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Terms of Reference

Consultancy/Position Title: Geotechnical Expert for Gold Ridge Tailings Storage Facility (TSF) and Return Water Dam Stability In Solomon Islands

Project Name: Managing Risks Associated with the Gold Ridge Mining TSF

Duty Station: Honiara, Solomon Islands/ Home Based.

Duration of the Contract:

- Contract Period: 29th September to 8th December 2017
- Starting date: 29th September 2017
- Duration: 40 Working days over 2 months (20 days home based/20 days duty station)
- End Date: 8th December 2017

Objectives:

Managing Risks Associated with the Gold Ridge Mining Tailing Storage Facility (TSF) Project is seeking to engage an institution or an organisation to provide support to the Mines Division in the Ministry of Mines Energy and Rural Electrification (MMERE), the Environment and Conservation Division in the Ministry of Environment, Climate Change, National Disaster Management and Meteorology (MECDM) and the Environmental Health Division in the Ministry of Health and Medical Services (MHMS) to meet the following objectives;

- To determine the stability modelling of the TSF and the Return Water Dam (RWD) based on review of the structural design and the construction quality assurance;
- To develop a catastrophic dam break scenario modelling by determining the accurate “as built dam and tailings deposition geometries and evaluating the materials parameters of the stored tailings

Background

The Gold Ridge Mine Tailings Storage Facility on the main island of Guadalcanal in Solomon Islands has been a constant threat to its surrounding communities since the April 2014 earthquake magnitude of 7.6 at 314.0 km SE of Honiara, Solomon Islands and heavy rainfalls then. The TSF is part of a bigger tailings storage system which has been operating since 1998 within a 25 year 30km² lease. The tailings storage system consists of the main TSF embankment covering 0.62km², a water treatment plant with separate (now combined) sedimentation and discharge ponds and a Return Water Dam upstream for storing treated water to be reused in the gold processing plant. The closure of the Gold Ridge Mine in 2014 also meant that maintenance of the water balance in the tailings storage system could not be sustained.

The Solomon Islands Government (SIG) with support through the UNDP had conducted assessment on various aspect of dam safety. There are concerns regarding the overall design of the tailings storage site (TSF and the Return Dam). In the long term, the impacts of the potential breach of the TSF would be catastrophic to the environment and the river communities of more than 8000 people downstream since the tailings water contains harmful substances of which the two main chemicals of concern are arsenic and cyanide. Based on these concerns and issues, the need to conduct a structural assessment of the TSF and RWD stabilities and a holistic assessment of environmental, social, health and economic impacts is required. This structural assessment must also consider the potential re-activation of the TSF, and future construction of the TSF to its original final design height; as the SIG is in ongoing negotiations to re-issue the mining licence for the Gold Ridge mine, and re-use of the current TSF is a possibility for that mining licence.

The report on the Gold Ridge Tailings Dam and Return Water Dam Risk Management by the Norwegian Geotechnical Institute Pty Ltd, the concept note on the Risk management and mitigation on the Tailings Dam and Return water dam at Gold Ridge mine by UNDAC and UNDP Gold Ridge Risk Management Initiative inception report provide further details and the need to conduct a structural assessment of the TSF and RWD stabilities and the assessment of environmental, social, health and economic impacts.

Some of the information gaps on understanding of the stability of the “as built” TSF embankment, Saddle Dam embankment and RWD embankment are expected to be addressed at the completion of this assignment. The assessments of the overall dam structures should provide better understanding about the mud flow potential coverage in the event of a dam break scenario. The information gathered from the assessments will inform the contingency planning and help establish information to support for monitoring and data management requirements for the TSF and RWD; for both the scenario that closure of the TSF is pursued with, or that the TSF is reactivated.

Scope of work/Expected Output

The purpose of this consultancy is to carry out dam structural assessments and establish the TSF and RWD stability modelling that will be required and appropriate in relation to risk reduction and management. The assessment will provide important baseline data to support effective monitoring and evaluation on the safety level of the TSF structure to the downstream communities, for both the scenario that the TSF is left 'as-is' or 're-activated'. The information will inform and support the contingency planning process at the institutional and community levels. This assignment focuses on the TSF and RWD Stability Modelling and the Catastrophic Dam Break Scenario Modelling. High-level guidance on assessments, audits and control measures, including monitoring, that must be considered during reactivation of the mine pit is also requested as part of this assignment.

The consultant will work closely with the relevant government ministries (MMERE and MECDMS) and in collaboration with UNDP Project Office.

The TSF and RWD Stability Modelling is expected to cover the following tasks for the 'as-built' condition;

- Review any available documentation associated with the design of the original dam and subsequent partial lift.
- Review all available Construction Quality Assurance (CQA) records, noting any departures from design;
- Determine the accurate “as-built” dam geometries;
- Assess appropriate material parameters to be used in the construction of model such as the 2D limit equilibrium model etc.;
- Assess available piezometric information;
- Evaluate seismic risk;
- Run sensitivities to piezometric levels and material parameters including the possibility of seepage.
- Based on the foregoing, assess static and seismic stability.

The Catastrophic Dam Break of the 'as-built' scenario modelling will include the following tasks;

- Determine the accurate “as-built” dam and tailings deposition geometries;
- Evaluate the material parameters of the stored tailings;
- Evaluate the moisture content and potential for liquefaction;
- Undertake run out modelling based on the derived inputs;
- Run sensitivities to input parameters.

Consultant shall also consider the future re-activation of the TSF and possible management regime. Based on the results of the foregoing work, relevant stability analyses shall be performed assuming the TSF is constructed to final height (original geometry); to inform the risk management process of TSF reactivation.

Review pit slope stability 'as-is' condition. Provide high-level guidance on assessments and control measures that must be implemented prior to the reactivation of the mine pit and TSF.

This consultant is required to work closely with hydrology study consultant and where possible share data and information to inform the hydrology study.

The following **deliverables** are expected to be delivered by the consultant at the completion of each tasks as per the payment schedule.

- Submission and presentation concept note and work plan for the assignment deliverables clearly defining the time schedules and duration to carry activities. The concept note should outline how the tasks will be carried out and the expected outputs for each

task.

- Technical note summarising findings of the 'as built' conditions.
- Based on evaluation of piezometric pressure information and the sensitivities to levels and material parameters as well as evaluation of seismic risk, rank the identified hazards on the order of their likelihood.
- Final Report with details of finding and recommendations. These should also relevant maps clearly identifying the exposed elements such as natural environment, human settlements and critical infrastructures.
- An external hard drive containing raw data collected for the purpose of this assignment including reports and products generated from modelling to be deposited with MECDM, MMERE and UNDP prior to end of this assignment.

Resources Provided

All inland transportation/logistical arrangement will be provided by Gold Ridge project.

Reporting and Supervision

Report to: The overall substantive work is to be guided by the Technical Staff from the Mines Division (MMERE) and the project staff and will report to the UNDP Country Manager, Permanent Secretaries (MECDM and MMERE) on a daily basis.

The deliverables shall be submitted to the Country Manager who will liaise with the stakeholders for peer review and to the government for approval through the National Disaster Committee

Requirement for Qualifications & Experience

Minimum educational qualifications:

The consultant must have at least a Master's degree in fields related to Geotechnical engineering, and related physical science fields.

Experience & skills:

The consultant should meet the following criteria in terms of work experience and skills

- At least 5-7 years of experience in working in the mining engineering, geology and related physical science fields, knowledgeable about mining tailing storage facilities and disaster risk management.
- Minimum of 3 years' Experience and skills in conducting and managing field work in Impact assessments in relation to the physical environment and mining
- Minimum of 3 years' Experience in working with international organization including governments in developing countries.

Functional Competencies:

The consultant must have and be able to show the following functional competencies

- Evidence of similar work undertaken in the past.
- Experience in working under multi- cultural environments and delivering on a wide range of tasks;
- Fluency in spoken and written English is a requirement.
- Demonstrate integrity, positive values and ethical standards in actions.
- Display cultural, gender, religion, race, nationality and age sensitivity and adaptability.
- Shares information, knowledge and experience through effective and frequent communication

Proposal Requirements

Technical Proposal

The consultant should submit the following documents:

- Technical proposal including an updated current CV, contact details of at least three referees and a cover letter setting out how the applicant meets the selection criteria, and a proposed approach and methodology)
- Letter confirming availability and Interest using UNDP template

Financial Proposal

The consultant is requested to provide a quotation in USD "all inclusive" for the services which will be rendered using the following format.

Daily consultancy rates	A daily consultancy rate proposed by the Individual Consultant
Air Ticket Estimate for 1 round trip travel (economy class, most direct route)	To and from respective duty station
Living Allowance	Based on the number of days spent at the respective duty station
Other miscellaneous expense (please specify)	Please state
Total cost	

Travel;

All envisaged travel costs must be included in the financial proposal. This includes all travel to join duty station/repatriation travel including airport transfers, visa formalities, and health insurance etc.

In the case of unforeseeable travel, payment of travel costs including tickets, lodging and terminal expenses should be agreed upon, between the consultant, prior to travel and will be reimbursed.

Financial proposal to be submitted separate from technical proposal

Payment Schedule & Deliverable :

Percentage %	Deliverables	Target Date
20 %	Submission of concept note and methodology/work plan for the assignment deliverables clearly defining the time schedules and duration to carry activities.	3rd October 2017
40%	Completion of field work and technical note summarizing findings	1st November 2017
20%	Draft Report with details of finding and recommendations including the datasets and products in appropriate formats.	15th November 2017
20%	Final Report with details of finding and recommendations including the datasets and products in appropriate formats duly approved by UNDP.	30th November 2017

Evaluation :

The proposals will be evaluated using the cumulative analysis method with a split 70% technical and 30% financial scoring. The proposal with the highest cumulative scoring will be awarded the contract. Applications will be evaluated technically and points are attributed based on how well the proposal meets the requirements of the Terms of Reference using the guidelines detailed in the table below: When using this weighted scoring method, the award of the contract should be made to the individual consultant whose offer has been evaluated and determined as:

a) responsive/compliant/acceptable, and

b) Having received the highest score out of a pre-determined set of weighted technical and financial criteria specific to the solicitation.

* Technical Criteria weighting; 70%

* Financial Criteria weighting; 30%

Only candidates obtaining a minimum of 70% out of 100% in technical evaluation would be considered for the Financial Evaluation

Technical Criteria		Weight 70%
Education:	Minimum Master's degree in fields related to Geotechnical engineering, and related physical science fields.	20
Experience:	<ul style="list-style-type: none"> At least 5-7 years of experience in working in the mining engineering, geology and related physical science fields, knowledgeable about mining tailing storage facilities and disaster risk management. Minimum of 3 years' Experience and skills in conducting and managing filed work in Impact assessments in relation to the physical environment and mining Minimum of 3 years' Experience in working with international organization including governments in developing countries. 	40
Functional Competency:	<ul style="list-style-type: none"> Evidence of similar work undertaken in the past. Experience in working under multi- cultural environments and delivering on a wide range of tasks; Fluency in spoken and written English is a requirement. Demonstrate integrity, positive values and ethical standards in actions. Display cultural, gender, religion, race, nationality and age sensitivity and adaptability. Shares information, knowledge and experience through effective and frequent communication 	10
<i>**If necessary interviews shall also be conducted as part of the technical evaluation to ascertain best value for money.</i>		
Financial Proposal		30%
Cumulative		100%

Proposal Submission :

- Closing date of all applications will be on 15th September 2017 @12:30 pm local time (GMT +11)
- All applications must be submitted either electronically to soi.bids@undp.org, or addressed under confidential cover to:

UNDP-SOI-IC-2017-025

Attention: Procurement Unit

UN Joint Presence Office, Ground Floor ANZ Haus Ranadi,

P.O. Box 1954, HONIARA, Solomon Islands

All proposal should be submitted to the above email, failure to submit to this email address, will result in disqualification of proposals.

Incomplete application will not be considered and only candidates for whom there is further interest will be contacted.

UNDP is committed to achieving workforce diversity in terms of gender, nationality and culture. Individuals from minority groups, indigenous groups and persons with disabilities are equally encouraged to apply. All applications will be treated with the strictest confidence.

For further information concerning this Terms of Reference, send email to soi.procurement@undp.org

