PROJECT PREPARATORY TECHNICAL ASSISTANCE

A. Justification

1. The project preparatory technical assistance (PPTA) will assist the government to conduct feasibility study, due diligence, and safeguard assessment for the proposed project, particularly to ensure that ADB's Safeguard Policy Statement (2009) should be strictly implemented in the Republic of Karakalpakstan. Moreover, to ensure long-term financial and environmental sustainability, initial cost recovery actions and economic development activities must be identified.

2. The Western Uzbekistan Water Supply System Development Project will significantly boost the coverage and particularly the quality of water supply services in district centers and in urban and rural settlements thus benefiting a population of no less than 452,000 at project completion, within six districts of the Republic of Karakalpakstan by providing continuous and safe water supply, thereby setting favorable conditions for enhancement of local small to large scale economies, including tourism which is steadily developing in the southern area of the Aral basin.

B. Major Outputs and Activities

3. The major outputs and activities are summarized in Table A3.1.

Table A3.1: Summary of Major Outputs and Activities

	Deliverable/Milestone	Expected Completion Date
1	Inception Report	February 2017
2	Environmental Baseline Survey	April 2017
3	Socio-Economic Survey and Draft PSA Report	April 2017
4	Alternative and cost comparison analysis	April 2017
5	Alternative selection – Review cost estimates	April 2017
6	Resettlement Survey, Draft LARP and Safeguard Documents	April 2017
7	LARP and Safeguard Documents – Final	May 2017
8	Draft IEE	May 2017
9	Draft SPRSS	May 2017
10	Interim Report	May 2017
11	SPRSS (Final), GAP, PSA	May 2017
12	Financial Management and Capacity Assessment	May 2017
13	Draft Capacity Building, Institutional Development Program	May 2017
14	Preliminary Financial and Economic Analysis	May 2017
15	Final Financial and Economic Analysis	May 2017
16	Project Procurement Risk Assessment	May 2017
17	Draft Final Report	June 2017
18	IEE Final	July 2017
19	ADB Fact-Finding Mission	August 2017
20	Final Report	August 2017

GAP = gender action plan, IEE= initial environmental examination, LARP = land acquisition and resettlement plan, PSA = poverty and social analysis, SPRSS = summary poverty reduction and social strategy.

C. Cost Estimate and Proposed Financing Arrangement

4. The PPTA is estimated to cost $750,000 equivalent, which will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-V). The government will provide counterpart support in the form of counterpart staff reports and data, and other in-kind

contributions. TA proceeds shall be disbursed in accordance with ADB TA Disbursement Handbook (May 2010, as amended from time to time). The detailed cost estimate is presented in Table A3.2.

Table A3.2: Cost Estimates and Financing Plan
($'000)

Item				Total Cost
Asian Development Bank[a]				
1.	Consultants			
	a.	Remuneration and per diem		
		i.	International consultants (16 person-months)	355,000
		ii.	National consultants (18 person-months)	70,000
	b.	International and local travel		70,000
	c.	Reports and communications		15,000
2.	Office Equipment (computer, printer, copier, etc.)[b]			15,000
3.	Miscellaneous administration and office rental			25,000
4.	Surveys			150,000
5.	Workshops, trainings, and seminars[c]			40,000
6.	Contingencies			10,000
	Total[d]			**750,000**

[a] Financed by the Asian Development Bank's Technical Assistance Special Fund (TASF V).
[b] Assets would be turned over to the EA/IA upon completion of the PPTA.
[c] Details to be discussed with government and finalized during PPTA implementation.
[d] The government will provide counterpart support in the form of counterpart staff, reports and data, and other in-kind contributions. The value of government contribution is estimated to account for 10% of the total TA cost. Additional TASF financing of $150,000 will be sought in 2017.
Source: ADB staff estimates.

D. Consulting Services

5. The PPTA team will consist of 10 international and 8 national consultants. Due to the complexity of the project and the tight processing timeline, these consultants will be recruited on an individual basis. The total input will be 16 international person-months and 18 national person-months. ADB will recruit individual consultants in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time).

Table A3.3: Summary of Consulting Services Requirement

No.	Expertise	Inputs (PM)
International		
1	Team Leader and Water Supply Engineer	4.0
2	Water Treatment Specialist	1.0
3	Institutional Specialist 1	1.5
4	Institutional Specialist 2	1.5
5	Project Financial Specialist	2.0
6	Project Economy Specialist	1.0
7	Environment Specialist	1.5
8	Social Safeguard (Resettlement) Specialist	1.5
9	Social Development and Gender Specialist	1.0
10	Climate Change Specialist	1.0
	Subtotal	**16.0**
National		
1	Water Supply and Sanitation Engineer 1	3.5
2	Water Supply and Sanitation Engineer 2	3.5

No.	Expertise	Inputs (PM)
3	Hydraulic Engineer (system simulation expert)	1.0
4	Electro-mechanical Engineer	1.0
5	Hydrogeologist	1.0
6	Project Financial and Economy Specialist	2.0
7	Procurement Specialist	3.0
8	Social Development and Gender Specialist	3.0
	Subtotal	**18.0**

Source: ADB staff estimates.

6. The outline terms of reference for the project preparatory TA consultants are described in paras. 7 to 38.

7. **Team Leader/Water Supply Engineer** (international, 4 person-months). Under the FS, the team leader and will carry out the following tasks:

(i) coordinate, manage, and supervise the overall project activities of the consulting team;
(ii) liaise with UCSA, the Republic of Karakalpakstan *Suvokova* (RKS), and other relevant government agencies, ADB as well as other project stakeholders as opportune; make sure that representatives of both the executing agency (EA) and implementing agency (IA) are constantly kept informed on alternative development options, perspectives and of any other potential difficulty that could arise at any time during the preparation of the FS;
(iii) prepare activity flow charts and revised personal assignment schedules; ensure the quality and timely delivery of the required deliverables, workshops, and other outputs as set in the activity charts;
(iv) ensure that standards and procedures adopted in FS are conform with national norms and international standards as required;
(v) provide support to and advise ADB missions, lead and participate in meetings, carry out field visits, and draft or revise sector-related reports as required;
(vi) review the progress of work of the national team of water supply engineers and surveyors and ensure timely delivery of the results of the surveys, the preparation of layouts and cost estimates;
(vii) provide inputs in formulating and assessing alternative development schemes, carrying out cost-comparison analysis and selecting the alternatives;
(viii) review water demand projections and the hydraulic calculations carried out by the national team engineers and make sure that pipelines, reservoirs and pumping stations are dimensioned in order to satisfy the projected average and maximum day and hour water demand;
(ix) ensure permanent and efficient interactions between the water supply engineering team, the safeguard and environment teams, and the financial and economy teams;
(x) interact with the institutional specialists and participate in the review of the legal, regulatory, and financial framework for the sector, and determine areas for improvement in urban water supply and sanitation;
(xi) work closely with the water treatment and the desalination experts and make sure that technical options for water treatment and desalination are cost-effective and sustainable;
(xii) work closely with the hydrogeologist and review the intermediate results of the hydrogeological surveys; examine alternative solutions for groundwater development and approve final hydrogeological reports;

(xiii) provide suggestions and inputs to institutional experts in order to identify specific needs and to tailor suitable capacity building programs targeting particularly; (a) financial sustainability, (b) tariff setting, (c) system management, and (d) utility management;
(xiv) provide inputs to the institutional and financial experts to tailor a program for strengthening institutional structure and implementation capacity with respect to financial sustainability and tariff setting, governance, utility performance, and private sector participation;
(xv) provide guidance and technical support in preparing a comprehensive FS feasibility study including preliminary conceptual technical engineering layouts of the planned infrastructure in support of the investment program;
(xvi) provide support and guidance to the national Procurement expert for the: assessment of the procurement capacity of both EA and IA, preparation of contract packaging, arrangements for project implementation, project implementation schedule, scope of work for Consultants;
(xvii) lead workshops and/or seminars about the project addressed the EA, IA, ADB and other project stakeholders;
(xviii) coordinate and provide inputs to the preparation of intermediate and final reports on the FS; and
(xix) coordinate water resources studies that demonstrate long term availability of the water resources for domestic water supply and studies on competitive use of water.

8. **Water Treatment Specialist** (international, 1 person-month). Under the FS, the Water Treatment Specialist will work closely with the team leader (TL) and undertake the following tasks:

(i) review the existing water treatment facilities at Takiatash, Tuyamuyun, Mangit, and Kipchak and make an accurate assessment of the present state of functionality of each facility; analyze performance from the point of view of quality but also of energy consumption; examine long term quality analysis of influent and treated water; examine the long term quantitative influent and treated water records;
(ii) review other simplified water treatment facilities such as these based on simple sedimentation like as that in use at Muynak; make accurate assessments and recommend improvements as appropriate, including relevant specifications and cost estimates;
(iii) develop and compare alternative options for the expansion of the treatment capacity of the Takiatash water treatment plant (WTP); establish basic layouts and process diagrams and carry out and relevant CAPEX and OPEX cost estimates;
(iv) establish and review alternative development options for the rehabilitation of the treatment/filtration plant in Mangit (15,000 m3/d) and for a new WTP in Kipchak (30,000 m3/d) and carry out relevant CAPEX and OPEX cost estimates;
(v) elaborate an alternative rapid sand filtration WTP to be possibly constructed in Munyak district, with an indicative capacity of 35,000 m3/d, and relevant cost estimates;
(vi) if applicable propose a plan for refurbishment and rehabilitation of the existing water treatment facilities at Tuyamuyun;
(vii) work closely with the TL and the water supply engineers and provide inputs as required for intermediate and final reports as well as for technical presentations and workshops if required.

9. **Institutional Specialists 1 and 2** (international, 1.5 person-months each). The Institutional Specialists will carry out the following main tasks:

(i) review the recent regulatory framework in the Water Supply sector with particular concern to recent Decrees of Cabinet of Ministers (DCM) in the sector (particularly examine changes/proposals in the Legal agreements and Fiduciary control as per DCM No. 306, to improve structure and management of WSS enterprises, and No. and 334 to improve mechanisms of finance from international donors) and assess the adequacy of the recent reform for the water supply sector;

(ii) carry out dedicated interviews and evaluate the management and operational capability of the UCSA and of the RKS;

(iii) identify weaknesses within the management, administration, planning and maintenance groups and propose measures and means to improve the institutional and capacity in areas identified as insufficient or weak with the purpose to ensure effective and sustainable implementation of the investment program;

(iv) propose mechanisms aimed to foster improved coordination among various organizations and stakeholders involved in the water supply and sanitation sector;

(v) assess the management capacity of the RKS and identify particular needs for improvement taking into account the regional extension of the water supply project, and the planned principle to include: a) full metering, and b) extended automation systems, in order to optimize control of water wastage;

(vi) as a consequence of above identify and propose capacity building programs addressed to both: a) the management, and b) the operational staff of the provincial suvokova taking also into account needs for improving operation and maintenance capacity of the personnel assigned to the districts' *suvokovas* branches;

(vii) work in coordination with the team leader and the FS engineering staff in order to identify specific needs for technical capacity building that will have to be provided to the *suvokovas* personnel in charge of operation and maintenance through on-the-job training during construction or specifically tailored training inland or abroad, in order to secure sustainable operation and management of the assess in the long term;

(viii) prepare headlines of the capacity building programs proposed to be implemented during the construction phase and further, as required, as well as matrix-type summaries and cost estimates of such capacity building programs with relevant schedule of implementation;

(ix) identify the needs for consultants specialists, both national and international, required to be assigned under the detailed design and construction supervision program of the Project in order to ensure the proper implementation of the Capacity Building Program, which will be finalized under the detailed design and further implemented under the construction phase of the project, and prepare a descriptive scope of work for said experts;

(x) propose institutional / structural arrangements to be applied for the construction of the water supply facilities being financed under the ADB Loan; and

(xi) provide inputs to periodic and final reports as well as to workshops, as needed.

10. **Project Financial Specialist** (international, 2 person-months). Under the FS, the International Project Finance Specialist will:

(i) undertake a financial management capacity assessment of the EA and the IA for the project in accordance with ADB's Technical Guidance Note (TGN) for Financial Management Assessment (2015), TGN for project financial reporting (2015), and the TGN for preparation of cost estimates (2014); use FMA questionnaires as a tool and hold meetings and discussions to assist with the FMA; identify risks to financial management, and develop risk mitigation measures and FM action plan; determine financial reporting and auditing arrangement for the Agencies;

(ii) prepare the financial evaluation (estimating Financial Internal Rates of Return) of the proposed investment components according to ADB's Technical Guidance Note for Financial Management Assessment (2015), and the Financial Due Diligence Methodology Note (2005); assess demand and tariff assumptions, check tariff setting mechanism, review cost structure as well as billing and collection system; prepare forecasts of cash flows and revenue and cost projections that will ensure financial viability; carry out sensitivity analysis for the financial evaluation;

(iii) review and analyze the financial performance using the financial statements of the past 3 years of the RKS and ADB project related districts (on pro forma basis); review the business plan and financial performance of RKS and ADB project related districts under DCM 306; prepare and develop financial projections for the company assuming ADB project based on the corporate restructuring reform; evaluate cost recovery and debt repayment capacity, external public and private financing sources, and recommend financial covenants if required;

(iv) review the fiscal arrangement and fiscal capacity of the RKS to sustain the investment program and review the financial performance of service delivery and capacity of implementing agencies regarding cost recovery, borrowing capacity, collection of fees and taxes, accounts receivable, and subsidies, as appropriate.

(v) design the funds flow and disbursement mechanisms based on the FMA of both EA and IA; propose onlending arrangement of ADB loan proceeds;

(vi) review past and potential government subsidy programs;

(vii) Work with the social development specialist to develop a willingness to pay survey for water; conduct tariff affordability analysis;

(viii) work with sector specialist and prepare tables of detailed cost estimates, a summary cost estimates table, a financing plan in accordance with ADB's Technical Guidance Note for Financial Management Assessment (2015), TGN for project financial reporting (2015), and the TGN for preparation of cost estimates (2014);

(ix) interact with the Institutional specialist and recommend strategies to ensure the financial sustainability of the proposed investment and provide inputs for identifying any further capacity building particularly with concern to financial management) that will be necessary to insure a smooth and effective implementation the Project;

(x) develop and test tariff setting and if needed, identify and quantify subsidy needed to achieve financial sustainability and make recommendations on transparent, equitable and efficient mechanisms for services tariffs setting;

(xi) propose a draft project financial performance system and relevant indicators for monitoring financial performance of the reconstructed company, considering the proposed financial structure and tariff setting methodology;

(xii) make recommendations regarding an effective and appropriate regulatory mechanism to ensure service quality and affordable fees.

(xiii) propose institutional and financial improvement arrangements for the RKS identifying reform measures and indicative target dates; provide inputs for the preparation of a capacity building program in Financial Management Systems being addressed to the IA, EA, and other representatives of stakeholder Administrations;
(xiv) assist in drafting the relevant sections of RRP and linked documents and provide relevant reports as needed.

11. **Project Economy Specialist** (international, 1 person-month). Under the FS, the Project Economy Specialist will carry out the following tasks:

(i) prepare overall project and sample subproject economic analysis in accordance with all ADB relevant guidelines which include the following: Guidelines for the Economic Analysis of Projects, Handbook for Integrating Poverty Impact Assessment in the Economic Analysis of Projects, Handbook Guidelines for the Economic Analysis of Water Supply Projects, Handbook for Integrating Risk Analysis in the Economic Analysis of Projects, and ADB's Criteria for Subsidies;
(ii) provide survey questions to the social survey team regarding affordability and people's willingness to pay;
(iii) prepare the project economic analyses in forms and substance agreeable to ADB, covering a review of the macroeconomic setting, economic justification, demand forecast, least economic cost analysis, economic cost and benefits analysis, economic internal rates of return and average incremental economic costs, sensitivity analysis, benefit distributional analysis, and subsidies; and
(iv) with the Institutional and Finance Specialist, review the tariff policy, tariff determination guidelines and other policies, and standards in the urban and water supply sectors. Assess the performance of past WSS tariffs to identify improvements.

12. **Environment Specialist** (international, 1.5 person-months). Specifically, the Environment Specialist will:

(i) prepare and finalize rapid environmental assessment checklist to determine environment category;
(ii) interacting with the civil engineering and social safeguard specialists for the information and data requirements available in the feasibility study and technical design reports. Identifying the gaps in information that still need to be included and obtaining the necessary information for the IEE;
(iii) estimating cost for EMP implementation and interacting with the economic and financial consultants to include the EMP costs into the project budget and bidding documents. The EMP costs consist of mitigation measures, environmental monitoring measurements, and environmental supervision, reporting and capacity building for PMU and contractors;
(iv) assist UCSA and RKS in conducting a meaningful public consultation by presenting draft IEE at meeting with relevant government agencies, local authorities, other stakeholders, local communities and potential affected people in the project sites. Incorporating their comments and feedback in the revision of the IEE; and
(v) incorporating comments from UCSA, ADB, and subsequently assisting UCSA in obtaining necessary approval to the IEE from ADB and UZB Gospripoda.

13. **Social Safeguard (Resettlement) Specialist** (international, 1.5 person-months). Following SPS 2009, the Social Safeguard (Resettlement) Specialist will: (i) provide guidance

on socioeconomic survey, census survey and social impact assessment; (ii) conduct stakeholders consultation and analysis; (iii) prepare analysis of survey results; (iv) provide inputs on social dimension and safeguard component on all project documents; and (v) prepare and finalize the resettlement plan, summary of poverty reduction and social strategy, indigenous peoples impact categorization, and involuntary resettlement impact categorization. The Specialist will (i) prepare involuntary resettlement categorization checklist; (ii) due diligence report on land acquisition and resettlement; (iii) for subprojects involving land acquisition and resettlement, prepare a land acquisition and resettlement plan, disclosure and grievance procedures; (iv) coordinate with project team to ensure that mitigation measures are integrated into the project design features; (v) ensure that resettlement-related information are well considered and included in the program communication plan; (vi) assess the capacity of executing agency to screen impacts, prepare and implement resettlement plans; and (vii) recommend appropriate capacity development activities to develop or enhance safeguards knowledge and skills of executing agency.

14. **Social Development and Gender Specialist** (international, 1 person-months). The Specialist should: (i) collect sex-disaggregated baseline data in order to set appropriate gender targets; (ii) develop a gender action plan (GAP); (iii) support improvement of the collection of sex-disaggregated data and information for the qualitative elements of the GAP matrix and DMF; (iv) conduct a gender analysis and identify potential gender design features; and (v) collect the qualitative benefits from the provision of water supply and sanitation, and solid waste management. (vi) prepare a poverty, social and gender assessment (PSGA) of the project's target beneficiary communities, (vii) draft the Summary Poverty Reduction and Social Strategy (SPRSS) based on the findings of the PSGA. Specifically, the Specialist will (i) work with the social survey team to ensure that household data and other demographic data that will be collected are sex-disaggregated; and (ii) lead the collection of qualitative information that may not be included in the survey, such as, women's perspectives on the potential benefits of the project, gender division of labor in the communities and household and see if the project will help ease women's housework, potential income-generating opportunities during and after the project, and other gender-relevant information.

15. **Climate Change Specialist** (international, 1 person-month). The Climate Change Specialist will identify expected climate change hazards relevant to the project. They will work with the Hydrologist, Team Leader, and Wastewater Engineer to: (i) identify and assess impacts and risks to the project structure, operation, maintenance and longevity; (ii) assess and recommend appropriate climate adaptation measures to incorporate into project design; (iii) estimate the incremental cost of the adaptation options; and (iv) conduct the climate change review on the project due to its location and link to the snow melt streams.

16. **Water Supply and Sanitation Engineers 1 & 2** (national, each 3.5 person-month). The national Water Supply Engineers 1 and 2 will work closely with the TL and undertake the following tasks under the FS:

(i) review the population projections and water demand within the project area for each village and water distribution center;
(ii) establish layouts of the water supply network, including transmission main, pumping stations and reservoirs, distribution mains and secondary distribution;
(iii) carry out field surveys; inspect all existing water supply facilities within the project area; carry out interviews with technical personnel of various provincial *suvokova* and District “branches” and obtain from them information about the real conditions of the existing water supply networks components including the electromechanical infrastructure including pumps, chlorinators, controls and transformers;

(iv) based on the field surveys make an accurate assessment of the existing water supply network within the planned distribution area; assess the condition of pipelines and electromechanical equipment and determine these components which need to be replaced;
(v) prepare layouts of the water supply systems down to the secondary and street distribution system, including all other system appurtenances such as pumping stations, disinfection devices, ancillary buildings, etc.;
(vi) for each pumping station provide layouts of the appurtenances such as reservoirs, pump houses, chlorinators, transformers as well as a description of all equipment including an assessment of the conditions of such equipment;
(vii) carry out hydraulic analysis of the transmission main and of the pipeworks from each pumping – distribution center down to the service areas; make sure that pumps and pipelines are sufficiently dimensioned to respond to the increasing service water demand up to the Project horizon;
(viii) provide pertinent inputs to the water treatment specialist for the preparation of conceptual development of the extension of the water treatment plant (WTP) in in Takiatash, as well as of the minor water treatment plants in Mangit and Kipchak, with particular concern to water quality analysis of the raw water to be used to prepare drinking water;
(ix) work closely with and provide pertinent inputs to the desalination plant specialist;
(x) review the quantitative assessments of groundwater availability in the long term prepared by the Hydrogeologist and assess the quantities of works such as drilling of new or rehabilitation of existing wells, replacement of submersible pumps, and other appurtenances within each potential wellfield within the project perimeter;
(xi) develop an alternative including groundwater as an alternative or complementary source of water;
(xii) obtain long term flow records of the Amu Darya and of irrigation canals in the area of Muynak and Kungrad and assess minimum available flow for abstraction during the critical summer months;
(xiii) develop optional water supply schemes for Muynak that can be sustainable and technically feasible alternative to the base option consisting of supplying the city by means of a new 101 km transmission main from Kungrad and fed from the expanded Takiatash WTP;
(xiv) carry out a detailed assessment of the situation of the water supply along the Tuyamuyun-Nukus water transmission main; compare the advantage of rehabilitating the 2nd lift pump station at Tuyamuyun WTP for the long term supply of the population living along the main; evaluate the opportunity of rehabilitating the water treatment plant for future needs as well as alternative options;
(xv) for each subproject, based on estimated quantities of works to be carried out and goods to be provided, prepare cost estimates for each variant, if applicable, which will be retained in the preliminary stage of the FS;
(xvi) in close collaboration with the TL carry out cost-benefits comparison analysis in order to select the most appropriate, cost effective and sustainable alternative for development;
(xvii) provide inputs to the TL for the preparation of an implementation plan of the Project;
(xviii) provide inputs to the Procurement Specialist, the Financial Expert and the TL for the preparation of a procurement Plan;
(xix) provide the involuntary resettlement team with information, data and layouts, regarding rights of way for pipelines, location and surface of any infrastructure included in the Project requiring permanent or temporary occupation of land;

(xx) prepare drawings and layouts as needed;
(xxi) make sure that all drawings, quantities and measures are conform with National standard norms as well as with international requirements as needed;
(xxii) provide the PCU with the required technical assistance throughout the period required for the submission of the FS documents to the State Expertise.

17. **Hydraulic Engineer** (national, 1 person-month). During his/her assignment under the TA, the Hydraulic Engineer will:

(i) carry out all required the hydraulic calculations for the optimization of the each water supply system as proposed in the FS;
(ii) establish hydraulic profiles along existing and planned transmission and distribution mains in each subproject;
(iii) verify the adequacy of the existing water distribution pipework to convey the quantities of water to and within each service area taking into account the planned water demand at the Project horizon;
(iv) optimize the size of pipelines within the service area commanded from each pump station or each water distribution center, taking into account average and peak-hour demand as well as fire requirements at the project horizon;
(v) based on the water demand of service areas, optimize the needed total pumping and lifting capacity at each relevant pumping station as well as the number and the specific capacity of each pump, taking into account maximum-day, peak-hour water demand, and stand-by capacity;
(vi) optimize the size of the primary, secondary and service distribution lines within each distribution area considering standard requirements relative to maximum flow velocity in pipelines and maximum day water demand at the project horizon;
(vii) provide inputs as needed for the selection and dimensioning of pumps and pumping equipment;
(viii) carry out calculations for the optimization of reservoirs and elevated tanks;
(ix) prepare layouts of network systems; and
(x) provide inputs to reports as needed.

18. **Electromechanical Engineer** (national, 1 person-month). The main tasks of the Electromechanical Engineer in the FS will consist of providing inputs for the preliminary dimensioning of pumping equipment, and all other electro-mechanical devices. His/her main activities under the FS will be:

(i) carry out inspections of all pumping stations and other electromechanical equipment in all the subproject included in the Project and make for each accurate assessments regarding working conditions, efficiency, residual life expectancy, needs for rehabilitation or replacement and relevant cost estimates using a protocol format agreed upon with the TL;
(ii) liaise with the hydraulic engineer and determine the power supply requirements of pumps based on their hydraulic characteristics;
(iii) determine the needs of all other utilities requiring power supply such as control systems, actuators, chlorinators, internal and external lightening;
(iv) provide inputs to the Water Supply Engineer to draft layouts of new Pump Station buildings and relevant cost estimates;
(v) provide general technical specifications or performance schedules for the various types of pumps which are to be installed under the Project;
(vi) provide inputs to the water supply engineers for the cost estimates of pumps, controls and other automatic data transmission systems as well as any other electrically operated equipment including lightening; and

(vii) provide inputs for the specification of characteristics of system operation control and operation, actuators, remote transmission, SCADA, on-line control systems.

19. **Hydrogeologist** (national, 1 person-month). Under his/her assignment in the FS, the Hydrogeologist will carry out the following tasks:

(i) collect all information on groundwater within the project area from the relevant institutions such as institute of geology, national hydrogeological survey, etc.;
(ii) prepare layouts indicating the perimeters of the main groundwater bearing units, their characteristics and renewable potential for development;
(iii) update the knowledge of the present state of exploitation of the main groundwater units with particular reference to the fresh water wellfields: in Beruniy, Turtkul, Amudarya, Nukus and other potential sites for development of groundwater being desalinated; for each production well, collect construction parameters, long term records on water quality, flow, regime of exploitation (hours per day) and total amounts withdrawn per month and per year; of the of the present state of exploitation of the main groundwater units with particular reference to the wellfields:
(iv) collect recent data on analysis of quality of the groundwater in each wellfield and resume such data in table format;
(v) make a clear assessment of the number of production wells stull operated and provide indications of their operational conditions;
(vi) collect information on characteristics of the submersible pumps and on their operating conditions, assess needs for replacement and repairs;
(vii) carry out field investigations in order to verify, improve and consolidate the data and information previously acquired;
(viii) re-assess the sustainable potential of groundwater which can be withdrawn on a permanent basis from each aquifer in the long term (30-40 years);
(ix) considering the amounts of groundwater being presently withdrawn from each aquifer on a permanent base, and based on the estimated total yield that can be developed annually from each aquifer, make an estimate of the additional quantities of groundwater which can be developed on a sustainable base in the long term;
(x) make an estimate the of the average yield that can be expected from a single production well on a long term basis and estimate the total number of wells which can be constructed in addition of existing ones in order to exploit the total amount of groundwater available from each aquifer on an average annual base;
(xi) make an inventory of other fresh and brackish groundwater production wells disseminated within the project area which are used for the supply of local settlements; obtain data on well construction parameters, characteristics of the submersible pumps, quality of groundwater, regime of groundwater extraction and quantity, any other pertinent information;
(xii) prepare layouts with the location of all surveyed wells containing indication on their characteristics: average yield, salinity, etc.;
(xiii) interact with the water supply team and provide them with relevant information as required by the team;
(xiv) elaborate a report on groundwater resources availability within each main aquifer containing at least the following developments; i) a statement on existing level of exploitation of the groundwater resource, ii) groundwater quality, and iii) perspectives for development of additional quantities of groundwater in the long term; and
(xv) provide inputs to periodical and final reports as required.

20. **Project Finance and Economy Specialist** (national, 2 person-months)**.** In the FS, the national Project Finance and Economy Specialist will primarily be the following:

(i) assist the international Project finance specialist to assess financial performance and financial management assessment of the EA and IA;
(ii) assist the EA and if applicable, the IA, in the process of approval of the Project by the MOF and other national commissions ad hoc by providing, as needed, competent answers to any clarification to enquiries set by the MOF;
(iii) provide assistance to the international finance specialist to carry out analysis of financial components based on ADB's Guidelines for the Economic Analysis of Projects and assess their economic viability;
(iv) carry out sensitivity analyses;
(v) provide inputs to organize and further review the outputs of the socio-economic survey with regard to ability-to-pay;
(vi) in consultation with the Social Development Specialist incorporate poverty reduction impacts in accordance with ADB's Handbook on Integrating Poverty Impact Assessment in the Economic Analysis of Projects;
(vii) provide assistance to undertake analysis of tariff, affordability, and sustainability;
(viii) collaborate/coordinate with the international project economy analyst to ensure consistent use of approach and assumptions in financial and economic analyses;
(ix) provide inputs to develop economic indicators relevant to the water supply sector roadmap;
(x) assist for the preparation economic cost-benefit assessments and economic analysis of the proposed Projects;
(xi) estimate the economic internal rate of and net present value, with sensitivity analysis and quantitative risk analysis;
(xii) provide inputs for the evaluation of the project's economic risks and propose mitigation measures;
(xiii) assist for the preparation of economic justification of the project based on the overall program development of the republic of Karakalpakstan;
(xiv) provide inputs to periodic and final reports as needed.

21. **Procurement Specialist** (national, 3 person-months). Under the FS the Procurement Specialist will undertake the following tasks:

(i) carry out a Procurement Assessment and Recommendation of the EA in accordance with the ADB requirements and procedures; identify gaps, and recommend appropriate undertakings;
(ii) carry out interviews based on Project Procurement Risk Assessment Questionnaire and prepare a Project Procurement Risk Assessment;
(iii) provide advices to TL and other consultant team members on suitable procedures for procurement of services, works and goods and for project and subproject packaging;
(iv) suggest and if opportune revise procedures and methods for the procurement of goods, works and services following national and international bidding as appropriate;
(v) coordinate and take the lead in the preparation of the procurement plan;
(vi) provide comments on quantities of works and goods, cost estimates and proposed Project implementation organization as appropriate;
(vii) ensure that methods of procurement requiring international bidding are in accordance with ADB procurement procedures and documents;

(viii) ensure that methods of Procurement requiring National bidding are in accordance with national procurement procedures in force in Uzbekistan but also consistent with ADB requirements for national bidding;
(ix) provide inputs for the preparation of arrangements for Project implementation;
(x) provide inputs for the preparation of terms of reference for consultants being selected for project implementation;
(xi) prepare draft scope of works for international and national consultants required for Project implementation;
(xii) provide suggestions and inputs relative to needs for capacity building in procurement and relevant training programs; and
(xiii) provide inputs to interim and final reports as required.

22. **Social Development and Gender Specialist** (national, 3 person-months). The national expert will assist the international Social Development and Gender Specialist to: (i) collect sex-disaggregated baseline data in order to set appropriate gender targets; (ii) develop a gender action plan (GAP); (iii) support improvement of the collection of sex-disaggregated data and information for the qualitative elements of the GAP matrix and DMF; (iv) conduct a gender analysis and identify potential gender design features; and (v) collect the qualitative benefits from the provision of water supply and sanitation, and solid waste management. (vi) prepare a poverty, social and gender assessment (PSGA) of the project's target beneficiary communities, (vii) draft the Summary Poverty Reduction and Social Strategy (SPRSS) based on the findings of the PSGA. Specifically, the Specialist will (i) work with the social survey team to ensure that household data and other demographic data that will be collected are sex-disaggregated; and (ii) lead the collection of qualitative information that may not be included in the survey, such as, women's perspectives on the potential benefits of the project, gender division of labor in the communities and household and see if the project will help ease women's housework, potential income-generating opportunities during and after the project, and other gender-relevant information.

E. Implementation Period

23. The TA will be implemented from December 2016 to May 2017. The Uzbekistan Agency 'Uzkommunkhizmat' (UCSA) will be the project's executing agency. The RKS will be the implementing agency for the project, with its strategic development department being responsible for day to day project implementation functions.

Table A3.4: Technical Assistance Processing and Implementation Schedule

Major Milestones	Expected Completion Date
Approval	December 2016
Inception	January 2017
Draft Final Report	May 2017
Completion	June 2018
Financial Closure	September 2018

Source: ADB staff estimates.