CARIBBEAN Safe School Initiative CSSI

IMPLEMENTATION OF THE MODEL SAFE SCHOOL PROGRAMME IN THE CARIBBEAN

HAZARD RISK ASSESSMENT REPORT AND COSTED ACTION PLAN

TUCKER CLARKE PRIMARY SCHOOL

ST. KITTS AND NEVIS

NDRM Natural Disaster Risk Management in the CARIFORUM

An initiative of the African, Caribbean and Pacific Group, funded by the European Union, and implemented by:

CDEMA CARIBBEAN DISASTER EMERGENCY MANAGEMENT AGENCY

REPÚBLICA DOMINICANA MINISTERIO DE LA PRESIDENCIA

SUBMITTED BY:
Environmental Solutions Limited

TO:
The Caribbean Disaster Emergency Management Agency Coordinating Unit

Hazard Risk Assessment Report and Costed Action Plan – Tucker Clarke Primary School, St. Kitts and Nevis for the Consultancy to Develop National Safe School Policies, Assess School Vulnerability to Hazards and Develop School Costed Action Plans in Six Borrowing Member Countries

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TABLE OF CONTENTS

1. INTRODUCTION

Environmental Solutions Ltd. (ESL) has been contracted by the Caribbean Disaster Emergency Management Agency (CDEMA) to develop/enhance National Safe School Polices in four Caribbean Development Bank (CDB) Borrowing Member Countries (BMCs), conduct hazard assessments of 33 schools across six BMCs, and prepare costed action plans for each of the schools based on the results of the assessments.

This document presents the Hazard Risk Assessment Report and Costed Action Plan for **Tucker Clarke Primary School** one of the seven (7) schools assessed in St. Kitts and Nevis. The report forms a part of the second and fourth deliverables (D2 and D4) under this Consultancy, and has been divided into eight main sections. Section 1 describes the method and approach the consultants used to undertake the assessment. Section 2 outlines the Country Risk Profile which presents the natural hazards each country and school is exposed to. Sections 3 to 6 summarize the vulnerability analysis of the identified hazards and Sections 7 and 8 present the summary findings, proposed recommendations and the Costed Action Plan. The results of the school safety and green assessments are presented in the Appendices.

The following schools were visited by the assessment team on regular school days, and as such the consultants were able to assess the schools during normal operational conditions:

TABLE 1.1: SCHOOL ASSESSMENT SCHEDULE

SCHOOL NAME	LOCATION	DATE VISITED
Washington Archibald High School	Basseterre, St. Kitts 17°18'12.78"N 62°43'26.42"W	Monday May 20, 2019
Charlestown Secondary	Charlestown, Nevis 17° 8'1.79"N 62°37'29.41"W	Tuesday May 21, 2019
Elizabeth Pemberton Primary	St. John's Parish, Nevis 17° 7'33.27"N 62°35'17.60"W	Tuesday May 21, 2019
Saddlers Primary	Saddlers, St. Kitts 17°24'20.72"N 62°47'39.58"W	Wednesday May 22, 2019
Cayon High School	Cayon, St. Kitts 17°21'8.83"N 62°44'0.66"W	Wednesday May 22, 2019
Tucker Clarke Primary School	Basseterre, St. Kitts 17°17'42.33"N 62°42'55.12"W	Thursday May 23, 2019
Sandy Point Primary	Sandy Point – Rural West, St. Kitts 17°21'28.05"N 62°50'56.72"W	Thursday May 23, 2019

FIGURE 1.1: SCHOOL LOCATION MAP – ST. KITTS

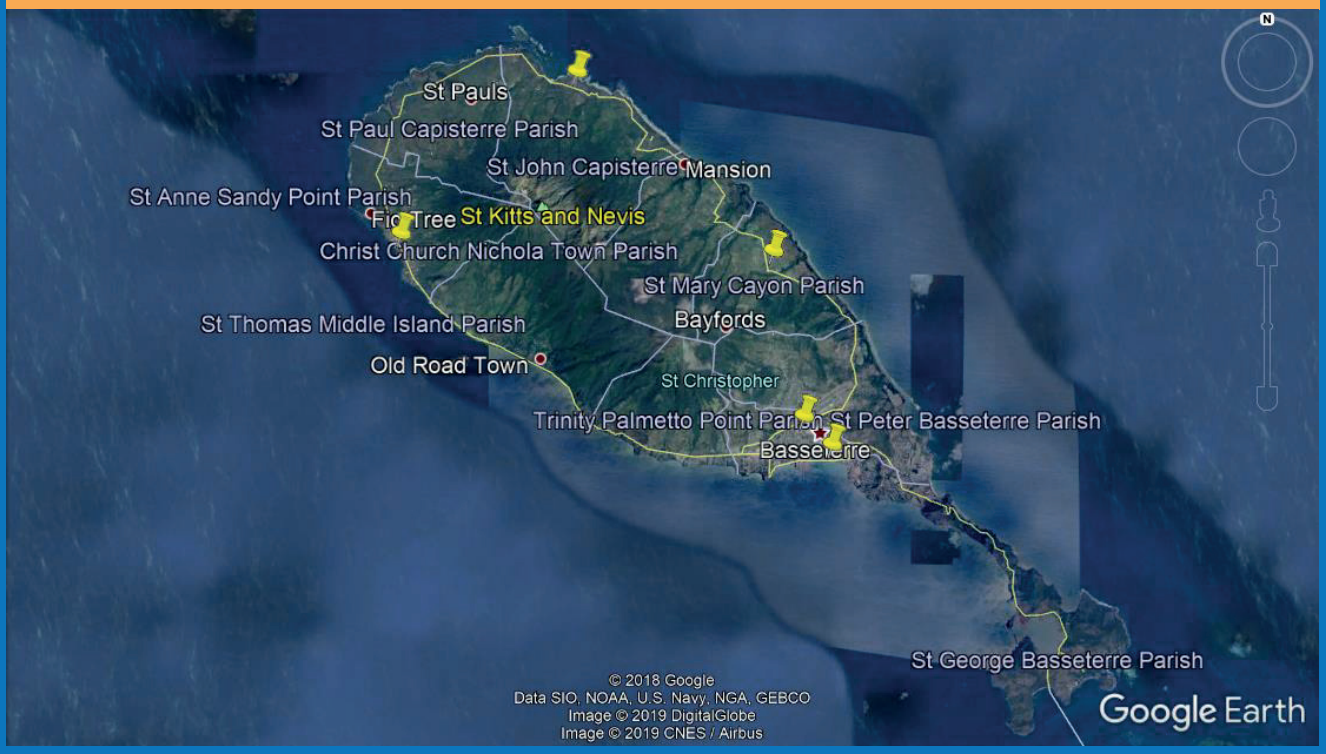
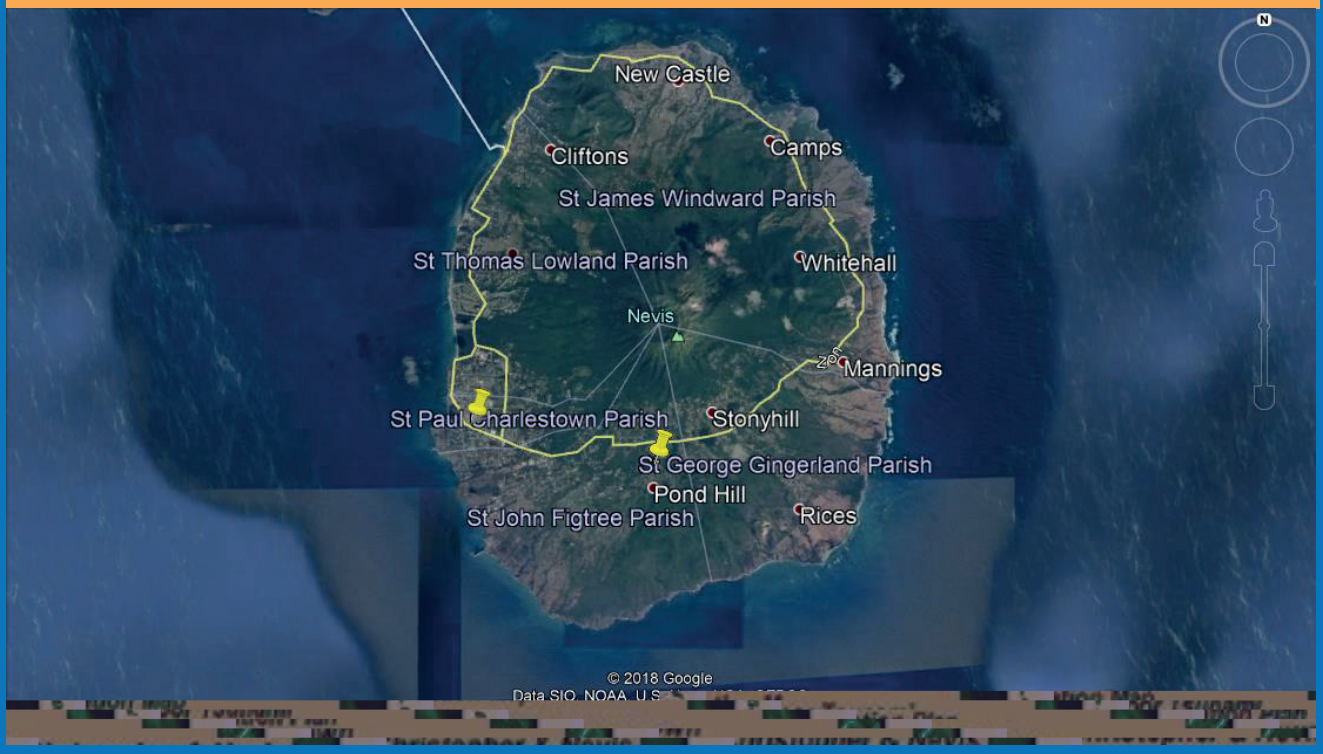
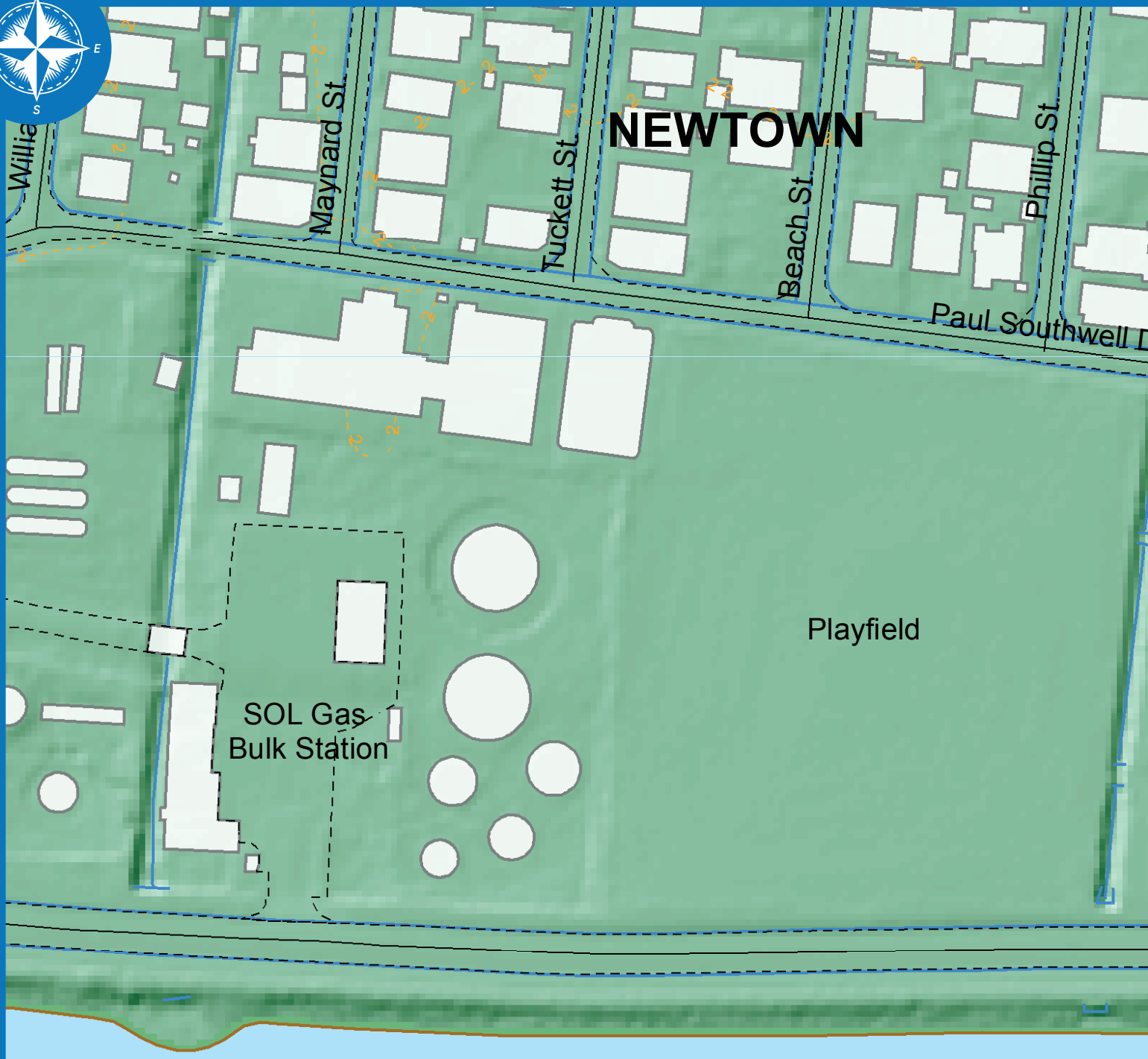


FIGURE 1.2: SCHOOL LOCATION MAP - NEVIS

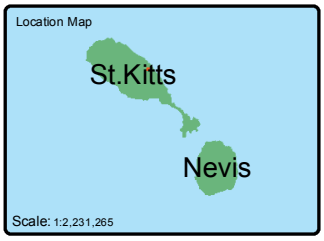




Scale: 1:1,500

0 0.05 0.1 Kilometers

0 0.05 0.1 Miles



Geographic Position
The island of St. Kitts is located at aproximately 17 degrees 19 minutes latitude and 62 degrees and 45 minutes west longitud

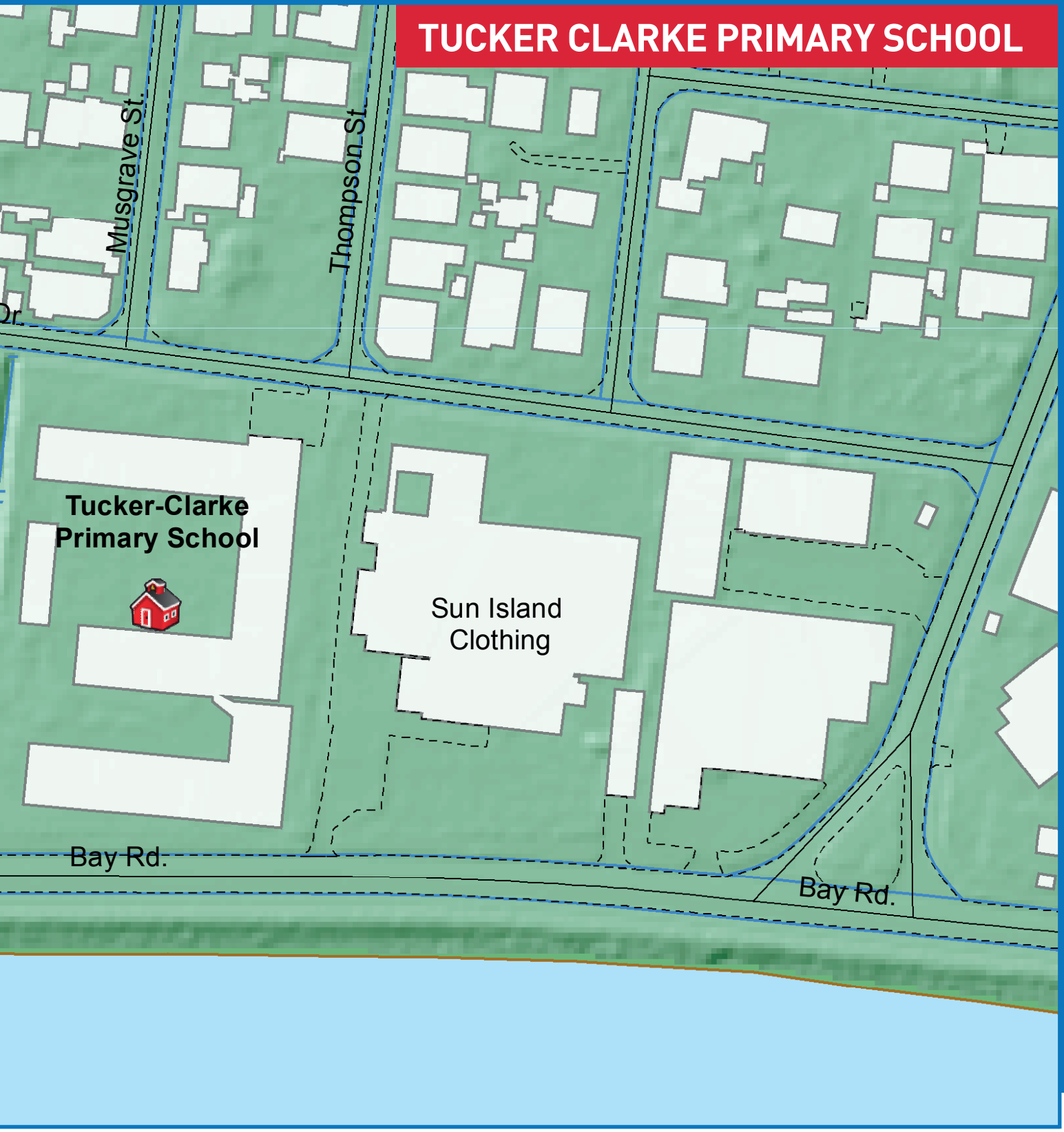
Height Depiction
Contours are in meters and shown at 2 meter intervals.
The accuracy of contours cannot be guaranteed in areas of high vegetation
Contours are shown through buildings for the purpose of continuity only.

Grid Data
Grid: St. Kitts 2001 Grid
Local Datums: NAD 1983
Spheroid: GRS 1980
Projection: Transverse Mercator
Latitude of Origin: Equator
Longitude of Origin: 62 deg 30 min West of Greenwich
Scale factor on Meter: 1.0000
False Easting: 304,800 m, False Northing: 0.0000 m

General Information
The representation of road or track is no evidence of the existence of a right of way.
When buildings are shown are according to roof outline.
The representation of boundary line do not necessary dipict the legal boundary on the ground.

Data Source
GIS Database 2001/19
Department of Physical Planning
Ministry of Education

TUCKER CLARKE PRIMARY SCHOOL



Legend

Road Network
- Main
- Highway
- Secondary

Edge of Road
Drainage
Contour - 2m
Inter v.i. 2m

Buildings
St.Kitts Is.
Participating Schools

The assessments consisted of interviews with senior administrators, a site walk-through to make general observations and take pictures, as well as a building condition survey described below.

The results of the school assessments are found in Appendix 1.

These deliverables have been prepared for the Project Implementing Agency, CDEMA, as well as the National Safe School Programme Committee (NSSPC) and national focal point in St. Kitts and Nevis. The list of NSSPC members are included in Appendix 2.

1.1 PURPOSE

The Model Safe School Programme (MSSP) Toolkit states that "in a region that is prone to various hazards, many schools may be located in hazardous locations. Wherever possible, Hazard and Vulnerability Assessments should be performed for schools to guide the inclusion of preparedness and mitigation measures in the design, construction and operational phases. Disaster and emergency planning should be founded on a thorough understanding of the specific hazards faced by the education sector in general and at the individual institutions."

The purpose of this hazard risk assessment report is to identify and analyze the hazard vulnerability of the **Tucker Clarke Primary School** and to make recommendations to inform decision-making.

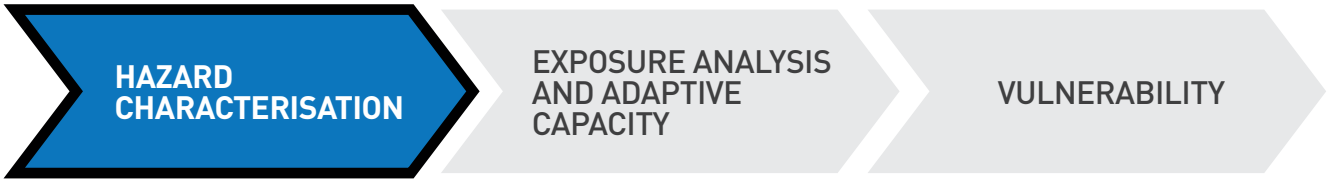
1.2 METHODOLOGY

The vulnerability assessment tool (VAT) used draws on the methodology developed by the National Oceanic and Atmospheric Association (NOAA). Some adaptations were made to take into account the local situation as well as data quality and availability.

1.2.1 HAZARD RISK ASSESSMENT

The consultants undertook the hazard risk assessments through a 3-step process elaborated below.

1.2.1.1 STEP 1 - CHARACTERIZING HAZARDS

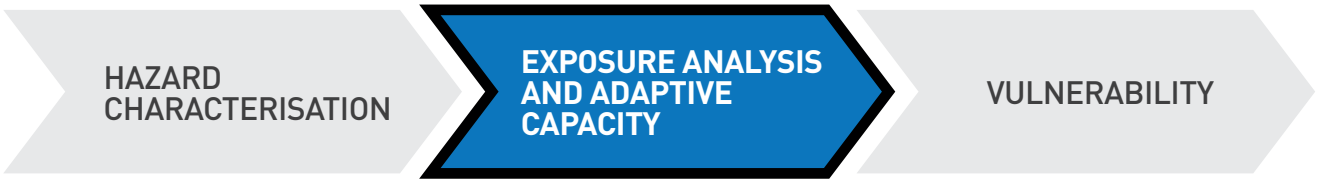


The first step involved the identification of the hazards (hydro-meteorological, geological, etc.) to which each of the countries, and by extension each school, may be exposed. To characterise hazards for each country, the Consultants conducted comprehensive desk research and stakeholder consultations with key agencies and various stakeholder groups (See Appendix 3) to acquire the necessary information, which included but was not limited to:

- Existing spatial data from local and regional Geographic Information Systems (GIS) databases e.g. Caribbean Risk Information System, CHARIM Handbook & Geo-node, PITCA, CARDIN etc.
- Multi-hazard maps, including:
  - Wind and cyclone hazard maps
  - Seismic zoning
  - Flood hazard maps
- Location of critical infrastructure and supporting infrastructure
- Historical and projected information on hazards for each country
- Damage history of each institution
- Previously conducted studies or country reports

Site visits were also conducted to the respective schools. These visits focused primarily on collecting physical infrastructure data and assessing the vulnerability of the facilities as they relate to the various hazards.

1.2.1.2 STEP 2 - EXPOSURE ANALYSIS AND ADAPTIVE CAPACITY



EXPOSURE ANALYSIS

Exposure analysis involved accessing various databases, including geospatial mapping using GIS, to identify the hazards to which the schools were exposed, as well as site assessments and discussions with stakeholders to ascertain history of hazard events.

Mapping hazard exposure enables stakeholders to visualise individual hazardous settings and identify cumulative hazard scenarios. This mapping also provides an effective tool to anticipate, plan and manage resources effectively in advance of these hazards. This geospatial framework is the foundation of the vulnerability assessment process.

The Consultants used the assessment tools from the MSSP toolkit to gather relevant information to help to inform exposure.

ADAPTIVE CAPACITY ASSESSMENT

The adaptive capacity for each school was determined by examining the characteristics that influence the school's capacity to prepare for, respond to and recover from hazards and disasters. The interaction between natural processes and the built environment is intrinsically linked, and it is the adaptive capacity that determines the risks and burdens created by hazards.

Some of the major factors assessed that influence adaptive capacity included:

- Are the proposed systems associated with each asset/facility designed to anticipate a hazard, cope with it, resist it and recover from its impact?
- Conversely, are there barriers to the ability to anticipate, cope, resist or recover?
- Are the systems associated with the school's assets/facilities already stressed in ways that will limit their capacity to anticipate, cope, resist or recover?
- Is the rate of impact from hazards likely to be faster than the adaptability of the systems?
- Are there efforts already underway to address impacts of hazards of interest related to the school's assets/facilities?

These variables outlined above were adopted for this project along with other indices. A systematic examination of building elements (as elaborated below), facilities, population and other components was carried out to identify features that are susceptible to damage from the effects of specific hazards. A qualitative scoring method was developed to determine the vulnerability of specific structures, exposed population and selected geographic areas. This data was analysed and used to prioritize mitigation activities and to guide disaster risk management within the schools.

The Consultants conducted targeted interviews with school administrators to identify gaps and needs for each school (institutional framework, physical infrastructure, human and financial resources). During the adaptive capacity analysis, the Consultants used the MSSP toolkit to identify gaps, needs and recommendations for capacity building measures and other interventions. Additionally, the Consultants provided a qualitative summary for each school.

Building Condition Assessment Methodology

The structural condition assessment was limited to visual observations and included both non-structural and structural-related issues. No finishes were removed to reveal hidden conditions, and no material or load tests were conducted to ascertain the structural capacity of the buildings' components. Moreover, the survey was limited to cursory inspection of electrical and mechanical systems such as ventilation, water services, plumbing and sewer utilities; egress, fire-suppression, or fire rating of the building components.

As such, any comments offered regarding concealed construction are the professional opinions of the Consultants based on analyses, and our joint engineering experience and judgment, and are derived in accordance with the standard of care and practice for evaluations of building structures.

The following standard conditions assessment definitions were used in describing the general state of the elements.

Good condition:
- It is intact, structurally sound and performing its intended purpose
- There are a few or no cosmetic imperfections
- It needs no repairs and only minor or routine maintenance.

Fair condition:
- There are early signs of wear, failure or deterioration, although the feature or element is generally structurally sound and performing its intended purpose.
- There is failure of a sub-component of the feature or element.
- Replacement of up to 25% of the feature or element is required.
- Replacement of a defective sub-component of the feature or element is required.

Poor condition:
- It is no longer performing its intended purpose.
- It is missing
- It shows signs of imminent failure or breakdown
- Deterioration or damage affects more than 25% of the feature or element and cannot be adjusted or repaired.
- It requires major repair or replacement.

The above was used qualitatively in conjunction with CDEMA's Enhanced Building Condition Assessment Tool (EBCAT) and the findings are contained in Section 5.1.

1.2.1.3 STEP 3 - VULNERABILITY ASSESSMENT

The data and information collected from Step 1 (Hazard Characterisation) and Step 2 (Exposure Analysis and Adaptive Capacity) were combined to determine how and where each school is vulnerable to hazards using the following formula:

HAZARD EXPOSURE + ADAPTIVE CAPACITY = VULNERABILITY

1.3 LIMITATIONS

This assessment represents a one-day snapshot of the schools that may or may not be the total depiction of what occurs daily. The team based its findings on the data provided and individual observations made during this one-day time frame. Please be mindful that this assessment is not binding but is merely an independent review to assist school officials in their quest to examine practices and procedures to better serve their student population. It is therefore incumbent upon the Ministry of Education, education officers and school staff to consider the report and determine what they believe is legitimate and critical to address when considering school safety management issues.

Comments in this report are intended to be representative of observed conditions. The consultants have made every effort to reasonably inspect and analyze the main structural components as well the non-structural components which form part of the building envelope. If there are perceived omissions or misstatements in this report regarding the observations made, we ask that they be brought to our attention as soon as possible so that we have the opportunity to address them fully and in a timely manner.

2. COUNTRY RISK PROFILE / SITUATIONAL CONTEXT

According to 2001 census data, the population of the Federation stood at just over 46,000 (34,930 on St. Kitts, 11,181 on Nevis) (Poverty Research Unit, 2006) and this increased to a mid-year population estimate for 2009 of 51,967 (ECCB, 2009). Although St. Kitts is not a low-lying island, over 60% of the population is located in coastal areas (Jeffers and Hughes, n.d.), with small villages strung along the main coastal road. This is partly due to the rugged, forest covered nature of the interior. The major urban areas are Basseterre (40% of the population), Sandy Point and Cayon (MOE, 2001).

The World Bank places St. Kitts and Nevis at position 21 of countries at high economic risk from multiple hazards (Global Facility for Disaster Reduction and Recovery, 2010). Over the years, the islands of St Kitts and Nevis have been impacted by a number of natural hazards, some of which have increased significantly in frequency over the past ten years. These include:

- Earthquake
- Volcanic activity
- Wind/tropical cyclone
- Flooding – coastal, riverine, flash flood
- Coastal erosion
- Drought

Detailed climate modelling projections for St. Kitts and Nevis predict:

- an increase in average atmospheric temperature;
- reduced average annual rainfall;
- increased Sea Surface Temperatures (SST); and
- the potential for an increase in the intensity of tropical storms.

And the extent of such changes is expected to be worse than what is being experienced now.

3. HAZARD IDENTIFICATION/ASSESSMENT

As with many other countries in the Caribbean, there are two broad categories of hazards that can cause potentially minor to significant impacts at any given time in St. Kitts and Nevis. These are:

- Hydro-meteorological hazards
  - Hurricanes and Tropical Storms
  - Flooding
  - Drought
  - Storm Surge
  - Landslide
- Geological hazards
  - Earthquake
  - Volcano
  - Tsunami

Based on a review of reports, site visits and consultation with key stakeholders, the main hazards that affect the schools found within the project area are presented below.

3.1 WIND

Since 1989, at least ten storms (see Table 3.1) have inflicted varying degrees of damage on both islands. The damage caused by those storms has occurred largely as a result of the impact from high velocity winds, with speeds in excess of 75 miles per hour. Damage has included coastal erosion, destruction of infrastructure – roads, bridges, water and electricity facilities, public property e.g. schools, hospitals, community buildings, as well as destruction of private property. Damage costs also include the opportunity cost of lost revenues due to interruption of commercial business activities such as tourism, a major revenue earner for the Federation. Human lives have also been affected through physical injuries, psychological trauma, and indeed on occasion, actual loss of life.

Prior to 1989, the incidence of wind hazard impacting St Kitts and Nevis was relatively infrequent (Table 3.1).

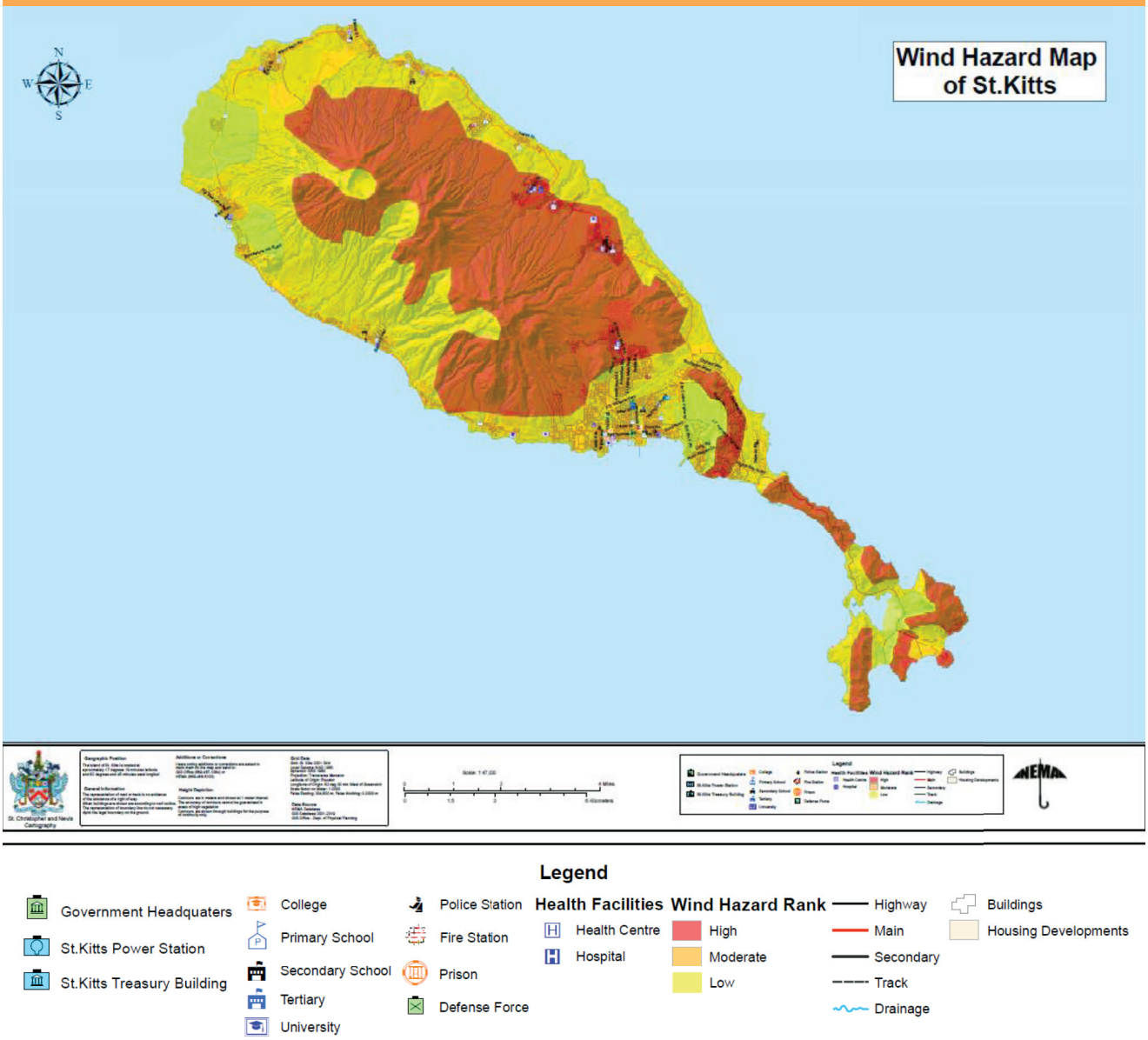
TABLE 3.1: MAJOR HAZARDS WHICH HAVE STRUCK ST. KITTS] AND NEVIS SINCE 1899

PERIOD	HAZARD TYPE	COMMENTS
1928	**Hurricane**	
1950	**Earthquake**	
1955	**Hurricane Alice**	
1961	**Earthquake**	6+ magnitude
1974	**Earthquake**	7.4 Richter Scale
1984	**Flood**	Basseterre SK only
1985	**Earthquake**	6.6 Richter Scale
1987	**Flood (major)**	
1989	**Hurricane Hugo**	
1989	**Storm Felix**	
1989	**Hurricane Gilbert**	
1989	**Hurricane Iris**	
1995	**Hurricane Luis**	
1995	**Hurricane Marilyn**	
1996	**Hurricane Bertha**	
1998	**Hurricane Georges**	
1998	**Flood (severe)**	
1999	**Hurricane Jose**	
1999	**Flood (minor)**	
1999	**Hurricane Lenny**	

There are a number of facilities in St. Kitts with relatively high vulnerability to wind in the areas of Basseterre, Cayon and Sandy Point. With regard to educational facilities, high scores were noted for the High Schools of Basseterre, Verchilds and Cayon, indicating the need for a review of the capacity of those buildings to withstand wind from storms (including hurricanes). Of note also of relatively high vulnerability, are two medical facilities, namely - the Pogson Hospital, Sandy Point and to a lesser extent the JNF General Hospital, Basseterre.

There are a number of facilities on the eastern side of Nevis with relatively high vulnerability to wind including Churches and Educational facilities which are also used as Emergency Shelters. Of particularly high vulnerability also, are the Community Centres at Hickman and Hard Times respectively and the Grove Park Pavilion in Charlestown.

FIGURE 3.1: WIND HAZARD MAP – ST. KITTS (SOURCE: NEMA)



3.2 STORM SURGE

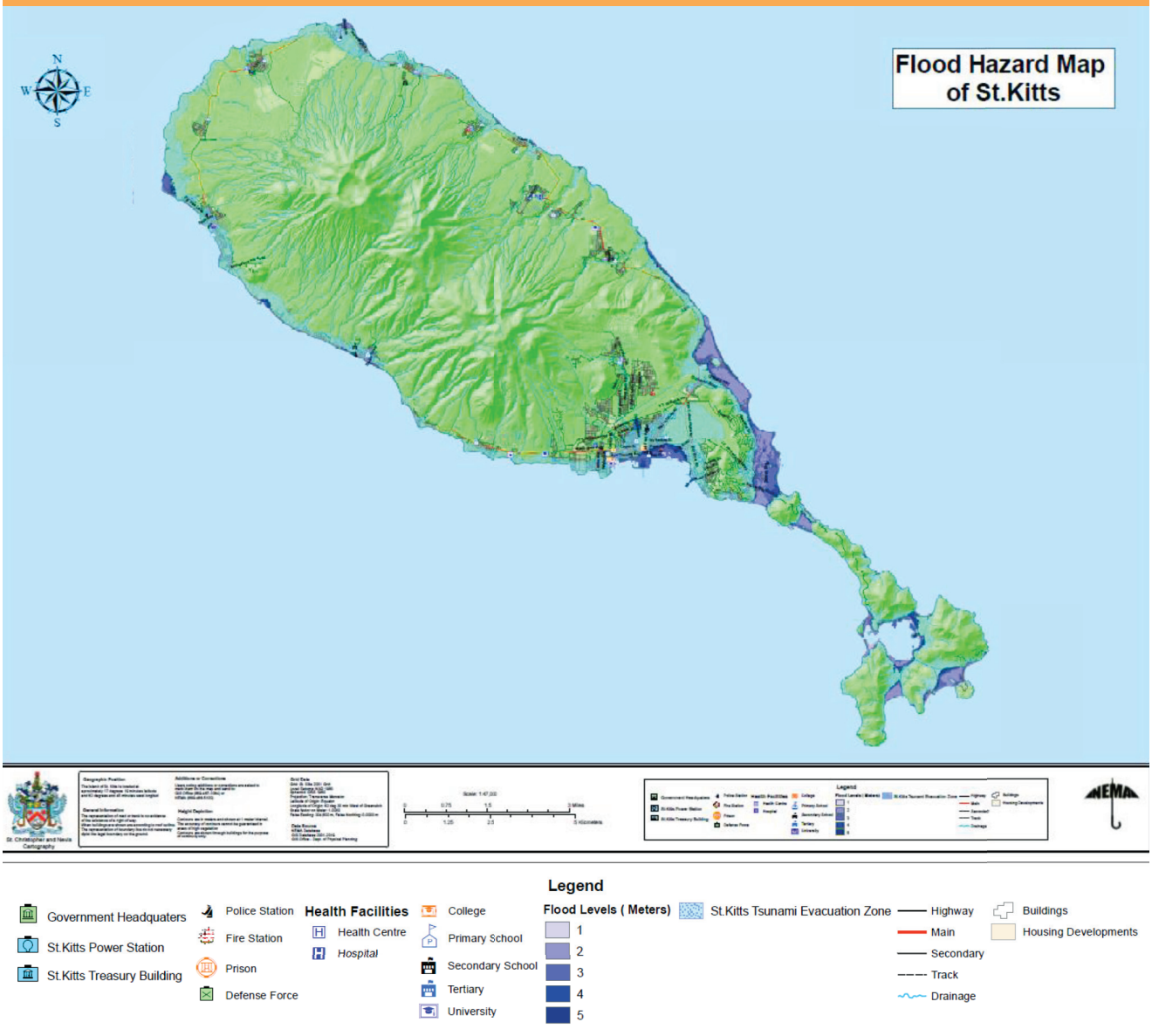
St Kitts and Nevis is exposed to coastal erosion with varying degrees of damage, resulting from the effects of storms and storm surge. As a result of Hurricane Luis (1995), the western coastal area of Nevis suffered significant damage through erosion brought upon by the force of waves. The western coastal areas of St Kitts and Nevis suffered most significantly as a result of the impact of Hurricane Lenny (1999) which approached from a westerly direction, an unusual development.

3.3 FLOODING

Flooding is largely localised in St Kitts. Heavy rainfall normally results in the overflow of Ghauts, as well as the retention of water in some sections of Basseterre. In 1998 severe flooding of one of the Ghauts in Basseterre resulted in significant damage and one loss of life was recorded. Flooding has been recorded in 1987 and more recently minor flooding in 1999. Prior to 1998 the last severe flooding was in 1880.

For Nevis, the Charlestown area along the Bath Ghaut has experienced relatively high flooding. Other areas where flooding has been experienced include the Stoney Grove to Charlestown road and the Newcastle International Airport.

FIGURE 3.2: FLOOD HAZARD MAP OF ST. KITTS



3.4 EARTHQUAKES

St Kitts as well as Nevis is prone to earthquakes. Relatively minor tremors have been felt infrequently, with little or no damage having been reported. Seismic activity is being monitored through the Seismic Research Unit in Trinidad and Tobago, West Indies.

Nevis experienced significant volcanic earthquake swarms in 1926, 1947-48, 1950-51, and 1961-63. These earthquakes were relatively shallow and originated at depths between 1-11 km. No earthquakes other than regional tectonic earthquakes have been reportedly felt in Nevis since May 1963. The permanent seismograph station at Gingerland has been in continuous operation since 1980 detecting local volcanic earthquakes once/twice per year.

3.5 TSUNAMI

The hazard maps below show tsunami evacuation zones for both St. Kitts and Nevis.

FIGURE 3.3: TSUNAMI HAZARD MAP – ST. KITTS (SHOWING BASSETERRE WHICH IS CONSIDERED A HIGH RISK ZONE)

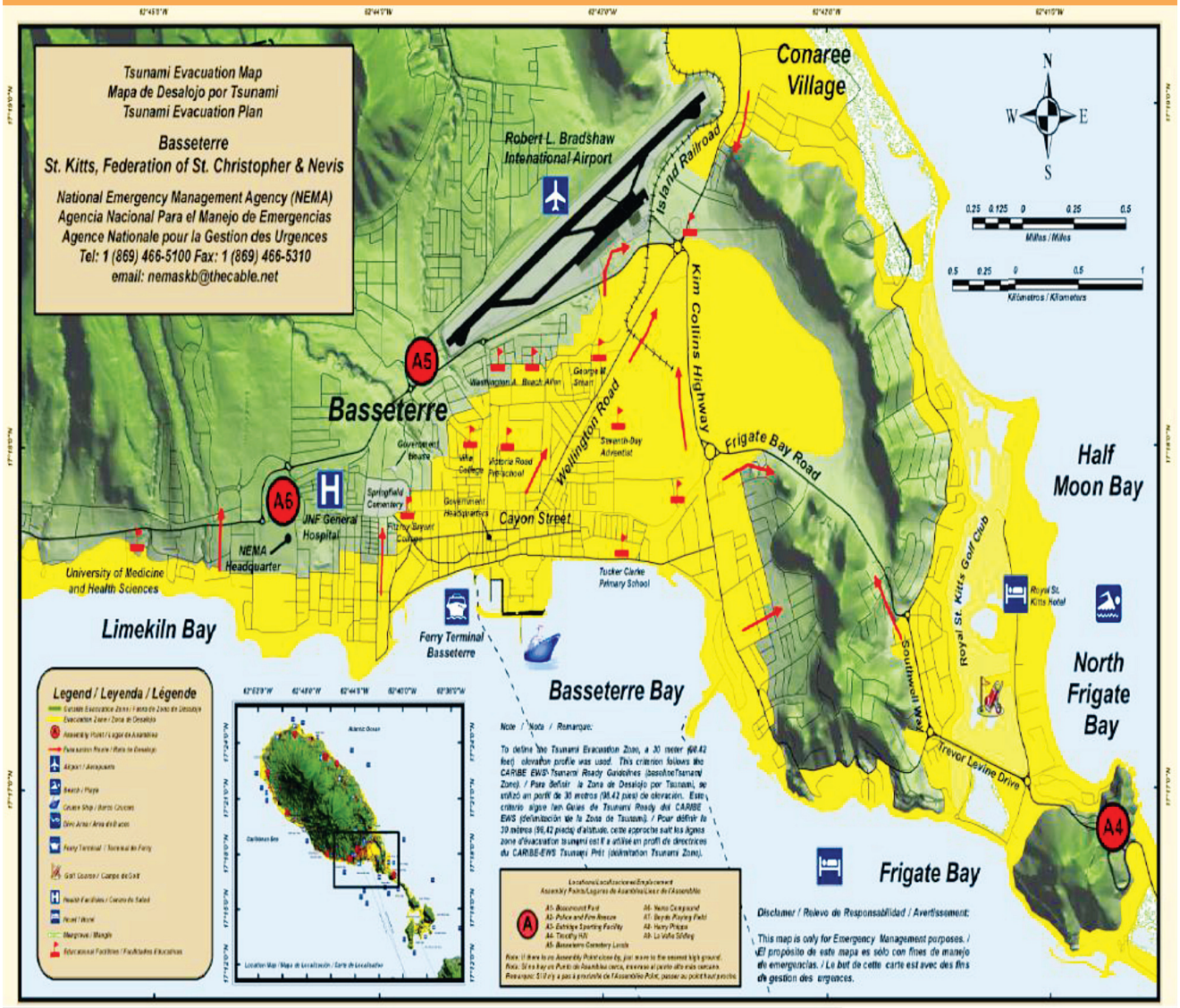
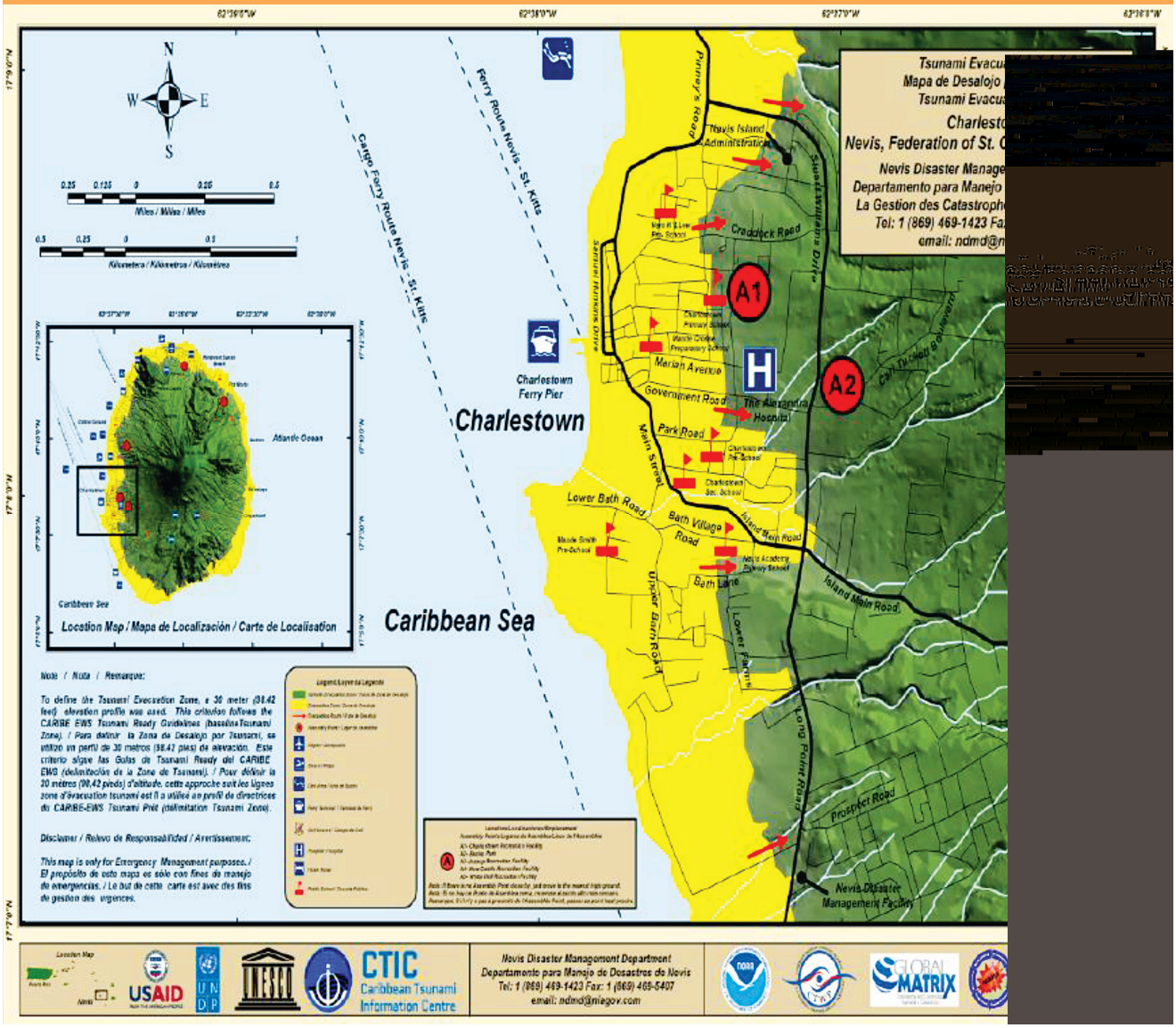


FIGURE 3.4 TSUNAMI HAZARD MAP – NEVIS (SHOWING CHARLESTOWN WHICH IS CONSIDERED A HIGH RISK ZONE)



3.6 LANDSLIDES / INLAND EROSION

St Kitts has been subject to inland erosion as a result of storm winds and ghaut flooding. The areas along ghaut levels have been susceptible to landslides and damage has been suffered particularly in areas where sub- standard housing has been erected, generally by squatters without official planning authority (Bentley Associates 1998).

Facilities with the highest vulnerability to Inland Erosion are spread around the island, with a greater concentration towards the south. It is noted that five of the six main water intakes, as well as six Emergency Shelters show high vulnerability to inland erosion.

3.7 DROUGHT

Drought was previously identified as a critical hazard for Nevis only. More than one-half of the island receives less than fifty (50) inches of rainfall per year. Rainfall per year has been known to average forty-six (46) inches as compared to an average of 64 inches for St Kitts. Rainfall is lowest on the eastern side of the island and increases in areas of higher altitude. Although short periods of drought may occur throughout the year, extended periods of drought are more often experienced from the months of February through April.

The central mountain area of moist forest has the lowest risk to drought. Moderate risk areas include the northwest and north of the island. High-risk areas include the Charlestown water zone and the Butlers/Mannings water zone on the east of the island. The south and southeast section of the island is considered to be of very high risk to drought.

Drought frequency is not well documented in St. Kitts. Aside from the 2010 drought event, another severe drought occurred between 1999 and 2000. Such droughts last between 1-2 months (Dr Sahely, personal communication, April 12, 2011). Other recorded instances of dry spells include 2003, when water yield from wells was 40% of its normal output. This highlighted the necessity for more water storage across the island (ECLAC, 2003).

3.8 VOLCANIC ACTIVITY

The islands of St Kitts and Nevis lie along a volcanic chain passing through the Lesser Antilles. Cones with crater formation include Mount Olivees, the Verchilds Mountain and Mount Liamuiga. It is believed that Mount Liamuiga (formerly known as Mount Misery) may have erupted in 1692 and in 1843 (Bender 1986 with reference to World Data Centre, 1981).

Seven volcanic centres have been identified on Nevis: Hurricane Hill, Round Hill, Cades Bay, Saddle Hill, Red Cliff, Butlers Mountain and Nevis Peak. Nevis Peak is the only volcanic centre likely to erupt in the future.

FIGURE 3.5: VOLCANIC HAZARD ZONES (NEVIS)

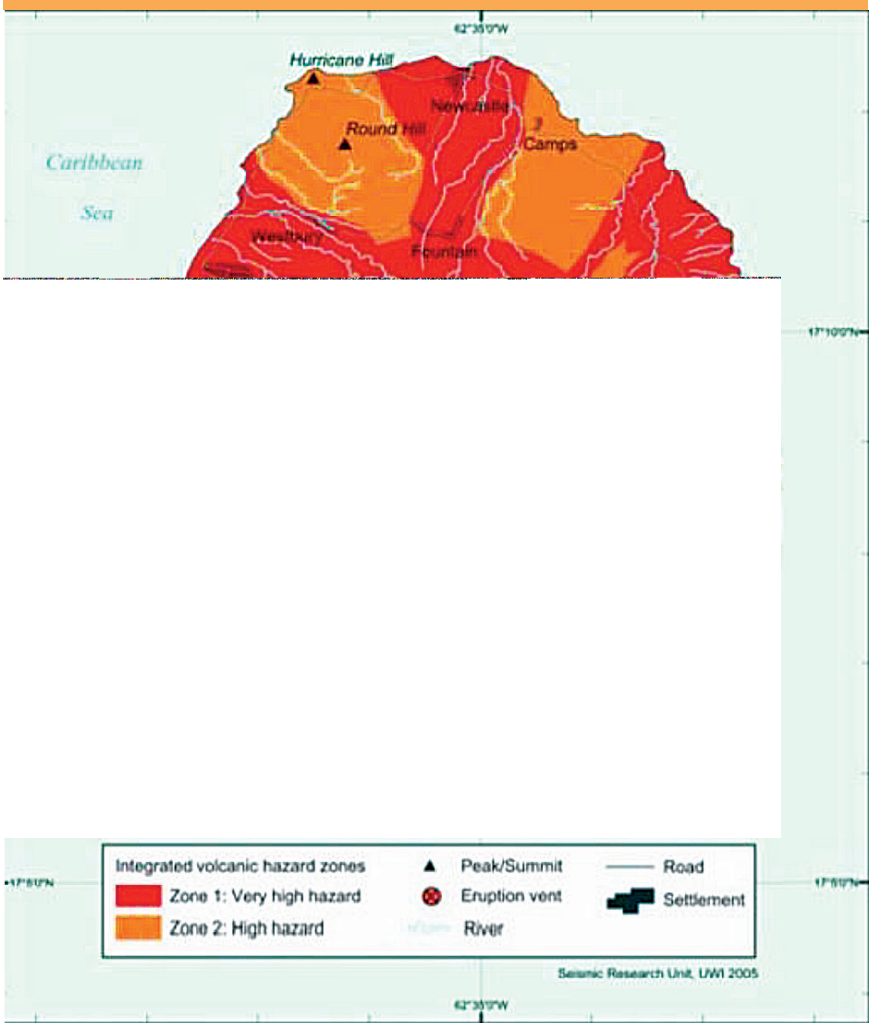
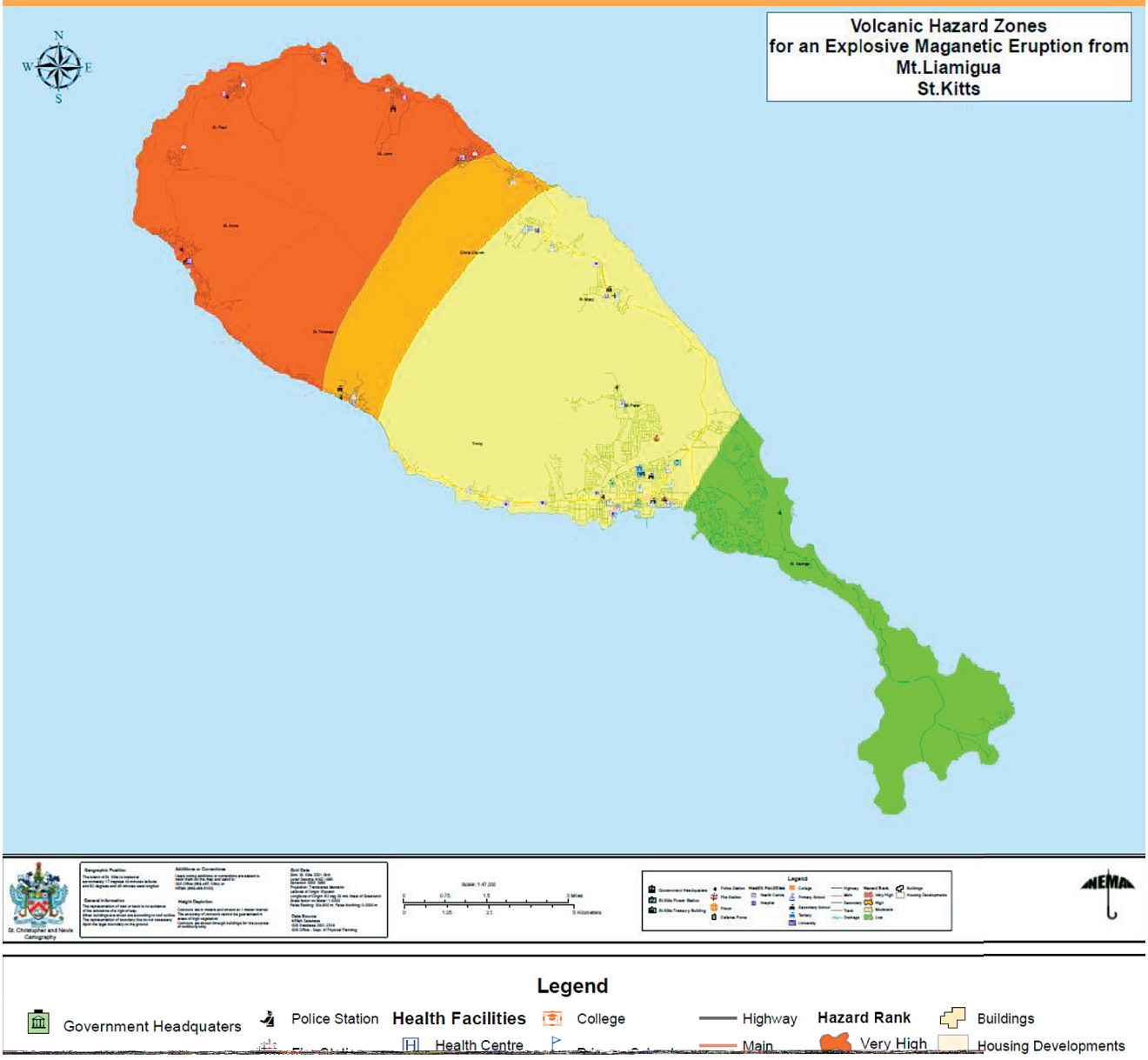


FIGURE 3.6: VOLCANIC HAZARD ZONES (ST. KITTS)



3.9 CLIMATE PROJECTIONS

Detailed climate modelling projections for St. Kitts and Nevis predict the following:

- **Temperature:** Regional Climate Model (RCMs) projections indicate increases ranging from 2.4 - 3.2 °C by the 2080s in the higher emissions scenario.
- **Precipitation:** General Circulation Models (GCM) projections indicate overall decreases in annual rainfall of between -41 to +13 mm per month by 2080 for the higher emissions scenario. RCM projections indicate a decrease of 7-22% in total annual rainfall.
- **Sea Surface Temperatures (SST):** GCM projections indicate increases from +0.7 °C and +2.8°C by the 2080s.
- **Tropical Storms and Hurricanes:** North Atlantic hurricanes and tropical storms appear to have increased in intensity over the last 30 years. Observed and projected increases in SSTs indicate potential for continuing increases in hurricane activity and model projections indicate that this may occur through increases in intensity of events but not necessarily through increases in frequency of storms.

4. EXPOSURE ANALYSIS

The term exposure is used to indicate those elements-at-risk that are subject to potential losses. Important elements-at-risk that should be considered in analysing potential damage of hazards are population, building stock, essential facilities and critical infrastructure. Critical infrastructure consists of the primary physical structures, technical facilities and systems which are socially, economically or operationally essential to the functioning of a society or community, both in routine circumstances and in the extreme circumstances of an emergency (UN-ISDR, 2009).

This exposure analysis involves developing a hazard profile for the school by assigning ratings (from 0 to 3) to the parameters[1] listed in Table 4.1 below and averaging the parameter scores for each hazards. Based on the average scores, the school is characterized by the degree of exposure to each hazard and further assigned an **Overall Exposure Index** (sum of the average scores for all hazards).

The objective is to quantify the schools' level of exposure and subsequently the potential impact (direct or indirect) of a specific hazard on people, essential facilities, and property. This will enable school administrators, the Ministry of Education and other key decision makers to have a better understanding of the hazards that present the highest risk to the school and focus planning efforts on making schools safer in this context.

Based on the rankings given, the schools are characterized by the degree of exposure to each hazard and further assigned an overall exposure index of Low, Moderate or High:

OVERALL EXPOSURE INDEX		
0 - 4	VERY LOW	
5 - 9	LOW	
10 - 14	MODERATE	
15 - 19	HIGH	
20 - 24	VERY HIGH	

1 FEMA risk assessment doc

TABLE 4.1: PARAMETERS AND RANKINGS USED IN EXPOSURE ANALYSIS

PARAMETER	RANKINGS	SCORE
Frequency	**Highly Likely:** Near 100% probability in next year.	3
	Likely: Between 10 and 100% probability in next year, or at least one chance in 10 years.	2
	Possible: Between 1 and 10% probability in next year, or at least one chance in next 100 years.	1
	Unlikely: Less than 1% probability in next 100 years.	0
Warning (potential speed of onset)	Minimal (or no) warning.	3
	6 to 12 hours warning.	2
	12 to 24 hours warning.	1
	More than 24 hours warning	0
Severity	**Catastrophic:** Multiple deaths; Complete shutdown of facilities for 30 days or more; More than 50%of property is severely damaged.	3
	Critical: Injuries and/or illnesses result in permanent disability; Complete shutdown of critical facilities for at least two weeks; More than 25%of property is severely damaged.	2
	Limited: Injuries and/or illnesses do not result in permanent disability; Complete shutdown of critical facilities for more than 1 week; More than 10%of property is severely damaged.	1
	Negligible: Injuries and/or illnesses are treatable with first aid; Minor quality of life lost; Shutdown of critical facilities and services for 24 hours or less; Less than 10% of property is severely damaged.	0

The consultants used existing data and available hazard maps to determine the level of exposure of the school to specific hazards. Table 4.2 presents the findings of the exposure analysis.

TABLE 4.2: EXPOSURE ANALYSIS – TUCKER CLARKE PRIMARY SCHOOL

HAZARD	COMMENTS	FREQUENCY		WARNING TIME		SEVERITY		DEGREE OF EXPOSURE	
		RANKING	SCORE	RANKING	SCORE	RANKING	SCORE	RANKING	SCORE
Hurricanes and Tropical Storms/Wind	The school is located within the moderate wind hazard zone.	**Likely**	**2**	**More than 24 hours warning**	**0**	**Catastrophic**	**3**	**MODERATE**	**1.67**
Flooding/inland erosion (from hurricanes, storms or extreme rainfall events)	The school is located within the high-risk flood hazard zone.	**Highly Likely**	**3**	**6-12 hrs**	**2**	**Limited**	**1**	**HIGH**	**2.00**
Drought	St. Kitts and Nevis has been impacted by drought and this is expected to be exacerbated by climate change.	**Likely**	**2**	**More than 24 hours warning**	**0**	**Limited**	**1**	**MODERATE**	**1.00**
Storm Surge	The school is located along the coast and as such is at risk to storm surge.	**Likely**	**2**	**6-12 hrs**	**2**	**Critical**	**2**	**HIGH**	**2.00**
Landslide	The school is not exposed to landslide hazard.	**Unlikely**	**0**	**-**	**-**	**-**	**-**	**NOT EXPOSED**	**0.00**
Earthquake	St. Kitts and Nevis are prone to earthquakes.	**Likely**	**2**	**Minimal (or no warning)**	**3**	**Catastrophic**	**3**	**HIGH**	**2.67**
Volcano	The school is located within the moderate volcanic hazard zone.	**Possible**	**1**	**Minimal (or no warning)**	**3**	**Limited**	**1**	**MODERATE**	**1.67**
Tsunamis	The school is located within the tsunami evacuation zone.	**Possible**	**1**	**Minimal (or no warning)**	**3**	**Catastrophic**	**3**	**HIGH**	**2.33**
								OVERALL EXPOSURE INDEX	**13.34**

Based on the above, the overall multi-hazard exposure is **moderate**.

While the development of the modern building code has progressed, many of the schools were built before the adoption of modern building codes, placing them at great risk for hurricane damage. Technologies exist today that allow older buildings to be retrofitted to become more hurricane resistant. Examples of these technologies include reinforcing gabled roofs, creating secondary water barriers in roofs, and installing hurricane straps and clips to ensure a roof stays in place despite high winds.

The school was assessed against the National Building Code which is common for the Organisation of Eastern Caribbean States (OECS) territory.

Flood mitigation was identified as a definite necessity in this and many of the schools assessed throughout the region. Due to the nature of the flood hazard, it cannot be addressed in isolation of its immediate environs and more generally, the storm water management of each school should be analyzed in the context of the run-off characteristics of the water catchment in which it is located. This may mean that focusing only on the school in attempting to resolve the flooding problem may not yield the required results and Community-based initiatives with specific focus on empowerment of the local community, and linking the community based activities to local development policies may be more effective.

Seismic hazard may or may not be mitigated. For example, fault rupture and ground motion cannot be mitigated because tectonic movement (the main cause of earthquakes) cannot be stopped, but liquefaction at a site can be mitigated by engineering measures. Seismic risk can be reduced through either mitigation of seismic hazard or reduction of exposure or both. For the purposes of this assignment the assessment was concerned more with building form and to a lesser extent soil type as it relates to susceptibility of liquefaction. It is recommended that a detailed structural analysis be conducted if 'as-built' drawings do not exist. It is based on that analysis that a determination of the need to retrofit will be made.

4.1 OTHER HAZARDS

Comprehensive school emergency planning utilizes an "all-hazards" approach, which considers a wide range of possible threats and hazards. It includes those that might take place in the community and surrounding area that could impact the school. Examples include:

1. Technological Hazards

- Hazardous materials in the community from industrial plants, major highways or railroads
- Hazardous materials in the school e.g. gas leaks, sewage breaks or laboratory spills
- Infrastructure failure e.g. dam, electricity, water, communications or technology systems

2. Biological Hazards

- Infectious diseases
- Contaminated food outbreak
- Water contamination
- Toxic materials present in schools e.g. mould, asbestos, substances in school science laboratories

3. Adversarial, Incidental and Human-Caused Hazards

- Fire
- Medical Emergency
- Intruder
- Active shooter/Threats of violence
- Fights
- Gang violence
- Bomb threat
- Child abuse
- Cyber attack
- Suicide
- Missing student or kidnapping
- Off-site emergencies
- Dangerous animal
- Riots

The school has indicated that there are written guidelines and procedures in place regarding bullying. It is recommended that the school determine which of the above are priority hazards to be included in the School Safety Plan.

5. ADAPTIVE CAPACITY

The adaptive capacity analysis describes the ability of the school to accommodate potential damage, to take advantage of opportunities, or to respond to consequences with minimum disruption or minimum additional cost (Climate Impacts Group, King County, Washington, and ICLEI-Local Governments for Sustainability, 2007). It describes the capacity of the school to learn from previous experiences and to apply those lessons to cope in future.

In the context of what each school may be exposed to (see Section 3), the analysis below, among other things, seeks to determine:

- If the school is already able to accommodate changes
- If there are any barriers to the school to accommodate changes
- If the rate of the projected change is likely to be faster than the adaptability of the school
- If there are efforts already underway to address impacts of various hazards in the school

To develop an overall index of adaptive capacity, 24 indicators were selected and grouped according to five determinants of adaptive capacity in the context of the hazards that may impact each school (Section 3). The indicators were selected using information garnered using the MSSP toolkit checklists, interviews and desk review of other existing data and information (Smit et al 2001, Yohe and Tol, 2002). The index was calculated by first aggregating the scores for the individual indicators to obtain a determinant value, which were then aggregated to an overall score to obtain an **Overall Adaptive Capacity Index.**

OVERALL ADAPTIVE CAPACITY INDEX	
0 - 4	VERY LOW
5 - 9	LOW
10 - 14	MODERATE
15 - 19	HIGH
20 - 24	VERY HIGH

This approach provides a holistic perspective on the school's ability to plan for, design and implement effective adaptation strategies or to react to evolving hazards and stresses which may ultimately reduce the likelihood of the occurrence and or the severity of harmful outcomes resulting from hazards.

TABLE 5.1: DETERMINANTS OF ADAPTIVE CAPACITY USED IN SCHOOL ASSESSMENT

DETERMINANT	RATIONALE
Economic	■ Greater economic resources increase adaptive capacity ■ Lack of financial resources limits adaptation options
Information and skills	■ Lack of informed, skilled and trained personnel reduces adaptive capacity ■ Greater access to information increases likelihood of timely and appropriate adaptation
Infrastructure and Technology	■ Lack of technology limits range of potential adaptation options ■ Less technologically advanced regions are less likely to develop and/or implement technological adaptations ■ Greater variety of infrastructure can enhance adaptive capacity, since it provides more options ■ Characteristics and location of infrastructure also affect adaptive capacity
Institutional	■ Well-developed social institutions help to reduce impacts of climate- related risks and therefore increase adaptive capacity ■ Policies and regulations may constrain or enhance adaptive capacity
Physical/Ecological	■ Elements of the physical or ecological environment of a region may enhance or limit the possibilities for adaptation

TABLE 5.2: SUMMARY OF ADAPTIVE CAPACITY ANALYSIS FOR TUCKER CLARKE PRIMARY SCHOOL

DETERMINANT	INDICATOR	SCORE	COMMENTS
Institutional	**1.** Is there a national policy on climate change adaptation and/or comprehensive disaster management (or related) for the education sector? **[YES = 1; NO = 0]**	1	Though not specific to the education sector, St. Kitts & Nevis has national policies which address climate change adaptation and/or comprehensive disaster management. These include but are not limited to: ■ Natural Hazard Mitigation Policy and Plan for the Federation of St Kitts & Nevis ■ St. Kitts-Nevis National Disaster Plan
	2. Have there been additions to the curriculum that integrate climate change/disaster preparedness/emergency management? **[YES = 1; NO = 0]**	1	There have been additions to the curriculum that integrate climate change/disaster preparedness/emergency management.
	3. Is an updated emergency management or disaster management plan in place? **[YES = 1; NO = 0]**	1	The school reported that there is an updated emergency/disaster management plan in place.
	4. Do the plans address priority hazards based on previous assessment(s)? **[YES = 1; NO = 0]**	1	It was reported that the school's emergency plan is based on previous risk assessment conducted at the school.
	5. Is there a designated environmental/health & safety officer, emergency response team or related position/team? **[YES = 1; NO = 0]**	1	A teacher has been identified and has been trained by NEMA and has done other training. She has been put in charge of managing the School Safety programme.
Information and Skills	**6.** Has the school done a walk through to identify and prioritize hazards for the population and visitors? **[YES = 1; NO = 0]**	1	The school reports that they have assessed and documented the risks to the safety of their staff, students and visitors.
	7. Are all teachers and school staff assigned roles in the overall response, pre-, during and post-hazard event? **[YES = 1; NO = 0]**	1	The school indicated that all teachers and school staff are assigned roles in the overall response, pre-, during and post-hazard event.
	8. Have staff received training in emergency/disaster management? **[YES = 1; NO = 0]**	1	Members of staff have reportedly been trained in at least one aspect of disaster management or health and safety.

TABLE 5.2: SUMMARY OF ADAPTIVE CAPACITY ANALYSIS FOR TUCKER CLARKE PRIMARY SCHOOL

DETERMINANT	INDICATOR	SCORE	COMMENTS
Information and Skills	**9.** Are there regular drills with staff, students and/or parents? **[YES = 1; NO = 0]**	1	It was reported that the school participates in regular drills and has also participated in national simulation exercises.
	10. Is the school able to manage an event independently if help is not immediately available? E.g. fire extinguishers, first aid kits, triage? **[YES = 1; NO = 0]**	1	While the school does not have anyone with first aid certification, they have indicated that there is a procedure in place for obtaining first aid help. Fire extinguishers and a first aid kit are accessible to the school. The infrastructure required for disaster planning was found to be generally lacking. This included lack of back up water supply, no stand-by electrical generators, and lack of adequate toilet facilities.
Infrastructure and Technology	**11.** Does the school have reserve water storage with adequate supply for at least 3 days? **[YES = 1; NO = 0]**	0	The school indicated that they do not have back up water supply.
	12. Does the school employ water conservation strategies to adapt to current usage or plan for future changes to water supply? **[YES = 1; NO = 0]**	0	Outside of discouraging the running of water while washing hands, there was no indication of other water conservation strategies being employed.
	13. Does the school actively harvest rainwater? **[YES = 1; NO = 0]**	0	Rainwater is not collected.
	14. Does the school employ energy conservation/efficiency mechanism? **[YES = 1; NO = 0]**	1	The use of energy efficient light bulbs and appliances was reported.
	15. Is there back up electrical power? **[YES = 1; NO = 0]**	0	No there is no back up electricity supply.
	16. Does the school employ other green practices? E.g. recycling, greenhouse/garden, green policy etc? **[YES = 1; NO = 0]**	1	There is a school garden and mulching is practiced. There have been presentations/awareness building done regarding recycling, but it is not practiced on a wide scale.

TABLE 5.2: SUMMARY OF ADAPTIVE CAPACITY ANALYSIS FOR TUCKER CLARKE PRIMARY SCHOOL

DETERMINANT	INDICATOR	SCORE	COMMENTS
Infrastructure and Technology	**17.** Can the building withstand the impacts of a hazard in its current condition? **[YES = 1; NO = 0]**	1	The general conclusion is that the structures (in their present state) are in generally good condition although there are areas in need of repairs. The most serious area of deficiency was the Aluzinc roof covering on some of the buildings which appeared to lack the required hurricane straps. There were also cases of missing or broken windows which will put the entire building at risk in an extreme wind event. The main roof structures were found to be in generally good condition.
	18. Have school buildings/plant been repaired or retrofitted to the building code? **[YES = 1; NO = 0]**	0	No. Repairs and retrofits are recommended in the Costed Action Plan (Section 8).
ARE THERE ANY EXISTING BARRIERS TO ADAPTATION?			
Physical/ Ecological/ Climate	**19.** Physical or ecological limits? E.g. Does the landscape/physical location/age range and size of the school population limit the range of adaptation options to priority hazards? **[YES = 1; NO = 0]**	0	The school has several limitations based on its location. It is located adjacent to a major fuel storage facility, a major thoroughfare and the coast. The school is located within the tsunami evacuation zone and the high-risk flood zone for St. Kitts.
	20. Is climate change likely to exacerbate any of the current hazards? **[YES = 1; NO = 0]**	0	Based on climate projections, the current hazards are projected to be exacerbated.
	21. Is the rate of climate change likely to outpace adaptation efforts? **[YES = 1; NO = 0]**	0	Climate change impacts are already being experienced, and adaptation efforts, though available, may be costly to implement.
Technological	**22.** Technological limits? Availability of technological options for adaptation e.g. public address system for warning/early warning; electronic data storage. **[YES = 1; NO = 0]**	0	These technologies are available, though not presently in place at the school.

TABLE 5.2: SUMMARY OF ADAPTIVE CAPACITY ANALYSIS FOR TUCKER CLARKE PRIMARY SCHOOL

DETERMINANT	INDICATOR	SCORE	COMMENTS
Economic	**23.** Financial barriers? E.g. Lack of resources may limit the ability of some schools to afford proposed adaptation mechanisms. **[YES = 1; NO = 0]**	**0**	The school is funded by the government., as a result funding is limited.
Information and Skills	**24.** Information or cognitive barriers (individuals tend to prioritize the risks they face, focusing on those they consider – rightly or wrongly – to be the most significant to them at that point in time)? E.g. concern about one type of risk is heightened while worry about other risks decreases; lack of experience of climate-related events inhibits adequate responses. **[YES = 1; NO = 0]**	**0**	In general, individuals tend to prioritize the risks they face, focusing on those they consider – rightly or wrongly – to be the most significant to them at that point in time. The other hazards identified in Section 4.1 should be reviewed and assessed to determine their relevance for this school.
	TOTAL	**13**	**MODERATE**

5.1 DESCRIPTION OF STRUCTURE

The investigation consisted of a visual review of the exterior and interior elements such as walls, slab, columns and beams as well as a general walk-through to examine the existing cracks and other defects which may exist. The results of the building condition assessment are presented below.

NAME OF SCHOOL:	TUCKER CLARKE PRIMARY SCHOOL
SCHOOL ADDRESS:	Newton Basseterre, St. George
TOTAL NUMBER OF BUILDINGS:	Six (6)
SPECIAL HAZARD RISK:	Flooding
GENERAL COMMENTS:	Buildings are in generally good condition. However, repairs and retrofit are recommended to as well as some flood mitigation interventions.

	BUILDING 1, 2 & 3	BUILDING 4 & 5	BUILDING 6
Number of Storeys per Building:	**1**	**1**	**1**
Floor Type:	**Description:** reinforced concrete. **Observation:** Floor slab in generally good condition with some spalling concrete at some areas.	**Description:** reinforced concrete. **Observation:** Floor slab in generally good condition with some spalling concrete at some areas.	**Description:** reinforced concrete. **Observation:** Floor slab in generally good condition.
Wall/ Partition Type:	**Description:** Reinforced masonry in fair condition.	**Description:** Reinforced masonry in fair condition.	**Description:** Reinforced masonry in fair condition.
Roof Structure:	**Description:** Reinforced concrete roof slab and beam in generally good condition.	**Description:** Reinforced concrete roof slab and beam in generally good condition.	**Description:** Reinforced concrete roof slab and beam in generally good condition.
Roof Covering:	**Description:** Structural Steel and Timber in generally fair condition.	**Description:** Timber in generally fair condition.	**Description:** Timber in generally fair condition.
Repairs/ Retrofitting Conducted:	**None**	**None**	**None**
Is there Disabled Access/ Special Needs Access to the Building?	**None**	**None**	**None**
Approx. Age of Each Building	**More than 40 years**	**More than 20 years**	**More than 20 years**
Building Use	**Classrooms, Administration**	**Classrooms**	**Toilets**
Overall Condition	**Fair**	**Fair**	**Fair**

5.1.1 SITE OBSERVATIONS / DISCUSSION

EXTERIOR

WALLS
There were some signs of water ingress through the external walls that may be porous, and the affected areas can be corrected by re-plastering of defective areas.

SLAB & BEAMS
Slab and beams were found to be in generally good condition with some isolated areas of spalling concrete.

COLUMNS
Columns were found to be in fair condition generally.

INTERIOR

WALLS
Interior walls were mainly masonry which were in fair condition.

WINDOWS
Several broken windows were observed the timely repairs of which will be critical in order to ensure that the building envelope is not compromised during an extreme wind event.

DOORS
Doors were all timber in conditions varying from good to poor. The problems were broken or corroded ironmongery (fastenings) and for which the timely repairs will be critical in order to ensure that the building envelope is not compromised during an extreme wind event.

GENERAL CONDITION
The summary of the main observations is as follows:

1. Historically, the issue of water ingress is normally not associated with structural assessments, however in recent times a direct link between water ingress and structural deterioration has been established. Generally, water ingress through inadequate seals around windows are doors as well as wall flashing need to be addressed. Water ingress around windows was identified as the main defect to be addressed.
2. There is also the need to repair roof and roof drainage as there are signs of deterioration, crude repairs and in some cases leaks.
3. There were some signs of water ingress through the external walls that may be porous and the affected areas can be corrected by re-plastering of defective areas.

6. VULNERABILITY ASSESSMENT

The final step in the vulnerability assessment process is to combine the findings of exposure and adaptability to determine how and where the school is vulnerable. It is important to note that the vulnerability assessment does not remain static, it can improve or worsen with time. Changes can occur within the school, such as implementation of preparedness activities, and/or new threats may emerge. These can all influence the school's overall vulnerability.

Tucker Clarke Primary School because of its coastal location, has inherent characteristics that exacerbate the degree of exposure to natural hazards, climate change and variability, has been classified as having an overall **moderate** exposure (Table 4.2). The analysis of the adaptive capacity (TABLE 5.2) revealed that while the school may have some barriers and limitations, their capacity to adjust to change (induced by the hazards to which they are exposed), moderate potential damages, take advantage of opportunities, and/or to cope with the consequences is **moderate**. While the administration has taken active measures towards disaster management and the physical plant of the school has not been structurally compromised, there are additional strategies that the school can employ to improve their adaptive capacity, however these may come at significant cost (presented in Section 8). As the school is government funded, this may further constrain the school's capacity to adapt. As such, Tucker Clarke Primary School can be characterised as having **moderate** vulnerability.

7. SUMMARY RECOMMENDATIONS

Based on the observations, there is no immediate concern about the structural integrity of the buildings. Once the remedial works are undertaken the structural integrity and useful life of the buildings should be greatly enhanced.

KEY STRENGTHS:

- The school has a disaster management plan in place. Some aspects of the plan are tested by conducting drills.
- The school has emergency supplies/warning systems. At the time of the assessment a new alert system was recently purchased.
- There are a few persons on staff who have been trained in first aid. The school also utilizes the nearest health centre in the event of emergencies.
- A teacher has been identified as the safety coordinator and has been trained in aspects of disaster management and health and safety.
- There is a visitor sign in policy in place. Security cameras are also present.
- First aid kits and fire extinguishers are present and accessible.
- Children are overseen by staff during play/break time.
- The school indicated that they raise funds to do various projects. For example, funds were raised to replace glass windows which were damaged by vandalism.
- Awareness has been increased with regards to recycling. However, this is not yet practiced on a wide scale at the school.
- A school garden is in place. The principal indicated that he would also like to see the school re-landscaped.

AREAS FOR IMPROVEMENT:

- Due to its location along the coast, the school is affected by sea spray. A lot of the infrastructure has rusted/corroded over time e.g. roof guttering, chain link fencing, etc.
- The damaged perimeter wall needs to be repaired. At the time of the assessment, the damaged chain link fencing was slated to be repaired.
- The school has had issues of vandalism in the past. Although there are security cameras, they were not able to identify persons who came in and vandalized the school.
- The school is over 50 years old, there are observed cracks in the structure, corrosion, etc. Water damage was also observed on the ceiling.
- During the time of the assessment the grounds were dry and very dusty. The school reported that there are a lot of dust-related issues. One teacher in fact was on sick leave at the time as she was having challenges with the dust.
- The school recognizes that the frequency of emergency drills is an area for improvement, particularly due to the proximity to the sea, fuel storage facility and the highway. It was reported that there hadn't been any recently conducted drills, however the school had acquired a new, more powerful megaphone/warning system that would assist them in carrying out the drills.
- There are issues with pests, particularly cats, coming through "breeze"/stylized blocks. It is recommended that until those types of blocks can be replaced, that a screen be placed on the inside of the blocks to prevent the animals from entering the classroom. The teachers and students are also encouraged not to leave food in the classrooms to attract the pests.
- It was reported that there used to be wire mesh on the inside of the blocks, but this was corroded by sea spray. Therefore, a plastic or other kind of rust-free material is recommended.
- Dust and rain also comes through the breeze blocks, so the school is desirous of having them removed.
- There were observed noise issues as there is a lack of sound barriers between some of the classes.
- There was no playground equipment on the school property.
- The storage room needs to be properly maintained and organized.
- Rainwater harvesting is not practiced. This may be for various reasons such as low/infrequent rainfall, or the school has a constant water supply. However, having a source of back up water supply is critical during an event and also to assist in offsetting irrigation needs.

FIGURE 7.1: AREAS FOR IMPROVEMENT IDENTIFIED

8. COSTED ACTION / IMPROVEMENT PLAN

Table 8.1 summarizes the recommended improvements and budgets for capital expenditures (remedial works, repairs, retrofitting) identified by this report. Expenditures that are expected to be managed as part of normal operations are not shown. The budgets assume a prudent level of ongoing maintenance. It should be noted that costs excluded engineering indirect costs and any local taxes.

TABLE 8.1: COSTED ACTION / IMPROVEMENT PLAN

RECOMMENDATION	TASK	RESPONSIBLE PARTY	FUNDS REQUIRED ($EC)	TIMEFRAME SHORT-MEDIUM -LONG TERM	RESULT
Grounds and Facilities	Upgrade of storm drains to include additional flood protection from adjacent existing roadway	Ministry of Education in collaboration with Department of Works	120,000	Medium Term	Improved safety of Physical Plant
	Repair roof covering, ceiling and roof drains to current Building Code Standards		144,600	Medium Term	
	Upgrade of doors and windows to hurricane resistant standards		72,400	Short - Medium Term	
	Expand and upgrade toilet block to include renewal of septic tank and soakaway		196,500	Medium Term	
	Construct new water storage		120,000	Medium - Long Term	
	Electrical rewiring complete with new fixtures		210,500	Medium Term	
	Repair defective or damaged external and internal walls and slabs		122,800	Medium Term	
	Painting		88,800	Medium Term	
	Contingency		50,000		
TOTAL			**1,125,600**		

9. REFERENCES

Natural Hazard Mitigation Policy and Plan for The Federation of St Kitts & Nevis (undated), USAID and OAS

Nevis Disaster Management Department Website

The Caribsave Climate Change Risk Atlas (CCCRA) - Climate Change Risk Profile for St. Kitts (2012)

10. APPENDIX

10.1 SAFETY ASSESSMENT

TABLE 10.1: VITAL INFORMATION TABLE

NAME OF SCHOOL	TUCKER CLARKE PRIMARY SCHOOL
Type of school (Pre-school, primary, secondary, tertiary)	**PRIMARY**
Is facility private and public?	**PUBLIC**
Location	**PONDS PASTURE**
Name of Head Teacher or Principal	**LESLIE RICHARDSON**
Telephone	**(869) 465-2294**
Email	**tuckerclarkeprimary@moeskn.org**
Year building(s) constructed	**50 years**
How many buildings are contained on the school compound?	**6**
How many classrooms are within each school building?	**4**
What is the total school population?	**510**
Students	**Male: 224 Female: 225**
Teachers	**Male: 2 Female: 23**
Non-teaching staff	**Male: 4 Female: 22**
How many first aid kits are available for use?	**1**
How many fire extinguishers are installed throughout the buildings?	**3**
Was the school affected by any natural disaster in the past?	**YES**
If yes, what type of event was it and when did it occur?	**HURRICANE**
Were there any repairs as a result of the event?	**YES**
Is the school designated as an emergency shelter?	**NO**

10.1.1 SCHOOL SAFETY COMPLIANCE ASSESSMENT

TABLE 10.2: SCHOOL SAFETY ASSESSMENT SUMMARY

TUCKER CLARKE PRIMARY SCHOOL			
	SCORE	%	CRITICAL STANDARDS MET
Safety Assessment	271	63%	NO
Green Assessment	263	55%	NO

TABLE 10.3: SCHOOL SAFETY COMPLIANCE ASSESSMENT

	%	CRITICAL STANDARDS MET
Disaster Planning	82%	NO
Emergency Planning	58%	NO
Safety Admin	68%	-
Medical Emergencies	74%	NO
Physical Plant	59%	NO
Physical Safety	70%	-
Protection of the Person	30%	-
Hazardous chemicals and materials	29%	NO

10.2 GREEN ASSESSMENT

TABLE 10.4: GREEN ASSESSMENT SUMMARY SCORES

	%	CRITICAL STANDARDS MET
Sustainability Management	24%	NO
Natural Resources	48%	NO
Indoor Environment	75%	NO
Hazardous Chemicals and Materials	70%	-
Facility and Grounds Management	61%	NO
Food Service	73%	YES

10.3 PHOTOGRAPHS

- STEEL TRUSSES WITH TIMBER FALSE CEILING

- STEEL TRUSSES WITH TIMBER FALSE CEILING

- STEEL TRUSSES WITH TIMBER FALSE CEILING

- STEEL TRUSSES WITH TIMBER FALSE CEILING

- STEEL TRUSSES WITH TIMBER FALSE CEILING

- STEEL TRUSSES WITH TIMBER FALSE CEILING

- STEEL TRUSSES WITH TIMBER FALSE CEILING

- STORM DRAINS OUT FALL

- BLOCKED STORM DRAINS

- A/C UNITS INSTALLED FOR SPECIALISED ROOM

- EXTERIOR VIEW – TOILET BLOCK

- EXTERIOR VIEW – TOILET BLOCK

- INTERIOR VIEW – TOILET BLOCK

- INTERIOR VIEW – TOILET BLOCK

- STANCHION SUPPORTS IN NEED OF REPAIRS

- TOILET ROOF STRUCTURE OF TIMBER

- MORE RECENTLY BUILT CLASSROOM BLOCK

- REINFORCED CONCRETE COLUMNS AND BEAMS SUPPORTING LIGHTWEIGHT TIMBER ROOF STRUCTURE

REINFORCED CONCRETE COLUMNS AND BEAMS SUPPORTING LIGHTWEIGHT TIMBER ROOF STRUCTURE

REINFORCED CONCRETE COLUMNS AND BEAMS SUPPORTING LIGHTWEIGHT TIMBER ROOF STRUCTURE

RECENTLY REPAIRED HORIZONTAL CRACKS

RECENTLY REPAIRED HORIZONTAL CRACKS

MORE RECENT BLOCK WITH GLAZED WINDOWS AND CORRODED ROOF SHEETING

MORE RECENT BLOCK WITH GLAZED WINDOWS AND CORRODED ROOF SHEETING

- PETROLEUM STORAGE FACILITY ADJACENT TO SCHOOL

- PETROLEUM STORAGE FACILITY ADJACENT TO SCHOOL

- PETROLEUM STORAGE FACILITY ADJACENT TO SCHOOL

- FENCE WALL IN A STATE OF DISREPAIR

- HURRICANE STRAPS ANCHOR RAFTERS TO WALL

- HURRICANE STRAPS ANCHOR RAFTERS TO WALL

FLOOR SLAB
TO BE REPAIRED

EXPOSED
ELECTRICALS

ELECTRICAL PANEL
IN CLASSROOM

ELECTRICAL PANEL
IN CLASSROOM

LIGHTING IN NEW BLOCK
APPEARS ADEQUATE

LIGHTING IN NEW BLOCK
APPEARS ADEQUATE

- MAKESHIFT RAIN AND SUN SCREENS OVER VENT BLOCKS

- MAKESHIFT RAIN AND SUN SCREENS OVER VENT BLOCKS

- KITCHEN GARDEN FENCED FOR PROTECTION

- PEELING PAINT – INDICATIVE OF MOISTURE PENETRATION

- RECENT REPAIRS TO ROOF DRAIN

- BLOCK WITH 3 DIFFERENT TYPES OF OPENINGS: GLAZED WINDOWS, FIXED WOODEN LOUVERS AND CONCRETE VENT BLOCKS

- TYPICAL GABLE TYPE ROOF

- GATHERING / ASSEMBLY SPACE FLOODS IN HEAVY DOWNPOURS

- GATHERING / ASSEMBLY SPACE FLOODS IN HEAVY DOWNPOURS

10. APPENDIX 2: NATIONAL SAFE SCHOOL PROGRAMME COMMITTEE (NSSPC) MEMBERS

COUNTRY: ST. KITTS AND NEVIS

#	FIRST NAME	LAST NAME	GENDER	JOB TITLE	ORGANIZATION	CONTACT EMAIL	CONTACT PHONE NUMBER
1	Tricia	Esdaille	Female	Senior Assistant Secretary	Ministry of Education (MOE)	tricia.esdaille@moeskn.org	(869)-467-1406
2	Sylvester	Charles	Male	Education Officer	Ministry of Education (MOE)	sylvester.charles@moeskn.org	(869)-467-1486
3	Amanda	Edmead	Female	Education Officer	Ministry of Education (MOE)	amanda.edmead@moeskn.org	(869)-467-1508
4	Christopher	Herbert	Male	Director, EMIS	Ministry of Education (MOE) - EMIS	christopher.herbert@emisskn.org	(869)-467-1329
5	Timothy	Martin	Male	Fire Sub Station Officer	St. Kitts-Nevis Fire and Rescue Services (SNFNRS)	-	(869)-465-2515
6	Livingston	Pemberton	Male	Engineer	Public Works – St.Kitts	livipembo@hotmail.com	(869)-465-5100
7	Adriansen	Hendrickson	Male	Draftsman	Public Works – Nevis	adriansenh93@gmail.com	(869)-469-5521
8	Vesta	Southwell	Female	Public Relations Officer	National Emergency Management Agency (NEMA)	scorpio_vesta@yahoo.com	(869)-466-5100
9	Gracelyn	Elliott	Female	Community Liaison Officer	National Disaster Management Department (NDMD)	elliottgrace31@gmail.com	(869)-469-1423
10	Marissa	Carty	Female	Health Disaster Focal Point	Ministry of Health	marissacartynd@gmail.com	(869)-467-1283

COUNTRY: ST. KITTS AND NEVIS

#	FIRST NAME	LAST NAME	GENDER	JOB TITLE	ORGANIZATION	CONTACT EMAIL	CONTACT PHONE NUMBER
11	Patricia	Peets	Female	Disaster Coordinator	Red Cross	patriciafahie_2@hotmail.com	(869)-467-1486
12	Laurence	Richards	Male	Education Officer	Department of Education, Nevis	kinglearleo@yahoo.com	(869)-469-4651
13	Claricia	Stevens	Female	Deputy National Disaster Coordinator	National Emergency Management Agency (NEMA)	lady.langleystevens@gmail.com	(869)-465-5100
14	James	Stevens	Male	Inspector	Royal St. Kitts Nevis Police Force	jamesstephen70@yahoo.com	(869)-465-2241
15	Carl	Francis	Male	Engineer	Ministry of Education (MOE) – Project Planning	carl.francis@moeskn.org	(869)-467-1402
16	Carl	Greaux	Male	Inspector	Royal St. Kitts Nevis Police Force	greaux_jr@hotmail.com	(869)-465-2241
17	Andrea	Liddie	Female	Resource Teacher	Ministry of Education (MOE) – Early Childhood Development Unit	andre.liddie@moeskn.org	(869)-466-2810
18	Milton	Nisbett	Male	-	-	dockerstm@hotmail.com	-

10. APPENDIX 3: ORGANIZATIONS CONSULTED

St. Kitts and Nevis

- National Safe Schools Programme Committee Ministry of Education
- Project Planning Division, MOE
- St. Kitts and Nevis Association of Principals Ministry of Health
- Red Cross
- St. Kitts Teachers Union
- NEMA
- Early Childhood Development Unit
- St. Kitts Nevis Association of Persons with Disabilities Council Department of Physical Planning
- Nevis
  - Disaster Management Department
  - Physical Planning Dept
  - Public Works Dept
  - Public Health Dept
  - Water Department
  - Early Childhood Education Department
  - Nevis Teachers Union