

**PUBLIC**

**DOCUMENT OF THE INDEPENDENT CONSULTATION  
AND INVESTIGATION MECHANISM**

**PN-MICI002-2011**

**PANAMA CANAL EXPANSION**

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# Assessment and Consultation Phase Report PN-MICI002-2011 Case Panama Canal Expansion Program (Loan 2027/OC-PN)

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June 27, 2012 \*

\* Note from the Executive Secretary: This document was circulated to Management and the Requesters on July 3rd, 2012.

## TABLE OF CONTENTS

<b>1. Background</b>	<b>1</b>
1.1 The Request: Processing and Content	1
1.2 The Project	4
<b>2. Assessment Methodology and Findings</b>	<b>11</b>
2.1 Scope of the Assessment	11
<b>3. Stakeholders and Positions</b>	<b>11</b>
3.1 Primary Stakeholders	12
<b>4. Main Findings of the Assessment</b>	<b>15</b>
4.1 Access to Information	15
4.2 Salt-water Intrusion in the Canal Lakes	19
4.3 Seismic Risks and the Adequacy of Mitigation Plans	22
<b>5. Conclusions and Recommendations</b>	<b>25</b>
<b>Annex A. Location of New Pacific and Atlantic Locks</b>	<b>28</b>
<b>Annex B. Executive Chronogram of (Expansion) Main Projects with Baseline and Contingency</b>	<b>29</b>
<b>Annex C. Review of Water Demand Projections for the Expansion of the Panama Canal Expansion Program</b>	<b>30</b>
<b>Annex D. Seismic Design Criteria for New Locks and Borinquen Dam</b>	<b>33</b>

## ASSESSMENT AND CONSULTATION PHASE REPORT

### 1. Background

#### 1.1 The Request: Processing and Content

1. On 10 October 2011, Mrs. Leila Shelton, Director of the organization called “Gatun Lake Pro-Defense Committee”, submitted a Request to the Independent Consultation and Investigation Mechanism (“ICIM” or “Mechanism”) in connection with the Panama Canal Expansion Program (“the Project” or “Expansion Program”), which is partially financed by the Inter-American Development Bank (“IDB” or “the Bank”). On 17 October 2011, the Executive Secretary acknowledged receipt and forwarded the Request to the Project Ombudsperson (“Ombudsperson”).<sup>1,2</sup>

2. The Requester initially submitted the Request on her own behalf. She nonetheless identified herself as a representative of the Panamanian-based non-governmental Organization “Alianza ProPanama.” On 20 October 2011, the Mechanism received a letter from representatives of another Panamanian organization, *Colectivo Voces Ecológicas* (“COVEC”), in support of Mrs. Shelton’s Request; this letter acknowledged Mrs. Shelton as a representative of *Alianza ProPanama*. According to information received by the Ombudsperson, *Alianza ProPanama* is an umbrella organization comprised of the following groups and organizations: Gatun Lake Defense Committee; *Coordinadora para la Defensa de Tierras y Aguas* (CODETIAGUAS); *Coordinadora Campesina por la Vida*; *Unión Campesina Panameña* (UCP); *Frente Campesino Contra los Embalses y la Minería de Coclé y Colón* (FCCCEM); *Frente Campesino Colonense* (FCC); *Organización Campesina Coclesana 15 de Mayo* (OCC-15 de Mayo); *Unión Indígena y Campesina* (UIC); *Asociación Pro Defensa de las Cuencas Hidrográficas*; and *Frente de Resistencia Coclesano* (Movimiento – Coclé del Norte).<sup>3</sup>

3. Prior contact with Management: Upon Management’s request to attempt to address the issues raised in the Request, in accordance with the ICIM Policy, the Ombudsperson granted a pause during the eligibility determination period on 2 November 2011. The pause period was then extended for 45 calendar days when the Parties<sup>4</sup> failed to meet within the initial timeframe provided. In this period, Bank Management arranged a meeting between the Requester and the

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<sup>1</sup> The terms: Mechanism, Management, Executive Secretary, Project Ombudsperson, Panel, Mechanism Policies, Eligibility, Consultation Phase, Executing Agency, Relevant Operational Policies, Assessment, and any other relevant term in this report shall have the meaning assigned to them in the Independent Consultation and Investigation Mechanism (ICIM) Policy, approved on 17 February 2010 and available at: [www.iadb.org/icim](http://www.iadb.org/icim).

<sup>2</sup> An initial Request was first received by the Mechanism, with copy to the Ombudsperson, on 9 May 2011, time at which the Executive Secretary asked the Requester to contact the Project Team Leader since the initial communication appeared to be more of a request for project information than a formal Request. On 15 July 2011 the Project Team Leader in turn asked the Requester to contact the Panama Canal Authority (PCA) directly, and also offered to meet with the Requester to discuss the concerns raised. Later on, in October, the Requester contacted the Mechanism reiterating her desire to have the Request processed. On 28 October 2011 Management reiterated the dialogue offer but the Requester said she wanted to go ahead with the process directly through the Mechanism.

<sup>3</sup> In addition to COVEC’s letter, during the Assessment stage an additional letter dated 2 April 2012, from Ms. Cecilia MacIntyre, was received by ICIM on 12 April 2012 in support of Mrs. Shelton’s Request, further validating Mrs. Shelton’s representativeness of *Alianza ProPanama*. The letter is on file and was submitted by representatives of CODETIAGUAS, *Asociación Pro Defensa de las Cuencas Hidrográficas* and *Frente de Resistencia Coclesano*.

<sup>4</sup> In this case, the “Parties” are understood to be the Requesters, the Executing Agency and the Bank’s Project Team.

Executing Agency (“Panama Canal Authority” or “PCA”) to discuss the issues raised in the Request. The meeting was held in Panama City on 20 December 2011.<sup>5</sup> The Ombudsperson and members of her team participated as observers at the invitation of Bank Management. Prior to the meeting, the Requester submitted a list of documents/information pursuant to the concerns raised in her Request as a condition for the meeting to take place. Specifically, the information requested was the following:

- a. Studies of salinization impacts of the selected lock design and configuration
- b. Application of earthquake design criteria to the upgraded canal system
- c. Copy of project design basis
- d. Copies of comparative studies made of lock options and configurations prior to selection
- e. Reports of due diligence experts with respect to above studies and determinations.

4. Bank Management asked the PCA to provide the information; and some information was passed on to the Requester in early December by the Project Team. After the meeting, the PCA still provided some additional information to the Requester.<sup>6</sup> The second pause period came to an end on 17 January 2012.

5. On 1 February 2012, the Requester contacted the Ombudsperson to reiterate her desire for the Consultation Phase process to go on, as she was not satisfied with the outcome of the Management response. In particular, she reiterated her concerns about the long-term sustainability of the Project as designed, and expressed her concerns regarding access to information since she had not received all of the information requested from the Executing Agency. This communication, along with supporting documentation thereto, was added to the Request’s file.<sup>7</sup>

6. On 9 February 2012, the Ombudsperson declared the Request eligible for the Consultation Phase; the Eligibility Memorandum was distributed via the Executive Secretary to the Parties on 14 February 2012.

7. Following the determination of eligibility, the Ombudsperson launched the Assessment stage of the case to further analyze the issues at hand and to gather additional information about the Request; identify the primary and secondary stakeholders in the case; assess the issues in the Request and determine whether it was feasible to initiate a dialogue between the Parties, in an effort to address the Requesters’ concerns. The Ombudsperson proposed to hold a videoconference with the PCA to discuss the three main issues identified per the Eligibility Memorandum. This, however, never materialized.

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<sup>5</sup> The Eligibility Memorandum cites this date as 21 December 2011. A review of the record shows the meeting was held on the 20<sup>th</sup> of December instead.

<sup>6</sup> The information passed on to the Requester was submitted via electronic links to the PCA website. The MICI Case Officer verified that some of the links were pointing to old studies—available and relevant to the period of the Project’s due diligence but not reflective of the current status of the Project. In one case, a link was pointing to a section of the PCA website that required a password to be accessed. The password was not provided.

<sup>7</sup> The supporting documents are: (1) an article entitled “Rectifying the Fundamentally Flawed Panama Canal Expansion,” September 2011; and (2) a copy of a cable released by Wikileaks in September 2011 entitled “December 2007 Panama and Panama City face Greater Earthquake Risk than previously realized.”

8. The Ombudsperson then proposed to carry out the Assessment site visit the week of 9 April. The PCA responded favorably at first. Nevertheless, few days before the mission, on 4 April, the PCA communicated to the Ombudsperson that it would no longer be available for meetings and that it would not partake of the Consultation Phase. Among the reasons cited for its decision were the following: all information had been made available to the accountability mechanisms and the lenders via the lenders' website (see paragraphs 11 and 15); the mechanisms accepted a complaint without the appropriate documentation and support; the burden of proof has been placed on the PCA; the Requester has a conflict of interest since she is promoting her brother's design of the canal expansion.

9. Content of the Request. The Requester alleges, both in the Request and in interviews held during the Assessment process, that the Project has been subject to (i) lack of transparency, incomplete disclosure of information and misrepresentation of project-related facts among the local and international community; (ii) that the Project is overlooking the potential intrusion of salt into the transited lakes of the Canal and, hence, has the potential to generate a migratory saltwater pathway across the Isthmus of Panama with consequent damages to the marine-ecology of the Atlantic and Pacific oceans; and (iii) the lack of adequate risk identification and appropriate mitigation measures related to an important seismic fault, thus threatening the Canal's Pacific end.

10. Furthermore, the Requesters allege that:

- a. Detail design of the new locks was not made available publicly and was therefore not subject to in-depth public scrutiny.
- b. Public fora leading to the approval of the Expansion Program via National Referendum held on 22 October 2006, were structured and controlled to keep focus on pre-packaged themes; engineering details of the locks' selected design were not revealed or fully discussed; discrepancies or questions about the soundness of the design were ignored by the Executing Agency and the authorities at large.
- c. An enhanced design comprising two-lane locks and Miraflores-sacrificial type lakes would increase the efficiency of the system and truly mitigate against the higher earthquake threat now known.
- d. International financial institutions have failed to truly independently verify and certify designs, procedures and assertions made by PCA.
- e. The Project has unrealistic and inadequate projections of the effects/impacts on local and global communities.

11. Similar requests have been logged by Mrs. Shelton with the International Accountability Mechanisms ("IAMs") of the other financiers of the program, namely the European Investment Bank's Complaints Mechanism, the Office of the Compliance Advisor/Ombudsman (CAO) of the International Finance Corporation (IFC), and the Office of Examiners for Environmental Guidelines of the Japan Bank for International Cooperation (JBIC).

12. Status of Complaints logged with other IAMs.

- a. The European Investment Bank's Complaint Mechanism was the first to receive a complaint on 27 March 2011. An evaluation site visit was carried out from 29 August to 4 September 2011. An Evaluation Report is under preparation.

b. The CAO received the complaint in May 2011. It was deemed eligible for its consultation process on 27 July 2011. A site visit was carried out from 20 to 27 October 2011. Its Assessment Report was issued in February 2012 and concluded that there were no conditions for a dialogue because neither the complainants and potentially affected communities, nor the PCA were willing to engage in it.<sup>8</sup> The complaint was then transferred to CAO's Compliance function and is currently in the final stage of the appraisal.

c. The JBIC Office of Examiners for Environmental Guidelines announced the admissibility of the complaint, but the Examiners decided to "suspend" the start of the process until all other related mechanisms would reach some conclusions, in accordance with what its guidelines stipulate.

## 1.2 The Project

13. On 8 October 2008, the Bank's Board of Executive Directors approved a Corporate Loan (Operation Number 2027/OC-PN, Project Number PN-L1032) in the amount of US\$ 400 million to the Panama Canal Authority, for the purpose of partially financing the Expansion of the Panama Canal. The Corporate Loan is a syndicated loan prepared by the IDB's Structured and Corporate Finance Department ("SCF").<sup>9</sup>

14. The Project's environmental classification is type "A", which applies to projects that are deemed to cause negative environmental and associated social impacts, in accordance with the Environment and Safeguards Compliance Policy (OP-703). As such, the Project required an Environmental Impact Assessment (EIA). The EIA was prepared by the international consulting firm URS Holdings, Inc., in collaboration with two local university foundations between 2006 and 2007. As per national law, the EIA was a Category III-type assessment, equivalent to the Equator Principles' Category A.<sup>10</sup> The Executing Agency submitted the EIA to the country's National Environmental Agency ("ANAM") and it was approved by Resolution 632-2007 on 9 November 2007.<sup>11</sup>

15. In addition to IDB, the following Lenders are co-financing the Project: the Japanese Bank for Reconstruction and Development (JBIC), the European Investment Bank (EIB), the International Finance Corporation (IFC), and the Andean Development Corporation ("CAF", per its Spanish acronym)—altogether known as "the Lenders." Table 1 summarizes the Expansion Program's

<sup>8</sup> CAO, February 2012. *Ombudsman Assessment Report*. Available online at <http://www.cao-ombudsman.org/>.

<sup>9</sup> Because of the fact that the Executing Agency is prohibited by law from pledging a sovereign guarantee for purposes of expanding the Canal (see *infra* 17), the loan extended by the Bank was a Corporate Loan—a non-sovereign loan that does not need a sovereign guarantee from an IDB member country. Other reasons included the fact that the PCA enjoys financial autonomy and the right to administer its own patrimony.

<sup>10</sup> The Equator Principles are based on the IFC Performance Standards on Social and Environmental Sustainability and on the World Bank Group Environmental, Health, and Safety Guidelines. The Principles are a "credit risk management framework for determining, assessing and managing environmental and social risk in Project Finance transactions where total project capital costs exceed US\$10 million." They were first launched in 2006. A review took place between 2009 and 2011. The review concluded with the issuance of updated "Sustainability Policy and Performance Standards," approved by the IFC Board in May 2011; the updated version became effective on 1 January 2012. (See <http://www.equator-principles.com/index.php/about-the-equator-principles> and [http://www1.ifc.org/wps/wcm/connect/Topics\\_Ext\\_Content/IFC\\_External\\_Corporate\\_Site/IFC+Sustainability/Sustainability+Framework](http://www1.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/IFC+Sustainability/Sustainability+Framework))

<sup>11</sup> IDB. *Environmental and Management Social Report*. Sept. 2008: p. 10.



financing plan.<sup>12</sup> The total cost of the Project was estimated at US\$ 5.25 billion in 2005 and the combined co-financing amounted to US\$ 2.3 billion.<sup>13</sup>

**Table 1. Financing Plan of the Expansion Program**

<b>Financing Plan</b>	<b>Amount (US\$ million)</b>	<b>% of Total Amount</b>
IDB	400	7.6
IFC	300	5.7
JBIC	800	15.2
EIB	500	9.5
CAF	300	5.7
PCA's contribution	The balance	The balance
<b>Total Cost</b>	<b>5,250</b>	<b>100*</b>

Source: PCA, 2011. *Canal Expansion Program*, p. 11. Available online at [www.pancanal.com](http://www.pancanal.com).

\* Discrepancies are due to round off.

16. The activities financed by the Project are the following: (i) the construction of a third set of locks, including two lock complexes and water-saving basins at the Atlantic and Pacific ends of the Canal; (ii) the deepening of the Pacific and Atlantic entrances of the Canal; (iii) the deepening and widening of existing Canal navigational channels, including the Gaillard Cut; and (iv) the raising of Gatun Lake to its maximum operational level (see figures 1, 2, and annex A). In terms of new infrastructure, the Project is to build two sets of one-lane locks—one on the Atlantic side of the Isthmus and one on the Pacific side—with three chambers and three water-savings basins at each side of the chambers (see figure 3).

17. The Expansion Program: On 17 July 2006, the Canal Expansion Program was approved by the Panamanian National Assembly by Organic Law Number 28. A National Referendum took place on 22 October 2006: 77 percent of the people that voted were in support of the expansion, while 22 percent opposed it.<sup>14</sup> It is important to highlight that this law states in Article 2 that “No reservoirs shall be built for the operation of the third set of locks” and “Funding for this project shall not bear State endorsement or guarantee.”<sup>15</sup>

18. Construction works began on 3 September 2007 with the excavation of the Pacific access channel and are expected to be completed in late 2014. As of the closing date of this Report, a total US\$ 900 million have been disbursed (see table 2).

<sup>12</sup> At the time the IDB Loan Proposal was approved by the Board, it was envisioned that JBIC would finance only US\$ 600 million, with IFC and CAF financing a larger share. However, the share of the JBIC increased by US\$ 200 million and the other two decreased by US\$ 100 million each thereafter.

<sup>13</sup> As part of its due diligence, the Bank commissioned an independent study to look into the soundness of the cost projections.

<sup>14</sup> IDB, *Environmental and Social Management Report*, September 2008. Washington, DC: p. 36.

<sup>15</sup> Organic Law 28. 17 July 2006. Available online at <http://www.pancanal.com/eng/plan/documentos/referencia/acp-plan-ref-ley-28.pdf>.

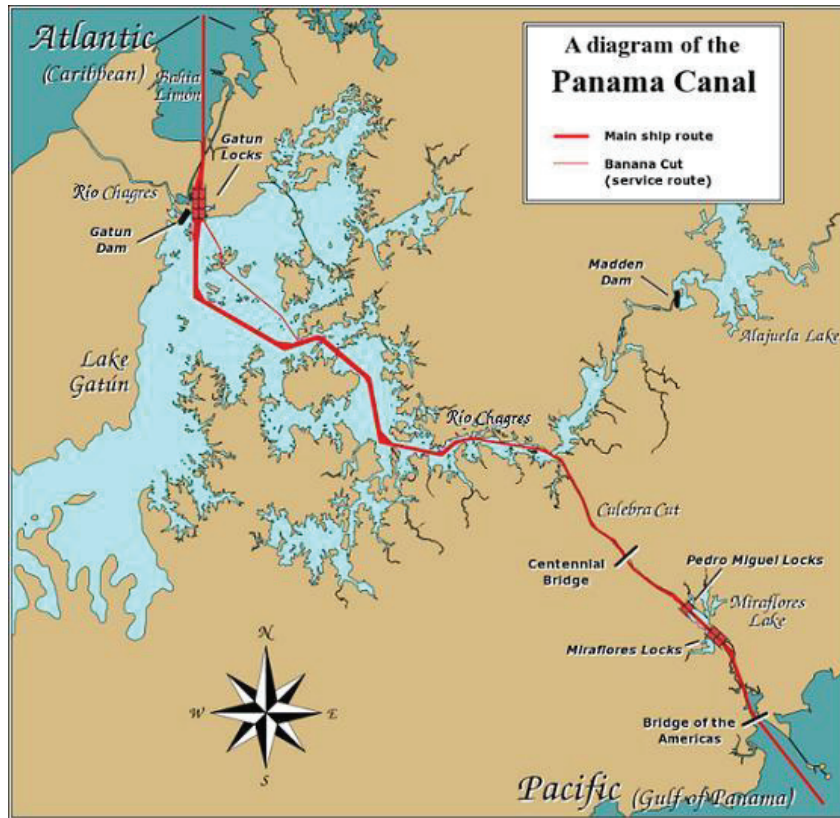


Figure 1. Panama Canal layout BEFORE the Expansion. Source: IDB. Loan Proposal

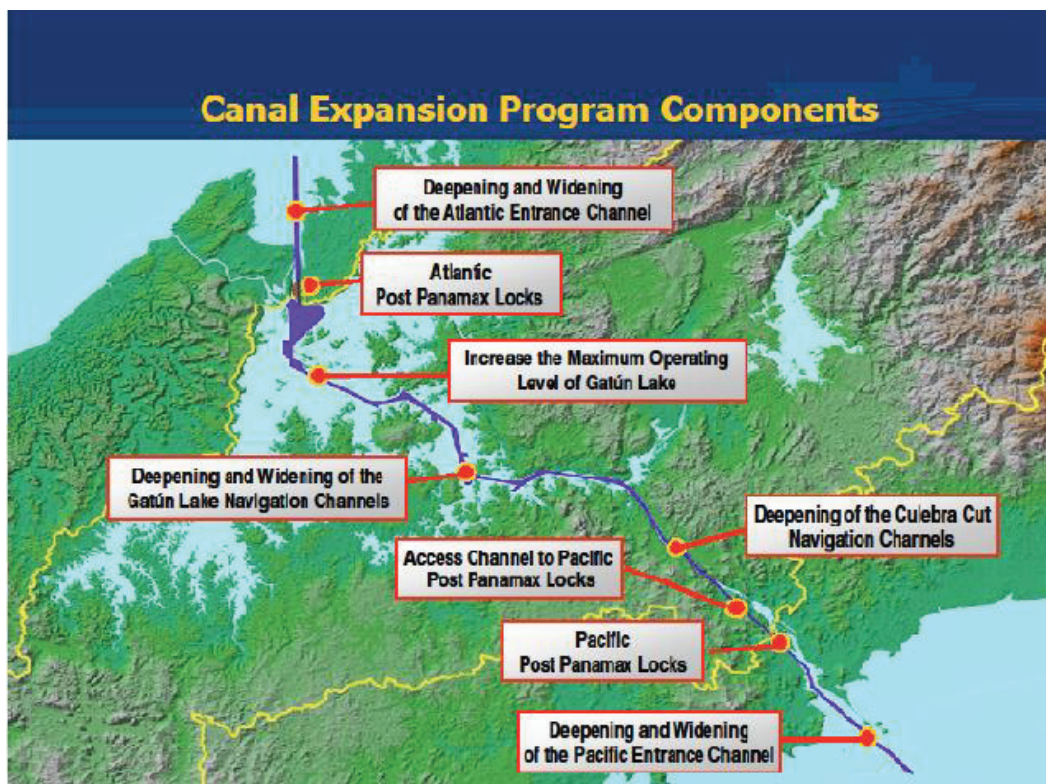
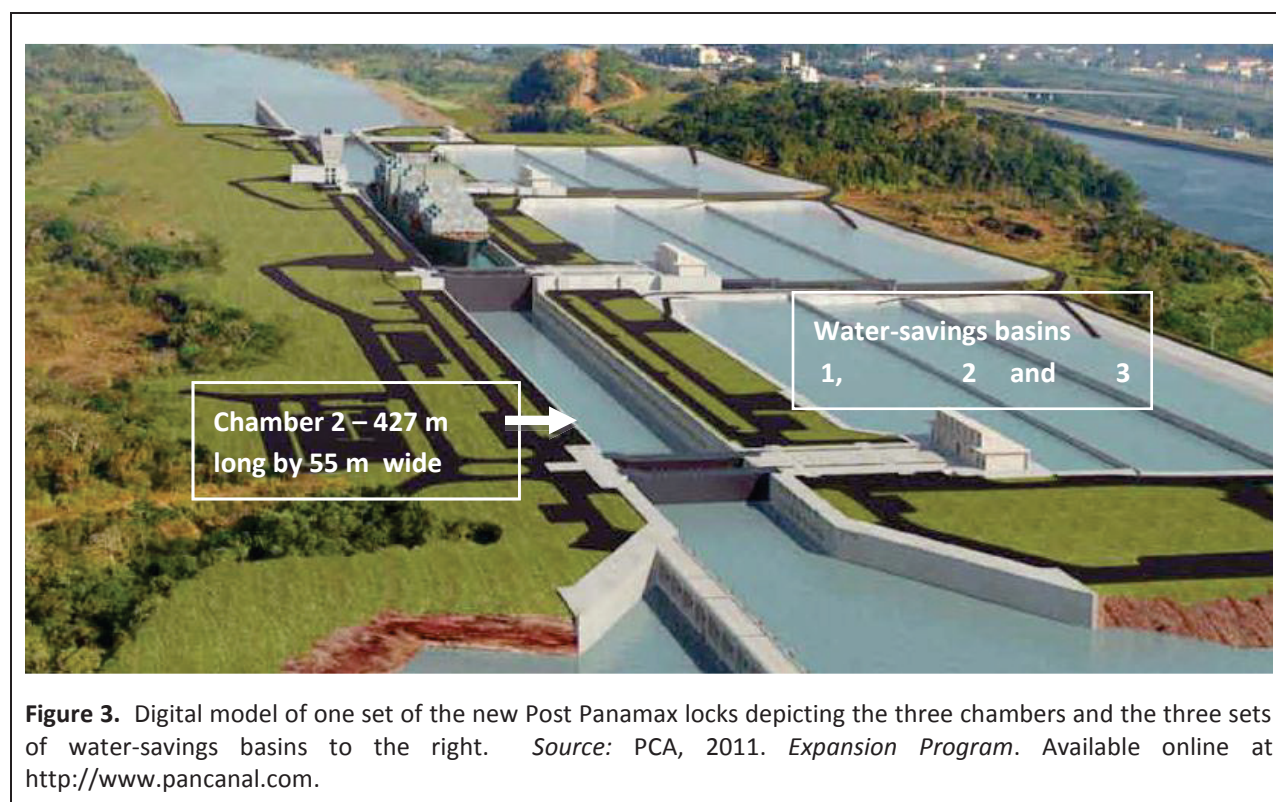


Figure 2. Activities and location of activities related to the Expansion of the Canal  
Source: IDB, Loan Proposal. September 2008.



**Table 2. Disbursements made by Lenders for Expansion Program**

Lender	Amount (US million)	Date of disbursement
JBIC	300	3 March 2011 <sup>(1)</sup>
JBIC	300	29 October 2010 <sup>(2)</sup>
JBIC	200	1 March 2010 <sup>(3)</sup>
EIB	100	1 March 2010 <sup>(3)</sup>

*Sources:* PCA.

<sup>(1)</sup> Progress Report XVIII. *Progress in the Contracts pertaining to the Expansion Program*, 31 March 2011, available online at <http://www.pancanal.com/esp/ampliacion/rpts/informes-trimestrales/20110331.pdf>;

<sup>(2)</sup> Progress Report XVII. 31 December 2010, available online at <http://www.pancanal.com/esp/ampliacion/rpts/informes-trimestrales/20101231.pdf>;

<sup>(3)</sup> Progress Report XIV, 31 March 2010, available online at <http://www.pancanal.com/esp/ampliacion/informes/informes-trimestrales/20100331.pdf>

19. Given the fact that the last disbursement took place over a year ago, it is likely that an additional disbursement will be soon requested by PCA. At closing of this Report, only JBIC had disbursed in full and EIB had disbursed US\$ 100 million. IDB, CAF and IFC have not made disbursements yet. The conditions for disbursement are stipulated in the Common Terms



Agreement (“CTA”) executed by the Lenders on 9 December 2008.<sup>16</sup> According to the latest PCA Quarterly Progress Report, during the first quarter of 2012 the PCA negotiated an amendment in the bilateral agreement with IFC related to the “extension of the margin and payment conditions.” No further information is available.

20. The third set of navigation locks being built by the Project will be larger than the existing locks so as to allow transit of larger vessels known as “Post Panamax” vessels which can carry as much as 13,000 Twenty-foot Equivalent Units (TEUs)—the standard of measurement for containers. In its background studies, PCA concluded that the optimal maximum size that the new locks should endure would be container ships measuring 12,500 TEUs. Nevertheless, given the number of vessels estimated to be available in the maritime market with the potential to use the Canal in future years, the PCA determined that the new locks would be transited, in its majority, by vessels ranging from 8,000 to 9,000 TEUs.<sup>17</sup> Figures 4A and 4B compare the dimensions of the existing and new locks.

21. On 24 January 2012, the consortium that won the bidding process for the design and build contract of the third of locks—*Grupo Unidos por el Canal S.A.* (“GUPCSA”)<sup>18</sup>—reached the contractual milestone of meeting all requirements for the design of the locks, gates and valves. The PCA received the final excavation design for the Atlantic Entrance Channel, provided recommendations and requested that it be resubmitted. Overall, progress in the Project stood at 36.3 percent, with 22 percent of the construction of the locks having been executed to date, which is about six months behind the baseline schedule due to both a later than estimated start date for the bidding process of the build and design contract of the locks as well as a longer duration of the bidding process than originally estimated. The expanded Canal is scheduled to start operations in the last quarter of 2014 (see annex B). The contract for the construction of the Borinquen Dam—a four-segment discrete dam to be built to the southwest of Miraflores Lake to serve as a long entrance channel for the new Pacific Locks—and for excavation works at the northern access of the Pacific site was also issued during this quarter.<sup>19</sup>

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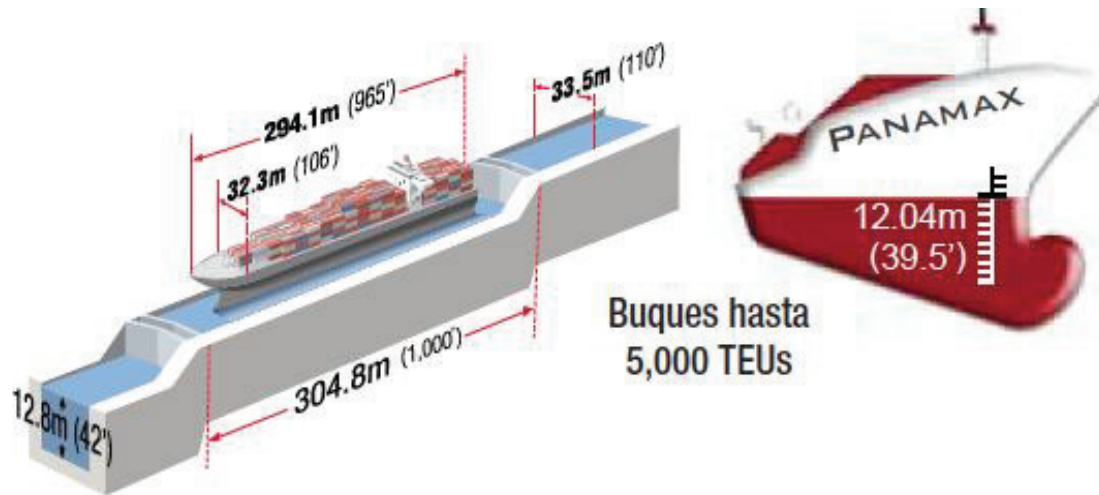
<sup>16</sup> According to the Bank’s Disclosure of Information Policy (OP-102) and its successor, the Access to Information Policy, the CTA and any legal agreements pertaining non-sovereign guaranteed operations are deemed confidential and cannot be disclosed by the Bank without the consent of the borrower. The conditions for each disbursement are found in Article III, Section 3.02 of the CTA. The agreement also contains a clause on Environmental and Social Requirements that the borrower must meet [see Section 3.03, clause (o)].

<sup>17</sup> Due diligence report (August 2007), commissioned by the Bank and the IFC.

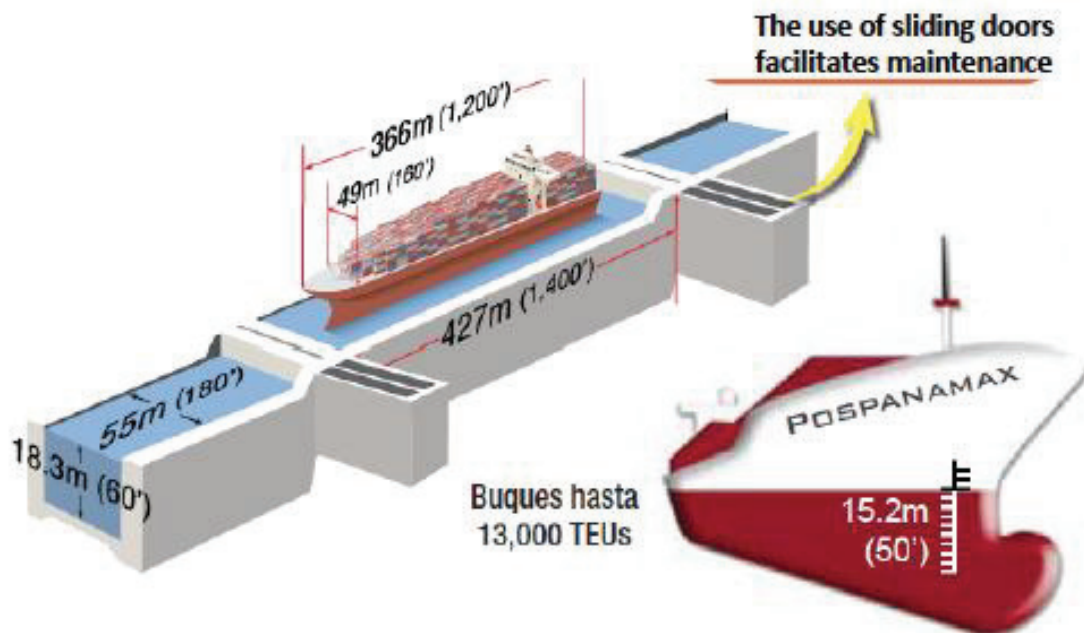
<sup>18</sup> The design and build contract was awarded by PCA to GUPCSA, an international consortium, on 15 July 2009 after an international bidding process took place. GUPCSA is comprised of the following member/companies: Sacyr Vallehermoso S. A., Impregilo S. p. A., Jan de Nul n. v., Constructora Urbana, S. A., Montgomery Watson Harza, IV-Groep and Tetra Tech. and Heerema Fabrication Group.

<sup>19</sup> PCA. Quarterly Report XXII. *Progress of the Contracts pertaining to the Expansion Program*. 31 March 2012. Available online at <http://www.pancanal.com/esp/ampliacion/rpts/informes-trimestrales/index.html>

4A



4B



**Figures 4A-B.** Comparison of dimensions of navigation locks currently used for Panamax-size vessels (4A) vs. new locks (post expansion), meant for Post Panamax vessels (4B). Source: PCA, 2011. *Canal Expansion Program*, p.7. Available online at <http://www.pancanal.com>

22. Table 3 summarizes the timeline leading to Project approval by the IDB Board.

**Table 3. Timeline of events leading to approval of Expansion Program by the Bank**

Event	Date of occurrence
Project Feasibility Studies are carried out by PCA	From 2003 to 2008
PCA presents Expansion Program proposal to Panamanian citizens	24 April 2006
National Referendum seeking approval of the Project is held	22 October 2006
EIA is submitted for approval to ANAM	July 2007
EIA is approved by ANAM	9 November 2007
Project Concept Document is circulated at IDB for review	11 October 2007
Environmental and Social Review Meeting is held	12 October 2007
Project secures eligibility for IDB financing	Mid-October 2007
Link to EIA is made available on the Bank's website	26 November 2007 (*)
Confidentiality agreement between Bank and PCA to carry out due diligence is executed <sup>20</sup>	14 December 2007
Environmental and Social Strategy is disclosed to the public	20 March 2008
Bank due diligence (i.e. analysis) mission takes place	16 – 18 July; and 10 – 12 August 2008
Environmental and Social Management Report (ESMR) is disclosed to the public	23 September 2008
Project is approved by the Board	8 October 2008
Commitment letter is signed with PCA	10 October 2008

Sources: Bank records.

(\*) Bank Project Information Center (PIC)

<sup>20</sup> Usually, processing of a non-sovereign guaranteed loan would include the signing of a "Mandate Letter" signaling the start of the Bank's due diligence; according to information provided by the Project Team, in this case, a Mandate Letter was not executed because PCA's procurement regulations did not allow it. Instead, a confidentiality agreement was executed at the outset of the due diligence and a Commitment Letter executed after the Board approved the Project—a common practice by SPF standards when dealing with subnational entities such as PCA.

## 2. Assessment Methodology and Findings

23. In this case, the Ombudsperson team conducted the following activities: (i) analysis of information gathered and/or submitted by the Requesters, the Executing Agency, and the Bank's Project Team, as well as other data collected by the ICIM team online and from Bank databases; (ii) teleconferences with the Requesters; (iii) a meeting with the Project Team and Management; (iv) various teleconferences with the EIB's Complaint Mechanism; and (v) a telephone conversation with staff from the consulting firm in charge of preparing the Project's Environmental and Social Monitoring Reports. Both the public PCA website and the password-protected website for Lenders (*infra* 38) were also inventoried and analyzed for contents and some forty reports deemed relevant were consulted.

24. Prior and during the Assessment stage it was possible to: (i) identify the primary stakeholders involved; (ii) listen to the concerns of some of the people who believe they will be adversely affected by the Project; (iii) identify the opportunities and difficulties for dialogue between the Parties; and (iv) analyze the positions and interests of the stakeholders.

### 2.1 Scope of the Assessment

25. In accordance with the Eligibility Memorandum issued on 14 February 2012, three issues were identified for more in-depth analysis during the Assessment stage, as follows: **(i) Access to Information;** **(ii) Salt-water Intrusion in the Canal Lakes** and adequacy of the monitoring plan/mitigation measures in place; and **(iii) Seismic Risks** and the adequacy of related mitigation plans in place. Section 4 of this Report covers the main findings of the Assessment on each of these three topics. During the Assessment stage, the three issues identified at Eligibility, out of several raised by the Requester, were confirmed considering them to be most substantiated and those which, left unchecked, could pose serious adverse environmental and/or social consequences.

26. Usually, an Assessment would count on the cooperation, at a minimum, of all primary stakeholders. In this case, the Assessment has not benefited from direct interaction and discussions with the PCA, which decided not to collaborate directly and declined to participate in a potential dialogue process, for the reasons cited earlier (see *supra* 8). In consequence, the Ombudsperson's analysis has had to rely mostly on: i) own information gathering and in-depth analyses of technical information; (ii) discussions with its counterpart mechanism at the EIB; and (iii) a review of many documents made available by the Executing Agency, most of which are deemed confidential as per the Bank's Operational Policy on Disclosure of Information (OP-102, effective from 1 January 2004 until 31 December 2010) and its revised version, the Access to Information Policy (OP-102, effective on 1 January 2011).

## 3. Stakeholders and Positions

27. The stakeholders in the case were identified during the Eligibility Analysis and further researched during the Assessment stage. Given the characteristics of this case, they were mainly classified as primary stakeholders. The primary stakeholders are persons and/or entities directly affected by the Project, or those who have a direct influence on decisions regarding the design, implementation, and operation of the Project, as well as their legitimate representatives.

### 3.1 Primary Stakeholders

#### 3.1.1 Requesters

28. Mrs. Leila Shelton is the main Requester. As explained earlier, she is the Director of Gatun Lake Defense Committee, a Panamanian grassroots organization, without legal persona. It advocates for “a genuinely responsible and sustainable expansion of the Panama Canal, where its valuable resources are used effectively and left undamaged for the benefit of this and future generations.” However, the Request was initially submitted by her as a Panamanian citizen and also as representative of the umbrella organization Alianza ProPanama that groups several civil society organizations (*supra* 2). During the Assessment stage, the Ombudsperson had the opportunity to verify that Mrs. Shelton is deemed indeed a representative by the other organizations mentioned in paragraph 2 (altogether “the Requesters”), and that these organizations are in support of her Request. In addition to receiving two letters from members of these organizations in support of the Request and in recognition of Mrs. Shelton as their representative, during the virtual meeting held on 11 May 2012, the Ombudsperson was able to speak with and listen to these additional Requesters.

#### 3.1.2 Executing Agency

29. The Executing Agency is the Panama Canal Authority (PCA), an autonomous legal entity, established in 1997 through a constitutional mandate and Law Number 19 of 11 June 1997; it is owned in its entirety by the Panamanian government. The PCA has exclusive responsibility for the operation, administration, management, preservation, maintenance and modernization of the Canal, as well as its activities.<sup>21</sup> The PCA started administering the Canal in December 1999, following the two-decade long joint arrangement between United States and Panama for control of the Canal. Within the organizational structure of the PCA, the Engineering and Program Management Department is responsible for the execution of the Expansion Program. Under this Department, there is a Section of Environmental Management and Supervision (known as “IARM,” per its Spanish acronym), which is responsible for coordination with the National Environmental Agency (“ANAM”) over environmental licensing and for reporting on environmental aspects.<sup>22</sup>

#### 3.1.3 Positions and Interests of the Parties

##### (i) The Requesters

30. During the Assessment, the Requesters reiterated their belief that the Project has not enjoyed full disclosure of information pertaining to the selected design of the third set of locks prior to the approval by National Referendum of the Expansion Program or thereafter. Specifically, they have expressed the following concerns:

##### *With regard to access to information*

- a. There was no EIA available to the public for scrutiny at the time the Referendum was held.<sup>23</sup> This greatly limited the ability of the public to make an informed decision.

<sup>21</sup> Panama Legislative Assembly Law No. 19. 11 June 1997.

<sup>22</sup> IDB, *Environmental and Social Management Report*, September 2008. Washington, DC: p. 36.

<sup>23</sup> The Project’s EIA was finalized in July 2007.



b. In addition to lack of disclosure of key information about the Project's design, environmental and social impacts, and costs, they report that there has been a great deal of both misinformation and disinformation about the Project. They believe the Executing Agency has undertaken promotional campaigns in favor of the expansion focusing on positive aspects but ignoring negative ones.

c. In particular, peasants and indigenous groups represented by *Coordinadora Campesina por la Vida*, *Frente Campesino Coclesano*, and Gatun Lake communities have had no access to information regarding the Project. The large majority of these people do not have a computer, much less access to the Internet; they do not have telephone and though some may have mobile phones, reception is very limited in the remote areas they live.

d. Right before and immediately after the Referendum, public meetings aimed at advertising the Project were tightly controlled. For instance, questions to be answered by PCA authorities were pre-selected according to content deemed suitable to their purpose of gaining Project acceptance; people with the knowledge and/or experience to raise difficult questions were not granted an opportunity to speak or were quickly disregarded.

e. The Requesters also alleged that access to salt-water intrusion data collected by the Executing Agency and status of monitoring activities regarding this water quality aspect have not been disclosed in full by the PCA. In the time leading to the Referendum, Mrs. Shelton visited the PCA library at Balboa on several occasions and found it extremely difficult to obtain information regarding this parameter.<sup>24</sup>

***With regard to salt-water intrusion and water quality/availability***

f. The Requesters claim that people were told that there would be no damage to water quality, including by salinization, and also that the selected design was the only one available.

g. They believe the design selected for the new locks is technically deficient regarding the following aspects: (i) it makes inefficient use of the water supply; and (ii) it poses an imminent risk of polluting the water supply by the increase in salinity that is expected to stem from the use of water-savings basins over the long term and from the new locks bypassing Miraflores Lake, which currently serves as a salt-water barrier from ships entering the existing locks on the Pacific side. As a result, the mitigation ability of the modified system will be significantly reduced.

h. They believe that additional reservoirs will be needed for the expanded Canal to function and that the PCA has not provided specific information regarding their location

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<sup>24</sup> This data was requested by Mrs. Shelton at the meeting held on 20 December 2011. The Ombudsperson understands from the Requester that the PCA provided historical data going back to the 1920s instead of recent data. In mid-April 2012, the Ombudsperson requested such data from the Executing Agency, clarifying that the Requester wanted recent data. The PCA provided a link to a Water Quality Monitoring Study, Part II, made by Delft Hydraulics in response to the request for information. This study is a series of three reports commissioned by the Executing Agency for the development of a tridimensional salt intrusion model to be used to estimate the effect of the new locks on salt intrusion in Gatun and other lakes. The data in the reports had been collected at specific points in time in 2007 and 2008 and used in the calibration of the model. It is the understanding of this Ombudsperson, based on the most recent Environmental and Social Monitoring Report available (April 2012), that more recent data exists; however, this has not been shared with ICIM or the Requesters.

and impacts. This belief is rooted in accounts of people coming forward to say that they have been approached by PCA's representatives to negotiate indemnization packages for future resettlement as well as on accounts that PCA's helicopters fly over Chagres territory<sup>25</sup> on surveying missions. Some of the Requesters believe this is a sign that they are looking at sites for development of reservoirs. They claim that PCA representatives have mentioned that "small reservoirs" may be needed in the future, but have not provided any details.

- i. They oppose the development of new reservoirs.
- j. See item (e) above.

***With regard to seismic risks***

k. They believe the design of the new locks carries with it a huge risk of loss of investments and of lives in the event of a catastrophic seismic event. This is due to the decision to site a three-chamber lock lane on top of an active fault on the Pacific side and to build a dike parallel to an active fault-line (i.e. Borinquen Dam). All facilities and communities lining the Pacific entrance are being placed at an increased risk of being washed away by the likely-resulting-release of Gatun Lake waters if the gates of the chambers were to collapse as a result of such seismic event.

l. They believe studies that forecast that a seismic event of catastrophic proportions will happen soon, given that the last event of this type took place in 1882<sup>26</sup> and the fault stress has been accumulating over the past 130 years.

m. Specifically, they request that a report produced by Earth Consultants International (ECI) in 2008 be fully disclosed to them and the public.

***Other***

n. They are concerned that archeological artifacts/sites recently discovered during excavation in the Canal Zone are not being preserved.<sup>27</sup>

o. They are willing to engage in a dialogue with the Executing Agency as long as it is based on information exchanges that are responsive to the specific nature of their concerns. They do not want to be given the same studies they have already had a chance to consult in the past.

p. Project costs divulged are not reflective of real costs and there is great suspicion that the Project will end up costing more than it has been publicly disclosed.

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<sup>25</sup> Chagres territory refers to territory over which the Chagres River in Central Panama runs. The central part of the river is dammed by the Gatun Dam and forms Gatun Lake. Damning the Alto Chagres is one of the alternatives analyzed but discarded by the PCA in its final selection of water projects for the operation of the Expanded Canal (see table C-2, annex C).

<sup>26</sup> The 1882 earthquake had a magnitude of 7.7 on the Richter scale and an intensity of IX on the Mercalli scale. IDB. *Disaster Risk Indicators and Risk Management*. Technical Note IDB-TN-169, September 2010: p. 35.

<sup>27</sup> Though this is not an issue covered by this Assessment, it is worth noting that according to the PCA's latest Progress Report for the first quarter of 2012, "the PCA renewed the contract for professional services of an archeological advisory nature, after recent excavations uncovered some layers at the Culebra Cut that might contain paleontological remains." PCA. Quarterly Report XXII. *Op. cit.*

**(ii) The Executing Agency**

31. Exchanges of views with the ACP at the outset of the Assessment reveal the following:
- a. The PCA states that it has disclosed all of the information requested and available for the Expansion Program. They confirmed that the PCA website is full of progress reports and studies leading to the EIA. The EIA is also available on its website. They emphasized that the Lenders have access to all the reports produced.
  - b. The basis for the Project design that was used in the Request for Proposals (RFP) is available online in English; a Spanish version of the documents was in the process of being uploaded on to its public website as recently as mid-April 2012.<sup>28</sup>
  - c. The Requester(s) has dubious interests and has manipulated the accountability mechanisms into believing the allegations, and thus, has been allowed ample room by the mechanisms to modify her complaints so as to be rendered admissible.
  - d. It calls into question the legitimacy of the main Requester given the lack of legal persona in Panama of the organizations she represents.<sup>29</sup>
  - e. The Project has carried out extensive studies and analysis of alternatives for both the design and the selection of alternatives of water projects, which has benefited from the review and professional experience of highly-reknowned international experts and top-of-the line engineering and technical firms.

**4. Main Findings of the Assessment**

32. The findings of the Assessment are reported below. The issues examined were limited to those identified in the Eligibility Memorandum, namely **(i) Access to information; (ii) Salt-water intrusion in the Canal Lakes** and adequacy of the monitoring plan/mitigation measures in place; and **(iii) Seismic risks** and the adequacy of mitigation plans in place (*supra* paragraph 25).

**4.1 Access to Information**

33. For purposes of examining the issues raised in the Request regarding access to information, the Assessment focused on the period when the Bank started its due diligence (i.e. since October 2007).<sup>30,31</sup> Access to information is analyzed from the standpoint of both the

<sup>28</sup> As of the closing date of this Report that part of the site was still under construction. No progress has been made since the Case Officer first checked it on 17 April 2012.

<sup>29</sup> The PCA regards with suspicion the motivation of Mrs. Shelton in bringing this complaint forward given that her brother holds a patent to a two-lane lock design, the use of which is advocated in the Request. (Mrs. Shelton reported she believed this to be an excuse or “red herring” employed by the Executing Agency in an attempt to delegitimize the complaint. According to her, in several occasions before and after the Referendum, her brother had wanted to discuss with the PCA the merits of the two-lane design and had put it at the country’s disposal for the betterment of the Project and as a service to the country. She also explained that, in spite of him holding a patent, the PCA still holds all rights to her brother’s and other designs, and it could make use of them without having to pay, if it so wished. It would be necessary to research the patent held by the Requester’s brother in order to verify the validity of the argument and counterargument. However, doing so falls outside the scope of this Report and the Ombuds’ mandate.

<sup>30</sup> The Ombudsperson has taken due note of the fact that the Expansion Program was approved in a National Referendum and by the country’s National Assembly, and that the Bank deemed these actions as sufficient in meeting the various requirements of OP-703.

<sup>31</sup> The Project formally entered the Bank’s pipeline on 31 October 2007.

Disclosure of Information Policy (OP-102), which applies to information produced and received by the Bank and governs its disclosure to the public, and the Environment and Safeguards Compliance Policy (OP-703), which set forth the public consultation and disclosure of information requirements to which EIAs are subject.

#### 4.1.1 Analysis in the Context of the Disclosure of Information Policy

34. At the time of Board approval of the Project, the Disclosure of Information Policy of 2006 was in place. This version of the Policy applied to IDB sovereign and non-sovereign operations approved by the Board from 1<sup>st</sup> January 2004 until 31 December 2010.<sup>32</sup> Being a non-sovereign guaranteed loan, the Corporate Loan for the Expansion Program is subject to disclosure of selected documents.<sup>33</sup> Table 4 shows the disclosed documents and their dates of disclosure.

35. Except for the Abstract of the Approved Project, the Bank seemed to have disclosed the documents mandated by the Disclosure of Information Policy for this type of non-sovereign guaranteed operation.

36. It is worth noting that during the Eligibility Analysis of the Request and this Assessment of the case, the Ombudsperson's team accessed the PCA website (<http://www.pancanal.com>) on several occasions and confirmed the existence of some 140 documents, reports and publications available in the section of the site dedicated to the Expansion Program alone. An inventory of this section of the site revealed that background and feasibility studies leading to the production of the EIA are available in Spanish (and most in English as well); however, more recent studies, dating from 2008 and onwards, may not. In particular, it has not been possible to determine whether the 2008/2009 three-volume Delft Hydraulics report on Water Quality Monitoring, commissioned by the PCA in the context of a modeling exercise carried out to forecast salt intrusion in the Canal lakes, was available to the public prior to April 2012. Likewise, the Assessment has not been able to confirm whether the design basis of the Project that accompanied the Request for Proposal (RFP) issued for the design-and-build contract of the third set of locks was publicly available prior to April 2012.<sup>34</sup> In addition, a seismic study, namely the Earth Consultants International (ECI) report dated January and April 2008, is not available and has not been disclosed by the PCA to the public.<sup>35</sup>

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<sup>32</sup> As per the ICIM Policy, Section A (26), this is the Relevant OP that applies to this Project.

<sup>33</sup> IDB/EXR, *Disclosure of Information Policy: Implementation Instructions*. Part III (2) (B). December 2009. Available online at <http://www.iadb.org>

<sup>34</sup> While there is a possibility that the English version of these documents may have been on the website prior to April 2011, the Spanish version of those documents was still in the process of being translated and uploaded as of the closing date of this Report. Notwithstanding this fact, it must be acknowledged that the PCA produced the report "Proposal for the Expansion of the Panama Canal. Third Set of Locks Project", dated 24 April 2006 that is available on the website and summarizes in a clear way the main aspects and rationale for the chosen design. Available online at: [http:// acp-expansion-proposal.pdf](http://acp-expansion-proposal.pdf)

<sup>35</sup> This report is referred to by the Requesters who are asking for its disclosure.

**Table 4. Disclosure of Expansion Program Project Documents by IDB**

<b>Document to be disclosed as per OP-102 (2006)</b>	<b>Document Description</b>	<b>Timeframe when disclosure is required</b>	<b>Date of Disclosure</b>
Initial Project Abstract	A basic summary of the proposed operation being considered by the Bank for financing. It includes recommendations made by the Bank's Loan Committee and it is accompanied by the ESS	No later than ten (10) working days after a Mandate Letter is signed <sup>36</sup>	20 March 2008
Environment and Social Strategy (ESS)	Preliminary assessment of the potential key direct, indirect, regional and cumulative environmental and related social and cultural impacts and/or risks of the proposed operation and its associated facilities. Includes actions proposed by the Project Team to confirm the preliminary risks/impacts identified as well as the mitigation/monitoring measures	Along with Initial Project Abstract. No later than ten (10) working days after a Mandate Letter is signed (see footnote 35)	20 March 2008
Environmental Impact Assessment (EIA) <sup>37</sup>	Study undertaken by the borrower to identify potential significant environmental and social impacts, and the selected measures to manage such impacts, and the selected measures that will avoid, mitigate or compensate for significant negative impacts enhance positive ones. The Environmental and Social Management Plan (ESMP) is an integral part of the EIA and includes all mitigation and compensation measures recommended	Prior to the Bank's due diligence mission (date of due diligence mission: July and August 2008)	26 November 2007 <sup>38</sup> (*)
Abstract of Approved Project <sup>39</sup>	Updated summary of the Initial Project Abstract	No later than ten (10) working days after Board approval	Not available
Environment and Social Management Report (ESMR)	A summary of the results of the Bank's review of the EA process and products prepared by the borrower; particularly the conclusions and recommendations of the ESMP. It should confirm that the applicable Bank Policies will be complied with		23 September 2008

Source: Bank documents above, borrower's EIA and (\*) Bank's Public Information Center (PIC).

<sup>36</sup> In this case, a Mandate Letter was not executed because PCA's procurement regulations did not allow it. Instead, a Confidentiality Agreement was executed prior to the Bank's due diligence and a Commitment letter signed after the Board approved the Project. The Project Team has indicated that this is a common SCF practice in cases involving subnational organizations such as PCA.

<sup>37</sup> If the project has Strategic Environmental Assessments (SEAs), Environmental Assessments (EA), and Resettlement Plans, these ought to be disclosed.

<sup>38</sup> The PIC has informed the Ombudsperson and her team that it does not have either a hard or a digital copy of the document on file. In the Bank's website, a link pointing to the EIA on the PCA's website was provided, but it was not working because the document was moved to a different place in the PCA's website since it was first made available. The Consultation Phase team has corroborated that the EIA is on the PCA's website. On 16 May 2012 the Case Officer notified the PIC that the link was broken and needed to be redirected to the new site address. The PIC in turn notified the Project Team and the External Relations Department.

<sup>39</sup> According to the Disclosure of Information Policy's Implementation Instructions, disclosure of this document requires approval from the borrower. ICIM was unable to locate this document.

37. Furthermore, it is important to highlight that altogether this information referred to in this report is available and downloadable, and the PCA publishes quarterly progress reports, audited financial statements, reports to the Nation, and monthly newsletters, in a timely manner, there are serious accessibility issues arising from both the sheer size of some of the documents posted on the site and their location and classification.

38. During the Assessment stage the Ombudsperson learned that there also exists a password-protected section of the PCA website where additional information and fiduciary documents are available for the Lenders to access. An inventory of this site revealed that there are indeed many documents still undisclosed, in particular those related to seismic assessments.<sup>40</sup> The PCA explained that these (seismic-related) documents are in the password-protected site because this section of the site is currently under development, but it has not said if or when they will be made public.

#### **4.1.2 Analysis in the Context of the Environment and Safeguards Compliance Policy**

39. At the time of the Project's approval by the Board, the Environment and Safeguards Compliance Policy (OP-703) was in effect (since July 2006). As per OP-703, projects such as the Expansion Program classified as type "A" must be subject to an Environmental Assessment (EA) which, in the case of investment operations such as this one, would be an Environmental Impact Assessment. The EIA has to be prepared, along with its Environmental and Social Management Plan (ESMP), and disclosed to the public prior to the Bank's analysis (i.e. due diligence) mission. In the context of the EIA, OP-703 requires consultations with affected parties<sup>41</sup> and consideration of their views "at least twice during project preparation, during the scoping phase of the environmental assessment or due diligence processes, and during the review of the assessment reports."

40. As part of its due diligence, the Bank examined the issue of public consultations and disclosure and deemed the actions taken by the Executing Agency to be in compliance with the Environment and Safeguards Compliance Policy, including the EIA requirements of Directive B.5 and the consultation requirements of Directive B.6.<sup>42</sup> The Project's Environment and Social Management Plan (ESMP) included a plan to set up a grievance mechanism for people to communicate their concerns to the Executing Agency<sup>43</sup>. According to the Environmental and Social Monitoring Report produced by the external independent consultant that has been engaged to report semi-annually on compliance with environmental and social aspects, the mechanism is functioning well.<sup>44</sup>

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<sup>40</sup> Of an estimated 150 documents, about half are publicly available. The password to the site was provided to the Ombudsperson by the Project Team on 28 March 2012.

<sup>41</sup> The OP defines affected parties as "individuals, groups of individuals or communities who may be directly impacted by a Bank-financed operation. Such impacts may be positive or negative."

<sup>42</sup> IDB, *Environmental and Social Management Report*. September 2008. Paragraph 3.12, p. 11.

<sup>43</sup> There is a toll-free hotline and e-mail address people can use to voice concerns or grievances related to the Project. The PCA keeps a log of incoming and outgoing information.

<sup>44</sup> The call numbers are announced to the public by means of flyers that are regularly distributed to the community and posted in public places in the relevant communities.



41. Policy Directive B.6 of OP-703 on Consultations states that:

“in the case of operations for which the EA studies have been completed before the operation formally enters the Bank pipeline, including projects under construction, the project team will review, during its due diligence, whether or not the consultations have been carried out to the satisfaction of the Bank. In the course of its due diligence, the Bank might need to require that the borrower consult affected and interested parties to identify the most vulnerable subgroups and ensure their interests are adequately represented in this process.”

Furthermore,

“Borrowers (...) may consider additional interaction with affected and interested parties, as such dialogue helps improve the design, promote a better understanding of the operation and improve its chance of success and sustainability.” After Bank approval, “the borrower should continue an applicable degree of information disclosure and consultation, on the basis of the agreed Environment and Social Management Plan.”

42. Although it falls outside the scope of this Assessment, it would be important to review, as part of a separate exercise, the effectiveness and accessibility of the existing grievance mechanism. While progress reports abound on the Executing Agency’s website, it is always important to keep in mind that people living outside Panama City, in more remote areas, may have none or very limited access to the Internet or telephones to contact the grievance hotline or access such reports.

#### **4.2 Salt-water Intrusion in the Canal Lakes**

43. According to the Requesters, the use of water-savings basins in the design of the new locks will bring about an accelerated increase in salinity that will affect the quality of the water of Lake Gatun and water availability in the near future, making it necessary to resort to the creation of additional reservoirs (see annex C for an analysis of water demand projections of the Project). The PCA’s Master Plan of the Project, which was released to the public as part of the Referendum process, corroborates the fact that the use of the basins indeed has the effect of increasing salt-water intrusion over the long run; however, the increase is deemed minimal and unlikely to affect the quality of the water, much less to devoid the Canal lakes of their freshwater nature. Box 1 cites an excerpt from the Proposal for the Expansion of the Canal, also a public document, to illustrate this point in detail.

44. The issue of salt-water intrusion is a very important environmental issue with the potential to generate social impacts. The freshwater quality at the location of the drinking water intakes of Panama City and Colon must be preserved at levels suitable for human consumption. In addition, the ecological functions of the fresh water ecosystem must also be maintained. The Ombudsperson notes that the concerns raised with regard to this issue pertain to the Bank’s Environment and Social Safeguards Policy (OP-703). As such, in accordance with the Policy, the ESMP should include a Monitoring Plan and the borrower must implement it.

45. The ESMP does include a Monitoring Plan for water quality, though said plan seems to be insufficient given the concerns of the salt-water intrusion issue. A review of available water quality monitoring studies commissioned by the PCA reveals that feasibility studies carried out by Delft Hydraulics in 2003-2005, based on volume-average simulations, were considered sufficient for analyzing salt transport through the locks, but not to predict the fate of salt in the Gatun and Miraflores lakes. The inaccuracies and limitations of this model were extensively discussed in URS Holdings’ report on “Tropical Lake Assessment with Emphasis on Changes of Salinity of Lakes,”

prepared in 2005. Said report also proposes a flora, fauna, and water quality monitoring in the Gatun and Miraflores lakes including tributaries and more detailed grids in the lakes. **However, it seems that the monitoring program was not specifically designed to monitor the long-term changes due to salt-water intrusion in the lakes.** Subsequently, this monitoring program was re-taken by the EIA and further “simplified” in the ESMP, Chapter 8, table 8.6.

**Box 1. Rationale and implications of the use of water-savings basins in the new locks**

The amount of basins built for each lock chamber determines the amount of water used for each lockage. Therefore, with more basins per chamber the amount of saved water will be greater. However, the water reutilization rate decreases as extra basins are added. For example, one basin will reduce utilization by 33%; two basins by 50%; three by 60%; four by 66%; five by 71%; and six by 75%. All basins have the same construction cost, but each additional basin yields significantly less savings than the previous one; as a result, the more basins per chamber the greater the required investment. Furthermore, lockages would become slower as the number of basins increases, because filling and emptying lock chambers would take more time, and thus diminishing their capacity.

Even when operating at maximum capacity, the third set of locks, equipped with water reutilization basins, will not affect the water quality of Gatun and Alhajuela lakes or that of their tributaries. These lakes will keep their tropical fresh water quality with stable ecosystems, and the water will be kept to well within appropriate quality levels and standards in order that they can be made potable and used by the population. The ACP will continue its measurement, testing and follow-up program to preserve the nature and quality of the fresh water of Gatun and Alhajuela lakes. All the correct actions to maintain water quality during project construction operations will be taken as part of the environmental management plan resulting from the project’s environmental impact study.

The proposed three basins per chamber is the best option because they offer the highest water yield in relation to construction costs, and have a low impact on lockage times and locks capacity. Studies performed by Delft Hydraulic determined that the use of three water reutilization basins per chamber will not affect Gatun Lake’s water quality (...) The new locks, with three water reutilization basins, will utilize 7% less water per transit than the existing locks.”\*

\* The existing locks use 55 million gallons of water per transit and the new locks, even though larger, would use approximately 51 million gallons because 60% is reutilized by using lateral basins.

Source: PCA, *Proposal for the Expansion of the Canal*. 24 April 2006: pp. 48 and 51. Available online at <http://www.pancanal.com/eng/plan/index.html>

46. The Ombudsperson’s team confirmed that the issues of salt-water intrusion and water availability were already flagged as potential risks early on by the Project Team in the Project Concept Document. The Environment and Social Strategy (ESS), produced by the Bank mentioned these risks again. In the ESMR, the salt-water intrusion risk was reviewed and it was noted that though the use of the basins was expected to increase salt concentration somewhat during downlockages, near the locks; according to modeling exercises carried out at the time, salt concentration in Lake Gatun “should remain unnoticeable.” The ESMR also noted that in order to determine the long-term concentration of salt in the lake (from years to decades), an upgraded model would be needed. In response to this, the PCA re-engaged Delft Hydraulics’ services to upgrade and recalibrate the model.<sup>45</sup>

<sup>45</sup> The results of this exercise are reported in the three-volume report mentioned earlier (*supra* 36) and are currently available online at <http://www.pancanal.com/esp/ampliacion/rpts/environment/esia/complementarios/index.html>



47. New modeling efforts carried out by Delft Hydraulics in 2008 provide more accurate and conclusive predictions of salt-water intrusion in the Gatun and Miraflores lakes for the expanded Panama Canal. **The three-volume report is perhaps the most comprehensive scientific analysis of this issue to date.** Based on extensive water quality and salinity monitoring efforts, the SWINLOCKS model was recalibrated and its coefficients adjusted. The re-calibrated model was used to predict the current conditions (the Panamax operation) with excellent results. **The successful calibration of the models to the current conditions seems to provide a strong confidence to the use of these models for the prediction of salt-water intrusion under the Expansion Program.** A review of the above-mentioned Delft Hydraulics reports did not reveal that the predictions made were limited to a specific timeframe, as claimed by the Requesters.

48. Several scenarios were identified to simulate the future situation. From the results of the numerical simulations for baseline (with the new locks running at full design capacity, and hydrological conditions as in the period 2003 – 2005) the models predict that salt-water concentration of the Gatun Lake will increase in the future; however, the *volume-averaged salt concentration* of the lake will remain ample beneath the freshwater limits. Local salinity values in the vicinity of the locks, in particular near the bottom, may rise above the freshwater limit.

49. The effects of several measures aimed to control the intrusion of salt water were also studied in the new modeling efforts. For instance, the no application of water-saving basins does bring about lower salt concentrations. Though this measure is at the cost of a higher water consumption of the Post Panamax locks, the simulations indicated that the salt loads of the locks can be reduced considerably. Available relevant reports recommend studying this and other salt control measures in further detail.

50. Such reports also recommend long-term monitoring of salt-water intrusion and dispersion. The proposed Monitoring Program includes continuous salt concentration and water temperature measurements at a limited number of strategically chosen locations, in addition to vertical profiles of salinity and temperature, and measurements of flow velocity. This monitoring is supposed to provide the basis for a continuous improvement of the model as a tool for adaptive management and decision-making regarding salt-water intrusion and the assessment for the need of additional mitigation measures. **However, there is no indication in the available reports that new additional measures are being considered for the Project.** In this context, **the ESMP seems to be outdated and does not include this long-term monitoring program.**

51. The model predicts long-term salt levels in the lakes based on a wide range of hydrological and operating conditions for the locks and the lakes. **The need for an Adaptive Management Approach is implicit in both URS Holdings and the Delft Hydraulics reports.** Both reports acknowledge the inherent inaccuracies and limitations of mathematical modeling and the need for intensive monitoring of the salt intrusion once the locks come into operation, as well as the need for a continuous consideration of additional mitigation measures, if warranted. This approach is explicitly mentioned in the URS Holdings' report and also referred to in the Delft reports. The former recommends adopting the following standards for Gatun Lake:

Chlorides:	230 milligrams/liter (mg/l)
Conductivity:	760 Microsiemens per centimeter (uS/cm)
Total Dissolved Solids (TDS):	500 milligrams per liter (mg/l)

52. However, it also recommends adopting an **Action Level of 50 percent** of the proposed standards (that is, 115 mg/l for Chloride, 380 uS/cm for conductivity and 250 mg/l for TDS). This means that when the monitoring of Gatun Lake indicates that the Action Level has been reached, this will trigger a review of the entire set of mitigation measures and the adoption of new or improved measures. **The Adaptive Management and Action Level Approach seem to be one of the most important tools for addressing salt-water levels in the Gatun Lake.** However, this requirement is not referred to in the ESMP and not included in the ESMR.

53. The Environmental and Social Monitoring Reports produced by the external consultant engaged by the ACP at the request of the Lenders were also reviewed. It is clear from them that monitoring is taking place at 68 monitoring stations, and that water quality data, including electrical conductivity and measurement of chlorides, both of which are used as proxies for measuring salinity, is being collected on a periodical basis. Going forward, it would be extremely important for the Bank to follow up on the implementation of the Adaptive Management and Action Level Approach.

### 4.3 Seismic Risks and the Adequacy of Mitigation Plans

54. Seismic events are natural hazards and, as such, if a Project is known to take place in the vicinity of sites that are vulnerable to such hazards, the risk should be duly weighed during project design. If present, it should be properly mitigated. Seismic risk falls under the type of issue covered by the Bank's Disaster Risk Management Policy (OP-704), effective since June 2007. It is well-known that some seismic faults are found in Panama's territory in as much as the country is an important connecting point between the Central and South American continental plates.

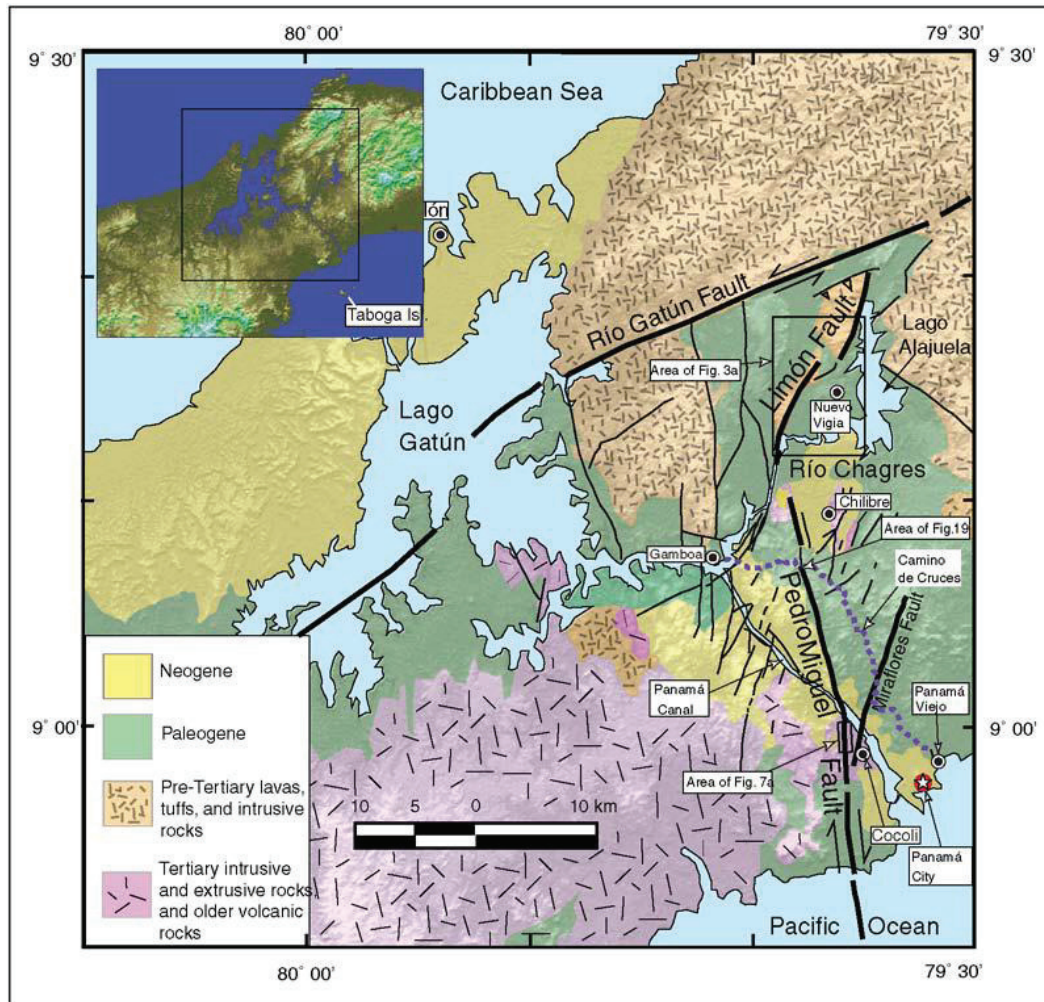
55. According to OP-704,

"[d]uring the project preparation process project teams will identify if the projects have high exposure to natural hazards or show high potential to exacerbate risk. The findings will be reported to the Bank through the social and environmental project screening and classification process. Project teams should consider the risk of exposure to natural hazards by taking into account the projected distribution in frequency, duration and intensity of hazard events in the geographic area affecting the project. Project teams will carry out a natural hazard risk assessment for projects that are found to be highly exposed to natural hazards or to have a high potential to exacerbate risk. Special care should be taken to assess risk for projects that are located in areas that are highly prone to disasters as well as sectors such as housing, energy, water and sanitation, infrastructure, industrial and agricultural development, and critical health and education installations, as applicable. In the analysis of risk and project viability, consideration should be given to both structural and non-structural mitigation measures.

When significant risks due to natural hazard are identified at any time throughout the project preparation process, appropriate measures should be taken to establish the viability of the project, including the protection of populations and investments affected by Bank financed activities. Alternative prevention and mitigation measures that decrease vulnerability must be analyzed and included in project design and implementation as applicable. These measures should include safety and contingency planning to protect human health and economic assets. Expert opinion and adherence to international standards should be sought, where reasonably necessary. In the case of physical assets, the Bank will require that, at the time of project preparation, the borrower establish protocols to carry out periodic safety evaluations (during construction as well as during the operating life of the project) and appropriate maintenance of the project equipment and works, in accordance with generally accepted industry norms under the circumstances."

56. The Project's EIA includes an extensive description of the geology, tectonics and faults in the Canal area and acknowledges the presence of several faults in the Project area, namely: Gatun, Caballo, Limon, and Azota on the Atlantic side, and Pedro Miguel and Miraflores on the

Pacific side<sup>46</sup> (see figure 5 for location of some of these faults). With the exception of the Gatun fault, which the EIA specifically states is an active fault of low micro seismicity, the document does not evaluate in detail whether the other faults are active. The EIA specifically states that Central Panama is characterized by low seismicity (based on the intensity VII, on the modified Mercalli scale, earthquake of May 1621, which is said to have had its origin there).<sup>47,48</sup> The EIA does not provide any of the seismic parameters used in Project design.



**Figure 5.** The map above shows the Limón, Pedro Miguel, the Rio Gatún and Miraflores faults. Note that there are many small, unnamed faults mapped in the vicinity of the Canal. Source: Rockwell, Thomas et al. *Neotectonics and Paleoseismology of the Limón and Pedro Miguel Faults in Panamá: Earthquake Hazard to the Panamá Canal*. Available online at [webcentral.uc.edu/eProf/media/attachment/eProfmediafile\\_1150.pdf](http://webcentral.uc.edu/eProf/media/attachment/eProfmediafile_1150.pdf)

57. With regard to the Bank's due diligence on this aspect of the Project, as mentioned earlier, during project preparation the screening process awarded the Project the environmental category "A" for high-risk projects. The ESMR mentions the potential occurrence of landslides as a risk

<sup>46</sup> See Chapter 4 of the EIA, sections 4.1.6 and 4.10.1.

<sup>47</sup> URS Holdings, Inc. *Environmental Impact Assessment*. July 2007, pp. 4-142.

<sup>48</sup> An earthquake of intensity VII on the modified Mercalli intensity scale is equivalent to one of 5.9 magnitude on the Richter scale. Magnitude is determined from measurements on seismographs. Intensity measures the strength of shaking produced by the earthquake at a certain location. Intensity is determined from effects on people, human structures, and the natural environment. Source: US Geological Survey, *Earthquake Hazards Program website* ([http://earthquake.usgs.gov/learn/topics/mag\\_vs\\_int.php](http://earthquake.usgs.gov/learn/topics/mag_vs_int.php))

factor of which the Executing Agency is aware and which has been monitored by a Geotechnical Advisory Board since 1993. The ESMR does not include a natural hazard risk assessment. It only reports that in 1968, “a control program was put in place to monitor slope movements.” Though the document recognizes the threat that landslides pose for the functioning of the Canal, a reading of the whole document does not convey the larger sense of gravity that this issue may pose. The document does not mention the term earthquake or seism, nor does it mention the existence of active faults. Specifically, it points out that “[a]mong other mitigation measures to reduce the occurrence of landslides are the detailed identification of geologic faults, re-routing water runoff to avoid saturation, reduction of the bank slopes, treatment of the banks and continuous on-time monitoring of ground motion.”<sup>49, 50</sup>

58. This Assessment has been able to corroborate that seismic design parameters for the new locks do exist and are available publicly in the RFP files on the PCA’s website (see annex D). However, locating them is a time-consuming and difficult exercise. In addition, from undisclosed reports available on the password-protected site of the PCA, it is possible to discern that the selection of seismic design criteria was the result of work carried out between 2006 and 2008, reviewed by the PCA’s Seismic Advisory Board (“SAB”), which is comprised of renowned international engineers and experts, and endorsed by the PCA’s Board of Directors. Studies commissioned by the PCA in 2006-2008 provide additional information pertaining the nature of the faults and their activity and risk of rupture. In particular, one of these studies, the Earth Consultants International Report (“ECI report”), dated January 2008,<sup>51</sup> concluded that both the Pedro Miguel and Miraflores faults posed a rupture hazard for the new locks. The following excerpts, from publicly available sources, serve to illustrate this point:

“The Pedro Miguel and Limón faults comprise potentially hazardous seismic sources to central Panamá, with a rate of right-lateral faulting estimated at 4–7 mm/yr. Both the Pedro Miguel and Limón faults have been historically active, with multimeter offsets of small channels, rills, and the historical Camino de Cruces. Although the fault passes through the Panamá Canal between the Pedro Miguel and Miraflores locks, missing all critical structures, its location and rate of activity is a factor in expansion of the Panamá Canal and its new lock system. The close proximity of Panamá City to this active fault zone and the lack of consideration of earthquake loads in structural design codes make this a particularly hazardous condition should the fault rupture before the current building stock is replaced with stronger, more earthquake-resistant construction.”<sup>52</sup>

“The Pedro Miguel fault (...) not only poses a shaking hazard to the Panama Canal, it also crosses through the proposed footprint of Borinquen Dam, a critical part of the expansion program. Borinquen Dam is composed of four discrete dam segments, totaling nearly 5 km in length. It will contain the new 6.7 km long approach channel to the new Pacific Lock, preserving the Gatun Lake water elevation at 10.6 meters above the current Miraflores Lake. Our studies of the fault involved over 55 geologically

<sup>49</sup> IDB. *Op. cit.*, p. 22, paragraph 5.18 -5.19.

<sup>50</sup> A natural hazard review financed in 2010 by the Bank’s Environment, Rural Development and Disaster Risk Management Division (INE/RND) in the context of the “Disaster Risk and Management Indicators Program for the Americas,” deems seismic risk in Panama to be “moderate”. In this report, Central Panama in particular (where the Canal is located), is said to have less propensity to suffer earthquakes than either Eastern or Western Panama. The study was carried out by the National University of Colombia’s Institute for Environmental Studies through technical assistance funds provided by operations ATN/JF-7907-RG and RGT1579/ATN/MD-11238-RG. Source: *Disaster Risk Indicators and Risk Management*, September 2010, pp. 34 - 35. Technical Note IDB-TN-169.

<sup>51</sup> The document contains six appendices (A through F). Appendices E and F were incorporated into the report in April 2008 and February 2009, respectively.

<sup>52</sup> Rockwell, Thomas et al. *Neotectonics and Paleoseismology of the Limón and Pedro Miguel Faults in Panamá: Earthquake Hazard to the Panamá Canal*. *Bulletin of the Seismological Society of America*, Vol. 100, No. 6, pp. —, December 2010. Available online at [webcentral.uc.edu/eProf/media/attachment/eprofmediafile\\_1150.pdf](http://webcentral.uc.edu/eProf/media/attachment/eprofmediafile_1150.pdf)



logged trenches, including three locations where we excavated the fault in 3-D to determine earthquake recurrence, displacement magnitudes and fault slip kinematics. The Pedro Miguel fault poses a significant hazard to the project. We were able to determine that it has had three surface-rupturing earthquakes in the last 1500 years, with the last event almost certainly occurring on May 2, 1621 AD. These three events all had 2-3 meters of right-slip displacement, with 8.1 meters. The challenge for the dams design will be to correctly understand the specific geology of the fault-crossing location to be able to predict the fault rupture kinematics, and then to use deformation modeling to understand how that rupture will transfer into the dams earthen structure.”<sup>53</sup>

59. The Bank’s ESMR does not seem to have fully assessed relevant aspects of OP-704, perhaps due to a combination of the short-lived effectiveness of the Policy at the time of due diligence as well as of the fact that the ECI study was being carried out concurrently with the Project’s due diligence.

60. In light of the information discussed above, including the availability of the ECI Report and any additional reports that may exist, **it would be important for the Bank to independently confirm that the seismic design criteria employed for the locks and Borinquen Dam are appropriate.** In particular, given the lack of a natural hazard risk assessment for this Project, it would be highly recommended that one be produced, preferably before making a disbursement.<sup>54</sup>

## 5. Conclusions and Recommendations

61. The Requesters have confirmed their willingness to participate in a dialogue sponsored by the Mechanism. The Executing Agency, on the other hand, **has declined to participate in such a dialogue.** As a consequence, **it is not possible to proceed with a Consultation Phase Exercise** and, thus, the Consultation Phase is hereby terminated.

62. As per Articles 44 and 54 of the ICIM Policy, the Ombudsperson will transfer the Request and pertinent information to the Executive Secretary, who will in turn contact the Requesters to determine if they wish to proceed with a Compliance Review. If so, the Executive Secretary will forward the Request to the Panel.

63. Due to the nature and scope of the issues examined in the Assessment stage (*supra* paragraph 25), as well as the stage in which this operation is, this case did not appear to be suitable for a typical dialogue process. A Consultation Phase Exercise would have probably focused on the disclosure of information and on enhancing the understanding of the Requesters regarding the Project’s responses to the issues raised. Considering that the Executing Agency declined to participate in any kind of dialogue, and the fact that the issues of concern remain, as observed in the Assessment Report, the Ombudsperson has specific recommendations regarding the three main issues dealt with in this Report.

64. **Access to Information.** Although the relevant Project documents have been made available in accordance with the OP-102, there is a case to be made here for the disclosure of key studies and the biannual Environmental and Social Monitoring Reports commissioned by the

<sup>53</sup> Gath, Eldon, Tom Rockwell, Tania Gonzalez, Chris Madden, Danielle Verdugo, Earth Consultants International. *Quantitative Determination of the Pedro Miguel faults slip displacement and slip kinematics for design of the Panama Canal Expansion Projects Borinquen Dam*. 1642 E. Fourth Street, Santa Ana, CA 92701 (TS#16). Date unknown. Available online at [www.earthconsultants.com/news/aeg-abstract.pdf](http://www.earthconsultants.com/news/aeg-abstract.pdf)

<sup>54</sup> For this purpose, The Consultation Phase team found useful information in the July 2011 *Vulnerability Diagnostic to Natural Hazards Threat* report, prepared as background paper for loan PN-L1074, “Program to Reduce Vulnerability to Natural Disasters and Climate Change II,” currently under preparation, as a starting point.

Lenders, in as much as they are based on direct observations and assessments by a third party of the Project's progress and compliance with national laws and the Equator Principles. Disclosing these reports could contribute to a better understanding (therefore, contribute to correct some of the existing levels of misinformation and disinformation) of how the Project is complying with said principles by the Requesters and interested parties at large.<sup>55</sup>

65. In reference to information disclosure and consultation activities called for by OP-703, the Assessment concludes that a separate review of the effectiveness with which ongoing disclosure activities and the PCA's existing grievance mechanism are functioning would be helpful. Though the Environmental and Social Monitoring Reports indicate that such activities are ongoing and that systematization of the information and actions taken to solve complaints are in place, there may be room for taking further actions to: i) improve accessibility of the information available - mainly those documents related to environmental and social studies; and ii) better publicize the existence and scope of the grievance mechanism in distant areas and to population with no access to internet.

66. **Salt-water Intrusion in the Canal Lakes.** Considering that water quality monitoring is taking place and data is being collected on a periodical basis, it seems extremely relevant for the Bank to follow up on the implementation of the Adaptive Management and Action Level Approach.

67. **Seismic Risks.** Article 48 of the ICIM Policy set forth that "[i]n cases where the Project Ombudsperson believes that serious, irreparable harm may result if processing or execution of a Bank-Financed Operation continue, the Project Ombudsperson may recommend to the President, the Board or Donors Committee, as appropriate, that processing or execution be halted." These two conditions coexist in the present situation. As mentioned, as per the Project documentation it is not possible to ascertain that all mitigation measures have been adopted with the aim of avoiding the consequences of a heightened seismic event. The potential loss of life and other injuries – a serious and irreparable harm to persons – and partial or full loss of the infrastructure being financed cannot be precluded in the case of a seismic event along the active faults atop which the new locks and the Borinquen Dam are being built (with its potential for causing an earthquake-induced tsunami).

68. In order to make sure that such risks and their potential harm are fully taken into account, it is recommended that Management conduct a comprehensive **natural hazard risk assessment**, considering and/or reviewing the latest findings reported by the ECI and other undisclosed studies. Should there exist any additional study or reports dealing with seismic risk, these, too, should be independently analyzed by the Bank and scrutinized by an independent third party with the technical capability and proven experience to do so. Although the Ombudsperson has had access to the ECI study and other studies and presentations – all of which highlight the PCA's actions and thinking with regard to the heightened seismic risk –, it is not possible to ascertain the extent to which design plans underway for the construction of the Pacific locks and Borinquen Dam would have taken into account the most adequate structural mitigation measures. **Until said**

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<sup>55</sup> At closing of this report, on 9 June 2012, the Ombudsperson requested PCA to disclose or authorize the disclosure of recent (2011 and 2012) salt-water intrusion reports with data collected during recent monitoring exercises as well as the ECI seismic report and the two last Environmental and Social Monitoring reports produced by the independent consultant. ICIM has not received a response.

**hazard risk assessment is carried out, the Ombudsperson recommends to Management that no disbursement shall be made for this operation.**

69. Finally, the findings of the seismographic research carried out to date appear to have implications beyond the Expansion Program itself: the heightened risk posed by the faults now known to be active could change the long-held belief that Central Panama is low- to moderately-vulnerable to seismic threat. This finding is deemed to have regional and global significance. The Bank is currently engaged in the last stages of the preparation of the second of three programmatic public-based loans to the Republic of Panama to Reduce Vulnerability to Natural Disasters and Climate Change II (PN-L1074).<sup>56</sup> Under component 2, “Government and Financial Management to Improve and Consolidate Institutional Capacity for Comprehensive Management of Natural Disasters and Climate Change Adaptation,” the proposed Project aims to formalize the creation of a “National Platform of Disaster Risk Reduction” which envisions the inclusion of the PCA among its member agencies. In this context, there might be an opportunity to utilize the proposed **natural hazard risk assessment** (*supra* paragraph 68) to update the country’s vulnerability indicators.

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<sup>56</sup> The general objective of the program is to help reduce Panama’s vulnerability to the risks of natural phenomena and climate change. Specifically, the program will support the country in developing a framework for policy, integrated disaster risk management, and climate change adaptation that will improve its Risk Management Index (RMI).

## Annex A. Location of New Pacific and Atlantic Locks

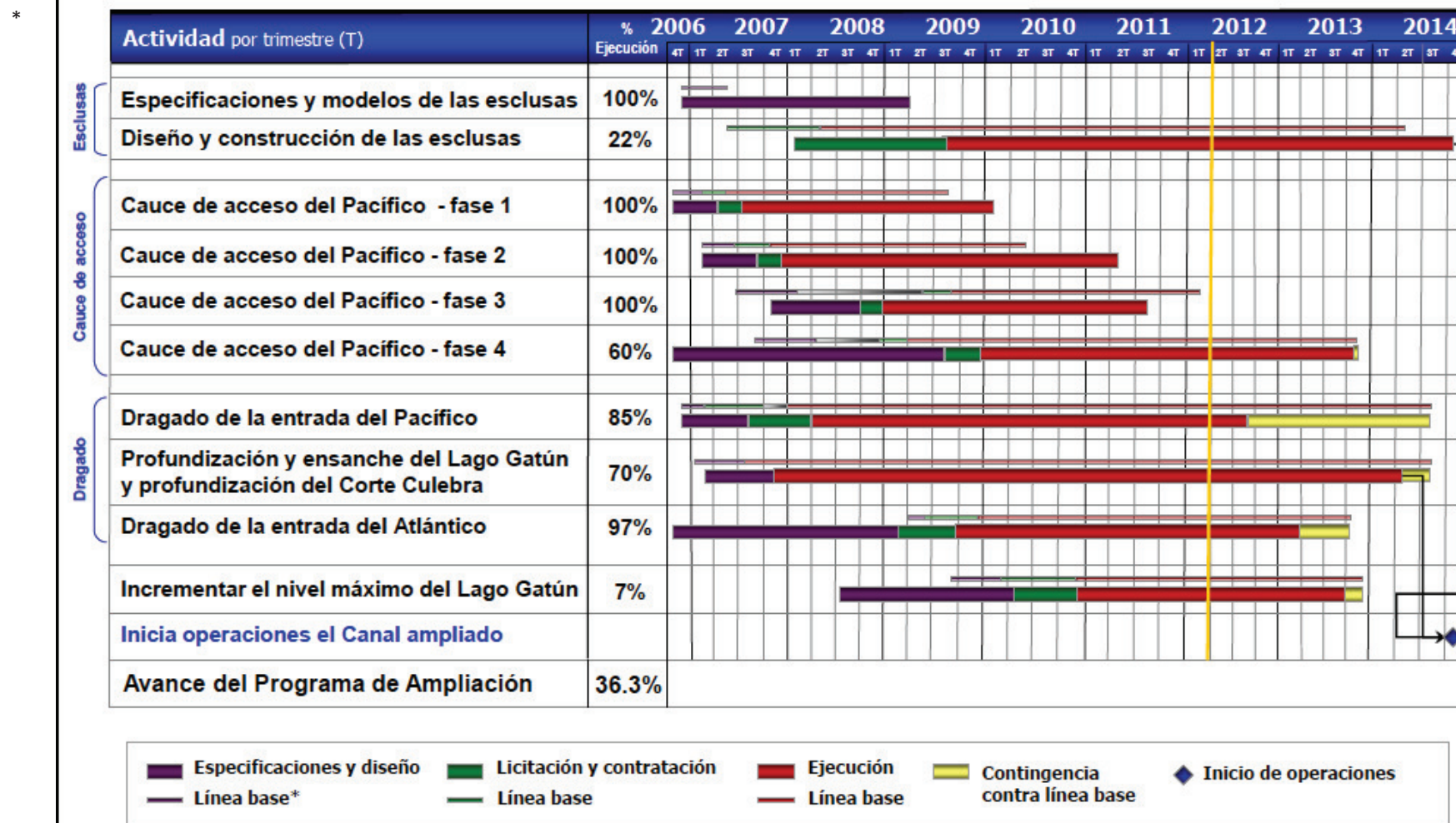


Source: URS Holdings, *Environmental Impact Assessment*. July 2007. (translation of this figure is not available in English)



## Annex B. Executive Chronogram of (Expansion) Main Projects with Baseline and Contingency

At 31 March 2012



Baseline of 31 December 2006 including contingency

Source: PCA. Quarterly Report XXII. *Progress of the Contracts pertaining to the Expansion Program*. 31 March 2012, p. 31. Available online at <http://www.pancanal.com/esp/ampliacion/rpts/informes-trimestrales/index.html> (translation not available in English)

### Annex C. Review of Water Demand Projections for the Expansion of the Panama Canal Expansion Program

In the Request and during the Assessment, the Requesters alleged that the design chosen by the PCA for the new Panama Canal locks do not make efficient use of water compared to an alternative design with a reduced number of water-saving basins. Given the relationship that exists between the utilization of water-saving basins and the increase in salt-water intrusion that is expected to stem from the use of such basins, this Assessment took a closer look at the forecast of water demand that the PCA envisioned for the operation of the expanded Canal. With regard to the increase in the demand for freshwater stemming from both population increase in the areas currently supplied by Lake Gatun and the expanded Canal, the following data is available from PCA:

**Table C-1 Projections of Total Water Requirements for the Expanded Canal  
(not considering any water projects)**

Year	(Needed by) Population		(Needed for) Canal Operation		Total	
2005	371	4.9	2,398	31.6	2,769	36.4
2010	403	5.3	2,584	34.0	2,986	39.3
2015	434	5.7	3,003	39.5	3,438	45.2
2020	466	6.1	3,386	44.6	3,852	50.7
2025	498	6.6	3,736	49.2	4,234	55.7

In millions of cubic meters of water per year

In number of equivalent lockages per day

Source: PCA, *Panama Canal Master Plan*, Figure 7-27. June 2006.

The data above shows that, by 2025, an additional 19.3 lockages/day compared to the baseline for 2005, equivalent to 1,465 millions of cubic meters of water, will be needed. Of this, 1.7 lockages/day will be needed to meet the demand of the expanded population and 17.6 lockages/day will be needed for the operation of the expanded Canal itself.

As noted in the table, the projections above are based on an expansion, not considering the implementation of water-saving projects. In other words, this is the total projection of water required by 2025, assuming that no water-saving techniques or projects are implemented. According to the PCA's Master Plan, there were as many as 29 such water-savings projects alternatives considered by the Expansion Program. Out of the 29, nineteen were actively looked into. Table C-2 below, shows the alternatives that were ultimately considered. From looking at the information in table C-2, one can conclude that, by choosing to include the water-saving projects in table C-3 as part of the Expansion Program, the PCA will have generated an adequate volume of water needed to run the expanded Canal until 2025.

Table C-2 Matrix of Analysis of Water Alternatives carried out by PCA

Matriz de Análisis de Alternativas de Agua									
Criterio de Decisión	Tinas de Reutilización de Agua			Reciclaje de Agua*	Subir el Lago Gatún a 89'	Profundizar Cauces a 30' PLD	Opción de Trinidad*	Opción de Alto Chagres*	Opción de Río Indio*
	1 Tina*	2 Tinas*	3 Tinas						
Aspectos Técnicos y de Costo									
Rendimiento Hídrico (con 99% de confiabilidad volumétrica)	3 - 5 esclusajes	5 - 9 esclusajes	6 - 11 esclusajes	10 - 12 esclusajes	3-5 esclusajes	7-10 esclusajes	7 esclusajes	5 esclusajes	16 esclusajes
Costo de Inversión (en millones de balboas)	B/. 250 Millones	B/. 315 Millones	B/. 480 Millones	B/. 210 Millones	B/. 30 Millones	B/. 150 Millones	B/. 700 Millones	B/. 330 Millones	B/. 290 Millones
Aspectos Sociales y Ambientales:									
Impacto en Calidad de Agua (Posibilidad de intromisión de agua salada)	Poca Intromisión	Poca Intromisión	Poca Intromisión	Mucha Intromisión	Ninguna Intromisión	Ninguna Intromisión	Ninguna Intromisión	Ninguna Intromisión	Ninguna Intromisión
Personas Afectadas (número de personas)	Ninguna	Ninguna	Ninguna	Ninguna	N / S	Ninguna	1,640 personas	263 personas	1,750 personas
Superficie Afectada Directamente (hectareas)	N / S	N / S	N / S	N / S	400 hectáreas	Ninguna	2,100 hectáreas	1,300 hectáreas	4,600 hectáreas
Impacto en la Biodiversidad (alto - regular - bajo)	Ningún impacto	Ningún impacto	Ningún impacto	Poco impacto en la biodiversidad	Ningún impacto	Ningún impacto	Pérdida de áreas boscosas	Pérdida de bosques primarios	Pérdida de áreas boscosas
Impacto Socio-Económico (alto - regular - bajo)	Ningún impacto	Ningún impacto	Ningún impacto	Ningún impacto	Adecuación de estructuras	Ningún impacto	Impacto en áreas rurales y semi-rurales	Impacto en áreas de reservas indígenas	Impacto en áreas rurales

N/S: No significant impact \* Options discarded in the Final Analysis

Source: PCA, Panama Canal Master Plan, Figure 7-31. June 2006 (Figure is not available in English)

Table C-3 Water-saving Projects included in the Expansion

Program to meet water requirements	
Project	Water Savings achieved/ additional water produced
Water-savings basins (3) <sup>57</sup>	6 – 11 lockages/day
Raise the operating level of Lake Gatun by 45 cm (from 26.7 to 27.13 m.a.s.l.)	3 – 5 lockages/day
Dredging and widening of navigation channels in Gaillard Cut and Lake Gatun	7 – 10 lockages/day
<b>TOTAL</b>	<b>16 – 26 lockages/day</b>

Source: PCA, Op. Cit.

<sup>57</sup> With the information available it is not possible to ascertain whether this estimate would need to be adjusted for the use of all 18 water-savings basins. If that is the case, the number of lockages/day of water saved would grow sixfold and the total water saved would be in the order of 46 to 81 lockages/day.

In the final analysis carried out by the PCA, the three projects above accounted altogether for an additional 29 lockages/day worth of water. While the Master Plan does not explain how this estimate rose from the original one (i.e. 16 to 26 lockages/day), assuming the water projections are correct, 29 lockages/day would more than cover the additional 19.3 lockages/day originally projected for the operation of the expanded Canal. Reviewing the assumptions on which the water demand projections rest is beyond the scope of this Assessment and could be left for a more in-depth technical analysis of the matter.

Due to lack of data at ICIM's disposal, it is not possible to tell whether the expansion, as planned, will require additional water-savings projects to be carried out beyond the year 2025. With the difference between the number of daily lockages projected to meet the increased demand for water and the estimated number of lockages achieved by the three water projects selected, it would appear there would still be room to cover increases in the demand for water stemming from increases in population and other uses beyond 2025 ( $29 - 19.3$  lockages/day = 9.7 lockages per day available for other uses).

**Annex D. Seismic Design Criteria for New Locks and Borinquen Dam****RESPONSE SPECTRA INDEX**

1. Atlantic
  - a. 475 rear return period
  - b. 1000 year return period
2. Pacific
  - a. 475 year return period
  - b. 1000 year return period
3. Borinquen
  - a. 1000 year return period
  - b. 2500 year return period
4. V/H Scaling Factors for Response Spectra

*Source:* PCA. *RFP-76161 files*. August 2008. Amendment No. 13. Available online at <http://www.pancanal.com/eng/expansion/tenders-online/76161-pliego.html>