

E568
November 2001

ENVIRONMENTAL IMPACT ASSESSMENT

FOR

***DEPARTMENT OF EDUCATION
ST. KITTS***

SADDLERS HIGH SCHOOL

NOVEMBER 2001

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1.0 BACKGROUND

1.1 Introduction

The Ministry of Foreign Affairs & Education in the Federation of St. Kitts and Nevis, **See Fig.1**, engaged the Department of Environment to carry out an Environmental Impact Assessment of the proposed site for the Secondary School at Saddlers Village. This document describes the environmental implications of the proposed development, recommends the necessary mitigation measures and the areas requiring further study.

The development includes the construction of a Secondary School at Saddlers Village to serve the feeder primary schools from Dieppe Bay to Lodge Village. At present this area is being served primarily by the Cayon High School and the Sandy Point High School. It is expected that the new development will accommodate up to 400 students and will reduce the present overcrowding at the two previously mentioned schools.

1.2 Project Location

The area identified is located in the village of Saddlers, the fourth largest community on the island. The site is located in a primarily farming area and has been earmarked by the new physical development plan as a likely area for school expansion. The site occupies some 15.51 acres of farmland and savannah with phase 1 of the project (the school) to incorporate some 3.12 acres. **See Fig 2.**

1.3 Project Description

Phase 1 of the project involves the construction and furnishing of a secondary school on the site. **See Fig 3.** The new school will accommodate four hundred and fifty (450) students from the ages of 12- 18, that is, the secondary education level. Five blocks housing twenty five classrooms, human resource center/library, eight science and technical laboratories, gymnasium/auditorium, home economics center/cafeteria and computer room will be constructed. Each block will accommodate six bathrooms. An administrative block including six bathrooms will also be constructed. The Ministry of Education is seeking to have the new school serve as a pilot project where the facility is being designed to serve for the next 25 - 30 years without the need for significant additions/upgrades.

2.0 EIA APPROACH AND METHODOLOGY

The approach and methodology followed the following steps:

A. Scoping Exercise

Visits were made to the site along with discussions with relevant departments in an effort to identify the significant issues related to the development and the individuals likely to be affected.

The following areas have been determined to be of potential concern to the development and surrounding area:

- Drainage/storm water management;
- Waste water and sewage management
- Soil Conservation /Erosion

The final report covers:

- A detailed description of existing conditions;
- An evaluation of likely impacts
- Mitigation measures

B. Methodology

The EIA will address biophysical and socio-economic impacts and effects of the project. An assessment of the state of the existing environment was conducted and includes the following:

- Review of existing site data;
- Review present resource use;
- Identify environmental features or ecosystems requiring attention and/or protection.

3.0 BASELINE CONDITIONS

Prevailing baseline conditions for the 15.51 acres site are as follows. The following categories were used in assessment:

- Climate and Rainfall
- Geology and Soil Type
- Terrestrial Ecology
- Socio-economic Environment
- Infrastructure

3.1 Climate and Rainfall

The site under consideration experiences a tropical marine climate, which is influenced by the North East Trade winds. This is typical of the Federation of St. Kitts and Nevis.

Atkins (1983) shows that the average annual rainfall for the area is 69.9 inches. The months of September, October and November are periods of highest rainfall - 8 inches. February and March each has less than 4 inches. Each of the remaining months has an average rainfall in excess of 4 inches

3.2 Geology and Soil Type

A geology map of St. Kitts, **See Fig.4**, shows that the soil at the proposed development site is relatively young and formed from volcanic activity. Atkins (1983) reported that this soil is coarse textured and deep **See Fig. 5, 6** and demonstrates the characteristics of a highly absorptive sandy loam.

On examining the site, the sandy loam nature of the soil was confirmed. No extensive digging was done by the analyzing team to determine the exact profile of the soil at the site.

Further examination of the site revealed a significant gully or ghaut (dry river) bordering the site. The ghaut runs the entire length of the proposed site and forms the eastern boundary of the development. The ghaut drains the Saddlers mountain area and only flows in times of high rainfall.

3.3 Terrestrial Ecology

The site was mainly scrubland with a couple of vegetable farming plots and grazing land for cows. The predominant vegetation identified was *Panicum maximum* or "guinea grass".

There is no known faunal species that is unique to this site.

Because of the nature of the proposed project, it was not necessary to compile an inventory of the weed species or micro flora and micro fauna that inhabit the site.

3.4 Saddlers Infrastructure

The infrastructure available in the village of Saddlers, along with the neighboring communities, is modern and up to date. A breakdown of the critical services available is as follows:

Electricity- a reliable source of electricity is provided by the Government owned power plant.

Water- Portable water is clean and available. To the South of the site bordering the southern most boundary is a reservoir with the capacity to hold 200,000 gallons of water. This reservoir serves the village of Saddlers. No ground water has been located in the Saddlers area and drilling continues in an effort to alleviate the shortages that occur during the dry season. Shortcomings during the dry season are accommodated by the well in Dieppe Bay and surface water from the Phillip's area. It is expected that further water demand can be met by the wells at Dieppe Bay.

Telephone - Saddlers is serviced by an excellent fibre optics telephone system.

Health Services - The Saddlers Village area has a community clinic which is capable of treating minor injuries with serious cases referred to the general hospital in Basseterre.

Roads - The roads in Saddlers Village and to the site are in excellent condition which makes the site readily accessible by vehicle and foot.

PART 2

4.0 PROJECT EVALUATION

This stage involves an assessment of the effects or likely direct impacts of the project. The assessment includes:

- Land use assessment
- Erosion impacts/construction related impacts
- Impacts on vegetation
- Impacts on Infrastructure
- Operations related impacts - water use, wastewater/sewage

4.1 Land use compatibility

In St. Kitts, the Ministry Planning and Development has the responsibility for land use planning and development control. The Government owns approximately 78% of the land in St. Kitts. See Fig. 7.

The proposed development will occupy 15.51 acres of land on 15.51 acres set aside for this development. The school will be located South of the Village of Saddlers. It is adjacent to the Saddlers playing field and South East of the Saddlers Park Housing Development.

The site for the school is presently occupied by two large farming plots. The Ministry of Education and Agriculture have agreed to relocate the Farmers to appropriate sites.

Mitigation

- Farmers are relocated to site that are equally accessible and comparable to present plots. Communication between all parties involved is essential to prevent dissatisfaction.

4.2 Potential Erosion Impact

The site is located adjacent to a steep sided ghaut whose highest point is approximately 30ft. The development has made provisions for a 100ft buffer zone between the school site and the edge of the ghaut.

The ghaut in some areas, mainly those on the far side of the development, has exposed steep sided surfaces. On the side that abuts the development site, although steeply sided, the slopes are covered in vegetation. The riverbed shows no evidence of flowing water extending beyond the floor of the river. Though steep sided, the river course is wide and meanders gently, evidence which indicates that this is not a youthful river.

The development is sited on gently sloping land. The highest point relevant to this phase of the project is 228 feet and the lowest is 202 feet above mean sea level. During construction, excessive disturbed soil due to excavation will be prone to erosion, especially during heavy rainfall. It is expected that some erosion will occur during the construction phase.

Generally, the highly porous, free draining sandy loams existing throughout the island and in particular on slopes are susceptible to wind and water erosion. The exposed position and aspect of the site adds to the potential of this impact.

A primary source of dust and noise will be construction site traffic. The site sits on a slope that faces the North East Trade winds and is in fairly close proximity to the sea. Wind blown excavated and general construction material improperly stored will have the potential to generate dust.

Mitigation

- Place dust screens and buffer boards around the area being constructed, particularly in the areas closest to the Housing development and playing field, to confine much of the construction related dust.
- Wetting back fill material.
- Phase removal of vegetation will prevent huge areas becoming exposed to the wind.

4.3 Effects on Vegetation and Landscape

The main vegetation that may be destroyed during excavation work for building is the "guinea grass" This may be considered a tolerable impact as this plant is not unique to the project site. It should be noted here that guinea grass has been used widely on the island to counteract erosion. Wherever possible this plant should be replaced by more appropriate grasses to maintain soil cover.

4.4 Operations Related Impacts

Direct demands for potable water will increase as a result of the new secondary school. The Water Department will, in its estimation, be able to meet the increased demand for water that the new school will bring. As a contingency to the 200,000 gallons of water being provided by the reservoir at Saddlers, extra water can be obtained from the wells at Dieppe Bay.

The school is proposed to have 36 individual bathrooms. It is expected, as is the common practice, that a septic system with leach-field will be employed. As the project is still under design, sewerage information was unavailable.

Mitigation

- The collection of rainwater off the various buildings into cisterns to serve as reserves in times of drought.
- A proper sewage system be designed, and incorporate the future demands of the development. This system should take into consideration the present drilling plans of the Water Department and the need to prevent contamination of the ground water. Percolation tests will be required to inform this process.
- A proper drainage system be designed to prevent occurrence of erosion on the site during and after construction.

5.0 Environmental Guidelines for Establishment of Schools in the Federation of St. Kitts-Nevis.

The Government or Developer should take the following guidelines into consideration when designing/constructing schools in the Federation.

Design Criteria for Schools

Location

- An Environmental Impact Assessment (EIA) should be conducted for the site to identify and minimize likely impacts of development.
- The school should be located in the most central and accessible point of the catchment area that it is intended to serve.
- Consideration should be given to the expansion of the school population. This should be reflected in the acquisition of the land and the design of the school.

Functional Requirements

Primary Schools: Classrooms shall provide at least 15 sq. ft of floor space per students, plus 8' - 0" times the proposed width of classroom.

Secondary Schools: Classrooms shall provide at least 20 sq. ft of floor space per student, plus 8' - 0" times the proposed width of classroom.

Primary Schools: Principal's office shall be at least 132 sq. ft of floor space and shall be provided with toilet facility (1 w.c. and 1 whb) and storage.

Secondary Schools: Principal's office shall be at least 144 sq. ft of floor space and shall be provided with toilet facility (1 w.c. and 1 whb) and storage.

Primary Schools: Staff room shall provide at least 15 sq. ft of floor space per staff.

Secondary Schools: Staff room shall provide at 20 sq. ft of floor space per staff.

Primary Schools: Deputy Principal's office shall be at least 108 sq. ft of floor space.

Secondary Schools: Deputy Principal's office shall be at least 120 sq. ft of floor space per student.

Student's Toilet: All student toilet facilities shall be located in blocks with a service between the boys and girls facilities.

Each toilet facility should be designed with a minimum of two (2) showers, one (1) for girls and one (1) for boys.

Staff Toilets: Staff toilet facilities shall be attached to the staff room with an entrance hall between the staff room and the toilets.

Cafeteria: Cafeteria should provide adequate space to accommodate at least 25% of the student population in a safe and healthy environment for the preparation, distribution and storage of foods and beverages.

The following accommodates should be provided for the Cafeteria:

- Changing room/area
- Administration room/area (minimum 64 sq. ft)
- Toilet facilities

Library/ Learning Resource Center:

A flexible space with accommodation to seat at least 10% of the students at any one time and at least ten (10) books per students and reference section for teaching staff. A quiet area and a computer section shall be provided in all library/learning resource centers.

- Quiet Area 20 sq. ft/student
- Computer Section: 25 sq. ft/student
- Resource Room: 1.5 times the area of a standard classroom.

Lab/Technical Rooms: Labs/Technical Rooms space should be 1.5 times the area of a standard classroom with an administrative space (minimum 48 sq. ft), storage (minimum 12 sq. ft). The teaching/practical space shall be 15 sq. ft/student.

Auditorium: The Auditorium shall provide adequate standing space to accommodate the school's student population. Seating minimum requirement shall be 9 sq. ft, aisle(s) not included.

Security Hut: Adequate shelter for security guards (male and or female) with easy control of premises and access to toilet facilities shall be provided. Maximum hut size 24 sq. ft.

Parking: Hard surfacing (minimum 8' - 0" wide) should be allowed for the comfortable maneuvering and parking of a standard long-base delivery or garbage truck, fire tender, tractor, car, motorcycle and bicycle.

Corridors/Aisles: External: 8' - 0" wide.
Internal: 4' - 0 wide minimum.

Construction Materials

- Builders and developers should ensure that no material containing asbestos whether for use in roofing, ceiling tiles, tiles, electrical and thermal installation, paneling or water and sewage pipes be used in the construction of schools.
- Developers should be aware that lead based paints and lead piping has been deemed to be unsafe. No products containing lead based paints/piping should be used in the construction of schools.
- Arsenic Treated wood has been determined to be unsafe for children. Builders and developers should ensure that no arsenic treated wood or arsenic treated wood by-products be used in areas where school children will come in contact with the product.

Hurricane Mitigation

- The use of Hurricane-resistant design in the planning and design of the school must be incorporated. This design should include the proper use of materials and architecture which have been proven to be resistant to Hurricanes. Additionally the school should be insured as part of the hurricane resistance plan.

Waste Disposal

- In the design of the sewage collection and disposal system, reference must be made to the St. Kitts Building Code for the design of sewage treatment facilities. The Ministry of Health must be consulted before plans are finalised for submission to the Development Control Planning Board (DCPB).
- In some instances where sewage disposal is by absorption pits (soakaway) or septic tanks with absorption pits or tile fields, percolation tests may be required by the DCPB. These tests are described in the St. Kitts Building Guidelines.
- Treatment of sewage can be accomplished satisfactorily through a septic tank and soakaway pit or tile field. Where septic tanks are being used the design of the tank should include a grease trap.

- The effluent from the septic tank can be channeled to an absorption pit or to a tile field. All absorption pits or tile fields shall be located so as to allow adequate protective distance to the boundaries of the lot and to the building.
- No absorption pit or tile field should be located in the vicinity of an actual or potential well or source of domestic water supply. The disposal of solid waste must be carried out in accordance with the rules and regulations of the Ministry of Health.
- All construction sites should store solid waste in a specific area on site that is maintained in a sanitary manner. A proper schedule for disposal should be developed to avoid accumulation of waste.
- A solid waste collection plan should be established in conjunction with the Solid Waste Management Corporation. This plan should include onsite storage, collection times and a recycling plan if applicable.

Construction Guidelines

- Consultation has to be sought from the Ministry of Health and Environment before constructing in an area deemed to be an historical/archaeological site or of historical/archaeological interest.
- Approval for development has to be granted by the Development and Control Planning Board when constructing on a historical site.
- Access to dwellings and businesses should be guaranteed for both the construction and operational phases.
- Alternative solutions and final designs should be subject to public and community consultation with special emphasis on the property owners directly affected, local NGOs and CBOs and private sector organizations.
- To minimize public nuisances, construction activities should follow strict environmental guidelines. Construction schedules and the timing of necessary interruption of public utilities (electricity, water and telephone) should be informed to the affected community.

6.0 REFERENCES

Atkins *Land and Watershed Management* (1983) *Soil and Water Conservation Windward and Leeward Islands: Phase 1 reconnaissance study*. Vol.1 main report (September 1983); Vol.2: appendices (August 1983). Prepared for Caribbean Agricultural Research and Development Institute (CARDI).

St. Kitts - Nevis Country Environment Profile, 1991. Caribbean Conservation Association.

D. M Lang, D. M. Carroll, *Soil and Land-Use Surveys #16*, St. Kitts and Nevis, August 1996

Government of St. Kitts and Nevis(2000) *Planning and Infrastructural Guidelines and Standards for St. Kitts and Nevis*. Development Control and Planning Board.

Kelly, James E. A, *Standards for the Design and Development of Primary and Secondary Schools in the Federation of St. Kitts and Nevis*. January 2002.

APPENDIX 1
MAPS AND DRAWINGS

- Figure 1: Map of St. Kitts
- Figure 2: Drawing Site Plan for Project Site
- Figure 3: Concept Drawing of Saddlers High School
- Figure 4: Geology Map of St. Kitts
- Figure 5: Soil Map of St. Kitts
- Figure 6: Soil Sub-type of St. Kitts
- Figure 7: Cadastral Map of St. Kitts

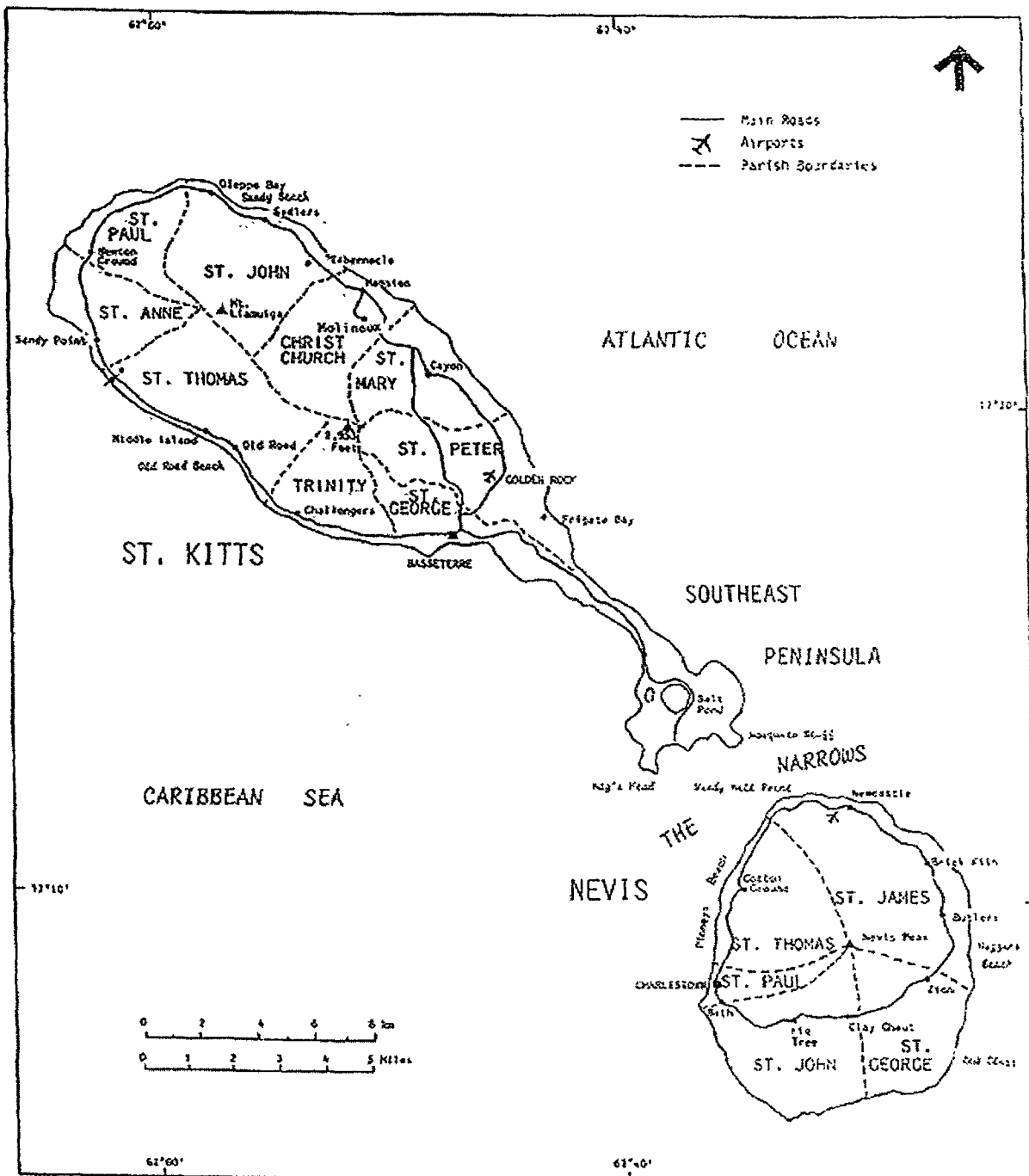
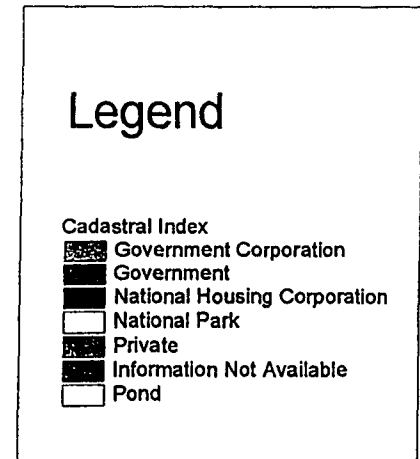
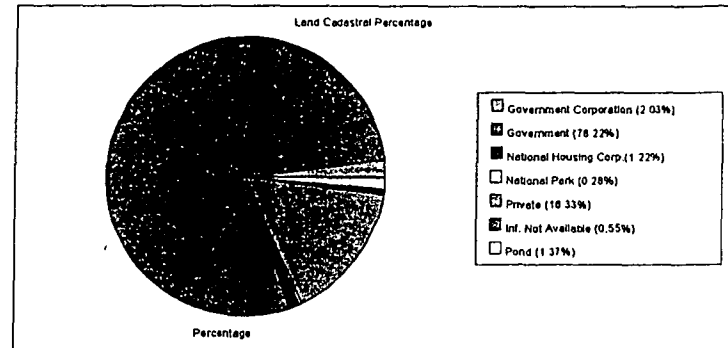
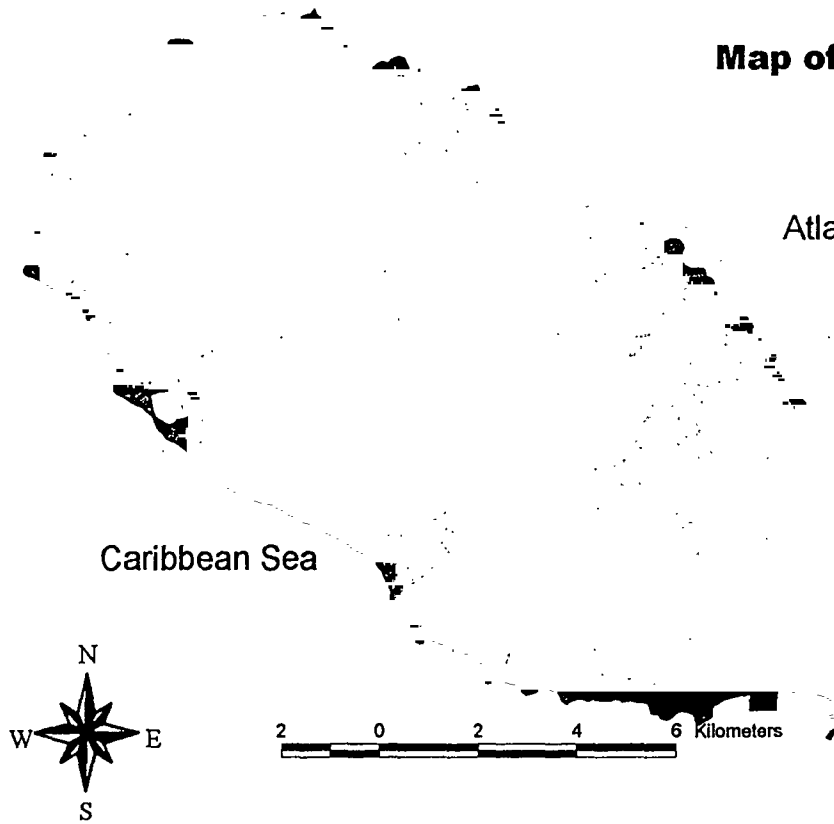


Fig. 1 Location Map of the Federation of St. Kitts - Nevis

St. Kitts

Cadastral Index

Map of Registered Estates, Farms and Government Lands



Parcel Det.	Area_sqa
Government Corporations	3428296.50
Government	131828541.76
National Housing Corporation	2055550.35
National Park	459715.66
Private	27541323.61
Inf. Not Available	943579.75
Pond	2295267.45

Produce by GIS Unit
Physical Planning Division
Ministry of Finance, Development and Planning
Government of St. Kitts and Nevis
7th November 2001

Fig. 7 St. Kitts Cadastral Map

St. Kitts

National Physical Development Plan - Soil Type

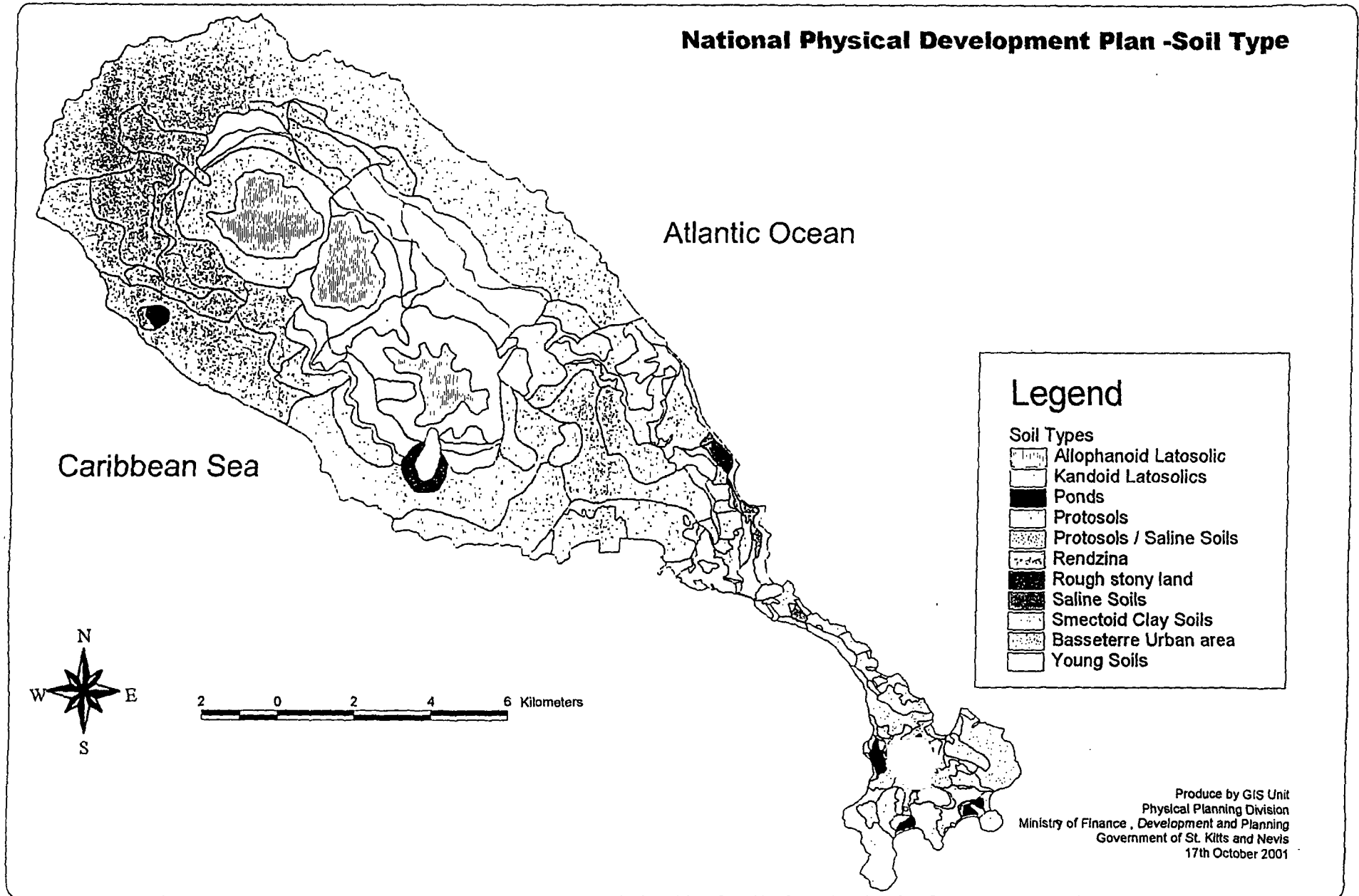


FIG. 6: : Map showing Soil Type in St. Kitts

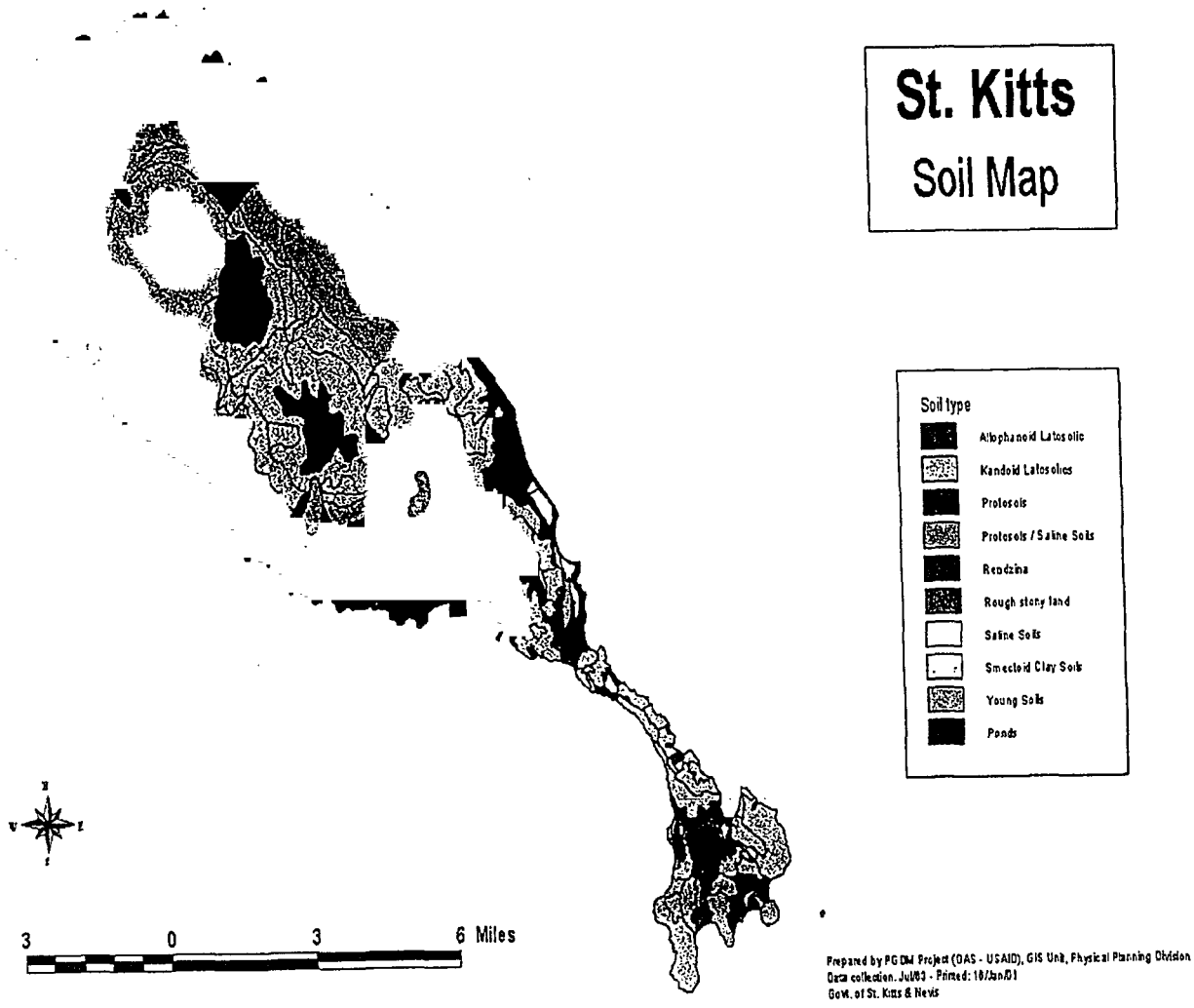
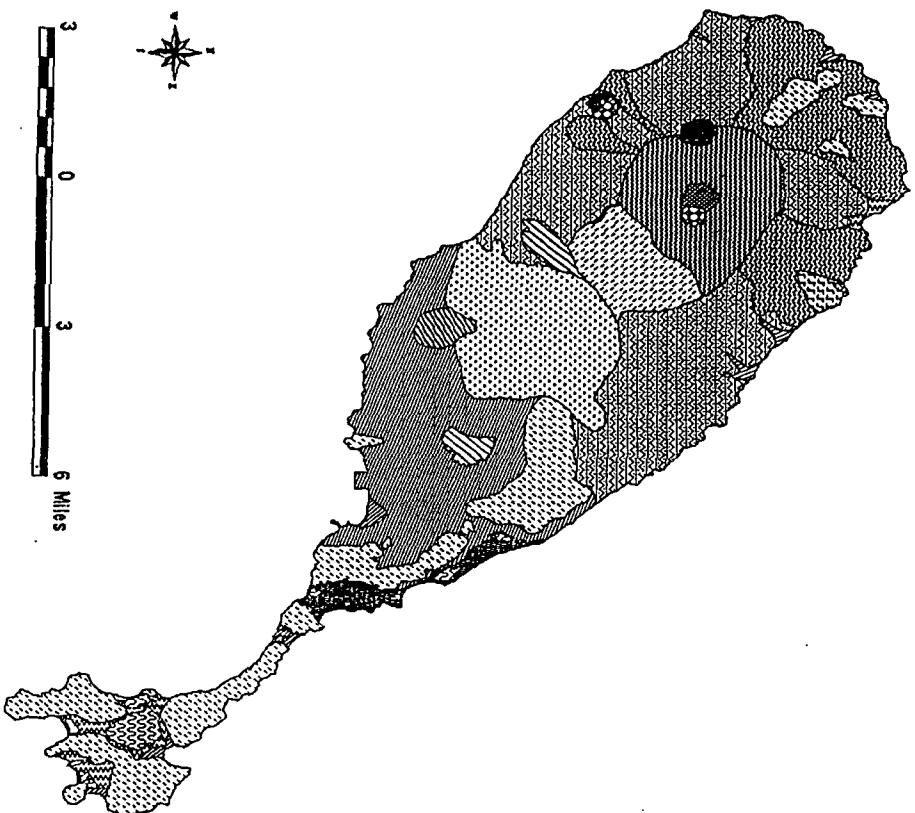


Fig. 5 Soil Map of St. Kitts



St. Kitts Geology Map

Geology	
	Amulet Kyaest
	Basaltic Tuff
	Beach Sand
	Black Rock Beach
	Brimstone Hill Andesite
	Brimstone Hill Limestone
	Carriacou Range Sand Deposit
	Crater
	Geology uncat. (Basseterre Volc.)
	Geological Unit Limestone
	Lane's Tuff at Mount Misery
	Lane's Deposit
	Mount Misery Hill basalt (Andesite)
	Mount Misery Cone Deposit
	Mount Misery Wind Flow
	Over (Basseterre) Volcanics
	Older Mount Misery Volcanics (Andesite)
	Salt Pond
	Sandy Beach Hill Dome
	South East Range Deposit

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 Data collection: 1987 Dr. Mervyn Skyles / Dr. Peter - Frost; 17/2/2001
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Fig. 4. Geology Map of St. Kitts

ELD

V

1	RECEPTION AREA
2	ADMINISTRATION
	HUMAN R. CENTER / INFORMATIC / MOD. LANGUAGE
3	HOME ECONOMICS / TYPING / CLOTH & TEXTI
	CLASS ROOMS.
4	CAFETERIA
5	TABLE AREA
6	2 SCIENCE LABS / 2 TECHNICAL LABS
7	" "
8	10 CLASS ROOMS
9	10 CLASS ROOMS.
10	GYM & AUDITORIUM
11	STUDENTS BATH ROOM.
12	FOUNTAIN
13	WALKING AREA.
14	ROOF
15	VEGITATION
16	LAWN

SCALE → 1:60

FIG. 3

SADDLERS

SADDLERS

PARK HOUSING

PLAY

