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**“An integrated approach to wastewater management in the
Wider Caribbean Region using innovative solutions and
sustainable financing mechanisms”**

**Review of Wastewater Policy and Legal Framework
in St. Kitts and Nevis**

National Wastewater Effluent Discharge Standards for St. Kitts and Nevis

Final Report

March 2025

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Contents

<i>Executive Summary</i>	4
<i>Chapter 1 Introduction</i>	6
<i>Chapter 2 LBS Protocol</i>	8
2.1 Mandate	8
2.2 Classification of Water	8
2.3 Comparison with Effluent Standards of Other Countries.....	9
<i>Chapter 3 Recommendation for Wastewater Effluent Discharge Standards for St. Kitts and Nevis</i>	11
<i>Chapter 4 Summary and Conclusions</i>	14

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List of Tables and Figures

Table 2.1: LBS Protocol Effluent Discharge Standards8

Table 2.2: Canada, USA and EU Effluent Discharge Standards9

Table 2.3: Wastewater Effluent Discharge Standards for Jamaica and Trinidad and Tobago 10

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Acronyms and Abbreviations

CAWASA	Caribbean Water and Sewerage Association Inc.
CWWA	Caribbean Water and Wastewater Association
CSO	Civil Society Organizations
DOE	Department of Environment
DPP	Department of Physical Planning
EHD	Environmental Health Department
FAMRA	Fisheries, Aquaculture and Marine Resources Act
GCF	Green Climate Fund
GEF	Global Environment Facility
GOSKN	Government of St. Kitts and Nevis
IWMC	Integrated Wastewater Management Committee
IWRM	Integrated Water Resources Management
NCEPA	National Conservation and Environmental Protection Act
NGO	Non-Governmental Organizations
NWMCP	National Wastewater Management Coordination Platform
OECS	Organization of Eastern Caribbean States
PHA	Public Health Act
PPP	Public Private Partnership
SIDS	Small Island Developing States
WCR	Wider Caribbean Region
WWM	Wastewater Management

Executive Summary

The **National Wastewater Effluent Discharge Standards for St. Kitts and Nevis** represents a major step in improving wastewater management, ensuring environmental protection, public health safety, and regulatory compliance with international best practices. This document establishes the legal and technical framework for controlling wastewater discharge into surface water, coastal areas, and groundwater, aligning national regulations with the Cartagena Convention's Land-Based Sources (LBS) Protocol and other regional and international standards.

Scope and Objectives

The primary purpose of these wastewater effluent discharge standards is to:

- **Define legally enforceable limits** for wastewater discharged into the environment.
- **Ensure compliance with the LBS Protocol**, which sets effluent discharge requirements across the Wider Caribbean Region.
- **Mitigate environmental and public health risks** by improving the quality of treated wastewater.

These standards apply to all domestic, commercial, industrial, and institutional wastewater discharges, with a **phased implementation approach** to accommodate institutional capacity-building and compliance enforcement.

Alignment with Regional and International Standards

The standards align with:

- **The Public Health Act (PHA), National Conservation and Environmental Protection Act (NCEPA), and Fisheries, Aquaculture and Marine Resources Act (FAMRA)** to strengthen wastewater regulation and enforcement.
- **The Cartagena Convention's LBS Protocol**, which provides a legally binding framework for wastewater pollution control.
- **Global Sustainable Development Goals (SDGs)**, specifically SDG 6 (**Clean Water and Sanitation**) and SDG 14 (**Life Below Water**).

Key Features of the Standards

The recommended wastewater effluent limits (based on the LBS Protocol and additional recommendations from environmental assessments) include:

- **Biochemical Oxygen Demand (BOD5):** Maximum 30 mg/L (Class I waters).
- **Total Suspended Solids (TSS):** Maximum 30 mg/L (Class I waters).

- **Fats, Oils, and Grease (FOG):** Maximum 15 mg/L.
- **Pathogen limits** (e.g., fecal coliform 200 MPN/100mL).
- **Additional parameters** such as total nitrogen (15 mg/L) and total phosphorus (2 mg/L).

Furthermore, all waters of St. Kitts and Nevis should be designated as **Class I**, ensuring higher levels of protection for aquatic ecosystems and public health.

Expected Benefits

The adoption of these wastewater effluent discharge standards will:

- **Reduce pollution risks** to marine and freshwater ecosystems.
- **Improve public health** by minimizing waterborne disease risks.
- **Enhance regulatory enforcement** through a structured compliance framework.
- **Support climate resilience** by integrating wastewater management into national adaptation strategies.
- **Encourage sustainable wastewater reuse** to conserve freshwater resources.
- **Attract investment and funding** for wastewater treatment infrastructure.

The National Wastewater Effluent Discharge Standards mark a transformational milestone in wastewater management for St. Kitts and Nevis. By following a phased, structured approach, the government can ensure long-term compliance, environmental sustainability, and improved public health.

With strong government commitment, stakeholder collaboration, and capacity-building, these standards will pave the way for a cleaner, more resilient water environment in St. Kitts and Nevis, benefiting current and future generations.

Chapter 1 Introduction

1.1 Background

St. Kitts and Nevis, like many Small Island Developing States (SIDS), faces increasing challenges in managing wastewater due to population growth, urbanization, tourism expansion, and climate change impacts. Inadequate wastewater treatment and disposal contribute to marine and freshwater pollution, threatening public health, biodiversity, and key economic sectors such as tourism and fisheries. Historically, the Federation has relied on decentralized treatment systems, such as septic tanks and small-scale treatment plants, which often suffer from poor maintenance and inefficiency.

Recognizing the urgent need to improve wastewater management, the Government of St. Kitts and Nevis in collaboration and support the GEF CREW+ project has undertaken a comprehensive wastewater policy reform, including the development of:

1. Situational Analysis on Wastewater Management
2. National Wastewater Management Policy
3. Wastewater Management Strategy and Action Plan

A critical component of this effort is the establishment of national wastewater effluent discharge standards to regulate wastewater treatment and disposal, ensuring compliance with regional and international best practices.

1.2 Purpose

The Wastewater Effluent Discharge Standards serve as a regulatory framework to:

- Define permissible limits for wastewater discharged into the environment.
- Ensure compliance with the Cartagena Convention's Land-Based Sources (LBS) Protocol, which sets regional water quality and effluent discharge requirements.
- Mitigate environmental and health risks by improving the quality of treated wastewater before discharge.
- Begin to support wastewater reuse initiatives, particularly in agriculture, industrial applications, and aquifer recharge.
- Provide guidance for industries, businesses, and residential developments on acceptable treatment and disposal practices.

1.3 Scope

These standards apply to all wastewater discharges from domestic, commercial, industrial, and institutional sources that are released into surface water, coastal areas and groundwater. Key parameters regulated, in the first phase, include:

- Biochemical Oxygen Demand (BOD5)
- Total Suspended Solids (TSS)
- Fats, Oils, and Grease (FOG)
- Pathogens (Fecal Coliforms, E. coli, Enterococci)

The document outlines effluent receiving water classification and introduces monitoring requirements, enforcement measures, and wastewater reuse provisions, ensuring a gradual, phased implementation approach that aligns with institutional capacity-building efforts.

1.4 Alignment with National and Regional Guidance

The adoption of these standards aligns with key national and regional frameworks, including:

- The Public Health Act (PHA), National Conservation and Environmental Protection Act (NCEPA) and Fisheries, Aquaculture and Marine Resources Act (FAMRA) – To strengthen wastewater regulation and enforcement.
- The Cartagena Convention and LBS Protocol – As a legally binding regional agreement for wastewater pollution control.
- The Sustainable Development Goals (SDGs) – Particularly SDG 6 (Clean Water and Sanitation) and SDG 14 (Life Below Water).

By integrating these effluent discharge standards into national policy and enforcement mechanisms, St. Kitts and Nevis will ensure sustainable wastewater management, improved water quality, and enhanced environmental resilience.



Chapter 2 LBS Protocol

2.1 Mandate

In the Wider Caribbean Region, wastewater effluent discharge standards are primarily guided by the Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol) of the Cartagena Convention (UNEP, 1999). This protocol establishes regional effluent limitations and provides a legal framework for managing domestic wastewater discharges into the marine environment of the Wider Caribbean Region. The countries that are signatory to the Cartagena Convention and its LBS Protocol are Antigua and Barbuda, The Bahamas, Barbados, Belize, Costa Rica, Dominican Republic, France, Grenada, Guyana, Honduras, Jamaica, Panama, Saint Lucia, Trinidad and Tobago and USA. St. Kitts and Nevis has also recently ratified the Protocol as of September 26, 2024, bringing to total number of countries ratifying the Protocol to 16.

2.2 Classification of Water

The LBS Protocol classifies receiving waters into two categories:

Class I Waters: Particularly sensitive areas requiring stringent effluent quality to protect ecosystems and human health.

Class II Waters: Less sensitive areas where standard effluent limitations apply.

Effluent limitations for domestic wastewater discharges into these classes are outlined in Annex III of the protocol. For example, discharges into Class I waters have stricter requirements for parameters such as total suspended solids (TSS), biological oxygen demand (BOD), and pH levels compared to Class II waters (UNEP, 1999). The effluent discharge standards stipulated by the LBS Protocol are listed in Table 2.1.

Table 2.1: LBS Protocol Effluent Discharge Standards

Parameter	LBS Protocol Class I waters	LBS Protocol Class II waters
Biological Oxygen Demand (BOD ₅)	30 mg/L	150 mg/L
Total Suspended Solids (TSS)	30 mg/L	150 mg/L
pH	5-10	5-10
Fats, Oils and Grease	15 mg/L	50 mg/L
Floatables	Not visible	Not visible
Feecal Coliforms (Parties may meet effluent limitations either for faecal coliforms or for <i>E. coli</i> (freshwater) and enterococci (saline water).)	Feecal coliform: 200 MPN/100mL; or a. <i>E. coli</i> : 126 organisms/100 mL; b. enterococci: 35 organisms/100 mL	N/A

Many of the countries that have signed onto the Protocol have enshrined these standards (or even stricter ones) into their national laws and regulations.

2.3 Comparison with Effluent Standards of Other Countries

Table 2.2 lists the main effluent discharge standards in larger jurisdictions such as the USA, Canada and the EU (data retrieved from Ambient Environmental Consulting 2021) and Table 2.3 highlights standards in jurisdictions closer to St. Kitts and Nevis notably, Jamaica and Trinidad and Tobago.

Table 2.2: Canada, USA and EU Effluent Discharge Standards

Parameter	Canada	USA	EU	
Population trigger	N/A	N/A	10,000 to 100,000	>100,000
cBOD5	25 mg/L	25 mg/L	25 mg/L	25 mg/L
COD	-	-	125 mg/L	125 mg/L
TSS	25 mg/L	>85% removal	35 mg/L	35 mg/L
NH ₃ -N (unionized)	1.25 mg/L	-	-	-
pH	-	6 to 9	-	-
Total nitrogen	-	-	15 mg/L	10 mg/L
Total phosphorus	-	-	2 mg/L	1 mg/L

Notes: cBOD5 = Carbonaceous biological oxygen demand measured over a 5-day period; COD = Chemical oxygen demand; TSS = total suspended solids; NH₃-N = Ammonia nitrogen in the toxic, unionized form

Ambient Environmental Consulting, in its assessment of St. Kitts and Nevis' water quality monitoring protocols in 2021, suggested wastewater effluent discharge standards for St. Kitts and Nevis. It recommends that a wastewater monitoring program in St. Kitts should include at least the analysis of Total Suspended Solids (TSS) and either Carbonaceous Biochemical Oxygen Demand (cBOD5) or Chemical Oxygen Demand (COD). The report suggests applying European Union (EU) regulatory guidelines for these parameters to evaluate wastewater effluent quality.

Table 2.3: Wastewater Effluent Discharge Standards for Jamaica and Trinidad and Tobago

Parameter	Jamaica (no classification of waters stated)	Jamaica Used for irrigation	TT Surface Inland Water	TT Coastal Nearshore	TT Marine offshore	TT Sensitive and/or Groundwater
Biological Oxygen Demand (BOD ₅)	20 mg/L	15 mg/L	30 mg/L	50 mg/L	100 mg/L	10 mg/L
Total Suspended Solids (TSS)	20 mg/L	15 mg/L	50 mg/L	150 mg/L	200 mg/L	15 mg/L
pH	6-9	N/A	6-9	6-9	6-9	6-9
Fats, Oils and Grease	N/A	10 mg/L	10 mg/L	15 mg/L	100 mg/L	No release
Floatables	Not visible	N/A	N/A	N/A	N/A	N/A
Faecal Coliforms	200 MPN/100mL	12 MPN/100 mL	400 MPN/100mL	400 MPN/100mL	400 MPN/100mL	100 MPN/100mL
Total nitrogen (as NH ₃ -N)	10 mg/L	N/A	10 mg/L	10 mg/L	10 mg/L	0.1 mg/L
Total phosphorus	4 mg/L	N/A	5 mg/L	5 mg/L	5 mg/L	0.1 mg/L

Notes: Both countries regulate other compounds such as Nitrates, Phosphates and trace metals.

1. Jamaica - Natural Resources Conservation (Wastewater and Sludge) Regulations, 2017 [https://www.nepa.gov.jm/sites/default/files/2019-12/sewage_effluent_standards.pdf
https://www.nepa.gov.jm/sites/default/files/2019-12/irrigation_standards_interim.pdf]
2. Trinidad and Tobago - Water Pollution Rules (2019) [<https://www.ema.co.tt/our-environment/water/water-pollution-rules-2019/>]

Notably, both Jamaica and Trinidad and Tobago regulate trade (industrial) effluents with a much wider list of compounds that must meet the standard before discharge. In addition, Jamaica has standards for sewage effluent to be used for irrigation whereas Trinidad and Tobago does not currently regulate wastewater reuse for any application, although this matter is being studied closely under CREW+. Similarly, Barbados does have a national policy on wastewater reuse but is still working to implement the policy through regulations and standards (Government of Barbados, 2020). In fact, many countries worldwide have standards for wastewater reuse for irrigation and other non-potable uses but very few are currently regulating and advocating for wastewater reuse for potable water usage. Several countries in the OECS have ambient water quality standards enshrined into law and regulations but very few have wastewater effluent discharge standards integrated into regulations but generally follow the guidelines laid out in the LBS protocol. For example, Antigua and Barbuda's Environmental Protection and Management Act (2015) mandates that all sewage and waste receive necessary treatment to protect the beneficial uses of the nation's water before discharge. However, no specific numerical effluent limits are detailed. On the other hand, the Act outlines a detailed framework for classifying waters (much more detailed than what is suggested in the LBS protocol) and has a detailed list of ambient water quality standards.

Chapter 3 Recommendation for Wastewater Effluent Discharge Standards for St. Kitts and Nevis

As outlined in the draft National Policy, Strategy and Action Plan for Wastewater Management for St. Kitts and Nevis, it is imperative to strengthen the policy, institutional and regulatory framework as the first foundational step to proactive wastewater management in the Federation. Priority Area 1 outlines these steps. As part of Action 1, update of the Public Health Act and National Conservation and Environmental Protection Act, it is **recommended to seek to regulate wastewater discharges by adopting in the first instance the standards outlined in the LBS Protocol (Table 2.1) with the addition of a limit for total nitrogen (15 mg/L) and total phosphorus (2 mg/L)** (as recommended by Ambient (2021)). In alignment with FAMRA and the marine management areas outlined within it, all the waters of St. Kitts and Nevis should be classified as Class I.

To achieve effective wastewater management and ensure long-term compliance with national and international standards, a phased approach should be implemented. This ensures that institutional capacity, regulatory mechanisms, and enforcement structures are established and strengthened before progressively implementing more stringent discharge regulations. The phased implementation is designed to align with the National Wastewater Management Strategy and Action Plan.

Phase 1: Foundational Policy and Institutional Strengthening

The first phase will focus on creating the necessary legislative, institutional, and administrative framework to support effective wastewater management. This includes:

1. Legislative and regulatory updates: Amendments to the Public Health Act (PHA) and the National Conservation and Environmental Protection Act (NCEPA) to introduce clear effluent discharge regulations, permitting systems, and compliance mechanisms.
2. Establishment of an Integrated Wastewater Management Committee (IWMC): A dedicated oversight body will be formed to coordinate policy implementation, stakeholder engagement, and inter-agency collaboration.
3. Development of technical guidelines and standards: Clear design, construction, and operational guidelines for wastewater treatment and discharge will be developed before full regulatory enforcement.
4. Capacity building for enforcement agencies: Training programs will be implemented to strengthen the technical expertise of Environmental Health Officers (EHO), Department of Environment (DOE) inspectors, and wastewater facility operators.

At the end of Phase 1, the institutional framework will be established and functional, setting the stage for the introduction of more stringent regulatory measures.

Phase 2: Implementation of Wastewater Discharge Permitting and Compliance

Once the foundational legal and institutional framework is in place, progressive regulatory enforcement will begin, with a focus on:

1. Implementation of a wastewater discharge permitting system: All commercial, industrial, and high-volume residential developments will be required to obtain wastewater discharge permits, ensuring compliance with initial effluent limits.
2. Enforcement of initial effluent discharge standards: Facilities will be required to meet basic effluent quality criteria (e.g., BOD, TSS, pH, coliforms, nutrients) before transitioning to stricter pollutant controls (e.g., heavy metals).
3. Expansion of wastewater monitoring programs: Routine effluent testing, self-monitoring requirements, and independent verification will be introduced to strengthen regulatory oversight.
4. Pilot implementation of wastewater reuse initiatives: Feasibility studies and pilot projects for wastewater reuse in agriculture, landscaping, and industrial applications will be launched.

By the end of Phase 2, wastewater dischargers will have clear regulatory obligations, monitoring frameworks will be operational, and initial enforcement mechanisms will be in place.

Phase 3: Full Enforcement of Stringent Regulations (Years 7-10)

With the institutional framework fully operational, the final phase will introduce stricter effluent discharge limits and expanded compliance mechanisms:

1. Strengthening of wastewater discharge limits: More stringent limits will be introduced heavy metals (Lead, Mercury, Arsenic, Cadmium), and other emerging contaminants.
2. Mandatory compliance monitoring and enforcement penalties: Facilities failing to meet progressive standards will face increased fines, permit revocation, or legal action for severe violations.
3. Advanced wastewater treatment requirements: Large dischargers (e.g., hotels, industries, and commercial developments) will be required to implement secondary or tertiary treatment systems.
4. Scaling up of wastewater reuse initiatives: Full implementation of wastewater reuse programs for agriculture, aquifer recharge, industrial cooling, and landscaping.

At the conclusion of Phase 3, St. Kitts and Nevis will have a fully developed wastewater regulatory framework, aligned with regional and global best practices.

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By adopting a phased approach, St. Kitts and Nevis ensures that wastewater regulations are implemented in alignment with institutional capacity and technical readiness. This gradual implementation strategy prevents premature enforcement challenges, encourages stakeholder engagement, and enables a sustainable transition to more stringent wastewater discharge regulations.

Chapter 4 Summary and Conclusions

The Wastewater Effluent Discharge Standards for St. Kitts and Nevis establish a structured, enforceable framework for wastewater treatment, disposal, and reuse, ensuring the protection of public health, freshwater ecosystems, and coastal waters. These standards align with regional and international best practices, particularly the LBS Protocol under the Cartagena Convention, and support the country's commitment to sustainable water management. Key findings of this report are:

1. Need for Improved Wastewater Regulation
 - St. Kitts and Nevis currently lacks a nationally enforceable set of effluent discharge standards, leading to inconsistent treatment practices.
 - The standards introduced in this document establish clear, legally binding discharge limits to reduce environmental contamination.
2. Institutional Strengthening and Compliance Framework
 - The standards will be implemented in a phased manner (2025-2035) to allow institutional capacity-building before full enforcement.
 - A Wastewater Discharge Permit System will be introduced to regulate commercial, industrial, and municipal dischargers.
 - Monitoring and enforcement mechanisms, including routine inspections, self-monitoring requirements, and public reporting mechanisms, will ensure compliance.
3. Economic and Environmental Benefits
 - Effective wastewater treatment will reduce marine pollution, safeguarding tourism, fisheries, and biodiversity.
 - The introduction of wastewater reuse guidelines will enable the safe use of treated wastewater for irrigation, landscaping, and industrial processes, reducing reliance on freshwater resources.
 - Strengthened compliance will attract international funding and investment in wastewater treatment infrastructure.

A Phased, Sustainable Approach

The establishment of wastewater effluent discharge standards marks a transformational step in the management of wastewater in St. Kitts and Nevis. However, to ensure effective enforcement and long-term sustainability, a phased implementation strategy is critical. The proposed timeline will:

- Phase 1: Strengthen policy, regulatory, and institutional capacity.
- Phase 2: Implement a permit system, monitoring framework, and initial discharge limits.
- Phase 3: Enforce stricter effluent limits and expand wastewater reuse initiatives.

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By adopting this strategic, evidence-based approach, St. Kitts and Nevis will:

- Reduce pollution risks to marine and freshwater ecosystems.
- Enhance climate resilience of wastewater infrastructure.
- Support economic sustainability through responsible wastewater management.

The successful implementation of these standards will require collaborative action from government agencies, private sector entities, and local communities, ensuring that wastewater is managed efficiently, sustainably, and in line with international best practices.

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