

TRINIDAD AND TOBAGO

Project Profile

I. BASIC DATA

Project name:	Flood Alleviation and Drainage Program
Project number:	TT-L1036
Project Team:	Evan Cayetano (WSA/CJA), Project Team Leader; Rodrigo Riquelme, Javier Garcia, Maria Julia Bocco, Raul Muñoz and Irene Cartin (INE/WSA); Gabriel Nagy (FMM/CTT); Dale James (CCB/CTT); Gregory Dunbar, Shirley Gayle (FMP/CTT); and Guillermo Eschoyez (LEG/SGO).
Borrower:	Republic of Trinidad & Tobago
Executing Agency:	Ministry of Environment and Water Resources
Financing Plan:	IDB (OC) Works: US\$120 million Local: 0.00 Total: US\$120 million
Safeguards	Policies triggered: OP-703 (B.1, B.4, B.5, B.7, B.11), OP-102, OP-704 Classification: Category: B

II. GENERAL JUSTIFICATION AND OBJECTIVES

- 2.1 **Background.** As a small twin island nation, Trinidad and Tobago, with high population density and economic pressure on coastal areas, is highly vulnerable to impacts of climate changes. Based on climate change models, the average rainfall is predicted to reduce but with higher intensities, which will only to be exacerbated by projected rise in sea level. Port of Spain (POS), the nation's capital city and the area of interest of the project, is located on the low-lying coastal plain, surrounded by steep hills in North and North-East and the sea in South-West. It has a triangular shape which is delimited by two urban water courses – the East Dry River (St. Anne River) in the East, and the Maraval River in the North-West, and the sea in South-East. The two rivers have been partially realigned from their original courses in the past, in order to provide additional space for the city development, and the river channels have been lined with concrete.
- 2.2 The drainage situation in POS has been aggravated over the past 30 years by urban developments which spilled outside the area demarcated by the two rivers onto the hills slopes, and by significant land reclamation works (housing harbour facilities) in front of the original sea front. While the former development created additional storm runoff loads on the drainage system, the latter has effectively inhibited capacity of gravitational drainage of the internal town area. Additionally, decades of neglect of the storm water drainage infrastructure and ad-hoc and uncoordinated solutions of acute problems, has contributed to the present situation of disfunctionality of the drainage system. All this has resulted in frequent floods (as frequent as several times each year) at several critical locations around the city, which cause serious damages, traffic disruptions and general uncertainty.

- 2.3 With regards to the East Dry River, a solution is being sought through a multidisciplinary “Longitudinal Park Project”, intended to convert the river itself and the currently deteriorated surrounding public areas into a harmonious urban context, delivering improved traffic solution in south-north direction and valuable urban space for public use, while at the same time ensuring adequate stream flow especially during storm events.
- 2.4 **Institutional Arrangement:** The Drainage Division (DD) within the Ministry of Environment and Water Resources (MEWR), referred to as the competent authority in the Waterworks and Water Conservation Act, is responsible to construct and carry out any waterworks for supplying, conveying, measuring, regulating or disposal of (storm) water subject to the provisions of the Act or special directions from the Minister. Under the Act the competent authority is responsible for irrigation, drainage or reclamation; protection of lands against water; and the widening, deepening, straightening, improving, diversion, stopping up or joining up of watercourses. Until recently the DD was within the Ministry of Works; the shift to the MEWR is consistent with the GORTT’s policy direction to consolidate water resources agencies.
- 2.5 The DD is divided into 2 Branches – Construction & Maintenance Branch in charge of the 4 Regions of Trinidad (North, Central, South and East) and mainly deal with recurrent works and public complaints; and the Planning Branch which is responsible for strategic planning of the DD, formulates the Drainage Development Program for the Country, including formal Drainage approval for land development. For major infrastructure works, the GORTT and DD rely on the National Infrastructure and Development Company (NIDCO), a special purpose state company wholly owned by the GORTT, which provides procurement, project and contract management services to the GORTT for assigned major infrastructure projects, such as roads, bridges, drainage and flood mitigation, and transportation projects, among others (See [Financial link](#)). It is reported that the POS City Corporation has responsibility for operation and maintenance of drainage works in POS; the legislative arrangement is to be confirmed.
- 2.6 **Sector Challenges:** The main challenge in the sector is the weak institutional arrangement to conduct and maintain drainage works. In the broader scheme, the legislative framework for water resources also needs to be modernized. There is need to increase the skills and institutional capacity of the public authorities to implement satisfactory measures of flood control and mitigation based on a more holistic and comprehensive catchment management approach. In Trinidad and Tobago, flood studies have been undertaken on an ad hoc catchment by catchment basis. Generally such studies have not been placed within an overall integrated framework. In order to improve the capacity and obligations of the public authority responsible for drainage infrastructure, the GORTT is desirous of establishing an Authority to be responsible for water resources management including drainage and flood control. Addressing the institutional challenges will not impede the implementation of the works and will be done on parallel tracts with implementation of the flood alleviation works.

- 2.7 **IDB Assistance:** The problem of flooding was noted under the POS Emergent Sustainable Cities Initiative (ESCI) Action Plan sponsored by the Bank and developed using a multidisciplinary approach with the participation of the GORTT and the of Port of Spain City Corporation. Also included in the ESCI Action Plan is a proposed linear park of 1.8 km that will be located along the East Dry River as an urban upgrading measure¹. The design for the linear park is being supported under the ESCI by the Agreement between the Bank and the Swiss Federal Institute of Technology (ETH).
- 2.8 **Link to Country Strategy.** The proposed operation is aligned with the overall philosophical underpinning of the 2011-2015 Bank Country Strategy (CS) with T&T, which states “Public sector spending will have to become more efficient and effective, and the multiple subsidies and transfers supporting patronage systems and distorting incentives for private sector activities will have to be rationalized and targeted to create incentives for the transition to the post-hydrocarbon economy”. The program will contribute directly to mainstreaming of climate change adaptation and carbon reduction into national development.
- 2.9 Also, through a better management of infrastructure and of water as a natural resource, the proposed program will contribute directly to the Ninth IDB General Capital Increase (GCI-9) lending target for the 2012-2015 period “Lending to support climate change initiatives, sustainable energy and environmental sustainability”. The program also contributes to the lending target “Support development to small and vulnerable countries”.

III. PROJECT DESIGN, EXECUTION AND SECTOR KNOWLEDGE

- 3.1 The objective of the project is to minimize impacts from the lack of, or insufficient, urban drainage infrastructure in critical areas of the city of POS. The Drainage Division is currently leading an initiative to start a catchment management approach for flood alleviation for Port of Spain. The GORTT has asked the IDB to provide support to the Drainage Division for the successful implementation of such catchment management plan and the necessary works, as well as modernizing the institutional arrangement for water resources management to ensure sustainability of the works. The plan indicates the main areas of POS affected by flooding, reasons for this situation, and proposed solutions. Some critical interventions emanating from this plan have already been defined and elaborated at a conceptual level, which need to be finalized with validated hydrological data. These interventions, also called packages, have been planned to mitigate the flooding events experienced in the past years in the Port of Spain catchment. The full implementation of these packages along with the development of a catchment management plan and the proper institutional arrangement will give sustainability to such initiative.

¹ The ESCI concept represents a new approach which identifies a city’s most pressing sustainability challenges via a rapid diagnostic assessment, based upon a core set of 60 indicators. “Sustainable City” is defined as one that offers a high quality of life for its inhabitants minimizes their impact on the natural environment and has a local and administrative government capacity to maintain its economic growth and perform its duties with urban citizens participation.

- 3.2 Given the state of readiness of the various work packages, the varying time required for their validation, and the importance to allow all potential interventions to be included in the operation, the proposed intervention will follow a multiple-works approach: i.e. while a representative sample of interventions is identified and analyzed to begin the operation (see Component 1 below), future interventions will be selected according to specific criteria and specifications, and completed within the timeframe of the program. The works to be financed are going to be selected after a careful consideration of a range of alternative investment possibilities. The project is comprised of the following three components.
- 3.3 **Component 1. Drainage works for the critical areas flooded in Port of Spain (US\$90.0M).** This intervention will cover necessary civil works to mitigate flooding events in the area of Port of Spain. Some of the works have been already identified and defined by the Drainage Division and will be implemented within the modality of design built schemes. The future interventions are going to be validated under a catchment management framework that is going to be implemented in parallel in order to give sustainability to the system. This approach will also consider climate change events that are reflected in the likely modifications of design storms in terms of frequency, return period and intensity as well as sea level rise scenarios. The works are going to be located within the sub-catchment formed between the St. Ann's and Maraval River. The main types of works to be included are: interceptors, drainage systems, detention ponds and pumping stations.
- 3.4 **Component 2. Institutional Strengthening of the Drainage Division (US\$10M):** This component will address the weak institutional arrangement of the sector, modernize the legislative framework, and include the necessary activities to support the GORTT in transforming the Drainage Division into an independent Authority within the MEWR that could build, operate and maintain all the future and existing drainage infrastructure in the country. Although the DD has adopted many actions toward this direction it does not operate within a modern, comprehensive institutional framework. GORTT has already developed some studies to support the transformation of the Drainage Division into an autonomous government agency and modernizing the institutional arrangement for management of water resources.
- 3.5 **Component 3. Linear Park (US\$20M):** This component will finance all the civil and landscaping works for the implementation of the 1.8 km linear park located at St. Ann's River. The linear park will be designed in conjunction with the catchment analysis and drainage works design. The river discharge is one of the most problematic areas in POS in terms of flooding. This area needs to have an integral solution which will contemplate the redesign of the civil works at the discharge area including road bridges, diversion chambers, river bed works, etc. (Component 1). Therefore, it will be necessary to adapt the linear park to the final layout of these works in order to give desired functionality of the park.
- A. Execution and complementary activities required**
- 3.6 The Republic of Trinidad and Tobago will be the Borrower, the Ministry of Environment and Water Resources will be the Executing Agency for the project. The executing success will depend on a good alignment between NIDCO (highly

experienced in executing infrastructure projects) and the technical experience of the Drainage Division in the MEWR. The sustainability of the program after execution will be provided by the accomplishment of Component 2 whereby an autonomous entity will be established for the operation of the new assets.

- 3.7 In parallel to the preparation of the project, the team is preparing Technical Cooperation (TC) Designs for Flood Alleviations and Drainage Program TT-T1043, for the institutional strengthening of the DD. The output from the TC will support the execution of Component 2 during execution.

B. Lessons Learned and Sector Knowledge

- 3.8 **Lessons Learned:** Past projects indicate that in order to ensure successful project implementation, the following conditions must apply: (i) the beneficiary's willingness to change; (ii) government support for the project and the political will to implement the project as proposed; and (iii) knowledgeable counterparts and a well-organized project implementation team.

- 3.9 **Sector Knowledge:** The Bank has learned from projects UR-L1069 (2011), City of Montevideo Drainage and Sanitation System Expansion and Improvement Project, NI-L1010 (2009), Storm Water Drainage and Development Management Program in Sub Watershed III of Managua, and BO-L1028 (2010) Drainage in the Municipios of La Paz and El Alto, that in addition to a good implementation program for the works, there is need for a detailed study at a catchment level that will confirm the reliability of the works under different scenarios related to extreme events (high intensity rainfalls, sea level rise or other climate change related events). The quality of such studies significantly increases the confidence level of the final designs. There is also a need to ensure the sustainability of the operation and maintenance of the new assets since it is very common to have drainage operation and maintenance under the responsibility of institutions that do not have enough budget and/or skills to operate the new assets in a sustainable manner. The three operations include similar activities to the ones detailed in the current operation.

IV. ENVIRONMENTAL AND SOCIAL IMPACTS AND RISKS

- 4.1 The program is not expected to have any large scale, significant and/or irreversible negative environmental or social impacts. Negative expected impacts and risks are mainly related to drainage and flood protection infrastructure construction works, including noise, dust, waste generation, traffic disruption and occupational risks. Key policies and directives triggered in this project include B.04 (other risks and factors), due to the vulnerability of the operation to onset changes in climatic variables, B.05 (environmental assessment requirements), B.06 (consultation), B.07 (supervision and compliance), and B.11 (pollution prevention and abatement) of the Environment Safeguards Policy (OP-703), IDB Access to Information Policy (OP-102), and the Natural Disaster Policy (OP-704). It is not likely that Involuntary Resettlement Policy (OP-710) will apply, however this will be assessed during the due diligence process, as well if B.9 of OP-703 (Natural Habitats and Cultural Sites).

- 4.2 The potential impacts of the program are anticipated to be low to medium and the team proposes an environmental classification of “B”, under OP-703, defined as operations that are likely to cause mostly local and short-term negative environmental and associated social impacts and for which effective mitigation measures are readily available.
- 4.3 The Environmental and Social Strategy involves the preparation of an Environmental and Social Analysis and the preparation of an Environmental and Social Management Plan. In compliance with OP-102, this document will be disclosed in the T&T local offices and on the IDB external website.
- 4.4 The lack of alignment between DD and POS City Corporation and the authorities responsible for drainage is a high risk that will be addressed by the implementation of Component 2. This intervention will provide for sustainability of this operation. Flooding and erosion during execution and/or operation is also flagged as a high risk, which will be mitigated by the assurance of technically sound designs of the work packages.

V. RESOURCES AND TIMETABLE

- 5.1 Annex V details the project preparation steps, milestone dates and estimated resources for project preparation. Expected date for approval of the Draft Loan Proposal is September 19, 2013, and expected Board approval is October 30, 2013. The administrative budget for the preparation of the project provides for a total of three missions for an amount of US\$116,600.00 including consultant services for engineering, socio-economic, institutional and environmental matters.

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SAFEGUARD SCREENING FORM

PROJECT DETAILS	IDB Sector	WATER AND SANITATION-URBAN DRAINAGE
	Type of Operation	Investment Loan
	Additional Operation Details	
	Country	TRINIDAD AND TOBAGO
	Project Status	
	Investment Checklist	Infrastructure Water and Sanitation
	Team Leader	Cayetano, Evan Stephen (EVANC@iadb.org)
	Project Title	Flood Alleviation and Drainage Program
	Project Number	TT-L1036
	Safeguard Screening Assessor(s)	Muñoz Castillo, Raúl (raulmu@IADB.ORG)
	Assessment Date	2013-05-03
	Additional Comments	

PROJECT CLASSIFICATION SUMMARY	Project Category: B	Override Rating:	Override Justification:
	Conditions/ Recommendations		Comments:
		<p>- Category "B" operations require an environmental analysis (see Environment Policy Guideline: Directive B.5 for Environmental Analysis requirements).</p> <p>- The Project Team must send to ESR the PP (or equivalent) containing the Environmental and Social Strategy (the requirements for an ESS are described in the Environment Policy Guideline: Directive B.3) as well as the Safeguard Policy Filter and Safeguard Screening Form Reports.</p> <p>- These operations will normally require an environmental and/or social impact analysis, according to, and focusing on, the specific issues identified in the screening process, and an environmental and social management plan (ESMP). However, these operations should also establish safeguard, or monitoring requirements to address environmental and other risks (social, disaster, cultural, health and safety etc.) where necessary.</p>	

SUMMARY OF IMPACTS/RISKS AND POTENTIAL SOLUTIONS	Identified Impacts/Risks	Potential Solutions
	<p>The project will or may require involuntary resettlement and/or economic displacement of a minor to moderate nature (e.g. in relation to pipeline rights of way) and does not affect indigenous peoples or other vulnerable land based groups.</p>	<p>Develop Resettlement Plan (RP): The borrower should be required to develop a simple RP that could be part of the ESMP and demonstrates the following attributes: (a) successful engagement with affected parties via a process of Community Participation; (b) mechanisms for delivery of compensation in a timely and efficient fashion; (c) budgeting and internal capacity (within borrower's organization) to monitor and manage resettlement activities as necessary over the course of the project; and (d) if needed, a grievance mechanism for resettled people. Depending on the financial product, the RP should be referenced in legal documentation (covenants, conditions of disbursement, project completion tests etc.), require regular (bi-annual or annual) reporting and independent review of implementation.</p>
	<p>The negative impacts from production, procurement and disposal of hazardous materials (such as fuel and chlorine) are</p>	<p>Monitor hazardous materials use: The borrower should document risks relating to use of hazardous materials and prepare a hazardous material</p>

	<p>minor and will comply with relevant national legislation, IDB requirements on hazardous material and international standards and guidelines such as the IFC Water and Sanitation Guidelines (if applicable).</p>	<p>management plan that indicates how hazardous materials will be managed (and community risks mitigated). This plan could be part of the ESMP.</p>
	<p>Generation of solid waste is moderate in volume, does not include hazardous materials and follows standards recognized by multilateral development banks.</p>	<p>Solid Waste Management: The borrower should monitor and report on waste reduction, management and disposal and may also need to develop a Waste Management Plan (which could be included in the ESMP). Effort should be placed on reducing and recycling solid wastes. Specifically (if applicable) in the case that national legislations have no provisions for the disposal and destruction of hazardous materials, the applicable procedures established within the Rotterdam Convention, the Stockholm Convention, the Basel Convention, the WHO List on Banned Pesticides, and the Pollution Prevention and Abatement Handbook (PPAH), should be taken into consideration.</p>
	<p>Likely to have minor to moderate emission or discharges that would negatively affect ambient environmental conditions.</p>	<p>Management of Ambient Environmental Conditions: The borrower should be required to prepare an action plan (and include it in the ESMP) that indicates how risks and impacts to ambient environmental conditions can be managed and mitigated consistent with relevant national requirements and international standards and guidelines such as the IFC Water and Sanitation Guidelines (as appropriate). The borrower should (a) consider a number of factors, including the finite assimilative capacity of the environment, existing and future land use, existing ambient conditions, the project's proximity to ecologically sensitive or protected areas, and the potential for cumulative impacts with uncertain and irreversible consequences; and (b) promote strategies that avoid or, where avoidance is not feasible, minimize or reduce the release of pollutants, including strategies that contribute to the improvement of ambient conditions when the project has the potential to constitute a significant source of emissions in an already degraded area. The plan should be subject to review by qualified independent experts. Depending on the financial product, this information should be referenced in appropriate legal documentation (covenants, conditions of disbursement, etc.).</p>

<p>DISASTER SUMMARY</p>	<p>Details The Project should include the necessary measures to reduce disaster risk to acceptable levels as determined by the Bank on the basis of generally accepted standards and practices. Alternative prevention and mitigation measures that decrease vulnerability must be analyzed</p>	<p>Actions A more limited and specific Disaster Risk Assessment (DRA) may be required (see Directive A-2 of the DRM Policy OP-704). Please contact a Natural Disaster Specialist in VPS/ESG or INE/RND for guidance. Also: if the project needs to be modified to increase resilience to climate change, consider the (i)</p>
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	<p>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.</p>	<p>possibility of classification as adaptation project and (ii) additional financing options. Please contact a INE/CCS adaptation specialist for guidance. The project triggered the Other Risks policy (B.04): climate risk. Please include sections on how climate risk will be dealt with in the ESS as well as client documents (EIA, EA, etc); Recommend addressing risks from gradual changes in climate for the project in cost/benefit and credit risk analyses as well as TORs for engineering studies.</p>
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<p>ASSESSOR DETAILS</p>	<p>Name of person who completed screening:</p>	<p>Muñoz Castillo, Raúl (raulmu@IADB.ORG)</p>
	<p>Title:</p>	
	<p>Date:</p>	<p>2013-05-03</p>

SAFEGUARD POLICY FILTER REPORT

PROJECT DETAILS	IDB Sector	WATER AND SANITATION-URBAN DRAINAGE
	Type of Operation	Investment Loan
	Additional Operation Details	
	Investment Checklist	Infrastructure Water and Sanitation
	Team Leader	Cayetano, Evan Stephen (EVANC@iadb.org)
	Project Title	Flood Alleviation and Drainage Program
	Project Number	TT-L1036
	Safeguard Screening Assessor(s)	Muñoz Castillo, Raúl (raulmu@IADB.ORG)
	Assessment Date	2013-05-03
	Additional Comments	

SAFEGUARD POLICY FILTER RESULTS	Type of Operation	Loan Operation	
	Safeguard Policy Items Identified (Yes)	Activities to be financed in the project area are located within a geographical area or sector exposed to natural hazards* (Type 1 Disaster Risk Scenario).	(B.01) Disaster Risk Management Policy– OP-704
		The Bank will make available to the public the relevant Project documents.	(B.01) Access to Information Policy– OP-102
		The operation is in compliance with environmental, specific women’s rights, gender, and indigenous laws and regulations of the country where the operation is being implemented (including national obligations established under ratified Multilateral Environmental Agreements).	(B.02)
		The operation (including associated facilities) is screened and classified according to their potential environmental impacts.	(B.03)
		The operation is sensitive to slow onset changes in climatic variables, weather patterns and the consequences incl. sea level rise, glacier run off. (Type 1 Gradual Climate Change Risk Scenario).	(B.04)
		The project is specifically designed to increase the capacity of human and natural systems to adapt to a changing climate.	(B.04)
		The project includes activities to close current “adaptation deficits” or to increase the capacity of human and natural systems to adapt to a changing climate.	(B.04)
		An Environmental Assessment is required.	(B.05)
		Consultations with affected parties will be performed equitably and inclusively with the views of all stakeholders taken into account, including in particular: (a) equal participation of women and men, (b) socio-culturally appropriate participation of indigenous peoples and (c) mechanisms for equitable participation by vulnerable groups.	(B.06)
	The Bank will monitor the executing agency/borrower’s compliance with all safeguard	(B.07)	

		requirements stipulated in the loan agreement and project operating or credit regulations.	
		The operation has the potential to pollute the environment (e.g. air, soil, water, greenhouse gases...).	(B.11)
		Suitable safeguard provisions for procurement of goods and services in Bank financed projects may be incorporated into project-specific loan agreements, operating regulations and bidding documents, as appropriate, to ensure environmentally responsible procurement.	(B.17)
	Potential Safeguard Policy Items(?)	Potential disruption to people’s livelihoods living in the project's area of influence (not limited to involuntary displacement, also see Resettlement Policy.)	(B.01) Resettlement Policy– OP-710
		The Borrower/Executing Agency exhibits weak institutional capacity for managing environmental and social issues.	(B.04)
		Environmental or culturally sensitive areas, defined in the Policy as critical natural habitats or critical cultural sites in project area of influence (please refer to the Decision Support System for more information).	(B.09)
		Conversion of Natural Habitats in project area of influence (please refer to the Decision Support System for more information).	(B.09)
	Recommended Action:	<p>Operation has triggered 1 or more Policy Directives; please refer to appropriate Directive(s). Complete Project Classification Tool. Submit Safeguard Policy Filter Report, PP (or equivalent) and Safeguard Screening Form to ESR.</p> <p>The project triggered the Disaster Risk Management policy (OP-704). A more limited and specific Disaster Risk Assessment (DRA) may be required (see Directive A-2 of the DRM Policy OP-704). Please contact a Natural Disaster Specialist in VPS/ESG or INE/RND for guidance. Also: if the project needs to be modified to increase resilience to climate change, consider the (i) possibility of classification as adaptation project and (ii) additional financing options. Please contact a INE/CCS adaptation specialist for guidance.</p> <p>The project triggered the Other Risks policy (B.04): climate risk. Please include sections on how climate risk will be dealt with in the ESS as well as client documents (EIA, EA, etc); Recommend addressing risks from gradual changes in climate for the project in cost/benefit and credit risk analyses as well as TORs for engineering studies.</p>	
	Additional Comments:		

ASSESSOR DETAILS	Name of person who completed screening:	Muñoz Castillo, Raúl (raulmu@IADB.ORG)
	Title:	
	Date:	2013-05-03

ENVIRONMENTAL AND SOCIAL STRATEGY (ESS)

I. INTRODUCTION

Project Summary:

Project name: Flood Alleviation and Drainage Program

Project number: TT-L1018

Project Team: Evan Cayetano (WSA/CJA), Project Team Leader; Rodrigo Riquelme, Javier Garcia, Maria Julia Bocco, Raul Munoz (INE/WSA); Gabriel Nagy (FMM/CTT); Dale James (CCB/CTT); Gregory Dunbar (FMP/CTT); Shirley Gayle (FMP/CTT); Guillermo Eschoyez (LEG/SGO).

Borrower: Government of the Republic of Trinidad and Tobago (GORTT)

Executing Agency: Ministry of Environment and Water Resources/ National Infrastructure and Development Company

Financing Plan: IDB: US\$ 120 million

Local: US\$ 0

Total: US\$ 120 million

Safeguards Policies triggered: OP-703 (B.1, B.4, B.5, B.7, B.11), OP-102, OP-704

Classification: Category B

II. PROJECT DESCRIPTION

- 2.1 **Program objective.** The main objective of this programme is the reduction of flood risk in POS by improving the management of the water resource in the drainage channels through development of the built infrastructure. The Drainage Division is currently leading an initiative to start a catchment management approach for flood alleviation for Port of Spain. The GORTT has asked the IDB to provide support to the Drainage Division for the successful implementation of such catchment management plan and the necessary works defined in the packages. Some critical interventions have already been defined and have been elaborated at a conceptual level. These interventions, also called packages, have been planned to mitigate the flooding events experienced in the past years in the Port of Spain catchment. The full implementation of these packages along with the development of a catchment management plan and the proper institutional arrangement will give sustainability to such initiative.
- 2.2 **Execution scheme.** Given the importance to allow all potential interventions to be eligible for financing, the proposed intervention will follow a multiple-works approach: i.e. while a representative sample of interventions is identified and analyzed to begin the operation (see Component 1 below), future interventions will be selected according to specific criteria and specifications, and completed within the timeframe of the program. The works to be financed are going to be selected after a careful consideration of a range of alternative investment possibilities.
- 2.3 **Executing agency.** The GORTT will be the Borrower and the Drainage Division under the Ministry of Environment and Water Resources will be the Executing Agency for the

project; NIDCO will be co-executing agency responsible for the infrastructure works. A specific Project Executing Unit (PEU) will be required headed by a Project Manager

- 2.4 **Program Design.** The program will include three components:
- 2.5 **Component 1. Drainage works for the critical flooded areas in Port of Spain (US\$ 90.0M).** This intervention will cover necessary civil works to mitigate flooding events in the area of Port of Spain. Some of the works have been already identified and defined by the Drainage Division and will be implemented within the modality of design built schemes. The future interventions are going to be validated under a catchment management framework that is going to be implemented (in parallel in order to give sustainability to the system. The catchment management approach will also consider climate change events that are reflected in the re-estimate of design storms in terms of frequency, return period and intensity as well as sea level rise scenarios. The works are going to be located within the sub-catchment formed between the St. Ann's and Maraval River. The main type of works to be included are: interceptors, drainage systems, detention ponds and pumping stations.
- 2.6 **Component 2. Institutional Strengthening of the Drainage Division (US\$10M):** This component will include all the necessary activities to support the GORTT in transforming the Drainage Division into an independent entity that could build, operate and maintain all the future and existing drainage infrastructure in the country. Currently the Drainage Division has a mandate that do not fully cover all the necessary activities to guarantee this sustainability. Although the Division has adopted many actions toward this direction it does not operate within a comprehensive institutional framework. GORTT has already developed some studies to support the transformation of the Drainage Division into an autonomous government agency.
- 2.7 **Component 3. Linear Park (US\$20 mill):** This component will finance all the civil and landscaping works for the implementation of the 1.8 km linear park located at St. Ann's River. The linear park will be designed in conjunction with the catchment analysis and drainage works design. The river discharge is one of the most problematic areas in Port of Spain in terms of flooding. This area needs to have an integral solution which will contemplate the redesign of the civil works at the discharge area including road bridges, diversion chambers, river bed works, etc (Component 1). Therefore it will be necessary to adapt the linear park to the final layout of these works in order to give desired functionality of the park.

III. ENVIRONMENTAL AND SOCIAL COMPLIANCE STATUS

- 3.1 The Trinidad and Tobago Environmental Management Authority (EMA) is mandated to write and enforce laws and regulations for environmental management, to educate the public about the nation's environmental issues and to control and prevent pollution, as well as conserve nature. Government policy is that any activity likely to have significant effects on the environment, including drainage and flooding control systems, is to be made subject to an environmental impact assessment before consent is given.¹

¹ National Environmental Policy (2005), edited September 2009 by the EMA

- 3.2 Specifically, any project likely to have significant effects on the environment is required to apply for a Certificate of Environmental Clearance (CEC) before starting the works. The application for the CEC must include the project design, description and scope, as well as mitigation and monitoring measures for the anticipated impacts of the activity. The CEC application process is regulated by the Certificate of Environmental Clearance Rules (2001) approved by the EMA, and if given, it establishes specific environmental terms and conditions for the project execution.
- 3.3 After consultation with the EMA, each one of the individual drainage packages (see Section II) under this operation will have to obtain its CEC before the works start. Since some of the them have its individual CEC, during the due diligence process it will be assessed what will be needed in terms of environmental assessments and permits for the remaining packages (including the linear park), as well as the requirements for public consultation.
- 3.4 EMA has produced in 2006 Water Pollution Rules² which set standards for discharge of effluent from industrial processes and domestic wastewater treatment plants. However, the majority of the entities currently discharging water pollutants do not comply with these Standards. The Cartagena Protocol entered into force in 2003 and GORTT has ratified the Protocol Concerning Pollution From Land-Based Sources (LBS) Protocol. All the drainage packages to be financed will have to comply with the Water Pollution Rules, and when needed will have to submit a source application in order to register any facility that could be a potential source of a water pollution to the environment (it is usually a condition included in the CEC for the construction phase). Any other applicable sectorial regulations (air quality, noise, solid and hazardous wastes, public health and safety and public engagement) will have to be considered in the project design for the CEC application for each package.
- 3.5 Key policies and directives triggered in this project include B.04 (other risks and factors), due to the vulnerability of the operation to onset changes in climatic variables, B.05 (environmental assessment requirements), B.06 (consultation), B.07 (supervision and compliance), and B.11 (pollution prevention and abatement) of the Environment Safeguards Policy (OP-703), IDB Access to Information Policy (OP-102), and the Natural Disaster Policy (OP-704).
- 3.6 Due to the dimension, nature and location of the works to be financed, it is not expected that the Program will have negative impacts on natural habitats or protected areas and it is not likely that Involuntary Resettlement Policy (OP-710) will be triggered by the project; however this will be assessed during the due diligence process, as well as if B.9 of OP-703 (Natural Habitats and Cultural Sites) applies.
- 3.7 The potential impacts of the Project are anticipated to low to medium (see section V) and the team proposes an environmental classification of “B” for the Project under OP-703, defined as operations that are likely to cause mostly local and short-term negative environmental and associated social impacts and for which effective mitigation measures are readily available.
- 3.8 In accordance with the Category “B” classification, the Environmental and Social Strategy (ESS) involves the preparation of an Environmental and Social Analysis (ESA)

² Amendment of the Water Pollution Rules from 2001

and the preparation of an Environmental and Social Management Plan (ESMP). In compliance with OP-102, this document will be disclosed in the Trinidad and Tobago local offices and on the IDB external website.

IV. ENVIRONMENTAL AND SOCIAL SETTING

- 4.1 Since the details of the interventions to be financed under this program have not been finalized, the specific environmental and social setting of the intervention areas cannot currently be described. However, all the works to be financed are located in an urban environment, most of them in east-POS, largely influenced by urban anthropogenic activities and far from any natural area. The overall environmental and social context of the drainage and flooding control system status in POS is presented below to set the overall setting for the program and the potential issues that may arise during development and execution.
- 4.2 As part of the environment and social assessment process, the environmental and social setting for the facilities that will be targeted with the proposed operation will be identified, and this information will be presented in the ESAs that will be prepared during project design.
- 4.3 **Storm drainage and flooding in POS.** As a small twin island nation, Trinidad and Tobago, with limited land areas, high population density and economic pressure on coastal areas, is highly vulnerable to impacts of climate changes. Flooding in both urban and rural areas is a frequent occurrence, leading to substantial losses of property, agriculture, human health and severe damage on quality of life. Based on climate change models the average rainfall is predicted to reduce but with higher intensities are expected, which will only to be exacerbated by projected rise in sea level. Port of Spain (POS), the nation's capital city and the area of interest, is located on the low-lying coastal plain, surrounded by steep hills in North and North-East and the sea in South-West. It has a triangular shape which is delimited by two urban water courses – the East Dry River (St. Anne River) in the East, and the Maraval River in the North-West, and the sea in South-East. The two rivers have been partially realigned from their original courses in the past, in order to provide additional space for the city development, and the river channels have been lined with concrete.
- 4.4 Flooding occurs frequently in the City of Port of Spain, particularly in the low-lying zones between the Maraval River on the West and St. Anne River in the East. The flooding is the result of a number of factors, such as: (i) intensive urban developments and removal of vegetation of the hillsides north of Port of Spain, causing increased volumes of surface waters and faster runoff concentration (i.e. short term steep peaks); (ii) inadequate drainage infrastructure: The present drainage infrastructure was built in the 1960s. Since then, there has not been any systematic reengineering of the system, except patchwork repairs and ad-hoc efforts to keep deteriorating drains in operation. Under extreme conditions, the system now carries volumes for which it was never designed; (iii) increased erosion in the upstream catchments and sediment deposition in the lower segments of river channels, and drains and the accumulated solid waste and in absence of regular maintenance reduces the rivers' and drains' effective hydraulic

conveyance; and (iv) occurrences of heavy rain storms and high tides aggravate the flooding situation.

- 4.5 Flooding is concentrated especially in locations where the channel gradients change abruptly, typically where old land meets reclaimed land. In the downtown area, known flooding locations include Wrightson Road, South Quay, Henry Street and the Brian Lara Promenade. The flooding occurs after short and intensive rainfall and usually recedes after about an hour, which indicates that the overall cause of the flooding is related to insufficient storm water evacuation capacity into the sea from the area. As a consequence of serious underground erosion and dysfunctional drains during heavy storms, dangerous sink-holes have opened at several locations, endangering human lives causing serious traffic disruptions and losses.
- 4.6 Given all these circumstances, the alleviation of flooding in the Port of Spain area will require substantial capital investments, institutional change and community support. With regard to the East Dry River, a solution is being sought through a multidisciplinary “Longitudinal Park Project”, intended to convert the river itself and the currently deteriorated surrounding public areas into an attractive urban contents, delivering improved traffic solution in south-north direction and valuable urban space for public use, while at the same time ensuring adequate stream flow especially during storm events.
- 4.7 The main challenge in the sector is the weak institutional arrangement to conduct and maintain drainage works. Additionally, in the broader scheme, the legislative framework for water resources also needs to be modernized. There is need to increase the skills and institutional capacity of the public authorities to implement satisfactory measures of flood control and mitigation based on a more holistic and comprehensive catchment management approach. In Trinidad and Tobago, flood studies have been undertaken on an ad hoc catchment by catchment basis. Generally such studies have not been placed within an overall integrated framework. In order to improve the capacity and obligations of the public authority responsible for drainage infrastructure, the GORTT is desirous of establishing an Authority to be responsible for water resources management including drainage and flood control.
- 4.8 The Drainage Division, under the Ministry of Environment and Water Resources is responsible for the provision of protective engineering works along the coastlines of Trinidad and Tobago and has undertaken numerous studies in this regard. They also hold the responsibility for flood alleviation works and river channel maintenance. A number of programs, studies, projects are undertaken on their behalf to address the problems of flooding in areas. It is reported that the POS City Corporation has responsibility for operation and maintenance of drainage works in POS.
- 4.9 **Natural disaster and risks** –T&T is located within the Atlantic hurricane belt, and as such is subject to tropical storms and hurricanes. T&T is also located on the Circum-Caribbean Tectonic Belt, which has produced several earthquakes in magnitudes exceeding 7.0 since 1900. Actions will be taken to ensure compliance with IADB’s Disaster Risk Management Policy (OP-704).

V. ENVIRONMENTAL AND SOCIAL IMPACTS AND RISKS

- 5.1 In general terms, the Program will have a net environmental positive impact and will contribute to the well-being of the POS's population by addressing the problems of flooding in the City, and as result by increasing the adaptive capacity of POS to potential Climate Change and Sea Level Rise impacts. The program is not expected to have any major large scale, significant and/or irreversible negative environmental or social impacts.
- 5.2 The expected environmental and social impacts and risks will be those typically encountered with the works and activities related to the upgrading and construction of the flooding control facilities. As part of the ESA process the specific project environmental and social impacts and risks will be assessed.

Construction

- 5.3 Potential environmental impacts during construction are noise, dust, soil, air and water pollution and inadequate solid waste management. This could also include possible disruption of traffic during construction from vehicles. These impacts are likely to be local and short term for which effective mitigation measures will be designed.

Operations

- 5.4 Typically, flood protection projects may cause potential adverse effects on aquatic resources by deterioration and changes in water quality (e.g. sediment load). To minimize the risk of water quality impacts, the Program will include adequate maintenance solutions for the control of downstream sedimentation, including safe dredging procedures and disposal of dredged material when needed. During the works phase, the amount of suspended material could be reduced by the application of rigorous control of excavation works and management of construction material. In addition, some of the drainage intervention proposed may reduce sediment emissions to the sea by increasing the storage capacity for storm runoff from the downtown area.
- 5.5 The uncontrolled disposal of solid waste in the water courses and drainage channels is another source of water pollution. In addition to being an environmental threat, the accumulated solid waste in river channels represents a physical barrier for water flow increasing the vulnerability to flooding impacts. This risk may be mitigated by the development and implementation of a comprehensive plan for the removal of accumulated solid waste from the river channels and their banks, key for the adequate operation and maintenance of the system.

Other risks

- 5.6 The vulnerability of the POS's drainage system to Climate Change related impacts is one of the major risks to be considered in the project design, mainly due to sea level rise and increased hydrological extreme events frequency and duration. Occurrences of heavy rain storms and high tides already aggravate the flooding situation since the lower parts of the City are located only a few meters above present mean sea level, in some areas located in reclaimed land. A general rise of this level will further aggravate the situation by changing the hydraulic condition in the lower reaches of the POS's urban rivers and in low parts of the storm drainage network, especially vulnerable to such

change. To mitigate this risk a comprehensive assessment of the proposed solutions is going to be carried out under this operation by using dynamic simulation models and the incorporation of the climate change projected impacts, including sea level rise.

VI. ENVIRONMENTAL AND SOCIAL DUE DILIGENCE

- 6.1 In accordance with the Category “B” classification, the Environmental and Social Strategy (ESS) involves the preparation of an Environmental and Social Analysis (ESA) and the preparation of an Environmental and Social Management Plan (ESMP).
- 6.2 The focus of the environmental and social due diligence (ESDD) will be on the potential environmental and social impacts and risks during all phases of the proposed operation. The ESDD will evaluate the EA’s capacity to identify, mitigate and manage the environmental and social aspects and risks, as well as the technical and institutional capacity for the proper operation and maintenance of the system.
- 6.3 The ESDD will look at the following aspects:
 - Evaluation to confirm that the Program has sufficiently defined project design details and environmental and social baseline information to assess potential impacts, risks, and mitigation requirements. Evaluation to confirm that the Program’s direct, indirect and cumulative negative environmental and social impacts have been properly identified and evaluated, and that proper mitigation and management measures will be implemented.
 - Assessment of compliance with applicable IDB environmental and social policies, including specifically the Environmental and Safeguard Compliance Policy, Access to Information Policy, Disaster Risk Management Policy.
 - Assessment of compliance status with the applicable environmental, social, health and safety, and labor legal requirements in Trinidad and Tobago (e.g., laws, regulations, standards, permits, authorizations, applicable international treaties/conventions, etc.).
 - Preparation of the environmental assessments/applications needed for the environmental permits (CEC) for the works to include in the Program.
 - Confirmation that adequate health and safety and contingency plans and procedures will be established and implemented for construction, operation and maintenance (including sub-contractors) to address potential worker health and safety risks associated and project-related accidental events (e.g. spills, fires).
 - Confirmation that the natural disaster risks have been adequately identified, and that proper mitigation is implemented in the design of the facilities and into the operational plans of the facilities.
 - A preliminary comprehensive assessment of the drainage solutions proposed from a hydrological and urban IWRM point of view, including system’s vulnerability to Climate Change and Sea Level Rise.
 - Assessment of EA’s capacity to mitigate and monitor environmental, social, health and safety and labor aspects.

- Evaluation of project-related information disclosure and public consultation activities that have been performed including confirmation that the participation processes of stakeholders has been adequately conducted and that the proposed future actions to provide adequate ongoing information disclosure and public consultation with the local population is in compliance with IDB policies.
- 6.4 The ESA will be disclosed prior to the IDB Analysis mission following IDB Policy OP-102.
- 6.5 Following the conclusion of the ESDD, an Environmental and Social Management Report (ESMR) will be prepared, summarizing the findings of the ESA, and outlining the recommendations for the loan documents and the Project execution.

INDEX FOR COMPLETED AND PROPOSED SECTOR WORK

Issues	Description	Expected Dates
Technical options and design	Hydrological study for validation of GOTT proposed works packages.	June 2013
Analysis of project economic viability	Survey data required to analyze economic viability of the program Economic analysis completed.	July-August 2013 August 2013
Financial analysis /fiduciary issues and control environment	No special fiduciary issues are anticipated. Preparation/conclusion of financial analysis, including financial projections based on historical information and business plan of the company. Identification of Procurement Unit. Review of lessons learned will be included in the program.	July - August 2013
Institutional analysis/personnel, procedures other aspects of implementation capacity	Preparation/conclusion of institutional analysis. Review of lessons learned will be included in the program.	August 2013
Stakeholders and political environment	Maintain close communication with stakeholders in NIDCO, Drainage Division and the Government on the program. Consultation meetings will be held as part of the Project Risk Management.	July - August 2013 July 2013
Social and environmental safeguards	Preparation/conclusion of ESA Review of aspects specific to the operation, additional baseline evaluation, budget	July 2013
Data collection and analysis for reporting on results	Identification of proposed indicators to measure impact of program	July-August 2013
Preparation of Operating Regulations	Preparation of the Operating Regulation for the operation	November 2013
Other key issues, such as donors, gender, sustainability, country/sector issues	N/A	N/A