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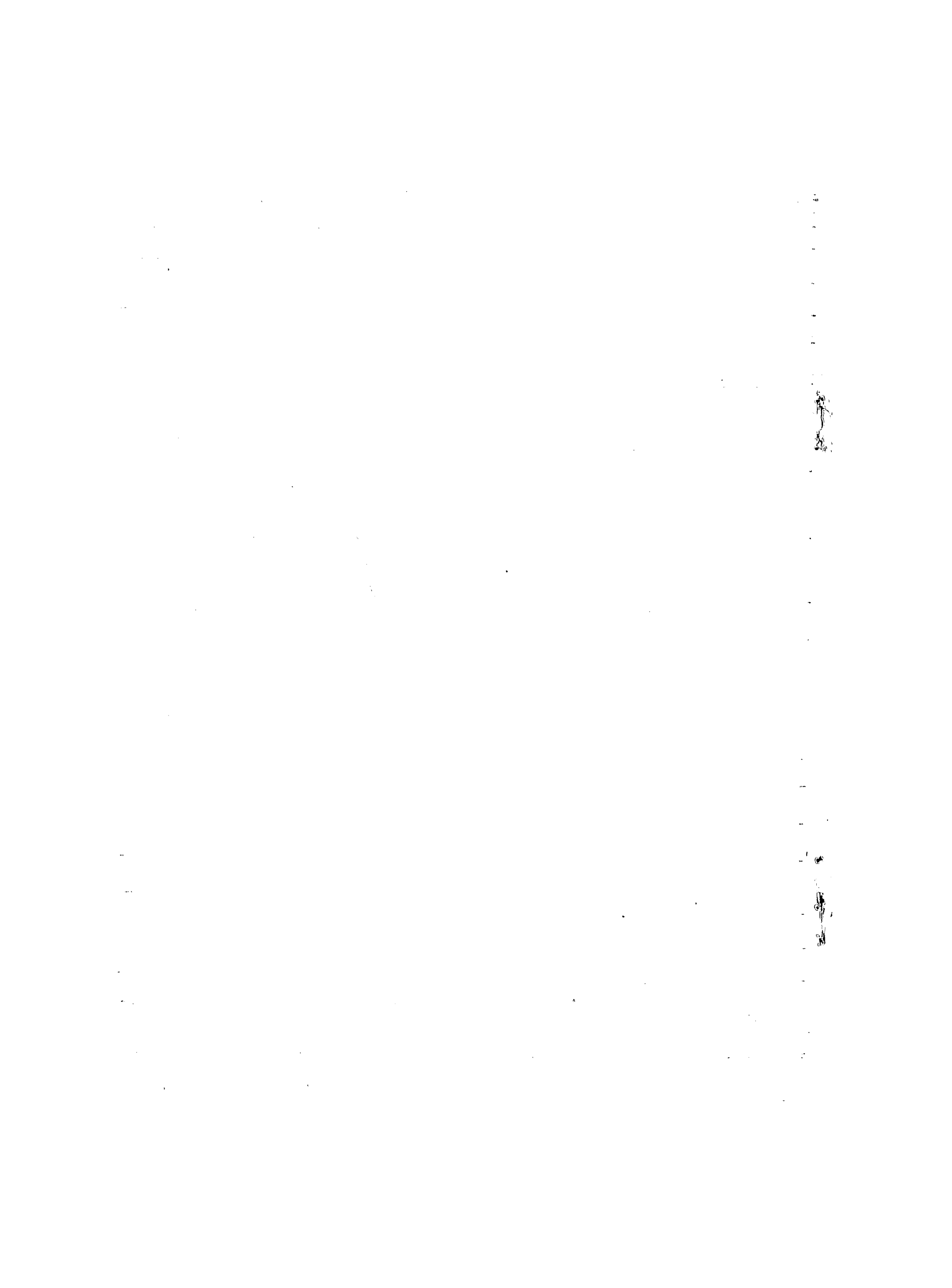


TOURISM AND ENVIRONMENT CASE STUDY OF FORT JAMES
DICKINSON BAY, ANTIGUA

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The views expressed in this document are those of the Consultant and do not necessarily reflect the views of the United Nations or of any CDCC Member Government.



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SECTION I

1

TERMS OF REFERENCE

This report is the result of a study commissioned by the Economic Commission for Latin America and the Caribbean (ECLAC).

The terms of reference summarized in the Contract agreement was:

"To carry out a case study on tourism development and environment in the Dickinson Bay - Fort James area, Antigua, and to formulate guidelines and concrete recommendations on appropriate ways to introduce the environmental dimension in the tourism industry, including its related infrastructure..."

STUDY METHODS AND PRESENTATION OF REPORT

The information upon which the analysis of tourism development and environment in Fort James - Dickinson Bay is based, was derived from the review of pertinent literature, aerial photographs, maps, development proposals, along with interviews and field investigations.

The area's natural resources, particularly its beaches and adjacent beach land, underscores the potential for tourism. Constraints become explicit when development or natural impacts create unbearable stress on resources that result in relative deterioration of the environment. This is best demonstrated by the problems affecting Dickinson Bay beach.

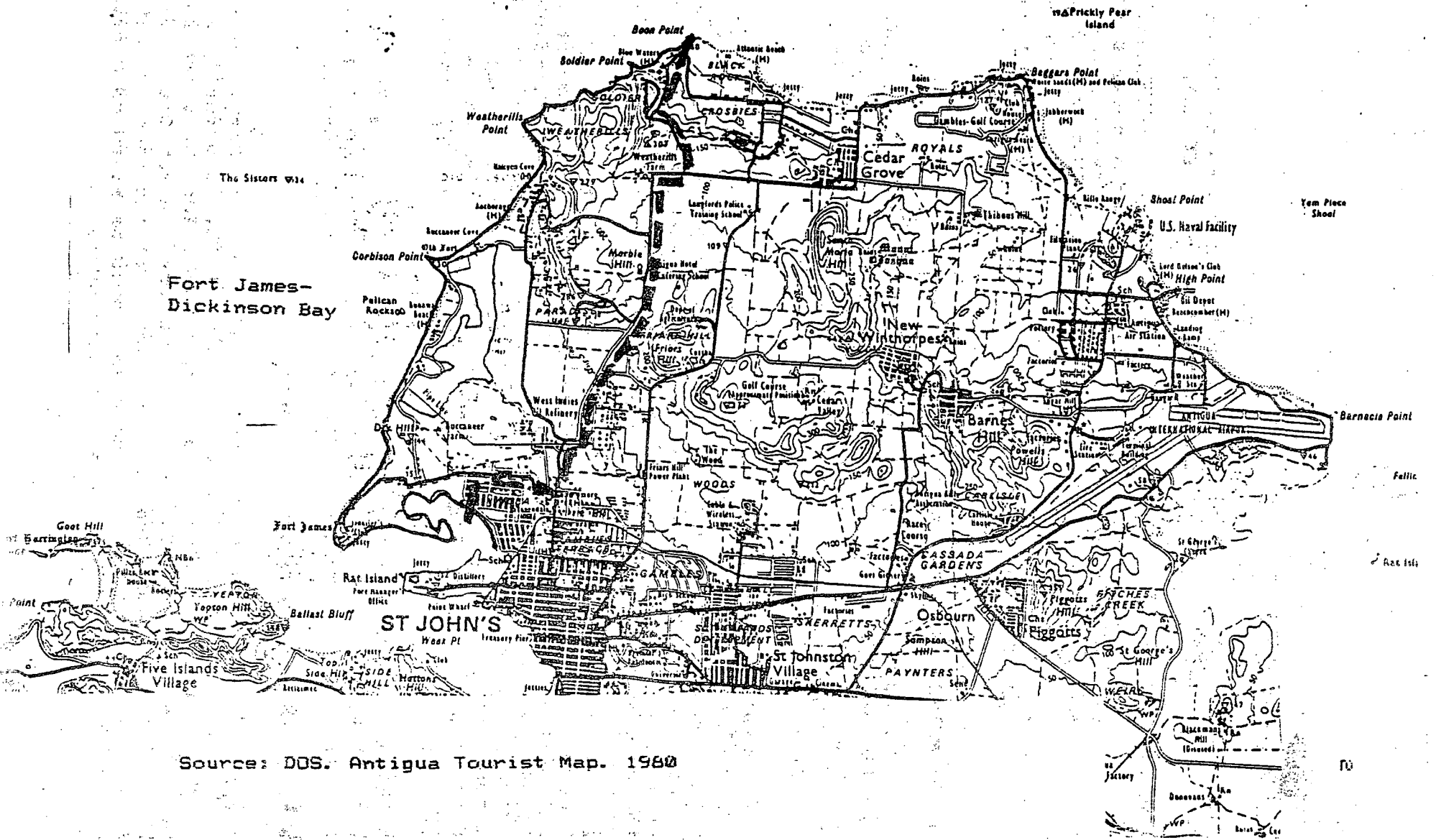
Section I of the report reviews the major resources of the area. Tourism potential is either explained or implied from the analysis. A summary of present tourism activities indicates the extent to which such potential is being explored. A review of the impacts created by tourism activities provides clues to the extent of development that the area's resources can endure. The Section also presents an analysis of infrastructure demands and supply.

Section II provides guidelines and specific recommendations that seek to provide the basis for appropriately exploiting tourism potential in the future, while minimizing environmental impacts.

DEFINITION AND DESCRIPTION OF AREA

The boundary of the area studied is shown on Map I. Although referred to as Dickinson Bay - Fort James, it actually extends north of Dickinson Bay up to Boon Point. The West Indies Oil Refinery and the Rat Island Peninsula, where a Rum Distillery and Deep Water Harbour are located, are not included within the boundary. Their impact on the area should be given more detailed consideration than is possible in this study.

MAP 1: AREA'S BOUNDARY AND LOCATION



Dickinson Bay - Fort James is a designated tourism development area. Close to 2/3 of its approximately 5 mile coastline is covered by beaches. Consolidated back beach sediments provide location for a number of hotels and other tourist accommodation at Dickinson and Runaway beaches. These are within 2 miles of the Capital, St. John's. Coolidge International Airport is 4.5 miles (straight measurement) and 20 minutes away by taxi.

The area has two distinct topographical features; the hills and slopes of its northern part, Paradise View to Blue Waters; in contrast to the mostly flat, sometimes depressed southern section. Mc Kinnons Salt Pond (approx. 150 acres) is a major feature of this area.

Nearshore bathymetric features are generally uniform, with depths between 1 to 3 fathoms. The 3 fathom depth contour stretches out to Little and Great Sisters, which along with Boon Reef afford some protection to the coastline. Because the area is located on the northwest of Antigua, the coastline is visibly affected by storm induced swells, which originate in the North Atlantic during November to May.

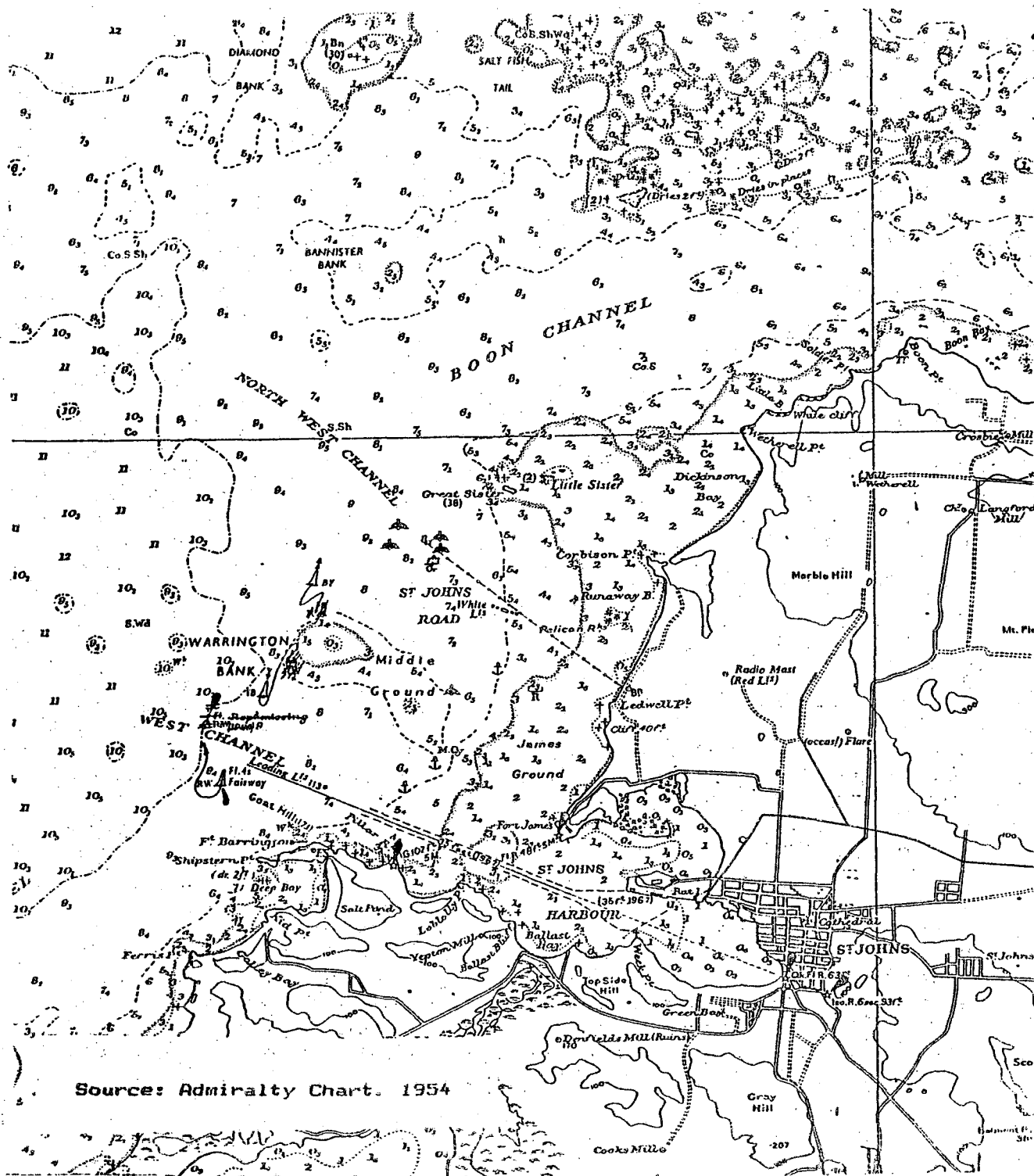
THE TOURISM SECTOR AND ANTIGUA'S ECONOMY

Since the 1960's, tourism has been considered as a major economic sector. Government's policy in promoting tourism development focused on job and income generation. A study done for the Caribbean Hotel Association (CHA) stated that Antigua employs about 1.8 persons per hotel room. Figures quoted elsewhere indicate that tourism directly and indirectly employs 23% of the island's labour force. Hotels and restaurants alone, contributed 10.9% of GDP in 1983. Associated services and indirect multiplier effects significantly increases the GDP contribution by tourism.

Growth has occurred in overnight visitor, cruiseship and yachting tourism. In 1963, overnight tourists numbered 43,272 compared to the 1981 figure of 129,099. Cruiseship passengers were 8,951 in 1963 and 113,357 in 1981. The number of yachts arriving in Antigua was 357 in 1965 and 2,150 in 1982. Total visitor expenditure in 1982 was US\$48 million.

Fort James - Dickinson Bay played a key role in the development of overnight tourism. Blue Waters and Anchorage hotels were constructed in the 1960's around the time of the first major hotel construction boom, when land prices were reasonably low. Growth and maturity in the industry, along with speculation have resulted in major increases in land prices. Increased labour and material costs have pushed the cost for building hotel accommodation up to US\$60 - US\$75 per sq. ft.

MAP 2: BATHYMETRIC FEATURES, OFFSHORE
REEFS AND BANKS
(Soundings in Fathoms)



Nevertheless, in the last five years over 150 rooms were constructed in the area. A number of these, including 100 at Antigua Village, were constructed and sold as condominiums and subsequently leased as hotel rooms. Condominiums reflect a growing diversity in tourist accommodation, that is responsive to the demand for self-catering units. Condominium sales provide the opportunity for developers to raise investment funds. Further growth in condominium units is planned for the area.

Presently, Fort James - Dickinson Bay accounts for 552 of Antigua's 1600 - 1700 hotel rooms. A significant number of cruiseship visitors use Fort James, Runaway and Dickinson beaches. Glass bottom boat cruises, day or night short yacht cruises, including the 200 person capacity Jolly Roger, originate in the area and occur along its coastline. Dickinson Bay is a major venue in Antigua's well publicized annual Sailing Week Regatta.

THE ENVIRONMENTAL POTENTIAL FOR TOURISM DEVELOPMENT IN ANTIGUA

Beaches

The environment and some of its key natural resources are the foundation of tourism in Antigua. Beaches and beach land are presently some of the most valuable of such resources. Tourism promotion literature boasts of 365 beaches in Antigua alone. A large part of the coastline of sister island, Barbuda, is covered in beaches, which are mostly undeveloped. In Fort James - Dickinson Bay beaches constitute about 3 miles of coastline, making the area a prime target for beach hotel development.

Hotel developers have generally exploited the beach and beachland potential of Antigua, by locating hotels on several of its good beaches. Because beaches are dynamic and vulnerable, poor siting of structures may disrupt natural processes and accelerate erosion. This is usually accompanied by deterioration in beach quality, lost of valuable beach front land and very often huge financial costs to correct problems.

It is important that appropriate ways are found to further exploit the development and recreation potential of the numerous beaches in Antigua and Barbuda while avoiding major and irreversible damages to the resources. Guidelines for the development and use of beaches and beachland in Fort James - Dickinson Bay are provided in Section II.

Anchorage and Sailing Opportunities

Antigua has a fairly well indented coastline, which provide the structure for several anchorages around the island. Coral reefs

provide protection by dissipating wave energy, thereby affording calm and a certain degree of safety for anchoring yachts. Sand produced from coral and algae fragments is gradually deposited in the bays and the build-up help to produce depths and good seabed anchor holding capacity that are critical to anchoring.

Nelson's Dockyard was constructed in English Harbour in the 18th Century, because of the protection and safety it afforded British warships. Antigua capitalized on the historic importance of the Dockyard by adapting the bulkhead and buildings to modern yachting and associated tourism uses, making it one of the best known yachting centers in the Caribbean. It is a major promotional asset for yachting, overnight visitor and cruiseship tourism.

Nevertheless, the full potential for yachting is yet to be tapped. There is still only limited coastal sailing and use of numerous day and night time anchorages because of insufficient promotion of such activities and the lack of a dependable bouyage or marker system, which is important to less experienced sailors. Coastal sailing is especially good on the west coast, between Blue Waters and Curtain Bluff. Three of the major races during Antigua's international Sailing Week are routed along the west coast.

The anchorages of Fort James - Dickinson Bay are fairly exposed. They enjoy good daytime use, although not highly recommended for nighttime anchoring because of swell motion particularly during the peak tourist season. Dickinson Bay is however, one of the main venues for boats during Antigua's Sailing Week.

Other Resources

There are other significant resources that enjoy only limited promotion and use for tourism. Both Antigua and Barbuda have well developed coral reefs that offer scuba diving and snorkeling opportunities. Glass bottom and scuba diving tours have increased in recent years, but this may not be in proportion to the increase in tourist arrivals. Better promotion and organization could increase the demand for such tours.

The dry woodland forest and cactus scrub areas of the eastern half of Barbuda are populated with deer, ducks, guinea fowl, land turtles and wild boars, providing opportunities for camping and wildlife viewing. A major frigatebird colony on the northwest of the island could be managed to provide education and enjoyment through proper documentation and interpretation. The same could be done for several white egret nesting areas in Antigua.

The success of Nelson's Dockyard demonstrates that the restoration and adaptive use of historic buildings can generate jobs and income, and at the same time help to highlight and interpret the history of the country. Antigua has an impressive list of naval, religious, military and industrial (plantation) historic buildings that offer tremendous scope for adaptive tourism related uses. Some suggestions for the use of Fort James provided in Section II.

NATURAL RESOURCES OF FORT JAMES - DICKINSON BAY

Land Forms and Soils

The hills and slopes of the northern section help to determine drainage patterns which should be given significant consideration in building design and construction. Soils in this area are laid over limestone and calcareous marl parent material. Erosion is slight to severe, with significant topsoil loss occurring in steep areas. When the soils were surveyed in the early 1960's, drainage was considered good.

This is in contrast to the imperfect or poorly drained soils of the flat southern section, particularly near the swamps and depressed areas, which are mainly laid over clay as parent material. Such soils, characteristically, are slow to absorb and dispose of sewage wastes, particularly where the water table is high. The build up and retention of topsoil in these areas, nevertheless, provide for grazing and vegetable production, which occur to some extent.

Coastal land in Dickinson Bay, Runaway Bay and Fort Bay (Fort James) was formed mainly from sand deposits over time. The hotels and other tourist facilities in Dickinson and Runaway bays are built on or near such formation. Alternating periods of accretion and erosion are normal for sand deposits. Where conditions are favourable net accretion or build up occurs. Conditions in several Caribbean islands and recent evidence in Dickinson and Fort bays would indicate a trend where net loss of beach and sand deposits is occurring. This could mean huge economic and social costs for beach hotel tourism in the area.

In recent times, developers have taken advantage of the hills and slopes, which offer attractive vistas, to locate a number of condominium units. The Halcyon Heights condos were built on a hill whose crest is 279 ft. Trade Winds and Paradise View residential areas have some of the best views on that side of the island. The largely undeveloped Weatherills hills and slopes offer similar development opportunities.

MAP 3: MAJOR RESOURCES OF FORT JAMES- DICKINSON BAY

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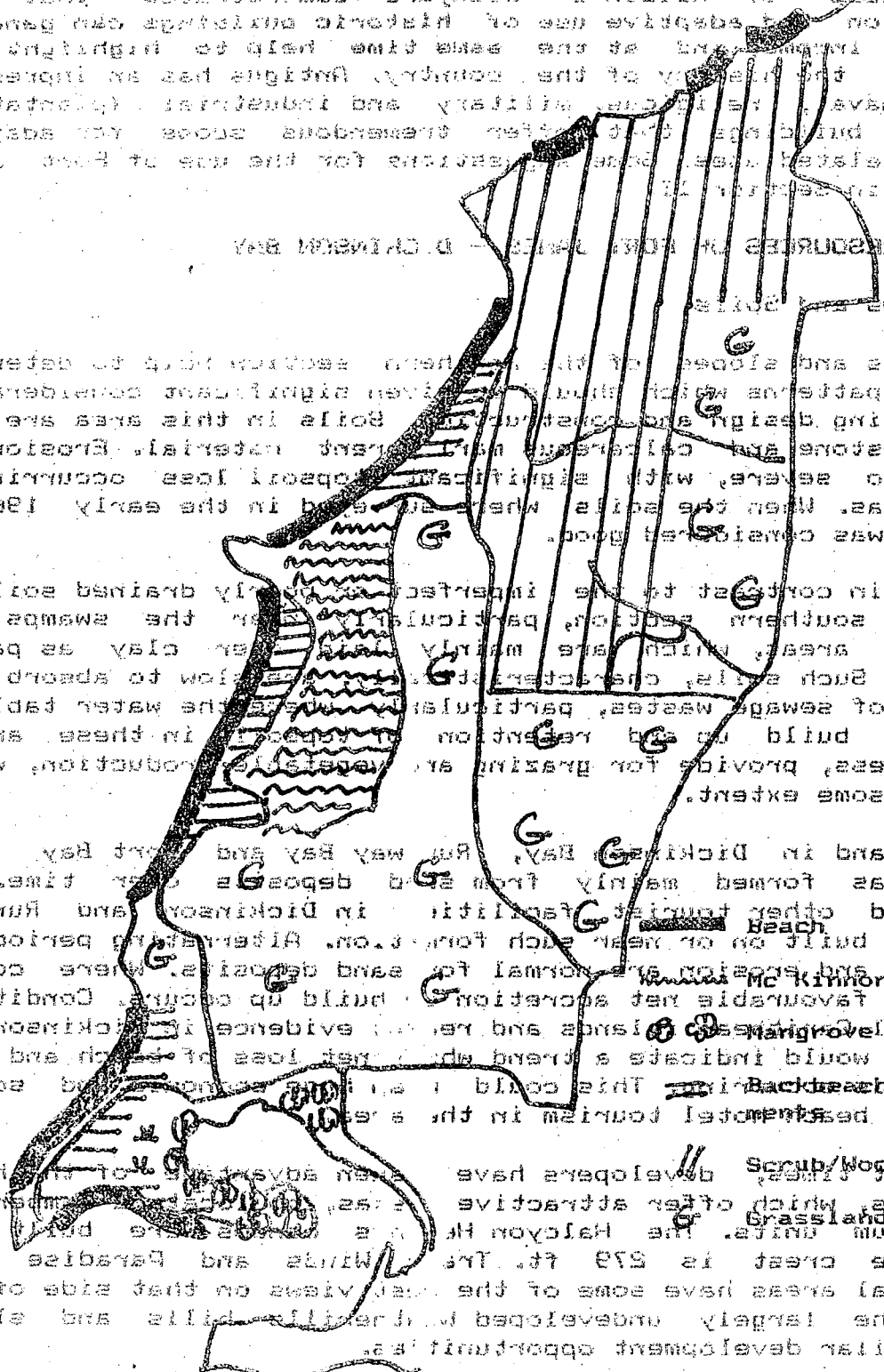
NATURAL RESOURCES OF FORT JAMES - DICKINSON BAY

Land forms and soils. The hills and slopes of the island have been severely eroded to a degree that is not only aesthetically displeasing but also a hazard to life and property. The hills and slopes of the island have been severely eroded to a degree that is not only aesthetically displeasing but also a hazard to life and property.

This is in contrast to the flat southern sector, particularly in the area of the old barracks. The flat southern sector, particularly in the area of the old barracks, is a depressed area with a high water table. The flat southern sector, particularly in the area of the old barracks, is a depressed area with a high water table.

Coastal land in Dickinson Bay, Runway Bay and Fort Bay (Fort James) was formed mainly from sand deposited during the Pleistocene. Coastal land in Dickinson Bay, Runway Bay and Fort Bay (Fort James) was formed mainly from sand deposited during the Pleistocene.

In recent years, developers have been advised to build on the hills and slopes which offer attractive views. In recent years, developers have been advised to build on the hills and slopes which offer attractive views.

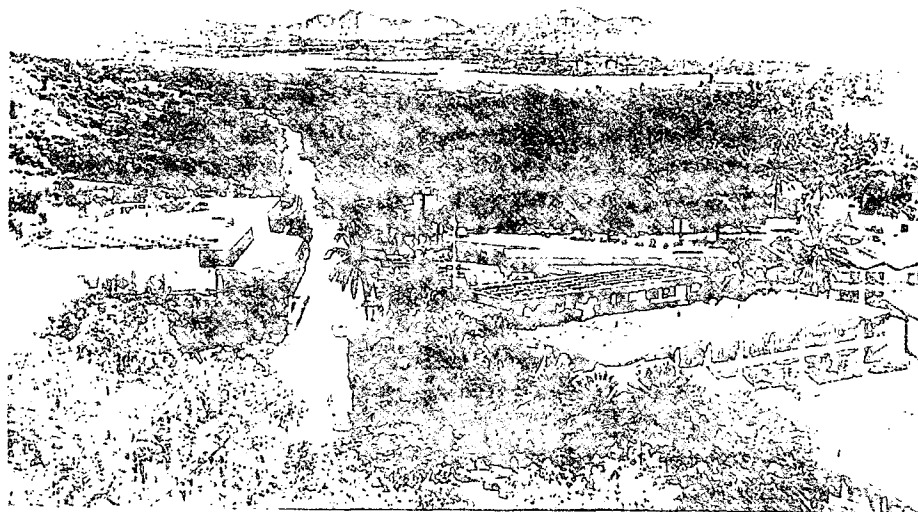


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Ridge line and slopes of Paradise View taken from Corbinson's Point, and looking over Mc Kinmons Pond.



View from above Halcyon Hotel overlooking the flat southern section of area, including Mc Kinmons Pond. Hills in background are outside the area.

Vegetation

Vegetation provides aesthetic and ecological functions. Both are important to tourism. The vegetation of the Paradise View to Blue Waters area is a combination of cactus scrub and dry woodland. Residential development in Paradise View and Trade Winds has resulted in a gradual reduction of vegetation within these areas. Yet, the northern section is greener and more attractive than the dryer looking southern section, where grass and pasture lands exist. Coconut and willow trees provide shade and attraction at Fort James. A fairly dense growth of coconut trees also exists on backbeach deposits at Dickinson Bay.

Without the cactus scrub and dry woodland vegetation of the northern section, erosion, top soil loss and drainage problems would be more severe. Minimum soil loss into the bays helps to maintain clear and attractive water for swimming. Vegetation also provides the attraction and opportunities for hiking and horseback riding. Future tourism and residential development would benefit from a concerted attempt to maintain existing vegetation and to increase vegetation cover, where appropriate.

Beaches

The beaches at Fort James - Dickinson include:

<u>Beach</u>	<u>Approx. Length (ft.)</u>
Blue Waters	500
Langford	500
Little Bay	600
Dickinson Bay	4,750
Runaway Bay	4,500
Fort Bay	2,750
Unnamed *	<u>1,600</u>
Total	15,200

Since sediment movement and transport are characteristic of beaches, the area's coastline is highly dynamic and at the same time vulnerable. Environmental constraints are implicit to such vulnerability and must be carefully weighed against the area's potential when siting new developments.

* Located on the southern part of Fort James peninsula.

The sources of beach sand are mainly coral, algae and shell fragments and to a lesser extent eroded sediments from cliffs at the Weatherhills Point, Corbinson's Point and Dry Hill headlands. Sand is moved onto the beach and along the beach by wave action, a process usually referred to as littoral transport. Due to the angle in which waves approach the coastline, littoral transport of sand is normally westward at Blue Waters, Langford, Little Bay beaches and the beach facing south at Fort James and southward at Dickinson, Runaway and Fort Bay beaches.

The process is periodically reversed when there is a major shift in the angle of wave approach, such as may occur from heavy swell action experienced especially between November and May. During such periods sand transport onshore or offshore is heaviest, resulting usually in a net loss to the beach. A net gain to the beach will occur after a return to normal conditions, unless major natural or man related activities intervene. For example, bathymetric features may prevent sand lost seaward of the 3 fathom depth line during a storm or hurricane from subsequently returning shoreward.

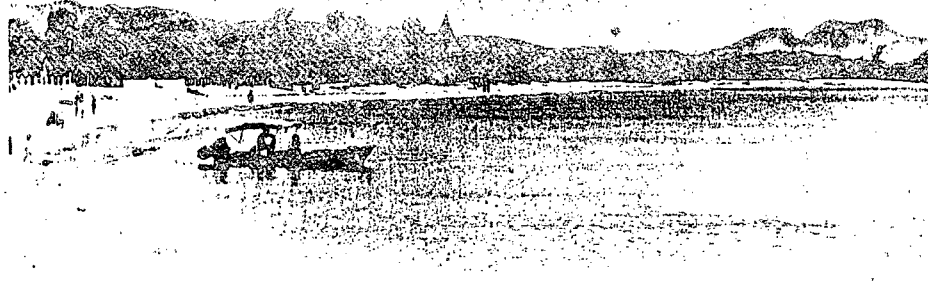
While natural processes cause beaches to alternate between erosion and accretion, present trends indicate that net erosion has occurred in most of the Fort James - Dickinson beaches in the past 30 years or more. In a study done for the owner of Buccaneer Cove, Compton Deane estimates that between 80 to 120 ft of the southern part of the beach property eroded during 1942 - 1968.

This is not uncharacteristic of the DECS region, where similar or even higher annual erosion rates have been recorded. It is generally assumed, though still to be proven, that a continued rise in the world's sea level is a major cause of beach erosion in the region. Man-made causes are, however, often responsible.

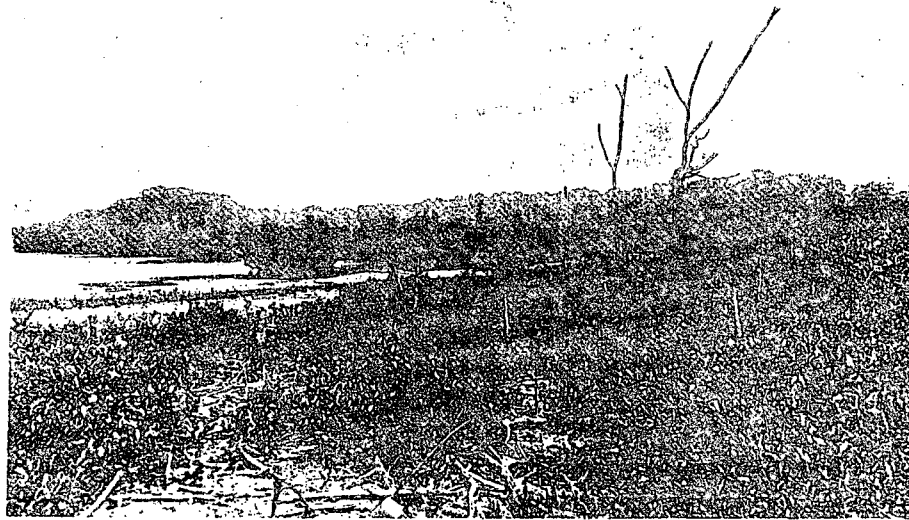
Human activities that may be partly responsible for beach erosion and general beach deterioration at Fort James - Dickinson Bay are described in the section of the report dealing with impacts. Whatever the causes, erosion has resulted in loss of beach and recreational opportunities between the Antigua Village and Buccaneer Cove area.

Wetlands

The natural evolution of the flat southern section of Fort James - Dickinson has been influenced by two major wetland areas, i.e., Mc Kinsons Salt Pond, and The Cove mangrove lagoon and associated swamp. Beach development is a significant product of this evolution.



Runaway Bay Beach, looking from the Corbinson's Point end. The beach is about 4,500 ft long.



A section of the Cove mangrove lagoon. New mangrove growth in foreground indicates previous cutting of trees.

Mc Kinnons Pond is 1 mile long, 1/4 mile wide and 152 acres. It was previously a mangrove lagoon with an opening to the sea. Over a period of time littoral transport of sand gradually narrowed the opening to a channel, creating barrier beaches at Dickinson and Fort James. More recently the channel was closed by additional littoral sediments.

While the littoral process was occurring, sediments washed from the Paradise View slopes and surrounding land were deposited in the pond and the ensuing build-up reduced its depth. Nevertheless, aerial photographs show that certain areas remained deep enough to maintain a healthy stand of red mangroves, rhizophora, as late as 1966.

The pond was a biologically productive ecosystem until a number of impacts severely reduced its value. Prior to such impacts, the pond was a habitat for nesting egrets, ducks, pigeons and other birds. Mulletts and shrimps were fished and salt mined, when sections of the pond dried out. On account of the lost of its commercial and recreational value, an environmental survey commissioned by UNDP in 1974 recommended that the pond be developed.

There appears to be two significant phases in the evolution of the second wetland at The Cove. The first phase involved the closing of an old lagoon; the creation of Fort James beach by littoral sand transport; and sediment deposition, which gradually reduced the depth of the salt pond that was created from the enclosure. Subsequent reclamation further reduced its depth to the present level.

The second and existing stage is a new mangrove system, whose major channel to the sea was recently closed by sand deposits after the dredging of the Deep Water Harbour. While this and other impacts have affected the lagoon, it remains biologically productive and aesthetically valuable. Hundreds of white egrets were observed nesting in a section of the mangrove. Communications with several persons who know or live next to The Cove reveal that the area is a nursery for a number of commercial fish species and perhaps a principal habitat for the larval and early post larval stages of the Spiny Lobster.

Reefs

Reef development is sparse and comparatively minor along the coast and offshore areas of Fort James - Dickinson Bay. A major reef system, Salt Fish Tail, exists about 1 mile north, and spreading west of Boon Point. It is a shallow reef, that developed over Diamond and Bannister banks, whose depths vary from 3 to 6 fathoms.

Boon channel separates the reef and banks from the land. Nevertheless, they along with Great and Little Sister rocks, Warrington Bank and smaller patch reefs offer some protection to the coastline and its beaches.

Seagrasses

Grass beds, Thalassia spp., and Syringodium spp., are fairly well developed in various areas of the Fort James - Dickinson Bay coast. The former is more dominant. Crustose algae, mainly, Halimeda spp., are frequently found growing among the seagrass. Halimeda is a major source of beach sand material for the Fort James - Dickinson Bay beaches.

Seagrasses trap and stabilize sediments, a function which is important, particularly in a tourist area, to maintaining good water quality. In addition, they produce leaf detritus, which is an important source of food for organisms linked in the food chain that ultimately produces seafood.

HISTORIC RESOURCES

Fort James

The largest and perhaps most important historic structure in the area is the Fort James military fortification. It consists of an old and inner fort built between 1704 and 1705 and a "new fort" or larger enclosure, built in 1739 to afford additional protection.

Built to protect the town of St. John's, the Fort was originally fitted with 17 cannons. By 1773, there were 35 guns mounted. The barracks at the Fort had the capacity to house 70 men.

The walls of the fortification are in fairly good condition; so too are the existing buildings, including the master gunner's house, which has been "adapted and enlarged". Few cannons remain.

Although the Fort is sometimes opened for public viewing, its history has not been interpreted for the benefit of viewers. The large open area next to it is used for the annual Labour Day festivities and otherwise occasionally by smaller groups. It has been proposed that the Fort, along with Fort James beach and adjacent lands, be established as a national park to further promote recreation and tourism uses.

Other Historic Resources

Three other military fortifications were constructed in the area. A small powder magazine is the only noticeable remains of a Fort at Corbinson's Point, which was used until about the middle 19th century. Another fort constructed at Weatherills was known as Weatherills Point Battery or Halfmoon Battery, the latter because of its shape. Nine guns were mounted at Weatherills and seven at Corbinson's Point. The Weatherills gun platform and other ruins still exist. In contrast, there are no remains of Fort Hamilton, which was built at Dry Hill around 1728. Another military defence was constructed at Soldier's Ghut (next to Blue Waters Hotel) and was in use in 1704. No further information on this fortification is available.

Corbinson's point is the only site of archaeological importance noted during this study. It is believed that prehistoric Stone Age men used the flint and chert found at the site. Pieces of Pre-Columbian pottery indicate that the area was also used by Arawaks.

TOURISM AND OTHER LAND USES

Existing Tourism Uses

Current tourism and other land uses are shown on Map 4. Proposed developments are shown on Map 5.

Tourism development is concentrated next to beaches, mainly Dickinson Bay and Runaway Bay. The major non-beach tourism development is at Halcyon Heights on both sides of the ridge and these are recently constructed condominium units. Table 1 lists facilities by area and gives associated densities.

Table 1: Tourism Facilities - Room and Bed Densities

Area/Facility	Type	Land Size (Acre)	Rooms	Beds	Rms/ Acre	Beds/ Acre
<u>Beach Development</u>						
<u>Dickinson Bay</u>						
Halcyon Cove	Hotel	22.75	126	252	5.50	11.0
Anchorage	"	12.00	99	198	8.25	16.5
Antigua Village	"	5.00	100	227	20.00	45.4
Siboney Beach Club	"	0.81	12	24	14.80	29.6
Succaneer Cove	Apts	3.75	14	28		
Sub Total		44.31	351	729		

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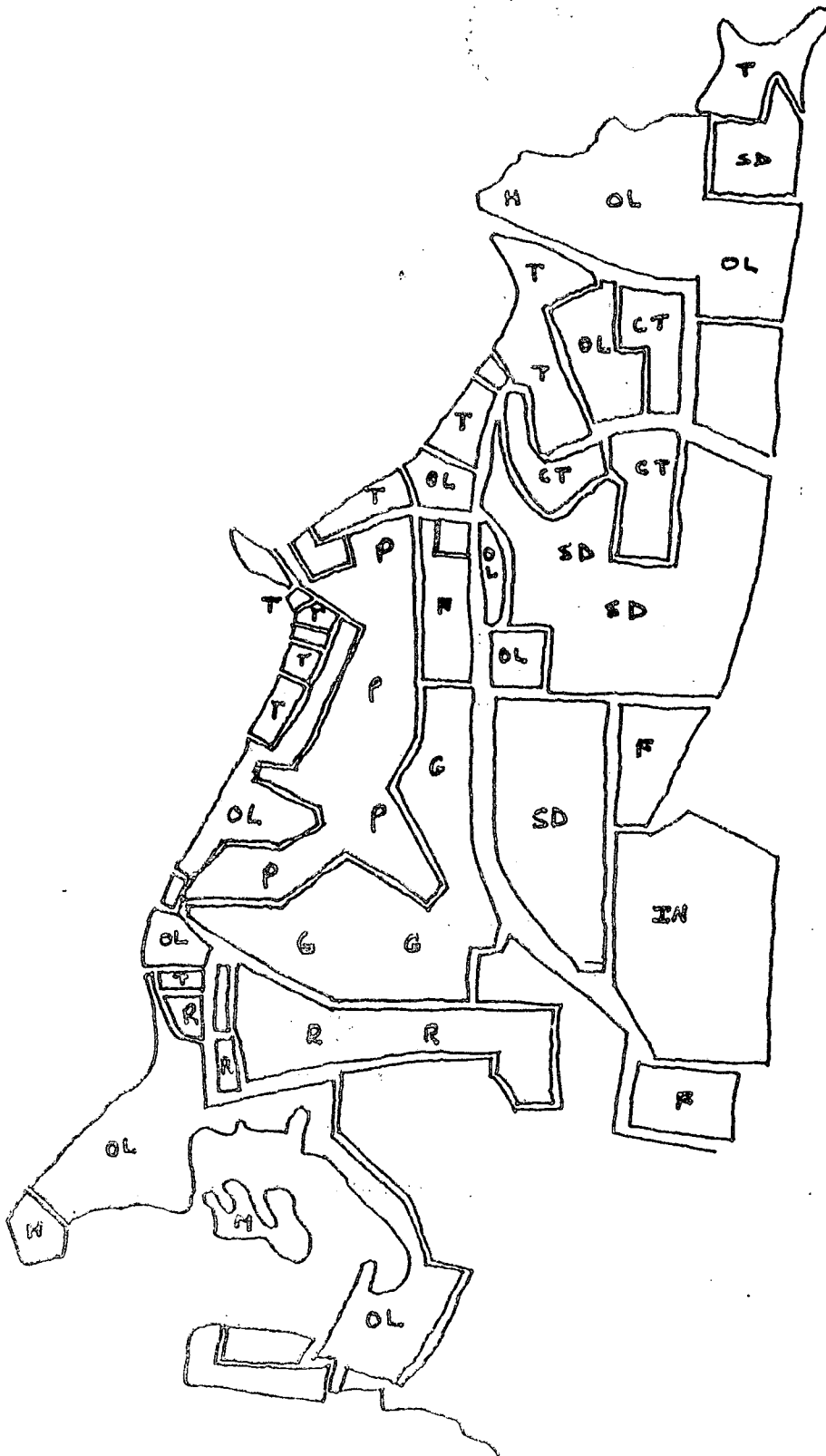
Table 1: Tourism Facilities - Room and Bed Densities (Cont'd)

Area/Facility	Type	Land Size (Acre)	Rooms	Beds	Rms / Acre	Beds / Acre
<u>Runaway Bay</u>						
Runaway Beach Club	Hotel	5.5	20	80	3.6	7.27
Sand Haven Hotel	"		14	28		
Barrymore Beach Apts	Apts		20	40		
Trev-T-Rone	"		6	7		
Alice Hopkins Beach Houses	Apts		n/a	n/a		
Sub Total			60	155		
<u>Blue Waters</u>						
	Hotel		48	96		
Sub Total			48	96		
Total (Beach Dev.)			459	980		
<u>Slope/Hill Development</u>						
<u>Halcyon Heights</u>						
Halcyon Heights	Condos		24	48		
Trade Winds	"		n/a			
Total (Slope/Hill Dev.)			24	48		
<u>Other (Inland)</u>						
Barrymore Hotel	Hotel		32	64		
Stevendale Hotel	"		20	40		
Total (Other)			52	104		
TOTAL (All Facilities)*			535	1132		

Older developments tend to be lower in density, since plots were initially larger and land prices lower. As land values increase, the tendency is to further sub-divide plots and to design more compact developments that ensure a higher return on land investment. Condominium style developments, such as Antigua Village, allows a more efficient use of land, though densities can be significantly higher than other forms of development. The highest densities in the area are at the Antigua Village and Siboney Beach Club properties, where the average of rooms per acre is 19 and at the Halcyon Heights and Trade Winds condominium developments.

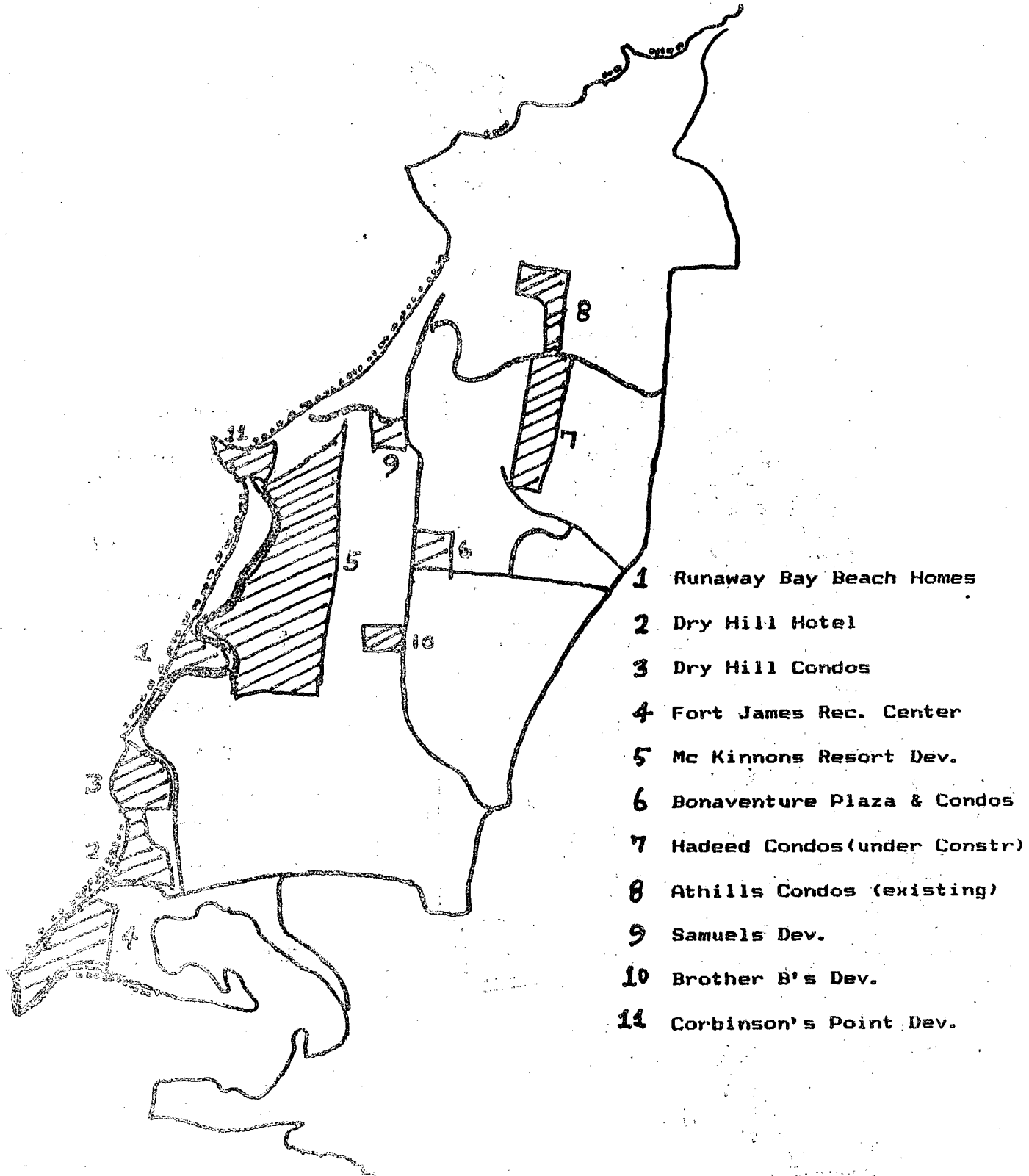
* Based on available information.

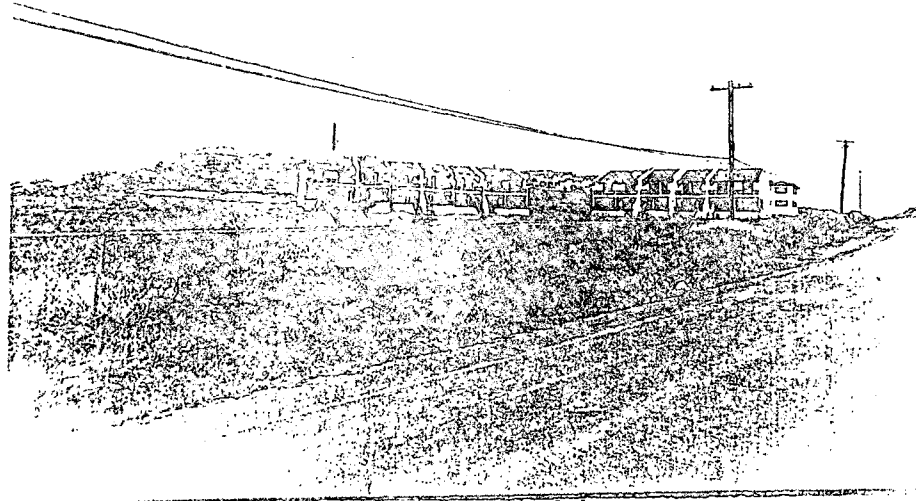
MAP 4: EXISTING USES



- T Tourism
- CT Condominium (Tourism)
- SD Subdivision (Residential)
- R Residential
- F Farming (Vegetable)
- G Grazing
- OL Open Land
- P Mc Kinhons Pond
- M Mangrove
- H Historic Site
- IN Oil Refinery

MAP 5: PROPOSED DEVELOPMENTS





Condominium development is expanding on the the east side of the Halcyon Heights ridge



Residential and condominium slope development at Paradise View and Halcyon Heights

Densities are much lower at Runaway Bay, where the largest facility is no more than 40 rooms. Generally, density has not reached alarming proportions at Fort James - Dickinson Bay, although future planning should seek to maintain a desirable balance between erected structures and open space. More critical than density at this point is the siting of structures, which in some critical areas impair drainage, circulation, access to the beach and aesthetics.

Relatively large parcels of undeveloped or partly developed land underscore the area's capacity for future tourism development next to beaches, otherwise near the coast and on the hills and slopes. Mc Kinns Pond also presents possibilities for intergrated yachting and overnight visitor accommodation tourism.

Land tenure and prices will to a large extent influence the timing and implementation of future development. Land ownership in the area is shown on Map 6. Mc Kinns Pond and a relatively large portion of lands with tourism development potential are publicly owned. This affords Government the opportunity to moderate density, minimize speculation and maintain a desirable level of open space by encouraging appropriate development on lands in public tenure. A vital consideration for future land use should be to design open space to maximize public recreation at Fort James in particular and to conserve areas such as The Cove, whose economic and social value underscores the need for conservation measures.

Planned Tourism Uses

Tourism projects proposed or planned for the area are listed in Table 2. Map 5 shows the location of the projects:

Table 2: Proposed Tourism Projects

Name	Type	No Rooms /units	Estimated Cost (E.C.\$ Million)
Runaway Bay Beach Homes	1, 2 & 3 Bedroom Apts	78 (units)	n/a
Dry Hill Hotel	Hotel	250	40.0
Dry Hill Condos	Condos	200	n/a

(Continued on next page)

Table 2: Proposed Tourism Projects (Cont'd)

Name	Type	No Rms/Units	Estimated Cost (EC\$mil)
Fort James Recreation Complex	Rec. & Tourism	N/A	5.0
Mc Kinnon's Resort Dev.	Condos/ Houses/ Marina	2,268	165.0
Bonaventure Plaza and Condos	Shopping Mall/ Condos	50 (units)	15.5
Hadeed Condos	Condos	20 (units)	3.0 (under const.)
Samuel's Dev.	Apts.	15 (units)	1.5
Brother B's Dev.	Hotel	32 (units)	2.5
Corbinson's Point Dev.	Hotel	50 (units)	8.0
Total		2953 (Units/Rms)	

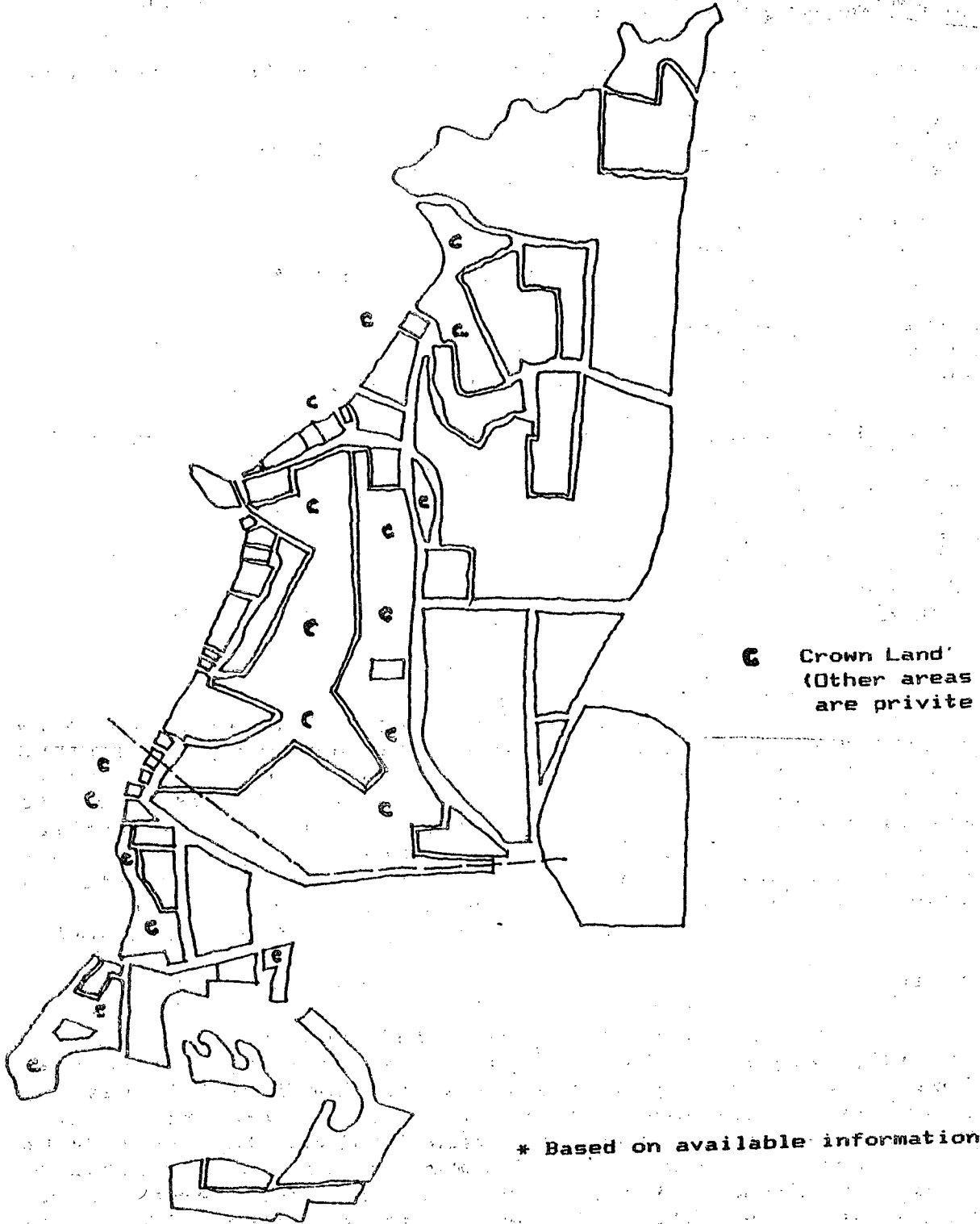
Planned projects would increase tourism accommodation in the area by over 200%. Experience indicates that a variety of factors would prevent the full realization of such plans. Mc Kinnons Resort Development is an ambitious proposal which is likely to undergo extensive modifications before it gets off the ground. Its realization would result in significant physical and ecological alterations to the environment and would dramatically increase the demand on infrastructure, i.e., water, electricity, roads and sewerage. Such impacts require considerable assessment.

Other Uses

Apart from tourism, the other major land uses in the area are residential, vegetable farming and animal grazing. Residential development occurs mainly on the hills and slopes of Blue Waters, Paradise View, Trade Winds and Marble Hill; the exceptions being Mc Kinnons (south of Paradise View), along the Fort James Road and the low income development of Yorks, a distance south of Mc Kinnons Pond. Yorks is the only area of low income houses, the other residential areas being middle and near upper income.

Much of the residential development, and tourism development as well, occurred after the last aerial photographs were taken in 1968. Paradise View is a fairly well developed subdivision, while

MAP 6: LAND OWNERSHIP*



the Marble Hill and Mc Kinmons subdivisions have grown steadily recent years. The demand for housing lots in these areas comes primarily from residents of St. John's and to a lesser extent from expatriates, either working or spending part of the year on the island.

Tourism and residential development are expected to dominate land use in Fort James - Dickinson Bay in the next decade. Livestock and vegetable farming presently other significant land uses, are likely to decline in scope and output unless such efforts are subsidized, or strict measures applied to prevent changes in use.

IMPACT OF TOURISM ACTIVITIES

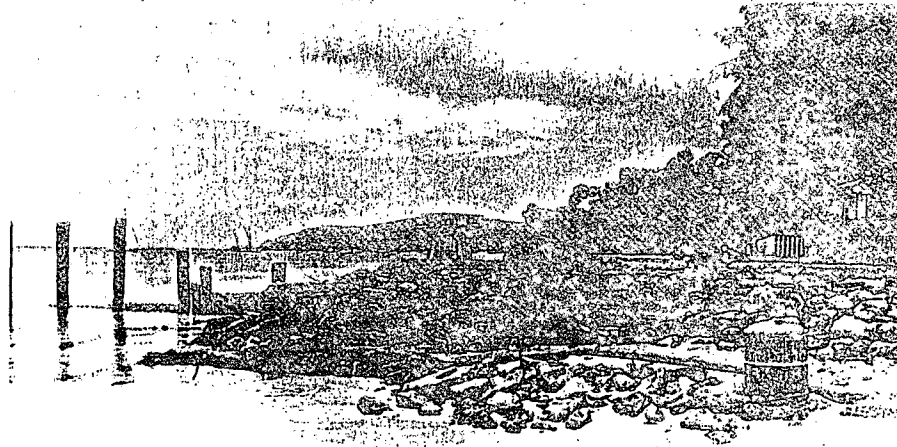
Beaches

It is difficult to isolate and determine the extent of tourism's impact on beaches. Significant erosion has occurred to the area's beaches within the last 30 or more years. Deane in 1975 and 1979 and David Lashley and Partners in 1980 suggest that the mining of sand at Corbinson's Point for the construction of hotels and other buildings in the 1950's and 1960's, plus an attempt to cut a channel to Mc Kinmons Pond increased the rate of littoral sand movement to the southern end of Dickinson Bay, while causing heavy erosion between Anchorage and Buccaneer Cove.

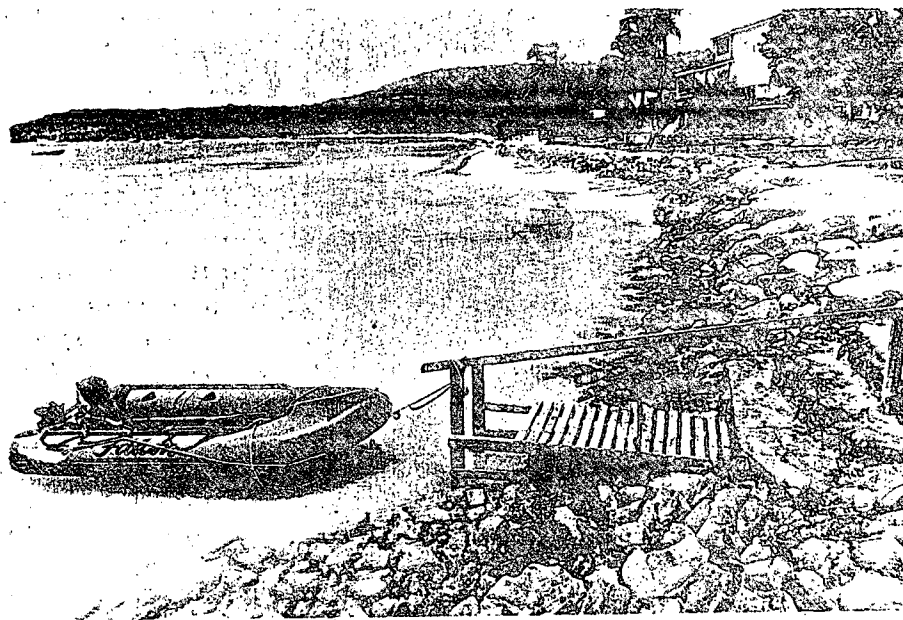
Natural causes may be partly responsible. Sea level rises have been recorded between 1/8 to 3/16 of an inch per year in other countries. It is suspected that this may have caused 3 to 6 feet of beach erosion in some OECS islands. It is possible that the estimated 80 to 120 feet beach lost on sections of Dickinson Bay in the 26 year period between 1942 and 1968, may be due to both man-made and natural causes. Failure to understand or appreciate this ongoing erosion trend have led to the construction of facilities too close to the high water mark (HWM). This will further aggravate the situation.

Whatever the causes of beach erosion, corrective measures can be very costly. The owner of Buccaneer Cove spent at least EC\$250,000 (\$2.60EC = \$1.00US) in beach protection and improvement between 1975 and 1985, constructing groynes and rubble revetments. The estimated cost of beach protection by rubble revetment at Antigua Village was EC\$100,000 in 1980.

Apart from the cost, the erosion resulted in the lost of a certain section of the beach. Groyne and rubble revetments are very unattractive, so the aesthetics of the beach have been greatly impaired. Although some improvement has been reported piecemeal solutions by individual property owners may in



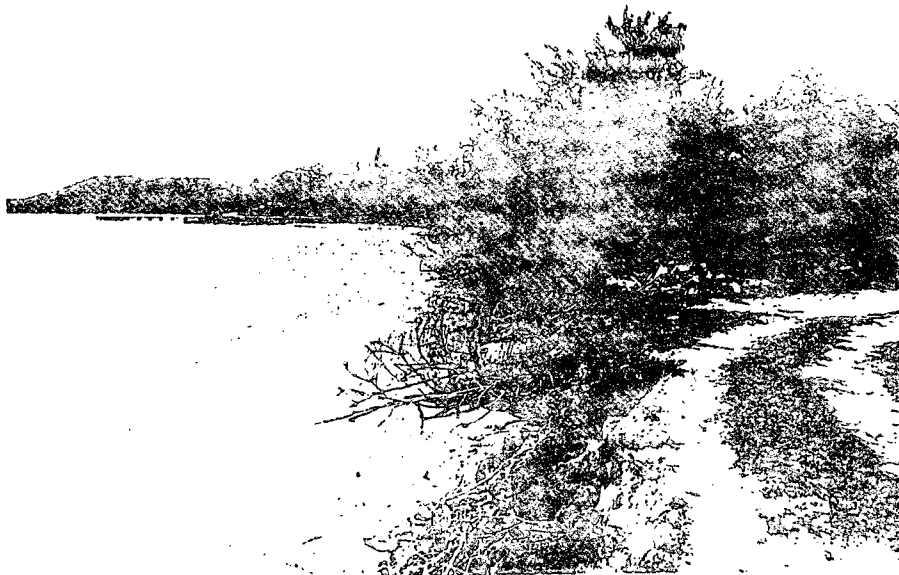
Coastal defence works at Buccaneer Cove. Rubble
revetment creates headland which divides beach.



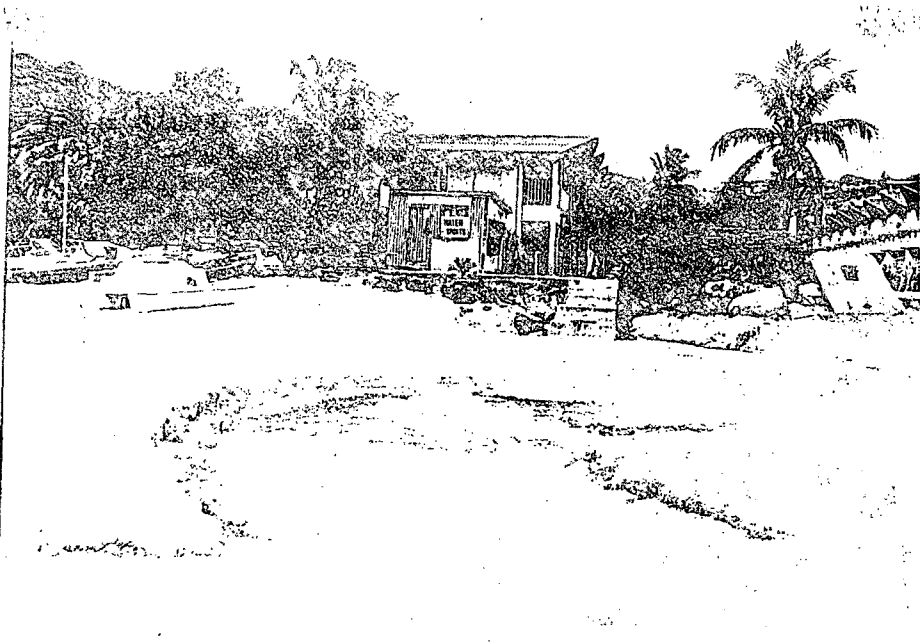
Rubble revetment between Siboney Beach Club and
Antigua Village at Dickinson Bay. Beach has been
lost in this area.



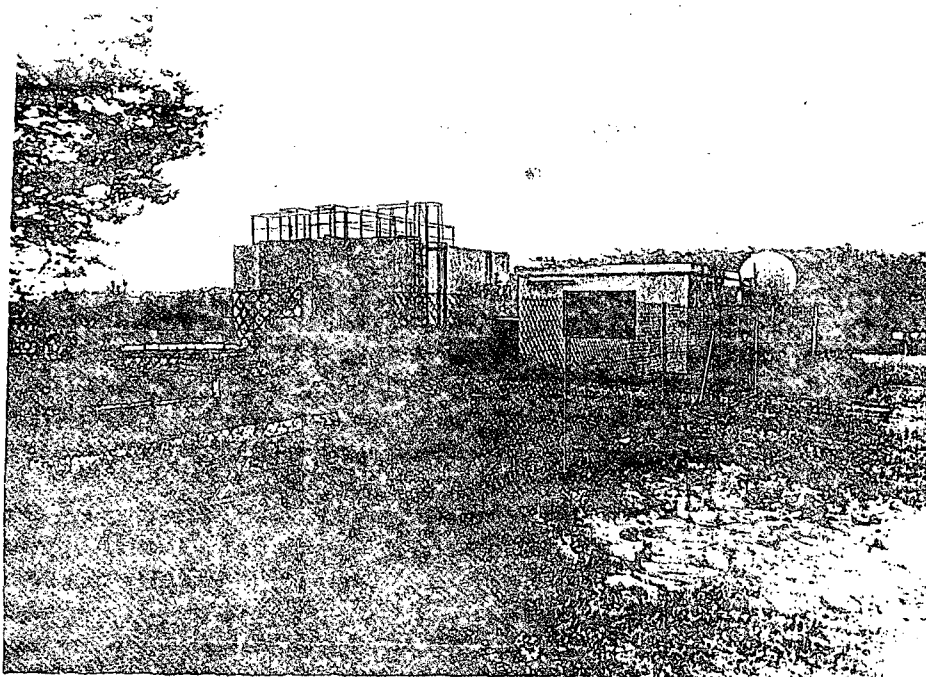
Erosion on east side of Fort James, perhaps influenced by dredging of Deep Water Harbour.



This road needs shifting because of erosion of beach on the east side of Fort James.



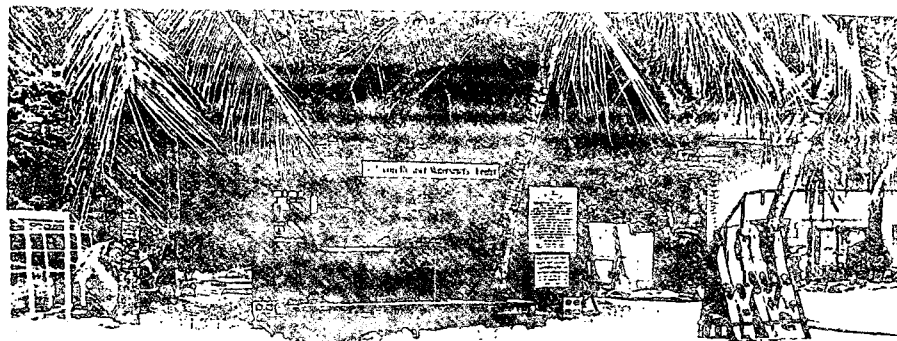
Surface water run-off from poor drainage erodes and discolours beach in front of Halcyon Hotel.



Activated sludge treatment plant at Mc Kinnons.
The plant has not worked for over a year!



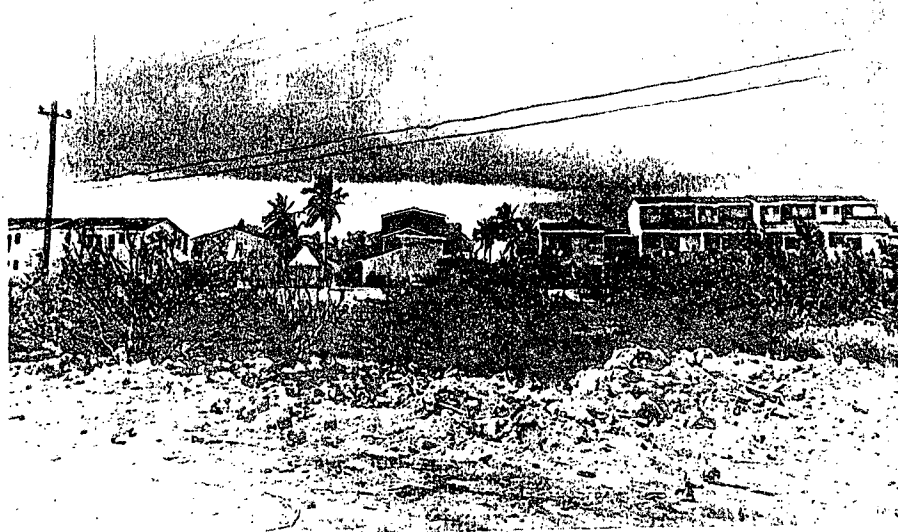
Yachts anchored at Dickinson Bay during Antigua's Sail Week. Parking and circulation is difficult then.



Watersports Centre (sited over natural drain) at Halcyon Hotel, Dickinson Beach.



Wastes dumped near the Cove Lagoon. Egrets nest in the adjacent mangroves.



Wastes used for landfill near Antigua Village, create undesirable visual impact.

the long run do more harm than good. Littoral dynamics is such that activities in one part of a beach may cause a negative reaction in some other area, which may take a while before being detected. The source of the problem may be much farther removed. It is likely, for example, that dredging at the Deep Water Harbour to allow both cargo and cruiseship berthing may have interfered with littoral processes, sufficient to cause erosion to the beaches at Fort James.

In the long run, a major cost and economic impact may be tied to the loss of land and developed property due to erosion. The estimated 80 ft - 120 ft erosion at Buccaneer Cove resulted in considerable loss of land. With land values averaging about US\$15.00 per ft, 10 ft of erosion along 100 ft of beach front, assuming that the beach width remains relatively unchanged, would mean a EC\$15,000 cost in undeveloped property.

Drainage

A major impact in the area is the modification of natural drainage through construction, most noticeable at Halcyon Beach Club. The main facilities of the hotel are built at the foot of a natural water catchment whose highest ridge is elevated at 290 ft. Trade Winds and Halcyon Heights condominiums are built on and just below the ridge of the catchment, while the maintenance and other facilities of Halcyon Hotel are located further down.

The steepness of the slopes of the catchment indicates that drainage was relatively rapid even under natural conditions. It has become even more so with the construction of buildings, tennis courts, roads, and parking lots, which render a significant portion of the catchment impervious. An elaborate drainage system was engineered to collect and channel surface water, but during heavy rains the increase run-off overflows the drains and culverts, causing temporary flooding.

The system is designed to channel the water eventually to the sea. However, the outflow is located above ground at the hotel's beach front. Water flows at a velocity, sufficient to scar the beach by cutting a gully to the sea and eroding the affected area of the beach. Debris and sediments, products of surface wash, discolours the beach making the area unattractive.

Surface water drainage problems at Halcyon are further compounded by the emptying of highly saline effluent, from a recently installed reverse osmosis water treatment plant, into the drains.

Some surface runoff flows via a small natural drain, which passes

under a small hut on the north side of Dickinson Bay Beach. Its effects appear less critical. Acute drainage problems occur elsewhere. Due to its relatively low elevation, the Anchorage Hotel experiences intermittent flooding from slope run-off. A northwest flowing watercourse contaminated by leaks at the West Indies Oil Refinery was partly responsible for the demise of Mc Kinnons Pond. On the southern end of the area, surface water run off, intercepted by kitchen and other household wastes, flow via concrete drains from Dickinson and St. George's Street in St. John's, into The Cove area.

Access and Circulation

Access and circulation at Dickinson Bay are seriously impaired due to improper layout of tourism facilities. Failure to make adequate allowance for the expansion of facilities during initial site planning is one of the major reasons. Expansion to Halcyon Hotel has created limitations to public access and parking.

Public access to this end of Dickinson beach is via the road leading to Shorty's Beach Bar. Apart from a small parking area next to the bar, beach users must use Halcyon's parking lot, which is sometimes accessible only to hotel patrons and staff. During major events, such as yacht races of Antigua's annual Sail Week, vehicular circulation and parking become unmanageable.

The location of Shorty's Beach Bar on the HWM at the end of the access road makes movement unto and along the beach more difficult than it otherwise would have been. Further complications arise when service vehicles drive unto the beach in order to get to beach facilities. A concrete drain carrying surface water from the Halcyon parking lot and wastes from the kitchen at Shorty's Beach Bar creates an unattractive entrance to the beach, particularly during heavy rains.

Experiences in other islands, such as Barbados, reveal that serious conflicts between residents and hotel owners can arise when public access to the beach is not assured through an appropriate public right of way (ROW). The dramatic increase of private cars in Antigua in recent times suggests that adequate parking facilities should be planned commensurate with public right of ways to facilitate beach use by residents.

At Blue Waters Beach and the southern end of Dickinson Bay beach, access is only possible over hotel property. This is neither convenient or advisable. Equally inconvenient and undesirable are the limitations to horizontal movement along the beach due to the presence of man-made structures too close to the HWM. Erosion and subsequent use of boulders for beach protection have helped to

foster such conditions between Antigua Village and Buccaneer Cove on Dickinson Bay beach.

Solid Wastes

Litter and negligently disposed wastes create an undesirable visual impact. The effects on tourism are often more damaging than can be discerned. There are alarming occurrences of litter and discarded wastes in Fort James - Dickinson Bay, not all resulting from tourism activities.

However, wastes disposed on both sides of the road near to the Antigua Village, Siboney and Buccaneer properties would indicate some link with tourism uses. In one case, it appears that the intention is to reclaim a section of Mc Kinnons Pond that was separated by previous reclamation for a new access road but the discarded construction material and other wastes used do not compliment the surroundings.

Other non-tourism related waste disposal practices also have an adverse effect on the industry. There is a tendency for people to believe that ponds and other wetlands are of no significant economic value. By inference, it is wrongly concluded that invariably, land reclaimed by solid wastes has more functional and economic value. As a result The Cove lagoon and wetland system is a target for negligent waste disposal practices.

Pollution

Sewage waste generated by tourism facilities, along with oil and associated wastes originating from the West Indies Oil Company Refinery, are major sources of pollution impact or threat to Fort James - Dickinson Bay. The ultimate effects of pollution on coastal waters, which are heavily used for swimming and other forms of marine related recreation, foster significant concern.

Sewage pollution is assumed because of generally known relationships between sewage disposal methods and certain natural resources. Appropriate tests are required to determine the degree and impact of pollution. The two assumed sources of sewage pollution are:

- a. Sewage channeled from Halcyon and subjected to oxidation treatment in two ponds at the Mc Kinnons treatment plant. Water from the second pond is used for irrigating nearby vegetable farms or allowed to flow into Mc Kinnons Pond.

It appears that the treatment is not adequate enough to allow effluent to flow into the Pond, judging from a strong odour, an indication of the presence of faecal coliform bacteria. Nearby tourism facilities claim a loss of business due to the odour.

The narrowness of the sand barrier between the Pond and sea (less than 100 ft. at the northern end of Runaway beach) may allow the sub-surface transport of pollutants that would affect the bay, and thus human health.

- b. Sewage disposed by septic tanks and soakaways or drain fields by other facilities may be problematic due to the high water table, intermittent flooding problems and the nearness of such facilities to the HWM. Erosion further aggravates the problem. For example, a soakaway draining kitchen wastes from the Siboney Beach Club was recently exposed at the HWM causing effluent to trickle into the sea. This could easily have been a soakaway connected to a septic tank.

The West Indies Oil Company no longer refines crude oil and has no immediate plans to resume refining activity. Nevertheless, the threat of a major oil spill from tankers off-loading or re-shipping imported refined products, including gasoline, LPG and jet fuel, is ever present. The terminaling operation utilizes an offshore terminal and a connecting pipeline to shorebased storage tanks. Tankers are smaller, but the frequency of calls has increased up to 2 or 3 ships per month, thus increasing the risk of an oil spill, which could inflict lasting damage to the beaches and marine resources of the area.

The Oil Company claims to have improved its waste treatment and oil spill clean-up capacity following a number of spills, that polluted Mc Kinnons Pond in the earlier years of its operations. Mulletts were reported killed as a result of such spills.

During the period of oil refining, the plant used large volumes of water for cooling and processing, drawing as much as 1.2 million gallons per day from the sea. Wastes included saline effluents from its desalinization plant, untreated seawater, and oily wastewater effluent from the oil refining and processing operations. This required an elaborate system of waste treatment, which was not always fully in place, before treated effluent could be safely discharged through a 3500 ft. outfall that terminated in 30 ft of water off Runaway Bay. Although the impacts that resulted from defects in the treatment system have been reduced because of the termination of refining activities, increased precautions would further minimize the chances of major accidents that could result from the terminaling operation.

Land Values

There has been a notable jump in land prices in the area in the past ten years, from EC\$0.50 per sq. ft. about 1976 to EC\$1.50 -

\$1.75 per sq. ft. presently for public lands being sold by the Ministry of Agriculture and Lands. Private lands are being sold for up to EC\$5.00 per sq. ft. in parts of Paradise View and Blue Waters. Beach land on Dickinson Bay may exceed E.C\$15.00 per sq. ft. Tourism is largely responsible for rising land values, which is expected to increase further with new tourism development. It is possible that land values will increase to the point where nationals will find it increasingly difficult to purchase land for home construction in the area. If the interest in real estate shown by non-belongers materializes in the further purchase of land, condominiums and other developed properties, there will be a marked shift in the make-up of the residential population of these areas.

INFRASTRUCTURE

The state of basic infrastructure, i.e., water, energy, roads and waste disposal, helps to determine the quality of the tourism product. Infrastructure capacity in Antigua has not always kept pace with demand. Shortage of finance is a major factor preventing needed expansion of plant capacities or adequate maintenance. There is reason to believe, however, that there are some deficiencies in infrastructure planning, due mainly to the absence of an adequate data base, upon which demand forecasts can be made.

While figures are not available, it is believed that tourism's demand on certain infrastructure has grown proportionately faster than any other sector or user category. It is likewise more vulnerable to acute infrastructure deficiencies or periodic problems such as water shortages and electrical outages.

Water

Water supply represents the major infrastructure deficiency. Production from combined surface and ground water sources is 1.5 - 1.6 MGD. The Antigua Public Utilities Authority's (APUA) estimate of demand, at 35 GPD per person, based on a population of 80,000 is 2.5 MGD. Recently, an extended drought dried out Potswort Dam, the major water source and reduced the island's water production by at least 60%.

The impact on the island and tourism was dramatic and costly. Hotels in Fort James - Dickinson Bay had to buy barged water for US\$50 - \$70 per 1000 gals, compared to the present normal rate of EC\$25 (US\$10) per 1000 gals. The cost, inconvenience and business lost due to severe water shortage forced at least two hotels to install water treatment plants. Halcyon installed a 30,000 GPD

Reverse Osmosis (RO) plant and Anchorage has two water treatment plants with combined capacity of about 35,000 GPD.

APUA provided information on metered water consumption, by hotels in the area, for 1983 and 1984. Some hotels received no water from APUA mains between July and October in 1984, a reflection of the gravity of the water problem. The metered figures are low, due to a system of water rationing used during the period. Room consumption rates varied from 26 GPD to 189.2 GPD. Under normal conditions the appropriate range would be 150 GPD - 300 GPD, depending on the size of the facility and the amenities offered.

An improvement of the water situation requires an increase in water production, treatment and storage capacities, improved distribution and the adoption of water conservation measures. Even under normal conditions, properties at higher elevation in Fort James - Dickinson Bay are affected by low water pressure due to the relatively low elevation of the supply reservoir at Cedar Hill.

APUA expects to increase water production by installing a 2.0 MGD desalinization plant at Crabbs Peninsula by 1987. While this would more than double the water supply, water demand by 1990 is expected to exceed 4.5 MGD. For example, planned tourism projects in Fort James - Dickinson Bay alone would require a minimum of 0.5 MGD.

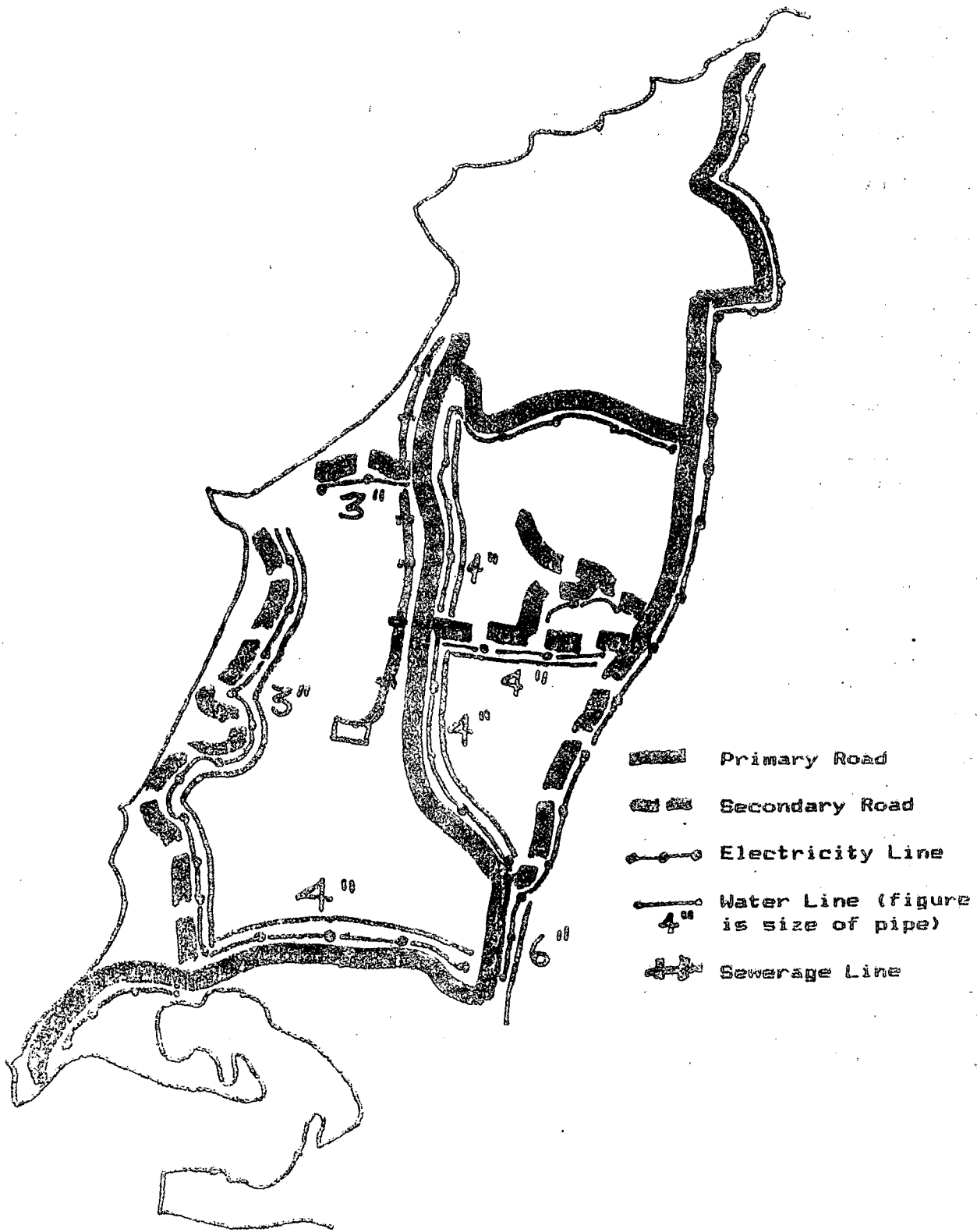
Electricity

Peak electricity demand in Antigua grew by 65% between 1976 and 1984, from 7.6 MW to 11.7 MW. In the same period the amount of electricity generated grew by 59%, from 40.4 million KWH to 68.9 KWH. Peak demand is expected to grow between 7% and 9% per year up to 1990.

Metered electricity consumption for 1983 and 1984 was reviewed for hotels in the area. The facilities listed have a combined total of 439 rooms and consumed 3.9 million KWH of electricity in 1984, or 5.6% of electricity generated by APUA for that year. Room consumption averaged 24.3 KWH per day. Although available hotel occupancy data are not reliable, electricity consumption seems to increase proportionately with increased occupancy.

Electricity consumption by hotels can be reduced if a variety of energy conservation methods are applied and proprietors resort to the use of practical non-conventional sources to meet part of energy demands. Solar water heating, for example, is enjoying

MAP 7: INFRASTRUCTURE



wider acceptance and use in Antigua. Halcyon Hotel uses a system of solar panels to heat water for about 60 of its rooms.

Condominium developments are especially suitable for the application of solar water heating, since the installation costs per unit could be recovered by individual owners in relatively quick time, due to reduced electrical bills.

Roads

Primary roads provide easy access to Fort James - Dickinson Bay from the Airport and St. John's. Existing conditions, however, suggest that major upgrading is needed for secondary roads leading to hotel and residential areas. Surfacing of the unpaved secondary roads should be a major component of a road upgrading programme.

Improvement to circulation is also necessary. To get from Dickinson Bay to Runaway Bay by vehicle, one must travel about 4 miles, unless you drive across the beach at Corbinson's Point. This is occasionally done by tourists, but is not advisable since it damages the beach. Recommendations on road adjustments to improve circulation are given in Section II.

Considering the importance of the area's beaches to public recreation, road development should make provisions for vehicular access, and complimentary parking facilities, through a system of public right of ways.

Sewage and Other Liquid Wastes

Recent and planned growth in the area makes it necessary to explore more effective ways to safely dispose of increasing volumes of sewage and other liquid wastes. Untreated or poorly treated sewage wastes constitute a major threat to public health when disposal occurs next to recreational beaches.

Most of the facilities treat and dispose sewage wastes by conventional means, mainly septic tanks and associated soakaways. Poorly drained soils, a high water table, occasional flooding and coastal erosion combine to make such disposal methods ineffective and sometimes unsafe.

An activated sludge treatment plant, which was constructed to treat wastes from Halcyon and other facilities has been out of operation for over a year. APUA is expected to repair and operate the plant. Meanwhile, the sewage is being treated by the use of oxidation ponds, but effluent is allowed to flow into Mc Kinnon's Pond, creating an odour that is uncomfortable to residents and tourists, particularly on Runaway Beach.

Halcyon Hotel is the only facility fully utilizing the plant, which is reported to have the capacity to accommodate Anchorage and another facility of 150-200 rooms. Kitchen and laundry wastes from Anchorage Hotel are hooked into the system.

One of two possible long term solutions to the sewage problems of Fort James - Dickinson could be considered, i.e., either integrate the area into the sewerage scheme already proposed for St. John's, or design and implement a separate system to service the area.

Solid Wastes

Tourist facilities in the area may generate between 1,380 lbs to 2,000 lbs of solid wastes per day depending on occupancy levels. Hotels contract with individuals to dispose of their respective wastes, while the Central Board of Health (CBH) undertakes to service residences in the area. CBH has available solid waste skips 5 ft x 6 ft x 7 ft that it rents to hotels and other facilities.

Solid waste problems of the area are already discussed and they seem to result more from negligence and perhaps lack of enforcement of pertinent laws than from deficiencies in the pick-up and disposal system.

ECONOMIC LINKAGES

Tourism's contribution to GDP grew from 12% in 1977 to about 17.6% in 1984 (measured in constant factor cost). Indirect value added in 1984 may have contributed another 7 to 8%, resulting in a total contribution to GDP of about 25%. Unfortunately, there has been an absolute decline in the agricultural sector at the time when increased growth in tourism presents better opportunities for improving linkages between both sectors.

When value added is considered, block manufacturing and cement packaging have enjoyed some increase in earnings due to increased condominium, and to some extent hotel construction activity. Nevertheless, linkages between the tourism sector and the rest of the economy are considered weak traditionally, leakages are high and multiplier effects are lower than they ought to be.

The statistical data base, which would allow an accurate assessment of the state of linkages between tourism and other sectors, or to forecast the potential for improving such linkages, remain weak and needs to be strengthened.

Discussions with hotels and restaurants in Fort James - Dickinson Bay reveal that they make special arrangements with farmers and fishermen to obtain fresh produce and fish. Such arrangements often fall short of meeting the demand of these establishments and as a result of this and other factors large quantities of agricultural produce and fresh or frozen fish are imported directly or through agents.

Ironically, the maximum allowable price for fish and lobster result in considerable export of catch to Guadeloupe and Puerto Rico where prices are much higher. In order to reduce such exports and make more fish and lobster available to hotels and restaurants, it is suggested that Government reviews its maximum pricing policy for highly valued seafood.

Perhaps a major reason why farmers fail to meet the demand for fresh produce by hotels and restaurants is the lack of sufficient information on demand patterns. Interestingly enough, the Central Marketing Corporation (CMC) recently established a statistical unit to coordinate production information, which will hopefully bring about improvement in marketing. Further achievements would be made if the CMC, in collaboration with the Ministry of Economic Development and Tourism, initiates a regular programme of market surveys to monitor demand for fresh produce and seafood among hotels and restaurants. The Extension Services of the Department of Agriculture would be responsible for conveying production estimates and demand forecasts to farmers.

Finally, considering the anticipated future growth in tourism facilities, opportunities should arise for local furniture

manufacturers and craftsmen to capture an increasing share of the market for hotel, condominium and restaurant furnishings.

Consideration should be given also to the possibility of locally manufacturing more tiles and a variety of other construction products, including fittings.

EXISTING PLANNING AND MANAGEMENT MECHANISMS

A review of planning and management mechanisms for tourism and environment related matters, reveals that responsibilities are fairly well scattered among Ministries, Departments or Divisions and Statutory bodies. The existence of a number of planning and management deficiencies may be due to one or more of several reasons, e.g. inadequate enforcement capacity, poor inter-Ministerial or inter-Departmental coordination. To determine which of these apply in respect of Fort James - Dickinson Bay would require more time than this study allows. Nevertheless, a few observations on problems and needs are given following a brief summary on the present distribution of responsibilities.

Major responsibilities appear to be distributed thus:

Ministry of Economic Development and Tourism: Economic and Tourism planning; Investment promotion; Review of proposed tourism projects; Responsibility for historic resources.

Department of Tourism: Tourism promotion.

Ministry of Agriculture, Lands and Fisheries: Processing of applications for lease or purchase of publicly owned lands for tourism development.

Fisheries Division: Responsibility for wildlife and other natural resources.

Ministry of Public Works/Public Works Department: Road Construction and maintenance; Drainage; Beach protection; Sand extraction control.

Development Control Authority (DCA): Physical planning; Development control; Land use.

Antigua Public Utilities Authority (APUA): Production and maintenance of water and electricity; To be given responsibility for supervision of the sewage treatment plant at Mc Kinmons.

Central Board of Health (CBH): Solid waste disposal; General environmental health.

Antigua and Barbuda National Parks Authority: Management of declared national parks.

Fort James - Dickinson Bay presents both an opportunity and challenge to improve the effectiveness in which such responsibilities are discharged. Considering the significant increase in tourism growth planned for the area, further environmental mistakes will become proportionately more costly. Environmental management therefore needs to be given the highest priority in policy and execution.

Formidable progress can be made if:

Future tourism development is guided by a clear statement of policy, objectives, plans and targets for growth. This could be written into a concise and clearly written document, in which maximum inter-Departmental input would be encouraged.

Environmental considerations are given more emphasis in tourism planning and project review at the Ministerial level.

A land use plan is prepared and approved for use, to give spatial reference to economic objectives, plans and growth targets.

Responsibilities for managing the environment are better streamlined and coordinated. The Ministry of Public Works and Communications may not have the capacity or a clear enough mandate to manage beaches for recreation and tourism. Its responsibility seems to rest more with sand extraction control at designated beach and back beach areas.

The DCA is provided the support it needs to effectively discharge its functions, which are vital to both tourism growth and environmental management.

Much greater efforts are made to develop and manage an effective data base for planning and decision making. Especially lacking are the scientific data needed to help monitor and interpret changes to critical natural resources and environmental processes, e.g., littoral sand transport.

SECTION II

GUIDELINES FOR MANAGEMENT AND DEVELOPMENT OF FORT JAMES -
DICKINSON BAY

This section provides recommendations and/or guidelines with the over-riding intention of harmonizing future development with environment potential and constraints.

PLANNING AND MANAGEMENT MECHANISMS

Quality tourism in Fort James - Dickinson Bay requires that the quality of its environment be maintained. Managing the environment, while developing the area to its fullest potential requires effective coordination among appropriate Ministries, Departments and Statutory Bodies, along with collaboration between the public and private sectors, in the latter's case, particularly property owners. Major areas through which planning and management mechanisms can be improved, thus ensuring better coordination and collaboration, include:

1. Strengthen and further involve the Development Control Authority (DCA) in reviewing development applications and providing technical advice to the Ministry of Economic Development and Tourism and the Cabinet upon which Government decisions on major development proposals can be based. The structure of the DCA allows for key and invaluable interdisciplinary technical input into major decisions that must be made at Cabinet level.
2. Commission the DCA to prepare a land use plan for the area, to be subsequently reviewed and approved by Cabinet. Maximum involvement of property owners and review by other interest groups should be encouraged to ensure public consensus on the objectives for future management and development.
3. Require that developers prepare and have approved impact assessment studies, particularly for projects with suspected critical impacts on the area's resources, ecological or biophysical processes, e.g. littoral sand transfer. Such studies provide an opportune way for government to gather invaluable scientific data on which future decisions can be based and changes to the environment monitored.
4. Involve the APUA, through membership or observer status on the DCA, or other means, in the review of development applications so that it can respond appropriately to additional demands on infrastructure.
5. Assign the responsibility for managing beaches, public open spaces and the proposed Fort James National Park to the Antigua and Barbuda National Park Authority.

The beaches of Fort James - Dickinson Bay warrants comprehensive management by a single body, whose aim would be to enhance their value for recreation and tourism. It is hoped that the newly formed Authority will in time develop the competence to qualify it as the body most able to manage beaches of outstanding recreation and economic value.

LAND USE

While zoning may be too restrictive for island communities, a land-use plan approved by Cabinet and executed by the DCA can be an invaluable tool in promoting understanding and cooperation between land owners, developers and Government technicians. Preliminary recommendations for land use are given in Map 8.

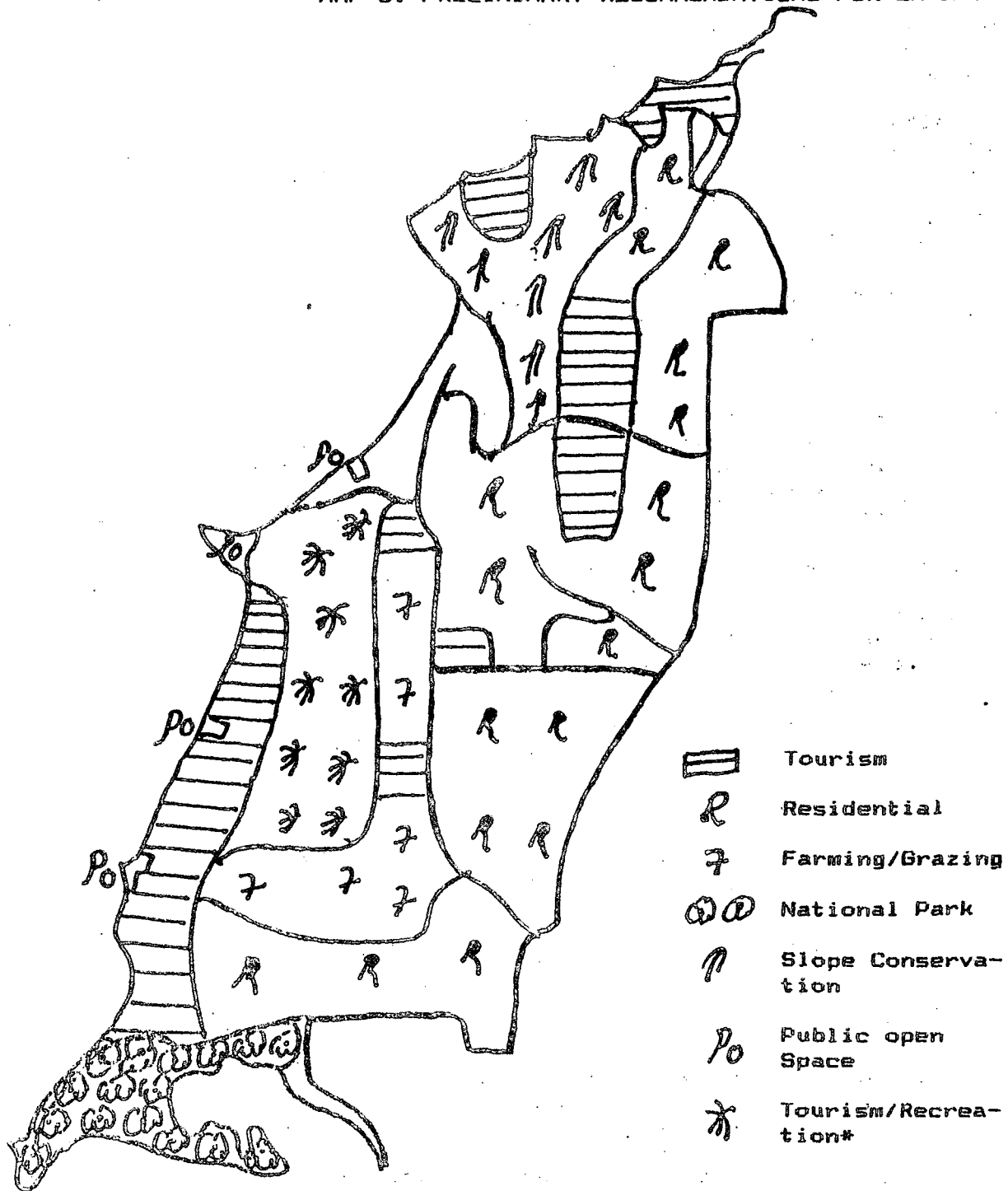
The following considerations helped to frame the recommendations:

1. The need to assign as much land as possible for tourism development, due to the importance of the industry to Antigua's economy.
2. At the same time, it is important that a network of public spaces be set aside to allow the public adequate access to the area's coastline and maximum recreational use of its beaches. Open spaces will also help to moderate densities and prevent overcrowding.
3. Fort James becomes the nucleus of the system of public open space and its historical importance provides opportunities for adaptive cultural uses.
4. Certain areas qualify for strict conservation measures, i.e.:
 - The Cove mangrove lagoon because of its importance to fisheries and its function as a habitat and nesting area for hundreds of white egrets.
 - The ridges and upper slopes of the hills, for two main reasons, i.e., to minimize problems of water run-off and soil erosion and to prevent further imposition of buildings on ridge lines, which can radically transform the landscape. This has already happened at Halcyon Heights and Paradise View.

BUILDING MEASURES

Future development policy should be to maximize and fully realize the area's potential for tourism development. However, the man-made environment created by such development should be orderly, functional and

MAP 8: PRELIMINARY RECOMMENDATIONS FOR LAND USE



* To be determined after environmental impact assessment

complementary to the natural surroundings by giving due consideration to density, height, setback, access and circulation in design and site planning, particularly at the coastline:

1. **Density.** Establishing appropriate room or bed to acre densities require detailed review. A preliminary assessment suggests that for the near future, density should not exceed 20 rooms or 45 beds per acre, which now exists at Antigua Village.

As a corresponding measure, plot coverage should be appropriate to avoid building congestion and total impairment of views unto the sea. On the other hand, haphazard siting of buildings which closes off future options for expansion should be avoided.

2. **Height.** For the near future, there seems to be no reason for building height to exceed three storeys, the latter being more appropriate where vegetation provides suitable cover. For example, as a rule of thumb, buildings should not exceed the height of coconut trees where they are located.
3. **Setback.** The extent of beach erosion at Fort James - Dickinson Bay beaches over the past three to four decades and the specific problems being experienced at Dickinson Bay make it necessary to adopt and enforce measures to set back buildings a suitable distance from the high water mark (HWM). If present trends continue, erosion at Dickinson could be upwards of 3 ft average per year. It may be possible to curb the erosion rate, or even reverse the trend through sensibly designed and engineered coastal defence measures. Nevertheless building design and siting should assume that net loss to beach and beach land will continue.

It is recommended that a 150 ft. minimum setback from the HWM be applied as a rule of thumb, for new buildings, to be modified at the discretion of the DCA, where practical or other considerations make it necessary (See Map 9). The setback would minimize further interference with littoral processes resulting from buildings too close to the HWM, and significantly reduce the cost of shoreline protection for developed property.

4. **Access and Circulation.** Measures should be taken to ensure that public access to the beach at appropriate points on the coastline remains free and unincumbered. Existing beach accesses at several properties on Dickinson Bay are poorly planned. Adequate provisions should also be made for access and circulation of service vehicles. Due to the lack of service access to beach facilities at Halcyon Cove, vehicles consistently use the beach. It is suggested that this

practice be halted, since it could further degrade the affected section of the beach.

MAJOR COASTAL ALTERATIONS AND ADJUSTMENTS

A northern section of Mc Kinnon's Pond was reclaimed to re-route access to Buccaneer Cove and to provide car parking facilities. In 1981 Government leased 2 acres of the Pond to a developer who was to reclaim it to expand a development planned for Corbinson's Point. Government is presently considering the Mc Kinnon's Resort Development proposal, which would involve dredging and reclamation of the Pond.

It seems then that a Cabinet level decision has been made to develop the Pond as recommended in the 1974 Island Resources Foundation report. A slight increase in bird life at the Pond provides a reason to review its status but perhaps not sufficient justification to consider its protection in view of perceived social and economic benefits that will accrue from development.

1. Extreme precaution should be taken to avoid the damaging results that development of the Pond could have on coastal processes and adjacent beaches. For example, cutting a channel for the proposed marina north of Corbinson's Point would result in increased sand movement southward into the created marina, and subsequently erosion or even loss of Dickinson Beach, unless costly preventative engineering solutions can be found. It is highly recommended that an environmental impact and design study precede the implementation of any development project for Mc Kinnon's Pond.
2. If a major dredging and reclamation project is undertaken, it is suggested that an equally major decision be made to re-align the Fort James - Runaway Bay road, as shown on Map 9. This would maximize tourism development potential on Runaway Beach by increasing the land area between the road and the HWM, helping to compensate for land loss due to ongoing erosion.

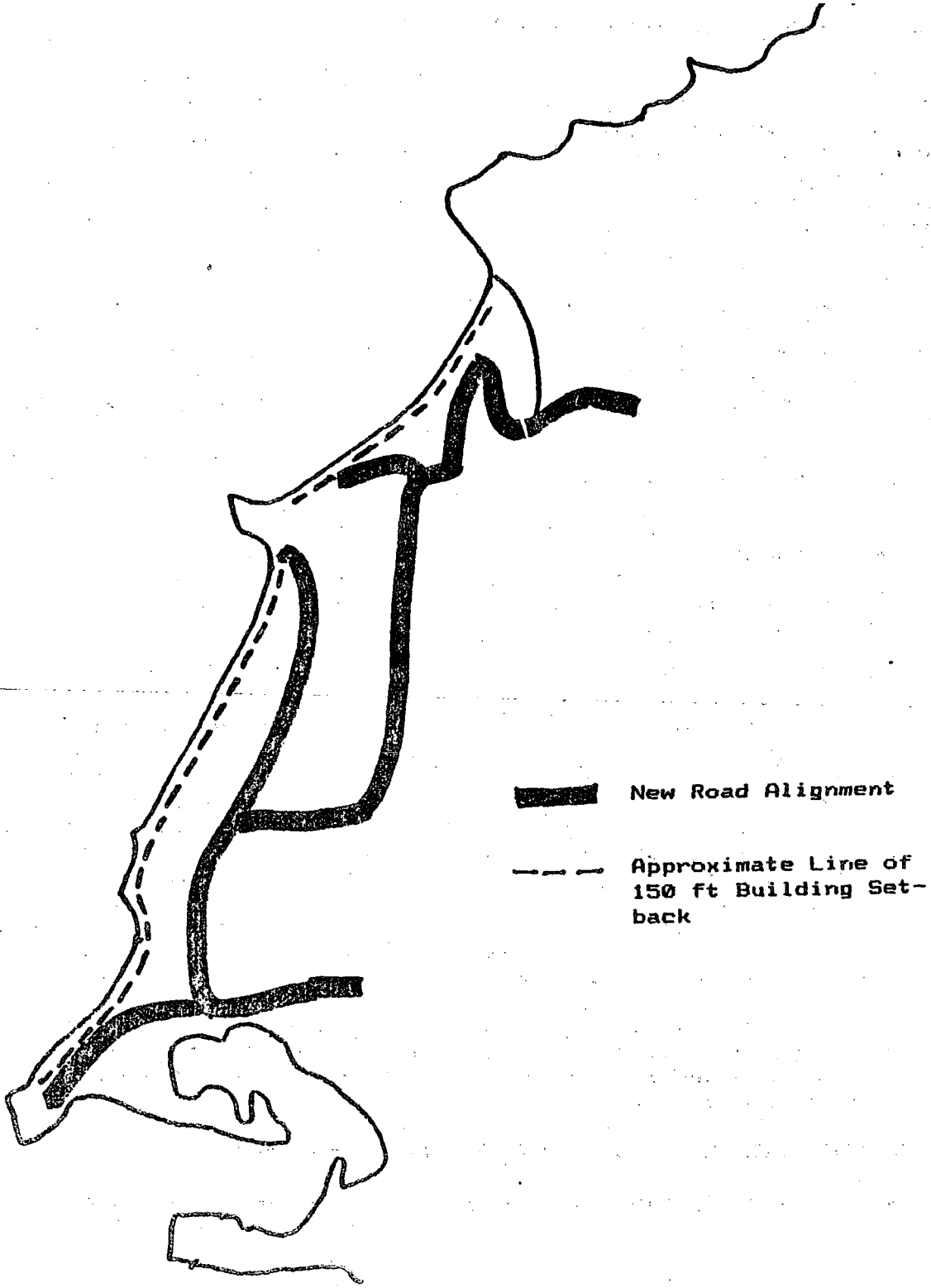
The routing of the road south and east of the proposed marina would provide needed circulation and access between Fort James, Runaway Bay and Dickinson Bay.

3. An environmental impact assessment study should also precede any major development that may be approved for Fort James. It should pay particular attention to possible effects on The Cove mangrove lagoon.

LANDSCAPE, WATER CATCHMENT AND DRAINAGE MANAGEMENT

Mc Kinnon's Pond, The Cove mangrove lagoon and associated swamp

RECOMMENDED MAJOR ROAD ADJUSTMENT
AND BUILDING SETBACK



and the large expanse of beach coastline, make Fort James - Dickinson Bay an area of extremely high environmental vulnerability. Steep slopes and fairly rapid surface drainage make the area further susceptible to human impacts.

A drainage or soil erosion problem originating in the slopes may have its greatest impact in the littoral or beach zone, which is the most dynamic component of the area's environment. The drainage problem at Halcyon has its greatest visible impact on the beach and may be affecting coastal resources in ways not yet detected. Guidelines to be considered, include:

1. New construction and building activities should seek to achieve minimum vegetation clearance and earth movement particularly on steep slopes. Major excavations should be avoided where possible. Attempts should be made to improve vegetative cover where needed. This will help to reduce the rate of surface wash and soil erosion. Adequate vegetation cover on the hills and slopes of Weatherills, for example, helps to maintain the quality of beaches and coastal water. It does this by reducing the amount of sediment that would otherwise be washed down to the sea from more exposed slopes. Sediments may reduce water clarity, change the complexion of the beach over a period of time and may even damage coral reefs and seagrass beds.

Maintenance of vegetation cover is also important to a healthy and attractive landscape.

2. It is also important for building and other forms of development to avoid major changes to natural water courses and drainage that have achieved stability over a period of time. Where major adjustments are necessary, such as Halcyon, measures must be taken to avoid major damage to resources.

It is strongly recommended that Halcyon Hotel investigates the most appropriate measure to eliminate the current surface water discharge problem that is damaging to the beach. Consideration could be given to catch, store and use the water.

BEACH MANAGEMENT

Beach protection and improvement is perhaps the most critical resource management issue facing the area. Piecemeal coastal defense measures may improve the beach front of individual properties, but could be damaging to others. Solutions to the problems at Dickinson Bay must be derived from an understanding of the littoral characteristics of the larger coastline. Assuming that the Antigua and Barbuda National Park Authority will be given the responsibility for managing the Fort James - Dickinson Bay beaches, the following recommendations should be considered:

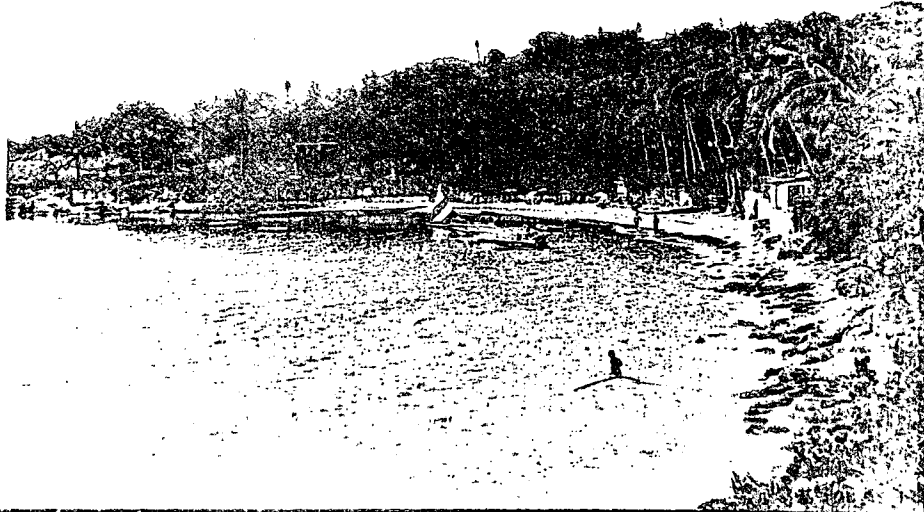
1. The Authority, with the collaboration of appropriate property owners, prepare a project and seek funding for a study of the area's beaches and for undertaking beach protection and improvement works at Dickinson Bay.
2. The study should provide general guidelines and specific instructions governing long term use of the beaches and for the monitoring of changes of beach profile due to erosion or accretion.

NATIONAL PARK AND OPEN SPACES

Future tourism development is expected to further intensify the demand for beach land and beach use. As new structures emerge on presently vacant beach lands, public access to some beach areas will become somewhat restricted. Although such restrictions are not imposed, residents tend to favour undeveloped or less developed beaches, particularly those with adjacent publicly owned lands, e.g. Fort James Beach.

Fort James is well suited for development as a National Park, where existing uses of swimming, running, beach games, picnics and Labour Day festivities would be fully facilitated in the future. Small parcels of publicly owned lands on Runaway and Dickinson Bays should be reserved as open spaces to facilitate public recreation and beach use. More specific recommendations include:

1. The Fort James National Park would include Fort James Beach, The Cove mangrove lagoon and other areas as shown on Map 8, and would be managed by the Antigua and Barbuda National Park Authority. The lagoon should be placed under strict conservation as a bird sanctuary, fish production and fish habitat reserve.
2. The Authority would then provide leases or concessions for appropriate development and commercial ventures within the park. Such developments should be designed and sited, so as not to compete with or restrict public recreation.
3. An important aspect of the park's development would be to restore and adapt the Fort James historic fortification to appropriate uses, some of which may generate revenue.
4. Two of several projects could be considered for implementation:
 - a. A Visitor/Interpretation Centre, to interpret the history of Fort James and the natural resources of the park and to provide other visitor information.



Blue Waters Hotel partly hidden by trees. Beach developments should maintain vegetation cover.



Dickinson Bay Beach also has good vegetation cover.



Langford Bay. The vegetation on the slopes helps to reduce erosion and sedimentation and maintains the quality of the Bay.



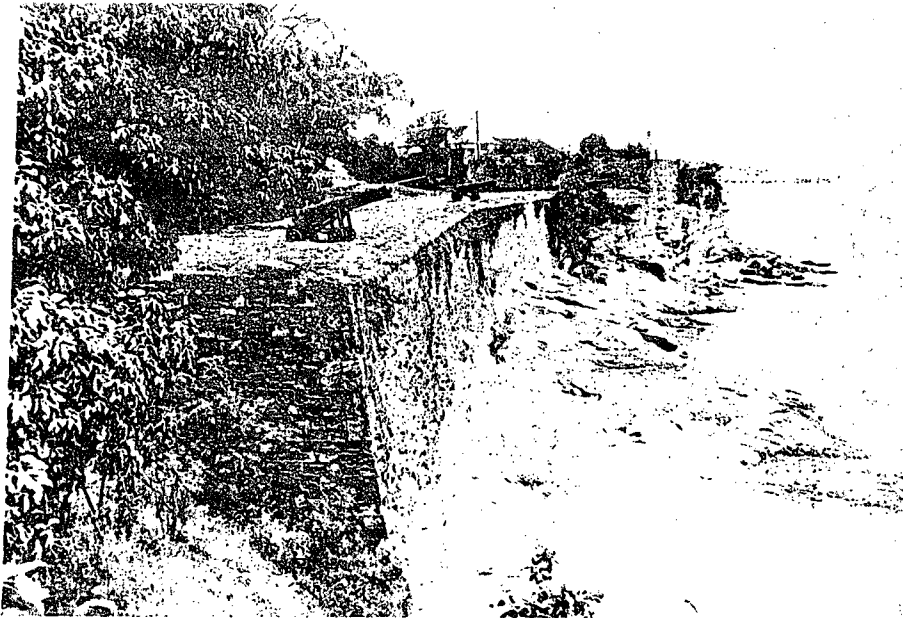
Former opening to Mc Kimmons Pond, now closed. If re-opened for a marina without safeguards, adjacent beaches could be severely damaged!



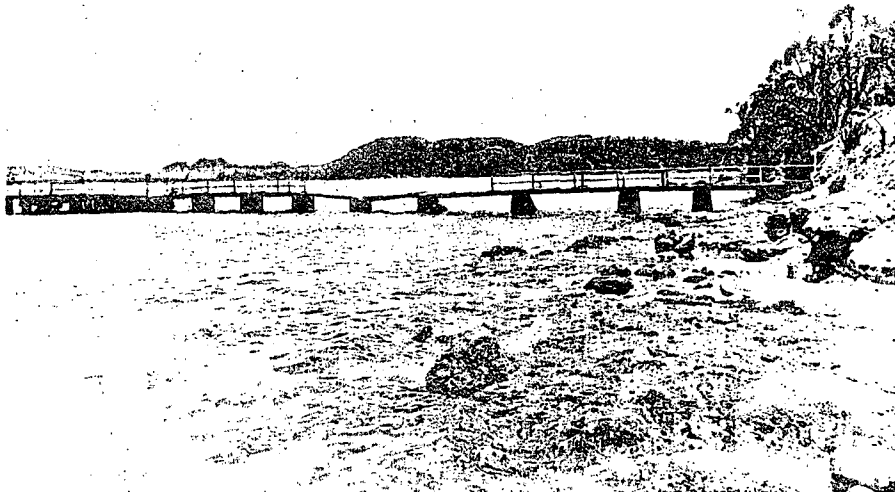
Northwest wall of Fort James. Proposed site for a Center for the Performing Arts within the National Park.



Snack bar at Fort James. Concessions would be granted to operate such facilities within the Park.



West wall of Fort James, showing three mounted
canons. The Fort's history would be interpreted.



Repair of this jetty would improve access to the
Fort James National Park by sea.

- b. A Performance Centre for National Arts to be erected along the Fortification's northwest wall and adjacent open area.

INFRASTRUCTURE

Further tourism development in Fort James - Dickinson Bay should be phased to coincide with needed improvements in basic infrastructure. Infrastructure planning should give priority to water supply and sewage disposal, though balanced attention should be given to other areas.

Given existing inadequacies, a development such as the proposed Mc Kinmons Resort may be out of proportion to present infrastructure capacity. APUA's involvement in the review of this and similar proposals may avoid excessive strain on infrastructure services, that may be damaging to tourism itself.

In addition to suggestions on infrastructure given in Section I, the following recommendations are worth consideration:

Water

1. Investigate the feasibility and efficiency of constructing a larger storage reservoir in the Paradise View/Marble Hill area to replace a small existing tank. Such a reservoir could function either as an integral part of an improved water distribution system for the area, or as a standby source to be used in critical periods.
2. Initiate new investigations to identify exploitable water sources and use results to supplement existing information in view of preparing water development projects for funding.
3. APUA, in collaboration with the DCA, initiates a programme aimed at encouraging the use of conservation devices and plumbing fixtures in local building practices. Hotels may find that the adoption of water conservation measures, such as installing water flow restrictions in shower heads and basin faucets, could result in substantial savings.

Sewage

1. Although the long term solution to sewage disposal is the implementation of a public sewerage system, short and medium term solutions may require that individualized package sewage treatment plants be used by some developments.

Package plants, however, require good maintenance to avoid mechanical failures and breakdowns. It may be best to have such plants discharge effluent into the ground via suckwells

in preference to outfalls.

2. In anticipation of the future implementation of a public sewerage system, new developments should be required to make adequate preparations for eventually tying into the system.
3. A major objective of waste management, is the control of pollution. Rather than assume the presence or absence of pollution, decisions should be based on facts drawn from scientific observations supported by appropriate tests and monitoring. It is recommended that initially a study be commissioned to determine the extent of pollution in the recreational bays of Fort James - Dickinson Bay. As an outcome of the study, CBH should be assigned the responsibility for a long term programme to test and monitor water quality in respective bays.
4. Meanwhile, a short term solution must be found for the odour problem at Mc Kinnon's Pond. Consideration should be given to: (a) repair and operate the treatment plant and ensure effective maintenance against future prolonged breakdowns; (b) increase the capacity of the oxidation ponds and make provisions to contain the effluent, rather than allow it to flow into the Pond.

Electricity

1. Existing and new developments should fully explore the possibility of reducing electricity costs by installing solar water heating devices. Solar water heating systems are readily available locally.
2. A number of electricity related energy conservation methods, resulting in considerable savings, have been adopted by hotels in other parts of the Caribbean and ought to be considered for application in Antigua, e.g. maximize the use of fluorescent, in preference to incandescent lighting; use photo-electric cells to control outside lighting; use paget controllers, which automatically turn off air conditioning units, through the use of sensors attached to doors, when guests leave their rooms.

It is claimed that tests carried out using the above measures reduced electricity consumption per room by an average of 6 KWH per day.

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