



## Third Set of Locks Project

### Fact Sheet

## Relevant information on the third set of locks project

### 1 Project Components

- **Third set of locks project objectives.** The objectives of the Canal expansion are: (1) to make long term growing and sustainable contributions to the Panamanian society, through the payments that the Canal makes to the National Treasury; (2) to maintain Canal's competitiveness as well as the value of the Panama maritime route to the national economy; (3) to increase the Canal's capacity in order to capture the growing demand with the appropriate level of service for each market segment; (4) to increase Canal's productivity, safety and efficiency.
- **General description.** The third set of locks project is an integral Canal capacity expansion program with three main components, as follows: (1) the construction of two lock facilities – one in the Atlantic side and one in the Pacific side – each with water reutilization basins; (2) the construction of access channels for the new locks, as well as the widening of existing channels; and (3) the deepening of the existing navigation channels and the elevation of Gatun Lake's maximum operating level.
- **Locks location.** One new lock facilities will be located on the Pacific side, to the Southwest of Miraflores Locks. The other new lock facility will be located to the East of Gatun Locks. Both complexes will be within the ACP patrimonial areas.
- **Number of lock levels.** Each one of the two new lock facilities will have three levels or chambers, similar to the configuration of the existing Gatun locks.
- **Locks dimensions.** Lock chambers will be 427 m (1,400') long, by 55 m (180') wide, and 18.3 m (60') deep.



- **Maximum vessel dimensions.** The new locks will allow the transit of vessels with a beam of up to 49 m (160'), an overall length of up to 366m (1,200') and a draft of up to 15 m (50').
- **Number of water reutilization basins.** Each of the chambers of the new locks will have three water reutilization basins for a total of nine basins each lock facility and a total of 18 water reutilization basins for the entire project.
- **Dimensions of the water reutilization basins.** Each water reutilization basin will be approximately 70 m wide, 430 m long and 5.50 m deep.
- **Dimensions of the new locks' approach channels.** Two new channels will be built to connect the new locks on the Pacific side with the existing channels: (1) the north channel, which will connect the lock to the Gaillard Cut channel, circumventing Miraflores Lake, will be 6.2 Km. long and (2) the south channel that will connect the lock with the existing sea entrance on the Pacific Ocean, will be 1.8 Km. long. The new channels will be 218 m (715') wide, both on the Atlantic and Pacific sides, which will allow post-Panamax vessels to navigate those channels in one single direction at a time.
- **Dimensions of the widening and deepening of Gatun Lake and Gaillard Cut channels.** Gatun Lake and Gaillard Cut channels will be deepened by 1.20 m (4'), from level 10.4m (34') PLD to level 9.1 m (30') PLD<sup>1</sup>. Gatun Lake channels will be widened to no less than 280 m (920') on the straight portions and no less than 366 m (1,200') on the bends.
- **Dimensions of the widening and deepening of sea entrance channels.** The navigational channels at the sea entrances on the Canal's Atlantic and Pacific sides will be widened and deepened to no less than 225 m (740') wide and 15.5 m (51') deep, with the lowest tide.
- **Elevation of Gatun Lake's maximum operating level.** Gatun Lake's maximum operational level will be raised by approximately 0.45 m (1.5'), from the actual 26.7 m (87.5') PLD level to 27.1 m (89') PLD.
- **Gate types.** The new locks will use rolling gates instead of miter gates as the existing locks. For safety and redundancy, two rolling gates will be installed at each end of each lock chamber. Rolling gates maintenance will be performed inside the slot that they retract into, which also serves as a maintenance dry dock.
- **The three components of the third set of locks project's water program.** (1) Raising Gatun Lake's maximum operational level, (2) deepening Gatun Lake's navigational channel, and (3) three water reutilization basins per each lock chamber.

<sup>1</sup> PLD is the abbreviation of *Precise Level Datum*. It is the geodesic reference level used at the Canal.



- **Water reutilization basins' yield.** With the water reutilization basins, the third set of locks will reutilize 60% of water in each transit. The third set of locks will use 7% less water per transit than each of the existing lock lanes.
- **Gatun Lake's channel deepening's yield.** Deepening Gatun Lake's and Gaillard Cut's navigational channels will allow the use of greater lake storage capacity, which will increase the yield of the water supply system by 385 million gallons (1,457 million liters) of additional water per day. This will be enough water to perform approximately 2,550 additional lockages per year, or about 7 additional lockages per day.
- **Gatun Lake's elevation water yield.** Elevating Gatun Lake's maximum operating level will increase the lake storage capacity, which will increase the yield of the water supply system by 165 million gallons (625 million liters) of additional water per day. This will be enough water to perform an annual average of approximately 1,100 additional lockages, or about 3 additional lockages per day.
- **Combined water program yield.** The combination of the three components of the water program will allow the Canal's water system to provide 2,670 million gallons of additional water per day, an amount of water equivalent to approximately 48.5 daily lockages or 17,700 transits per year<sup>2</sup>.

## 2 Cost estimate for the third set of locks project.

- **Cost estimate for the third set of locks project.** The project will have an approximate estimated cost of \$5,250 million, which includes provisions for contingencies and inflation during the construction period. This estimate assumes 2% average annual inflation.

## 3 Canal market

- **Main Canal market segments.** During FY 2005, the containerships segment represented, with 98 million PCUMS tons<sup>3</sup>, a 35% of total PCUMS tonnage transiting the Canal and 40% of its revenues. That same year, the dry bulk segment represented a 55 million PCUMS tons volume and 19% of revenues, while the vehicle carriers segment generated 35 million PCUMS tons or 11% of revenues.
- **Key Canal route.** Within the containerized cargo segment, trade between Northeast Asia and the U.S. East Coast has the highest

<sup>2</sup> An equivalent lockage refers to the water required to transit a vessel from one ocean to the other through the existing Canal, or approximately 55 million gallons per transit.

<sup>3</sup> Cargo volume transiting the Canal is measured in PCUMS tons, PCUMS being the acronym for Panama Canal – Universal Measurement System. A PCUMS ton is the unit used by the Canal to establish tolls, and measures vessels volumetric cargo capacity. A PCUMS ton is equivalent to approximately 100 cubic feet of cargo space, and a 20-foot long container is equivalent to approximately 13 PCUMS tons.



potential for Canal traffic growth. At present, this route represents over 50% of PCUMS volume of containerized cargo transiting the Canal.

- **Projected traffic growth for the expanded Canal.** In the most probable scenario, Canal traffic will increase from the 280 million PCUMS tons that transited through the Canal during FY 2005 to nearly 510 million PCUMS tons in FY 2025, which represents an 82% growth. In the highest growth scenario, traffic will reach 585 million PCUMS tons in 2025, while in the lowest growth scenario demand will grow to almost 480 million PCUMS tons in FY 2025. This represents a growth of between 72% and 110%, considering the lowest and highest growth scenarios, respectively.
- **Growth forecast for containerized cargo transiting the Canal.** Most probably, containerized cargo traffic will increase at an average annual rate of approximately 5.6%, from 98 million PCUMS tons in 2005 to close to 296 million in 2025. In the optimistic scenario, containership demand would grow to reach 345 million PCUMS tons in 2025 and, in the pessimistic case, to 279 million.
- **The advantages of post-panamax containerships.** These ships offer scale economies that reduce shippers' operational cost per TEU<sup>4</sup> by 7% and 17%. Transcontinental routes where shippers may use post-Panamax vessels hold an advantage over routes where these may not be used, such as the Canal.
- **Other Canal segments' growth projections.** In terms of PCUMS volume, the vehicle carriers and cruise ships segments will have an average annual growth of between 2% and 3%. The dry bulk segment will grow at an average rate of about 1% per year during the next twenty years.
- **Canal competitors.** In the containerships market segment Canal competitors between Northeast Asia and the U.S. East Coast, are: (1) the transpacific route combined with the U.S. Intermodal system of the United States and (2) the Suez Canal route
- **Market share.** In the containerships route between Northeast Asia and the U.S. East Coast, the Canal holds a 38% market share, while the transpacific / Intermodal route holds 61% and the Suez Canal route, 1%. Should the Canal be expanded with a third set of locks, the Panama route will increase its market share to about 49%. Otherwise, Panama route's market share will decrease to about 23%; that of the Intermodal system will go up to 65%; and Suez's to 12%.
- **The post-Panamax containerships fleet.** By 2011, the entire post-Panamax containerships fleet will consist of approximately 670 vessels with a total capacity of about 4.6 million TEUs, twice the current capacity of the post-Panamax containership fleet. Therefore, by that same year, 37% of the world's containerships fleet capacity will be in vessels that cannot transit through the Canal due to their size.

<sup>4</sup> One TEU (*twenty-foot equivalent unit*) is the term used to identify a 20' long maritime container, or its equivalent.



- **Few vessels represent many transits.** For market segments that operate in itineraries, one single vessel repeats its route multiple times per year. In January 2006, there were 36 liner services operating with 291 Panamax containerships in the Northeast Asia and the U.S. East Coast route through the Panama Canal. These vessels represented 2,119 transits, more than 85 million PCUMS tons, and paid B/.377 million in tolls, which represents 33.8% of Canal revenues. In conclusion, a reduced number of large vessels operating on permanent rotations represent a major traffic and revenue volume for the Canal.

#### 4 Canal capacity

- **Maximum sustainable capacity of the existing Canal.** With the completion of a few remaining improvements, the Canal will have a maximum sustainable capacity of between 330 and 340 million PCUMS tons per year, equivalent to approximately 13,800 and 14,000 ocean going vessel transits per year. This maximum capacity is determined by the capacity of the existing locks, and cannot be increased further without the construction of the third set of locks.
- **The date when the Canal will reach its maximum capacity.** The present Canal will reach its maximum capacity between the years 2009 and 2012.
- **Present Canal utilization level.** Currently the Canal handles about 280 million PCUMS tons. Considering its maximum capacity of 340 million tons, the Canal is currently operating near 85% of its maximum sustainable capacity.
- **Booking slots shortage.** Over 75% of Canal users request a reservation slot to guarantee a particular transit date, and the number of these requests is increasing. The Canal does not have enough booking slots for all those requesting them. During the last two years, the Canal could not provide a reservation to approximately 20% of the users who requested them.
- **Canal capacity is exhausted.** Close to 50% of transiting vessels have the maximum width that fits in the locks and over 10% have the maximum length. Approximately 80% of the PCUMS tonnage that the Canal handles transits in vessels of the maximum dimensions that fit in the locks. Also, most Canal users already utilize the largest vessels appropriate for the routes they serve.
- **Capacity of the Canal with the third set of locks.** The Canal, expanded with the third set of locks, will have a maximum sustainable capacity of approximately 600 million PCUMS tons per year.
- **Maximum vessel sizes that may be use the new locks.** The new lock chambers will be able to transit post-Panamax containerships with a 366 m (1,200') length, 49 m (160') width and a 15 m (50') draft in tropical fresh water. This is equivalent to containerships with a nominal capacity of up to 12,000, 20' long containers, and tankers and



dry bulk vessels of Capesize and Suezmax dimensions. Typical Capesize and Suezmax sized vessels that would use the post-Panamax lock, have a 130,000 to 170,000 tons dead weight; and are 270 to 280 m in length and 40 to 45 m in width.

## 5 Project execution

- **Commissioning.** The execution of the third set of locks project will start in 2007 if it is approved by referendum during 2006.
- **Project Duration.** The execution of the project will take up to 8 years, between 2007 and 2014. The third set of locks will begin operations on 2015.
- **Job generation during project execution.** Estimates are that approximately 35,000 to 40,000 additional job positions will be created directly and indirectly due to the projects construction activities. During these works, the period when employment will be most intense will be between 2010 and 2011. Among the jobs that will be created during this peak construction period, about 6,000 to 7,000 include construction workers.
- **Job generation after project execution.** Between 10% and 15% more jobs will be created in the economy if the Canal is expanded. It is estimated that, without the expansion of the Canal, by 2025 there will be 1.5 million employed people. The number of additional jobs created due to the expansion will be between 150,000 and 250,000 jobs by the year 2025.
- **Payments to the National Treasury during the construction.** During the construction of the third set of locks, the Canal will continue making contributions to the National Treasury in concept of rights per ton and operational surplus. These payments will never be less than those made to the National Treasury in 2005 of those that will be made in 2006. In cumulative terms, the Canal will contribute over B/.6,000 million in concept of rights per ton and surplus during the construction period, between 2007 and 2014.
- **Costs recovery.** Third set of locks project investments will be recovered through Canal toll charges. In accounting terms, the investment will be recovered in ten years or less.
- **Financing.** The financing of the third set of locks will be the result of combining a reasonable tolls increase, implemented immediately after the moment when the proposal is approved, with interim external financing sources in order to meet the requirements during the peak construction period. Therefore, the third set of locks project will be financed through a mix of ACP capital contributions and external financing. The amount to come from external financing will depend on (1) investment amounts required by the project; (2) the need to build as fast as it is technically and economically viable; (3) Canal revenues



resulting from Canal traffic volumes and the price policy implemented by ACP.

- **Financing will be temporary and short-termed.** Financing for the third set of locks project will be temporary to cover the project's peak construction periods, and it will be repaid shortly after commissioning. The source for the repayment of this interim financing will be the Canal tolls
- **No need for State endorsement or guarantees.** The external financing contracts undersigned by ACP for the third set of locks project will not have the endorsement of the State, and will be solely guaranteed by the cash flows that the project will generate. No State guarantees will be utilized to back up the third set of locks project.
- **Different financing sources will be used.** ACP will use financial markets different than those utilized by the State to finance its capital programs.

## 6 Operational aspects of the expanded Canal

- **Existing locks will continue to operate.** The existing locks will continue to operate during construction and once the third set of locks begins operating. With proper maintenance, the present locks will continue to work indefinitely. The third set of locks, due to the increase in capacity, will allow adequate maintenance of the existing locks, which will have been operating for 100 years by that time.
- **Positioning vessels with tugboats.** In the third set of locks, vessels lockage process will be assisted with tugboats instead of locomotives, as they it is done now.
- **Uninterrupted present Canal operations.** The Canal will continue to work as usual and without traffic interruptions during the construction of the third set of locks.
- **New locks will work with water flowing by gravity.** The new locks and their water reutilization basins will work similar to existing locks, where water flows by gravity, with no need for pumps.
- **Tolls collection.** Tolls will not be different regardless of which lock is used.
- **Operations with and without basins.** The third set of locks will be able to operate without the water reutilization basins and maintain its efficiency, as well as its transit capacity. The third set of locks will continue working even when water reutilization basins are under maintenance.

## 7 Project environmental aspects

- **No reservoirs will be built.** The third set of locks project does not require the construction of reservoirs. The expanded Canal will be able



to operate at full capacity without the need for additional water other than that produced by the western area of the watershed with Gatun and Alhajuela lakes. It will not be necessary to relocate any communities. The project's construction site is entirely located within ACP operational and administrative areas.

- **Cultural and scientific resources.** Archaeological and paleontological prospecting has been performed at the site of the new locks and channels, and it has been determined that no major archaeological, cultural or scientific findings are likely to occur in these areas. During the construction, permanent supervision of all areas which may contain cultural or scientific resources will be conducted, in order to detect and rescue those of scientific interest.
- **Water quality.** Gatun and Alhajuela lakes will maintain their quality of tropical fresh water with stable ecosystems, and their water will be kept only to well within appropriate quality levels and standards to be potabilized and used by the population.

## 8 The project's economic and social yield

- **Project rate of return.** Based on the most probable demand projection, investments on the third set of locks will generate an internal rate of return in the order of 12%<sup>5</sup>.
- **Social profitability rate.** The social profitability rate of the third set of locks project is between 11% and 14%. When studying the effects of expanding the Canal on Panama's poverty, conclusions were that if the project is executed the number of poor people will decrease by over one hundred thousand people in 2025, as opposed to the no-expansion scenario.
- **Effect on the GIP.** The expansion of the Canal will allow Panama to reach a gross internal product of B/.31,700 million in 2025, which represents almost 2.5 times that of 2005, and is equivalent to over 5% average annual growth for the next 20 years.

<sup>5</sup> The third set of locks project generates an internal rate of return in the order of 12%, considering cash flows not affected by inflation, in 2005 dollars. Taking into account a 2% average possible annual inflation, the expansion program generates a 14% internal rate of return.