

**TERMS OF REFERENCE FOR CONSULTING SERVICES  
CONSTRUCTION SUPERVISION CONSULTANT [CSC] SERVICES  
FOR SECTION BISHKEK–KARA-BALTA**

**I. BACKGROUND**

1. The Asian Development Bank (ADB) has assisted the Kyrgyz Republic in rehabilitating 320 kilometers (km) of the 655 km Bishkek–Osh road. Other development partners also recognize the importance of this road, such as the Japan Bank for International Cooperation and the Islamic Development Bank. Combined, all the development partners have assisted the government in rehabilitating over 539 km (about 82%) of the Bishkek–Osh road. The Government of the Kyrgyz Republic requested the Asian Development Bank (ADB) to provide financing (loan and/or grant) for the rehabilitation of the Central Asia Regional Economic Cooperation (CAREC) Corridor 3 section (Bishkek–Osh road). The Bishkek–Osh road section is in very poor condition, with an international roughness index of above 7 and truck and bus average travel speed of below 60 kilometers per hour (km/h). It is unable to provide the required level of service and poses traffic hazards to road users and pedestrian traffic. Upgrading of the Bishkek–Osh road will help reduce poverty, enhance regional connectivity and access to the Kyrgyz Republic markets. The project will make the freight and passenger traffic on Bishkek–Osh road efficient.

2. The project will improve the national and regional connectivity by reconstructing and rehabilitating an estimated 52.5 km of crucial road sections between Bishkek and Osh, and include road safety measures such as road signing, lane markings, street lighting, parking area, bus stops, crash barriers, and sidewalks. The project is fully consistent with the Government's priority in upgrading key corridors as stated in the National Strategy of Sustainable Development (2013–2017). The project is also well aligned with ADB's Strategy 2020 and with the Country Partnership Strategy of the Kyrgyz Republic (2013–2017) (CPS). The priority theme for the CPS is the development of a successful and stable democratic state through inclusive growth and the reduction of regional disparities. This theme also runs at the core of the project.

3. The subject terms of reference (TOR) is for consulting services for:

(i) Construction Supervision for the following road sections:

Section No.	Name	Chainage		Length (in km)
		Start	End	
1	Bishkek – Kara-Balta	15+900	61+000	45.1
2	Bishkek – Kara-Balta	8+500	15+900	7.4
	<b>Total Length</b>			<b>52.5</b>

(ii) The Performance-Based Maintenance Contract (PBMCM) for the Bishkek–Osh road section from Kara-Balta to the Too-Ashuuu tunnel (km 61–km 129.5), total length of 68.5 km.

4. At the end of 2014, the Joint Venture EPTISA Servicios De Ingenieria S.L., Eptisa Muhendislik Ltd Sti and RAM Engineering Associates LLC was selected as a Consultant to supervise the construction of the above road sections. Currently, the contract with the Joint Venture EPTISA Servicios De Ingenieria S.L., Eptisa Muhendislik Ltd Sti and RAM Engineering Associates LLC will expire in a few months and will not be extended. The Ministry of Transport and Roads of the Kyrgyz Republic (MOTR) (Client) will therefore select a new international firm, in association with local consultants, to take over the construction supervision assignment from the above mentioned consultant and carry out the tasks under this TOR.

5. The works and services to be provided under the Works Contracts by the appointed civil works Contractors consist of two major parts:

- (i) **Part A** – Rehabilitation works on Bishkek–Kara-Balta section.
  - (a) Section 1 (Bishkek–Kara-Balta, 45.1 km long). The contract for construction works was signed on 28 March 2017 with the Contractor China Railway No.5 Engineering Group Co. As of June 2019, construction works were completed for 20%.
  - (b) Section 2 (Bishkek–Kara-Balta, 7.4 km long). The tender documentation is currently being agreed with ADB and a call for tender for the selection of a contractor for the construction works will be announced in the nearest future. The estimated contract duration is 2 years with a 36-month defects notification period (DNP);
- (ii) **Part B** – PBMC. The contract for road maintenance throughout the contract period, which is 3 years, was signed with the Contractor Mostdorstroi LLC on 18 December 2017. MOTR needs a qualified consultant for supervision of the PBMC which is implemented as a pilot contract. The purpose of the consulting services is to provide technical and financial supervision to ensure that the works are carried out in accordance with the contract and to the Client's satisfaction. The second objective is to gain maximum experience from the pilot contract in order to extrapolate the PBM contracts to other parts of the road network.

6. The civil works Contracts will be based upon the FIDIC MDB Harmonized General Conditions of Contract, 2010 edition ("the Pink Book") with modifications in order to accommodate the Performance Based Maintenance (PBM) services that are to be provided by the appointed Contractors. The General Conditions of Contract contained in the contracts is obtainable from the following location:

<https://www.adb.org/sites/default/files/page/84077/fidic-gcc-construction.pdf>.

7. The rehabilitation component of the Works Contract will use a standard ad-measurement approach as described in the FIDIC 'Pink Book'. The PBM component will be based on a series of "lump-sum" payments, based on the approach typically used by the World Bank for Output and Performance Based Road Contracts (OPBRC).

## **II. OBJECTIVES OF THE ASSIGNMENT**

8. The Consultant, to be designated as the 'Engineer' for the civil works contracts as defined in the FIDIC General Conditions of Contract, will continue to assist MOTR, the Executing Agency (EA) for the Project and the Employer for the civil works Contracts, in reviewing and approving the Contractor's working drawings, supervising the civil rehabilitation works, monitoring the subsequent PBM services for the road sections, and continuing to ensure due compliance with road safety standards, environmental protection measures, and social safeguards. In addition, the Consultant will assist in the procurement of construction works for Section 2, if necessary, during bid evaluation until award of the contract to the winning bidder.

## **III. SCOPE OF SERVICES, TASKS (COMPONENTS) AND EXPECTED DELIVERABLES**

9. Apart from every requirement described below or elsewhere in the TOR and without any limitation to those requirements, the Consultant shall fulfill all obligations set forth for the Engineer in the civil works Contracts, namely for Section 1 – continuing construction supervision, and for Section 2 – after awarding the contract to a selected contractor.

10. The specific tasks of the Consultant include the following:
- (i) Supervision and Administration – Rehabilitation phase**
- (a) Assist the Employer in overall Contract administration work.
  - (b) Interpret the Technical Specifications and Contract Documents.
  - (c) Review designs, drawings, bill of quantity (BOQ) provisions and specifications with respect to actual site conditions both for permanent and temporary works and suggest modifications, if required or deemed appropriate.
  - (d) Review and ensure conformity of Contractor's securities (bank guarantees) with the requirements given in the civil works Contracts and are in approved formats and track and ensure validity and confirm the enforceability of these securities.
  - (e) Review and ensure conformity of Contractor's insurance policies with the requirements given in the civil works Contracts and track and check that the Contractor is maintaining the validity of these insurance policies throughout.
  - (f) Review compliance with the Contract documentation including the securing of all statutory clearances and permits as well as the handing over of the site.
  - (g) Scrutinize the Contractor's detailed work programme and related logistics, notify the Contractor, giving detailed reasons, if the programme does not comply with the contract, and ensure that the Contractor complies at all times, with the approved programme.
  - (h) Check that the construction methods proposed by the Contractor for carrying out the works, are satisfactory.
  - (i) Inspect the Contractor's construction equipment, the results of material and soil sample tests, the safety of the works, property and personnel and the schedule of mitigation measures proposed to mitigate adverse environmental impacts. Notify the Contractor to remedy any working methods, approaches and materials that fail to comply with the Specifications.
  - (j) Confirm the horizontal and vertical alignments for the roads based on reviews of the Contract drawings and the topographic survey to be carried out by the Contractor. This work may include if required, amending the alignment plan and profile drawings based on the updated topographic survey details.
  - (k) Review and approve finalized or revised 'Issued for Construction' drawings for use by the Contractor and release additional detailed drawings, if and as necessary, including drainage (inclusive of drainage systems through the built-up areas), junction layouts, road signs and markings, road safety measures, marker stones, protection works etc. based on the Contractor's survey and setting out data.
  - (l) Identify with the Contractor and public utility agencies, all services (i.e. electricity, telecommunications and water) if any, within the right-of-way that are to be protected to avoid damage or to be relocated, as required by the works. Review the owner-agencies' reinstallation planning for gas and water pipelines, telecommunications systems and electricity services and monitor work progress to ensure continuous public supplies during the construction period and provide recommendations/proposals for the Client to enable the making of decisions on the issue.

- (m) For purposes of land transfers, prepare a register of land plots by type of land for each owner and land user; also a layout of the affected plots specifying borders and scale and coordinating with the local authority responsible for registration of rights to immovable property—all in accordance with the relevant legislation of the Kyrgyz Republic.
- (n) Monitor and supervise progress of the Contractors' works vis-à-vis the approved Contract programme and the quality of the Contractors' works vis-à-vis the applicable technical specifications and design details.
- (o) Ensure that 'as-built' drawings are prepared by the Contractors for all works as construction progresses. Review and approve those drawings and correlate them with maintained records of all test data and results; certify them "as constructed" drawings for each component of the works when furnished by the Contractor.
- (p) Ensure that road safety design measures are implemented in full accordance with the Contract drawings and specifications.
- (q) Develop a quality assurance system and a quality control plan for provision and placement of asphalt-concrete materials for road surfaces and for reinforced concrete for use in bridges and engineering structures.
- (r) Monitor the implementation of community-targeted, public awareness raising campaigns on human trafficking and sexually transmitted diseases, as well as on road-user safety.
- (s) Monitor the Contractor's compliance with and performance of, required actions regarding HIV/AIDS, human trafficking and core labor standards in accordance with the Contract documents, such as awareness and education of laborers and workers.
- (t) Ensure that the Contractor does not recruit child labor in the execution of the civil works Contracts in accordance with the provisions of the Contract agreement.
- (u) Establish procedures to verify the Contractor's performance and report progress and any perceived problems on time; these to include quality control reports, quantity survey records, requests for variations or change orders and for any Contractor's claims and for invoices rendered.
- (v) Conduct weekly Site Meetings (technical matters) and monthly Site Meetings (progress matters) to be attended by representatives of the Employer and the Contractor.
- (w) Evaluate any changes proposed (e.g. in terms of time, scope, methodology and cost) by the Contractor during the course of the Project.
- (x) Review and certify work volume and process interim and final payments prepared by the Contractor. Arrange for timely submission of interim payment certificates and monitor the release of payments made.
- (y) Maintain a day-to-day site diary recording all events relevant to the works.
- (z) Ensure project financial management procedures are in place and that they are strictly followed, specifically relating to payments, financial accounting, any requests for time extensions, claims and Contractor's invoices.
- (aa) Review the price adjustment data and coefficients included in the Contract and check current index prices as submitted by the Contractor. Recommend to the Employer for approval, any price adjustments found to be justified. In case the price adjustment indexes included in the civil works Contract(s) prove to be unreliable, or unavailable, develop an alternative solution and present it to the Employer for approval.

- (bb) Develop and implement training programs (including workshops and technical guidelines) for MOTR staff and national Consultants at the project site on project management issues. These to include quality assurance, contract administration, quality control, in-situ and laboratory testing, reporting, monitoring and the implementation of environmental and social safeguards plans, road maintenance plans and any other activities as required.
- (cc) Make all necessary tests upon completion of the rehabilitation works.
- (dd) Prepare the taking-over procedure, establish the 'snag' list and issue the Taking-Over Certificate[s] at the appropriate time.
- (ee) Monitor the completion of any minor outstanding works noted at completion as well as attending to items on the 'snag' list.
- (ff) Identify any defects for the Contractor during the DNP and ensure that they are duly treated.
- (gg) Prepare and issue the Performance Certificate.
- (hh) Review the Contractor's final account for the rehabilitation works at the end of the DNP.
- (ii) Make determinations on any claims submitted by the Employer or the Engineer.

**(ii) Supervision and Administration – PBM phase**

- (a) The Consultant shall supervise the construction as specified herein, and ensure engagement of qualified personnel, management, coordination and effective implementation of these services.
- (b) The Consultant shall supervise the work and approve the materials and quality of the work to be carried out jointly with the Client. The Consultant shall not be entitled to relieve the Contractor of any of its obligations or commitments under the contract. Neither the work involving delays nor any additional payment by the Client may be proposed by the Consultant without the Client's permission.
- (c) Capacity Development. The Consultant shall carry out the following at the initial stage:
  - Review the current PBM contract piloted under the L3056/G0366 Agreement, Kara-Balta–Too-Ashuuu Tunnel section, and the results of the capacity building activities of the previous Consultant.
  - Review and assess the achievements and challenges faced by the pilot project.
  - Risk analysis for the Contract parties. Based on the results of the risk analysis, the Consultant will make proposals and develop mechanisms for risk distribution in the pilot PBM contract.

It is expected that the Consultant will carry out the above activities within 2 months from the date of conclusion of the Contract and will provide a report and proposals to the Client on them. The Consultant's proposals may include 1 (one) training for the personnel of the Contractor, Consultant and Client involved in the project.

**(iii) Environmental Safeguard. The CSC consultant shall:**

- (a) Conduct detailed field and desk surveys that will result in the updating of all IEE documents and other documents required for environmental impact assessment.

- (b) Ensure that the requirements identified in the EMP are included in the tender and contract documents, and
- (iv) ensure that all potential contractors are aware of the requirements to all environmental measures included in the EMP, through tender documents.
- (d) Ensure the Contractor fulfils and strictly follows the relevant national environmental legislation and the ADB's Safeguards Policy. When required, due to design changes, unforeseen impacts or any other situation that may warrant update of the impact assessment, update the initial environmental examination (IEE), environmental management plan (EMP), site-specific environmental management plan (SSEMP) or any other environmental safeguard document, detailing impacts and identifying any environmental mitigation measures required to address each identified impact, and recommend appropriate monitoring requirements.
- (e) Prepare Corrective Action Plans (CAP) as required and needed.
- (f) Assist MOTR/Investment Projects Implementation Group (IPIG) in implementation by the Contractors of IEE, EMP, SSEMP, and CAP to ensure compliance with environmental safeguards compliance.
- (g) Assist IPIG in the supervision of the implementation measures aimed at the protection of historical and cultural sites.
- (h) Assess the cost, responsibilities, schedule, location, and monitoring framework associated with the implementation of the mitigation measures and the EMP.
- (i) Provide guidance and quality assurance in undertaking the environmental monitoring as outlined in the EMP.
- (j) Prepare a section in the Project's monthly progress report on environmental safeguard compliance.
- (k) Assist IPIG in compiling semi-annual environmental monitoring reports.
- (l) Monitor compliance with environmental mitigation, management plans (EMP and SSEMP), and CAP as well as the Contractor's health and safety plan.
- (m) If necessary, conduct consultations with groups to be affected by the project and conduct public awareness meetings as required by the project.
- (n) Support IPIG and the Contractor with the development of SSEMPs and ensure that the Contractor complies with the requirements on-site.
- (o) Undertake the environmental monitoring as outlined in the EMP and SSEMP.
- (p) Prepare all related certificates or other relevant papers or documentation.
- (v) **Social Development and Resettlement Supervision.** The Consultant shall:
  - (a) Monitor and report on the land acquisition and resettlement plan (LARP) implementation, including preparation of semi-annual social safeguards monitoring reports [SSSMRs] based on those compiled during the detailed design stages. These are to cover resettlement and social safeguards matters and be in English, Russian and if necessary, in the Kyrgyz language on a semi-annual basis and are to be distributed to MOTR, ADB and for broader disclosure after approval, if necessary.
  - (b) Assist IPIG in collecting all the needed monitoring data on LARP implementation, including the establishment of a LAR database;
  - (c) Prepare a Completion Report on LARP and due diligence report (DDR) implementation in English, Russian and if necessary, in the Kyrgyz language for review and approval of ADB and MOTR.
  - (d) Prepare a section in the project's quarterly progress report on resettlement and social safeguard compliance.
  - (e) Regularly monitor implementation of the project grievance redress mechanism and inform MOTR and ADB about any project-related issues,

requests and complaints received from and registered by the affected persons, local authorities and other stakeholders; and assist MOTR in addressing complaints related to the LAR and social safeguards during the project. These works also include development / improvement of existing complaints database (electronic format), which helps to consolidate, track, compare and analyze complaints received by type, gender of the complainant, decisions, status, etc. and relevant reporting thereof.

- (f) In the event of design changes and/or unforeseen impacts on the LAR (both permanent and temporary in nature) ensure that the necessary impact assessment surveys, consultations, valuation and preparation of LARP are carried out (and published as an additional document) and approved by ADB before implementation; and provide all necessary permits, legal opinions and agreements, as well as means of compensation owed to persons affected by the project, prior to the commencement of construction works.
- (g) Support the implementation of a social summary matrix and its implementation progress reporting.
- (h) Ensure that the Contractors comply with relevant HIV/AIDS, human trafficking and labor standards in accordance with contractual documentation, such as workers' awareness and education.
- (i) Ensure that the Contractors do not involve child labor in construction work as required by the contract.

**(vi) Road Safety Campaign.** The scope of services comprises the development of awareness campaigns and also establishes in-country expertise for further road safety campaigns. The safety awareness campaign for the Bishkek–Osh road should take into consideration safety-issues related to high-speed traffic and the likely implication to both the road-users and roadside communities. The target-groups would therefore be road-users and drivers of all types of vehicles and roadside communities. Suggested campaigns will include, but are not limited to:

- (a) Safety Code for Major Roads: Educating drivers about the correct code of behavior while driving on Bishkek–Osh road. It should consist of design of materials to be used in program and the actual education should be conducted to all road-users through joint collaboration with MOTR, Police and the consultants.
- (b) Awareness Campaign for Heavy Vehicles: The main message behind this campaign will be to underscore the importance of observing safe-driving habits with special consideration given to pedestrians and non-motorized vehicles on mixed traffic road sections. This campaign should be conducted at truck and bus operator's depots and should include preparation of brochures and stickers and lectures at transport operator's depots with the assistance of MOTR and Traffic Police.
- (c) Pedestrian Awareness Campaign: This campaign should use posters and literature related to increased danger from heavy-vehicles and safe pedestrian behavior when walking by heavily trafficked roads. This program should be conducted in schools along the project roads. Activities should include preparation of posters and other literature and conduct of lectures at schools with the assistance of MOTR and Traffic Police.
- (d) Publicity through Public Media: The project should produce a documentary on public media highlighting the following issues pertaining to the project roads, including code of driving behavior on high speed roads. For

newspaper publicity, a set of road safety advertisements/information should be designed and placed in national and regional papers.

- (vii) **Road Safety Audit.** Road Safety Audits shall be carried out in accordance with internationally recognized guidelines for safety audit on roads and road projects and Kyrgyz national standards and shall include audits at Construction/Pre-Opening Stage of the project.
- (a) Road Safety Audit Stage shall include two distinct aspects as follows:
- Audit of the compliance of the works to the Detailed Design Stage Audit to ensure that the decisions with regards to the previous audit are 'carried through' in the construction. In particular the audit shall include a final detailed check of the project just prior to it being 'opened to traffic'.
  - Audit of traffic management through and in the vicinity of the project during the construction phase. This includes the observation of the effectiveness of the Traffic Management Plans prepared by the contractor/consultant and the devices employed during the night.
- (b) The audit at construction/pre-opening stage will be carried out three (3) times during the construction duration:
- Part 1 or Verification Audit to be carried out after the issuance of construction and traffic management drawings.
  - Part 2 to be carried out when the construction work's progress is about 50%.
  - Part 3 to be carried out during the pre-opening of the project. Both day and night audit will be required.
- (c) Road safety audits shall be carried out together with road safety experts from MOTR to provide training-on-the-job and enhance the capability of the local staff.

#### IV. TEAM COMPOSITION & QUALIFICATION REQUIREMENTS FOR THE CONSULTANT'S KEY EXPERTS

11. **Inputs.** The Employer will select a consulting firm, to carry out the tasks described in this TOR for which the QCBS selection method will be used. The format of the Technical Proposal to be submitted is a 'Biodata Technical Proposal'. The weights given to the Technical (T) and Financial (P) Proposals are: T = 0.9, and P = 0.1. Consulting services are expected to require a total of 52.23 person-months of international experts and 138.5 person-months of national experts who will be engaged on intermittent basis and will cover a total period of **60 months** (24 months of rehabilitation and **36 months** of DNP).

No.	Suggested Personnel	No. of Experts	Inputs Person-Months
<b>1</b>	<b>International Key Experts</b> (See Note 1)		
1.1	Resident Engineer/Team Leader	1	21.50
1.2	Pavement and Materials Engineer	1	7.00
1.3	Road Safety Engineer	1	5.00
1.4	Contract Specialist	1	4.00
1.5	Social Development and Resettlement Specialist	1	5.23

No.	Suggested Personnel	No. of Experts	Inputs Person-Months
1.6	Environment Specialist	1	4.50
1.7	PBM Engineer	1	5.00
	<b>Sub-total International Key Experts</b>		<b>52.23</b>
<b>2</b>	<b>National Key Experts</b> (See Note 1)		
2.1	Highway Engineer/Deputy Team Leader	1	26.82
2.2	Pavement and Materials Engineer	1	15.00
2.3	Structural Engineer	1	7.50
2.4	Quality Assurance Engineer	1	16.00
2.5	Road Safety Engineer	1	8.50
2.6	Social Development and Resettlement Specialist	1	14.50
2.7	Environment Specialist	1	18.50
2.8	Quantity Engineer	1	22.50
2.9	PBM Engineer	1	9.18
	<b>Sub-total National Key Experts</b>		<b>138.5</b>
	<b>Total Key Experts</b>		<b>190.73</b>

Note 1: The abovementioned list is the Client's estimate of the MINIMUM key staff input required for the assignment. If the Consultant considers that additional involvement of the key staff is required, it is free to include such input in its proposal. If no additional input is included in the proposal, it will be deemed that the Consultant is satisfied with the minimum input for key staff provided above and takes full responsibility to fulfil all obligations as set out in the TOR with the indicated inputs.

12. Except for admin staff, the firm's team composition and personnel schedule shall reflect the proposed key experts' names and inputs, and proposed non-key experts' names (if available) and inputs. The curriculum vitae (CV) of the key experts must be submitted. Only one CV must be submitted for each key expert included in the proposal. Only the CVs of key experts will be scored during the technical proposal evaluation.

13. The design of the team as a whole [including the appropriateness of the level of inputs (Home, Field Total)] of both key and non-key experts will be taken into account in the evaluation of Work Program and Personnel Schedule criteria.

14. Apart from the indicative list of non-key staff included above, the Consultant is fully responsible to determine and provide (in its proposal) for any and all additional experts (to be described as non-key staff) that might be necessary for proper implementation of the duties prescribed by the current TOR.

15. Consulting firms are requested to prepare a detailed description of how they propose to perform the assignment and deliver the tasks and outputs of the contract in the section of their proposal called "Approach and Methodology". In this narrative, firms should be explicit in explaining how they will achieve the outputs and deliverables and include details of what staff and staff inputs will comprise the project team, including key and non-key experts.

16. **Requirements for Key International Staff.** Staff should have expertise, knowledge and skills as described below.

**(i) Resident Engineer/Team Leader**

- (a) The Team Leader must have expertise in all aspects of road design and construction supervision with experience in leading a team of multi-discipline experts. The Team Leader must be a certified graduate civil engineer. The Team Leader will have overall responsibility for implementing the project and managing the team of the Consultant's staff with expertise in bridge and road engineering, cost estimation and Contract documentation, geology, traffic engineering, road safety, social development, environment, and construction supervision. The Team Leader should be a senior engineer with preferably 15 years of relevant experience covering road design and construction projects. He should have good communication and reporting skills.
- (b) Scope of tasks. The Team Leader shall be responsible for the overall project management in performing the scope of services specified in Section III of the Consulting Services TOR, and for solving disputable issues. The Team Leader shall be responsible for managing the overall supervision team, and for fulfilling the obligations of all staff. The Team Leader's tasks shall include but not be limited to the following:
- Prepare (1) detailed work program and schedule of activities to be undertaken as per the TOR for each type of activity; (2) final staff table; (3) quality assurance system, and procedures for supervising and monitoring the contractors' performance, and the provision of timely reports on progress and of any problems faced; and (4) payment schedule.
  - Carry out management of the detailed design review including technical specifications (including BOQs), drawings, and construction methods against the required road standards. Propose changes if necessary.
  - Issue a commencement notification for contractors for the respective road sections or road sections.
  - Verify and approve the Contractors' work program, the schedule of implementation, the work methodology and plan, and monitor construction progress. Report to the Employer any delays or possible delays in the approved contract schedule, and undertake any required measures to prevent possible delays.
  - Issue notifications to the Contractor on any non-compliance with the approved road safety plan, the agreed environment mitigation measures and the social safeguards as stipulated in the contract documents.
  - Issue notifications to the Contractor on defects and deficiencies observed and provide instructions for remedy, or issue notifications on inappropriate performance.
  - Verify, approve within the competence, and prepare any requests for variation or addendum relating to quantities, quality of materials or extensions of time).
  - Verify progress and the quality of construction and maintenance works for project sections.
  - Certify payments for works against the respective BOQ, and issue interim payment certificates, final certificates and such other certificates including handing over certificates, all in accordance with the Contract for construction works.

- Coordinate and monitor the work of the site supervision team and regarding compliance with the contract.
- Verify with the Employer when the Works are completed works and assist in the formal acceptance of the works, the review and approval the as-built drawings and relevant plans. Prepare and submit reports confirming satisfactory completion of contracts.
- Issue defects liability certificates after the contractors have eliminated the defects.
- Advise the Client on day-to-day coordination and supervision of the construction works, including the implementation status and any problems noted, and on the preparation of regular progress reports.

**(ii) Pavement and Materials Engineer**

- (a) The international Pavement and Materials Engineer should be a senior engineer with a civil engineering degree in the field of road construction, of a Bachelor's or higher level with preferably 10 years of relevant experiences in pavement design and works supervision of road projects and with extensive knowledge of materials used in road building and in conducting pavement conditions and materials quality tests. The Pavement and Materials Engineer should be familiar with modern international pavement design guidelines and state-of-the art pavement construction technologies and with the preparation of Contract Specifications for materials and testing.
- (b) Scope of tasks. The tasks of the Pavement and Materials Engineer shall include, but not be limited to the following:
- Review the mix designs for road pavements and engineering structures proposed by Contractors and approve/propose any necessary changes in the mix design, paving method, sampling and testing procedures, and quality control measures to ensure required standards and quality are achieved. Provide the results of the review and recommendations to the Team Leader.
  - Develop a quality assurance system for the works, including testing intervals and acceptance criteria for all construction works.
  - Verify that the work is performed in accordance with the technical specifications and all necessary tests, in order to accept any type of work.
  - Advise the Team Leader on whether or not the Contractors have complied with the material specifications and tests, the workplace requirements, and the overall construction specifications.
  - Keep a record of all testing activities, including references to the elements of the work to which the tests relate and the location from which the test samples were obtained.

**(iii) Road Safety Engineer**

- (a) The international Road Safety Engineer should have a Bachelor's degree in road safety or in traffic engineering or in the more general road construction field with preferably 10 years of work experience including 5 years in implementing and monitoring road safety for road construction projects. The Road Safety Engineer should have knowledge of and skills in implementing the road safety aspects of design, the application of road

safety design standards, preparing road safety and traffic management plans in relation to major highway construction work sites, and in the development of community-awareness road safety campaigns. The Road Safety Engineer should be proficient in both written and spoken English. Experience in similar geographic areas will be an advantage. Knowledge of local languages would be an added advantage but is not mandatory.

(b) Scope of tasks:

- Review the road safety audit reports compiled during the detailed design stages and of measures duly included in the design drawings noting any shortcomings for correction during the Works.
- Review the Contractors' own road safety plans for compliance with the specifications and identify any areas where amendments may be needed.
- Conduct a road safety audit at the period close to the completion of the Works and report on the findings.
- Provide written accounts of all road safety site work undertaken for inclusion in monthly progress and in the project completion documentation.
- Organize and participate in road safety campaigns.

**(iv) Contract Specialist**

(a) The international Contract Specialist should have university degree in a relevant field and preferably 10 years' experience in the preparation of Contract Documents for international agency funded highway projects and in claim management on major road or infrastructure projects using FIDIC and preferably 3 years' experience in working on PBM contract. The Contract Specialist should be familiar with the ADB's standard bidding documents and procurement guidelines. The Contract Specialist shall possess knowledge and skills in Contractor's claims management, resolution of disputes, arbitration proceedings in any project involving the FIDIC general conditions, and in the application of price adjustment provisions; and shall have experience in similar geographic areas and shall be proficient in both written and spoken English.

(b) Scope of tasks. The tasks of the Contract Specialist will include, but not be limited to, the following:

- Advise the Client (via the Team Leader) on possible consequences and risks arising from the construction Contract's terms and conditions in making decisions by the Client.
- If necessary, participate in the preparation of Determinations, Variation Orders, Instructions and Addenda to the Construction Contract documents.
- Assist team members, the Employer and the Contractor in interpreting the contract conditions. In case of ambiguity, absence, or contradiction in the definition of the Contract conditions the Contract Specialist shall make proposals for their settlement.
- Assess and monitor contractors' performance to determine and control that all contractual obligations are met and propose resolution mechanisms to the Employer in any case of the Contractor's non-compliance (including but not limited to, the preparation of the Employer's response to Claims placed).

- Review, approve, or reject requests regarding perceived discrepancies between the contract specifications.
- Review Contractors' claims and support the Team Leader in responding to these Claims in line with Conditions of Contract.
- Assist in bid evaluation and in the preparation of the signing of the contract for construction works, if necessary.

**(v) Social Development and Resettlement Specialist**

- (a) The international Social Development and Resettlement Specialist should have a master's degree in social science with preferably 10 years of work experience. Up-to-date knowledge of ADB's safeguards policies and procedures, particularly on social impact assessment, poverty assessment, core labor standards, land acquisition, and resettlement and its implementation is required. Experience with ADB funded projects or projects funded by other multilateral agencies in the transport sector will be preferred. The Specialist shall also have experience in working in multi-disciplinary teams and have good communication skills in the relevant languages.
- (b) The tasks of the Social Development and Resettlement Specialist include, but are not limited to the following:
- To carry out the internal monitoring of LARP implementation compliance and prepare a LARP compliance report:
    - Support IPIG during the LARP implementation activities (i.e. the conclusion of contracts and compensation payments), provide guidance and suggest corrective measures, if needed.
    - Verify that resettlement has been implemented in accordance with the approved final LARP and ADB's Safeguards Policy Statement (SPS 2009) and that compensation has been fully paid according to agreed entitlements.
    - Monitor and evaluate the schedules and the achievement of targets related to land acquisition and resettlement activities.
    - Ensure that resettlement objectives are met and that any affected people's (AP) livelihoods and living standards are restored or enhanced.
    - Review the project impacts on vulnerable and severely affected groups and assess the effectiveness of the mitigation measures adopted.
    - Assess resettlement relevance, efficiency, effectiveness and impact drawing both on policies and practices and suggest any corrective measures, if necessary.
    - Prepare a LARP implementation internal monitoring report.
    - Prepare DDR for Section 1.
  - Regularly oversee the performance of the grievance redress system for the project and report to MOTR and ADB any project-related concerns, queries and complaints registered from the APs, local authorities and other stakeholders; assist MOTR in addressing LAR related complaints throughout the implementation of the project. This includes also developing/improving the existing Grievance Database (electronic format), that helps consolidating, tracking, collating and analyzing

received grievances per type, gender of complainant, solutions, status etc.

- In the event that an unanticipated LAR impact is encountered, facilitate any needed surveys and consultations and prepare an updated LARP (as a supplementary document); and secure all requisite clearances, legal opinions, and agreements as well as reviewing compensation obligations to APs prior to commencement of the civil works.
- Monitor the Contractor's compliance with and performance of, required actions regarding HIV/AIDS, human trafficking, and labor core standards in accordance with the contract documents, such as awareness and education of laborers and workers.
- Ensure that the contractor does not involve child or forced labor in the execution of the civil works contracts in accordance with the provisions of the contract agreement.
- In the event of design changes and/or unforeseen impact of LAR (both permanent and temporary), ensure that the necessary impact assessment surveys, consultations, valuation and preparation of LARP are carried out (as an additional document) and approved by ADB before the implementation; and provide all necessary permits, legal opinions and agreements, as well as compensation to persons affected by the project, prior to the commencement of construction works.
- Support the implementation of the social summary matrix and its implementation progress reporting.

**(vi) Environment Specialist**

- (a) The international Environment Specialist should have a university degree in a relevant field and preferably 10 years' experience and familiarity with all aspects of environmental assessment and management and with significant experience in environmental management, auditing, and monitoring of projects, environmental assessment and/or implementation of environmental mitigation measures on construction projects. The Environment Specialist shall also have experience of working with multi-disciplinary teams of experts.
- (b) Scope of tasks.
  - Coordinate and monitor the project site environment protection for purposes of proper and full implementation of activities as per IEE, EMP, and SSEMP during road construction works.
  - Render assistance to MOTR in the timely updating of IEE, EMP, and SSEMP documentation as required.
  - Coordinate and participate if necessary, in monitoring and carrying out laboratory tests/measurements of sources of contamination of the environment (quality of air, water, dust, noise, vibration).
  - Prepare and provide information on the progress of environment protection measures in monthly reports. Prepare semi-annual environmental monitoring reports which will include detailed discussion of monitoring process findings over the reporting period, environment monitoring findings, and recommended environment improvement measures, updating SSEMP if necessary. Prepare a final environmental monitoring report upon completion of the construction works.

- If necessary, assist in preparation for public hearings and meetings on environment protection issues, and prepare recommendations for MOTR to fulfill ADB requirements.
- Attend to other environment protection activities as per the CSC's TOR.

**(vii) PBM Engineer**

- (a) The international PBM Engineer should have a university degree in a field related to the construction of highways or in civil engineering with preferably 10 years of experience in management of OPBRC (Output and Performance Based Road Contracts) including road rehabilitation and maintenance. Experience in road maintenance and general road asset management will be an added advantage as will background in the training of support staff. Fluency in the English language is required.
- (b) Scope of tasks. The PBM Engineer's tasks shall include but are not limited to the following:
  - Monitor the Contractor's performance in maintaining roads open to traffic and substantially free of interruptions at all times and use best efforts to ensure that these requirements are fulfilled throughout the project period.
  - Be responsible for meeting all the requirements established for the Engineer in the construction contracts for PBM works.
  - Check that the required Maintenance and Service Levels specified for each road section are being complied with in full through an established system of formal and informal inspections described in the Special Specifications.
  - Formally notify the Contractor in the event of any deviation.
  - In the case of any failure by the Contractor to rectify deviations from the required Maintenance and Service Levels within the permitted time or to the required quality, determine in accordance with the provisions of the Specifications what penalties should be deducted from the relevant monthly payment calculation. Also, ensure that these penalties are correctly reflected in the Contractor's Monthly Payment Certificate.
  - Review the Contractor's monthly statements and ensure that the certification to the Employer properly reflects payment due, having regard to all penalties and deductions the PBM Project Manager considers appropriate and to the levels of service achieved.
  - Review the price adjustment data and coefficients included in the Contract, and recommend to the Employer for approval, those price adjustments which are justified.

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**17. Requirements for Key National Staff.** The key national staff should have expertise, knowledge and demonstrated skills as described below.

**(i) Highway Engineer/Deputy Team Leader**

- (a) The Highway Engineer/Deputy Team Leader must be a certified road engineer with a relevant university degree and have preferably 15 years of experience in road construction projects, including preferably 7 years of experience in the design and implementation of road construction supervision, on projects funded by international donors. The Deputy Team

Leader will have responsibility for helping with implementing the project and in managing the team of consultants in support of the international Resident Engineer/Team Leader. The Deputy Team Leader should have good verbal communication and reporting skills.

- (b) Scope of tasks: The scope of tasks of the Highway Engineer/ Deputy Team Leader shall include but not be limited to the following: assisting the Team Leader in coordinating and monitoring the road construction works on site; monitoring of the schedule and construction progress; monitoring of construction works quality; preparation of monthly payment certificates, verification and approval of detailed and as-built drawings; preparation of reports; coordination and monitoring of supervision team on site; inspection of progress and quality of road construction and maintenance works executed by the Contractors; inspection of accomplished works during the defects liability period, preparation of a list of defects (if any), and supervision of the remedial activities of the Contractors, and the issue of defects liability certificates after remedy of any defects by the Contractors.

**(ii) Pavement and Materials Engineer**

- (a) The national Pavement and Materials Engineer should be a senior engineer with university degree in a field related to road design and construction, or higher with preferably 10 years of relevant experiences in modern pavement design methods and in the supervision of road projects with extensive knowledge of local materials for use in road construction. The Pavement and Materials Engineer should be familiar with international pavement design guidelines and pavement construction technologies and in the interpretation of Technical Specifications for materials and testing.
- (b) Scope of tasks. The tasks of the Pavement and Materials Engineer include but are not be limited to the following:
- Review the mix designs for asphalt concrete pavements and concrete for use in engineering structures proposed by Contractors, and approve/propose changes in the mix design, paving method, sampling and testing procedures, and quality control measures to ensure required standards and quality are achieved. Provide the results of the review and recommendations to the Team Leader;
  - Inspect the Contractor's construction equipment.
  - Inspect and approve all materials and sources proposed by the contractor, and ensure the most efficient use of resources and materials.
  - Monitor all quality control activities, including those for materials, earthworks, base courses etc. to ensure that the number of tests and procedures carried out are statistically sufficient.
  - Verify that the work is performed in accordance with the technical specifications and all necessary tests, in order to accept any type of work.
  - Advise the Team Leader on whether or not the Contractors have complied with the material specifications and tests, workplace requirements, and construction specifications.
  - Keep a record of all testing activities, including references to the elements of the work to which the test relates and the location from which the test samples were obtained.

**(iii) Structural Engineer**

- (a) The national Structural Engineer should have a university degree in civil engineering or related fields with preferably 15 years of work experience including 7 years field supervision of the construction of bridges and concrete culverts. The Engineer should possess skills in general bridge and structural engineering including design reviews and the prescription of maintenance techniques.
- (b) Scope of tasks. The tasks of the Structural Engineer include but are not be limited to the following:
  - Review the detailed design of bridges, underground pedestrian crossings, and structures vis-à-vis the technical specifications.
  - Monitor compliance of construction of bridges, underground pedestrian crossings, and culverts with technical specifications and standards and schedules for construction of bridges and culverts and their elements.
  - Prepare inspection reports, and discuss with the Team Leader and the Employer any issues related to the bridge and underground pedestrian crossings design/construction procedures in use, and propose alternative solutions if necessary.

**(iv) Quality Assurance Engineer**

- (a) The national Quality Assurance Engineer should have a degree in civil engineering or a related field with preferably 15 years of work experience including preferably 7 years in quality assurance/quality control for highway and bridge construction works and materials testing. The Quality Assurance Engineer should possess extensive knowledge of laboratory and in-situ field testing of materials.
- (b) Scope of tasks. The tasks of the Quality Assurance Engineer include but are not be limited to the following:
  - Develop a quality assurance system including establishing frequencies and locations for tests and criteria of acceptance of all construction works.
  - Verifying quality control and quality assurance measures undertaken by the Contractors.
  - Provide recommendations and proposals on how to improve the Contractors' internal quality control and suggest means to remedy any non-compliances.
  - Monitor the quality of supplied and in-situ manufactured products (construction materials).
  - Coordinate the teams on site during construction supervision.

**(v) Road Safety Engineer**

- (a) The national Road Safety Engineer should have a Bachelor's degree in road safety or traffic engineering or a broader road construction field and preferably 10 years of work experience in monitoring road safety in road construction projects. The Road Safety Engineer should have knowledge and skills in road safety aspects in design, the application of road safety standards, and in preparing or reviewing safety and traffic management plans for road construction sites and also in the development of road safety campaigns.

- (b) Scope of tasks.
  - Organize and participate in road safety campaigns.
  - Prepare and include information on execution of road safety measures and requirements. Prepare recommendations aimed at improving road safety measures, if necessary.
  - If necessary, assist in preparation for a participation in public hearings and meetings on environmental protection which include measures aimed at improving road-user safety and other activities under the CSC's TOR.

**(vi) Social Development and Resettlement Specialist**

- (a) The national Social Development and Resettlement Specialist shall have a relevant university degree in areas related to the social sector including social sciences; general experience in the relevant field (preferably 7 years); specific experience (preferably 3 years) in international organizations as a social sector specialist, sociologist and/or resettlement specialist, on projects funded by international donors; and experience in conducting social surveys, resettlement and monitoring activities, availability participation in the preparation of relevant of scientific publications will be an advantage. Preference will be given to specialists with experience in LARP implementation and its monitoring.
- (b) Scope of tasks. The tasks of the Social Development and Resettlement Specialist include, but are not limited to the following:
  - Assist MOTR/IPIG in LARP implementation:
    - Assist IPIG in updating the legal data of AP on the basis of identified changes in existing conditions during the period (as of the commencement date) with respect to compensation payments.
    - Assist MOTR/IPIG in organizing information to the AP on the amount of accrued compensation due and the methodology used for calculating the compensation amount (cost) based on the Evaluation Report data.
    - Assist MOTR/IPIG in concluding agreements with AP and for paying compensation.
    - Prepare a report on compliance of the LARP implementation jointly with the international Social Development and Resettlement Specialist and staff of MOTR/IPIG.
  - Register complaints received from local residents. Conduct outreach activities if necessary and conduct training sessions on the GRM process for the Contractors and local authorities;
  - Regularly monitor the impact of project activities on the social aspects of community life. Prepare monthly, quarterly, semi-annual and annual reports. Monitoring shall be carried out in the following aspects:
    - increased attention to women's economic empowerment in the project area;
    - reduction of health risks, social risks and consequences of infrastructure development, such as (HIV/AIDS, sexually transmitted infections), etc.; and
    - identification of opportunities for optimal participation of communities (in particular women and students) in the public information program on road safety matters.

- Assist IPIG in organizing and conducting public consultations and in the preparation of minutes of meetings with AP.
- In the event of design changes and/or unforeseen impact of LAR (both permanent and temporary), ensure that the necessary impact assessment surveys, consultations, valuation and preparation of LARP are carried out (as an additional document) and approved by ADB before the implementation; and provide all necessary permits, legal opinions and agreements, as well as compensation to persons affected by the project, prior to the commencement of construction works.
- Support the implementation of the social summary matrix and its implementation progress reporting; as well as any tasks related to social issues.

**(vii) Environment Specialist**

- (a) The national Environment Specialist should have a university degree directly related to this field and preferably 10 years' experience, proven familiarity with all aspects of environmental impact assessment and environmental management procedures, implementation of environmental management plans, auditing and monitoring for major construction projects. The Environment Specialist shall also have experience in working in teams of multi-disciplinary experts.
- (b) Scope of tasks
  - Coordinate and monitor the project site environment protection against impacts including those described in the IEE, EMP, SSEMP documents, in national environmental legislation, and ADB environmental safeguards.
  - Coordinate and participate, if necessary, in monitoring and carrying out laboratory tests/measurements of sources of contamination affecting the natural environment (e.g. quality of air, water, dust, noise, vibration).
  - Prepare and provide information on the progress made with the implementation of environment protection measures, through the monthly reports. Prepare semi-annual environmental reports which will include detailed discussion of monitoring process findings over the reporting period in the environmental sector with recommended environmental improvement measures available, updating SSEMP if necessary.
  - Assist MOTR in the timely updating of IEE, EMP, and SSEMP documents as required.
  - If necessary, assist in preparations for public hearings and meetings on environmental protection issues, and other environment protection activities as per the CSC's TOR.

**(viii) Quantity Engineer**

- (a) The national Quantity Engineer shall have a relevant university degree with preferably 7 years of experience in determining quantities and payments due for works in road construction projects. Experience in similar internationally funded projects is an advantage.
- (b) The Quantity Engineer shall assist the Employer in:

- checking BOQs against the Technical Specifications provided by MOTR, and recommending any changes if necessary;
- monitoring and measuring the quantity of materials and of plant and equipment present at the construction site in order to minimize the amount of material used, and to ensure that construction costs remain within the budget;
- verifying interim and final payment certificates of contractors, with verification of the BOQs against the measurements;
- preparing Requests for Variation as necessary;
- preparing and maintaining quantity accounting books and lists with the latest information on materials and works;
- auditing and management of monthly financial statements;
- preparing payment schedules and maintaining work schedules and cash flows; and
- maintaining current as-built drawings as work progresses.

**(ix) PBM Engineer**

- (a) The national PBM Engineer should have university degree in the construction of highways or civil engineering and preferably 5 years of experience in management of road rehabilitation with preferably experience in maintenance and operation of roads. Experience in road asset management will be considered as an advantage. The PBM Engineer shall be familiar with local legislation and state standards for road maintenance.
- (b) The national PBM Engineer will assist to the international PBM Engineer. The PBM Engineer's tasks include but are not limited to the following:
  - Monitor the Contractor's performance in maintaining roads open to traffic and substantially free of interruptions at all times and use best efforts to ensure that these requirements are fulfilled throughout the project period.
  - Verify that the required Maintenance and Service Levels specified for each road section are being complied with in full through an established system of formal and informal inspections described in the Special Specifications.
  - Notify formally the Contractor in the event of any deviation.
  - In the case of any failure by the Contractor to rectify deviations from the required Maintenance and Service Levels within the permitted time or to the required quality, determine in accordance with the provisions of the Specifications what penalties should be deducted from the relevant monthly payment calculation. Also, ensure that these penalties are correctly reflected in the Contractor's Monthly Payment Certificate.
  - Review the Contractor's monthly statements and ensure that the certification to the Employer properly reflects payment due, having regard to all penalties and deductions the PBM Engineer considers appropriate and to the levels of service achieved.
  - Review the price adjustment data and coefficients included in the Contract, and recommend to the Employer for approval, those price adjustments which are justified.

## **V. REPORTING REQUIREMENTS AND TIME SCHEDULE FOR DELIVERABLES**

18. The Consultant shall prepare the following reports in English and Russian and distribute them in the number of copies indicated below to MOTR and ADB. The format and content of each report is to be agreed with MOTR and ADB. For each report submitted, an electronic copy will be provided. Standard software shall be used for preparation of the reports.

- (i) Inception report (IR) – shall be submitted within 1 month from the date of signing the contract. IR shall: (I) define the goals and objectives for the services to be provided; (II) state the detailed work program of the project; (III) identify potential problems to address and possible solutions; (IV) identify the staff, employees in the office and other organizations of the Client, and specify their obligations; (V) include analysis of stakeholders involved in the project implementation process; (VI) include an overview of the current project implementation status.
- (ii) Supervision and Quality Assurance Manual – shall be submitted within 3 months after the project start. The Manual shall contain a detailed description of the software system to be implemented, as well as a quality control process to be performed while monitoring the acceptability of works performed.
- (iii) Monthly progress reports – shall be submitted by the 10th of each subsequent month (The Client needs this report for monthly progress monitoring).
- (iv) Quarterly progress reports – shall be submitted by the 15th of each subsequent quarter, and show compliance with safeguard measures [(i) description of project activities during the current quarter with a summary of payments describing; (ii) implementation progress for each component and subcomponent during the corresponding quarter; (iii) problems and delays encountered during project implementation, and proposed measures, and (iv) description of the activities for the next quarter. Such a report shall also contain indicators and targets set in the Project Design and Monitoring Framework].
- (v) Updates of the existing design-stage versions of the semi-annual social monitoring reports (social aspects, land acquisition and resettlement) – shall be submitted within one month after each reporting period, throughout the project implementation period.
- (vi) Semi-annual environmental monitoring reports, throughout the project implementation period, within one month after each reporting period.
- (vii) Updates of the project performance monitoring reports prepared at the design stage including project indicators and achievements. They shall be provided within one month after each reporting period throughout the project implementation period.
- (viii) LARP Completion Report shall be submitted within 15 days after completion of LARP implementation.
- (ix) Review of the Road Safety Audit Reports prepared during the design phase and at the beginning of construction, and the Contractor's proposed road safety and traffic management schemes. The audit shall be conducted and reported during and after the construction phase and reported within the agreed timeframe during the project implementation and within 2 months after substantial completion of the rehabilitation part of the project.
- (x) LARP Implementation Report in English and Russian for review and endorsement/approval by ADB and MOTR.

- (xi) The content of the Project Completion Report shall follow the list provided in the Project Administration Manual, and shall be submitted within 2 months after physical Project completion.

## **VI. CLIENT'S INPUT**

19. The Employer will arrange to provide the following items for the Consultant's use through the Civil Works Contract(s) after award to the Contractor, in accordance with the Technical Specifications contained therein:

- (i) Site office with specified furniture, equipment and consumables;
- (ii) Site laboratory with specified furniture, equipment and consumables;
- (iii) Survey equipment;
- (iv) Living accommodation Type 1, 2 and 3 with furniture and consumables; and
- (v) Vehicles Type 1, Type 2, Type 3 and Type 4 in the specified number and each with drivers, fuel, and repair and maintenance services.

20. The final locations of the offices, laboratories and accommodation units are to be agreed with the successful Contractors and approved by the CSC, at project commencement.

21. Housing. The different types of accommodation specified shall be in compliance with the standard drawings and specifications contained in the respective Contract documents. The accommodation unit shall also be supplied with constant running water and electricity and equipped with water heaters providing an adequate flow of hot water to both kitchen and bathrooms. The Contractor(s) shall be responsible for cleaning and maintaining the accommodation on a daily basis.

22. Laboratories. The Contractor(s) shall provide and install reverse-cycle air conditioning units, electrical heaters and water heaters in the laboratory buildings as directed, and in full compliance with the standard drawings and specifications contained in the respective Contract documents. The air conditioning units and electrical heaters, in combination with building insulation, shall be such as to enable the maintenance of a constant internal temperature of 20 degrees C in the accommodation throughout the year. The Contractor(s) shall be responsible for cleaning and maintaining the laboratories on a daily basis.

23. Equipment. The Contractor(s) shall provide a minimum of one telephone line connected to an international telephone service. All expenses in connection with the installation and maintenance of the telephone shall be included in the relevant tendered rates in the Works Contracts.