CARIBBEAN Safe School Initiative CSSI

IMPLEMENTATION OF THE MODEL SAFE SCHOOL PROGRAMME IN THE CARIBBEAN

HAZARD RISK ASSESSMENT REPORT AND COSTED ACTION PLAN

KINGSTOWN PREPARATORY SCHOOL

ST. VINCENT AND THE GRENADINES

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

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SUBMITTED BY:
Environmental Solutions Limited

TO:
The Caribbean Disaster Emergency Management Agency Coordinating Unit

Hazard Risk Assessment Report and Costed Action Plan – Kingstown Preparatory School, St. Vincent and the Grenadines 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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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 **Kingstown Preparatory School** in St. Vincent and the Grenadines. The report forms a part of the second and fourth deliverables (D2 and D4) under this Consultancy and has been divided into six 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 Kingstown Preparatory School, located on the south coast of St. Vincent, was visited by the assessment team on Tuesday June 11, and then again on Friday June 14, 2019. The assessment 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 assessment are found in Appendix 1.

These deliverables have been prepared for the Project Implementing Agency, CDEMA, as well as the national focal point in St. Vincent and the Grenadines.

FIGURE 1.1: LOCATION MAP OF KINGSTOWN PREPARATORY SCHOOL, ST. VINCENT AND THE GRENADINES

Projection:St_Vincent_1945_British_West_Indies
Data Source:GIS Unit,
Physical Planning Unit
Map Creator:GIS Unit
Map Created:03.7.2019

Scale 1:1,000

0 0.01 0.02 0.04 Km

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 analyse the hazard vulnerability of **Kingstown Preparatory School in St. Vincent and the Grenadines** and to make recommendations to inform decision- making.

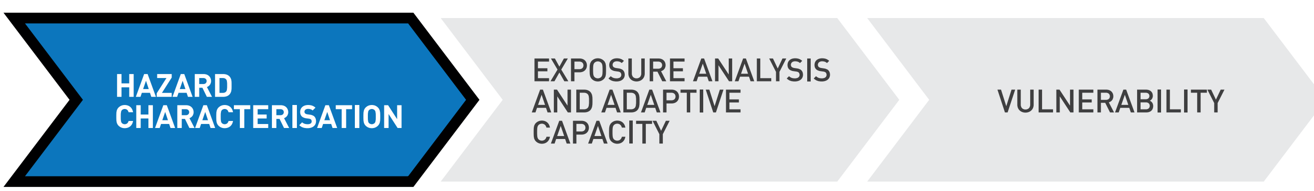
1.2 METHODOLOGY

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

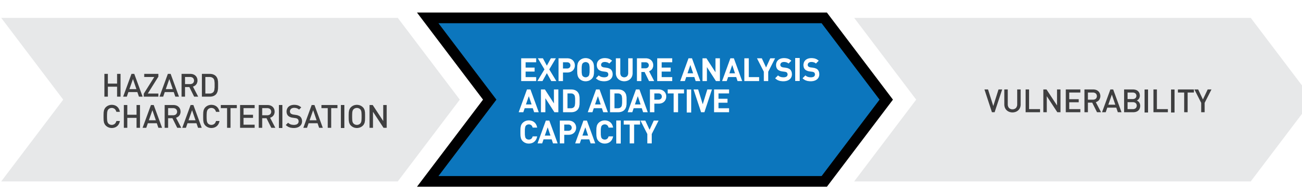


The first step involved the identification of the hazards (hydro-meteorological, geological, etc.) to which each of the countries, and by extension each school, may be exposed. To characterise hazards for each country, the Consultants conducted comprehensive desk research to acquire the necessary information, 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 Kingstown Preparatory School 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

St. Vincent and the Grenadines (SVG) is a collection of 32 islands and cays that are primarily of volcanic origin with steeply sloping topography (GFDRR, 2010a). Structures and the population of SVG are prone to moderate levels of a variety of hazards.

The islands lie towards the southern end of the main Atlantic hurricane belt, although high and steep topography increases peak winds and secondary hazards of rain and landslides. The low-lying Grenadines are exposed to storm surge and wave hazards. Earthquake hazards are moderate, but there are significant volcanic hazards from both the Soufrière volcano on St Vincent and from Kick 'Em Jenny in the southern Grenadines, which is also a potential tsunami source (CCRIF, 2013).

St Vincent and the Grenadines has limited economic diversity, with tourism important in the Grenadines where there is moderate exposure to wave and storm surge hazards. Bananas are the main export product from St Vincent, and all farming is prone to severe impact from high winds and heavy rain. Landslides commonly hamper communications on the island. Several volcanic eruptions in the past 2 centuries have killed many people and devastated areas in the north of the island.

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. Vincent and the Grenadines. These are:

- Hydro-meteorological hazards
  - Hurricanes and Tropical Storms
  - Flooding
  - Drought
  - Storm Surge
  - Landslide

- Geological hazards
  - Earthquake
  - Volcano
  - Tsunami

Based on a review of previously published reports, site visits and consultation with key stakeholders, the main hazards identified for St. Vincent and the Grenadines are presented below.

3.1 WIND

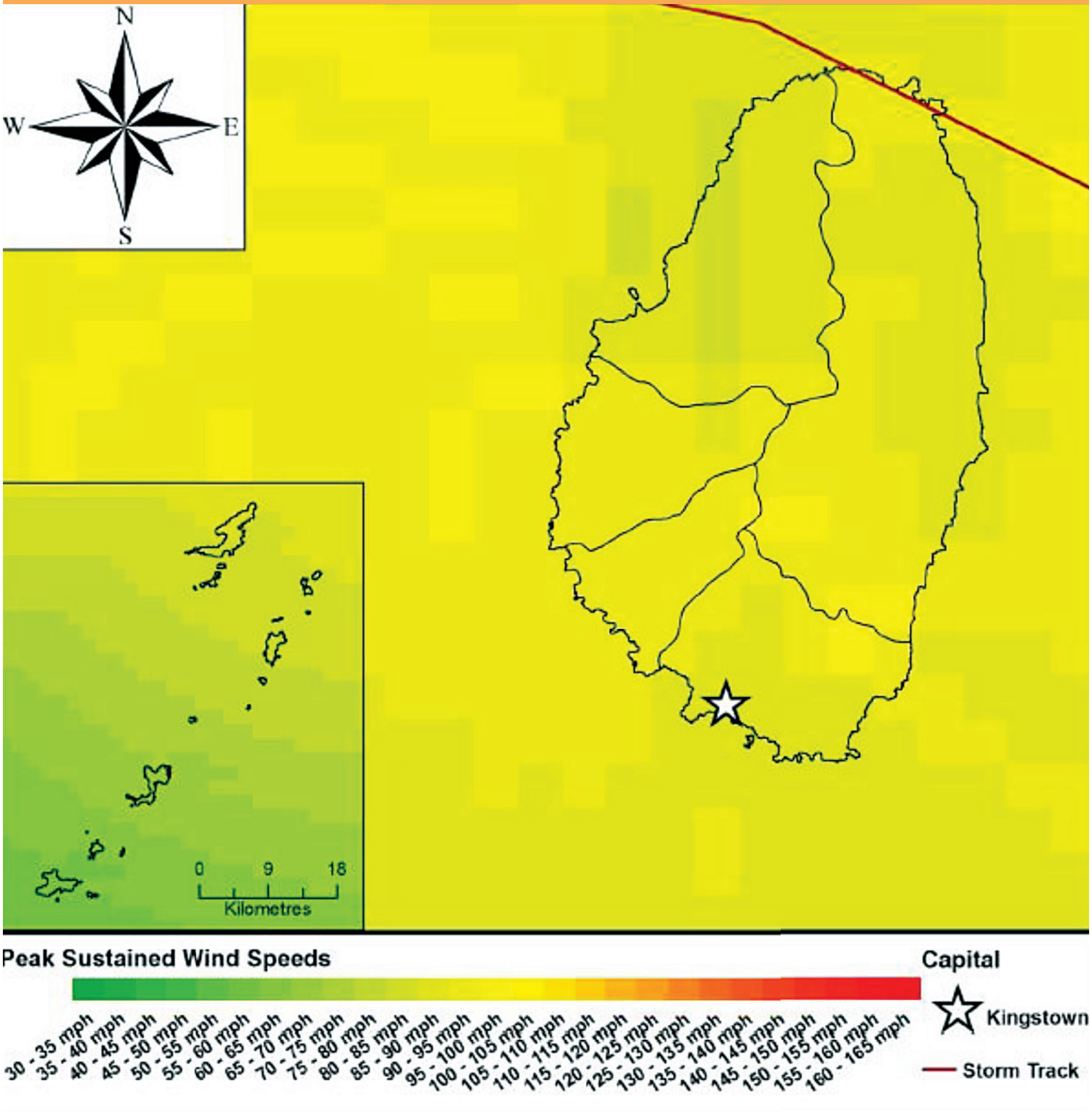
Although St Vincent lies quite far south in the Lesser Antilles, hurricanes are still common, and the rugged topography of the island and low-lying nature of the Grenadines makes the impact of even moderate hurricanes potentially serious. Hurricanes Janet (1955) and Allen (1980) both produced severe hurricane winds (greater than 110 mph) on St Vincent, although damage reports for these events are not available (CCRIF, 2013).

Below is a list of the tropical storms and hurricanes which affected SVG in the past 20 years (CARIBSAVE, 2012):

- Tropical Storm Chantal (August 17, 2001)
- Tropical Storm Jerry (October 8, 2001)
- Tropical Storm Lily (September 23, 2002)
- Tropical Storm Claudette (July 8, 2003)
- Hurricane Tomas (October 31, 2010)

More recently, hurricanes Matthew in 2016 and Irma and Maria in 2017 affected St. Vincent and the Grenadines. The most significant hurricane event on record for SVG was in 1898 (CCRIF, 2013).The second most significant event on record is Hurricane Tomas and its footprint map is shown in Figure 3.1 below.

FIGURE 3.1: PEAK SUSTAINED WINDS ASSOCIATED WITH HURRICANE TOMAS, 2010 (SOURCE: CCRIF, 2013)



3.2 STORM SURGE

Figure 3.2 shows the expected storm surge flood extent during a 100year storm event. Changes to the frequency or magnitude of storm surge experienced at coastal locations in SVG are likely to occur as a result of the combined effects of:

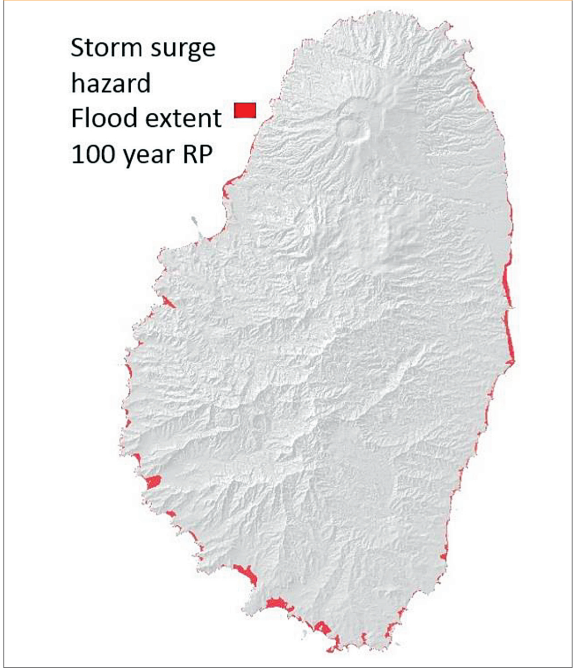
1. Increased mean sea level in the region, which raises the base sea level over which a given storm surge height is superimposed.

2. Changes in storm surge height, or frequency of occurrence, resulting from changes in the severity or frequency of storms.

3. Physical characteristics of the region (bathymetry and topography) which determine the sensitivity of the region to storm surge by influencing the height of the storm surge generated by a given storm.

Under a 1m SLR scenario, a 1 in 100-year storm surge event could cause severe damages to infrastructure and livelihood, since such an event could bring with it surges of 4.5 m and loss of 3% of the population and 7% of agricultural lands (CARIBSAVE, 2012). Under a mid-range rise scenario, capital costs of infrastructure and land losses could approach US $445 million in 2050. By 2080 that cost could increase to US $1,290 million. Also associated with SLR is an exacerbation of any tsunamis or sea waves that may result from an eruption of the active submarine volcano Kick 'em Jenny, which is located south of the Grenadines.

FIGURE 3.2: STORM SURGE HAZARD FLOOD EXTENT – 100 YEAR RETURN PERIOD (SOURCE:CHARIM -GEONODE.NET)

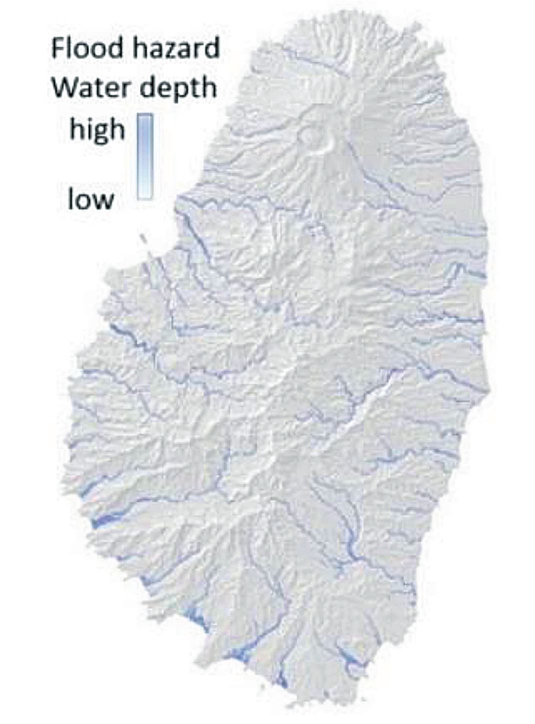


3.3 FLOODING

Recent examples of flood impact associated with heavy rainfall, tropical storms and hurricanes include Hurricane Tomas which affected the island at the beginning of November 2010, bringing heavy rains and high winds which caused flooding, loss and destruction to several buildings, agricultural plots, livestock and the natural landscape. Persons were displaced from their homes. The impact of the hurricane was exacerbated because most residents did not initially expect the system to affect the country and failed to prepare adequately (CARIBSAVE, 2012). Before most residents recovered fully from the impact of Hurricane Tomas, a severe flash flood occurred in April 2011 which caused rivers to overflow and landslides in the north-eastern section of St. Vincent.

Severe rains and high winds due to a low-level trough system during the period of December 23-25, 2013 caused floods and landslides in St. Vincent and the Grenadines. Nine deaths were reported and over five hundred persons affected, of which 237 were provided with aid. On Tuesday November 29, 2016, St. Vincent and the Grenadines was impacted by heavy rains, which resulted in flooding and landslides in several communities. Sandy Bay in the north-eastern area of St. Vincent was the most severely affected community. Figure 3.3 below maps the areas exposed to flood hazard.

FIGURE 3.3: FLOOD HAZARD MAP (SOURCE: CHARIM-GEONODE.NET)



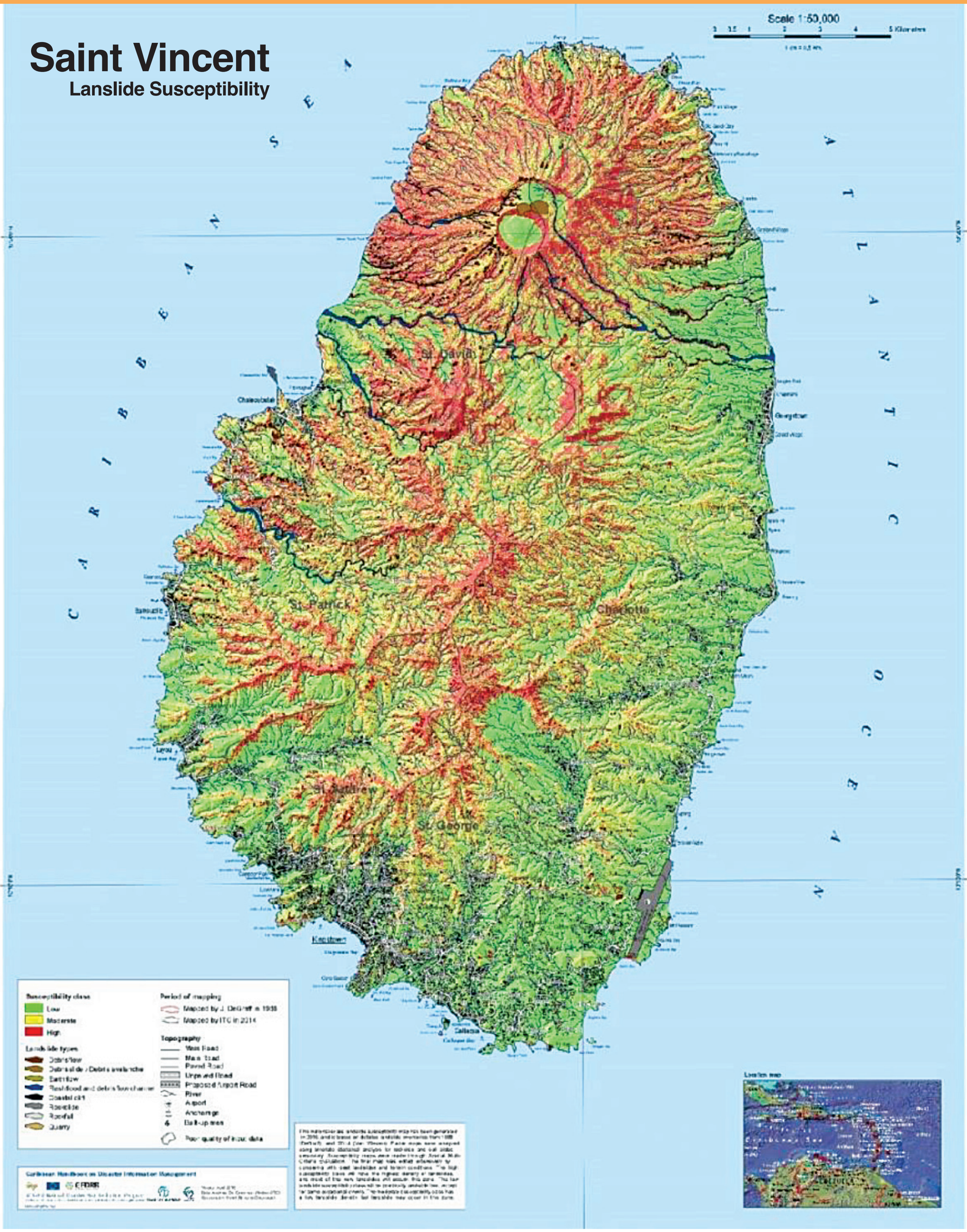
3.4 EARTHQUAKES

St Vincent and the Grenadines experiences two types of earthquakes: earthquakes associated with volcanic activity and earthquakes associated with tectonic activity. SVG lies in a relatively quiet zone of the Lesser Antilles island arc; earthquakes are more common to both the north and south. However, there are four instances of shaking intensity (MMI) of VII or VIII (potentially damaging) in the past 200 years, although actual damage reports for these events are not readily available. The last major volcanic eruptions in 1979 and 1902 produced earthquakes as well as more devastating explosions and pyroclastic flows in valleys around the north of the island (ESL, 2019).

3.5 LANDSLIDE

Several factors make St. Vincent susceptible to landslides (rockfalls and soil landslides). These include the island's steep topography, the geological nature of the island, soil and land cover (ESL, 2019). The steeper hill slopes are in the northern section of the island at the Soufriere Volcano. Landslide inventory and susceptibility has been well documented, studied and modelled. The most recent available susceptibility map is given in Figure 3.4.

FIGURE 3.4: LANDSLIDE SUSCEPTIBILITY MAP FOR ST. VINCENT (WESTEN, 2016)



3.6 DROUGHT

The island of St. Vincent is generally not considered to be water-stressed, with average annual rainfall ranging from 1,500 mm on the coast to 3,800 mm in the central mountains; in the Grenadines, by contrast, average annual rainfall is lower at around 1000 mm and severe water shortages are experienced (CARIBSAVE, 2013).

Prolonged dry spells and lack of rainfall have resulted in significantly lower stream flows on many of the major rivers in St. Vincent, particularly the Vermont/Buccament River and the Montreal system of rivers and springs. Such shortages have affected the production of treated water at some of the main water sources and forced the CWSA to initiate a number of measures to ensure a satisfactory and equitable distribution of water to the residents of SVG (CWSA, n.d.). While the CWSA does have some small reservoirs for everyday distribution, these provide only limited security in cases of emergency (CEHI, 2001).

The Grenadines Islands depend on water from St. Vincent. In Union Island water is barged across, but the quality is often poor due to contamination from dirty water-transportation vessels (CEHI, 2007).

During the period 2009-2010, the Caribbean experienced one of the most severe droughts in recent years. In St. Vincent and the Grenadines, the rains ceased in October 2009 and did not return until July 2010. Considered the worst drought to affect the country since 1987, the Central Water and Sewage Authority (CWSA) was required to shut off the water supply in some parts of the country at various times of the day and activate emergency response teams. There is no available drought hazard map for St. Vincent and the Grenadines.

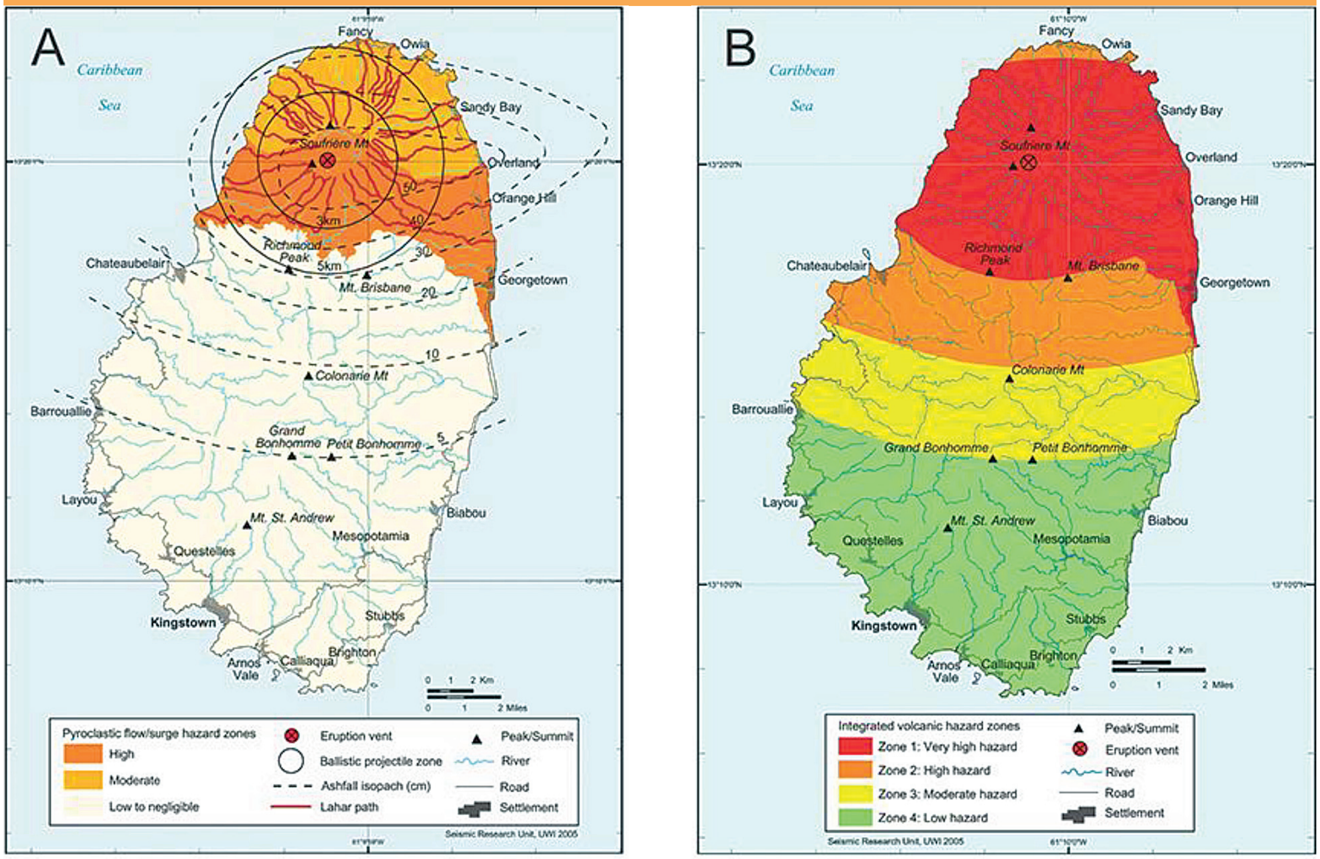
3.7 VOLCANIC ACTIVITY

The island of St. Vincent is divided into four volcanic geological regions: (i) the South-East Volcanics, (ii) the Grand Bonhamme Volcanic Centre, (iii) the Morne Garu Volcanic Centre and (iv) the La Soufriere Volcanic Centre (Robertson, 2003). La Soufriere is the only active volcano on the island and is situated in the northern section of the island (Figure 3.5 **Error! Reference source not found.**) (UWI Seismic Unit, 2011).

The La Soufriere exhibits two types of volcanic eruptions: (i) an explosive type eruption that ejects large volumes of material and is generally associated with frequent strong earthquakes and (ii) a non-explosive (effusive) type eruption that ejects smaller amounts of material and is generally not associated with earthquakes (UWI Seismic Unit, 2011).

Historically, the volcano has erupted on average once every 100 years, with the last recorded event occurring in 1979 (UWI Seismic Unit, 2011).

FIGURE 3.5: VOLCANIC HAZARD MAP (A) AND INTEGRATED VOLCANIC HAZARD ZONES (B) FOR THE SOUFRIERE VOLCANO, ST, VINCENT (LINDSAY, ROBERTSON, SHEPHED, & ALI, 2005).



3.8 TSUNAMIS

There is the potential for tsunamis in SVG as a result of geological hazards. An eruption from the submarine volcano south of Grenada, Kick-'em-Jenny, could cause tsunami waves in SVG (GFDRR, 2010a). Many villages are located in low lying coastal areas where waves would have damaging impacts. A main roadway connecting the east and west coasts of St. Vincent is also located very close to the coast and is exposed to impacts from wave action and storm surge (GFDRR, 2010a).

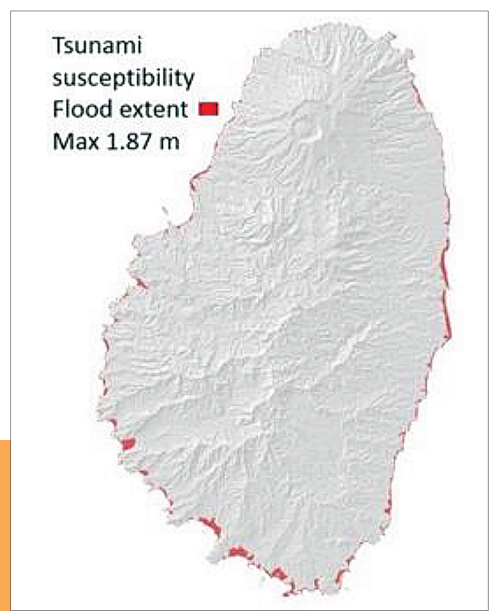


FIGURE 3.6: TSUNAMI SUSCEPTIBILITY FLOOD EXTENT MAP (SOURCE: CHARIM-GEONODE.NET)

3.9 CLIMATE PROJECTIONS

St. Vincent & the Grenadines (SVG) is already experiencing some of the effects of climate variability and change through damage from severe weather systems and other extreme events, as well as more subtle changes in temperature and rainfall patterns (CARIBSAVE, 2012).

Detailed climate modelling projections for St. Vincent & the Grenadines are shown below:

TABLE 3.1: SUMMARY CLIMATE PROJECTIONS FOR SVG (SOURCE: CARIBSAVE, 2012)

CLIMATE VARIABLES	CLIMATE MODELLING PROJECTIONS
An **increase** in average atmospheric **temperature**	Regional Climate Model (RCM) projections indicate an increase spanning 2.4-3.1 °C in mean annual temperatures by the 2080s in the higher emissions scenario.
Reduced average annual **rainfall**	General Circulation Model (GCM) projections of rainfall span both overall increases and decreases, ranging from -34 to +6 mm per month by the 2080s across 3 scenarios. Most projections tend toward decreases. Both RCM projections indicate large decreases in total annual rainfall (-30% when driven by HadCM3 boundary conditions and -22% based on ECHAM4).
Increased Sea Surface Temperatures (SST)	GCM projections indicate increases in SST throughout the year. Projected increases range from +0.9 °C and +3.0 °C by the 2080s across all three emissions scenarios.
The potential for an increase in the intensity of tropical storms.	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.

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

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 hazard. 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 school's 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 school is 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	

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.

1 FEMA risk assessment doc

TABLE 4.2: EXPOSURE ANALYSIS – KINGSTOWN PREPARATORY SCHOOL, ST. VINCENT AND THE GRENADINES

HAZARD	COMMENTS	FREQUENCY		WARNING TIME		SEVERITY		DEGREE OF EXPOSURE	
		RANKING	SCORE	RANKING	SCORE	RANKING	SCORE	RANKING	AVERAGE SCORE
Hurricanes and Tropical Storms/Wind	Although St Vincent lies quite far south in the Lesser Antilles, hurricanes are still common.	**Likely**	**2**	**More than 24 hours warning**	**0**	**Catastrophic**	**3**	**MODERATE**	**1.67**
Flooding (from hurricanes, storms or extreme rainfall events)	Kingstown Prep falls within the flash-flood hazard zone characterized as "very high" (see Figure 4.2).	**Highly likely**	**3**	**6-12 hrs**	**2**	**Limited**	**1**	**HIGH**	**2**
Drought	Drought is a hazard that impacts the entire island, particularly the islands of the Grenadines. No hazard map available.	**Likely**	**2**	**More than 24 hours warning**	**0**	**Limited**	**1**	**MODERATE**	**1**
Storm Surge	School is located in an at- risk coastal zone.	**Likely**	**2**	**12 to 24 hours**	**1**	**Critical**	**2**	**MODERATE**	**1.67**
Landslide	School located in Low landslide susceptibility zone (see Figure 4.3).	**Unlikely**	**0**	**Minimal (or no warning)**	**3**	**Negligible**	**0**	**LOW**	**0.67**
Earthquake	SVG lies in a relatively quiet zone of the Lesser Antilles island arc; earthquakes are more common to both the north and south. However, there are four instances of shaking intensity (MMI) of VII or VIII (potentially damaging) in the past 200 years.	**Possible**	**1**	**Minimal (or no warning)**	**3**	**Catastrophic**	**3**	**HIGH**	**2.33**
Volcano	Based on map (Figure 3.5), school is located in the Low hazard zone for volcanic activity, therefore severity of an event is anticipated to be limited.	**Possible**	**1**	**More than 24 hours warning**	**0**	**Limited**	**1**	**LOW**	**0.67**
Tsunamis	School is located in an at-risk coastal zone.	**Possible**	**1**	**Minimal (or no warning)**	**3**	**Critical**	**2**	**HIGH**	**2**
						OVERALL EXPOSURE INDEX		**MODERATE**	**12.01**

Based on the above, the overall multi-hazard exposure was determined to be **moderate**.

While the development of the modern building code has progressed, many of the schools assessed 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.

Kingstown Prep was assessed against its National Building Code which is common for the Organisation of Eastern Caribbean States (OECS) territory. The most serious area of deficiency was the roof covering which appeared to have been left incomplete after attempted repairs. There were also missing or broken windows which will put the entire building at risk in an extreme wind event. The main timber roof structure was found to be in good condition.

Flood mitigation was identified as an absolute 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. 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.

FIGURE 4.1: IMAGE OF ROOF STRUCTURE AND COVERING AT KINGSTOWN PREP

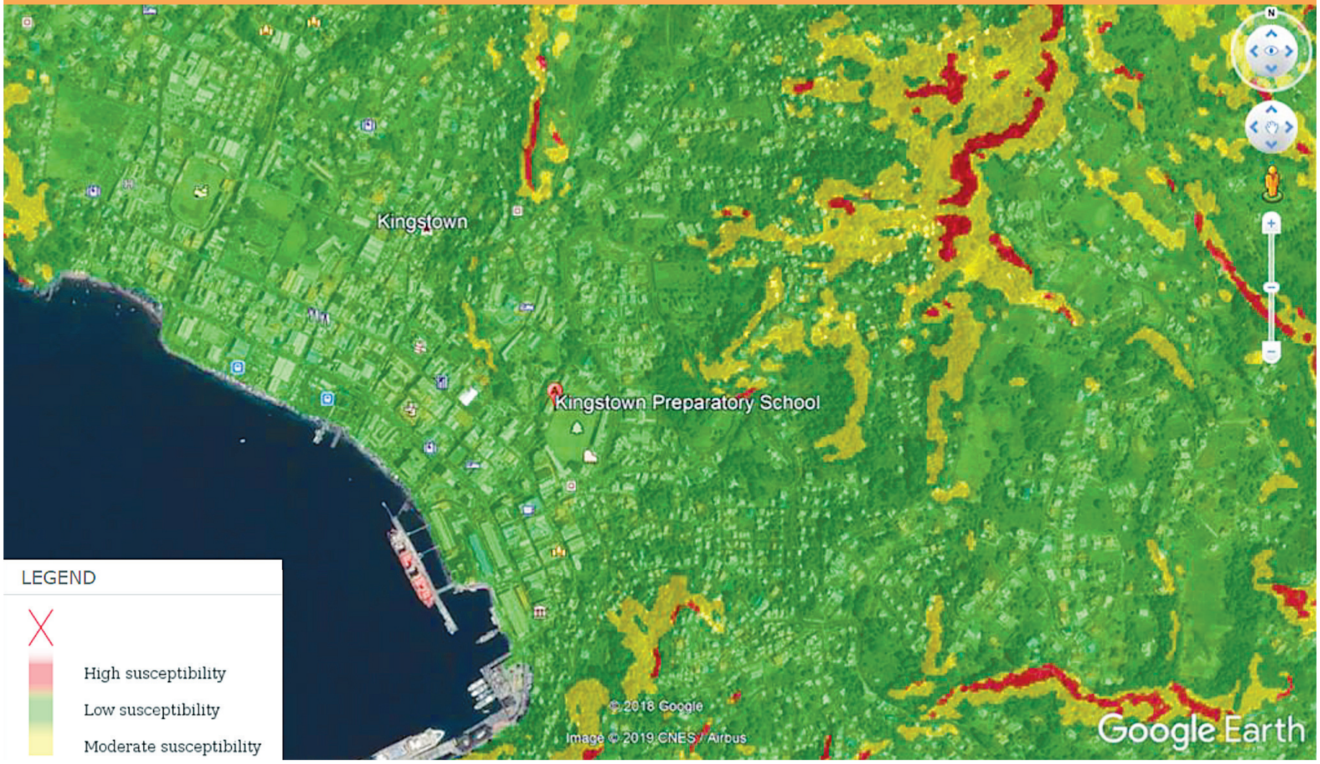
Kingston Prep can be described as being confined between a playing field and a major waterway or non- perennial river. The school has not however identified this as a cause for concern.

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.

FIGURE 4.2: FLOOD HAZARD EXPOSURE – KINGSTOWN PREPARATORY SCHOOL

FIGURE 4.3: LANDSLIDE HAZARD EXPOSURE – KINGSTOWN PREPARATORY SCHOOL



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

At present the school's Safety/Disaster Plan only factors in natural hazards. It is recommended that the school determine which of the above are priority hazards to be included in the revised 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 KINGSTOWN PREPARATORY 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	The country is a signatory to the Antigua and Barbuda Declaration on School Safety in the Caribbean. SVG has a draft Climate Change Policy, Strategy and Implementation Plan. Though not specific to just the education sector, the National Emergency and Disaster Management Act, 2006 establishes the National Emergency Management Organisation (NEMO) as an agency of the Government and mandates the development of a National Disaster Management Plan. Also Goal #4 of the St. Vincent and the Grenadines National Economic and Social Development Plan 2013-2025 is: Improving Physical Infrastructure, Preserving the Environment and Building Resilience to Climate Change.
	2. Have there been additions to the curriculum that integrate climate change/disaster preparedness/emergency management? **[YES = 1; NO = 0]**	1	SVG is also working on a DRR and CCM/A curriculum to be integrated into forms 1 to 3 of secondary schools.
	3. Is an updated emergency management or disaster management plan in place? **[YES = 1; NO = 0]**	1	School committee formed this year, with intention to develop the plan more formally. However, a document does exist.
	4. Do the plans address priority hazards based on previous assessment(s)? **[YES = 1; NO = 0]**	1	Applies only to natural hazards.
	5. Is there a designated environmental/health & safety officer, emergency response team or related position/team? **[YES = 1; NO = 0]**	1	Disaster committee has been formed.

TABLE 5.2: SUMMARY OF ADAPTIVE CAPACITY ANALYSIS FOR KINGSTOWN PREPARATORY SCHOOL

DETERMINANT	INDICATOR	SCORE	COMMENTS
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]	0	
	7. Are all teachers and school staff assigned roles in the overall response, pre-, during and post-hazard event? [YES = 1; NO = 0]	0	
	8. Have staff received training in emergency/disaster management? [YES = 1; NO = 0]	1	Some staff are trained in CPR (but not throughout the school).
	9. Are there regular drills with staff, parents and students? [YES = 1; NO = 0]	1	
	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	
Infrastructure and Technology	**11.** Does the school have reserve water storage with adequate supply for at least 3 days? [YES = 1; NO = 0]	0	There is reportedly no water storage on compound.
	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	
	13. Does the school actively harvest rainwater? [YES = 1; NO = 0]	0	
	14. Does the school employ energy conservation/efficiency mechanisms? [YES = 1; NO = 0]	0	

TABLE 5.2: SUMMARY OF ADAPTIVE CAPACITY ANALYSIS FOR KINGSTOWN PREPARATORY SCHOOL

DETERMINANT	INDICATOR	SCORE	COMMENTS
Infrastructure and Technology	**15.** Is there back up electrical power? **[YES = 1; NO = 0]**	0	
	16. Does the school employ other green practices? E.g. recycling, greenhouse/garden, green policy etc? **[YES = 1; NO = 0]**	1	School has an environment programme and initiatives such as 'Recycle Fridays'.
	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 structure (in its present state) is in very fair condition and is in urgent need of a major intervention as outlined in the costed action plan in Section 8. The infrastructure required for disaster planning was assessed and was found to be generally lacking. The critical items included public address system, water storage, stand-by electrical generator and the number and condition of the bathrooms.
	18. Have school buildings/plant been repaired or retrofitted to the building code? **[YES = 1; NO = 0]**	0	
ARE THERE ANY EXISTING BARRIERS TO ADAPTATION?			
Physical/ Ecological/ Climate	**19.** Physical or ecological limits? E.g. landscape/physical location limits range of adaptation options to priority hazards? **[YES = 1; NO = 0]**	0	School located in high risk zone for flash floods (Figure 4.2). Kingstown Prep is also nearby the coast and is susceptible to tsunami and storm surge impacts. Based on the building condition assessment, the buildings are particularly exposed to both wind and flooding.
	20. Is climate change likely to exacerbate any of the current hazards? **[YES = 1; NO = 0]**	0	
	21. Is the rate of climate change likely to outpace adaptation efforts? **[YES = 1; NO = 0]**	0	

TABLE 5.2: SUMMARY OF ADAPTIVE CAPACITY ANALYSIS FOR KINGSTOWN PREPARATORY SCHOOL

DETERMINANT	INDICATOR	SCORE	COMMENTS
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**	
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**	School is government-owned.
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**	
OVERALL ADAPTIVE CAPACITY INDEX		**10**	**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:	KINGSTOWN PREPARATORY SCHOOL
SCHOOL ADDRESS:	Kingstown
TOTAL NUMBER OF BUILDINGS:	Three (3)
NUMBER OF STOREYS PER BUILDING:	One (1) one-storey and Two (2) two-storey buildings

	BUILDINGS 1 AND 2 (IDENTICAL)	BUILDING 3
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.
Wall / Partition Type:	**Description:** Reinforced masonry and Timber for some internal walls. **Observation:** Masonry in generally good condition with signs of termite infestation in timber members.	**Description:** Reinforced masonry and Timber for some internal walls. **Observation:** Masonry in generally good condition.
Roof Structure:	**Description:** Structural Steel and Timber. **Observation:** Roof structure in generally good condition.	**Description:** Timber. **Observation:** Roof structure in generally poor condition.
Roof Covering:	**Description:** Aluzinc sheets. **Observation:** Roof covering has a wide range of defects including missing components, missing fasteners and other signs of deteriorations.	**Description:** Aluzinc sheets. **Observation:** Roof covering has a wide range of defects including missing components, missing fasteners and other signs of deteriorations.
Repairs / Retrofitting Conducted:	**None**	**None**
Is there Disabled Access / Special Needs Access to the Building?	**None**	**None**
Approx. Age of Each Building	**More than 40 years**	**More than 40 years**
Building Use	**Classrooms, Office, Kitchen**	**Toilets**
Overall Condition	**Fair**	**Poor**
Special Hazards Risk	**Flooding**	
General Comments	**Buildings are in generally fair condition. Major repairs and retrofit are recommended as well as some flood mitigation interventions.**	

5.1.1 SITE OBSERVATIONS / DISCUSSION

The below presents a summary of the observations made of the physical plant:

EXTERIOR

WALLS

Generally, there are signs of water ingress through the external walls that may be porous, and the affected areas can be corrected by re-plastering.

SLAB & BEAMS

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

COLUMNS

Columns were found to be in good condition generally.

INTERIOR

WALLS

Interior walls were both masonry and timber. Masonry walls were in good condition while some of the timber panels were found with termite infestation.

WINDOWS

Several broken and termite infested windows and doors were also observed the timely repairs of which will be critical in order to ensure that the building envelope is not compromised.

DOORS

Doors were all of timber in conditions varying from good to poor. The problems ranged from termite infestation to broken or missing ironmongery.

GENERAL CONDITION

A summary of the 4 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 and 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 and in some cases leaks.
3. Generally, there are signs of water ingress through the external walls that may be porous, and the affected areas can be corrected by re-plastering.
4. Several broken and termite infested windows and doors were also observed, the timely repairs of which will be critical in order to ensure that the building envelope is not compromised.

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.

Kingstown Prep School, because of its coastal location, has inherent characteristics that exacerbate the degree of exposure to natural hazards, climate change and variability, and 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 climate change (including climate variability and extremes), 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 ability to adapt to climate change. As such, Kingstown Prep School can be characterised as **moderately vulnerable** to natural hazards, climate change and variability.

7. SUMMARY FINDINGS

Based on the observations, there is need for urgent intervention with respect to the state of the roof covering which will directly impact the structural integrity of the building. It is recommended that all of the other observed defects be remedied promptly in order to preserve the structural integrity and functionality of the facility.

KEY STRENGTHS:

- Many of the school's areas of weakness have been previously identified and are in the process of being addressed.
- Establishment of a committee demonstrates dedication to ensuring that school safety is a priority (including focus on 'greening' of school).
- School perimeter is well secured (with intact fence and gates that are shut during school time).
- On-site security personnel were very visible.

AREAS FOR IMPROVEMENT:

- Committee in place to ensure draft plans, policies and guidelines are developed and implemented; need to ensure that these are followed through.
- School assessments/walk-throughs and audits in key areas such as water usage are required.
- On-site drainage of water (rainwater, wastewater from sinks, etc.) need to be addressed as they currently run as open channels through communal areas the children walk through.
- Infrastructural upgrades as discussed in Section 5.1 – re-plaster external walls where there are signs of water ingress, repair roof and roof drainage, repair/replace windows and doors with inadequate seal and termite damage.
- Although design of building is well thought out for ventilation (presence of open blocks etc.); effort needs to be taken to prevent free thoroughfare of pests (e.g. fixing of broken or missing windows/mesh on blocks).
- Need for improved use of personal protective equipment (PPE).

8. COSTED ACTION/IMPROVEMENT PLAN

TABLE 8.1: COSTED ACTION/IMPROVEMENT PLAN

RECOMMENDATION	TASK	RESPONSIBLE PARTY	FUNDS REQUIRED	TIMEFRAME SHORT-MEDIUM -LONG TERM	RESULT
Ensure draft plans, policies and guidelines are in developed and implemented	Update draft plans, policies and guidelines.	Principal and/or Safety Committee in collaboration with National Disaster Office and MOE.	None	Short	Enhanced Emergency /Disaster Plan based on identified risks.
	Conduct School assessments /walk- throughs and audits in key areas such as water usage.	Principal and/or Safety Committee.	None	Short	
On-site drainage of water (rainwater, wastewater from sinks, etc.) need to be addressed	Upgrade of storm drains to include additional flood protection from adjacent existing waterway.	Ministry of Education in collaboration with Department of Works.	EC$40,000	Medium	Improved drainage.

TABLE 8.1: COSTED ACTION/IMPROVEMENT PLAN

RECOMMENDATION	TASK	RESPONSIBLE PARTY	FUNDS REQUIRED	TIMEFRAME SHORT-MEDIUM -LONG TERM	RESULT
Other Infrastructural upgrades	Replace roof covering, ceiling and roof drains with current Building Code Standards.	Ministry of Education in collaboration with Department of Works. *some smaller projects can be undertaken by school/community /private organization as a special project.	EC$256,000	Medium	Increased building resilience; improved school plant.
	Upgrade doors and windows to hurricane resistant standards.		EC$76,500	Medium	
	Expand and upgrade toilet block to include new septic tank and soakaway.		EC$190,000	Long	
	Construct new water storage.		EC$84,000	Medium - Long	
	Complete electrical re- wiring.		EC$75,000	Medium	
	Replace defective internal wall.		EC$154,000	Short	
	Painting.		EC$98,000	Short - Medium	
Effort needs to be taken to prevent free thoroughfare of pests (e.g. fixing of broken or missing windows/mesh on blocks)	Meshing of rooms with decorative/breeze blocks.	Principal and/or Safety Committee in collaboration with MOE.	EC$5,500	Short - Medium	Minimize pest nuisance.
Need for improved use of personal protective equipment (PPE)	Obtain additional PPE, gloves, lab coats, and dust masks, non-slip shoes.	Principal and/or Safety Committee in collaboration with MOE.	EC$3,000	Short	Improved personal safety.
	Contingency		EC$50,000		
TOTAL			**$1,032,000**		

9. REFERENCES

Baseline Assessment Report, Environmental & Social Impact Assessment, Sandy Bay Coastal Protection Project - Ministry of Transport, Works, Urban Development and Local Government Kingstown, St Vincent, Smith Warner International in Association with Environmental Solutions Ltd. 2019.

Caribbean Handbook on Risk Information Management, World Bank.

St. Vincent and the Grenadines Country Risk Profile. Caribbean Catastrophe Risk Insurance Facility (CCRIF), 2013.

THE CARIBSAVE CLIMATE CHANGE RISK ATLAS (CCCRA) Climate Change Risk Profile for Saint Vincent and the Grenadines, 2012.

10. APPENDIX 1

10.1 SAFETY ASSESSMENT

TABLE 10.1: VITAL INFORMATION TABLE

NAME OF SCHOOL	KINGSTOWN PREPARATORY SCHOOL
Type of school (Pre-school, Primary, Secondary, Tertiary)	PRIMARY
Is facility private and public?	PUBLIC
Location	KINGSTOWN, SAINT VINCENT
Name of Head Teacher or Principal	MRS. SUSAN FOSTER-ABRAHAM
Telephone	(784(457-1624
Email	kingsprep@outlook.com
Year building(s) constructed	1948
Buildings contained on the school compound	4
Number of classrooms	27
Total school population	900
Students	Male: 428 Female: 472
Teachers	Male: 8 Female: 47
Non-teaching Staff	Male: 0 Female: 10
Number of first aid kits available	2
Number of fire extinguishers throughout the buildings?	6
Natural disaster in the past	NOT TO PRINCIPAL'S KNOWLEDGE (only in job for 2 years)
The type of event and the time it occur	SOME FLOODING
Repairs as a result of the event	NO
School designated as an emergency shelter	NO

TABLE 10.2: SCHOOL SAFETY ASSESSMENT SUMMARY - KINGSTOWN PREPARATORY SCHOOL			
CHECKLIST	SCORE	%	CRITICAL STANDARDS MET
Safety Assessment	186	43%	NO
Green Assessment	212	45%	NO

TABLE 10.3: SAFETY ASSESSMENT SUMMARY SCORES		
SAFETY ASSESSMENT THEME	SCORE (%)	CRITICAL STANDARDS MET
Disaster Planning	33%	NO
Emergency Planning	38%	NO
Safety Admin	10%	
Medical Emergencies	62%	YES
Physical Plant	63%	YES
Physical Safety	27%	
Protection of the Person	15%	
Hazardous chemicals and materials	71%	YES

10.2 GREEN ASSESSMENT

TABLE 10.4: GREEN ASSESSMENT SUMMARY SCORES		
GREEN ASSESSMENT THEME	SCORE (%)	CRITICAL STANDARDS MET
Sustainability Management	15%	NO
Natural Resources	36%	NO
Indoor Environment	57%	NO
Hazardous Chemicals and Materials	43%	
Facility and Grounds Management	57%	YES
Food Service	86%	YES

10.3 PHOTOGRAPHS

- MAIN ENTRANCE
- FRONT ELEVATION
- FRONT ELEVATION
- ELEVATIONS
- ELEVATIONS
- LOUVRE GLASS AND WOODEN WINDOWS

LOUVRE GLASS AND WOODEN WINDOWS

WALKWAY AND STORM DRAIN

KITCHEN – BROKEN TILES

KITCHEN – BROKEN TILES

FIRE HYDRANT IN KITCHEN

WIRE MESH AND WOODEN WINDOWS

ROOF OF TOILET BLOCK

TOILET BLOCK

TOILET BLOCK

TOILET BLOCK

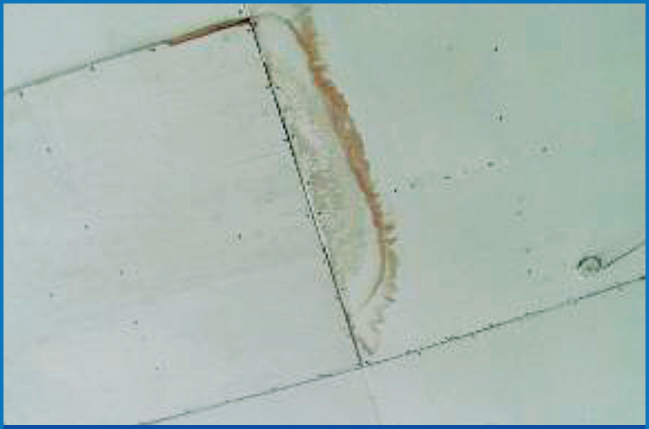
TOILET BLOCK

TOILET BLOCK

TOILET BLOCK

STORM DRAINS

INTERNAL HALLWAY



LEAKING ROOF

LEAKING ROOF

LEAKING ROOF

■ SUNSHADE

■ SUNSHADE

■ SCIENCE LABORATORY

■ BROKEN FLOOR TILES

■ BROKEN WINDOW

■ BUILDING'S EXTENSION

■ ROTTED ROOF SHEET

■ ROOF WITH LEAKS

■ ROOF WITH LEAKS

■ VENT BLOCKS, TIMBER PARTITIONS

■ TERMITE INFESTATION

■ TERMITE INFESTATION

CORRODED FRAMES

CEILING IN DISREPAIR