CARIBBEAN Safe School Initiative CSSI

IMPLEMENTATION OF THE MODEL SAFE SCHOOL PROGRAMME IN THE CARIBBEAN

HAZARD RISK ASSESSMENT REPORT AND COSTED ACTION PLAN

DOMINICA COMMUNITY HIGH SCHOOL

DOMINICA

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 – Dominica Community High School, Dominica 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 **Dominica Community High School, one of ten (10) schools assessed in Dominica**. 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.

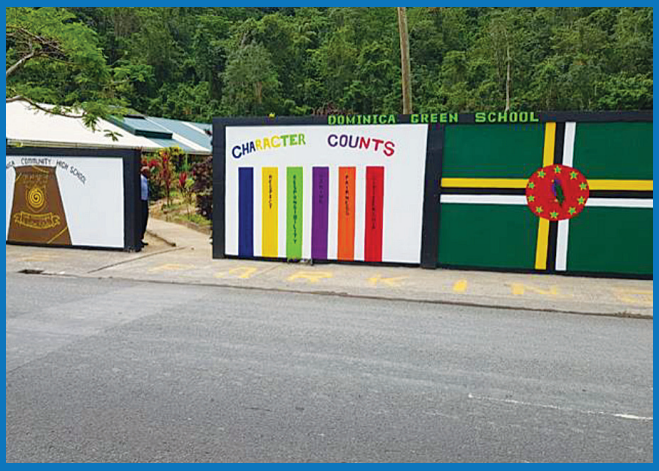
The assessments were conducted during the period May 15 to 31, 2019 (Table 1-1) on regular school days, and as such the consultants were able to assess the schools during normal operational hours. All the schools assessed are designated emergency shelters that may be used during a hurricane or other hazard event.

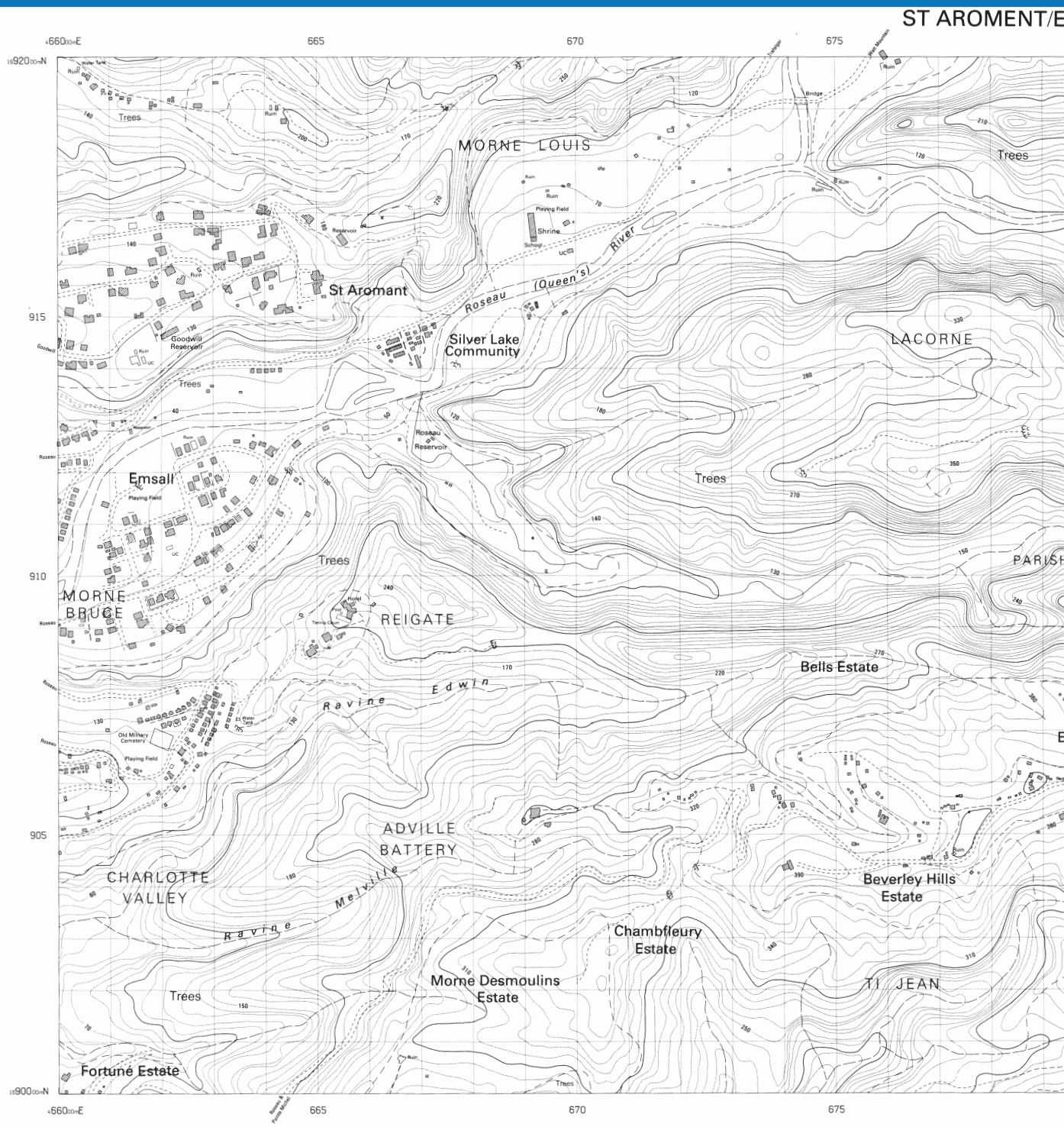
TABLE 1.1: LIST OF SCHOOLS ASSESSED IN DOMINICA

SCHOOL NAME	DATE VISITED
Grandbay Primary	May 15 & 17, 2019
Pierre Charles Secondary	May 15 & 17, 2019
Dominica Community High School	May 15 & 17, 2019
Campbell Primary	May 16 & 17, 2019
Massacre (Canefield) Primary	May 16 & 17, 2019
Castle Bruce Secondary	May 17, 2019
Belles Primary	May 17, 2019
Colihaut Primary	May 17 & 31, 2019
Morne Prosper Primary	May 17 & 31, 2019
Isaiah Thomas Secondary	May 17 & 31, 2019

The team of assessors visited Dominica Community High School on May 15 and 17, 2019. The school is located in the parish of St. George (Figure 1-1) and is bordered to the south by the road and the Layou River. The Dominica Community High School is a non-government self-help project established in 1978. Additional general information on the school and the scores based on the MSSP Assessment Toolkit Checklists can be found in the Appendix.

FIGURE 1.1: DOMINICA COMMUNITY HIGH SCHOOL





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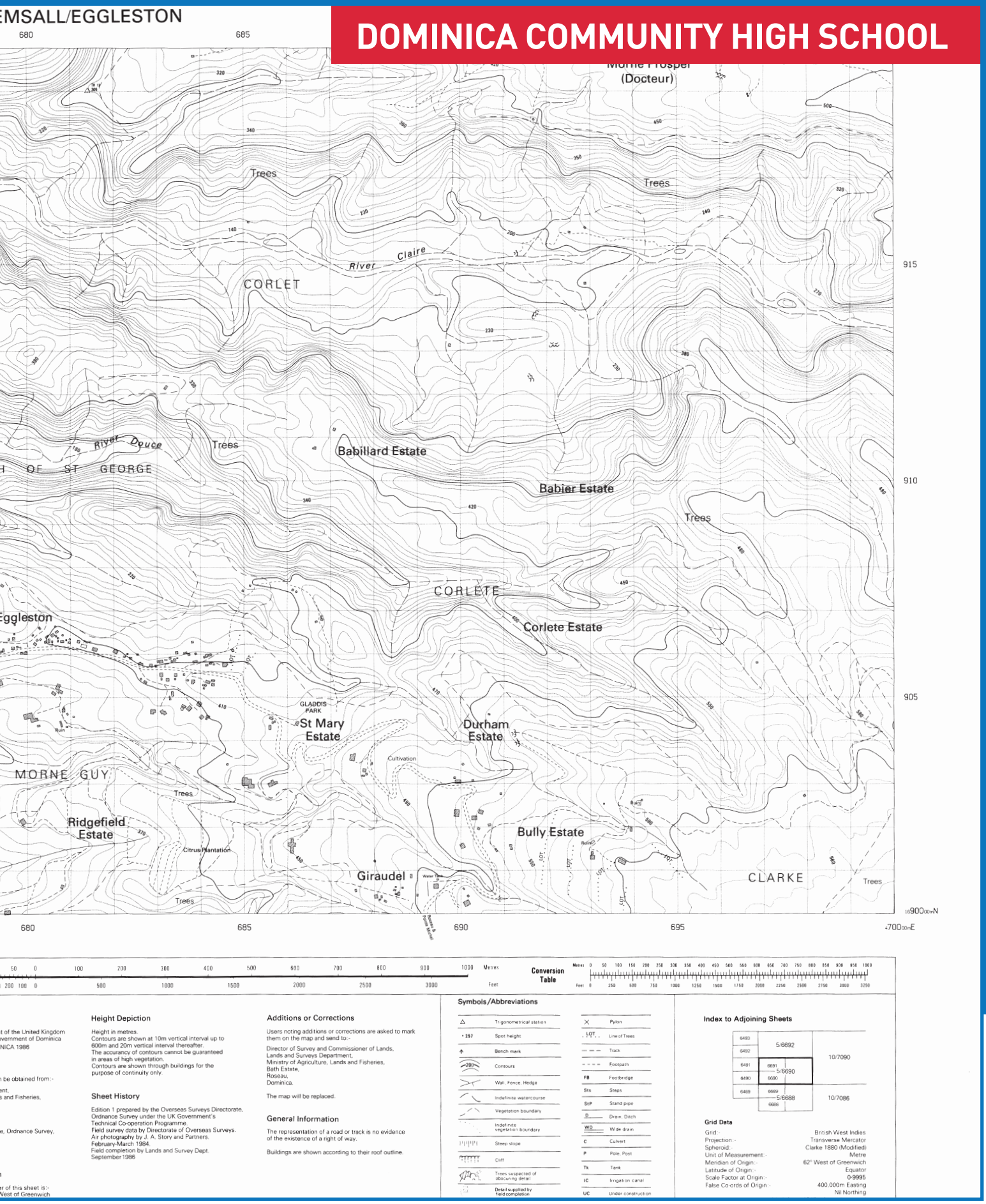
DOMINICA COMMUNITY HIGH SCHOOL



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 assessment report is to identify and analyse the hazard vulnerability of **Dominica Community High School** and to make recommendations to inform decision-making.

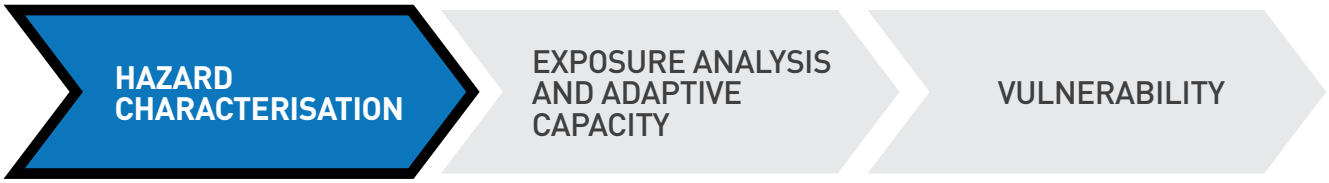
1.2 METHODOLOGY

The vulnerability assessment tool (VAT) draws on the methodology developed by the National Oceanic and Atmospheric Association (NOAA). Some adaptations were made to consider 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

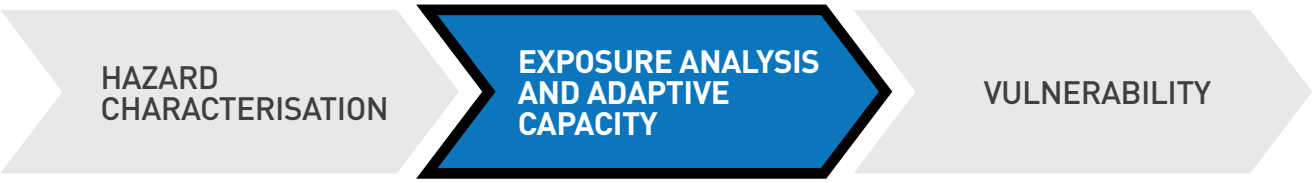


The first step involved the identification of the hazards (hydro-meteorological, geological, etc.) to which each of the countries, and by extension each school, may be exposed. To characterise hazards for each country, the Consultants conducted comprehensive desk research and stakeholder consultations with key agencies and various stakeholder groups 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.

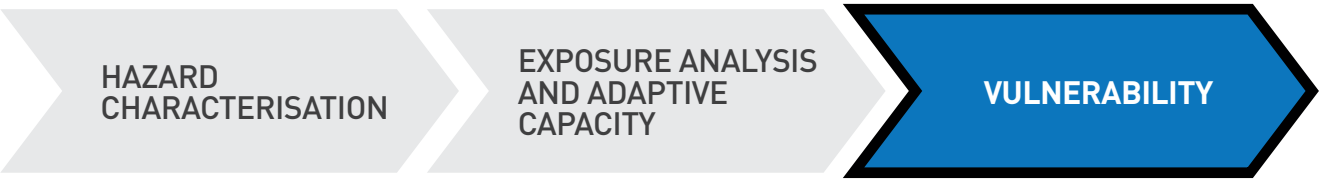
Good condition:
- It is intact, structurally sound and performing its intended purpose.
- There are a few or no cosmetic imperfections.
- It needs no repairs and only minor or routine maintenance.

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 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 can address them fully and in a timely manner.

2. COUNTRY RISK PROFILE / SITUATIONAL CONTEXT

Dominica, officially the Commonwealth of Dominica, is the largest, most northerly island of the Windward Islands in the Easter Caribbean Sea, located northwest of Martinique and south-southeast of Guadeloupe. The island occupies an area of 750.6 km^2 (48km long and 24km wide) and is characterised as mountainous and volcanic island with steep terrain features. The cone of highest point on the island, Morne Diablotin (1,447m), dominates the topography of the north. A chain of mountains including Morne Tros Piton (1,424m), Morne Micotrin, Morne Anglais and Morne Plat Pays covers the southern half of the island (ECU 2001). The more gently sloping areas of flat land are restricted to the northeastern coast, in river valleys and in the Belle's Wet Area in the centre of the island (ECU 2000). The island is known as "The Nature Island" of the Caribbean, hosting several perennial streams, rivers, waterfalls and lakes including the world's second largest hot spring, Boiling Lake.

The population of Dominica is estimated to be 71,293 (2011 census) and has experienced net zero growth or declines in population over the past three decades due largely to emigration. steeply dissected, mountainous terrain found in Dominica's centre means most population centres are located along mountain tops and stream valleys, with nearly 90% of the population found in settlements along the coastal fringe of the island (GFDRR 2010). Approximately 67% of the population resides in urban areas (ECLAC 2010) and it estimated that 28% lived in the capital Roseau, 5% in Portsmouth and 4% in Marigot (Poverty Research Unit, 2006), all coastal settlements.

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 Dominica:

- 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 the key stakeholders at each school and the Ministry of Education, Dominica is at risk to impacts from all of the above hazards and is ranked as one of the 10 most susceptible countries in the Caribbean relative to total number of events (CRED 2000). The steep slopes of the volcanic hills pose the risk of landslides and volcanic eruption, and with 90% of the population living within 5 km of a live volcano, that risk is quite extreme (GFDRR, 2010). Dominica has 9 of the 16 active volcanoes in the Caribbean making the risk of volcanic event quite serious (Kairi Consultants Ltd, 2010). In addition, the tropical climatic conditions on the island mean that heavy rainfall and flooding is possible any time of year. Heavy rainfall associated with tropical storms and hurricanes can, and has, also caused significant flooding damage and high wind damage. Additionally, storm surge and coastal erosion pose significant threats to the dense, developed coastal areas, not only during hurricanes but also from regular storm activity. This is compounded by the poor roads and high frequency of landslides which can and has isolated persons living in major centres.

3.1 HYDROMETEOROLOGICAL

3.1.1 TROPICAL STORMS AND HURRICANES

Dominica is in the Caribbean, one of the most disaster-prone regions in the world. Since 1950, over 13 named tropical storms have passed within 40km of the island. Since 1979, Dominica has been impacted by over 15 tropical systems including 12 hurricanes. Given that most of Dominica's population and infrastructure are located along the coast, they have experienced severe damage and losses in the past from strong winds and high seas (ODI 09/2001). Several hurricanes are notable as they required humanitarian assistance for recovery:

- **Hurricane Maria (September 2017):** a category 5 hurricane, Maria produced wind speeds of 160mph (with higher gusts), intense storm surges and rainfall and overflowing of rivers that resulted in 31 people deaths, 37 missing people and major destruction of critical infrastructure. It is estimated that over 90% of the population was directly affected; up to four months following the hurricane, approximately 450 people were still in shelters, 15% of children has not yet returned to school and 90% of the population remained without electricity.

- **Tropical Storm Erika (August 2015):** Dominica suffered major infrastructural damage in the wake of Erika, primarily related to transportation, households and agriculture. The island experienced heavy rainfall of up to 850mm in less than 12 hours. The mountainous terrain, excessive moisture and ground saturation from previous rains caused river basins to overflow and triggered flooding and landslides that displaced thousands and killed up to 30 people (CDEMA 30/08/2015).

- **Tropical Storm Ophelia (September 2011):** the country experienced more than 80mm of rainfall in six hours, damaging the towns of Massacre, Canefield, Mahaut, Cochrane, Coulibistrie and Campbell most severely (Dom hazard profile).

- **Hurricane David (August 1979):** this category 5 storm produced heavy rainfall and major landslides causing the most damage in areas in the southwest and the capital of Roseau. Most of the country's population was displaced following the hurricane as more than 80% of homes on the island were destroyed.

TABLE 3.1: HISTORICAL HURRICANES DIRECTLY AFFECTING DOMINICA SINCE 1979 (SOURCE: ACAPS 2018)

NAME OF EVENT	YEAR	AFFECTED	DEATHS
Maria	2017	65,000	31
Erika	2015	15,951	13
Ophelia	2011	240	0
Dean	2007	7,530	2
Marilyn and Luis	1995	5,001	2
Hugo	1899	710	0
David and Frederick	1979	72,100	40

FIGURE 3.1: TRACKS OF TROPICAL CYCLONES MOVING WITHIN 150KM OF DOMINICA SINCE 1851 (SOURCE: CCRIF 2013)

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

Following the passage of Hurricane Maria in 2017, the school experienced significant looting. In interviews with school officials, the physical security of the school compound remains a challenge for e.g. they have had components of their solar panel system stolen. Additionally, the proximity to the river and the frequency of flooding could result in issues with mould and pests (and associated vector-borne illnesses).

At the time of the assessment, persons interviewed advised that teachers were not trained in first aid and had limited emergency management materials (first aid kits, fire extinguishers etc.); this is a concern as it limits their ability to manage risks. Representatives also discussed the psychosomatic challenges facing students as well as teachers following the Hurricane Maria, as persons remain traumatized and uncertain.

It is recommended that the school determine which of the above are priority hazards to be included in the revised EMP.

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 the school may be exposed to (Section 3), the analysis below seeks to determine (among other things):

- 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 (Table 5-1) 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. It considers all elements of Comprehensive Disaster Management (Preparedness, Mitigation, Response and Recovery)[2]. The analysis is presented in Table 5-2.

2 https://www.cdema.org/cdm

TABLE 5.1: DETERMINANTS OF ADAPTIVE CAPACITY USED IN SCHOOL ASSESSMENT (ADAPTED FROM SMIT ET AL. 2001)

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
Natural/Ecological /Climate	■ Elements of the natural, physical or ecological environment of a region may enhance or limit the possibilities for adaptation (including projected climate change impacts)

TABLE 5.2: SUMMARY OF ADAPTIVE CAPACITY ANALYSIS FOR DOMINICA COMMUNITY HIGH SCHOOL (2019)

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]**	0	Dominica has addressed climate adaptation at the policy level through the preparation of a national climate change adaptation strategy, and through the "Economics of Climate Adaptation Initiative", the Mainstreaming Adaptation to Climate Change (MACC) Project, and the Pilot Programme for Climate Resilience (PPCR). While education is not listed as a vulnerable or priority sector with regards to climate change in the Second National Communication. Dominica has requested support from the OECS to increase climate change resilience of the education sector through a regional approach. The reason is that there is a priority to reduce the impacts of climate change-related extreme weather events, including the disruption of education services and high costs of damages, in their national plans. Dominica is also signatory to the Antigua and Barbuda Declaration on School Safety and is in the process of implementing the Model Safe School Programme.
	2. Have there been additions to the curriculum that integrate climate change/disaster preparedness/emergency management? **[YES = 1; NO = 0]**	0	At the time of this assessment, there was no curriculum integration.
	3. Is an updated emergency management or disaster management plan in place? **[YES = 1; NO = 0]**	1	Yes, there is a plan in place however it needs to be updated.
	4. Do the plans address priority hazards based on previous assessment(s)? **[YES = 1; NO = 0]**	1	Yes, the plan addresses priority hazards.
	5. Is there a designated environmental/health & safety officer, emergency response team or related position/team? **[YES = 1; NO = 0]**	0	At the time of this assessment, there was no officer or related position in place.
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	At the time of this assessment, no walkthroughs had been conducted.

TABLE 5.2: SUMMARY OF ADAPTIVE CAPACITY ANALYSIS FOR DOMINICA COMMUNITY HIGH SCHOOL (2019)

DETERMINANT	INDICATOR	SCORE	COMMENTS
Information and Skills	**7.** Are all teachers and school staff assigned roles in the overall response, pre-, during and post-hazard event? **[YES = 1; NO = 0]**	1	Yes, all persons are assigned roles and responsibilities for disaster/emergency management.
	8. Have staff received training in emergency/disaster management? **[YES = 1; NO = 0]**	0	At the time of this assessment, teachers were not trained.
	9. Are there regular drills with staff, parents and students? **[YES = 1; NO = 0]**	1	Yes, the school conducts drills and simulation exercises with teachers, staff and students.
	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]**	0	While there is a strong culture of risk management at the school, teachers are not fully trained and first aid materials may be limited.
Infrastructure and Technology	**11.** Does the school have reserve water storage with adequate supply for at least 3 days? **[YES = 1; NO = 0]**	1	Yes, there is sufficient stored.
	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	No, there are no initiatives underway or planned.
	13. Does the school actively harvest rainwater? **[YES = 1; NO = 0]**	1	Yes, the school harvest rainwater.
	14. Does the school employ energy conservation/efficiency mechanisms? **[YES = 1; NO = 0]**	1	Yes, the school has solar panels in place.

TABLE 5.2: SUMMARY OF ADAPTIVE CAPACITY ANALYSIS FOR DOMINICA COMMUNITY HIGH SCHOOL (2019)

DETERMINANT	INDICATOR	SCORE	COMMENTS
Infrastructure and Technology	**15.** Is there back up electrical power? **[YES = 1; NO = 0]**	0	This is an area for improvement as there is no back up electrical power.
	16. Does the school employ other green practices? E.g. recycling, greenhouse/garden, green policy etc? **[YES = 1; NO = 0]**	1	Yes, the school can be described as a green school. They have a garden and subsistence farm.
	17. Can the building withstand the impacts of a hazard in its current condition? **[YES = 1; NO = 0]**	1	Yes, there are no immediate concerns about the structural integrity of the building. However, flood mitigation measures are needed.
	18. Have school buildings/plant been repaired or retrofitted to the building code? **[YES = 1; NO = 0]**	0	No repairs have been done. Repairs and retrofit are recommended in Costed Action Plan (Section 8).
ARE THERE ANY EXISTING BARRIERS TO ADAPTATION?			
Natural / 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	Yes, proximity to the Layou River limits adaptation options.
	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	Dominica has been cited as one of six Caribbean countries listed in the world's top-40 climate "hot spots". The impacts of certain hazards are already being experienced islandwide.

TABLE 5.2: SUMMARY OF ADAPTIVE CAPACITY ANALYSIS FOR DOMINICA COMMUNITY HIGH SCHOOL (2019)

DETERMINANT	INDICATOR	SCORE	COMMENTS
Infrastructure and Technology	**22.** Technological limits? Availability of technological options for adaptation e.g. warning systems/ impacts of disruptions on any technology-based emergency communication resources; electronic data storage. **[YES = 1; NO = 0]**	**0**	There are no technological adaptations in place.
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 partially funded by the government. Funding is a considerable limitation for the school.
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]**	**1**	Based on interviews with school officials, there is an acknowledgement of the range of natural and man-made hazards facing the school. They are cognizant of the climate-related hazards.
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.

Based on our observations, the building is in generally good condition. However, repairs and retrofit are recommended as well as landslide and flood mitigation interventions. The primary and secondary structural members are in a satisfactory condition with no visible signs of distress or imminent failure.

TABLE 5.3: RESULTS OF BUILDING CONDITION ASSESSMENT (MAY 2019)

	BUILDING 1
Number of Storeys per Building:	**1**
Floor Type:	**Description:** Reinforced concrete. **Observation:** Floor slab in generally good condition with some spalling concrete at some areas.
Wall / Partition Type:	**Description:** Reinforced masonry in good condition.
Roof Structure:	**Description:** Timber in generally good condition.
Roof Covering:	**Description:** Reinforced concrete roof slab with waterproofing membrane in generally fair condition.
Repairs / Retrofitting Conducted:	**None**
Is there Disabled Access/ Special Needs Access to the Building?	**None**
Approx. Age of Each Building	**More than 20 years**
Building Use	**Classrooms, Toilets**
Overall Condition	**Good**

5.1.1 SITE OBSERVATIONS / DISCUSSION

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

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
Found to be in generally good condition with some isolated areas of spalling concrete.

COLUMNS
Found to be in good condition generally.

INTERIOR

WALLS
Interior walls were of both masonry and timber. Masonry walls were in good condition as were the timber panels.

WINDOWS
No broke windows observed.

DOORS
Doors were all of timber in good condition.

Photographs obtained during our inspection are provided in the Appendix.

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.

The proximity of the Dominica Community High School to the Layou River means it has inherent characteristics that exacerbate the degree of exposure and risk to natural hazards, climate change and variability, and has been classified as having an overall **moderate exposure**. The analysis of the adaptive capacity revealed that the school has several barriers and limitations, as such their capacity to adjust to change (induced by the hazards to which they are exposed), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences is **moderate**. 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 only partially funded by the government, this may further constrain the school's ability to adapt. As such, the Dominica Community High School can be characterised as having **moderate to high vulnerability**.

7. SUMMARY FINDINGS

Overall, the persons interviewed at Dominica Community High School had a good understanding of the hazards that need to be addressed at the school as priority as well as the limitations; there is a strong culture of safety and accountability. The school administration has been able to successfully build relationships among the parent and local community to implement several initiatives that improve the safety of the school population e.g. painting a pedestrian crossing in front of the school gate. In addition, the school has adopted several green/sustainability practices including greenhouses, subsistence farming, rainwater harvesting and solar panels, that can be used as an example for replication across other schools. The D.C.H.S is the only high school using solar energy in the commonwealth of Dominica. The school is establishing itself as going green by implementing two environment-friendly projects; generating renewable energy by solar power, as well as the provision of an alternate energy source of recycling of waste material, example grass and dry leaves.

Our team's assessment suggests that maintenance is a priority task for the school administration which is an integral component of disaster management and risk reduction. The critical areas for improvement included ensuring teachers are trained in first aid and are equipped with the necessary materials, safety signage and storm water drainage upgrades.

Note: The number of students broken down by sex is included in Appendix A.

KEY STRENGTHS:
Dominica Community High School possesses some of the key elements to ensure quality education for children:

- The school has an up-to-date emergency management plan (EMP) that addresses some of the priority safety hazards. Teachers and staff are all assigned respective roles and responsibilities and have been trained on the plan. Evacuation routes and assembly areas have also been defined in the plan.
- The school employs exemplary sustainability practices which foster a culture of awareness to the impacts of climate change.
- In speaking with students, they were aware to report any hazards to teachers/administration.
- The principal maintains a list of repairs to be done and priority issues for safety.
- The school has a designated area for storage of chemicals and hazardous materials/tools should be considered.

AREAS FOR IMPROVEMENT:

- The School Safety Plan needs to critically examine information about the student population (such as number of students broken down by age group and sex), as the number, age and ability of the students can make a significant difference in the event of an emergency.
- There is a need to have teachers trained in first aid, fire suppression or related aspects of emergency management.
- The laboratories are not adequately equipped with personal protective equipment e.g. lab coats, latex gloves, respirators.
- Safety signage around the school was limited.
- Access for persons with disabilities (PWD) is limited throughout the school, particularly for those who are wheelchair bound. This is of critical importance as the school is a designated emergency shelter.
- Some repairs and retrofitting required to the physical plant to ensure safety before or during a hazard event, particularly for flood mitigation.

FIGURE 7.1: IMAGES SHOWING SUSTAINABILITY HIGHLIGHTS AT DOMINICA COMMUNITY HIGH SCHOOL (MAY 2019)

FIGURE 7.2: IMAGES HIGHLIGHTING (L) SHALLOW STORM WATER DRAINAGE (R) LAYOU RIVER WITHIN 100M OF SCHOOL COMPOUND (MAY 2019)

Section 8 – Improvement Plan and Costed Action Plan provided specific actions and timelines for recommendations on improving the overall safety of the school. Additional selected photographs can be found in the Appendix.

8. IMPROVEMENT PLAN AND COSTED ACTION PLAN

The table below summarizes our opinion of 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. Opinions of cost also excluded any local taxes.

The proposed estimated cost to undertake the remedial work is **Four Hundred and Seventy-Nine Thousand, Eight Hundred Dollars Eastern Caribbean Currency (XCD$479,800.00)**.

TABLE 8.1: IMPROVEMENT PLAN AND COSTED ACTION PLAN FOR DOMINICA COMMUNITY HIGH SCHOOL (MAY 2019)

RECOMMENDATION	TASK	RESPONSIBLE PARTY	FUNDS REQUIRED	TIMEFRAME SHORT-MEDIUM -LONG TERM	RESULT
Emergency Planning and Management	Erect safety signage around the school premises.	School administration in coordination with Disaster Management Agency(ies) and other relevant entities.		Short	Improved Emergency Planning and Management
	Run drills and simulations to sensitize teachers and students.	School administration in coordination with Disaster Management Agency(ies) and other relevant entities.		Short	
	Draft emergency management plan (EMP) that addresses hazards with a rating of high or moderate, as well as other hazards. EMP should be submitted to the Ministry of Education. Include in the school safety plan disaggregated date on student population (age, gender) as this will better inform disaster and emergency planning. This can be updated as needed and appended to the plan.	School administration in coordination with Disaster Management Agency(ies) and other relevant entities.		Short	
	Complete Emergency First Response (EFR) or First Aid Training for all teachers and staff.	School administration in coordination with Disaster Management Agency(ies) and other relevant entities.		Short	

TABLE 8.1: IMPROVEMENT PLAN AND COSTED ACTION PLAN FOR DOMINICA COMMUNITY HIGH SCHOOL (MAY 2019)

RECOMMENDATION	TASK	RESPONSIBLE PARTY	FUNDS REQUIRED	TIMEFRAME SHORT-MEDIUM -LONG TERM	RESULT
Occupational Health and Safety	Provide students and teachers with required personal protective equipment for laboratory work.	School administration to seek funding from relevant stakeholders (trusts, grants, agencies etc.)	XCD$6,000	Medium	Improved culture of safety within the school community.
	Install emergency eye-wash station and shower.		XCD$4,000	Medium	
	Re-organize science lab chemical storage area: ■ Re-label illegible containers and properly store chemicals [1] (consult Material Safety Data Sheets as well for proper storage) ■ Separate containers to be discarded ■ Ensure Material Safety Data Sheets for each chemical are available and easily accessible	Principal and/or Safety Committee in collaboration with Chemistry Teacher.		Short	
On-site drainage of water (rainwater, wastewater from sinks, etc.) needs 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. School administration to seek funding from relevant stakeholders (trusts, grants, agencies etc.)	XCD$66,400	Medium	Improved drainage.

TABLE 8.1: IMPROVEMENT PLAN AND COSTED ACTION PLAN FOR DOMINICA COMMUNITY HIGH SCHOOL (MAY 2019)

RECOMMENDATION	TASK	RESPONSIBLE PARTY	FUNDS REQUIRED	TIMEFRAME SHORT-MEDIUM -LONG TERM	RESULT
Other Infrastructural upgrades	Repair roof covering, ceiling and roof drains with current Building Code Standards.	Ministry of Education in collaboration with Department of Works. School administration to seek funding from relevant stakeholders (trusts, grants, agencies etc.) *some smaller projects can be undertaken by school/community / private organization as a special project.	XCD$24,500	Medium	Increased building resilience; improved school plant.
	Upgrade toilet block to include renewal of septic and soak-away.		XCD$96,500	Long	
	Upgrade of doors and windows to hurricane resistant standards.		XCD$25,600	Medium - Long	
	Construct new water storage.		XCD$76,500	Medium - Long	
	Repairs to electrical wiring complete with new fixtures.		XCD$64,600	Medium	
	Painting to affected areas.		XCD$36,500	Short	
	Repair defective or damaged external and internal walls and slabs.		XCD$38,200	Medium	
General Safety and Security	■ Adequately train and equip security personnel with requisite skills/tools to secure the compound. ■ Review contractual obligations of current security service providers – particularly performance clauses. ■ Explore options for other service providers by issuing a new request for proposal.	School administration.	Quotations to be solicited by the Ministry of Education and other relevant Ministries /agencies.	Medium Term	Improved safety and security.
	Contingency		XCD$50,000		

NOTE:
The recommended actions should commence in the following time periods:
Short term= 1-3 yrs; Medium term= 3-5 yrs; Long term= > 5 yrs

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10. APPENDICES

APPENDIX A: MSSP ASSESSMENT TOOLKIT RESULTS

GENERAL INFORMATION

TABLE 10.1: VITAL INFORMATION FOR SCHOOL SAFETY

NAME OF SCHOOL	DOMINICA COMMUNITY HIGH SCHOOL
Type of school (Pre-school, Primary, Secondary, Tertiary)	SECONDARY
Is facility private and public?	PARTIALLY FUNDED
Location	SAVANNE PARK
Name of Head Teacher or Principal	CELIA NICHOLAS
Telephone	-
Email	-
Year building(s) constructed	1971
Buildings contained on the school compound	4
Number of classrooms	-
Total school population	101
Students	90
Teachers	11 (one individual on special assignment and 1 responsible for the agricultural crop production and animal husbandry)
Non-teaching Staff	-
Number of first aid kits available	1
Number of fire extinguishers throughout the buildings?	2
Natural disaster in the past	YES
The type of event and the time it occur	HURRICANE - September 2017 Flood Damage.
Repairs as a result of the event	YES - Minor repairs
School designated as an emergency shelter	YES

OVERALL SCORES

TABLE 10.2: SCHOOL SAFETY ASSESSMENT SUMMARY

CHECKLIST	SCORE (%)	CRITICAL STANDARDS MET
Safety	55%	NO
Green	67%	NO

The above scoring is calculated based on the questions and Critical Standards applying to secondary schools only.

SAFETY ASSESSMENT SCORES

TABLE 10.3: SAFETY ASSESSMENT SUMMARY SCORES

SAFETY THEME	SCORE (%)	CRITICAL STANDARDS MET
Disaster Planning	60%	NO
Emergency Planning	51%	NO
Safety Admin	26%	
Medical Emergencies	47%	NO
Physical Plant	72%	NO
Physical Safety	43%	
Protection of the Person	48%	
Hazardous chemicals and materials	60%	NO

GREEN ASSESSMENT SCORES

TABLE 10.4: GREEN ASSESSMENT SUMMARY SCORES

SAFETY THEME	SCORE (%)	CRITICAL STANDARDS MET
Sustainability Management	86%	NO
Natural Resources	53%	YES
Indoor Environment	67%	YES
Hazardous Chemicals and Materials	51%	YES
Facility and Grounds Management	82%	YES
Food Service	100%	YES

APPENDIX B: SELECTED PHOTOGRAPHS

FRONT ELEVATIONS

FRONT ELEVATIONS

FRONT ELEVATIONS

FRONT ELEVATIONS

COURTYARD

TOWERING HILLSIDE
IN BACKGROUND

TOWERING HILLSIDE IN BACKGROUND

TOWERING HILLSIDE IN BACKGROUND

REAR ELEVATIONS

REAR ELEVATIONS

SIDE ELEVATIONS

SIDE ELEVATIONS

MAIN ENTRANCE

MAIN ENTRANCE

Please note that the photographs are not an illustration of all defects at the property.
They are to give you guidance on its general condition. The photographs should not be viewed in isolation.

Please note that there may be some defects in the photographs which are not referred to in the main text.

APPENDIX C: NSSPC - DOMINICA

COUNTRY: DOMINICA

#	FIRST NAME	LAST NAME	GENDER	JOB TITLE	ORGANIZATION	CONTACT EMAIL
EG.	Jane	Doe	Female	Education Officer - South Division	Ministry of Education	jane.doe@moe.eg.org
1	Melina	Fontaine	Female	Current Education Officer (CEO)	MOE	chiefeduoff @education.gov.dm
2	Dr. Jeffery	Blaize	Male	ACEO	MOE	blaizej@yahoo.com
3	David	Maximea	Male	DEO	MOE	earl31@hotmail.com
4	Cynthia	Joseph	Female	DEO	MOE	ceanjayy@gmail.com
5	Queen	Thomas	Female	DEO	MOE	felixia21@gmail.com
6	Magaret	Jules Royer	Female	DEO	MOE	margoroyer2007 @hotmail.com
7	Octavia	Timothy	Female	Coordinator/ Special Education	MOE	octimj98@gmail.com
8	Mervin	Alexander	Male	President DAT	DAT	-
9	Dionne	Durand Smith	Female	Communication Specialist	MOE	dionnedurand @gmail.com
10	Veda	George	Female	Coordinator Early Childhood	MOE	coordinatorecd @dominica.gov.dm
11	Donaldson	Frederick	Male	ODM	-	donalsonfrederick @gmail.com
12	Andy	Prosper	Male	Engineer	Public Works	andpros@hotmaill.com
13	Natalie	Murphy	Female	President	Dominica Association of Persons with Disability	-
14	Sawana	Fabien	Female	Program Director	IsraAid	sfabien@israaid.org

APPENDIX D: ORGANISATIONS CONSULTED

Organizations consulted:

- Ministry of Education
- Physical Planning Division
- Ministry of Public Works
- Principals
- National Safe School Committee
- Isra-Aid
- Early Childhood Unit
- Special Education Unit
- Dominica Association of Local Govt
- Engineers Without Borders
- Office of Disaster Management (ODM)
- Climate Resilience Execution Agency for Dominica (CREAD)