



CANAL DE PANAMÁ

# The Panama Canal Expansion

**Presented by: Rogelio A. Gordon**

**October 2014**



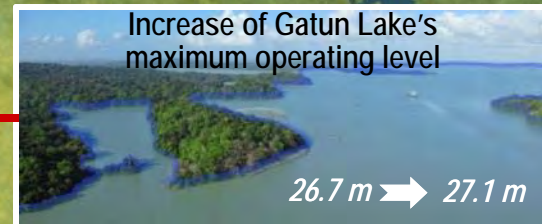
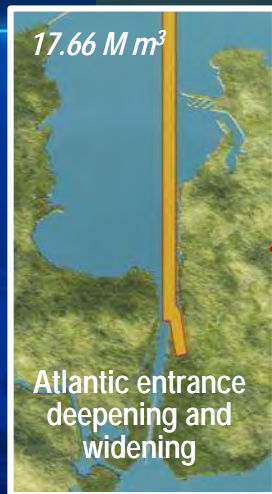
# The Panama Canal - 2015

It's all about economies of scale!



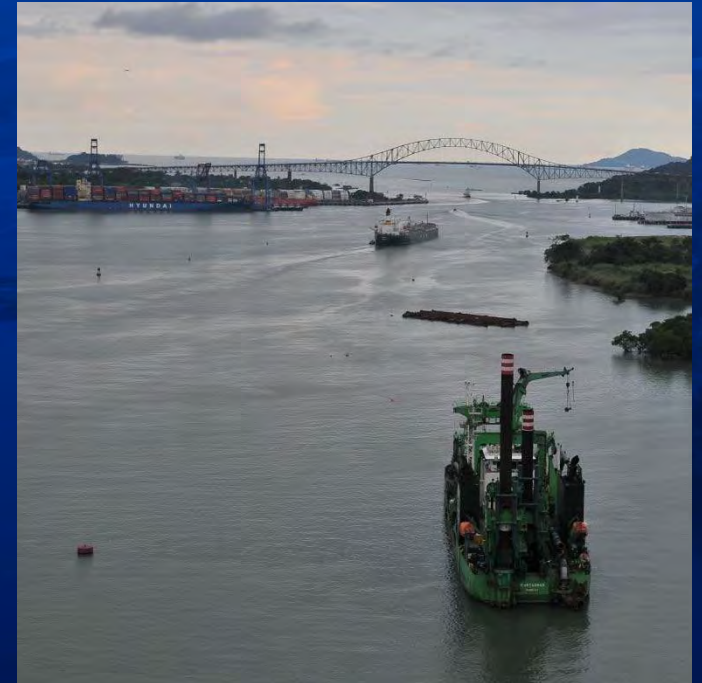
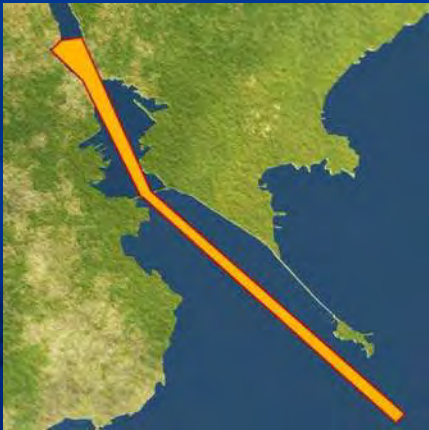


# Program Components



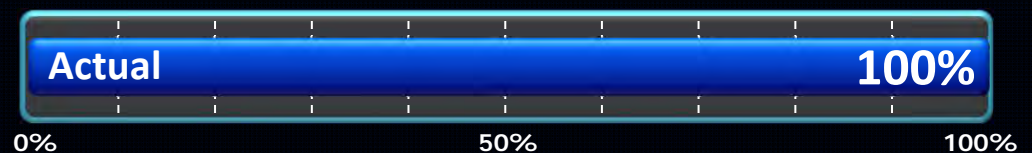


# Deepening and widening of the Pacific entrance



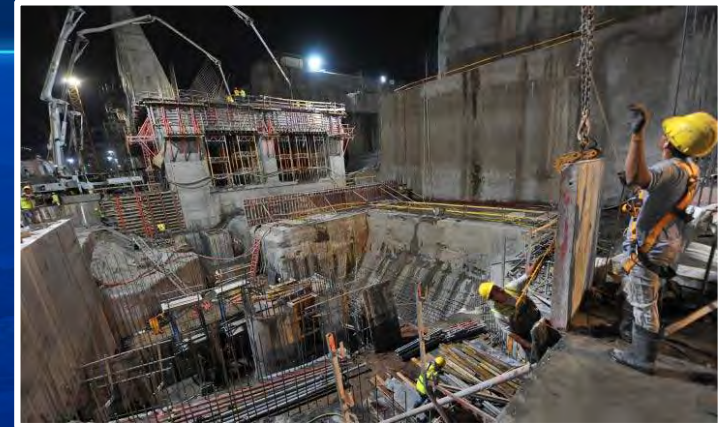
- Scope of Contract: 8.6 M m<sup>3</sup>
- Award: April 1, 2008
- Amount: B/. 177,500,676.78
- Company: Dredging International
- Amendment No. 12 : February 10, 2012
  - Expansion Program deliverable: Dec 31, 2012
  - Termination of Contract: June 30, 2013

**8.6 M m<sup>3</sup> dredged**





# Locks Design and Construction



- Scope of Contract: Design and Construction of Locks
- Award: July 15, 2009
- Order to Proceed: August 25, 2009
- Initial Amount + options: B/. 3,158,600,059
- Consortium: Grupo Unidos por el Canal S.A.
  - Sacyr Vallehermoso – Impregilo –
  - Jan De Nul - CUSA
- Conclusion of the contract: October 21, 2014

**Volume excavated and dredged:**

**41.6 M m<sup>3</sup> / 48.7 M m<sup>3</sup>**



Actual

75%

0%

50%

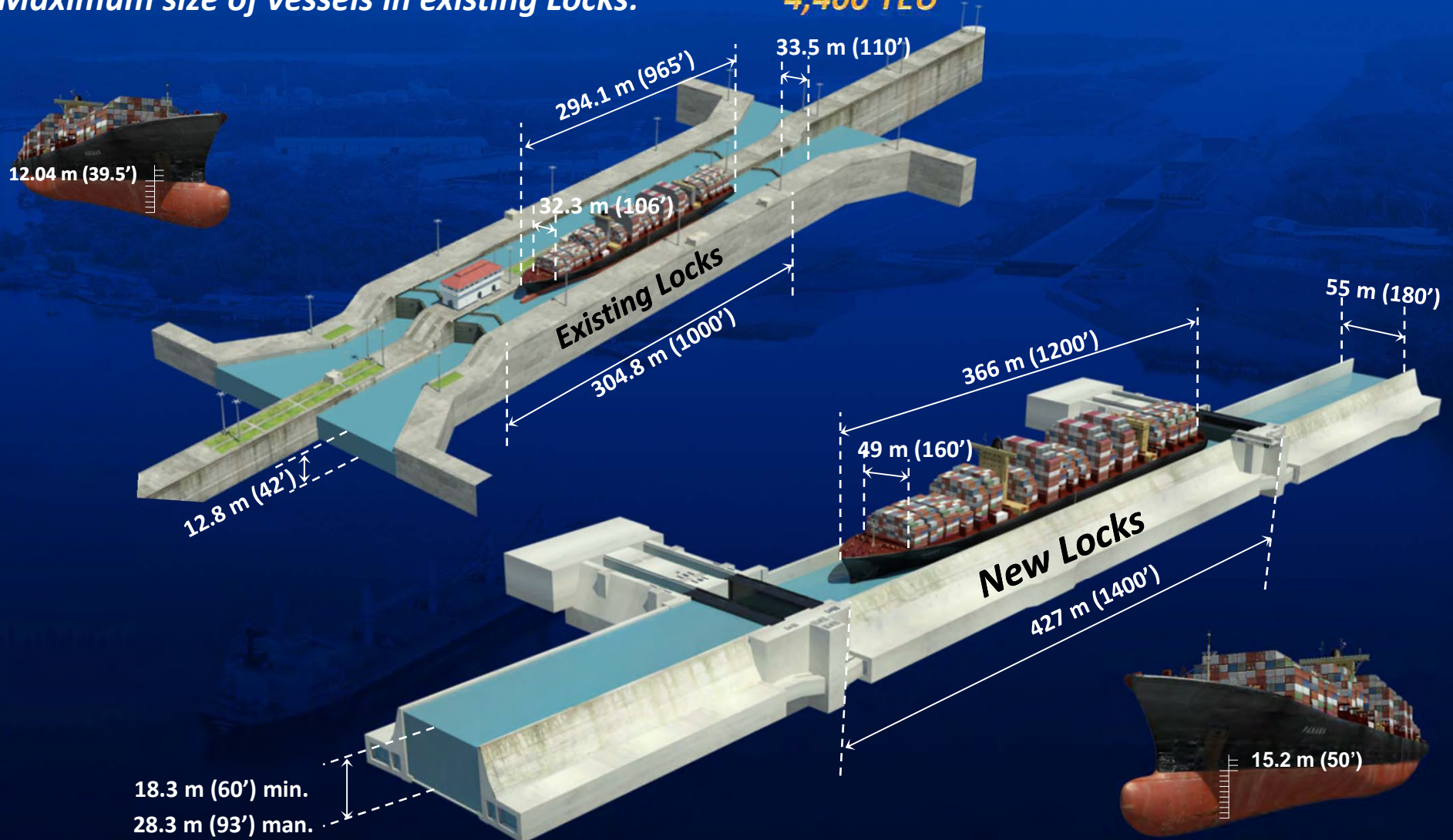
100%



# Dimensions of Locks and Ships

*Maximum size of vessels in existing Locks:*

**4,400 TEU**



*Maximum size of vessels in new Locks: **13,000 – 14,000 TEU***







# 1939 Excavations – Pacific Site

2014



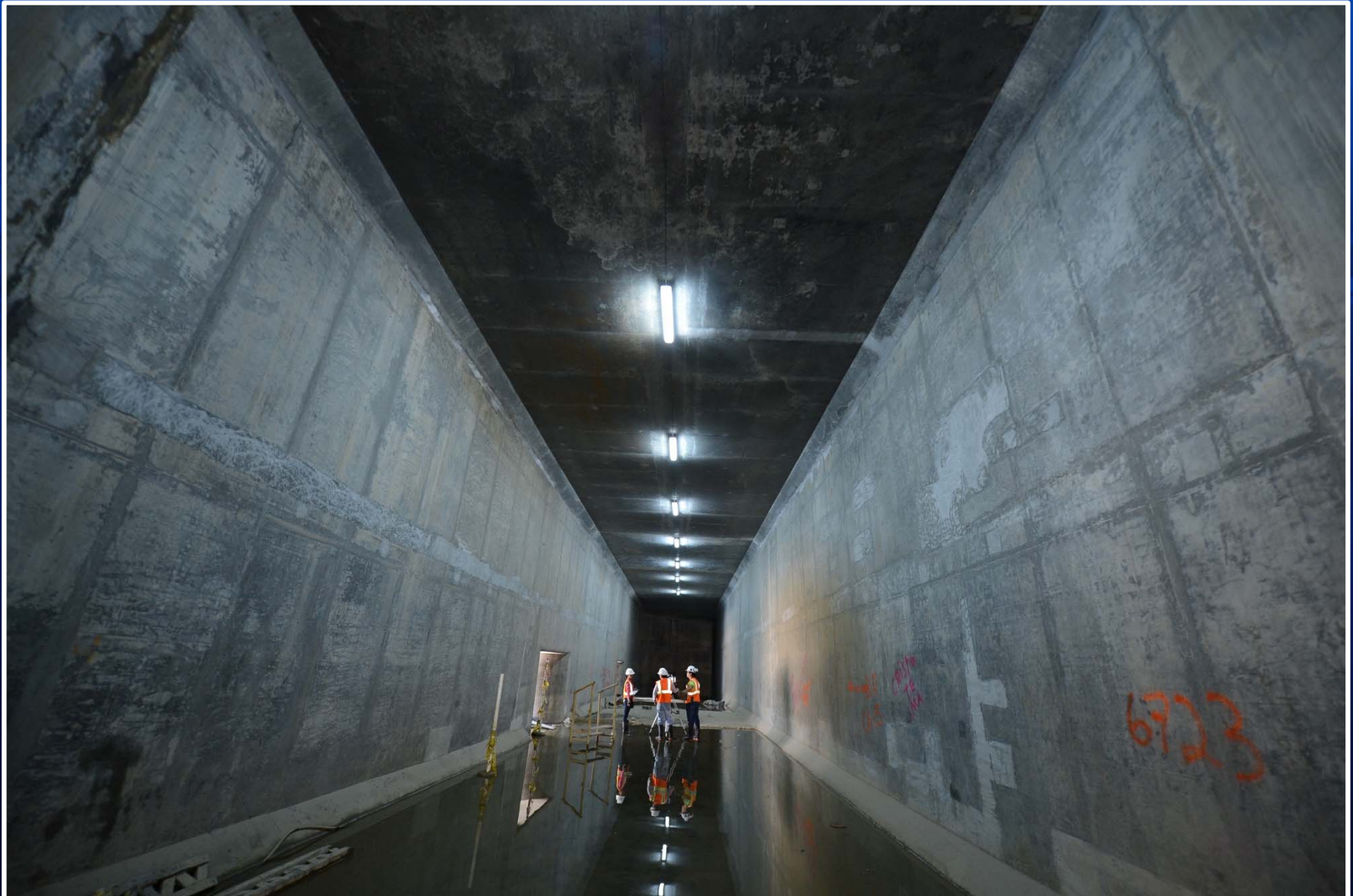


# Locks – Pacific Site



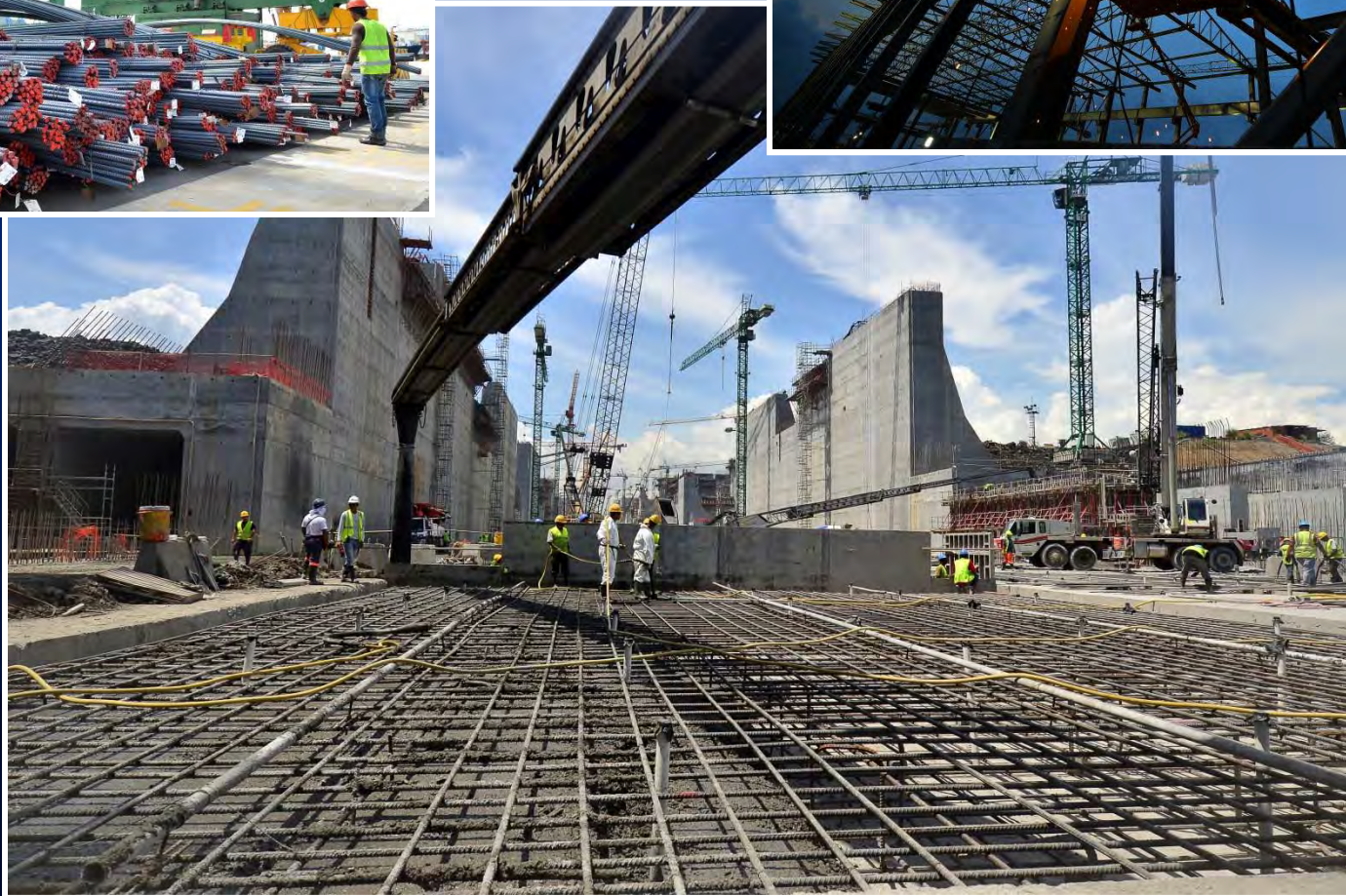


## Locks – Pacific Site





# Locks – Pacific Site





# Locks – Pacific Site





# Locks – Pacific Site





# 1939 Excavations - Atlantic

2014





# Locks – Atlantic Site





# Locks – Atlantic Site







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# Valves - Manufacturing

Hyundai Samho Heavy Industries, South Korea

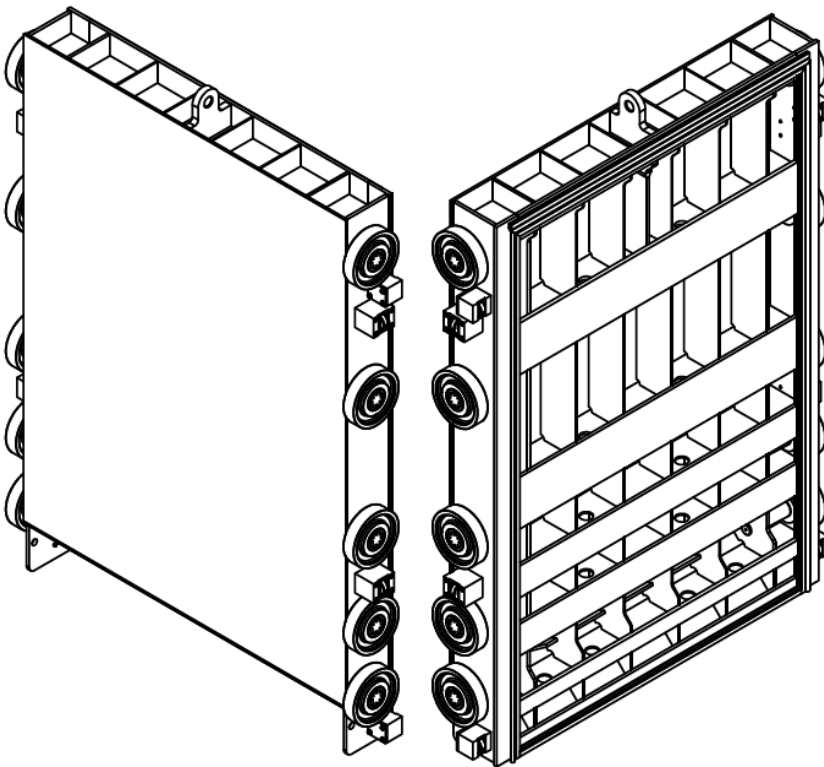




# Locks Valves

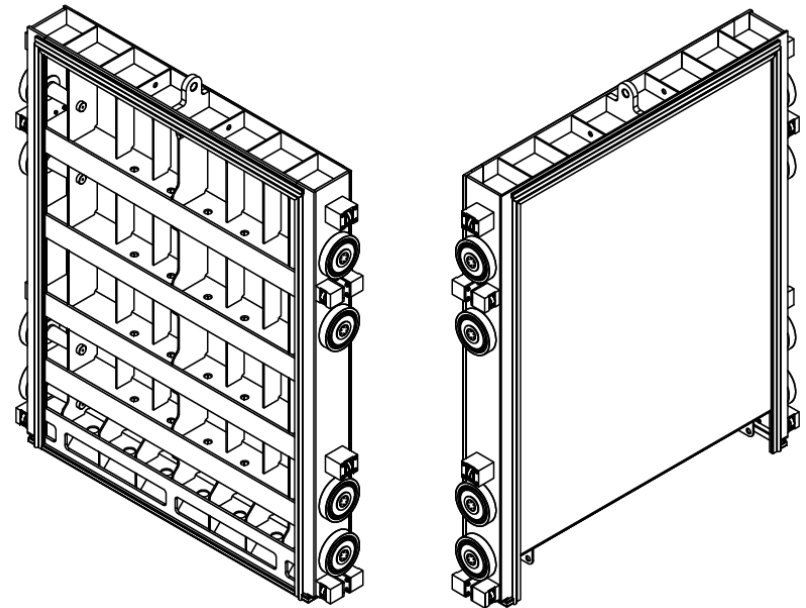
Total operating valves: 152

Main Sewer Valves 4.69m x 6.786m



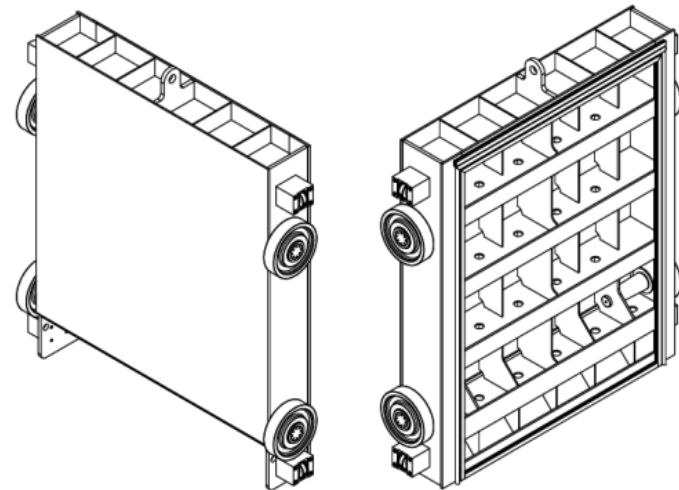
64 + 2 (replacement)

Pipeline Valves 4.69m x 6.786m



72 + 2 (replacement)

Equalization Valves 3.545m x 4.285m



16 + 2 (replacement)



# Valves arrived to Atlantic project site







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# Gate - Fabrication

Cimolai Spa, Italia



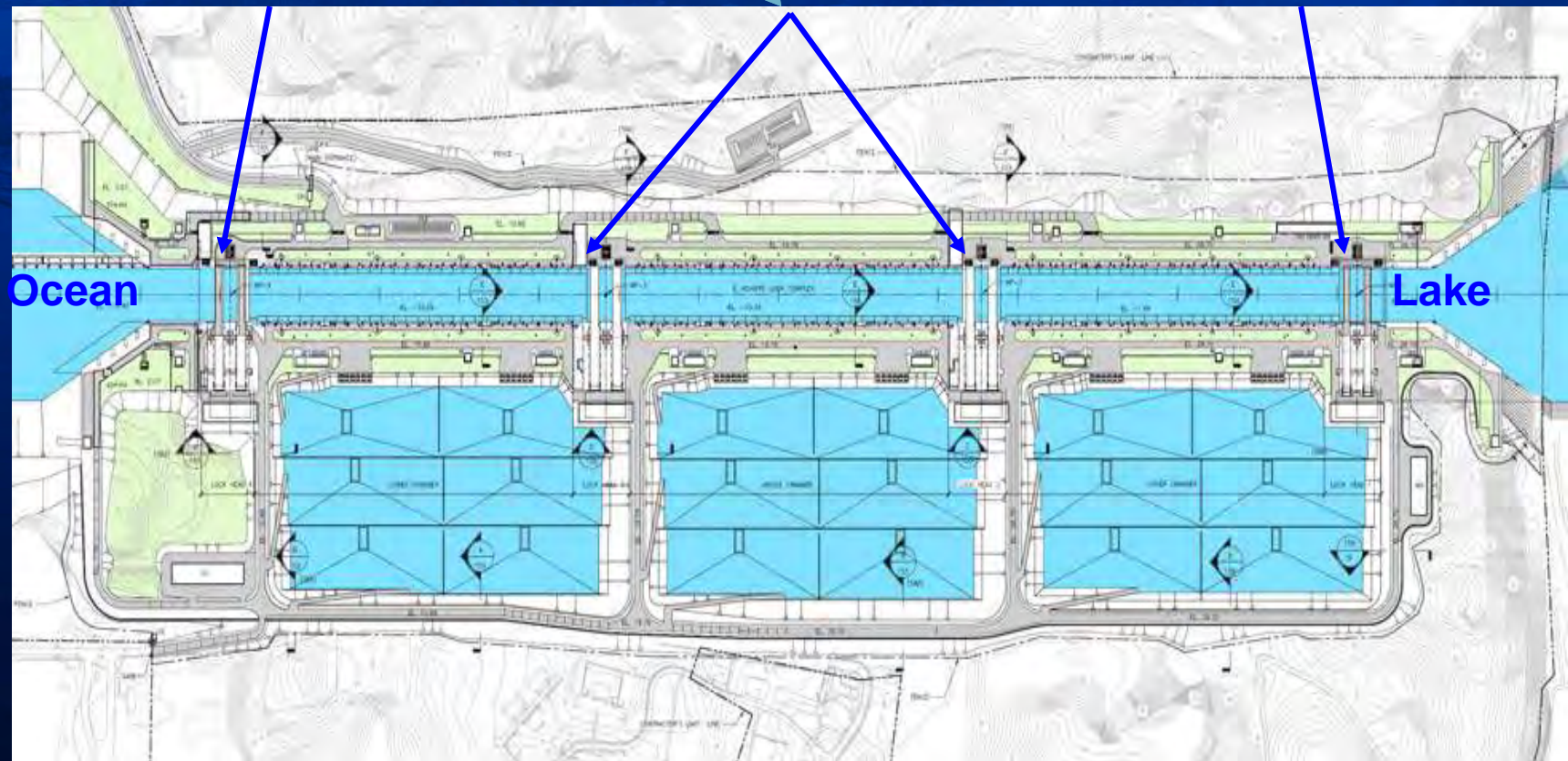


# Locks Gates Location

Atlantic— type D  
Pacific — type E

Atlantic — type B  
Pacific — type C

Atlantic — type A  
Pacific — type F



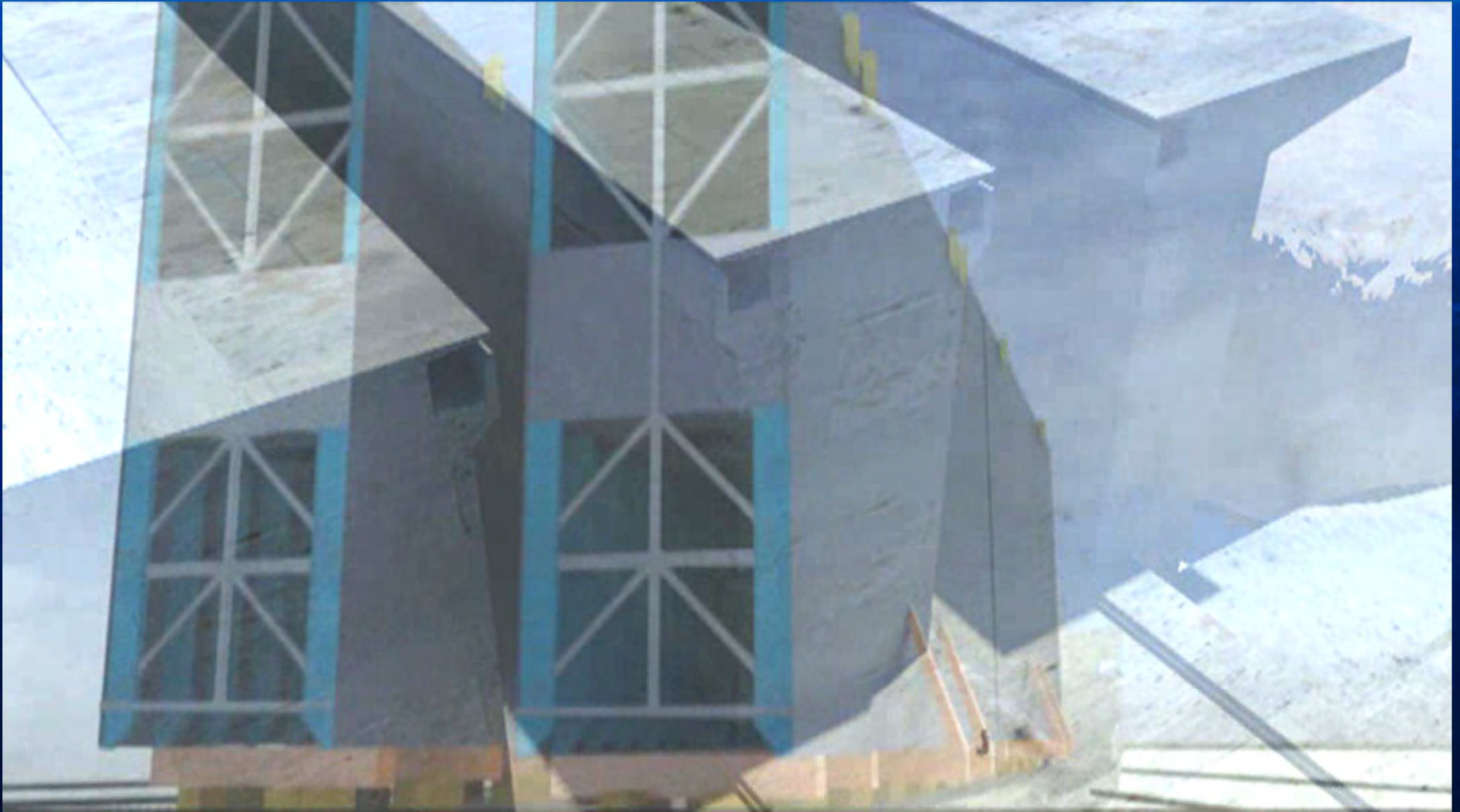


# Gates arrival to Panama





# Gates Transport and Installation





# Gates Transport and Installation





# Gates Transport and Installation



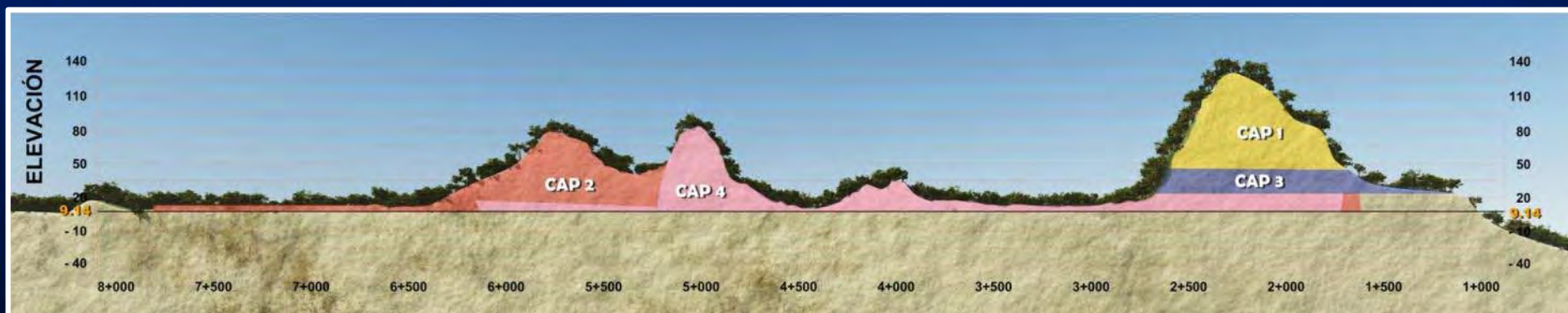
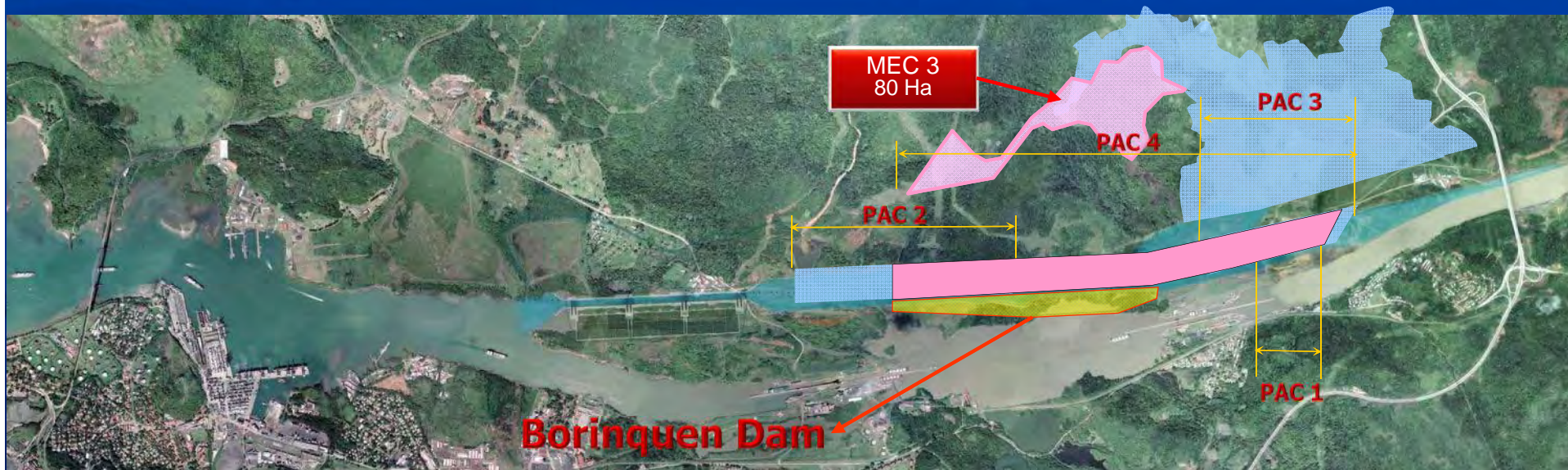


# Gates Transport and Installation - Atlantic Site





# Pacific Access Channel





# Pacific Access Channel



PAC-1



CONCLUDED  
25-Jan-2010

PAC-2



CONCLUDED  
25-Feb-2010

PAC-3



CONCLUDED  
15-May-2011

PAC-4



UNDER  
EXECUTION

43.88 M m<sup>3</sup> excavated / 49 M m<sup>3</sup>

Actual

79.8%

0%

50%

100%



# Pacific Access Channel – PAC 4

## 26 M m<sup>3</sup> dry excavation



- Scope of Contract:
  - 26 M m<sup>3</sup> excavation
  - Borinquen dam construction
  - Clearing of 80 hectares of MEC.
- Award: January 7, 2010
- Amount: B/. 267,798,795.99
- Company: Consortium ICA-FCC-MECO

20.98 M m<sup>3</sup> excavated / 26 M m<sup>3</sup>

Actual

75%

0%

50%

100%



# Borinquen Dam





# Post-Panamax navigational channel

9 m

Miraflores Lake





# Excavation and dredging at the northern entrance of the Access Channel to the New Locks

Oct 2012

3.98 M m<sup>3</sup>

CONCLUDED  
17-Oct-2012

- Scope of Contract:
  - Deepening of 27.5m a 9.14m PLD
  - Channel Width = 218m
  - Length = 1.6km
  - Volume approved 4 M m<sup>3</sup>
- Award: August 16, 2010
- Amount: B/. 54,550,647
- Company: Jan De Nul n.v.
- Concluded: 17 October 2012

Actual

100%

0%

50%

100%

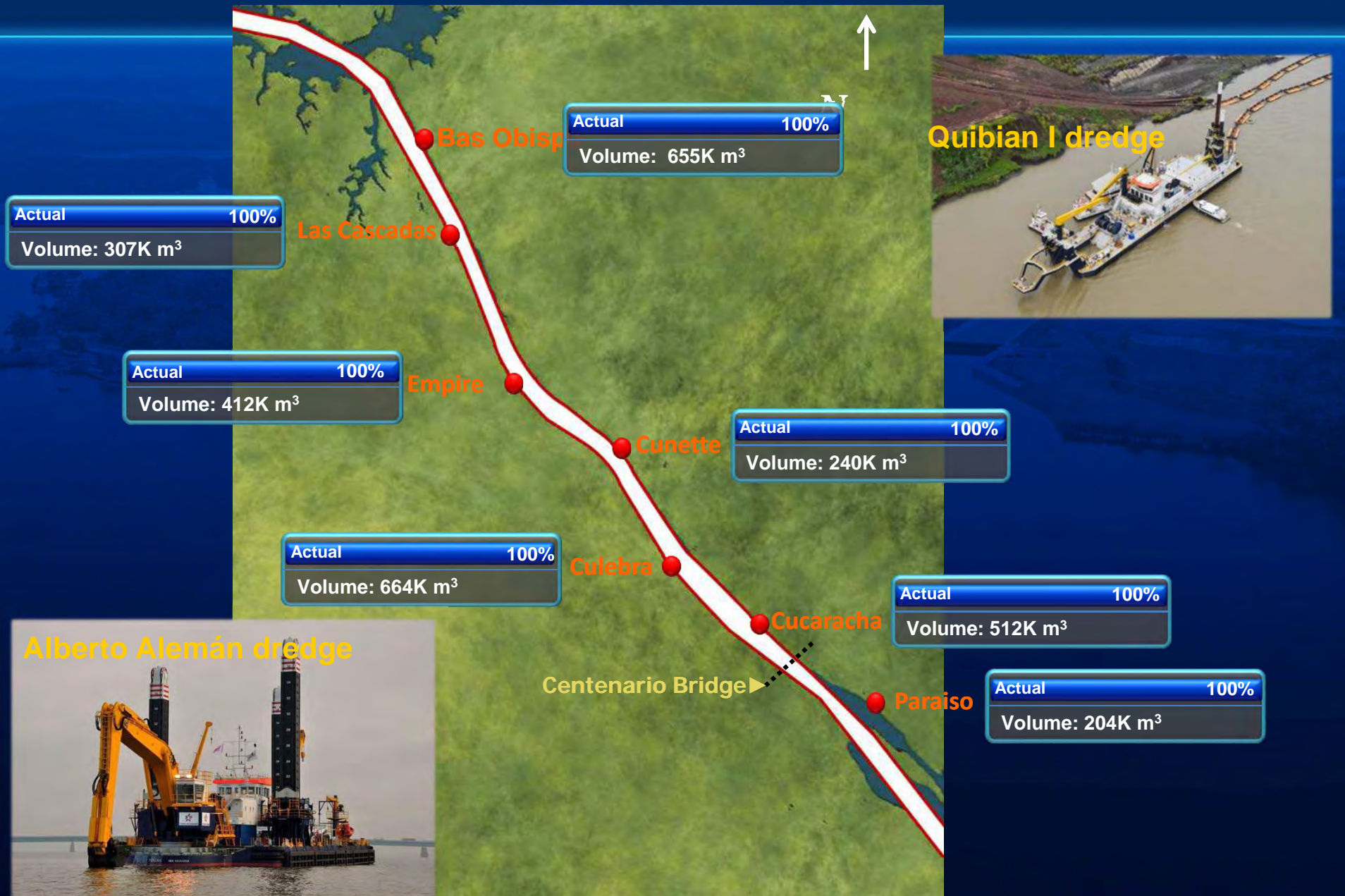


# Gatun Lake and Gaillard Cut Dredging Areas





# Dredging Areas in the Culebra Cut





# Dredging Equipment used in the Culebra Cut

**R.H. Christensen**



**Mindi**



**Cornelius**



**Quibian I**



**Alberto Alemán**



**IL Principe**





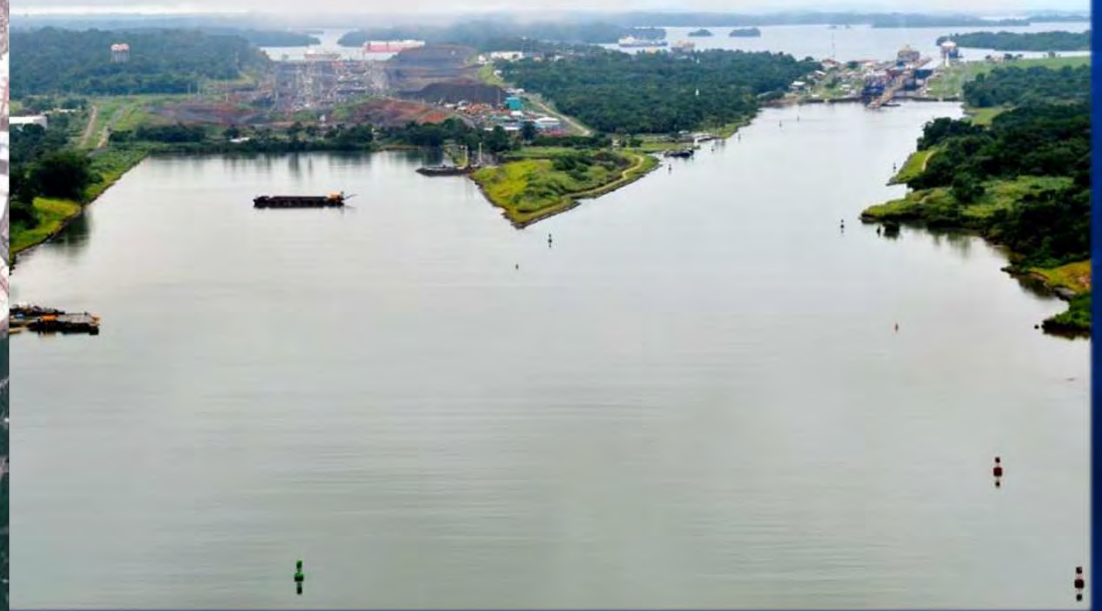
# Critical dredging areas in Gatun Lake





# Atlantic Entrance Deepening & Widening

17.38 M m<sup>3</sup> dredged and excavated / 17.66 M m<sup>3</sup>



Award: September 25, 2009

Amount: B/. 144,236,596.44

Company: Jan De Nul NV

Conclusion of contract: April 25, 2013

Actual

100%

0%

50%

100%



# Atlantic Entrance Deepening & Widening





# Atlantic Entrance Deepening & Widening







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# Raising the maximum operating level of Gatun Lake





# Raising the Maximum Operating Level of Gatun Lake

## Extension of Gatun Spillway gates



12 modified and installed gates  
2 fabricated gates installed  
2 modified gates in spare



Prototype testing of  
hydraulic cylinders  
for gates

Bid for the acquisition of 32 hydraulic cylinders.



Actual

92%

0%

50%

100%





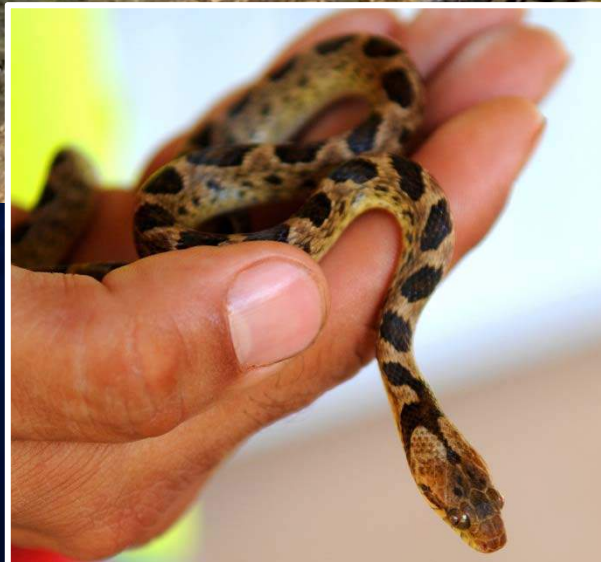
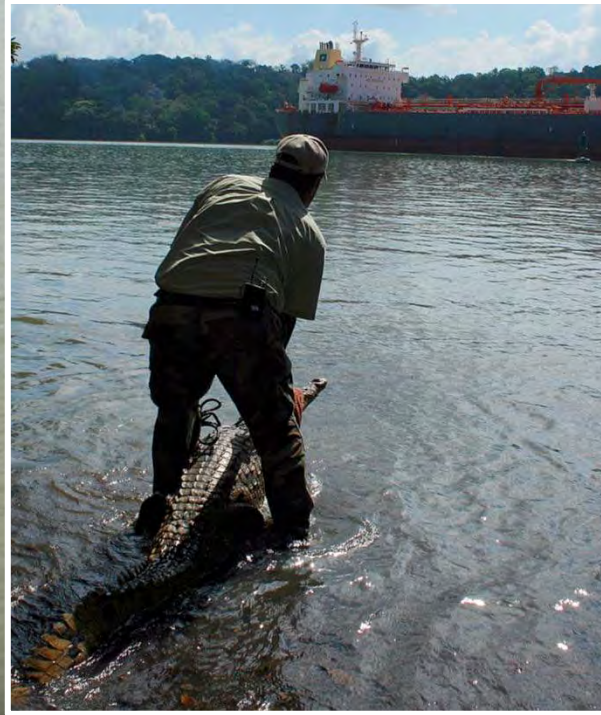
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# Social and Environmental Aspects





# Fauna Rescue



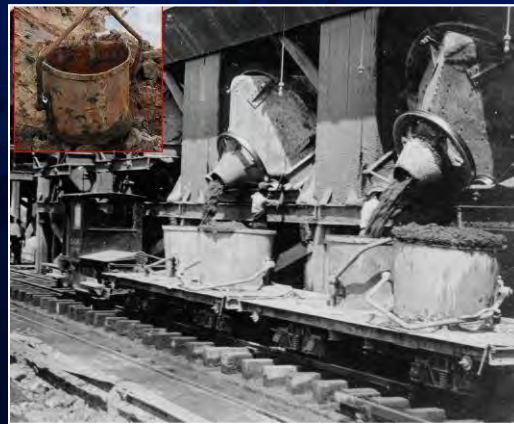
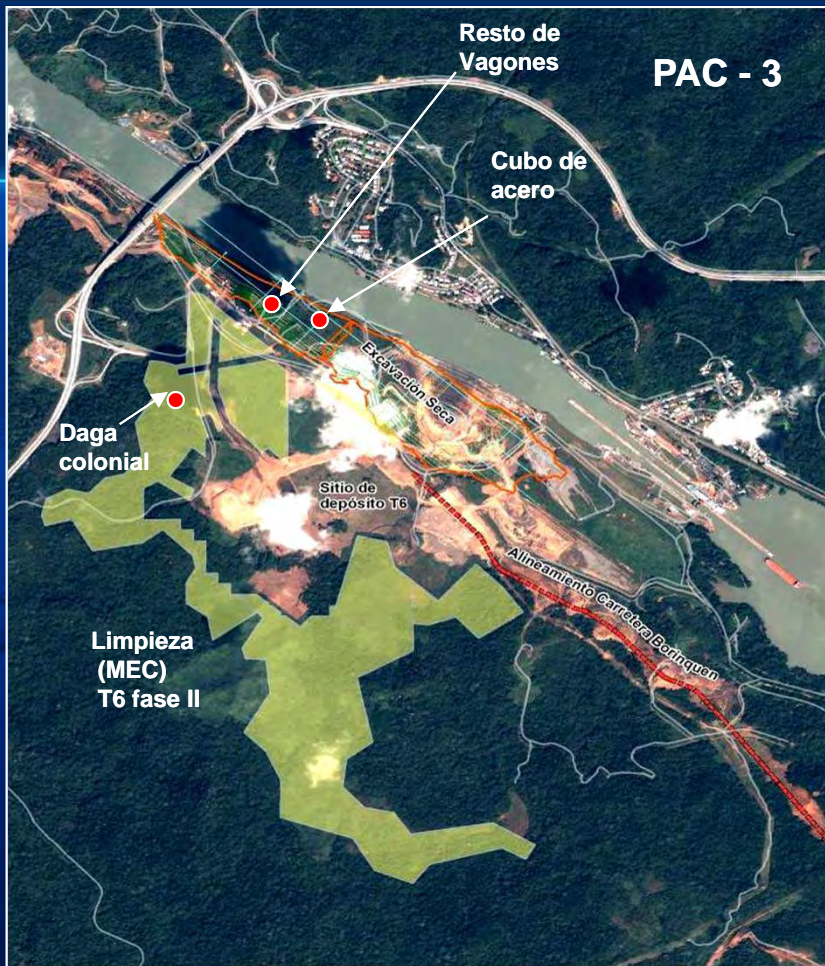






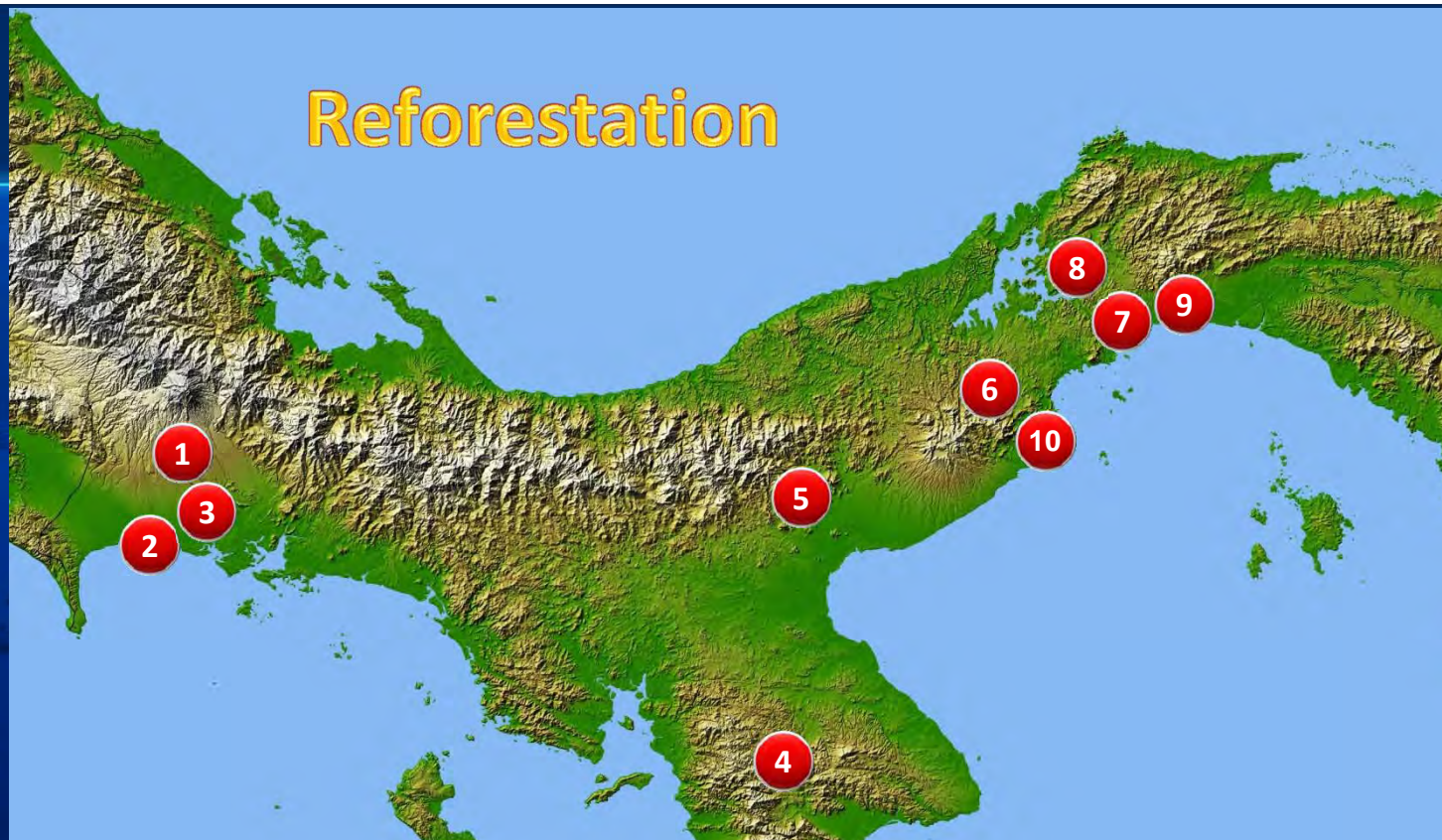
# Archeological

- Archeological surveys
- Archaeological rescue
- Requirement contract in place
- Dagger from the colonial era:
  - Found in the PAC-3 project area
  - Commonly-used weapon during the years 1590 through 1610
  - The restoration process took 3 months
  - Actually part of the Interoceanic Canal Museum's exhibition





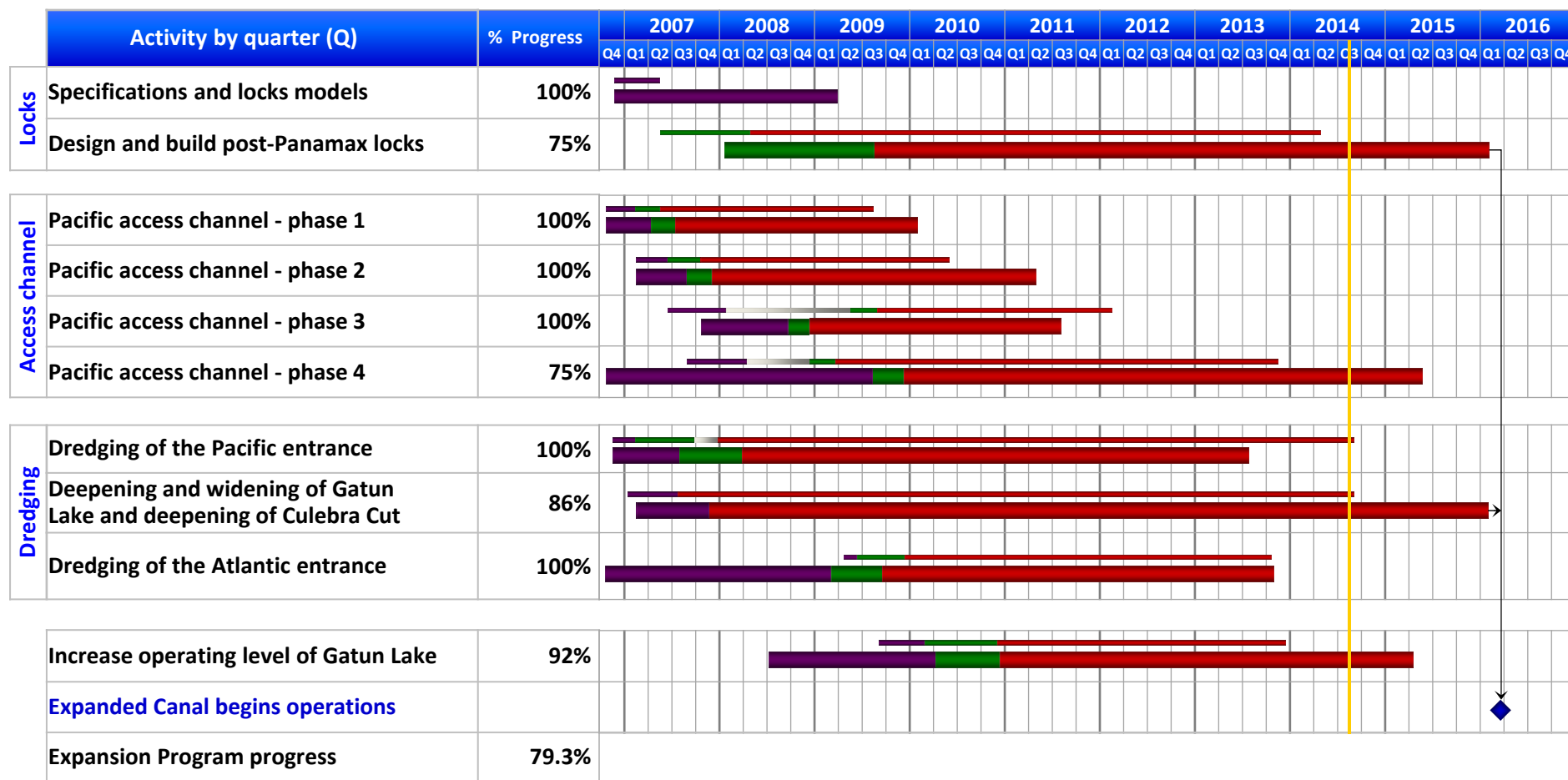
# Reforestation



Project	Site/protected area	Has	Comment
1 LAKE DREDGING	Volcan Baru NP	30	UNDER EXECUTION
3 LOCKS	Mangrove - Chiriqui Viejo	50	UNDER EXECUTION
2 PAC 3 AND PAC 4	Forestry Research Center	100	UNDER EXECUTION
4 PAC 4	Montuoso F.R.	50	UNDER EXECUTION
5 PAC 2 AND PAC 3	Omar Torrijos NP	150	UNDER EXECUTION
6 PAC 2	Campana NP	30	CONCLUDED
7 PAC 1	Camino De Cruces NP	115	CONCLUDED
8 PAC 3	Chagres NP	40	UNDER EXECUTION
9 LOCKS	Tapagra H.P.Z.	61	UNDER EXECUTION
10 PAC 4	Chame	59	UNDER EXECUTION
TOTAL		685	



## Summary Schedule of Main Projects with Baseline and Contingency As of 31 August 2014



Specifications and design    
  Bidding and contracting    
  Execution    
  Contingency against baseline    
 ◆ Beginning of operations  
 Baseline\*    
 Baseline    
 Baseline

\* Baseline from 31 December 2006 including contingency





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# Corozal Container Terminal





# Business areas under study



**LNG Terminal**



**Ro-Ro Terminal**



**Ship Repair**



**Logistic Parks**



**Bunker Terminal**



**Container Barge Service**



**Top-Off**



**Corozal Container Terminal**





**Panama Ports Company  
Cristobal**



**Manzanillo International  
Terminal (MIT)**



**Colon Container  
Terminal**



**Corozal Port**



**Ports Singapore Authority (PSA)**

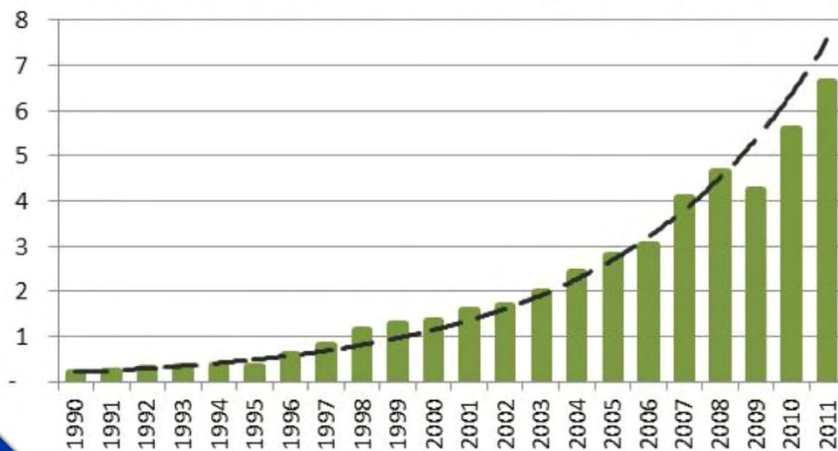


**Panama Ports Company  
Balboa**



# Evolution of the National Port Movement

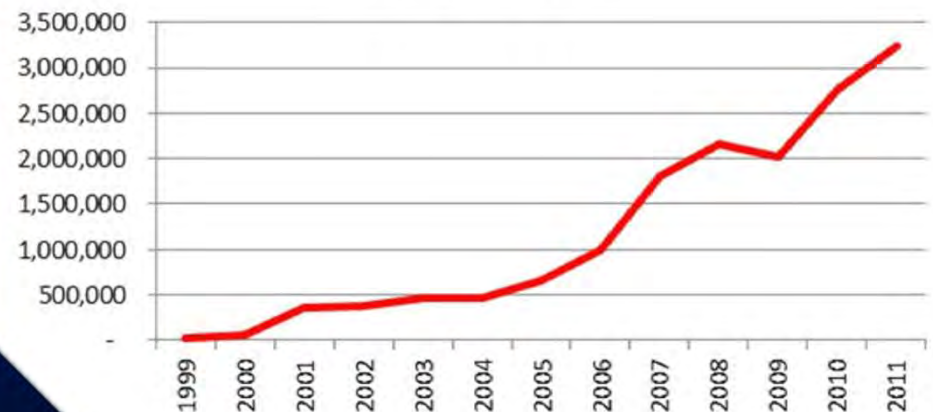
TEU movements in Panamanian port terminals



The total container throughput reached 6.8 million TEUs in 2012, which puts pressure on the port system, especially in the Pacific Side.

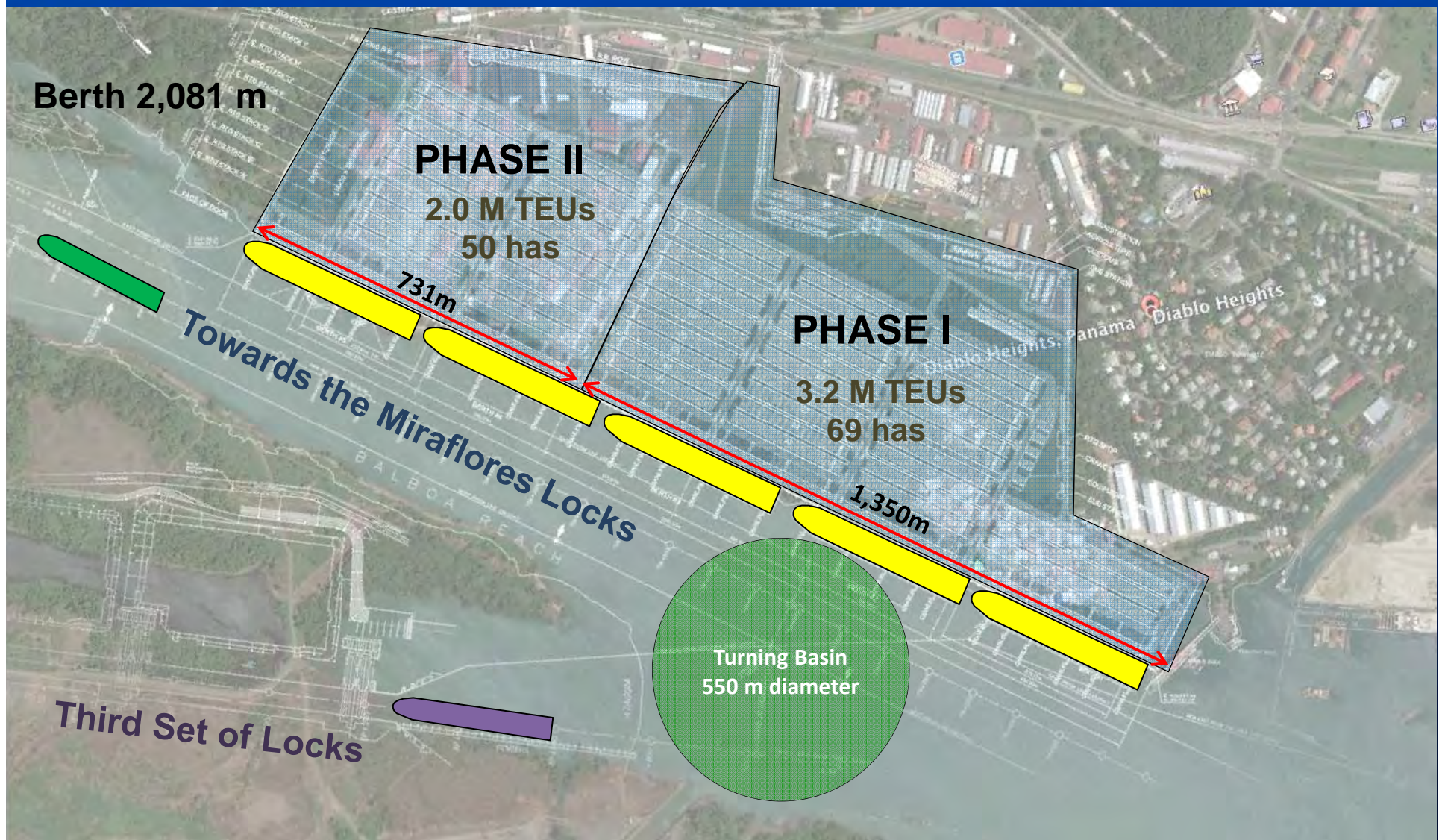
Pacific ports are reaching capacity and the transshipment demand is expected to increase further with the expansion of the Canal.

TEU movements at the Panama Pacific Area





# Corozal Terminal, Phase I and Phase II







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Thanks