

CONFIDENTIALITY AGREEMENT FOR MARKET RESEARCH

I hereby _____, male/ female, _____, of age, identity card / passport _____, acting in my capacity as legal representative of the company _____, registered under _____ (hereinafter _____) duly authorized for this act hereby declare and agree to _____ (company) by the following:

FIRST: Recognizes that the **AUTORIDAD DEL CANAL DE PANAMA**, autonomous legal entity of public law established under Title XIV of the Constitution of the Republic of Panama and organized under Law No. 19 of 11 June 1997 (hereinafter ACP), is carrying out a market study for the acquisition of _____ (hereinafter the Study)

SECOND: Under the study, _____ (company) will have access to "confidential information" to be provided by the ACP.

THIRD: "Confidential Information", as used herein, is any information that can be disclosed orally, in writing or by any other means or medium, tangible or intangible, currently known or invented in the future not public, provided by or on behalf of the ACP to _____ during the study, including, without limitation, documentary, electronic and / or verbal information contained in the construction drawings and seismic design for ACP critical structures document (URS 20088) ; and in general, any information disclosed or obtained through observation or other perception in any of the facilities of the ACP that is not public and therefore it should not be disclosed to third parties without the prior written consent of the ACP.

FOURTH: _____ recognizes the confidential nature of the information described above and the fact that the ACP make available such Confidential to _____ information does not constitute an express consent to its disclosure, or the acquisition of intellectual property rights or license of use unless strictly established herein. _____ also recognizes that Confidential Information and all intellectual property rights and other related belong to the ACP, even though suggestions, comments and/or ideas are made by workers of the ACP during the implementation of the Study.

FIFTH: _____ accepts and recognizes the highly confidential nature of the information they have access and therefore undertakes to:

- a. Keep secret and strictly confidential all "Confidential Information", made available by the ACP either in writing, verbally or by any other means.
- b. Prevent unauthorized use or reproduction of any material identified or contained as "Confidential Information".
- c. Prohibit anyone, any copy or any other form of reproduction of these materials, except to the extent necessary to provide such information to those entitled to access it, as established by the own "Confidential Information";
- d. Ensure that its employees, officers, consultants, representatives (including lawyers, technical staff, etc.), and any other potential participants in the study, comply with the terms of this Agreement.
- e. To communicate to the ACP any total or partial filtering of the confidential information they have or acquire knowledge produced by infidelity, negligence or other omissions of individuals who have accessed the confidential information.

f. Not disclose "confidential information" to anyone without the prior written permission of ACP. This prohibition extends to agents, employees, contractors and / or any other third party linked to _____, all of which must be aware of the confidentiality of such information to perform the study described in this document.

In the event that confidential information is required to _____ under an applicable legal standard and by an authority, _____ shall inform the ACP such request within twenty-four (24) hours after the date of receipt of such request of the confidential information.

SIXTH: _____ agrees to provide the ACP, a list with the names and addresses of all persons, companies or individuals who know the "Confidential Information" and agree not to use such confidential information for any purpose other than the purpose to give reply to requests during the study and in accordance with the terms and conditions of it, and will not disclose the confidential information to any person without the prior written consent of the ACP authorization are not, under conditions of confidentiality and guarantee that their representatives are aware of the confidentiality of such information and exclusive to fulfill the purposes of the study.

SEVENTH: _____ acknowledges and agrees that breach of the commitments made in this agreement may result not continue to take it into account for the Study without prejudice to any other legal action that would result in the applicable regulations.

EIGHTH: _____ agree and acknowledge that any exchange of confidential information will not, under any circumstances, granting permission or express or implied right to use patents, licenses or copyright or any other intellectual property that is of ACP ownership to disclose confidential information and acknowledges that this document, or delivery of confidential information or the study constitute an agreement with the ACP or commitment to the ACP, to enter into a business relationship.

NINTH: All confidential information provided by the ACP to _____ under this agreement or generated during execution of the study, is issued under the concept "as is" without warranty company or implied, that is complete and / or accurate. Confidential Information will be maintained and understood under the full ownership of the ACP and must be returned, deleted, or otherwise destroyed within ten (10) calendar days following the completion of the study or within five days (5) calendar days following the written request of the ACP to _____ to carry out such actions, whichever comes first, meaning thereby that _____ or their representatives may not keep copies, files or duplicate such information, once the ACP has made this request and / or has terminated the study.

TENTH: This Agreement shall be governed by and construed in accordance with the rules of the ACP and the laws of the Republic of Panama. If any provision of this Agreement is declared invalid or unenforceable by a decision of competent authority, this does not invalidate the rest of the clauses of this contract, which will be fully interpreted to ensure appropriate confidentiality is intended by this agreement.

ELEVENTH In case of conflict over the interpretation and / or fulfillment of the terms of this agreement, it shall be settled by arbitration in law, in Spanish, at the Center for Conciliation and Arbitration of Panama (CECAP), located in the Chamber of Commerce, Industries and Agriculture of Panama, Republic of Panama, under the rules and procedures established by the CECAP.

TWELVETH: _____ agrees and acknowledges that the fact that the ACP provide confidential information and perform this study will not result in this circumstance is used, either implicitly or explicitly, for reference quality _____, nor authorized under any concept the use of the name of the ACP by reference with respect to third parties.

The provisions of this Confidentiality Agreement shall remain in force for a period of up to two (2) years from its signature.

IN WITNESS WHEREOF, I sign on _____ (__) days of _____ 20__.

By: _____
First name:
Position:
Address



**MARKET RESEARCH FOR
EARTHQUAKE ASSESSMENT OF CANAL STRUCTURES IN THE PANAMA CANAL**

1. **SCOPE OF MARKET RESEARCH:** The Autoridad del Canal de Panamá (ACP) is conducting market research to address market aspects such as possible contractors, estimated prices, estimated time frame for completion of the work, market best practices, among others related issues, regarding the contracting of services for the earthquake assessment of the following Panama Canal critical structures: Gatun Locks, Pedro Miguel Locks, Miraflores Locks, Gatun Spillway, Madden Dam, and Miraflores Spillway. This project also seeks to obtain retrofit solutions, at preliminary design level, as necessary for these structures. The ACP is interested in seeking your participation on the market research of this project.

2. **GENERAL INFORMATION REGARDING THE INTENDED SERVICES**

The ACP has the intention to acquire earthquake assessment services for critical structures. Earthquake assessment shall be a performance-based seismic assessment of the structure. The earthquake assessment shall undertake evaluation under strong earthquake excitation, evaluate performance levels related to seismic response parameters, and incorporate systematic methodology for simulating structure response to earthquake motions. Earthquake assessment shall include, but not be limited to, preparation of reports containing field investigations, sampling and testing results; analysis and calculations; models; recommendations and other related items. More information about the intended services scope is shown in Tender No. 194284, reference material.

The following paragraphs that will be taken out from the work included in the Terms of Reference of Tender No.194284:

5.1.8 Loss Analysis

5.1.9 Risk Analysis

3. **GENERAL QUESTIONS**

Please review the Terms of Reference of Tender No. 194284, reference material and answer the following questions.

3.1. Do you consider that the information provided is sufficient to carry out this assessment? If your answer is no, please explain your reasons. Note that the project includes field Investigations, sampling, and testing with the purpose of collecting data to perform the object of the contract.

Refer to paragraphs: 5.1.2 Field Investigations, Sampling and Testing and paragraph 16 CONTRACT DRAWINGS, REFERENCES AND OTHER ACP INFORMATION, Annexes A to H.

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- 3.2. Considering the contract and reference drawings, the age of the structures, we appreciate your expert recommendation on the tests that are required for the existing conditions investigation, site field investigation, sampling, and testing, to gather sufficient data to fulfill the object of this assessment. *Please fill Tables 1 to 6. Add as many rows as required.*

Note that the objective of the field investigation, sampling and testing is to obtain data and to complement the available information.

Refer to paragraphs: 5.1.2 Field Investigations, Sampling and Testing and paragraph 16 CONTRACT DRAWINGS, REFERENCES AND OTHER ACP INFORMATION, Annexes A to H.

Table 1. GATUN LOCKS - Field investigation type of test/sampling				
Sampling/test description	Destructive or Nondestructive test	Quantity of tests	Length (m)	Unit price USD

Table 2. PEDRO MIGUEL LOCKS - Field investigation type of test/sampling				
Sampling/test description	Destructive or Nondestructive test	Quantity of tests	Length (m)	Unit price USD

Table 3. MIRAFLORES LOCKS - Field investigation type of test/sampling				
Sampling/test description	Destructive or Nondestructive test	Quantity of tests	Length (m)	Unit price USD

Table 4. GATUN SPILLWAY - Field investigation type of test/sampling				
Sampling/test description	Destructive or Nondestructive test	Quantity of tests	Length (m)	Unit price USD

Table 5. MADDEN DAM - Field investigation type of test/sampling				
Sampling/test description	Destructive or Nondestructive test	Quantity of tests	Length (m)	Unit price USD

Table 6. MIRAFLORES SPILLWAY - Field investigation type of test/sampling				
Sampling/test description	Destructive or Nondestructive test	Quantity of tests	Length (m)	Unit price USD

3.3. Considering the object of the assessment and the available information, advise if a visual inspection (including underwater inspection when applied) is required in the scope of work.

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3.4. Advise on the amount of 2D cross sections to be considered for each critical structure according to paragraph 5.1.4.2 (a). You will find below tables 7 to 10 with the reference drawing that applies to each area of the structure. **Fill tables 7 to 12**

Refer to paragraph 5.1.4.2 (a) Analysis with two-dimensional (2D) models.

Items	Amount of 2D Sections required	Comment	Reference Drawing
Upper Approach			7088
Lower Approach			7123
Upper Wing Wall			7088
Lower Wing Wall			7123
Upper Chamber			7040, 7041,7107
Middle Chamber			7042
Lower Chamber			7108, 7110,7111

Items	Amount of 2D Sections required	Comment	Reference Drawing
Upper Approach			7087
Lower Approach			7132
Upper Wing Wall			7087
Lower Wing Wall			7132
Chamber			7045, 7046

Items	Amount of 2D Sections required	Comment	Reference Drawing
Upper Approach			7088
Lower Approach			7131, 7133
Upper Wing Wall			7088
Lower Wing Wall			7131
Upper Chamber			7065, 7066
Lower Chamber			7067, 7129, 7130

Items	Amount of 2D Sections required	Comment	Reference Drawing
Wall of Approach Channel			4008, 4011, 4015
Spillway Dam			4020
Wing Wall			4026
Abutment			4029, 4032

Items	Amount of 2D Sections required	Comment	Reference Drawing
Spillway Dam			5137-57, 5137-61
Power Station Dam			5137-57

Items	Amount of 2D Sections required	Comment	Reference Drawing
Spillway Dam			4502, 4508
Wing Wall			4509, 4510
Channel Wall			4507, 4508
Abutment			4511, 4513, 4515, 4517

3.5. Does your company have experience performing earthquake assessment using 3-D models of massive concrete with linear and nonlinear properties in accordance with USACE standards EM-1110-2-6050, EM-1110-2-6051, EM-1110-2-6053, ER-1110-2-1806? **If equivalent standards are used by your company, please provide information.**

Please refer to paragraphs 5.1.4:

Answer:

3.6. Does your company have experience in “comparable projects”? **Fill table below.**

If the answer is yes, indicate on how many comparable projects a description and the years that the projects were finalized.

If the answer is no, indicate the experience on projects related to this topic, as well as the number of projects performed and the years that the projects were finalized.

Comparable Project definition: It refers to a project that included performance-based seismic assessment and retrofit design of existing concrete structures such as dams, spillways, or locks. For the project to be considered comparable, the retrofit design shall have been built. Performance-based seismic assessment shall have included the following as a minimum:

1. Seismic hazard analysis.
2. Response history analysis and tree-dimensional modeling.

Answer:

No.	Project Name	Description – scope of work	Completion date

3.7. Provide information on the experience related to the object of this assessment of the structural and geotechnical engineer. **Fill table below.**

Name Structural engineer	Project Name	Experience	Completion date of the project

Name Geotechnical engineer	Project Name	Experience	Completion date of the project

3.8. Have your company implemented field investigation, testing and sampling in projects that included seismic assessment of existing concrete structures such as dams, spillways, or locks within the last 15 years? Provide information.

Answer:

3.9. Please advise on the inclusion and extent of clauses related to market practices in contracts with similar purposes, regarding:

3.9.1.Third party liability

3.9.2.Bonds

3.9.3.Professional liability

3.9.4.Clauses of normal standard of care and survival clause

3.10. Please advise on the contract selection process for this type of service. Provide information according to your suggestion.

3.11. Estimated time to complete the scope of work for the Earthquake Assessment **(as stated above, excluding from the scope of work paragraphs 5.1.8 to 5.1.9 of the Terms of Reference of Tender No. 194284)**. Please indicate if you have the capability to work in parallel for the 6 critical structures.

Answer:

3.12. Provide information regarding price proposal schedule and payment terms according to market practices for this type of service.

3.13. Estimated cost for the Earthquake Assessment (as stated above, excluding from the scope of work paragraphs 5.1.8 to 5.1.9 of the Terms of Reference of Tender No. 194284). Fill table below.

Item	Description	Estimated Amount USD
1	Earthquake Assessment, Gatun Locks	
2	Earthquake Assessment, Pedro Miguel Locks	
3	Earthquake Assessment, Miraflores Locks	
4	Earthquake Assessment, Gatun Spillway	
5	Earthquake Assessment, Madden Dam	
6	Earthquake Assessment, Miraflores Spillway	

3.14. Estimated time to complete the scope of work for the preliminary retrofit designs. Please indicate if you have the capability to work in parallel for the 6 critical structures.

Please refer to paragraph 2.2.1. Preliminary Retrofit Design: Preliminary retrofit design for each structure shall include, but not be limited to, preparation of reports containing drawings, analysis and calculations, technical specifications, cost estimates, environmental considerations, and other related items.

Answer:

3.15. Estimated quantities and unit price for the preliminary retrofit design.

Please refer to paragraph 2.2.1. Preliminary Retrofit Design: Preliminary retrofit design for each structure shall include, but not be limited to, preparation of reports containing drawings, analysis and calculations, technical specifications, cost estimates, environmental considerations, and other related items. Fill table below.

Item	Job Category	Unit	Estimated Quantity	Unit Price USD Dollar	Estimated Price USD Dollar
1	Management				
1.a.	Project manager	hour			
1.b.	Technical review/Quality Control	hour			
2	Geotechnical Engineering				
2.a.	Principal	hour			
2.b.	Senior	hour			
2.c.	Junior	hour			

3	Structural Engineering				
3.a.	Principal	hour			
3.b.	Senior	hour			
3.c.	Junior	hour			
4	Civil Engineering				
4.a.	Principal	hour			
4.b.	Senior	hour			
4.c.	Junior	hour			
5	Geology				
5.a.	Principal	hour			
5.b.	Senior	hour			
5.c.	Junior	hour			
6	Environmental Engineering				
6.a.	Principal	hour			
6.b.	Senior	hour			
6.c.	Junior	hour			
7	Cost Engineering				
7.a.	Principal	hour			
7.b.	Senior	hour			
7.c.	Junior	hour			
8	Computer-Aided Design and Drafting (CADD)				
8.a.	Principal	hour			
8.b.	Senior	hour			
8.c.	Junior	hour			
9	Other				
9.a.	Clerical Support (Technical Secretary)	hour			

4. **PARTICIPATION IN MARKET RESEARCH:** The companies interested in participating in this market research at no cost to the ACP, are required to communicate their interest by submitting a formal-written notification to the ACP, together with a signed confidentially agreement. In response, the ACP will provide these companies with all available reference documents listed on paragraph 7 (Reference Material) of this document.
5. **DELIVERABLES:** The companies interested in participating in this market research are required to present all the information requested in paragraph 3, **by October 15, 2022:**
6. **ACP DISCLAIMER:** Please note that this process is strictly confidential, and the information provided in this email and information exchange shall be treated as such. Therefore, participants should undertake to keep all the information strictly confidential; to use adequate security measures to prevent disclosure of the information; not to disclose or otherwise part with the possession of any of the confidential information; to maintain and consider the confidential information as ACP's property; and to keep the confidential information in a safe and secure place. Should the participant consider that some or all the information to be provided is confidential, it should be so indicated.

Additionally, no information contained herein and because of the terms contained in these exchanges shall be considered as an evaluation or acceptance by the ACP of the documentation to be provided by participants of this market survey or create expectations of any future contract award. Any ACP future procurement process related to this, or any related studies will be formally advertised and competed.

- 7. REFERENCE MATERIAL:** The following material will be provided to the companies which have formally communicated their interest in this market research and delivered the signed confidentiality agreement to the ACP:
 - Terms of Reference of Tender No. 194284 Project No.SE-21-22.
 - Construction drawings and documents of each structure listed in the scope. REFERENCES AND OTHER ACP INFORMATION, Annexes A to H.

- 8. POINT OF CONTACT:** Companies requiring any clarification on this market study should contact Mr. Darinel Moreno, e-mail dmoreno@pancanal.com ; (Point of Contact).

END OF DOCUMENT

TENDER

FOR

EARTHQUAKE ASSESSMENT

OF CANAL STRUCTURES



CANAL DE PANAMÁ

AUTORIDAD DEL CANAL DE PANAMÁ

REPUBLIC OF PANAMA

May 17, 2022.

AMENDMENT No. 3
TENDER FOR
EARTHQUAKE ASSESSMENT OF CANAL STRUCTURES

Tender No. 194284, Project No. SE-21-22 issued on March 23, 2022
(The date for receipt of proposals is May 25, 2022 at 1:00 p.m. – local time)

The tender documents are revised as follows:

Note: In general, changes in the documents are shown in **blue** font.

TERMS OF REFERENCE

1. Replace Terms of Reference with revised Terms of Reference.

OTHERS

2. Clarifications are included.

Attachments:

Terms of Reference, revised;
Clarifications.

TERMS OF REFERENCE

EARTHQUAKE ASSESSMENT OF CANAL STRUCTURES

1. **BACKGROUND AND PURPOSE:** The Autoridad del Canal de Panamá (ACP) is an autonomous legal entity of the Government of Panama established under Title XIV of the National Constitution. The ACP is exclusively in charge of the administration, operation, conservation, maintenance, and modernization of the Panama Canal and its related activities, pursuant to current constitutional and legal provisions in force, in order that the ACP may operate the Canal in a manner that is safe, continuous, efficient, and profitable. Gatun Locks, Pedro Miguel Locks, Miraflores Locks, Gatun Spillway, Madden Dam and Miraflores Spillway are critical structures for the operation of the Panama Canal. These Canal structures are over one hundred years old, being designed at a time when seismic data and design considerations were more limited. The ACP aims to assess the response of such critical structures of the Canal to seismic hazards.

1.1 **Gatun Locks:** Gatun Locks construction was completed in 1913. Gatun Locks are located at the northern end of the Canal. Gatun Locks have two lock lanes. Each of these two lock lanes uses three chambers or steps to allow the transit of vessels between sea level and Gatun Lake's level. Each chamber is 110 feet wide by 1000 feet long. Chambers have steel mitering gates at each end. The vessels are raised or lowered in the chambers by admitting or withdrawing water through 18 feet diameter culverts extending full length in the side and center walls. From these large culverts, there are smaller culverts which extend laterally under the floor of the locks. The flow of water through the culverts is controlled by valves. Gatun Locks structure comprises concrete gravity side walls, concrete gravity center wall supported on rock, cellular concrete south approach wall supported on reinforced concrete pilings, concrete pier north approach wall supported on wooden piles, and concrete (control house) building over the center wall.

1.2 **Pedro Miguel Locks:** Pedro Miguel Locks construction was completed in 1911. Pedro Miguel Locks are the inner Locks on the Pacific side of the Canal and is located about one mile north of Miraflores Locks. Pedro Miguel Locks have two lock lanes. Each of these two lock lanes uses one chamber or step to allow the transit of vessels between Miraflores Lake's level and Gatun Lake's level. Each chamber is 110 feet wide by 1000 feet long. Chambers have steel mitering gates at each end. The vessels are raised or lowered in the chambers by admitting or withdrawing water through 18 feet diameter culverts extending full length in the side and center walls. From these large culverts, there are smaller culverts which extend laterally under the floor of the locks. The flow of water through the culverts is controlled by valves. Pedro Miguel Locks structure comprises concrete gravity side walls, concrete gravity center wall supported on rock, cellular concrete north approach wall supported on rock, concrete gravity south approach wall supported on rock, and concrete (control house) building over the center wall.

1.3 **Miraflores Locks:** Miraflores Locks construction was completed in 1913. Miraflores Locks are located at the southern end of the Canal. Miraflores Locks have two lock lanes. Each of these two lock lanes uses two chambers or steps to allow the transit of vessels between sea level and Miraflores Lake's

level. Each chamber is 110 feet wide by 1000 feet long. Chambers have steel mitering gates at each end. The vessels are raised or lowered in the chambers by admitting or withdrawing water through 18 feet diameter culverts extending full length in the side and center walls. From these large culverts, there are smaller culverts which extend laterally under the floor of the locks. The flow of water through the culverts is controlled by valves. Miraflores Locks structure comprises concrete gravity side walls, concrete gravity center wall supported on rock, cellular concrete north approach wall supported on reinforced concrete caissons, concrete gravity south approach wall supported on rock, and concrete (control house) building over the center wall.

1.4 **Gatun Spillway:** Gatun Spillway construction was completed in 1913. The spillway consist of three sections: an ogee section, piers built at the top of the ogee section to hold the steel gates (stoney gates), and a discharge channel which varies in thickness from 4.0 ft at the upper end to 1.0 ft at the lower end. However, below the ogee, where great water disturbance is expected, the thickness was increased to 12.0 ft. The latter was constructed at the end of the ogee section to conduct the waters collected from the lake, into the Chagres River stream. In order to reduce the velocity of the flow downstream and obtain a uniform flow at a reasonable velocity in the discharge channel, a baffle system was then introduced in the floor just below the dam. The crest is divided into openings or bays by piers, which extend above the crest high enough to permit the stoney gates to be raised clear of the water and to allow the safe passage of drift. Each stoney gate weighs about 42.5 tons and are essentially steel frames, consisting of two end post, four horizontal main girders, and three vertical cross girders with intercostals and braces. Their dimensions are approximately 45 ft wide, 22 ft height and four to five inches thick. At the back of the gates (facing the lake) the frame is covered with watertight steel plates, butt-jointed with calked cover plates. Inside the spillway (ogee) it was constructed a machinery tunnel extending throughout its length and beyond it. This tunnel gives access to the mechanism controlling the gates. Gatun Spillway structure comprises concrete gravity wall, concrete pier gate support, concrete gravity east and west wing wall, concrete gravity curved wall of approach channel, concrete gravity wall of power plant forebay, concrete gravity east and west wall of approach channel and stoney gates.

1.5 **Madden Dam:** As the number of lockages through the Canal incresead, it became necessary to augment the storage in Gatun Lake. To provide an adequate supply of water for maintaining minimum draft requeriments essential to passing vessels through the Panama Canal, the construction of Madden Dam was completed in 1935. Although the dam's main purpose was water storage for lock operation and navigation draft and flood control, the construction included an integral hydropower plant for electrical power to run the Canal features. In the 1970's water intakes were built by the Government of Panama to provide drinking water to the City of Panama. Madden Dam is a concrete gravity structure located in the Chagres river approximately 12 miles upstream the Canal and 25 miles north of the City of Panama. Madden Dam is 974 feet long, 223 feet high at the maximum section and has a base width of 186 feet. Madden Dam has a spillway with four 100 feet long by 20 feet high drum gates. Other than water release for hydropower, this is the main discharge of lakewater. The spillway also have six low level sluice gates. Control is achieved by two hydraulically operated tandem sluice gates, one emergency gate and one service gate for each sluice. Discharge is into a sloping concrete paved deep pool stilling basin terminating 294 feet downstream from the axis of the dam. Madden

Dam structure comprises concrete gravity wall, concrete pier gate support, concrete bridge over the pier and drum gates.

1.6 **Miraflores Spillway:** Miraflores Spillway completion was in 1914. Miraflores Spillway is a concrete gravity type dam with a gated overflow spillway designed for a maximum discharge of about 100,000 cfs. The maximum height of the dam, to the deck level, is 110 feet above the foundations level. The head on the dam varies from about 56 feet at low tide to about 44 feet at high tide on the Pacific side. It is located east of the north end of Miraflores Locks and forms the lake which provides vessel transit between Miraflores and Pedro Miguel Locks. The gates are remotely controlled from the Miraflores Locks control house and provide the lake level control necessary to prevent excessive levels for the lock structure. The dam is approximately 484 feet long between two gravity type wing walls. The spillway is controlled by eight vertical lift gates 45 feet wide and 19 feet high. The gates are of steel plate and shape construction, riveted (original gates) or welded (new gates) and operated by individual hoists. The downstream face of the spillway ends in a short toe slab. Miraflores Spillway structure comprises concrete gravity wall, concrete pier gate support, concrete gravity west wing wall, concrete gravity north and south side wall of channel and stoney gates.

2. **WORK INCLUDED:** In general, the work comprises the following services for the designated critical structures of the Panama Canal under this Contract, i.e., Gatun Locks, Pedro Miguel Locks, Miraflores Locks, Gatun Spillway, Madden Dam, and Miraflores Spillway. The work under this Contract shall include any task or work which is necessary to satisfy the requirements of the Contract. Without prejudice to any other provisions of the Contract, the Contractor shall at all times be responsible for the accuracy, correctness, integrity and organization of the Contractor's deliverables and documentation produced by or on its behalf as part of the work under this Contract or for which it is responsible under the Contract.

2.1 **Bid Schedule A (Basic Work):**

2.1.1 **Earthquake Assessment:** The Contractor shall execute all work required to perform earthquake assessment of each structure listed in paragraph 2. Earthquake assessment shall be a performance-based seismic assessment of the structure. The earthquake assessment shall undertake evaluation under strong earthquake excitation, evaluate performance levels related to seismic response parameters, and incorporate systematic methodology for simulating structure response to earthquake motions. Earthquake assessment shall include, but not be limited to, preparation of reports containing field investigations, sampling and testing results; analysis and calculations; models; recommendations and other related items.

2.2 **Bid Schedule B (Optional Work):**

2.2.1 **Preliminary Retrofit Design:** The ACP reserves the right to exercise the Optional Work. If the ACP exercises its right to proceed with the Optional Work, (1) the Optional Work will be for one structure, more than one structure or all structures listed in paragraph 2, (2) the ACP's decision will be implemented through Contract modification, and (3) the Contractor will be notified of the ACP's intention to proceed with the Optional Work within 30 days after the Final Acceptance of the Basic Work. Optional Work consists of preliminary retrofit design for the structure to minimize the risk of

uncontrolled release of the reservoir. Preliminary retrofit design shall include, but not be limited to, preparation of reports containing drawings, analysis and calculations, technical specifications, cost estimates, environmental considerations and other related items.

3. **LOCATION:** Structures of the Canal listed in paragraph 2 are located as shown in drawing 6129-0001-G-0001, and drawings from 6129-0001-C-0001 to 6129-0001-C-0012 included in annex A (*Contract Drawings*).

4. **EXISTING OPERATIONAL LAKE LEVEL:**

Existing Operational Lake Level (PLD)			
	Minimum Level (feet)	Maximum Level (feet)	Mean Level (feet)
Gatun Locks	78.8	88.0	83.4
Pedro Miguel Locks	78.8	88.0	83.4
Miraflores Locks	53.5	54.5	54.0
Gatun Spillway	78.8	88.0	83.4
Madden Dam	205	252	228.5
Miraflores Spillway	53.5	54.5	54.0

5. **MAIN GENERAL REQUIREMENTS:** This paragraph 5 (*Main General Requirements*) identifies the main requirements for the work, which may be further specified in other paragraphs of these terms of reference. The Contractor shall be responsible for producing as much level of detail for the work (including levels of effort in investigation, sampling and testing, analyses, models and other services) as necessary to adequately and satisfactorily fulfill the object of the Contract.

5.1 **Basic Work, Earthquake Assessment:** For each structure listed in paragraph 2, the Contractor shall perform, as a minimum, the following tasks:

5.1.1 The Contractor shall scrutinize the reference drawings and documents.

5.1.2 **Field Investigations, Sampling and Testing:** The Contractor shall perform field investigations, sampling and testing. All necessary material parameters (including, but not limited to, soil properties, concrete properties and lift joint properties) for the assesment shall be obtained. All necessary sampling and testing to determine the structural properties and condition of elements of the structure shall be performed. A plan for field investigation, sampling and testing shall be developed and submitted.

5.1.2.1 Investigations, sampling and testing shall include activities such as:

(a) geotechnical investigations comprising soil borings, laboratory testing, geotechnical analysis, geotechnical investigation reports and other similar items.

(b) materials sampling and testing comprising sampling and testing of concrete (e.g., mass density, modulus of elasticity, Poisson's ratio, tension strength, compressive strength, fracture energy, tensile and shear strength of parent concrete and lift joints); foundation rock (e.g., mass density, modulus of elasticity, Poisson's ratio, cohesion, angle of friction, compressive strength, rock strength parameters and shear strength of dam-foundation joint); soil (e.g., mass density, modulus of elasticity, Poisson's ratio, cohesion, angle of friction); Vs30 surface measurements: shear-wave velocity (Vs) surveys; ambient vibration testing to estimate the natural frequency of structures; and other similar items.

5.1.2.2 **Vertical core** extractions **passing** through the structure, **and penetrating its foundation as necessary**, shall be performed.

5.1.3 **Seismic Hazard (Ground Motions)**: Seismic hazard data is provided by the ACP in Annex B (*Other Contract Documents*). The Contractor shall perform the earthquake assessment using this data.

5.1.4 **Analysis and Modeling**:

5.1.4.1 **General**: Analysis and modeling shall, as a minimum, be in accordance with applicable requirements of the following standards or equivalent standards. Equivalent standards require the approval of the Contracting Officer. The Contractor shall submit all evidence to demonstrate that the proposed standard is equivalent to the substituted standard.

- (a) EM-1110-2-6050
- (b) EM-1110-2-6051
- (c) EM-1110-2-6053
- (d) ER-1110-2-1806

5.1.4.2 **Preliminary Analysis and Modeling**: **Shall include, but not be limited to, the following.**

(a) **Analysis with Two-Dimensional (2D) Models**: Analysis with 2D models shall be performed under various load cases (e.g., normal, earthquake and post-earthquake). Analysis shall implement realistic and comprehensive methods that are widely known and accepted in the industry for linear and nonlinear structural analysis. The structure shall be modeled as a finite element system. Structure-water-foundation interaction shall be included considering foundation inertia and damping (material and radiation), water compressibility, and hydrodynamic wave absorption by sediments and/or rock at the reservoir bottom. Neglecting water compressibility, foundation rock mass, or foundation damping (material and radiation) are unacceptable assumptions. Transverse cross sections (2-D) models of the structure-water-foundation rock system shall be analyzed by response-spectrum modal analysis.

1. Dynamic analysis shall include the weight in all parts of the system, including but not limited to spillway, reservoir water, bridge deck, gates, and mechanical equipment.

2. Structural analysis shall use appropriate levels of damping for all seismic excitation cases. Viscous damping larger than 2% in the concrete and 4% in the foundation rock, or 5% in the overall structure-water-foundation rock system shall be justified. Radiation damping shall be included by either modeling foundation rock and fluid as semi-unbounded continua, or by including non-reflecting boundaries in finite element models of the two domains.

3. Sensitivity analysis shall be performed.

5.1.4.3 **Detailed Analysis and Modeling:** Shall include, but not be limited to, the following.

(a) Analysis shall implement realistic and comprehensive methods that are widely known and accepted in the industry for linear and nonlinear structural analysis. The structure shall be modeled as a finite element system with nonlinear constitutive properties of concrete that allows for opening and closing of contraction joints. Structure-water-foundation interaction shall be included considering foundation inertia and damping (material and radiation), water compressibility, and hydrodynamic wave absorption by sediments and/or rock at the reservoir bottom. Neglecting water compressibility, foundation rock mass, or foundation damping (material and radiation) are unacceptable assumptions. Transverse cross sections as well as three-dimensional (3-D) models of the structure-water-foundation rock system shall be analyzed by response history analysis (RHA).

1. Dynamic analysis shall include the weight in all parts of the system, including but not limited to spillway, reservoir water, bridge deck, gates, and mechanical equipment.

2. Structural analysis shall use appropriate levels of damping for all seismic excitation cases. Viscous damping larger than 2% in the concrete and 4% in the foundation rock, or 5% in the overall structure-water-foundation rock system shall be justified. Radiation damping shall be included by either modeling foundation rock and fluid as semi-unbounded continua, or by including non-reflecting boundaries in finite element models of the two domains.

3. Dynamic analysis of piers shall consider amplification of motion from the base of the spillway to the bottom of the pier. Forces transferred from the gates to the piers shall also be considered.

5.1.5 **Uncertainty Analysis:** Shall include, but not be limited to, the following.

5.1.5.1 Evaluate all sources of epistemic uncertainty in the analysis.

5.1.5.2 Construct a logic tree to model all uncertainties.

5.1.5.3 Estimate probabilities for alternative estimates of input parameters.

5.1.6 **Potential Failure Mode Analysis (PFMA):** Potential Failure Mode analysis (PFMA) shall be implemented to determine various predicted modes of failure. The PFMA shall consider as a minimum

the following: concrete cracking, reinforcement yielding, redistribution of load during concrete cracking or steel yielding and various failure modes: bending, twisting, and shearing. Specific areas that need to be considered are changes of geometry, lift surfaces, and points of stress concentration. The intent of the PFMA is to identify critical sections and locations in the structure where structural analysis and retrofit designs can be focused to prevent progressive failure sequences.

5.1.7 **Damage Analysis:** Shall include, but not be limited to, the following.

5.1.7.1 For selected PFM's, perform analysis to develop the Fragility Curve estimates.

5.1.7.2 Perform quantification of fragilities curve for each damage state to be evaluated in addition to uncontrolled release of the reservoir.

5.1.7.3 Estimate conditional probability of damage as a function response metrics from the detailed analysis for each failure mode.

5.1.8 **Loss Analysis:** Shall include, but not be limited to, the following.

5.1.8.1 Estimate the consequences for the uncontrolled release of the reservoir.

5.1.9 **Risk Analysis:** Shall include, but not be limited to, the following.

5.1.9.1 Perform risk analysis for seismic hazard.

5.1.9.2 Perform post processing of risk analysis results to estimate the following:

(a) Contribution of ground motion and magnitude to risk.

(b) Disaggregation of contribution of sources of uncertainty to risk (Tornado plots, variance in inputs and respective contribution to variance in risk analysis results).

(c) Review and evaluation of risk analysis results and their effects on decision making about retrofit options.

5.2 **Optional Work, Preliminary Retrofit Design:** Applies for the structure(s) the ACP decides to proceed with the Optional Work (Preliminary Retrofit Design). The Optional Work (Preliminary Retrofit Design) will take into account the results of the Basic Work (Earthquake Assessment).

6. **DEFINITIONS:**

6.1 **"ACP"** means the Panama Canal Authority, or Autoridad del Canal de Panamá as it is officially known in Spanish.

6.2 **"day"** means a calendar day and

6.3 **"working day"** means an ACP labor day; refer to clause 4.28.8. (*Jornada Hábil*).

6.4 “year” means 365 days or 366 days in the case of a leap year.

6.5 The “PLD” or Precise Level Datum is the zero-point surface-control datum to which all elevations for vertical-control surveying are referred at the Canal. It was established at mean sea level in Cristobal (on the Atlantic side of the Isthmus) during the construction of the waterway (in 1910). Atlantic mean low water (MLW) approximately equals PLD, Pacific mean low water springs (MLWS) approximately equals -2.20 meters (-7.22 feet) PLD, mean lake level (MLL) for Gatun approximately equals 25.91 meters (85 feet) PLD, and the mean level of Miraflores Lake approximately equals 16.46 meters (54 feet) PLD.

7. **APPLICABLE PUBLICATIONS:** The following publications, of the issues listed below but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto.

7.1 **American Association of Cost Engineering (AACE) International Publications:**

17R-97	Recommended Practice - Cost Estimate Classification System
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7.2 **International Organization for Standardization (ISO) Publication:**

12006-2 -15	Building Construction - Organization of Information About Construction Works - Part 2: Framework For Classification
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7.3 **U.S. Army Corps of Engineers (USACE), Engineering Manuals and Other Documents:**

ER-1110-2-1806	Earthquake Design and Evaluation for Civil Works Projects
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EM-1110-2-6050	Response Spectra and Seismic Analysis for Concrete Hydraulic Structures
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EM-1110-2-6051	Time-History Dynamic Analysis of Concrete Hydraulic Structures
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EM-1110-2-6053	Earthquake Design and Evaluation of Concrete Hydraulic Structures
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8. **COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK:** The Contractor shall be required to prosecute the work diligently, and complete the work in accordance with the following:

8.1 **Bid Schedule A (Basic Work), Earthquake Assessment:** The Contractor shall complete the entire work for the Basic Work (Earthquake Assessment) no later than 490 days after the date of the notice of award.

8.2 **Bid Schedule B (Optional Work), Preliminary Retrofit Design:** If the ACP exercises its right to proceed with the Optional Work, then the Contractor shall complete the entire work for the Optional Work (Preliminary Retrofit Design) no later than 100 days after the date of the notice of the contract modification for the Optional Work.

8.3 The Contractor shall be responsible for furnishing all materials, labor and equipment necessary to commence, execute and complete the work satisfactorily and expeditiously within the indicated time frame and according to the terms and conditions of the Contract.

9. MEETINGS

9.1 **Post-Award Meeting:** Within 10 working days after the notice of award, the Contractor and the Contractor's key personnel shall attend a post-award meeting through videoconferencing with ACP representatives. The specific date and time for this meeting will be coordinated by the Contracting Officer not less than 7 days in advance. The Contractor shall prepare and bring to this meeting the proposed work schedule. The purpose of this meeting is to establish points of contact, review functions and responsibilities, review ACP administrative procedures, discuss technical approach and schedule, review of deliverables, and other relevant topics.

9.2 **Progress Update Meetings:** The Contractor shall attend progress update meetings every 2 months or the time interval indicated by the Contracting Officer. Work progress update shall be presented and addressed by the Contractor. In addition, matters from previous months, schedule activities for subsequent months and other related topics shall be addressed. The Contractor shall attend the progress update meetings through videoconferencing. The Contractor and pertinent members of the Contractor's personnel shall participate in progress update meetings.

9.3 Checkpoint Meetings:

9.3.1 **General:** During the course of the work, the Contracting Officer may request checkpoint meetings to the Contractor, in addition to the progress update meetings, to monitor the progress of the work, address issues, and concerns, and any other aspect as deemed necessary by the ACP. Also, the Contractor may request checkpoint meetings to address issues and concerns as deemed necessary by the Contractor. Checkpoint meetings shall allow for continuous dialogue between the parties so that issues that may develop are resolved in an expeditious manner. The Contractor shall organize, program and hold checkpoint meetings. The date and time of each checkpoint meeting shall be agreed upon between the parties. The Contractor shall attend the checkpoint meetings through videoconferencing. The Contractor and pertinent members of the Contractor's personnel shall participate in checkpoint meetings.

9.3.2 **Meeting Documentation:** The Contractor shall prepare agendas, issue meeting invitations, and prepare minutes for all meetings specified herein. Comprehensive meeting minutes shall include participants, a record of topics discussed, and action items. Draft meeting minutes shall be provided to the Contracting Officer for review and input within 2 working days after the meeting was held. For each such draft meeting minute, the ACP will review and provide input to the Contractor within 7 days after

its receipt. Within 7 days after receiving ACP's input the Contractor shall finalize the meeting minute and provide it to the Contracting Officer. Meeting minutes shall include all support documentation.

10. **DELIVERABLES - REPORTS:** The Contractor shall perform all appurtenant work required to provide complete deliverables.

10.1 **Basic Work, Earthquake Assessment:** The following requirements shall be met for each structure listed in paragraph 2.

10.1.1 **Progress Report:** The content of the progress report shall include, as a minimum, the following:

10.1.1.1 Executive summary (to the extent covered up to the progress report).

10.1.1.2 Background (100 percent completion).

10.1.1.3 Description of work methodology (100 percent completion).

10.1.1.4 A summary of the findings and results reached from scrutinizing the references drawings and documents (100 percent completion).

10.1.1.5 Field investigations, sampling and testing plan (100 percent completion).

10.1.1.6 Evaluation of field investigations, sampling and testing results (100 percent completion).

10.1.2 **Draft Report:** The content of the draft report shall include, as a minimum, the following. Items listed from paragraph 10.1.2.2 to paragraph 10.1.2.6 shall be 100 percent complete as requested from the progress report:

10.1.2.1 Executive summary.

10.1.2.2 Background.

10.1.2.3 Description of work methodology.

10.1.2.4 A summary of the findings and results reached from scrutinizing the references drawings and documents.

10.1.2.5 Field investigations, sampling and testing plan.

10.1.2.6 Evaluation of field investigations, sampling and testing results.

10.1.2.7 Preliminary analysis and modeling results.

10.1.2.8 Detailed analysis and modeling results, including but not limited to the following.

(a) Analysis and calculations.

- (b) Assumptions and analysis criteria.
- (c) Models and modeling results.
- (d) Material properties.

10.1.2.9 Uncertainty analysis.

10.1.2.10 Potential Failure Mode Analysis (PFMA) results.

10.1.2.11 Damage analysis results.

10.1.2.12 Loss analysis results.

10.1.2.13 Risk analysis results.

10.1.2.14 Conclusions.

10.1.2.15 **Recommendations:** Shall include, but not be limited to, the following.

(a) All possible outcome-based options that allow the ACP to make the best decision based on the risk of uncontrolled release of the reservoir for seismic intensity.

(b) The criteria for defining a type of retrofit to minimize risk of uncontrolled release of the reservoir.

(c) Possible alternatives to overcome deficiencies found for the evaluated structure. Retrofit alternatives must be proven alternatives that have been carried out in similar projects; they shall be practical, viable and constructable in accordance with the best construction industry practices and must consider the environmental impact as well as the impact on the operations of the Canal. In the case of retrofit of locks, alternatives shall be able to be implemented in such a way that vessels traffic through the locks is not interrupted.

(d) Descriptive approach and considerations for retrofit design options that consider a ground motion corresponding to a return period of 1,000 years and for which the structure may experience damage without uncontrolled release of the reservoir.

10.1.2.16 Glossary, including acronyms, and abbreviations.

10.1.2.17 References.

10.1.2.18 Appendices or annexes.

10.1.3 **Final Report:** After the draft report of the assessment have been submitted by the Contractor and approved by the Contracting Officer, the Contractor shall submit the final report of the assessment and give its oral presentation. The final report shall be complete, i.e., include all items submitted in the

draft report in its final version. The final report shall have addressed all ACP's comments to the satisfaction of the Contracting Officer. The final report requires the approval of the Contracting Officer.

10.1.4 Reports Time Frame:

10.1.4.1 Progress Report: The Contractor shall submit for approval of the Contracting Officer the progress report of the assessment within **160** days after the date of the notice of award.

10.1.4.2 Draft Report: The Contractor shall submit for approval of the Contracting Officer the draft report of the assessment and give its oral presentation, within **400** days after the date of the notice of award.

10.1.4.3 Final Report: Refer to paragraph 8.1 (*Bid Schedule A (Basic Work), Earthquake Assessment*).

10.1.4.4 ACP Review: Shall be according to paragraph 11 (*Contractor's Documents*). The Contracting Officer may, within the review period, give notice to the Contractor that a Contractor's report fails (to the extent stated) to comply with the Contract. If a Contractor's report so fails to comply, it shall be rectified and resubmitted by the Contractor within 14 days after the corresponding notice is given by the Contracting Officer.

10.2 Optional Work, Preliminary Retrofit Design: If the ACP exercises its right to proceed with the Optional Work, then the following requirements shall be met by the Contractor for each structure forming part of the Optional Work.

10.2.1 Draft Report: The content of the draft report shall include, as a minimum, the following:

10.2.1.1 Executive summary.

10.2.1.2 Background.

10.2.1.3 Objectives.

10.2.1.4 Description of work methodology, including, but not limited to, constructability analysis.

10.2.1.5 Existing conditions.

10.2.1.6 Environmental considerations.

10.2.1.7 Narrative documentation.

10.2.1.8 Drawings.

10.2.1.9 Technical specifications.

10.2.1.10 Design analysis and calculations.

10.2.1.11 Cost estimates.

10.2.1.12 Operation and maintenance recommendations.

10.2.1.13 Construction methodology recommendations, including environmental and social considerations.

10.2.1.14 Work schedules.

10.2.1.15 References.

10.2.1.16 Appendices or annexes.

10.2.2 **Final Report:** After the draft report of the preliminary retrofit design have been submitted by the Contractor and approved by the Contracting Officer, the Contractor shall submit the final report of the preliminary retrofit design and give its oral presentation. The final report of the retrofit preliminary design shall be complete i.e., include all items submitted in the draft report in its final version. The final report shall have addressed all ACP's comments to the satisfaction of the Contracting Officer. The final report requires the approval of the Contracting Officer.

10.2.3 **Reports Time Frame:**

10.2.3.1 **Draft Report:** The Contractor shall submit for approval of the Contracting Officer the draft report of the preliminary retrofit design and give its oral presentation, within 35 days after the date of the notice of the Contract modification that exercises the Optional Work.

10.2.3.2 **Final Report:** Refer to paragraph 8.2 (*Bid Schedule B (Optional Work), Preliminary Retrofit Design*).

10.2.3.3 **ACP Review:** Shall be according to paragraph 11 (*Contractor's Documents*). The Contracting Officer may, within the review period, give notice to the Contractor that a Contractor's report fails (to the extent stated) to comply with the Contract. If a Contractor's report so fails to comply, it shall be rectified and resubmitted by the Contractor within 14 days after the corresponding notice is given by the Contracting Officer.

10.3 **Over-The-Shoulder Review:** The ACP will be entitled to carry out over-the-shoulder review during the deliverables development and there shall be a continuous review and dialogue between the Contracting Officer and the Contractor. The over-the-shoulder review process shall allow the ACP to be kept updated by the Contractor of the Contractor's progress and serve to expedite the review of submittals.

10.4 **Follow-up to Comments:** The ACP will comment on deliverables. The Contractor shall keep track of all comments made by the ACP. The Contractor shall include an annex that cumulatively lists all comments, the Contractor's approach to address these comments, and where these comments were resolved within the corresponding deliverable. Any comments made by the ACP relative to the deliverables shall not relieve the Contractor from the Contractor's obligation to execute the work in compliance with the requirements of the Contract, and shall not constitute grounds for time extensions nor additional costs.

10.5 **Oral Presentations:**

10.5.1 **Basic Work, Earthquake Assessment:** The following requirements shall be met for each structure listed in paragraph 2.

10.5.1.1 **Draft Report's Oral Presentation:** The Contractor shall give an oral presentation for the draft report of the earthquake assessment through videoconferencing. Oral presentation shall be given individually per draft report submitted.

10.5.1.2 **Final Report's Oral Presentation:** An oral presentation for the final report of the earthquake assessment shall be given by the Contractor. The Contractor shall be physically present at the ACP's facilities to deliver the presentation. Specialized Contractor personnel engaged directly in the Contract work shall be present. Oral presentation shall be given individually per final report submitted. The ACP will provide the conference room and display equipment (e.g., projector, projector screen) for the presentation; the Contractor shall provide all other items that may be needed to conduct the presentation. The ACP reserves the right to film and audio record the presentation proceedings.

10.5.1.3 At the request of the Contracting Officer, other presentations of deliverables being developed shall be also executed by the Contractor at any time during the Contract execution as deemed necessary by the ACP.

10.5.2 **Optional Work, Preliminary Retrofit Design:** If the ACP exercises its right to proceed with the Optional Work, then the following requirements shall be met by the Contractor for each structure forming part of the Optional Work.

10.5.2.1 **Draft Report's Oral Presentation:** The Contractor shall give a presentation for the draft report of the earthquake assessment through videoconferencing. Oral presentation shall be given individually per draft report submitted.

10.5.2.2 **Final Report's Oral Presentation:** A presentation for the final report of the earthquake assessment shall be given by the Contractor. The Contractor shall be physically present at the ACP's facilities to deliver the presentation. Specialized Contractor personnel engaged directly in the Contract work shall be present. Oral presentation shall be given individually per final report submitted. The ACP will provide the conference room and display equipment (e.g., projector, projector screen) for the presentation; the Contractor shall provide all other items that may be needed to conduct the presentation. The ACP reserves the right to film and audio record the presentation proceedings.

10.5.3 At the request of the Contracting Officer, other presentations of deliverables being developed shall be also executed by the Contractor at any time during the Contract execution as deemed necessary by the ACP.

10.5.4 **Other Requirements (applies for Basic Work and Optional Work):** The following requirements shall be met for each presentation:

10.5.4.1 Submit the presentation, and its agenda, to the Contracting Officer 7 days before the presentation takes place. The presentation agenda shall include as a minimum: (1) the presentation

program, time and duration, (2) objectives, (3) deliverables and results, (4) cost estimates (as applicable), (5) list of presenters and facilitators, and (6) methodology and procedure.

10.5.4.2 Prepare documentation and support resources, including digital representations and other visual aids as needed to execute the presentation.

10.5.4.3 Facilitate and conduct the presentation. The Contractor shall provide the facilitators and presenters needed to conduct the presentation. The presentation shall be conducted and facilitated by the specialized Contractor personnel engaged directly in the Contract work.

10.5.4.4 Prepare and keep a register that documents the proceedings of the presentation. At the request of the Contracting Officer, the Contractor shall submit this register.

10.6 **Measurements:**

10.6.1 **Usage:** Measurements in the Contractor's documents, deliverables and other submittals shall be in SI units, except when a different system of units is specifically approved by the Contracting Officer.

10.6.2 **Decimal Marker:** The Contractor shall make use of a decimal point (.) to separate the whole number from the decimal fraction of numbers composed of a whole number and a decimal fraction, and the Contractor shall make use of a comma (,) to separate the thousands, millions, et al in whole numbers, for example, 1,254,823.68; except that on drawings, the Contractor shall make use of a blank space to separate the thousands, millions, et al in whole numbers, for example, 1 254 823.68.

10.6.3 **Coordinates and Elevations:** The coordinate system used shall be based on the UTM system; the horizontal datum shall be NAD 27. Scale factors appropriate to the location shall be used. The Contractor shall establish control points close to the locations of the main structures and facilities and calibrate new topographic and bathymetric data. Data obtained from local authorities or other sources, shall be translated into this unified system before being used in the Contractor's documents. All levels (elevations) shall be based on the PLD datum provided by the ACP and verified by the Contractor.

10.7 **Reports Format:** Reports shall be submitted in both, printed and digital file format. Digital files shall be in Microsoft Word file format (Word latest version or a version approved by the Contracting Officer) and Adobe Acrobat PDF file format. In case the digital file format of a particular item of the report is not compatible with Microsoft Word, the Contractor shall previously notify and request the approval of the Contracting Officer for the item's proposed digital format. In the case of digital file format of drawings for the retrofit preliminary design refer to paragraph 10.8.4 (Digital Format).

10.8 **Drawings (for Optional Work, Retrofit Preliminary Design):** The Contractor shall prepare and provide the drawings of the retrofit preliminary design.

10.8.1 **Guidelines:** The Contractor shall follow the latest version of the NCS (U.S. National CAD Standard) for all drawings.

10.8.2 **List of Drawings:** The Contractor shall provide a list of all submitted drawings, which includes, as a minimum, sheet titles, sheet numbers, description, and file name identification.

10.8.3 **Printed Format:** The Contractor shall submit an original and 2 copies of the drawings. Printed drawings format shall be the standard "D" size with outside cut-line dimensions of 24 inches by 36 inches. Printed drawings shall be on high-quality paper, with the line work and text of such quality as to allow digital reproduction and readable prints from the original prints, copies, and digitized files.

10.8.4 **Digital Format:** The Contractor shall provide the digital files of the drawings in Autodesk AutoCAD file format (AutoCAD latest version or a version approved by the Contracting Officer) and in Adobe Acrobat PDF file format.

10.9 **Technical specifications (for Optional Work, Retrofit Preliminary Design):** In general, the specifications shall be performance-based specifications; however, the Contractor shall prepare prescriptive specifications as required by the design or instructed by the Contracting Officer.

(a) The Contractor shall organize the specifications into sections per CSI MasterFormat or a classification system that meets ISO 12006-2; organize each section into paragraphs numbered in the Arabic and legal style numerical format (i.e., 1.1, 1.1.1, 1.1.2, 1.1.2.1, etc.). All paragraphs, tables, and figures shall be numbered.

(b) The specifications shall include sections to address work restrictions, design and construction management and coordination requirements, general submittal procedures, health and safety requirements, environmental requirements, quality requirements, role of references, temporary facilities, general acceptance and taking-over procedures, and general demonstration and training requirements.

(c) Each section of the specifications shall be organized to have the following main paragraphs: (1) Scope, (2) References, (3) Requirements, (4) Design Criteria, (5) Submittals, and (6) Quality Assurance. The specifications shall be coordinated with the drawings. If the Contractor desires to use a different way of organizing the section format, then the Contractor shall provide his proposal with the appropriate justification to the ACP for evaluation.

(d) Standard specification sets, general guide specifications or specifications not specifically tailored for the project and work to be performed will not be accepted.

10.10 **Designer of Record Oversight (for Optional Work, Retrofit Preliminary Design):** Relevant Contractor's documents including drawings and their associated analysis and calculations, narrative documentation, and technical documentation shall be reviewed, approved, and certified by the Contractor's designer of record before their initial submittal to the ACP. This review, approval, and certification requirement shall be required for subsequent submittals, which shall be accompanied with documentation of the latest review before re-submittal to the Contracting Officer.

10.11 Cost Estimates (for Optional Work, Retrofit Preliminary Design):

10.11.1 **General:** The Contractor shall prepare detailed estimated total retrofit cost, which shall include but not be limited to design and construction costs; and shall include a constructability evaluation. The Contractor shall include notes to explain the ways in which the costs may be affected by inflation and other variables. Quantities shall be supported by sufficient analysis that clearly evidences the elements, parameters and calculations considered.

10.11.2 **Cost Estimate Class:** Shall conform to AACE Class 2 cost estimate in accordance with AACE 17R.

10.12 **Design Standards (for Optional Work, Retrofit Preliminary Design):** The work shall comply with standards that are widely known and accepted in the industry. These standards shall be as set out in the Contract or as approved by the Contracting Officer.

10.12.1 Standard Selection:

10.12.1.1 The selection of standards shall be in compliance with applicable laws, including ACP regulations, and Contract requirements.

10.12.1.2 In general, the set of standards shall be from (but not be limited to) one of the following countries or zones, in order of preference.

- (a) United States of America;
- (b) Eurozone; or
- (c) United Kingdom of Great Britain and Northern Ireland.

11. CONTRACTOR'S DOCUMENTS:

11.1 **General:** The Contractor's documents shall include the deliverables required to fulfill Contract requirements, e.g., reports. The Contractor shall prepare all Contractor's documents. ACP personnel shall have the right to inspect the preparation of all these documents, at any given time wherever they are being prepared. Contractor's documents shall be submitted together with a notice as required in paragraph 11.4 (*Contractor's Notice*). In the following provisions of this paragraph 11 (*Contractor's Documents*), "review period" means the period required by the Contracting Officer for review and approval/disapproval.

11.2 Unless otherwise indicated, Contractor's documents shall be submitted for approval.

11.3 **Review Period:** Unless otherwise stated in the Contract, each review period by the ACP will not exceed 28 days, calculated from the date on which the Contracting Officer receives a Contractor's document and the Contractor's notice. The Contracting Officer may, within the review period, give notice to the Contractor that a Contractor's document fails (to the extent stated) to comply with the Contract. If a Contractor's document so fails to comply, it shall be rectified, resubmitted and reviewed

in accordance with this paragraph 11 (*Contractor's Documents*), at the Contractor's cost, hence at no cost to the ACP. If requested by the Contracting Officer, the Contractor shall provide as requested, free of charge, details and information that the Contracting Officer considers necessary or desirable to enable it to understand and use any of the Contractor's documents.

11.4 **Contractor's Notice:** This notice shall state that the Contractor's document is considered ready, both for review in accordance with this paragraph 11 (*Contractor's Documents*) and for use. The notice shall also state that the Contractor's document complies with the Contract, or the extent to which it does not comply.

11.5 **Procedure:** The Contracting Officer will give notice to the Contractor that the Contractor's document has been (A) "Approved", (AN) "Approved as noted", or (D) "Disapproved and resubmit". If the Contracting Officer instructs that further Contractor's documents are required, the Contractor shall prepare them promptly. Any approval or consent, or any review or comment or failure to do the same (under this paragraph 11 (*Contractor's Documents*) or otherwise), by the Contracting Officer, shall not relieve the Contractor from any of its obligations or responsibilities under the Contract. Further, the Contractor shall not be entitled to argue or contend that any approval, consent or review or comment or failure to do the same on a Contractor's document (under this paragraph 11 (*Contractor's Documents*) or otherwise) by the Contracting Officer or any of the ACP's personnel, shall of itself give rise to any extension of time for completion and/or to a milestone date, an entitlement to additional costs or constitute a modification. To the extent that a Contractor's document shows a deviation from or a change to the Contract which is approved consented to or not objected to by the Contracting Officer (or any of the ACP's personnel) that approval consent or non-objection (including any comment) shall not of itself constitute an instruction by the Contracting Officer or a modification of any nature to the Contract.

12. **SITE VISITS:** Site visits to examine and verify existing conditions of each structure listed in paragraph 2 shall be performed. The Contractor shall provide written notification to ACP at least one week in advance for each site visit. Such written notice will describe the purpose of the visit and indicate the Contractor's personnel who will participate. The Contractor shall prepare and keep a register that documents relevant information regarding the visits made by the Contractor to the site. At the request of the Contracting Officer, the Contractor shall submit this register.

13. **OFFICIAL LANGUAGE:** Except as otherwise expressly indicated in the Contract documents, the Contractor shall submit all correspondence, deliverables, and other documents required by the Contract in the English language. Refer also to clause 4.28.7 (*Idioma Oficial*).

14. **CONFIDENTIALITY OF ACP INFORMATION:** All data, studies, reports, documents and information concerning the operation and management of the Panama Canal, and anything affecting the same, that is either (a) given by the ACP to the Contractor in support of Contract performance, (b) generated or produced by the Contractor during Contract performance, shall be for restricted use and shall not be released or distributed at any time, without the prior, explicit, consent of the Contracting Officer. Any violation of this provision shall be considered a serious breach of confidence by the ACP and may result in termination of the Contract for failure of the Contractor to comply with its obligations under this paragraph 14 (*Confidentiality of ACP Information*) and the Contract.

15. **INFORMATION FOR RESTRICTED USE:** Information including drawings and designs about Canal vital sites, such as locks and spillways, is classified for restricted use. Therefore, the availability of said information is subject to a confidentiality agreement with the ACP that must be signed prior to the release of any information. Each interested party shall contact the person in charge responsible for this solicitation; refer to the SLI. The information will be made available upon receipt of the signed Confidentiality Agreement.

16. **CONTRACT DRAWINGS, REFERENCES AND OTHER ACP INFORMATION:** The ACP shall retain the copyright and other intellectual property rights in the ACP’s drawings and other data and documents supplied or made available by (or on behalf of) the ACP under the Contract. The Contractor may, at his cost, copy, use, and obtain communication of these data and documents for the purposes of the Contract. They shall not, without the ACP’s consent, be copied, used or communicated to a third party by the Contractor, except as necessary for the purposes of the Contract. Any permitted communication shall only be to third parties who are subject to appropriate confidentiality obligations specified by the ACP and the Contractor shall remain responsible for ensuring that the documents are not, without the ACP’s consent, further copied, used or communicated.

16.1 **Contract Drawings:** The work shall conform to the following Contract drawings, which are included in annex A (*Contract Drawings*):

Drawing No.	Title	Revision	Date
	AUTORIDAD DEL CANAL DE PANAMÁ VICEPRESIDENCIA DE INFRAESTRUCTURA E INGENIERÍA DIVISIÓN DE INGENIERÍA Edificio 721, Corozal Oeste, República de Panamá		
	EARTHQUAKE ASSESSMENT OF CANAL STRUCTURES Republic of Panama		
6129-0001-G-0001	General Location List of Drawings	-	30-nov-2021
6129-0001-C-0001	Existing Conditions Miraflores Spillway and Miraflores Locks North-East Area	-	30-nov-2021
6129-0001-C-0002	Existing Conditions Miraflores Locks North West Area	-	30-nov-2021
6129-0001-C-0003	Existing Conditions Miraflores Locks Center-East Area	-	30-nov-2021

Drawing No.	Title	Revision	Date
6129-0001-C-0004	Existing Conditions Miraflores Locks Center-West Area	-	30-nov-2021
6129-0001-C-0005	Existing Conditions Miraflores Locks South-East Area	-	30-nov-2021
6129-0001-C-0006	Existing Conditions Miraflores Locks South-West Area	-	30-nov-2021
6129-0001-C-0007	Existing Conditions Pedro Miguel Locks North Area	-	30-nov-2021
6129-0001-C-0008	Existing Conditions Pedro Miguel Locks South Area	-	30-nov-2021
6129-0001-C-0009	Existing Conditions Gatun Locks North Area	-	30-nov-2021
6129-0001-C-0010	Existing Conditions Gatun Locks South Area	-	30-nov-2021
6129-0001-C-0011	Existing Conditions Gatun Spillway	-	30-nov-2021
6129-0001-C-0012	Existing Conditions Madden Dam	-	30-nov-2021

16.2 **OTHER CONTRACT DOCUMENTS:** The following documents form part of the Contract and are included in annex B (*Other Contract Requirements*).

16.2.1 **Seismic Design Criteria for ACP Critical Structures:**

(a) Seismic Design Criteria for ACP Critical Structures - Task A: Development of Design Earthquake Ground Motions, Draft Report, prepared by URS for the ACP, dated January 2008.

(b) Seismic Design Criteria for ACP Critical Structures - Task B: Ground Acceleration Time Histories for Five ACP Sites, Draft Technical Memorandum, prepared by URS for the ACP, dated February 2008.

(c) Ground acceleration time histories.

16.2.2 Section A – Environmental Protection, regarding environmental protection requirements for work performance at the work site.

16.3 **References:** Notwithstanding any other provisions of the Contract, the parties agree that the ACP shall not be responsible in any way whatsoever for the reference documents included in this Contract, including but not limited to the drawings, geotechnical data, reports, documents and other information included therein and shall not be deemed to have given any warranty, representation of accuracy or completeness in relation to the same. The ACP shall not be held responsible for any interpretation by the Contractor of the reference documents, nor for any determinations by the Contractor derived from its interpretation. Nothing contained therein shall relieve the Contractor from his responsibility for the execution of the works in accordance with the Contract requirements. The parties agree that the reference drawings and reference documents are included in the Contract for information purposes only, may not be relied upon by the Contractor in any way or for any reason, and shall not give rise to, form the basis of, or be the subject matter of, any claims of any nature against the ACP.

16.3.1 **Reference Drawings:** Reference drawings listed in Table 1 (*Reference Drawings Listing*) at the end of these terms of reference are included in annex C (*References Drawings*).

16.3.2 **Reference Documents:**

16.3.2.1 **Reports and Other Documents:** The following reports and other documents are included in annex D (*References Documents: Reports and Other Documents*).

(a) “Reporte Anual de Instrumentación Año Fiscal 2020 (Programa de Seguridad de Represas)”, prepared by ACP’s “Sección de Ingeniería Geotécnica”, Yesenia Cerrud and Carlos Fong, dated October 2021.

(b) “Reporte Anual de Instrumentación Año Fiscal 2019 (Programa de Seguridad de Represas)”, prepared by ACP’s “Sección de Ingeniería Geotécnica”, Osmey Cedeño and Yesenia Cerrud, dated February 2020.

(c) Preliminary Report on the Seismic Adequacy of the Gatun Spillway (Gatun Dam, Panama Canal), prepared by ACP’s Geotechnical Branch, Antonio Abrego and Maximiliano De Puy, dated July 2001.

(d) Core Drilling, Logging and Sample Preservation at Gatun Spillway Apron, prepared by Pastora Franceschi and Jennifer Ramesch, dated August 1999.

(e) Miraflores Dam Stability Report, prepared by Harza Engineering Company for the Panama Canal Company (PCC), dated January 1969.

(f) Report on Compressive Strength of Concrete and Rock Cylinders from Miraflores Spillway, prepared by PCC’s Water and Laboratories Branch, dated August 1967.

(g) The Military Engineer (TME) Magazine's Article: Foundations for the Madden Dam by R. L. Klotz, TME November-December 1935 Issue.

(h) Final Report on Field Investigations of the Madden Dam and Reservoir Site at Alhajuela, Panama Canal Zone, prepared by Frederic H. Kellogg, dated March 1931.

(i) A Geologic Study of the Madden Dam Project, Alhajuela, Canal Zone (1930) by Frank Reeves and Clyde P. Ross.

1. General Geologic Map of the Proposed Madden Reservoir, Near Alhajuela, Canal Zone.

2. Geologic Map and Sections of Area in the Vicinity of Dam Sites 1 and 5, Canal Zone.

16.3.2.2 **Geological Field Logs:** Geological field logs of core holes are included in annex E (*Reference Documents: Geological Field Logs*).

16.3.2.3 **Laboratory Tests:** Laboratory test results are included in annex F (*Reference Documents: Laboratory Tests*).

16.3.2.4 **Photos:** Historical photos of the structures are included in annex G (*Reference Documents: Photos*).

16.3.3 **Other Reference Data:** After award, the Contractor may request additional reference data to the data listed under paragraph 16.3 (*References*) for the purposes of this Contract. The ACP will analyze the request and if is viable will schedule and provide the support as soon as possible; however, the ACP cannot guarantee that such support will be provided immediately or that will be provided at all. The data, if supplied, will be data that the ACP may have available at the time of the request and without additional formatting or sorting. The Contractor shall investigate, update, and obtain information in addition to that which may be available from the ACP.

17. **WORK SCHEDULE:**

17.1 Within 7 days after the Notice of Award, the Contractor shall prepare and submit a work schedule for approval by the Contracting Officer. The work schedule shall include the type, duration, order, and critical path of every activity inherent to the Contract and the initiation and completion dates. The work schedule shall be submitted in the form of a bar chart that allows for an adequate indication of the percentage of progress on any given date during the Contract execution period. A narrative description of the work methodology approach and the activities comprising the work shall be attached to the work schedule. If the Contractor does not submit the work schedule within the established deadline or if such schedule is not submitted in the manner described and with the required details, the Contracting Officer may retain payments until the Contractor submits the required work schedule.

17.2 At the end of each month, the Contractor shall record in the work schedule, the actual progress made. The Contractor shall keep a copy of the work schedule in a visible place at the worksite. Additionally, the Contractor shall submit an updated work schedule at the end of each month.

17.3 The Contracting Officer shall use the approved work schedule as the official record to determine if the Contractor is accomplishing the work with the required speed and diligence to assure completion by the time specified in the Contract. If, in the Contracting Officer's judgment, the Contractor falls behind the approved work schedule, the Contractor shall take the necessary steps to recover lost time, including those measures, which the Contracting Officer may require, at no additional cost to the ACP. Under these circumstances, the Contracting Officer may demand that the Contractor increase the Contractor's workforce, working hours, overtime, and equipment, and/or take any other corrective action needed to guarantee timely completion of the work within the time stated in the Contract. The Contractor shall submit a supplementary work schedule to show how the Contractor intends to recover the rate of progress that was previously approved.

18. **SCRUTINY OF DATA AND FIELD INVESTIGATIONS, SAMPLING AND TESTING PLAN:** Within 14 days after the Notice of Award, the Contractor shall submit, for approval, a summary of the findings and results reached from scrutinizing the references drawings and documents, and the Field Investigations, Sampling and Testing Plan.

19. **ESTIMATED QUANTITIES:** Clause 4.28.48 (*Renglones de Cantidades Estimadas*) applies to Bid Schedule B (*Optional Work*).

20. **CONTRACT PRICE BREAKDOWN:**

20.1 Within 7 days after the Notice of Award, the Contractor shall submit, for approval, a detailed price breakdown of the price proposal [Bid Schedule A (Basic Work) and Bid Schedule B (Optional Work)].

20.2 The Contracting Officer may request supplementary, partial or total price breakdowns. The submitted price breakdowns shall include adequate and sufficient cost details so that cost allocation may be easily identified within the activities and tasks. The ACP reserves the right to request adjustments to the proposed breakdown in the cases where the price breakdown or the cost details are not consistent with the activities or tasks.

20.3 Activities and/or tasks shall include but not be limited to:

20.3.1 Work performed in the Republic of Panama, which will be subject to tax withholdings pursuant to Contract clause 4.28.3 (*Retención de Impuestos a Contratista con Domicilio fuera de la República de Panamá*).

20.3.2 [Field investigations, sampling and testing.](#)

21. **PAYMENT:** Payment shall be according to clause 4.28.77 (*Pagos*) and as follows.
- 21.1 **Bid Schedule A (Basic Work):**
- 21.1.1 **Earthquake Assessment, Gatun Locks:**
- 21.1.1.1 **Progress Report:** 6 percent of the Basic Work Contract amount will be paid after the progress report has been approved by the ACP.
- 21.1.1.2 **Final Report:** 17 percent of the Basic Work Contract amount will be paid after the final report has been approved by the ACP, its oral presentation has been given to the ACP, and all deliverables and documentation required for this structure have been submitted.
- 21.1.3 **Earthquake Assessment, Pedro Miguel Locks:**
- 21.1.3.1 **Progress Report:** 4 percent of the Basic Work Contract amount will be paid after the progress report has been approved by the ACP.
- 21.1.4 **Final Report:** 11 percent of the Basic Work Contract amount will be paid after the final report has been approved by the ACP, its oral presentation has been given to the ACP, and all deliverables and documentation required for this structure have been submitted.
- 21.1.5 **Earthquake Assessment, Miraflores Locks:**
- 21.1.5.1 **Progress Report:** 6 percent of the Basic Work Contract amount will be paid after the progress report has been approved by the ACP.
- 21.1.6 **Final Report:** 14 percent of the Basic Work Contract amount will be paid after the final report has been approved by the ACP, its oral presentation has been given to the ACP, and all deliverables and documentation required for this structure have been submitted.
- 21.1.7 **Earthquake Assessment, Gatun Spillway:**
- 21.1.7.1 **Progress Report:** 4 percent of the Basic Work Contract amount will be paid after the progress report has been approved by the ACP.
- 21.1.7.2 **Final Report:** 11 percent of the Basic Work Contract amount will be paid after the final report has been approved by the ACP, its oral presentation has been given to the ACP, and all deliverables and documentation required for this structure have been submitted.
- 21.1.8 **Earthquake Assessment, Madden Dam:**
- 21.1.8.1 **Progress Report:** 4 percent of the Basic Work Contract amount will be paid after the progress report has been approved by the ACP.

21.1.9 **Final Report:** 11 percent of the Basic Work Contract amount will be paid after the final report has been approved by the ACP, its oral presentation has been given to the ACP, and all deliverables and documentation required for this structure have been submitted.

21.1.10 **Earthquake Assessment, Miraflores Spillway:**

21.1.10.1 **Progress Report:** 3 percent of the Basic Work Contract amount will be paid after the progress report has been approved by the ACP.

21.1.11 **Final Report:** 9 percent of the Basic Work Contract amount will be paid after the final report has been approved by the ACP, its oral presentation has been given to the ACP, and all deliverables and documentation required for this structure have been submitted.

21.2 **Bid Schedule B (Optional Work):** If the ACP exercises its right to proceed with the Optional Work, then the Optional Work Contract amount will be paid after all preliminary retrofit design final reports of the structures forming part of the Optional Work have been approved by the ACP, all of its oral presentations have been given to the ACP, and all deliverables and documentation required for such structures have been submitted.

22. **TECHNICAL PERSONNEL:** The Contractor shall provide the qualified personnel required to satisfactorily carry out the services under this Contract. The Contractor's personnel shall be appropriately qualified, skilled and experienced in their respective trades or occupations.

22.1 **Listing:** The Contractor shall submit the list of the personnel designated by the Contractor for the Contract work, identifying their roles. This list shall be provided along with evidence of the personnel experience and academic background.

22.2 **Obligation to use Proposed Key Personnel:** For the execution of the Contract, the Contractor shall provide the same key personnel as the key personnel submitted by the Contractor in its Technical Proposal.

22.3 **Replacement of Contractor's Personnel:** If the Contractor needs to replace personnel, the Contractor shall submit such request in writing to the Contracting Officer for approval; the request shall explain the reasons for the change. The Contractor shall not make any changes without the Contracting Officer's written consent. The qualifications of the new proposed personnel should be equal or better than the qualifications of the personnel originally proposed. The Contractor shall be responsible for presenting sufficient evidence and/or documentation of qualifications for the new proposed personnel as to allow the ACP to properly evaluate the changes. The ACP may request as much documentation as it deems appropriate to evaluate any new personnel proposed by the Contractor. The ACP reserves the right to reject any new proposed personnel.

23. **RIGHTS IN DATA:** Clause 4.28.24 (*Derechos de Autor y Propiedad Intelectual*) applies to this Contract. The Contractor shall transfer exclusively to the ACP all copyrights and proprietary industrial rights over designs, drawings, models, manuals and reports that have been produced by the Contractor in the performance of this Contract.

24. **PENALTIES FOR LATE DELIVERY:** If the Contractor fails to complete the entire work within the time specified in paragraph 8 (Commencement, Prosecution, and Completion of Work) of this Section, the Contracting Officer may impose penalties for delays as follows: 7% of the value (V) of the goods not delivered or services not provided, of the purchase order or contract, divided between 30 days and multiplied by each day of delay (DA): $((7\% \times V \div 30) \times DA)$. In any case, the penalty shall not be greater than 10% of the contract amount for services not rendered for each time extension granted. The above provision does not limit the rights of the ACP to terminate the Contract for reasons attributable to the Contractor.

25. **INSURANCE AND BONDS:**

25.1 **Insurance:** The Contractor must submit to the Contracting Officer the insurance policies compliant with the requirements listed below in this clause within a period of thirty (30) working days, before commencing day of work. If they are to be corrected or adjusted, the Contractor must submit the corrections, riders or any other documentation required before commencing work. Cover letters must mention they are binding and act as proof that the document issuer shall answer to the ACP for up to the coverage amounts stated.

25.1.1 **Third Party Liability:** To cover damages to property, personal injuries, including death, in addition to personal damages caused to the ACP and/or its employees or to any third party by activities conducted by the Contractor, its subcontractors or any other party directly or indirectly hired by any of them during the execution of the contract. Additionally, this policy must cover the following damages:

25.1.1.1 Damages caused to cables, pipes and/or other underground or overhead installations.

25.1.1.2 Cross-Liability.

25.1.1.3 Premises and operations.

25.1.1.4 Damages caused by the use of mobile equipment, including forklifts, to perform operations when the contract uses that type of equipment. Mobile equipment is defined as a land vehicle (including any machinery or fixtures connected thereto), with or without its own propulsion:

- (a) that does not require registration as a motor vehicle or plates, or
- (b) that is solely kept for use in the land owned or leased by the Insured, including in immediately adjoining roads, or
- (c) designed to be mainly used outside of highways and public roads, or
- (d) designed and kept for the single purpose of moving certain equipment which is integral and permanently connected to said vehicle.

25.1.1.5 **Coverage limits:** The Contractor shall have a limit sufficient to respond to the damages to property, body injuries and personal damages caused, including death that is not below a B/.300,000.00 single limit combined in the annual installment.

25.1.1.6 The policy must include that,

(a) The ACP is an additional insured party and the insurance company waives its right to subrogation against the ACP for any claim arising in connection to the contract.

(b) The ACP may file a direct claim against the insurance company for any misguided claim filed by third parties for which, pursuant to the contract, the Contractor is liable.

(c) The ACP and its employees hold the right to file claims against third parties. Hence, appointing the ACP as an additional insured party does not prevent it or its employees from submitting claims against this policy for damages, injuries and/or personal damages caused by the Contractor, subcontractor or by any other party directly or indirectly hired by them.

25.1.2 Professional Liability (Errors & Omissions) Policy:

25.1.2.1 To cover negligent acts, negligent errors and omissions due to the performance of professional services provided by the Contractor, including but not limited to claims due to oversight and mistakes, failure to deliver promised services, professional negligence, and/or wrongful disclosure of confidential or sensitive information with minimum limits of one million dollars (\$1,000,000) per occurrence and one million dollars (\$1,000,000) in the annual aggregate.

25.1.2.2 Professional services means only those services identified as Covered Professional Services in the Declarations and covers damages caused by things the Contractor did and/or things that should have done.

25.1.2.3 The coverage includes but is not limited to:

(a) Property damage.

(b) Bodily Injury.

(c) Pollution Liability.

(d) Defense costs; judgments or settlements and expenses incurred in defending or settling an action against insureds.

25.1.3 Vehicle Civil Liability Policy: To cover damages to property and/or personal injuries, including death, caused to the ACP and/or its employees or to any third party by the operation of any vehicle whatsoever, either owned, leased or used by the Contractor, its subcontractors or any other party directly or indirectly hired by any of them.

25.1.3.1 **Coverage limits:** The Contractor or its subcontractors, as applicable, shall keep coverage to answer to damages caused with limits that may not be below.

(a) For heavy equipment or vehicles over 8 tons in weight requiring vehicle registration and plates issued by the Land Transport Transit Authority (ATT) to circulate on public roads.

1. Personal injuries: B/.100,000.00 per person and B/.300,000.00 per accident.
2. Damages to property: B/.100,000.00 per accident.

(b) In the case of vehicles requiring vehicle registration and plates issued by the Land Transport Transit Authority (ATT) to circulate in public roads, weighing 8 tons and mainly used to transport passengers:

1. Personal injuries: B/.5,000.00 per person and B/.10,000.00 per accident.
2. Damages to property: B/.5,000.00 per accident.

25.1.3.2 For contracts where the Contractor is required to transport explosives by land, the policy must include coverage for the transportation of explosives.

25.1.3.3 The policy must mention it cannot be canceled or modified without written notice issued by the insurance company to the ACP's Contracting Officer at least thirty (30) days in advance. For the notice to be deemed valid, the insurer must obtain an acknowledgment of receipt from the Contracting Officer.

25.1.4 **Other Insurance Terms and Conditions:**

25.1.4.1 The ACP will only accept the Vehicle Liability policy and Third Party Liability policy that are accompanied by the corresponding forms, issued by the ACP for this purpose (Form No. 1521, Vehicle Civil Responsibility Policy; Form No. 1522, General Civil Liability Policy). Any policy or evidence of coverage that is not accompanied by the corresponding form or has been issued in forms not authorized by the ACP will be rejected outright, unless another form or mechanism is expressed within the specifications of the tender documents.

25.1.4.2 The insurance policies shall be valid as of the date work is initiated mentioned in the order to proceed, including any extension authorized by the ACP, until the date the goods and services hired are delivered, including the obligations and responsibilities.

25.1.4.3 Policies issued by Insurance companies and/or reinsurers legally incorporated in the Republic of Panama and authorized by the Insurance and Reinsurance Superintendence of the Republic of Panama to conduct insurance business in the relevant industries.

25.1.4.4 Insurance, reinsurance and/or international P&I Clubs must have, at the time the policy is signed, a long-term credit rating equal or above A.M. Best "A-", Standard & Poor's (S&P) "A-", Moody's Investor's Service "A3" or Fitch Ratings "A-", or the rating required by the ACP at its full and sole discretion.

25.1.4.5 The Contractor must substitute, at his expense, policies issued by insurers and/or reinsurers that no longer comply with the requirement herein described.

25.1.4.6 The ACP holds the right to acquire, at the Contractor's expense, any of the policies contained in this clause if the Contractor fails to obtain or comply with the insurance requirements of the contract. The ACP shall deduct premiums and other direct and indirect expenses incurred by the ACP for policy acquisition, brokerage and management.

25.1.4.7 Any company holding policies or guarantees in favor of the ACP must annually publish a copy of its audited financial records in its website, including notes, within ten (10) business days as of the issuance date. These records may be delivered electronically or through a website link.

25.1.4.8 Notwithstanding the foregoing, the ACP shall not accept and shall reject any insurance policy issued by an insurer and/or reinsurer that:

(a) Pursuant to the applicable regulations of the ACP, has been suspended or penalized and cannot enter into contracts with the ACP; or

(b) Has been suspended by the Panamanian State from entering into contracts with State agencies or State-owned companies; or

(c) Has been suspended in its country of origin in the case of companies incorporated outside of Panama; or

(d) Is undergoing a regularization or administrative or operation control takeover process, legally put under administration, under forced liquidation, or prevented or limited from conducting business as ordered by a relevant authority in the Republic of Panama or in its country of origin in the case of insurance companies incorporated outside the national territory; or

(e) Is in breach of any of its contractual obligations to the ACP as an insurer, reinsurer or guarantor, even when and while it is under dispute or litigation with the ACP.

25.1.4.9 The Contractor must replace, at his expense and within thirty (30) days, all insurance policies approved by the ACP and issued by insurance and/or reinsurance companies that:

(a) Pursuant to the applicable regulations of the ACP, the Panamanian State or of the country of origin (if the insurer was incorporated outside the national territory) are suspended or penalized and cannot enter into contracts with the ACP while the suspension holds; or

(b) Are undergoing a regularization or administrative or operation control takeover process, or are under forced liquidation as ordered by a relevant authority in the Republic of Panama or in its country of origin in the case of insurance companies incorporated outside the national territory; or are in breach of any of their contractual obligations to the ACP, the Panamanian State and/or in their country of origin (if the insurer was incorporated outside the national territory) as an insurer or guarantor, even when involved in litigation.

25.2 **Performance Bond:** The Contractor must submit the performance bond within ten (10) days as of the date the contract is signed.

25.2.1 The performance bond warrants a contract fulfillment or an obligation to duly execute it and, once fulfilled, to correct any defects found. The bond shall cover (60%) of the contract amount with a minimum amount of \$1,500,000.00, whichever is greater. Its validity corresponds to the period of execution of the main contract, including any extension approved by the ACP, plus a one (1) year extension for personal property to answer for redhibitory defects such as workforce defects, defective material or any other vice or defect in the contract purpose, except for consumable personal property without special regulations whose coverage shall be between six (6) months to three (3) years to answer for construction defects or work or personal property reconstruction.

25.2.2 The ACP shall establish applicable criteria or limits that bonds and bond issuers must comply with, and shall only approve and accept bonds when issued by an "Acceptable Insurer and/or Reinsurer".

25.2.3 "Acceptable Insurer and/or Reinsurer" is any insurance and/or reinsurance company legally incorporated in the Republic of Panama and authorized by the Insurance and Reinsurance Superintendence of the Republic of Panama to conduct insurance business in the relevant industries that:

25.2.3.1 Has adjusted technical reserves of no less than ten million balboas (B/.10,000,000.00) as per the most recent quarterly report published by the Insurance and Reinsurance Superintendence of the Republic of Panama; and

25.2.3.2 Is an "Acceptable Insurer and/or Reinsurer" to the ACP, pursuant to the policies established.

25.2.4 Acceptable Insurers and/or Reinsurers may issue bonds up to a maximum of ten percent (10%) of the most recent adjusted technical reserves published by the Insurance and Reinsurance Superintendence of the Republic of Panama in the quarterly report in force during the period in which the bond is issued.

25.2.5 Acceptable Insurers and/or Reinsurers may only issue bonds for the ACP for up to fifty percent (50%) of their most recent adjusted technical reserves published by the Insurance and Reinsurance Superintendence of the Republic of Panama in the quarterly report in force during the period in which the bond is issued.

25.2.6 Acceptable Insurers and/or Reinsurers may only issue bonds for the ACP using co-guarantors, subject to up to five (5) co-guarantors per bond who have the same requirements, rights and obligations, but are responsible for up to the individually subscribed amount. They must appoint a leader co-guarantor representing them while the bond is in force, both in the presentation as well as during the execution of the contract term.

25.2.7 Acceptable Insurers and/or Reinsurers may issue bonds for the ACP using reinsurance in cases where bonds exceed the maximum limit established for bonds in section 4 of this clause. Acceptable Insurers and/or Reinsurers accepted by the ACP for the reinsurance must have a long-term international credit rating that is not below "a-" from A.M. Best, "A-" from Standard & Poor's (S&P), or "A3" from Moody's Investor's Service or "A-" from Fitch Ratings. If more than one long-term credit

rating is held, the most recent rating shall be taken into account. The reinsurance structure must be approved by the ACP based on the procedures indicated in section 8 of this clause. In these cases, "Acceptable Insurers and/or Reinsurers" shall directly withhold, per bond, a minimum of five percent (5%) of their most recent adjusted technical reserves published by the Insurance and Reinsurance Superintendence of the Republic of Panama in the quarterly report in force during the period in which the bond is issued.

25.2.8 Prior to the Contractor submitting the bond to the Contracting Officer, the ACP shall approve the reinsurance structure from the Insurance and/or Reinsurance Company. To comply with this requirement, the Insurance and/or Reinsurance Company shall send a formal letter with the reinsurance structure to the Insurance, Risks and Controls Units of the Finance Vice Presidency of the ACP at least five (5) business days prior to the last day available to deliver the bond, together with the following documents certifying:

25.2.8.1 The tender or contract title and number;

25.2.8.2 The amount the Acceptable Insurance and/or Reinsurance Company for the ACP must withhold, and a formal letter sent including the reinsurance structure and required documents;

25.2.8.3 Maximum amount each Insurance and/or Reinsurance Company may withhold per bond type and per each company's corporate name. In case of a co-guarantor, maximum amount subscribed by the co-guarantor per bond type and each co-guarantor's corporate name.

25.2.8.4 The most recent long-term credit rating of the insurance and/or reinsurance companies subscribing part of the bond, name of the rating company and number assigned by it, if applicable.

25.2.8.5 Document stating and including a direct action clause (Cut-Through Clause) in favor of the ACP where the reinsurer undertakes that if the reinsured does not meet its contractual obligations to the ACP, the reinsurers shall pay to the originally insured party the portion the reinsured ought to pay in the event of any loss for which the reinsurers are liable to the reinsured under the policy terms, minus the premium owed to the reinsurers if any. The ACP's bid specifications shall detail how this requirement is applied.

25.2.9 No reinsurance structures made up by insurers and reinsurers who participate or are a part of the same holding company, business and/or corporation; and/or who have leader executives, members in the boards of directors, and stakeholders in common with effective control or parent or subsidiary companies in common shall be approved. Acceptable insurers and/or reinsurers shall neither include in their application the identity of the company or bidder for which the reinsurance structure review and acceptance are being requested and the exact bond amount proposed, nor shall they reveal them to the ACP or to any of its employees in any other instance prior to the selection of the Contractor.

25.2.10 Once the ACP has issued a formal acceptance of the reinsurance structure, and for the bonds used as reinsurance to be accepted, the bidder or Contractor must submit the following documents together with the guarantee in the tender:

25.2.10.1 A letter issued by the ACP approving the reinsurance structure from the Acceptable Insurance and/or Reinsurance company and indicating the tender or contract name and number; the amount withheld by it in each bond; the name of each insurance or reinsurance company used, and the amount subscribed by each.

25.2.10.2 A letter from each insurance or reinsurance company used to issue each guarantee indicating the tender or contract name and number: the amount subscribed by each upon issuing the bonds; and the RUC, Legal Representative Name, Physical Address and email of the person responsible for the subscription.

25.2.10.3 Cut-Through Agreement or Endorsement by the ACP where the reinsurer and the reinsured party agree that, in the event the reinsured party runs into insolvency or financial problems, or fails to pay and/or does not fulfill its obligations to the ACP, the party shall notify the reinsurer who shall pay the original bonded party the portion due by the reinsured party in the event of any loss for which the reinsurer is liable to the reinsured party under policy terms, minus the premium owed to the reinsurers if any.

25.2.10.4 The contract shall specify how this requirement is applied;

25.2.10.5 The reinsurance structure authorization note issued by the Insurance and Finances Section of the Authority addressed to the insurer.

25.2.11 Notwithstanding the foregoing, the ACP shall not accept and shall reject any bond issued by an "Acceptable Insurer and/or Reinsurer" that:

25.2.11.1 Pursuant to the applicable regulations of the ACP, the Panamanian State or of the country of origin (if the insurer was incorporated outside the national territory) are suspended or penalized and cannot enter into contracts with the ACP while the suspension holds; or

25.2.11.2 Is undergoing a regularization or administrative or operation control takeover process or under forced liquidation as ordered by a relevant authority in the Republic of Panama or in its country of origin in the case of insurance companies incorporated outside the national territory; or

25.2.11.3 Is fulfilling its obligations to the insurer or guarantor before the ACP, the Panamanian State and/or in its country of origin (for insurer companies incorporated outside the national territory); and when in a litigation process.

25.2.12 When the ACP has admitted bonds from an "Acceptable Insurer and/or Reinsurer Company" that later incurs in any of the situations mentioned the previous paragraph 25.2.11, the ACP shall be entitled to demand the Contractor replace the bond within thirty (30) days as of the date the ACP formally notifies the Contractor of the situation unless the ACP's interests are affected, in which case the Contracting Officer shall determine the most convenient action to safeguard the ACP's best interests.

25.2.13 The ACP shall only accept bonds submitted in forms drafted by the ACP for those purposes (Form No. 1525, Proposal Bond; Form 1526, Performance Bond; Form 1534, Advanced Payment Bond,

and Form No. 1527, Payment Bond). Any bond issued in forms that were not authorized by the ACP shall be firmly rejected.

26. **VERIFICATION MEASURES:** The Contractor acknowledges that the Contractor has taken all reasonable measures necessary to ascertain the nature and location of the work, and to have investigated to the Contractor's entire satisfaction the general and local conditions that may affect the work or the cost of Contract performance, including but not limited to:

26.1 Conditions relating to transportation, disposal, handling, and storage of materials;

26.2 Availability of labor, water, electric power, and accessibility;

26.3 Uncertainties concerning weather, bodies of water, or any other similar physical conditions at the work site;

26.4 The conformation and conditions of the terrain; and

26.5 The type of equipment and facilities required before and during the execution of the work.

27. **WORK REQUIREMENTS AT THE WORK SITE:**

27.1 **Work Restrictions:**

27.1.1 **Access to the Work Site:** The Contractor shall previously coordinate with the Contracting Officer the access to the work site. The work site is located within a restricted area of the ACP. For access clearance, the ACP will process the documentation of the Contractor's personnel and vehicles needed to enter this area. Vehicles required to enter these areas will require previously approved vehicular insurance policies per clause 4.28.52 (*Seguros*).

27.2 **Special Requirements:**

27.2.1 **Protection of Personnel and Property:** The Contractor shall take precautions against injury to ACP personnel working at the work site and against damage to existing structures or any property of the ACP during the period that work is being performed under this Contract. Damage done by the Contractor shall be rectified by and at the expense of the Contractor and to the satisfaction of the Contracting Officer. Care shall be taken by the Contractor to prevent the dropping of tools, disposable materials, new material, cleaning liquids, paint, dust or other such injurious materials into the water or on machinery or equipment in and around the work area. The Contractor shall remove from roads debris related to work in this Contract.

27.2.2 **Clean-up:** Cleaning materials and other flammable items shall be stored in a safe place. Upon completion of the work, staging, containers, tools, equipment, surplus materials, and debris shall be removed from the work site.

27.2.3 **Illumination of the Work Area:** The Contractor may work during periods of darkness; however the Contractor shall provide enough illumination in order to execute the work in a safe and

efficient manner during periods of darkness. The luminaries shall have a shade that eliminates the interference with the night vision of transiting vessels, ACP pilots, and ACP vessels working near the work site.

27.2.4 **Watchman Services:** The ACP cannot guarantee and assumes no responsibility for the security of Contractor's property. The Contractor is, therefore required to provide the necessary surveillance to avoid loss or theft of property.

27.3 **Noninterference with Operations:** Locks and spillway operations and other ACP operations will continue in the vicinity of the work area, and the Contractor shall ensure the work and the Contractor's personnel do not interfere with these activities, except when specifically permitted by the Contracting Officer. Permission shall be requested by the Contractor, in writing, should such interference become necessary. The Contractor shall be held liable for damages to the locks operations and other ACP operations caused by delays in the Contractor's work, except when the delay was specifically permitted by the Contracting Officer, and all costs incurred by the ACP for these delays will be at the expense of the Contractor.

27.4 **Safety Requirements:**

27.4.1 **Safety and Occupational Health Regulations and Requirements:** The Contractor shall comply with the ACP's safety and occupational health regulations, standards and requirements (refer to address <https://pancanal.com/es/seguridad-y-salud-ocupacional/>), also 29 CFR 1910 and 29 CFR 1926 as applicable.

27.4.1.1 **Safety Coordinator:** The Safety Coordinator shall be provided by the Contractor to lead safety and industrial hygiene management at the work site. The Safety Coordinator shall be physically present at the work site throughout the entire working shifts.

27.4.1.2 **Safety and Occupational Health Plan.** The Contractor shall submit for approval the Safety and Occupational Health Plan. Safety and Occupational Health Plan shall be in accordance with ACP's standard 1410SAL129 (Norma para Contratos) and its annexes. The Contractor shall obtain the approval of the Safety and Occupational Health Plan prior to commencing any work at the work site.

27.4.2 **Maritime Safety Standards:** The Contractor shall comply with the ACP's maritime safety standards, as applicable; refer to URL: <https://pancanal.com/es/servicios-maritimos/servicios-maritimos/>.

27.5 **Environmental Protection:** The Contractor shall comply with environmental protection requirements stated in Section A (*Environmental Protection*) included in annex B (*Other Contract Documents*).

27.6 **Working Hours:** Contract work at the work site will be permitted in a schedule from 7:00 a.m. to 3:00 p.m., Monday through Friday, in accordance with the approved work schedule. The Contractor may make requests for other working hours, at least 7 working days before the intended date for its use. The Contracting Officer may approve the request, if the Contracting Officer considers it to be in the best interest of the ACP.

28. **GOVERNING LAW:** The Contract between the ACP and the Contractor shall be construed in accordance with the pertinent rules of the Acquisition Regulation of the ACP and the rules and regulations of the Panama Canal (Text available at <https://micanaldepanama.com/wp-content/uploads/2021/09/Compendio-Contrataciones-9-2021.pdf>), and the contractual clauses of the single tender documents for the contracting of works, goods and services of the Panama Canal Authority. These clauses are available in full text on the ACP's website, www.micanaldepanama.com; they are available in the Spanish language in the Tenders section and in the English language, in the Financial Information, Procurement and Sales section.

29. **INSTRUCTIONS TO TENDERERS AND EVALUATION CRITERIA**

29.1 **Proposal Format and Content:** The proposal shall consist of a price and a technical proposal. The Tenderer shall submit the price proposal through the ACP's Tender Online System (SLI, for its acronym in Spanish – Sistema de Licitaciones por Internet). Therefore the Tender shall have registered in the SLI prior to submitting the proposal. The Tenderer shall submit the technical proposal documentation attached to the price proposal through the SLI. The SLI may receive up to 15 attachments per proposal, each attachment not to exceed 10 MB. The SLI may receive attachments solely in pdf format.

29.2 **Financial Capacity:** Tenderers shall demonstrate that they have financial capacity to perform the required services. To evidence compliance with this requirement, Tenderers shall submit a bank letter, issued by a financial institution, certifying the amount of funds available to perform the work. The bank letter must make reference to the Tender number, description and title. As a minimum, the Tenderer shall evidence availability of financial resources in the amount of 20% of the price proposal submitted.

29.3 **Legal:** The Tenderer shall be a legally constituted entity in its country of origin. The Tenderer shall submit evidence of compliance for this requirement. If the Tender is a Panamanian entity, the Tenderer shall submit its certificate from the public registry and notice of operation. If the Tender is not a Panamanian entity, the Tenderer shall submit business license, business permit, legal entity registration, documents of incorporation or business registration.

29.4 **Price Proposal:** Each Tenderer shall submit its Price Proposal (pages 1 to 6) through the SLI as an attachment [Bid Schedule A (Basic Work) Existing Condition Assessment and Bid Schedule B (Optional Work) Improvements Program]. Additionally, the Tenderer shall introduce the corresponding amounts for Bid Schedule A and Bid Schedule B in the SLI.

29.4.1 The Tenderer shall submit the Price Proposal before the deadline for submission of proposals, in order to be considered for award.

29.5 **Technical Proposal:** The following requirements shall be met by the Tenderer.

29.5.1 **Comparable project:** It refers to a project that included performance-based seismic assessment and retrofit design of existing concrete structures such as dams, spillways or locks. For the

project to be considered comparable, the retrofit design shall have been built. Performance-based seismic assessment shall have included the following as a minimum:

29.5.1.1 Seismic hazard analysis.

29.5.1.2 Response history analysis and three-dimensional modeling using finite element system with nonlinear constitutive properties of concrete that allows for opening and closing of contraction joints, and that include structure-water-foundation interaction considering foundation inertia and damping (material and radiation), water compressibility, and hydrodynamic wave absorption.

29.5.1.3 Potential failure mode analysis.

29.5.1.4 Damage analysis.

29.5.1.5 Loss analysis.

29.5.1.6 Risk analysis.

29.5.2 **Experience of the Tenderer:** The Tenderer shall have performed a minimum of 4 comparable projects within the last 20 years. Presentation of proposals by Joint Venture, Association or Consortium is not allowed. Only projects performed by the Tenderer will be accepted as the Tenderer's Experience. Projects performed by companies other than the Tenderer will not be considered as the Tenderer's Experience, even when said companies are part of the same economic group, such as subsidiaries, branches, affiliates, parent company. Tenderer shall submit information to corroborate compliance with this requirement. Each project submitted as evidence of compliance with this requirement shall have a distinct name. Each project submitted shall include at least the following information.

29.5.2.1 Name and location of the project performed.

29.5.2.2 A description of the project performed.

29.5.2.3 Completion date of the project.

29.5.2.4 Completion date of the construction of the retrofit design.

29.5.2.5 The name of the organization (client) for which the project was performed; point of contact, telephone number and email. The ACP may verify references provided.

29.5.2.6 Project amount in U.S. dollars.

29.5.3 **Past Performance:** The Tenderer shall provide for each project submitted to comply with paragraph 29.5.2 (*Experience of the Tenderer*) a reference letter from the client for whom the Tenderer performed the project, indicating satisfaction with the services received, as well as client's contact person, email and telephone number for the corresponding project. The ACP reserves the right to contact and verify the information provided in the reference letters, as well as any other information included in the technical proposal.

29.5.4 **Key Personnel:** The Tenderer shall submit the documentation that demonstrates that the following Tenderer's proposed key personnel to work in the Contract meet the qualification requirements stated in paragraph 29.5.4.1 (*Qualification Requirements*). The information shall include curriculum vitae for each of the proposed key personnel and copies of professional certifications and licenses related to the subject matter, as well as a list of the projects performed. Key personnel experience requirements are indicated in years prior to the date of submission of the proposal.

29.5.4.1 **Qualification Requirements:** Key personnel shall include experts in the following fields:

(a) **Structural Engineering:** The Tenderer shall submit at least 2 structural engineers. Each structural engineer shall have at least 20 years of professional experience as a structural engineer, and shall have participated as a structural engineer in at least 3 comparable projects (as defined in paragraph 29.5.1) within the last 20 years.

(b) **Geotechnical Engineering:** The Tenderer shall submit at least 2 geotechnical engineers. Each geotechnical engineer shall have at least 20 years of professional experience as a geotechnical engineer, and shall have participated as a geotechnical engineer in at least 3 comparable projects (as defined in paragraph 29.5.1) within the last 20 years.

(c) **Concrete Core Sampling:** The Tenderer shall submit at least one concrete core sampling expert. Each concrete core sampling expert shall have participated as concrete core sampling expert in at least 3 projects that included concrete core sampling for massive concrete structures within the last 20 years.

(d) **Geological Core Sampling:** The Tenderer shall submit at least one geological core sampling expert. Each geological core sampling expert shall have participated as a geological core sampling expert in at least 3 projects that included geological core sampling for massive concrete structures within the last 20 years.

29.5.5 **Field Investigation, Testing and Sampling Plan**

29.5.5.1 The Tenderer shall provide a detailed written description of the proposed work plan by which the field investigation, testing and sampling will be performed. The Tenderer shall substantiate the scope and content of the plan. The content of the plan shall demonstrate full understanding of the work to be accomplished.

29.5.5.2 The Tenderer shall have implemented field investigation, testing and sampling similar to that required per paragraph 5.1.2 (*Field Investigations, Sampling and Testing*), in at least 2 projects that included seismic assessment of existing concrete structures such as dams, spillways or locks within the last 15 years.

29.6 **Clarifications:** Per Clause 4.28.72 (*Consultas*), requests for clarifications shall be made through email to the person indicated in the SLI, using the form referenced in annex H (*Other Solicitation Documents*). Clarifications shall be sent no later than 5 days prior to the deadline for submission of proposals. The ACP will make public its response to requests for clarifications (including

a copy of the inquiry) through its web site, if applicable. However, the ACP may or may not respond to requests for clarifications made within 5 days prior to the deadline for submission of proposals.

29.7 **Amendments to the Tender Document:** At any time prior to the specified deadline for submission of proposals, the ACP may change the tender document by issuing amendments. The Tenderer shall acknowledge receipt of each amendment to the ACP.

Table No.2 in the next page.

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone			
GATUN SPILLWAY			
4004-G-4	General plan	-	08-oct-1909
4005-G-5	Piers to be built in channel plan	4	20-jan-1910
4006-G-6	Piers to be built in channel details of pier A	2	11-feb-1910
4007-G-7	Piers to be built in channel base of pier B	-	10-jan-1909
4008-G-8	West wall of approach channel	4	28-oct-1909
4009-G-9	Ogee section with dimensions	-	09-jan-1909
4010-G-10	Piers to be built in channel details of piers C and D	-	21-aug-1909
4011-G-11	East wall of approach channel	-	21-sep-1909
4012-G-12	Elevation of part of channel wall	-	20-sep-1909
4013-G-13	Piers to be built in channel details of pier B	-	10-oct-1909
4014-G-14	Sections showing relation of piers A and B to main dam	-	15-oct-1909
4015-G-15	Curved wall of approach channel west side, from P.C. to abutment of Spillway Dam	-	27-oct-1909
4016-G-16	Piers to be built in channel details of pier a with dam at end of culvert	6	11-feb-1910
4019-G-19	Plan of spillway dam footbridge omitted	-	01-nov-1910
4020-G-20	Sections of spillway dam	2	16-may-1910
4021-G-21	Rock excavation at ends of spillway dam	-	25-jan-1910
4024	Sections through tunnel ends of spillway dam	1	09-sep-1911
4026-G-26	West wing wall	-	01-mar-1910

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
4027-G-27	Crest piers on spillway dam. Plan and elevations of 8.5 ft piers	10	17-jan-1912
4028-G-28	Crest piers on spillway dam. Section of 8.5 ft piers	7	24-nov-1911
4029-G-29	East abutment of spillway dam. Elevations	-	06-jun-1910
4030-G-30	East abutment of spillway dam. Plan and sections	5	17-jan-1912
4031-G-31	East abutment of spillway dam. Sections	3	10-apr-1911
4032-G-32	West abutment of spillway dam. Elevations	-	17-aug-1910
4033-G-33	West abutment of spillway dam. Plan and sections	8	17-jan-1912
4034-G-34	West abutment of spillway dam. Sections	-	17-aug-1910
4035-G-35	Crest piers on spillway dam. Plan and elevations of 15 ft piers	9	09-feb-1910
4036-G-36	Crest piers on spillway dam. Sections of 15 ft piers	-	25-apr-1910
4039-G-39	Details of 15ft crest piers showing gate and machinery for pier A. Sections	-	14-apr-1910
4043	Details of machinery tunnel and counterweight pits	-	10-dec-1910
4044-G-44	Curved wall of approach channel east side, from P.C. to abutment of spillway dam	1	25-Apr-1912
4048	Machinery tunnel - pier 2 to pier 7	4	04-apr-1913
4049	Machinery tunnel - pier 7 to pier 12	4	04-apr-1913
4050	General plan of dam	2	12-dec-1927
4051	Wall of power plant forebay	8	18-nov-1912
4055	Typical plan of one gate opening on crest of dam	1	24-feb-1911
4060	Longitudinal section	-	25-feb-1911
4061	Details plan of Miraflores Spillway	-	-

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone			
MIRAFLORES SPILLWAY			
4502-M-2	Proposed section of Dam	-	05-jan-1910
4503	General plan	-	30-aug-1910
4504	Sections	-	30-aug-1910
4505	Plan of rock excavation	-	09-feb-1911
4506	Cross sections of Spillway Dam	1	13-mar-1912
4507-A	Wall for north side of channel	1	23-jan-1945
4508	Wall for south side of channel	2	13-mar-1911
4509	North wing wall	-	04-apr-1911
4510	West wing wall	1	18-jan-1945
4511	North abutment. Elevations	4	12-dec-1941
4512	North abutment. Plan and sections	6	01-feb-1927
4513	North abutment. Details and sections	5	09-jan-1942
4514	North abutment. Details	-	29-mar-1911
4515	South abutment. Elevations	3	01-oct-1941
4516	South abutment. Plan and sections	5	19-nov-1940
4517	South abutment. Details	4	13-nov-1940
4518	South abutment. Detailsh	-	20-apr-1911
4519	Typical plan – one bay of crest	1	24-nov-1911
4520	Machinery tunnel. Half plan of floor and ceiling	6	04-apr-1913
4521	Machinery tunnel. Details of tunnel and counterweigh pits	2	06-feb-1913

TABLE 1
REFERENCE DRAWINGS LISTING

Drawing No.	Title	Revision	Date
4525	Crest piers on Dam. Plan and elevations	2	24-nov-1911
4526	Crest piers on Dam. Sections	1	24-nov-1911
<p>PANAMA CANAL COMMISSION ENGINEERING AND CONSTRUCTION BUREAU ENGINEERING DIVISION Balboa Heights, Republic of Panama</p> <p>GATUN AND MIRAFLORES SPILLWAYS</p>			
5016-311	Stoney gates. Floor plan & elevations	1	05-aug-1987
5016-314	Stoney gates. Sections	1	16-nov-1987
<p>AUTORIDAD DEL CANAL DE PANAMÁ DEPARTAMENTO DE INGENIERÍA Y ADMINISTRACIÓN DE PROGRAMAS DIVISIÓN DE INGENIERÍA Edificio 721, Corozal Oeste, República de Panamá</p> <p>20.5 FT HIGH STONEY GATE Gatun Spillway, Colón</p>			
5016-323	Gatun Lake rise to 89 ft. Elevations, details and general notes	-	01-mar-2010
5016-324	Gatun Lake rise to 89 ft. Details and sections	-	01-mar-2010
5016-325	Gatun Lake rise to 89 ft. Sections	-	01-mar-2010
<p>THE PANAMA CANAL DEPARTMENT OF THE INTERIOR BUREAU OR RECLAMATION Balboa Heights, Canal Zone</p> <p>MADDEN DAM PROJECT</p>			
5127-50	Location map	-	15-may-1931
5127-51	General layout	2	14-jul-1932
5137-13	Left spillway training wall. Below power station. Scheme B	4	04-oct-1935
5137-15	Spillway apron	5	02-oct-1935

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
5137-16	Experimental equipment. Spillway pitot and piezometer tubes	7	03-oct-1935
5137-18	Right spillway training wall	5	07-oct-1935
5137-19	Left spillway training wall west of power station. Reinforcement on south side of wall	1	14-oct-1935
5137-20	Left spillway training wall west of power station. Reinforcement on north side of wall	1	15-oct-1935
5137-21	Left spillway training wall west of power station. Reinforcement bars	2	15-oct-1935
5137-22	Left spillway training wall. General drawing	3	07-oct-1935
5137-28	Spillway apron. Reinforcement and construction joints	2	08-oct-1935
5137-30	Left abutment – grouting system for contraction joints	3	21-nov-1935
5137-50	Location and log of drill holes	1	08-oct-1935
5137-51	Profile and log of drill holes. Line “A”	1	08-oct-1935
5137-52	Profiles and logs of drill holes. Lines “B” and “C”	1	08-oct-1935
5137-53	Profile and log of drill holes. Line “D”	1	12-oct-1935
5137-54	Madden, left ridge and saddle N ^o 8 Dams. Layout	2	08-oct-1935
5137-55	Madden, left ridge and saddle N ^o 8 Dams. Plan, elevation and sections	4	08-dec-1937
5137-56	Plan, elevations and sections	3	08-dec-1937
5137-57	Maximum section	7	12-oct-1935
5137-58	Grouting system	5	12-oct-1935
5137-59	Shaft and gallery layout	8	11-oct-1935
5137-60	Longitudinal gallery sections	10	12-oct-1935
5137-61	Transverse gallery sections	5	09-oct-1935
5137-65	Spillway training wall and apron	1	07-sep-1932

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
5137-67	Sluice gate trashrack structure	4	11-oct-1935
5137-70	Drum gate – pier – crest – gallery	6	15-oct-1935
5137-71	Drum – gate – piers and crest	6	15-oct-1935
5137-72	Drum – gate – pier and gallery	5	15-oct-1935
5137-73	Drum gate-pier N ^o 1	6	16-oct-1935
5137-84	Penstock and outlet valve layout	4	09-oct-1935
5137-86	Penstock trashrack structure	6	10-oct-1935
5137-107_2of8	5'-8"x10'-0" sluice gate assembly	1	09-oct-1933
5137-162	100'x 18' Drum gate. General assembly	1	18-oct-1935
5137-163	100'x 18' Drum gate. End plate assembly	1	19-oct-1935
5137-164	100'x 18' Drum gate. Exterior - End assembly and sections	1	17-oct-1935
5137-165	100'x 18' Drum gate. Interior - End assembly and sections	1	17-oct-1935
5137-166	100'x 18' Drum gate. Intermediate sectional assembly. Typical connections	1	17-oct-1935
5137-167	100'x 18' Drum gate. Hinge and seat anchorage assemblies. Seal shields	1	17-jul-1934
5137-168	100'x 18' Drum gate. Typical seat and hinge castings	1	17-oct-1935
5137-169	100'x 18' Drum gate. Seat and hinge castings and anchor base	1	17-oct-1935
5137-170	100'x 18' Drum gate. Seal clamp bars – plates and bolts	1	17-oct-1935
5137-171	100'x 18' Drum gate. End hinge filler seal assembly and parts	2	13-mar-1975
5137-174	100'x 18' Drum gate. Pier plates and anchor bolts	1	2-nov-1935
5137-175	100'x 18' Drum gate. Pier plate tie rod spacer system	1	05-nov-1935

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
5137-176	100'x 18' Drum gate. Gate seat seal and end seals	3	19-oct-1935
5137-177	100'x 18' Drum gate. Rubber seat – cushions – filler block	1	13-mar-1975
5137-181	100'x 18' Drum gate. Lower filler seal	-	18-dec-1932
5137-221	Operating galleries. Sectional plan	3	30-dec-1932
5137-227	Penstock trashrack structure. Plan and sections	3	30-oct-1935
5137-228	Penstock trashrack structure. Sections	4	30-oct-1935
5137-229	Penstock trashrack structure. Sections and bar list	3	25-jan-1935
5137-231	Electrical installation. Parapet – gallery at elevation 260.38	5	25-apr-1956
5137-234	Electrical installation. Galleries at elevation 197+ - stairway N ^o 2	4	25-apr-1956
5137-235	Electrical installation. Galleries at elevation 110'+	4	13-aug-1956
5137-237	Electrical installation. Sluice gate chambers right and left stairways	2	13-nov-1935
5137-250	Drum gate structure – reinforcement bar list	4	21-apr-1934
5137-253	Gravity section – abutments. Parapet details and reinforcement	4	18-nov-1935
5137-254	Spillway arch bridge. Plan and sections	4	05-nov-1933
5137-255	Spillway arch bridge. Arch reinforcement	2	02-nov-1935
5137-256	Spillway arch bridge. Parapet and counterfort reinforcement	3	13-dec-1935
5137-257	Spillway arch bridge. Reinforcement bar list	1	14-may-1934
5137-258	Miscellaneous metal installed in concrete for drum gate	2	08-nov-1935
5137-259	Drum gate – pier N ^o 5	7	09-nov-1935

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
5137-550	Experimental equipment. Location of strain meters, thermometers and uplift pressure pipes	5	13-jan-1936
5137-551	Experimental equipment. Thermometers in spillway section	4	08-jan-1935
5137-552	Experimental equipment. Thermometers in abutment section	3	11-nov-1935
5137-553	Experimental equipment. Uplift pressure pipes body of dam	3	19-aug-1934
5137-554	Experimental equipment. Uplift pressure pipes base of dam	6	17-jan-1939
5137-555	Experimental equipment. Installation of strain meters	6	08-dec-1936
5137-557	Block № 1-2-3-4 grouting system for contraction joints	2	23-nov-1935
5137-558	Block № 4-5-6 grouting system for contraction joints	2	23-nov-1935
5137-559	Block № 6-7-8 grouting system for contraction joints	3	25-nov-1935
5137-560	Block № 8-9-10 grouting system for contraction joints	3	26-nov-1935
5137-561-1of10	Transverse sections at stations 13+56, 13+94, 14+50 and 14+54	-	13-jun-1934
5137-561-2of10	Transverse sections at stations 15+06 and 15+10	-	08-jul-1933
5137-561-3of10	Transverse sections at stations 15+62 and 16+18	-	26-may-1933
5137-561-4of10	Transverse sections at stations 16+74 and 17+30	-	26-may-1933
5137-561-5of10	Transverse sections at stations 17+86 and 18+42	-	22-apr-1933
5137-561-6of10	Transverse sections at stations 18+98 and 19+36	-	22-apr-1933

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
5137-561-7of10	Transverse sections at stations 19+38 and 19+40	-	22-apr-1933
5137-561-8of10	Transverse sections at stations 19+62.5, 19+76.25, 20+16.5 and 20+22.5	-	13-jun-1934
5137-561-9of10	Transverse sections at stations 20+68.25, 20+72.5, 21+10 and 21+22	-	13-jun-1934
5137-561-10of10	Transverse sections at stations 21+50, 21+63, 21+78, 22+34 and 22+79	-	22-apr-1933
5137-564	Experimental equipment. Installation of measuring posts in Block N ^o 9	1	19-aug-1934
5137-574	Block N ^o 13-14 and 15 grouting system for contraction joints	2	27-nov-1935
5137-603	100'x 18' Drum gate. Upstream end seal guards	-	16-jun-1934
5137-649	Bellmouth intake for sluice gates	3	18-may-1936
5137-656_1of14	Contraction joint cooling system. Stability analysis	-	-
5137-656_2of14	Contraction joint cooling system. Stability analysis	-	-
5137-656_3of14	Contraction joint cooling system. Stability analysis	-	-
5137-656_4of14	Contraction joint cooling system. Stability analysis	-	-
5137-656_5of14	Contraction joint cooling system. Stability analysis	-	-
5137-656_6of14	Contraction joint cooling system. Stability analysis	-	-
5137-656_7of14	Contraction joint cooling system. Stability analysis	-	-
5137-656_8of14	Contraction joint cooling system. Stability analysis	-	-

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
5137-656_9of14	Contraction joint cooling system. Stability analysis	-	-
5137-656_10of14	Contraction joint cooling system. Stability analysis	-	-
5137-656_11of14	Contraction joint cooling system. Stability analysis	-	-
5137-656_12of14	Contraction joint cooling system. Stability analysis	-	-
5137-656_13of14	Contraction joint cooling system. Stability analysis	-	-
5137-656_14of14	Contraction joint cooling system. Stability analysis	-	-
5137-694	Final rock excavation plan	-	1-may-1934
5137-728	Drum gate extension. Plan sections & details	1	27-sep-1965
ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone			
MITERING LOCK GATES			
5151	Record plans general plan of 47 4 leaf	-	25-mar-1914
5152	Record plans general plan of 54 8 leaf	-	25-mar-1914
5153	Record plans general plan of 66 0 leaf	-	25-mar-1914
5154	General plan of 77' - 0" and 77' - 10" leaf	-	25-mar-1914
5155	Record plans general plan of 79 0 leaf	-	25-mar-1914
5156	Record plans general plan of 82 0 leaf	1	06-feb-1940
5166	Record plans anchorages	-	25-mar-1914

TABLE 1
REFERENCE DRAWINGS LISTING

Drawing No.	Title	Revision	Date
	ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone		
	GATUN LOCKS		
6124	General plan showing location of machinery chambers	1	18-nov-1940
	ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone		
	PEDRO MIGUEL LOCKS		
6125	General plan showing location of machinery chambers	11	10-jul-1940
	ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone		
	MIRAFLORES LOCKS		
6126	General plan showing location of machinery chambers	16	18-jul-1941

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
	ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone		
	GATUN LOCKS, MIRAFLORES LOCKS, PEDRO MIGUEL LOCKS – CONTROL HOUSE		
6750	End elevation and transverse section	17	12-jul-1913
	ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone		
	GATUN LOCKS, MIRAFLORES LOCKS – CONTROL HOUSE		
6751	Side elevation	15	06-oct-1913
6752	First floor plan and sections	12	05-apr-1913
6753	Second and third floor plan	14	05-apr-1913
6754	Structural steel, roof plan.		31-jan-1913
	ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone		
	ALL LOCKS – CONTROL HOUSES		
6755	Structural steel, roof trusses A and B		31-jan-1913

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
<p>ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone</p>			
<p>GATUN LOCKS</p>			
7039	General plan and sections of upper lock	5	15-jan-1910
7040	Plan of forebay and upper portion of upper lock	2	13-oct-1910
7041	Plan of middle portion of upper lock	2	07-sep-1912
7042-G-22	Plan of lower end of upper and upper end of middle locks	8	29-dec-1911
<p>ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone</p>			
<p>PEDRO MIGUEL LOCKS</p>			
7044-P-13	Plan of forebay and upper portion of lock	8	02-may-1968
7045-P-14	Plan of middle portion of lock	-	01-aug-1910
7046-P-15	Plan of lower portion of lock	8	26-jun-1958
<p>ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone</p>			
<p>MIRAFLORES LOCKS</p>			
7064	General plan and sections of upper lock	9	26-feb-1938
7065	Plan of forebay and upper portion of upper lock	5	05-feb-1968
7066	Plan of middle portion of upper locks	3	07-sep-1912

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
7067-M-30	Plan of lower end of upper and upper end of lower locks ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone GATUN LOCKS	-	14-feb-1911
7086-G-51	Upper approach and wing walls ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone PEDRO MIGUEL LOCKS	-	01-oct-1911
7087-P-45	Plan of upper approach ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone MIRAFLORES LOCKS	15	27-mar-1913
7088-M-44	Plan of upper approach	4	29-mar-1913
7089-M-45	General plan and sections of lower lock ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER GATUN LOCKS	1	05-nov-1930
7107	Plan of middle portion of middle lock	-	19-sep-1910

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
7108	Plan of lower end of middle and upper end of lower lock	11	02-jan-1912
7110	Plan of middle portion of lower lock	-	01-oct-1911
7111	Plan of lower portion of lower lock	8	02-nov-1971
<p>ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone</p>			
<p>STONEY GATE VALVES AND GUARD GATE VALVES</p>			
7113	For Locks and Gatun Spillway. Index plan showing location of valves and erection diagrams giving lengths and location of all fixed iron work	1	07-nov-1911
<p>ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER</p>			
<p>GATUN LOCKS</p>			
7123	Lower approach and wing walls	8	23-oct-1930
<p>ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone</p>			
<p>PEDRO MIGUEL LOCKS</p>			
7125-P-72	Side approach and wing walls	12	08-feb-1913
7127-P-74	Middle wall for north approach	-	13-sep-1910

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
	ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER		
	GATUN LOCKS		
7128	Middle wall for south approach	-	13-sep-1910
	ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone		
	MIRAFLORES LOCKS		
7129-M-71	Plan of middle portion of lower locks	4	29-dec-1911
7130-M-72	Plan of lower portion of lower locks	9	14-nov-1945
7131	Lower approach and wing walls	5	14-nov-1945
	ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone		
	PEDRO MIGUEL LOCKS		
7132	Lower approach and wing walls	-	01-feb-1912
	ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER Culebra Canal Zone		
	MIRAFLORES LOCKS		
7133	Middle wall for upper approach	3	16-aug-1941

**TABLE 1
REFERENCE DRAWINGS LISTING**

Drawing No.	Title	Revision	Date
	ISTHMIAN CANAL COMMISSION DEPARTMENT OF CONSTRUCTION AND ENGINEERING OFFICE OF THE ASSISTANT CHIEF ENGINEER		
	GATUN LOCKS		
VF-84	Section Taken 100 Feet N pf Side and WingWall Knuckle	-	-

AMENDMENT No. 3

TENDER 194284/ PROJECT No. SE-21-22

TENDER FOR EARTHQUAKE ASSESSMENT OF CANAL STRUCTURES

The following are questions received from prospective bidders.
This information is issued for the benefit of the interested parties.

2. **Reference:** 29. Instruction to Tenderers and Evaluation Criteria -29.3 Legal.
Question: Does legal documentation coming from outside Panama need to be translated to Spanish (certified sworn translation), legalized and apostilled?
Answer: It is not necessary that, to receive the proposal, the incorporation documents of the foreign company be legalized with an Apostille stamp. However, in the event that the contract is awarded, the ACP may require legalization with an Apostille for the purposes of due registration of the contractor in the Supplier Registry.

Now, regarding the translation, we consider that, if the documents are not in English or Spanish, they must be translated into one of these two languages (English or Spanish) so that their revision is possible.

10. **Reference:** 5. Main General Requirements - 5.1 Basic Work, Earthquake Assessment - 5.1.4 Analysis and Modeling - 5.1.4.3 Detailed Analysis and Modeling
Question: In our experience seismic risk evaluation, which we understand ACP is aiming for, does not strictly require 3D RHA models for all failure modes to be considered. The optimum approach might, depending on the dominant failure modes resulting from PFMA, also make use of less advanced models / simulations, which are more suitable for extensive uncertainty evaluation. Can ACP indicate if the use of less advanced models will be accepted if the main objective of ACP (seismic risk evaluation) can be met?
Answer (revised): Refer to paragraph 2 (*Work Included*) of the Terms of Reference. The terms under paragraph 5.1.4.3 (*Detailed Analysis and Modeling*) of the Terms of Reference remain unchanged.

35. **Reference:** 20.3.2 Core extractions.
Question: Do these core extractions refer to concrete or soil?
Answer: Refer to paragraph 5.1.2.2 (revised) of the Terms of Reference.
