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Department of Environment, Government of St Kitts and Nevis

Minerals Sector Study in St Kitts and Nevis

Legislation and Policy Report

Report for

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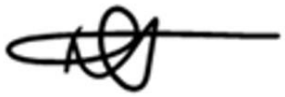

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Doc Ref. 42629-WOOD-ZZ-XX-RP-Z-0005_A_P01.4

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Document revisions

No.	Details	Date
1.	Draft final report	25/04/2022
2.	Final issue after comments	26/08/2022

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1. Introduction

1.1 Background

This report is delivered with respect to the original contract between the Government of St Kitts and Nevis (Department of Environment) and Wood Environment & Infrastructure Solutions (E&IS) UK Ltd (signed March 9th 2020) and the associated addendum signed April 7th 2021.

The scope of this report is further guided by the Inception Report (February 2020, Wood Ref: Doc Ref. 42629-WOOD-ZZ-XX-RP-Z-0001_A_P01.2) and covers Task 6: Policy (which in turn also seeks to inform and feed into the completion of Task 5 - training). The report is an evolution of the Interim Legislation and Policy Report and covers the following components of the study:

- Identification and review of the existing legislation and policy landscape which has a direct bearing on the development and operation of the minerals industry in St Kitts and Nevis;
- Outline of the institutional structures across the islands within which the regulation of existing quarrying activity, and the planning for future activity, must operate;
- Recommendations for improving the robustness and effectiveness of the regulation and management of quarrying activity in St Kitts and Nevis.

The contents of the report are based on our review of an extensive range of documents, including:

- Relevant international treaties and agreements of which the Governments of St Kitts and Nevis are signatories;
- The Islands' own planning and environmental acts of Parliament, and statutory instruments which enact the provisions of primary legislation;
- Relevant planning and environmental policy statements; and
- Other relevant planning and environmental guidance.

The interim report drew on a series of stakeholder interviews which were held in August and September 2020. These interviews covered the following cross section of stakeholder interests and provided some helpful insights to the implementation of existing planning and environmental legislation and policy across St Kitts and Nevis, as well as views on the current systems' potential shortcomings:

- Department of Physical Planning & Environment, Nevis;
- Department of Environment, St. Kitts;
- Department of Physical Planning, St. Kitts;
- Department of Public Works, St. Kitts;
- Nevis Housing and Land Development Corporation; and
- Operators of current quarries across St. Kitts and Nevis.

This report also draws heavily on the learning gleaned from the first project visit to St. Kitts and Nevis, during which our project representatives (Ben Thomas and Nick Jarritt) were able to consult with relevant government departments and quarry operators to understand the current regulation and management of quarrying activities. As part of this, we were able to discuss a number of points highlighted in our previous interim report, and these discussions have substantially informed this updated report.

1.2 Report structure

The report is set out as follows:

- Section 2 sets out the minerals planning landscape on St. Kitts and Nevis;
- Section 3 outlines the institutional structure with regards to minerals planning on St. Kitts and Nevis;
- Section 4 summarises the current situation and considers the gaps that are required to be filled in order to ensure a more effective control of quarrying and mining activities in St. Kitts and Nevis;
- Section 5 presents the key considerations for quarrying and mining permissions, covering both the definition of the site and activity as well as the primary environmental considerations that should be incorporated into site working arrangements; and,
- Section 6 summarises the conclusions of the report.

2. Legislative and policy landscape

2.1 Introduction

This section seeks to identify the existing legislation and policy landscape which has a direct bearing on the development and operation of the minerals industry in St. Kitts and Nevis. Specifically, this review has sought to identify relevant:

- International agreements and treaties relating to the protection of the environment (and to which SKN are signatories);
- National legislation and regulation i.e. the Islands' own acts of parliament and statutory instruments which enact the provisions of primary legislation (if any);
- St. Kitts and/or Nevis wide planning, environmental and other policy statements; and
- Other recognised guidance within St. Kitts and Nevis.

2.2 International environmental agreements

Overview

The Government of St. Kitts and Nevis has certain obligations under a number of multilateral environmental agreements (MEAs). The most notable of these (as referenced in the current St Kitts National Physical Development Plan, 2006) are:

- The United Nations Convention on Biological Diversity (CBD);
- The United Nations Framework Convention on Climate Change (UNFCCC);
- The United Nations Convention to Combat Desertification (UNCCD); and
- The United Nations Environment Programme (UNEP) Cartagena Convention to prevent, reduce and control pollution in the Caribbean Sea.

Consideration was also given as to whether there were any 'regional'/ Caribbean agreements or policy statement of relevance. In this regard however, the review concluded that there were no documents of direct relevance.

United Nations Convention on Biological Diversity

The Convention on Biological Diversity (CBD) is the international legal instrument for "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources".

Signed by 150 government leaders at the 1992 Rio Earth Summit, (and since ratified by a further 46 nations) the Convention on Biological Diversity is dedicated to promoting sustainable development. Conceived as a practical tool for translating sustainable development principles into reality, the Convention recognizes that biological diversity is about more than plants, animals and

microorganisms and their ecosystems – it is about people and our need for food security, medicines, fresh air and water, shelter, and a clean and healthy environment in which to live.

United Nations Framework Convention on Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty addressing climate change, negotiated and signed by 154 states at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro from 3 to 14 June 1992. It entered into force on 21 March 1994. The Kyoto Protocol, which was signed in 1997 and which entered into force in 2005, was the first implementation of measures under the UNFCCC. The protocol was superseded by the Paris Agreement, which entered into force in 2016. As of 2020, the UNFCCC has 197 signatory parties. Its supreme decision-making body, the Conference of the Parties (COP), meets annually to assess progress in dealing with climate change.

United Nations Convention to Combat Desertification

The United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD) is a Convention to combat desertification and mitigate the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements.

The Convention - the only convention stemming from a direct recommendation of the Rio Conference's Agenda 21 - was adopted in Paris, on 17 June 1994 and entered into force in December 1996. It is the only internationally legally binding framework set up to address the problem of desertification. The Convention is based on the principles of participation, partnership and decentralization—the backbone of Good Governance and Sustainable Development. It has been signed 197 nations.

Cartagena Convention

The Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region (WCR) or Cartagena Convention is a regional legal agreement for the protection of the Caribbean Sea. The Convention was adopted in Cartagena, Colombia on 24 March 1983 and entered into force on 11 October 1986.

The Convention is supported by three technical agreements/ protocols as follows:

- The Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region was adopted in 1983 and entered into force on 11 October 1986.
- The Protocol Concerning Specially Protected Areas and Wildlife (SPAW) in the Wider Caribbean Region was adopted on 18 January 1990 and entered into force on 18 June 2000.
- The Protocol Concerning Pollution from Land-Based Sources and Activities was adopted on 6 October 1999 and entered into force on 13 August 2010.

The Regional Coordinating Unit (UNEP-CAR/RCU) was established in 1986 in Kingston, Jamaica and is the Secretariat to the Cartagena Convention and its Protocols.

Summary of international commitments

In summary, via its signature to the United Nations conventions outlined above, St. Kitts and Nevis has made a clear commitment, to promote sustainable development, address and mitigate the impacts of climate change and to mitigate the effects of drought. These commitments have direct implications for the way in which the islands' minerals sector must operate in the future. Most notably, to ensure that St. Kitts and Nevis can fulfil their wider commitments to sustainable development and protection of biodiversity, effective environmental regulation of the quarrying sector must not only be in place, but also enforced.

2.3 National legislation and regulation

Legislation (and associated regulation) relating to mineral extraction across St Kitts and Nevis comprises that which relates to both islands, as well as island specific provision. An overview of this legislation is set out below.

Legislation relevant to both St Kitts and Nevis

National Conservation and Environmental Protection Act 1987 (as amended)

The National Conservation and Environmental Protection Act is a key piece of legislation, which sets out the provisions for the better management and development of the natural and historic resources of St Kitts and Nevis for the purposes of conservation. Key features of the Act include:

- The establishment of a Department for the Environment for the purposes of conservation and environmental protection across St. Kitts and Nevis;
- The establishment of National Parks, historic and archaeological sites and other protected areas of natural or cultural importance including the Brimstone Hill Fortress National Park;
- Measures to conserve the coast and beach protection;
- Measures to protect forests, soil and water;
- The Establishment of a Conservation Commission; and
- To provide for related or incidental matters.

Of particular note to the minerals project are Parts VII and VIII of the Act, which relate to coastal and beach protection; and the protection of forests, soil and water. In terms of Part VII, Section 29 sets out the duties and functions of a Conservation Commission is respect of coastal conservation. These duties include undertaking environmental impact assessments of any development activity in collaboration with other departments, agencies and institutions for the purpose of coastal conservation.

The Act also makes provision for the preservation of the beach in that Section 30 states:

"No person shall

(a) Remove or assist in the removal of any natural barrier against the sea;

(b) Engage in sand mining from any land that is part of the foreshore, or from any land within the coastal zone (whether vested in that person or otherwise); or

(c) Remove or assist in removing any vegetation from the beach;

Except under the authority of a permit granted by the Minister in writing, in such form as the Minister approves."

Section 31 of the Act goes on to make provision for applications to be made to dig and take out sand, stone or gravel by way of making an application to the Minister (i.e. the Minister with responsibility for the environment). Such applications must contain the name and address of the applicant; the location of the proposed extraction area; what the material will be used for; and how much material will be extracted.

Section 34 of the Act seeks to protect the coastal zone from pollution. The coastal zone is defined as an 'area having an elevation less than 15m above mean sea level, within a limit of 100m of the mean high water mark and a limit of 2km seawards of the mean low water mark and includes the foreshore and the floor of the sea'. Specifically, this part of the 2009 Act prevents any person from polluting any part of the coastal zone by depositing sewage, solid waste, garage oil or other waste in any place in the coastal zone. 'Pollute' includes to cause such contamination or other alteration of the physical, chemical or biological properties of the coastal zone.

Finally, Section 31 makes provision for any persons contravening Sections 30 and 34 of the Act to be punished by a fine up to $10,000 or to imprisonment for up to 1 year.

In terms of Part VIII of the Act, this contains provision to protect soil resources. In this regard, reference is made to a commitment that the Minister, in consultation with the Conservation Commission, shall provide Regulations for soil conservation, including the identification and protection of critical watershed areas and natural drainage systems. The Act also protect ghauts from removal, damage or pollution (including the extraction of sand from these features). The current position, however, is that the Conservation Commission has yet to be established and associated regulations are yet to be developed.

Finally, in terms of the NCEPA 1987, it is noted that an announcement was made in June 2021 that the primary legislation was presently undergoing a revision, which sought to strengthen all the sections, including the sections on pollution control, which expands and adds to the definitions and procedures for dealing with violations. It is anticipated that the newer version, once enacted, will be known as the National Conservation and Environmental Management Protection Act (NCEMA).

Legislation specific to St Kitts

Development Control and Planning Act 2002 (as amended)

The Development Control and Planning Act 2002 (as amended – most recently in 2018) is a substantial act that makes provision for the orderly and progressive development of land both in rural and urban areas, as well as for the protection of the environment. Specifically, it provides for the grant of permission to develop land and for other powers of control over the use of land. It also

confers additional powers in respect of the acquisition and development of land for planning purposes. It is a thorough and extensive act which sets out the fundamentals of the planning system in St Kitts. This Act relates to St Kitts only and of particular note is the need to develop a St Christopher National Development Plan. Other key provisions include:

- Establishment of a Development Control and Planning Board (under section 6) – for the determination of applications.
- The requirement to seek planning consent for development.
- Provision for requiring EIA for all major projects (under section 26) – this includes mining proposals.
- All the usual planning provisions expected including modification and revocation of permissions (including stop notices) – (sections 37-47).
- Provision for performance bonds (under section 33).

Legislation specific to Nevis

Nevis Physical Planning Development Control Ordinance 2005

This ordnance makes provision for the preparation of physical plans for Nevis, for the control of the development of land, for the assessment of environmental impacts of development, for the preservation of the natural and cultural heritage and for related matters. It appears to be a thorough and extensive piece of legislation which sets out the fundamentals of the planning system in Nevis. This Ordnance relates to Nevis only and of particular note is the need to develop a physical plan for the whole of Nevis. Other key provisions include:

- Establishment of a Development Advisory Committee (under section 6) for the purpose of discharging the functions of the Ordinance.
- The requirement to seek planning consent for development (section 17).
- Provision for requiring EIA (section 20) where proposals could significantly affect the environment – this includes mining proposals.
- All the usual planning provisions expected including modification and revocation of permissions (including stop notices) – (sections 38-43).
- Provision for bonds (section 21).

In 2016 – concurrent with the updating of the Nevis Physical Development Plan (see below) – the Nevis Physical Planning and Development Control Regulations 2016 were prepared. These Regulations, which sit alongside the 2005 Ordinance, detail the requirements for obtaining development permissions from the Director of Physical Planning, including a wide variety of other development requirements, and the necessary documents that must accompany all development applications.

Nevis Zoning Plan Ordinance (1991, revised 2009)

This Ordinance makes provision the Nevis Island administration to prepare a zoning plan for the island. Specifically, it sets out the need for x13 specific zones to be identified on the island for development / protection. There is no specific mention of minerals or mining, only reference to 'Industrial Areas' and the need to protect high quality agricultural land.

Pursuant to the 1991 Zoning Ordinance (revised in 2009), a Zoning Plan Map was prepared in 1991, which set out permitted land uses within 13 specific zones of the island. The Ordinance provided that no person shall carry out development which is contrary to the provisions of the Zoning Plan, unless granted permission by the Minister.

In 1995, the Department of Physical Planning, Natural Resources and the Environment (DPPNRE) prepared a Zoning Compatibility Matrix to convert the 1991 Zoning Plan into a less rigid framework. Nine main zones were identified covering a total of around 90 potential land uses. An updated version of the Zoning Compatibility Matrix was included in the 2017 Nevis Physical Development Plan and it provides guidance as to whether a development within a specific zone is likely to be approved.

Discussion of national legislation and regulation

The documents listed above represent what are thought to be the most relevant Acts and Ordinances associated with, and relevant to the extraction of minerals in St Kitts and Nevis. Whilst key legislation is island specific, there do not appear to be any notable differences in scope or detail. There is, however, an apparent lack of regulation i.e. statutory instruments which focus on implementing the key provisions of the legislation (although it is noted that there is provision in the legislation for the development of Regulations).

Through the development of this report and discussion with Government departments, a number of discussion points have arisen which are considered below.

The legality of and mining in St Kitts and Nevis

A key issue which arose during the stakeholder interviews was that of the legality of sand mining in Nevis (it was accepted that sand mining in St Kitts was a legitimate activity, where the appropriate permit was in place). With respect to Nevis, however, it was considered that the mining of sand from the beaches was an illegal activity – although it is unclear in terms of the prevailing law as to where this position on illegality was derived.

Prior to its amendment in 1996 and 2001, Section 26, part (b) of the **National Conservation and Environmental Management Act of 1987** prohibited the removal of any sand from the beaches, in that it stated:

"No person shall –

(a) Remove or assist in the removing of any natural barrier against the sea;

(b) Dig and take away or assist in the digging and taking away of any deposit of sand, stone gravel or shingle from any landmark that is part of the beach; or

(c) Remove or assist in removing any vegetation from a beach in St Christopher and Nevis except under the authority of a permit granted to him by the Minister in writing, in such form as the Minister approves."

This section of the original 1987 Act has been subsequently amended, such that (now) Section 30 of the Act makes provision for the Minister to grant approval for all three activities, and not just the removal of vegetation (as in the original 1987 Act). The Nevis position on the legality of sand mining is therefore likely to be one of historic interpretation of the legislation. Under the provisions of the original 1987 Act, sand mining could have been considered illegal. However, under the terms of the amended Act, beach sand mining in St Kitts and Nevis is legal where an appropriate permit has been obtained from the Minister – and that this is the only scenario where sand mining could be considered legal in Nevis.

This position was confirmed during discussions with Thema Ward and other Nevis-based stakeholders during the first project visit – theoretically, sand mining could be undertaken with approval from the Minister, however this would not be granted and therefore, to all intents and purposes, sand mining is illegal in Nevis.

Control over existing mining activities

It is understood that the existing quarrying activities across St Kitts and Nevis are activities which, in the context of current planning land environmental legislation, do not have the benefit of any formal planning consent.

Furthermore, it is unclear at this stage, the extent to which the prevailing planning enforcement rules can be applied to development that 'pre-dates' the system for applying for planning consent i.e. can the system regularise old / established land uses (even if those land uses are causing environmental damage)?

On the face of it, the answer to this question would appear to be no – the current system does not allow for the regularisation of established quarries and mines. However, it is also recognised that the current legislative landscape does contains some provisions that are clearly applicable to existing operations which could potentially be drawn upon:

- Section 34 of the 2009 Act seeks to protect the coastal zone from pollution. The coastal zone is defined as an 'area having an elevation less than 15m above mean sea level, within a limit of 100m of the mean high water mark and a limit of 2km seawards of the mean low water mark and includes the foreshore and the floor of the sea'. Specifically, this part of the 2009 Act prevents any person from polluting any part of the coastal zone by depositing sewage, solid waste, garage oil or other waste in any place in the coastal zone. 'Pollute' includes to cause such contamination or other alteration of the physical, chemical or biological properties of the coastal zone.

  Whilst this section of the 2009 Act does not cover silt contamination of the coastal zone from quarries, consideration could be given to widening the scope of these provisions to include this. However, in considering this, thought would also need to be given to geographical constraints imposed by Section 34 of the 2009 Act. The 'coastal zone' is limited to an area 100m inland and unless any direct link between quarrying activities outside this zone and silt contamination of the coastal zone could be proven, such a widening out of provisions could prove difficult to enforce.

- Section 29 of the 2009 Act sets out the duties and functions of a Conservation Commission in respect of coastal conservation. These duties include undertaking environmental impact assessments of any development activity in collaboration with other departments, agencies and institutions for the purpose of coast conservation. It is assumed that this provision is to control existing development activity to make sure that it's not causing damage to the coastal environment.

It is considered that there is potential for this provision to be used as a vehicle for identifying (and facilitating) remediation of quarrying activity which is causing coastal damage, but there is little provision within current legislation that would allow for wholesale regularisation of all existing extraction operations.

Requirement to prepare an EIA for future mining proposals

The Development Control and Planning Act 2002 in St Kitts and the Nevis Physical Planning Development Control Ordinance 2005 both require requiring EIA (sections 26 and 20 respectively) where proposals could significantly affect the environment – this includes mining proposals. The provisions for requiring EIAs appear full and robust. However, from the stakeholder interviews carried out, the evidence is that EIAs are rarely asked for.

Why are few EIAs ever asked for? It is likely that in the context of mineral working that few (if any) new proposals for mineral working have come forwards under the provisions of the prevailing legislation. Furthermore, as the Government is carrying out most of the quarrying operations across St Kitts and Nevis, it is likely that the regulatory authorities are not insisting that EIAs are produced for what is effectively the Government's own development.

Notwithstanding this, for future new quarry developments, consideration could be given to the helpfulness of preparing some simple 'planning guidance' on matters that a proposed new quarry would need to demonstrate in an EIA.

2.4 National planning and environmental policy statements

National planning and environmental policy statements relating to mineral extraction across St Kitts and Nevis comprises that which relates to both islands, as well as island specific provision. An overview of this policy framework is set out below:

Current policy guidance relevant to both St Kitts and Nevis

Policy guidance relevant to both St Kitts and Nevis have been identified as follows:

- St. Kitts and Nevis National Biodiversity Strategy and Action Plan (July 2014). Prepared by the Ministry of Sustainable Development under the provisions of the United Nations Convention on Biological Diversity.
- St. Kitts and Nevis Climate Change Action Plan (December 2015). Prepared under the United Nations Framework Convention on Climate Change, and known as an Intended Nationally Determined Contribution (INDC), the document was prepared in advance of the Paris Agreement, which came into effect in 2020, and which empowers all countries to act to prevent average global temperatures rising.

- St. Kitts-Nevis Building Regulations, Code and Guidelines to manage land development practices. The Building Regulations were adopted in 2000. Specifically, the Building Code and Guidelines are set out in Schedules 2 and 3 of the Building Regulations. This code and guidelines set out details on minimum standards for all buildings (reflecting the fact that natural disasters such a hurricanes and earthquakes are commonplace in the Caribbean) as well as advice on general construction principles and material specifications for buildings.

Additionally, the Department of Physical Planning (DPP) on St. Kitts and the Department of Physical Planning and the Environment (DPPE) on Nevis, supported by the Development Control and Planning Act and the Nevis Development Control and Planning Ordinance respectively, have developed Guidelines for the conduct of Environmental Impact Assessments (EIA).

Policy guidance specific to St Kitts

National Physical Development Plan for St Kitts (2006)

This document provides the existing land use planning context for St Kitts. In the introductory section of the plan at paragraph 5.10 on page xvii, in respect of quarrying in St Kitts, the plan states that it will seek to:

> *"Control the level and type of development allowed in the vicinity of operating quarries until these operations have completed their economic life, in order to reduce possible negative side effects on other development as follows:*
>
> - *Development that involves the excavation of earth materials will not be permitted within designated residential districts, conservation areas, or any area deemed to be environmentally sensitive.*
> - *A development proposal with respect to mining and quarrying must be accompanied by an analysis of projected environmental impacts. Where this type of development is acceptable, the approval of the Minister responsible for Development and Planning and other relevant authority should be required."*

Chapter 7 of the plan relates to industrial and commercial activities and contains polices relating to existing and future minerals activities. Specifically, the plan states:

> *"Mining and quarrying activities have traditionally been of relatively limited economic importance contributing less than one percent to the GDP. Generally, mining operations in St. Kitts are managed by public sector agencies (PWD and Environmental Planning Division). The main outputs have been fine and coarse aggregates to fuel the building construction industry (see Plate 37).*
>
> *One concern that arises out of the expansion of the construction sector is the growth in beach sand mining. As observed in Chapter 3, while large-scale removal of beach sand is strictly prohibited by law, it is still being practiced illegally in some places. The loss of beaches threatens the future of St. Kitts as a tourism destination."*

The plan goes on to set out policies for future mineral extraction in St Kitts and states these as being:

- *"Facilitate the excavation of aggregates from areas outside of residential districts, conservation areas, or any area deemed to be environmentally sensitive. Future development proposals with respect to mining and quarrying must be accompanied by an analysis of projected environmental impacts.*
- *Divest government interest in the quarry in favour of private sector control with the view of improving site management and operational efficiency.*
- *Control the level and type of development allowed in the vicinity of operating quarries until these operations have completed their economic life, in order to reduce possible negative side effects on other development as follows:*
  - *Development that involves the excavation of earth materials will not be permitted within designated residential districts, conservation areas, or any area deemed to be environmentally sensitive.*
  - *A development proposal with respect to mining and quarrying must be accompanied by an analysis of projected environmental impacts. Where this type of development is acceptable, the approval of the Minister responsible for Development and Planning and other relevant authority should be required."*

The plan also covers those instances where development would attract the need for an Environmental Impact assessment (EIA). In Chapter 3: Environmental Management (page 29), the plan seeks to:

- *"Require that all proposals for major projects in St. Kitts follow the environmental assessment requirements incorporated in the Development Control and Planning Act 2000;*
- *Ensure the preparation of EIAs for all development projects to conserve and protect fragile ecosystems; and*
- *Require appropriate environmental analyses from all developments proposed for ecologically important areas, including all shore fronts and marine areas, lagoon and salt pond fringes and drainage areas, forest land above the 1000-foot contour, areas of unique vegetation, and areas of wildlife habitat."*

As noted earlier in this document, empirical evidence is that few EIAs are requested for quarrying activities. To facilitate with the delivery of the plan's EIA policies for future new quarry developments, consideration could be given to the helpfulness of preparing some simple 'planning guidance' on matters that a proposed new quarry would need to demonstrate in an EIA.

One final point to note at this stage is that the plan refers to the preparation of a detailed Land Use Management Plan (LUMP) – see section 6 of the introductory section of the plan (page xix). The plan notes that the future LUMP will provide direction for managing anticipated growth in the island of St. Kitts and reference is made to four overall goals:

- The conservation and protection of natural resources, historic resources, and neighbourhoods;
- The provision of adequate acreage and public facilities to accommodate projected population growth;

- The orderly development of the land uses needed to accommodate the projected growth; and
- The preparation of detailed plans to address specific development opportunities and redevelopment needs.

Policy guidance specific to Nevis

Nevis Physical Development Plan (2016)

This document provides the existing land use planning context for Nevis. The Physical Development Plan has never been formally adopted and remains as a draft, but provides a valuable indication of the intended approach and operation of physical planning for Nevis.

Specifically, Section 3.3.10 relates to minerals working and quarries. The plan notes that according to a November 2006 report entitled "Nevis Quarry Impact Study and Soil Conservation" (JECO), the quarry industry in Nevis evolved in an ad hoc manner in response to the demand of the construction industry. No proper zoning, planning or site development was done and whilst there is a large mineral resource capacity, its full potential cannot be exploited based on current mining practices.

The Plan further notes that if enacted, the Quarry Management Act will provide the legislative foundation for the development of regulations to govern quarry operations on Nevis, including environmental management and performance standards. To date, no Quarry Management Act has been enacted.

In respect of sand mining, the Plan states that the Nevis Island Administration has a zero-tolerance stance when it comes to mining sand from Nevis's beaches or ghauts. It is further stated that according to the NCEMA, it is illegal for anyone or any company to remove sand from the beaches of Nevis. This is translated into policy (Policy 23 New or Extended Mineral Working) which states that "any form of sand taking is illegal and will not be permitted". However, and to tie in with the discussion point set out in section 1.3 of this document, the Nevis position on the legality of sand mining is likely to be one of historic interpretation of the legislation. Under the provisions of earlier legislation, sand mining could have been considered illegal. However, under the terms of current legislation, beach sand mining in St Kitts and Nevis is legal where an appropriate permit has been obtained from the Minister. It is therefore considered that rather than being illegal, sand mining in Nevis is an activity that is avoided on policy grounds.

In terms of other mineral working, policy 23 of the Plan contains criteria relating to those circumstances where new or extended mineral working would be permitted. Policy 24 Restoration of Mineral Sites also requires the preparation and submission of an acceptable Site Restoration Plan.

It is understood that the Nevis Physical Development Plan is presently being updated and that a draft version of the Development Plan was scheduled to be published in November 2020. However, a newspaper article dated 21 January 2021 has been located (St Kitts and Nevis Observer), within which Deora Pemberton, Director of the Department of Physical Planning and Environment in the Nevis Island Administration, spoke of plans to revise and obtain Cabinet's approval for the Nevis Physical Development Plan.

> *"This important planning document provides a vision for the future of Nevis, the foundation for sustainable development and land use policies for the next 25 years and beyond," said Pemberton. "Pressing environmental concerns, economic opportunities, the need to improve quality of life and, both current and future challenges are all matters to be addressed.*
>
> *"The policies set out in this development plan aim to provide for economic growth, but not at the expense of our environment and culture," he said. "It is imperative to note that the future decisions though important, may be difficult but having a strong land use policy document will greatly assist in the decision-making process."*

Notwithstanding this, it is understood that this plan is not yet available for review as part of the ongoing minerals project. As such, reliance has been placed on the 2016 Nevis Physical Development Plan.

3. Institutional structure

3.1 St Kitts planning system

Department of Physical Planning. Ministry of Sustainable Development (DPP): The Department of Physical Planning (DPP), which sits within the Ministry of Sustainable Development is the government body responsible for the implementation of the provisions of the Development Control and Planning Act, Chapter. 20:07 of the Laws of St. Christopher and Nevis, which includes the control and regulation of the development of land and buildings. Specifically, the DPP:

i. Accepts and reviews development plans or drawings;

ii. Assists the public in identifying the proper siting of development activities; and

iii. Provides support to other Government agencies and the public in the area of Geographical Information Systems (GIS).

The DPP in St Kitts is separate to the Department of Environment (DoE), which sits under a separate Ministry – the Ministry of Environment and Cooperatives. The DoE seeks to provide a framework to support the implementation of policies, programmes and measures to mitigate and/or reverse environmental degradation through scientific and technological excellence, raising public awareness, standard setting, advocacy and resource mobilization, thereby contributing to poverty reduction. The Department seeks to achieve its mission by providing for the stewardship of the country's environmental resources.

3.2 Nevis planning system

The Department of Physical Planning and Environment is charged with the responsibility of granting permission to develop lands according to the laws that govern development on Nevis (https://nia.gov.kn/ministries/communications/physical-planning/). This department sits within the Ministry of Communications (which also has postal services, the water department and public works under its umbrella). The functions of the department of Physical Planning are:

- Implement Forward Planning through the preparation of physical planning instruments and studies in the interest of promoting the sustainable use of land, to include environmental research, land use and zoning plans, physical development standards and guidelines.
- Implement development control to provide guidance and development activities and methodology by ensuring their consistency and conformity with development regulation as well as approved planning standards and guidelines.
- Co-ordinate the spatial planning function in government and devise strategies for implementing and integrated spatial planning system.
- Promote policies, strategies and programs to enhance the protection, conservation and the sustained development and management of the island's natural and environmental resources, including the monitoring of environmental quality, conservation and preservation of critical environmental areas.

- Encourage compliance with national and international agreements that are binding on the island of Nevis.
- Guide development applications to promote environmentally prudent use of land.
- Provide a platform for which Geographic Information can be shared between government agencies, NGO's and the public.

3.3 Environmental Impact Assessment (EIA) framework

As noted in the first section of this document, there is a legislative and policy provision within both in St Kitts and Nevis to require and prepare Environmental Impact Assessments (EIAs). In summary, the process is as follows:

- STAGE 1: SUBMISSION OF PROJECT APPLICATION WITH PROJECT PROPOSAL FOR IN-PRINCIPLE APPROVAL. Responsible party: Developer(s).
- STAGE 2: SCREENING OF PROJECT APPLICATION FOR ENVIRONMENTAL CONCERNS, AND NOTIFICATION. Responsible party: Department of Physical Planning.
- STAGE 3: SUBMISSION OF TERMS OF REFFERENCE. Responsible party: (Developer(s) / Department of Physical Planning.
- STAGE 4: ACCEPTENCE OF TERMS OF REFERENCE. Responsible parties: Developer(s) / Department of Physical Planning.
- STAGE 5 COMPLETION OF EIA. Responsible party: Developer(s).
- STAGE 6: PREPARATION AND SUBMISSION OF ENVIRONMENTAL IMPACT ASSESSMENT REPORT. Responsible party: Developer(s).
- STAGE 7: REVIEW OF EIA REPORT AND NOTIFICATION. Responsible party: Department of Physical Planning.
- STAGE 8: IMPLEMENTATION. Responsible party: Developer(s).
- STAGE 9: MONITORING. Responsible parties: Developer(s) / Department of Physical Planning.

Quarrying and other mining activity is listed as an activity for which EIA is ordinarily required. However, as noted in earlier sections of this document, empirical evidence suggests that EIAs are rarely requested for quarrying activity across both St Kitts and Nevis. The reasons for this are because (a) the legislative and regulatory provision for requesting and producing EIAs came into force after much of the islands' quarrying activities had begun; and / or (b) as a large proportion of the islands' quarries are publicly owned and run and therefore do not require a permit/ planning approval to be issued, there has been no regulatory need to prepare and submit any EIA (which would usually be required to support any permit application).

Notwithstanding these points, this review has found that there is a clear and robust legislative and policy framework in place which supports the preparation and submission of EIAs for future quarrying activities – should an EIA be required by the regulatory authorities. What is less clear is the extent to which the quarrying sector is provided with robust and clear advice on the implementation of the legislative and policy provisions surrounding EIA. It is noted earlier in this

document that the Department of Physical Planning (DPP) on St. Kitts and the Department of Physical Planning and the Environment (DPPE) on Nevis, supported by the Development Control and Planning Act and the Nevis Development Control and Planning Ordinance respectively, have developed Guidelines for the Conduct of Environmental Impact Assessments (EIA). However, a thorough review of these guidelines has not been possible to date, as we have been unable to secure a copy of the documentation.

Whilst there is good provision within the existing legislation to require EIAs, stakeholder feedback is that this provision is not being leant on as a mechanism to manage environmental impacts from quarrying activities. The reasons for this are, however, unclear. To develop further understanding on the EIA process and crucially, its implementation across the islands, it will be important to understand the extent to which EIAs are requested more generally across St Kitts and Nevis (i.e. not just in relation to the quarrying sector). It will also be important to clearly establish the scope and content of EIA specific guidance available to developers – most notably that set out in *Guidelines for the Conduct of Environmental Impact Assessments (EIA)*.

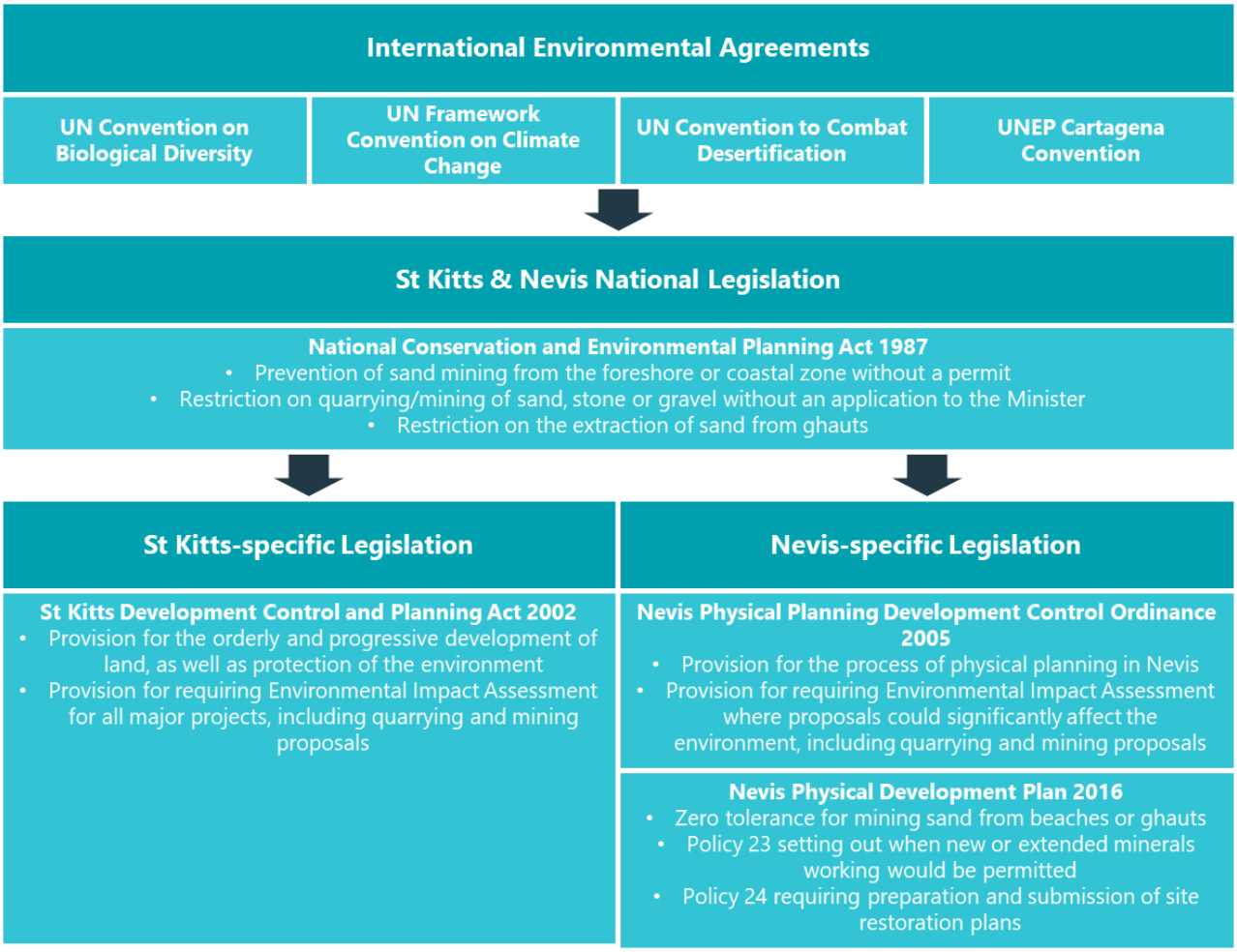
4. Gap analysis

4.1 Assessment of the current legislative and policy landscape

Our review of the existing legislative and policy landscape relevant to minerals and quarrying activities in St Kitts and Nevis has identified that environmental and planning legislation and policy is structured, clear and contains strong provisions to manage the extraction of sand, gravel and stone. There are also strong regulatory and policy processes in place for development control, including EIA requirements that are explicitly linked to quarrying/mining as an activity requiring EIA. This gives good provision for the government to impose suitable controls when considering new quarrying activity.

The key provisions of existing legislation are summarised in Figure 4.1 below.

Figure 4.1 Key provisions of existing legislation



4.2 Gap analysis

In order to provide comprehensive environmental control of quarrying/mining activities across St Kitt and Nevis, there needs to be sufficient provision to regulate both existing and new activities,

and for there to be sufficient clarity on the requirements for environmental impact assessment and/or permitting of activities. There are three scenarios, covering both St Kitts and Nevis, to be considered:

- Provision for the effective environmental regulation of new activities
- Provision for the effective environmental regulation of existing quarries that are considered to be permitted
- Provision for the effective environmental regulation of existing sites of extraction that are not considered to be permitted (i.e. "illegal sites")

Regulation of new activities

As noted above, there are strong regulatory and policy processes in place for development control, including EIA requirements that are explicitly linked to quarrying/mining as an activity requiring EIA. This gives good provision for the government to impose suitable controls when considering new quarrying activity. However our observations and learning from this project are that:

- EIAs need to become a more meaningful part of the development control process in order to be effective; and
- There is a potential gap in supporting documentation to allow the government to effectively assess EIAs and/or for operators to know what mitigation should be included.

Regularisation of existing permitted activities

Within the existing legislation there is a clear gap in provision to allow regulation of existing activities, particularly if these have managed to bypass environmental controls when they were established – for example, sites that became active prior to the application of controls through the National Conservation and Environmental Protection Act, the Development Control and Planning Act (St Kitts) or the Physical Development Control Ordinance (Nevis), or that are government-controlled sites.

This could be remedied through the introduction of legislative and/or policy provision which seeks the review of historic quarrying activities to ensure that they meet modern operating and environmental standards and that the environment of St Kitts and Nevis continues to be protected. Based on our observation of the existing quarry operations, and the relationship between operators and government, this approach would be heavy-handed and administratively burdensome. A more appropriate approach would be to engage with existing operators to achieve clarity with respect to the extent and duration of workings, and to ensure appropriate environmental management through the education of quarry operators. Where existing activities are run by the government (e.g. Canada Estate), conformance with appropriate environmental management should be a given.

Regulation of existing non-permitted sites

There are a number of sites, particularly on St Kitts, where it is clear that extraction is being undertaken, but that are outside of the current regulatory system (so-called "illegal sites"). These range from small sites where sand is taken on an ad hoc basis (e.g. in farmland above Wash Ghaut),

up to more substantial sites where material is regularly taken (e.g. at Beaumont, close to the former racecourse). Whilst these sites fall outside the reach of existing legislation, they do not highlight a gap in the legislation or policy landscape – they have not been permitted in line with the existing legislation and, therefore, can be bought within the requirements of legislation through appropriate enforcement.

4.3 Recommendations

Based on our evaluation of the existing legislation and policy landscape, and the gap analysis above, the following recommendations are made with respect to the regulation of quarrying/mining activities across St Kitts and Nevis:

- It is not necessary to create additional legislation or policy to ensure appropriate controls are available to the respective administrations of St Kitts and Nevis – the existing legislation provides sufficient coverage of powers. The further development and enhancement of environmental legislation, as is planned through the revised National Conservation and Environmental Protection Act and the updated Nevis Physical Development Plan will further serve to reinforce and strengthen this position, and the completion and enactment of these revisions is strongly encouraged.
- Greater clarity is, however, required on the nature of conditions that need to be satisfied for effective environmental management of quarrying and mining activities. Although there is sufficient provision for control in existing legislation and policy, the translation of (for example) EIA requirements into the specific aspects that should be considered for quarrying and mining is not currently supporting the administrations to effect appropriate controls.
- Equipped with this additional clarity, the administrations of St Kitts and Nevis should then ensure the following:
  - For any new quarrying or mining sites, or extensions to existing sites, the EIA requirements included within existing legislation and policy should be applied, ensuring that environmental protection is incorporated into the management of all new sites.
  - For existing sites that are considered to be permitted, a review of environmental management should be undertaken to ensure that sites are operating in a manner that is appropriate to the environmental protection aspirations of St Kitts and Nevis.
  - For existing sites of extraction that are not considered to be permitted (i.e. "illegal sites"), these should be bought within the scope of the existing legislative provisions as part of the process of appropriately permitting the sites. Environmental considerations should be addressed through appropriate mitigation.

5. Conditions for quarrying and mining permissions

5.1 Introduction

This section considers the key environmental considerations for quarrying/mining activities that should be incorporated into an environmental impact assessment and/or permit to operate. These considerations are based on good practice, drawing on example documents such as the UK Minerals Planning Guidance.

Under the National Conservation and Environmental Protection Act, there is restriction on quarrying/mining of sand, stone or gravel without an application to the Minister, which must set out the proposed extraction area, use of material and volume to be extracted. In St Kitts, the Development Control and Planning Act 2002 requires Environmental Impact Assessment for all major projects, including mining proposals. Similarly, in Nevis the Physical Development Control Ordinance 2005 requires Environmental Impact Assessment where proposals could significantly affect the environment, including for mining proposals.

As identified in the Gap Analysis (section 4), however, there is a gap in supporting documentation to allow the government to effectively assess EIAs and for operators to know what information and mitigation should be included. This section of the report aims to provide information to fill that gap.

5.2 Definition of site and activity

For all quarrying/mining activities, it is important that there is a clear definition of the site and activity proposed (as required by the National Conservation and Environmental Protection Act). For all sites, the following information and conditions of operation should be clearly understood by both government and operators:

Definition of the proposed extraction area

There should be no ambiguity about the area for which permission to operate has been granted. The spatial limits of extraction should ideally be identified on a map at an appropriately detailed scale (e.g. 1:10,000), including clarity of land ownership and/or the permission of land owners for materials to be extracted.

Duration of extraction activities

Permissions for quarrying/mining activities should also be subject to a clear time limit on the duration of workings at the site (e.g. X years from the granting of permission). This allows a clear control point – a time by which activities must cease, or, if workable deposits remain at the site (within the defined extraction area), for a new permission to continue operation to be sought.

Volume to be extracted

As assessment of the workable volume of material at the site, and the volume to be extracted, should be made prior to permission being granted. This should be appropriate to the area and duration of extraction activities. Alongside the definition of a total volume that can be extracted from the site, consideration should also be given to limitation on the maximum extraction in any given year (or smaller time period as appropriate).

Phasing plan

For larger sites, where an area is to be worked over a number of years, a prearrange progressive programme of working the site should be agreed with the operator. Such a programme would divide the site into smaller areas to be worked and reclaimed in succession. By using this approach, the disturbance to the environment of the quarrying/mining activities can be minimised and the progressive rehabilitation of the site after working accelerated

For example, if consideration was being given to bringing sand mining at Belmont (St Kitts) within the permitted quarrying sites, a progressive working plan could be used to ensure that as each area of the site was mined for sand it was then re-planted and rehabilitated. Over time, the site would feature a working area where sand was being extracted, whilst previously-worked areas were already recovering and re-vegetating.

Practically, a simple annotated map or diagram of the quarry indicating the subdivision of the site and the progression of extractions should be provided and agreed.

Limitation of depth of working

It may also sometimes be desirable to impose conditions to limit the depth of excavation at a site. This may be for safety considerations or to prevent alteration to the hydrological regime through changes to topography. Limitations may be used to define a specific post-operation land form or to ensure that rehabilitation can be achieved without the need for future import of material to the site.

Topsoil and subsoil preservation

It would normally be considered good practice to retain any topsoil and subsoil that is stripped as part of the workings. Topsoil and subsoil should be separately stripped and stored to allow their re-spreading as part of site rehabilitation after working. When accompanied by a clear phasing plan for the progressive working of a site, the volume of topsoil and subsoil to be stored at any time can be minimised by using the stripped soil from a new area to be worked to support the rehabilitation of the area being closed.

Long-term stockpiling of topsoil should be avoided wherever possible, and ideally used to rehabilitate worked out areas immediately[1]. If the topsoil is stockpiled, there are a number of recommended practices[2][3] to consider:

[1] The Institute of Quarrying (2021) Good Practice Guide for Handling Soils In Mineral Workings. First Edition.
[2] Environment Protection Authority (2017) Quarry Code of Practice 3rd Edition, EPA Tasmania, Hobart, Tasmania.
[3] Department of Primary Industries, Earth Resources Regulation (2010) Code of Practice for Small Quarries. Melbourne, Victoria, Australia

- Handling should be kept to a minimum and the topsoil should not be buried or driven on to avoid compaction;
- Stockpiles should be strategically placed away from traffic, waterways and sources of pollution, and ideally next to the excavation site to minimise subsequent respreading costs;
- Align stockpiles parallel to the slope contour in stable heaps;
- Install drainage measures to allow drainage through or around large stockpiles;
- Growing vegetation on the stockpiles reduces erosion and maintains biological activity within the soil, and;
- The establishment or spread of any noxious weeds should be controlled and minimised.

Geotechnical considerations and facing angles

Quarries should be carefully designed such that the landform poses no slope failure, slumping or collapse risk to employees or the public. Natural instability should be minimised by setting a face orientation which optimises stability while minimizing the induced stability by adopting an appropriate method of excavation[4].

All quarry workings will include slopes of varying nature, either in the excavations themselves or formed from fill material. Each slope formed within a quarry should be designed, constructed, and managed to ensure that it remains in a safe and secure position. These include short (stockpiles and soil mounds), medium (soil mounds, quarry faces, and screening bunds etc.) and long-term slopes (quarry faces, spoil mounds, and screening bunds etc.). It is critical that a quarry is designed taking into account the major factors affecting stability[5].

There are three primary constraints affecting the stability of excavated slopes:

- Properties of in situ material;
- Incidence and properties of discontinuities, and;
- Groundwater conditions.

Additional external factors may also influence the stability of excavated slopes and should also be considered. These include the impact of loading from spoil and machinery, vibrations due to processing or earthquakes and the effect of additional engineering activities.

Accumulations of materials in quarries result in fill slopes (spoil heaps, stockpiles and backfilled areas). There are a range of factors that contribute to the stability of fill slopes:

- Properties of materials in and beneath the slope;
- Structure of the slope and its foundations;

[4] MATHESON, G.D.: 'The stability of slopes exposing rock', Proc. Int. Symp. on Failures in Earthworks, Inst. of Civil Engineers, London, 1985

[5] GWP Consultants LLP & David Jarvis Associates Ltd (2014) A Quarry Design Handbook, 2014 Edition.

- Water pressures within the slope, and;
- External influences.

Specialist geotechnical advice should be sought to ensure the safe development of all excavations.

5.3 Environmental considerations

Alongside the definition of site and activity, environmental considerations should also be included in permissions for quarrying and mining activities. This would normally be undertaken as part of the EIA for the site, as required under the Development Control and Planning Act (St Kitts) or the Physical Development Control Ordinance (Nevis).

In the sections below, we have highlighted the principal environmental considerations for quarrying and mining activities, tailored to the factors of greatest relevance in the context of the environment of St Kitts and Nevis. This should not be interpreted as an exhaustive list for all quarrying or mining EIAs, however – other environmental factors may be relevant as a result of other drivers (e.g. traffic impacts on local communities, depending on the location of the activity) and should be included in EIAs as required.

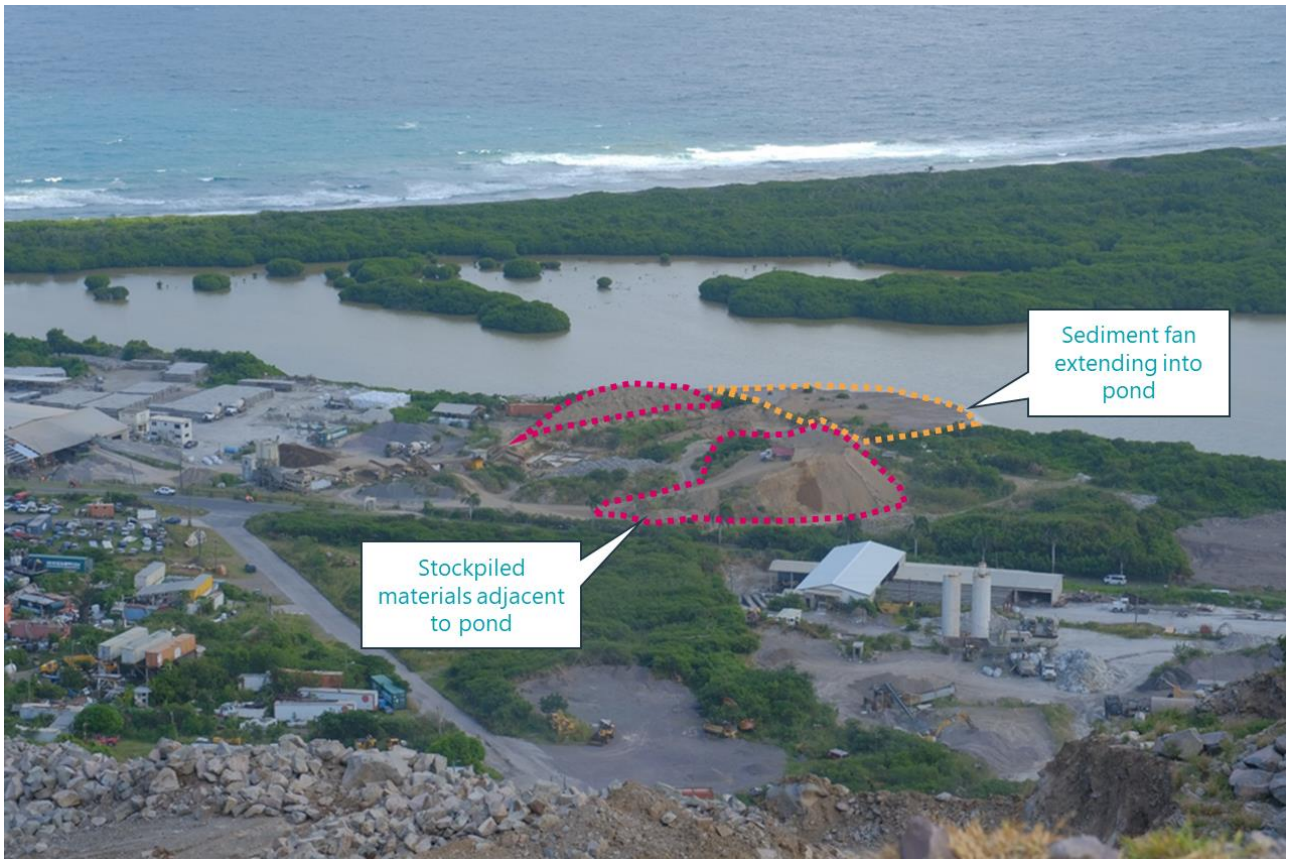
As part of determining the scope for an EIA for any particular site/application, pre-application engagement is strongly encouraged. We understand from our discussions with the Government administrations of both St Kitts and Nevis that pre-application engagement is standard practice and promoted as much as possible (although there are always applicants that do not wish to engage) – this is an important principle to maintain and embed for quarrying and mining activities as well.

Surface runoff and drainage management

Quarrying and mining activities have significant potential to lead to problems with respect to surface runoff and land drainage where not managed effectively. Site runoff has the potential to mobilise significant quantities of sediment from quarrying/mining sites, leading to water quality issues in downstream receiving water bodies (e.g. ponds) or the nearshore environment. Runoff also has the potential to mobilise pollutants from the site (see below).

Figure 5.1 illustrates the impact of sediment runoff from stored material into Greatheeds pond.

Figure 5.1 Sediment fan extending into Greatheeds Pond at Canada Estate



At a headline level, an EIA should be expected to demonstrate how the activities will **ensure no interference with or pollution of surface water bodies or the marine environment**. To achieve this, consideration should be given to the following:

- Understanding the existing flow pathways and ghauts that will channel surface runoff either into, or away from, the site;
- Ensuring that quarrying/mining activity is located away from ghauts to ensure that they are not removed, damaged or polluted (in line with the requirements of the National Conservation and Environmental Protection Act);
- Managing the water coming onto site through the use of cut-off trenches/channels and bunds, to direct runoff away from the disturbed areas;
- Use of diversion drains and contour drains to capture and slow down water that would otherwise gather momentum downslope;
- Surface drains should have slopes that prevent the erosion or scouring of drains (a maximum slope of 1:100 is considered appropriate for earthn drains), and additional stabilisation techniques should be used in high velocity areas;
- Managing runoff of water from quarrying/mining activity to ensure that sediment is removed before water is drained into the wider environment – this can be achieved through, for example, the use of settlement lagoons;

- Ensuring that the depth of excavation does not breach the local water table in order to prevent water ingress.

Stockpile management

With respect to managing the runoff of fine sediment from quarrying/mining sites, techniques such as settlement lagoons can be effective in capturing sediment entrained in site runoff before it discharges from the site – but measures should also be taken to minimise the entrainment of fine sediment in the first place. These measures can include:

- Locating stockpiles well away from drainage pathways, channels and drains;
- Ensuring slope stability and limiting the size/height of stockpiles to reduce direct runoff and fine sediment loss, and;
- Managing stockpiles within siloes or bunds to reduce runoff and sediment entrainment.

Pollution prevention

In order to prevent pollution as a result of surface runoff from quarrying/mining activities, consideration should be given to measures to remove and control potential sources of pollution, and to measures to intercept pollution vectors from the site. These measures can include:

- Ensuring that sources of potential contaminants (e.g. oil/fuel stores) are sited on impermeable surfaces and surrounded by bunds to prevent pollution runoff;
- Use of Sustainable Drainage Systems (SuDS) to minimise pollutant transportation, such as:
  - Filter strips – vegetated sections of land designed to intercept overland flow and remove excess sediment and pollutants before discharging from the site;
  - Swales – grassed shallow depressions to intercept and convey runoff, effective at retaining sediment and oily residues, and;
  - Filter drains – excavated drains, backfilled with coarse stone, to intercept and store runoff.

Groundwater protection

Quarrying and mining activities have the potential to affect underlying aquifers by removing filtering superficial deposits, or by excavating into an aquifer and creating a direct pathway for pollution of groundwater. Although the hydrogeology of St Kitts and Nevis is such that it is unlikely that quarrying or sand mining activities would take place in locations coincident with aquifers, the importance of groundwater for water supply is such that consideration of groundwater impacts should not be ignored.

An EIA should demonstrate how the activities will **ensure no interference with or pollution of groundwater**. The most effective means of ensuring this is to avoid quarrying/mining activities in deposits above or containing groundwater aquifers, and the existing protection given to aquifers critical to water supply (e.g. the Basseterre Valley Aquifer) will ensure this to a large degree.

Pollution of groundwater can come from the infiltration of surface water and contaminants through permeable overlying strata, or through direct interception of an aquifer as a result of excavation of the quarry below the water table. As a minimum, all sites should ensure that:

- Disposal or tipping of effluent or polluting substances (e.g. oil or fuels) is prevented and controlled to ensure no risk of discharge to groundwaters, and;
- Excavation does not intrude into designated aquifers or result in any excavation below the water table.

There are two main ways that pollution reaches groundwater:

- Point source pollution – this comes mostly from spills, leaks and discharges at a single point or over a small area. Point source pollution is often easy to identify because it results from isolated events or activities.
- Diffuse pollution is the cumulative impact of small, undefined pollution events and general environmental pollution spread over the catchment area.

Point source pollution is the most significant risk from quarrying or mining activities and it is essential that controls are in place to prevent spills, leaks and discharges of hazardous or polluting substances. The biggest risk of spills is likely to come from re-fuelling or maintenance of vehicles – this should ideally be done off site, or if done on site should be undertaken within a bunded area on an impermeable surface, with facility to capture and safely dispose of any spills.

Waste management

Quarrying and mining activities have the potential to create significant quantities of 'waste' material as a result of extraction and processing. All activities should have a plan in place to minimise, treat, recover and dispose of extractive waste. Through effective planning, waste materials can often be minimised, stored on site and then re-used in the restoration or rehabilitation of the site at the end of its working life. Wherever possible, however, all material extracted should be used, and there is plenty of good evidence of this happening at sites across St Kitts and Nevis.

Key considerations for extractive waste are:

- Whether extractive waste is inert, non-hazardous but non-inert, or hazardous. For the majority of locations in St Kitts and Nevis extractive waste would be expected to be inert, and non-hazardous, but this should not be taken for granted
- How waste will be created, treated and stored:
  - What is the expected volume of waste material that will be created?
  - Does the material need to be treated in any way to avoid risk of pollution or contamination?
  - Where will the material be stored and how will this be done in a way that avoid the risk of pollution (see sections above regarding surface water management and runoff)?

Overburden material and/or topsoil that is extracted should be retained and stored on site to be used in the rehabilitation of the site once extraction activities are completed. If stockpiled waste material being stored on site is capable of supporting vegetation, this should be promoted to assist with the stability of the stockpile, minimise loss of material with surface runoff, and to reduce the visual impact of the stockpile.

Tailings

Tailings, the fine-particle residues from mineral processing which are generally disposed of as a slurry to tailings dams, can have considerable pollution potential, depending on the particular mineral involved and the processes used. Where tailings are produced, these must be closely managed through capture behind a tailings dam, giving due regard to:

- The safety and stability of the dam and retention of material behind it
- The possibility of seepage
- The visual impact on the surrounding landscape
- The treatment and discharge of water and control of pollution risk to downstream water bodies

Based on our observations, the quarries visited in St Kitts and Nevis do not produce a significant volume of tailings material, only the waste runoff from washing that takes place on site. For example, at the Lefco quarry at New River in Nevis settlement ponds are used to remove fine deposits from washing, as shown in Figure 5.2.

Particular attention should be given to the storage of fine materials recovered from settlement ponds – if left in unmanaged stockpiles, fine material can very easily be eroded and transported by rainfall and run off from the quarry site.

Figure 5.2 Settlement ponds at Lefco quarry, New River, Nevis

Dust suppression

Dust can pose an environmental challenge for quarry/mining sites in two ways:

- Impacting the heath of workers at the site – respiratory conditions, such as silicosis, can be debilitating and are irreversible after prolonged exposure, and there are also proven links between exposure to dust and the occurrence of lung cancer.
- Impacting the wider environment in the vicinity of the site, exposing those living or working close to sites to dust.

Dust suppression should be considered to minimise these impacts. Suppression techniques prevent dust escaping from source, usually through spraying mechanisms. Water is sprayed as a fine mist over the source of the dust emission (usually at the point of extraction or crushing), ensuring that particles are trapped in water droplets and can be managed through drainage control on site.

Appropriate PPE to minimise dust inhalation from site workers should also be used. This should include respirators/masks, coveralls and gloves. PPE should only be considered as a control measure of last resort – priority should always be given to techniques to suppress dust and minimise the exposure of workers.

Figure 5.3 Worker in PPE to minimise dust inhalation

Noise

Quarrying and mining activities can give rise to considerable noise and this will be a major consideration where working is proposed close to dwellings or other noise-sensitive properties. Disturbance from excessive noise should be managed through consideration of measures such as:

- Siting of plant in relation to dwellings / noise-sensitive properties
- Consideration of prevailing wind direction and avoiding siting noisy plant upwind of noise-sensitive properties
- Use of screens and landscaping to minimise noise disturbance
- Provide appropriate buffer distance between quarry and receptors during quarry design stages, and optimise the use of natural topography and vegetation as sound barriers

Noise also has health and safety implications for site workers. It is important that appropriate occupational health and safety systems are in place to monitor and control employee exposure to noise and vibration, and to reduce exposure times for people working near noisy machinery.

Landscaping, restoration and aftercare

Quarrying and mining activities may be visually out of proportion with surrounding areas and measures should be taken to minimise their visual intrusion on the landscape, and to restore sites to more natural states following the cessation of extraction activities.

Visual impact

Visual impact should first be considered during the initial site layout and planning in order to minimise adverse effects. This consideration should cover measures such as:

- Choosing the direction of working so that the working face is shielded from the most critical views and seeking to ensure that the quarry/mine site is hidden from neighbours or other sensitive land uses
- Making use of natural topographic features and vegetation to screen areas. Clearance of vegetation should be minimised and tree planting considered to provide additional screening
- Avoiding locating new quarrying/mining activities adjacent to busy roads and sensitive receptors

The ideal strategy is to seek to prevent/avoid significant visual intrusion. Where this is not possible, the visual impact of quarrying/mining activity on the landscape should be reduced through emphasis on scheme design to ensure that the levels, working and management of the site does not exacerbate visual impact.

Restoration

Once extraction activities have ceased, quarrying/mining sites should be restored as close as possible to a natural state. The requirements for restoration should be set out in the initial permissions for a site to be worked. Restoration requirements should cover:

- Site cleanup, as the initial step towards restoration and covering:
  - Removal of all machinery, infrastructure and waste materials
  - Rehabilitation of any hardstanding areas, surplus roads, etc
  - Breakup or burial of concrete slabs and loose rock, etc
- Landscaping to reshape the landform to an appropriate topography for the post-working life of the site:
  - Ensuring that the landform is stave and free-draining, blending into surrounding areas
  - Smoothing slows
  - Re-spreading topsoil evenly across the site at a suitable depth (ideally retained topsoil)
  - Breaking up compacted surfaces
- Re-vegetation of the site to provide self-sustaining cover consistent with the final land use:
  - Applying mulch or fertiliser where needed to promote vegetative growth
  - Seeding new vegetation in keeping with the surrounding areas
  - Minimising disturbance (both human and animal) by using perimeter fencing in order to promote speedy establishment of vegetative cover

Erosion prevention is critical during restoration – there is a risk that poor drainage management can damage rehabilitation workings. The best form of erosion management is to successfully re-vegetate, although during the process of re-establishment, other measures of erosion control may be required. This could include retaining existing site drainage controls and sediment ponds to slow down runoff.

Progressive rehabilitation

The most effective approach to minimise environmental impacts from quarrying/mining activity is to work and restore sites progressively – as each area of the site is worked for extraction, it should be restored whilst new areas of the site are worked. This approach minimises the total disturbed areas and allows overburden and topsoil to immediately contribute to restoration rather than need to be stored. Progressive rehabilitation should be included as part of a progressive working plan for the site.

Aftercare

Restoration and revegetation may take several years to establish and there will be an ongoing need for aftercare of sites until rehabilitation is completed. Key aftercare activities should include:

- Inspection of the site to assess the health of vegetation and check for erosion, animal browsing, weeds, etc
- Carrying out additional restoration work where required to fully establish vegetation cover, such as applying additional fertiliser
- Repairing landforms where erosion has occurred and ensuring that effective drainage is maintained.

Site rehabilitation can be considered complete when the site is assessed as self-sustaining, stable, non-polluting and not affected by significant erosion. Additional conditions for the final landscaping and vegetation of the site could be specified – for example, the required density of vegetation (trees per hectare) or diversity of plant species.

6. Summary and Conclusions

6.1 Assessment of the current legislative and policy landscape

Our review of the existing legislative and policy landscape relevant to minerals and quarrying activities in St Kitts and Nevis has identified that environmental and planning legislation and policy is structured, clear and contains strong provisions to manage the extraction of sand, gravel and stone. In particular, existing legislation includes provisions for:

- Restriction on quarrying and mining activity without an application to the Minister (National Conservation and Environmental Planning Act)
- Prevention of sand mining from the foreshore or coastal zone without a permit (National Conservation and Environmental Planning Act)
- Restriction on the extraction of sand from ghauts (National Conservation and Environmental Planning Act)
- Provision for the requiring Environmental Impact Assessment (EIA) for major projects, including for quarrying and mining proposals (St Kitts Development Control and Planning Act and the Nevis Physical Development Control Ordinance)

This gives good provision for the government to impose suitable controls when considering new quarrying activity.

6.2 Recommendations

In order to provide comprehensive environmental control of quarrying/mining activities across St Kitt and Nevis, there needs to be sufficient provision to regulate both existing and new activities, and for there to be sufficient clarity on the requirements for environmental impact assessment and/or permitting of activities. There are three scenarios, covering both St Kitts and Nevis, to be considered:

- Provision for the effective environmental regulation of new activities
- Provision for the effective environmental regulation of existing quarries that are considered to be permitted
- Provision for the effective environmental regulation of existing sites of extraction that are not considered to be permitted (i.e. “illegal sites”)

Based on our evaluation of the existing legislation and policy landscape, and the gap analysis above, the following recommendations are made with respect to the regulation of quarrying/mining activities across St Kitts and Nevis:

- It is not necessary to create additional legislation or policy to ensure appropriate controls are available to the respective administrations of St Kitts and Nevis – the existing legislation provides sufficient coverage of powers. The further development and enhancement of environmental legislation, as is planned through the revised National Conservation and Environmental Protection Act and the updated Nevis

Physical Development Plan will further serve to reinforce and strengthen this position, and the completion and enactment of these revisions is strongly encouraged.

- Greater clarity is, however, required on the nature of conditions that need to be satisfied for effective environmental management of quarrying and mining activities. Although there is sufficient provision for control in existing legislation and policy, the translation of (for example) EIA requirements into the specific aspects that should be considered for quarrying and mining is not currently supporting the administrations to effect appropriate controls.
- Equipped with this additional clarity, the administrations of St Kitts and Nevis should then ensure the following:
  - For any new quarrying or mining sites, or extensions to existing sites, the EIA requirements included within existing legislation and policy should be applied, ensuring that environmental protection is incorporated into the management of all new sites.
  - For existing sites that are considered to be permitted, a review of environmental management should be undertaken to ensure that sites are operating in a manner that is appropriate to the environmental protection aspirations of St Kitts and Nevis.
  - For existing sites of extraction that are not considered to be permitted (i.e. "illegal sites"), these should be bought within the scope of the existing legislative provisions as part of the process of appropriately permitting the sites. Environmental considerations should be addressed through appropriate mitigation.

6.3 Conditions for quarrying and mining permissions

To address the gap in supporting documentation to allow the government to effectively assess EIAs and for operators to know what information and mitigation should be included, the key environmental considerations for quarrying and mining activities that should be incorporated into an environmental impact assessment and/or permit to operate have been set out. These are based on good practice, drawing on example documents such as the UK Minerals Planning Guidance. The key considerations are summarised in Figure 6.1 below.

To support the application of these considerations, a prompting checklist that can be used to cross-check the environmental management of either existing activities or to assess proposals for new activities has been developed and is presented in Appendix A.

Figure 6.1 Key considerations for quarrying and mining permissions

Definition of site and activity For all quarrying/mining activities it is important that there is a clear definition of the site and activity proposed, as required by the National Conservation and Environmental Protection Act.	**Environmental Considerations** Alongside the definition of site and activity, environmental considerations should also be included in permissions for quarrying and mining activities. These would normally be included within the Environmental Impact Assessment for the site, as required under the Development Control and Planning Act (St Kitts) or the Physical Development Control Ordinance (Nevis).
• Definition of proposed extraction area • Duration of extraction activities • Volume to be extracted • Depth of working • Phased working • Topsoil and subsoil preservation • Geotechnical considerations and facing angles	• Site runoff and surface drainage management • Groundwater protection • Waste management • Dust suppression • Noise • Landscaping, restoration and aftercare

Appendix A
Quarrying & Mining Permissions Checklist

Section 5 of this report sets out the key considerations for quarrying and mining permissions. The headline requirements are summarised in the table below as a prompting checklist that can be used to cross-check the environmental management of either existing activities or to assess proposals for new activities.

Definition of site and activity For all quarrying/mining activities it is important that there is a clear definition of the site and activity proposed, as required by the National Conservation and Environmental Protection Act.	
Definition of proposal extraction area	• Is the proposed extraction area clearly defined? • Has the extraction area been mapped at an appropriate level of detail? • Is there clarity of land ownership and record of permission from the land owners for material to be extracted?
Duration of extraction activities	• Is the time limit for the duration of extraction activities clear (e.g. X years from the granting of permission)? •
Volume to be extracted	• Has an assessment of the workable volume of material at the site been undertaken? • Has the total volume for extraction been defined? • Do any additional limitations (e.g. maximum extraction per year_) need to be set?
Depth of working	• Has the maximum depth of working been specified?
Phased working	• Has a phasing plan for progessive extraction and rehabilitation of the site been provided?
Topsoil and subsoil preservation	• Is a plan in place for the preservation and storage or removed topsoil and subsoil? • Is the preservation of topsoil and subsoil incorporated into a phased progressive working plan?
Geotechnical considerations and facing angles	• Has a geotechnical assessment been undertaken? • Does the proposal include appropriate consideration of the properties of materials and the structure of slopes and foundations?
Environmental Considerations Alongside the definition of site and activity, environmental considerations should also be included in permissions for quarrying and mining activities. These would normally be included within the Environmental Impact Assessment for the site, as required under the Development Control and Planning Act (St Kitts) or the Physical Development Control Ordinance (Nevis).	
Site runoff and surface drainage management	• Has a drainage management plan been provided that adequately demonstrates that activity will ensure no interference with or pollution of surface water bodies or the marine environment? • Does the drainage management plan demonstrate how the site will interact with existing surface water flow pathways and ghauts, and how this will be managed?

	• Does the plan include measures to manage runoff and sediment loss from stockpiles? • Does the plan include measures to control potential sources of pollution and to intercept pollution vectors from the site?
Groundwater protection	• Does the EIA demonstrate how the activities will ensure no interference with or pollution of groundwater? • Are measures proposed to ensure that disposal or tipping of effluent or polluting substances is prevented and controlled to ensure no risk of discharge to groundwater? • Does the proposed excavation plan demonstrate that the activity will not intrude into designated aquifers or result in any excavation below the water table?
Waste management	• Does the EIA demonstrate how extractive waste will be minimised, treated and recovered? • Is there any hazardous or non-inert waste that needs to be managed? • What is the expected volume of waste material that will be created? • Does the material need to be treated in any way to avoid risk of pollution or contamination? • Where will waste material be stored and how will this be done in a manner that avoids the risk of pollution?
Dust suppression	• Are measures in place to minimise the generation of dust from the site? • Are measures in place to protect site workers from the risks of dust inhalation?
Noise	• Has consideration been given to the management of noise from the site? • Are measures in place to protect site workers from the risks of exposure to noise and vibration?

Landscaping, restoration and aftercare	• Has the visual impact of the quarrying or mining activity been considered in the development of the proposals?
	• Has a plan for the restoration of the site been presented, including coverage of:
	  ○ Site cleanup
	  ○ Landscaping to reshape landforms to an appropriate topography
	  ○ Re-vegetation to provide self-sustaining cover for the site
	  ○ Measures for drainage management and erosion prevention during restoration
	• Is restoration included as part of a progressive working plan for the site?
	• Are requirements for final site rehabilitation sign-off clearly defined?

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