

UNCLASSIFIED

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523

GRENADA

PROJECT PAPER

INFRASTRUCTURE REVITALIZATION

AID/LAC/P-203

Project Number: 543-0008

UNCLASSIFIED

Grenada

543-0008

Latin America and the Caribbean

05

Infrastructure Revitalization

0 9 3 8 6

8 4

Quarter 3

Final FY 85

A. FUNDING SOURCE	B. FUNDING		C. LIFE OF PROJECT		D. TOTAL	
	B. FY	C. LC	E. Total	F. FY	G. Total	H. Total
AID Appropriated Total	1,075	4,925	6,000	1,075	4,925	6,000
(Grant)	1,075	4,925	6,000	1,075	4,925	6,000
(Loan)						
Other						
U.S.						
Host Country	-	537	537	537	537	537
Other Donors)	1,075	5,462	6,537	1,075	5,462	6,537
TOTALS						

9. SCHEDULE OF FUNDING

A. APPROPRIATION/PURPOSE CODE	B. PRIMARY TECH CODE	C. OBLIGATIONS TO DATE		E. LIFE OF PROJECT		
		D. Grant	F. Loan			
(1) ESF	ESA	701	890	0	6,000	6,000
(2)						
(3)						
(4)						
TOTALS					6,000	6,000

11. SECONDARY TECHNICAL CODES (maximum 3 codes of 3 positions each) 821 825 826

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each) A. Code B. Amount

13. PROJECT PURPOSE (maximum 480 characters)

To assist in improving Grenada's physical infrastructure to a level required to create immediate employment opportunities, encourage foreign Exchange inflows, and encourage a long-term flow of private sector investment.

14. SCHEDULED EVALUATIONS Interim MM YY Final MM YY 15. SOURCE/ORIGIN OF GOODS AND SERVICES X 000 X 91 X Local X Other (Specify) 935

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of 1 page of amendments)

17. APPROVED BY James W. Habron AID Representative USAID/Grenada Date Signed DD YY 11 08 84

18. DATE DOCUMENT RECEIVED IN AID/W. OR FOR REVIEW DOCUMENTS, DATE OF DISTRIBUTION MM DD YY 11 08 84

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UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON D C 20523

PROJECT AUTHORIZATION

Name of Country : Grenada
Name of Project : Infrastructure Revitalization
Number of Project : 543-0008

1. Pursuant to Section 531 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Infrastructure Revitalization Project for Grenada, involving planned obligations of not to exceed Six Million United States Dollars (\$6,000,000) in grant funds ("Grant") over a two (2) year period from the date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the project. The planned life of the project is two (2) years from the date of initial obligation.

2. The project ("Project") will assist the Government of Grenada ("Grantee") in improving designated roads, schools, water systems, waste water systems, solid waste collection and electrical distribution. It will also develop a small amount of tourism infrastructure and industrial space for private sector manufacturers.

3. The Project Agreement, which may be negotiated and executed by the officer to whom such authority is delegated in accordance with A.I.D. regulations and Delegations of Authority, shall be subject to the following essential terms and covenants, and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

A. Source and Origin of Commodities, Nationality of Services

Commodities financed by A.I.D. under the Grant shall have their source and origin in Grenada or in the United States, except as A.I.D. may otherwise agree in writing. Except for

ocean shipping, the suppliers of commodities or services financed under the Grant shall have Grenada or the United States as their place of nationality, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Grant shall be financed only on flag vessels of the United States, except as A.I.D. may otherwise agree in writing.

B. Conditions Precedent to Disbursement

1. Disbursement for Solid Waste

Prior to any disbursement, or to the issuance of any commitment documents under the Project Agreement for activities under the Solid Waste component, the Grantee shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., evidence that (a) the Ministry of Health will receive, in good working order, two crawler type tractors, two dump trucks, and one road vehicle for use in the operations of Grenada's sanitary land-fills when this equipment is no longer needed in the A.I.D.-financed Point Salines Airport Project; and that (b) the land selected for the location of the new Telescope land-fill is owned by the Government of Grenada and is under the jurisdiction of the Ministry of Health.

2. Disbursement for Factory Shells

Prior to any disbursement, or to the issuance of any commitment documents under the Project Agreement for activities under the Factory Shells component, the Grantee shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., evidence that the land and building selected as the location for factory shells will be under the jurisdiction of the Ministry of Industrial Development for lease to private enterprises.

3. Disbursement for School Rehabilitation

Prior to any disbursement in excess of Five Hundred Thousand United States Dollars (US\$500,000), or to the issuance of any commitment documents under the Project Agreement for activities under the School Rehabilitation component, exceeding Five Hundred Thousand United States Dollars (US\$500,000), the Grantee shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., (a) a plan that indicates the number of people to be recruited and the provisions for their

continued training to assure continued maintenance of the schools rehabilitated under the Project, and (b) evidence that the Ministry of Education has requested sufficient funding from the Ministry of Finance for the maintenance of the schools rehabilitated under the Project.

4. Disbursement for Leak Detection Equipment

Prior to any disbursement, or to the issuance of any commitment documents under the Project Agreement for activities involving the leak detection equipment for the Central Water Commission, the Grantee shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., evidence that a leak detection unit has been established within the Central Water Commission and adequately funded to provide services of leak detection and repair in the water systems of Grenada.

C. Covenants

The Grantee shall covenant that, unless A.I.D. otherwise agrees in writing:

1. The Ministry of Tourism will utilize concessions with the private sector as the preferred method of operating and maintaining the Grant-funded facilities at Fort Frederick and Grand Etang.

2. Fort Frederick shall be placed under the jurisdiction of the Ministry of Tourism which will assure its maintenance and operation as a historical site of both national and international interest.

3. The Ministry of Construction and the Ministry of Education will receive adequate funding to assure proper maintenance of the roads and schools.

4. The Ministry of Health will assure (a) the construction of earth berms at Perseverance and Telescope land-fills to reduce the leaching, (b) the placement of a portable wire fabric fence at the proposed Telescope land-fill to prevent fugitive trash from offshore winds, and (c) the daily covering of Perservance and Telescope land-fills with a proper layer of soil.

5. The Government of Grenada will assure that the traxcavator on loan to the Point Salines Airport Project from the Ministry of Construction's Central Garage is returned to the Central Garage by the first half of October, 1984, for use in the Telescope Quarry, and that the government owned and

operated entities supplying materials for the A.I.D.-financed road activities receive sufficient budget allocations to supply the inputs necessary for the Project.

6. The operations of the A.I.D.-financed factory shells will be accounted for as an enterprise fund and there will be an independent annual review of the financial statements or segment financial statements pertaining to the A.I.D. supported factory shells for at least five years from the date of the Project Agreement.

7. The Government of Grenada will reduce pollution in the Grand Anse beach area by requiring the St. George's University of Medicine and the Grenada Beach Hotel to use intermittent sand filtration, and by requiring the Grand Anse Shopping Center to use intermittent sand filtration and chlorination to treat their effluent before discharging it, or such other appropriate action to achieve the equivalent levels of treatment.

8. The Ministry of Education will submit a maintenance plan for reducing the recurring maintenance costs of the public schools and will allocate the resources necessary to cover the expenses of the Ministry of Education Maintenance Team on an annual basis.

D. Waivers

The requirement that commodities financed by A.I.D. have their source and origin in the United States is hereby waived in order to permit the procurement of right-hand drive trucks, right-hand drive motor vehicles, spare parts and equipment, in order to permit the standardization of equipment and related services and to provide for the accessibility of spare parts, in an amount not to exceed Two Hundred Eighty Thousand United States Dollars (US\$280,000), from countries included in A.I.D. Geographic Code 935.

The provisions of Section 636(i) of the Foreign Assistance Act of 1961, as amended, are also hereby waived.

I hereby certify that exclusion of procurement from free world countries other than Grenada and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program.

Victor M. Rivera

Victor M. Rivera
Assistant Administrator
Bureau for Latin America and
the Caribbean

Sept 21, 1984

Date

Clearances:

GC/LAC: JSilverstone *[Signature]* date *9/20/84*
LAC/DR: ILevy *[Signature]* date *9/22/84*
LAC/LR: DJohnson *[Signature]* date *9/21/84*
LAC/CAR: TBratrud *[Signature]* date *10/21/84*

PGJ
GC/LAC: PGJohnson/gw 0294A/9/20/84

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INFRASTRUCTURE REVITALIZATION
PROJECT PAPER

I. SUMMARY AND RECOMMENDATIONS

A. Recommendation

USAID/Grenada recommends authorization of a grant of \$6,000,000 to the Government of Grenada (GOG) to finance the Infrastructure Revitalization Project. The GOG will contribute \$537,000.

B. Project Summary

Grenada has a severe unemployment problem, estimated to be one third of the labor force. It is compounded by its youthfulness and exacerbated by recent events. Creating immediate and sustainable employment opportunities is a primary concern of the GOG and USAID/Grenada. Generating employment opportunities through increased investment is difficult because of the condition of Grenada's infrastructure. Investors will not commit funds in Grenada until the state of the infrastructure is supportive of their needs.

Infrastructure Revitalization will eliminate some of the more immediate problems and consequences of unemployment. At the same time, it will bring a good portion of Grenada's infrastructure up to acceptable standards and resolve a few of the constraints to attracting investments to Grenada. The Project will assist Grenada improve its roads, schools, water system, waste water system, solid waste collection, and electrical distribution. It will also develop a small amount of tourism infrastructure and industrial space for private sector manufacturers. The Project is expected to create 132,000 person days of employment over its two year life.

C. Summary Findings

The Project Review Committee has reviewed all aspects of the proposed Infrastructure Revitalization Project and finds that it is financially, economically, technically, environmentally, and socially sound, and consistent with the development objectives of the host country and of USAID. The Project Review Committee has further determined that the institutions participating in the Project's activities are institutionally capable of administering the Project as designed and explained in the Project Paper.

D. Project Issues

Issues identified in the AID/W review of the PID are addressed as follows:

Selection criteria: criteria were used to select from the initial list of proposed project activities (see ANNEX II, Exhibit J). The roads activities were considered against the criteria along with almost all of the other activities.

Major restorations: system overhauls or endeavors such as those needed for the sewerage and telephone systems were not considered (see Section IV, C.1.).

multiple sector project: The Project will fund a Monitoring Unit (see III B. 9.). Also, construction schedules are such that construction of in some sectors ends as construction in others begins. Three of the participating institutions have limited responsibilities.

Private sector: Some construction work will be done by private contractors, and the management of the tourist facilities will be concessioned to private enterprise. Private sector was involved in the proposed Project to the extent possible.

Telephone: Assistance for the telephone system was rejected after a careful review of the complicated problems involved in improving it (see Section IV. C. 1.). It may be considered at a later date in another project.

Procurement: Waivers of source and origin regulations are included in the Project Authorization.

II. PROJECT BACKGROUND AND RATIONALE

A. Economic Overview

Grenada is a small island nation of 133 square miles and about 91,000 people. The major structural characteristics of its economy are its size, openness and reliance on agriculture. In 1982 its gross domestic product was about \$107 million, the sum of its exports and imports of goods and nonfactor services was over 90 percent of GDP, and agriculture represented about 25 percent of GDP.

Past performance of the economy has been mixed. Between 1975 - 1978, real GDP grew at 3.8 percent with growth in percapita incomes averaging 2.3 percent per annum. During this period production in most sectors increased because of favorable world prices for Grenada's major export crops, good weather conditions, and increased tourism. Yet Grenada was still confronted with high unemployment and underemployment, inadequate production of basic foodstuffs, high inflation and persistent deficits in the balance of payments. This brief period of growth did not create the base or environment to establish a sustainable pattern of economic growth.

The real rate of growth in the Grenadian economy in the ensuing period (1979-1982) fell sharply to only 0.2 percent per annum. The performance of the different sectors during these years varied. Agriculture declined because of low productivity and decreased revenues from bananas, cocoa, and nutmeg. Tourism declined because of adverse publicity, and manufacturing stagnated. There was growth in construction though, which was primarily the result of the work on the Point Salines airport.

Grenada's growth potential has long depended on the outlook for exports of goods and services, the terms of trade, and the amounts of foreign savings the country is able to attract from transfers, grants, loans, and private investment. Yet, Grenada's current account deficit has grown from the equivalent of 1 percent of GDP in 1978 to 33 percent in 1982, chiefly the result of stagnant export earnings and a steep increase in imports associated with government investment programs. It has financed the current account deficits

with foreign grants and concessionary loans, raising the foreign debt to GDP from 16.1 percent in 1978 to 28.1 percent in 1982. The debt service ratios have been steadily rising, owing mostly to heavy governmental expenditures and the increase in nonconcessionary financing. It is now expected to rise to 10-13 percent of export earnings by 1985. Current debt service payments amount to \$12.5 million, consisting of principal repayments of \$8.8 million, interest of \$3.2 million, and a sinking fund contributions (\$416,000). These debt service payments are the most significant contributor to an unfinanced fiscal gap which threatens to produce a fiscal crisis of major proportions.

Three sectors, agriculture, tourism and light manufacturing, have taken on an important role for future growth prospects. Agriculture is the largest sector in the Grenadian economy. The sector employs about 30 percent of the labor force. Bananas, cocoa, nutmeg, and mace represent about 75 percent of agriculture's contribution to GDP and a similar percentage of merchandise exports. The agricultural sector has significant structural problems: nearly one third of the available land is idle; labor-productivity is low; holdings are small and fragmented; technology and cultivation practices need to be updated; credit is not readily available; and infrastructure is inadequate. Medium sized private commercial producers must be supported as a means of increasing quality products at competitive costs. This will generate employment on the farm and off the farm in packaging, processing and transport of goods moving to export markets and into the growing tourism sector.

Tourism in Grenada has declined over the past decade, especially in the last five years. The number of days spent by stayover visitors fell by 27 percent from 270,400 in 1978 to 197,200 with expenditures by all visitors falling in real terms by 50 percent over the same period. Tourist receipts, nevertheless, continued to account for about one-third of Grenada's total foreign exchange earnings. The Grenada tourism sector including hotels, restaurants and other tourism activities was estimated by the World Bank in 1979 to have generated 4.5 percent of GDP and to have provided employment (albeit seasonal) for 1,738 persons, or approximately 5.8 percent of the labor force at that time. Tourism has an important role to play in the development of Grenada. With the necessary infrastructure in place, effective tourism promotion, substantial private investment completed in hotels and other accommodations, the rehabilitation of yacht facilities, and

greater vertical integration in supplying the tourist industry, it is possible by the end of the decade for tourism to account for 12-15 percent of GDP. The sector could provide employment for more than 10 percent of the labor force and continue to earn approximately one-third of total foreign exchange receipts.

The small manufacturing sector in Grenada produced less than three percent of GDP from 1978 to 1982. Products were largely for domestic market. A small but increasing amount of garment manufactures for export to Trinidad developed in the period up to 1983, when the market suffered an abrupt setback due to trade restrictions imposed in Trinidad. There is a limited number of entrepreneurs in Grenada with the experience in managerial and technical skills required in manufacturing and none have engaged in production on the scale and to the quality standards required for export to the North American market. Labor is largely unskilled, but most workers are literate and trainable. Grenada's industrial plants and factory shells are located in various scattered areas adjacent to St. George's. The absence of good air connections with the outside world, the deterioration of infrastructure, a generally hostile attitude toward the private sector by the People's Revolutionary Government and high rates of corporate taxation account for the limited development of manufacturing since Independence in 1974. Yet the picture for light manufacturing in Grenada is brighter now because of its designation as a beneficiary of the trade provisions of the Caribbean Basin Initiative, the existence of an educated labor force, and renewed confidence of investors in the domestic and international economy.

B. Problem Description

Grenada's economy is stagnating, with negative implications for employment and thus, incomes and the island's standard of living. The unemployment problem is compounded by its youthfulness and exacerbated by recent events. The best information on the nature of the unemployment problem, a 1980 survey, estimated the pool of unemployed at 8,500, approximately 75 percent of which were in the 15 to 29 age group. Sixty-four percent of the unemployed were 24 or younger. Of all the unemployed, 58 percent were female and 42 percent were male. Females 24 years of age or younger comprised 37 percent of all those out of work. The characteristics have not changed with time; the unemployed remain primarily a disenchanting youthful segment of the population.

An unfortunate consequence of the October 1983 rescue mission was the substantial increase in Grenadas' unemployed, now estimated at 13,000, or approximately one third of the country's 39,000 work force. The 1,600 members of the Peoples Revolutionary Army, the 400 airport workers, and the 125 Grenadian support personnel who lost their jobs after the rescue mission remain mostly jobless today. In addition, the country's garment industry has laid off 200 workers because of the import licensing scheme introduced by Trinidad and Tobago to compensate for some of the difficulties it is encountering with its own unemployment problem.

Given the structure of Grenada's economy, investment must be encouraged in agro-industry, tourism, and light manufacturing, the three sectors most capable of stimulating growth, earning foreign exchange, increasing employment opportunities and thus raising incomes for Grenada's workforce. However, increased investment and attendant productivity in all three sectors is currently constrained by pre-election political uncertainties, ineffective economic policies, and badly deteriorated public infrastructure.

The inadequate infrastructure is a significant obstacle to investment across sectors, confirmed by staff field reports and interviews with investors. The Interagency Team on Commercial and Private Sector initiatives travelled to Grenada in November 1983, to examine general economic and private sector conditions in the aftermath of the rescue mission. In its analysis of the principal constraints to increased trade and investment, the team recommended support for the rehabilitation of public utilities and infrastructure. It further identified priority concerns in infrastructure as: completion of the Point Salines airport, primary road repair and maintenance, construction of feeder roads, improvements in the supply and distribution of water and electricity, and investment in more reliable communications systems.

Since the intervention, one AID official has discussed investment possibilities with approximately 200 foreign investors who were considering or had considered investing in Grenada. The most prevalent reason he was given for not locating in Grenada was the state of the infrastructure. Similarly, the Project Development Assistance Program (PDAP) representative in Grenada reports that at least 35 U.S. firms in a broad range of product areas, including electronics, furniture, nails, paint, plastics, ceramics, tiles, computer assembly, and data transmission have expressed keen interest in investing in Grenada. However, they are also interested in other islands in the Eastern Caribbean and will not choose Grenada if the public support services are not present.

Grenada's infrastructure is in poor condition largely as a result of inadequate maintenance. Prior to the rescue mission, scarce capital resources were devoted almost exclusively to the construction of the Point Salines Airport, neglecting critical needs in electric power, drinking water, sewerage, telecommunications, and road maintenance.

C. Strategy

1. AID Program Strategy

The principal objective of the five year US economic assistance strategy in Grenada is to encourage sufficient economic growth by 1990 to create an additional 10,000 jobs, a number sufficient to reduce the unemployment rate from its present 28-30 percent to 15 percent. The strategy recognizes the importance of three sectors of the economy: tourism, light manufacturing, and agriculture. The strategy assumes that infrastructure problems are adequately addressed, and thereby concentrates on increasing productivity, encouraging private sector investment, and expanding small scale enterprises. With this focus, the overall assistance strategy expects to create employment over the next five years by providing assistance in the areas of policy and planning, institutional development, training for employment, agricultural expansion and diversification, private enterprise development, small scale enterprise development, self-help and community participation projects, and infrastructure rehabilitation and development.

Bilateral Economic Support Funds (ESF) made available since the rescue mission have been used to encourage policy reforms, support the Grenadian private sector and initiate some emergency infrastructure work. In addition, regional resources have been used to provide Grenada with access to advisory services, participant training within and outside the region, and training seminars organized in Grenada to improve productivity in agriculture, tourism, manufacturing and private sector organization. Other regional AID activities in which Grenada is expected to participate include projects designed to improve management and administration; to improve efficiency and diversification of the agriculture sector through support to regional institutions such as the Caribbean Agricultural Research and Development Institute (CARDI), the Caribbean Agricultural Extension Project (CAEP) and the regional agricultural training center; to support small-scale enterprise and community action initiatives; and to develop job skills through non-formal education. Thus, the overall strategy is comprehensive and methodical about creating more on-island economic opportunities over a five year period.

2. USAID Project Strategy

While the comprehensive assistance strategy will produce results in the medium term, it does not address the unemployment crisis of the moment. Thus, bilateral AID efforts in general have been directed towards eliminating some of the more immediate problems and consequences of unemployment, foreign exchange shortages, and scarcity of investors. The most often cited constraints to new investment and resulting job creation in Grenada are political uncertainty, non-competitive investment policies, and the condition of Grenada's infrastructure. The up-coming elections will resolve political uncertainty. In the process of negotiating Economic Support Fund Grants for balance of payments AID is addressing investment policy issues. This proposed Project and a planned FY 86 project will deal, albeit moderately, with the infrastructure constraint.

As part of the Initial Disaster Relief and Rehabilitation Program, AID procured and delivered generators and electrical equipment, water tanks, and containers on an emergency basis (\$225,000). Subsequently, AID provided \$2.0 million under the Intermediate Relief/Rehabilitation Assistance effort. The related infrastructure work included garbage collection and general sanitation; limited repair of the water system, power system, telecommunication and telephone system; repair of selected public health facilities; and upgrading of a selected group of schools. Maintaining employment and minimal infrastructure rehabilitation were the objectives of the short-term emergency program.

Unemployment, however, has experienced only moderate relief as a result of assistance efforts to date. In fact, many of the initial rehabilitation program activities are completed and those employed by them are once again out of work. Other related bilateral efforts to the proposed Infrastructure Revitalization Project will help somewhat. The Point Salines Airport Project (\$19 million) now employs over 300, while the Emergency Road Repair Project (\$500,000) should add 500 to the payrolls by early September. The Project Development Assistance Project (\$300,000) identified the need for the factory shells activity of the proposed Infrastructure Revitalization Project and will assist in locating manufacturers to fill the industrial space and create permanent jobs. The Grenada Agriculture Sector Revitalization Project (\$1.9 million) will soon employ workers to rehabilitate the central market. Yet, this bilateral assistance is only a start. It is insufficient considering the needs.

Carrying out the initial relief and rehabilitation program provided USAID/Grenada with a good perspective of the extent and depth of the infrastructure problems. Years of inadequate maintenance of and insufficient additions to the infrastructure base have left the GOG with the formidable challenge of just meeting the current demand for the most frequently demanded infrastructure services, let alone the strains to be added from expected economic expansion and population growth over the next five to ten years. Assistance for the proposed Infrastructure Revitalization Project will be used to employ people immediately, resolve some of the constraints to attracting investments in Grenada and bring a limited amount of infrastructure up to acceptable standards for the development of tourism, light manufacturing and agricultural sectors of the economy. The project also addresses some pressing public health concerns of the population and builds on the experience of several previous projects.

3. The GOG Strategy

The employment, investment attraction and infrastructure rehabilitation aspects of the proposed Project conform to four of the six national objectives adopted by the Government of Grenada. These are:

- Attain a drastic and immediate cost-effective reduction in the levels of unemployment by creating self-sustaining employment opportunities as far as possible, particularly for persons displaced by recent events and those from the ranks of the chronically unemployed;
 - Increase the generation and optimize the subsequent utilization of the country's scarce foreign exchange resources;
 - Preserve and enhance the country's social and economic infrastructure by effecting essential and lasting improvements to it; and
 - Minimize the growth of the country's external debt burden.
- The activities to be undertaken by the Infrastructure Revitalization Project have been surveyed, analyzed and recommended mostly within the last year by numerous Grenadian and international organizations. The project addresses many of the problems cited by the Government of Grenada with the assistance of the Caribbean Development Bank in the Economic Memorandum on Grenada (February 1984). The proposed project follows the recommendations made: by the Interagency Team on Commercial and Private Sector Initiatives (December 1983) on

infrastructure development; by the Organization of American States (1983 Attraction Development Plan - Grenada) for a rational development of the tourist sector; and by an International Executive Service Corps Advisor (Tourism - Grenada's Second Industry - July 1984). Finally, other international donors also recognize the inadequacy of the infrastructure and are responding to it.

4. Other Donors

The following international donors are providing related assistance to the Government of Grenada (GOG): Canadian International Development Agency (CIDA); Caribbean Development Bank (CDB); European Development Fund (EDF); British Development Division (BDD); European Investment Bank (EIB); Organization of American States (OAS)

Project activities related to the proposed Infrastructure Revitalization Project are briefly described below.

Roads: The CDB has agreed to finance the road improvement from St. George's to Gouyave. This effort, along with AID assistance provided under the proposed Infrastructure Revitalization Project will complete the rehabilitation of the Western Main Road to the northernmost point of Grenada. The work on the CDB portion of the Western Main Road should begin in March 1985. CDB funds also support work on 11 feeder roads scattered throughout the island. The road segments range from .5 to 2.5 miles in length totalling 15.5 miles, and the effort is expected to be completed within three months. The EDF is financing the construction of the Eastern Main Road. Phase I, 15 km. from St. George's to Redgate, is completed. Phase II, widening and resurfacing of 16 kms. from Redgate to Grenville, is 10 percent complete.

Water: Contributions from CIDA and CDB are financing the Mamma Cannes Water Project. Contributions from CIDA and CDB amount to \$1.6 million. The project's completion is expected by June 1985. The proposed Infrastructure Revitalization Project will close the loop between Mamma Cannes and the Calivigny systems. Phase I of the Les Avocat project was completed with financing from AID's regional Basic Needs Trust Fund Project.

Electricity: The EIB is providing funding for two new generators for GRENLEC. The generators have been installed and commissioned. They provide 3.6 MW of power and will be complemented with one additional large generator to be procured by the BDD. CIDA is providing \$40,000 for community electrification.

Schools: Using the AID funded Basic Needs Trust Fund, the CDB will finance the rehabilitation of selected schools and health centers, which will begin before the end of the year. None of these are included in the sub-projects selected for the proposed Infrastructure Revitalization Project. EDF funds are financing the construction, with community participation, of two community multi-purpose centers. The EDF is also providing about \$600,000 for the construction of dormitories and a cafeteria at the agriculture training school in Maribeau.

Ports: Under a CDB-funded contract, a Trinidadian company has constructed a schooner berth and dredged some shallow areas in St. George's harbor. A Grenadian company will now begin erecting some new and relocating some old buildings at this wharf site. The entire project is budgeted at \$1.9 million. Construction of the Hillsborough jetty in Carriacou is supported with an estimated \$350,000 of EDF funds.

Tourism: The OAS has financed the development of a comprehensive tourist plan for Grenada (1983) and currently provides long-term technical assistance to the Ministry of Tourism. The proposed Infrastructure Revitalization Project will finance the construction of some of the tourist attraction projects identified and analyzed by the OAS.

Telephones: The CDB has loaned over \$600,000 to the telephone company for cables as part of its expansion program for the St. George's and St. Andrews areas. They are currently installing this cable.

Sanitation: CIDA is providing small grants totalling \$30,000 for two rural sanitation efforts.

Institution Building: The OAS has begun a program of technical assistance designed to increase the GOG's institutional capacity to identify and manage projects. The OAS is providing: assistance in planning (eight person-months of short-term technical advisors); training in areas such as statistics, electronic data processing, computer operations, investment project preparation and management, infrastructure project engineering and implementation; and studies of beach erosion in the Grand Anse area, seismic and geologic activity, and institutional operations in the tourism sector.

A CIDA project with the Ministry of Construction's Central Garage is in progress. It provides spare parts and technical assistance in equipment handling and control. The total cost of this project is \$2.5 million. Because of the project's integral relationship to infrastructure revitalization activities, the activity is more fully described in the Technical Attachment in ANNEX III, EXHIBIT A.

III. Project Description

A. Project Goal and Purpose

The goal of the project is to contribute to the development of sustainable equitable economic growth based on free institutions and enterprises thereby increasing employment and raising incomes. The indicators of goal achievement are a real GDP growth rate of six percent, a GOG selected target, and the creation of 10,000 jobs by 1990 thus reducing the unemployment rate from 30 percent to 15.

The purpose of the project is to assist in improving Grenada's physical infrastructure to a level required to create immediate employment opportunities, encourage foreign exchange inflows, and encourage a long-term flow of private sector investment. End of Project Status, the indicators of purpose achievement, are: 132,000 of person days of employment over the life of the Project (see ANNEX II, EXHIBIT K); a 16 percent increase in extra-regional merchandise exports; and six additional light manufacturing plants in operation.

Although the proposed Project will fund a wide variety of infrastructure activities, the depth of the work to be carried out is limited to repairing the infrastructure to meet a few of the immediate needs. The proposed Project activities will only repair existing infrastructure. New systems for sewerage, electricity, telecommunications, and water are desperately needed, but not contemplated under this Project. This proposed Project will not pave new roads nor construct new public buildings, even though there is a strong demand for such work. Grenadians will begin repatriating themselves, the population will grow and the private sector will begin to expand. The proposed Infrastructure Revitalization Project will not meet the next generation of infrastructure demands placed upon it by a growing economy and population.

B. Project Activities

The project will fund eight infrastructure activities and project monitoring activities. Funding is allocated to construction or rehabilitation activities that the GOG has identified as priorities. The GOG and USAID/Grenada analyzed a series of proposed infrastructure projects and selected the following activities as those 1) meeting the immediate needs of providing employment, 2) readiness to implement, 3) support for the three growth sectors of the economy, and 4) resolving public health hazards. Because of funding limitations and the possibility of future substitution, the selected activities were rank ordered in terms of priority.

The activities included in the following description require more funding than the proposed authorized amount. They have all been reviewed and found to be technically feasible, economically sound and important to the immediate development needs of Grenada. Detailed cost estimates have been prepared for each activity. The summary budget at the end of the description indicates the activities the GOG proposes to undertake with AID support. Four activities ranging in value from \$55,000 to \$208,000 will be eligible without amendments to the Project Paper or Grant Agreement should the need for activity substitution occur during implementation.

1. Roads

Most of the primary highways of Grenada are characterized by: inadequate drainage caused by clogged or poorly designed ditches and culverts, resulting in numerous surface failures; surface undulations caused by base course failures; eroded edges which have reduced the usable portion on the pavement to an unacceptable width; narrow and poorly sited bridges, many of which appear to be structurally unsound; inadequate sight distance on horizontal and vertical curves; and other obstructions which limit sight distances and the usable width of the roadway.

The state of disrepair of the roads is uniform; that is, no one segment deserves priority because of its condition. Consequently, funding for road repairs is based solely on current and projected traffic flows. The roads with the heaviest traffic flows are: St. George's to Point Salines (6.7 miles), the Eastern Main Road-St. Georges to Grenville via St. Davids (20.5 miles), St. Georges to Grenville (Grand Etang Road 14.0 miles), and the Western Main Road from St. Georges to Sauteurs (20 miles). Because of the state of the roads and the limited domestic budget, (an estimated \$740,000 in 1984 for 565 miles of road), the GOG has successfully arranged for international donor support for its road program. At the request of the GOG and after reviewing the participation of the other donors in the road program, USAID/Grenada decided to include six road segments, four bridges and some assorted work on retaining walls and drainage structures in the Infrastructure Revitalization Project. These segments meet the development needs of Grenada, will alleviate some of the unemployment problem, and are technically and economically feasible. With AID funding, the Ministry of Construction will rehabilitate: Gouyave-Sauteurs (10 miles); Vendome to Beaulieu segment of the Grand Etang Road (2 miles), the Grand Anse-Woodlands road (2.2 miles); Grenville to Birch Grove segment of the Grand Etang Road (3 miles); and Hospital Road (0.5 miles) and Windward Road (1.0 mile) on the island of Carriacou.

The Gouyave to Sauteurs Section will improve road transport for the export of banana, nutmeg and cocoa from the Northwest part of the island. Three nutmeg and mace stations along this road supply approximately 15 percent of Grenada's total annual nutmeg and mace production. The region served by this road also produces almost 40 percent of the islands cocoa output and 10 percent of its banana production. The road will handle an estimated 1500 passenger car units per day.

The two lower elevation sections of the Grand Etang Road serve as development corridors, especially for the St. Georges area, and as the primary route to the Grand Etang dam, the Grand Etang Forest Reserve, and several water reservoirs. This route over the mountains receives some tourist traffic now, which is expected to increase with the proposed development of Grand Etang as a National Park and improvement of several Northeastern sections of road which will permit a half-day circular tour of the island.

The Grand Anse to Woodlands section will serve as an alternate route to St. Georges during the construction of the road into St. George's from the airport, and afterwards as an option to avoid heavy industrial traffic. Once this section of road is upgraded, it will provide direct access from the Point Salines area to the Northeast section of the island.

Two roads on Carriacou will be improved. One, Hospital Road, provides access to the island's only major medical facility, while Windward Road serves a major fishing area and the island's shipbuilding industry.

The bridges to be included in the project are: the Grand Roy, Florida, Soulier, and Radix. All four need major repair and are inadequate or unsafe. There will also be some work on retaining walls and drainage structures on other primary routes.

The MOC's AID-funded activities will generally provide a minimum 16 foot roadway with adequate drainage and cross slopes, and an improved riding surface. Widening will be limited to sections of the Victoria-Sauteurs road which currently provide only a 12 to 13 foot width. Using force account and locally hired laborers, the MOC will: repair potholes and patch edges; clear ditches and culverts; reestablish ditches; install pipe culverts; clear right-of-way; construct retaining walls; apply leveling course, and resurface existing pavement, and reestablish roadway; and reconstruct roadway. Since the rainy season precludes pavement construction, activities to be initiated immediately subsequent to the signing of the Project Agreement will be limited to

repairing potholes, clearing and installing culverts, and constructing retaining walls. The initial work will employ about 320 individuals.

Local suppliers will furnish the materials and equipment needs for the AID-funded work. The stone will come from three quarries, the RS-1 and RS-2 asphalt from an MOC emulsion plant, and the RC-2 asphalt from a local Shell Oil Company distributor. To assure sufficient stone, the project will fund the services of a technical advisor for one year for the Telescope quarry. Most of the equipment required, including small hand tools, rollers, graders, trucks, and loaders, is available at the MOC's Central Garage, or can be obtained within a reasonable time.

As identified in the Administrative Analysis, many of the service units (quarry, central garage, and emulsion plant) which will supply the four AID-funded roads projects are operating under a central government budget allocation. Theoretically, a fiscal crisis in the Central Government could close these operations because of insufficient operating budget allocations. To avert this remote possibility, the Grant Agreement contains a Covenant to provide sufficient support to these units.

Since efficient quarry operations are critical to the road construction work, the proposed Project will fund a technical advisor at the Telescope quarry to assist in increasing the levels of production. Further, a Grant Agreement Covenant will bring about the release of a traxcavator from the Point Salines Airport Project for use at the quarry. The Roads Division of the MOC will be the implementing agency for the roads activities of this Project. The MOC officer responsible for both the Buildings and Roads Divisions will be the Project Manager. As part of this road work, the MOC will start an intern program for Road Supervisors. About 15 young unemployed individuals from the disbanded military will be incorporated into the roads project in junior field management positions. A separate accounting unit in the MOC already experienced with AID advances, vouchers and reporting under the Emergency Road Repair Project will also assume this Project's financial accounting and reporting.

Total cost of the road rehabilitation activity of this project is \$3.772 million of which AID will provide approximately \$3.517 million: \$1.8 million for Gouyave-Sauteurs; \$500,000 for Grenville-Birch Grove; \$240,000 for Beaulieu-Vendome; \$345,000 for Grand Anse-Woodlands; \$250,000 for Carriacou; \$225,000 for bridge and retaining wall improvements; \$67,000 for equipment

purchases; and \$90,000 for technical assistance. The estimated GOG contribution of \$255,000 will be in-kind. This activity will create almost 80,000 person days of employment over the life of the Project.

2. School Rehabilitation/Vocational Training

Almost all of Grenada's 64 schools require some degree of attention ranging from minor repairs to major renovation. The Ministry of Education (MOE) selected 20 of the schools for emergency repair and requested AID assistance in financing their rehabilitation (See ANNEX II EXHIBIT K). A review of the condition of the schools and the institutional capacity to carry out the project indicated several problems.

Leaking roofs were the most common defect, and were the cause of subsequent rot in the structural frame and other damage such as deteriorating walls, windows and doors. Other identified needs were painting, broken plumbing, and faulty electrical work. The MOE undertook some previous emergency work on almost 50 schools with AID assistance. Even though it was for the most part minor work, the average AID funding per school was \$1,300. It was not completed on schedule because the MOE did not have the personnel to supervise the repair work, and the quality of the work varied in accordance with the supervision efforts of the principal at each school.

Ironically, the skilled labor, such as electricians, plumbers, and carpenters, necessary to repair and maintain the schools is not a product of the standard school curriculum. A deficiency of the school system, identified in a 1974 survey and reconfirmed in a 1982 UNESCO report, is the paucity of vocational/technological courses at all levels of the system. Technical training in the school system has consisted largely of simple woodworking, technical drawing, and home economics. The only options open to most students for technical/vocational training are through informal skill training programs. Thus, rehabilitating the schools in itself leaves no assurance that the human capability exists at the village level to maintain the schools.

By coordinating the proposed activities of the Infrastructure Revitalization Project with the Civic Action Program of the US Military Support Element in Grenada, the MOE, USAID/Grenada and the 306th Civil Affairs Brigade decided to meet the immediate rehabilitation and employment problems with a training approach which would involve local participation of unemployed youths. This approach is clearly not an integrated program which will resolve the shortage of vocationally trained. It will,

however, provide many with some initial trade skills and work exposure from which to build, and leave each school with a local pool of laborers from which to draw for basic school maintenance.

The MOE has agreed to utilize US Army construction engineers to supervise the repair work and maintenance training at each school. The 20 schools will be grouped into four clusters of three or six schools per cluster. The MOE has begun to identify site foremen for each school. The site foreman would be the US Army construction engineers counterpart, and assemble his work force. The US Army construction engineers and the site foreman would start with an inspection of the repairs to be made. They would itemize the materials required for the school and purchase them from Grenadian vendors as "shelf items." They and selected skilled tradesmen would then put the trainees to work on repairs and instruct them in each of its phases. Training films and visual aids would be used after school hours to supplement the on-the-job training. After the repair work is completed, a maintenance team for the clusters will be selected from the trainees. The tools purchased with Project funds for the trainees will be placed under the custodianship of selected school principals. Payrolls will be the responsibility of the MOE, while the US Army construction engineers will be responsible for materials and equipment purchases, progress reports, and certification of overall expenditures.

AID will provide \$700,000 of which \$390,000 will be for materials, \$60,000 for tools and four vehicles, and \$250,000 for laborer and trainee salaries. The United States Army will provide travel, per diem, and salaries for four construction engineers. The MOE will provide an estimated \$35,000 as an in-kind contribution. This activity will create over 23,000 person days of work over the life of the Project.

3. Solid Waste Disposal

The solid waste system was improved under the A.I.D. emergency program. Using AID funds, the Ministry of Health (MOH) constructed concrete bins in populated areas to store solid waste. However, this use of a limited number of bins has not solved the problem of improper disposal at the refuse site, and the health hazards incumbent with the uncollected portion, estimated at one-third of the total. The solid waste problem is beginning to present itself with increased rodent infestation, increased fly and mosquito breeding, pollution of water ways and beaches, and the possible epidemic of communicable disease.

An analysis of the problem by the Environmental Health Division of the MOH cited the need for improvement in the collection and disposal of solid wastes. The present collection system is limited by too few and the wrong kind of trucks. Of the 12 trucks in service, one is over 10 years old and impossible to keep in operation, and the balance are from East Germany, creating difficulties in obtaining spare parts. All of the trucks, flat bed type, are loaded and unloaded manually. Because the trucks cannot compact the trash, the hauling capacity of the trucks is not reached, reducing fuel and maintenance efficiency and causing long delays due to loading.

The MOH disposes the waste in two land-fills it operates. One is located in Perseverance Estate and the other is in Grenville. Neither is operated in a sanitary manner due to insufficient and inadequate equipment, limited management expertise, a lack of cover, and inappropriate locations. The Perseverance land-fill is in a swamp adjacent to Halifax Bay. The MOH has considered relocating this land-fill, but because of land ownership problems has not found a suitable alternative site. At the Grenville site the fill has reached its capacity so the waste is dumped directly on the beach. The situation of uncovered garbage scattered about to Northeastern beaches is a serious health hazard.

The short-term solution to the solid waste problem is to improve collection and disposal of the waste with better equipment, relocation of the Grenville land-fill, and some management training. The long-term solution will involve institutional reform, an autonomous entity with its own revenue source for collection and disposal, and relocation of the Perseverance site.

The Project will assist the MOH with its equipment shortages by funding the purchase of three compactor trucks for urban collection and arranging for the transfer of one four wheel drive vehicle for inspection, two D-4 size crawler tractors and two dump trucks from the airport project. The compactor trucks must be appropriate for the narrow streets of St. George's. These trucks will free up the working flat-bed trucks for other island collection routes. Each land fill will receive a crawler tractor designed to compact and cover the waste each day with fill brought to the site by the donated dump trucks. In addition, the Project will finance the proper preparation of the sites. A newly proposed site at Telescope Point will require repairs to an entrance road, excavation for usable configuration, and delivery of suitable materials to use as a cover stockpile. The MOH will also close the Grenville site by covering it and constructing a berm around its

boundary. Finally, the Perseverance site will be improved by the construction of a berm to reduce leaching, landscaping with shrubbery to isolate it from the road, and adequate covering. To manage this operation, the Project will provide limited short-term training for one MOH official. This person will attend a short-term course in solid waste management, and receive some on-the-job training in Barbados where the environment and required solutions are similar. Finally, as part of the project, the MOH will initiate a derelict vehicle and steel program. They will use the dump trucks to remove many of the abandoned vehicles on the island, and provide steel barrels and a limited number of two cubic yard bins for commercial and densely populated areas.

The heavy equipment will belong to the MOH but be under the custodianship of the Central Garage. The purchase price of the equipment will include maintenance training for MOH operators and Central Garage mechanics.

The cost of this activity for AID is \$275,000 of which \$210,000 is for collection trucks, \$10,000 is for training, \$40,000 is for site preparation, and \$15,000 for the derelict vehicle/drum preparation program. The counterpart contribution will be an estimated in kind contribution of \$25,000. This activity will generate 3,620 person days of employment.

4. Factory Shells

Grenada's return to a market economy has not in itself brought on a flood of investors. Although the Chamber of Commerce and the GOG expressed their confidence that the private sector could and should have a central role in stimulating the economy through employment generated from new investments, the new investments have not materialized. Indeed, only one US firm has invested in Grenada since the intervention. One limitation in attracting investors is the absence of available factory space. Spare industrial space in Grenada does not exist. Private contractors have not constructed the demanded space because the short payback period they require raises the rents above those found in neighboring islands; it is not competitive or profitable for them. The public sector has yet to fill the void. Inquiries by 11 companies into the availability of fiscal incentives indicates that their total immediate need for factory space is 95,400 square feet and that none of them is prepared to construct their own. The Ministry of Industrial Development at present can only identify 42,400 square feet for the inquiring companies leaving an immediate shortage of 53,000 square feet. The shortage is actually much higher, since many foreign investors, discouraged by the lack of space, have not formally submitted requests for GOG consideration.

There are good indications that the immediate demand will increase rapidly. Because of Grenada's lower wage rates, about \$6.00 per day compared to Barbados' \$12.00, it is in an advantageous position to attract textile and other labor intensive manufacturers. A Hong Kong garment producer with an on-going operation in neighboring Antigua needs 40,000 square feet of space and would put 500 people to work immediately. Another Hong Kong garment manufacturer has formally indicated his intention to enter into a joint venture with a local businessman. For their operation, only 10,000 square feet factory space is available, but they could effectively utilize another 25,000 to 30,000 square feet. Lack of factory space is also preventing a rattan furniture manufacturer from hiring 100 Grenadians to begin production.

Through the CDB, the Grenada Development Bank is proposing a two phase project to provide 100,000 square feet of industrial space. But this is a medium term project with no estimate as to when the final processing of the application and the construction of the first 40,000 square feet under Phase I will take place. Even if the construction of the 40,000 square feet were to begin soon, the expected demand for factory space in Grenada would continue to exceed supply. An analysis by the Free Zone Authority Services, Inc. in May 1984 predicted the demand for factory space in Grenada to increase in the coming years because of pent up growth pressure which had been capped during the previous regime, the impact of the Caribbean Basin Initiative Program, and rising Far Eastern investment interest. It predicted an excess demand of 115,000 square feet in 1986 even if the public sector were to produce 85,000 square feet.

A December 1983 report on "Provision of Factory Space in PDAP Countries," recommends improvements in the programs providing industrial floorspace. Recommendations include: the maintenance of stock of advanced factory floorspace which ensures availability and flexibility in 10-20,000 square foot buildings; provision of small scale nursery units aimed at the local business sector; and the provision of services and infrastructure on land designated as industrial estates. Grenada currently has nothing that comes close to the recommendations. In analyzing ways to fill the immediate demand for industrial space, the GOG and USAID identified an opportunity for a low-cost solution for the immediate problem. The GOG has land available with existing but vacant or underutilized warehouses on them, offering 43,700 square feet of covered space. With renovation these warehouses will be suitable for light manufacturing. In addition to an available site, the GOG has spare construction materials left by the

Cubans at the Point Salines Airport. These include: reinforcing bars, siding, and roofing. Those responsible for the airport construction have released these materials for use in developing factory shells. By incorporating these idle resources, the GOG can construct factory shells at an estimated \$3.30 per square foot. There simply is no other private or public sector alternative which is as responsive and inexpensive as this one. The institution responsible for the construction, maintenance and operations of the factory shells is the Ministry of Industrial Development. Eventually the Ministry will spin off this function to an autonomous or semi-autonomous unit. The GOG authorized the establishment of this type of an entity under the Grenadian agriculture and Industrial Development Corporation Act of 1976, but never fulfilled the intent of the law by establishing a functional agency. The use of this Act to create an Industrial Development Corporation (IDC) is under review.

A PDAP-funded technical advisor is assisting in this review. His assignment also involves the identification of existing institutions responsible for industrial and tourism development, analysis of the feasibility of establishing an IDC or some other similar-type agency in Grenada, and identification of its staffing, budgeting, financing and promotional requirements. This assignment will assist in determining whether an IDC should be incorporated into the Grenada Development Bank, or whether it should exist as an autonomous corporation.

In the meantime, the Ministry of Industrial Development will manage this activity by relying on the private sector for construction and operations, and draw from the experience of the Industrial Development Corporation in Barbados in determining the arrangements with the leasees. In general, the GOG will bring water and electricity to the building, and maintain the outside of the building and the grounds. The leasee will install the inside wiring and plumbing to his own specifications, and maintain the inside of the building. If the Barbados model is followed, the building lease will be for three to five years with an option to buy. Rental costs in Barbados are calculated at 14 percent per annum of the construction cost; the average rent in Barbados, covering maintenance and insurance, is \$5.00 per square foot. Since the Ministry of Industrial Development does not have the developed institutional experience, they would contract with local Grenadian firms for the construction and property management of this sub-activity. The income and expenses of the factory shells will be maintained and accounted for as an enterprise fund. The Ministry of Industrial Development or any subsequent

entity responsible for the operations of the factory shells will be required to have an annual review by an independent accounting firm of the financial statements or segments of financial statements pertaining to the AID-supported factory shells for at least five years from the date of the Grant.

AID will provide \$150,000 for the rehabilitation costs of converting warehouses into factory shells. The GOG will finance the salaries of the employees assigned to this activity, and the operating expenses of repairs, maintenance, and rental management fees estimated at \$20,000. This activity will provide 3,750 person days of employment over the life of the project. The Project will provide space for manufacturers expected to create an estimated 437 permanent jobs.

5. Tourist Attractions

The Organization of American States (OAS) and the Ministry of Tourism have prepared two tourism development plans for the GOG in the last six years. The most recent proposes a comprehensive list of activities to develop Grenada into a different and more complete tourist product than its region-wide competition. This balanced approach proposes development of attractions that offer not only sun, sea, and sand, but also an opportunity to readily learn about or "experience" Grenada's history, natural history, and culture. However, unless Grenada begins to develop some of the attractions which highlight these unique aspects of its character, marketing of Grenada as a different tourist site will be impossible.

In analyzing the proposals made by the Ministry of Tourism and the OAS, three were selected because of their: priority in terms of balancing the tourist package, appeal, and accessibility to national and international visitors, immediate visual impact, ability to generate revenue to offset maintenance and operating costs, and ability to generate employment.

While the past forecasts of visitor growth have not been too accurate, there is ample reason to estimate an increase in the number of tourists over the next several years. The indicators of tourist growth are in place. The economies of the US and other industrial countries appear to be healthy and the completion of the Point Salines Airport should lower air transportation costs. In 1982, the total number of tourists in Grenada reached 23,300. The Ministry of Tourism predicted 30,000 for 1983, and based on this prediction recommended implementation of the first stage of the tourist plan, an

investment of over \$600,000. The 1983 projections did not occur due to political events and ensuing changes. Nevertheless, the projections used in the AID-funded study to examine the feasibility of completing the Point Salines Airport indicated a return of enough tourism by 1985 (32,000) to justify funding of projects identified in the first stage of the tourist plan. Since AID funding is only for three of the first stage activities, the projected tourist demand, or even the 1982 level, would be a sufficient indicator of feasibility for the AID supported work.

Three activities were selected for funding under this project: Revitalization of the Carenage, restoration of Fort Frederick, and establishment of the Grand Etang Visitors Center. The Carenage is the existing focal point of tourism in St. George's. It runs the boundary of a colorful, active harbor used to load and unload people and/or cargo on and off cruise ships, steamers, and inter-island wooden sailing vessels. The turn of the century architecture of the brick buildings adds to the setting. Yet, traffic and parking along the waterfront are uncontrolled, the pavement has deteriorated, and pedestrians are forced to compete with the cars for limited space.

The AID assistance would relieve the congestion by constructing up to a six foot sidewalk on the land side of the waterfront road, level and overlay the existing pavement, paint center-line stripes on the pavement to delineate traffic lanes, install new grates on storm drains, and construct three concrete docks adjacent to the sea wall to improve loading and unloading operations of small vessels. The AID cost of this is \$115,000.

Fort Frederick sits atop Richmond Hill overlooking St. George's. It has deteriorated from lack of maintenance, damage as a result of the events of October 1983, and encroaching brush and weeds. AID funds will be used to prevent further deterioration of the Fort's facade, convert one of the adjacent buildings into a visitor's center, demolish and remove several temporary structures, landscape the area, and pave driveways and parking areas. The AID cost of this is \$90,000.

The volcanic lake and surrounding area of Grand Etang may soon be declared the first national park of Grenada. The OAS is arranging for US National Park Service personnel to examine the legal procedures necessary to declare the Grand Etang a national park. This activity will establish the Grand Etang Visitor's Center which will ultimately be the starting point for hiking. AID funding will renovate and refurbish two existing buildings near the road to serve as the Interpretation

Center, and provide some landscaping and improvements to the lakefront. The AID contribution for this activity is \$95,000.

Because of the need to begin these activities before the heavy tourist season, the MOC will perform the construction assignments. Contracting the work to local construction companies would take too long. A local architect knowledgeable in restoration techniques will supervise the repairs to the walls of Fort Frederick.

The private sector will be responsible for operating and maintaining the Fort Frederick and Grand Etang tourist facilities under a concessionary arrangement with the GOG. The OAS is expected to recommend in September the institutional arrangements and procedures for concessions and operations at Grenadian tourist sites. Total annual operating costs, including salaries for 21 employees, are about \$45,000.

In summary, AID will provide \$300,000 for this activity of which \$177,000 will be for local equipment and material, \$98,000 for labor, and \$2,500 for imported equipment for the visitor's centers. The GOG will support this activity with a \$59,000 in-kind contribution.

6. Water

There is a chronic water shortage problem in the greater St. George's Area. During the dry (tourist) season it is severe with total estimated demand at 3.1 million gallons per day. The supply in the dry season, also estimated because only two water sources are metered, is 1.65 million gallons per day. Thus, the dry season shortage with 100 percent hotel occupancy is slightly under 1.5 million gallons per day. During the wet season, the short fall drops to approximately 440,000 gallons per day because of a lower demand and greater supply. The water problem is simply one of insufficient supply throughout the year; that is, too few sources and too much leakage in the distribution.

The solutions to supplying St. George's immediate water demand fall into several categories: increase the capacity of the water treatment plants supplying the area, interconnect water surplus systems to the St. George's water-short system, and develop new sources. In terms of cost efficiency in and between these alternative solutions, capital costs and type of flow (gravity or pumped) were considered. A review of the pricing policies of the agency responsible for Grenada's water supplies and distribution, the Central Water Commission (CWC), emphasizes the need for preference in general for gravity flow

water over pumped water to preclude the CWC from delivering at a unit price lower than unit cost.

Of the four water treatment plants serving the St. George's Area, Annandale should be expanded to increase the wet season supply by 750,000 gallons per day, thus eliminating the wet season shortage. AID funds would be used at Annadale for an intake structure, an additional eight inch raw water supply line, an additional rapid sand filter, and some plant piping modifications. The additional water from this modification will save the CWC \$90,000 per seven and a half month wet season in power costs.

The Mamma Cannes/Pomme Rose water system has a 200,000 gallon per day surplus treatment capability throughout the year which can be brought to the water-short greater St. George's Area by interconnecting the two systems. AID funds will be used to purchase and install 15,000 feet of six inch diameter pipeline between the St. George's and Mamma Cannes systems. This increased supply will be gravity fed, thereby avoiding the high costs of pumping from boreholes.

Finally, waste and leak reduction is important to furthering the existing water supplies. A fairly extensive system of water supply and distribution mains exist within the St. George's Area. However, some of the pipelines dating back to the nineteenth century are severely affected by encrustation and corrosion. Waste is also the result of faulty standpipes, taps, faucets and household fixtures. Waste and leakage is conservatively estimated at 1 million gallons per day. To reduce this loss of water, AID funds will finance three electronic leak detectors and other repair hardware.

AID will contribute \$453,000 of which \$285,000 will be used for materials and equipment purchases, and \$168,000 will be used for installation costs. The CWC will make an in-kind contribution of approximately \$30,000 in labor and operating expenses. This activity will create 12,500 person days of employment over the life of the Project.

Two activities identified for water system improvement, Les Avocat and Woodlands Borehole #5, are substitute activities for the proposed Project. The installation of a 125 foot diameter rapid sand filter at Les Avocat will increase the wet season supply of water to the St. George's Area by 200,000 gallons per day. The Woodlands Borehole #5 is an unfinished pumping station capable of supplying 200,000 gallons per day throughout the year. It needs, however, a slab, pump house, water meter, power supply, and 1,600 feet of six inch transmission piping to

connect it to the St. George's system. Should these activities be substituted during implementation of the Project, AID would provide \$67,000 for the purchase and installation of the Les Avocat filter, and \$55,000 to complete the pump house at the Woodlands Borehole #5.

7. Waste Water

The waste water system of St. George's town and port area poses a special problem. The drainage system, developed over the last century or more, has two pumping stations. One, in the Carenage port area, pumps sewage up a hill to a gravity system which drains to the north and west of Fort George's Point. This pump has failed regularly, but some recently installed air compressors should rectify this situation. The second pump station is located on the north side of Fort George Point. The existing pumps in it will not reliably prime and pump sewage and should be replaced.

To completely eliminate pollution in the harbor would require a complete sewage collection and pumping system, a remote treatment plant and a long outfall into the sea. This would be costly and take years to implement. So, AID funds will be used for an immediate solution of restoring the system to its full capacity by purchasing materials and equipment. AID funding will be used to procure a standby generator and two pumps with associated valves, pipe, and fittings to replace the equipment on the north side of Fort George Point. AID funds will procure this equipment (\$40,000) and pay for its installation (\$10,000). The GOG will contribute \$9,000 for in-kind services.

8. Electricity

The electricity services in Grenada are presently inadequate. The causes of the poor service were insufficient generation and incomplete distribution. For some time the generators serving the island were not maintained properly, resulting in numerous shut-downs. Even though the theoretical installed capacity was 6.7 MWs, the down-time lowered the operating capacity below the load and forced the Grenada Electric Company (GRENLEC) to begin a rationing plan (load-shedding) for various parts of the grid. GRENLEC has begun to address the generation problem with two new generators with a combined 3.6 MWs of power capacity. These are on-line. While the generation problems are being addressed transmission and distribution problems remain.

The grid needs repairs or replacement in various sections and does not cover the island equitably. Power losses for 1982 were recorded at an extremely high 19.8 percent. The annual economic impact to GRENLEC of this loss was over \$1 million. The power losses include technical losses as well as those from errors in billing, meter tampering, uncalibrated meters, and illegal connections. St. George's East and West feeders are unreliable because of a failed underground cable which used to connect the two systems. The existing secondary system in St. George's is inadequate to carry the load placed on it. The Point Salines Airport has been provided with adequate generating capacity to be self sufficient in the event of a failure of the one line supplying it. However, considering the potential for commercial and residential growth in the area and the critical loads the back-up generators must supply at the airport, an alternate transmission line to the airport is necessary.

To resolve the distribution losses and insufficient coverage, the Project will fund: replacement of the inadequate conductor in the secondary system; the interconnection of East St. George's with West St. George's, obviating any further concern about replacing the underground cable; the extension of a 11 KV line from Morne Rouge to the Airport; and the procurement of calibration meters to improve the accuracy of metering at major points in the grid.

AID will provide an estimated \$142,000 for equipment purchases. GRENLEC will provide \$79,000 in labor as a counterpart contribution. This activity will generate 704 person days of additional employment.

Two substitute activities for this Project are the expansion of the distribution network into three parishes (St. George's, St. Andrew's, and St. John's), where the demand and ability to pay are high enough to make subsidized extensions profitable, and the purchase of a computer to assist GRENLEC in improving its data management and accounting system. Because the neighboring islands' electric companies are successfully using IBM System 36s with the developed software, GRENLEC would prefer not to experiment with other configurations. Should these activities be substituted, AID would provide \$208,000 for village electrification and \$100,000 for a computer, software, and training.

9. Monitoring Unit

Because of the wide variety of activities to be funded by Infrastructure Revitalization and the findings of the institutional analyses, a special coordinating and monitoring

unit will be formed and funded under the Project. A central unit is required to consolidate the accounting records and progress reports of the eight Project activities. Moreover, the insufficient level of internal controls found in the various institutions creates a need for a central unit to monitor project funding and progress.

The primary function of the Monitoring Unit will be to assure that Infrastructure Revitalization is carried out in a timely, efficient, effective and economical manner. It will be USAID/Grenada's principal Project contact. The proper location for the Monitoring Unit is the Ministry of Planning (MOP), since the MOP monitors foreign donor projects. Placing Infrastructure Revitalization in any other ministry would only duplicate this function.

The Monitoring Unit will consist of up to four locally hired employees: a Project Coordinator, one or two accountants, and an engineer. It will include part-time services of one or two MOP civil service employees. Up to three expatriate advisors will also be assigned to the Monitoring Unit. They are expected to be a Project Advisor, a Civil Engineer with primary responsibility for the road construction, and a school coordinator.

The Project Coordinator will assist the participating ministries and organizations in meeting the Project's deadlines as agreed to in the implementation plan. The Project Coordinator will resolve bureaucratic entanglements and other delays in ways which conform to GOG and AID guidelines. The overall progress of the Project will be his responsibility. He will be assisted by an advisor who should have a complete project management background which includes engineering, auditing, and AID procurement. This individual will assist in setting up the systems to assure Project progress and oversee all the procurement actions being carried out by the various participating institutions.

It is preferred that the two accountants be senior types with knowledge of or experience in auditing. They will maintain the accounting system prescribed by AID for the Project, and assist the Project's participating entities in setting up and processing the proper accounts. They will develop and write up a simple but reliable system of internal controls for payroll, materials and procurement, inventory control, reporting and such other areas as considered necessary. They will assure that financial accounting and reporting duties are separated, and that traceable responsibilities are assigned. They will make random inspections of payoffs on paydays, and inventory

stores. They will notify the GOG and AID of discrepancies between actual and budgeted costs, and between physical progress of each activity and its expenditures. Any irregularities discovered in the course of their work are to be reported to the GOG and AID immediately.

The local hire engineer will monitor performance and progress of the Project's activities through on-site inspections, and prepare reports on project status and evaluation of work accomplishments. He/she will also be responsible for resolving disagreements about engineering and construction practices and procedures, staffing, and schedules. He will assist the senior accountants in the determination of efficient utilization of materials and tools. This individual will concentrate on activities other than roads and schools where adequate engineering assistance is provided.

An expatriate civil engineer with primary responsibility for the road construction will be funded for 18 months. This individual will assist the Ministry of Construction with: planning and scheduling of work; procurement and delivery of construction materials and equipment; establishment and maintenance of controls for material inventories; resolution of technical problems with construction, especially those related to drainage and slopes; review and endorsement of design computation; certification of vouchers; preparation of monthly progress reports; and performance of such other duties which may be necessary to facilitate project progress.

This activity will also provide for the purchase of office equipment and supplies for the monitoring unit and the participating institutions needing it for Project management. Needed items include desks, filing cabinets, adding machines with tapes, typewriters and general supplies. The Project will provide the monitoring unit with two vehicles for field work and inspections. Funding will be available to provide the participating agencies with staff to assist in processing the Project's reporting requirements. Finally, funding can be used to rent office space if necessary.

AID will contribute \$413,000 for this activity of which \$100,000 will be for local salaries and office space if necessary, \$240,000 for the expatriate advisors, \$20,000 for vehicles, and \$53,000 for office equipment and supplies.

C. Summary Budget and Financial Plan

1. Project Costs

A Summary Project Budget and Summary Financial Plan appear as Tables I and II respectively. Costing of Inputs/Outputs and Projection of Expenditures by fiscal year can be found in ANNEX II, Exhibit B.

Over 30 percent of the Grant amount will be expended for labor and services. Since the AID-funded portion of the Project is expected to be 85 percent disbursed within the first year, no allowance was made for contingencies and inflation.

2. Recurrent Costs

Four of the Project's activities (Water, Electricity, Tourism, and Factory Shells) will generate revenues or savings sufficient to pay for recurring maintenance costs. Four activities will not (Roads, Schools, Waste Water and Solid Waste). The added fiscal burden of recurrent costs is a concern.

While the recurring costs of maintaining the schools is unknown, the present state of the schools indicates that if rehabilitation does not take place under this Project, the cost burden of complete demolition and reconstruction will be inevitable and far higher for the GOG and international donors at a later date. The current estimated annual expenditure per mile of road is \$3,000. The Infrastructure Revitalization Project will increase this cost by an estimated \$1,230 per year, a 31 percent increase. Some of the increased costs can be offset through greater operating efficiency learned while implementing the Project. Also, with the repair of Grenada's infrastructure, new investment policies, and return to political stability, the economic base of Grenada will grow and support the GOG's ability to raise the required revenues.

The MOH is capable of bearing the recurring costs of solid waste collection and waste water maintenance at the Project's outfall, as they will not be significantly higher. Improved efficiency of the compactor trucks will lower average unit maintenance costs of the collection routes. The eventual solution to reducing the MOH's recurring costs for these activities is to move them out from under the MOH's responsibility and place these functions under an autonomous agency with billing authority. This type of administrative reform is expected to receive serious consideration later along with major restoration of the systems.

TABLE I
SUMMARY BUDGET (\$000)

ACTIVITY	AID	GOG	TOTAL
1. Roads			
Sauteurs	1100	128	
Vendome	240	17	
Birch Grove	500	36	
Woodlands Road	345	25	
Carriacou	250	18	
Bridges Walls	225	16	
Advisor	90	15	
Equipment	67	-	
			3772
2. Schools			
			700
			35
			735
3. Tourist			
Carenage	115	9	
Ft. Frederick	90	30	
Grand Etang	95	20	
			300
			59
			359
4. Factory Shells			
			150
			20
			170
5. Water			
Annandale	220	17	
Mamma Cannes	200	13	
Leak Detection	33	-	
			453
			30
			483
6. Waste Water			
			50
			9
			59
7. Solid Waste			
Heavy Equipment	Airport		
Compactors	210	17	
Training	10	3	
Drum Vehicle	15	2	
Site Preparation	40	3	
			275
			25
			300
8. Electricity			
Reconductor	113	63	
Close E&W	5	3	
Transmission	20	13	
Calibration	4	-	
			142
			79
			79
			221
9. Monitoring Unit			
			<u>413</u>
			<u>25</u>
TOTAL			<u>6537</u>
			6000
			537
SUBSTITUTE ACTIVITIES			
1. Village Elec			
			208
			101
			309
2. Les Avocat Water			
			67
			5
			72
3. Woodlands Water			
			55
			8
			63
4. Computer			
			<u>100</u>
			<u>-</u>
TOTAL			<u>544</u>
			430
			114

TABLE II
SUMMARY FINANCIAL PLAN
(US\$000)

PROJECT ELEMENT	FX	LC	FX	LC	TOTAL
Roads	160	3357	-	255	3772
Schools	-	700	-	35	735
Solid Waste	225	50	-	25	300
Factory Shells	-	150	-	20	170
Tourism	25	275	-	59	359
Water Supply	285	168	-	30	483
Waste Water	38	12	-	9	59
Electricity	142	-	-	79	221
Monitoring Unit	200	213	-	25	438
TOTAL	1075	4925	0.00	537	6537

29B

IV. PROJECT ANALYSES

A. Institutional Analysis

Eight institutions will participate in the implementation of the Infrastructure Revitalization Project. The institutional analyses for each Ministry or organization appear in Annex II, Exhibit G. Based on these analyses, the Project needs to: centralize the monitoring function; establish internal and accounting controls for the Project; rely on a monitoring unit to ascertain the accuracy of project records, promote operational efficiency, and encourage adherence to the regulations and policies agreed to by the GOG and AID in the Project Grant Agreement; utilize the accounting and reporting procedures developed for the Emergency Rehabilitation Program; and provide project implementation units in the various Ministries with office support.

The summary findings of the Institutional Analyses are:

Internal and administrative controls are out of date and inadequate. There is an awareness of the situation, and reorganizations and the establishment of policy guidelines and delegations of authority are expected after the elections.

In spite of inadequate or absence of formal operational, functional, and internal control guidelines, the analyzed Ministries and organizations do carry out their assigned functions such as maintaining roads, educating students, collecting the trash, and delivering water and power. In other words with the exception of the Ministry of Industrial Development and Tourism, no Project implementation unit will incur a new set of responsibilities.

All the organizations are overburdened in the management of capital projects. Either a central unit must take on part of the work load for Project management, or each organization must be provided with additional staff and possibly technical assistance.

The Ministry of Planning (MOP) is in an ideal position to act as the counterpart for the AID project officer, both to monitor and expedite the various Project activities. The MOP has the responsibility to monitor foreign donor projects.

For the most part, simple office work is constrained by a shortage of filing cabinets, desks, typewriters, adding machines, and common office supplies.

None of the analyzed institutions are using flow charts (Critical Path Method, or PERT or Bar Charts) for capital project management. All expressed an interest in or consented to their use for Infrastructure Revitalization.

B. Economic Analysis

Each subactivity under the project has been analyzed separately. Rate of return analyses, usually in the form of internal rates of return (IRRs), were performed on all but a few of the subactivities. Those activities that were not subjected to IRR analysis had their designs subjected to least cost analysis. Following the practice of the Ministry of Planning, the opportunity cost figure of 12 percent was used as the cut-off point for all projects. Thus, the entire project will produce a rate of return no less than 12%, with the averages being considerably higher.

Discussions with GOG officials, the USAID Barbados program economist, and other informed sources indicated that the EC currency was overvalued in Grenada by some 10 - 30 percent. In those cases where shadow pricing of capital goods was appropriate, the average 20 percent figure was used. For those projects where shadow pricing of labor was indicated, the market price was reduced by 50 percent. A 50 percent rather than a 100 percent reduction was used in order to reflect inherent or implicit income derived from the abundance of foods growing naturally on the land and in the sea that require just one's time and little, if any, capital cost. The results of the analysis of each subactivity are briefly described below. Details can be found in Annex II Exhibit F.

1. Roads

Vehicle operating cost (VOC) savings due to reduction in time and maintenance costs were used as the major, quantifiable benefit resulting from road improvement. Savings in fuel and oil consumption as well as time savings were not included for the reasons explained in the technical annex. Traffic growth, due to normal economic and population growth not related to the improved roads, is assumed to be 4 percent, some 20 - 30 percent below other estimates of 5 - 6 percent. No benefits were included from the tourist and agricultural sectors, although the roads certainly will have a positive impact on the two sectors by making travel easier and faster around the island for the tourists and by, among other things, reducing the spoilage of such export crops as bananas. The VOC savings alone provided sufficient benefits to justify the five road segments analyzed and suggested for repair under this project.

As shown in Table 1, the use of market prices in the analysis produced financial IRRs ranging from 14 to 17 percent with the exception of one at 32 percent. It demonstrates that with other assumptions that increase capital costs by 20 percent to account for the overvaluation of the currency and reduce the labor costs by 50 percent to better reflect its opportunity cost, produces economic IRRs not much different than the financial ones because the two adjustments tend to offset one another.

Sensitivity analysis was applied to the road segment with the lowest economic IRR of 13 percent. First, vehicle traffic growth was reduced by 50 percent while holding all other variables constant. Next, vehicle operating cost savings were reduced by 17 percent with all other variables constant. In the first case the IRR fell from 13 percent to 10 percent. In the second, it fell to 9 percent. The sizes of the reductions used here in the sensitivity analysis are not considered very likely. And even if these unlikely changes were to occur, the unquantified tourist and agricultural benefits would certainly raise the IRRs above 12 percent. Thus, the Mission is confident that all the road segments analyzed here will realize economic rates of return no less than those shown in Table 1.

Table 1

Road Segment	Financial IRR %	Economic IRR %
Victoria-Sauteurs	14	13
Gouyave-Victoria	16	14
Birch Grove-Grenville	17	16
Grand Anse-Woodlands	13	12
Beaulieu-Vendome	32	30

2. Water

The proposed water activities under the project will add water to the system and will reduce the cost of supplying the water by partially substituting gravity flow sources for water produced from borehole pumps. The analysis thus focused on cost savings as the principle benefit of the activity. A minimum per gallon value was estimated for the extra water produced and was included as an additional benefit.

Four activities were considered: three treated water supply activities (TWSA) providing more gravity flow service, and a leak detection plan, that reduces supply losses. The economic analysis indicated that the leak detection activity would render an IRR of 156 percent, while the TWSA activities, in the

absence of the leak detection activity, would return 12 percent, because the borehole pumps still would have to run continuously during the dry (tourist) season. Combined together, the four activities produce an economic IRR of 30 percent.

The analysis demonstrates that all water activities provide more than a sufficient rate of return to justify their implementation. Based solely on IRRs, the leak protection activity should be started immediately, and that if a timing choice has to be made between TWSA activities (i.e., between Annandale, Les Avocats, and Mamma Cannes), the order should be Les Avocats, Mamma Cannes, and then Annandale.

3. Electricity

Several electrical infrastructure improvements are seen as critical to the growth of tourism and industry. However, given the state of the economy, there is concern that the power company will not undertake these improvements in a timely fashion, and that as a result, the income losses to the economy in the tourism and industrial sectors may exceed the cost of the investment. Based on that logic, grant funding is proposed for activities that produce financial rates of return that exceed 12 percent by some margin and economic returns that are slightly lower. Briefly:

The investment of \$176,000 in the St. George's area will reduce power losses to the point that the reduction in power generation costs produce a financial IRR of 35 percent and an economic IRR of 29 percent.

Purchase of the computer will reduce the amount of electricity being used without payment and will reduce errors occurring in the accounting and billing procedures. This activity should produce an economic rate of return in excess of 12 percent.

Finally, the alternate power supply to the Point Salines Airport will provide the necessary back up to the airport. The interconnection of the St. George's east and west will improve the efficiency of the two feeders, creating less inconvenience for the customers, especially the tourists. No economic analysis has been conducted. The improvements form part of the necessary infrastructure needed for the tourist and industrial sectors.

4. Factory Shells

For the types of businesses that are likely to be attracted to Grenada, the major benefit can be expected to be in the form of value added to labor. Under this activity approximately 43,700 sq. ft. of factory space will be made available. If the regional experience of about one employee per 100 sq. ft. holds for Grenada as is expected, the factory shells under this project should provide work for some 437 people. Even at the low wage of \$.60/hr., the investment in the factory shells produces a benefit cost ratio of 14.6 or an IRR of 341 percent. The returns are large, partially because the repairs to the buildings were used as the investment cost figure. The basic building was assumed to be a sunk cost with no alternative use. No shadow pricing was done because the high financial rate of returns indicate that, though the economic IRR would be lower, it still would be very high.

5. Tourism

The three activities selected for development under this program have gone through an elaborate selection process. Making the final list implies that a group of experts knowledgeable in tourism believe that these activities will play a key role in the first phase of development of the tourism industry in Grenada. Implicitly, the group has concluded that the total benefits, both the direct and, most importantly, the indirect unquantifiable external benefits that accrue to other parts of the economy, if measured, would produce a rate of return equal to any other project that the GOG might undertake. In addition, these three activities can be considered to be part of the \$12 million other infrastructure costs included in the economic analysis of the Airport Project Paper, and thus do not require any further analysis. In the Airport Project Paper inclusion of the \$12 million figure in that analysis produced an IRR of about 12 percent.

The importance of the Carenage activity is not for its direct benefits that might be measured by admission fees, but in the external effect it will have for the rest of the tourism industry. The same argument is made for the Grand Etang Visitor's Center, although in this case it does receive direct benefits in the form of admission payments by the foreign tourists. When just the direct benefits in terms of admission fees are considered, the economic IRR is about 2 percent. However, the external effect of the Center on the tourist environment is believed to be such that, if measurable, would bring the IRR to no less than 12 percent. Finally, the Fort Frederick activity can be justified solely on the direct benefits it generates from admission fees and related sales.

The Fort will render a financial IRR of 70 percent and a still impressive economic IRR of 35 percent.

The Mission believes that, when taken as a whole, these three activities provide an important package that will provide the tourist industry with indigenous entertainment infrastructure which will make a tourist's stay memorable and lead to an improved positive view of vacationing in Grenada.

6. All Other Activities

The school and bridge activities were not subjected to rate of return analysis because the returns to schooling and the cost of a failed bridge are well documented. In the former case the important issue was not the amount of benefits, but whether the students could be sent elsewhere at a lower cost; that is, was there an alternative to the repairs? The answer is no. In the latter, there was no question about the high cost of postponing improvements.

The solid waste and waste water activities form part of the tourist infrastructure improvement package discussed earlier under the tourism activities and hence were not subjected to return analysis. The size of the remaining elements was deemed too small to justify analysis.

C. Technical Analysis

1. General Considerations

The proposed Project design is based on the immediate unemployment and infrastructure problems facing Grenada. The Project was kept as a straight infrastructure effort to create jobs immediately and bring the infrastructure up to a level required to support the tourism, light manufacturing, and agricultural sectors. The proposed design did not combine infrastructure construction with regional and urban planning, broad based tax schemes for infrastructure support, nor institution building. Infrastructure needs to be integrated with these related concerns, but only after the immediate levels of unemployment are reduced and the basic infrastructure is returned to a level supportive of Grenada's economic base activities. Planning is important for Grenada's next generation of infrastructure problems, but not necessary for activities which only return some of the existing infrastructure back to serviceable condition. Specialized tax allocations are important for infrastructure, but somewhat meaningless if the existing infrastructure is not suitable enough to attract and maintain enterprises to be taxed.

Institution building is needed to increase the capability of the agencies responsible for infrastructure, but this is long-term fine tuning which would consume limited resources needed for urgent problems.

The selection of activities to be funded under the project was made in stages. In developing the Project Paper, technical consultants and AID staff worked with GOG counterpart officials to screen out infrastructure activities which did not create immediate employment or contribute to the immediate needs of tourism, light manufacturing, or agriculture. Technical consultants then worked with their counterparts to prepare detailed cost estimates and plans for implementation of activities appearing to meet the basic criteria.

Telephone development was dropped and assistance for the waste water system reduced by this process. Two technical consultants worked with the Grenada Telephone Corporation (GTC) to determine the feasibility of completing the installation of the Mt. Hartman and St. George's crossbar switches. The German Democratic Republic (GDR) provided a \$2.8 million loan to the GOG for telecommunication equipment. They had completed between 60 and 75 percent of the installation at the time of the Intervention. It was hoped that with a small amount of grant assistance, GTC would be able to improve the telephone service for the manufacturing and tourism sectors by completing the crossbar installation. The analysis, however, noted several complications in finishing the GDR installation.

Crossbar equipment will not provide manufacturers and investors with modern features such as data transmission, direct dialing, and conference calling. Since it uses East German electronic devices that operate on 60 volts rather than the standard 48 volts, it would deny the GOG a reliable source for spare parts. Finally, completion of the telephone exchanges would only be effective if additional investments were made in the "physical plant" (outside wiring) and trunk lines serving the various switches, increasing the basic cost of the GDR equipment by \$1.5 million. Thus, completing the crossbar system was not as inexpensive as originally estimated, would have committed the GOG to an inefficient system and would not have provided the service the private sector needs.

As with the telecommunications system, an examination of the sewage disposal system in the Grand Anse and St. George's area indicated an overall need for longer-term solutions. The recommendations of the 1975 World Health Organization/Pan American Health Organization report to collect and export the raw sewage from Grand Anse to another part of the island was

found to still be valid because it will leave a maximum area for hotel development, and will remove the treatment and odor problem away from the high income tourist area. The identified short-term solution to the sewage problem in the Grand Anse area requires MOH regulation, not Project assistance. A technical advisor recommended that the Grenada Beach Hotel, Grand Anse Shopping Center, and medical school individually install intermittent sand filters to treat their effluent before discharging it. To completely eliminate sources of pollution from the St. George's harbor and coastal area would require a complete sewage collection and pumping system, a remote treatment plant, and a long outfall into the sea. Solutions to these problems would be expensive and take years to implement. Since the existing systems in Grand Anse and St. George's are sufficient to avoid public health problems, minor efforts were identified to keep these systems as efficient as possible.

2. Selection of Priority Activities

After an initial review and screening, the proposed infrastructure activities were ranked in priority based on criteria relevant to the Project's Purpose. Those activities with the highest priority were generally those that could employ people the fastest at the lowest cost per Grant investment. Other important considerations were the internal rate of return, the direct relationship of the activity to tourism, light manufacturing and/or agriculture, and the impact on foreign exchange earnings or savings. Because of the concern for human life, the reconstruction of four bridges was considered a priority without applying any other criteria. Also, purchasing calibration meters and the closing of the electrical distribution loop between East and West St. George's were included as priorities without calculating a ranking because of the minor amounts of funding involved. The calculations of the rankings and supporting explanations appear in Annex II, Exhibit K.

3. Technical Feasibility

Each activity proposed for funding under this Project was analyzed by professional consultants, AID personnel, and Grenadian counterparts, and determined to be technically feasible. They carefully examined the immediate infrastructure problems confronting Grenada and recommended the most suitable and cost effective methods of resolving them. The technical considerations and, when appropriate, alternatives for each activity in Infrastructure Revitalization are fully described in the technical reports appearing in Annex III, Exhibits A through I (file copy).

D. Social Soundness Analysis

Grenada is not poor by world standards. High basic literacy, low infant mortality, and long life expectancy result in a Physical Quality of Life Index (PQLI) of 92, which compares favorably with other, more highly developed countries. Perhaps as a result, expectations for good basic infrastructure are high. Infrastructure problems have raised considerable public interest during each of the previous political administrations.

Grenada is small. With a proportionately small number of roads, schools, water lines, electrical lines, and so on, the deterioration of even a few is felt more acutely than it would be if there were alternative routes. Furthermore, basic infrastructure is just that - basic - and becomes a sine qua non for productive activities as well as the ordinary activities of personal life. Neither an office nor a hotel can operate if the electricity fails for hours at a time.

Infrastructure that works is quickly taken for granted. One learns to expect the lights to go on, and blame mismanagement and ultimately the utility agency or the government if they fail. Good infrastructure may even be perceived as evidence of good government and of a healthy institutional environment that will foster growth and progress. While roads/water/lights are required for development for their own sake, they also provide a physical and cultural base for the more sophisticated requirements of development such as trained staff, credit, and public services, which lead to predictability, stability, and incentive.

The summary findings of the social analysis are:

Unemployment of unskilled laborers, who are generally farmers as well, is particularly acute. The workforce is predominately female because many young men feel that unskilled work is underpaid.

The MOC is a primary employer of unskilled labor and pays road and construction workers the standard wage which was negotiated six years ago by the laborers union. The union agreement is due to be renegotiated before January 1985 and is expected to result in higher standard wages, which then will make road and other construction work more attractive to the potentially restive unemployed young men.

Direct employment in the tourism sector is expected to increase when the physical infrastructure and accompanying services are improved. However tourism-based employment is seasonal and limited by Grenada's small existing tourism "plant" of hotels and restaurants.

In addition to meeting the project's intended goal and purpose, the repair and expansion of Grenada's physical infrastructure will have substantial positive spread effects and will benefit the entire population.

IMPLEMENTATION ARRANGEMENTS

A. Administrative Arrangements

As explained in Section III B. 9, the host country counterpart office for the implementation of the Project will be a Project Monitoring Unit established in the Ministry of Planning. Each of the participating institutions will also designate one or more authorized representatives with Project implementation authority for their approved activities. The Project Monitoring Unit will work under the MOP's authorized representative(s).

The Monitoring Unit will prepare and the MOP authorized representative will forward monthly financial and quarterly progress reports to USAID/Grenada. The Monitoring Unit will gather and process the information required for the reports from the individual participating institutions.

USAID/Grenada will assign a direct hire AID professional as the Project Officer responsible for routine monitoring and supervision. The Project Officer will also utilize the Monitoring Unit in the MOP to perform routine monitoring and supervision.

B. Implementation Plan

Detailed implementation plans for each activity appear in ANNEX II, Exhibit C. Some of the major implementation events and dates are:

GOG/AID:

Project Authorization	September 1984
Project Obligation	

MOP identifies Monitoring Unit	
AID identifies technical assistance	

Roads:

Work begins on retaining walls and culverts	October 1984
Bidding and contract awarded for bridges	
Advisor hired for Telescope Quarry	
Reestablishing and reconstructing roadway begins	January 1985
Final road (Western Main) completed	June 1986

Schools:

MOE identifies tradesmen	September 1984
Tradesmen hired	October 1984
US Army construction engineers arrive	
Trainees recruited	

School rehabilitation cycle begins
School rehabilitation completed

March 1985

Tourist Attractions:

C begins construction
Facilities completed and open

October 1984
April 1985

Factory Shells:

Contract awarded
Rehabilitation of buildings No. 1 and 2 begins
Rehabilitation of buildings No. 3 and 4 begins
Buildings 1 through 4 ready for occupancy
Activity completed

October 1984
November 1984
December 1984
February 1985
May 1985

Water:

Contracts for materials awarded
Materials arrive in Grenada
Excavate and begin field work
Final water activity (Annandale) completed

October 1984
January 1985
January 1985
October 1985

Waste Water:

Contracts for equipment awarded
Equipment operational

October 1984
January 1985

Solid Waste:

MOH identifies sanitary engineer
Contract awarded for compactor trucks
Work begins on land-fill sites
Compactor trucks in service

October 1984
November 1984
January 1985

Electricity:

Clearing begins for right-of-way
Begin setting poles
Install hardware
Transmission lines completed

October 1984
January 1985
April 1985
September 1985

Monitoring Unit:

Monitoring unit hired and in offices

October 1984

C. Disbursement Procedures

The Monitoring Unit will maintain a Project account. Because of the fiscal situation and the financial position of the autonomous agencies, advances will be required. The Monitoring Unit will receive a sufficient advance of funds from USAID and apportion it to the NCC, MOE, MOH, Central Water Commission, and CREWLEC based on the anticipated needs and previous disbursements. The Project account will be maintained on the imprest basis. Since the MID will contract for the factory shells rehabilitation, the Monitoring Unit

The fixed amount reimbursement system of payment was considered and rejected. None of the participating agencies are in a financial position to bear the expense of completing construction should an activity be under-budgeted.

D. Procurement Plan

A detailed procurement list appears in ANNEX II, Exhibit E. Because of the need to procure about \$3,500 worth of spare parts for West German-made plate compactors, three compactor trucks and six right-hand drive vehicles, a source and origin waiver is included in the Project Authorization. The need to have immediate access to spare parts and service requires that the MOH obtain three compactor trucks from a local agent in Barbados. This limits the selection to three agents representing manufacturers from AID Geographic Code 935 countries (See ANNEX II, EXHIBIT J). Similarly, passenger vehicles in Grenada are right hand drive. Access to spare parts and service necessitates purchases from a 935 country.

Contracting for some or all of the road work was rejected after a review of local contractor capabilities and a discussion with the MOC. The MOC has limited experience with contracting of this nature. It has designed a form for contracting, but does not follow any policies or guidelines for solicitation, bidding, and award. To try and impose AID's complex contract regulations and documents on the MOC's regulation-free operations would merely impede, if not stall, Project implementation and inevitably result in procedural errors.

Finding technical advisors for the Project will require AID/W assistance. Up to four advisors are to be hired under personal services contracts with AID. USAID/Grenada is attempting to locate a quarry specialist through the Airport Project contractor, but has yet to identify a candidate. The advisor for the quarry should begin his assignment in October. A civil engineer with a minimum of 10 years experience as a resident engineer is needed for 18 months beginning December 1984. A Project Advisor is wanted as soon as possible. The Mission will provide AID/W with the names of potential candidates to contact and is open to recommendations of others. Scopes of work for these individuals appear in ANNEX II, EXHIBIT D. A candidate for the School Rehabilitation coordinator has tentatively been identified and can be hired by the Mission locally.

E. Evaluation Plan

Although the Project will be completed within two years, it will fund an interim evaluation approximately nine months after Project obligation. This evaluation will measure progress against the Project's implementation plans. An AID direct hire (AID/W, RDO/C, or USAID/Grenada) will conduct the evaluation in collaboration with the MOP. Many of the Project's activities

will be completed by this time. The evaluation will give serious consideration to substituting activities should any particular effort be stalled with unresolvable problems.

A final evaluation will be carried out at the end of the Project to measure achievement of the Project's established objectives.

F. Conditions, Covenants and Negotiating Status

1. Conditions Precedent to Disbursement of Funds:

Disbursement for Solid Waste

Prior to any disbursement, or to the issuance of any documentation pursuant to which disbursement will be made for the solid waste activities of the Project, the Grantee shall, except as the parties may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, evidence assuring that the Ministry of Health will receive in good working order two crawler type tractors, two tipper type dump trucks, and one road vehicle for use in the operations of Grenada's sanitary land-fills once this equipment is no longer needed in the AID-funded Point Salines Airport Project, and that land selected for the location of the new Telescope land-fill is owned by the Government of Grenada and under the jurisdiction of the Ministry of Health.

Disbursement for Factory Shells

Prior to any disbursement, or to the issuance of any documentation pursuant to which disbursement will be made for factory shells activity of the Project, the Grantee shall, except as the parties may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, evidence in writing that the land and buildings selected as the location for factory shells will be under the jurisdiction of the Ministry of Industrial Development to lease out to private enterprises.

Disbursement for School Rehabilitation

Prior to any disbursement in excess of five hundred thousand United States Dollars (\$500,000), or to the issuance of any documentation pursuant to which disbursement over five hundred thousand United States Dollars (\$500,000) will be made for the school rehabilitation activities of the Project, the Grantee shall, except as the parties may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, a plan that indicates the number of people to be recruited and

the provisions for their continued training so that there will be continued maintenance of the schools rehabilitated under the Project; and evidence that the Ministry of Education has requested sufficient funding from the Ministry of Finance for the maintenance of the schools rehabilitated under the Project.

Disbursement for Leak Detection Equipment

Prior to any disbursement, or to the issuance of any documentation pursuant to which disbursement will be made for leak detection equipment for the Central Water Commission, the Grantee shall, except as the parties may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, evidence that a leak detection unit has been established and adequately funded to detect and repair leaks in the water systems of Grenada.

2. Covenants

Except as AID may otherwise agree in writing, the Grantee shall covenant that:

(a) The Ministry of Tourism will utilize concessions with the private sector as the preferred method of operating and maintaining the Grant-funded facilities at Fort Frederick and Grand Etang.

(b) Fort Frederick shall be placed under the jurisdiction of the Ministry of Tourism which will assure its maintenance and operations as a historical site of both national and international interest.

(c) The Ministry of Construction and the Ministry of Education will receive adequate funding to assure proper maintenance of the roads and schools.

(d) The Ministry of Health will assure the construction of earth berms at Perseverance and Telescope land-fills to reduce the leaching, the placement of a portable wire fabric fence at the proposed Telescope land-fill to prevent fugitive trash from offshore winds, and the daily covering of Perseverance and Telescope land-fills with a proper layer of soil.

(e) The GOG will assure that the traxcavator on loan to the Airport Project from the Ministry of Construction's Central Garage is returned to the Central Garage by the first half of October for use in the Telescope Quarry, and that the government owned and operated entities supplying materials for the AID-funded roads activities receive sufficient budget allocations to supply the inputs necessary for the Project.

(f) That operations of the AID-funded factory shells will be accounted for as an enterprise fund and that there will be an independent annual review of the financial statements or segment financial statements pertaining to the AID-supported factory shells for at least five years from the date of the Grant.

(g) The Government of Grenada will reduce pollution in the Grand Anse beach area by requiring the St. George's University School of Medicine and the Grenada Beach Hotel to use intermittent sand filtration and the Grand Anse Shopping Center to use intermittent sand filtration and chlorination to treat their effluent before discharging it, or such other appropriate means of sewage treatment to achieve the equivalent levels of treatment.

3. Negotiating Status

The GOG and USAID designed the Project jointly. The GOG is aware of the covenants and the standard conditions precedent. No delay is anticipated in negotiating a Project Agreement.

CERTIFICATION PURSUANT TO SECTION 611 (e) OF THE
FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, James W. Habron, as AID Representative of the United States Agency for International Development Mission to Grenada having taken into account, among other things, the maintenance and utilization of projects in the Caribbean region previously financed or assisted by the United States, do hereby certify that in my judgement Grenada has both the financial capacity and human resources capability to effectively utilize and maintain goods and services procured under the proposed capital assistance grant project entitled Productive Infrastructure Revitalization.

This judgement is based upon the implementation record of externally financed projects including AID-financed projects, in Grenada, the commitments from the Government of Grenada, and the quality of the planning which has gone into this new project.

(Signed)


James W. Habron
AID Representative

(Date)

10 Sep 1984

b. ISDCA of 1981, Sec. 725(b). If ESF is to be furnished to Argentina, has the President certified that (1) the Govt. of Argentina has made significant progress in human rights; and (2) that the provision of such assistance is in the national interests of the U.S.?

c. ISDCA of 1981, Sec. 726(b). If ESF assistance is to be furnished to Chile, has the President certified that (1) the Govt. of Chile has made significant progress in human rights; (2) it is in the national interest of the U.S.; and (3) the Govt. of Chile is not aiding international terrorism and has taken steps to bring to justice those indicted in connection with the murder of Orlando Letelier?

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ANNEX I
EXHIBIT B

5C(2) PROJECT CHECKLIST

Listed below are statutory criteria applicable to projects. This section is divided into two parts. Part A. includes criteria applicable to all projects. Part B. applies to projects funded from specific sources only: B.1. applies to all projects funded with Development Assistance Funds, B.2. applies to projects funded with Development Assistance loans, and B.3. applies to projects funded from ESP.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT

1. FY 1982 Appropriation Act Sec. 523; FAA Sec. 634A; Sec. 653(b).

(a) Describe how authorizing and appropriations committees of Senate and House have been or will be notified concerning the project;
 (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that amount)?

A Congressional Notification has been forwarded to Congress

2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,00, will there be

Yes

- (a) engineering, financial or other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance? Yes
3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance? No further legislative action is required
4. FAA Sec. 611(b); FY 1982 Appropriation Act Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973? (See AID Handbook 3 for new guidelines.) N/A
5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project? Yes

6. FAA Sec. 209. Is project susceptible to execution as part of regional or multilateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.

The project is not appropriate for regional execution

7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; and (c) encourage development and use of cooperatives, and credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

The project will improve the country's infrastructure to a level required to encourage investment which directly support (a), (b), (d) and (e)

8. FAA Sec. 601(b). Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

US goods and services will be used in the Project as appropriate US investors are expected to invest in Grenada as a direct result of this project.

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9. FAA Sec. 612(b), 636(h);
FY 1982 Appropriation
Act Sec. 507. Describe
steps taken to assure
that, to the maximum
extent possible, the
country is contributing
local currencies to meet
the cost of contractual
and other services, and
foreign currencies owned
by the U.S. are utilized
in lieu of dollars.
- The best country is contributing
staff and facilities and related
support for the project
10. FAA Sec. 612(d). Does
the U.S. own excess
foreign currency of the
country and, if so, what
arrangements have been
made for its release?
- No
11. FAA Sec. 601(e). Will
the project utilize
competitive selection
procedures for the
awarding of contracts,
except where applicable
procurement rules allow
otherwise?
- Yes
12. FY 1982 Appropriation Act
Sec. 521. If assistance
is for the production of
any commodity for export,
is the commodity likely
to be in surplus on world
markets at the time the
resulting productive
capacity becomes
operative, and is such
assistance likely to
cause substantial injury
to U.S. producers of the
same, similar or
competing commodity?
- N/A
13. FAA 118(c) and (d).
Does the project comply
with the environmental
procedures set forth in
AID Regulation 16? Does
- Yes. An environmental assessment wa
prepared.

the project or program take into consideration the problem of the destruction of tropical forests?

14. FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)? N/A

B.. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria N/A

a. FAA Sec. 102(b), 111, 113, 281(a). Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and

otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used?

N/A

c. FAA Sec. 107. Is emphasis on use of appropriate technology (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)?

N/A

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed" country)?

N/A

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e. FAA Sec. 110(b).

Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"? (M.O. 1232.1 defined a capital project as "the construction, expansion, equipping or alteration of a physical facility or facilities financed by AID dollar assistance of not less than \$100,000, including related advisory, managerial and training services, and not undertaken as part of a project of a predominantly technical assistance character.

N/A

f. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?

N/A

g. FAA Sec. 281(b).

Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage

N/A

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institutional development;
and supports civil
education and training in
skills required for
effective participation in
governmental processes
essential to self-government.

2. Development Assistance Project
Criteria (Loans Only)

- a. FAA Sec. 122(b).
Information and conclusion
on capacity of the country
to repay the loan, at a
reasonable rate of interest. N/A
- b. FAA Sec. 620(d). If
assistance is for any
productive enterprise which
will compete with U.S.
enterprises, is there an
agreement by the recipient
country to prevent export
to the U.S. of more than
20% of the enterprise's
annual production during
the life of the loan? N/A
- c. ISDCA of 1981, Sec. 724
(c) and (d). If for
Nicaragua, does the loan
agreement require that the
funds be used to the
maximum extent possible for
the private sector? Does
the project provide for
monitoring under FAA Sec.
624(g)? N/A

3. Economic Support Fund
Project Criteria

- a. FAA Sec. 531(a). Will
this assistance promote
economic or political Yes

stability? To the extent possible, does it reflect the policy directions of FAA Section 102?

- b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities? No

- c. FAA Sec. 534. Will ESP funds be used to finance the construction of the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives? No

- d. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made? N/A

5C(3) - STANDARD ITEM CHECKLIST

Listed below are the statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by imposing limits on certain uses of funds.

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed? Yes
2. FAA Sec. 604(a). Will all procurement be from the U.S. except as otherwise determined by the President or under delegation from him? Yes
3. FAA Sec. 604(d). If the cooperating country discriminates against marine insurance companies authorized to do business in the U.S., will commodities be insured in the United States against marine risk with such a company? N/A
4. FAA Sec. 604(e); ISDCA of 1980 Sec. 705(a). If offshore procurement of agricultural commodity or product is to be N/A

financed, is there provision against such procurement when the domestic price of such commodity is less than parity? (Exception where commodity financed could not reasonably be procured in U.S.)

- 5. FAA Sec. 604(g). Will construction or engineering services be procured from firms of countries otherwise eligible under Code 941, but which have attained a competitive capability in international markets in one or these areas? No

- 6. FAA Sec. 603. Is the shipping excluded from compliance with requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S. flag commercial vessels to the extent that such vessels are available at fair and reasonable rates? No

- 7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? If the facilities of other Yes

Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

8. International Air Transport. Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will U.S. carriers be used to the extent such service is available? Yes
9. FY 1982 Appropriation Act Sec. 504. If the U.S. Government is a party to a contract for procurement, does the contract contain a provision authorizing termination of such contract for the convenience of the United States? Yes

B. Construction

1. FAA Sec. 601(d). If capital (e.g., construction) project, will U.S. engineering and professional services to be used? Yes, if appropriate
2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable? Yes

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed \$100 million (except for productive enterprises in Egypt that were described in the CP)? No

C. Other Restrictions

1. PAA Sec. 122(b). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter? N/A
2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights? N/A
3. FAA Sec. 620(b). Do arrangements exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries? Yes
4. Will arrangements preclude use of financing: Yes
- a. FAA Sec. 104(f); FY 1982 Appropriation Act Sec. 525: (1) To pay for performance of abortions as a method of family

planning or to motivate or coerce persons to practice abortions; (2) to pay for performance of involuntary sterilization as method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization; (3) to pay for any biomedical research which relates, in whole or part, to methods or the performance of abortions or involuntary sterilizations as a means of family planning; (4) to lobby for abortion?

b. FAA Sec. 620(g). To compensate owners for expropriated nationalized property? Yes

c. FAA Sec. 660. To provide training or advice or provide any financial support for police, prisons, or other law enforcement forces, except for narcotics programs? Yes

d. FAA Sec. 662. For CIA activities? Yes

e. FAA Sec. 636(i). For purchase, sale, long-term lease, exchange or guaranty of the sale of motor vehicles manufactured outside U.S., unless a waiver is obtained? Yes

f. FY 1982 Appropriation Act, Sec. 503. To pay pensions, annuities, retirement pay, or

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adjusted service
compensation for military
personnel?

g. FY 1982 Appropriation
Act, Sec. 505. To pay
U.N. assessments,
arrearages or dues? Yes

h. FY 1982 Appropriation
Act, Sec. 506. To carry
out provisions of FAA
section 209(d) (Transfer
of FAA funds to
multilateral
organizations for
lending)? Yes

i. FY 1982 Appropriation
Act, Sec. 510. To
finance the export of
nuclear equipment, fuel,
or technology or to train
foreign nationals in
nuclear fields? Yes

j. FY 1982 Appropriation
Act, Sec. 511. Will
assistance be provided
for the purpose of aiding
the efforts of the
government of such
country to repress the
legitimate rights of the
population of such
country contrary to the
Universal Declaration of
Human Rights? No

k. FY 1982 Appropriation
Act, Sec. 515. To be
used for publicity or
propaganda purposes
within U.S. not
authorized by Congress? No



OFFICE OF THE CHAIRMAN
P.O. Box 315
St. George's
GRENADA, West Indies

September 10, 1984

Mr. James Habron
USAID Representative
USAID Office
The Carenage
ST. GEORGE'S.

Dear Mr. Habron,

RE: GRENADA INFRASTRUCTURE REVITALIZATION PROJECT

During the past few months members of USAID staff, a team of consultants comprising Engineers, Economists and Systems Analyst and Grenadian Officials drawn from the Ministries of Planning, Construction, Education, Industrial Development and Health, have collaborated in the identification and planning of a multi-island project called Infrastructure Revitalization. The sub-projects selected were analysed for their development impact and found to be financially and technically viable. The proposed project has been approved by the Advisory Council of Grenada.

In order to achieve the objectives of the proposed project, the Government of Grenada will require at least US\$6 million of financial assistance primarily for construction work on roads, schools, tourist attractions, industrial space, potable water systems and waste water systems. Technical assistance for project management and equipment procurement for solid waste collection and disposal were also identified as being crucially important to Grenada at this time.

Because of the importance and high visibility of this project and to preclude any undue implementation delays, I hereby authorize the Head of the Ministry of Planning to be the Director of the Monitoring Unit. The Director-General, Planning, reports to the Deputy Chairman who has the portfolio of Planning, Finance and Trade.

/Because of . . .

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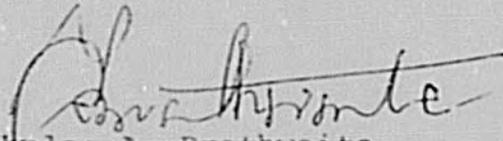
Mr. James Habron

September 10. 1984

Because of the critical importance of this project, I hereby request on behalf of the Government of Grenada gratuitous financial assistance totalling US\$6 million to finance the Infrastructure Revitalization Project.

I look forward to an early initiation and completion of this project.

Yours sincerely,



Nicholas A. Brathwaite
CHAIRMAN,
ADVISORY COUNCIL.

cc: Dr. Allan Kirton

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ANNEX I
EXHIBIT D

Page 1 of 4

DRAFT PROJECT AUTHORIZATION

Name of Country: Grenada

Name of Project: Infrastructure Revitalization

Number of Project: 543-0008

Pursuant to Section 531 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Infrastructure Revitalization Project for Grenada involving planned obligations of not to exceed \$6 million United States Dollars (US \$6,000,000) over a two year period from date of authorization subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the project.

The project will assist the Government of Grenada in improving designated roads, schools, water systems, waste water systems, solid waste collection and electrical distribution. It will also develop a small amount of tourism infrastructure and industrial space for private sector manufacturers.

The Project Agreement which may be negotiated and executed by the officer to whom such authority is delegated in accordance with A.I.D. regulations and Delegations of Authority shall be subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

A. Source and Origin of Goods and Services

Except for ocean shipping, and except as set forth in Section D below, goods and services financed by AID under the Project shall have their source and origin in the United States and Grenada. Ocean shipping financed by AID under the Project shall be procured in the United States, except as AID may otherwise agree in writing.

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B. Conditions Precedent to Disbursement

1. Initial Disbursement

Prior to first disbursement under the grant, or to the issuance by AID of documentation pursuant to which disbursement will be made, the Grantee will, except as the parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:

(a) An opinion of counsel satisfactory to AID that this Agreement has been duly authorized and/or ratified by, and executed on behalf of, the Grantee, and that it constitutes a valid and legally binding obligation of the Grantee in accordance with all of its terms;

(b) A statement of the name of the person holding or acting in the office of the Grantee specified as a representative, and of any additional representatives, together with a specimen signature of each person specified in such statement.

2. Disbursement for Solid Waste

Prior to any disbursement, or to the issuance of any documentation pursuant to which disbursement will be made for the solid waste activities of the Project, the Grantee shall, except as the parties may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, evidence assuring that the Ministry of Health will receive in good working order two crawler type tractors, two dump trucks, and one road vehicle for use in the operations of Grenada's sanitary land-fills once this equipment is no longer needed in the AID-funded Point Salines Airport Project, and that the land selected for the location of the new Telescope land-fill is owned by the Government of Grenada and is under the jurisdiction of the Ministry of Health.

3. Disbursement for Factory Shells

Prior to any disbursement, or to the issuance of any documentation pursuant to which disbursement will be made for factory shells activity of the Project, the Grantee shall, except as the parties may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, evidence that the land and buildings selected as the location for factory shells will be under the jurisdiction of the Ministry of Industrial Development to lease out to private enterprises.

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4. Disbursement for School Rehabilitation

Prior to any disbursement in excess of five hundred thousand United States Dollars (\$500,000), or to the issuance of any documentation pursuant to which disbursement over five hundred thousand United States Dollars (\$500,000) will be made for the school rehabilitation activities of the Project, the Grantee shall, except as the parties may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, a plan that indicates the number of people to be recruited and the provisions for their continued training so that there will be continued maintenance of the schools rehabilitated under the Project; and evidence that the Ministry of Education has requested sufficient funding from the Ministry of Finance for the maintenance of the schools rehabilitated under the Project.

5. Disbursement for Leak Detection Equipment

Prior to any disbursement, or to the issuance of any documentation pursuant to which disbursement will be made for leak detection equipment for the Central Water Commission, the Grantee shall, except as the parties may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, evidence that a leak detection unit has been established and adequately funded to detect and repair leaks in the water systems of Grenada.

C. Covenants

Except as AID may otherwise agree in writing, the Grantee shall covenant that:

(a) The Ministry of Tourism will utilize concessions with the private sector as the preferred method of operating and maintaining the Grant-funded facilities at Fort Frederick and Grand Etang.

(b) Fort Frederick shall be placed under the jurisdiction of the Ministry of Tourism which will assure its maintenance and operations as a historical site of both national and international interest.

(c) The Ministry of Construction and the Ministry of Education will receive adequate funding to assure proper maintenance of the roads and schools.

(d) The Ministry of Health will assure the construction of earth berms at Perseverance and Telescope land-fills to reduce the leaching, the placement of a portable wire fabric fence at

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the proposed Telescope land-fill to prevent fugitive trash from offshore winds, and the daily covering of Perseverance and Telescope land-fills with a proper layer of soil.

(e) The Government of Grenada will assure that the traxcavator on loan to the Airport Project from the Ministry of Construction's Central Garage is returned to the Central Garage by the first half of October for use in the Telescope Quarry, and that the government owned and operated entities supplying materials for the AID-funded road activities receive sufficient budget allocations to supply the inputs necessary for the Project.

(f) That operations of the AID-funded factory shells will be accounted for as an enterprise fund and that there will be an independent annual review of the financial statements or segment financial statements pertaining to the AID-supported factory shells for at least five years from the date of the Grant.

(g) The Government of Grenada will reduce pollution in the Grand Anse beach area by requiring the St. George's University of Medicine and the Grenada Beach Hotel to use intermittant sand filtration, and the Grand Anse Shopping Center to use intermittant sand filtration and chlorination to treat their effluent before discharging it, or such other appropriate means to achieve the equivalent levels of treatment.

(h) The Ministry of Education will submit a maintenance plan for reducing the recurring maintenance costs of the public schools and will allocate the resources necessary to cover the expenses of the MOE Maintenance Team on an annual basis.

D. Waivers

In accordance with the Project Paper, Section V. D., the procurement of goods and services from AID Geographic Code Countries 935 is hereby authorized in a total amount of up to two hundred eighty thousand United States Dollars (\$280,000) to permit the standardization of equipment and provide for the accessibility of spare parts.

I hereby certify that exclusion of procurement from Free World countries other than the cooperating country and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program.

PROJECT DESIGN SUMMARY

Logical Framework

Project Title & Number: Infrastructure Revitalization (543-0008)

ANNEX II
EXHIBIT A
Page 1 of 5

Life of Project: FY '85'
Total US Funding: \$6.0 m
Date Prepared: 7/29/84

Narrative Summary

Verifiable Indicators

Means of Verification

Assumptions

Goal: Sustainable equitable economic growth based on free institutions and enterprises thereby increasing employment and raising incomes.

Real GDP growth rates of 6 percent or more.
Creation of 10,000 jobs by 1990, reducing the unemployment rate from 30 percent to 15 percent.

World Bank Country Reports.
IMF Economic Memorandum.

Maintenance of open political and economic system.

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PROJECT DESIGN SUMMARY

Logical Framework

Project Title & Number: Infrastructure Revitalization (543-0008)

Life of Project: FY '85
Total US Funding: \$6.0 m
Date Prepared: 7/29/84

Narrative Summary

Purpose: To improve Grenada's physical infrastructure to a level required to create immediate employment opportunities, encourage foreign exchange inflows, and encourage a long-term flow of private sector investment.

Verifiable Indicators

End of Project Status

- a) 132,000 person days of employment over life of and directly attributable to the project.
- b) 16 percent increase in extra-regional merchandise exports.
- c) 6 additional light manufacturing plants in operation.

Means of Verification

- a) Ministry and parastatal corporate records, AID Reports.
- b) IMF Economic Memorandum.
- c) IMF Economic Memorandum.
- d) AID Reports.

Assumptions

Absence of natural disasters and adverse weather.

Continued economic growth in US and industrial countries.

Timely input of AID resources.

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PROJECT DESIGN SUMMARY

Logical Framework

Project Title & Number: Infrastructure Revitalization (543-0008)

Life of Project: FY
Total US Funding: \$6
Date Prepared: 7/29/

<u>Narrative Summary</u>	<u>Verifiable Indicators</u>	<u>Means of Verification</u>	<u>Assumptions</u>
<u>Outputs:</u>	<u>Magnitude of Outputs:</u>		
1. Improved roads	1) 18.7 miles of pothole free resurfaced roads with adequate drainage to reconstruct bridges.	1-8 AID Reports and Records	1-8 Timely delivery goods and serv:
5. Improved water system	5) Additional 250,000 gal/day capacity in Greater St. George's area.		
8. Improved electrical service & distribution	8) Replacement of 12.5 miles of low tension conductor and 220 poles. Construction of a 0.4 mile section of 11KV overload transmission line to close East and West St. George's. Construction of 2 miles of transmission line from Morne Rouge to Pt. Salines Airport. 4 calibration meters.		
7. Improved solid waste collection and handling processes.	7) 3 compactor trucks 2 properly covered and maintained land-fills.		
2. Rehabilitated Schools	2) Minor repair to renovation of 20 public schools		
4. Factory shells	4) Conversion of 6 warehouses into factory shells		
3. Restoration of development of a tourist site	3) 3 tourist sites restored, improved and/or constructed		

PROJECT DESIGN SUMMARY

Logical Framework

Life of Project: FY '85
Total US Funding: \$6.0 m
Date Prepared: 7/29/84

Project Title & Number: Infrastructure Revitalization (543-0008)

Narrative Summary

Verifiable Indicators

Means of Verification

Assumptions

Outputs:

Magnitude of Outputs:

6. Improved waste water
system

6) 1 outfall operating at
full capacity

PROJECT DESIGN SUMMARY

Logical Framework

Life of Project: FY
Total US Funding: \$6.
Date Prepared: 7/29/8

Project Title & Number: Infrastructure Revitalization (543-0008)

<u>Narrative Summary</u>	<u>Verifiable Indicators</u>			<u>Means of Verification</u>	<u>Assumptions</u>
<u>Inputs:</u>	<u>AID</u>	<u>GOG</u>	<u>Total</u>		
Roads	\$3157	\$255	\$3772	USAID Disbursement records.	AID Funds Available
Schools	700	35	735	GOG records.	
Tourist Attractions	300	59	359		
Factory Shells	150	20	170		
Water	453	30	483		
Waste Water	50	9	59		
Solid Waste	275	25	300		
Electricity	142	79	221		
Monitoring Unit	413	25	438		
	<u>\$6,000</u>	<u>\$537</u>	<u>\$6,537</u>		

2

COSTING OF INPUTS/OUTPUTS

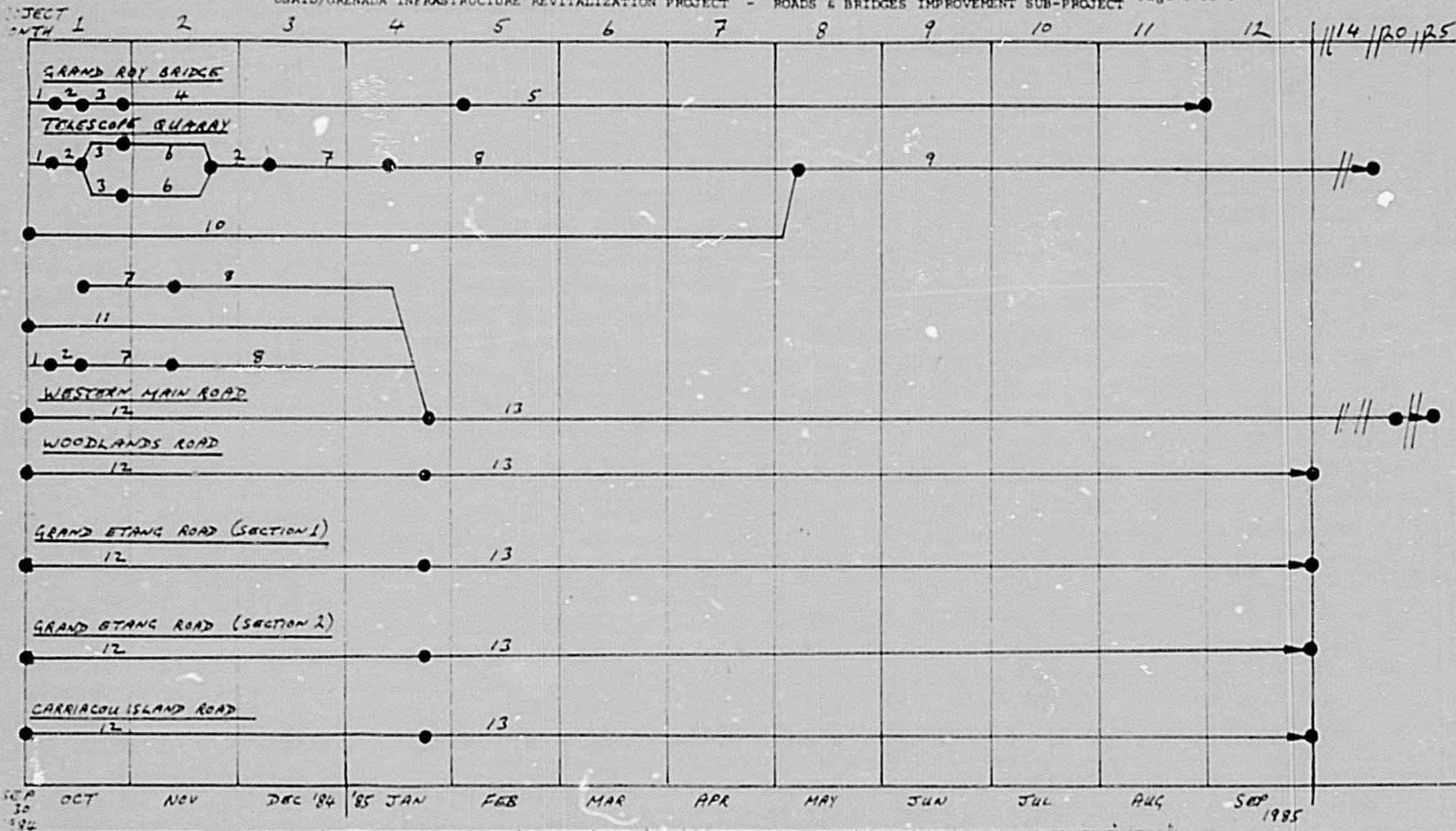
INPUTS	OUTPUTS									TOTAL
	ROADS	SCHOOLS	SOLID WST	PCTRY SKILL	TOURISM	WATER	WASTE WATER	ELECTRICITY	MONITORING	
AID FUNDED										
Offshore equipment	67		210		25	285	38	142		767
Technical Assistance	90		6						200	296
Local equipment & materials	2235	480	39	85	177				70	3086
Local labor/professionals	1125	220	10	65	98	163	12		143	1841
Training			10							10
AID TOTAL	3517	700	275	150	300	453	50	142	413	6000
OGG FUNDED										-
Local labor							7	50		57
Local management	255	35	25	20	59	30	2	29	25	480
OGG TOTAL	255	35	25	20	59	30	9	79	25	537
PROJECT TOTAL	3772	735	300	170	359	483	59	221	438	6537

PROJECTION OF EXPENDITURES BY FISCAL YEAR

(US \$000)

<u>Fiscal Year</u>	<u>AID</u>	<u>GOG</u>	<u>Total</u>
1985	5,104	490	5,594
1986	<u>896</u>	<u>47</u>	<u>943</u>
TOTAL	<u>6,000</u>	<u>537</u>	<u>6,537</u>

USAID/GRENADA INFRASTRUCTURE REVITALIZATION PROJECT - ROADS & BRIDGES IMPROVEMENT SUB-PROJECT

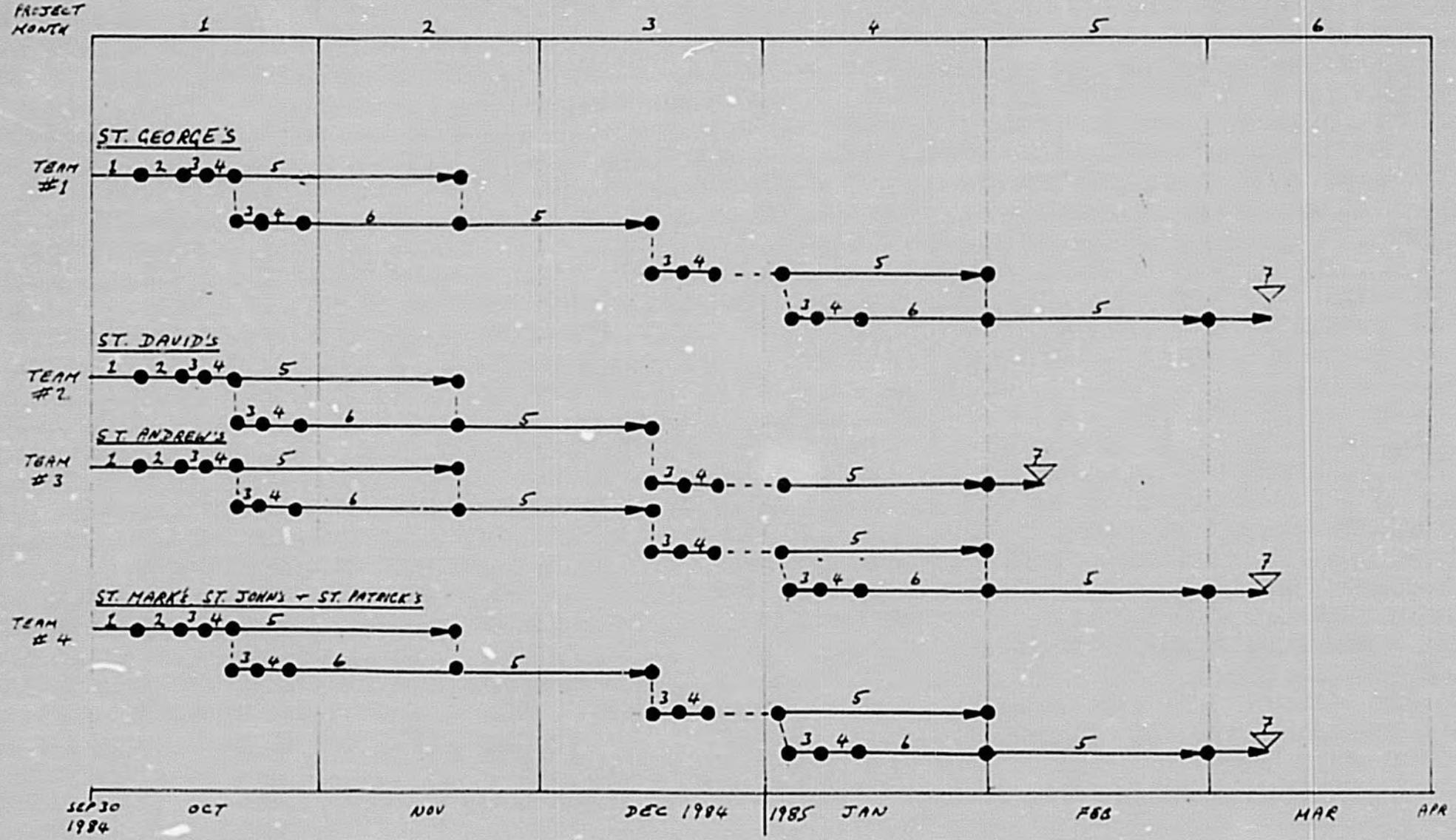


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USAID/GRENADA INFRASTRUCTURE REVITALIZATION PROJECT - ROADS & BRIDGES IMPROVEMENT SUB-PROJECT

<u>Activity</u>	<u>Description</u>
1	Prepare scope of work/specifications, and advertise
2	Review offers and award contract
3	Contractor mobilization
4	Bridge design
5	Bridge construction
6	Identify additional equipment needed
7	Suppliers deliver materials to U.S. Port
8	Ocean shipment to Grenada
9	Improve quarry operation
10	Stockpile crushed stone
11	Produce RS-1 & RS-2 Emulsified asphalt at Grand Mal
12	Retaining wall construction and pipe culverts
13	Road construction

USAID/GRENADA INFRASTRUCTURE REVITALIZATION PROJECT - SCHOOL REPAIR/MAINTENANCE TRAINEE DEVELOPMENT PROJECT

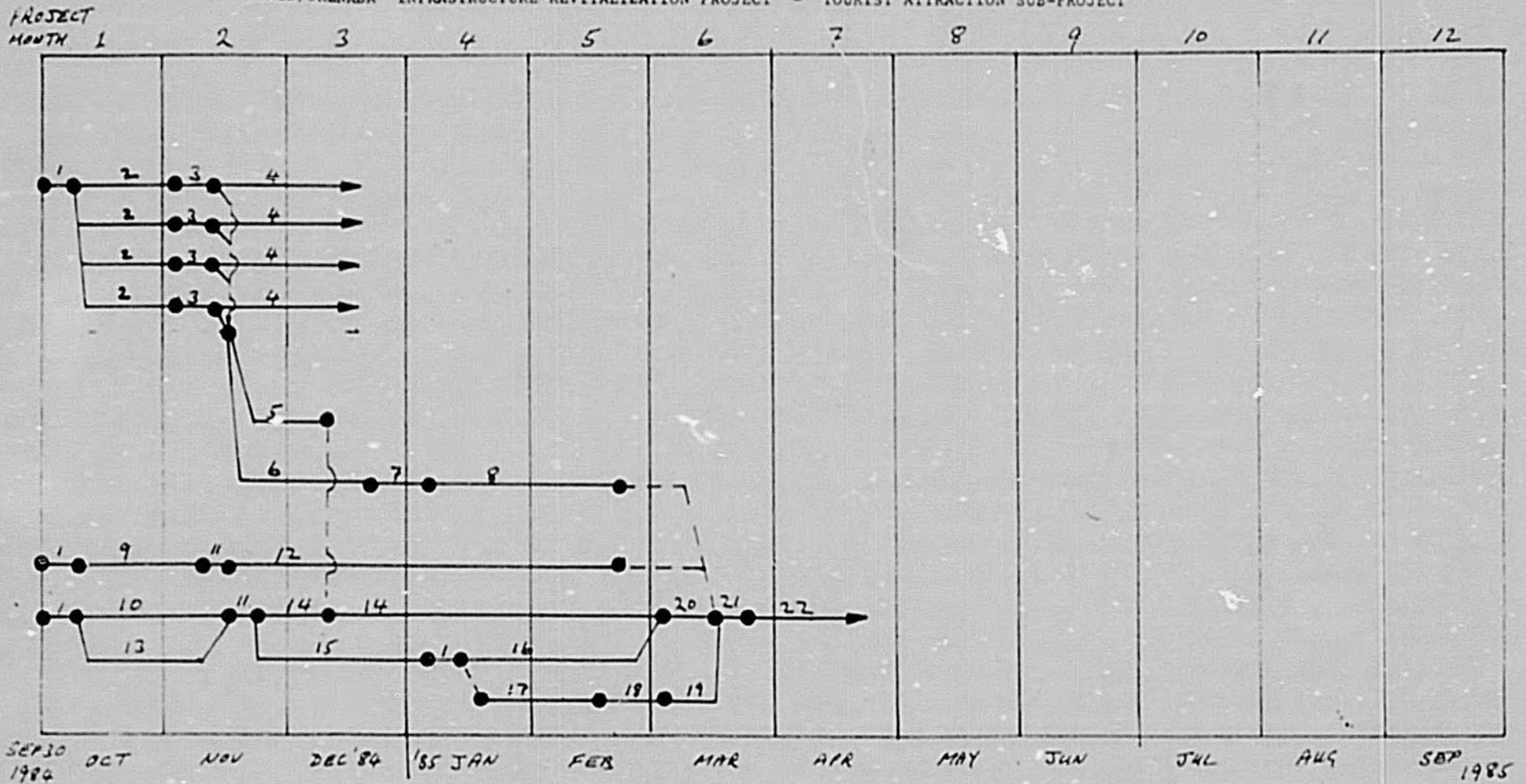


USAID/GRENADA INFRASTRUCTURE REVITALIZATION PROJECT - SCHOOL REPAIR/MAINTENANCE TRAINEE DEVELOPMENT
SUB-PROJECT

<u>Activity</u>	<u>Description</u>
1	Hire tradesmen
2	Deploy to Parish and recruit trainees
3	Visit and inspect school
4	Buy materials
5	Repair school
6	Preliminary repair work
7	Ministry of Education appoints permanent team

AB

USAID/GRENADA INFRASTRUCTURE REVITALIZATION PROJECT - TOURIST ATTRACTION SUB-PROJECT



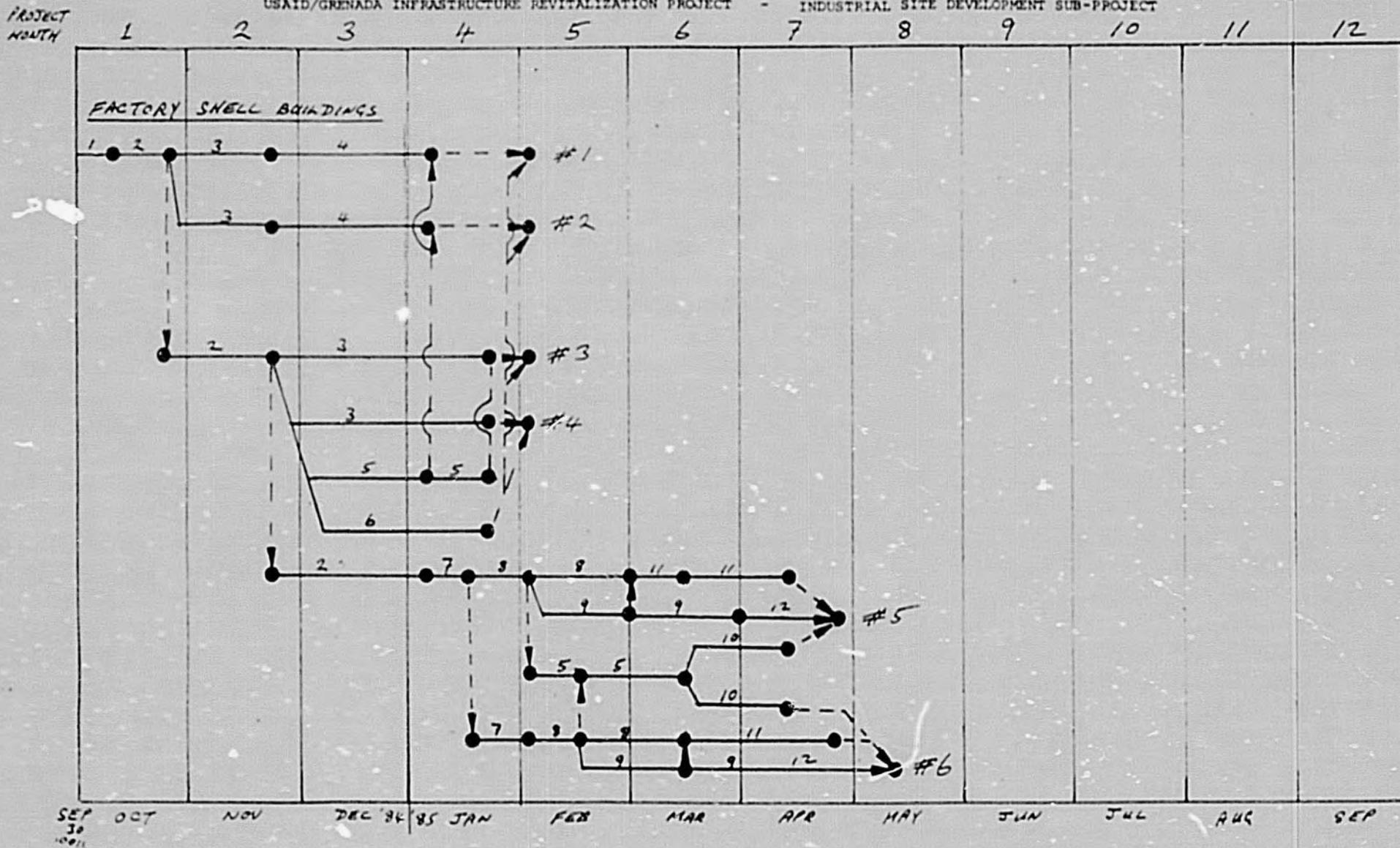
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USAID/GRENADA INFRASTRUCTURE REVITALIZATION PROJECT - TOURIST ATTRACTION SUB-PROJECT

<u>Activity</u>	<u>Description</u>
1	Award Contract
2	Demolish structure
3	Remove debris
4	Level and landscape
5	Repair pipe railing
6	Pave parking area
7	Cure concrete
8	Pave driveways
9	Review, analyze and prepare restoration plan
10	Design - convert building into an interpretation center
11	Ministry approval.
12	Implement restoration work
13	Identify equipment needs - audio-visuals, etc. & furnishings
14	Implement building renovation work
15	Prepare and advertise tender for equipment and furnishings
16	Ship to Grenada
17	Ministry of Tourism identifies job skills and advertises vacancies
18	Interview, select and hire staff
19	Staff orientation and classroom training
20	Install equipment and furnishings
21	Staff on-the-job training
22	Facility ready for opening and operation

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USAID/GRENADA INFRASTRUCTURE REVITALIZATION PROJECT - INDUSTRIAL SITE DEVELOPMENT SUB-PROJECT



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USAID/GRENADA INFRASTRUCTURE REVITALIZATION PROJECT - INDUSTRIAL SITE DEVELOPMENT SUB-PROJECT

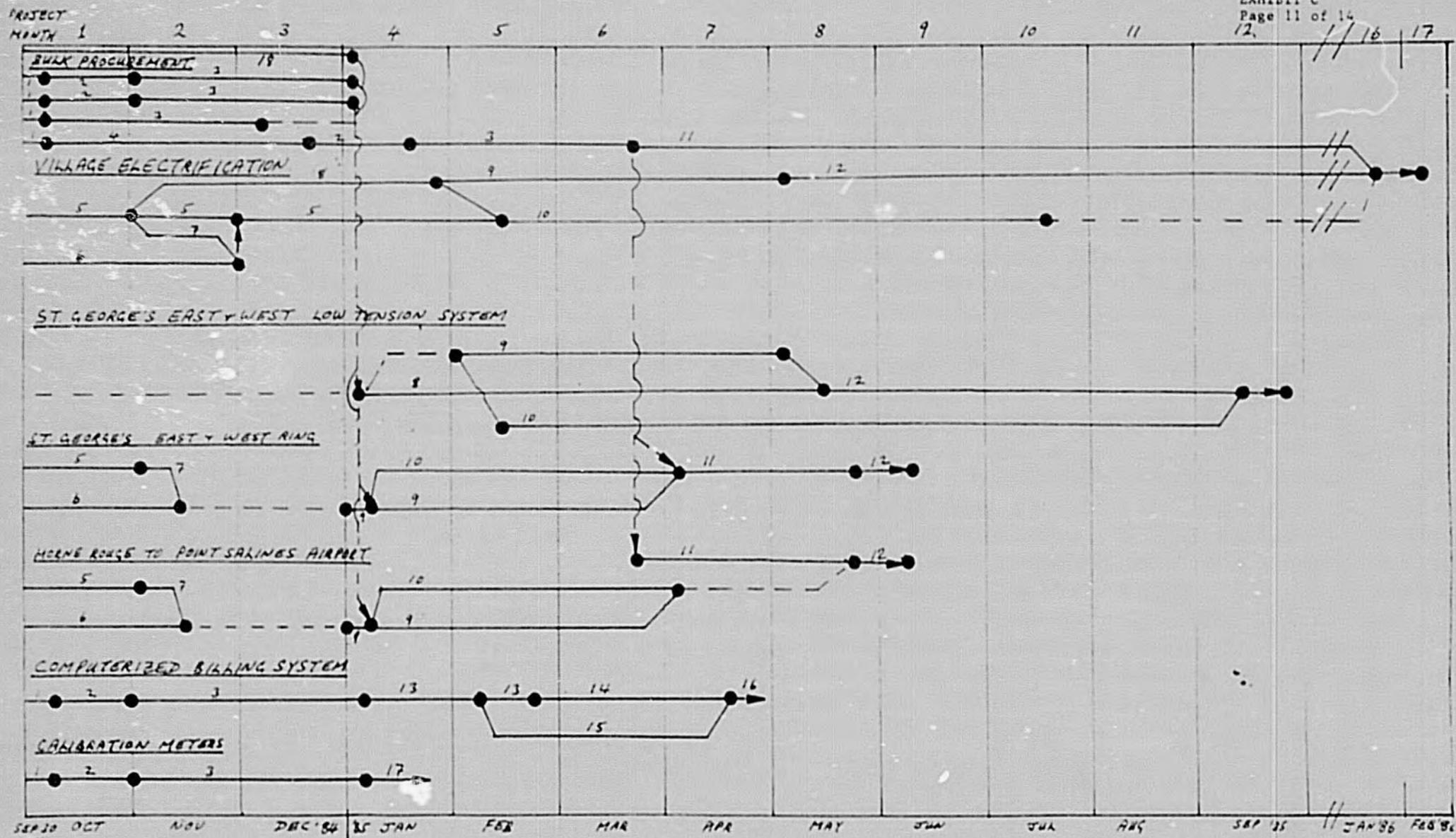
<u>Activity</u>	<u>Description</u>
1	Award Contract for Architect/Engineer to supervise project
2	Prepare specifications
3	Rehabilitate/renovate building
4	Hookup to common utilities
5	Install septic tank
6	Install site utilities
7	Stake out site and set forms for concrete slab
8	Install soil pipe, pour slab, cure slab
9	Erect steel
10	Install plumbing
11	Install siding, fittings
12	Install electrical work

USAID/GRENADA INFRASTRUCTURE REVITALIZATION PROJECT - POTABLE WATER IMPROVEMENT SUB-PROJECT

<u>Activity</u>	<u>Description</u>
1	Award Contract
2	Initial design
3	CWC detailed design
4	Survey
5	Factory supplies technical design for filter
6	CWC review & approval
7	Establish construction yard
8	Deliver to U.S. port
9	Ocean shipment to Grenada
10	Cut sluice gate opening in dam
11	Construct new structure and install sluice gate
12	Fabricate filter
13	Excavate
14	Final survey
15	Cure concrete
16	Tap pipe for connections
17	Tap and connect into existing water pipe
18	Pressure test
19	Install lines and valves
20	Field fabricate and set filter
21	Lay 6" pipe
22	Install building piping and valves
23	Install pump
24	Install electrical system controls
25	Connect pipe to clarifier - fix and launder
26	Tie in raw and filtered water pipe
27	Restore pavement
28	Install filter media
29	Produce filtered water
30	Start water delivery

USAID/GRENADA INFRASTRUCTURE REVITALIZATION PROJECT - ELECTRIFICATION ENHANCEMENT SUB-PROJECT

ANNEX II
EXHIBIT C
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12, // 16 | 17

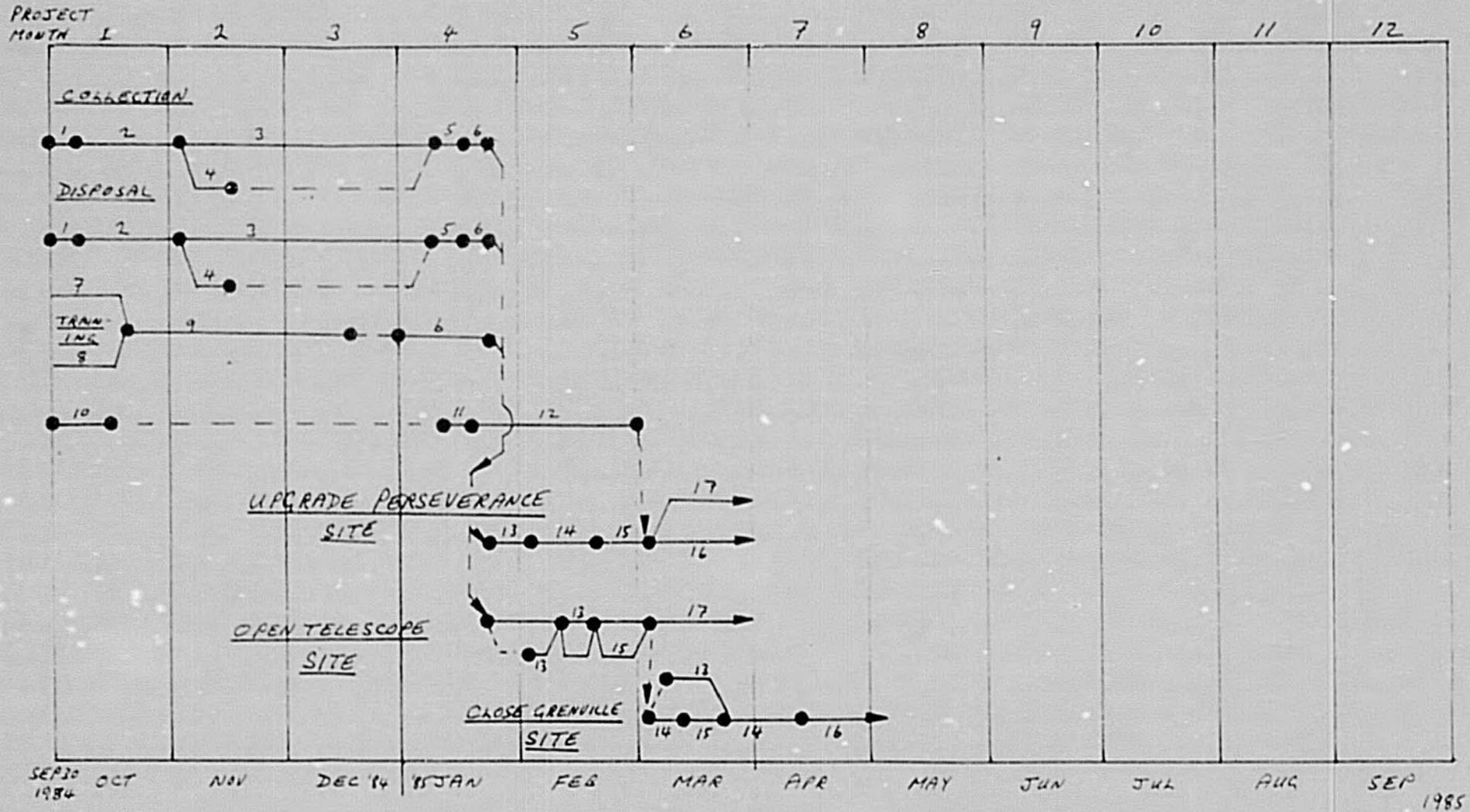


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USAID/GRENADA INFRASTRUCTURE REVITALIZATION PROJECT -- ELECTRIFICATION ENHANCEMENT SUB-PROJECT

<u>Activity</u>	<u>Description</u>
1	Award contract
2	Supplier delivers to U.S. port
3	Ocean shipment to Grenada
4	Transformer manufacturing
5	Clear right of way
6	Select transmission line route
7	Survey, soil testing, pole location
8	Remove existing lines, insulators, and some poles
9	Dig new holes
10	Install new poles, insulators and connect wires
11	Install transformers
12	Test and energize
13	Install computer system
14	Switch over existing system to computerized billing
15	Training - provide technical assistance on the job, and formal training in computer use, billing operations, and maintenance
16	Full service operation
17	Install/use meters
18	GRENLEC staff engineering design

df



USAID/GRENADA INFRASTRUCTURE REVITALIZATION PROJECT - SOLID WASTE MANAGEMENT SUB-PROJECT

<u>Activity</u>	<u>Description</u>
1	Award contract
2	Supplier delivers to U.S. Port
3	Ocean shipment to Grenada
4	Equipment operator classroom training
5	Service equipment
6	On the job training/familiarization
7	Ministry of Health identifies and arranges for environmental health training program in the U.S.
8	Ministry of Health identifies, screens and selects participants
9	U.S. environmental health training program
10	USAID identifies sanitary engineer for TDY, IQC, PSC or PASA duty - short term assignment
11	Orientation and travel to Grenada
12	Sanitary engineering supervisor provides Technical Assistance to Ministry of Health
13	Haul soil and gravel for covering material
14	Move, cover, compact solid waste, level and drain site
15	Construct isolating berm
16	Plant vegetation to screen site
17	Site ready for use

Scopes of Work for Technical Advisors

1. Construction Manager (Highways)

The highway construction engineer shall assist the Chief Technical Officer of the Ministry of Construction by:

- (a) reviewing pavement designs proposed and making recommendations for changes if required;
- (b) planning and scheduling work activities for each of the highway subprojects;
- (c) scheduling the procurement and delivery of construction materials to each subproject site;
- (d) preparing technical specifications for equipment to be procured offshore, soliciting quotations from suppliers, evaluating responses, and making recommendations for the award of procurement contracts.
- (e) scheduling use of heavy equipment from the Central Garage Unit;
- (f) establishing controls for and maintaining material inventories;
- (g) advising on the resolution of technical problems which may arise during construction, particularly those relating to drainage and slope stabilization;
- (h) reviewing and endorsing design computations for bridges and retaining walls and advising on appropriate construction techniques;
- (i) certifying vouchers submitted by the MOC to liquidate project advances;
- (j) preparing monthly progress reports for submission to USAID; and
- (k) performing such other technical/administrative duties as may be assigned by the Chief Technical Officer.

2. Quarry Superintendent

The quarry superintendent shall assist the MOC in implementing the highway improvement program by:

- (a) inspecting existing plant at the quarry site and determining if an appropriate mix of equipment is available;
 - (b) if required, identifying and preparing brief technical specifications for additional equipment needed to maximize production at the quarry;
 - (c) soliciting quotations for, evaluating responses, and making recommendations for the award of supply contracts for equipment required;
 - (d) identifying and assisting in the procurement of spare parts needed to rehabilitate existing equipment and developing a plan to overhaul equipment which will not disrupt plant operations;
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- (e) developing a plant flow chart which would most effectively utilize existing and new equipment and supervising the installation of any required conveyor systems;
- (f) developing and supervising the implementation of a preventive maintenance program;
- (g) supervising plant operations and advising on the resolution of technical problems which may arise;
- (h) maintaining production records; and
- (i) performing such other technical/administrative duties as may be assigned by the Chief Technical Officer.

3. Project Advisor

The Project Advisor shall assist the MOP and the members of the Monitoring Unit to administer the projects by:

- (a) Assist and set up the coordinator and monitoring operation to assure proper control of financial and administrative activities.
 - (b) Review and certify all invoices and documentation prior to submittal to USAID/Grenada.
 - (c) Set up procurement operation in accordance with AID procurement regulation and effectively be responsible for all procurement of equipment and materials.
 - (d) Establish control systems to effectively monitor and maintain records for all contractual obligations under this project.
 - (e) Assist in preparation of monthly reports and quarterly reports.
 - (f) Inspect project at site to assure compliance with specifications, standards and provide technical advice as necessary.
 - (g) Plan and schedule for all procurement.
 - (h) Perform such other Technical/monitoring duties as may be assigned by the Project Coordinator.
- P

EXHIBIT E
Procurement Lists

- I. Road Improvement Program
- II. Water Supply Improvements
 - A. Annandale
 - B. Les Avocats
 - C. Mamma Cannes
 - D. Woodlands Borehole #2
 - E. Water Meters
 - F. Leak Detection Equipment
- III. Waste Water Disposal
- IV. Solid Waste Disposal
- V. Electric Power Improvements
 - A. 11 KV Transmission Lines
 - B. Distribution Lines
 - C. Billing Equipment
 - D. Calibration Meters
 - E. Computer System

I. Road Improvement Program

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
1.	1	1-1/2 ton, self-propelled vibratory roller - \$8,000
2.	Lot	Spare parts for hand operated vibratory plate compactors (German made) - List available at CGU - \$3,500
3.	4	Hand sprayers for application of emulsified asphalt - detailed specifications available at MOC \$6,000
4.	Lot	Miscellaneous materials required for quarry operation, including conveyer system; spare parts for crusher, air compressors and rock drills; vibrating grizzly; explosives, and drill bits - \$50,000

II. Water Supply Improvements

A. ANNANDALE

MATERIALS FOR UNITED STATES PURCHASE

All fittings are cement lined cast iron or ductile iron unless otherwise shown. All fittings to be complete with gaskets, bolts, seals, glands, etc. for complete assembly.

1. Potable water filter, one each, gravity sand, self backwashing, vertical steel tank with manual valves. No automatic or electric controls. Rated flow of 750,000 imperial gallons per day. Include paint system and welding rod for field assembly. Possible suppliers: Graver-Ecodyne, Walker Process, Permutit
2. 100 ft. of 10-inch min. diameter steel pipe with 1-10 inch butterfly valve to serve as settled water supply pipe from existing clarifier
3. 2 - 10-inch sleeve couplings
4. 1- 300 amp D.C. diesel driven portable welder with 100 ft. leads, 2 masks, 200 lb. assorted welding rod
5. 3000 feet class 50 ductile iron pipe, 8 inch, cement lined, push-on joint
NOTE - All flanges 125 lb.
6. 1 - 8-inch wall spool, flanged
7. 1 - 8-inch rosebud intake
8. 1 - length 8-inch flanged spool - 20 ft. nominal
9. 3 - 8-inch flanged AWWA gate valves - 2" sq. nut operator
10. 5 - 8-inch flanged x push on joint adaptors
11. 1 - 8x8x8 tee, cast iron - flanged
12. 1 - 12x12x8 tee, cast iron - mechanical joint
13. 6 - 22.5° elbows
14. 2 - 8-inch sleeve couplings
15. 1 - 8-inch flange spigot
16. 4 - 8-inch uni-flanges (125 lb.)

List to be checked by CWC prior to purchase.

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B. LES AVOCATS

MATERIALS FOR UNITED STATES PURCHASE

All fittings are cement lined cast iron or ductile iron unless otherwise shown. All fittings to be complete with gaskets, bolts, seals, glands, etc. for complete assembly.

1. Potable water filter, one each, gravity sand, self backwashing, vertical steel tank with manual controls and valves. No electrical or automatic controls. Rated flow 200,000 imperial gallons per day. 8-inch flanged inlet with butterfly valve. Maximum filtration rate 1 GPM per square foot. Include paint system and welding rod for field assembly. Possible suppliers - Ecodyne Graves, Walker Process, Permutit. 6-inch flanged outlet.
 2. 300 ft, 8-inch diameter ductile iron pipe, class 50, push on joint, cement lined
NOTE - All Flanges 125 lb.
 3. 3- 8-inch sleeve couplings
 4. 1 - 8-inch AWWA flanged gate valve, 2" sq. nut operator
 5. 4 - 45° cast iron bond, flanged
 6. 4 - 22.5° cast iron bonds, push on joint
 7. 1 - 8-inch well spool
 8. 2 - 20 ft. nominal length flanged 8" pipe, ductile iron
 9. 4 - 8-inch UNI flanges
 10. 2 - flanged x push on joint adaptors
 11. 100 ft. 6-inch diameter class 50 ductile iron pipe, cement lined, push on joint
 12. 2 - 10 foot long, 6-inch flanged spigots - ductile iron
 13. 2 - 6-inch sleeve couplings
 14. 2 - 6-inch flanged 90° bonds cast iron
 15. 1 - 5-inch x 5-inch x 6-inch mechanical joint tee
 16. 4 - 22.5° 6-inch diameter bonds, push on joint
 17. 1 - flanged 6-inch AWWA gate valve with 2" sq. nut
- list to be checked by CWC prior to purchase.
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C. MAMMA CANNES PIPELINE EXTENSION

MATERIALS FOR US PURCHASE

All fittings are cement lined cast iron or ductile iron unless otherwise shown. All fittings to be complete with gaskets, bolts, seals, glands, etc for complete assembly.

1. 15,000 feet of 6-inch diameter cement lined ductile iron pipe, minimum pressure rating 220 psi.

Note: All Flanges 125 lb.

2. 4- 1-inch air release valves
3. 4- 6 inch X 4-inch flanged tees
4. 4- 4-inch flanged gate valves, 175 psi, 2-inch SW.NUT AWWA
5. 8- 6-inch push on joint gate valves, AWWA, 175 psi- 2-inch square nut operators
6. 1- 6-inch X 4-inch flanged reducer
7. 5- 6-inch flanged spigots
8. 4- 4-inch flanged sockets
9. 6- 6-inch sleeve couplings
10. 12- 11 $\frac{1}{2}$ °, mechanical joint bend
11. 12- 22 $\frac{1}{2}$ °, mechanical joint bend
12. 4- 6-inch flanged sockets
13. 6- 1" AWWA X 1" MIPT corporation stops, bronze
14. 30- 1 $\frac{1}{2}$ " AWWA X 1 $\frac{1}{2}$ " MIPT corporation stops, bronze
15. 600ft- 1 $\frac{1}{2}$ -inch galvanized iron pipe schedule 40
16. 30- 1 $\frac{1}{2}$ -inch gate valves, FIPT X FIPT
17. 1- manual dry tapping tool with taps for 1 $\frac{1}{2}$ "- AWWA and 1" AWWA Corporation stops.

★LIST TO BE CHECKED BY CWC PRIOR TO PURCHASE★

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D. WOODLANDS BOREHOLE #2

MATERIALS FOR US PURCHASE

All fittings are cement lined ductile iron or cast iron with 125lb flanges. Fittings to be complete with bolts, gaskets, seals, glands, etc for a complete assembly.

1. 1,900ft 6-inch ductile iron pipe, minimum 220 psi rating, cement lined, push on joint.
2. 1- 4" X 6" flanged reducer
3. 1- 6-inch flanged swing check valve, 175 psi
4. 1- 6-inch flanged tee
5. 4- 6-inch flanged Gate valves
6. 1- 6-inch Y junction
7. 5- 6-inch 114° bends, mechanical joint
8. 2- 6-inch 45° bends, mechanical joint
9. 2- 6-inch 90° bends, mechanical joint
10. 3- 6-inch couplings sleeve type
11. 4- 6-inch flanged spigots
12. 4- 6-inch flanged sockets
13. 2- 6-inch by 2'-0" long flanged spools
14. 1- 6-inch 90° bend, flanged

★CWC TO CHECK LIST PRIOR TO EQUIPMENT PURCHASE★

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E. WATER METERS

MATERIALS FOR US PURCHASE

1. 20- 4-inch turbine water meters, bronze body, with 4-inch, 125lb flanges. Meter register to read in Imperial Gallons. Meter to have integral flow straightening vanes.
2. 40- 4-inch X 6-inch cast or ductile iron flanged reducers, cement lined, with bolts & gaskets.

Possible meter suppliers are:

1. Kent
2. Neptune (Trident)
3. Sparling
4. Badger

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F. LEAK DETECTION
MATERIALS FOR US PURCHASE

3. - Leak detectors, aqua scope by heath company, complete with case and battery charger.
1. - Assortment of leak repair equipment including repair clamps, saddles, sleeve couplings, etc. List to be prepared by CMC to amount of US\$ 25,000 CIF Grenada.

III. Wastewater Disposal

MATERIALS

All pipe and fittings 4-inch, ductile iron or cast iron unless shown otherwise. Flanges are 125 lb. All flange bolts to be 18-8 stainless and furnished with fittings.

1. 2 - 250 GPM x 30' TDH self priming non clog sewage pumps with 2 sets belts each pump and 400 volt 50 cycle 3 phase motors, complete with sheaves, and base plate. Include wall mounted motor control for each pump along with float switches for pump-on and pump-off. Each watertight float switch to include 30 ft. of flexible electrical cable. Pump to have flanged inlet and outlet.
2. 2 - suction elbows, reducing if needed, to connect pump suction flange to 4-inch suction pipe.
3. 1 - 4" x 4" x 4" flanged wye, 45°.
4. 2 - 4-inch eccentric plug valve, flanged.
5. 2 - 4-inch swing check valve, flanged.
6. 2 - discharge elbows, reducing if needed, to connect pump discharge flange to 4-inch check valve.
7. 2 - 4-inch sleeve type coupling.
8. 5 - 4-inch 22-1/2° bends - mechanical joint.
9. 2 - 5 ft. flanged spigots (trim to needed length).
10. 2 - 4-inch suction bells.
11. 4 - 4-inch x 10 foot pipe spigots.
12. 6 - uni flanges - 4-inch.
13. 2 - 4-inch PVC socket weld x flange, 125 lb. adaptors.
14. 1 - 30 KW, 1800 PPM, 60 cycle, 460 volt, 3 phase standby generator.

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IV. Solid Waste Disposal

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
1.	3	Refuse collection vehicles consisting of compactor units with minimum 12 c.y. body space and minimum 3 to 1 compaction ratio mounted on appropriate chassis. Chassis equal to LNT 8000 series. Compactor unit equal to HEIL 4000 series. Unit should be equipped to handle dumpsters.

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V. Electric Power Improvements

A. 3 Phase - 11KV Transmission Line

Estimated Quantities and Costs for One Mile of 3 Phase, 11kv Transmission Line

<u>Item</u>	<u>Qty</u>	<u>Description</u>	<u>Cost US\$</u>
1	3 Miles	All aluminum stranded conductor 7-122 In to RS215 Part A 1970	2217
2	60	Galvanized pins for above, type R28	224
3	60	Brown glazed porcelain pin insulators with conductive glazed heads, Doulton BC9-16-CG	336
4	5	Galvanized pilot pins, type R45	19
5	30	Brown glazed porcelain disc insulators, type P80B-140	392
6	5	7'-4" galvanized steel crossarms to RS1320 Fig 28	121
7	5	Steel crossarm tie staps to RS1320 Fig 34	9
8	20	5' - 6" X 3" X 3" green heart crossarm to BS 1320 Fig 35	290
9	40	1'8 7-16" X 1 1/2" X 1 1/2" greenheart crossarm strut to BS 1320 Fig. 37.	75
10	40	Galvanized crossarm strut sockets to BS 1320 Fig 40	75
11	40	Galvanized crossarm box washers to BS 1320 Fig. 41	30
12	5	Galvanized 12" X 3/4" eye bolt to BS 1320 Fig. 24 type B	10
13	30	Aluminum terminating thimble	19
14	30	Galv. 16mm clevis ended socket adaptor to BS 1320 Fig. 20	19
15	30	Galv. Insulator hooks to BS 1320 Fig. 22	39
16	30	Galv. Terminating straps to BS 1320 Fig 23	47
17	15	Aluminum line taps AL 62	28
18	5	Wooden stay insulators to BS 1320 Fig. 47 complete with thimbles	47
19	5	Stay rods to BS 1320 Fig. 46, type A	56
20	150	7-0.16 In stay wire to BS 1320 Table 8	131
21	60	Preform side tie suitable for 7-122 In aluminum right hand lay conductor	112

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22	2	11KV single pole insulator drop out fuses switch with 8KA interrupting capacity, complete with fuse holders suitable for wood crossarm mounting. Supplied with all necessary mounting accessories.	43
23	50	10 X 3/4" galv. bolt and nut	6
24	40	4 X 3/4" galv. bolt and nut	31
25	10	2 X 3/4" galv. bolt and nut	9
26	5	1 1/2 X 3/4" galv. bolt and nut	9
27	50	Galvanized curve washers to BS 1320 Fig 38 for 3/4" bolt	52
28	80	Galv. flat washers to BS 1320 Fig 39 for 3/4" bolt	34
29	23	35' medium wallaba poles	3433
Total US\$(August 1983)			8114
Escalated to August 1984 at 8% Annual Rate			8763
15% Engineering, design, supervision, other.			1314
			10077

Labor Costs

(50mh¹-pole) (15EC\$/mh) (23 poles-mile) = 17,250 EC\$ - mile = US\$ 6,437

Total 16,514

or 16,600-mile

Quantities and Cost Estimates For 1 Mile

B. Low Tension Single Phase Line For Rural
Electrification Projects

Item	Qty		1984 US \$'s
i	2 mi	All Aluminum stranded conductor 7-122 In to BS 215 Part B 1970	1,478
2	10	Brown glazed shackle insulators type K1124	94
3	10	Brown glazed porcelain stay insulators type 118	38
4	100	Galvanized D- Iron assemblies type V11 complete with split pin	133
5	20	Aluminum line taps AL 62	30
6	10	Stay rods to BS 1320 type B	112
7	3	6' earth rods to BS 1320 Fg 45 C/W Bull Dog clips	28
8	200	4-0.16 in stay wire as above	94
9	1	Service fuse	15
10	10	Shackle insulator straps suitable for Doulton type K1124 insulator	508
11	100	8 X 5 X 8 galvanized bolt and nut	90
12	100	Galvanized curved washers to BS 1320 Fg 38 for 3/4" bolt	27
13	50	30' medium wallaba poles	6343
		Total	8790
		Escalate to August 1984 (10%)	9669
		15 Percent Contingency	1450
		Total Material US\$-mile-1Ø system	11119

Transformer Cost Estimates

14	1	25KVA-50KVA, 11000-240 single phase 50HZ wood pole mounting distributions transformer + 5% tap to BSS171-1978 with open bushings.	2230
----	---	---	------

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C. Billing Equipment

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
1.	1	Billing equipment consisting of one computer equal to the IBM system - 36 Model A22 with one matrix line printer and 5 display stations. Accessories to include application software for billing and receivables system, cable disks, printer ribbons and other system software for payroll, material management and general ledger operations. Supplier will be expected to provide minimum 20 days training for Grenadian technician. \$100,000

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D. Calibration Meters

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
1.	2	Single phase calibration meters with instruction manuals
2.	2	Three phase calibration meters with instruction manuals
		\$4,000

E. Computer System

Hardware-Software Cost Estimate Summary

<u>Item</u>	<u>1984 - US Dollars</u>
<u>Hardware</u>	
1 IBM System 36 Model A22	36,385
1 Matrix Line Printer	7,225
5 Display Stations	<u>11,875</u>
Total	55,485
<u>Accessories</u>	
Cable Diskets, Printer Ribbon, etc	4,170
System Software	6,528
<u>Application Software</u>	
Billing and Receivables System	<u>25,000</u>
Total	91,183
Training (20 Days X US\$ 450 day)	9,000
Air Fare	1,000
Living US\$ 100 X 30 Days	<u>3,000</u>
	<u>15,000</u>
Total Project Cost	104,183

15

2

100 A 415 V rewirable fuse cut outs complete suitable
for wood mounting.

47

2286

Escalation to August 1984

2515

0% Contingency

0

Use US\$ 2500 - Transformer

2515

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ECONOMIC ANALYSIS

A. ROADS

1. Vehicle Operating Cost (VOC) Savings/Vehicle
2. Weighted Average VOC Savings
3. Road Maintenance Costs per Mile With and Without Project
4. Financial/Economic Analysis

Gouyave - Victoria
Victoria - Sauteurs
Birch Grove - Grenville
Beaulieu - Vendomme
Grand Anse - Woodlands

5. Sensitivity Analysis

B. Water

C. Electricity

D. Tourism

E. Factory Shells

F. All Other

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SUMMARY CALCULATION OF VEHICLE OPERATING COST(VOC) SAVINGS DUE TO ROAD IMPROVEMENT

A. Cost per mile on existing roads (without project)
(Roughness Index = 250 inches/mile)

	EC\$		
	<u>Car</u>	<u>Van</u>	<u>Truck</u>
Fuel	.150	.170	.513
Oil	.010	.016	.035
Tires	.179	.238	.562
Maint.(Parts + Labor)	<u>.170</u>	<u>.187</u>	<u>.628</u>
Total	.509	.611	1.738

B. Costs per mile on improved, resurfaced road (with Project)
(Roughness Index = 100 inches/ mile)

	EC\$		
	<u>Car</u>	<u>Van</u>	<u>Truck</u>
Fuel	.150	.170	.513
Oil	.010	.016	.035
Tires	.102	.150	.321
Maint.(Parts + Labor)	<u>.112</u>	<u>.122</u>	<u>.387</u>
Total	.374	.458	1.256

1.

As noted in the technical analysis, last comprehensive traffic survey was conducted in 1972. Projections made for 1977, 1982, 1987, 1992. In 1982, MOC and Jentech, consultant for the Western Main Road Project, conducted limited surveys on selected routes which indicated traffic densities in 1982 were approximately those projected for 1977 in the earlier study. We have conservatively assumed no increase between 82 and 84, and are using the 77 projections for Year 1 conditions.

VOC formulas from Vehicle Operating Costs in the Caribbean: Results of a Survey on Vehicle Operators, Transport & Road Research Laboratory, July 1982. Covered Barbados, St. Vincent, St. Lucia and Dominica. Assumed applicable to Grenada as road conditions similar.

Autos

1. Tires/Km = $(-0.0601 + 0.0000746R) \times 10^{-3}$
Where R = Roughness Index in mm/km

2. Maintenance

a) Parts:

$$\frac{PC}{VP(K)} = (-5.501 + 0.00262R) \times 10^{-11}$$

PC = Parts Cost
VP = New Vehicle Cost
K = Kilometers to Data
R = Roughness Index (mm/km)

b) Labor = 45% of parts

Trucks

1. Tires/Km = $(0.00706 + 0.0000135R) \times 6 \times 10^{-4}$
R = Roughness Index in mm/km
G = Wt. of Vehicle

2. Maintenance

a) Parts

$$\frac{PC}{VP(K)} = (-6.538 + 0.003/6 R - 0.0000002/R^2) \times 10^{-11}$$

b) Labor at 45% of parts

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WEIGHTED AVERAGE VOC SAVINGS

A. Road Segment: Victoria - Sauteurs

Cars = 380; Vans = 95; Trucks = 210: Total = 685

VOC Without Project:

Cars: $\frac{380}{685} \times \text{EC}\$.50 \times 9 = \text{EC}\$.28$

Vans: $\frac{95}{685} \times \text{EC}\$.611 = \text{EC}\$.09$

Trucks: $\frac{210}{685} \times \text{EC}\$1.738 = \frac{\text{EC}\$.53}{90}$

VOC With Project:

$\frac{380}{685} \times \text{EC}\$.374 = \text{EC}\$.21$

$\frac{95}{685} \times \text{EC}\$.458 = \text{EC}\$.06$

$\frac{210}{685} \times \text{EC}\$1.256 = \frac{\text{EC}\$.39}{.66}$

VOC Savings: .99
- .66
EC\$.24/mile/day

(1) VOC = vehicle operating costs. The weighted average cost of figure eliminates the need to present the benefits by category of vehicle, thus greatly simplifying the presentation.

B. Road Segment: Beaulieu - Vendomme

Cars = 960; Vans = 240; Trucks = 215: Total = 1415

VOC Without Project:

Cars: $\frac{960}{1415} \times \text{EC}\$.509 = \text{EC}\$.35$

Vans: $\frac{240}{1415} \times \text{EC}\$.611 = \text{EC}\$.10$

Trucks: $\frac{215}{1415} \times \text{EC}\$1.103 = \frac{\text{EC}\$.26}{\text{Total EC } .71}$

VOC With Project:

$\frac{960}{1415} \times \text{EC}\$.374 = \text{EC}\$.25$

$\frac{240}{1415} \times \text{EC}\$.458 = \text{EC}\$.08$

$\frac{215}{1415} \times \text{EC}\$1.256 = \frac{\text{EC}\$.19}{.52}$

VOC savings = EC\$.71 - EC\$.52 = EC\$.19

C. Road Segment: Birch Grove - Grenville

Cars = 984; Vans = 246; Trucks = 100: Total = 1330

VOC Without Project:

Cars: $\frac{984}{1330} \times \text{EC}\$.509 = \text{EC}\$.38$

Vans: $\frac{246}{1330} \times \text{EC}\$.611 = \text{EC}\$.11$

Trucks: $\frac{100}{1330} \times \text{EC}\$1.738 = \frac{\text{EC}\$.13}{\text{Total EC}\$.62}$

VOC With Project:

$\frac{984}{1330} \times \text{EC}\$.374 = \text{EC}\$.28$

$\frac{246}{1330} \times \text{EC}\$.458 = \text{EC}\$.09$

$\frac{100}{1330} \times \text{EC}\$1.256 = \frac{\text{EC}\$.09}{\text{Total EC}\$.46}$

.62 - .46 = .16

D. Road Segment: Gouyave - Victoria

Cars = 456; Vans = 114; Trucks = 380: Total = 950

<u>VOC Without Project:</u>		<u>VOC With Project:</u>	
Cars:	$\frac{456}{950} \times \text{EC}\$.509 = \text{EC}\$.24$	$\frac{456}{950} \times \text{EC}\$.374 = \text{EC}\$.18$	
Vans:	$\frac{114}{950} \times \text{EC}\$.611 = \text{EC}\$.07$	$\frac{114}{950} \times \text{EC}\$.458 = \text{EC}\$.06$	
Trucks:	$\frac{380}{950} \times \text{EC}\$1.738 = \text{EC}\$.70$	$\frac{380}{950} \times \text{EC}\$1.256 = \text{EC}\$.50$	
	Total EC\$ 1.01	Total EC\$.74	

VOC savings = EC\$1.01 - EC\$.74 = EC\$.27

Grand Anse - Woodlands

Cars:	620 X .8 = 496.0	Total:	620 + 100 = 720
Vans:	620 - 496 = 124		
Trucks:	= 100		

<u>VOC Without Project:</u>		<u>VOC With Project:</u>	
Cars:	$\frac{496}{720} \times 50.9 = \text{EC}35.06$	$\frac{496}{720} \times 37.4 = \text{EC}25.76$	
Vans:	$\frac{124}{720} \times 61.1 = \text{EC}10.52$	$\frac{124}{720} \times 45.8 = \text{EC}7.89$	
Trucks:	$\frac{100}{720} \times 173.8 = \text{EC}24.34$	$\frac{100}{720} \times 125.6 = \text{EC}17.44$	
	Total Wtgd Avg: EC.73/	Total Wtgd Avg: EC.51	

VOC savings/mile = .70 - .51 = .19

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ANNUAL ROAD MAINTENANCE COSTS WITH AND WITHOUT PROJECT

A. Without Project

Current estimate of maintenance expenditure = \$3,000

B. With Project

Item

1. Pavement Repairs	=	\$1,730
2. Cleaning	=	\$1,500
3. Drainage Repairs	=	\$ 750
4. Other miscellaneous works	=	<u>\$ 250</u>
	Total	= <u>\$4,230</u>
	Increase	= <u>\$1,230</u>
	X EC\$2.7/US\$1	=EC\$3,321

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FINANCIAL ANALYSIS

GOUYAVE - VICTORIA

Year	(1) Road Cost	(2) MAINT	(3) Total Cost	(4) No. Vehicles	(5) VOC SAV/ Mile/day Col 5 X 3.1 Miles X 355 Days	(6) Total Savings (Col 5 X 3.1 Miles X 355 Days)	(7) Net Benefits
1984	1,947,244 ¹		1,947,244	950			
1985		10,295	10,295	988	267	301,839	-1,947,244
1986		"	"	1028	278	314,059	291,544
1987		"	"	1069	289	326,585	303,764
1988		"	"	1112	300	339,722	316,290
1989		"	"	1156	312	353,164	329,427
1990		"	"	1202	325	367,217	342,869
1991		"	"	1250	338	381,888	356,922
1992		"	"	1300	351	397,157	371,586
1993		"	"	1352	365	413,043	386,862
1994	272,800	-0-	272,800	1406	380	429,540	402,748
1995		"	10,295	1462	395	446,648	156,740
1996		"	"	1520	410	464,368	436,353
1997		"	"	1581	427	483,003	454,073
1998		"	"	1644	444	968,911	472,708
							958,616

IRR = 16%

Note: Salvage Value in 1998 = .25 X ECS1,866,644 = ECS466,661

1) To the ECS 1,866,644 construction cost figure has been added ECS 80,600 (\$10,000, or EC\$2.6/US Dollar) to cover the technical assistance included in the project for road construction.

2) Major resealing: ECS 88,000/mile

3) Col.6 for 1998: 1644 X EC.27 X 3.1 X 355 = ECS 502,250 plus salvage = ECS 968,911.

GOUYAVE - VICTORIA

SHADOWING PRICING FOR ECONOMIC ANALYSIS
(ALL VALUES IN EC DOLLS)

A. Construction Cost

1) Capital		
1,866,664 X .8 = 1,493,331 X 1.2 =		1,791,997
2) Technical Assistance: 80,600 X 1.2 =		96,720
3) 1,866,664 Total Cost		
- 1,493,331 Capital Cost		
373,333 Labor cost ÷ 2 =		<u>186,667</u>
	Total Shadowed Priced Construction Cost	2,075,384

B. Maintenance

1) Capital		
10,295 X .8 = 8,236 X 1.2 =		9,883
2) Labor		
10,295 Total Cost		
- 8,236 Capital Cost		
2,059 ÷ 2 =		<u>1,030</u>
	Total Shadow Priced Maint Cost	10,913

C. Resealing

1) Capital		
272,800 X .8 = 218,240 X 1.2 =		261,888
2) Labor		
272,800 - 218,240 = 54,560 ÷ 2		<u>27,280</u>
	Total Shadow Priced Resealing Cost	289,168

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ECONOMIC ANALYSIS

GOUYAVE - VICTORIA

Year	Road Cost	(2) Maint	(3) Total Cost	(4) No. Vehicles	(5) VOC SAV/ Mile/day Col 4 X ECS.27	(6) Total Savings (Col 5 X Miles X 5.1 365 Days	(7) Net Benefits
1984	2,075,384		2,075,384				
1985		10,913	10,913	950	267	301,839	-2,075,384
1986		"	"	988	278	314,059	290,926
1987		"	"	1028	289	326,585	303,146
1988		"	"	1069	300	339,722	315,672
1989		"	"	1112	312	353,164	328,809
1990		"	"	1156	325	367,217	342,251
1991		"	"	1202	338	381,888	356,404
1992		"	"	1250	351	397,157	370,975
1993		"	"	1300	365	413,043	386,244
1994	289,168	-0-	289,168	1352	380	429,540	402,130
1995		10,913	10,913	1406	395	446,648	140,372
1996		"	"	1462	410	464,368	435,735
1997		"	"	1520	427	483,003	453,455
1998		"	"	1581	444	996,916	472,090
				1644			986,003

IRR = 14%

NOTE

Salvage value in 1998 = .25 (2,075,384 - 96,720 (TA)) = ECS494,666

1) Column 6 1998 = ECS502,250 + Salvage value = ECS996,916

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FINANCIAL ANALYSIS

BEAULIEU - VENDOMME

Year	(1) Road Cost (EC\$)	(2) Maint (EC\$)	(3) Total Cost (EC\$)	(4) No. Vehicles	(5) VOC SAV/ Mile/day Col 4 X EC\$.19	(6) Total Savings (Col 5 X 2 Miles X 365 Days	(7) Net Benefits (EC\$)
1984	682,235 ²		630,236	1415	---	---	- 682,236
1985		6,642	6,642	1472	280	204,166	197,524
1986		"	"	1531	291	212,350	205,708
1987		"	"	1592	302	220,810	214,168
1988		"	"	1656	315	229,687	222,045
1989		"	"	1722	327	236,841	232,199
1990		"	"	1791	340	246,412	241,770
1991		"	"	1863	354	258,389	251,756
1992		"	"	1938	368	268,801	262,159
1993		"	"	2016	383	279,619	272,977
1994	176,000 ³	-0-	176,000	1097	398	290,854	114,854
1995		6,642	6,642	2181	414	302,505	295,863
1996		"	"	2268	431	314,572	307,930
1997		"	"	2359	448	327,193	326,551
1998		"	"	2453	466	497,790 ⁴	491,148

IRR = 32%

Note; Salvage value in 1998 = .25 X EC\$ 630,236 = EC\$ 157,559

1. Vehicle operating cost (VOC) savings = EC\$.19
2. To the EC\$ 630,236 construction cost figure has been added EC\$ 52,000 (\$10,000/mile or EC 2.6/US Dollar) to cover the technical assistance included in the project for road construction.
3. Major resealing = EC\$ 88,000/mile
4. Col 6 for 1998: 2453 X EC\$.19 X 2 miles X 365 days = EC\$ 340,231 + Salvage value = EC\$ 497,790

BEAULIEU - VENDOMME

SHADOW PRICING FOR ECONOMIC ANALYSIS
(EC\$)

(A) Construction Costs

$$630,236 \times .8 = 504,189 \times 1.2 = 605,027$$

(B) Technical Assistance

$$\text{EC\$ } 52,000 \times 1.2 = 62,400$$

(C) Labor Cost

$$\begin{array}{r} 630,236 \\ -504,189 \\ \hline 126,047 \div 2 = \end{array} \quad \begin{array}{r} 63,024 \\ \hline 730,451 \end{array}$$

Revolved Construction Costs

(D) Maintenance

$$6,642 \times .8 = 5314 \times 1.2 = 6,376$$

$$\begin{array}{r} 6642 \\ -5314 \\ \hline 1382 \div 2 = \end{array} \quad \begin{array}{r} 664 \\ \hline 7,040 \end{array}$$

(E) Resealing

$$176, \times .8 = 140,800 \times 1.2 = 168,960$$

$$\begin{array}{r} 176,000 \\ -140,800 \\ \hline 35,200 \div 2 = \end{array} \quad \begin{array}{r} 17,000 \\ \hline 186,560 \end{array}$$

ECONOMIC ANALYSIS

BEAULIEU - VENDOMME

Year	(1) Road Cost	(2) Maint	(3) Total Cost	(4) No. Vehicles	(5) VOC SAV/ Mile/day (Col 4 X ECS19)	(6) Total Savings (Col 5 X 2Miles X 365 Days	(7) Net Benefits
1984	730,451		730,451	1415	---	---	
1985		7,040	7,040	1472	280	204,166	- 730,451
1986		"	"	1531	291	212,350	197,126
1987		"	"	1592	302	220,810	205,310
1988		"	"	1656	315	229,687	213,770
1989		"	"	1722	327	238,841	222,647
1990		"	"	1791	340	248,412	231,801
1991		"	"	1863	354	258,389	241,372
1992		"	"	1938	368	268,801	251,358
1993		"	"	2016	383	279,619	261,761
1994	186,560	-0-	186,560	1097	398	290,854	272,579
1995		7,040	7,040	2181	414	302,505	104,294
1996		"	"	2268	431	314,572	295,465
1997		"	"	2359	448	327,193	307,532
1998		"	"	2453	466	507,244	361,763
							500,204

IRR = 30%

Salvage value in 1998 = .25 X (EC\$ 730,451 - 62,400 (TA)) = EC\$ 167,013

1. Col 6 1998 = EC\$ 340,234 + Salvage value EC\$ 507,244

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FINANCIAL ANALYSIS

BIRCHGROVE - GRENVILLE

Year	(1) Roll Cost EC\$	(2) Maint EC\$	(3) Total Cost EC\$	(4) No. Vehicles	(5) VOC SAV/ Mile/day Col 4 X EC\$.16	(6) Total Savings (Col 5 X 3 Miles X 365 Days	(7) Net Benefits
1984	1,439,166 ^{1]}		1,361,166	1330	-	-	1,439,166
1985		9,963	9,963	1383	221	242,302	232,339
1986		"	"	1439	230	252,113	242,150
1987		"	"	1496	239	262,099	252,136
1988		"	"	1556	249	272,611	262,648
1989		"	"	1618	259	283,474	273,511
1990		"	"	1683	269	294,862	284,890
1991		"	"	1750	280	306,600	296,637
1992		"	"	1820	291	318,864	308,901
1993		"	"	1893	303	331,654	321,691
1994	264,000 ^{2]}	-0-	264,000	1969	315	344,969	80,969
1995		9,963	9,963	2047	328	358,634	348,671
1996		"	"	2129	341	373,001	363,038
1997		"	"	2215	354	388,068	378,105
1998		"	"	2303	368	743,778 ^{3]}	733,815

IRR = 17%

NOTE: Salvage value in 1998 = .25 X EC\$1,363,166 = EC\$340,292.

1] To the EC\$1,361,166 construction cost figure has been added EC\$78,000 (\$10,000 /mile at EC\$2.6 /US DOL) to cover the technical assistance included in the project for road construction.

2] Major resealing: EC\$88,000/mile.

3] Column 6 for 1998: 2303 X EC\$.16 X 3 miles X 365 days = EC\$403,486 + salvage value = EC\$743,778.

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BIRCHGROVE - VENDOME

Shadow Pricing for Economic Analysis

All values in EC\$

(A)	<u>Construction Costs</u>		
	1,361,166 X 8 = 1,088,933 X 1.2	=	1,306,720 +
(B)	Technical Assistance: EC\$78,000 X 1.2	=	93,600
(c)	labor Costs		
	1,361,166		
	- 1,088,933		
	<u>272,233 ÷ 2</u>	=	<u>136,117</u>
	Shadow Priced construction		
	costs = 1,536,437		
	and technical assistance in		
	1984		
(D)	<u>Maintenance</u>		
	9,963 X 8 = 7,970 X 1.2	=	9,564
	9,963		
	-7,970		
	<u>1,993 ÷ 2</u>	=	<u>997</u>
			10,561
(E)	<u>Resealing</u>		
	264,000 X 8 = 211,200 X 1.2	=	253,440
	264,000		
	- 211,200		
	<u>52,800 ÷ 2</u>	=	<u>26,400</u>
			279,840

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ECONOMIC ANALYSIS

BIRCHGROVE --- GRENVILLE

Year	(1) Road Cost	(2) Maint	(3) Total Cost	(4) No. Vehicles	(5) VOC SAV/ Mile/day Col 4 X EDS .16	(6) Total Savings (Col 5 X 3 Miles X 365 Days	(7) Net Benefit
1984	1,536,437		1,536,437	1330	-	-	1,536,437
1985		10,561	10,561	1383	221	242,302	231,741
1986		"	"	1439	230	252,113	241,552
1987		"	"	1496	239	262,099	251,538
1988		"	"	1556	249	272,611	262,050
1989		"	"	1618	259	283,474	272,913
1990		"	"	1683	269	294,862	284,301
1991		"	"	1750	280	306,600	296,039
1992		"	"	1820	291	318,864	308,303
1993		"	"	1893	303	331,654	321,093
1994	279,840	-0-	279,840	1969	315	344,969	65,129
1995		10,561	10,561	2047	328	358,634	348,073
1996		"	"	2129	341	373,001	362,440
1997		"	"	2215	354	388,068	377,507
1998		"	"	2303	368	764,195	753,634

IRR = 16%

NOTE Salvage Value in 1998 = 25 X (1,536,437 - 93,600 (TA)) = 360,709

1) Column 6 1998 = EC\$403,486 + Salvage value = EC\$764,195.

GRAND ANSE - WOODLANDS
FINANCIAL ANALYSIS

Year	(1) Road Cost	(2) Maint	(3) Total Cost	(4) No. Vehicles	(5) VOC SAV/ Mile/day (Col 4 X ECS.19)	(6) Total Savings (Col 5 X 2.3 miles X 365 Days	(7) Net Benefits
1984							
1985	981,517		981,517				
1986		7,638	7,638	1440	274	229,687	-981,517
1987		"	"	792	150	126,328	222,049
1988		"	"	824	157	131,432	118,690
1989		"	"	857	163	136,696	123,794
1990		"	"	891	169	142,119	129,058
1991		"	"	927	176	147,861	134,481
1992		"	"	964	183	153,786	140,223
1993		"	"	1,002	190	159,824	146,125
1994	101,200	-0-	101,200	1,042	198	166,204	152,186
1995		"	"	1,084	206	172,903	65,004
1996		"	"	1,127	214	179,762	165,265
1997		"	"	1,172	223	186,940	172,124
1998		"	"	1,219	232	194,437	179,302
1999		"	"	1,268	241	432,681	186,799
							425,043

IRR = 13%

NOTE: Salvage Value = .25 X ECS921,717 = 230,429

- 1) To the ECS921,717 construction cost figure has been added ECS59,800 (\$10,000/mile or ECS2.6 USDOL) to cover the technical assistance included in the project for road construction.
- 2) Major resurfacing: ECS44,000/mile
- 3) Column 6 for 1999: 1268 X 2.3 X 365 = 202,252 plus salvage value = ECS432,681.

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GRAND ANSE - WOODLANDS
SHADOW PRICING FOR ECONOMIC ANALYSIS
(ALL VALUES IN EC DOLLARS)

A. Construction Costs:

1) Capital

$$921,717 \times .8 = 737,374, \times 1.2 = 884,848$$

2) Technical Assistance

$$59,800 \times 1.2 = 71,760$$

3) Labor

$$(921,717 - 737,374) \div 2 = \underline{92,172}$$

$$\text{Total Shadow Priced Construction Cost} \quad 1,048,780$$

B. Maintenance

1) Capital

$$7,638 \times .8 = 6,110 \times 1.2 = 7,332$$

2) Labor

$$(7,638 - 6110) \div 2 = \underline{764}$$

$$\text{Total Shadow Price Maint Cost} \quad 8,096$$

C. Resurfacing

1) Capital

$$101,200 \times .8 = 80,960 \times 1.2 = 97,152$$

2) Labor

$$(101,200 - 80,960) \div 2 = \underline{10,120}$$

$$\text{Total Shadow Price Resurfacing} \quad 107,272$$

1.24

ECONOMIC ANALYSIS

GRAND ANSE - WOODLANDS

Year	(1) Asset Cost	(2) Maint	(3) Total Cost	(4) No. Vehicles	(5) VOC SAV/ Mile/day (Col 4 X ECS.19)	(6) Total Savings (Col 5 X 2.3 MilesX 365 Days)	(7) Net Benefits
1984							
1985	1,048,780		1,048,780				-1,048,780
1986		8,096	8,096	1440	274	229,687	221,591
1987		"	"	792	150	126,328	118,232
1988		"	"	824	157	131,432	123,336
1989		"	"	857	163	136,696	128,600
1990		"	"	891	169	142,119	134,023
1991		"	"	927	176	147,861	139,765
1992		"	"	964	183	153,786	145,667
1993		"	"	1,002	190	159,824	151,728
1994	107,272	-0-	107,272	1,042	198	166,204	158,108
1995		"	"	1,084	206	172,903	164,807
1996		"	"	1,127	214	179,762	171,666
1997		"	"	1,172	223	186,940	178,844
1998		"	"	1,219	232	194,437	186,341
1999		"	"	1,268	241	432,681	438,411

IRR = 12%

Savings Value in 1999 = .25 (1,048,780 - 71,760 (TA)) = 244,255

ROAD SEGMENT: VICTORIA - SAUTEURS¹

FINANCIAL ANALYSIS

Year	(1) Road Cost	(2) Maint	(3) Total Cost	(4) No. Vehicles	(5) VOC SAV/ Mile/day Col 4 X ECS	(6) Total Savings (Col 5 X 2.4 Miles X 365 Days	(7) Net Benefit
1984	3,165,089 ²		3,165,089	685			-3,165,089
1985		24,575	24,575	712	171	461,871	437,296
1986		"	"	740	178	479,698	455,123
1987		"	"	770	185	499,145	474,570
1988		"	"	801	192	519,240	494,665
1989		"	"	833	200	539,984	515,409
1990		"	"	866	208	561,376	536,801
1991		"	"	901	216	584,064	559,489
1992		"	"	937	225	607,401	582,826
1993		"	"	974	234	631,386	606,811
1994	641,200 ³	-0-	651,200	1013	243	656,667	5,467
1995		24,575	24,575	1054	253	683,245	658,670
1996		"	"	1096	263	710,471	685,896
1997		"	"	1140	274	738,994	714,419
1998		"	"	1186	285	1,511,985 ⁴	1,487,410

IRR = 14%

Note: Salvage value in 1998 = .25 X EC\$ 2,972,689 - EC\$ 743,172

1. Vehicle Operating Costs (VOC) savings = EC\$.24/mile/day. Road Length = 7.4

2. To the EC\$ 2,972,689 construction cost figure has been added EC\$192,400 (\$10,000/mile or EC\$2.6/US dollar) to cover the technical assistance included in the project for road construction.

3. Major resealing: EC\$ 88,000/mile

4. Col 6 for 1998: 1186 X EC\$.24 X 7.4 miles X 365 days = EC\$ 768,813 plus salvage = EC\$ 1,511,985

ECONOMIC ANALYSIS

SHADOWING PRICING FOR ECONOMIC ANALYSIS

(ALL VALUES IN EC DOLLARS)

1. Construction Cost

a) Capital

$$2,972,689 \times .8 = 2,378,151 = \quad 2,853,781$$

$$b) \text{ Technical Assistance: } 192,400 \times 1.2 = \quad 230,880$$

$$c) \text{ Labor: } 2972,689 - 2,378,151 = 594,538 \div 2 = \quad 297,269$$

Total Shadowed Priced Construction Cost 3,381,930

2. Maintenance

a) Capital

$$24,575 \times .8 = 19,660 \times 1.2 = \quad 23,592$$

$$b) \text{ Labor: } 24,575 - 19,660 = 4,915 \div 2 = \quad 2,458$$

Total Shadowed Priced Construction Cost 26,050

3. Resealing

a) Capital

$$651,200 \times .8 = 520,960 \times 1.2 = \quad 625,152$$

$$b) \text{ Labor: } 651,200 - 520,960 = 130,240 \div 2 = \quad 65,120$$

Total Shadowed Priced Resealing Cost 690,272

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ECONOMIC ANALYSIS

VICTORIA - SAUTEURS

Year	(1) Road Cost	(2) Maint	(3) Total Cost	(4) No. Vehicles	(5) VOC SAV/ Mile/day Col 4 X ECS.24)	(6) Total Savings (Col 5 X 7.4 Miles X 365 Days)	(7) Net Benefits
1984	3,381,930		3,381,930	685			
1985		26,050	26,050	712	171	461,871	-3,391,930
1986		"	"	740	178	479,698	435,497
1987		"	"	770	185	499,145	453,648
1988		"	"	801	192	519,240	473,095
1989		"	"	833	200	539,984	493,190
1990		"	"	866	208	561,376	513,934
1991		"	"	901	216	584,064	535,326
1992		"	"	937	225	607,401	558,014
1993		"	"	974	234	631,386	581,351
1994	690,272	-0-	690,272	1013	243	656,667	605,336
1995		"	"	1054	253	683,245	- 33,605
1996		"	"	1096	263	710,471	657,195
1997		"	"	1040	274	738,994	684,421
1998		"	"	1186	285	1,556,576	712,944
							1,530,526

IRR = 13%

Note: Salvage value in 1998 = .25 X (3,381,930 - 230,880 (TA)) = ECS 787,763

1. Col 6 1998 = ECS768,813 plus salvage = ECS1,556,576

SENSITIVITY ANALYSIS

Change: Vehicular Traffic growth falls by 50% from 4% to 2% (Column 4).

Result: A 50% fall in projected traffic reduces the IRR by just 23%.

Road Segment: Victoria - Sauteurs
Vehicle Operating Cost/mile: EC\$.24
Road Length: 7.4

Year	(1) Road Cost	(2) Maint	(3) Total Cost	(4) No. Vehicles	(5) Net Benefits ¹
1984			3,381,930	685	-3,381,930
1985		26,050	26,050	699	427,070
1986		"	"	713	436,145
1987		"	"	727	445,220
1988		"	"	741	454,296
1989		"	"	756	464,019
1990		"	"	771	473,743
1991		"	"	787	484,115
1992		"	"	803	494,487
1993		"	"	819	504,859
1994	690,272	-0-	690,272	835	-148,992
1995		26,050	26,050	852	526,250
1996		"	"	869	537,271
1997		"	"	886	548,291
1998		"	"	904	1,347,722

IRR = 10%

1. Obtained by multiplying the new vehicle count by EC\$.24 X 7.4 miles X 365 days, and then subtracting total costs in Column 3.

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SENSITIVITY ANALYSIS

Change: Vehicle operating cost savings are reduced by 12% from EC\$.24 to EC\$.20.

Result: A 17% fall in VOC savings produced a 31% drop in the IRR.

Road Segment: Victoria - Sauteurs
 Vehicle Operating Cost/mile: .20
 Road Length: 7.4

Year	(1) Road Cost	(2) Maint	(3) Total Cost	(4) Net Benefits ¹
1984			3,381,930	-3,381,930
1985		26,050	26,050	358,572
1986		"	"	373,698
1987		"	"	389,904
1988		"	"	406,650
1989		"	"	423,937
1990		"	"	441,763
1991		"	"	460,670
1992		"	"	480,117
1993		"	"	500,105
1994	690,272	-0-	690,272	-143,049
1995		26,050	26,050	543,321
1996		"	"	566,009
1997		"	"	589,778
1998		"	"	1,402,390

IRR 9%

1. Obtained by multiplying the new VOC savings figure of EC\$.20 X 7.4 miles X 365 and by the No. of vehicles in the previous Economic Analysis Table to first obtain total savings, then subtracting the total cost figures in Column 3 above.

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WATER ACTIVITIES

The purpose of this activity is to seek a reasonable short-term solution to meet the water demand 100% of the time in the tourist/industrial sector and the Greater St. George's area.

In considering a project that adds additional water to an urban area, the traditional consumer surplus approach, as so well described in the IDB document, "Guide for Appraising Urban Potable Water Projects", would be the first choice. Indeed, the analysis was begun on the assumption that either consumer surplus, willingness to pay approach could be used to approximate the benefit value of the extra water supplied. However, severe data and time limitations required such strong assumptions and estimates that the approach was essentially abandoned. Fortunately, examination of the water technician's suggested solution to the supply problem indicated that the activity could quite appropriately be couched in the traditional with and without project framework because the solution not only would add to the supply, but as importantly, would significantly reduce the cost of the water currently being delivered. The following analysis, thus, focuses on cost savings as the principal benefit of the activity. In addition, a minimum value is given to the extra water produced and is included as an additional benefit in the analysis.

Five borehole pumps will become operable shortly. When these are combined with the current existing plant, a 450,000 gallons per day (gpd) deficit will exist during the 4.5 month dry season, with little capacity of meeting peak demands. Demand can be met during the remaining wet season. Operating costs of the borehole pumps for the entire year are \$276,750 as shown in detail in Table I.

For our analysis, the operating costs of the 5 pumps, with the existing treated water supply capabilities, were considered the "without project" case. Three "with project" cases were then developed in order to obtain the rates of return (IRRs) of the various solutions proposed by the water technicians. All construction and fuel cost estimates were based on CIF prices delivered in Grenada. The prices for the majority of the costs involved in these water subactivities, thus, already represent their true costs to the economy (by the use of border or accounting prices as they are strangely named by some economists). No attempt was made to shadow price the labor content since it represented such a small portion of total costs.

The development of a leak detection program was the first "with project" case analysed. As Table 2 indicates, the return is quite large, with an IRR of 156%. The second case analysed the impact of three treated water supply augmentation (TWSZ) activities with no leak detection program. The return, shown in Table 3, is considerably lower at 12 % because though the TWSA activities reduce the deficit from 450,000 gpd to just 57,000 gpd, the pumps must run during the entire dry season. The third case, shown in Table 4, considers the leak protection and the TWSA activities as one combined activity. The rate of return for this case is 30%, reflecting the fact that now during the dry season it is not necessary to run all 5 pumps. In summary, the rates of return for all the water subactivities are large enough to more than justify their implementation. These are minimum values because the value of the extra water produced or saved under the project is, itself, a minimum value as discussed in Table 7.

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At this stage of our analysis we would establish that the leak protection plan should be started immediately, and that if funds become an issue, the other TWSA activities should be done in the order of Les Avocats, Annadale, and finally Mamma Cannes (using as the selection criterion the result of dividing the present value sum of capital and operating costs by the total additional yearly gallons provided by each activity. See Table 5.)

The previous analysis implicitly assumes that the subactivities provide water during the same period of time, so that any external benefits would be equal per gpd of water supplied and, thus, would not change the relative position of the IRRs and any decision that might be based on the rates of return. In practice, however, unlike the other three subactivities, the Annadale plant will supply extra water only part of the year, during the nontourist wet season. Since tourism is an important economic sector, it is not unreasonable to assume that projects which provide additional water, and thus assure that there will be no water shortage during the tourist season, will create external benefits for the tourist sector. Thus, as a second stage of our analysis, we need to take these tourists benefits into account. Although we cannot quantify the tourist benefits, given the values shown in column 7 of Table 5, it does not seem unreasonable to assume that, if we could quantify them, Mamma Cannes would be ranked above Annadale. Table 5 demonstrates the change in order of implementation that occurs when these external benefits are implicitly added to the other three subactivities.

In summary, from our analysis, all water subactivities provided more than a sufficient rate of return to justify their implementation. It is quite clear that the leak protection activity should be started immediately, and that if a timing choice has to be made between TWSA subactivities (i.e., between Annadale, Les Avocats, and Mamma Cannes), the order should be Les Avocats, Mamma Cannes, and then Annadale.

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TABLE 1

Without Project Cost Figures^{1/}
(US\$)

Monthly Cost of Borehole Pump

\$4,920: Fuel for 20 hrs. daily operation, plus maintenance.
See Technical Annex.

Cost During Dry Season (4.5 months)

-5 Borehole Pumps x 4.5 x \$4,900 = \$110,700

Cost During Wet Season (7.5 months)

-2.5 Borehole Pumps x 7.5 x \$4,920= 92,250

- 1 Borehole Pump x 7.5 x \$4,920 = 36,900
to cover treatment plant downtime

- Borehole Pump x 7.5 x 4,920 = 36,900
to cover peak demand

Total Yearly Without Project Operating Cost \$276,750

1/ See Table 6 for the Values Developed - Tables 1-4.

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TABLE 2

With Project, Case I
Leak Detection Plan

Year	(1) Cost w/o Project	(2) ^{1/} Cost w project Capital Operating	(3) Cost Savings	(4) ^{3/} Value Extra Water	(5) Net Benefits <u>3+4</u>
1985		31,000	-31,000		-31,000
1986	276,750	256,650 ^{2/}	20,100	28,350	48,450
1999	↓	↓	↓	↓	↓

IRR = 156%

1/ Borehole Pump Needs in Case I

During dry season:

5 pumps x 4.5 months x \$4920 = 110,700

During wet season:

1.5 pumps x 7.5 months x \$4920 (running) = 55,350

1 pump x 7.5 months x \$4920 = 36,900

(to cover plant deficiencies)

1 pump for peaking 7.5 x \$4920 = 36,900

Total Pump Cost with Project \$239,850

2/ Additional Operating Expenses

Total Additional Expenses with Case I 16,800
\$256,650

3/ Value water: 300,000 gpd x 4.5 months x 30 days
x \$.007/g =

28,350

300,000 = amount estimated will be saved by program

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TABLE 3

With Project, Case 2
Treated Water Supply Augmentation (TWSA) Only

Year	(1) Cost w/o Project	(2) Cost w project Capital Operating	(3) Cost Savings 1-2	(4) Value Extra Water	(5) Net Benefits 3+4
1985		487,000	-487,000		-487,000
1986	276,750	239,400	37,350	37,139	74,489
1999	↓	↓	↓	↓	↓

IRR = 12%

1. Borehole Pump Needs in Case 2

During Dry Season:
5 pumps x 4.5 months x \$4920 = \$110,700

During Wet Season:
1 pump x 7.5 months x \$4920 = 36,900
plant deficiencies = 73,800
2 pumps x 7.5 months x \$4920 = 73,800
Total Pump Costs with Project \$221,400

2. Additional Operating Expenses 18,000
Total additional expenses with Case 2 \$239,400

3. Value Water:
393,000 gpd x 4.5 months x 30 days x \$.0007/g = \$ 37,139

Deficit before = 450,000 gpd less deficit after = 57,000 gpd = 393,000 gpd additional

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TABLE 4

With Project, Case 3
 Composite Program Leak Protection plus TWSA

Year	(1) Cost w/o Project	(2) Cost w Project Capital	(2) Cost w Project Operating	(3) Cost Savings 1-2	(4) Value Extra Water	(5) Net Benefits 3+4
1985		518,000 ^{1/}		-518,000		-518,000
1986	276,750		159,522 ^{2/}	117,228	42,525 ^{3/}	159,753
1999	↓		↓	↓	↓	↓

IRR = 30%

Borehole Pump Needs in Case 3

During Dry Season:

3.8 pumps x 4.5 x \$4920 = \$84,132
 1 pump x 4.5 x \$4920 = 22,140
 (for peaking)

During Wet Season:

.5 x 7.5 months x \$4920 = 18,450
 (for peaking)
 Total Pump Costs with Project \$124,722

^{2/} Additional Operating Expenses
 16,800 plus 18,000 = 34,800
 Total \$159,522

^{3/} Value Water
 (450,000 gpd less deficit of 0) x 4.5 x 30 x \$.0007 gpd = \$ 42,525

^{4/} 487,000 capital costs TWSA + \$31,000 capital costs for
 Leak Detection Program

TABLE 5

Marginal Cost Per Gallon of Extra Water
 Provided by the TWSA Sub Activities

<u>Sub Activity</u>	(1) <u>Capital Costs</u>	(2) <u>Annual Operating Costs</u>	(3) <u>NVP 12 & 15 yrs</u>	(4) <u>Extra gpd</u>	(5) <u>Months of Service</u>	(6) <u>Extra gp Year Col 5x30</u>	(7) <u>Cost Per Gal Col 3+6</u>	(8) <u>Order Without Tourist Benefits</u>	(9) <u>Order With Tourist Benefits</u>
Annandale	\$220,000	\$14,500	\$316,000	750,000	7.5	168,750,000	.0019	2	3
Les Avocats	67,000	2,000	80,256	200,000	12	72,000,000	.0011	1	1
Mamma Cannes	200,000	1,500	209,942	200,000	12	72,000,000	.0029	3	2

TABLE 6

Well Pump Running Time Estimate

1. Assume no improvements to treatment plants and distribution system.

4.5 month dry season: 5 borehole pumps running 450,000 GPD deficit

7.5 month wet season: (2.5 borehole pumps running if all plants on line
(1.0 pumps for plant deficiencies
(21.0 pumps for peaking

Total: 56.25 pump-months/year

2. Assume leak program only.

4.5 month dry season 5 borehole pumps running

7.5 month wet season (1.5 borehole pump running if all plants on-line
(1 pump for plant deficiencies

Note: 150,000 GPD deficit (1 pump for peaking
in dry season

Total: 48.75 pump months/year

3. Assume complete program.

4.5 month dry season (3.8 borehole pumps running in worst year - 25%
(0.8 borehole pumps running in average year - 75%

Note: 7.5 month wet season (1 borehole pump for peaking
0.5 pumps-peaking

Total: 15.2 pump months/year

4. Assume construction program without leak reduction program.

4.5 month dry season - 5 pumps running

Note: 57,000 GPD deficit

7.5 month wet season

1.0 pumps for plant deficiencies

2.0 pumps for peaking

Total 45.0 pump-months/year

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TABLE 7

Calculating the Average Cost of Unmetered Water
(Major Source, Central Water Commission (CWC))

1. Weighted Total Daily Supply (Manager, CWC)

	5.38 million gals pd
Less: 30% losses	<u>1.61</u>
Net Total Available	3.77 millions gals pd

2. Metered Water, payment and supply/demand (CWC)

EC\$ 505,771 payment	
<u>92,447 accounts receivable</u>	
598,218 total value of metered water 1982	

Price/gal = EC\$.01
 $\frac{EC\$598,218}{EC\$.01/g} = 59,822,000 \text{ gals/year}$
 = 163,896 gals/day

3. Net Water Available to Nonmetered

3,770
<u>164</u>
3,606 million gals/day

4. Approximate Payment for Domestic Non-metered water supplied
(1982 CWC Financial Statement)

EC\$1,668,925 payments
<u>464,234 accounts receivable</u>
EC\$2,133,159

5. Average cost per gallon of unmetered water 1982

$\frac{EC\$2,133,159}{3,606,000 \times 365 \text{ days}} = EC\$.002 = US\$.0007$
 $\frac{2.68}{2.68}$

6. The US\$.0007 unmetered figure is clearly a minimum value. Hotels and businesses pay 10 times as much, with ships paying even more. While it is impossible to know precisely the price people would be willing to pay, the existing low rates imply that people would be willing (and capable) to pay considerably more than they are currently paying.

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ELECTRICITY ACTIVITIES

The primary purpose for providing the power company with funding under this project is to assure that specific infrastructure weaknesses in the electrical system are improved quickly within the tourist and industrial complex areas, thereby assuring that electrical service will not impede the development of the two sectors that have the potential for obtaining foreign exchange, expanding markets beyond Grenada and increasing employment in significant numbers.

Most of the activities produce high financial rates of return and economic returns that are slightly lower. While the power company might eventually invest in these same improvements on its own, there was concern that potential market bottleneck's such as difficulty in obtaining credit and the general uncertainty of the economy and the politics might well cause the power company to postpone the needed improvements, and that this postponement would seriously affect not only the speed of economic recovery and growth, but even chances for recovery. It was therefore decided that the potential for lost income to the economy due to the power company's postponement of the improvements resulting from either its inability to obtain funding or its natural business conservative reaction to the somewhat unsettled situation, could certainly surpass the value of the grant needed to obtain the improvements identified as critical to the country's growth. On that basis the grant funding could be provided for the following activities.

1. Recommended for the St. George's Area

As discussed in detail in the appropriate technical annex, the St. George's area suffers rather large power losses during transmission due to inadequate equipment. As Table I indicates, at an investment cost of \$176,000, and no additional operating and maintenance expenses, power losses can be reduced so that the cost savings from a lower level of required production will produce a financial IRR of 35% and an economic IRR of 29% (with the EC currency depreciated by 20%).

In addition to the general impact on the economy that will occur as a result of more efficient use of resources, the activity will reduce the need for diesel fuel and thus for foreign exchange by about \$73,000 per year. Thus freeing-up foreign exchange for other imports, and possibly at a lower EC cost over the longer-run.

2. Village Electrification

The activity will extend electricity to three different areas in the country. From the power company's viewpoint, the project will yield a return of about 25% while the economic IRR will be about 20% (See Table 2).

While socio-economic data has not been collected for the areas and developmental benefits have not been estimated, the power company is responding to requests for the electricity from the people in the areas. The manifested willingness to pay for the service is a clear indication that the potential consumers have concluded that the benefits are certainly no less than the cost. One of the important impacts of the increased availability of power, and more precisely, the availability of cheaper power, is expected to be on the cottage industries in the area and ultimately on the tourist trade where these goods are likely to be sold.

3. Computer Purchase

The introduction of the computer is expected to reduce billing errors, reduce billing and accounting costs, and through surveillance of meter use reduce the power losses. While it is difficult to quantify the precise impact on the billing and accounting activities, it is possible to demonstrate that the expected reduction in power losses from the computer surveillance, alone will likely provide almost enough savings to justify the computer investment. The electrical engineer consultant estimates that a computer program which monitors electrical usage by user will reduce power losses by something more than 1% but less than 2%. Currently, power losses are running at 4.936 MWh.

As the following equation indicates, a rate of return of 12% over a ten year period can be obtained from a \$100,000 investment in the computer if power loss saving of 82 MWh could be realised. This is 1.6 % of total current power losses. This figure, combined with the savings to be derived in the other administrative and accounting areas, should assure that the investment realizes a financial IRR in excess of 12 % and an economic IRR even higher, with the more efficient use of resources.

$$B/C = \frac{(MWh) (EC\$582) (5.65)}{EC\$268.00} = 1$$

MWh = 82

Where:

MWh = Mega Watt Hours (1,000 kwh)

EC\$582 = Sales value of 1 MWh

5.65 = The sum of discount factors over 10 years at the 12% discount rate

4. Alternate Power Supply to Point Salines Airport

Valued at \$33,000, this activity represents one piece of the basic tourist/ industrial infrastructure needed by the country. It is relatively low cost and provides extra assurance that the airport will have electricity at all times. In addition, it will facilitate commercial and residential growth in the nearby areas, and will replace the diesel generators at the airport during non-emergency power losses.

5. Interconnect St. George's West and East Feeders

6. Calibration Meters

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TABLE 1

Financial/Economic
Rate of Return

Reconductoring for the St. George's Area
(EC\$)

Year	Column 1 Investment	Column 2 MWH Energy Losses Without	Column 3 MWH Energy losses With	Column 4 MWH Savings in Energy Losses	Column 5 Value ^{2/} of Savings	Column 6 Net Benefits Col 5-Col
1984	471,680 ^{1/}	-0-	-0-	-0-	-0-	-471,680
1985		635	291	341	165,400	165,385
1986		652	303	349	169,290	169,265
1987		666	312	354	171,720	171,690
1988		683	324	359	174,140	174,115
1989		697	324	373	180,930	180,905
1990		715	333	382	185,300	185,270
1991		739	345	394	190,150	191,090
1992		756	354	402	195,000	191,970
1993		761	363	418	202,760	202,730
1994		805	375	430	208,580	208,550

IRR = 35%^{3/}

^{1/} converted from US\$176,000 x EC\$2.68/US\$, the official exchange rate.

^{2/} Column 4 times EC\$485/MWH.

^{3/} If we assume the exchange rate is overvalued by 20%, the US\$176,000 would equal US\$176,000 x EC\$3.22 = EC\$566,720. At this investment cost level the IRR would be 29%.

TABLE 2

Financial/Economic
 Rate of Return

Village Electrification^{1/}

<u>Year</u>	<u>Investment</u> ^{1/}	<u>O&M Costs</u>	<u>Sales</u> ^{1/}	<u>Net Benefits</u>
1984	827,340			-827,340
1985		1,141,680 ^{2/}	1,370,000	228,320
1986				
1987				
1988				
1989				
1990				
1991				
1992				
1993				
1994				

IRR = 25%

1/ See Electricity Technical Annex for figures.

2/ If we assume the exchange rate is overvalued by 20%, and 80% of the Investment and O&M Costs (diesel) is imported, the new Investment and O&M Costs figures would be EC\$959,714 and the corresponding IRR would be 20%. We have not made new calculations for O&M Costs because the sales would rise enough to offset the O&M foreign exchange rate adjustment, leaving the next benefits in years 1985-94 unchanged.

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TOURISM ACTIVITIES

As noted elsewhere, the tourism sector has undergone careful analysis. The three subprojects chosen for funding under this project thus come from a very select group. They were chosen because, of all the tourist projects, they appear to be the ones that can have the greatest and most rapid positive impact on tourism.

The Carenage improvement subproject represents the beginning of the general non-directly remunerated tourism infrastructure development that is required if Grenada is to realize the growth in tourism needed to meet the country's overall economic growth targets. In that context, the Carenage improvement represents part of the \$12 million "other infrastructure costs," discussed in the Economic Analysis annex of the Airport PP, which need to be spent on tourism related infrastructure projects as complements to the airport construction, and which will still provide an acceptable rate of return to the "tourism infrastructure cost package." Because it represents part of the general tourism infrastructure, it is difficult to ascribe benefits to it. Following the reasoning outlined above concerning the "infrastructure cost package" and recognizing the methodological difficulties involved in attempting to measure the direct benefits of such an investment, no rate of return analysis was performed on this particular subproject. The selection of this project by a group of people with knowledge of tourist attractions and the islands carries with it an implicitly high rate of return.

The two other subprojects identified for this project create revenues directly associated with the services supplied by them. They, thus, can be subjected to rate of return analysis, always keeping in mind that these rates will be understated by the unquantified amount of external benefits captured by the rest of the tourist sector.

As shown in Table 1, the Fort Frederick Restoration subproject should be financially self-supporting from the very beginning of operations, while the Grand Etang Interpretation Center will need about 3 years before it begins to cover the operating costs. Both projects assume a minimum 30,000 figure for stayover tourists. If the tourist sector expands as expected at about 15% a year for several years, the two subprojects should earn a substantial profit.

From an economic standpoint, the direct benefits of the subprojects come from the additional value added to the economy from the tourists. Thus, in Table 2, revenue from admissions and sales at the restaurant and crafts shop at Fort Frederick are adjusted to reflect in the first year 5,000 student/children tourists and 44,000 adult tourists. Similar changes are made in Table 3 for the Grand Etang subproject. In addition, following the technical analysis, the percent of stopover and cruise ship tourists is raised to 70% and 35%. While the technical analysis makes the change in the second year, for simplicity, we make the change in the first year. For both subprojects, we assume that tourism grows at 15% per year for 10 years.

The Fort Frederick subproject will provide a substantial rate of return of 40% as shown in Table 4. While shadow pricing of the labor would be appropriate, as would be that of some of the materials used in construction, it was not performed because the result would have been a figure larger than the already rather large financial IRR, and would not have affected any decision making. With a 33% reduction in either the estimated number of tourists or tourist dollars spent by the current estimated number of tourists, the financial IRR for Fort Frederick would fall only to 35%.

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As Table 5 indicates, the Grand Etang subproject will provide about a zero financial rate of return. From an economic standpoint, shadow pricing the labor during the original construction phase would raise the economic IRR to only 1.8%. But, as stated earlier, there are an unquantifiable amount of external benefits that are not captured by the analysis in Table 5. The who included the Grand Etang subproject in the final list believes that if "rounds-out" a good "first package" of tourist attractions that will have an impact on the number of tourist that visit Grenada and on the amount each spends in Grenada. Those that originally selected it would thus say that if the external benefits could be measured, the IRR would surely be greater than 18%. We do know that once the buildings are erected, operating and maintenance expenses will likely be covered, that it will not likely create an additional budget burden on the Government.

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TABLE 1

FL. Frederick Projected Income Statement for 1985

1. Visitors for first year:		
a) Grenada Residents (10%)	=	10,000
b) Stayover Tourists (80%)	=	24,000
c) Cruise Passengers (50%)	=	25,000
2. Revenues form Admission Charges:		
a) 7,000 @ EC 0.50 (students/children)	=	\$3,500
b) 52,000 @ EC 2.00	=	\$104,000
		Sub Total (Admissions) = \$107,500
3. Sales at SnackBar and Craft Shop:		
52,000 @ EC \$3.00	=	\$156,000
Income from sales = 15% of \$156,000	=	\$23,400
4. Total Gross Income	=	\$130,900
5. Operating and Maintenance Costs	=	\$77,000
6. Net Income	=	\$53,900

PROJECTED FINANCIAL STATEMENT FOR YEAR 1 (1985);

GRAND ETANG INTERPRETATION CENTER

1. Estimated No. of Visitors:		
a) Grenadian Residents (5%)	=	5,000
b) Stop Over Tourists (50%)	=	15,000
c) Cruise ship tourists (20%)	=	5,000
Total	=	25,000
2. Admission Fees:		
a) 3,000 @ 0.50 (students & children)	=	EC\$1500
b) 22,000 @ 1.00	=	22,000
Total	=	\$23,500
3. SnackBar and Gift shop sales:		
22,000 @ 3.00 = \$66,000		
Income @ 10% x \$66,000	=	\$6,600
4. Total Income	=	\$30,100
5. Maintenance, Utility and Salary costs	=	44,000
6. Net loss for Year 1	=	\$13,900

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TABLE 2

Ft. Frederick Projected Income Statement for 1985^{1/}

1. Visitors for first year:	(EC\$)
a) Stayover Tourists (80%)	= 24,000
b) Cruise Passengers (50%)	= 25,000
2. Revenues from Admission Charges:	
a) 5,000 @ EC0.50 (students/children)	= 2,500
b) 44,000 @ EC2.00	= 88,000
Sub Total (Admissions)	<u>90,500</u>
3. Sales at Snackbar and Craft Shop:	
44,000 @ EC3.00	=132,000
Income from sales = 15% of 132,000	= 19,800
4. Total Gross Income	=110,300
5. Operating and Maintenance Costs	= <u>77,000</u>
6. Net Income	33,000

^{1/} Adjusted to reflect just foreign tourist expenditures.

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TABLE 3

Projected Financial Statement for Year 1 (1985):

Grand Etang Interpretation Center

	(EC\$)
1. Estimated Number of Visitors:	
a) Stopover Tourists (70%)	= 21,000
b) Cruise Ship Tourists (30%)	= 7,500
2. Admission Fees:	
a) 3,000 @0.50 (students & children)	= 1,500
b) 25,000 @1.00	= <u>25,000</u>
Total	26,500
3. Snackbar and Gift Shop Sales	
25,000 @3.00 = 75,000	
Income @10% x 75,000	= <u>7,500</u>
4. Total Income	= 34,000
5. Maintenance, Utility and Salary Costs	= 44,000
6. Net Loss for Year 1	= 10,000

1/ Adjusted to reflect just foreign tourist expenditures.
 Total Revenue = \$26,500 + 75,000 = EC\$101,500.

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TABLE 4

Fort Frederick Tourism Subproject

Financial/Economic
Rates of Return

Year	(1) Investment	(2) O&M Costs Costs	(3) ^{1/} Costs Goods Sold	(4) Total Cost 1+2+3	(5) ^{2/} Revenues from Admissions	(6) Restaurant, Craft Sales	(7) Total Revenue Col 5&6	(8) Net Benefits Col 7-Col 4
1984	86,000			86,200				-86,200
1985		77,000	112,200	189,200	90,500	132,000	222,500	33,300
1986			129,030	206,030	104,075	151,800	255,875	49,845
1987			148,385	225,385	119,686	174,570	294,256	68,871
1988			170,642	247,642	137,639	200,756	338,395	90,753
1989			196,239	273,239	158,285	230,869	389,154	115,915
1990			225,674	302,525	182,028	265,499	447,527	145,002
1991			259,525	336,525	209,332	305,324	514,656	178,131
1992			298,454	375,454	240,732	351,123	591,855	216,401
1993			343,222	420,222	276,842	403,791	680,633	260,411
1994			354,706	471,706	318,368	464,360	782,728	311,022

IRR - 70%

- ^{1/} Derived from Table 2. Assume a 15% growth rate in cost of goods sold.
- ^{2/} Derived from Table 2. Assume a 15% growth rate for both Admissions Sales and Restaurant and Craft Sales.

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TABLE 5
 Grand Etang Interpretation Center
 Financial/Economic Analysis

Year	Rates of Return					
	(1) Investment	(2) O&M Costs	(3) Cost ^{1/} Goods Sold	(4) Total Costs	(5) Total Revenue	(6) Net Benefits
1984	251,470			251,700		-251,700
1985		44,000	67,500	111,500	101,500	- 10,000
1986			77,625	121,625	116,725	- 14,900
1987			89,269	133,269	134,234	965
1988			102,659	146,659	154,369	7,710
1989			118,058	162,058	177,524	15,467
1990			135,767	179,767	204,153	24,386
1991			156,132	200,132	234,776	34,644
1992			179,552	223,552	269,992	46,441
1993			206,485	250,485	310,491	60,006
1994			237,458	281,458	357,065	75,607

IRR = -.06%

^{1/} See Table 3.

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TABLE 6
Fort Frederick Tourism Subproject
Sensitivity Analysis^{1/}

	Net Revenue ^{2/} Admissions and Craft Sales	Net Benefits Col 1x.67 - \$77,000
1984		-86,200
1985	110,300	- 3,099
1986	126,845	7,986
1987	145,385	26,208
1988	167,753	55,395
1989	192,915	82,253
1990	221,853	111,642
1991	255,131	143,938
1992	293,401	179,599
1993	337,411	219,065
1994	388,022	262,975

IRR = 35%

^{1/} Reducing Net Revenue from Admissions and Sales by 1/3. The \$77,000 figure represents the constant O&M annual costs.

^{2/} Col 7 - Col 3 from Table 5.

FACTORY SHELL ACTIVITY

The absence of adequate factory space has been cited as the major obstacle thwarting the establishment of numerous firms in Grenada. The purpose of the Factory shells activity is to eliminate this binding constraint to industrial development.

For the types of business that are likely to be attracted to Grenada, the major benefit can be expected to be in the form of value added to labor, that is, income to those Grenadians who work in the new factories and businesses. It is not likely that any significant amount of retained earnings will remain in the country.

Under this activity approximately 43,700 sq. ft. of factory space will be made available. If the regional experience of about one employee per 100 sq. ft. holds for Grenada, as it is expected to, the factory shells under this project should provide work for some 437 people. Even at the low wage of \$.60/hr. (approximately EC\$13/day), the investment in the factory shells can be shown to have a rather large impact on the economy. The B/C equation shown below incorporates as costs, the repairs to the factory shells and a \$.20/sq. ft. maintenance factor for the 43,700 sq. ft. in the factory shells. The 5.65 figure is the sum of discount factors over a 10 year period at the 12% discount rate.

$$\begin{aligned} \text{B/C} &= \frac{(437\text{emp} \times \$.60/\text{hr} \times 40\text{hrs} \times 48\text{wks}) (5.65)}{(\$145,000) + (\$.20/\text{sq. ft.} \times 43,700 \text{ sq. ft.}) (5.65)} \\ &= 14.6 \quad (\text{IRR} = 341\% \text{ or } 167\% \text{ with wage shadow} \\ &\quad \text{priced at } \$.30/\text{hr}) \end{aligned}$$

The B/C equation is extremely large partially because only the repairs to the buildings were used as the investment cost figure. The basic building cost was assumed to be a sunk cost and the buildings were assumed to have no alternative use. Also missing from the equation are any investment promotion costs or any permanent staff costs of an investment promotion board that might be expected to oversee the day to day operations of the shells.

Inspection of the equation reveals that the benefits could quite easily support both investment promotion and higher building costs. In fact, at the limit, the Government could spend an additional \$2.6 million to attract the companies that would employ the 473 people, and still realize a 12% rate of return for the economy. Therefore, though the operating cost figures for the group that will manage the industrial estate are not known with any precision at this moment, the above analysis provides assurance that the expenditures on the factory shells are wise investments for the economy.

From a financial standpoint, those experienced in the business investment field in the region indicate that factory rental space is in the \$2.50-\$3.00 per sq. ft. per annum range, and that to attract investment, Grenada should consider factory rentals priced at \$1.50-\$2.00/sq. ft. At the latter rate, with maintenance cost assumed to be at \$.20/sq. ft., the six shells would produce direct net rental income of \$78,660 per year (see Table I). An indirect, yet very real addition to Government revenue are the extra taxes that will accrue to it each year as a result of the increased income of some \$503,000 earned by the 473 people employed in the factory shells. Over the past several years tax revenues

have been slightly greater than 20% of GDP. Twenty percent of the \$503,000 value added to labor should lead to increased government revenues of \$100,000 annually. Thus, as long as the management of the industrial estate does not exceed \$178,000, and the average tax rate remains at least at twenty percent, there will be no increase in budget costs for the central government once the factories are occupied.

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Table 2

ANNUAL INCOME AND COSTS FROM THE FACTORY SHELLS

Building	Maintenance	Rental Income	Net Rental Income/yr
1	1020	10200	9180
2	1240	12400	11160
3	840	8400	7560
4	840	8400	7560
5	2400	24000	21600
6	2400	24000	21600

Bldg 1=5100sq. ft., Bldg 2=6200sq. ft., Bldg 3=4200sq. ft.,
Bldg 4=4200sq. ft., Bldg 5=12000sq. ft., Bldg 6=12000sq. ft.

Maintenance cost=\$.20/sq. ft.

ALL OTHER ACTIVITIES

The school and bridge activities were not subjected to rate of return analysis because the returns to schooling and the cost of a failed bridge are well documented. In the former case the important issue was not the amount of benefits, but whether the students could be sent elsewhere at a lower cost, that is, was there an alternative to the repairs. In the latter, there was no question about the high cost of postponing improvements.

The solid waste and waste water activities form part of the tourist infrastructure improvement package discussed earlier under the tourism activities and hence were not subjected to return analysis. The size of the remaining elements was deemed too small to justify analysis.

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INSTITUTIONAL ANALYSES

MINISTRY OF CONSTRUCTION (MOC)

Budget Cycle and Administration-

The Ministry of Construction (MOC) employs 476 individuals in different divisions. About 60 percent of its estimated \$1.9 million 1984 budget is destined for salaries and overhead while 35 percent is for materials and supplies. The Roads Division is responsible for the overall maintenance of the roads and expects to receive 38 percent of the Ministry's total budget.

The MOC initiates the budget cycle with an October 31 submission of the budget to the Ministry of Finance (MOF). The MOC calculates its budgetary needs according to two categories of expenditures - operating and capital. The known annual operating costs of salaries, overhead and maintenance are added to the projected capital costs of new construction and major renovation. New roads or buildings are the result of Cabinet directives or policy statements, or a jointly planned effort between the MOC and the Ministry of Planning. The MOF reviews the submission and sends it back if they consider modification necessary. By December 31, the MOF submits budgets from all the Ministries to the Cabinet for approval. The Government-wide budget is normally approved in January or February. The MOF then retains control over the entire budget throughout the year.

While the budget process segregates funding according to the MOC's 10 divisions, the accounting system (single entry) has not leant itself to providing a self balancing set of accounts; the separate governmental units do not produce balance sheets or statements of operations. As such, it was not possible to examine year-end records to ascertain a past capability of the MOC to achieve its overall objectives efficiently.

Availability of funding is determined on a monthly basis. The Accounting Section of the MOC receives monthly budget requests from each of the divisions and determines levels based on the requests and the MOF monthly limits. The Accounting Section determines the Division allocations by first assuring allocations for fixed expenditures and then applying the balance to variable expenditures. Thus, it is possible for work on capital projects to be halted during various periods because of one or more low monthly budget allocations by the MOF. All work is done subject to the monthly availability of funds.

The budgeting and accounting for expenditures is done by hand in numerous journals. While the system does not preclude segregation of accounts and segment reporting, it is not conducive to it and would be difficult to implement. For these reasons, separate aid funding and accounting systems are essential to the Infrastructure Revitalization Project.

The MOC is divided into 10 divisions. Four of these operate as governmental units and six operate as a combination of central service and

private enterprise. Since the Intervention, the MOF has required the central service and enterprise units to use the governmental accounting system imposed on all the Ministries. These units must now operate solely on budget allocations from the MOF and forward all revenues from governmental units and the private sector to the National Treasury. This arrangement affects divisions that will supply several activities of the Infrastructure Revitalization Project. These divisions are: Central Garage, Telescope Quarry, and Gravel and Concrete Production Divisions. Theoretically, these Divisions could be unable to supply project inputs due to insufficient operating budget allocations. The Telescope Quarry is operating on a limited budget, and will need assistance. A return to enterprise accounting may occur for the Central Garage resolving this problem with equipment rentals. The Canadian International Development Agency (CIDA), through its technical assistance project with the MOC, is discussing with the GOG the possibility of returning the Central Garage to enterprise status and accounting. This appears imminent and may be repeated for more of these MOC divisions.

Procurement and Inventory

The procurement system of the MOC allows the field units to combine several procurement functions. The process begins with field or division personnel completing and sending a requisition for goods and services to the Accounts Section at the MOC. The Accounts Section prepares a purchase order, enters the expected amount as a commitment in their Vote Book (Journal), and sends the completed purchase order to the Ministry of Finance Budget Section for approval. If the procurement is a cash purchase, the purchase order goes to the Treasury for checks to be written and sent to the vendor. If the purchase is on credit, the purchase order goes to the field and is tendered to the vendor for the goods. The vendor then presents his copy of the purchase order to the Treasury as a note payable. The MOF ends the cycle by returning all the processed voucher duplicate copies to the MOC for reconciliation. This system has worked for Grenada because the number of suppliers of construction materials is limited, in many cases to one, almost all the procurement is done in small quantities, and there is little or no inventory at the job sites to control.

The difficulties with inventory occur when large international purchases of bulk material are made for more than one district. There is no control or on-site record keeping at receiving dock or temporary storage site to assure proper allocations to the various districts. This results in material shortages in some of the districts and over supply in others.

The procurement plan for the Roads Activity of the Infrastructure Revitalization Project does contemplate a limited number of imports. The MOC will procure or rent almost all the materials and equipment from its internal or state owned units such as the quarry, emulsion plant and central garage. It is expected that these units will deliver the needed quantities on short notice, keeping inventory storage and control costs will be kept to a minimum.

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Payroll

The MOC employs two types of labor, permanent staff and day laborers. The permanent staff is hired through the Public Services Commission while the day workers are approved by the Permanent Secretary. The payroll sequence is: each site has a time checker who fills out and certifies time sheets; the Road Officers sign the time sheets and send them to the Road Office where a paysheet is completed; the head of the district countersigns the paysheet and forwards it to the Accounts Section along with the time sheets; the Accounts Section checks and posts the entries and passes the paysheet to the Treasury through the Ministry of Finance; the Treasury issues individual salary checks for those desiring checks, and one check made out to a wages clerk for those employees wanting cash; the wages clerk cashes the check at a bank and goes to the work sites to pay the employees; at the-site, laborers are identified by a Road Officer, a Time Checker, and a Foreman.

Although the Project will have its own funding source and accounting section, it will follow the pay procedures normally used by the MOC. This will be acceptable for the Project provided that the monitoring unit makes periodic random checks of the pay offs and an occasional check on the time keepers.

Policy and Procedures

The MOC is operating under an institutionally developed set of unwritten rules and procedures. Limits on procurement and contracting authority, personnel policies, and operations manuals exist but are outdated and therefore not used. New policies and lines of authority are expected after a new Cabinet and Parliament are in power. The Auditor General's Office charged with encouraging adherence to established policies and ascertaining the accuracy of records, was disregarded by the past GOG administrations. It has therefore not been active as a monitoring unit over the Ministries, but it has become a new priority for the interim government and will probably play a more active role than in the past.

Prior AID Experience

A special accounting unit within the MOC was established for two emergency AID-funded road projects and continues handling the recently obligated Accelerated Impact Project. Under the Emergency Road Repair Projects (\$465,000) the accounting unit experienced some initial difficulties in complying with AID's reporting requirements. A system was eventually developed, however, whereby the MOC maintained a Project bank account and on a monthly basis reported on current and cumulative disbursements by budget line item, reconciled the bank account, listed the Project-funded payroll, and delivered original paid invoices and related receiving reports. Early project experience indicated the need for AID project management to be firm on budgetary control and to be consistent in its reporting requirements.

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MINISTRY OF PLANNING (MOP)

The MOP has no day to day responsibilities for managing projects, but does act as a monitoring unit for foreign donor projects; it reviews project progress reports from the various ministries, and transmits reimbursement applications to the external donor. The Central Water Commission (CWC) is an exception to this in that it not only manages its own capital projects but also deals directly with the foreign donor agencies. CWC reports to MOP on its projects but only to keep the MOP informed of project status - not for reimbursement processing, management action or intervention.

This MOP monitoring role is done in the following manner: A Ministry of Construction Engineer certifies completion of work for capital projects for each ministry and forwards the certification to the MOP; the MOP records the information in the project file to update the project status; based on the bills and vouchers received from the contractor or MOC, the MOP prepares the documentation necessary to request reimbursement from the donor agency; the Donor then reimburses the contractor/implementing agent directly by deposit to their bank account.

The MOP personnel have had some training in project management, and demonstrated their familiarity with bar charts and PERT/CPM for project planning purposes. However, they have not yet adopted such a system for general use in monitoring projects. The MOP is in the process of implementing a new government-wide project monitoring system, which attempts to obtain physical progress data and financial expenditure data in the same report. Essentially, this is a three page fill-in-the-blank format which calls for percentage estimates of completion for work in progress, and a spread sheet of financial expenditures by various line item categories, plus a narrative summary of problems. Unfortunately, the system is not generally well understood or received by the various ministries because the costing of activities to this detail, and computations of percentages of physical progress are an unaccustomed reporting burden. The MOP is thus not getting full compliance or timeliness in reporting, or accuracy when reports are received. The MOP further noted that because of ineffective monitoring in the past, projects often ran out of funding before being completed. This new system was an attempt to rectify that problem. However, in view of the difficulties being experienced in implementing it, the system is now under review for improvement. The MOP plans to computerize this system when it is fully operational.

One major difficulty in monitoring project status is that every project's data is kept in a separate file, and stacked on a shelf - loosely bound with ribbon - but no overall summary report is made, or graphics displayed (or even available) for ready reference or comparative purposes. Furthermore, although both physical "work accomplished," and "funds expended" are monitored (rather being attempted to be monitored), nothing in the system inter-relates the two (time and cost) to resolve the problem of identifying potential cost overruns. Such information could be obtained, computed and displayed quite readily from the data available to the Ministries, and would provide a powerful increment in project management and control.

The Ministry of Planning currently does not have a workable system to monitor projects efficiently, but would welcome additional project management assistance to obtain better control of government programming and project activities. With such assistance provided to this key ministry office, the implementation and management of all government projects could be improved. Because of its monitoring role, the MOP is an ideal position to act as the counterpart for the AID project officer, both to monitor and expedite the various sub-project components of the new Infrastructure Revitalization Project. Therefore, the Project should finance additional staff for monitoring its activities. By utilizing the Infrastructure Revitalization Project Implementation Plan and complying with AID financial reporting requirements, the MOP will develop a monitoring system that it may want to use on other donor projects.

The alternative would be for the AID project officer to work directly with the project monitoring officer in each ministry (as well as with the Ministry of Planning to keep them informed). This option would increase considerably the number of personal contacts the AID project officer would be required to maintain, as well as his/her administrative monitoring workload.

It is a mistake to assume that the urgency of implementing the current project's activities is too great to take the time necessary to comply with effective management control systems for them; or that modern management methodology is too sophisticated or too expensive for the MOP to employ. It is precisely where such controls are lacking and personnel and skill shortages exist, that the greatest waste of time, effort, and money tends to occur - through excessive reporting requirements being imposed on operating personnel, compounded by a lack of effective control with the data they provide.

CENTRAL WATER COMMISSION (CWC)

The Central Water Commission has approximately 170 permanent staff - administrative, clerical, engineering and maintenance personnel. The Water Commission's primary function is to supply potable water to the island's population and collect payments for such service. They also undertake capital improvement projects to increase their sources of available water and to improve their ability to distribute it.

The Commission acts as a semi-autonomous business arm of the government of Grenada. While it receives a small budget from the government to supplement its operations, it functions primarily on revenues which it collects from the public for water supplied, and which it deposits in an operating expense account. These revenues cannot be utilized for new capital project development and expansion operations however. Such projects must be budgeted for, and managed separately.

The largest activity of the Water Commission is the maintenance of the existing system, to the extent that funds are available. The fee-for-service system does not necessarily generate sufficient capital to maintain itself however, as most of the water is delivered on a sliding scale user fee which varies

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established many years ago, and is not directly related to the volume of water provided. Some of the larger business establishments are metered, and charged by volume, in addition to the fee. Because of the fee system, there is little incentive for most of the public to conserve, or curtail its utilization of water or push for improvement in the system, which is old, underpressured, and with many leaks. With maintenance equipment limited, the system is in a poor state of repair.

There are six (6) decentralized water areas. Each area is managed by an Area Supervisor, and each township has an office to provide maintenance to the area, and to receive payments of fees. There is a centralized guidebook of accounting procedures which is currently available, but which has not been adhered to in the past. The system has been in the implementation stage for the past five years, but with varying degrees of success. The accounts staff are relatively inexperienced and have mostly been trained on the job, rather than formally schooled in accounting theory and practices. Each Area manages its own accounts collection system and maintains its own books, so some difficulties persist. Delinquent accounts also create problems and follow-up varies from area to area.

The Water Commission occasionally has to hire some people on a temporary basis to meet short term maintenance needs. They also sometimes contract out to other private organizations for rush jobs and also to rent equipment, but for the most part, they do their maintenance work under force account - with existing staff. Occasionally they also rent vehicles from individuals. As a government agency, the Water Commission can also rent vehicles from the Ministry of Housing, or the Government Central Garage, but they have no priority for obtaining such equipment and it is not always available when they need it, so have to resort to outside renting. The Commission is aware of competitive procurement concepts but does not always follow them as time is often of the essence, and there are few suppliers available. Thus, they tend to deal with experienced, former contacts.

For capital development projects, the Water Commission does its own planning and day-to-day implementation and management. Although the Water Commission provides information to the the Ministry of Planning on project activities, status, and disbursement of funds, the Ministry of Planning does not supervise the Water Commission, but is merely being kept informed of activities. The Water Commission also deals directly with donor organizations for progress reporting, billing and reimbursement.

Currently, the Caribbean Development Bank (CDB) is funding a major EC\$5 million dam construction project - the Mamma Cannes - in the eastern part of Grenada. The Water Commission is supervising and carrying out the work with its own personnel. They have also hired about 180 temporary employees for the project duration, on both a monthly, and a day-labor basis. Some of the new equipment used to support the Mamma Cannes project was obtained under competitive bidding procedures.

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Supplies are procured through the central government marketing board, but the Water Commission has experienced delays in obtaining goods in the past, which could hold up project activities. Because of the lack of a central storage depot or warehouse available to the Water Commission, supplies are distributed to each Parish sub-Area. A card stock monitoring system is used and there has reportedly not been much difficulty in accounting and controlling supplies, tools and equipment disbursed to the various areas. However, problems occur after that as there is no record of what is actually utilized (or left over) when items or materials are checked out for release to a project site.

The Mamma Cannes project has incurred a number of delays because of slow funding disbursements from the CDB. Originally, the Water Commission was authorized by the Government of Grenada to obtain an overdraft at the bank - the National Commercial Bank - which they could draw upon for start up seed money and while awaiting reimbursement from the CDB. However, the National Commercial Bank is no longer willing to provide this line of credit. Since reimbursement from the CDB takes about six weeks, project activities are often delayed at the job site for lack of adequate cash flow. To remedy this, the Water Commission has taken to billing the CDB on a fortnightly, rather than a monthly basis, as previously. While this has alleviated the cash problem somewhat, it has not really solved it since the amounts reimbursed are smaller while the administrative burden has effectively doubled - falling on the existing staff to prepare and process the vouchers.

Furthermore, as a "business," the Water Commission gets no special privileges from the other government agencies. It has to make deposits to other ministries for services required, such as electricity.

The Water Commission's expertise lies in pipeline work. It has very little capability for structural work. This would have to be contracted out to private contractors, or the Ministry of Construction on force account. In any event, project work progress is certified by a MOC engineer - working as a consultant to the Water Commission. The Commission then bills the CDB on the work certified as completed. For contract-out work, once the MOC engineer certifies that work is completed, the project manager authorizes payment, and the accounting staff pays the amount authorized.

For the payroll, a timekeeper maintains a record of time worked by each individual, and the accounts department prepares the payroll and provides the money. A security guard accompanies the cash to the project site whenever payment is made. The engineering assistant is responsible for making payments. The accounts office maintains the payroll vouchers after signing, plus any cash from unliquidated vouchers. A fortnightly payment system is used. Literacy rates are high, and there has been no problem of identification of individuals in signing the payroll.

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Water Commission accounts are audited by an external second-tier, accounting firm: Pannel Kerr Forster. Pannel Kerr Forster disclaimed an opinion on the last audited financial statements (December 31, 1982) of the CWC because the internal controls and accounting procedures were not adequate enough to ensure that all transactions were properly recorded.

The Water Commission has had some previous experience in dealing with AID when some pumps were procured on an emergency basis. The AID project and accounting officers found the CWC's performance to be very satisfactory.

Although the Water Commission is managing the present, Manma Cannes project without additional temporary staff and technical assistance, the Commission believes it would experience difficulty in undertaking the management monitoring and support of another capital project. Technically, the present project manager has some familiarity with project management scheduling and reporting systems. Financially, the CWC would need an initial cash advance sufficient to cover start-up costs, as well as a revolving fund large enough to defray the cost of work in process at all times in order to assure that project delays do not occur on the job site for lack of funds.

MINISTRY OF EDUCATION (MOE)

The Ministry of Education does not have a Project Monitoring Office, nor any capability for monitoring projects. It relies entirely upon the Ministry of Construction to fill this function. Although, the Ministry is interested in establishing a centralized School Maintenance Monitoring Unit, it would need to hire a Project Manager, a Coordinator, a draftsman and a typist.

The MOE does occasionally contract out directly for maintenance/repair work. When it does this, bids are obtained from several selected contractors, then reviewed with assistance from the Ministry of Construction. The contractor is then selected, does the job and after certification of accomplishment by the Ministry of Construction, submits his bills to the MOE accounts officer for payment. Because of expediency, and the fact that there are not many contractors available, the competitive process is not always followed. Work is spread around to those who can do the job.

Temporary employees are also hired and paid daily by the principal of each school. The principal comes in to the Grenada accounts office to draw the money personally. This method does not comply with generally accepted procedures, and is not a good use of a principal's time.

The School Rehabilitation Activity will utilize US Army construction engineers for some supervision and training. The Army supervisors will be responsible for the funds for the material procurement, and the MOE will be responsible for payroll, following guidelines established by the MOP Monitoring Unit and AID. When the Project-finished school rehabilitation has been completed, the MOE will select some of the of the best apprentice trainees to remain as permanent maintenance staff for the area. It is not yet clear how these individuals will be appointed, whether on a permanent staff or a temporary casual basis, since there is no Ministry Budget to cover them.

MINISTRY OF HEALTH (MOH)

The Ministry of Health has a Planning and Project Management Unit for development projects. This unit has already had experience in working with USAID, and although AID has some requirements which are new to the Ministry, particularly from the accounting perspective, the Ministry is very pleased with the way it has worked out. If the MOH has to undertake larger projects, it would need additional personnel to handle the administrative management workload. However, some recruitment difficulties are expected even though it is no problem to get people, it is a problem to get "doers" who will keep up with things and expedite the process. The MOH Project Management Unit staff has some familiarity with bar and PERT/CPM charting, but are not currently using any for project management and would like some further training and/or technical assistance. The MOH Project Management Unit would also need to expand its office space and obtain some vehicles dedicated for project use. Currently the Unit's vehicles are in a poor state of repair.

The Ministry would prefer to contract outside for project assistance work, rather than contract with another Ministry, such as the Ministry of Construction. The contractor could then procure the materials that are needed, and handle the labor requirements. The Ministry's project manager would merely inspect that the work was completed, and authorize progress payments.

The MOH is operating open, flatbed trucks to pick up trash, which is not very effective, and certainly not cost efficient. They have the management capability to add three compactor trucks to the fleet, and expand the routes.

GRENADA ELECTRICITY SERVICES LIMITED (GRENLEC)

GRENLEC is a semi-autonomous entity of the Government of Grenada, with the exclusive right to generate, transmit, distribute and sell electricity. The Company has a work-force of about 143 people - 100 technical workers, and 43 administrative personell. It is organized into four departments - Generation, Transmission and Distribution (T&D), Accounting, and Planning and Development. About 25 people work in Generation, and 75 in Transmission and Distribution.

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Any new project development activities would be undertaken by T&D under force account. In this manner, GRENLEC could monitor its own work force. If there is a need for additional personnel, temporary laborers can be hired on a daily or weekly basis. This tends to occur most frequently in the case of rural electrification, where people from the local communities are hired. If necessary, GRENLEC would subcontract out construction work to a private firm. The technical project officer would be responsible for procurement of materials, most of which is off-shore. In this regard, GRENLEC follows the guidelines of the donor agency regarding competition, sources, eligible contractors, etc.

GRENLEC has had experience in off-shore procurement with foreign donors, including work with the European Investment Bank to purchase generators. They have dealt with AID and the US Army on emergency activities in the past to procure poles and cables, and have been satisfied with the procedures used. Other management arrangements through the Ministry of Planning would depend upon the project.

There would be no problem of project management staff. The way GRENLEC is currently organized, there are three people in the T&D department who could handle the technical side of the project. They currently have no on-going projects and there is no problem of hiring laborers for field work. For monitoring, accounting and progress reporting there is a Planning and Development Unit which can handle the job. Management personnel are familiar with bar chart and PERT/CPM planning and scheduling, but are not currently using it.

GRENLEC's most critical need is in billing. They are about three months behind in billing customers. Many mistakes are made because of the use of a double entry manual bookkeeping system, which is a slow method of reconciling accounts. They have three NCR 99 Machines, which are constantly unreliable. GRENLEC's public relations are not always good because the public's are almost always out of date and/or incorrect. GRENLEC wants to get a computerized billing system to solve this problem.

Cash flow is always a problem. To carry out the proposed Project activities, GRENLEC will need an advance on which to draw for project expenses. A special Project account would be established for payroll, materials, and Project administrative costs. GRENLEC's audited financial statements show a net loss of for the year ended December 31, 1983, and they expect a substantial loss for 1984. In addition to billing and collection problems, the GOG's energy pricing policy is a constraint on GRENLEC's revenues.

The union requires a particular payroll accounting format, but that should be acceptable to AID. The company pays by check, which minimizes accounting and cash handling problems. Workers sign to acknowledge receipt of checks.

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MINISTRY OF INDUSTRIAL DEVELOPMENT (MID)

The Ministry is currently in a state of reorganization. The reorganization is expected to take place within the next two or three weeks. It has been agreed to "in principle," but has to be formally approved by the Council. The reorganization would split the Grenada Agricultural and Industrial Development Corporation into two organizations, an Industrial Development Corporation (IDC) similar in nature to that in Barbados and the Grenada Development Bank. The IDC will be a semi-autonomous business of the Ministry of Industry, authorized to provide investment opportunities for the government, and to attract business from abroad. A consultant provided under the AID-financed Project Development Assistance Project (PDAP) is advising the Ministry on how to operate such a corporation. The Manager of the Industrial Development Corporation will be the individual responsible for managing the AID-assisted sub-project on Factory Shell Construction, and for subsequent leasing.

The Ministry of Industrial Development will tender for an Architect/Engineer in Grenada to develop the details and initiate project financed activities. This could be done in about two to four weeks. The A/E contractor will then sub-contract to another firm to actually do the physical construction and manage it for the Ministry. The Ministry has no engineering management capability to technically supervise the project.

The Ministry will establish an account with the Grenada Development Bank and draw down on this account for project expenses. Since there is no national budget line item from which to draw down for project activities, the MID will require an advance from AID. Although they can advertise for without funds for an A&E firm, they will not be able to actually enter into a contract without available funding.

The MID would need to recruit an additional accountant to manage the project account. The Ministry will provide monthly reports on progress in whatever form AID requires. They are not very familiar with PERT/CPM reporting however, and have not used it before. AID will have to provide some assistance in explaining, monitoring and reporting requirements.

MINISTRY OF TOURISM (MOT)

The Ministry of Tourism is a small organization. It has 13 local staff members and five overseas personnel located in New York, Toronto, and London offices. It has an annual budget of \$800,000 of which it spends 60 percent on overseas marketing.

MOT's expertise lies in marketing, public relations and cruise ship administration. While quite active in these product areas, it has limited experience in managing tourist attractions. Its only previous experience consisted of a small project with the Federal Republic of Germany for vendors' booths. The MOT rents out one of these booths for a nominal fee. The revenue from the booth is sent to the Treasury.

The OAS has recommended the transformation of the MOT into an autonomous

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statutory agency. There is no indication of the likelihood of this occurring soon. Should funding be approved for two or three tourist attractions, the Product Official of the MOT would be responsible for overseeing the concessions. Because of his heavy workload, he would require an assistant.

SUMMARY OF INSTITUTIONAL ANALYSES

The summary findings of the Institutional Analyses are:

Internal and administrative controls are out of date and inadequate. There is an awareness of the situation, and reorganizations and the establishment of policy guidelines and delegations of authority are expected after the elections.

In spite of inadequate or absence of formal operational, functional, and internal control guidelines, the analyzed Ministries and organizations do carry out their assigned functions such as maintaining roads, educating students, collecting the trash, and delivering water and power. In other words with the exception of the Ministry of Industrial Development, no Project implementation unit will incur a new set of responsibilities.

All the organizations are overburdened in the management of capital projects. Either a central unit must take on part of the work load for Project management, or each organization must be provided with additional staff and possibly technical assistance.

The Ministry of Planning (MOP) is in an ideal position to act as the counterpart for the AID project officer, both to monitor and expedite the various Project activities. The MOP has the responsibility to monitor foreign donor projects.

For the most part, simple office work is constrained by a shortage of filing cabinets, desks, typewriters, adding machines, and common office supplies.

None of the analyzed institutions are using flow charts (Critical Path Method, or PERT or Bar Charts) for capital project management. All expressed an interest in or consented to their use for Infrastructure Revitalization.

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SOCIAL NEEDINESS ANALYSIS

Introduction

The objectives of the project will be met. Jobs will be immediately provided, particularly for unskilled laborers. The physical infrastructure will be restored and improved to a level necessary to attract and sustain at minimum the previous level of tourism, and new investment and productive enterprise.

In addition, and equally important to the people of Grenada, basic services needed to meet human needs, such as roads, water, waste disposal and light, will be restored after years of disruption and deterioration. Each political administration since independence has recognized the need for better infrastructure, yet services have progressively worsened. Many roads are barely passable, standpipes in some areas do not deliver water for household use, and electrical service was intermittent until very recently. Garbage piles up uncollected along main roads in the St. George's area, the dump sites are overfilled, and garbage is spilling into the sea. In the increasingly congested southwest, the sewage system is inadequate, and it is suspected that human waste may contaminate the water supply through faulty pressure. Schools, which are the symbol of the upward aspirations of West Indian folk, are in disrepair and some are dangerous for children.

The new presence of Americans and other visitors puts additional pressure on a tired infrastructure. Americans throw away more, per capita, than Grenadians, and use more water and electricity than Grenadians. While our hosts know that tourism will bring jobs and higher income, they may also discover that their guests will cost them dearly by further burdening an already inadequate service base. In order to avoid competition for limited services which would foster hostility toward visitors, restoration and expansion of the physical infrastructure and accompanying services must begin immediately.

Potentially, the deterioration of infrastructure may be a political issue if it is not addressed soon. In the summer of 1984, nearly every local newspaper, regardless of political viewpoint, raised questions about inefficiency and poor maintenance. Grenadians have been promised improvement, and expectations are high.

Employment for the Unskilled

The lack of jobs for unskilled laborers is one of Grenada's most persistent problems. During the Revolutionary regime, many young people joined the military for the security of a steady job. These men and women are now unemployed, and enlarge the ranks of Grenadians whose traditional, non-vocational schooling has left them ill-equipped for the technical needs of a small and limited economy.

The Ministry of Construction, which is one of the implementing agencies of the project, has long been a primary local provider of jobs for the unskilled and unemployed, and expects to hire laborers to provide over 6,000 man-months of work during the life of the project. Currently, some forty or fifty persons

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each day call on MOC's Road Offices in the various parishes, looking for construction jobs on the various donor projects. For a typical recruitment of 20 laborers for a work crew, some sixty or eighty may apply. While the MOC's need for skilled and supervisory staff is met through the permanent ministry payroll, or "force account," unskilled laborers are hired on a temporary basis in their home parishes. Labor is recruited against a list of approximately a thousand laborers nationwide who are members of the Agricultural and General Workers Union. Those applicants with a proven record of conscientious work will be hired as a core crew, while others will be hired on a rotating basis to give a large number of people the opportunity to work. Approximately 300 people form the core of crews nationwide or what might be called Grenada's critical mass of laborers.

Roads and other MOC projects are selected in all parishes including the island of Carriacou in order to distribute work. Non-contiguous road segments are planned in order to divide the work neatly and allow only the local people to apply. The peak season for road work is from January through August, when the roads are dry. Only minimal maintenance work such as clearing drains and fixing bridges can be done during the rainy season from September through December.

Laborers are hired by the fortnight, and are paid at the end of the fortnight. Men are paid the standard wage of US\$4.50/day less income taxes and National Insurance contributions, resulting in take home pay of about US\$3.80; while women are paid US\$3.80 for a take home pay of about US\$3.20. Some women who can do men's work are paid the men's wage, but the notion that a weak man could be paid only a women's wage brings indignation, then laughter at its absurdity.

Although the employment objective of all AID road projects since the intervention of October 1983 has been to provide employment for the potentially restive young men, our experience has been that women - often middle age women - comprise about half the road crews. Young men appear to prefer to stay unemployed rather than to work on the roads. In part this is due to the Grenadian pattern of households headed and supported by women, particularly the grandmother of the family, which provides a sort of informal social security system in which no one goes hungry or homeless regardless of his ability or willingness to contribute to the household. In part, young male disinterest is also due to the traditional non-vocation school curriculum which sends strong cultural messages to the youth of the English-speaking Caribbean that manual labor is somehow less respectable than a desk job.

In the past, the prospect of emigrating to the U.K., Canada or the United States was accompanied by the expectation that emigration would be a step up - in other words, a step toward respectable white collar work. For someone who hoped and believed that he would soon be able to emigrate, neither the dull drudgery of road work nor the social-institution-union steps required to get the road job were attractive. Furthermore, a young man who is interested in staying in Grenada and working in construction will make considerably higher wages starting as unskilled labor in private sector building construction and gradually learning the skills needed to become a well-paid master builder.

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The Agriculture and General Workers Union agreement under which all road crews and other MOC construction operate establishes the standard pay scale and includes a package of benefits such as sick leave, extra holiday pay, and "annual leave" in the form of a bonus based on the number of fortnights worked. The last union agreement was negotiated six years ago, and holds through December 1984. Inflation and other pressures make renegotiation for higher wages likely in January 1985, as the construction season begins.

If wages and other benefits for road work increase under the anticipated renegotiation, road work may well become more attractive to the unemployed young men. Meanwhile, the Chief Engineer of the MOC talks of a possible scheme to train the young men who, formerly in the military, are now the most disheartened unemployed, and hire them for about \$7.20 per day, substantially higher than the standard wage.

While road work will provide the most immediately visible and beneficial employment, as road crews can be hired and on the job within days, more jobs will also be available as soon as the improved infrastructure and the opening of the new airport produce the anticipated increase in tourist arrivals. Even if no new hotels are built in the immediate future, the restoration of full occupancy to the existing tourist "plant" of hotels and restaurants will require a substantial increase in skilled and unskilled staff. (Currently the hotels in Grenada are fully occupied by American and other international missions and a number of private consultants, but full hotel services such as restaurants and bars are not always offered, perhaps because the "guests" spend the day away from the hotel and hotels are not fully staffed.)

There are approximately six hundred hotel rooms in Grenada and a few guest house accommodations. In the high winter season, assuming completion of the new airport and improvement in water and electrical services, each hotel will require an average of one employee for each room. Employment in the tourist industry is seasonal, however; in the low season each hotel requires only a core crew of four - head chambermaid, head maintenance man, head chef and headwaiter. Employment in the tourist sector will not be so abundant nor reliable as employment in the day to day business of rebuilding Grenada for its own people.

Spread Effects of Project Activities

From the point of view of the average Grenadian, the repair of the roads brings the most immediate and visible benefits in addition to increased employment. In Grenada, vehicles of all kinds are costly to buy and costly to maintain on roads that are a succession of potholes that destroy tires and springs. Public buses, on which people depend for transportation to jobs and the markets in St. George's often break down and cause personal inconvenience that cumulatively bring havoc to business and the general economy. When school buses break down the children are kept home. Beyond these irritating personal inconveniences, rough roads contribute to bruising the bananas which are brought from the farms to the markets and port. Improved roads, as well as the corollary services of more reliable water and electrical services, will benefit every part of the population and every sector of the economy.

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UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON DC 20523

LAC/DR-IEE-84-40

ENVIRONMENTAL THRESHOLD DECISION

Project Location : Grenada

Project Title and Number : Infrastructure Revitalization
543-0008

Funding : \$6,000,000 (G)

Life of Project :

IEE Prepared by : Albert A. Karian
Engineering Officer
USAID/Grenada

Recommended Threshold Decision : Positive Determination

Bureau Threshold Decision : Concur with Recommendation

Comments : Positive Determination is
for Wastewater and Solid
Waste Subprojects

Copy to : James Habron, AID Rep
USAID/Grenada

Copy to : Albert Karian, USAID/Grenada

Copy to : Wendy Stickel, LAC/DR

Copy to : IEE File

James S. Hester Date AUG 14 1984
James S. Hester
Chief Environmental Officer
Bureau for Latin America
and the Caribbean

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GRENADA INFRASTRUCTURE REVITALIZATION PROJECT
ENVIRONMENTAL ASSESSMENT

SUBMITTED TO

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

PREPARED BY

TIPPETS - ABBETT - MCCARTHY - STRATTON

AUGUST 23, 1984

E. PATRICK SORENSEN, PH.D.

INITIAL ENVIRONMENTAL EXAMINATION

Project Location: Grenada

Project Title: Grenada Infrastructure Revitalization Project

Funding: FY 84, ESF \$6,000,000

Life of Project:

IEE Prepared by:



Albert A. Karjan
Engineering Officer, Grenada

Date:

Recommended Threshold Decision: Positive determination

Concurrence:



James W. Habron
Representative
USAID, Grenada

Date:

Chief Environmental Officer, LAC Decision:

Recommendation Approved J. Hester, Chief Environ. Date
Office, AID/LAC

Recommendation Disapproved _____ Date

IDENTIFICATION AND EVALUATION

		1 Const. of 18 mls Rds 60 mls Second	2 Retaining Walls and Drainage	3 Pot. Hole Repairs	4 Bridges Const/ Repairs	5 Water	6 Electricity
<u>Land Use</u>							
1	a	N	L	N	L	N	N
	b	L	L	L	L	L	N
	c	N	N	N	N	N	N
	d	N	N	N	N	N	N
	e	N	N	N	N	N	N
2		N	N	N	N	N	N
3		N	N	N	N	N	N
<u>Water Related Impacts</u>							
1	a	N	N	N	N	N	N
	b	N	N	N	N	N	N
	c	N	N	N	N	N	N
	d	N	N	N	N	N	N
	e	N	N	N	N	N	N
	f	N	N	N	N	N	N
	g	N	N	N	N	N	N
<u>Atmospheric Changes</u>							
1	a	L	L	L	L	N	N
	b	L	L	L	L	N	N
	c	N	N	N	N	N	N
	d	L	L	L	L	N	N
<u>Natural Resources</u>							
1	a	N	N	N	N	N	N
	b	L	L	L	L	N	N
	c	N/A					
<u>Cultural</u>							
1	a	N	N	N	N	N	N
	b	N	N	N	N	N	N
	c	N	N	N	N	N	N
	d	N	N	N	N	N	N
<u>Socio Economic</u>							
1	a	N	N	N	N	N	N
	b	N	N	N	N	N	N
	c	N	N	N	N	N	L
	d	N	N	N	N	N	N
	e						
<u>Health</u>							
1	a	N	N	N	N	N	N
	b	N	N	N	N	N	N
	c	N	N	N	N	N	N
	d	L	L	L	L	N	N
<u>General</u>							
1	a	N	N	N	N	N	N

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IDENTIFICATION AND EVALUATION

		7	8	9	10	11	12
		Waste Water	Solid Waste	School Rehab.	Factory Shell	Telephone	Tourist Attraction
<u>Land Use</u>							
1	a	N	N	N	N	N	N
	b	M	M	N	L	N	L
	c	L	L	N	N	N	N
	d	L	L	N	N	N	N
	e	L	N	N	L	N	N
2		N	N	N	N	N	N
3		N	N	N	N	N	N
<u>Water Related Impacts</u>							
1	a	N	N	N	N	N	N
	b	N	N	N	N	N	N
	c	N	N	N	N	N	N
	d	N	N	N	N	N	N
	e	L	N	N	N	N	N
	f	N	N	N	N	N	N
	g	N	N	N	N	N	N
<u>Atmospheric Changes</u>							
1	a	L	L	N	L	N	N
	b	N	N	N	N	N	N
	c	N	L	N	N	N	N
	d	N	L	N	L	N	N
<u>Natural Resources Balance</u>							
1	a	N	N	N	N	N	N
	b	N	N	N	N	N	N
	c	N/A					
<u>Cultural</u>							
1	a	N	N	N	N	N	N
	b	N	N	N	N	N	N
	c	N	N	N	N	N	N
	d	N	N	N	L	N	N
<u>Socio Economic</u>							
1	a	L	L	N	L	N	N
	b	N	N	N	L	N	L
	c	L	N	N	L	N	L
	d	N	N	N	L	N	L
	e	L	L	N	L	N	L
<u>Health</u>							
1	a	N	N	N	N	N	N
	b	N	N	N	N	N	N
	c	N	N	N	N	N	N
	d	N	N	N	N	N	N
<u>General</u>							
1	a	N	N	N	N	N	N

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ENVIRONMENTAL ASSESSMENT:

GRENADA INFRASTRUCTURE REVITALIZATION PROJECT

I. SUMMARY

An Environmental Assessment (EA) was conducted as an integral part of this project. The purpose of this assessment was to identify any major environmental impacts caused by funding for a (1) wastewater collection/treatment improvement subproject; and a (2) solid waste disposal subproject. Recommendations for mitigation of identified impacts were also formulated.

Assistance for the wastewater collection/treatment subproject will be limited to renovating an existing unreliable sewage pumping facility in St. George's. No adverse environmental impacts were identified for this subproject.

The analysis of the solid waste disposal subproject identified potentially serious environmental consequences resulting from the AID funding. The majority of the environmental concerns relate to developing a new sanitary landfill on Telescope Point. Remedial actions are described to mitigate potential impacts.

Fugitive trash problems may result from the strong off short wind. Remedial measures include placement of berms, portable wire fabric fences, proper alignment of tipping areas, and covering solid waste with fill. Community impacts along the access road may also result from locating the landfill at Telescope Point. Public health, noise, dust, fugitive trash and odor problems can be mitigated. However, esthetic and potentially decreased land value impacts will be more difficult to remediate. Finally, establishing the landfill will not seriously affect quarrying operations on Telescope Point.

In summary, implementation of the Proposed Action can be carried out in an environmentally sound manner if remedial measures outlined in this study are incorporated into development plans.

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II - INTRODUCTION

This report was prepared in response to a request for technical assistance by USAID through TAMS' Environmental Planning Indefinite Quantity Contract. The purpose of this assistance was to conduct analyses of environmental effects caused by funding for a (1) wastewater collection/treatment improvement subproject and a (2) solid waste disposal subproject, as part of a comprehensive Infrastructure Revitalization Project for Grenada. It is intended that this assessment will be incorporated into USAID's Project Paper.

2. 1 Scoping

The identification of the proposed actions by the project suggested major environmental concerns to be addressed by this assessment. They are described below.

2. 1. 1 Waste Water Collection/Treatment

An intensive evaluation of short-term solutions for the improvement of wastewater collection and treatment in the Grand Anse area, and the St. George's town and port areas was conducted in August 1984. After evaluating available options, it was proposed that AID's total assistance should be limited to renovating an unreliable sewage pumping facility in St. George's. This assistance includes providing (1) a standby generator; (2) two pumps with associated valves; and (3) pipe fittings.

It is evident that this limited assistance will not have a deleterious effect on the environment in the vicinity of St. George's. In fact, the new pumping equipment will help prevent further pollution of the St. George's harbour area by increasing pumping efficiency and reliability. As a result of the limited AID wastewater collection/treatment assistance and minimal environmental impact anticipated. This report suggests no further environmental impact evaluation.

2. 1. 2 Solid Waste Disposal

The primary objectives of AID's assistance for the solid waste disposal subproject are to (1) provide appropriate solid waste disposal systems; (2) supply necessary equipment for proper solid waste collection and sanitary landfill operations; and (3)

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train Grenadian personnel in proper long-term solid waste management practices. The major environmental impacts of the solid waste disposal subproject focus on the collection and disposal systems. It is these two systems which will be addressed in this report.

The findings of this report are based on an 8 day visit to Grenada (August 16 to 23, 1984), which included field reconnaissance of existing and proposed landfill sites and, due to the limited time frame, a review of only the most readily available information. The principal data sources were:

- Aldredge, T.E. (1982). Comprehensive Plan for Solid Waste Management in Grenada.
- Harrington, W.H., Jr. (1983). Report on Solid Waste Management Practices and Requirements in Grenada, W.I. STC/PAHO, Wash, D.C. 15pp
- Seely, E.C. Capt. (1984). Proposed U.S Grant. U.S Army.
- Interviews with knowledgeable USAID staff, Grenadian Government Officials, Project Hope Staff, and others.

III. EXISTING ENVIRONMENT

As noted above, the two main areas of concern for the solid waste subproject include proposed changes in collection and landfill disposal systems on Grenada. These systems are described below.

3. 1 Collection

As described previously, a large portion of the solid waste generated in Grenada is not collected due to the absence of proper equipment and management expertise. This uncollected portion, estimated at 30-35% of the total, ends up in drains, water courses, beaches, or in the sea. Uncollected solid waste presents a continuing serious public health problem in Grenada, increasing rodent infestation, fly and mosquito breeding and pollution of waterways and beach water, noxious odors, human and animal scavengers and the possible epidemic of communicable diseases.

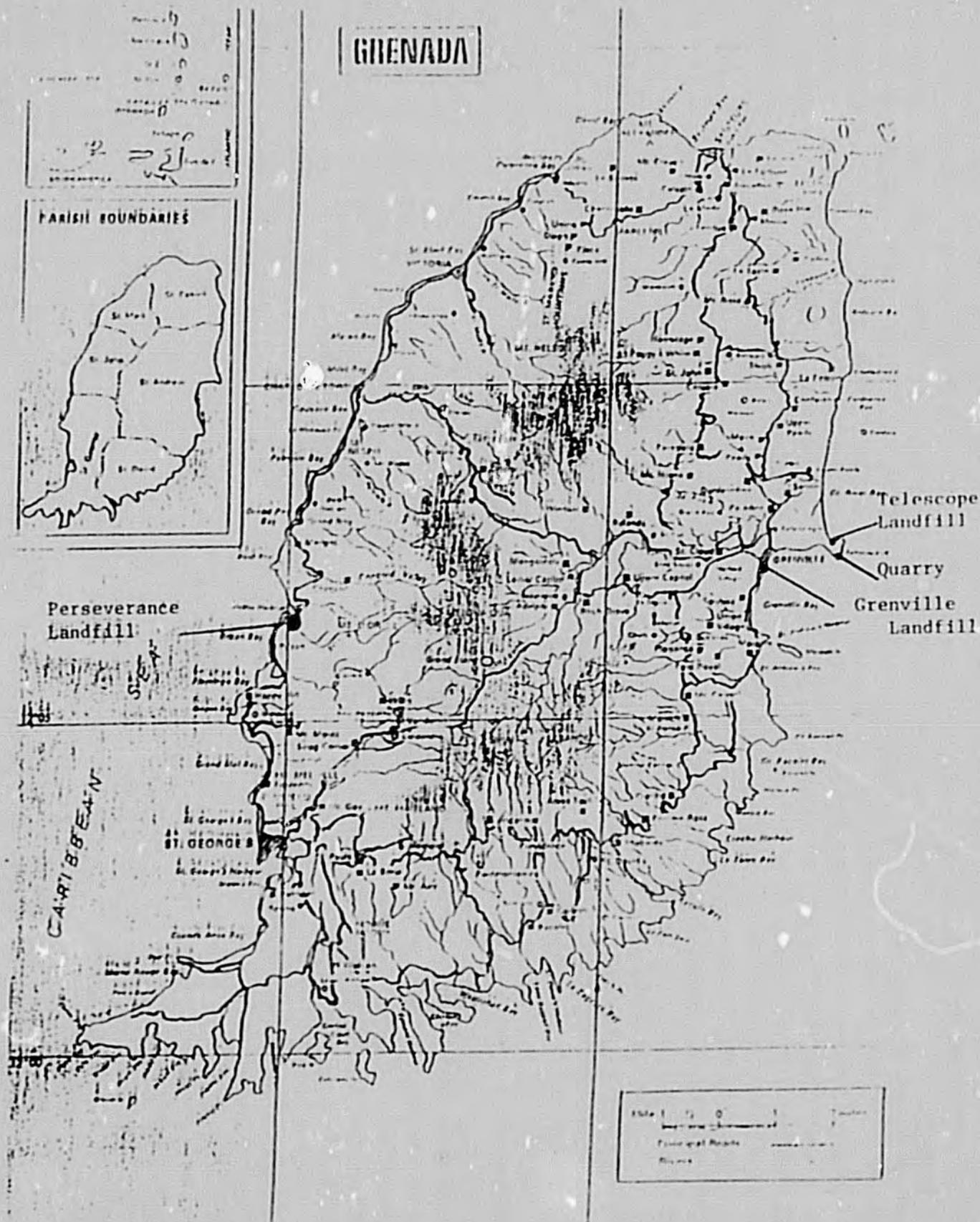
The present collection vehicle fleet in Grenada includes seven (7) trucks belonging to the Ministry of Health, three (3) leased from the Ministry of Construction and available on Ad Hoc basis and two (2) borrowed from the Ministry of Agriculture. None are trucks designed for solid waste collection. All are of the flat bed type with a reported five ton capacity. The trucks are loaded and unloaded manually, and because of the bulky nature of the solid waste, the trucks can never be filled to capacity. Thus unnecessary trips to the disposal sites are necessary, and inefficient servicing of the collection routes results. At least four (4) of the trucks are over ten (10) years old and are nearly impossible to keep in service. The balance are IFA trucks from East Germany and replacement spare parts are not readily available.

3. 2 Disposal

The MOH operates two (2) landfill disposal sites on Grenada, and is prepared to develop a third. Figure 1 provides a site location map. Descriptions of three sites are provided below.

3. 2. 1 Grenville Landfill

One of the two active landfills is located in Grenville, serving St. Andrews Parish



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and much of the eastern portion of Grenada. This site adjoins the commercial area of the town on the south. Solid waste has been tipped directly on the beach, is in direct contact with the sea on one side, and is adjacent to the main town storm drain on another side. Serious fouling of the beaches and beach water results from activities at this site.

The Grenville landfill has reached its capacity, and because no suitable equipment exists on site, the waste is manually spread. Cover is placed on a sporadic basis leaving the filled waste open to insects, birds and animals. In particular, the site's proximity to Grenville poses serious public health concerns.

Proposed action to be taken at Grenville to relieve the situation includes site closure and development of an alternate landfill to serve the eastern portion of Grenada. Only one alternate site has been selected by the Government of Grenada. It is described below.

3. 2. 2 Telescope Point

The MOH has proposed locating a new sanitary landfill on Telescope Point, approximately 2 km northeast of Grenville. Telescope Point is a triangularly shaped peninsula, roughly 1 km per side. The peninsula and some of the adjoining land is owned by the Government of Grenada. An active rock quarrying operation on the southern part of the peninsula provides material for construction. This quarry will be used heavily during the road reconstruction work in the vicinity of Grenville. Material from the quarry could also provide cover for the proposed sanitary landfill.

The access road to Telescope Point is composed of broken pavement and dirt, but is suitable for truck use. However, road improvements will eventually be necessary for proper access to the peninsula. The peninsula itself is presently fenced and guarded. Development along the road includes a low density of housing, which becomes increasingly sparse approaching the point. There are few commercial establishments along the road, and there are apparently no plans for development. Potable water, electric power, and telephone service is provided along the access road.

The proposed site is on the northern part of Telescope Point, opposite from the quarry. The site itself is approximately 5 acres in size and is bordered on the north by Great

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River Bay, on the east by an escarpment roughly 120 feet high and on the west by coconut grove and a small pond. Much of the site's surface water drains toward this pond.

Vegetation on the site itself is unremarkable, consisting primarily of scattered Coconut Palms and surface vegetation, and the site itself has been disturbed previously by quarrying and other activities on Telescope Point.

Soil on site consists of a mixture of sand, silt and gravel. Depth to bedrock is not known but, because of outcropping of volcanic bedrock on Telescope Point east of the site, it is expected to be relatively close to the surface. Some of the site's drainage percolates to the shallow bedrock or to a confining layer. There are apparently no wells in the vicinity of the site. The prevailing winds in the vicinity of Telescope Point are from the ocean east of the site, and result in a steady easterly breeze through the proposed sanitary landfill.

The most recent U.S Department of Interior Endangered Species Act Amendments include three bird species which are considered to be endangered (under the threat of extinction) on Grenada. They are: (1) Euler's Flycatcher - Empidonax euleri johnstonei; (2) Grenada Hook-Billed Kite - Chondroheirax uncinatus mirus; and (3) Grenada Dove - Leptotila wellsi. These three species are probably endemic to the island, that is, they occur only in Grenada and nowhere else in the world. Other species which are also classified as endangered and which could occur on Grenada, but are found in various locations of the West Indies, include the Brown Pelican, Kirtland's Wood Warbler and five sea turtle species.

Since the wildlife habitats occurring at Telescope Point have been substantially altered, and are not particularly unusual for the island, there is no evidence to indicate that the project will have any deleterious effects on the critical habitat of any endangered species.

3. 2. 3 Perseverance Landfill

The second active landfill operated by the MOH is situated on the Perseverance Estates. This facility serves much of western Grenada, including St. George's and the tourist areas south of the city. The Perseverance Site is located north of St. George's and on the opposite side of town from the Point Salines airport and the area of expected significant

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development. Consequently, the time expended in hauling waste from the collection area to the final disposal site will increase as waste quantities increase south of St. George's.

The Perseverance disposal site is provided with an overaged D4 bulldozer that is inoperative and a disposal site supervisor who also operated the tractor when it was operative. No cover exists on site and covering occurs on a sporadic basis.

Solid waste has been tipped to the immediate vicinity of a major drainage swale on one side and into stagnant water in a poorly drained swamp on the other side. Waste oil from St. George's, government vehicle maintenance operations, and from electric generation facilities is dumped at the landfill and has severely contaminated the swamp. The tipping operation is near the Salle River, which discharges into a cove, used as a small boat anchorage. Leachate can potentially contaminate the river and cove water. Fortunately, there appears to be no potential for underground water contamination, since this is a discharge area.

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IV. PROPOSED ACTIONS

Proposed AID assistance for improving solid waste collection and disposal systems on Grenada is described below.

4.1 Collection

Planned assistance to improve solid waste collection systems presently include providing three (3) Compactor trucks of 12-16 yd³ capacity and one (1) 4-wheel drive vehicle. Included in this assistance package will be spare parts and personnel instruction in equipment maintenance and operations.

4.2 Disposal

Equipment to be provided to improve disposal operations includes: two (2) D-4 size crawler tractors designed for sanitary landfill operation, and two (2) dump trucks of 6 yd³ capacity for hauling cover. In addition, spare parts and personnel training in equipment maintenance and operations will be provided. AID will also provide a sanitary engineer on a temporary basis to implement changes at the Grenville, Perseverance and Telescope Point sites. Details of proposed changes are provided below:

4.2.1 Grenville Landfill

Proposed action includes closing the present Grenville landfill located within the town boundaries. This includes (1) hauling fill to cover the site; (2) construction of berms along the boundary of the fill and ocean; (3) covering the site with gravel and soil; and (4) upgrading the site for proper drainage.

4.2.2 Telescope Point

Development of the proposed new landfill at Telescope Point includes (1) repairing the entrance road; (2) cutting and filling the site area to a useable configuration; and (3) hauling fill to the site for cover stockpile.

4.2.3 Perseverance Landfill

Proposed action to refurbish and upgrade the Perseverance Landfill includes (1) constructing water isolating berms around the site; (2) planting thick shrubbery to isolate the site from the road; (3) covering exposed waste with clean earth; and (4) limiting the active fill area.

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V. IMPACT ANALYSIS

Major environmental impacts to be expected from the proposed solid waste assistance program are provided below. A No Action Alternative is also provided below, but is not considered a viable alternative, because of the critical and immediate need to address the solid waste problems in Grenada.

5.1 Collection

The use of the new compactor truck system will enhance substantially the collection network, because additional trucks will be available to collect in new areas and collection frequency will increase. In addition, because of the enhanced collection capability, the volume of solid waste transported per load will increase. This will result in an appreciable drop in the uncollected portion of solid waste in Grenada, presently estimated at 30-35%. It will also result in a noticeable improvement in sanitation.

The new compaction trucks to be provided will be appreciably larger than the present collection vehicles and their loads will be substantially heavier. However, this change in size and weight will not appreciably affect collection and disposal operations. This is evident, since vehicles similar in size and weight to compacting solid waste trucks are often seen in Grenada.

5.2 Disposal

5.2.1 Grenville Landfill

Closure of the Grenville Landfill will result in significant environmental improvements. In particular, the severe public health hazard posed by the site will be eliminated by removing breeding habitat for rodents and insects. Gas, odor and leachate generation from the site will decrease, and the practice of tipping solid waste on the beach will be terminated. This will result in a decrease in environmental degradation, especially in beachside and floating trash. This decrease in visible trash is particularly important in terms of touristic demands. The primary negative effect of site closure will be the longer distance required for proper disposal of Grenville's solid waste. Since this additional distance is approximately 2 km, and the access facilities are adequate, this increased distance is not anticipated to have a major impact.

5.2.2 Telescope Point

Development and operation of the new landfill facility on Telescope Point will have a number of effects on the environment. The most significant of these effects are discussed below with a follow-up discussion of measures that can be employed to mitigate any adverse impacts that may arise.

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Landfill operations at Telescope Point may result in a substantial increase in nuisance insects. This condition in particular could be aggravated by site's present drainage to a pond located west of the site. In addition, landfilling can result in an increase in the rodent population in the Telescope Point area.

The sparse human population in the immediate vicinity of the site will mitigate these public health impacts effect somewhat. In addition, insect and rodent populations can be effectively controlled by following proper sanitary landfilling procedures; including controlling tipping to only the active face and covering solid waste at the close of each day with an appropriate layer of soil. This should be a minimum of 6 in. of compacted soil, or 1 ft. if the operation will not be used for more than one month.

Environmental Effects

The location of Telescope Point near the ocean results in a steady easterly breeze throught the site. This situation can result in a potential ingitive trash problem.

Several mitigative measures can be taken to minimize this condition: (1) An earthen berm can be built on the windward side of the landfill to decrease wind through the site; (2) downwind portable wire fabric fences can be strategically placed to catch blowing trash; (3) unloading areas can be properly aligned; and (4) the waste can be covered with proper fill. Since solid waste density in Grenada is much greater than that found in the United States, and contains a far smaller percentage of paper, fugitive paper and trash problems at this site will be mitigated somewhat.

Odor generation from the Telescope Point site is a distinct possibility should solid waste be placed over the eastern portion of the pond or left uncovered. Several methods can be used to mitigate this potential odor impact. During the landfill development, low lying areas can be filled and bermed and proper surface drainage can be maintained. In addition, placement of cover on the solid waste on a daily basis will aid in minimizing odor problems.

Methane generation at this site is not expected to present an unusual safety hazard. There are no dwellings in the immediate vicinity of the land fill and the site is well ventilated.

Leachate will be generated as a result of water percolating throught the landfill and leaching natural decomposition products derived from solid waste. contact of the leachate with surface or groundwater may result in altered water quality, by increasing nutrient loading rates.. These increased nutrients levels

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are expected to ultimately increase mosquito and certain other aquatic insect populations. However, the rate of leachate generation can be decreased appreciably by using proper soil cover and vegetation, and by providing proper surface drainage to minimize water penetration through the landfill. In addition, a collection system can be placed to intercept leachate leading to the pond. Groundwater contamination by leachate is not considered to be a severe problem in this instance, since it is likely that the groundwater is saline in this region. In addition, there are no wells in the vicinity.

Community Effects

There are several potentially negative community effects resulting from the development of Telescope Point. In particular, noise and dust will increase on the access road to the site.. This effect will be mitigated somewhat by the access road improvements to be implemented through the development program.

Additional negative community impacts will include the presence of solid waste truck traffic through areas not previously exposed resulting in odor and fugitive trash. Use of the new compactor trucks will help mitigate the odor and fugitive trash somewhat. In addition, fugitive trash effects can be decreased by using sanitation workers to collect trash from the access road on periodic basis. However, esthetic and decreased land value impacts may still result and be more difficult to mitigate.

It is estimated that establishment of the sanitary landfill will not have a significant negative impact on quarrying operations on Telescope Point. The quarry is upwind from the prevailing winds and no nuisance insect, or odor problem is expected. The quarrying and landfill operations will be physically separated, and although both operations will share the access road, the expected low volume of traffic to the landfill is not expected to seriously affect quarrying.

5. 2. 3 Perseverance Landfill

Leachate will continue to be generated by the Perseverance Landfill, and degrade surface water quality downstream from the site. In addition, waste oil, presently dumped

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on the site, will also continue to present esthetic and environmental problems and degrade water quality. This waste oil problem can be remediated by providing appropriate containers or tanks for collection and storage. However, in the long term this waste oil problem should be resolved. One possibility to be investigated is blending the waste oil with fuel oil presently used for electric power generation on Grenada.

Upgrading the Perseverance Landfill will result in significant public health improvements. In particular, operating the operation in a sanitary manner will eliminate a source of odor and fugitive trash. In addition, establishing fence of thick shrubbery around the site will help mitigate the site's severely negative visual impact. This particularly important in light of the tourist development requirements.

5.3 No Action Alternative

The critical and immediate need to address the solid waste problem on Grenada, dictates that the No Action Alternative should not be considered a truly viable alternative. In any case, by not taking action for remedying the solid waste situation, the presently grossly inadequate collection and disposal conditions on Grenada will continue to present severe public health problems and negatively impact potential development of tourism.

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VI. RECOMMENDATIONS

Remedial measures to mitigate environmental impacts of the Proposed Action were discussed in the previous section. Additional recommendations are provided below to address solid waste collection and disposal concerns on Grenada.

6.1 Collection

- Regular periodic maintenance should be given to collection vehicles, logged and strictly enforced.
- Regular collection routes should be strictly maintained.
- Regular truck washing and painting should be instituted to extend the life of vehicles & to minimize aesthetic nuisance.

6.2 Disposal

- Periodic inspection of the closed Grenville landfill site should be maintained; lost cover should be replaced, drainage and revegetation should be maintained.
- Proper guarding of the Grenville landfill should continue after site closure to prevent unauthorized dumping.
- Proper, timely and sensitive notification of the Telescope Point Land fill construction and proposed use of the new landfill should be given local residents and quarry workers to minimize misconceptions and undue concern regarding the facility.
- Site selection work should be initiated to identify long-term alternatives to the Perseverance Landfill.

memorandum

ANNEX II
EXHIBIT J
Page 1 of 4

DATE: August 17, 1984
REPLY TO ATTN OF: Jim Baird, Deputy Chief Engineer, RDO/C
SUBJECT: Refuse Collection Vehicles for the Ministry of Health (Grenada)

TO: Al Kirian, USAID/Grenada

On 8/16 I met with Christopher Griffith, Manager of the Barbados Sanitation Service Authority, to discuss the Authority's collection operation and to solicit his suggestions for the Grenada program.

Barbados has 69 collection vehicles in operation, including open trucks (bulky items), side loaders and rear load compaction units. Our discussion was limited to the latter, which increase payloads by a factor of 3 or 4 depending on compaction capability. Griffith recommended three alternative units: (1) the Hestair Eagle mounted on a Leyland, Bedford or Dodge chassis; (2) the Heil rear loader mounted on a Leyland chassis; or (3) the Shelvolke and Drewry unit which is mounted on its own chassis. Each comes in a variety of body sizes. The Authority is using and has received good service from all three units. The Leyland Hestair and Shelvolke and Drewry units are British-made. The Heil/Leyland unit is an American-made unit mounted on a Leyland (British) chassis. The attached table provides a summary of information on each unit. More detailed brochures on each are enclosed.

The Authority procures its collection vehicles from local agents who represent the various manufacturers. The agent is responsible for assembly and inspection before delivery. The Authority itself stocks fast moving spares and maintains its own vehicles. Local agents stock slower moving spares. The Authority recently requested the dealers to increase their stocks to provide quicker service.

Presumably in Grenada the Central Garage Unit (CGU) would maintain the collection vehicles for the Ministry of Health (MOH). Spare parts not stocked by the CGU could be obtained from Barbados. I would suggest that the PP include a waiver to permit procurement from Code 935 (Free World) sources and that the Ministry solicit quotations for each of the three units discussed above.

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Mr. Griffith indicated that he would be willing to spend a few days in Grenada with the MOH people if we thought it would be beneficial. USAID or the Ministry would have to provide the airline ticket and accommodations. I personally believe it would be quite useful. He could likely spot problem areas and make more meaningful suggestions after a short visit. However, since I am not familiar with the Ministry's capabilities, I will leave that decision to you.

Attachment/Enclosures: As Stated

ATTACHMENT

REFUSE COLLECTION VEHICLES

<u>LOADER</u>	<u>CHASSIS</u>	<u>BODY AIRSPACE</u>	<u>COMPACTION RATIO</u>	<u>ESTIMATED COST CIF BRIDGETOWN</u>	<u>DEALER/ TELEPHONE/ CONTACT</u>
Heil	Leyland	13 C.Y.	3 to 1	BD\$ 96,000 (\$48,000)	Detco Motors Bay Street, Bridgetown 426-3387 Mr. Greenidge
Hestair 2MB	Leyland	10 C.Y.	4 to 1	BD\$101,000 (\$50,500)	Detco Motors Bay Street Bridgetown 426-3387 Mr. Greendige
Hestair	Bedford	10 C.Y.	4 to 1	???	Courtesy Garage/NSG Ltd. 425-0372 Mr. Challenor
Shelvolke & Drewry ^{1/}	Shelvolke & Drewry	10 C.Y.	4 to 1	BD\$130,000 (\$65,000)	Bruce Hill Ltd. (Agent) Bridgetown 427-5670

^{1/} Considering establishing assembly plant in Barbados

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FORMULA 3000

REAR LOADER 1980 SPECIFICATIONS

ANNEX 11
EXHIBIT J
Page 4 of 4

	Model 3000-16	Model 3000-18	Model 3000-20	Model 3000-25
BODY SIZE				
Overall Length	16 yd ³ (12.7m ³)	18 yd ³ (13.76m ³)	20 yd ³ (15.29m ³)	25 yd ³ (19.11m ³)
Overall Length	185 1/2 in. (4702.8mm)	202 1/8 in. (5134.0mm)	216 5/8 in. (5502.28mm)	239 1/2 in. (6086.48mm)
Length at Body Floor	131 in. (3320.0mm)	145 1/2 in. (3695.7mm)	160 in. (4064.0mm)	183 in. (4648.2mm)
Overall Width	95 1/4 in. (2432.1mm)			
Overall Height (above chassis frame)	83 in. (2108.2mm)	83 in. (2108.2mm)	83 in. (2108.2mm)	90 in. (2286.0mm)
TAILGATE				
Hopper Capacity (TBEA Rated)	1.4 yd ³ (1.07m ³)			
Hopper Width	80 in. (2032.0mm)	80 in. (2032.0mm)	80 in. (2032.0mm)	80 in. (2032.0mm)
Load Opening	54 in. (1371.6mm)	54 in. (1371.6mm)	54 in. (1371.6mm)	54 in. (1371.6mm)
Loading Height (below chassis frame)	5 in. (127.0mm)	5 in. (127.0mm)	5 in. (127.0mm)	9 in. (228.6mm)
CYCLE TIME				
Complete Cycle	14-18 seconds	14-18 seconds	14-18 seconds	14-18 seconds
CHASSIS REQUIREMENTS				
C/A Single Axle	102 in. (2591mm)		120-132 in. (3048-3353mm)	
C/A Tandem Axle			116 in. (2946mm)	138 in. (3505mm)
Recommended GVWR	27,000 lbs. (12,247 kgs)		32,000 lbs. (14,515 kgs)	41,000 lbs. (18,597 kgs)
COMBINED CG FROM FRONT OF BODY				
C/G empty from front head	99 in. (2514.6mm)	106 in. (2692.4mm)	115 in. (2921.0mm)	126 in. (3203mm)
C/G average loaded from front head body and payload	80 1/2 in. (2044.7mm)	89 1/4 in. (2273.3mm)	97 in. (2463.8mm)	108 in. (2743.2mm)
Gross Weight (approx.)	9,200 lbs. (4173 kgs)	9,450 lbs. (4286.4 kgs)	9,700 lbs. (4400 kgs)	10,500 lbs. (4763 kgs)

ALL 3000 MODELS

STEEL TYPE AND GAUGE		STEEL TYPE AND GAUGE	
Body Sides	11 ga. high tensile (3.038mm)	Hopper Floor	3/4 in. hi-tensile (6.350mm)
Body Roof	11 ga. high tensile (3.038mm)	Hopper Sides	3/4 in. hi-tensile (6.350mm)
Front Head	11 ga. high tensile (3.038mm)	Packing Blade	3/8 in. hi-tensile (4.760mm)
Body Flooring	10 ga. high tensile (3.416mm)	Ejector Panel	12 ga. high tensile (2.657mm)
Tailgate Sides	12 ga. hrs. (2.657mm)		
CYLINDERS		CYLINDERS	
Tailgate Raise	2-3 in. (76.2mm) bore x 22 in. (559mm) Stroke	Ejector 16 yd ³ (12.23m ³)	1-3 stage, double acting telescopic
Packing Blade	2-5 in. (127mm) bore x 16 in. (406mm) Stroke, double acting or 2-5 1/2 in. (140mm) x 16 in. (406mm)	Ejector 20 yd ³ (15.29m ³)	1-4 stage, double acting telescopic
Hopper	2-5 in. (127mm) bore x 16 in. (406mm) Stroke, double acting telescopic	Ejector 25 yd ³ (19.11m ³)	1-4 stage, double acting telescopic
HYDRAULICS			
Pump		22 gpm (83.28 liters/min.) @ 1,000 rpm @ 0 PSI	
Filter		Return line 25 micron, replaceable element	
Maximum operating pressure		2,500 PSI (17,237 KPA)	
OPTIONAL EQUIPMENT	<ul style="list-style-type: none"> • Left side access door • Left side buzzer • Reversible cutting edge packing blade • Bulky object switch • 100,000 PSI (6895 MPa) • Steel hopper floor • Automatic safety door • Heavy duty packing cylinders • Air operated (P.T.O.) • Auxiliary engine drive • Extra capacity hoppers • Arm type hydraulic container mechanism (requires extra capacity hopper) for 1-3 yd³ (76.2-2.29m³) containers. 		

HEIL THE HEIL CO.

Solid Waste Systems Division,
P.O. Box 8676, Chattanooga, TN 37411

Note: Specifications are subject to change without notice.

* with dumpster not being attached.

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SELECTION OF PRIORITY ACTIVITIES
SELECTION CALCULATIONS

Activity	X1	X2	X3	X4	X5			TOTAL
Sauzeurs	1.00	2.00	1.00	3.00	1.00	1.10	0.20	1.30
Vendome	2.00	3.00	3.00	2.00	1.00	2.30	0.15	2.45
Birch Grove	2.00	3.00	2.00	2.00	1.00	2.00	0.15	2.15
Woodlands Road	2.00	3.00	1.00	3.00	1.00	1.70	0.20	1.90
Cariacou	2.00	3.00	1.00	1.00	1.00	1.70	0.10	1.80
Bridges	*	*	*	*	*	*	*	*
Schools	3.00	3.00	3.00	1.00	0.00	2.70	0.05	2.75
Carenage	3.00	3.00	1.00	3.00	3.00	2.10	0.30	2.40
Ft. Frederick	3.00	3.00	3.00	3.00	3.00	2.70	0.30	3.00
Grand Etang	3.00	3.00	0.00	3.00	3.00	1.80	0.30	2.10
Factory Shells	2.00	3.00	3.00	3.00	3.00	2.30	0.30	2.60
Annandale	0.00	3.00	2.00	3.00	3.00	1.20	0.30	1.50
Les Avocat	0.00	2.00	2.00	1.00	3.00	1.00	0.20	1.20
Mama Cannes	0.00	3.00	2.00	3.00	3.00	1.20	0.30	1.50
Woodlands Well	0.00	2.00	2.00	3.00	0.00	1.00	0.15	1.15
Leak Detection	1.00	3.00	3.00	2.00	3.00	1.90	0.25	2.15
Tunnel Outfall	*	*	*	*	*	*	*	*
Solid Waste	1.00	2.00	1.00	3.00	0.00	1.10	0.15	1.25
Rural Electrification	1.00	1.00	2.00	1.00	0.00	1.20	0.05	1.25
Reconductor	0.00	1.00	3.00	1.00	3.00	1.10	0.20	1.30
Close Electric Loop	*	*	*	*	*	*	*	*
Transmission Line	1.00	2.00	1.00	3.00	3.00	1.10	0.30	1.40
Computer Billing	0.00	0.00	1.00	1.00	1.00	0.30	0.10	0.40
Calibration Meters	*	*	*	*	*	*	*	*

EXPLANATION

- X1 weighted 0.4
- X2 weighted 0.2
- X3 weighted 0.3
- X4 weighted 0.05
- X5 weighted 0.05

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WORKING MATRIX

Activity	X1	X2	X3	X4	X5
Sauteurs	0.36	0.06	13.50	H	L
Vendome	0.14	0.03	30.00	M	L
Birch Grove	0.24	0.03	16.00	M	L
Woodlands Road	0.13	0.04	12.00	H	L
Cariacou	0.17	0.04	12.00	L	L
Bridges	*	*	*	*	*
Schools	0.05	0.03	H	L	N
Carenage	0.05	0.03	12.00	H	H
Ft. Frederick	0.06	0.04	70.00	H	H
Grand Etang	0.09	0.05	-0.06	H	H
Factory Shells	0.26	0.04	341.00	H	L
Annandale	N	0.04	20.00	H	H
Les Avocat	N	0.10	20.00	L	H
Marin Cannes	N	0.02	20.00	H	H
Woodlands Well	N	0.12	20.00	H	N
Leak Detection	0.41	0.04	156.00	M	H
Tunnel Outfall	*	*	*	*	*
Solid waste	0.56	0.08	12.00	H	N
Rural Electrification	1.04	0.38	20.00	L	N
Reconductor	N	0.37	29.00	H	H
Close Electric Loop	*	*	*	*	*
Transmission Line	0.50	0.06	12.00	H	H
Computer Billing	N	N	12.00	L	L
Calibration Meters	*	*	*	*	*

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**Employment Generation
Additional Person Days**

<u>Activity</u>	<u>Person-Days Life of Project</u>	<u>Person-Days Oct.-Nov.</u>
1. Highways		
(a) Gouyave-Sauteurs	33,840	5,000
(b) Vendome-Beaulieu	9,480	1,640
(c) Birch Grove-Grenville	14,640	2,800
(d) Grand Anse Valley-Woodlands	10,320	2,800
(e) Carriacou	6,000	1,400
(f) Bridges	4,800	0
Subtotal	<u>79,080</u>	<u>12,920</u>
2. Schools	23,330	12,315
3. Tourism Development		
(a) Carenage	3,630	2,300
(b) Ft. Frederick	2,115	1,500
(c) Grand Etang	1,530	1,050
Subtotal	<u>7,275</u>	<u>4,850</u>
4. Factory Shells	3,750	543
5. Water Supply		
(a) Annandale	5,400	---
(b) Les Avocat	620	---
(c) Mamma Cannes	6,300	---
(d) Woodlands Borehole	460	---
(e) Leak Detection	800	---
Subtotal	<u>13,580</u>	<u>---</u>
6. Waste Water	120	120
7. Solid Waste	3,620	531
8. Electric Power		
(a) Rural Electrification	547	20
(b) Reconductor	300	---
(c) Transmission Ring	68	---
(d) Transmission Line (Pt. Salines)	336	---
(e) Billing Equipment	---	---
(f) Meter Calibration	---	---
Grand Total	<u>132,006</u>	<u>31,299</u>

EXPLANATION OF CRITERIA VALUES

X1 - Total AID cost per person day of employment during the first two months of the Project. If:

$X1 < 0.10$ then value is 3
 $0.10 < X1 < 0.30$ then value is 2
 $0.30 < X1 < 1.50$ then value is 1
An N value indicates no impact and a value of 0

X2 - Total AID cost per person day of employment over the life of the Project. If:

$X2 < 0.05$ then the value is 3
 $0.05 < X2 < 0.20$ then the value is 2
 $0.20 < X2 < 1.00$ then the value is 1
An N value indicates no impact and a value of 0

X3 - Economic Internal Rate of Return. If:

$X3 > 20$ then the value is 3
 $15 < X3 < 20$ then the value is 2
 $0 < X3 < 15$ then the value is 1
 $X3 < 0$ then the value is 0

X4 - Relationship to light manufacturing, agriculture, and/or tourism. Values are: High is 3, Medium is 2, Low is 1, and No Relationship is 0.

Gouyave - Suaters Road: This road will provide better access to market and port facilities for principal export crops. Rating: High.

Vendome - Beaulieu Road: A small amount of tourist traffic at this time. Tourist traffic is expected to increase with the development of the tourist Attractions Plan. Rating: Medium.

Grenville - Birch Grove Road: A limited amount of agriculture travels this road. Rating: Medium.

Grand Anse - Woodlands Road: This road will accomodate airport and industrial traffic. Rating: High.

Cariacou Roads: To be used by a minor amount of tourism and agricultural traffic. Rating: Low.

School Rehabilitation/Vocational Training: No direct measurable impact on light manufacturing, tourism or agriculture.

Carenage: This activity is proposed specifically for tourism. Rating: High.

Fort Frederick: This activity is proposed specifically for tourism. Rating: High.

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Grand Etang: This activity is proposed specifically for tourism. Rating: High.

Factory Shells: This activity is proposed to promote light manufacturing. Rating: High.

Annandale: The water supply in the dry season will help resolve the water shortages during the tourist season. Rating: High.

Les Avocat: Project activities will not increase the water supply during the tourist season. Rating: Low.

Mamma Cannes: Water from this activity will help resolve the dry season water problems in the hotels and guest houses. Rating: High.

Woodlands Borehole: Water from this activity will help resolve the dry season water problems in the hotels and guest houses. Rating: High.

Leak Detection: This activity will find and repair leaks all over the city. It will not concentrate on hotels and industrial zones. Rating: Medium.

Solid Waste: Removing the trash from the city and island will have a direct impact on tourist reaction, promotion and return. Rating: High.

Rural Electrification: There is no indication that these areas to be electrified have or will develop a significant cottage industry and apply the electricity for productive uses. Rating: Low.

Reconductor: The reconductor will increase operating efficiency of GRENLEC, but not meet any immediate needs of the three economic base sectors. Rating: Low.

Transmission Line: This line will pass through the industrial area and service the Point Salines Airport. Rating: High.

Computer Billings: No direct impact on the three economic base sectors. Rating: Low.

X5 - Impact on foreign exchange earnings or savings. Values are: High is 3, Medium is 2, Low is 1, and No Impact is 0.

Roads: Better roads should increase foreign exchange earnings and savings through more efficient usage of transport fuels, less transport damage to export crops, and greater tourist access to various parts of the island. This, however, is considered to be minimal. Ratings: Low.

Schools: No foreign exchange is expected to be directly earned or saved as a result of the school program. Rating: No Impact.

Tourist Attractions: The tourist attractions are developed to increase the number of tourist visits and consequently the amount of foreign exchange they spend in Grenada. While difficult to estimate the amount generated, the value is

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known to be high in comparison to the other activities under consideration for Project funding.

Factory Shells: The factory shells should attract private foreign investment and generate foreign exchange earnings. Rating: High.

Water Projects: Three water activities (Annandale, Les Avocat, and Mamma Cannes) will be gravity systems. They will reduce fuel costs incurred from pumping by \$125,000 per year. The leak detection program will also reduce the pumping water requirements. Ratings: High. Woodlands Borehole #5 consumes fuel and will have no effect on foreign exchange. Rating: No Impact.

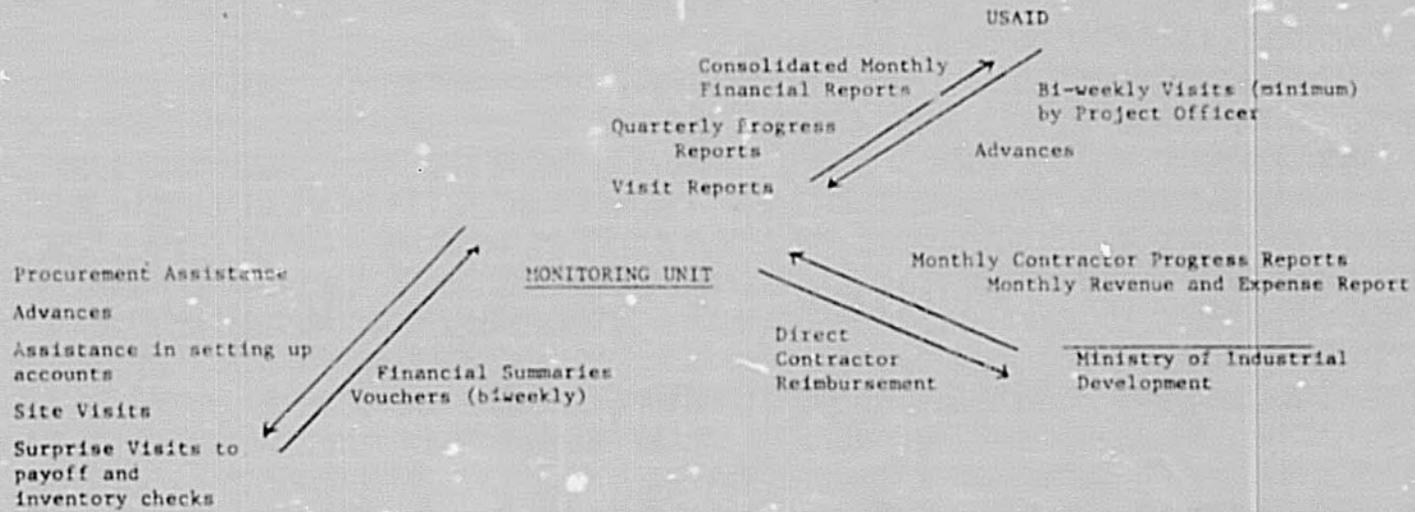
Solid Waste: Trash collection will not generate or save any foreign exchange. Rating: No Impact.

Electricity: Of the electric projects, the reconductor effort will reduce the imported energy consumption by \$72,000 per year. Rating: High. The computer billing is also expected to detect line losses and illegal connections resulting in some savings. Rating: Low. The transmission line's use by light manufacturing and the Point Salines Airport should have a positive impact on foreign exchange. Rating High.

Because of public safety or the minor amounts of funding involved, the following activities were selected without consideration against the selection criteria: Bridges, Tunnel Outfall, St. George's Loop, Calibration Meters, Monitoring Unit, and Common Road Costs.

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MONITORING CHART



- * Ministry of Construction
- * Ministry of Education/US Army Construction Engineers
- Ministry of Health
- * Central Water Commission
- GRNLEC
- Ministry of Tourism

- * Require additional staff support

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PROJECT ORGANIZATION CHART

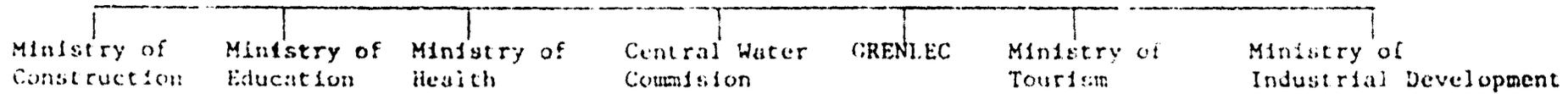
Ministry of Planning - - - - - USAID

Ministry of Planning
Monitoring Unit

Contractors

Project Coordinator
Accountant (B)
Engineer

Project Advisor
Civil Engineer
School Coordinate





UNITED STATES OF AMERICA
AGENCY FOR INTERNATIONAL DEVELOPMENT
REGIONAL DEVELOPMENT OFFICE/CARIBBEAN

P O BOX 4115
ST GEORGE'S
GRENADA

REF: AID/PSIA: 84-59

20 August 1984

Mr James W Habron
USAID Representative
ST GEORGE'S

Dear Mr Habron

The following materials which were reserved for the Point Salines Airport can be released. These materials were requested by Wally Bowles, USAID engineer; for use in other projects which the Government of Grenada has planned.

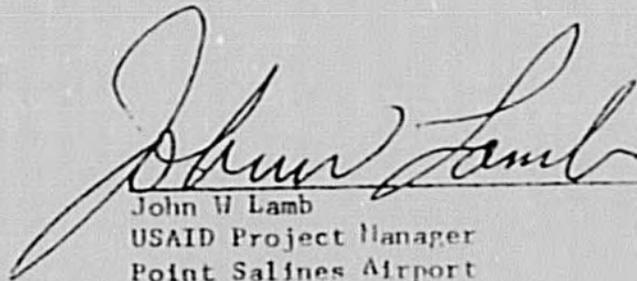
600 - Sheets of Corrugated Asbestos Siding, 3.5ft X 5ft. †

8 - Steel Doors - Approx. 6ft. X 9ft.

24,000 - Lineal Feet - 1/2" Ø Reinforcing steel

Before taking any of these materials please check with me to assure proper material identification and release.

Sincerely


John W Lamb
USAID Project Manager
Point Salines Airport

JWL/sa

CC: HK - Duane Buckert
GOG - Ron Smith

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SCHOOLS TO BE REHABILITATED UNDER INFRASTRUCTURE REVITALIZATION PROJECT

1. St. Andrews Anglican Secondary School
2. Holy Innocents Anglican School
3. Birch Grove Roman Catholic School
4. St. Davids Roman Catholic School
5. Hermitage Roman Catholic School
6. Belair School
7. Constantine School
8. River Salle School
9. Paraclete Government School
10. St. Theresa's School
11. Munich School
12. Waltham Secondary School
13. St. Dominics Roman Catholic School
14. Chantimelle Roman Catholic School
15. St. George's Roman Catholic School
16. Happy Hill School
17. Crochou School
18. Woburn Methodist School
19. St. Andrews Anglican School
20. Concord Government School

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