some construction materials (e.g. sand, gravel and stone) will be carried out from the nearby river making sure that the quantity of materials taken from the river will not have adverse effect on the river regime (its longitudinal slope, size, flow etc.). During different periods the river flow will have aggradations and degradation to maintain its regime. It is the responsibility of the contractor to ensure that collection of materials for the construction work will proceed in a manner not have adverse effect on river flow (regime).

139. Since the construction work for an individual CR/HR may last for 6 months, removal of diversion work and land reinstatement will be done after 6 months. Depending on the area, making good and tree planting can be done after reinstatement.

140. Mechanical excavators are used for site clearance and foundation. Equipment movement will be restricted to the construction site and contractor will be required to use equipment less than 10-year-old to avoid pollution due to sound and gas. Excavated earth will be stored in the bank of canal or next to construction site.

141. A masonry foundation will be prepared with crushed stone/gravel, and above that stone masonry/concreting or reinforce concreting work is carried out as per construction drawings. At completion of structure, earth backfilling will be carried out using the excavated earth, the extra earth obtained after backfilling shall be used to maintain the depression (if any) of the canal bank or used in dressing of canal banks. After completion of the construction work, naked earthen-face of the structure will be turfed with the suitable species of grass/plant. The life of structure will be 25 years as per design.

D. ANALYSIS OF ALTERNATIVES

142. Under ADB's Safeguards Policy Statement (2009) there is a requirement to examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and consider the no project alternative. During the project preparation, various alternatives have been proposed, screened against technical, economic, as well as environmental criteria. In terms of the environmental consideration for the alternatives, the primary objective was to identify and adopt options with the least adverse environmental impacts and maximum environmental benefits.

1. No-Project Alternative

143. In the no-project alternative, irrigation schemes in the Panj-Amu basin would likely be rehabilitated and upgraded by MAIL with funding from other sources in much the same manner as under the PARB. This is believed to be the case because (i) the PARB is designed to support Afghanistan and MAIL in implementing their pre-existing irrigation development plans, and (ii) the Project utilizes commonly-used technical options for irrigation rehabilitation and upgrading that would likely also be used in the no- project alternative (i.e. with alternative funding).

2. How Subproject Were Selected

144. In 2015 a long list of 408 potential subproject in all six sub-basins was identified by MEW and the preparation consultant to be considered for rehabilitation and upgrading (R&U) under the Project. This list was shortened into a priority list of 62 subproject selected by MEW, the RBA, and the SBAs, which, in turn, were screened first by eligibility criteria, then prioritized according to criteria like command area size and accessibility. The RBA and SBAs then prepared a priority list of 22 subproject.⁷

3. The project design alternative

145. The NBC-04 secondary canals involves rehabilitation of existing irrigation infrastructure and the technologies involved are fairly simple with few available options. The rehabilitation essentially puts the existing irrigation systems back into its full operational potential and the structural improvements will be optimized during detailed design. The interventions now have standard details available for each type, affected sections of the canals will be strengthened to withstand anticipated floods and landslides. For droughts irrigation scheduling will be done based crop water requirement. Hydrological analysis will be done to forecast the river flows, water availability and extreme floods/droughts.

⁷ See ADB website, <https://www.adb.org/projects/documents/afg-panj-amu-river-basin-sector-project-rrp>, Supplementary Document 11, Environment Assessment and Review Framework, pp. 5-6.

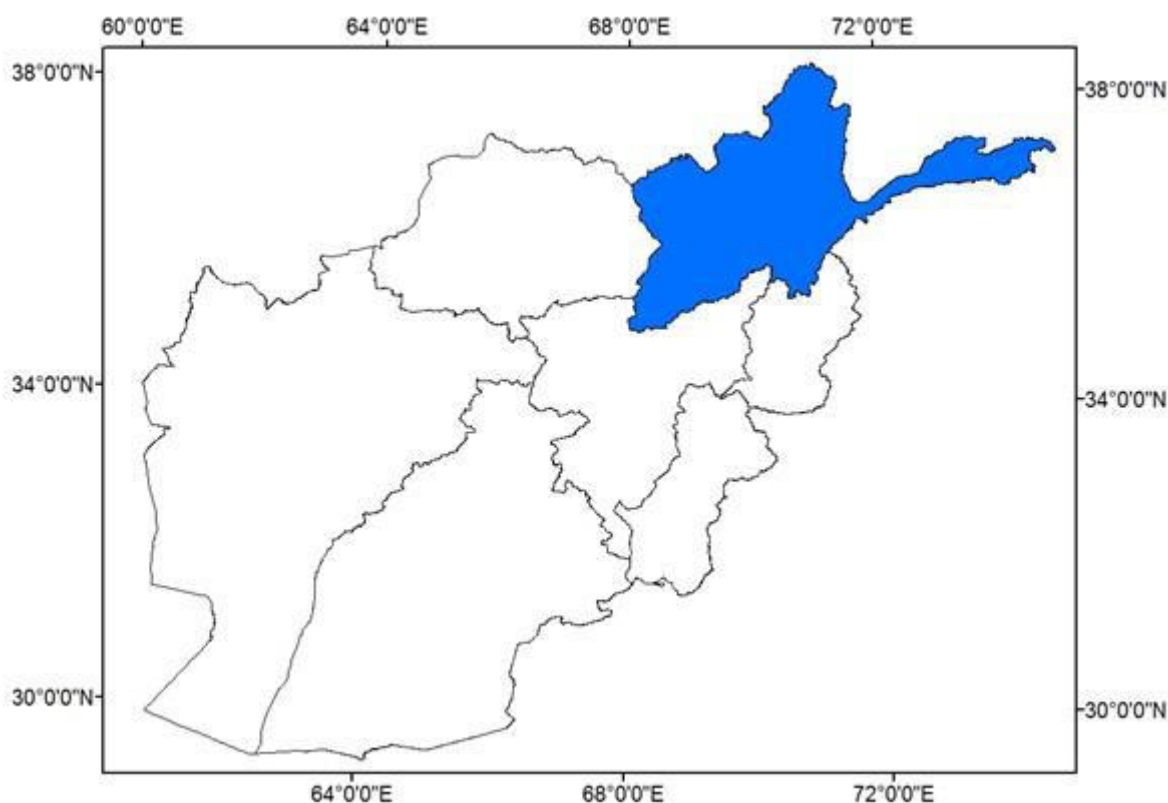
E. DESCRIPTION OF THE ENVIRONMENT

1. Physical Environment

a) Climate

146. **Climate Classification** – North-eastern Agro-Climatic Zone (NEACZ) is a mountainous area. It occupies 83,534.01 sq. km. from a total 655,000 sq. km area of Afghanistan (**Figure 9**). It is located between 35°00'00" N to 38°29'57" N and 68°00'00" E to 74°53'46" E. It consists of the four provinces, they are Badakhshan, Baghlan, Kunduz and Takhar.

Figure 9: Map of Afghanistan with Northeastern agro-climatic zone.



147. **Takhar** The climate here is considered to be a local steppe climate. There is little rainfall throughout the year. The climate here is classified as BSk by the Köppen-Geiger system. The average annual temperature is 15.4 deg. C in Taloqan. In a year, the average rainfall is 434 mm.

148. **Recent droughts.** Overall, respondents perceived Afghanistan as having a low level of drought during the period of 30 to 26 years ago. The Country experienced a severe drought in many areas during the period of 25 to 16 years ago. Respondents perceived the level of drought as being normal for the last 15 years. 30-26 years ago, the Southern zone has high drought situation. All other zones have low drought situation.

Table 1: The summary of drought trend over 30 years is given in Table.

drought trend (in years)							
Zone	30-26	25-21	20-16	15-11	10-6	5-1	Present (Last 12)
Northeastern Agro-Climatic Zone	Low	High	High	Normal	Normal	Normal	Normal
Afghanistan	Low	High	High	Normal	Normal	Normal	Normal

149. **Regional Paleoclimate** The paleoclimate of Central Asia is believed to have been characterized by progressive aridization with occasional minor fluctuations to moister phases, from the middle Pleistocene (781,000 to 126,000 years before present, years before present (ybp)) up to the present. One hypothesized reconstruction of Central Asian Holocene climate (11,700 ybp to the present) has a first wet transgression occurring during 5000-3000 BCE, during which lacustrine landscapes and human niches occurred in areas now occupied by deserts and takyr formations (shallow depressed areas with heavy clay soils that are submerged after seasonal rains), followed by moister transgressions of lesser dimension between 1400-1000 BCE, 600-250 BCE, 900-1200 CE and 1600-1800 CE.⁸

150. **Regional Prehistory** - The Panj-Amu basin has been inhabited and modified by human activities for millennia. Extremely rich concentrations of Mesolithic and Neolithic settlements dating as far back as 10,000 BCE have been found south of the Amu Darya in the Turkistan plain. This indicates that the Neolithic revolution took place in northern Afghanistan about 9000 years ago, indicating that the area may have been one of the earliest centres for the domestication of plants and animals. Mounds that seem artificial and alien to the surrounding flat area are the remnants of monumental Neolithic palaces and complex circular temples.⁹ Lapis lazuli mining in the narrow Upper Koksha canyon from before 3000 BCE was the main source of lapis to ancient Sumer and Egypt, and likely what attracted Harappans in ~2000 BCE to Shortugai in modern-day Yangi Qala district, Takhar province, the settlement furthest from Harappa itself.¹⁰

151. In the second half of the third millennium BCE, a new type of social organization, suggestive of a form of large-scale colonization involving mastery of advanced techniques of large-scale irrigation, appeared in settlements in northern Afghanistan and Turkmenistan, which archaeologists have named the Bactria-Margiana Archaeological Complex (BMAC).

⁸ Sala, Renato. 2003. Historical Survey of Irrigation Practices In West Central Asia. Almaty, Kazakhstan: Laboratory of Geo-archaeology, Centre of Geologo-Geographical Research, Ministry of Education and Science. <http://lgakz.org/Texts/LiveTexts/CAIalrigTextEn.doc>

⁹ As a result, excavation anywhere in the region poses a risk of disturbing physical cultural resources, specifically archaeological materials. ADB guidance on environmental safeguards for physical cultural resources are documented in Section VII Physical Cultural Resources (pp. 66-71), ADB (2012) Environment Safeguards, A Good Practice Sourcebook—Draft Working Document. Retrieved from <http://www.adb.org/sites/default/files/environment-safeguards-good-practices-sourcebook-draft.pdf>

¹⁰ Bancroft, Peter. 1984. Gem and Crystal Treasures. Fallbrook, California, USA: Western Enterprises/Mineralogical Record. http://www.palagems.com/lapis_lazuli_bancroft.htm

b) Geographical Location

The NCB-04 maps are presented in **Figure 3** and offers an overview of the topography, and the broad valley in which the NCB-04 projects are positioned. The NCB-04 is position in a fertile alluvial valley surrounded by hills and rangelands. There is very limited settlement occurring in the foothills and mountains above the broad river valley.

c) Topography

152. Similar too many irrigated river valleys' the command area is a fairly level agricultural zone with some interspersed small low hills. The surrounding topography contributes to the dramatic increase in river flow after rains.

153. **Environmentally sensitive areas.** As noted from the REA in Annex 1, the Subproject areas (Momin Abad, Qatak Jar and Yatem Tapa) are not adjacent to or within any of the following environmentally sensitive areas: (i) Protected Area; (ii) Wetland; (iii) Buffer zone of protected area; (iv) Special area for protecting biodiversity.

d) Geology

154. As a landlocked country dominated by the Hindu Kush Mountains, Afghanistan has some of the most complex and varied geology in the world.

155. NCB-04 locations (Takhar) are located in Zone 4 and is potentially prone to earthquakes of over 7.3 on the Richter scale.

e) Soils

156. Afghanistan soils have predominantly been formed under arid and semi-arid climatic conditions, most extensively developed in the lower part of the course of a river, forming flood plains and deltas. Textural soil classes can generally be considered as waterborne or 'alluvium', a general term for clay, silt, sand, gravel or similar unconsolidated detrital material deposited during comparatively recent geologic time by a stream or other body of running water. So, alluvial plains adjacent rivers basically comprise sediment. Soil organic matter is generally low, ranging from 0.2 to 2.5%.

157. From the predominant land use perspective, soil problems include high pH, low organic matter, high amounts of calcium carbonate, high erosion potential, poor soil structure, micronutrient deficiencies. The opportunity to improve these soils is high and recommendations include additions of organic matter (i.e., compost, cover crops, animal manures), mulches, conservation tillage, crop rotation and improved fallows, foliar application of nutrients, correct fertilizer timing, placement and amount, testing fertilizer quality, terracing and contour barriers.

158. NCB-04 Cultivated soils are typical of an alluvial floodplain.

f) Hydrology

159. **Rivers and water bodies:** The waterways of the subproject area are the main canal and its secondary branch and higher-order canals. In an average year, there is water in the main and higher-order canals year-round. There are no natural or man-made lentic water bodies in the area, other than community cisterns.

160. **Irrigation: Jargon** used to label specific areas within an irrigated area include the (i) Head, the (ii) middle and (iii) tail areas. Irrigation is basically gravity driven. These terms therefore translate to (i) the top, the (ii) middle and (iii) the lowest part of the irrigated area.

161. **Groundwater:** The source of groundwater in subproject areas is well. As per the local people the depth of well change from location to location, as average the depth of well in all three subproject area is from 30 to 40 meters. People in subproject area are using from well water as a source of drinking too.

g) Water Quality

162. Due to outbreak of Covid-19 no water quality of the study area have been conducted and analysed. The water quality will be analysed from the subprojects areas prior to construction phase of the project and the results will be part of this IEE.

163. **River water quality.** In NCB-04 the quality of water in the rivers are believed to be good, a water quality assessment are required before the construction work in order to provide qualitative data of the project area. However, due to the limited potential impact from the project, no monitoring is planned for water quality, and as such no baseline survey has been undertaken. The monitoring of water quality is a planned task of the river basin agency and sub-basin agencies however. A separate ADB TA project (TA-9095 REG: Strengthening Integrated Water Resources Management in Mountainous River Basins) will likely provide assistance to the Panj-Amu RBA in undertaking a water quality baseline for the river environment, and build its capacity for follow-up water quality monitoring as part of its institutional mandate.

h) Air quality and noise

164. The Air quality and noise data for this IEE study were not conducted due to outbreak of Covid-19. The data will be conducted and will be part of this IEE study.

2. The Biological Environment

165. The Biological environment data for this IEE study was not conducted due to outbreak of Covid-19. The data will be conducted and will be part of this IEE study.

a) Vegetation and Land use

166. The project site and surrounding valley includes highly cultivated agricultural farming systems which have been under settlement for millennia. The surrounding foothills are predominantly rangelands of minimal settlement although they are used extensively for grazing. The impact upon rangelands vegetation for fuel wood as well as brushwood to repair irrigation canals is recognised as a major burden upon biomass.

b) Fauna and Wildlife

167. **Protected areas.** Numbers of the protected area have been identified by the government of the Afghanistan. However, there are two protected area near the project. Which are Imam Sahib (Kunduz) wildlife managed Reserve and Darqad (Takhar) Wildlife Managed Reserve. Imam Sahib (Kunduz) wildlife managed Reserve is 50 km away from project site. And Darqad (Takhar) Wildlife Managed Reserve. Is 20 km away from project area.

3. Social and Economic Conditions

168. The subproject areas are located in north eastern region of Afghanistan, where the canals are located among the communities. From a macro perspective it would lead to direct and indirect impacts on the communities. The direct impacts would include the creation of new jobs for skill and unskilled labor during the construction of the subprojects. Indirect impacts are those impacts that would occur

as a result of water management especially during the summer season, which would have direct impact on agriculture products of the communities.

a) Population

169. Based on site visit the current population of NCB-04 is around 117943 people which is equal to 16849 families. Moreover, in 2011, the total basin population was estimated to be 3.90 million, 917,700 in Takhar province and total 186,300 in the Panj-Amu basin. The main ethnic groups in NCB-05 are the Tajik, Uzbek, Turcoman, Pashtun and some Kyrgyz. The Tajik are the second largest ethnic group in Afghanistan and in the majority in the Northern provinces.¹¹

b) Land Tenure and Rural Livelihoods

170. In the absence of observations specific to the studied area, a description of the national situation with respect to land tenure and its implications for rural livelihoods is provided in the following paragraphs.¹²

171. In Afghanistan, agrarian land relations have feudal origins and remain complex and inequitable. A few large landlords likely still own around 40 per cent of farmland as was the case in the 1981. Most of the cropped area is farmed by smallholders, but with great variations in farm size by region. Rent-seeking absentee landlordism is common in many areas and has been reported to be a source of conflict within local populations.

172. Around one-quarter of the rural population is entirely landless, surviving on off-farm piecework, farm labouring, sharecropping, or some combination thereof. In some areas over half of all households are entirely landless. Farm labourers generally receive one-fifth of the crop as payment and sharecroppers, who tend to have more skills, up to one-third.

173. A large number of rural families are homeless as well as landless, and must depend upon landlords or relatives for shelter from one generation to the next. The men from these families form a significant body of mobile farm labour, going from landlord to landlord every year or two with their only capital asset, a small herd of karakul sheep. Although possibly numbering in the hundreds of thousands, these poorest of the poor are not considered a permanent part of (any) community and rarely appear in survey statistics.

174. Indebtedness is very high in the rural population with up to 92 per cent and 57 per cent of sample populations in 2002 borrowing respectively cash and wheat. Many landowners have their land under a form of mortgage that is to the full advantage of the creditor. These loans are typically taken up out of desperation, to buy food or cover health or bride price costs, not to invest in economically productive activities. Outright land sales by smaller farmers typically soar during droughts and other difficult times. Land purchases tend to be by those who already own land, suggesting continuing consolidation of holdings.

175. Those who lose their land find it difficult to re-acquire land and tend to end up in cities as unskilled domestic or market labour. For the better-off as well as the poor, periodic outmigration in search of work within and beyond Afghanistan (especially to Iran and Pakistan) is a well-established routine dating back to the 1960s, and may inflate or confuse figures of refugees and internally displaced persons (IDPs).

¹¹ Landell-Mills. (2013). Panj-Amu river basin profile. Afghanistan Water Resources Development (AWARD) Technical Assistance Project – Technical and Implementation Support Consultancy (TISC) Grant No. TF093637-AF / Contract No. MEW/957/QBS.

¹² The text in this section is a lightly edited version of pp. 4-6 of the excellent paper: L. A. Wily. 2004 (April). Putting Rural Land Registration in Perspective: The Afghanistan Case. Paper presented to Symposium on Land Administration in Post-Conflict Areas, hosted by the International Federation of Surveyors, 29-30 April, 2004, United Nations, Geneva. <http://www.fig.net/commission7/geneva2004/papers/lapca06aldenwily.pdf>

176. Rural society is intensely stratified, and its socio-cultural mores remain largely effective in perpetuating the status quo. Large and powerful socio-cultural barriers exist between those referred to as landlords, small farmers, and the landless (neither the rich nor labourers are referred to as 'farmers'), and especially between those with and without land. Farming, an artisan skill and the preserve of tenants and sharecroppers, is considered to be beyond the homeless and landless mobile labourer, who typically perceives landownership as not only financially impossible but as getting above his station or 'not permitted'. Very few of these mobile labourers were likely among the classified landless who benefited from the (short-lived) revolutionary land redistributions of 1978-1984.

177. Women are customarily barred from landholding despite religious law recognizing limited female land inheritance rights. This restriction affects the significant proportion of the population living in households that are woman-headed, either de facto due to male labour out-migration or by widows.

c) Rural Housing

178. People in the project area live in the traditional Afghan house or part of a shared house, occupied by an extended family. These conditions are quite uniform. Houses are made of traditional material and therefore it can be said that the age of the premises is relatively young.¹³

d) Public Health

179. **Diarrhoeal and other water-borne disease.** Water-borne diseases are highly prevalent due to unsafe water and unsanitary conditions. While poor water quality is emphasized as a cause of water-borne disease alone, the impact of inadequate water quantity on personal and household hygiene may be as or more important.¹⁴

180. In the centre of each subproject small clinic with basic health facilities is available and the residence of subprojects are using from health facilities base on need. For complex illness they refer to centre of province and Kabul.

181. **Malaria.** In 2002, most of Afghanistan's estimated 3 million malaria cases per year occurred in Kunduz Province. In late 2003, Takhar province had a 31 per cent incidence of *Plasmodium falciparum* malaria. Between 2001 and 2005, *P. falciparum* and *P. vivax* malaria re-emerged rapidly in Kunduz, with cases peaking during 2002 and then declining independently of each other. Control campaigns were successful against *P. falciparum* malaria transmitted by the freshwater breeding mosquito *Anopheles superpictus*, but as of 2007, *P. vivax* remained highly endemic in Kunduz, transmitted by the rice-field breeders *A. pulcherrimus* and *A. hyrcanus*. Field studies in northern Afghanistan found anthropogenically-induced increases in rice field vivax malaria, indicating that control strategies in rice-growing areas, including large-scale larval mosquito eradication, needed to continue.¹⁵ By 2011, anti-malarial control interventions had reduced the confirmed malaria case rate in Kunduz and Takhar provinces to <1 per 1000 population.¹⁶

182. **Cutaneous Leishmaniasis.** Endemic to northern Afghanistan and caused by sand flies, outbreaks can occur when individuals without immunity to the disease, such as migrant agricultural or construction workers, move to an endemic area to engage in activities that expose them to sand flies.

¹³ SNC-Lavolin, 2013, Lower Kokcha Irrigation Project Feasibility Study.

¹⁴ Huttly, S.R.A., S.S. Morris, and V. Pisani. 1997. "Prevention of Diarrhoea in Young Children in Developing Countries." Bulletin of the World Health Organization 75(2):163-174.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2486931/pdf/bullwho00393-0073.pdf>

¹⁵ Faulde, Michael K., Ralf Hoffmann, Khair M. Fazilat, and Achim Hoerauf. 2007. "Malaria Reemergence in Northern Afghanistan." Emerging Infectious Diseases 13. <http://www.cdc.gov/eid/content/13/9/1402.htm>

¹⁶ WHO. 2015. Afghanistan Country Profile, World Malaria Report. http://apps.who.int/iris/bitstream/10665/200018/1/9789241565158_eng.pdf?ua=1

e) Domestic Water Supply

183. **Sources and availability.** Information on domestic water supply sources and availability is very limited. Studies for the project area state that the main sources of domestic water in the area is river and canal water, and hand-pumped ground water. Some villagers travel 4 to 10 km to collect water, and in areas where domestic water supply is scarce, villagers have been observed collecting water from puddles during the rainy season.

184. **Links between domestic water supply and irrigation.** Domestic water supply and irrigation water distribution can be linked in several ways. Some communities use irrigation canal water for their domestic supply. Others use ground water, and in some cases ground water quantity and quality can be affected by irrigation water quantity and quality. Thus, irrigation system management can both directly and indirectly affect the domestic water supplies of individuals, families, and communities.

185. **Domestic water supply behaviours.** A study to understand unexpected behaviours around access to water supplies was commissioned by the NGO, DACAAR, which installed more than 24,000 wells to provide safe drinking water primarily to rural communities in south, east, and west Afghanistan between 1990 and the early 2000s. Though DACAAR's work area did not include northern Afghanistan, the study findings indicate the types of issues that could be in play in the LKIP area. The remainder of this section consists of an extended paraphrase from this study.¹⁷

186. **Owned space and water.** Land ownership has a substantial impact on how water supply is perceived and used. Three forms of village land ownership were identified: public, private and tribe or clan. Tribe or clan owned village land is considered to be the joint property of a group of families from one tribe or clan. The families sometimes compete in claiming temporary land ownership, and newly installed tube-wells can play a part in this process. There is less overt competition between families for control of private and public land but a family can enhance their relative social status by providing water to other families from their own private well, or by paying for the maintenance of a public well.

187. **Water patronage.** A practice common to all three forms of land ownership is that the wealthy and the landowners provide water or the means to obtain water to the poor. They regard this as almsgiving that will be rewarded either in this life or later, 'at Gods door'. There is also an expectation of reciprocity. Something given now will be repaid later by a similar item or in the form of loyalty or service.

188. **Gendered space and water.** Village water collection patterns are related to purdah, which in turn is related to living standard. Following purdah is an ideal. Wealthy families tend to send their men to collect water when necessary since that is less shameful then sending their women, given the fact that these families are able to practice purdah. Within poorer families who are unable to practice purdah, however, the women generally collect water as it is considered shameful for men to do so. What is considered shameful for men and women depends on their family social and economic status. Water sources, routes to water sources, and times at the source can all be gender segregated, governed by shared understandings of when and where men and woman may collect water. A change in water sources very often disrupts the balance, since it forces men and women to negotiate new patterns of water collection. New water sources can be assigned as 'women's places' if they meet the requirements for public seclusion.

189. **External influence and interventions.** Exposure to life outside rural Afghanistan as an internally displaced person (IDP) or refugee and the trend in some areas to follow purdah more strictly can affect village water collection patterns and well site preferences. Another influence has been aid agencies' involvement of a broader section of the community in discussions of well siting. Formerly these discussions were dominated by richer households, who have the resources to follow stricter purdah and in turn a preference for wells on private land. Now, the issue of whether a well site is appropriate for women to use has become something that is discussed and debated.

¹⁷ Klijn, Floortje. 2002. Water Supply and Water Collection Patterns in Rural Afghanistan - An Anthropological Study. Kabul: DACAAR. <http://reliefweb.int/sites/reliefweb.int/files/resources/835738AA2919E2DBC1256BE50055F5D7-21jun.pdf>

190. **Water supply and drought.** The drought in Afghanistan during the 1999-2002 had both direct and indirect impacts on drinking water supply. Wells ran dry and community-based maintenance was also affected. Traditionally wealthy families paid the maintenance costs of public wells; but they became less inclined to do so during the drought when funds were tight. Another factor is that wealthy families increasingly have their own private wells, which insulates them from the impact of public well breakdowns and reduces their motivation to pay public well maintenance costs.

f) **Physical Cultural Resources**

191. It has been established that there are no known historical sites in NCB-04 area. However, during construction of the NCB-04 works the contractor and SBA site engineers will be vigilant for chance finds during excavation activities.

192. Local stakeholders stated that no physical cultural resources of importance to them (mosques, graveyards, etc.) were located in or near areas potentially affected by RSP activities.

g) **Takhar Province Agriculture**

193. The agriculture products in the projects area are Crops (Wheat, Maize, Rice, cotton, Melon, Water melon), in vegetable (lettuce, tomatoes, Potatoes, Peppers, Cauliflower, lady fingers, eggplant, cucumbers, Pumpkin, Onions and garlic) and in Fruit (Apples, Grapes, Almond, Apricot, Peach, Pear).

F. ANTICIPATED IMPACTS AND MITIGATION MEASURES

194. Anticipated impacts and mitigation measures have been discussed considering the following three key phases of the project:

- Pre-Construction/Rehabilitation phase
- Construction phase
- Operation phase

195. Each phase environmental screening is done in consideration of its impacts on the physical environment, ecological environment, and socio-economic development.

196. Each phase environmental screening is done in consideration of its impacts on the physical environment, ecological environment, and socio-economic development.

197. The significance of potential impacts was assessed using the risk assessment methodology that considers impact magnitude and sensitivity of receptors, described below.

198. The potential implications of the project have been categorized as major, moderate, minor or nominal based on consideration of the parameters such as i) duration of the effect; ii) the spatial extent of the impact; iii) reversibility; iv) likelihood; and v) legal standards and established professional criteria.

199. The magnitude of each potential impact of the Project has been identified according to the categories outlined in Table 2.

Table 2: Parameters for Determining Magnitude.

Parameters	Major	Moderate	Minor	Minimal
Duration of potential impact	Long term (beyond the project period)	Medium Term Lifespan of the project (within the project period)	Limited to construction period	Temporary with no detectable potential impact
Spatial extent of the potential impact	Widespread far beyond project boundaries	Beyond next project components, site boundaries or local area	Within project boundary	Specific location within project component or site boundaries with no detectable potential impact
Reversibility of potential impacts	Potential impact is effectively permanent, requiring considerable intervention to return to baseline	Benchmark needs a year or so with some responses to come back to baseline	Baseline returns naturally or with limited response within a few months	Baseline remains constant
Legal standards and established professional criteria	Breaches national standards and or international	Complies with limits given in national standards but violates international lender	Meets minimum national standard limits	Not applicable

Parameters	Major	Moderate	Minor	Minimal
	guidelines/obligations	guidelines in one or more parameters	or international guidelines	
Likelihood of potential impacts occurring	Occurs under typical operating or construction conditions (Certain)	Happens under worst-case (negative consequences) or best case (positive impact) working conditions (Likely)	Occurs under abnormal, exceptional or emergency conditions (occasional)	Unlikely to happen

Sensitivity of Receptor

200. The sensitivity of a receptor has been determined based on a review of the population (including proximity/numbers/vulnerability) and the presence of features on the site or the surrounding area. Each detailed assessment has defined sensitivity to the topic. Criteria for determining receptor sensitivity of the Project's potential impacts are outlined in Table 3.

Table 3: Criteria for Determining Sensitivity.

Sensitivity Determination	Definition
Very Severe	Vulnerable receptor with little or no ability to absorb proposed changes or minimal opportunities for mitigation.
Severe	Vulnerable receptor with little or no ability to absorb proposed changes or limited opportunities for mitigation.
Mild	Vulnerable receptor with some ability to absorb proposed changes or moderate opportunities for mitigation
Low	Vulnerable receptor with good ability to absorb proposed changes or/and excellent opportunities for mitigation

Assessing Significance

201. Following the assessment of impact magnitude and determining the quality and sensitivity of the receiving environment or potential receptor, Magnitude, spatial extent and duration of impact the significance of each potential impact was established using the impact significance matrix shown in Table 4.

Table 4: Criteria for Determining Impact Significance.

Magnitude of Impact	Sensitivity of Receptors			
	Very Severe	Severe	Mild	Low
Major	Critical	High	Medium	Negligible
Moderate	High	High	Medium	Negligible
Minor	Medium	Medium	Minor	Negligible
Minimal	Negligible	Negligible	Negligible	Negligible

202. The initial feasibility analysis is performed to make sure that the existing RoW is Presents minimal engineering challenges (e.g., avoids rock outcrops, steep slopes, water bodies, and other similar features to the extent possible) and results in the least impact to the existing public infrastructures and environment.

203. Carefully selection of the proposed structures to avoids or reduces major environmental impacts. Therefore, activities that could occur during the detailed design phase are field surveys for recording significant resources present in a potential project area (e.g., cultural resources, archaeological sites or wetlands). These surveys are typically of short duration and result in the limited disturbance.

204. All the essential permits must be obtained and regulatory requirements must be achieved before detail design. The subproject canals are surveyed to identify and specified the proposed structures to be constructed generally, only small survey crews and survey equipment would be required. The below potential impacts might result from the project site evaluation activities.

G. NCB-04 SECONDARY CANALS IMPACTS AND MITIGATION

a) Impacts and Mitigation Measures during the Pre-Construction Phase

205. The NCB-04 secondary canals sites evaluation and pre construction phase impacts such as preliminary survey site characterization, and monitoring are usually temporary and of relatively smaller magnitude. The impacts at this stage include vehicular, pedestrian traffic, interruption to the people especially women working in agriculture field are collecting water from canals.

206. The initial feasibility analysis is performed to make sure that the existing RoW is Presents minimal engineering challenges (e.g., avoids rock outcrops, steep slopes, water bodies, and other similar features to the extent possible) and results in the least impact to the existing public infrastructures and environment.

207. Carefully selection of the proposed structures to avoids or reduces major environmental impacts. Therefore, activities that could occur during the detailed design phase are field surveys for recording significant resources present in a potential project area (e.g., cultural resources, archaeological sites or wetlands). These surveys are typically of short duration and result in the limited disturbance.

208. All the essential permits must be obtained and regulatory requirements must be achieved before detail design. The NCB-04 secondary canals are surveyed to identify and specified the proposed structures to be constructed generally, only small survey crews and survey equipment would be required. The below potential impacts might result from the project site evaluation activities.

b) Physical Environment

209. **Impacts on Soils and Geologic Resources and Mitigation Measures:** Surface disturbance and use of geologic materials are minimal during the site assessment phase, and soils and geologic resources are unlikely to be affected. Site survey activities would also be unlikely to activate geological hazards or increase soil erosion.

Overall Mitigation Measures: Sitting and design considerations that mitigate impacts include:

- Identify soil properties, engineering constraints, corrosive potential, and facility design criteria.
- Consider the floodways for proposed structures in the detail design phase.
- Identify and avoid areas with unstable slopes and local factors that can cause slope instability (groundwater conditions, precipitation).
- Develop a site grading and management plan to identify areas of disturbance, areas of cut and fill, slope during and after grading, existing vegetation, and measures to protect slope, drainages, and existing vegetation in the project area.
- Develop an erosion control and re-vegetation plan to delineate measures to minimize soil loss and reduce sedimentation to protect water quality.

Impact of/on	Extent of impact
Soil	=Low
Geologic resource	=Low

210. **Residual Impacts:** The impact of the project on the soil and geologic resource are not expected to be significant. With the implementation of mitigation measures outlined above, the environmental potential impacts will be low in magnitude. Therefore, residual impacts are expected to be not significant.

211. **Flooding and Erosion Impacts:** Floods are the most frequent natural hazard in Afghanistan and result in the largest economic damage. Changes in precipitation patterns as well as earlier spring snowmelt that are expected with climate change will increase risks for different types of floods (e.g. flash floods);

120. According to HDR/Afghanistan, 2011 “In the middle of the 20th Century, surveyors estimated the total forest cover in Afghanistan at 3.1 million to 3.4 million hectares. Today, woodlands occupy less than 1.0 million to 1.3 million hectares (2 percent of the total area of the country), while the north-eastern and eastern regions are prone to high-intensity floods. A remote sensing analysis undertaken in Kunduz and Takhar provinces in 1977 and then again in 2002 revealed that the forest cover had shrunk by more than 50 percent in the interim. If deforestation continues at the present rate, the country’s woodlands will disappear in three decades.” A comparison of forest land in 1977 and 2002 in the Kunduz and Takhar province in the northern Afghanistan is presented in **Error! Reference source not found..** Which shows more than 50% reduction in the forest area in this province, the project influence area

121. **Overall Mitigation Measures:** For flood management watershed has been constructed to prevent water flow and upgrade underground water surfaces. As Under output 3 (Water sheds are properly managed and protected) of Panj Amu River Basin project establishes 26 watersheds, out from them 17 are already completed. A part from that there are other complementary activities under mentioned output such as:

1. Watersheds management technical manual and guidebook development
2. Establishment of 26 Forest Management Associations (FMA)
3. NRM plans development (26)
4. Trainings for DAIL and CDCs members pertaining NRM management. These activities will help restore 10,500 ha of forestry and/or rangeland in the vicinity of 21 prioritized schemes and protect irrigation structures under output 1 and 2 from flash floods and sedimentation.

122. In addition to above the main objective of establishment of WUAs and IAs are to ensure long term sustainability of the project and to make the irrigation infrastructure last its economic life through promotion of active participation of irrigation users in their management, distribute equitable water among the farmers, efficient use of water in the system.

123. Based on Afghanistan water law all water users are responsible for preparation of the annual plan for usage of water in the 4 seasons of the year, also the Mirab, Mirab Bashi and Check Bashi are responsible for O&M of the main, secondary and tertiary canals during the year based on the action plan which prepared by the cooperation of all stakeholders and their approval.

124. One of the main tasks of the WUA and IAs is coordination between these two associations during seasonal flood and are noted as below:

(vi) WUA Responsibilities:

- Act based on RBA/SBA direction during flood
- Control water in the intake
- Inform all Mirabs along the main canal
- Inform all elders of the villages

- Inform all Secondary Canals Mirabs for the flood coming to close the secondary canal regulating gates.
- Open all spillways in the main canals
- Have regular contacts by phone/any other possible equipment's.
- Inform RBA and SBA from all damages done by flood
- Arrange necessary actions for repair of damage parts

(vii) **IAs Responsibilities:**

- Has full coordination with WUA
- Act based on WUA, RBA, SBA, DAIL directions during flood
- Inform all tertiary canals Mirabs
- Closing of SC regulating gates by order of Main canal Mirab
- Inform all farmers
- Have regular contact with all stakeholders
- Cleaning of SC after flood if there is silt coming by flood

125. So flood risk mitigation is part of the responsibilities of IAs and WAs. Project planning trainings to IAs and WAS where a long with other topics their capacity will be also boost up pertaining to flood risk management.

(viii) Impact of/on	(ix) Extent of impact
(x) Flood erosion	(xi) =Medium

212. **Residual Impacts:** Provided the proposed mitigative measures are implemented, the environmental effects will be temporary, and low in magnitude on Flood erosion. Therefore, no significant adverse residual environmental impacts are likely to occur. **Health and Safety:** Occupational and community health and safety risks normally associated with construction and outdoor activities exist, however, are very limited during the site assessment phase because of the limited range of activities. Siting and design considerations that mitigate impacts include:

- Conducting a safety assessment to describe potential safety issues (site access, construction, work practices, hazardous materials, security, transportation of heavy equipment, traffic management, emergency procedures, wildlife encounters, and fire control and management) and measures to mitigate them.
- Develop and implement a health and safety program for workers and the public, addressing all the safety issues identified in the assessment and all applicable safety standards.
- Address specific issues (e.g., school bus routes and stops) in a traffic management plan or in the health and safety program.

Impact of/on	Extent of impact
Health and Safety	= High

c) Impacts and Mitigation Measures during the Construction Phase

213. The proposed NCB-04 secondary canals construction process includes the following steps:

214. The area of proposed structures would be cleared of vegetation, and other items that may prohibit construction. In addition to these activities, the establishment of access roads to some structures which have no access road or far from existing road would also be needed.

215. The activities during project's construction phase, potentially causing environmental impacts, include ground clearing and removal of trees and vegetative cover, loss of landscape, view shed value, habitat value due to tree removal, excavation, vehicular and pedestrian traffic, noise, dust water pollution and so on.

216. Environmental concerns of the NCB-04 secondary canals can include the following:

- Terrestrial habitat alteration (as this project does not cross any forest so this impact is negligible)
- Aquatic habitat alteration
- Hazardous materials (IFC, 2007)

126. The following impacts, presented by resource, may result from the construction activity.

127. **Residual Impacts:** A preventative health and safety program will be implemented for construction, operation, and decommissioning that ensures that the public and workers are not adversely affected during routine operations, and that contingency plans will be in place to prevent impacts during accidents, malfunctions, and unplanned events.

d) Physical Environment

(xii) **Impacts on Topography and Mitigation Measures:** Land use during construction would be affected by intrusive impacts such as ground clearing, increased traffic, noise, dust, and human activity, as well as by changes in the visual landscape.

128. Vegetation removal and ground disturbance could result in visual impacts that produce contrasts of color, form, texture, and line. Excavation for foundations and ancillary structures; surfacing roads; clearing and leveling staging areas; and stockpiling soil and spoils (if not removed) would (1) damage or remove vegetation, (2) expose bare soil, and (3) suspend dust.

129. Specific mitigation measure recommended during the construction phase of the project are:

- Bring construction material from authorized sites.
- Avoid creating excessive slopes during excavation.
- Dispose of excess excavation materials in approved areas to control erosion and minimize leaching of hazardous materials.
- Save topsoil removed during construction and use to reclaim disturbed areas.
- Stabilize soils during final landscaping of project site

Impact of/on	Extent of impact
Topography	=Medium

e) Impacts on Acoustics (Noise) Environment and Mitigation Measures

130. The sources of noise during construction would primarily occur from equipment (Excavator, heavy vehicle, and diesel engines). The additional noise sources include vehicular traffic and labor. In most cases, the NCB-04 secondary canals are passing away from residential areas. In places that the canals passes near residential areas such as villages, schools, and other sensitive receptors the noise levels from equipment must not exceed the allowable range. In some cases, the construction noise could exceed the permissible noise levels indicated in the World Bank General EHS guidelines but would be intermittent and extend for only a limited time.

f) Noise Impacts on Workers and Mitigation Measures

- The noise of construction and transportation will have a negative impact on workers. Noise could cause hearing loss, impair the ability to communicate and hear high-frequency sounds and even permanent hearing loss. During construction of the proposed structures and excavation of foundation, there would be noise from construction equipment. The levels would range from about 70 decibels (dB) for a paving breaker to about 85 dB from large trucks. The noise must not exceed the OSHA all worker permissible exposure limit of 80 dBA for eight

hours day. There are two main ways to reduce and control worker exposure to noise in the workplace where the noise is excessive:

- **Engineering Control:** this involves replacing or modifying equipment, or bringing relevant changes at the source of noise or along the noise transmission path. The contractor must make sure that the low noise level machinery and tools are utilized. Maintain and lubricate equipment and machinery (oil bearings) in accordance with its respective manufacturer recommended periods. Place a noise barrier such as curtains and sound walls between the employees and the noise source. And isolate or enclose the noise source.
- **Administrative Control:** this includes changes in the schedule or workplace that eliminate or minimize the labors exposure to noise. The contractor must schedule the noisy machinery operation when fewer workers are exposed in case possible, limit the time a worker spends near a noisy source, and provide a quiet area where employees can gain relief from noise sources. Furthermore, the control of the noise exposure through distance is often a simple, inexpensive and yet effective administrative noise control way. To be precise, for every double of the distance between the workers and the noise source the noise could be reduced by 6 dBA (OSHA, 2017).
- **Noise Impacts on Communities and Mitigation Measures**

131. Work outside the usual working hours/day will have negative impacts in terms of noise and disturbances in communities. Therefore, it is recommended that no construction should be allowed during nighttime (22:00-07:00); particularly the construction material transportation or night construction work could be limited to relatively quiet activities, such as interior work.

132. As this project does not require a huge amount of construction work at a specific location the impacts of noise will be minimal. However, if the noise still exceeds the allowable limits the above-mentioned mitigation measures should be taken. The contractor must have a sound level meter at the site to continuously monitor and record the noise level.

133. Additional key mitigation practices for noise impacts that could apply to all phases of this project include:

- Limit noisy activities to the least noise-sensitive times of the day (weekdays only between 07:00- 22:00).
- Whenever feasible, schedule different noisy activities to occur at the same time, since additional sources of noise generally do not add a significant amount of noise. That is, less-frequent noisy activities would be less annoying than frequent less-noisy activities.
- Heavy-duty equipment should have sound-control devices no less effective than those provided on the original equipment.
- Notify nearby residents in advance when noisy activities are required.
- To the extent feasible, route heavy truck traffic supporting construction activities away from residences and other sensitive receptors.

Impact of/on	Extent of impact
Noise	=Low

Residual Impacts: Provided the proposed mitigative measures are implemented, the Noise impacts will be temporary, and low in magnitude. Therefore, no significant adverse residual environmental impacts are likely to occur.

g) Impacts on Air Quality and Mitigation Measures

134. Emissions generated during the construction phase include diesel emissions from generators and large construction equipment, vehicle emissions; emissions from storage and transfer of fuels for construction equipment; and fugitive dust from various sources such as disturbing and moving soils (clearing, excavating, backfilling, dumping, and truck and equipment traffic), mixing concrete. Air quality impacts could also occur if cleared vegetation is burned. Therefore, measures need to be taken to mitigate these emissions.

135. The construction work of the project generates particulate matter, which can be a significant pollutant particularly in any nearby areas such as residential areas. During the construction of the project, fugitive dust comes from blowing exposed soil or other particles. Fugitive dust becomes an issue as the land is cleared and graded, and as delivery trucks and other vehicles and equipment travel on dirt or gravel roadways in the construction area. The dust becomes a nuisance in nearby neighborhoods, a face and lung irritant, or a visual obstacle in nearby streets. The dust must be suppressed, and this is usually done by spraying unpaved roads with water and stabilizing exposed soil areas.

136. Vehicle and diesel generator emission will have a negative impact on the environment. Therefore, vehicles and generators should be kept in good working condition and properly maintained, in order to minimize the exhaust emissions. The dust emissions should be minimized by methods, such as spraying water on soil, where required and removal of dirt and mud from vehicles wheels before leaving the project site and the loading plants. In addition, the vehicle should move at a slow speed in the site and on unpaved roads to avoid excessive dust emissions. Attention should be given to conserve water during the construction. The construction and operation worker should be provided with liquefied petroleum gas (LPG) for cooking and heating if required, and the usage of fuel wood should not be allowed. Generators and vehicles used in this project should have exhaust mufflers to minimize the exhaust and noise.

137. The below mitigation measures are recommended in all phases of the project to control the air quality particularly during the construction phase:

- Use dust abatement techniques on unpaved surfaces to minimize dust and during earthmoving activities, prior to clearing, before excavating, backfilling, compacting.
- Introduce speed limits to reduce airborne fugitive dust from vehicular traffic.
- Limit access to the construction site and staging areas to authorized vehicles only through the designated treated roads.
- When possible, schedule construction activities during periods of low winds to reduce fugitive dust.
- Cover construction materials and stockpiled soils if they are a source of fugitive dust.
- Train workers to handle construction materials and debris during construction and dismantlement to reduce fugitive emissions.
- Keep soil moist while loading into dump trucks.
- Keep soil loads below the freeboard of the truck.
- Minimize drop heights when loaders dump soil into trucks.
- Tighten gate seals on dump trucks.
- Around the work area, the NO₂ (annual average concentration) must not exceed 0.053 ppm and Sulphur Dioxide (SO₂) - 0.14 ppm.
- Cover dump trucks before traveling on public roads (TEEIC, 2017).

Impact of/on	Extent of impact
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Air quality	=Low
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138. **Residual Impacts:** Provided the proposed mitigative measures are implemented, the impacts will be, temporary, and low in magnitude. Therefore, no significant adverse residual environmental impacts are likely to occur.

h) Impacts on Cultural and Historic Resources and Mitigation Measures

139. Direct physical disturbance through construction activities such as vegetation removal and earthmoving, or building renovation; indirect construction disturbance by blasting or vibration; increased human access; and operational impacts that include altering the amenity of a site or area by factors such as noise, vibration and reduction in scenic quality (ADB, 2012; Environment Safeguard a Good Practice Sourcebook).

140. Potential impacts to cultural resources include:

- Complete destruction of the resource if present in areas undergoing surface disturbance or excavation;
- Vandalism, theft and illegal export of movable Physical Cultural Resources (PCR), and of pieces of monumental PCR.
- Degradation or destruction of near-surface cultural resources on- and off-site resulting from changing the topography, changing the hydrological patterns, and soil movement (removal, erosion, sedimentation).
- Unauthorized removal of artifacts because of human access to previously inaccessible areas.
- Soil compaction, damaging buried PCR (archaeological and paleontological) on site.
- Vibration, air, soil and water pollution, leading to damage to natural and human-made PCR in the vicinity (ADB, 2012; Environment Safeguard a Good Practice Sourcebook).

141. To avoid adverse impacts to PCRs it is recommended to undertake the following mitigation measures:

- Searches need to be conducted to determine the presence of known archaeological sites and historic structures within the area of potential effect. Identify the need for an archaeological and/or architectural survey.
- Periodic monitoring of significant cultural resources near the development may be required to reduce the potential for looting and vandalism.
- An unexpected discovery of cultural resources during any phase of the project shall result in a work stoppage near the find until the resources can be evaluated by a professional archaeologist.
- Educate workers and the public on the consequences of unauthorized collection of artifacts.
- During all phases of the project, keep equipment and vehicles within the limits of the initially disturbed areas.
- Prepare and follow a cultural resources management plan, if cultural resources are present at the site or if areas with a high potential to contain cultural material have been identified.
- Use existing roads to the maximum extent feasible to avoid additional surface disturbance.

Impact of/on	Extent of impact
Culture and historical resource	=Low

Residual Impacts: No significant adverse residual environmental impacts on cultural and historical resource are likely to occur.

142. PCR Chance Find Procedure

143. An unexpected discovery of cultural resources during any phase of the project shall result in a work stoppage near the find until the resources can be evaluated by a professional archaeologist. Chance finds must not be disturbed until avoidance, minimization or mitigating measures are developed by competent experts from Afghanistan Ministry of Information and Culture (MoIC). Workers should be educated on the consequences of unauthorized collection of artifacts.

144. The contractor must develop a cultural resources management plan. The plan should include:

- Definition of the PCR to which the procedure applies
- Ownership of the found artifacts: Ministry of Information and Culture
- Recognition procedure for identifying chance finds during project implementation
- Procedure upon discovery, a rapid response procedure to protect chance finds while minimizing disruption to project activities (i.e., stipulates the procedures for consultation with the authorities legally responsible for PCR, demarcation of the discovery site, chance finds report, arrival, and actions of cultural authority, and suspension/non-suspension/further suspension of work) (ADB, 2012; Environment Safeguard a Good Practice Sourcebook).

Impact of/on	Extent of impact
PCR change and find procedure	=Low

i) Impacts on Water Quality and Mitigation Measures

145. Use of or spills of chemicals could result in contamination of surface and groundwater. There is always the risk of the spill which could result the soil and water contamination.

146. In addition, water would be required for making concrete, dust control and consumptive use by the construction workers. Depending on availability, it may be trucked in from off-site or obtained from local groundwater wells.

Water quality can be affected by:

- Activities that cause soil erosion;
- Weathering of newly exposed soils causing leaching and oxidation that can release chemicals into the water;
- Discharges of waste or sanitary water;
- Herbicide applications; and
- Contaminant spills, especially oil.

147. Following mitigation measures are recommended to reduce the adverse impacts on water quality:

- Save topsoil removed during construction and use it to reclaim disturbed areas upon completion of construction activities.
- For in-stream construction, use isolation techniques such as diversion to limit the exposure of disturbed substrates to moving water.
- Closely monitor construction near aquifer recharge areas to reduce potential contamination of the aquifer.
- Obtain borrow material from authorized and permitted sites.

- Dispose of excess excavation materials in approved areas to control erosion and minimize leaching of hazardous materials.
- Pollution of rivers by vehicles and waste shall be forbidden and controlled, (e.g. no car washing in the rivers, no oil spills, etc.).
- Where access roads would cross a dry wash, restrict the road gradient to 0% to avoid diverting surface waters from the channel specifically near the river and canals.

Impact of/on	Extent of impact
Water quality	= Medium

148. **Residual Impacts:** Provided the proposed mitigative measures are implemented, the environmental impact will be temporary, and low in magnitude on water quality, in the same time on aquatic ecosystem. Therefore, no significant adverse residual environmental

j) Waste and Hazardous Material Management

149. Solid and industrial waste can be generated during construction activities. The solid wastes are expected to be nonhazardous and consist of mostly containers and packaging materials, miscellaneous wastes from equipment assembly and presence of construction crews (food wrappers and scraps). Industrial wastes would include minor amounts of paints, coatings, and spent solvents. Most of these materials would likely be transported off-site for disposal. Impacts could result if hazardous wastes were not properly handled and were released to the environment.

150. The secondary containment should be considered wherever liquid wastes are stored in volumes greater than 110 liters. The available volume of secondary containment should be at least 110 percent of the largest storage container, or 25 percent of the total storage capacity (whichever is greater), in that specific location. Provide adequate ventilation where volatile wastes are stored.

151. General mitigation practices and principles that could apply to all phases of this project include:

- Implement plans for hazardous materials management, waste management spill prevention and response, and storm-water management.
- Train employees to promptly contain, report, and/or clean up any oil or hazardous material spill.
- Provide secondary containment for all on-site hazardous materials and waste storage, including fuel.
- Containerize and periodically remove wastes for recycling or for disposal at appropriate off-site permitted disposal facilities.
- Provide portable spill containment and cleanup equipment in all vehicles.
- Keep vehicles and equipment in good working order to prevent oil and fuel leaks.
- Document accidental releases as to cause, corrective actions are taken, and resulting environmental or health and safety impacts.
- All measures for waste management, waste storage, transportation, etc. mentioned in the IFC general EHS (2007) guidelines must be followed.

Impact of/on	Extent of impact
Waste and hazardous material	=Low

152. **Residual Impacts:** Provided the proposed mitigative measures are implemented, the environmental effects will be temporary, and low in magnitude. Therefore, no significant adverse residual environmental impacts are likely to occur.

k) Ecological Environment (Flora and Fauna)

153. The secondary canals proposed structures planned to be constructed at the canals right of

way and has less impact on flora. However, a number of non-fruit trees should be removed, as well as some structures have no access road which needs to be passed by agricultural land, Therefore, mitigation measures need to be considered to avoid the excessive removal of the flora, the impacts of the construction process on fauna are not expected to be significant.

154. Dust settling on vegetation may alter or limit plants' abilities to photosynthesize and/or reproduce. Although the potential for an increase in the spread of invasive and noxious weeds would occur during the construction phase due to increasing traffic and human activity, the potential impacts could be partially reduced by interim reclamation and implementation of mitigation measures.

(xiii) There are two major types of impacts on vegetation:

- **Direct impacts:** vegetation and trees removal or damage during construction activities.
- **Indirect impacts:** on vegetation from air pollution or surface water contamination during construction of the proposed structures along the canals right of way.

155. The ecological survey of the site confirmed lack of endangered and ecologically significant fauna and flora. Therefore, there are no serious biological concerns with the implementation of this project.

156. The following mitigation measures during construction are recommended to reduce the adverse impacts on the environment:

- Use existing facilities and disturbed areas (e.g., access roads, graded areas) to the extent feasible to minimize the amount of disturbance.
- Given that trees are supposed to be cut on the proposed structures it is recommended to compensate it by planting the similar type trees on at least 1:10 ratio at nearby free space.
- Conduct blasting for raw materials only within specified times and at specified distances from sensitive wildlife or surface waters as specified by IFC/NEPA.
- Refuel in a designated fueling area that includes a temporary berm to limit the spread of any spill. Use drip pans during refueling to contain accidental releases and under fuel pump and valve mechanisms of any bulk fueling vehicles parked at the construction site.
- Retain all ground-level vegetation and stumps left after cutting, unless their removal is necessary to install support structures or other ancillary facilities.
- Schedule construction activities to avoid important periods of wildlife courtship, breeding, nesting, lambing, or calving.
- Re-vegetation of disturbed areas with native plant species and unnecessary removal of plants should be avoided.
- Use dust abatement techniques on unpaved, un-vegetated surfaces to minimize airborne dust.
- If an endangered species is found during construction, work in the area will be stopped and NEPA and other relevant institutions should be immediately notified (TEEIC, 2017).

Impact of/on	Extent of impact
Flora and fauna	=Low

157. **Residual Impacts:** Provided the proposed mitigative measures are implemented, the environmental effects will be temporary, and low in magnitude. Therefore, no significant adverse residual environmental impacts are likely to occur.

I) Socioeconomic Environment and Land Use

158. No new irrigation channels will be built so no communities will be split most land use impacts would be temporary, such as disruption of irrigation water supplies at in-canals construction sites, blockage of vehicle, pedestrian paving of access road, removal of livestock from grazing areas during

periods of blasting or heavy equipment operations; curtailing hunting near work crews; or temporary effects to the character of a recreation area because of construction noise, dust, and visual intrusions. ROW clearing could result in the long-term loss of timber production there will be a positive impact on work availability due to the need for temporary construction staff from the local area during the construction period. There will be some potential adverse impacts like temporary water supply distribution problems Conflict over hiring of jobs, Privacy of the local communities i.e. ladies working in the field or at nearby during construction activities, Water use for washing and domestic use by local women Fetching of water by ladies from the canals or river, Canals and river quality issue during rehabilitation process, health and safety aspects of construction which will be mitigated by the construction contractors. There will be no impact on any public infrastructure such as transmission lines...etc. See a full list of mitigation measures below (Table) which address socio-economic impacts. During the consultation meeting with the villagers it was agreed that all labor will be local people hired from the project area, even the skilled workers that live in the villages. Also the contractor will work in coordination with the community head (CDC) and WUAs. Local water supply problems will be solved with a temporary canals with temporary water access points, and also after rehabilitation of the canals water access points will be constructed in the existing canals.

159. Siting and design considerations that mitigate impacts include:

- Establish a reclamation plan to ensure that all temporary impact areas are restored.
- The civil work's contractor will provide temporary irrigation channels and roads/paths.
- Where possible, the construction work will be prioritized during the late autumn and winter seasons, depending on the weather and accessibility.
- Consolidate infrastructure requirements (transmission, roads) for efficient use of land.
- Distribute a proposed schedule of construction activities to all potentially affected landowners and nearby residents so they know when they might experience construction-related disruptions.
- Minimize the amount of land disturbance, and develop and implement stringent erosion and dust control practices.
- Repair underground drainage tile damage on agricultural lands.
- Repair compacted or rutted agricultural lands.
- Dewater open trenches in a manner that does not damage the adjacent agricultural land. If this cannot be done, compensate the landowner appropriately.
- Compensate farmers for crop losses and restore compacted soils.

160. Direct positive socioeconomic impacts would include the creation of new jobs for construction workers and the associated increase in the yield. Indirect impacts would occur as a result of the new economic development and would include new jobs at businesses that support the expanded workforce or provide project materials, and associated income and taxes. Local people hiring will have positive socio-economic impacts on the community. It is, therefore, recommended to hire local labor for the construction phase of this project.

Impact of/on	Extent of impact
Socioeconomic	=Low

161. **Residual Impacts:** Provided the proposed mitigative measures are implemented as suggested, the potential Impact is considered non-significant. Therefore; no significant adverse residual environmental impacts on soil, socioeconomic and land use are likely to occur.

m) Health and Safety

162. The workers and equipment safety risks are high during construction. To mitigate these impacts, the staff must have essential protective equipment (i.e. PPE) and must be provided with safety training.

163. All safety precautions should be taken into consideration during the construction phase of the project to minimize the safety hazards. Furthermore, all the equipment for this project should meet the national noise standards.

164. Potential impacts to the worker and public health and safety from NCB-04 secondary Canals construction would be similar to those expected for any construction project with earthmoving, large equipment, transportation of oversized materials. In addition, health and safety issues include working in potential weather extremes, and possible contact with natural hazards, such as uneven terrain and dangerous plants, animals, or insects.

165. Mitigation Measures During COVID 19 Outbreak

Planning phase

- Plan construction phases avoiding large group of workers and unnecessary overlap of crews. If the
- work plan was developed prior to COVID-19 outbreak, consider reviewing and adapting when
- necessary;
- Basic Personal Protective Equipment (PPE) related to construction safety such as gloved and glasses
- should be provided to workers depending on the tasks they are assigned to. In addition, each worker
- should be provided with two or more reusable masks (not surgical/medical graded masks);
- Additional hand washing stations including provision of clean water and soap, together with cleaning
- and disinfection products may be required for construction sites opened prior to the outbreak. For
- new construction site, plan and budget provision of these items;
- Preferably, every worker should be provided with a basic set of tools needed for the tasks they are
- assigned to. Using of the same tool by multiple workers should be avoided. If tools are shared or
- stored for later use by another person, they need to be disinfected/cleaned;
- Plan to engage workers coming from the close proximity of the facility been built (possibly from the
- same block) and avoid involving labor from farther away camps or villages;
- Supervision should be strengthened including COVID-19 prevention principles, and supervisors
- oriented on their new responsibilities;
- If possible, prior to start construction work coordinate with Health partners to check the site and
- ensure appropriate measures are adopted;

Prepare your workforce

- An orientation on COVID-19 should be provided to all workers, including description of the disease,
- symptoms, transmissibility, severity and WHO's key prevention messages to be followed on site, public
- spaces as well as in their homes;

- Prevention messages should be printed and clearly displayed on site. Consider providing an additional
- printed copy of the key prevention messages for all workers to disseminate in their families (and
- communities);
- Workers should be clearly informed on protocols to follow in case they or their family members get
- sick;
- Workers should be requested to maintain physical distance of 2 meters (6') from others as much as
- 1. possible and to adhere to the other suggested practices for infection prevention and control, in
- 2. particular:
- 3. Wash your hands regularly with clean water and soap for at least 20 seconds, or clean them
- 4. with a hand sanitizer;
- 5. Avoid touching your eyes, nose and mouth with unwashed hands;
- 6. When coughing or sneezing, cover your mouth with tissue and throw it into closed bin
- 7. immediately. If you do not have a tissue, cough or sneeze into your flexed elbow;
- 8. Do not spit.
- Working gloves are sometimes worn to protect against injuries during some activities, but they do not
- offer any protection against transmission of COVID-19 and should be considered as unwashed hands in
- terms of minimizing touching one's face;
- Workers should not greet each other with handshakes or embraces at any point during the day;
- If workers are operating in an area where sick or suspected infected people are currently or recently
- transited (in the previous 3 days), they should wear mask and disposable gloves at all times;
- If masks are not available, workers should be encouraged to prepare handmade ones using household
- items or clothes materials;
- Advice workers to wash their clothes frequently (daily if possible).

Access to site

- Only essential visitors (workers, supervisors, and managers) should be allowed on site;
- Programme/monitoring visits should be reduced to the minimum and should be planned when
- workers are not on site (i.e. lunch or prayer time);
- Fence off the construction site to ensure no one can enter or approach the workers without
- authorization;
- Entry and exit gates should be clearly marked and guarded;
- Body temperature should be measured for all persons entering the site;
- Allow enough space for people to queuing in a safe manner at the entrance of the site while they wash
- their hands and get screened;
- A trained staff should be designated to guard the access, checking temperature of workers and visitors
- and enquiring about overall health condition and vulnerability;

- Ensure there are sufficient hand washing stations at the entrance and that they have water and soap,
- as well as clearly display signs requesting persons entering to wash their hands;
- Anyone falling in one of the following categories should not be allowed on site:
 1. Has a family member suspected COVID-19 patient living in the same household or selfisolating, or if s/he has got in close contact with a confirmed COVID-19 patient in the previous
 2. two weeks. S/he should not report on site and self-quarantining at home for two weeks;
 3. Is showing one or more symptoms related to COVID-19 (high temperature, new persistent
 4. cough, shortness of breath). S/he should not report on site, stay home and self-isolate or seek
 5. medical care in case of severe symptoms;
 6. Is a vulnerable person (by virtue of age, clinical/health condition or pregnant)?
- All persons should wash or clean their hands before entering and leaving the site;
- Workers should be encouraged to reach the site using individual modes of transportation and avoid
- public transport when possible.

During construction

- To the most possible extent, workers should maintain physical distance of 2 meters (6') from others at
- all times. Performing activities that must be conducted in close proximity should be avoided when
- possible. If these activities must take place, workers should wear masks;
- If possible, construction crews should be segregated and tasks allocated so they do not overlap. It is
- suggested to establish crew shifts to be also applied for break, lunch and pray time;
- If a worker develops COVID-19 symptoms on site, the following actions should be followed:
 - Avoid touching anything;
 - Cough and sneeze into a tissue and put it in a closed bin, or in their flexed elbow in case they don't have tissues;
 - Return home and self-isolate, or seek medical care in case of severe symptoms;
 - All surfaces and tools s/he may have recently touched should be cleaned and disinfected.
 - In spaces where queuing may happen (including latrines and hand washing stations), consider marking
 - safe distance of 2 meters (6') on ground or railings;
 - Meetings on site should be avoided at all times. Instruction to workers should be given in open spaces
 - and maintaining physical distance;
 - If construction activities happen in an enclosed space, the site should be ventilated as much as
 - possible, for example leaving doors and windows open during the working day;
 - Due to potential sudden access restrictions, all materials and equipment should be carefully and safely
 - stored before leaving the site at the end of every day;
 - When receiving and unloading goods and construction materials, workers should keep distance from
 - the drivers at all times. When possible, drivers should remain in their vehicles. If drivers must unload

- the goods for safety reasons, they should do so without the help of the workers and they should wash
- or clean their hands before and after. Any contact between deliverers and receivers should be avoided
- (including delivery papers and pens for signature, etc.). It is recommending that everyone needing to sign
- paperwork have their own pen or wash their hands after.

Hand washing, hygiene and cleaning

- Provide adequate hand-washing station with water and soap or an alcohol-based hand sanitizer (min.60% alcohol).
- Ensure water and soap are topped up regularly;
- Clean the hand washing facilities regularly during the day, establishing a clear cleaning plan;
- Tools, reusable PPE and frequently touched surfaces should be cleaned and disinfected frequently (atleast daily);
- If possible, appropriate latrine facilities should be made available inside the compound and be kept
- cleaned. In any case, workers should be encouraged to wash their hands before and after using the latrines;
- Dedicated eating, break and prayer areas should be identified on site and access should be staggered
- to reduce risk of congestion. Workers should keep physical distance while eating, praying and having a break;
- Provide safe drinking water dispensers and one-time cups, or encourage workers to carry an individual cup;
- All solid waste (excluding construction materials) should be put immediately in closed bins or closed.
- bags and not left for someone else to clear up;
- Separate and collect all solid waste that could serve as transmission vector. To avoid contact with
- waste bags, use double plastic bags (for instance when removing a filled waste bag, cover tightly and
- wrap with a second plastic bag). Store the waste for at least 72 hours before disposing;
- Store leftovers construction materials for at least 72 hours before disposing.

Upon completion

- The facility should be carefully cleaned and disinfected prior to the handover;
- All waste, construction materials, tools and equipment should be removed from the site and disposed safely

166.

(xiv) Mitigation measures specific to the construction phase of this project include:

- Hold contractor crew safety meetings at the start of each workday to go over potential safety issues and concerns.
- Ensure that employees are trained, as necessary, first aid, rescue techniques, and safety equipment inspection and use.
- Secure construction sites at the end of the workday to protect the equipment and the general public.
- Health and safety supervisor must always available at the construction work site.

Impact of/on

Extent of impact

Health and safety	=Medium
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217. **Residual Impacts:** A preventative health and safety program will be implemented for construction, operation, and decommissioning that ensures that the public and workers are not adversely affected during routine operations, and that contingency plans will be in place to prevent impacts during accidents, malfunctions, and unplanned events.

n) NCB-04 Impacts and Mitigation

Beneficiary-identified problem locations are described in Annex 2.

218. The NCB-04 subprojects have minimal impact since an implicit least-cost analysis of a set of eligibility and prioritization criteria was used for sub-project selection. Criteria included 'No significant potential environmental impact as outlined in the ADB Safeguard Policy Statement (June 2009)' - more specifically, GoIRA Category 1 subprojects, and Category 2 subprojects for which NEPA requires EIA, are excluded from Project financing as are ADB Category A subprojects – and 'Not in an environmentally protected area.'

219. For the NCB-05 subprojects can be considered representative of the majority of schemes in the basin, including the other 18 schemes short-listed for support under the PARB. For all schemes the environmental characteristics, potential environmental impacts and required mitigation measures are almost identical, so their impact and management/mitigation measures are as shown in the paragraphs below and summarized in **Table 5**.

220. **Construction.** The potential construction-phase impacts and corresponding mitigation / management measures are:

- i. **Impact:** Loss of landscape, view shed value, and habitat value due to tree removal on the public right of way of canals at construction sites. **Management:** Replacement tree planting of selected species at alternate sites will be identified in consultation with local communities. If agreed, this will be in surrounding hillsides as part of the tree plantation under output 3. If not agreed, suitable sites on public land will be identified within the irrigation scheme, and plantation undertaken by the civil works contractor, with the proposal that community WUGs be involved in an appropriate maintenance and establishment period. This will be a contract requirement.
- ii. **Impact:** Temporary disruption of irrigation water supplies at in-canal construction sites, or blockage of vehicle, pedestrian, and livestock movement. **Management:** The civil works contractor will provide temporary irrigation channels and roads/paths. This will be a contract requirement. Works, where possible, will be prioritized during the late autumn and winter seasons, depending on the weather and accessibility.
- iii. **Impact:** Loss of landscape and view shed value, landform alteration/destruction, erosion, landslides, sedimentation, and water pollution from quarries used to source or created to obtain construction materials. **Management:** Contract provisions will state that the contractor must seek prior approval from the PIO (who will obtain PMO approval) on the selection of quarry sites.
- iv. **Impact:** Landscape alteration (impacts on topography), canal sedimentation, and water pollution from improperly managed excavation spoil. **Management:** The contractor will select and manage spoil disposal sites to avoid adverse impacts. Prior approval from the PIO on the selection of spoil sites will be undertaken. This will be a contract requirement. The PIO will ensure such spoil sites have been selected with community agreement.
- v. **Impact:** Landscape disruption (impacts on topography) from borrow pits and redundant canals left unfilled post-construction. **Management:** The contractor will fill in of pits and redundant canals when no longer needed. This will be a contract requirement.
- vi. **Impact:** Impacts to cultural resources could occur due to unexpected discoveries in the construction process (some canals in the Panj Amu Basin area are thought to be several thousand years old). **Management:** Contract provisions will state that: "In the event of unanticipated discoveries of cultural or historic artefacts (movable or immovable) in the course of the work, the

contractor shall take all necessary measures to protect the findings and shall notify the PIO and SBA representatives”.

- vii. **Impact:** While not envisaged as part of the NCB-4 rehabilitation, there could in theory be crop damage from temporary construction roads. **Management:** The contractor will minimize/avoid damage through community consultation re timing and placement. If significant damage is expected then the land acquisition and resettlement plan (LARP) will be updated compensation to affected farmers provided.
- viii. **Impact:** Routine construction-phase impacts (dust, noise, vibrations, air pollution, liquid and solid waste generation, occupational health and safety). **Management:** Tenders include standard construction contract environmental safeguard clauses (attached as **Annex 3**) that require bids to include site environmental management plans (SEMPs) which will incorporate a Solid Waste Management Plan (SWM); construction supervision tracks SEMP implementation.
- ix. **Impact:** Impact on fauna. There will be no direct impact on fauna. There may be indirect impacts due to tree removal, water pollution and topographical changes. See mitigation measures above.
- x. **Impact:** Impact on protected areas will be zero as one of the selection criteria is that no sub-projects are to be located in or in the vicinity of protected areas.
- xi. **Impact:** Impact on socio-economic environment. No new irrigation channels will be built so no communities will be split. There will be a positive impact on work availability due to the need for temporary construction staff from the local area during the construction period (over seven years). Temporary water supply distribution problems will be negated through temporary channels. Health and safety aspects of construction will be mitigated by the construction contractors. There will be no impact on any public infrastructure such as transmission lines...etc. See a full list of mitigation measures above which address socio-economic impacts.

221. **Operation.** The main potential subproject operation impacts are:

- i. **Impact:** Hydrologic changes - changes in magnitude and timing of water abstraction, irrigation flows, flooding, drainage, erosion, and sedimentation. While such changes could potentially be negative, it is more likely that there will be a positive impact through improved availability of water for environmental flows. The impact on groundwater quantity will be negligible, or in fact positive, due to the construction of check dams and other structures to slow down water velocity on hillsides which will increase water infiltration. **Management:** Irrigation works are well-designed and constructed; irrigation and water user associations and river sub-basin / basin agencies are supported to achieve intended benefits while mitigating adverse impacts.
- ii. **Impact:** Knock-on impacts of increased agricultural production due to improved water availability – on soil and water (including groundwater) quality due to increased use of fertilisers and pesticides. **Management:** Under output 2, training will be provided to farmers by DAILs on improved agronomic practices including correct application of fertilisers and pesticides, so as to mitigate any negative impact.
- iii. **Environment-on-project (EOP) impacts:** Issues including erosion, sedimentation, flooding, and drought, climate variability on irrigation infrastructure, farmer behaviour, and benefit realization will all contribute in a dynamic manner. Overall impacts are considered to be positive. Soil erosion (and vegetation loss) and sedimentation will be reduced from reforestation and structures such as check dams in surrounding watersheds. While not a priority in the three representative sub-projects, any canal bank protection will also have a positive impact on terrestrial ecology from preventing soil and vegetation from being washed away. Flooding will also be reduced from watershed interventions, as well as the construction or improvement of intakes. Improved water availability will reduce the impact of droughts. **Management:** Project management systems to ensure irrigation works are well-designed and constructed; support to irrigation associations (IAs) and water user associations (WUAs) and river sub-basin / basin agencies to reduce EOP impacts and increase resiliency to them. This will include training to WUAs and IAs on O&M of irrigation infrastructure, and protection and management of watershed in the vicinity of schemes, under output 3.
- iv. **Impact:** Impact on fauna. There will be no foreseen direct impact on fauna. There may be indirect impacts due to soil erosion and water quality and quantity changes. See mitigation measures above. Such impacts are likely to be positive as a result of project interventions.

- v. **Impact:** Impact on protected areas will be zero as one of the selection criteria is that no sub-projects are to be located in or in the vicinity of protected areas.
- vi. **Impact:** Impact on socio-economic environment. Impacts will be positive due to a reduction in poverty from improved farm incomes, and an increase in work availability due to an increase in farm labour requirements. The project will also have a positive impact on domestic and livestock water supply through the construction of water access points. No new irrigation channels will be built

o) ENVIRONMENTAL Management Plan

222. The impacts and proposed mitigation measures as described above are summarized in the EMP **Table 6**. The mitigation plan will be reviewed and developed to a greater level of detail at several points during Project implementation.

223. Capacity building of MAIL institutions (DAILs and IAs) responsible to implement operation-phase measures at second/tertiary/farm levels, to mitigate the impacts of irrigation operation and knock-on agricultural changes, will be mainstreamed into the activities of Project Output 2, “Improved on-farm water management”.

224. **Environmentally Responsible Procurement as a Mitigation Measure** The contractor will identified source of construction material prior to the construction and get construction material source approval from PIO environment safeguards officer. Procurement can proceed only after a PIO construction supervisor, advised and assisted by their PMO environment safeguards officer and field staff if necessary, has determined that no significant adverse impacts are posed by the quarry site or quarrying activities (e.g. sedimentation, erosion, or sliding adversely affecting water courses, settlements, roads, agriculture etc). If significant adverse impacts are identified, mitigation measures at the proposed quarry / quarry site may be considered, or a different existing quarry / quarry site / quarrying activity can be substituted and assessed.

225. **Responsibility for Mitigation Implementation - Overview.** Responsibilities for mitigation implementation (pre-construction to operation) are shown in **Table 6**.

226. **Pre-construction phase.** Responsibility for implementing pre-construction mitigation measures will rest with MEW PMO, FSDC, and MAIL PMO (**Table 6**).

227. **Construction phase.** Responsibility for implementing construction mitigation measures will rest with contractors selected to implement civil works packages, under the supervision and overall management of the responsible ministry’s PIO and PMO respectively (**Table 6**).

228. **Operation phase.** Mitigation of operation-phase impacts involves, first, capacity building of sub-basin and RSP level institutions (SBAs, DAILs, WUAs, IAs), and then implementation of mitigation measures by the strengthened institutions. Capacity building to implement operation-phase mitigation will be planned by MEW PMO and MAIL PMO with the advice and assistance of FSDC and ICS. The planned capacity building activities will be delivered by staff or contract trainers under their supervision to staff/members of the SBAs, DAILs, WUAs, and IAs, who will be responsible for implementing operation-phase mitigation (**Table 6**).

Table 5: Environmental Management Plan.

Potential impacts	Nature of impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
1. Recommendation during project location, design and contract completion phase						
Non-compliance of the technical design to applicable national and international guidelines	- Quality of construction (i) to ensure structures and canals are not vulnerable to the anticipated increase in flash flooding with ability to withstand potential impact of increase in high velocity storms.	Medium	Long Term	- Final technical design of the building should take into consideration the following: (i) construction specifications to incorporate technical specification to withstand increase in uncharacteristic storm events anticipated with climate change. .	Included in the project cost	MAIL CPMO,
Need for vegetation / tree removal.	- Design layout may initiate need to remove existing vegetation.	Low	Long-term	- Design should at all times aim to follow existing canal alignment so to minimise need for vegetation removal. - An SRP will be applied using template for any vegetation removal.	Included in the project design cost	MAIL CPMO
Protected areas; Areas of ecological significance & historical and cultural monuments and values	- The sub project is located outside all of the protected areas and multiple use area. The surrounding land use is dominated by cultivated agricultural land. Thus, potential impact on local protected, ecological and cultural features is not envisaged.	Low	Long term	- It is specified in project documentation that an archaeological assessment will be completed prior to any on-site works. - In the event of unanticipated discoveries in the course of the work, contractor shall take all necessary measures to protect findings, notifying PIO and SBA representatives.	Included in the project cost	Contractor, CPMO
Downstream impacts (Water Quantity)	- Increased irrigation could cause decrease in available water for downstream farmers but this project is CSA water management irrigation so risk is not likely to be significant.	Low	Short	- As part of the environmental monitoring plan, water availability monitoring will be conducted in downstream villages during the wet and dry seasons to minimize any adverse impacts and take any necessary remedial measures in a timely manner if necessary.	Project cost (capacity building & FWUC Package)	CPMO/PIO/ WUAs Monitor by: CPMO/PIO
Flooding and erosion	- Some sections of the project alignment could be vulnerable to flooding and erosion especially	Low	Short Term	- Impacts will be reduced or avoided by appropriate qualitative design and skilled contractor together with	Cost of the plantation (in	CPMO/PIO

Potential impacts	Nature of impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
	during intense melt-down periods.			environmental consideration including incorporation of bio-engineering factors like use of gabions and plantation of shrubs & tree along alignment where applicable.	construction contract)	
Contractor not aware of specific on-site EMP responsibilities.	- Contractors may not have previously been required to comply with environmental safeguards and there may not maintain standards.	High	Contract	- Contractor to develop and table a SSEMP 10 day's minimum before commencing construction.	Contractor.	Contractor, PIO, CPMO.
2. Impacts during Construction						
Confusion and anger by community regarding scope and size of construction activity.	- Lessons learnt from other projects indicate ignorance by farming community of size, scope and temporary impact from project activities.	Low	Short Term	- Communication regards the scope or activity should be shared with the Community using clear photographs, plans and sketches to illustrate works to be done across the site.	PIO and Contractor costs.	
Water pollution	- Currently, use of agricultural chemicals is available in the project area. The primary objective of the Project is to provide supplementary wet season irrigation and dry season irrigation but the project scale is very small. Therefore, it is not likely to significantly increase the use of agricultural chemicals. However environmental consideration, especially about the toxic chemical used, must be considered.	Low	Long Term	- Educational program on the fertilizer uses and environmental impacts should be provided. - Environmental monitoring of water quality is conducted by PMU to assess any negative impact on the water bodies and collaborate with DOA to ensure appropriate use of agricultural chemicals.	Training budget; monitoring budget	DOA Monitor by: CPMO
Creation of access to site & establishment of	- Contractor will need to access the entire length of canals, thru	Medium	Short Term	- Contractors will discuss and agree on specific vehicular access to each	Contractor shall absorb the costs of	Contractor, PIO.

Potential impacts	Nature of impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
temporary storage sites	<ul style="list-style-type: none"> farming land and crossing existing canals and rivers. Crop damage could occur. 			<ul style="list-style-type: none"> construction site with farmers & community prior to any on-site works. Contractor will make good these tracks and storage areas at completion of works. 	such activities into contract.	
Land required for temporary canal diversion.	<ul style="list-style-type: none"> Water flows maybe required during construction period and land will be required to establish canals. 	Low	Short Term	<ul style="list-style-type: none"> Land and alignment of temporary canals. Discussions with WUA and community before construction to get written agreements about location, size, and length of time for a diversion – 	Agreed with WUA's before commencement.	Contractor, WUA's, PIO.
Mature tree removal and general vegetation clearance	<ul style="list-style-type: none"> During construction, there may be a need to remove existing vegetation and excavate existing soil profiles. Such activity will incur loss of view-shed, habitat, amenity, fuelwood source and existing erosion control. 	Medium to High	Medium to long term	<ul style="list-style-type: none"> The contractor is obliged to exercise care to preserve the natural environment (including soils, water and vegetation). All trees for removal will be quantified and replaced on a ratio 1:5 Specific species, location and period of maintenance for establishment will be agreed with in collaboration with community members. 	<p>Contractor shall absorb the costs of such activities into contract.</p> <p>Costs for specific tree specimens & planting to be included in contract</p>	Contractor, PIO
Excavation of existing canals for construction.	<ul style="list-style-type: none"> Excavation will be required along canal length and at regulator sites. Soil erosion could occur during earthwork and clearing along the line of irrigation canal. 	Low	Short term	<ul style="list-style-type: none"> All excess spoil is to be relocated from site and relocated to the discretion of the community. Good construction practices shall help to mitigate soil erosion and siltation Top soil is to be kept separate from other. At works completion, all excavations made good. 	<ul style="list-style-type: none"> Contractor - costed into construction contract (and requirement in contract docs) 	Contractor Monitor: PIO/CPMO
Impact from waste within and across the site	<ul style="list-style-type: none"> Contractor activity will generate waste and will require management. 	Medium	Short term	<ul style="list-style-type: none"> On site need for Solid Waste Management (SWM) plan. 	Contractor obliged to manage.	

Potential impacts	Nature of impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
Dust from material transportation and construction and	- Impact from dust could occur during the construction thru improper construction management. .	Low	Short Term	<ul style="list-style-type: none"> - Water shall be sprayed during construction if activity is located close 50 m to villages to ensure that dust is minimized in construction zones. - Dry material handling and transport generate large amounts of dust thus: - The Contractor shall prepare a dust control program. - Water shall be sprayed where dry materials are handled, crushed and transported. - Vehicles transporting materials are to be covered to reduce spills and dust. 	Costed into Construction contract (and requirement in contract docs)	Contractor Monitor: PIO/CPMO
Air pollution and noise	- Vehicle and equipment emissions cause air pollution and noise. Adverse impact could occur during the construction phase in case of improper construction management but is not likely significant.	Low	Short Term	<ul style="list-style-type: none"> - Vehicles and equipment are to be maintained to meet emission and noise standards. - Construction within 100m of a village or town is to be limited to times agreed with community. 	Costed into Construction contract (and in contract docs)	Contractor Monitor: PIO/CPMO
Human waste from construction	- An adverse impact could occur if contractors have no designated on-site latrines during the construction phase. Informal latrines can generate flies and transmitted diseases which can result in unsanitary condition.	Low	Short Term	<ul style="list-style-type: none"> - Provision of sanitary facilities (latrines, burying, etc.) with proper waste disposal will be provided by contractors for the entire period of the on-site construction period. - 	Costed into Construction contract (and in contract docs)	Contractor Monitor: PIO/CPMO
Solid waste generation from construction, work sites and workers.	<ul style="list-style-type: none"> - Solid waste can create nuisance and bad odor, and encourage disease vectors. - Solid Waste Management (SWM) is recognized as an import indicator for contract success. 	Low	Short Term	<ul style="list-style-type: none"> - An appropriate SWM plan is to be put in place by the contractor for construction camps and work sites. And be emptied daily, the waste being disposed of in an approved dump site. - Every camp and work site should be clean during stay and before moving to a new sites. 	Coasted into Construction contract (and in contract docs)	Contractor Monitor: PIO/CPMO

Potential impacts	Nature of impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
Soil erosion	- Soil erosion could occur during excavation earthworks and clearing along the line of irrigation canal.	Low	Short	- Appropriate construction practices shall help to mitigate soil erosion and siltation.	Costed into Construction contract (and in contract docs)	Contractor Monitor: PIO/CPMO
Worker safety and health	- Some workers will be recruited for construction activities and workers' camp will be constructed. These will include non-skilled workers, operators and drivers as well as surveyors and construction supervisors. Since the works will be relatively small scale and expected to be completed within one-year, large numbers of workers are not expected. However, safety and health impacts will be also expected.	Low	Short Term	- Workers should wear protection equipment during works to ensure that they are safe and good health. - A contractor should develop a guideline on working mechanism, health and safety during construction. Manager should educate his workers on health and safety projection.	Costed into Construction contract (and requirement in contract docs)	Contractor Monitor: PIO/CPMO
Pollution from cement, fuels and black oil	- During the construction period there will be use of cement, fuels and oils for machinery. These materials could be spilt on site and there can be impact on surrounding agricultural land.	Low	Medium Term	- Secure storage of all toxic and hazardous materials including cement, fuels and oils. - Ensure mixing of concrete and maintenance of vehicles and plant is limited to designated sites. - Fuels & oils should be securely stored.	coasted into Construction contract (and requirement in contract docs)	Contractor Monitor: PIO/CPMO
3. Environmental Impacts during Operation						
Inadequate O&M	- Poor and inadequate operation and maintenance (O&M) of the improved irrigation systems could cause unintended adverse environmental impacts.	Low	Medium Term	- Acceptable and appropriate O & M should be developed for sustainable operation and maintenance. - Sufficient training must be also provided so seed farm personnel will be able to manage, operate and maintain the irrigation in sustainability. - WUA's to be given training in O&M.	Project Cost (in design, capacity building)	CPMO/PIO/ PIC

Potential impacts	Nature of impacts	Significance	Duration	Mitigation Measures	Cost	Responsibilities
Hydrological changes Conflict of water utilization	<ul style="list-style-type: none"> - Change in timing, flows, flooding, drainage, erosion and sedimentation will occur by default with the project. - expected conflict on water use 	Low	N/A	<ul style="list-style-type: none"> - Irrigation works are well designed and constructed; - WUA's and RBA's are supported to achieve intended benefits while mitigating adverse impacts. 	N/A	RBA /management and CPMO/PIO WUAs
Ground Water Resources	<ul style="list-style-type: none"> - The groundwater in project command area should benefit from construction. 	Low	N/A	- N/A	N/A	N/A

Table 6: Summary of Mitigation Measures.

Project activity	Potential impact	Proposed mitigation	Institutional responsibility	Cost estimates
Pre-construction				
Finalize RSP designs	Omission from designs of water access points agreed with local communities	Incorporate water access points agreed with local communities into SP designs	MAIL CPMO & design consultant (design engineer)	Included in MAIL CPMO staff & design & support consultant costs
Procure construction services	Deficient/failed contractor implementation of construction-phase mitigation measures	Incorporate standard construction contract environmental safeguard clauses (Annex 3) and EMP into tender documents	MAIL CMPO & design & support consultant (procurement expert)	Included in MAIL CPMO staff & design & support consultant costs
Commence construction	Non-compliance with legal requirement for environmental clearance	Prepare and submit environmental clearance application to NEPA for each RSP. Track and respond to NEPA queries	MAIL CPMO	MAIL CPMO staff costs
Source quarried materials	Landslides, erosion, sedimentation, landform/landscape/viewshed degradation at/near quarry sites	Investigate and accept/reject commercial quarries / proposed RSP local quarry sites for acceptable environmental impacts	MAIL CPMO, PIO & construction contractors	Included in MAIL CPMO & PIO staff costs & construction contractor costs

Project activity	Potential impact	Proposed mitigation	Institutional responsibility	Cost estimates
Commence excavation	Disturbance, damage, loss/theft of physical cultural resources	Prior to commencing excavation at any location, an archaeologist will inspect the excavation sites, and based on the findings, undertake rescue archaeology and/or monitor excavation activities as needed		
Construction				
Construction site clearance including tree removal	Loss of ecological services and aesthetic value of trees removed from construction sites	Afforestation - tree plantation	MAIL CPMO, PIO & construction contractors	Included in MAIL CPMO & PIO staff costs & cost of civil works
Excavation	Landscape alteration, canal sedimentation, and water pollution from improperly managed excavation spoil	Select and manage soil disposal sites, in consultation with community		
Canal rehabilitation and upgrading	Opportunity to construct water access points agreed by local communities foregone	Construct water access points agreed with local communities		
Canal rehabilitation and upgrading	Temporary disruption of irrigation water supplies, or blockage of route ways	Temporary irrigation channels or roads/paths. Works prioritized, where possible in late autumn/winter	MAIL CPMO, PIO & construction contractors	Included in MAIL CPMO & PIO staff costs & cost of civil works
Construction roads	Crop damage from temporary construction roads	Community consultation re. Road siting and timing. If significant impact, compensation to APs		
Operation of vehicles & equipment; generation of liquid and solid waste	Excessive noise, dust, air / water pollution, fuel/oil spills, pollution from improper liquid/solid waste disposal	Routine construction housekeeping measures per contractor SEMP		
Borrow pits and redundant canals	Landscape disruption if left unfilled post-construction	Pits and redundant canals filled in		

Project activity	Potential impact	Proposed mitigation	Institutional responsibility	Cost estimates
Operation and maintenance				
Operation and maintenance of improved irrigation infrastructure	Suboptimal irrigation and agricultural benefits	Establish and strengthen WUAs/IAs and provide training on O&M and improved management of water	MAIL CPMO SBAs WUAs DAILs IAs	Included in MAIL staff costs
Increased cropping intensity and input use	Environmental contamination from excessive pesticide and fertilizer use	Training provided to IAs on optimal application and use of pesticides and fertilisers	DAILs, IAs	
Construction site clearance including tree removal	Loss of ecological services and aesthetic value of trees removed from construction services	Afforestation – care and maintenance of tree plantations (ongoing watering, fertilizing, protecting from damage of afforested trees while initial saplings grown into mature trees)	MAIL CPMO & PIOs WUAs MAIL CPMO & PIOs DAILs IAs	

p) Monitoring Requirements / Plan

229. **Monitoring activities** are shown in **Table 7**. The monitoring plan will be reviewed and developed further at several points during the Project.

230. **Pre-construction phase.** Responsibilities for pre-construction monitoring will rest with FSDC, MEW PMO, and MAIL PMO (**Table 7**).

231. **Construction phase.** Under the direction of the responsible ministry's PMO and with advice and assistance from ISC, monitoring of construction-phase impacts and mitigation will be integrated into the work plans of the responsible ministry's PIO construction supervisors. Schedules of monitoring activities, procedures, and checklists to be used by these supervisors will be prepared in collaboration with them. On-the-job training and backstopping of PIO construction supervisors will be provided as required by the PMO environment safeguards with support from the ICS national environment specialist (**Table 7**).

232. **Operation phase.** Monitoring of operation-phase impacts involves, first, capacity building of sub-basin and RSP level institutions (SBAs, DAILs, WUAs, IAs) to undertake participatory monitoring, and then the undertaking of monitoring activities the strengthened institutions. Capacity building to undertake operation-phase participatory monitoring will be planned by the PMOs with the advice and assistance of ICS. The planned capacity building activities will be delivered by staff or contract trainers under their supervision to staff/members of the SBAs, DAILs, WUAs, and IAs, who will in turn be responsible to undertake operation-phase monitoring (**Table 7**).

233. Note that due to the limited potential impact, no monitoring is planned for soil and water quality, and as such no baseline survey has been undertaken. Note however, that monitoring of water quality is a planned task of the river basin agency and sub-basin agencies. A separate ADB TA project (TA-9095 REG: Strengthening Integrated Water Resources Management in Mountainous River Basins) will likely provide assistance to the Panj-Amu RBA in undertaking a water quality baseline for the river environment, and build its capacity for follow-up water quality monitoring as part of its institutional mandate.

Table 7: Summary of Monitoring Requirements.

Mitigation measure	Monitoring parameters	Location	Measurements	Frequency	Responsibility	Cost
Pre-construction						
Incorporate water access points agreed with local communities into SP designs	Designs	Contractor (MAIL) office	Check designs against water access point list	Once, before signing off on designs	MAIL CPMO	Included in design & support consultant costs
Incorporate standard construction contract environmental safeguard clauses (IEE Appendix 9) and EMP into tender documents	Tender documents	Contractor (MAIL) office	Check tender documents for required inclusions	Once, before signing off on tender documents		
Prepare and submit environmental clearance application to NEPA for each RSP. Track and respond to NEPA queries	Environmental clearance certificate progress	Contractor (MAIL) office	Query status of applications	Ensure they are obtained prior to planned construction start dates so certificate process continues to progress.	MAIL CPMO	Included in MAIL staff & construction contractor costs
Investigate and accept/reject commercial quarries / proposed RSP local quarry sites for acceptable environmental impacts	Indications of erosion, landslides, landform & view shed damage	Candidate quarry sites	Photographs	Once for each site, prior to quarry selection	MAILPIOs & construction contractors	Included in MEW staff & construction contractor costs
Archaeology inspection of excavation sites, rescue archaeology / excavation monitoring as required, prior to commencing excavation	Archaeology test pit(s)	Excavation sites	Presence/absence of archaeological findings	Once at each site, prior to commencing excavation	Archaeology expert, respective ministry's design & support consultant	Included in MEW design & support consultant's staff costs
Construction						
	replacements.	Community-identified afforestation locations	Photographs; inventory; girth/height measurements; visual assessment	Included in construction supervisor site visits	MEW PIOs & construction contractors	Included in MEW staff & construction contractor costs
Select and manage soil disposal sites, in consultation with community	Soil disposal	Soil disposal sites	Photographs	Included in construction supervisor site visits	Included in MEW staff & construction	Included in construction contractor costs

Mitigation measure	Monitoring parameters	Location	Measurements	Frequency	Responsibility	Cost
					contractor costs	
Routine construction housekeeping measures per contractor EMP	Noise, dust, air pollution PM 10, fuel/oil spills, improper liquid/solid waste disposal	Construction sites	Visual assessment of dust, liquid / solid found outside proper receptacles. Vehicle inspections to check exhaust and noise. Site visits	Once, before construction work; Every 6 months during construction phase	MAIL PIOs, Contractor	Included in construction contractor costs
Noise	Noise level in dBA	Near residents and inside the construction site	Average of 15 minutes measurement of the noise level in dBA	Once before construction and Daily during construction	MAIL PIOs, Contractor	Included in construction contractor costs
Air pollution	CO, NOx, Sox, PM10 and 2.5	Work area	Laboratory measurements of air samples	Monitoring will be carry out Prior to start of construction	MAIL PIOs, Contractor	Included in construction contractor costs
Flora and fauna	Respect for minimal ground clearance (1 km) in design. The extent of lay down areas and routing of new access roads Implementation of Avifauna	Subproject ROW	Regular visual inspection during construction Complete study area survey after construction	Six Monthly during construction General survey after construction	MAIL PIOs, Contractor	Included in construction contractor costs

Mitigation measure	Monitoring parameters	Location	Measurements	Frequency	Responsibility	Cost
	protection measures					
Waste	Implementation of Sewerage and Waste Management Plan. Septic tanks at each construction campsite Measures to prevent spills of liquid wastes (i.e oil change of construction vehicles).	Work area	Design compliance, Visual control	Daily monitoring during construction process; EHS Audit	MAIL PIOs, Contractor	Included in construction contractor costs
Health and Safety	Compliance with EHS Plan (Work Safety / Sanitation, Noise)	Work area and workers camps	Visual Control of EHS Management Plan implementation	Daily monitoring during the construction	MAIL PIOs, Contractor	Included in construction contractor costs
Physical and culture resource	Implementation of the chance procedure	Work area	Visual Control, Records	Monthly during construction	MAIL PIOs, Contractor	Included in construction contractor costs
Grievance Mechanism	Implementation of an accessible grievance mechanism for APs to address complaints at the local level	Community level	Communication of GRM to stakeholders /APs.	Daily during the construction process	MAIL PIOs, Contractor	Included in construction contractor costs

Mitigation measure	Monitoring parameters	Location	Measurements	Frequency	Responsibility	Cost
Construct water access points agreed with local communities	Construction of access points per design	Design access point locations	Photographs	Included in construction supervisor site visits		
Temporary irrigation channels or roads/paths. Works prioritized, where possible in late autumn/winter	Water availability for farmers	Construction sites	Photographs; farmer interviews	Included in construction supervisor site visits	WUA's, MEW PIO,	Included in construction contractor costs
Community consultation re. road siting and timing. If significant impact, compensation to the affected.	Meeting reports & minutes.	Construction sites or adjacent community sites.	Reports and photographs of completed work.	At commencement of site work.	MEW PIO, Contractor	Included in construction contractor costs
Routine construction housekeeping measures per contractor SEMP	Management of oils, fuels, solid waste, spoil etc.	Construction sites	Monthly reports, photographs.		Contractor	Included in construction contractor costs
Pits and redundant canals filled in	Quality of fill, making good.	Adjacent new canal works.	Photographs of before and after.	At completion of site works.	Contractor, WUA's.	Contractor.
Operation and maintenance						
Establish and strengthen RSP WUAs and IAs re: (i) improved management of water, soil, & agricultural pests / pesticides; increased resilience to climate & other variability and (ii) participatory monitoring	WUA and IA establishment status, date, place, training plans; training type trainers, participants vs plan targets	Training locations per training plan	Photographs, training sign- in sheets, training reports	As/when training occurs	MEW PMO RBA SBA MAIL PMO DAILs MEW design & support consultant	Included in MEW & MAIL staff costs
Implementation of improved management of water, soil, & agricultural pests / pesticides; increased resilience to climate & other variability	Irrigation flow, crops grown, yields, soil quality, pesticide use,	Monitored locations in agricultural fields	Irrigation records; participatory / farmer self-reporting of other parameters	Monthly		

Mitigation measure	Monitoring parameters	Location	Measurements	Frequency	Responsibility	Cost
	agricultural pests					
Afforestation – care and maintenance of tree plantations (ongoing watering, fertilizing, protecting from damage of afforested trees while initial saplings grown into mature trees)	Trees surviving/died; tree growth	Afforested locations	Photographs; inventory; girth / height measurements; visual assessment	Included in WUA, IA or CMA monitoring work plans	MEW PMO RBA SBA; WUAs, IAs MAIL PMO DAILs CMA MEW design & support consultants	Included in (i) MEW & MAIL staff costs (ii) WUA, IA or CMA budgets

q) Estimated EMP Cost Summary

Table 8: Preliminary cost estimate of the implementation of the EMP is given in Table below.

PROJECT STAGE	DETAILS	ESTIMATED COST (USD)
EMP IMPEMETATION TEAM	Salaries for 1-2 staff required for EMP implementation	15,000
AIR, NOISE, WATER TEST COST	Test costs for checking teh quality of air, noise and water before, during and post project implementation	10,000
TRAINING OF STAFF	Training on data collection, data entry, data analysis and reporting	5,000
MONITORING AND REGULAR DATA COLLECTION	Regular data collection to gauge the quality of various environmental parameters	10,000
HEALTH AND SAFETY	Office operation cost such as stationary, intenet, furniture, etc	5,000
TOTAL	450,00 \$	

H. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

a) NCB-04 IEE Consultation and Disclosure

234. The consultation meetings at up and downstream were held in March 2020 with the potentially affected people along the NCB-04 subproject route. The objectives of the meetings were to share the project relevant information with communities and understand their concerns. The information shared included project activities, proposed hydraulic structures to be constructed and their expected impacts on the physical, biological and socio-economic conditions. In coordination with resettlement experts, the concerns of the affected population associated with the project were documented and understood.

235. Public consultation during the environmental screening process of development projects is increasingly considered an important imagination and requirements which increases the authenticity and acceptability of assessment itself but more importantly can possibly enhance the quality of decisions making as well. Stakeholder's consultation/participation during various stages of developmental projects helps improve the decision making and ultimately leads towards sustainable development.

236. Stakeholder consultation is a two-way process. For stakeholders, the consultation process is an opportunity to obtain project information, to raise issues and concerns, and ask questions. For the project proponents, the consultation process offers opportunity to understand the stakeholders and their concerns about the project, their needs and aspirations, and also their suggestions that can potentially help shape the project. Listening to stakeholder concerns and feedback can be a valuable source of information that can improve project design and outcomes and help the project proponent to identify and control external risks.

237. The national legislation and ADB safeguard policies require consultations to be carried out particularly with the affected communities as part of the environmental assessment process. The consultation carried out during the present IEE and reported in this Chapter meet these requirements.

238. **Overview of public consultation programme.** Public consultation meeting have been holding since the beginning of the project related IEE by PIO team. Meeting conducted by participant of affected people, Community Development Councils head, NGOs working on water management and concern Government authority, Water User Association and Forest Associations. The dates, places, attendees, and records of these meetings are documented in **Annexes**.

239. **Men's meetings:** The concerns expressed by men who attended meetings at the head, mid-canals, and tail areas of each RSP are shown in the combined **Table 9**. All of these expressed concerns are incorporated in the RSP designs, with one exception – foot/vehicle bridges (a type of “community structure”) will not be provided, as this type of civil work is outside the scope of Project financing. Stakeholders will be advised of this exclusion as part of IEE local disclosure.

Table 9: Key concerns during the consultation meetings.

240. The comments have been raised by community people, NGOs working on water management and concern government authority during the numerous meeting with them in 2019 about the NCB-04 canals construction.

Number	Key Concern shared
1	When the project will start?
2	How and who will compensate the trees?
3	How much will be the cost of per tree?

241. **Women's meetings:** Due to security situation and cultural barriers female consultation meeting weren't conducted, and their view reflected by the family head the concerns expressed by family head attended meetings in each of the two RSPs focused on domestic water issues. Consistent across all the meetings, they stated that canals water is an important domestic water source, and therefore they face domestic water supply shortages when there is less water in the canals, typically during the May to Aug/Sep/Oct period. They expect the RSPs will result in more water in the canals during this period, which will benefit them. They expressed a need for domestic water supply physical works – wells or feeder canals to bring water from the irrigation canals to the settlement areas. RSP designs will include water access points for domestic water collection, laundry, and livestock watering. Water access point locations will be identified early in the Project implementation period in consultation with local stakeholders.

242. **On ADB Website.** The draft IEE will be disclosed on the ADB website. Any revised IEE received by ADB will be disclosed on the ADB website when it is received. If no revision is made to the IEE, the draft IEE becomes the final document.

243. Consultation and disclosure during EMP implementation will include:

- pre-construction stakeholder involvement in the design of mitigation measures (specifically, in selecting the locations of water access points and afforestation areas);
- notification to local communities when project activities are going to take place;
- provision for public participation in environmental monitoring;
- public consultation during the preparation of biannual environmental monitoring reports;
- disclosure of biannual environmental monitoring reports on the ADB website; and
- local disclosure of monitoring results to local communities.

244. **NCB-04 Construction-Phase Consultation and Disclosure** Construction-phase environmental monitoring will be incorporated into the on-site work plans and checklists of PIO construction supervisors. These supervisors will be in regular contact with WUAs and IAs to exchange

information about monitoring activities and results, construction schedules, activities, progress, complaints, and concerns. WUAs and IAs may arrange to participate in construction monitoring as and when they wish.

245. Construction supervisors will include environment-related matters in their regular reporting to PIO management. Management will in turn follow up with stakeholders as needed and appropriate to provide information and resolve issues.

246. Notification of upcoming construction and other PARB activities will be provided to WUAs and IAs for posting at construction sites (e. g. signboards) and in places readily accessible to local people.

247. Biannual environmental monitoring reports (EMRs) will be prepared documenting environment-related consultation and disclosure events during the reporting period. An example EMR outline is provided in **Annexes**. WUAs and IAs will be consulted during EMR preparation. Monitoring results will be locally disclosed in an appropriate manner. EMRs will be disclosed on the ADB website.

248. **NCB-04 Operation-Phase Consultation and Disclosure** - When NCB-04 become operational, the EMP and operation-phase public consultation plan will be reviewed and revised. Public consultation and disclosure on impacts and mitigation of irrigation scheme operation and knock-on agricultural changes will be mainstreamed into the activities of Project Output 2, improved on-farm water management, and into MEW activities related to operation and maintenance of water conveyance infrastructure and WUA establishment and capacity building.

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I. GRIEVANCE REDRESS MECHANISM

249. A grievance redress mechanism (GRM), consistent with the requirements of the ADB Safeguard Policy Statement (2009) will be established to prevent and address community concerns, reduce risks, and assist the project to maximize environmental and social benefits. In addition to serving as a platform to resolve grievances, the GRM has been designed to help achieve the following objectives: (i) open channels for effective communication, including the identification of new environmental issues of concern arising from the project; (ii) demonstrate concerns about community members and their environmental well-being; and (iii) prevent and mitigate any adverse environmental impacts on communities caused by project implementation and operations. The GRM is accessible to all members of the community including workers of contractors.

a) Purpose of GRM

250. The main purpose of the GRM is to educate Project Affected Families (PAFs) about the grievance mechanism and to publicize the complaints procedures to the affected families. It will also inform PAFs about the present arrangement for grievance handling and to assist them to seek redress to unresolved grievance from land acquisition, resettlement dispute and it will also facilitate people who might have objections or concerns regarding the project activities to rise.

251. The GRM was introduced during community consultations and will be publicly available to stakeholders throughout the project and all parties should comply with it particularly the implementation contractor and EA. In the event of a grievance issue, up to three stages will be implemented, as follows;

252. **Stage 1** (maximum 7 days): If a concern arises during construction of the NCB-04 sub canals, the affected person may raise the issue with the contractor. All stakeholders including local residents and the contractors will be aware of the GRM and will be requested to immediately report any incidents to the Project owner. If the issue is resolved directly between the affected person and contractor, no follow-up is required. But the log/record shall be saved in the GRM logbook at the Project owner

253. **Stage 2** (maximum 15 days): If the issue is not resolved, the affected person can submit an oral or written complaint to the project authority or district officials. The district and the Project owner will reply within two weeks and keep a written record of the whole process.

254. **Stage 3** (maximum 15 days): If the issue is still not resolved, the project owner will, if agreed by the affected person, arrange a meeting with the district officials and relevant community representatives to identify a solution. If the issue still cannot be resolved it will be referred to the relevant higher-level authorities including the specialized inspection agency in the province. The project owner may report the process to ADB at any of Stages 1–3, but will do so immediately if Stage 3 is reached.

255. **Complaints on Similar ADB Water Resources Projects in Afghanistan** - As mentioned previously, the monitoring reports of four similar ADB projects report very small numbers of complaints made to their GRMs, most related to construction site waste management and were resolved relatively quickly.

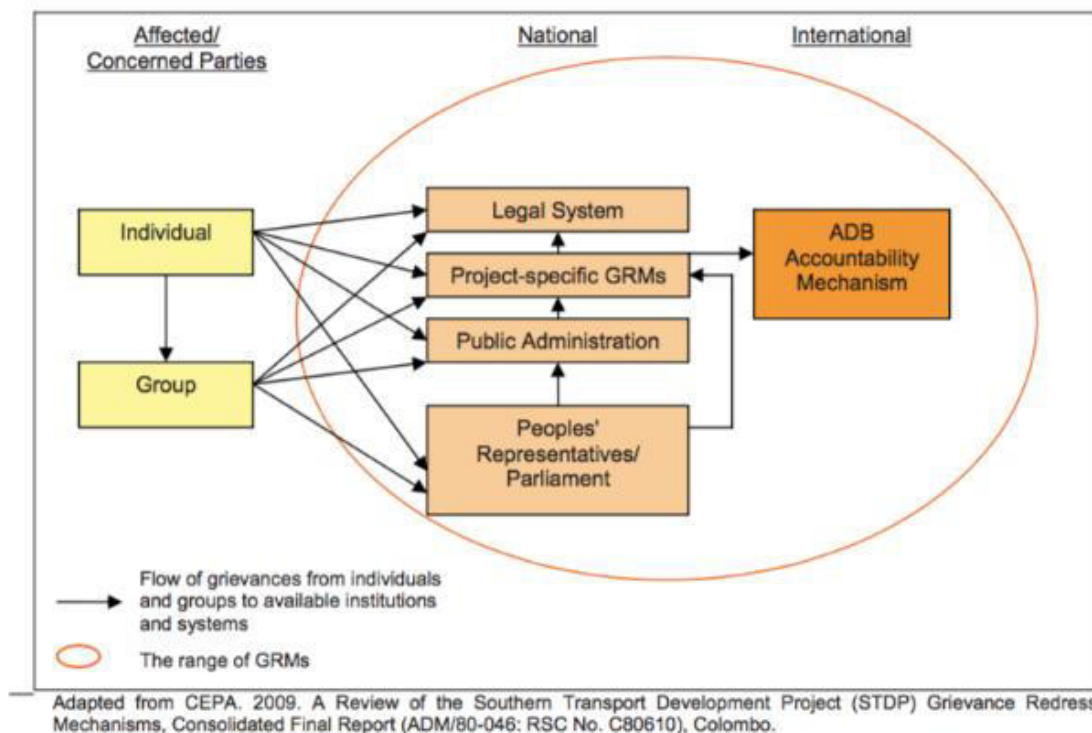
256. **Model for construction-phase GRM.** The GRM arrangements of the Western Basin Project appear to provide a good model for the Project to adopt.

257. **Construction-phase GRM.** The GRM will be established prior to commencement of construction in PMOs at central level, PIOs at sub-basin / subproject level, and in the WUAs/IAs at construction level. WUA/IA heads will be provided with logbooks for grieved individuals to record complaints and comments, and will be charged to inform their PIO of new logbook entries within one week. PIO will respond to complainants within two weeks of the complaint registration date. PIO construction supervisors will attempt to address the complaint at field level. If they are unsuccessful, they will refer the matter to the PIO director, who may communicate with or call a meeting of

contractors, PMO and PIO staff, and/or ISC consultants. If this is unsuccessful, s/he will refer the matter to PMO for resolution. At any time, the complainant has the option of seeking legal remedy.

Figure 10: Grievance Redress Mechanist Process Flow Diagram.

Figure 1: Systems and Institutions for Grievance Redress Available to Affected Persons



J. FINDINGS AND RECOMMENDATIONS

258. **Project Justification** - The NCB-04 subprojects are anticipated to create significant benefits for local people while having acceptable residual adverse after the implementation of feasible environmental management measures.

259. **Risks and Assurances** - Insecurity and weak governance are a risk to subproject sustainability. To mitigate this risk, PARB subprojects were selected where sustained engagement of project proponents with local government and communities, farmers, and traditional water managers is achievable; and longer-term impact of PARB institutional strengthening on local institutions is possible.

260. Existing and PARB-provided irrigation infrastructure, crops, and communities and their assets more generally are at risk from occurrences of low-frequency, large- magnitude environment-on-project impact events (floods, drought, and earthquakes). These risks are somewhat mitigated by event-resilient engineering design, and through the availability of Government and donor post-disaster relief and rehabilitation support to affected communities.

261. **During early PARB implementation** – as a priority task and as more complete PARB subproject construction information becomes available, PARB environment experts and those responsible for construction-phase subproject EMP implementation will review the subproject EMPs and consultation and disclosure plans, and finalize them to an implementation-ready level of detail. EMP elements to be upgraded or added, on an as-needed basis, including (i) reporting responsibilities, (ii) EMP work plan, (iii) environmentally responsible procurement plan, (iv) detailed EMP costs, and (v) mechanisms for taking corrective action.

262. **During the transition from construction to early operation**, and then to full benefit realization in each PARB subproject, responsibility for EMP and consultation and disclosure plan implementation will be transferred from implementation-phase PARB environmental managers to operation-phase and ultimately post-PARB RBA environmental managers.

263. During this transition, **additional review and elaboration** of the operation-phase elements of these plans will be necessary, (i) to adjust them to both the NCB-05 environmental management capacity, or include capacity building in areas where this is needed, and (ii) to develop them to a realistically implementable state.

K. CONCLUSIONS

264. Based on site surveys of the locations where structures will be built, and following a review of potential wider impacts following public consultation, the NCB-04 projects are not expected to have significant adverse impacts, given the small scale of the works and the fact that it is basically an exercise in rehabilitation and upgrading of an existing irrigation system. Therefore, the environmental impact of NCB-04 projects are expected to be minimal. The only impact of any note is the removal of the trees which will need to be re- planted.

265. Rehabilitation/reconstruction of the NCB-004 sub-project is required to managed water at sub-canal level as well as on-farm level. There is no environmentally sensitive area adjacent to the canal alignment and it will not cause encroachment on to any precious ecology, and cultural area. This IEE concludes that the adverse environmental impacts arising from the project will be prevented, minimized, mitigated and managed to acceptable levels through the implementation of clearly identified mitigation measures. Therefore, the IEE is considered to be an adequate environmental assessment for the project. A monitoring program for the environment impacts and corresponding mitigation measures will be undertaken to ensure proper implementation of the project.

266. Considering the environmental setting and anticipated impacts due to the proposed improvement works on the NCB 004 sub-project is categorized as Category “B” as per ADB’s safeguard policies. As per environmental screening and IEE, no significant adverse impact has been envisaged due to proposed canal rehabilitation and improvement. Anticipated potential impacts are localized and most of them would be limited during construction stage, and reversible. The project would be anticipated to have some moderate adverse impact anticipated on land use, air quality, water quality, noise environment, which will be limited to construction stage. Impact on other environmental attributes will be minor or negligible. Suggested mitigation measures along with the proposed institutional arrangement would ensure that all the adverse impacts are adequately mitigated and the results reported to various stakeholders. some positive impacts are also seen due to the project which may be as follows:

- Increased growth in the economy of the area.
- Temporary employment opportunities.
- Better life style and improved living conditions.
- Increase agriculture production through water management.
- Enhanced women status in the society.
- Reduced health risk.
- Reduced poverty and
- Enhanced Environmental skills and awareness level of the people living around the project.

ANNEX 1: - ENVIRONMENTAL SCREENING CHECKLIST FOR MOMIN ABAD, QATAK JAR AND YATEM TEPA SUBPROJECTS

Instructions:

- (i) The Project team completes this checklist for each potential subproject to support its classification as ADB environment category A, B, or C.
- (ii) The checklist focuses on environmental issues and concerns. Social screening instruments should be used to screen for social dimensions such as involuntary resettlement, indigenous peoples, poverty reduction, and gender.
- (iii) Complete checklist items for the “without mitigation” case to identify potential environmental impacts. Document potential mitigation measures in the “remarks” column.

Subproject name: Afghanistan, Panj Amu River Basin Project, NCB 004 (Consolidated REAs)

Subproject location: Momin Abad, Qatak Jar and Yatem Tepa Takhar province

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> • Project Siting <p>Is the Project area adjacent to or within any of the following?</p> <p>Environmentally sensitive areas?</p>			
<ul style="list-style-type: none"> ▪ Protected Area 		√	There in the project sites isn't any protected area or National Park and They won't be damaged by the project Activities.
<ul style="list-style-type: none"> ▪ Wetland 		√	The project civil works are doing in the sites where not any wetland is.
<ul style="list-style-type: none"> ▪ Mangrove 		√	There is not any Mangrove species in the project site.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> ▪ Estuarine 		√	There is no Estuarine in the project area.
<ul style="list-style-type: none"> ▪ Buffer zone of protected area 		√	The project activities will be done in the areas where any buffer zone of protected area isn't.
<ul style="list-style-type: none"> ▪ Special area for protecting biodiversity 		√	The project activities will be implemented in the site where any special area for protecting biodiversity isn't.
<ul style="list-style-type: none"> • Potential Environmental Impacts <p>Will the Project cause...</p>			
<ul style="list-style-type: none"> ▪ Loss of precious ecological values (e.g. result of encroachment into forests/swamplands or historical/cultural buildings/areas, disruption of hydrology of natural waterways, regional flooding, and drainage hazards)? 		√	The Yatim Tapa sub project aims to rehabilitate water canal in Takhar province so the project is doing rehabilitation of the canal and it won't damage to the cultural or historical building and also the project itself will decrease and avoid the regional flooding across the area.
<ul style="list-style-type: none"> ▪ Conflicts in water supply rights and related social conflicts? 		√	The project is rehabilitation of canal so it improves water supply in the project sites, and also the project will hire local labor for the construction phase activities.

Screening Questions	Yes	No	Remarks
▪ Impediments to movements of people and animals?		√	The rehabilitation project won't impede to the people and animal's activities. Because the project won't cause to the blockage of roads and other sensitive area.
▪ Potential ecological problems due to increased soil erosion and siltation, leading to decreased stream capacity?		√	The project is rehabilitation of water canal, and the water canal will decrease soil erosion and leaching of the soil chemicals around the canal.
▪ Insufficient drainage leading to salinity intrusion?		√	The project will improve water drainage through the canal so it will avoid the salinity of the water.
▪ Over pumping of groundwater, leading to salinization and ground subsidence?		√	As mentioned above, the project activities are for the rehabilitation of existing canal and it will not cause the over using and over pumping of groundwater.
▪ Impairment of downstream water quality and therefore, impairment of downstream beneficial uses of water?		√	The project deliverables and the canal rehabilitation will help the water users and farmers to use the water.
▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	The project is expected to provide the poor farmers with ample irrigation water and help them reduce the level of poverty in the area of project vicinity.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> Potential social conflicts arising from land tenure and land use issues? 		√	This project is aimed at reducing the conflicts occurred in the past due to water apportionment, and expected outcome in this regard is local people will have ample irrigation water at all times of season and will lead to reduce the conflicts.
<ul style="list-style-type: none"> Soil erosion before compaction and lining of canals? 		√	The project civil work doesn't cause soil erosion because there will not any chemical materials for the project activities.
<ul style="list-style-type: none"> Noise from construction equipment? 	√		It will arise during construction phase which will be managed by proper mitigation measures which have been mentioned in the EMP.
<ul style="list-style-type: none"> Dust during construction? 	√		It will arise during construction phase which will be managed by proper mitigation measures which have been mentioned in the EMP.
<ul style="list-style-type: none"> Waterlogging and soil salinization due to inadequate drainage and farm management? 	√		The project aims to improve water supply and on farm water management activities by the increasing of the amount of water.

Screening Questions	Yes	No	Remarks
▪ Leaching of soil nutrients and changes in soil characteristics due to excessive application of irrigation water?		√	The canal operationalization activities will not cause the soil erosion or leaching of the soil chemicals because the project aims to improve on farm water management to avoid the discharge of farm polluted water to the surrounded soil.
▪ Reduction of downstream water supply during peak seasons?		√	The project improves water supply and all season of the year this is why project activity never cause reduction of downstream water.
▪ Soil pollution, polluted farm runoff and groundwater, and public health risks due to excessive application of fertilizers and pesticides?		√	The project civil work is for rehabilitation of the existing canal. It doesn't work on agricultural productivity and application of pesticides and fertilizers on the farm.
▪ Soil erosion (furrow, surface)?		√	The project civil work doesn't cause soil erosion because for construction phase
▪ Scouring of canals?		√	
▪ Clogging of canals by sediments?		√	Community based natural resources management associations will be responsible for the timely cleaning of the canal sediments.

Screening Questions	Yes	No	Remarks
▪ Clogging of canals by weeds?		√	Community based natural resources management associations will be responsible for the avoiding of weeds intrusion in to the canal.
▪ Seawater intrusion into downstream freshwater systems?		√	There is no sea in the project vicinity.
▪ introduction of increase in incidence of waterborne or water related diseases		√	The nature of the project deliverables is rehabilitation and it will not cause any diseases in to the site.
▪ Dangers to a safe and healthy working environment due to physical, chemical and biological hazards during project construction and operation?	√		The labor and supervision engineers are supposed to use PEE during construction phase.
▪ Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	As the proposed projects are rehabilitation works, such problem will not happen.
▪ Social conflicts if workers from other regions or countries are hired?	√		No worker will be hired from other regions.
▪ Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		√	There is not any community's houses in the project activity vicinity to cause community health and safety due to the construction activities.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., irrigation dams) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning? 		√	There are no community households in the vicinity of the project activity also the project area is not in the risk of natural hazards.

Climate Change and Disaster Risk Questions The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.	Yes	No	Remarks
<ul style="list-style-type: none"> Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I) 		√	
<ul style="list-style-type: none"> Could changes in temperature, precipitation, or extreme events patterns over the Project lifespan affect technical or financial sustainability (e.g., increased glacial melt affect delivery volumes of irrigated water; sea level rise increases salinity gradient such that source water cannot be used for some or all of the year). 		√	
<ul style="list-style-type: none"> Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)? 		√	
<ul style="list-style-type: none"> Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., by diverting water in rivers that further increases salinity upstream, or encouraging settlement in earthquake zones)? 		√	

ANNEX 2: - GENERAL DESCRIPTION OF PROPOSED STRUCTURES

The general conditions and photos of each sub canals are given below one by one.

Figure 11: Below photos are belong to NCB-04 sub canals.







ANNEX 3: - ENVIRONMENTAL SAFEGUARD CLAUSES; CONSTRUCTION CONTRACT

A. Environmental Protection and Control of Pollution

1. General

1. The Contractor shall observe and comply with all National Laws, Government Regulations, Presidential Decrees, and Ministerial Regulations pertaining to environmental protection, pollution control, waste management and biodiversity protection.
2. In conducting his construction activities, the Contractor shall take all necessary precautions to minimise environmental disturbance to the project area and surroundings and to prevent the escape of polluting substances into streams, water courses, and groundwater. The Contractor shall also utilise all necessary practicable methods and devices as are available to prevent and otherwise minimize atmospheric emissions or discharges of air contaminants.
3. Except where otherwise agreed or provided for by the Employer or expressly stipulated in Particular Specifications or Technical Specifications forming part of the Contract Documents, no separate payment will be made for complying with the provisions of this Clause and attendant sub-clauses; and all costs shall be deemed to be included in the prices for the Contractor's mobilisation for construction, and the various rates and lump sum items for the works included in the priced Bill of Quantities.

2. Pollution of Water Courses and Streams

4. The emission of polluting liquids or other waste into drains, water courses, or groundwater shall not be permitted.
5. No concrete or cement washings from the works or drainage from the Contractor's concrete batching and mixing areas, asphalt (hot mix) plants, or other manufacturing or production facilities shall be allowed to discharge into streams or drains without passing through an adequate system of settling ponds.
6. Storage of fuels, fuelling and maintenance of plant and vehicles, etc. shall take place only on sites and under conditions that do not allow spilt fuels to be discharged to water bodies. Fuel storage and fuelling areas shall be equipped with adequate protective measures to confine and retain accidental spillages. No drainage from fuel store and plant maintenance depots shall be allowed to be discharged without passing through an adequate arrangement of oil traps and separators.
7. Washing of vehicles shall not be permitted in streams but only in specially designated and equipped areas.
8. Operations in quarries and borrow areas shall be carried out in such a way as to minimize any possible pollution from particulate matter entering the streams.
9. Adequate sanitary waste control facilities shall be provided in site offices and workers camps, and sewage waste shall be collected regularly and disposed in accordance with relevant environmental legislation.
10. The Contractor shall accordingly be responsible for the installation, operation and maintenance of a comprehensive drainage system to all areas of the Works. The system shall be constructed such that no discharges of oil, cement, silt or other liquid or solid waste matter can enter the streams and water courses at the site; and it shall have all necessary solid waste and sediment traps, settling ponds, oil separators, etc., required to ensure that pollution of streams watercourses and natural bodies of water does not occur. The Contractor shall be responsible for maintaining the system to the satisfaction of the Employer's Construction Supervisor and all costs of providing the system shall be deemed to be included in the various rates and lump sum items for the works included in the priced Bill of Quantities.

3. Air Pollution

11. The Contractor shall take all necessary steps to minimize air pollution resultant from his operations.
12. Except where stipulated in these Specifications for the disposal of natural vegetation and organic materials from clearing operations, the burning of waste materials for disposal, particularly oil and petroleum wastes, rubber, plastics and similar materials will not be permitted.
13. During the performance of the work required under the Contract or of any operations appurtenant thereto, whether on the Project Site or elsewhere, the Contractor shall take all steps necessary, and shall furnish all labour, equipment, materials and means, required to reduce dust nuisance from the Works, and to prevent dust originating from his operations from damaging crops, orchards, cultivated fields, and dwellings; or causing a nuisance to persons. The Contractor shall be held liable for any damage resulting from dust originating from his operations including on Government roads, rights-of-way or elsewhere.
14. The emission of dust into the atmosphere shall not be permitted during the manufacture, handling and storage and handling of cement and of concrete aggregates, and the Contractor shall use such methods and equipment as are necessary for the prevention, or the collection and disposal, of dust during such operations. All truck-loads of loose materials shall be covered during transportation
15. Concrete batching and mixing areas, asphalt (hot mix) plants, or other manufacturing or production facilities shall be sited at least 500m from the nearest habitation. Emission outlets shall be fitted with pollution control devices in compliance with relevant current Government of Afghanistan emission control legislation.
16. The cost of spraying water on haul roads, access roads, government roads, aggregate stockpiles, etc.; or of any other methods of reducing the formation of dust; and the cost of furnishing and applying materials to maintain the works areas, adjacent areas, and roads, in a dustless condition, shall be deemed to be included in the various rates and lump sum items for the works included in the priced Bill of Quantities.

4. Noise Pollution

17. The Contractor shall take all necessary precautions to minimize the amount of noise and vibrations coming from construction activities.
18. The Contractor shall ensure that all plant and equipment is properly maintained in good operating condition, and that noisy construction activities shall be effectively sound- reduced by means of silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other means, to avoid disturbance to any nearby noise sensitive receivers. All plant and equipment shall comply with relevant Government of Afghanistan legislation covering sound emissions.
19. Quarry operations and blasting shall be undertaken so as to minimize blasting and disturbance during the night, and insofar as it is possible, noise, vibration and dust. Operation of trucks and heavy vehicles and machinery shall be restricted to the hours of 06:30 to 19:00.
20. All necessary measures shall be undertaken to protect schools, hospitals and other adjacent noise sensitive receptors, including the use of noise barriers.

5. Damage to Property, Crops and Vegetation

21. The Contractor shall limit the movement of his employees and equipment within the project area and on adjacent land, including access routes approved by the Employer's Construction Supervisor, so as to minimize damage to natural vegetation, farming soils, crops and property, and shall endeavour to avoid any damage to land.
22. The Contractor shall strictly ensure employees and equipment do not enter any sensitive environmental areas that are demarcated as "no-entry" zones.

23. The Contractor shall preserve existing trees, plants and other vegetation that are to remain within or adjacent to the Works and shall use every precaution necessary to prevent damage or injury thereto. Trees or shrubs shall only be felled or removed where such impinge directly on the permanent works or necessary temporary works areas; and where such is approved by the Employer's Construction Supervisor.
24. On completion of the Works all areas disturbed by the Contractor's construction activities shall be restored by the Contractor to their original condition, or as may be acceptable to the Employer.
25. The Contractor shall be responsible directly to the Employer for any excessive or unnecessary damage to crops or lands arising from his operations, whether within the project area, on lands adjacent thereto, or adjacent to approved access roads: and deductions will be made from the payment due to the Contractor to cover the cost of such excessive or unnecessary damage, as determined by the Employer.

6. Reporting

26. The Contractor shall maintain a record of all emissions and spills of liquid, solid and gaseous matter which occur at the site, whether into water courses, streams, on land, or into the air. This record shall be compiled daily and shall include details of date, time and nature of the event, along with details of the remedial and clean-up measures carried out. Copies of these records shall be given to the Employer monthly.
27. The result of water, air, noise, waste (solid and sewage) will be recorded and reflected in the biannual monitoring report.
28. The Contractor shall also maintain a record of any complaints made by any Governmental or Community Organization or by the public, regarding his operations. This record shall contain the date and time of receipt of the complaint, the name and address of the complainant and the action taken to remedy the situation. Copies of these records shall be given to the Employer monthly.

7. Environmental Management Plan

29. Contractor should have to Preparation of SSEMP before commencement of construction work.
30. The requirements of this clause and attendant sub-clauses on Environmental Protection and Pollution Control notwithstanding; the Contractor shall observe and comply with all relevant environmental protection and mitigation, monitoring, and reporting requirements in the Environmental Management Plan (EMP) as stipulated in the Particular Specification. In the event of any conflict between the foregoing sub-clauses and the environmental protection and mitigation measures and pollution control requirements of the EMP, the EMP shall take precedence.
31. The SSEMP shall be submitted within 15 working days of the Contractor receiving the Notice to Proceed with the Works, and shall include a solid waste management plan detailing procedure for site waste management, covering all solid, liquid and gaseous waste materials and emissions. The waste management plan shall include procedures for the collection and disposal of all waste materials in such a way as to ensure that no damage is caused to the environment. Training shall be provided to workers about the appropriate implementation of the SSEMP and waste management plan measures.
32. Where stipulated in the Particular Specifications or Technical Specifications forming part of the Contract Documents, and provision has been made in the Bill of Quantities; payment for the implementation of the SSEMP will be made in accordance with the Unit Rates, Lump Sum or Provisional Sum Items included in the Priced Bill of Quantities.

ANNEX 4: - IEE PUBLIC CONSULTATION MEETING RECORDS

PARB Sub-Project Community Consultation and Site Disturbance Data For NCB-04 Subprojects (Head, Mid & Tail)

Instructions:

This checklist of 14 items aims to support the site-specific community consultation process which will share anticipated impact and mitigation during construction and operation, with a specific focus upon environmental issues and concerns. It is intended as a support document and checklist in addition to the REA checklist.

Ideally, this checklist is to be completed with the assistance of an Environment Specialist and feedback from the community is to be recorded and returned for inclusion in EIA / IEE.

A. Access, Timing & Involvement of WUA's, and broader community

	Checklist Item	Check
1	Schedule meetings with WUA's & community (community) to outline intended survey. Photographs of constructed items, spatial plans etc should be available.	✓
2	Identify & share vehicular access needs to each site where works are planned.	✓
3	Identify planned construction area, auxiliary area for storage of building materials etc. During construction.	✓
4	Identify optimum timing and opportunities for preparation and transplanting of any existing vegetation using machinery.	✓

Outputs; Community understands sketch spatial plan for each site and agreed areas of activities. Bullet-point summary of feedback.

B. Vegetation Removal and Replacement

	Checklist Item	Check
5	Identify and quantify number all vegetation to be removed (including shrubs, trees and sections of pasture grazing areas	✓
6	As a baseline, in collaboration with community, develop an inventory of existing plant material on common and farmer land including fruit trees, hedge trees/shrubs, trees for firewood, fodder and other purposes.	✓
7	Broadly categories existing vegetation with a view to re-vegetation.	✓
8	In collaboration with community identify on paper where replacement vegetation will be planted.	✓
9	Specifically discuss with community the establishment and maintenance period for all the replacements. All re-vegetation issues should be in the SRP.	✓

Outputs; Community has ownership of the existing vegetation, replacement species, plan from community regarding establishment and maintenance. Bullet-point summary of feedback.

C. Construction – possible impact upon soil, existing channels and surrounding farmer fields

	Checklist Item	Check
10	Spatial plan of agreed planned construction site, auxiliary storage and access area for contractor.	✓
11	Identification of all farmer fields where contractors must agree are no-go areas.	✓
12	Identify areas for storage of any construction spoil and top soil	✓
13	Plan for all removal of solid waste from the site as added detail for the EMP.	✓
14	Any other additional issues raised by the community.	✓

Outputs: Specific plans where Contractor can protect, operate and store materials. Bullet-point summary of feedback.

NB: On the next page is a Recording sheet – notes of discussion with community. This page is only a summary. If you need more space to record, use additional pages.

MEETING RECORDING SHEET

Name of Village: NCB-04 (Head, Mid & Tail)

Date: 2020

A. Access, Timing & Involvement of WUA's, and broader community

#	Important issues raised.
1	<p>Consultation conducted in the project area by participation of Water User Association, CDCs and Affected people regarding the project and likely impact of the project on Environment and people.</p> <p>Community people expressed their concerns about the project, and pledged that they will cooperate during the project implementation. Based on their saying it is a vital project that will have positive impact on their income.</p> <p>People want the project to start as early as possible and they will extend their support for the timely completion of the project;</p>
2	<p>NCB-05 irrigation scheme are located in an agriculture area that are mostly covered by vegetation, so it is difficult to start the work in the current season. Because there are no access road to be used for the vehicles, but community people will give access road after finishing the cultivation season and collect their crops.</p>
3	<p>Only private land can be used, there is no public land. The people were emphasizing on rehabilitation of existent canal, and the canal alignment should not be changed.</p>
4	<p>As most of the trees are small trees (sapling) and non-fruit local trees, and they are only used for fuel wood, and community people think that no need for transplanting, but as it explained that trees are very important for the protection of environment and it should have protected and transplanted affected people will provide land for that trees and also there is road for machine. The best season for transplanting and replantation is spring. Also people requested that if possible to use these machineries for transplanting of other private trees.</p>

Output; ensure community understands sketch spatial plan for each site and agreed areas of activities. Bullet-point summary of feedback.

Summary: Consultation conducted in the project area by participation of Water User Association, CDCs and Affected people regarding the project and likely impact of the project on Environment and people. During the consultation community people expressed their concerns about the project, and pledged that they will cooperate during the project implementation.

NCB-05 irrigation scheme is located in an agriculture area that is mostly covered by vegetation, so it is difficult to start the work in the current season. Because there is no access road to be used for the vehicles, but community people will give access road after finishing the cultivation season and collect their crops.

Most of the trees are small trees (sapling) and non-fruit local trees, and they are only used for fuel wood, and community people think that no need for transplanting, also these species can grow if they plant a branch of the trees.

For transplantation affected people will provide land in their private land and the best season for transplanting and replantation is spring. People will cooperate if there is any problem during the project implementation

B. Vegetation Removal and Replacement

#	Important issues raised.
5	The number of trees identified during the survey, and as mentioned most of the trees are small trees and non-fruit. In the project area there is no pasture, actually it is an agricultural area and all the lands are used for agriculture.
6	All of the trees are non-fruit trees such as willow and populus alba that are used for fuel wood. These trees are mostly planted in the bank of canal for bank protection.
7	NCB-05 Subproject area is about 85% covered by vegetation that is included trees and agriculture area.
8	Community people will provide land in their private land for replantation, besides that after rehabilitation of the canal and huge number of trees will be replanted in the ROW of the canal and also adjacent to the existing road. Also based on the agreement of people there is some public places that also we can replant the trees.
9	The number of trees which will be replanted in the private land, the land owner will take the responsibility of maintenance, and also the number of trees which will be planted in the public places, CDCs and Forest association will take the responsibility of maintenance in cooperation of villagers.

Output; *Ensure community has ownership of the existing vegetation, replacement species, plan from community regarding establishment and maintenance. Bullet-point summary of feedback.*

C. Construction – possible impact upon soil, existing channels and surrounding farmer fields

#	Important issues raised.
10	Contractor can have access to all project area, but before the starting of any work agreement of PIO engineer and CDCs are very important. So there is no any problem for the contractor.
11	As the project is in agricultural area and there is farm adjacent to the irrigation scheme, so outmost care should be taken to avoid impacts on agriculture. Also before starting of the work contractor should inform the affected people and get their agreement.
12	Top soil will be used by farmers, and also all construction spoil will be used by farmer no-need for storage, but if in some part of the canal there is no need to be used by farmer it will be carried out to some public site.
13	All solid waste should be removed from the construction site to some places that doesn't have any negative impact on the environment. Or to the area that are identified by the municipality.
14	In general people are very happy for the starting of the project, and they will cooperate in resolving of any problem during the project implementation. Also community people suggested that labors should be local. Also they were emphasized that the construction work should not disturb their irrigation system, and in this regard their agreement is very important prior to start of work. People suggested that some water access point should be built in the on canal as people used this water for drinking too, also for animal.

Outputs: *Ensure community understand that there will be specific plans where Contractor can protect, operate and store materials. Bullet-point summary of feedback.*

Summary:

Contractor can have access to all project area, but as the project is in agricultural area and there is farm adjacent to the irrigation scheme, so outmost care should be taken to avoid impacts on agriculture. Top soil will be used by farmers, and also all construction spoil will be used by farmer no-

need for storage, but if in some part of the canal there is no need to be used by farmer it will be carried out to some public site.

Solid waste should be removed from the construction site to some places that doesn't have any negative impact on the environment or to the area that are identified by the municipality. As the cropping season already started, affected people were emphasized that the construction work should not disturb their irrigation system, and in this regard their agreement is very important prior to start of work.

Participant Sign in Sheets

Yatem Tapa main canal NCB 004						
S/No	Name	Location	Occupation	District	Project	Date of visit
1	Haji Nabi	Old YanguQala City	Mirab	Yangi Qala	P-ARBSP	25/11/2018
2	Jetawal No 1	Haji Dastagir	Farmer	Yangi Qala	P-ARBSP	25/11/2018
3	Damshsk	Dr. Zalmaya	Farmer	Yangi Qala	P-ARBSP	25/11/2018
4	Jarqolaq	Sofi Ahamad	Farmer	Yangi Qala	P-ARBSP	25/11/2018
5	Kafter Ali	Ahamad Khan	Farmer	Yangi Qala	P-ARBSP	25/11/2018
6	Qazi Jan mohmmad	Mola Samad	Farmer	Yangi Qala	P-ARBSP	25/11/2018
7	Alaman Shakh	Haji Juma Khan	Farmer	Yangi Qala	P-ARBSP	25/11/2018
8	Jetawal No 2	Abdul Raoof	Farmer	Yangi Qala	P-ARBSP	25/11/2018
9	Adam Khan	Safar Mohammad	Farmer	Yangi Qala	P-ARBSP	25/11/2018
10	Arbab Qodos	Arbab Qara	Farmer	Yangi Qala	P-ARBSP	25/11/2018
11	Safiha	Haji Qader	Farmer	Yangi Qala	P-ARBSP	26/11/2018
12	Haji Zafar	Shams Rahman	Farmer	Yangi Qala	P-ARBSP	26/11/2018
13	Toghay Qishlaq	Qodus	Farmer	Yangi Qala	P-ARBSP	26/11/2018
14	Poze Ishan	Haji Akbar	Farmer	Yangi Qala	P-ARBSP	26/11/2018
15	Silaba	Jumadin	Farmer	Yangi Qala	P-ARBSP	26/11/2018
16	Qazi Abad	Jan Mohammad	Farmer	Yangi Qala	P-ARBSP	26/11/2018
17	Nawabad 1	M. Akbar Bay	Farmer	Yangi Qala	P-ARBSP	26/11/2018
18	Nawabad 2	Abdul Wahid	Farmer	Yangi Qala	P-ARBSP	26/11/2018
19	Nawabad 3	Haji Sidiq	Farmer	Yangi Qala	P-ARBSP	26/11/2018
20	Usta Saifullah	Mohammad Allah	Farmer	Yangi Qala	P-ARBSP	26/11/2018
21	Saifuddin	Khan jan	Farmer	Yangi Qala	P-ARBSP	26/11/2018
22	Qodos Bay	Nazar	Farmer	Yangi Qala	P-ARBSP	26/11/2018

Mominabad main canal NCB 004

S/No	Name	Location	Occupation	District	Project	Date of visit
1	Nawroz		Mirab	Khwajabahuddin	P-ARBSP	29/11/2018
2	Haji Akbar	Sadullah	Farmer	Khwajabahuddin	P-ARBSP	29/11/2018
3	Haji Ali	Lala Guzar	Farmer	Khwajabahuddin	P-ARBSP	29/11/2018
4	Suldan	Naw Abad	Farmer	Khwajabahuddin	P-ARBSP	29/11/2018
5	Ghulam Azrat	Janga Taghan	Farmer	Khwajabahuddin	P-ARBSP	29/11/2018
6	Sofi Karim	Lala Guzar 1	Farmer	Khwajabahuddin	P-ARBSP	29/11/2018
7	Arbab Nawroz	Haji Saifuddin	Farmer	Khwajabahuddin	P-ARBSP	29/11/2018
8	Sofi Anan	Kohnah Shakh	Farmer	Khwajabahuddin	P-ARBSP	29/11/2018
9	Mola Nader	Jamaluddin	Farmer	Khwajabahuddin	P-ARBSP	29/11/2018
10	Haji Nabi	Haji Lalay	Farmer	Khwajabahuddin	P-ARBSP	29/11/2018
11	Manaf	Haji Manaf	Farmer	Khwajabahuddin	P-ARBSP	29/11/2018
12	Haji Ghani	Qarloq	Farmer	Khwajabahuddin	P-ARBSP	29/11/2018

Qatiqjar main canal NCB 004

S/No	Name	Location	Occupation	District	Project	Date of visit
1	Molawi Majid		Mirab	Khawajabahuddin	P-ARBSP	30/11/2018
2	Haji Mohammad	Mogholha	Farmer	Khawajabahuddin	P-ARBSP	30/11/2018
3	Q. Ali	Sojani 1	Farmer	Khawajabahuddin	P-ARBSP	30/11/2018
4	Arbab Dastagir	Sojani 2	Farmer	Khawajabahuddin	P-ARBSP	30/11/2018
5	M. hakim	Shir Ali	Farmer	Khawajabahuddin	P-ARBSP	30/11/2018
6	Sayedullah	Abdul Rauf	Farmer	Khawajabahuddin	P-ARBSP	30/11/2018
7	Maqsom	Mula Haji Moqadam	Farmer	Khawajabahuddin	P-ARBSP	30/11/2018
8	Abdul Maroof	Imam Murad	Farmer	Khawajabahuddin	P-ARBSP	30/11/2018
9	Majed	Molawi Majed	Farmer	Khawajabahuddin	P-ARBSP	30/11/2018
10	Haji Rahman	Mulla Mahmud	Farmer	Khawajabahuddin	P-ARBSP	30/11/2018
11	Haji M.Ali	Haji Khaja Mohammad	Farmer	Khawajabahuddin	P-ARBSP	30/11/2018
12	Juma Khan	Bulbul	Farmer	Khawajabahuddin	P-ARBSP	30/11/2018

ANNEX 5: - IEE EXAMPLE; ENVIRONMENTAL MONITORING REPORT (EMR)

Project Number: {XXXXX}
{Reporting period: Month Year}

{Full Country Name}: {Project Title}
{(Financed by the <source of funding>)}

Prepared by {author(s)}
{Firm name}
{City, country}

For {Executing agency}
{Implementing agency}

Endorsed by: (staff name of IA/PIU) and signature, submission date

- I. Introduction
 - a. Preamble
 1. This report represents the Semi - Annual Environmental Monitoring Review (SAEMR) for INSERT PROJECT NAME.
 2. This report is the (insert number of report, i.e. 1st, 2nd etc.) EMR for the project.
 - b. Headline Information
 3. Include a brief summary of significant outcomes of the project construction process and any specific areas of concern of which ADB should be informed.
- II. Project Description and Current Activities
 - c. Project Description
 4. Provide a brief description of the project. – This should not vary from one report to the next.
 - d. Project Contracts and Management
 5. Provide a list or table of main organizations involved in the project and relating to Environmental Safeguards. This should include lender, borrower, PIU, Main Contractor/s and significant sub-contractors, environmental staff of various organizations should be named, and contact details provided.
 6. Provide a description of how the contracts are being managed and names of key personnel.
 - e. Project Activities During Current Reporting Period
 7. Provide an outline of major activities which have been carried out during the current reporting period. Provide adequate information so the reader can understand what has been taking place on site. Include photographs (with date stamp) of activities where possible and relevant. Place bulk photographs into an annex to the main report or a separate photographic record.
 8. Where multiple work sites are involved provide information on which work sites have been active during the current reporting period. Provide map of work site areas if relevant.
 9. Provide details (chart) of worker numbers (maximum, Minimum) in the current reporting period and anticipated changes in staff in following period.
 10. Highlight any significant new activities commenced during the current reporting period.
 11. For the above make maximum use of charts, images and tables.

- f. Description of Any Changes to Project Design
 12. Describe any changes to the project design from that which was assessed in the Impact Assessment phase of the project and is set out in the Initial Environmental Examination/Environmental Impact Assessment. If none have taken place, please state – No changes.
 13. Note if significant changes have occurred the PIU should have already informed ADB of this and made a decision on the need for updates to the EIA/IEE and/or Environmental Management Plans
- g. Description of Any Changes to Agreed Construction methods
 14. Provide a description and reason for changes to any construction processes, for example, blasting of rock rather than excavation, open channel rather than thrust boring at road crossings.

III. Environmental Safeguard activities

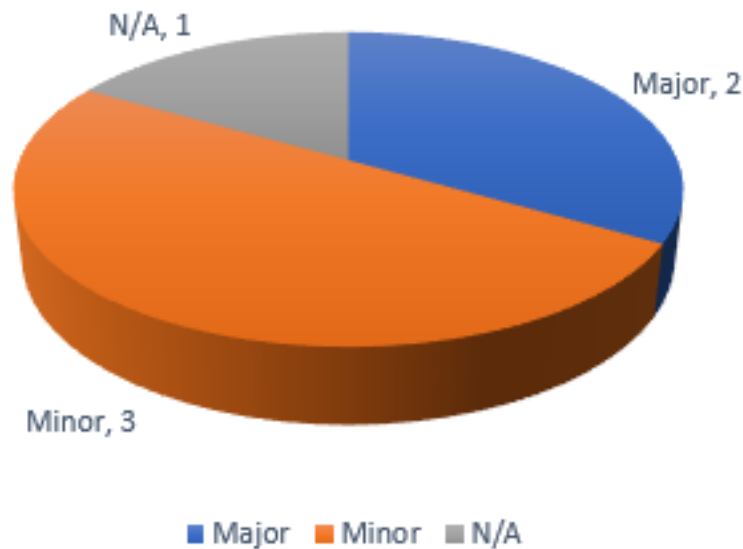
- h. General Description of Environmental Safeguard Activities
 15. Please provide a summary of the routine activities undertaken by environmental safeguard staff during the current reporting period. This should include the work undertaken by the contractor's environmental manager, the Environmental Supervisor and any informal visits by the PIU environmental staff.
- i. Site Audits
 16. Please provide details (table form preferred) of any formal audits undertaken by environmental safeguard process staff during the current reporting period. This would include Contractors Environmental Manager, Environmental Supervisor, PIU Staff and ADB staff during review missions.
 17. Information required includes:
 - Date of Visit
 - Auditors Name
 - Purpose of Audit
 - Summary of any Significant Findings
 - Cross reference to Audit Report which should be included as an annex.
 18. Summarize Findings of Audits under taken in the current period, compare with previous periods and identify any trends or common issues.
- j. Issues Tracking (Based on Non-Conformance Notices)
 19. Provide an overview and description of issues tracked during the current period.
 20. Provide commentary on key statistics based on graphs and tables which can be copied from the Environmental Safeguards Issues Tracing Workbook. For example -

Table 3-1: Summary of Issues Tracking Activity for Current Period

Summary Table	
Total Number of Issues for Project	6
Number of Open Issues	1
Number of Closed Issues	5
Percentage Closed	17%
Issues Opened This Reporting Period	5
Issues Closed This Reporting Period	4

Figure 0-1 - Summary of Issues by Non-Conformance

Non-conformance Level



21. Use data from workbook as required.

k. Trends

22. Use information from previous period reports and the current period information to identify trends in issues. For example -

Quarterly Report No	Total No of Issues	% issues Closed	% issues closed late
1	5	87	0
2	18	56	15
3	59	23	26

23. Provide a commentary on the trends, explain why they may be occurring and in the case of negative trends explain what steps have been taken to make corrections.

24. Provide a copy of all NCN's for all major Non-Conformances in an annex. If none state this.

l. Unanticipated Environmental Impacts or Risks

25. Document any unanticipated environmental impacts and risks which have been identified in the current period (as a reminder, these are impacts or risks which were not identified in the Impact Assessment process). State what actions were taken to mitigate the impacts and risks, were these successful.

IV. Results of Environmental Monitoring

m. Overview of Monitoring Conducted during Current Period

26. Provide a commentary on what environmental measurements have been undertaken during the current reporting period. Highlight any areas where agreed monitoring has not taken place.

27. Include sub sections for the report on those environmental media which have been measured, for example

- Noise
- Air Quality
- Water Quality

28. The sections should present highlights of the outcomes of the monitoring focusing on a comparison of the results with the agreed standards as set out in the Specific Environmental Management Plan and/or Monitoring Plan.
 29. In particular make clear where exceedances in the standards have occurred and provide reasons and actions which have been implemented to correct – refer to relevant NCN as appropriate.
 30. Detailed monitoring results should be presented as an annex.
- n. Trends
31. Based on the current and past periods of monitoring identify and discuss any trends which may be developing.
- o. Summary of Monitoring Outcomes
32. Provide any recommendations on the need for additional monitoring, or requests for ceasing/altering monitoring if activities have been completed or monitoring is showing no significant effects over long period.
- p. Material Resources Utilization

Current Period

33. Provide any recommendations on the need for additional monitoring, or requests for ceasing/altering monitoring if activities have been completed or monitoring is showing no significant effects over long period.

Cumulative Resource Utilization

34. Provide values (tables, graphs etc.) for cumulative resource utilization of power water etc., for whole project life. Identify trends or significant changes and provide reasons for any such changes.
- q. Waste Management
35. Provide summary of waste management activities during the current period. Provide waste contractors/s names and location of waste sites.

Current Period

36. Provide any recommendations on the need for additional monitoring, or requests for ceasing/altering monitoring if activities have been completed or monitoring is showing no significant effects over long period.
 - Type of Waste (description and classification – e.g. hazardous – non-hazardous;
 - Waste Source – what activity generated the waste and where;
 - Quantity of waste generated;
 - Treatment/disposal route – provide information on quantities of waste reused, recycled and sent to landfill or incineration; and
 - Final disposal sites for waste.

37. Provide commentary on results.

(xv) *Cumulative Resource Utilization*

38. Using the above bullet points for waste develop cumulative waste generation results.
39. Discuss trends and provide suggestions for waste reduction, increase in reuse and recycling if possible.

- r. Health and Safety

(xvi) *Community Health and Safety*

40. Provide information on any incidents which have occurred during the reporting period which resulted in or could have resulted in Community Health and Safety issues. Include within this section traffic accidents.

(xvii) Worker Safety and Health

- 41. Provide detailed statistics on accident rates, including Lost Time Incidents, Accidents and near misses.
- 42. Provide information on safety campaigns conducted during the reporting period.

s. Training

- 43. Provide information on all environmental safeguard related training activities undertaken in this period and cumulatively for project life to date. These may include specific training of environmental staff, HSE inductions of site workers etc.
- 44. Discuss the need for additional training and what training is planned for coming quarter.

V. Functioning of the SEMP

t. SEMP Review

- 45. Provide a commentary on the SEMP in terms of the ability of the contractor to implement fully the requirements set out. Highlight any areas where the contractor has not been able to implement mitigation or monitoring measures.
- 46. Is the SEMP effective, are mitigation measures set out still appropriate and are they working as intended – do they need changing?
- 47. Are there better alternative mitigation measures?
- 48. Can some mitigation measures be reduced or removed as the specific risk identified in the IEE/EIA and/or SEMP has not materialized?
- 49. Provide a table of requests for changes to the current mitigation measures for consideration by ADB. Note you can send these at any time during the project, there is no need to wait until the quarterly reporting period to be completed. If PIU has supplied requests to ADB, these should be listed along with ADB response. Where changes (additions/deletions and modifications) of mitigation or monitoring measures have been approved, the PIU shall ensure that the SEMP is updated to reflect these changes.

VI. Good Practice and Opportunity for Improvement

u. Good Practice

- 50. Provide an overview with charts, images etc. of examples of continuing good practice for the project. State why these have been implemented and how they are reducing environmental impacts or risks.

v. Opportunities for Improvement

- 51. Identify any areas which may be outside of the formal NCN process, but which changes to construction techniques, mitigation etc would result in an improvement in environmental, health and safety performance of the project.

VII. Summary and Recommendations

w. Summary

- 52. Provide a summary of the effective implementation of Environmental Safeguards during the reporting period and for the overall project construction period to date.

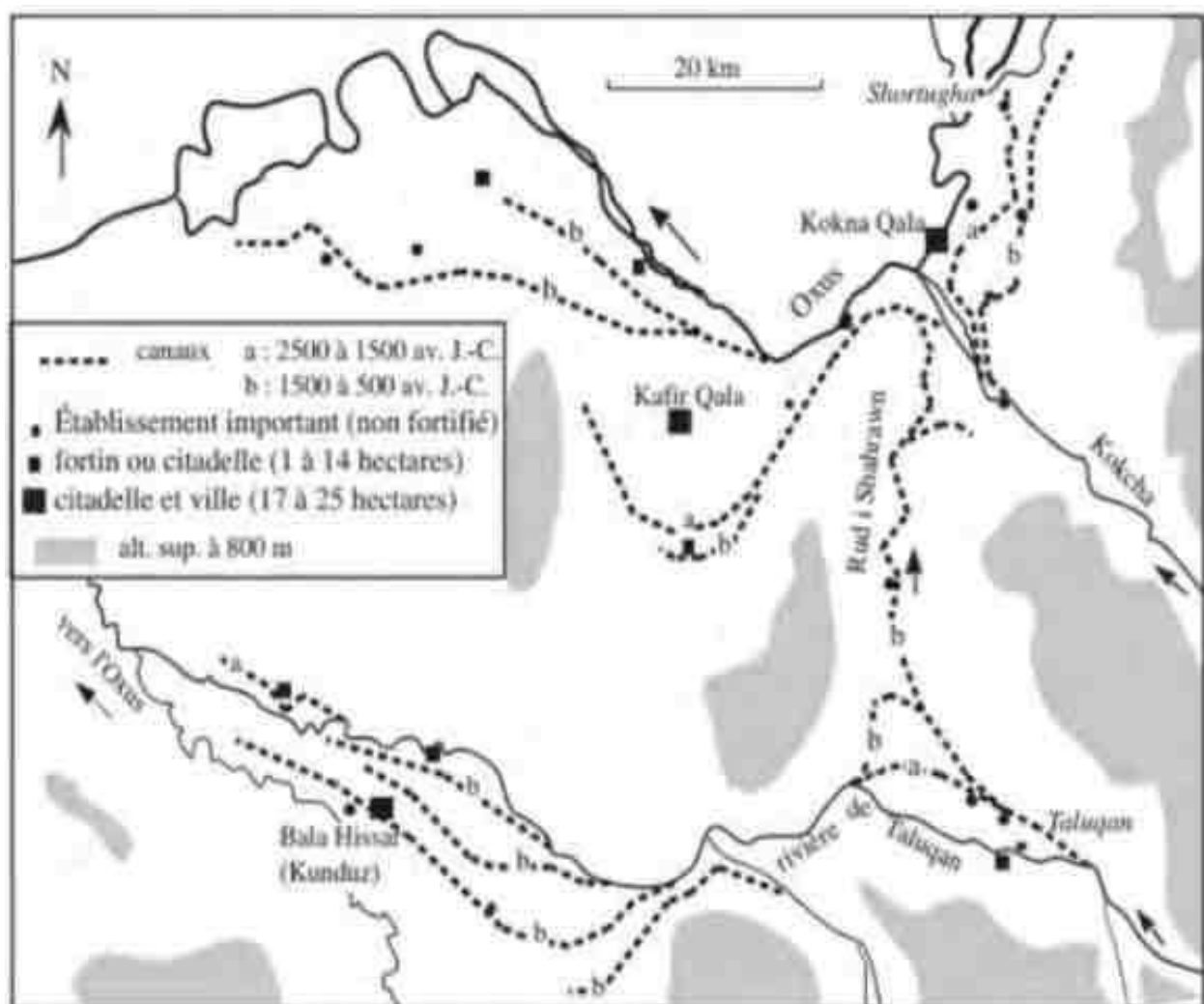
x. Recommendations

- 53. Provide any recommendations for consideration by the ADB for changes to the Environmental Safeguarding process for the project.

ANNEX 6: - ARCHAEOLOGICAL DATING OF IRRIGATION CANALS

Regional History - The history of the region before the coming of Islam (600-800s CE) is demarcated by the Persian Achaemenids (6th-4th century BCE), Alexander and the Greeks (4th century BCE), Asoka and Buddhism (3rd century BCE), Kanishka and the Kushans (1st century CE), the Persian Sasanians (100-600s CE), and the Iranian Huns (300-800s CE). Islamic civilization initially flourished under the Ghaznavids (900-1100s) and the Ghurids (1100-1200s) but this era ended in catastrophe with the Mongol invasion (1200s). The opening of the new maritime trade route between Europe and the East Indies in the 1500s sent Afghanistan and all other areas along the traditional overland silk route into economic and cultural decline. During the latter half of the 1700s, Ahmad Shah Durrani liberated the area between the Hindu Kush and the Amu Darya from Persian and Indian influence, thereby creating modern Afghanistan.

Figure 20: Archaeological Dating of Irrigation Canals, Panj-Amu Basin



Source: Figure 2.20. Viollet, Pierre-Louis. 2004. *L'hydraulique dans les civilisations anciennes - 5000 ans d'histoire*. Paris: Presse des Ponts. http://graduateschool.paristech.fr/Films/001_130.pdf

- (xviii) Modern water management was introduced to northern Afghanistan in the mid-
20
- (xix) century. Under the monarchy (1919-1973), irrigation management was significantly improved, individuals were allocated water rights, the Law on Irrigation

(Qanun-i-Abyari) was published, and provincial Departments of Irrigation (Riyasat-i-Abyari) were established.

(xx) During the two decades of war from 1979 to 2001, irrigation systems fell into disrepair, and traditional community-based water management declined. Since then the government, with support of the donor community, has begun to rehabilitate and upgrade irrigation systems, and to restore community-based water management.

ANNEX 7: - THREE PARB OUTPUTS

Output 1 – Water allocation and availability improved

(xxi)

(xxii)

This output provides the capacity and resources for MEW, and associated River Basin Agency (RBA) and Sub-Basin Agencies (SBAs) in the Panj-Amu river basin to:

- (i) **Sub-component 1: Water conveyance infrastructure rehabilitated and upgraded (R&U):** Improve water conveyance and allocation to irrigated farm systems through rehabilitation and upgrading of water conveyance infrastructure (head works and main canals) for which MEW is responsible (see para. 33) in 21 priority schemes. Climate proofing and environmental enhancements, specifically, water access points on canals, will also be provided in these schemes. R&U of these schemes aims to improve the availability of water, particularly in tail-end areas; increase irrigated area; increase yields; increase cropping intensity; and create an enabling environment for capacity building and reduced water conflict. Gated headworks will allow exclusion of river flood flows and reduce flood damage to command areas.
- (xii) **Sub-component 2: WUAs established and strengthened:** Establish and strengthen capacity of 112 WUAs in respect of (i) WUA operation and maintenance (O&M) of conveyance infrastructure in their schemes (and others previously supported under the EU programme) to improve sustainability and increase equitability of within-scheme head-tail water distribution; and (iii) WUA cooperation with the RBA, SBAs, and same sub-basin WUAs to facilitate water sharing among schemes in a sub-basin.
- (xiii) **Sub-component 3: Water resources planning and management strengthened:** Improve capacity of MEW, RBA, and SBAs to (i) plan, operate, and maintain their respective water resources infrastructure investment portfolios and (ii) address water sharing among schemes in a sub-basin, for increased total benefits and reduced sub-basin water conflicts.

Output 2 – On-farm water management enhanced

(xxiii)

(xxiv)

This output provides resources and enhanced capacity to MAIL, and to Panj-Amu river basin DAILs to:

- (ii) **Sub-component 1: On-farm Irrigation infrastructure rehabilitated and upgraded:** improve irrigation infrastructure at secondary and tertiary canal levels so as to have an integrated approach (including environmental enhancements to schemes i.e. water access points on canals).
- (xiv) **Sub-component 2: IAs established and strengthened:** establish and strengthen the capacity of at least 105 IAs to operate and manage irrigation infrastructure in these schemes thus improving sustainability, as well as ensuring more equitable distribution of water, increasing yields and cropping intensity, particularly in lower canal reaches, and thus reducing conflict over water use.
- (xv) **Sub-component 3: Efficiency of agricultural water use enhanced:** improve water use efficiency at the farm level by improved on-farm water management and agronomic techniques and improving farmer knowledge from demonstration plots.

Output 3 – Watersheds properly managed and protected.

(xxv)

(xxvi)

This output provides resources and enhanced capacity to MAIL, and Panj-Amu river basin DAILs to improve community-based watershed management, resulting in the restoration and protection of forestry and rangeland on 10,500 ha, through:

- (iii) preparation of a community-based natural resources management technical manual and guidebook;
- (xvi) training of DAIL staff as master trainers to train communities;
- (xvii) identification and selection of approximately 21 watershed and rangeland sites for restoration and protection;
- (xviii) creation of community forestry and rangeland associations for each selected site;
- (xix) preparation and implementation of natural resource management plans for each selected site.

Annex 8: Chance Find Procedure

Purpose of the chance find procedure

The chance find procedure is a project-specific procedure that outlines actions required if previously unknown heritage resources, particularly archaeological resources, are encountered during project construction or operation. A Chance Find Procedure, as described in IFC Performance Standard 8 and EBRD Performance Requirement 8 and law on Cultural Heritage of Georgia, is a process that prevents chance finds from being disturbed until an assessment by a competent specialist is made and actions consistent with the requirements are implemented.

Scope of the chance find procedure

This procedure is applicable to all activities conducted by the personnel, including contractors, that have the potential to uncover a heritage item/site. The procedure details the actions to be taken when a previously unidentified and potential heritage item/site is found during construction activities. Procedure outlines the roles and responsibilities and the response times required from both project staff, and any relevant heritage authority.

Induction/Training

All personnel, especially those working on earth movements and excavations, are to be inducted on the identification of potential heritage items/sites and the relevant actions for them with regards to this procedure during the Project induction and regular toolbox talks.

Chance find procedure

If any person discovers a physical cultural resource, such as (but not limited to) archaeological sites, historical sites, remains and objects, or a cemetery and/or individual graves during excavation or construction, the following steps shall be taken:

1. Stop all works in the vicinity of the find, until a solution is found for the preservation of these artefacts, or advice from the relevant authorities is obtained;
2. Immediately notify a foreman. The foreman will then notify the Construction Manager and the Environment Officer (EO)/Environmental Manager (EM);
3. Record details in Incident Report and take photos of the find;
4. Delineate the discovered site or area; secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities take over;
5. Preliminary evaluation of the findings by archaeologists. The archaeologist must make a rapid assessment of the site or find to determine its importance. Based on this assessment the appropriate strategy can be implemented. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage such as aesthetic, historic, scientific or research, social and economic values of the find;
6. Sites of minor significance (such as isolated or unclear features, and isolated finds) should be recorded immediately by the archaeologist, thus causing a minimum disruption to the work schedule of the Contractor. The results of all archaeological work must be reported to the Ministry/institute of Archaeology, once completed.
7. In case of significant find the Agency/Ministry (Agency for Protection of National Heritage or Archaeological Research Centre, hereinafter referred to as Heritage team) should be informed immediately and in writing within 7 days from the find (ref. law on heritage protection).
8. The onsite archaeologist provides the Heritage team with photos, other information as relevant for identification and assessment of the significance of heritage items.

9. The Ministry must investigate the fact within 2 weeks from the date of notification and provide response in writing.
10. Decisions on how to handle the finding shall be taken by the responsible authorities. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage;
11. Construction works could resume only after permission is granted from the responsible authorities.
12. In case no response received within the 2 weeks period mentioned above, this is considered as authorisation to proceed with suspended construction works.

One of the main requirements of the procedure is record keeping. All finds must be registered. Photolog, copies of communication with decision making authorities, conclusions and recommendations/guidance, implementation reports ± kept.

Additional information

Management options for archaeological site x **Site avoidance.** If the boundaries of the site have been delineated attempt must be made to redesign the proposed development to avoid the site. (The fastest and most cost-effective management option)

x **Mitigation.** If it is not feasible to avoid the site through redesign, it will be necessary to sample it using data collection program prior to its loss. This could include surface collection and/or excavation. (The most expensive and time-consuming management option.)

x **Site Protection.** It may be possible to protect the site through the installation of barriers during the time of the development and/or possibly for a longer term. This could include the erection of high visibility fencing around the site or covering the site area with a geotextile and then capping it with fill. The exact prescription would be site- specific.

Management of replicable and non-replicable heritage

Different approaches for the finds apply to replicable and non-replicable heritage.

Replicable heritage

Where tangible cultural heritage that is replicable¹⁸ and not critical is encountered, mitigation measures will be applied.

The mitigation hierarchy is as follows:

- x Avoidance;
- x Minimization of adverse impacts and implementation of restoration measures, in situ;
- x Restoration of the functionality of the cultural heritage, in a different location;
- x Permanent removal of historical and archaeological artefacts and structures ;
- x Compensation of loss - where minimization of adverse impacts and restoration not feasible.

Non-replicable heritage

Most cultural heritage is best protected by in situ preservation, since removal is likely to result in irreparable damage or even destruction of the cultural heritage.

¹⁸ Replicable cultural heritage is defined as tangible forms of cultural heritage that can themselves be moved to another location or that can be replaced by a similar structure or natural features to which the cultural values can be transferred by appropriate measures. Archaeological or historical sites may be considered replicable where the particular eras and cultural values they represent are well represented by other sites and/or structures.

Nonreplicable cultural heritage¹⁹ must not be removed unless all of the following conditions are met:
x There are no technically or financially feasible alternatives to removal; x The overall benefits of the project conclusively outweigh the anticipated cultural heritage loss from removal; and

Any removal of cultural heritage must be conducted using the best available technique advised by relevant authority and supervised by archaeologist.

Human Remains Management Options

The handling of human remains believed to be archaeological in nature requires communication according to the same procedure described above.

There are two possible courses of action:

- x **Avoid.** The development project is redesigned to completely avoid the found remains. An assessment should be made as to whether the remains may be affected by residual or accumulative impacts associated with the development, and properly addressed by a comprehensive management plan.
- x **Exhume.** Exhumation of the remains in a manner considered appropriate by decision makers. This will involve the predetermination of a site suitable for the reburial of the remains. Certain ceremonies or procedures may need to be followed before development activities can recommence in the area of the discovery.

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¹⁹ Nonreplicable cultural heritage may relate to the social, economic, cultural, environmental, and climatic conditions of past peoples, their evolving ecologies, adaptive strategies, and early forms of environmental management, where the (i) cultural heritage is unique or relatively unique for the period it represents, or (ii) cultural heritage is unique or relatively unique in linking several periods in the same site. Examples of non-replicable cultural heritage may include an ancient city or temple, or a site unique in the period that it represents.