**Terms of reference**

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| **Position:** | Local consultant/Head of the predictive modeling of filling and breakthrough of moraine lakes  (hereinafter referred to as the Contractor) |
| **Project Name:** | "Further strengthening Kazakhstan's programming capacity, institutional support for expanding direct access to the Green Climate Fund and development of green finance system." |
| **Contract type:** | Individual Contract |
| **Place of service provision:** | Home-based, with possible business trips to Almaty |

**Introduction:**

The International Center for Green Technologies and Investment Projects (hereinafter referred to as the Center), in 2022, was designated by the Ministry of Ecology, Geology, and Natural Resources of the Republic of Kazakhstan as the National Implementing Organization of the Readiness project "Further strengthening of Kazakhstan's programming capacity, institutional support for expanding direct access to the Green Climate Fund (hereinafter – GCF) and development of the green Finance system". The Readiness project is implemented jointly with the United Nations Office for Project Services (UNOPS).

The Readiness project is aimed at further strengthening the country's potential and creating favorable conditions for more active participation in the GCF and attracting climate investment. The first Readiness grant created an initial enabling environment for the institutionalization of the National Designated Authority (hereinafter referred to as theNDA) and interaction with the GCF. The project will strengthen the NDA's ability to effectively and efficiently perform its functions, facilitate the successful completion of the GCF accreditation process by direct access applicants, and thus open up access to GCF funds to address climate change challenges in Kazakhstan, and allow for the development of an updated country program with a clear framework for priority climate change investments and portfolio. strengthen the practice of sustainable finance in the financial sector of Kazakhstan by creating an enabling institutional environment and building the capacity of local experts.

The Readiness project provides for five tasks:

Task 1: Update the Country Programme in accordance with GCF procedures and establish a coordination mechanism

Task 2. Institutional and potential support for direct access applicants in the GCF accreditation process

Task 3: Building the capacity of the private sector to facilitate the planning and implementation of GCF-funded activities

Task 4: Support Hydrometeorological diagnostics and identify future investment needs

Task 5. Preparation of a concept for integrating green finance issues into existing operations of the banking sector and financial institutions.

**Goal:**

The goal is to improve the system of forecasting natural disasters, which will provide information about the possibility and strength of impending threats, by predictive modeling of filling and breaking of moraine lakes.

These models will be used to predict the amount of water entering the lake from various sources, such as rain, snowmelt, or glaciers, taking into account the geography of the region, climatic conditions and other factors to predict the probability of a moraine breakout creating the lake.

Modeling will be carried out in a pilot version at the key site-Big Almaty Lake (hereinafter - BAO).

**Scope of services:**

1. Development of the project methodology and algorithms for the work of field workers, hydrologists and GIS specialists. The methodology includes the main stages of work, detailed instructions on how to perform specific tasks, allowing you to optimize the work processes of specialists and providing a single standard and control over the tasks of the specialists involved.

2. Coordination and methodological support for industry tasks: field surveys, hydrological calculations, modeling and processing of GIS and remote sensing data (hereinafter – remote sensing). Conducting a review of the processes of work on industry tasks.

3. Analysis of the volume of Lake BAO and monitoring of the dynamics of its filling.

4. Analysis of hydrometeorological data of moraine Lake BAO, evaluation of calculation results;

5. Analysis of the results of in-house data processing of field bathymetric, hydrometric works and surveys;

6. Analysis of the BAO Lake water management balance;

7. Assessment of the representativeness of the initial hydrometeorological data.

8. Predictive modeling of the filling of the moraine lake BAO.

9. Modeling of the breakthrough of the moraine lake BAO and forecasting the risk of flooding of the territory of the underlying settlements.

10. Approbation, forecast and evaluation of the model, calculation of its error

11. Preparation of the final report outlining the main results of the work and holding an online seminar on the results of forecasting natural disasters on filling and breaking moraine lakes in the Republic of Kazakhstan with the participation of representatives of the Ministry of Emergency Situations of the Republic of Kazakhstan. Preparation of all necessary presentations for the online seminar..

**RESULTS AND DEADLINES**

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| **№**  **n** | **Expected Results** | **Deadline** |
|  | A methodology has been prepared with the main stages of work, detailed instructions on how to perform specific tasks, allowing you to optimize the work processes of specialists and providing a single standard and control over the tasks of the specialists involved.  A report on the work performed under item 1 has been prepared, containing supporting materials (methodology with the main stages of work and control of the tasks of the specialists involved.). | 4 weeks from the date of signing the contract |
|  | An overview of the process of work on industry tasks has been prepared: field surveys, hydrological calculations, modeling and processing of GIS and remote sensing data  A report on the work performed under item 2 has been prepared, containing supporting materials (an overview of the process of work on industry tasks). | 10 weeks from the date of signing the contract |
|  | An analysis of the volume of Lake BAO and monitoring of the dynamics of its filling has been prepared.  A report on the work performed under item 2 has been prepared, containing supporting materials (analysis of the volume of Lake BAO and monitoring of the dynamics of its filling). | 14 weeks from the date of signing the contract |
|  | An analysis of the results of in-house processing of data from field bathymetric, hydrometric works and surveys has been prepared;  An analysis of the hydrometeorological data of the moraine lake BAO has been prepared, an assessment of the calculation results;  The representativeness of the initial hydrometeorological data was assessed  An analysis of the water management balance of the BAO lake has been prepared  A report on the completed work on items 4,5,6,7 has been prepared, containing supporting materials (analyses and assessments) | 18 weeks from the date of signing the contract |
|  | Predictive modeling of the filling of the moraine lake BAO has been prepared.  A simulation of the breakthrough of the moraine lake BAO and a forecast of the risk of flooding of the territory of the underlying settlements were prepared and the approbation, forecast and evaluation of the model, calculation of its error were carried out.  A report on the work performed on items 8,9,10 has been prepared, containing supporting materials (predictive modeling of filling and breakthrough, risk forecast, approbation analysis and model evaluation). | 23 weeks from the date of signing the contract |
|  | A final report was prepared and an online seminar was held on the results of forecasting natural disasters on filling and breaking moraine lakes in the Republic of Kazakhstan.  A report on the work performed under item 11 has been prepared, containing supporting materials (a final report outlining the main results of the work and a report on the online seminar (seminar program, list of participants, screenshots of the online seminar)). | 25 weeks from the date of signing the contract |

**Business trip**

30 days for field trips to conduct bathymetric surveys at the BAO, as the head of the field team.

**Note:**

* The contractor is responsible for thequality of the prepared materials within the scope of its duties;
* The contractor works under the supervision of the team leader and the overall guidance руководителяof the project manager.
* The contractor prepares reports in Russian.
* The report must be submitted electronically in MS Word format for Windows files.

**Basic conditions**

* When performing the entire scope of services, the Contractor must ensure the complete safety of materials and finished products, excluding the creation of counterfeit products.
* It is necessary to ensure compliance with the legislation and regulations of the Republic of Kazakhstan on copyright (and related rights).
* All rights to manufactured products, including original documents and copies thereof, may be transferred to any third party by the Customer's decision, and such transfer may be made directly to a third party and immediately after completion and acceptance. All work performed in accordance with this Technical Specification (hereinafter referred to as the TOR).

**Payment schedule**

The contractor must include all expenses, including fees for professional services, travel, accommodation and other expenses, in its financial proposal for performing the tasks of the TOR. Transportation costs are indicated only if the trip is provided for by the ToR.

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| **Payment stage** | **% of the contract amount** | **Results** |
| 1 | 20% | Result 1 |
| 2 | 20% | Result 2 |
| 3 | 20% | Result 3 |
| 4 | 20% | Result 4 |
| 5 | 20% | Result 5 |

**Required skills and abilities:**

**Education:**

 higher education in natural sciences in one of the specialties: geography, hydrology, water resources and water use;

A PhD in geography is preferred.

**Technical and functional experience:**

 work experience of at least 10 years in the specialty;

 work experience in scientific projects in the field of hydrology, water resources, geography for at least 6 years;

 work experience in a managerial position for at least 3 years;

 experience in projects on modeling and forecasting of runoff for at least 3 years.

**Language skills:** fluency in spoken and written Russian is required.