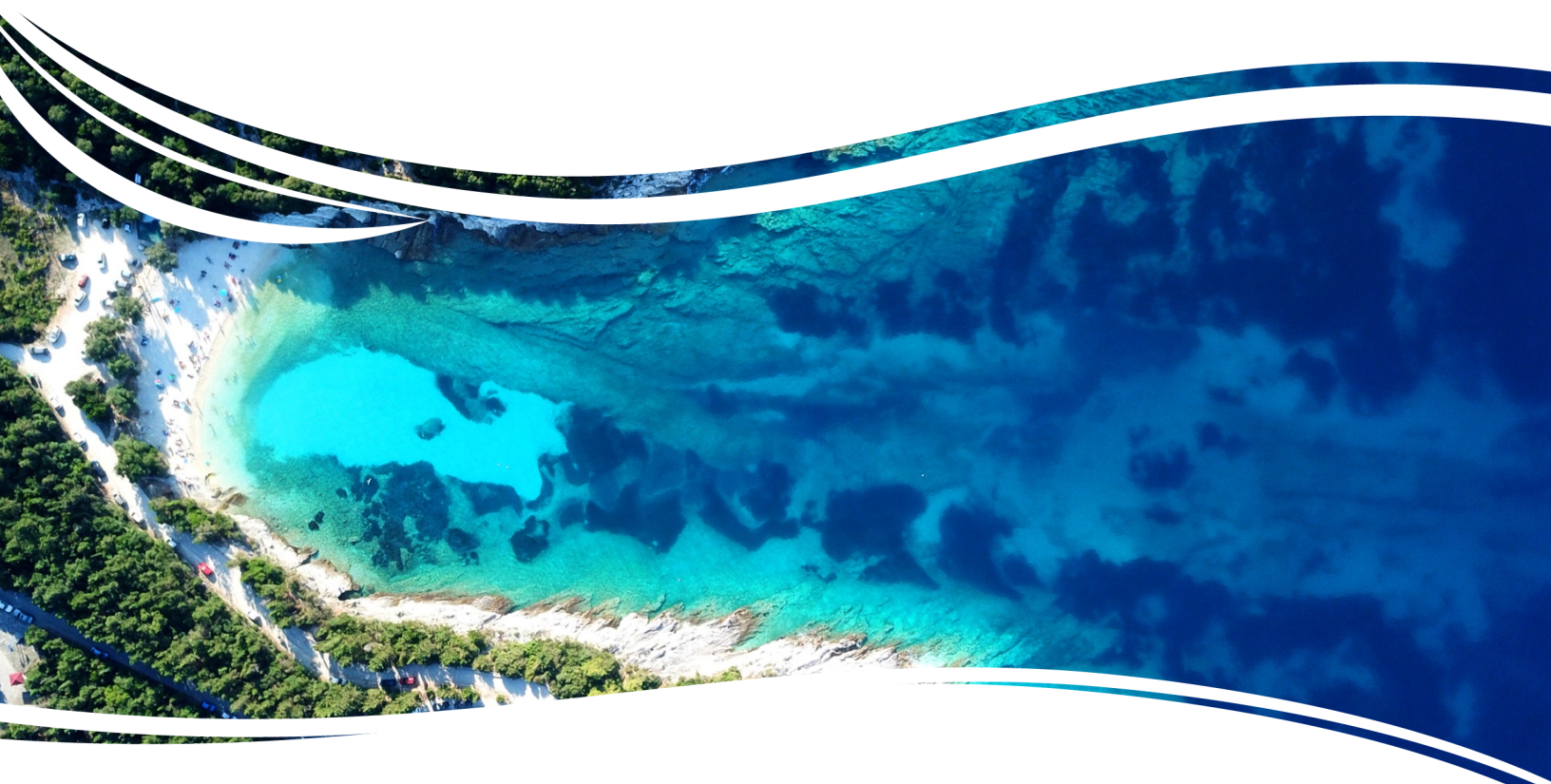




## *Diagnostic Analysis of the Governance Framework*

*Barbados*



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This project builds upon its previous successful phase “The Caribbean Regional Fund for Wastewater Management (CReW)” project (2011-2017). CReW+ is being executed by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, the Organisation of the American States (OAS) and the Secretariat of the Cartagena Convention (CAR/RCU) on behalf of the IDB and UNEP respectively.

The 18 participating CReW+ countries (Barbados, Belize, Colombia, Costa Rica, Cuba, Dominican Republic, Grenada, Guatemala, Guyana, Honduras, Jamaica, Mexico, Panama, Saint Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Suriname and Trinidad and Tobago) vary geographically from large, continental countries to small island states, with significantly different political, linguistic and cultural contexts.

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# 1. Introduction

According to the SDG 6 Data Portal maintained by UN Water (<https://sdg6data.org/country-or-area/Barbados>) 98% of Barbados' population has access to at least basic sanitation service (SDG 6.2.1a). However, only approximately 6% of all properties are connected to one of the two central sewage collection and treatment system. Whilst there are a few properties that are connected to package wastewater treatment systems, most properties make use of either septic tanks, soak-aways, or pit latrines. This is particularly so in the case of domestic properties. The operation of these systems poses a potential threat to groundwater supplies and contribute to levels of nutrient loading especially in the more densely settled areas. Groundwater discharges onto coral reefs on the West Coast are generally higher in the wet season than in the dry season, and richer in nitrogen than in phosphorus (Lewis, 1987). Wellington (1999) found that nitrogen and phosphorous concentrations in the coastal waters were twice and three times higher than at the pumping stations farther inland. Elevated concentrations of nutrients in the coastal areas compared to inland pumping stations are likely due to the use of fertilizers and dense coastal settlements. Work by Baird (2017) concluded that groundwater fluxes contributed 85% of the offshore nutrient load. Surface water fluxes contribute 15% of nutrient flows but are different in character to the groundwater flows being episodic and associated with rainfall-run off events. Furthermore, the composition and concentration of the contaminants in surface flow events will be different. As such surface water fluxes may be thought of as point sources of pollution in contrast with groundwater fluxes being diffuse sources of pollution. Further evidence that coastal waters have been contaminated appears in a study conducted in 2003 that found that coral reefs have been impacted by eutrophication, an enrichment of water by nutrient salts, which has caused structural changes to the ecosystem off the Barbados coastline (Linton & Warner, 2003). Overall, high nutrient loading has adversely impacted the marine ecosystems around Barbados. The focus of this work is concerned with managing groundwater pollution.

The cost of installing or retrofitting wastewater treatment systems on properties capable of removing nutrients and other pollutants is high and developers often seek exemption from installing them in new developments. Where they are installed in existing developments, there is often limited maintenance and operators are inexperienced. In the case of individual

properties using suck wells or septic tanks there is little reason to change especially as the cost of retrofitting is high for no perceived personal benefit. Indeed, without a strong regulatory ability to encourage or require upgrading there are few pressures to alter the status quo<sup>1</sup>. These factors have contributed to the degraded state of the marine environment from land-based sources. This intervention addresses the financial barriers that prevent or inhibit public and private entities from installing, operating, and managing wastewater treatment systems. It will do so by developing a framework that facilitates a strong supporting environment with mutually reinforcing legal, policy and institutional frameworks and the provision of affordable financing and accessible incentives.

The overarching aim is the protection of public and environmental health, which is the responsibility of the State, on behalf of its citizens. It is why the State has the mandate to put in place such measures as it believes are necessary and legitimate to provide that protection. As indicated however, there are few drivers to change the status quo, a situation in the light of improved understanding of the threats to public and environmental health that needs to change. The preferred way forward is seen as being a mix of incentives and regulatory requirements - a 'carrot and stick' approach. The first step is to understand the current legal and regulatory environment which governs the wastewater sector; the requirements for the provision, operation and maintenance of facilities and services. The diagnostic analysis of the governance framework is geared towards providing that understanding.

In this Report documentation pertaining to the wastewater sector has been gathered and assessed. Similarly for the financial sector, which would play a role in the sourcing and provision of finance for the implementation of wastewater infrastructure and services. The purpose is to determine the extent to which the existing enabling environment and institutional arrangements allow for alternative arrangements for providing wastewater infrastructure and services. This also entails targeted engagement with national stakeholders to identify relevant documentation and commentary on the operation of legislation and regulations and the practical challenges faced. Essential to this are the perspectives of the private sector.

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<sup>1</sup> The revisions to water zoning areas represents a potential ability to require changes in a limited range of circumstances.



## **Part 1: Wastewater Sector**

### **2. Legislation and regulation**

As would be expected there are laws and regulations which pertain to wastewater management. These may be broadly divided into those that deal with the provision of wastewater services and those that deal with pollution and the discharge of effluents. Associated with these are the institutional arrangements, identified under the legislation, that are charged with the responsibility to oversee the application thereof.

**Table 1** provides a list of relevant policy and legislative documentation related to the management of sewerage and wastewater.

**Table 1: List of relevant policy and legislation**

<b>Name</b>	<b>Description</b>	<b>Year</b>
Marine Pollution Control Act (MPA) Cap 392A	Establishes discharge standards for marine environment	2000
Draft Marine Pollution Control (discharge) Regulations	Sets standards for effluent discharges into the marine environment	2004
Town and Country Planning Act, Cap. 240 - Repealed under the Planning and Development Act 2019	Regulates development planning process which includes wastewater infrastructure	1985
Planning and Development Act 2019	Facilitate land development in Barbados, taking account of all relevant social, economic and environmental factors, so as to ensure	2019

Name	Description	Year
Tourism Development Act, Cap. 341	that sustainable use is made of public and private land in the interests of present and future generations. Grants rebates for wastewater treatment	2002
The Town and Country Planning Development Order, 1972; Replaced by S.I. 2021 No. 89: Planning and Development (General Development) Order.		1972
Income Tax Act	Grants rebates for wastewater treatment.	2009
Utilities Regulation Act	This Act provides for the regulation of utility services. However, at present it does not apply to the provision of water services. Recent developments have brought General Standards of Service under the ambit of the Fair-Trading Commission. The policy establishes a zone rule for private sewage and industrial discharges.	2001
Groundwater Zoning Policy	Implemented through the Town and Country Planning Office in collaboration with the BWA and EPD, it controls development in areas of groundwater abstraction as a way of protecting groundwater resources. A draft revision of the Zones was approved by Cabinet. The new zones have been incorporated into the National Physical Development Plan, published 2018 and to be Gazetted in	1963 Revised and amended in 1973 and 2020

Name	Description	Year
The Health Services Act	2022 Makes the Minister “responsible for the promotion and preservation of the health of the inhabitants of Barbados”. The Minister has the power to construct sewers.	1969 Amended 2015
Rural Development Commission Act CAP 238	Under section 4 (a) to provide housing and ancillary services including the installation of sanitary facilities in rural area.	1997
Building Regulations	Used to regulate sewage services in buildings	1969
Disposal of Offensive Matter Regulations	Generally used by the EPD to regulate private and public wastewater treatment	1969
Nuisance Regulation	Generally used by the EPD to regulate private and public wastewater treatment	1969
Barbados Water Authority Act CAP 274	Establishes the Barbados Water Authority. A Comprehensive Review of Groundwater Protection Zoning Policy and System consultancy in 2010 recommended the introduction of a Groundwater Protection Act which would modify BWA’s responsibilities for the management of water resources	1980
National Strategic Plan 2005-2025	Promote and facilitate the environmentally sustainable use of natural resources and to maintain a safe and reliable water supply.	2007
Sewerage Regulations (S.I. No. 151)	The Regulations provide for rules concerning the discharge of water	1980

Name	Description	Year
Water Services Regulations (S.I. No. 150)	through the public sewer system by domestic premises and industries. The Regulations concern the regular supply of water to customers by the Water Authority of Barbados.	1982
Planning and Development (Amendment) Act 2020	Amends a number of Sections of the Planning and Development Act 2019. The key amendment relates to the repeal and replacement of Section 44 which deals with Building Plans. Introduces the establishment of a “Design and Engineering Committee” and an “Environmental Impact Assessment Committee”.	2020
S.I. 2021 No. 89: Planning and Development (General Development) Order, 2021.	Sets out requirements in respect of permitted developments, developments for which pre-application consultations are required, and applications for which publicity is required.	2022
Water Reuse Act 2021	Provide for the capture, collection, treatment and reuse of wastewater to be used for various purposes.	2021
Barbados Water Authority (Amendment) Act, 2021	Introduces provisions for water protection zones and establishes a Water Review Management Committee, addresses the Garbage and Sewage Contribution levy Relief Board	2021

## 2.1 Planning controls

The Planning and Development Act 2019 was proclaimed on 7<sup>th</sup> December 2021. Additionally the Planning and Development (Amendment) Act 2020 was also proclaimed on the same date as was the Planning and Development (Environmental Impact Assessment) Regulations 2021. The Planning and Development (General Development) Order was proclaimed on the 10<sup>th</sup> December,

2021. It is supported by the Planning and Development (Amendment) Act (2020) which principally introduced changes in titles as well as the establishment of a Design and Engineering Committee to advise the Minister and Director of Planning and Development on matters pertaining to the design of major and sensitive infrastructure. The Act is to govern the orderly and progressive development of land, the granting of permission to develop land, powers to regulate land use and development, and related matters. Under Section 3 (1) (b) the purpose is; "the attainment of appropriate standards for land use and development, which promote the health and well-being of people in Barbados, protect the natural and cultural heritage, and preserve and improve the amenity of the country".

In general, development is to be guided by the Physical Development Plan (Amended 2003) that has been adopted and hence to be in force; Section 18 (1) and Section 19 (1) of the Act. However, the Draft Physical Development Plan (Amended 2017) is a Plan in preparation and as such is a material consideration when assessing Planning Applications. The Act sets out the circumstances, procedures and requirements for applying for planning permission for developments. Whilst the provision of sewerage and sanitation services are not explicitly mentioned, apart from a few instances, they are covered through reference to requirements under a number of sections. Under the powers conferred on the Minister by Section 23 of the Planning and Development Act, 2019, the Minister can make Development Orders which sets out the various requirements with which planning applications must comply. Section 24 (1) the Minister by Development Order specifies that a pre-application consultation is required for all developments listed in the Sixth Schedule of the Act with the Director of Planning and Development, and with regulatory agencies ahead of any application for planning permission. Under Section 27 (1) the Director may require further information and/or the carrying out of an environmental impact assessment - also see Sixth Schedule of the Act Matters for which Environmental Impact Assessment is required. Under Section 28 (1) requests for technical information from referral agencies, although not the referral agencies are not specified such agencies would include the BWA, EPD and the Coastal Zone Management Unit. Under Section 30 (4) EIA Regulations-Planning and Development (Environmental Impact Assessment) Regulations 2021 - S.I. 2021 No 58 Gazetted 7<sup>th</sup> December 2021, the requirements for an environmental impact assessment are set out. Such an assessment would normally consider the nature and impact of discharges, pollutants and effluents and their impact on the terrestrial and marine environment with concomitant recommendations for their mitigation and control.

Recommendations might include the manner in which any discharges or effluent are to be handled and regulatory standards met.

Section 49 (2) and (3) explicitly address the sewerage requirements of new developments.

“(2)The operations that the Board may require the developer of the land to carry out pursuant to subsection (1) include the provision of roads, drains, **a sewage collection, treatment and disposal works**, water mains, fire hydrants, electricity supply, street lighting and telecommunications services.

(3) Any engineering or other operations required to be carried out under this section shall be carried out in the manner and to the standards specified by the statutory bodies, authorities or statutory undertakers having functions and powers under any other enactment with respect to the provision of roads, drains, **sewage collection, treatment and disposal works**, water mains, fire hydrants, electricity supply, street lighting and telecommunication services (in this Part referred to as the “relevant authorities”) and approved by the relevant authorities prior to the issue of a completion certificate issued pursuant to section 50.”

In considering an application, the location of a development would be considered with respect to Groundwater Zoning Policy. This means that the application would be referred to the BWA for comment. The Groundwater Zoning Policy was introduced in 1963 and revised in 1973. The groundwater zones are incorporated into the Draft Physical Development Plan (2017). The 2020 Green Paper on Water Protection and Land Use Zoning Policy provided further details and regulatory requirements for the handling of activities to be regulated within the zones to prevent the occurrence of contamination of groundwater and water sources from known or potential sources. The updated zoning policy delineates Zones A to E and sets out recommendations for the water protection and land use and suggests appropriate means for each zone by which the objectives would be achieved. The Zoning Policy also sets out the following:

#### Criteria for Provision of Sewer Systems

- i. The implementation of the sewerage systems will be based on priorities determined through vulnerability studies, water protection objectives and public health.

#### Operations and Maintenance of Sewerage System

- i. Mechanisms will be implemented to ensure proper operation and maintenance of sewerage systems.
- ii. Low-cost systems as an alternative to septic tanks will be investigated for use.

These provisions apply to new developments and to existing developments where changes, alterations or extensions are proposed. According to a Cabinet Decision in 2002 responsibility for groundwater protection and zoning policy was transferred from the BWA to the EPD. This policy decision has not been transposed into legislation or regulation. In scrutinising an application from a developer the Director Planning and Development would refer to BWA and EPD to ensure that the provisions have been adhered to. Under these circumstances, the developer is required to submit calculations and drawings for the proposed treatment system, which EPD would then scrutinise and report back to the Director Planning and Development. Under the BWA (Amendment) Act 2021 there is provision for BWA to designate water control zones which the Planning and Development Department must take into account when assessing any planning applications.

In parallel with Planning requirements, the Health Services (Building) Regulations 1969, Section (3) requires that any person who wishes to erect, alter or extend a building shall apply to the Minister and that the application must provide details of the drainage and sanitation facilities. The provision goes on to say that an application does not have to be made to the Director Planning and Development but that the Director shall, submit such plans for the Minister's (Health) approval. This regulation is now deemed to be enacted under the Planning and Development Act (2019) but will be repealed for a new regulation.

The General Development Order, under the Planning and Development Act (2019) (S.I. 2021 No87) provides a means to require, regulate and control various aspects associated with the granting of planning permission for development. Whilst it is possible for there to be conditions attached which require the provision of wastewater facilities, there is no provision to address arrangements for the management and operation of such facilities.

## 2.2 Provision of sewerage services

The Barbados Water Authority Act (CAP 274A, 1989) under Part II Establishment, Constitution and Functions of the Authority, Section 5: Functions of the Authority states under the following respective paragraphs:

(d) to prepare details of schemes for the development of water resources and for the supply of water and sewerage services and to construct, maintain and operate such schemes;

(i) to control and regulate the disposal of sewage through sewerage plants that are not part of the Authority's system;

(k) to disseminate information and advice with respect to the management, collection, production, transmission, treatment, storage, supply, and distribution of water and where applicable, sewage;

(m) to advise the Minister on the matters referred to in paragraph and such other matters relating to water supply and sewerage services as the Minister refers to the Authority;

Section 28 (2) allows the Authority to make regulations governing, inter alia; connections to sewerage services, content entering sewerage services, standards of quality for sewage and industrial waste effluents, operating standards, and conditions pertaining to the service.

The Sewerage Regulations 1983-151 exercises the powers under Section 28 of the Water Authority Act. The Regulations set out definitions, the rights of domestic, commercial and industrial premises, prohibition of certain discharges and requirements for private sewers connected to the Authority's sewerage systems. The Regulations govern the terms, conditions, standards and requirements related to the Authority's sewerage systems, treatment works and plants and access to them.

By a 2006 Cabinet Decision, the responsibilities in respect of Section (5) (i) were transferred from BWA to the Environmental Protection Department (EPD) and applies to public and private sewerage systems. This has not been transposed either into law or regulation, but the EPD operates under the mandate of the BWA Act, noting that this is a government policy but not a legal mandate. The BWA (amendment) Act 2021 retains BWA's responsibility in this matter.

Thus the Sewerage Regulations only apply to the Authority's systems and not to any systems regulated by the EPD, though EPD may use the provisions as a guide. Furthermore, the BWA Act does not speak to the adoption by the Authority of private sewerage systems nor have there been any instances of adoption. The matter of the potential adoption of wastewater systems is of concern to the authorities, given the example of Trinidad and Tobago's difficulties experience when the operation and management of decentralised wastewater treatment plants were adopted from private developers by the Water and Sewage Authority (WASA) some years ago.

## 2.3 Regulation of effluents

Sewage that has passed through a wastewater system or waste that has been generated by virtue of a commercial or industrial process give rise to effluent which is to be disposed of. While the Sewerage Regulations 1983-151 9. (1) Prohibition of certain discharges set out general guidance on the disposal of substances, it does not set out quality requirements or limits, and as pointed out refers primarily to discharges into public sewers. The regulation of effluents falls under the Marine Pollution Control Act (MPA) Cap 392A (2000) and Marine Pollution Control (Discharge) Regulations. The Act states: "3. (1) No person shall release or cause to be released any pollutant into the environment which is in violation of any applicable standards, conditions or requirements specified under this Act or regulations; where the term environment covers land, water and airspace of Barbados and its territorial waters." Under Section 4 Management of the level of pollution, powers are granted to

"develop and implement a programme for the prevention, reduction and control of pollutants which shall include the registration and further characterisation of significant sources of any ongoing or intermittent releases of pollutants into the environment, and prescribe by order a list of pollutants with their prohibited concentration levels."

Section 6: Record keeping and monitoring requirements, makes provision for the sampling, monitoring, recording and reporting of substances and constituents of effluent discharges. It also allows the Director discretion as to how to go about the implementation of the provision of the section. These powers are further reinforced by Section 13 which gives the Minister powers to set regulations for the purposes of implementing the Act.

In addition to the Marine Pollution Control Act, the EPD also has at its disposal The Health Services Act, the Disposal of Offensive Matter, and Nuisance Regulations. The Health Services Act (Act No. 38 of 1969) (Cap. 44) gives the Minister powers under Section 6 (1) to:

- a) construct, repair and maintain sewers; and
- b) make provision by means of sewerage disposal works or otherwise for effectively dealing with the contents of such sewers.

While under Section 6A there are powers to enter premises. Section 10 gives powers to the Minister to make regulations for the carrying into effect of the Act, in particular related to:

- (d) for the maintenance of the proper sanitary condition of premises;
- (f) for the prevention, abatement or removal of nuisances and insanitary conditions on premises;
- (g) with respect to sewers and sewage disposal works;
- (h) providing for the collection, removal and sanitary disposal of rubbish, night-soil and other offensive matter;
- (i) providing for the licensing of persons, places and institutions for the carrying on of prescribed businesses;
- (j) prescribing the method of carrying on any offensive trade or business;

The powers are further strengthened through the Health Services (Disposal of Offensive Matter) Regulations 1969 and Health Services (Nuisance) Regulations 1969.

By a Cabinet Decision taken in 2002, the regulatory functions in respect of water quality were transferred to the EPD. The Cabinet Sub-committee on Infrastructure has directed EPD to execute these functions. The Ministry of Health and Wellness had contended that under the Health Services Act it had responsibility for the regulation of potable water quality. By Cabinet decision, this matter appears to have been resolved.

In 2006, following a consultancy Water Reuse Bill and Water Reuse Regulations were drafted for consideration. In 2018 EPD was instructed to ensure that existing proposals and recommendations regarding water reuse should be consolidated and incorporated into a single policy document. In 2018 EPD published the National Water Reuse Policy, which contains a recommendation to draft the necessary legislation to establish a Water Reuse Act and Water

Reuse Regulations with the EPD as the regulator. The Water Reuse Bill and Regulations are with the office of the Chief Parliamentary Counsel and are on the 2022 Parliamentary Agenda for discussion and parliamentary approval and subsequent proclamation in the Official Gazette.

## 2.4 Reuse Regulations

There are two main sets of guidance with respect to water reuse. These are the guidance contained in the Water Reuse Policy, which will be incorporated into the Water Reuse Act and Regulations and the draft “Rain and Potable Water Storage Policy” which is under development on the uses to which different categories of water can be put. In addition to this there is “Guidance for Preparing Regulation for Standards for Reclaimed Water Use” for reclaimed water quality - potable aquifer and non-potable aquifer recharge, agreed between BWA and EPD as of 8th February 2022.

In proposing the categories of Water Use, the National Water Reuse Policy drew on the work of the 1997 and 2002 Task Forces on Water Resources (Policy Framework for Water Resources Management and Development in Barbados). The Categories are shown in Table 2. Categories I and II are the only two categories requiring potable water whilst all others require access to non-potable water resources including treated water reuse.

**Table 2: Categorisation of Water Uses<sup>2</sup>**

Category	Description
I	Potable requirements including domestic use, watering animals, food processing, and toilet flushing in non-dual plumbing systems.
II	Recreation requirements including swimming pools and amusement parks
III	Irrigation of food crops inclusive of vegetables with possible direct human consumption.
IV	Irrigation of non-food crops inclusive of cotton, grass for animals and ornamental plants.
V	Non-potable domestic requirements such as toilet flushing in dual plumbing system.
VI	Non-potable other requirements such as golf course irrigation, cooling water,

<sup>2</sup> Water is Indispensable to Life-A Draft Policy Framework for Water Resources Development and Management in Barbados, March 2002.

firefighting, washing of roads and watering lawns.

With respect to rain and potable water storage the draft guidance is as follows. Outside of government permission, stored rainwater may not be used for potable purposes but subject to the following may be used for non-potable purposes, see Table 3.

**Table 3: Permitted and Non-permitted Uses of Rainwater and Stored Water**

Non-potable purposes permitted	Potable purposes <u>NOT</u> permitted for rainwater reuse
Irrigation Washing and cleaning of outdoor surfaces Toilet flushing Groundwater recharge Swimming pool filling (as long as the pool complies with the disinfection and clarity standards outlined in the Health Services Swimming Pools Regulations. Surface ponds and lakes Aquaculture and fish rearing Industrial and equipment cooling	Drinking Food processing Agriculture processing (meats and vegetables) Animal husbandry Consumption by domestic animals Personal Hygiene Institutional hygiene and cleaning of food contact surfaces Any other uses determined by the Ministry of Health

The draft guidance includes the following caveat: Under emergency conditions treatment methods for treating rainwater for potable uses will be provided by the Ministry of Health and Wellness.

Note that the use for Groundwater Recharge would be subject to the water quality standards agreed between BWA and EPD. Other permitted uses would be subject to meeting the appropriate water quality regulations or requirements for use for a particular purpose e.g. aquaculture. In other words water treatment may be required and would be subject to planning guidance and requirements.

## 2.4 Standards

Barbados has the National Standards Institution and Building Standards Authority. Between them they are responsible for the preparation, promotion and implementation of standards and codes, and to review development application against the National Building Code. However, current standards and codes do not adequately address and cover all relevant aspects pertaining to the design, construction, operation and maintenance of sewerage systems, training, certification, and record-keeping. Aspects that have been highlighted include the need to improve the training and certification of wastewater operators and wastewater treatment plant operators; the establishment of water use standards for all categories and uses of water to ensure that they meet the minimum standards for usage that complies with approved health criteria, and; plumbing codes to ensure the safe transfer of different quality waters from one location to another and within same building.

The establishment of appropriate standards and codes of practice are integral to the proper functioning of the built environment, protection of public health and safeguarding the natural environment. At present, there are gaps which make the achievement of these goals problematic.

## ***3. Institutional Arrangements***

It is clear from the provisions of the relevant legislation and regulations detailed above that there are several institutions involved in the governance of wastewater systems. However, what is also clear is that there is a lack of clarity in some areas as regards who is responsible for what. The status of Cabinet decisions transferring responsibilities further problematises the situation.

Formally, the Department of Planning and Development through the Director Planning and Development has responsibility for the granting of planning permissions. However, the Ministry of Health and Wellness, through the Health Services (Buildings) Regulations also has complementary powers for granting development permission with respect to buildings, exercised through the Chief Medical Officer and Minister. The Barbados Water Authority as a statutory

body has powers with respect to the provision and regulation of wastewater services, and control of water resources through the Groundwater Zoning Policy, though these functions have been devolved to the Environmental Protection Department. The Environmental Protection Department, which falls under the Ministry of Environment and National Beautification, regulates the operation of sewerage systems and the disposal of effluents, under the Health Services Act and the Marine Pollution Control Act. The Ministry of Health and Wellness, through the Environmental Health Department exercises responsibility over the control and regulation of potable water quality - though this is a subset of overall water quality. Lastly, under section 4(1)(c) of the Coastal Zone Management Act (2000) the Coastal Zone Management Plan may include standards for water quality in coastal and marine areas to affect the maintenance, rehabilitation and enhancement of coastal and marine habitats. Under the and the Marine Pollution Control Act (2000), the Director Environmental Protection Department has powers and duties for the control of effluent and pollution.

Recent changes to planning legislation have seen the establishment of a Design and Engineering Committee and an Environmental Impact Committee, as well as provision for ad hoc committees, allow for a better degree of coordination, including as they do qualified persons with expertise related to the work of the committees. The recent nature of these committees means that their working arrangements are evolving.

However, the current arrangements disperse responsibilities across several different institutions. This complicates the process of promoting Integrated Water and Wastewater Management (IWWM) as well as regulating applications. There continues to be a failure to adopt draft legislation<sup>3</sup> and to implement existing legislation which would streamline regulatory processes and responsibilities, remove overlaps in jurisdictions, and resolve conflicting issues and mandates. The result is that there is not only duplication of functions but also confusion as to the limits of responsibilities and hence high transaction costs associated with incentivising IWWM. This runs counter to recommendations in the Barbados Green Economy Scoping Study (2012) for the development of a strategic roadmap to achieving an environmentally advanced green economy, among which was:

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<sup>3</sup> Examples include among others: the Environmental Management Bill, the Water Reuse Act and Regulations, the Environmental Pollution Control Bill, promulgation of the Development and Planning Act, promulgation of the Physical Development Plan (2018).

- *Drafting and enactment of legislation on environmental management, water reuse, groundwater provisions and solid waste management, and the incorporation of 'green policies' in the building code along with strengthening of the policy guidelines in the Physical Development Plan;*

## **4. Management Instruments**

The available management instruments used to manage wastewater management and sewerage systems have to an extent been outlined above in Section 2, which outlines the various regulatory mechanisms that are in place. These allow a degree of interpretation with respect to their implementation. So for example, conditions of planning approval have in recent years included license requirements to put in place for new developments a body to manage the sewerage systems, and requirements to report on the performance of the wastewater treatment systems. This places the onus on the developer or the management body to carry out the checks and the associated costs, and to provide the information to EPD. In addition, the EPD has the power to inspect and check on the performance of wastewater treatment systems, under the various regulations highlighted above. With the transfer of EPD to the Ministry of Environment in 2004, the Department continued to perform certain functions on behalf of the Chief Medical Officer of the Ministry of Health, in accordance with section 9 of the Health Services Act (1969), giving it authority to act under that Act.

However, the use of the available management instruments is circumscribed by capacity issues. The EPD has limited resources to carry out inspections and in fact has not been able to do so for a number of years. Furthermore, the laboratory capacity within the Government Analytical Services Laboratory is also limited and they would be unable to process and report on samples. These practical difficulties have been highlighted in the National Water Reuse Strategy document (2018), which contained the following recommendation:

- g. The laboratory infrastructure at the Government Analytical Services Laboratory should be improved to facilitate increased processing of environmental samples and analyses of complex chemical residuals in soils, water and air.

It is understood that even though license requirements have been introduced, few of the conditions are being observed; the private sector appears to be, at best, reluctant to abide by them and at worst knowingly recalcitrant. In other words, as matters stand, the ability to monitor, manage and control potential environmental pollution arising from the management of wastewater is limited and would require the application of more resources if the situation were to be improved. A greater and more stringent legal requirement with appropriate incentives, as envisaged in proposed legislation, is required if the current situation is to be improved upon.

A potential incentive mechanism could be to offer concessionary water tariffs, particularly to entities which are charged commercial water tariffs, contingent on the entities undertaking to introduce wastewater treatment and reuse. In fact, there is emerging practice around this point. Although not specified in legislation, the GSC Appeals Board has on a case-by-case basis considered applications for levy relief. Where it has been shown that there is a wastewater treatment system and reuse of the treated wastewater exemptions from the garbage proportion of the levy have been granted. Formalising this as a policy provides a potential mechanism for encouraging wastewater collection, treatment, and reuse. This could potentially be reinforced through the use of Planning Obligation Agreements (see Section 5.2.2 Operation and Maintenance costs).

## ***5. Integrated Management***

## ***Wastewater***

### **5.1 Gaps**

As the sections above clearly show, there is no shortage of legislation and supporting regulations that address the provision and operational standards pertaining to the wastewater services and management. Regulatory agencies have at their disposal a wide range of instruments through which they can regulate. Although these rely heavily on a 'Command and Control' approach they do encompass mechanisms to avoid, control and mitigate potentially

negative impacts on the environment arising from the disposal of wastewater by way of planning controls through to the ability to impose penalties for non-compliance with regulations. The governance arrangements (enabling environment and institutional arrangements) give rise to confusion and duplication of responsibilities. Reports and interventions over the last two decades have highlighted the fragmented nature of the governance which has resulted in a lack of clarity over institutional roles and responsibilities. In addition, many relevant Cabinet policy decisions have not been transposed into law and regulations and are therefore potentially open to challenge. There has been a progressive use and introduction, under existing legislation, of management instruments such as license conditions attached to planning applications.

There are initiatives that would streamline, simplify and clarify the requirements and responsibilities, identified by the Water Protection and Land Use Policy (2020) as being; an Environmental Management Bill, and an Environmental Pollution Bill. More recent thinking is that Environmental Management and Environmental Pollution do not need separate Acts and can be dealt with under one umbrella Act. These would also allow the standing Cabinet decisions to be transposed into law, where applicable. It is somewhat ironic that whilst Barbados was one of the first Caribbean countries to draft an environmental management bill in 1985, it is now one of the last to have a functional act. The current legal arrangements increase the transaction costs for any developer to include sewerage services in proposed developments. And with respect to retrofitting of sewerage services, the requirements and processes pose a significant “barrier to entry”. Although license conditions have been progressively introduced, these have not been matched with the capacity and ability to ensure that they are adhered to, either through monitoring, inspection, or reporting. Furthermore, the power to ensure and compel compliance is at present weak under existing legislation. A strengthening of the regulatory environment, particularly with respect to monitoring and reporting would not only benefit the environment but would be an economic impetus to the provision of green jobs and services. Shifting the onus of ensuring compliance from the regulatory authorities to those providing the service (a combination of producer responsibility and polluter pays principle) would benefit regulatory authorities such as EPD and underpin the economic impetus, contingent on the regulatory authorities having the requisite expertise and powers to ensure the system functions effectively.

At present the governance focus with respect to I/W/M appears to be overwhelmingly on government and its institutions, in which the private sector is a ‘responder’ rather than a partner.

Strengthening legislation to require higher levels of wastewater management and control of pollution, extending opportunities for the private sector to provide sewerage services complementary to the BWA through Special Purpose Vehicles or Public-Private Partnerships, allowing for a diversification of certification and compliance services, and a more transparent reporting regime with respect performance and standards<sup>4</sup> should be regarded as a priority alongside the provision of alternative financing mechanisms.

## 5.2 Commentary

### 5.2.1 General

The following is a compilation of comments received from various stakeholders on the existing technical arrangements regarding the provision and operation of wastewater facilities, particularly related to decentralised systems i.e., systems other than the Bridgetown and South Coast sewerage Systems. Generally, there is consensus that the current legislative regime with its regulatory instruments is flexible enough to accommodate requirements as this can be done through secondary legislation by ministers - through regulations. However, there are a number of areas where revisions were considered necessary. These include addressing the need for standards relating to under what conditions wastewater facilities are required and the type of facility to be provided. Several respondents noted issues with brown water, fats oils and greases generated by properties in close proximity to the coast and affecting the nearshore environment. In such cases it was suggested that the use of septic tanks was not acceptable and that a higher level of treatment was necessary.

### 5.2.2 Decentralised Sewage Systems

In another instance, reference was made to a requirement for developments of 30 units or more should have a requirement for decentralised wastewater collection and treatment facilities but that this was often challenged on cost grounds and exemptions granted. The point was made by virtually all parties that whilst there could be requirements for such decentralised systems to be

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<sup>4</sup> Possibly through the Fair-Trading Commission, though this too would probably require amendments to legislation.

required as part of the approvals process, the system failed because it was not possible to impose a condition that there should also be a body with responsibility to operate and maintain such systems. To address this problem the new Planning and Development Act makes provision for Planning Obligation Agreements (Section 361). The Planning Obligation was introduced to be able to secure benefits capable of mitigating the potential adverse impacts of a development and is executed via a legal agreement between the developer and the State. There was consensus that a model similar to that which operates at Coverley Village, where there is a management body which collects fees and manages various services, could serve as a model. However, it was also noted that this model was unlikely to work in low-cost, affordable home developments as there is a consistently high incidence of non-payment of rents. This point is picked up in the following Section.

BWA raised concerns over the design, operation and maintenance of sewerage infrastructure not installed by themselves, covering both public sector and private sector residential properties. To date BWA has resisted moves for them to take over the operation and maintenance of such systems for the following reasons.

- **Design standards.** Developers may use design standards that would not meet BWA's own standards plants and disposal with knock-on effects on the operation and maintenance of the systems. This would entail BWA having to bear retrofitting costs and/or shouldering additional operation and maintenance costs which it would not be able to recoup should it be called upon to take-over systems. Developers are at liberty to adopt any treatment system that they believe is fit-for-purpose, and it is not the responsibility of authorities to prescribe wastewater treatment technologies (technology-based standards). Rather, developers must demonstrate that the wastewater treatment solutions proposed can meet the appropriate effluent discharge standards (performance-based standards). Requiring the submission of water quality data would assist.
- **Compliance.** BWA has limited capacity and ability to check sewerage system designs, and there are costs involved in any checks. Whilst secondary legislation could be introduced to include fees for such purposes, the capacity issue would remain, and this is an organisational issue which would require time to address. For checks on designs submitted as part of the planning approval process to be effective two things are required. First, that those checking designs have the

necessary training and expertise to do so. Second, that there are enough trained persons to ensure that applications and checks are carried out in a timely fashion and do not create delays. An alternative or addition would be to have accredited third parties provide a certification process (again requiring secondary legislation), but it would be contingent on addressing the design standards noted above.

- **Installation:** Even when there are design standards that would be deemed to be 'compliant' challenges have been encountered with the installation and commissioning phase of works. Construction supervision by third parties with little expertise, the example was given of the NHC, has led to the installation of systems that do not comply with the design and design requirements, and is something that BWA has no control over.
- **Operation and Maintenance costs.** Through the planning system developers can be required to install sewerage systems and hence funds are made available for these capital works. However, in the view of BWA and others, little attention is paid to ensuring that there are adequate funding arrangements put in place for their sustainable operation and maintenance. Without this and often with the developer having no further legal responsibility after completion, infrastructure deteriorates and breaks down. The view of the Department of Planning and Development is that under the Planning Regulations they have the power to require the installation of sewerage systems as part of granting planning permission. The power to require there to be arrangements put in place to ensure that such systems are properly operated and maintained, for example by requiring there to be a managing agent can now be secured via a Planning Obligation. Planning Obligation Agreements are negotiated between the developer, the Planning and Development Department and relevant government agencies, in the context of granting planning permission. It provides a means to ensure that a proposed development contributes to the provision of the necessary infrastructure, services and facilities required by national planning policies.
- **Training.** As noted elsewhere in this report, the need for and importance of training and accreditation for persons who would operate and maintain sewerage facilities was brought up by several parties.

- **Policy:** It was noted by BWA that as the demand for housing increases the need for a clear policy on the provision of wastewater services is needed, to guide which areas should be serviced by centralised sewerage systems operated by BWA and which areas could be serviced by decentralised sewerage systems provided by other service providers. These are long term policy decisions for which the proposed Water and Sanitation Master Plan should provide guidance.

### 5.2.3 Effluent Standards and Enforcement

Among the providers of wastewater services there was consensus that that the effluent discharge standards were problematic. The standards need to be better specified with many pointing to Jamaica's National Environmental and Planning Agency's (NEPA) Natural Resources Conservation (Wastewater and Sludge) Regulation 2013 and Trinidad and Tobago's Environmental Management Authority's recently adopted Water Pollution Rules, 2019 as evidence of good practice in this regard. For some the existing standards were considered to be too stringent and out of step with best practice in other countries and hence increased the cost of installing infrastructure and operational costs. It can be noted that there are two recent documents produced through the CReW+ project which provide some guidance: Good Practice in Wastewater Treatment and Reuse (2022) and, Technical Paper on Proposed Criteria for Nutrients Discharges for Domestic Wastewater Effluent (2021). Irrespective consideration could be given to the question of how to improve the management of effluents discharges, either through the use of Performance Based Standards perhaps with guidance on 'Deemed to Comply' or through Process Based Standards. In developing these approaches, the opportunity to include aspects such as carbon footprint and energy use intensity could be considered.

Developing standards are one thing but enforcement also must be considered. Respondents noted that the level of regulatory monitoring of the performance of wastewater facilities - including those of the BWA, was inadequate. Insufficient checks were being carried out and in the case of self-checks problems are encountered in having samples tested, being delays in tests being done and results made available and/or a lack of testing facilities. There was a strong consensus amongst the institutional stakeholders that the onus for monitoring and testing should be on the service provider with the role of EPD being to carry out spot checks for compliance. This should be seen as an opportunity for third parties to provide compliance monitoring services and to charge for the services. However, a drawback that was indicated

concerned having the necessary laboratory services. This was, along with putting greater responsibility for monitoring on service providers, seen as an opportunity for the private sector. This though is subject to laboratories being properly accredited and equipped to carry out all of the testing requirements. These requirements could probably be brought in via secondary legislation and would strengthen EPD's enforcement capabilities. At present there is too greater reliance on the Government Analytical Services laboratory.

Without regular monitoring it will be problematic to address the related concern raised of transparency and accountability. There was a strong feeling that the monitoring results, level of compliance and enforcement actions should be published at least annually.

However, this raises a further point regarding qualification and certification. Respondents suggested that wastewater facilities should be given operating licenses contingent on compliance with effluent discharge standards and the qualifications of the personnel operating the facility. Furthermore, those bodies operating or providing services should also be licensed, based on the qualification of their personnel and perhaps other criteria such as performance bonds. Training and measures to support training and qualifications needs to go hand-in-hand with the above measures to ensure that the regulatory system is credible and robust. This would in all probability require collaboration with regional entities that can provide training such as the Caribbean Water and Sewerage Association (CAWASA) Inc.

#### **5.2.4 Regulatory Responsibilities**

The last significant discussion point concerns regulatory responsibility. It is clear that EPD is the primary agency responsible for the regulation of wastewater discharges and effluents. However, because the EPD operates under the Health Act there is there are grey areas regarding where responsibility of the Environmental Health Department intersects with EPD's with respect to certain aspects of wastewater management and regulation. The matter of jurisdiction was brought up by several parties during discussions. The consensus view was that the lack of clarity needs to be addressed. The suggestions were that this should, ideally, be addressed through the proposed Environmental Management Act or alternatively through alterations to existing regulations both in the BWA and Health Acts to assign primary responsibility to EPD.

Another area requiring regulatory clarification concerned enforcement capacity with respect to effluent from properties, in particular fats oils and greases and the requirement for grease traps. Regulation falls both under the BWA Act and the Health Act but the powers to act, the ability to recover the costs of enforcement actions, and the penalties for non-compliance are such as to offer little deterrent. Furthermore, under the BWA Act the responsibility to act and initiate action falls under the General Manager with no provision for an alternate to act or take on responsibility. These are aspects of regulation that require attention and could be resolved through secondary legislation.

A decorative graphic consisting of three overlapping, wavy lines in shades of green, blue, and grey, positioned at the top left of the page.

## *Part 2: Financial Sector*

### **6. Background**

The provision of wastewater treatment infrastructure, whether by the public or the private sector, is driven largely by planning and development requirements. The potential range of parties that might be affected by a potential policy to facilitate the introduction of wastewater systems could include the following.

- Barbados Water Authority,
- National Housing Corporation,
- Private sector residential developments,
- Commercial and industrial developments,
- Resort and recreational developments e.g., golf courses,
- Agriculture - poultry and micro-, small- and large livestock,
- Beverage industry,
- Hotel sector,
- Medical facilities,
- New homeowners,
- Existing homeowners.

There is a distinction between existing and new developments as this would impact those parties that may be interested in accessing a supporting financial mechanism. Existing developments would have been subject to compliance with statutory requirements in place at the time of their approval. Generally, existing developments would not be subject a need to comply with updated or revised conditions unless changes to the fabric required a planning application or changes were made retrospective by regulation or statutory instrument. Without specific drivers requiring the upgrading of wastewater facilities it is unlikely that these would

have a large demand for a supporting financial mechanism. It is thought likely that the majority of existing home and facilities owners are unlikely to feel the need to upgrade their wastewater management infrastructure unless incentivised to do so. Therefore, most of the demand for financial support is likely to emanate through new developments.

With new developments a distinction can be made between those that are unlikely to experience difficulties in raising sufficient financing and those for which access to additional sources of funding could make a difference. In the first category would be private developments such as hotels, resorts, recreational facilities, and industrial developments. Discussions with existing facility owners suggest that for such facilities the inclusion of wastewater infrastructure is factored into the development costs. These are also mostly circumstances in which there would be a one-to-one relationship between the operator of the development and a contracted operator of the wastewater treatment infrastructure - such as you would find with a hotel or industrial development.

The success of a supporting financial mechanism is likely to depend on its ability to generate sufficient business to cover its operational costs as well as to sustain and grow its ability to make funds available. This can only be determined after a market demand survey is conducted. However, the main demand is likely to be generated through new residential developments by the public and private sectors, by wastewater service providers offering a package deal to developers, and to a lesser extent by commercial developments.

The other parties indicated above, e.g. beverage and the agriculture sectors are, like existing residential owners, unlikely to have much appetite to increase their operating expenses in the absence of any compelling reason to do so. The current legislative and regulatory framework does not allow for the retrospective introduction of measures that would improve wastewater management, except in those cases where licenses have been granted and conditionalities can periodically be reviewed. There are not that many cases as the including of license conditions associated with planning permission has been a relatively recent development. The other avenue is through new legislation or regulations under existing Acts. The 2020 Green Paper on Water Protection and Land Use Zoning Policy spoke to the need to introduce a number of new Acts, being;

- Water Resources Agency Act,
- Water Protection Act,

- Water Reuse Act and Regulations,
- Environmental Management Act, and
- Chemicals Management Act.

Of these a Water Resources Agency has been rejected by the Cabinet and with the Water Reuse Act and Regulations moved forward. Furthermore, the 2020 Green Paper only referred to future developments and did not mention retrospective application of the provision of the policy. The Barbados Water Authority (Amendment) Act 2021 does introduce provisions under Section 5 (1) j and Section 28 (2) which could be interpreted as giving powers to BWA with respect to requirements to safeguard water supplies and hence to regulate the management of wastewater and its disposal. Again though these powers are assumed to apply after the passage of the Act rather than to be used retrospectively. Any attempt to use these provisions is likely to be both unpopular and contested. Furthermore, the idea that BWA could act as both a service provider and a regulator in such matters is an uneasy one. Normalising the role of EPD as the regulatory agency would do much to address this issue, as discussed above.

## ***7. Existing Funding Arrangements***

The provision of wastewater infrastructure by BWA is funded through either grants, loans or from its own funds, whilst the operation of the services are funded revenue generated from the sale of water and the Garbage and Sewage Contribution (GSC) levy, which replaced wastewater tariffs in 2018. In the case of residential developments by the National Housing Corporation (NHC) the cost of the wastewater system is included in the capital cost of the development. There are only a few NHC housing projects that have wastewater collection and treatment systems installed, the development at Constant, St George being an example. There is no separate itemisation that distinguishes between rent and other charges such as for wastewater collection and treatment. Residents are billed by the NHC. The NHC has indicated that they experience difficulties in collecting the fees due for their services. In discussions with NHC it was indicated that approximately 70% of their clients regularly do not pay towards the service provide i.e. rent or other services. Furthermore, the Corporation is spending Bds\$1.2 million per month on attending to problems related to their communal wastewater systems. Recent press

coverage<sup>5</sup> highlights the problems being experienced where overcrowding of housing units was blamed for sewage was backing up in homes and the frequency with which this occurs.

In the case of residential developments, the wastewater treatment facility is either operated by a service provider or the estate management, where there is a communal or collection systems in place. Those connected to the service pay a management fee to the estate managing company part of which goes towards paying the wastewater service provider. For other developments or facilities, e.g. industrial operations or hotels, they either operate the facility themselves or pay a service provider to operate and manage the system, which could be the same entity that installed the wastewater system. From information received the cost of such services runs from BDS\$600 per month for a hotel using a basic treatment system up to Bds\$20,000 per month for large residential developments with advanced tertiary treatment and reuse. It might be noted that in Jamaica the Rose Hall Developments Ltd. provides wastewater services to a number of hotels and development in the Montego Bay area. The company is paid to collect and treat sewage and then resells treated water back to the hotels whose sewage it treats; the treated water is used to irrigate golf courses. The rates charged for collection and treatment are said to be 20% lower than those of the National Water Company with the resale of the water providing an additional income stream.

All BWA customers are charged the GSC levy, irrespective of whether they are connected to one of BWA's two wastewater systems or not. The introduction of this levy, only part of which goes to BWA, is a source of contention among those not connected to BWA, this is particularly the case for non-residential customers who are significantly impacted, and residential customers who pay for wastewater services by a service provider. According to BWA, the GSC levy generates between Bds\$400,000 to 700,000 per week. By the 2018 Amendment to the BWA these funds can only be used by BWA for sewerage services. This additional revenue - more than was generated prior to the introduction of the GSC levy is having a significant impact on the finances of BWA allowing it to cover the operational costs of the Bridgetown and South Coast Sewerage systems with the balance, approximately 70% available for capital works and upgrading.

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<sup>5</sup> Barbados Today 15 February 2022, Sewage woes: NHC Concerned overcrowding in units causing problems. Reporter Kareem Smith

## **8. Barbados Economic Recovery and Transformation Programme**

### **8.1 Overview**

The Barbados Economic Recovery and Transformation Programme (BERT) was implemented in 2018 by the Government of Barbados to generate economic growth and restore debt and fiscal sustainability over a three-phase, five-year period. The programme introduced austerity as well as stimulus measures to address the growing fiscal deficit and avoid devaluation. The measures were to be introduced in three phases. The first focused on increasing tax revenue, introducing new domestic and international user fees, the removal of three statutory corporations from the Consolidated Fund, and a broadening of the tax base on overseas visitors. The second phase focused on reducing expenditure by the Central Government and in particular by State Owned Enterprises. It also included a review of the framework within which the international business sector operates with a view to introducing economic stimulus measures. The third phase was to determine what expenditure is essential, what is highly desirable and what is optional, covering aspects such as social needs, changes to taxation, VAT on goods and services amongst others. The fiscal adjustment and structural reform measures are intended to shift the burden of the adjustment away from labour and the most vulnerable towards capital and the visitor economy. Based on the BERT programme, Barbados signed an Extended Fund Facility (EFF) with the International Monetary Fund (IMF) in October 2018 to run through to October 2022.

Under the BERT programme there was a suspension of payments due on debt owed to external commercial creditors and a comprehensive domestic and external debt restructuring, aided by funding through the IMF's Extended Fund Facility. The austerity measures and the start on restructuring of some SOE's contributed to rising unemployment. The effect of the measures has been a decline in public debt and a recovery of the country's international reserves. In the December 2021 IMF Country Report for Barbados it was noted that Barbados has successfully met all of its targets so far within the IMF's Extended Fund Facility. However, the Sixth Review by the IMF in December 2021 noted that Barbados should resume its fiscal adjustment as soon

as the pandemic dissipates. Such adjustment has to include continued SOE reforms and enhanced adaptation measures to climate change and natural disasters.

Some of the headline points included in the Sixth Report that are of some relevance are the following:

- The current account deficit continues to be financed by financial support from International Financial Institutions (IFIs) to assist the Government manage the financial challenges associated with the pandemic.
- Exceptional IFI support is expected to fall as the pandemic wanes. FDI, including into the tourism sector and renewable projects, would compensate for a decline in IFI support but not to the full extent. To attract FDI steadily over the medium- and long-term, it is important to accelerate structural reforms under the BERT program to enhance business facilitation.
- Private sector credit continues to contract, with liquidity in the banking sector increasing. Banks have highlighted the limited opportunities for bankable projects, which, coupled with trending up deposits, have buoyed liquidity and pushed down the loan-to-deposit ratio.

Starting in 2018 the Government undertook a cost reduction measures and revenue enhancement initiatives that did a decrease in transfers to public entities. These were supplemented by reforms to strengthen oversight frameworks to improve SOE performance over time. Under the 2019 Public Financial Management and Audit Act, the government must approve all SOE borrowing. The legislation also requires the government and parliament to receive regular financial reports on SOE performance. The combined efforts reduced SOE transfers and reduced areas which were a major source of concern. However, the majority of SOEs continue to exhibit weak financial performance that reflect longstanding inefficiencies and struggle with structurally weak profitability and high operating costs. This situation gives rise to transfer dependence and highlight a need for sustained reform. The IMF continues to emphasise the need to rationalise the bloated SOE sector and the adjusting of their costs and revenue structures as a means of reducing dependence on Central Government transfers. There is the expectation that commercial SOEs should be viable on commercial terms without government subsidies. The IMF's position is that the Government should accelerate SOE reform and create space for investment in greening the economy and introduce measures such as an increase in user fees, and mergers and divestment.

The report notes that resilient infrastructure investments have substantial long-run benefits, but the large upfront costs imply a burden on Barbados' public finances in the short term. This is especially so given the limits brought on by the pandemic and other natural disasters. Hence more donor financing to climate-related projects and stronger private sector engagement by providing technical support, financial incentives, and access to affordable financial services is needed. The government has acknowledged that reform of SOEs is necessary and has made some moves in this regard. These have included adjusting water rates, and a Garbage and Sewage Contribution (GSC) levy.

The GSC levy was introduced in August 2018 through an amendment to the BWA Act Cap. 274A. A charge of Bds\$1.50 per day is levied on all domestic customers of which Bds\$0.25 is retained by BWA with the balance paid to the Sanitation Service Authority by BWA. For all other customers the levy is 50% of the amount shown on the water and services bill, of which 50% is retained by BWA. The amounts collected by BWA are to be used for the purposes set out in the BWA Act Cap. 274A.

## 8.2 Interpretation of BERT and GSC Levy

There are three main points of relevance that have a bearing on the potential Alternative Financing Mechanism for supporting wastewater management.

One is the diversification of revenue generating opportunities as a means of increasing income. In this respect the introduction of the GSC levy is clearly a response and one that is having a positive impact on BWA finances. That said, there have been many voices which have been raised against it and it is notable that the Democratic Labour Party have indicated that they would phase it out. Whether there would be any appetite for the introduction of further revenue raising initiatives is unclear and would probably meet with opposition from many quarters, especially under the current economic circumstances and levels of unemployment. The same logic applies to the question of increases in water tariffs, whilst desirable any increase is likely to come at a high political cost.

Another is the restructuring of SOEs of which BWA is one of the larger. Whilst some modest gains have been made, for example through staff retrenchment, changing cultures and practices

is acknowledged to take time. Other than tightening up of financial practices and greater oversight by the Ministry of Finance Economic Affairs and Investment (MFEAI) it is unclear what changes to working practices have been made that would increase efficiency. By way of comparison, Jamaica's National Water Commission, BWA's equivalent, is in a worse financial and operational position, and it has one of the highest set of water tariffs in the region. For the NWC to meet the objectives of the country's National Water Sector Policy, the Government has proposed greater private sector involvement in the delivery of water services, including privatisation.

Which leads to the final point. The BERT programme recognises that private sector investment in the economy is required and needs to be supported. The IMF, unsurprisingly, is keen to see a greater role for the private sector especially through green initiatives. Both recognise that the Government does not have the resources needed to meet the infrastructure challenges and that mobilising private sector investment will be critical. However, it is unclear at the moment how and in what way the private sector can be incentivised to play a greater role in the delivery of water and wastewater services. This is unclear from the measures being put in place under the BERT programme as they do not seem to be tailored to providing a supportive environment. It is also likely that there would be negative perceptions around a greater role and involvement of the private sector in water services provision.

New developments in the hotel sector - which seem to be a government priority, are already subject to planning requirements around the handling and treatment of wastewater and these costs would have been factored into the development costs. So it is unlikely that investment requirements would be a barrier and hence in need of support.

Overall then the opinion is that the BERT programme will not have a significant accelerating effect on the provision of wastewater infrastructure and services.

### **8.3 GSC**

Since the GSC levy was introduced, there have been voices raised against it. One of the arguments put forward is that it is a blunt taxation instrument which is levied irrespective of whether or not a customer has access to a wastewater service or not. Because it is collected by

BWA, the Authority has become the focus of discontent even though the bulk of the funds go to the Sanitation Services Authority; by some estimates. Furthermore, for those who pay a service provider for the management of their wastewater, such as hotels and residential developments, they are paying twice so the levy is seen as inequitable. From the agricultural sector, there have been calls for exemption from the levy arguing that it has increased production costs. According to information received from the Barbados Agricultural Society some 1,000 farmers have been adversely affected and some pig producers have ceased operations. Furthermore, there is no separate customer identifier for water supplied to the agricultural sector<sup>6</sup> as they are at present classified as 'commercial'. Given its current design and application, there is little financial incentive for the ordinary property owner to invest in upgrading their wastewater management if it is seen as an additional cost. The blanket application also creates challenges for developments where the cost of investment in and operation of a decentralised wastewater system would have to be recouped from those benefiting from the service. Many of the entities consulted have mentioned this as a serious challenge that needs to be addressed with suggestions such as the need to reconsider how the GSC is levied and on what, or to provide incentives that would offset the cost, for example some mentioned the assistance given to encourage the uptake of solar water heaters.

There is a logic to levying a tax on the population to improve wastewater management as such interventions benefit the environment as well as the population as a whole. Furthermore, in theory the levy should act as a dynamic incentive to non-residential consumers to optimise their water use, though there is no evidence of this as yet. But as currently configured the levy acts as a potential disincentive to improving wastewater management beyond BWA and furthermore, it can only be used by BWA for their wastewater management interventions.

## 8.4 Funding BWA

At present BWA is funded through a combination of direct grants from the Government Consolidated Fund, revenue from the sale of water and the GSC levy, grants from development partners and loans for capital projects from financial institutions underwritten by the Government. The Government has indicated that it does not have the funds to continue supporting BWA in the way it has in the past and concomitantly BWA is expected to move to a

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<sup>6</sup> This situation is changing as a new tariff for agricultural water use was introduced from 1<sup>st</sup> May 2022.

position whereby it is able to fund itself without recourse to Government. Achieving this will require a combination of measures which could include: reducing costs, improving efficiency and productivity, increasing revenue, and restructuring the Authority. Options such as public-private partnerships are said to be on-the-table.

The financial position of BWA improved during the 2019/2020 financial year due to a combination of increased income from the sale of water, structural adjustments, the contribution of the GCS levy as well as a reduction in operating costs. At the same time transfers from the Central Government were significantly reduced as well as interest payments on loans. The reduction in transfers from Central Government is in line with the intention that BWA should be able to finance its operations from its own revenue generation, something which the BWA appears to be able to do. However, the aspiration that it will be able to finance its capital works programme from its own resources is more problematic. Over the last 3 years, BWA has received significant IFI loans to fund capital works amounting to US\$83 million and it is in the process of securing a further US\$150 million for investment in two major wastewater infrastructure projects. Other projects are to be funded either directly by Government through specific transfers or self-financed out of revenues generated through the GSC levy. Repeated studies have shown that if BWA is to finance its capital works programmes from its own revenues then it will have to increase those revenues either through increased tariffs or diversifying its income streams.

In this respect the Government has signalled its support for BWA to move into the generation of Renewable Energy and to use the sale of power as an additional source of income. This is a process that has already started with the installation of PV panels at a number of BWA sites and BWA is looking at further opportunities using its sites and landholdings. However, the sale of renewable energy will only offset the existing cost of electricity, reducing operational costs. The premiss is that the savings in operational costs can be reinvested in capital works. Some of the grant funding made available to BWA is contingent on the revenue generated from the sale of renewable energy being put into a revolving fund. The revolving fund is to support customers through the Personal Tank Programme and is administered internally by BWA; there are suggestions that its remit may be expanded to include other aspects under the Roof-to-Reef initiative. At this point in time it is understood that discussions are on-going between interested parties within Government.

From information received from BWA it was indicated that only those renewable energy projects funded through the Green Climate Fund grant to the WSRN-S<sup>7</sup> project would contribute to the Revolving Fund. All other income derived by BWA from its own renewable energy projects would go towards funding its capital works programme; whether this would be limited Non-Revenue Water Loss reduction measures or for more general capital expenditure is still subject to discussion by the Government.

From discussions with BWA it transpires that although renewable energy infrastructure has been put in place at various locations, they are not yet connected to the grid and are not generating income to BWA. Furthermore, BWA itself is unclear as to how it is going to manage and operated the renewable energy facilities. If BWA installed sufficient renewable energy capacity to offset its power needs it could generate an income of Bds\$17 million per year, with a payback period of under 8 years. Such figures are of course preliminary. It is considered unlikely that any of these funds would be made available for wastewater services.

It is understood that in the light of the impact of the GSC levy on BWA and the shortcomings with the existing configuration of the levy, it can be expected that there will be changes to the way in which BWA generates revenue. These might include a separation of the garbage and sewage components of the levy. A suggestion has been that the sewage contribution could be replaced by the inclusion of a Water Adjustment Clause (WAC). This would consist of a monthly debt servicing charge divided by monthly water sales. The purpose would be to use this to cover the costs of capital expenditures and loans. A further extension of this approach would be to introduce what is known as a K-factor on water bills, as Jamaica has had for several years. A K-factor is a percentage added to bills made up of two components; a reduction associated with efficiency gains and an addition to cover investment requirements. Irrespective of whether the GSC is replaced by a WAC or a K-factor adjustment the overall intention remains the same. The additional revenue raised would be used to expand BWA's wastewater services beyond the operation of the two existing sewerage systems.

However, in the Government's 2022 Budget, introduced by the Prime Minister in the role of Minister of Finance, set out anticipated changes. It was noted that whilst the GSC has stabilised BWA's finances such that it is able to cover its operation and maintenance costs, it needs a new model to enable it to finance its capital expenditures without recourse to the Government

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<sup>7</sup> Water Sector Resilience Nexus for Sustainability in Barbados (WSRN S-Barbados)

Consolidated Fund. In the financial years of 2020/21 and 2021/22 BWA had received Bds\$26.7 and Bds\$27.3 million in such support. The Government proposes a new financing and governance model for executing and expanding capital projects. This is to be based on the GSC income to secure a capital loan facility that will enable BWA to secure a mix of financing including commercial borrowing and concessionary development financing to service Bds\$50 million of loans. Further details of how this would work would have to be followed up with BWA and the Ministry of Finance Economic Affairs and Investment, as this was not mentioned in previous discussions with BWA.

How this might develop in the future in terms of whether BWA would introduce wastewater systems into existing urbanised areas, major new developments and/or take over existing systems has not been addressed. Such considerations might reasonably be expected to be part of the remit of the proposed Water and Sanitation Master Plan. Irrespective of what type and form of additional operational responsibilities BWA takes on, two things are clear. First, that this should lead to major organisational changes within BWA for it to be able to assume such new responsibilities. Secondly, BWA is unlikely to need to have recourse to another financing facility if it is capable of raising funding through its revenue streams.

## ***9. Sustainable Environmental Protection Revolving Fund/Appropriate Financing Mechanism***

## 9.1 Administrative Options

There are a number of ways in which the development of a financial Sustainable Financing Mechanisms for Integrated Water and Wastewater Management could come into being. Broadly, these might include:

- A registered charity,
- A cooperative, mutual or friendly society,
- A registered non-profit company,
- A registered for-profit company,
- A social enterprise,
- A Special Purpose Vehicle - within or outside of a Statutory Authority,
- A Public-Private Partnership,
- A fund established within a Ministry or Statutory Authority.

The other consideration is who would be the potential beneficiaries accessing the funding mechanisms, as this too would have a bearing on the form of the mechanism. It would also have a bearing on the level of funding that the mechanism would be expected to provide. The potential target groups are discussed in section 4.3.

### 9.1.1 Charity, Cooperative, Mutual or Friendly Society

The first option, a registered charity is considered to be an unsuitable vehicle because of its charitable purpose - it would not be able to make loans which would be repaid as this would conflict with charitable purposes. The use of a Special Purpose Vehicle is also not considered to be suitable for the purposes for which the mechanism is intended.

Cooperatives, mutuals and friendly societies as potential vehicles through which the supporting mechanism could operate might at first appear to be suitable but have restrictions which negate their potential. The governance structure of a cooperative is premised on the condition that those who they might lend to have to be 'owners' of the business, in other words there is a relationship which goes beyond that of an investor, customer or employee. Mutuals have a similar governance arrangement whereby they are owned by their depositors. A difference is that they operate for the profit of their owners, and they are unrestricted in who they may have as customers. In this respect they are a half-way house between a cooperative and a commercial

bank. Mutual's used to be widespread in the banking sector but from the 1980's a move towards de-mutualisation started. A mutual bank would be subject to regulation by the Financial Services Commission.

## **9.1.2 Registered Company**

With respect to the potential suitability of either a not-for-profit company or a social enterprise the following characteristics are relevant. A not-for-profit organisation as the name implies is not seeking to make a profit from its operations but this does not mean that they cannot generate income. In fact for financial sustainability the ability to generate income to sustain operations and activities is important especially when reliance on grants is a precarious strategy and not one that a not-for-profit company would rely on. It might be that to ensure financial sustainability, raising investment and hence providing a return to investors is needed. Under these circumstances a not-for-profit structure might not be the best option. A not-for-profit company is subject to rules and requirements in order to maintain its tax status, usually any profits have to be reinvested as opposed to paying dividends (distributing profits) to its investors. A social enterprise operates to provide social benefits in line with its declared intentions and goals. Furthermore, it can be either for-profit or non-profit in nature, depending on what it is setting out to achieve. In the UK there are over 100,000 social enterprises employing two million people and contributing US\$7.8 billion to the economy ([www.socialenterprise.org.uk](http://www.socialenterprise.org.uk)). Whilst there are many similarities between the two, as to what a social enterprise is appears to be 'work in progress'. Both not-for-profit and social enterprise companies have shareholder ownership models. Although the difference between the two revolves around the emphasis on social benefits and mission. This also suggests that a social enterprise company model would be preferable to a for-profit company as it would have a clearer purpose.

## **9.1.3 Public-Private Partnership**

Barbados already has examples of Public-Private Partnerships (PPP). The public partner would be the government whilst the private partner would be a business, public corporation, or a consortium of businesses. PPP arrangements are often entered into where there are difficulties in financing projects on the part of the government and the private sector is interested in

providing funding and expertise in exchange for receiving payments. The arrangements can come in different forms depending on the type of project and range from a management contract to a long-term contract that includes funding, planning, building, operation, maintenance and divestiture. One of the characteristics it could be said is that is that there is a specific and defined project, such as a wastewater treatment works. A potential model would be where the fund is established by the government and a private sector business or consortium has a contract to operate the fund and receives a performance-based fee for providing the service. Existing examples include the Agriculture Development Fund which was established by Act of Parliament in 2001. The Act establishes the Fund and provides for its administration with the revenue being administered and managed by a specified corporation and be used to finance projects and programmes. The Enterprise Growth Fund Ltd is a joint public/private sector financial institution providing loan financing and technical assistance to SME companies in the productive sectors, it also manages a number of government funds. Its operations include; Enterprise Growth Fund Limited, Agricultural Development Fund, Disaster Relief Revolving Fund, Energy Smart Fund, Industrial, Investment & Employment Fund, Innovation Fund, Small Hotels Investment Fund, Tourism Loan Fund and, Barbados Enterprise and Sustainable Transformation (BEST) Programme for the tourism sector.

#### **9.1.4 Ministry /Statutory Authority Fund**

Another possible mechanism is through a fund administered through a Ministry or Statutory Authority. This is a model BWA is engaged upon in respect of its Personal Tank Programme and the Revolving Adaptation Fund Facility (RAFF). The RAFF Charter sets out how the fund would operate and is used here as a guide. First a fund would have to be adopted and ratified by the Board of a Statutory Authority and the responsible Minister, in so far as the Authority's Act allows it to do so. This would then establish the responsibility for the management, operation and oversight of a fund as being within the statutory authority, through an oversight committee, and the requirement to maintain separate records and reporting. The cost of the administration would be borne by the statutory authority though this would entail additional staff resources. The fund would be subject to oversight by the Auditor-General. It would have to be set out in the documents establishing the fund who the potential recipients might be, the RAFF example appears to focus on individuals and does not mention businesses as being eligible to apply to it.

Another point to note is that there is no mention of the role of the private sector in the administration of the fund. Furthermore, the Charter would have to address the ability and conditions under which the fund could attract or accept additional investment. It should be noted that the RAFF is focused only on supporting potable water supply related initiatives. Establishing a fund within a ministry or statutory authority would minimise the operational costs. However, doing so would come with other risks often associated with government administration: bureaucratic burden, a perceived lack of transparency and accountability, implementation challenges with limited staff, and political favouritism.

### **9.1.5 Green Investment Bank and Other**

The setting up of a Green Investment Bank was included in the 2022 Budget Speech by the Prime Minister, in connection with promoting local and regional investment in renewable energy projects. The stated intention of the Green Investment Bank would be to enable the credit union movement and all other interested financial entities in Barbados to participate in and own a part of the benefits from investment in renewable energy projects, whilst also welcoming regional investment. It is understood that there were to be discussions between the Ministry of Finance Economic Affairs and Investment, the Inter-American Development Bank and the Green Climate Fund to explore this initiative. It is understood from conversations with Government representatives that this is very much at the conceptual stage and that there is still much work to be done on developing the details of its operation in terms of its form, remit, scope and capitalisation. However, it has been indicated that one of the roles of the Green Investment Bank could be to leverage funding from other financial institutions, raising capital investment for commercially viable programmes such as HOPE housing projects. Furthermore, it was indicated that the existence of such a financial institution would and should not adversely impact the development of an alternative financing mechanism to support wastewater. Indeed, it was mentioned that to achieve the goals of the Roof to Reef Programme<sup>8</sup> (R2RP), which is located

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<sup>8</sup> The Roof to Reef Programme is the GOB overarching approach to the sustainable development of Barbados over the next decade, guiding both public and private sector investment. The cross-cutting approach encompasses six inter-connected themes: Shelter, Water, Energy, Waste, Land-use, and Ecosystems Management. At the household level this includes supporting the provision of potable & rainwater storage tanks, upgrading domestic wastewater treatment with nutrient removal, and improved stormwater management and groundwater recharge. At the community scale this includes the reuse of wastewater and nutrients for productive purposes.

within the Office of the Prime Minister, it will be necessary to access a range of financing mechanisms.

In 2020 the Government of Barbados (GOB) together with The Nature Conservancy (TNC) and the University of the West Indies (UWI) agreed to work together to establish the Barbados Environmental Sustainability Fund (BESF). The initiative is also supported by the Barbados Chamber of Commerce and Industry through its Green Committee. The stated purpose of the BESF is to enable a reliable, long-term flow of financial resources to support environmental management, biodiversity conservation, and sustainable development initiatives in Barbados. The initiatives would include Integrated Solid Waste Management and Integrated Water Resources Management, which together would encompass wastewater management. The Fund would make grants available and be funded through various forms and sources of donations and revenues generated by sustainable financing mechanisms. The sustainable financing mechanisms could include Green Bonds, Debt-for-Nature and Debt-for-Climate Swaps. Although GOB through the Ministry of Finance Economic Affairs and Investment has been working on securing Debt-for-Nature Swaps, it would appear that the BESF is still work-in-progress.

## 9.2 Preferred Options

Based on the above, the potential funding vehicle options can be limited to,

- A registered non-profit company,
- A social enterprise,
- A mutual,
- A Public-Private Partnership,
- A fund established within a Ministry or Statutory Authority.

All of the above vehicles, subject to the provisions in an establishing 'charter', would be able to accommodate the provision of support to the potential target groups, and others, identified above. The associated running costs are likely to be least in the case of the ministry or statutory authority option and possibly the public-private partnership.

In discussions with various parties as to which might be the preferred vehicle some very clear opinions were expressed. Almost universally the option of a fund being based within a ministry

or statutory authority was rejected. The private sector respondents were particularly skeptical and unwelcoming of this option, fearing that it could well be politicised and not achieve its goals. There was some interest in the idea of a social enterprise model set up as a for-profit company but a lack of experience and examples of this model and how it would work created some hesitancy around it. The not-for-profit option was not at all favoured in discussions as it was felt it would limit opportunities to fund interventions and to be sustainable. The PPP option attracted support on the basis that there were several examples of this model already in operation and that there were a number of institutions which could be engaged with and chosen between. A caveat was raised in discussion by some respondents related to the how a governing Board would be appointed. There was a strong hint that if a government had too greater influence on the choice of board members, then there would be the potential for politicisation which was to be avoided if the vehicle was to achieve its purposes.

## 9.3 Potential Beneficiaries

The potential beneficiaries accessing the funding mechanisms could broadly include the following categories:

- Homeowners and occupants,
- Developers (public and private),
- Service providers (public and private),
- Industrial undertakings, and
- Farming enterprises.

As discussed in section 3.4, it is considered unlikely the BWA would need to utilise the funding mechanism. From discussions with a few stakeholders, one of the potential beneficiary groups could be those in low-income housing and housing provided through state agencies such as the NHC, existing and proposed. Low-income housing developments may need to be retro-fitted with septic tanks (individual or communal) and in the case of new-build septic tanks or better will be required. Their inclusion is often seen as increasing costs, see section 2, a problem that is

compounded by the high rate of non-payment of rents and water bills<sup>9</sup>. So whilst the low-income housing sector might be seen as a large potential participant, there would be challenges with respect to receiving payments, either from individual tenants or from the NHC, for wastewater services.

Suggested changes to land zoning and planning conditions, implicit in the Water Protection and Land Use Zoning Policy<sup>10</sup> would result in some properties with suckwells being required to install septic tanks. This would require existing land users in Zone B areas to adopt best management practices to be implemented over a defined phase-in period. Under these circumstances the provision of financial support would be envisaged. The number of properties that could be affected is not known at present.

The present Government of Barbados has indicated its intention of building 10,000 houses through the HOPE Inc, a government owned corporation. The developments are open to households where the net income does not exceed Bds\$8,000 per month; financing is through a preferred lending institution, offering preferential mortgage rates or through banks. Discussions with HOPE indicated that they are projecting to build between 500-700 houses per year, given their capacity. They have also indicated that they are actively considering how to make the developments sustainable and including water use. Tentative plans include harvesting rainwater, treatment and storage for the purpose of selling it to farmers as well as considering the collection and treatment of wastewater also for farming purposes. Having such a large number of houses in a number of discrete developments and a willingness to include the necessary infrastructure potentially represents a significant opportunity. The issue will be one of financing. HOPE Inc will not be funded through the Government budget and must explore alternative means of financing. The ability to access a source of finance at competitive rates that could assist with the provision of infrastructure would be beneficial to HOPE Inc in leveraging other sources of finance. Alternatively, the HOPE Inc developments may also be of interest to providers of wastewater services who could access financing and offer to install and manage the onsite sewerage systems and recoup their costs through charging homeowners. However, the contractual arrangements between homeowners and service providers would have

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<sup>9</sup> BWA have indicated that under the COVID regulations it still cannot disconnect consumers for non-payment and an outstanding account is not tied to a property. Furthermore, the NHC does not assume responsibility for non-payment on behalf of its tenants.

<sup>10</sup> Page 55 paragraph (e)

to be such that neither party is exposed to unreasonable levels of risk (financial and environmental).

In addition to HOPE Inc and the National Housing Corporation, both the Urban Development and Rural Development Commissions under their respective Acts have responsibility for the provision of housing and other related amenities. Both Commissions were charged with rebuilding and repairing properties damaged by Hurricane Elsa and in addition they have built and repaired houses as part of their mandate. It might be expected that they will have a role to play in the realisation of the Government's aspirational 10,000 houses programme, alongside HOPE Inc. How exactly they would be able to fund this has not been spelt out as in the past both have been constrained by finances in what they could achieve. There have been suggestions that these two SOEs should be combined but this would require legislative intervention and does not seem to enjoy a priority.

Industrial undertakings and other developers e.g. hotels generally would not require access to additional financing for the inclusion of wastewater management infrastructure as the costs would have been factored in. That is not to say that if low-cost/competitive financing were available that they would not avail themselves of it. However, the number of such potential beneficiaries is likely to be low in number. The other set of potential beneficiaries are middle to upper income residential developments. Here, subject to the constraints discussed in section 4 with respect to the need for incentives, ability and willingness to pay should be a lesser challenge. However, for new-build residential developments potential buyers are perceived as being price sensitive and therefore requirements that add costs are often resisted - hence the number of exemptions granted by planning authorities on appeal. Again, there would have to be arrangements in place between homeowners and a service provider - such as pertains at Coverley Village - to ensure that neither party experiences unreasonable risks. An option to encourage uptake that has been mentioned concerns to offering of concessionary water tariffs to customers which are charged at the commercial tariffs. These could be targeted at developments, commercial and industrial undertakings, particularly if wastewater is treated to a standard that enables reuse to reduce water overall water consumption or onward supply of treated water for reuse purposes such as irrigated agriculture<sup>11</sup>. The possibility of generating

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<sup>11</sup> It has been suggested that industrial undertakings such as Pinehill and Banks, which are large users of potable water, could be encouraged to treat their wastewater for onward sale as irrigation water via the proposed treated water pipeline from the South Coast Sewage Plant to the irrigation areas of River Plantation, St Phillip.

additional revenue from the sale of treated wastewater together with potential lower water tariffs may create a more favourable cost-benefit calculation for developers, especially if coupled with appropriate planning inducements. Whilst such an approach - which it is understood is being considered by the Government of Barbados, would provide incentivisation, the scale of uptake is likely to be limited. The availability of concessionary tariffs may allow qualifying entities to access funding from a variety of sources including commercial loans. It is unlikely that there will be a significant number of existing property owners who would be interested in upgrading their sewerage systems without there being financial or regulatory incentives to induce them to do so. Such incentives may well have to differ from those potentially available to commercial entities or large developments.

A further set of potential beneficiaries could be the agricultural sector. Discussions with the Ministry of Agriculture Food and Nutrition Security and the Barbados Agriculture Development and Marketing Corporation (BADMC) indicate that there is interest in on site sewerage systems that could treat agricultural waste to produce energy (biogas), soil conditioner and wastewater, all of which would have a value. Both parties indicated that a facility treating agricultural waste would probably have to operate at the community level scale and that there would be questions regarding the associated infrastructure required for operation. There would have to be compliance with Regulations under the Water Reuse Act. Whilst there was interest in the idea of supporting the introduction of the treatment of agricultural waste the feasibility of such schemes would have to be tested and including the level of funding available and how a fund would operate. An associated issue concerned the level of acceptability of produce grown using treated wastewater and soil conditioner.

## 9.4 Sustainability

For a revolving fund to be financially viable it has to be capable of generating sufficient income to cover its operating costs and liabilities, and at the same time be able to grow the fund to meet potential demand. This requires that there would be sufficient number of interested parties willing to access financing and repay loans to generate the required income. On the other side, parties interested in accessing financing would have to be able to repay the loans. This would

have to come either from their own income, in the case of a homeowner for example. Alternatively, if this were a service provider, there would have to be a business case for making a reasonable profit from the provision of a service. These factors would have to be weighed up by the operators of the fund. There are many individually operated plants and at least three private sector wastewater service providers. The service providers have been in business for a number of years and so there is clearly enough business around. However, there are two caveats. First, none of the service providers operate only in Barbados, so their risk and income streams have been diversified. Second, none of them were certain that there would be any significant growth in demand for their services in Barbados.

With respect to the encouragement of the introduction of wastewater treatment there are potential benefits which could be used to offset costs. Water treated to an appropriate standard could be either resold for beneficial purposes or used to offset part of water consumption. Beneficial purposes might be the provision of water for irrigation whilst offsetting might be for landscaping or toilet flushing within homes. This may become an increasingly important aspect given the climate change predictions and the likely impact on water resources. However, there needs to be some caution in seeing the resale of treated water or the offsetting of consumption as a sure means of offsetting capital and operational costs. These measures will only be viable depending on specific locations and circumstances, e.g. the provision of dual plumbing in new developments. Furthermore, it would have to be determined on a case-by-case basis the breakeven point i.e. where the potential income generated equals or exceeds to capital and operational costs of wastewater management. Such calculations would be influenced by factors such as the applicable water tariff and the price taking behaviour of entities to which treated water could be sold i.e. how much they would be prepared to pay.

For consideration, in new residential developments an inset type of arrangement might have some advantages. Under this arrangement, contingent on there being wastewater treatments and reuse arrangements, the managing agent is treated as a bulk purchaser of potable water at a lower overall cost than would be the case using the commercial tariffs and then recovers costs of water and wastewater services from the clients within the development. The managing agent would be free to contract a service provider. Such arrangements could be negotiated on a case-by-case basis.

At this stage it is unclear what the potential level of demand might be for a fund that provides financial support for the installation of sewerage infrastructure ranging from the individual property level through to more extensive developments such as residential areas. A potential pilot, through one of the HOPE Inc developments could be considered to test some of the suggestions with respect to rainwater harvesting, stormwater run-off capture and wastewater reuse. Such a pilot could be supported financially through the European Union's "Caribbean Sustainable Water Management and Clean Oceans Programme". This is offered as a suggestion and would have to be discussed further with HOPE Inc.

# Appendix I: List of Stakeholders Consulted

Organisation	Comment
Corporate Affairs and Intellectual Property Office	Repeated efforts to contact the Office have gone unanswered.
Financial Service Commission	Repeated efforts to contact the head
Ministry of Finance Economic Affairs and Investment	<p>Initial contact was made with Mr Ricardo Marshall. During subsequent follow up with the Permanent Secretary it was suggested that the Ministry did not have a position. Further contact was made to further clarify that it was the financial aspects that were to be discussed. Discussions have been held with the PS, the Chief Economist and members of the Project Implementation Unit.</p> <p>Discussions have also been held with Dr Clyde Mascoll, Chief Economic Counsellor and Lead Negotiator with the IMF and Chief Economic Advisor to the Minister of Finance.</p> <p>Discussions have been held with Mr Ricardo Marshal Director Roof to Reef Programme.</p>
Ministry of Commerce and Trade - Cooperatives Department	During discussions the Department indicated that they would not have a role in respect of the financing mechanism or arrangements.
Barbados Water Authority	Discussions have been held with senior managers
Coastal Zone Management Unit	Discussions have been held with the Director.
Environmental Health Department	Discussions have been held with Chief Environmental Health Officer.
National Housing Corporation	Discussions have been held.
Planning and Development Department	Discussions have been held with the Director and Deputy Director.
Ministry of Transport Works and	Discussions have been held with the Deputy PS with

Organisation	Comment
Water Resources	responsibility for Water Resources
Environmental Protection Department	Discussions have been held.
Ministry of Agriculture Food and Nutrition Security	The Permanent Secretary had been contacted on several occasions to request a meeting. Following intervention by Mr A Headley a meeting was held and arrangements made for a joint meeting with the Deputy Chief Agriculture Officer and BADMC Chief Agricultural Economist.
Ministry of Housing Lands and Maintenance	The Permanent Secretary has been contacted on several occasions to request a meeting or even to have the PS return the call but all approaches have so far gone unanswered and no
Ministry of Health and Wellness	Discussions have been held jointly with EHD.
HOPE Inc	Discussions have been held with two Directors.
Natural Heritage Department.	Discussions have been held with the Director
Ecohesion Ltd	Discussions have been held with the company
SIR Water Management Ltd	Discussions have been held with the company
Renew Waste Ltd	Discussions have been held with the company
Sandy Lane	Discussions have been held with the Director Engineering
Grantley Adams International Airport Inc.	Discussions have been held with the company
Port St Charles Operator	Discussions have been held with the management company
Port Ferdinand Operator	Discussions have been held with the management company

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