

Ministry of Natural Resources, Ecology and Technical Supervision of the Kyrgyz Republic

Air Quality Improvement Project (P177467)

TERMS OF REFERENCE

Consulting services: Detailed Design, Cost estimates and Author's supervision for the construction of air pollution analysis laboratory and data processing center

I. PROJECT BACKGROUND

The Ministry of Natural Resources, Ecology and Technical Supervision of the Kyrgyz Republic (hereinafter referred to as MNRETS) is currently implementing a World Bank funded Kyrgyz Republic Air Quality Improvement Project (hereinafter referred to as Project).

The main objective of the Project is to i) strengthen the capacity of the Kyrgyz Republic to manage air quality; and ii) reduce net PM2.5 and GHG emissions in Bishkek.

The first part of the project objectives is premised on the need to strengthen national capacity on air quality management (AQM) in the country and laying the foundation for comprehensive air quality management system (AQMS) for effective AQM. The establishment of AQMS will enable the Government to make informed decisions and ensure sustainability of the investments in priority areas and sectors in the long term.

The second part of the project objectives reflects investments in the selected priority sectors for improving AQ in Bishkek City.

The project consists of three main components:

- Component 1: Strengthen Air Quality Management System;
- Component 2. Support the adoption of clean heating solutions;
- Component 3: Improve Urban Greening.

The Project is implemented by the Project Implementation Unit (PIU) under the MNRETS, which currently requires consulting services under Component 1 "Strengthening the Air Quality Management System". Under this component, the Project will finance the construction of a modern laboratory (energy efficient and seismically resistant) building in Bishkek City to strengthen the capacity of the Department of Environmental Monitoring (DEM) of the MNRETS, whose main activity is the implementation of a unified state policy in the field of environmental monitoring of pollution of environmental objects. The building will house a modern environmental laboratory as well as an integrated data management center. The data center will handle all environmental and greenhouse gas emissions data for the entire country.

This Terms of Reference (hereinafter referred to as the Assignment) describes the required competences of the Consultant to support the PIU in preparation of a detailed design and cost estimate for the construction of the modern laboratory building which will house the of a laboratory as well as the data processing center for the DEM under MNRETS.

II. OBJECTIVE OF THE ASSIGNMENT

The main objective of the present Assignment is to prepare a complete package of technical design for the construction of a modern laboratory and data processing center (hereinafter referred to as DPC) for DEM, the location of which was determined by the MNRETS and conduct author's supervision during the civil works.

III. SCOPE OF SERVICES

The scope of the Consultant's services consists of the following tasks and will be performed as follows:

TASK I. PREPARATION OF CONCEPTUAL DESIGN (ARCHITECTURAL CONCEPT) FOR THE LABORATORY BUILDING

Preliminary analysis and data collection:

- Analyze the construction site (location, topography, climatic conditions), limitations of land area and necessary communications (utility services);
- Obtain from the Client documents of title and legal documents for the land plot, regulations on the use of the territory within its boundaries, and the purpose of the object following the land use rules and make sure that a complete list of documents is available;
- Study of urban planning regulations and requirements, and constraints for the construction of the laboratory.

Development of the architectural concept

- Defining the overall Concept and style of the project, considering the climate resilience and energy efficiency of the building (optimal orientation of the building to the sun and wind to reduce consumption in heating, cooling, and lighting);
- Possibility to apply methods and technologies to ensure resilience to potential climate risks (use of solar water heaters, heat pumps, solar electric panels, heat recovery, implementation of automatic energy management, water reuse, natural ventilation, etc.), and also in accordance with the Law of the Kyrgyz Republic "On the energy efficiency of buildings" dated 20.06.2019 No. 74;
- Propose two unique conceptual designs with analytical rationale;
- Functional Zoning Determination.

Sketching:

- Development of volume-planning solutions considering the functioning of the laboratory and data processing center, equipment, and work areas.
- Development of major architectural elements with explications and specifications (situation site layout, master plan, facades, sections, floor plans and roof plan, etc.)

Visualization:

- Creating 3D models and visualizations.
- Preparing collages and diagrams.

Customer approval:

- Preliminary presentation of the conceptual design to the Client.
- Adjusting sketches based on feedback.
- Project Finalization.
- Prepare final package of documents to obtain further approval from the authorized state body.

Conducting a preliminary environmental and social impact assessment:

- Analyze the potential risks of environmental and social impacts of the project.
- Prepare the Environmental and Social Impact Assessment report.
- Adjust the Report based on the comments provided by the Client and the World Bank.

Engineering and geological surveys of the construction site:

Geological and engineering surveys should be sufficient to develop design and cost estimate documentation for the construction of a modern laboratory. The graphical part of the report should contain maps of existing materials (by sites, routes, territories, and their variants); maps of engineering-geological conditions; engineering-geological sections; columns or descriptions of mine workings, and others. When drawing up the graphical part of the technical report it is necessary to use conventional symbols following the requirements of GOST 21.302-2013 "Conventional graphic symbols in the documentation on engineering-geological surveys". Appendices to the report should contain:

tables of laboratory determinations of soil properties and chemical composition of groundwater with the results of their statistical processing; tables of results of geophysical and field studies of soils and other works in case of their performance; catalogs of coordinates and marks of excavations, probing points, geophysical studies and, if necessary, other materials.

The composition and content of the Conceptual Design shall be by the established procedure in the Kyrgyz Republic.

TASK II. PREPARATION OF THE DETAILED DESIGN AND WORKING DOCUMENTATION.

VOLUME PLANNING AND STRUCTURAL SOLUTIONS

When developing space-planning and design solutions for laboratory buildings, the consultant shall follow the requirements of SN, SNIIP, SanPiN and other regulatory and legal requirements for the design of laboratory buildings.

When developing volume-planning and structural solutions for laboratory buildings, the requirements of SN, SNIIP, SanPiN and other regulatory and legal requirements for the design of laboratory buildings should be observed. The recommended number of floors of the building is 3 stories with basement.

Table 1. Recommended zoning of premises/ rooms and approximate areas in 3-storeyed building with basement

Floor 1			
#	Title of premises	Furniture, Fixtures, and Equipment	Area of rooms (m²)
1	Stairs		16
2	Sample acceptance (OAMCOP)		18
3	Dishwashing room (OAMCOP)	Fume cupboard Laboratory wash table (two sinks) 1800 mm*800 mm*920 mm Wash basin	48
4	Soil chemical analysis (nitrate and ammonia nitrogen)	Fume cupboard Laboratory wash table (one sink) 1500 mm*800 mm*920 mm	25
5	Liquid chromatograph for determination of benzopyrene	Fume cupboard Laboratory wash table (one sink) 1500 mm*800 mm*920 mm	25
6	Fire escape corridor		6
7	Bathroom	2 sinks, 2 cabins	9
8	Shower room		9
9	Data processing center (DPC)	Server equipment	76
10	Soil chemical analysis (cyanide, sulfate)	Fume cupboard Laboratory wash table (one sink); 1200 mm*800 mm*920 mm	16
11	Soil chemical analysis (petroleum products)	Fume cupboard Laboratory wash table (one sink); 1200 mm*800 mm*920 mm	16
12	Muffle furnace (coal)	Exhaust	16
13	Spare entrance		16
14	Coal sample preparation	Mill fume cupboard	20
15	Sample reception (coal and soil)		18
16	Weighing		18

17	Soil sample preparation	Fume cupboard	16
18	Sample storage		15
19	Washing, dis. Water		18
20	Coal devices (Sulfur and carbon analyzer, calorimeter, ash and moisture contents)	3 instrument hoods. Laboratory sink table (one sink): 1500 mm*800 mm*920 mm	28
21	Room for the OptiMass 9600 ICP Time-of-Flight Mass Spectrometer (ICP-TOFMS) instrument	Extractor hood for the appliance Laboratory sink table (one sink): 1500 mm*800 mm*920 mm	28
22	Room for Atomic Absorption Spectroscopy AA-7000 instrument (Shimadzu)	Appliance hood for the appliance. Sink for drainage.	15
23	Gas chromatograph	Appliance hood for the appliance. Sink for drainage.	16
24	Soil chemical analysis (mobile phosphorus and potassium)	Fume cupboard. Laboratory sink table (one sink): 1500 mm*800 mm*920 mm	15
25	Dressing room (changing room)		15
26	Soil and coal data processing		44
27	Soil chemical analysis (humus, water extract, chloride)	Fume cupboard. Laboratory sink table (one sink): 1500 mm*800 mm*920 mm	22
28	Main entrance corridor		16
	sub-total:		600 m²
Floor 2			
Chemical analyses			
1	Nitrogen group	-table sink LAB-M MD 150.65.90 RR 1500*650*900 mm -cabinet with sink and mixer 1800*900*2300 mm -table sink laboratory end table	30
2	Sulfate, chloride	-table sink LAB-M MD 150.65.90 RR 1500*650*900 mm -cabinet with sink and mixer 1800*900*2300 mm -table sink laboratory end table	30
3	Ion chromatograph	-table sink LAB-M MD 150.65.90 RR 1500*650*900 mm	30
4	Suspended solids	-table sink 800*800*920 mm	30
5	Room for Atomic Absorption Spectrometer SavantAA Zeeman instrument	-table sink 800*800*920 mm -ventilation hood -cabinet with sink and mixer 1500*900*2300 mm	15
6	pH, transparency	-table sink 800*800*920 mm	15
7	Automatic titrator	-table sink LAB-M MD 150.65.90 RR 1500*650*900 mm -cabinet with sink and mixer 1500*900*2300 mm	18
8	Receiving unit	- table sink LAB-M MD 150.65.90 RR 1500*650*900 mm	18
9	COD	-table sink LAB-M MD 150.65.90 RR 1500*650*900 mm -cabinet with sink and mixer 1800*900*2300 mm	18

		-table sink laboratory end table	
10	Phenol	-table sink LAB-M MD 150.65.90 RR 1500*650*900 mm -cabinet with sink and mixer 1800*900*2300 mm -table sink laboratory end table	18
11	Cyanide	-table sink LAB-M MD 150.65.90 RR 1500*650*900 mm -cabinet with sink and mixer 1800*900*2300 mm -table sink laboratory end table	18
12	Petroleum products	-table sink 800*800*920 mm	18
13	SPAV synthetic surfactants	-table sink 800*800*920 mm -cabinet with sink and mixer 1800*900*2300 mm	18
14	Mercury analyzer room	-table sink 800*800*920 mm -ventilation hood	18
15	BOD+permagnetic oxidizability	-table sink LAB-M MD 150.65.90 RR 1500*650*900 mm -cabinet with sink and mixer 1500*900*2300 mm (2 pcs.) -table sink laboratory end table	30
16	Radiation	-table sink LAB-M MD 150.65.90 RR 1500*650*900 mm	33
17	Weighing	-table sink LAB-M MD 150.65.90 RR 1500*650*900 mm	15
18	Canister washing	-table sink LAB-M MD 150.65.90 RR 1500*650*900 mm	15
19	Distilled water production room	-table sink LAB-M MD 150.65.90 RR 1500*650*900 mm	18
20	Working room of the technical safety engineer		24
21	Data processing (OAMCOP)		45
22	Data processing (radiation)		24
23	Data processing (OMBP)		45
24	Wardrobe		15
25	Analytics, stat analysis		24
26	Bathroom		9
27	Shower room		9
	sub-total:		600 m²
Floor 3			
Scheme of the Sector for Monitoring Atmospheric Air and Industrial Emissions and Administration			
1	Room for receiving atmospheric air and industrial emissions samples	sink, fume hood	36
2	Sample preparation room	Sink, fume hood	24
3	Weighing room		18
4	Analysis room	Sink, fume hood	24
5	Room for producing distilled, bidistilled, ionized water	2 sinks	20

6	Washing room, bathroom Washing room + bathroom (washing room 14 m ² + bathroom 2 m ² =16m ²)	2 sinks, hood	16
7	Room for chemical analysis	2 sinks, 2 fume hood	24
8	Room for preparation and storage of reagents	Sink, fume hood	20
9	Room for conducting gas analyzer analysis	hood, sink	42
10	Room for processing results	sink	30
11	Room for muffle furnace and drying cabinet	sink, fume hood	20
12	Room for determination of volatile organic compounds (VOC)	sink, fume hood	20
13	Room for conducting analyses on gas analyzers (formaldehyde, radon, benzopyrene)	sink, fume hood	20
14	Room for determination of odor	sink, fume hood	18
15	Room for processing results	sink	24
16	Office for 4 department heads	sink	42
17	Accounting, cashier	sink	24
18	HR and lawyer	sink	21,6
19	Reception room for citizens	sink	18
20	Director (meeting room)		24
21	Reception		18
22	Deputy Director		20
23	Archive		20,4
24	Quality Manager		18
25	Technical staff, driver (MOP)		20
26	2 Guest bathrooms, storeroom	2 sinks	18
	sub-total:		600 m²
	Grand total:		1800 m²

1. HEATING AND VENTILATION REQUIREMENTS

The design of the ventilation and heating system should be carried out in accordance with the requirements of sanitary-epidemiological, environmental, fire, and building requirements for laboratories and data processing center. Laboratory heating and ventilation requirements are critical to ensure safe and comfortable working conditions, as well as to prevent air pollution and maintain the accuracy of measurements.

Minimum requirements include:

Heating and hot water supply

Use of modern types of technology as renewable energy sources:

• consider the possibility of using alternative types of heating and hot water supply, including the use of heat pumps, solar collectors, etc.

Temperature Control:

- The laboratory should be kept at a constant temperature, depending on the requirements of specific experiments and equipment.

Heating uniformity:

- The heating system should ensure that heat is evenly distributed throughout the room.

Manageability:

- The heating system should be adjustable, with the ability to locally adjust the temperature in different areas of the laboratory.

Ventilation

- It is necessary to provide a high ventilation system on all floors, where fume hoods are located;
- Premises with fume hoods must be located in one part of the building, ensuring high noise insulation;

Air exchange rate:

- A high air exchange rate should be maintained in the laboratory to remove contaminants and supply fresh air.
- Air exchange rates may vary depending on the type of work being performed for general laboratories and higher for special areas.

Separation of ventilation zones:

- The laboratory should be divided into areas with different ventilation requirements (e.g., toxic area, clean sample area).
- Each area should have its own ventilation system to prevent cross-contamination.

Emissions and extraction:

- Exhaust ventilation must effectively remove harmful gases, vapors, and aerosols from areas where chemical or biological experiments are conducted.
- Fume hoods shall be equipped with independent exhaust systems that provide safe removal of contaminants.

Air Filtration:

- Ventilation systems should have filters to clean incoming and outgoing air of dust, microorganisms and chemical contaminants.

Pressure Balance:

- It is important to maintain the proper pressure balance between the different areas of the laboratory (e.g., negative pressure in the hazardous materials area to avoid contaminant leakage).

Automation and control

Climate control system:

- Heating and ventilation systems should be integrated with an automatic control system that monitors and regulates temperature, humidity and air quality.
- It should be possible to remotely monitor and control the microclimate parameters.

Sensors and alarms:

- Temperature, humidity and air quality sensors should constantly monitor conditions in the laboratory and alert you to any deviations.
- The system shall be equipped with alarms to warn of ventilation or heating failures.

Safety

Fire Prevention:

- Ventilation systems shall have fire dampers and devices to prevent the spread of fire and smoke.
- Emergency ventilation shall be provided that is activated when dangerous concentrations of gases or smoke are detected.

Sanitary Standards:

- All heating and ventilation systems must comply with sanitary and hygienic standards established for laboratory facilities.

2. REQUIREMENTS FOR POWER SUPPLY AND ELECTRICAL DEVICES

Electric power supply, power electrical equipment, and electric lighting should be designed following the Rules for Electrical Installations, instructions for the design of power supply, power and lighting electrical equipment, earthing, and grounding networks in electrical installations, and lightning protection of buildings and structures.

3. WATER SUPPLY AND SEWERAGE REQUIREMENTS

The design of the water supply and sewerage system should be carried out in accordance with the sanitary-epidemiological, environmental and construction requirements for laboratories. All methods should be considered during development. The building should be provided with a combined internal water supply (domestic and drinking, industrial and fire-fighting). The water should be of potable quality. Requirements for the quality of water for technological equipment and its temperature parameters should be established by the technological task. For industrial water supply of a group of buildings should be provided centralized systems of recycled water supply and water reuse.

Provide for wastewater treatment before discharge into the sewer system. The composition and concentration of contaminants in the production wastewater should be determined according to the technological data.

4. HOT WATER SUPPLY REQUIREMENTS

Hot water supply points to sanitary appliances and technological and other equipment should be provided in accordance with sanitary norms and requirements for equipment.

5. SAFETY REQUIREMENTS

Fire Safety:

- Provide for the installation of fire alarms and fire extinguishing systems in accordance with current national requirements and obtain a positive opinion from an authorized state body;
- Use of non-combustible materials and sealed joints.

Chemical Safety:

- Organization of chemical waste collection and neutralization system;
- Ensuring personnel are protected by ventilation systems.

Gas supply:

- Provision should be made for the construction of separate premises for the installation and maintenance of gas cylinders for different purposes with a separately piped supply line

Occupational Health and Safety:

- Consider the organization of workplaces according to ergonomic requirements;
- Consider ensuring the safe storage and transportation of chemicals.

Video surveillance system and internet communication system.

- Provide for the design of a video surveillance system to secure the building, monitor critical areas, and reduce the risk of unauthorized access;
- Provide for the design of a video surveillance system for laboratory premises;
 - When designing a video surveillance system, consider the requirements following the Law of the Kyrgyz Republic "On Outdoor Video Surveillance".

Technical requirements:

- Camera resolution: good camera resolution (Full HD);
- View angle: Wide-angle cameras with a minimum 90° viewing angle for common areas;

- Night photography: Cameras shall be equipped with infrared illumination for night photography. It shall be possible to shoot in low light or total darkness;
- Weather protection: IP66 dust and moisture protection is required for outdoor cameras;
- Resistant to temperature fluctuations between -40°C and +50°C;
- Vandal-resistant properties: Cameras shall have vandal-resistant housings;
- Data Transfer: Supports wired connection via Ethernet or wireless via Wi-Fi;
- Data Storage: The system shall provide storage of video archives for the last 30 days;
- Use of network video recorders (NVRs) with data backup capability. Support for modern video compression codecs such as H.265 to save disk space;
- Intelligent functions: Motion detection, face recognition, etc.;
- Access to video stream: Remote access to video stream via mobile applications or web interface. Distinguishing access rights for different categories of users;
- Integration with other systems: Integration with access control systems. Interaction with alarm and notification systems;
- Reliability and fault tolerance: The system must provide continuous operation 24/7;
- Connection to uninterruptible power supplies (UPS) for operation in the event of a power outage;
- Maintenance and control: Possibility of remote monitoring of equipment status. Regular maintenance and software updates. Installation of video surveillance alerts at camera locations;
- Camera Location: Install cameras at key monitoring points on the site. Avoiding dead zones and covering all significant monitoring areas;
- Cable infrastructure: Cabling should be laid in compliance with fire safety, construction norms and aesthetic requirements. Use of protective boxes and sealed connections for outdoor chambers;

Design a structure that provides a connection to the Internet and distribution of this connection between devices in the local network.

6. AUXILIARY FACILITIES

Household facilities shall be designed following SNiP for the design of auxiliary buildings and premises. Recommended additional facilities.

	Facility	Capacity
1	Training Center (lobby, cloakroom, and restroom)	<ul style="list-style-type: none"> • Large hall for 60 people (150 m²); • Small hall for 40 people (100 m²)
2	Basement. Storage facilities: <ul style="list-style-type: none"> • Precursor • Storage for soap and detergents • For cylinders (PGS) of atmospheric air • For reagents and reactants 	20 m ² 20 m ² 20 m ² 40 m ²

7. ENVIRONMENTAL AND SOCIAL REQUIREMENTS

At the stage of the draft design and further stage, in accordance with national legislation, conduct an Environmental and Social Impact Assessment, taking into account the assessment and analysis of the possible impact of the laboratory at the stages of construction and operation. Obtaining a positive expert opinion from the state authorized body for environmental protection.

8. SPECIAL CONSTRUCTION CONDITIONS

In accordance with national legislation, provide a sanitary protection zone for the laboratory building (if necessary).

9. AUTHORIZATION

To obtain a town planning conclusion (TPC) and Engineering- Technical Conditions (ETC) for connection to engineering networks from the local architecture authorities following the procedure established by the KR.

According to the received Design Permits (DP), develop a design and construction project and obtain a positive conclusion of the relevant expertise following the established procedure in the KR.

10. REQUIREMENTS FOR THE COMPOSITION AND CONTENT OF THE Detailed Design documentation

The composition and content, as well as development procedure of the detailed design should comply with the national legislation and the current acting (in force) building codes on territory of the Kyrgyz Republic. [\[reference\]](#)

- a) General explanatory note;
- b) Situation diagram of the area of placement of the projected construction object in the system of the city, settlement, and undeveloped free territory in scale 1:5000, 1:10000;
- c) a reference plan of the development site with a specific indication of existing buildings, structures, engineering and technical systems, and communications on a scale of 1:2000, 1:500. The reference plan shall indicate the location of the boundaries of the land plot and its occupied area, existing capital buildings, accesses to the design object, engineering communications, zones of validity of easements, red lines and building lines, location of sanitary breaks and protection zones, adjacent territory subject to improvement;
- d) A master plan for the development of the site following the requirements of the master plan section;
- e) The report on the results of performed calculation and technical substantiation (CTS) of the adopted volume-planning and construction-structural solutions of buildings and structures concerning and ensuring their strength, load-bearing capacity, stability, reliability, and earthquake resistance. Requirements to ensure the safe operation of the building;
- f) Architectural and structural drawings of all floor plans and roof plan at a scale of 1:100 or 1:200;
- g) Drawings of internal engineering systems and communications, including ventilation, heating, electricity, water supply, gas, sewerage, lightening, fire alarm, etc. on a scale of 1:100 or 1:200;
- h) Drawings of external engineering networks and communications;
- i) Characteristic cross sections at a scale of 1:100 or 1:200;
- j) Facades at a scale of 1:100 or 1:200;
- k) Perspectives, axonometry, 3-D projections - in arbitrary scale, production of the layout at the discretion of the customer;
- l) Determination of technical and economic indicators of the project and estimated term of its realization in kind.

Basic set of documentation at the Project (P) stage:

Section 1. Explanatory Note;

Section 2. Master Plan;

Section 3. Architectural Solutions;

Section 4. Information on engineering equipment, engineering and technical support networks, list of engineering and technical measures, the content of technological solutions:

- a) subsection "Electricity and power supply system";
- b) subsection "Water supply system";
- c) subsection "Wastewater disposal system";
- d) subsection "Heating, ventilation and air conditioning, heat networks";
- e) subsection "Communication and video surveillance networks";
- f) subsection "Gas Supply System"
- g) Subsection "Technological solutions";

Section 5. "Construction Organization Project";

Section 6. List of environmental protection measures;

Section 7. Fire safety measures;

Section 8. Measures to Ensure Access for Persons with Disabilities;

Section 9. Measures to Ensure Compliance with Energy Efficiency Requirements and Requirements for Equipping Buildings, Structures, and Facilities with Metering Devices for Energy Resources Used;

Section 10. Consolidated cost estimate for the construction of capital construction objects (approved by the technical task for design in coordination with the Customer).

The main set of drawings at the "Working Documentation" (WD) stage:

Working documentation - a set of working graphical and text documents containing the necessary information about the construction object and is the basis for the production of construction and installation works, as well as the manufacture of construction products at factories or directly at construction sites.

1. **Set of Master Plan (MP) drawings:** layout drawing, plan of relief organization, plan of earth masses, summary plan of utilities, landscaping, including explication of buildings / facilities, type of coatings;
2. **Set of drawings of "Architectural Section" (AS) mark:** Basement, first, second, third and technical floor plans, roof plan, sections and details of connections, facades, entrances, assemblies and details, specifications and explications, perspective;
3. **Sets of drawings of "Constructive (Structural) Section" (CS) mark:** Excavation plan, foundations, walls and floors of basement, first, second, third and technical floors, roof plan, elevators, sections and details of connections, stairs, entrances, assemblies and details, specifications, design justification of structural section (as structural calculation and analysis report); **(report on the results of calculation and analysis of the load-bearing structure of the building)**
4. **Set of drawings of "Heating and Ventilation" HVAC:** ITP, plan of engineering equipment (heating and ventilation) of the basement, first, second, third and technical floors, schemes, specifications;
5. **Set of drawings of "Water Supply and Sewerage" (WS) mark:** Plan of engineering equipment (water supply, sewerage, stormwater) of basement, first, second, third and technical floors, schemes, specifications;
6. **Set of drawings of "Internal Electricity Supply and Equipment" (IES):** Plan of engineering equipment (electrical equipment and lighting) of a basement, first, second, third and technical floors, schemes, specifications;
7. **Set of drawings of Low Current Systems" (LCS) section:** Plan of engineering equipment (telephonization, television, radiofication, fire alarm system) of basement, first, second, third and technical floors, schemes, specifications.
8. **Set of drawings of the other sections:** lift / elevator; septic tank, fire tank (reservoir), energy efficiency report, environmental impact assessment report.

The composition of the attached documents and the necessity of their fulfillment are established by the technical assignment for design and relevant standards. Annex 3 is provided the necessary set of main and additional elements which should be considered in development of drawings and reports under the Working Documentation Stage.

Estimated costs

Execute a Bill of quantities (BOQ) and cost estimate documentation. The cost estimate documentation should be performed in two variants - based on the definitions of the current unit rates of the State Agency of Architecture, Construction and Housing and Communal Services under the Government of the Kyrgyz Republic (SAACHCS) under the Cabinet of the Ministries of the KR, as well as according to current market rates. The cost estimate should consider major repairs including sanitation facilities upgrade. Identification of possible unaccounted-for scope of work in the cost-estimated portion of the project should also be specified. In case of occurrence of other unaccounted volumes during construction, the Developer of detailed design and cost estimate documentation (DED) shall make appropriate adjustments to DED and, if necessary, obtain the required conclusion on expertise at its own expense.

Implementation Plan

1. Develop an action plan for construction site preparation, worker accommodation, placement of construction equipment, and storage of construction materials, considering environmental, health and safety measures.
2. Develop a detailed time schedule for the construction of the building by the approved DED.
3. The Consultant shall propose a plan for technical supervision and monitoring of construction (civil) works.
4. Develop a plan for delivery of construction materials to the construction site.
5. The action plan, detailed time schedule and delivery of materials for construction of building can be developed in accordance with the current building codes, particularly SN KR 12-02:2018 "Organization of construction works" and SN KR 12-01:2018 "Occupational safety in construction".

TASK III: AUTHOR'S SUPERVISION

The author's supervision is carried out by a separate additional contract to the main contract for design, which will be concluded after the hiring of the Contractor/s. Author Supervision shall be performed in accordance with the national legislation - in case of technical issues during the civil works at construction site conducted following design solutions, types of specific construction works, which are evidenced with the Acts for hidden works and acceptance into commission of completion.

IV. DURATION OF THE ASSIGNMENT (OR SCOPE OF SERVICES)

The duration of the Consultant's assignment (or scope of services) under Task I and II shall be completed within 10 months from the date of signing the Contract. The Task III – Author Supervision will begin / start after the Contract for Construction will be signed and will be carried out throughout the full construction period until (its) completion.

V. EXPECTED DELIVERABLES

TASK I: Preparation of Conceptual design

- Results of the preliminary analysis;
- General Concept and style of the project considering the climate resistance and energy efficiency of the building;
- Sketch options;
- Results of engineering and geological surveys at the construction site.

TASK II: Preparation of the Detailed design and working documentation

- Design Permits (Act on architectural urban planning conclusion);
- Architectural and construction (structural) design;
- Engineering Design;
- Estimated Costs;
- Implementation Plan.

TASK III: Author's supervision:

- Monthly progress reports related to monitoring on performance of construction works according to DED and detailed time schedule, including ESMP and technical issues discussed and solved during the site visit and observation.

VI. CLIENT CONTRIBUTION

1. When conducting engineering survey works, the PIU will ensure cooperation with the Client's administration in providing free access to the site and necessary information;
2. During the development of the DED, the PIU will support the Design Consultant during the approval and permitting procedures with the relevant governmental authorities only if necessary.
3. The PIU, through the MNRETS, will assist, if necessary, in the development of the Involuntary Resettlement Plan;
4. The PIU will assist in the timely resolution of any issues that may arise that impede the performance of the design and survey work;
5. The PIU will support the discussion of materials through the placement of information in public places, as well as measures to ensure the participation of Bishkek residents, including women, in the decision-making process;
6. Before starting the conceptual (preliminary) design for the construction of the building, the PIU will provide the Consultant with the necessary materials and documents within its competence, based on the recommendations of the involved state bodies.

VII. REPORTING REQUIREMENTS AND PAYMENT SCHEDULE

Deliverables	Description	Submission deadline	Copies	Payment
Inception (commencement) report	Scope of work, work plan and time schedule, team members and its responsibilities, methodology of project implementation, including survey methodology, risks description and recommendations	2 weeks from the date of contract signing	2 hard copies in Russian and 1 soft copy in Russian and English	10%
Progress report No. 1	Results of preliminary analysis and data collection, design concept with the preliminary environmental and social impact assessment	2 months from the date of contract signing	2 hard copies in Russian and 1 soft copy in Russian and English	10%
Progress report No. 2	Engineering and geological surveys at the construction site	3 months from the date of contract signing	3 hard copies in Russian and 1 soft copy in Russian and English	10%
Progress report No. 3	Final conceptual design	5 months from the date of contract signing	3 hard copies in Russian and 1 soft copy in Russian and English	10%
Progress report No. 4	Preliminary Detailed design with full package of design and working documentations	7 months from the date of contract signing	3 hard copies in Russian and 1 soft copy in Russian and English	20%
Environmental Impact Assessment Report	Environmental Impact Assessment Report	8 months from the date of contract signing	3 hard copies in Russian and 1 soft copy in Russian and English	10%
Final report	Final Detailed design with the full package of design and working documentation and all necessary approvals from the authorized state bodies	10 months from the date of contract signing	5 hard copies in Russian and 1 soft copy in Russian and English	20%
Author's supervision reports	Description of the work performed, results of control and comments	Monthly throughout full construction period	2 hard copies in Russian and 1 soft copy in Russian and English	10% (over the supervision period)

VIII. QUALIFICATION REQUIREMENTS AND SELECTION CRITERIA

Minimum qualifications to the Consulting Company

- Minimum of 7 years total experience in building design and author supervision;
- Experience in at least 2 projects in the development of detailed design and cost estimate documentation (DED) for the construction of new public buildings, and laboratory design for the last 5 years will be an advantage;
- Availability of a license for the development of DED of at least II (second) level of responsibility and a license for engineering and geological surveys of at least II (second) level of responsibility valid in the Kyrgyz Republic.

Foreign firms and joint ventures are encouraged to submit Expressions of Interest and should be informed that the winning Consultant/joint venture must have the necessary licenses to perform the assignment.

Criteria to evaluate the technical proposal of the company that received the highest score when evaluating expressions of interest:

The number of scores awarded to each of the following positions or specialties should be determined taking into account the following sub-criteria and the corresponding percentage:

- Methodology and work plan for completing the assignment 15%
- Experience and qualifications of key staff 85%

If the technical proposal does not reach 75%, the Client has the right to ask the second-highest consultant to provide a technical proposal

Criteria for selection of key personnel

Professional specialists will be required to prepare a well-researched, analyzed, and developed product. Accordingly, the professional resumes of 15 key specialists will be evaluated during the selection process. The team of specialists may be supplemented depending on the needs of the project team as and when is required. In addition to the key positions, the assignment will require several supporting technical and non-technical professionals. Some of the supporting specialists may have experience in areas such as surveying, civil engineering, mechanical and electrical engineering, geotechnical engineering, hydraulic and sanitary engineering, economics and communications, etc.

Project Chief-Engineer and Consultants Team Leader (international/national experience) – 5 person/ month.

Must-Have:

- Higher education/master's degree in civil and industrial engineering, relevant certificate to perform the works specified in this ToR;
- Related experience as a Team Leader for at least 2 projects where the scope and complexity of work is similar to the proposed assignment;
- At least of 7 years of relevant professional experience in areas related to earthquake-resistant building design, structural and seismic analysis, and design work to improve the earthquake-resistance of buildings and structures using modern technology, and construction supervision;
- Availability of a relevant qualification certificate obtained from authorized state body and valid in the Kyrgyz Republic.

Project Chief-Architect, Deputy Team Leader of consultants (international/national experience)

– 4 person/month. Must Have:

- Higher education/master's degree in the specialty of Architect in civil and industrial engineering, appropriate certificate to perform the works specified in this ToR;
- Related experience for at least 2 projects where the scope and complexity of work is similar to the proposed assignment;
- At least 7 years of relevant professional experience in fields related to the architectural design of buildings and social facilities using modern technologies, as well as construction author supervision. International experience in the architectural design of laboratories is an advantage;
- Availability of a relevant qualification certificate obtained from authorized state body and valid in the Kyrgyz Republic.

Leading Expert in Energy Efficiency (national experience) – 3 person/month. Must-Have:

- Higher education/master's degree in mechanical or energy engineering;
- Related experience for at least 2 projects related to measure definition, heat load calculations, requirements, losses, energy passports for buildings, measurements, design, and technical specifications;
- At least 7 years of experience in building energy efficiency (e.g., roof, wall and basement insulation, window replacement, lighting, etc.). International experience in energy efficiency will be an advantage;
- Availability of a relevant qualification certificate obtained from authorized state body and valid in the Kyrgyz Republic.

Design Engineer (national experience) – 4 person/month. Must-Have:

- Higher education/master's degree in civil and industrial engineering relevant certificate to perform the works specified in this ToR,;
- Knowledge of current design standards of the Kyrgyz Republic is mandatory. Knowledge of nonlinear analysis is an advantage;
- Minimum of 7 years of relevant experience in fields related to structural and earthquake engineering of social buildings and facilities, particularly related with structural design of laboratories is an advantage;
- Availability of a relevant qualification certificate obtained from authorized state body and valid in the Kyrgyz Republic.

Calculation Engineer (national experience) - 3 person/month. Must-Have:

- Higher education/master's degree in civil and industrial engineering;
- Appropriate experience in performing calculations and analysis of buildings and structures for at least two social facilities;
- At least 7 years of relevant experience in the field of calculation and analytical evaluation of building structure's load-bearing capacity, related with laboratories is an advantage;
- Availability of a relevant qualification certificate obtained from authorized state body and valid in the Kyrgyz Republic.

Cost Estimation Engineer (national experience) - 2 person/month. Must-Have:

- Higher education/master's degree in technical or economic specialty;
- Related experience in cost estimation on design and construction of social facilities;
- At least 5 years of experience and good knowledge of construction technology, have broad economic knowledge, related with laboratories is an advantage;
- Availability of a relevant qualification certificate obtained from authorized state body and valid in the Kyrgyz Republic.

Water Supply and Sanitation Engineer (national experience) - 2 person/month. Must-Have:

- Higher education/master's degree in water and wastewater engineering;
- Related experience in the design of water supply and wastewater disposal systems for social facilities;
- Minimum of 7 years of relevant experience in water and wastewater system design, related with laboratories is an advantage;
- Availability of a relevant qualification certificate obtained from authorized state body and valid in the Kyrgyz Republic.

Manufacturing (Technology) Engineer (national experience) - 3 person/month. Must-Have:

- Higher education/master's degree in civil and industrial engineering, technology;
- Related experience in process design of social facilities;
- At least 7 years of relevant experience in process design of industrial and civil facilities of various industries, related with laboratories is an advantage;
- Availability of a relevant qualification certificate obtained from authorized state body and valid in the Kyrgyz Republic.

Heat Supply and Ventilation Engineer (national experience) - 4 person/month. Must-Have:

- Higher education/master's degree in heating and ventilation engineering;
- Related experience in the design of heating, ventilation and air conditioning systems of social facilities;
- At least a minimum of 7 years of experience in HVAC (Heating, Ventilation and Air Conditioning) system design, related with laboratories is an advantage;
- Availability of a relevant qualification certificate obtained from authorized state body and valid in the Kyrgyz Republic.

Electrical Power Engineer (national experience) - 4 person/month. Must-Have:

- Higher education/master's degree in electrical engineering;
- Related experience in the design of electrical networks of social facilities;
- At least a minimum of 7 years of experience in a field related to the detailed design of building electrical systems (e.g., transformers, wiring, ventilation, lighting systems), related with laboratories is an advantage;
- Availability of a relevant qualification certificate obtained from authorized state body and valid in the Kyrgyz Republic.

Landscape Designer (national experience) - 4 person/month. Must-Have:

- Higher education/master's degree in landscape design;
- Related experience in landscape design;
- At least a minimum of 7 years of experience in the relevant field.

Environmental Engineer (national experience) - 4 person/month. Must-Have:

- Higher education/master's degree in environmental engineering;
- Related work experience for at least 5 projects where the scope and complexity of work is not less than the proposed assignment;
- At least 5 years of experience in environmental work and development of Environmental Impact Assessment (EIA) / Primary Environmental Investigation (PEI).
- Experience in planning, design and development of environmental clean construction works and environmental analysis and environmental action plans;
- Availability of a relevant qualification certificate obtained from authorized state body and valid in the Kyrgyz Republic.

Sociologist (international/national experience) - 2 person/month. Must-Have:

- Higher education/master's degree in sociology;
- Related experience of at least two projects on resettlement and displacement issues in compliance with the KR/international donor requirements;
- At least 2 years of experience in sociology. Knowledge and experience in the World Bank policy procedures is an advantage.

Security and fire alarm engineer (national experience) - 2 person/month. Must-Have:

- Higher education/master's degree in technical specialties;
- Related experience in designing fire systems for social facilities;
- At least 5 years of experience in a relevant professional field.

IT and communications specialist (national experience) – 2 person/month.

Must-Have:

- Higher education/master's degree in technical specialties;
- Relevant work experience in the field of IT and communications;
- At least 5 years of experience in the relevant professional field.

Annex 1: Environmental Impact Assessment

In accordance with the Law of the Kyrgyz Republic "On Environmental Protection", "On Environmental Expertise", **feasibility studies, construction projects, reconstruction of facilities and other projects** regardless of their estimated cost, departmental affiliation, and forms of ownership, the implementation of which may affect the environment, are subject to state environmental expertise.

Availability of environmental impact assessment as a part of all types and stages of project documentation development is mandatory and serves as a basis for decision-making by the specially authorized state body on environmental impact assessment.

It is prohibited to finance and implement projects related to the use of natural resources without a positive conclusion of the state's environmental expertise.

In accordance with the Law of the Kyrgyz Republic "On Environmental Protection", "On Environmental Expertise", feasibility studies, construction projects, reconstruction of facilities and other projects, regardless of their estimated cost, departmental affiliation and forms of ownership, the implementation of which may have an impact on the environment, are subject to state environmental expertise.

At the stage of the feasibility study, a Preliminary Environmental Impact Assessment (Pre-EIA) should be developed, which will assess the socio-economic feasibility of implementation (location) of the planned activity (facility) in terms of the significance of the environmental impact and the purpose of the planned activity, taking into account the costs of implementing measures to prevent, minimize and (or) compensate for possible significant adverse impacts, and the choice of technological solution and priority option for implementation of the project.

The Preliminary EIA should contain:

- brief description of the planned activity;
- assessment of the existing environmental condition of the territory within the boundaries of the potential zone of possible impact of the planned activity;
- assessment of possible environmental impacts of the planned activity;
- assessment of the environmental impact of alternatives to the planned activities;
- forecast and assessment of environmental changes during construction, operation, and decommissioning of the facilities of the planned activity;
- development of measures to prevent, minimize and/or compensate for significant adverse environmental impacts during construction, operation, and decommissioning of the proposed activity facilities;
- conclusions based on the EIA results;
- environmental Impact Statement (EIS);
- results of the preliminary impact assessment are presented in the form of an EIA report.

An Environmental Protection section shall be developed **during the Design Stage**, including:

- updated integrated assessment of the impact of the selected baseline option on the implementation of activities;
- specified technical solutions and a set of measures to prevent, mitigate and minimize the impact of the planned activity on the environment and public health, its operation and liquidation;
- resource-supported program of industrial control and environmental monitoring for each component during construction, operation, and decommissioning of the planned works;
- design standards for emissions, discharges of pollutants, waste generation and disposal;
- Environmental Impact Statement (EIS).

Annex 2: Energy Efficiency

Calculation of thermal characteristics of external building structures and thermal energy characteristics of the object as a whole:

- Preparation of an energy passport for the building.
- Design solutions to improve energy efficiency.

The laboratory and data processing center should be designed and constructed in such a way that, while meeting the established requirements for indoor climate of the premises, efficient and economical use of energy resources during its operation is ensured. In case of alternative energy sources, such as electricity, should be considered for buildings to meet energy needs.

The requirements of energy saving standards to the thermal performance of envelope structures and engineering systems or to the complex indicator of specific heat energy consumption for heating and ventilation of the building must be met.

Annex 3: The set of main and additional elements, which should be considered during the development of reports and drawings under the Working Documentation Stage but no limited:

1. **Engineering and geological survey Report** (site survey, investigations, site climatic characterization, soils physical-mechanical properties, site seismicity, topographic survey map, wind rose, pits and section, groundwater level, etc.);
2. **Environmental and Social Impact Assessment Report; Building Energy Efficiency Report;**
3. **Master plan** (land plot boundary scheme, relief, road surface and landscaping – parking, security post, access road, greenery, site plot plan, layout, coating types, boundary fencing, explication and specification, etc.);
4. **Architectural solutions** (explication of finishing of exterior facades, interior finishing of building rooms, facades, floor plans, roof plan, explication of premises, elevator/lift plan, sections with joint connections / detailing, flooring plan with details and explication, specifications on window and door openings, roof dormer window, perspective, visualization, etc.); ***The recommended approximate areas for rooms / premises on each floor is provided in Table 1 of this ToR;***
5. **Structural or constructive solutions** (excavation plan - section, foundations, frame: column and beam, walls - section, lift/elevator, staircase, floor and roof plan, sections with joint connections / detailing, mark schemes, specifications, etc.); ***This section shall include the calculation and analysis report according to current acting (in force) building / design codes.***
6. **Heating and ventilation** (plan with installation of elements / equipment, explications of premises and specifications, axonometric schemes, boiler, gas supply, etc.);
7. **Interior water supply and sewerage** (plan with installation of pipes and showing the sanitary facilities, explications of premises and specifications, axonometric schemes, etc.);
8. **Exterior water supply and sewerage** (connect of water supply and sewerage system to existing in master plan, longitudinal section, water wells, specifications, pumping, waste handling facilities, septic tank, water reservoir, etc.);
9. **Interior lightening and power supply** (, lightening floor plan, power supply equipment floor plan, heating floor plan, if electric convector heaters proposed, connect with ventilation floor plan, lift/elevator, grounding and lightning protection mesh on roof plan, distribution and other schemes – also on fire shutdown, specifications, Fire hydrant, etc.);
10. **Exterior power supply** (connect of power supply system to existing in master plan – outdoor network plan, schemes, specifications, etc.);
11. **Fire alarm system** (distribution of fire alarm elements in floor plan, schemes, specifications, etc.);
12. **Security safety and communication systems** (security video surveillance schemes and distribution in floor plan, specifications, Internet TV and telephony networks in floor plan – schemes, etc.);
13. **Technology section** (distribution of equipment and furniture in floor plan, specifications, etc.).