



Panama Canal Expansion Program



EXPANSION PROGRAM COMPONENTS



POST-PANAMAX LOCKS

Construction of the new Pacific and Atlantic lock complexes. Each of the new lock complexes will feature three chambers, three water-saving basins per chamber, a lateral filling and emptying system, and rolling gates.

PACIFIC ACCESS CHANNEL

Excavation of the new Pacific locks access channel. The project requires the dry excavation of nearly 50 million cubic meters of material along 6.1 kilometers. Executed in four phases (PACs 1 – 4.)

DREDGING OF NAVIGATION CHANNELS

Dredging is conducted at both Canal entrances, on the Atlantic and Pacific sides, as well as in Culebra Cut and Gatun Lake.

IMPROVEMENTS TO WATER SUPPLY

Raising Gatun Lake's maximum operating level to improve Canal water supply and draft dependability.



1. Dredging of the Pacific entrance
2. New Pacific locks
3. Miraflores Lake
4. Pacific Access Channel
5. Culebra Cut

PROJECTS

By August 2012, contracts for a total of \$4.29 billion had already been awarded. Total cost of the Program is \$5.25 billion.

PACIFIC ACCESS CHANNEL



Once completed, the Pacific Access Channel will look like this computer rendering.

Construction of a new access channel to link the Third Set of Locks, on the Pacific side, to Culebra Cut has been under construction since September 2007. This project calls for the excavation of some 50 million cubic meters of material. Three of the four contracts in which the project was divided have already been completed.

Flooding of the north entrance to this new channel through which Post-Panamax vessels will navigate was completed in 2011. It is the 13-hectare section closest to Culebra Cut, located south of Centennial Bridge. It constituted the first phase of the flooding of the 6.1 kilometer-long span of the new channel.

A 2.3 kilometer-long dam is also being built under this project to separate the waters of Miraflores Lake from those of the new Pacific Locks channel. The dam is required mainly because the new channel will operate 10 meters above the level of the existing channel.

Pacific Access Channel dry-excavation activities have also entailed clearing of more than 400 hectares of land contaminated with Munitions and Explosives of Concern (MECs) left behind by the US military during its deployment in Panama Canal areas.

A total of 42 million cubic meters of material have been excavated to date.



- 6. Gatun Lake
- 7. New Atlantic locks
- 8. Dredging of the Atlantic entrance

DREDGING



Dredging of the Pacific entrance.

Dredging activities to enable safe navigation by Post-Panamax vessels once the Panama Canal is expanded are also part of the Expansion Program.

The entrances to the waterway on the Pacific and Atlantic sides are currently being dredged, as well as the existing navigational channel in Gatun Lake and Culebra Cut.

PACIFIC ENTRANCE

This contract was awarded on April 1, 2008 to Belgian company Dredging International Panama, S.A. (DI). The project consists of the widening of the Panama Canal Pacific entrance navigational channel to a minimum 225 meters and deepening to 15.5 meters below mean low water level, as well as partial construction of the Pacific Post-Panamax locks south access channel.

A total of 8.7 million cubic meters of material will be removed as part of this project.

To complete the work, DI deployed the *D'Artagnan*, one of the world's most powerful cutter-suction dredges. Dredging work in the Pacific entrance shall be completed in 2012.

By August, 7.7 million cubic meters of material had already been removed, out of the total 8.7 million cubic meters specified in the contract.

ATLANTIC ENTRANCE

This contract was awarded to Belgian company Jan de Nul n.v. on September 25, 2009. The work includes dredging and dry excavation of nearly 17.9 million cubic meters of material.

Approximately 13.8 kilometers are being dredged and the existing Atlantic entrance navigation channel is being widened from its current 198 meters to a minimum 225 meters, and the north access channel to the new locks on the Atlantic side widened to a minimum 218 meters.

This contract includes an option for additional deepening up to 16.1 meters, the equivalent to 2.3 million cubic meters of material.

The contractor has deployed several pieces of equipment along the area, which will enable to complete the project ahead of schedule. To date, 98% of the work has been completed under this project.

GATUN LAKE AND CULEBRA CUT



This project entails the removal of some 29 million cubic meters of material to deepen and widen Gatun Lake navigation channels and deepen the navigation channel at Culebra Cut.

Part of the work is being conducted by the Canal workforce using in-house equipment. The remainder of the work was awarded to two contractors: Jan De Nul n.v., is in charge of dredging the new north entrance to the Pacific Access channel, and Dredging International completed dredging work in the northern reaches along the Gatun Lake navigational channel during the second quarter of 2012.

Work under the latter allowed for the recovery of archaeological remains found under Gatun Lake waters. Covering 422 square kilometers, the lake is key to Canal operations.

In 2011, the Panama Canal added the new cutter-suction dredge Quibian I to its fleet to support activities in the lake and Cut.

By August, 19.44 million cubic meters of material had been dredged under the contract.

Dredging in Culebra Cut.

RAISING GATUN LAKE'S MAXIMUM OPERATING LEVEL

This component will enable raising Gatun Lake's maximum operating level by 45 centimeters, from its current 26.7 meters to 27.1 meters.

The project will provide additional storage capacity for nearly 165 million cubic meters of water in the lake.

The work calls for the modification of certain structures, including the hydraulic cylinders that open and close the gates at Pedro Miguel Locks and the Gatun Locks upper chamber, as well as the gates at Gatun Dam, among others.

Eleven gates have already been extended, while two new ones were fabricated at the Canal industrial dry dock.

Two new caissons were procured to complement the operation and maintenance of the extended spillway gates.

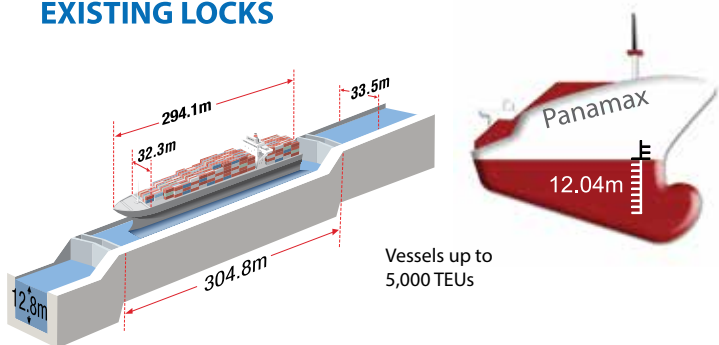
Parallel to the extension of the gates, tests are being conducted on prototype cylinders for submersible hydraulic arms, and designs to make the required modifications to the gates that so require it are also being conducted.

THIRD SET OF LOCKS



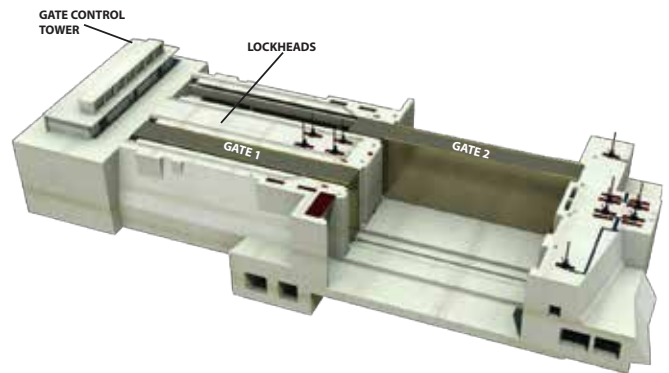
GENERAL INFORMATION ON THE NEW LOCKS

EXISTING LOCKS

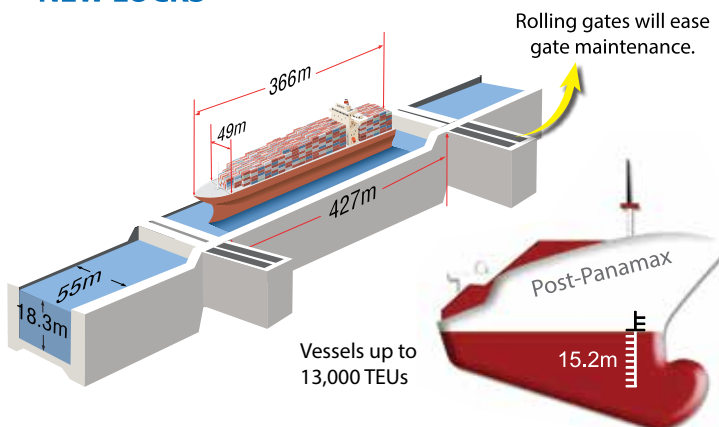


Vessels up to 5,000 TEUs

RECESSES AND GATES



NEW LOCKS



Vessels up to 13,000 TEUs

The new locks will require 16 rolling gates. These gates will operate from a recess located adjacent and perpendicular to the lock chamber. This gate configuration turns each recess into a dry dock, which in turn allows servicing the gates on site without the need of removing them and without major interruption to lock operations.

The system results in increased lockage capacity and flexibility as it offers shorter maintenance times at a lower cost.

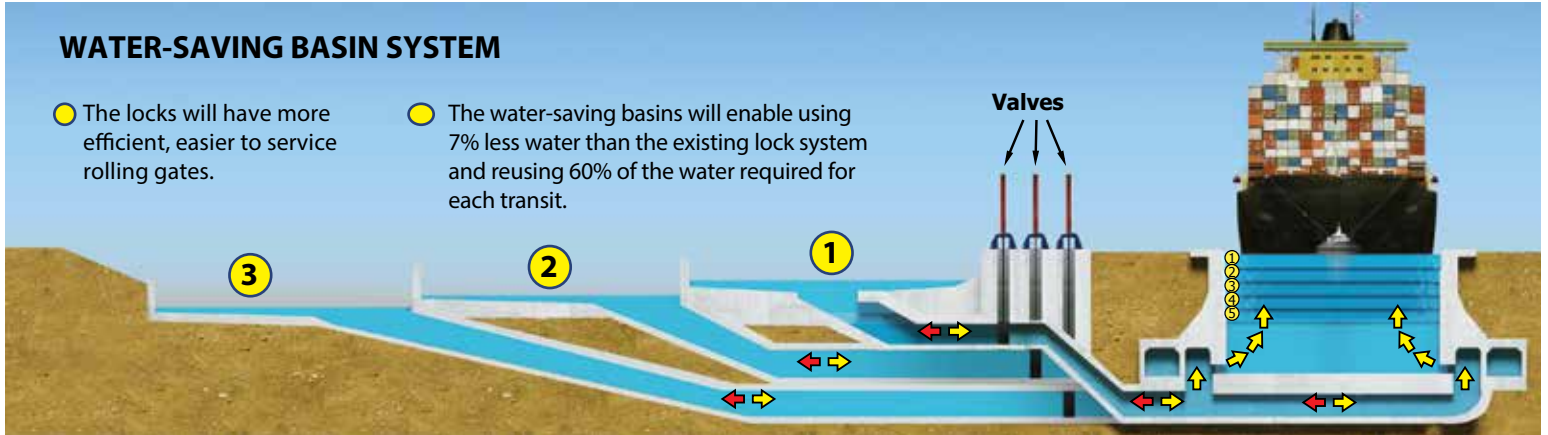
POST-PANAMAX LOCKS

The new locks will have three chambers, three water-saving basins per chamber, a lateral filling and emptying system and rolling gates.

WATER-SAVING BASIN SYSTEM

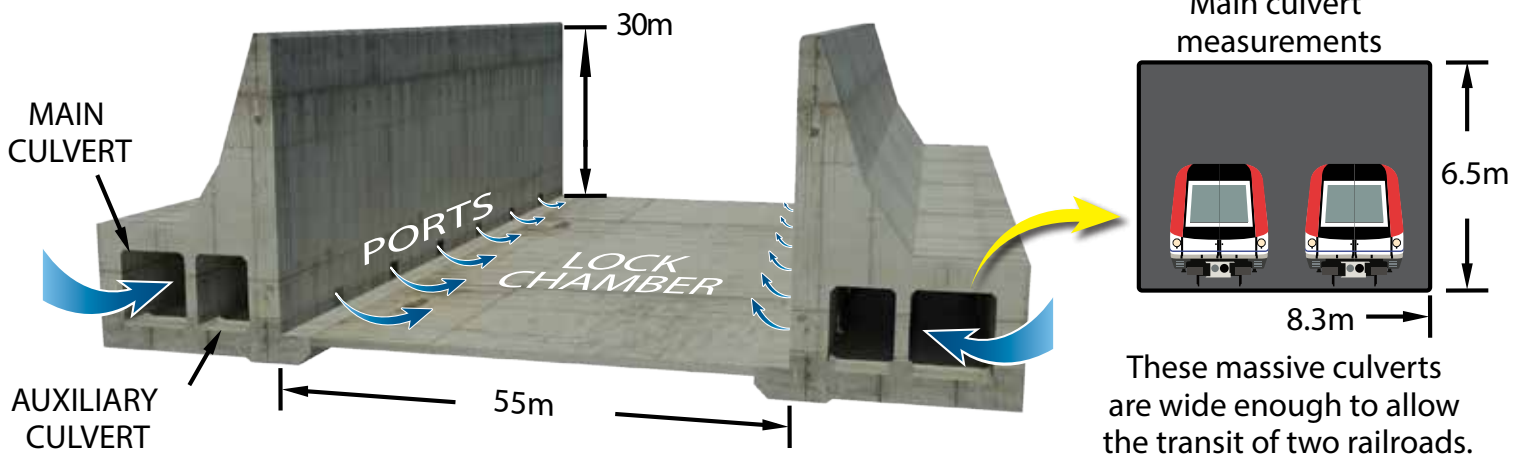
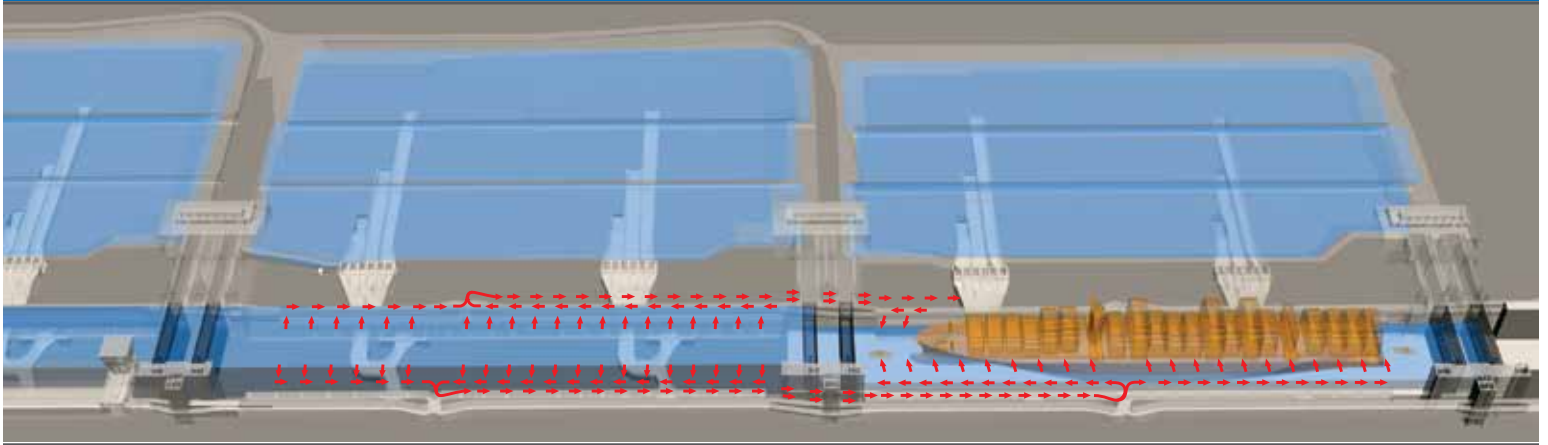
● The locks will have more efficient, easier to service rolling gates.

● The water-saving basins will enable using 7% less water than the existing lock system and reusing 60% of the water required for each transit.



1, 2 and 3: Moves by gravity to water-saving basins for use in the following lockage.
4 and 5: It equalizes and moves to the next chamber and eventually to sea.

CULVERT AND WATER-SAVING BASIN SYSTEM



The existing Canal's filling and emptying system uses ports located on the chamber floor. The Third Set of Locks, however, will work with a lateral system with ports located on the chamber walls. The system will allow filling each lock chamber in 10 minutes whenever water-saving basins are not used, and in 17 minutes when they are part of the operation.

DESIGN AND CONSTRUCTION OF THE THIRD SET OF LOCKS



Pacific Locks site.



This is the largest and most comprehensive of the projects under the Expansion Program. At a cost of \$3.2 billion, the contract was awarded on July 15, 2009 to Grupo Unidos por el Canal, a consortium formed by Spain-based Sacyr Vallehermoso, S.A.; Italy's Impregilo SpA; Belgian mogul Jan de Nul n.v.; and Panama's Constructora Urbana, S.A. The contractor officially began the work on August 25 of the same year.

The project entails the design and construction of two similar lock complexes — one on the Pacific and the other on the Atlantic side — each with a total of three chambers and nine water-saving basins per chamber, as well as a redundant system with eight rolling gates.

Designs for the Third Set of Locks, as well as the fabrication of its various components, are conducted in different parts of the world. For instance, the gates are being fabricated in Italy by sub-contractor Cimolai SpA, and valves are being built by Hyundai in Korea.

To build the new locks, the contractor installed its own industrial parks to produce the aggregates and prepare the concrete, which is currently being placed at both sites to shape the massive structures.

The rock excavated from the project footprint on the Pacific side, known as basalt, is being used as aggregate and sand in preparing the concrete mixes at both lock sites.

To date, 32 million cubic meters of material have been excavated from a total of 47.5 million cubic meters of material corresponding to this contract.

Atlantic Locks site.

ENVIRONMENT



Launching of reforestation project in Tapagra, Chepo.

The environment is a priority under the Expansion Program. Along with its contractors for each component, the Canal conducts wildlife rescue and relocation activities as work progresses in all areas in which projects are executed. Mammals, reptiles and birds have been rescued and relocated to safe areas.

Reforestation projects with native species are also being conducted by ACP and in close coordination with institutions such as Panama's National Environmental Authority (ANAM) and the Aquatic Resources Authority (ARAP). From the capital city to Chiriqui, passing through Cocolé and Herrera, 626 hectares have already been reforested from a projected one thousand hectares. Some 600 thousand seedlings of native species have been planted, contributing to the pride of local residents in these regions who feel, the Canal reaches to them.

As of August 2012, the ACP had also contributed \$3.6 million to ANAM and ARAP as ecological compensation.



Location of reforestation projects

1. Volcan Baru National Park - 30 hec
2. Chiriqui Viejo River Mangrove - 50 hec
3. Forest Research Center - 100 hec
4. El Montuoso Forest Preserve - 50 hec
5. Omar Torrijos National Park - 150 hec
6. Altos de Campana National Park - 30 hec
7. Camino de Cruces National Park - 115 hec
8. Chagres National Park - 40 hec
9. Hydrological Preserve Zone in Tapagra, Chepo - 61 hec

PALEONTOLOGICAL AND ARCHAEOLOGICAL RESEARCH

An STRI team conducts paleontological research along Canal banks in Culebra Cut.



The Panama Canal works hand in hand with the Smithsonian Tropical Research Institute (STRI) for the location and assessment of paleontological findings within Third Set of locks construction sites.

As the program evolves, archaeological items found within expansion areas also continue to be assessed. The list of findings includes arrows from the pre-Columbian era, bottles dating back to the beginning of the 20th Century and a dagger, deemed to have been a commonly used weapon between 1590 and 1610.

ACCOUNTABILITY



Regular visit by the Canal Board of Directors to the Expansion Program.

In compliance with its responsibility to inform on the progress of the Expansion Program and as established by Law 28 of July 17, 2006, the Canal publishes quarterly reports, with progress achieved under the program, for auditing entities including the Executive Branch, the National Assembly, Panama's General Controller's Office, and the Ad-hoc Committee (formed by members of the civil society), as well as for multilateral financing agencies. The contents of these reports are available for public consultation in the Canal's Internet page at www.micanaldepanama.com

The Expansion Program also has hotline 800-0714 and electronic mail address ampliacion@pancanal.com to respond to queries regarding general information on the program and to respond to questions, concerns and suggestions made by the general public related to the execution of the works.

Regarding the environmental aspect, the Canal has established a strict environmental surveillance and auditing program to guarantee compliance with the program's environmental commitments.



Members of the National Assembly visit the Third Set of Locks Project on the Pacific side.



Visit by Panama President Ricardo Martinelli to the locks project on the Pacific side.

LABOR



Atlantic locks builders.



The Canal Expansion Program has become a source of employment and training for professionals in different fields.

Its workers are men and women whose commitment is to complete this great endeavor. In turn, the program has granted them the opportunity to grow professionally, which is definitely an added value for the project.

More than 27,000 direct jobs have been created since September 3, 2007, when expansion work in the waterway was formally inaugurated.

Safety inspection at the locks project.

FINANCING

The Panama Canal Authority signed agreements with a group of bilateral and multilateral financing institutions to procure financing of up to \$2.3 billion required to complete the expansion of the waterway.

With authorization by the Cabinet Council, the Canal Board of Directors proceeded to subscribe financing agreements with the following institutions:

Financing Institutions	
European Investment Bank (BEI)	\$500 million
Japan Bank for International Cooperation (JBIC)	\$800 million
Inter-American Development Bank (IDB)	\$400 million
International Financial Corporation (CFI)	\$300 million
Andean Development Corporation (CAF)	\$300 million
Total	\$2.3 billion



CANAL DE PANAMÁ

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