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669-8001-00460
 [669-0167?]

AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT PAPER FACESHEET

1. TRANSACTION CODE
 A ADD
 C CHANGE
 D DELETE

2. DOCUMENT CODE
 PP **(2)**
 3

3. COUNTRY/ENTITY
 Liberia

4. DOCUMENT REVISION NUMBER

5. PROJECT NUMBER (7 digits)
 [669-HG-001]

6. BUREAU/OFFICE
 A. SYMBOL: AFR
 B. CODE: [06]

7. PROJECT TITLE (Maximum 40 characters)
 [Low Income Housing Phase III]

8. ESTIMATED FY OF PROJECT COMPLETION
 FY [8][3]

9. ESTIMATED DATE OF OBLIGATION
 A. INITIAL FY: [7][9]
 B. QUARTER: [4]
 C. FINAL FY: [8][1] (Enter 1, 2, 3, or 4)

10. ESTIMATED COSTS (\$000 OR EQUIVALENT \$1 -)

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FY	C. L/C	D. TOTAL	E. FY	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL	5,000		5,000			5,000
(GRANT)*	5,000		5,000			5,000
(LOAN)						
OTHER U.S. 1. HG	10,000		10,000			10,000
2.						
HOST COUNTRY						
OTHER DONOR(S)						
TOTALS	15,000		15,000			15,000

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	E. 1ST FY: 79				H. 2ND FY		K. 3RD FY	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) SA	720	862		5,000					
(2)									
(3)									
(4)									
TOTALS				5,000					

12. IN-DEPTH EVALUATION SCHEDULED

A. APPROPRIATION	N. 4TH FY		O. 5TH FY		LIFE OF PROJECT	
	C. GRANT	P. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN
(1) SA					5,000	
(2)						
(3)						
(4)						
TOTALS					5,000	

MM [07] YY [83]

13. DATA CHANGE INDICATOR: WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1. NO
 2. YES

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: *Peter M. Kimm*

TITLE: Peter M. Kimm
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 Office of Housing

DATE SIGNED: MM [15] DD [19] YY [79]

15. DATE DOCUMENT RECEIVED IN AID # 39 FOR AID # 39000. MONTHS DATE OF DISTRIBUTION
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AID 1330-4 (11-78)

*Funds from Project 669-0167

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1	Logical Framework
2	PID Approval Cable and GOL Request For Assistance

Annex No.

Title

3	Technical Detail A. Sites and Services B. Waste Water Design C. Community Upgrading D. New Kru Town Survey
4	Initial Environmental Examination
5	Environmental Assessment
6	Statutory Check List
7	Authorization

1.0 Face Sheet

1.1 Recommendation

The following action is hereby submitted for authorization within this Project Paper.

Housing Guaranty be authorized in FY 79 \$10,000,000

1.2 Description of Project

The Borrower shall be the National Housing and Savings Bank (NHSB). The Implementing Agencies will be the NHSB and the National Housing Authority (NHA). The Government of Liberia (GOL) will guaranty the Loan.

This phase of the project will involve a total cost of \$10,000,000 and will require four years to complete. It is expected that NHSB will contract for the funds from a U.S. Investor in 2 tranches of \$5 million each. The overall purpose of the project is to establish and strengthen a coordinated Liberian operation to design, implement, finance and manage replicable shelter projects for lower income families.

In connection with this, the GOL is in the process of developing and implementing a National Housing Policy and in the interim will implement certain interim policy actions to assure the integrity of the proposed project. GOL will assure that all subprojects within the New Georgia and Barnersville areas fully recover all costs including infrastructure. GOL will further accept the concept of cost recovery within the

community upgrading areas as tests of the viability of this type of activity. NHSB will make additional resources available to the NHA to allow it to pursue the middle income components of the New Georgia and Barnersville mixed development concurrently with the low income components funded by this project.

The HG will be used to:

- (a) complete \pm 1,100 - 1,400 sites and services plots at the New Georgia and Barnersville sites
- (b) allow \pm 5,000 families to receive improved infrastructure in existing low income neighborhoods, initially New Kru Town and one other community
- (c) allow \pm 2,000 low income families to receive loans for construction materials or home improvements
- (d) develop a secondary city pilot project.

1.3 Project Findings

When the GOL decided to develop a shelter program that reduced the reliance on subsidy and adopted a minimum standards approach, it represented a substantial innovation in its housing strategy and a channeling of resources into direct benefits for the urban poor.

From a construction standpoint, the program presents no difficulties given the substantial technical assistance provided.

to the implementing agencies under the first two phases of this shelter program. This technical assistance is directly supporting the upgrading of capabilities of the NHA to design and implement low income shelter projects.

The financial program is realistic. The resources and ability to manage them exist within the NHSB and the technical assistance and training provided during Phase II will reinforce their management of the project resources.

The various solutions offered are within the means of the lower 50 percent of the urban income group. This target group will benefit from improved shelter and from improved access to community facilities such as schools and health units. In addition, the required construction will generate employment.

The proposed level of borrowing from HG sources is within the GOL capacity and will cause no B/P problems.

The project meets all applicable statutory criteria. The Statutory Checklist is included as an annex.

1.4 Findings

The project directly addresses the shelter needs of the rural and urban poor, which is one of the four principal objectives in the AID Country Development Strategy Statement; and supports the government's Four Year Development Plan goals of improving housing conditions for the urban poor.

On the basis of the analyses contained herein, RHUDO/ Abidjan and the USAID Mission to Liberia conclude that the project is technically, economically, socially and financially sound. It is recommended that the HG be authorized immediately so that RHUDO, NHA and NHSB can begin negotiating the implementation agreement and the NHSB can begin investor selection leading to funds availability by end FY 80.

2.0 Background and Project Description

2.1 The Problem

On April 14-15, 1979, Monrovia, Liberia was sacked. The number of persons involved in the demonstrations, riots and looting was estimated at twenty to twenty-five thousand. The instigators, who used a possible increase in rice prices as the rallying cry, were few but extremely vocal, and dissident university students, unemployed slum dwellers and finally unsupervised military personnel joined in the rampage. The damage to stores and business is estimated at \$50 million. Forty-one people were killed and five hundred and seven injured. The psychological damage may be even greater than the physical damage since Liberia is hosting the OAU Conference in July. The civil disturbance was a crushing blow to President Tolbert and his government and underlines root problems between the rulers and the ruled and the many thousands of urban poor who perceive themselves as disadvantaged by the Tolbert administration. This also caused an extreme financial squeeze on the GOL at a time when they were "strung out" trying to build the OAU site, highways, rural and urban construction, and maintain the development budget.

USAID responded to this crisis by proposing a \$5 million Grant project (669-0167) to assist the GOL at a crucial time and provide a housing alternative to the urban poor, which is

the potentially volatile group with which the government is most concerned.

It was decided to finance part of the project through a grant in order to permit the government to act more rapidly and build up a management capacity that will make it possible for the HG financed elements of the project described in this paper to flow more smoothly into the system.

2.2 Project Description

A. Introduction

The population dynamics of Liberia are similar to those of many developing countries. Its population of approximately 1.7 million is growing at an annual rate of 3.3 percent per year. Liberia is also undergoing rapid urbanization, especially in Monrovia which is growing at a rate of about 8 percent per year. The city's population is expected to double by 1990.

Current estimates for the period 1975 to 1980 indicate the need for approximately 10,000 new dwelling units per year to absorb population increases, housing back-log and replacement of substandard housing in Metropolitan Monrovia. Demand among low income groups substantially outstrips supply by a wide margin. In the center city, low income families are packed into the large, originally, single family structures that

have been subdivided into high density rooming houses. As a means of augmenting income, families in low income areas who own or lease land build additional rooms and other dwellings to accomodate their extended families and others.

These areas are serviced by a limited number of community stand pipes, pirated water and electrical connections, inadequate garbage collection, poor drainage and sewage facilities, dirt roads, community staircases and walkways. Undeveloped lots are used for dumping garbage; are overgrown with weeds and collect water; and are breeding grounds for malaria-carrying mosquitos. In the outlying areas, the low income communities occupy unevenly developed land which is subject to flooding in the rainy season.

During the past decade the Government has sought to come to grips with the housing problem and slowly but definitely entered on the path of greater direct involvement and responsibility. Beginning in 1964, the United Nations prepared a series of studies examining the problem and recommending solutions. The result of these efforts was a major UNDP technical assistance project in the early 1970's which was designed to assist the Government to establish the National Housing Authority (NHA), develop a local building materials

industry and create a national housing finance institution, the National Housing and Savings Bank (NHSB).

In 1973, a HG financed conventional housing program was authorized by AID in response to a GOL request. The program was designed to support and build upon the institutional framework prepared by the UN experts. However, following the failure of related negotiations for continued UNDP technical support, further development of the HG program ceased.

The institutional results of these early GOL efforts to deal with housing problems were the creation in 1970 of the NHA as an autonomous Government agency charged with planning, regulating and sponsoring housing development and in 1972 the establishment of the NHSB to mobilize domestic savings and to attract foreign capital principally to finance the development of housing. The NHSB actually became operational in 1976.

Despite the formation of these institutions, real progress in creating a workable housing delivery system has proceeded slowly. Until 1978, most of NHA's activities have been directed to middle income households. Starting in 1976, the Government of Liberia began reassessing its housing policy in light of continuing urbanization and rapid deterioration in the quality of life for large numbers of Monrovia's

population. The GOL recognized that the emphasis on publicly-financed conventional two and three bedroom units does not meet the needs of the overwhelming majority of Monrovia's population, and was ready to try alternative less costly shelter options which were suitable for and affordable by lower income families and reasonable considering GOL resource limitations.

In 1976, the GOL and AID resumed discussions on the basis of the current AID priorities and the revised GOL strategy. An overall phased intervention was envisioned by AID starting with a Grant for Technical Assistance to the implementing agencies and leading into a mix of BG and DL loan resources to fund the capital projects. The first phase, Technical Assistance Grant for \$1,672,000 was approved in FY 78 and three TA advisors were assigned to the NHA in January 1979. The purpose of the technical assistance is to help the GOL develop a national housing policy to provide an improved, comprehensive framework for decision making for the low income shelter sector; and to assist the NHA to expand and reorient its institutional capacity to design and implement low income shelter projects through training of staff and design of demonstration projects.

This initial activity is moving ahead, however staff and resource constraints have stretched out the

time required to begin physical development of the demonstration projects. At the same time, increasing pressure is being put on the GOL to provide very quickly physical solutions for the poor of Monrovia who live in substandard, overcrowded conditions without services.

The Easter riots were a strong manifestation of the unrest among the urban poor. This incident has made the government keenly aware of the gravity and urgency of the situation. The need to provide a better living environment for the masses of urban poor is seen as essential. While the necessary land has already been acquired and the shelter sector planning is sufficiently advanced to allow them to proceed in an orderly manner, the present budgetary constraints inhibit the GOL's ability to respond. The government now has the political will to act but they will need financial assistance to address the shelter needs of low income families and provide support to small enterprises to help stabilize the employment in a timely manner. The implementation of the shelter program as originally planned would not be possible on the new stepped up schedule due to lack of trained staff in the implementing agencies.

The Phase II \$5 million grant (669-0167) will be used to expedite the start-up of these shelter activities, support further institutional development, staff

expansion, and training. This \$10 million HG will follow on the Phase II Grant and will finance the expansion of activities begun under the grant. It will provide a stream of financing to assure institutionalization of these types of activities both in Monrovia and in secondary centers.

Specifically, HG financing will be used to complete the sites and services projects in New Georgia and Barbersville, implement a community upgrading project, expand the construction material and home improvement loan programs and begin a secondary city pilot project. To assure institutionalization of this project and to maximize the benefits that will flow from the grant-funded activities, it is important that the HG be authorized simultaneously or as soon as possible after approval of the grant. Taking into consideration the time required to complete HG related agreements it is reasonable to expect these HG resources to begin flowing within a year of authorization.

B. Phases I and II

USAID currently has a project with the GOL National Housing Authority with two major objectives, (a) develop a national housing policy to provide a comprehensive framework for decision making for the low income shelter sector, and (b) train staff and build up the institutional

capacity of the NHA to design and implement low income housing projects. This will lead into Phase II which will finance implementation of demonstration sites and services, community upgrading and supportive construction material, home improvement and small business loans to the beneficiaries. This paper describes Phase III which will reinforce and expand the initiatives begun under the previous 2 phases.

With the advent of the "Easter Uprising" the GOL has urgently requested and the Mission endorses moving directly into Phase II of the project immediately. This course of action would generate employment for unskilled and semi-skilled workers immediately after OAU construction was completed, show that the government was interested in the urban poor with slum upgrading projects, and provide an alternative to slum dwellers which would allow them to move onto their serviced plots of land and complete their houses on a self-help basis.

Since the initiation of Phase I, the implementing agencies (NHA and NHSB) have upgraded their capabilities and completed initial design work for implementing the capital projects as follows:

a. Three technicians fielded January 1979 and successfully operating in NHA with counterparts.

b. NHA is in process of reorganization which will

expedite its ability to implement low income shelter projects.

c. NHA has identified in its current budget process the additional staff necessary to implement the project.

d. NHA has acquired 500 acres at the New Georgia site, part of which will be used for the demonstration sites and services project.

e. An initial low income project (not AID financed) of 183 units at New Georgia is complete and occupancy began June 1979.

f. A Master Plan has been developed for New Georgia which includes water, sewer, electricity, a mix of housing types and provision for community facilities, i.e. schools, markets, clinics, etc.

g. New Kru Town (a low income community on Bushrod Island) confirmed as first neighborhood upgrading area and a socio-economic survey completed of 100 percent of the 4,500 households in the area.

h. Based on survey results, outline of the proposed improvements to New Kru Town identified and project description included in this PP.

i. An inter-ministerial housing policy commission named by President Tolbert, initial meetings held, and subcommittees formed to provide commission members with technical analysis to use to formulate housing policy for Liberia.

j. An initial environmental examination carried out and Environmental Assessment as outlined in the IFE completed.

k. NHSB has a well established mortgage lending program and procedures which maintain a low delinquency rate.

C. Phase III

NHA constraints which were specifically outlined in the Phase I project paper were mainly (a) lack of a well-defined government policy toward meeting the housing needs of Monrovia and, (b) the organizational structure of the NHA needed reform to clearly define division responsibilities especially since low income shelter is a new institutional focus. Other problem areas were: an inadequate supply of trained personnel for the NHA; and lack of procedures or authority to expedite land acquisition, assure land tenure, select beneficiaries, deliver socio-economic services and assure availability of financing to beneficiaries. The constraints and problems mentioned above are being dealt with (a) through the Presidentially appointed inter-ministerial housing policy commission which is now grappling with land tenure, land acquisition, beneficiary selection, cost recovery and the delivery of services to the project

areas and, (b) the NHA is being reorganized so that divisional responsibilities are sharply defined and the institution can respond to the housing needs of low income families.

As part of the overall upgrading of NHA capability and reorientation to problems of constructing low income shelter, key staff have visited operating projects in Senegal, Kenya and the Ivory Coast. The head of the Research and Town Planning Division has attended the IBRD Economic Development Institute special course on shelter for low income groups. In a move to improve its financial position, NHA has received governmental authority to evict tenants in its estates who are delinquent in rent payments. A legal division has been organized and eviction proceedings begun. The socio-economic unit has completed a series of surveys in representative low income communities. The data from these surveys are being fed into the project design process to assure that the basic needs of the target group are met.

A training program, funded by Phases I and II Grant resources will provide in the field intensive training to NHA and NHSB staff directly involved in implementation of the demonstration projects. The Phase II project will build on the momentum already started in Phase I

Low Income Housing Project and will give the NHA and NHSB the capability to provide sites and services development in New Georgia, construction material, home improvement loans and small loans to businesses in the project areas.

This HG financed project will extend the initiatives begun in the first 2 phases. It will finance the completion of the sites and services portion of the New Georgia development, and begin a sites and services component of the Barnersville development. Funding will be made available to NHSB to expand the home improvements and construction materials loans to project areas. Infrastructure will be upgraded in 2 existing low income communities, initially New Kru Town. Development of this phase of the project will be coordinated with the World Bank which is beginning development of an urban upgrading project for Monrovia. A secondary city will be identified and shelter project designed to improve infrastructure and shelter services, on a cost recoverable basis, provided to low income residents. DL funding will be sought for this subproject.

2.3 Studies

A great number of studies related generally to the shelter sector and specifically to this project have been undertaken in the last several years and form the basis of

the project design for both Phase I and Phase II:

- a. Shelter Sector Analysis
- b. Monrovia Urban Development Study
- c. Project Feasibility Study
- d. Initial Environmental Examination
- e. Environmental Assessment of the proposed Liberia
DG and HG loan
- f. Mensah Master Plan Study
- g. West Point Fire Victim Survey
- h. New Kru Town Community Survey.

2.4 Other Donor Activity

Several other international donors are involved or in the planning stages of shelter programs to Liberia.

World Bank is at the preappraisal stage of a planned community upgrading project for Monrovia. Specific communities, mix of services and cost recovery mechanisms have not yet been identified. DS/H and RHUDO meet regularly with IBRD Project Division Staff to coordinate projects and strategies.

Commonwealth Development Corporation (CDC) is proposing to loan NHA \$2 million to develop housing costing \$4,675 as part of the New Georgia development. The AID TA Team is involved in NHA's preparatory activities.

Denmark assigned a structural engineer as technical assistance to MHA for 2 years. His skills complement those of the TA Team.

Partners for Productivity (PVO) have a small self help low income housing project in the mining town of Yukepu which is supported by the LAMCO concession as a means of providing better shelter for their workers.

2.5 Detailed Project Description

A. Project Goal:

The goal of this project is to improve the living environment of lower income families.

B. Project Purpose:

The purpose is to establish and strengthen a coordinated Liberian operation to design, implement, finance and manage replicable shelter projects for lower income families.

C. End of Project Status:

1. Shelter related ministries and agencies cooperate to deliver project components on schedule.
2. Implementation of HG financed components follows DG activity on schedule.

3. Shelter institutions prepare proposals for future low income housing projects.
4. Cost recovery principle firmly established and effective collection mechanisms in place.
5. PP for DL authorized to fund secondary city pilot project.
6. Project units affordable by low income beneficiaries.

D. Important Assumptions:

The project design makes several assumptions concerning the response of the population, the GOL and the NHA/NHSB.

1. Cost recovery is sufficient to ensure adequate rollover on loans.
2. The projects will stimulate community pride and organization, i.e. neighborhood associations and self-help efforts to assure adequate maintenance of community facilities.
3. NHA and NHSB will be able to successfully involve and schedule activities of GOL ministries and agencies essential to project execution.

E. Planned Outputs:

The outputs expected to flow from a successful project are:

1. Sites and services (1,100 to 1,400 plots)
2. Construction material and home improvement loans
3. Upgrading of low income communities (\pm 5,000 families)
4. Secondary City Pilot Project

F. Inputs:

1. HG

\$4.0 million for sites/services

4.0 million for community upgrading

1.5 million for loan programs for construction materials and home improvements

0.5 million for secondary city pilot project.

2. Staff assistance as provided through DG-funded TA programs.
3. TDY support from RHUDO and DS/H.

3.0 Project Specific Analysis

3.1 Economic Feasibility

A. Macro

This project will encourage the GOL to utilize its available shelter sector resources in addressing the needs of the lower income groups in the Monrovia area through minimum standards programs. These programs will encourage ownership schemes through basic sites and services options and will encourage self-help activities in housing completion and home improvements by means of in-kind home improvement loans, combined with physical upgrading of selected existing low-income areas.

The projects will be largely self supporting as additional revenues are generated over time through increased property taxes, income taxes, business taxes and assessments, and will therefore not impose a drain on overall GOL resources.

The economy of Liberia has shown only marginal growth net of inflation over the past five years. This has been due to a number of factors of which increased costs of imported fuel and equipment; depressed world demand for steel, and therefore iron ore of which Liberia is the world's eleventh largest

producer; and reduced levels of investment, are the main components. Growth rates are projected to increase slightly over the next year or two, after which they are forecast to show greater improvement as world demand for steel recovers and prices of rubber, coffee and cocoa are expected to increase over current levels.

While many economies in the developing world have taken a nose-dive in recent years, Liberia has continued to show real economic growth with the assistance of substantial foreign borrowing, especially in the infra-structural and agriculture sectors. The External Debt Service as a ratio of revenues averaged 15.9% during 1973 - 1977/78. This is expected to increase to about 17.5% during 1978/79 - 1983/84 and will rise significantly thereafter as grace periods for loans contracted in the middle and late 1970's come to an end and amortization payments begin and as donors reduce the grant component of their assistance.

However, foreign exchange earnings from Liberia's main exports (iron ore, rubber, lumber, coffee, cocoa) are expected to increase and Liberia appears capable of sustaining some additional development borrowing for the next decade, especially for socially and politically important purposes such as low income housing and employment creation.

The proposed Housing Guaranty calls for commercial borrowing of \$10 million over a 5 year period along the following schedule:

Year 1	\$ -
Year 2	1.2 m.
Year 3	2.7 m.
Year 4	3.0 m.
Year 5	2.1 m.
Year 6	1.0 m.

Annual debt service, assuming a 11% market rate and a 10 year initial grace period during which only interest would be paid, would be scheduled as follows:

Years 3 - 12	\$1.1 m.
Years 13 - 32	\$1.26 m.

This would result in an average debt service ratio over a 30 year period (repayment as a percentage of original principal) of .120, whereas total GOL external debt service in 1979/80 totals \$41 million on a total draw-down external debt of \$400 million, or a debt service ratio of .103 (Note: most of GOL's external borrowing to date has been on highly concessionary terms).

Housing investment is typically low on import components and its stimulative effects are retained

in the economy. The multiplier effect for housing investment is greater, for example, than for investment in plant and equipment and only slightly less than that for exports. Current plans for sites and services to be made available under the proposed USAID shelter sector assistance program would involve only the additional import of klinker (to be ~~crushed for locally manufactured cement~~). Those beneficiaries opting for the more sophisticated low income housing alternatives would generate additional demand for corrugated zinc-coated roof sheets imported from Japan. Neither item would constitute a significant addition to the import bill. Construction materials constitute only 7% of total imports.

B. Micro

(1) Land Development

Funds will be used in part to develop currently vacant, undeveloped and unused land in the greater Monrovia area to provide housing to the city's low income population. The new sites selected for this project are ideal locations for either residential or industrial development. The upgrading will permit more intensive utilization of existing areas.

(2) Population Pressure on Housing

Currently 50% of Monrovia's population are unsatisfactorily housed. Between 1979 and 1990 some 50,000 additional housing units will have to be provided to accommodate population growth and household formation, without any consideration to preserving and upgrading existing housing stock and, or replacing used-up dwellings. Although some of this increase can be absorbed by existing units (doubling up, increased overcrowding, deteriorated social conditions), it is clear that the private sector will build the majority of these new units. The project will help improve GOL capacity to control to some extent this inevitable growth.

(3) Employment Generation

Monrovia's current labor force is estimated to be 117,000 persons. The Ministry of Planning and Economic Affairs estimates that 40% of the city's labor force is unemployed. This rate is projected to increase to about 65% by 1990 if a minimum growth rate of 2.5% annually in the modern sector employment is attained over the next two years. Even a maximum employment growth rate in the monetary sector of 7.5% annually would not

reduce the unemployment rate below 50% by 1990. The bulk of the labor force consists of unskilled and illiterate workers. Currently the construction industry employs 3,000 workers, largely in connection with OAU-79 related projects. Using a 1:2 ratio in construction-related indirect employment (materials, production, transportation, warehousing, etc.), total construction sector employment is estimated to constitute 9,000 workers.

Once the construction activities associated with the OAU Conference are completed and the service and support functions of the Conference have been completed, Monrovia will be faced with sudden and significant additional unemployment.

Housing investment generates labor-intensive activities which stimulate employment of largely unskilled and semi-skilled persons. Each \$10,000 of housing investment produces between 7-14 additional jobs; for each person working in construction, two persons work in construction-related activities. Investment in and assistance to small scale industry provides further employment opportunities to low income groups because small scale industry is labor intensive and uses proportionately greater numbers of unskilled and semi-

skilled workers than medium-size and large scale establishments. Profits of small enterprises tend to be reinvested in Monrovia so that the stimulative effects are retained in the local economy.

(4) Promotion of Savings

Investment in housing and small scale industry promotes savings. Domestic savings applied to home-ownership and building up enterprises mobilizes funds previously held in unproductive ways (jewelry, cash hoards) or used for consumption expenditure which has a large import component. As a result of increased savings and investment, inflationary tendencies in the economy are restrained.

The current limited availability of mechanisms for channeling local savings into medium and long term investments is a major constraint on industrial development and on the creation of further job opportunities. Proposed assistance to the NPSB under the grant project, in addition to on-going USAID assistance to the Agricultural Cooperative Development Bank should help relieve this constraint.

(5) Industrial Growth

The average annual growth rate of industry, the output of which currently constitutes 7% of GDP,

over the period 1970-1978 was only 4.5%. This contrasts sharply with the 7.8% annual growth rate realized for 1960-1970, which was largely the result of foreign-owned operations. Foreign investment in this sector has stagnated in recent years and there is a great need for small scale industrial credit and entrepreneurship development to enable more Liberian participation in this sector which currently is dominated by foreign nationals. In the light of government policy directly to link low income housing development with job creation and increased employment in the vicinity of low income housing areas, proposed USG investment in small-scale industry development and vocational training opportunities for low cost housing beneficiaries would dovetail with GOL policy and fill a real need.

3.2 Social Soundness Analysis

A. Sociocultural Feasibility

This project represents the first major attempt of the GOL to provide shelter to the large sector of growing urban population who cannot afford conventionally or publicly financed housing produced to date except on highly subsidized schemes. The project also provides for the preservation and upgrading of existing housing stock. The emphasis is on development of affordable shelter and upgrading of substandard housing on a cost-recovery basis. This is reinforced by a loan program geared to the target group needs, thus providing for a broader distribution of limited public resources among the lower income urban population.

Sites and services projects provide minimum standard infrastructure services to lots that are sold or rented to low income families. Construction of dwelling unit is generally on a self-help basis with technical assistance provided by the developer. This allows low income families to retain cultural identity in design of their homes while at the same time upgrading to modern sanitation standards.

Settlement Upgrading projects define a low income community with relatively stable population base, housing

inventory which can be improved and below standard level of infrastructure service. This type of project finances the upgrading of infrastructure within the community (roads, drainage, sewer, water, street lights), provides loans and technical assistance to residents to improve their houses and supports upgrading the provision of improved social and economic services. Since relocation is not involved in this type of project, traditional living patterns are maintained with minimum disruption.

The target group for this project is the lower income sector of the Monrovia population, that is, families having an income below the median for Monrovia, estimated at \$125 per month in 1979. Recent NHA surveys of several low-income areas in Monrovia show that most of the target population, currently live in substandard housing. A typical family will rent one or two rooms and share kitchen, bathroom and toilet facilities with several other families. These families lack adequate supplies of basic food staples, adequate medical-care facilities, and employment opportunities which can yield tangible economic gains. However, there is virtually no economic segregation in Monrovia. Although there are some low income concentrations, one typically finds low income families living adjacent to middle and upper income families. In fact, middle and upper income

families use this to their advantage by renting a portion of their lot to low income families who construct temporary shelter on their allotted area, usually without adequate basic sanitation facilities.

The normal family size is five but it is common to find additional members of the extended family "visiting" either to eventually return to the interior, or establish their own household in Monrovia. The head-of-household is the only income-provider in most cases, although in one of every five families more than one family member is gainfully employed. Most head-of-households are employed as laborers, transport equipment operators or sales workers and are usually paid-employees. Families have no access to credit and do their shopping mostly on a day-to-day cash basis.

Although families are mostly nuclear type, related families tend to live close to each other and low-income communities are usually socially and culturally homogeneous. Families with a common tribal origin and dialect tend to cluster together in specific geographic areas. Most communities have opinion leaders, either officially appointed or selected by the community, who have a definite impact on community and personal decision-making.

Housing is important to development in both economic and welfare terms. This project will stimulate employment

in both the formal and informal construction sectors. It will also provide improved sanitation facilities, more adequate community services and additional economic development for beneficiaries through the small-business loan program, thereby significantly contributing to the social welfare of the target group.

All of the options offered in the program will be affordable to the target group. The sites and services component of the program will affect "volunteer beneficiaries", that is, participants will have to make a conscious effort to apply for program services and to determine whether they are financially or otherwise suited for the project.

The NHA has substantially upgraded its capacity to do socio-economic research over the past year. AID financed short term technical assistance to this Division during 1978. The result of this effort is the completion of a number of socio-economic surveys of low income communities in Monrovia providing basic characteristics data on this population. The NHA is inputting these data into the project design process. These data are also being used to identify potential constraints to successful implementation of the project and design innovative ways of minimizing the negative impact of these constraints.

During the last several years, the following studies were completed by the NHA Research Division:

- a. Matadi Socio-Economic Feasibility Study - ROL/NHA (1978)
- b. Socio-Economic Feasibility Study for Housing Development - ROL/NHA (1978)
- c. New Kru Town Data Sheet - ROL/NHA (1978)
- d. Plaunkor Data Sheet - ROL/NHA (1978)
- e. Community Needs Survey, West Point Sector - ROL/NHA (1978)

These studies confirm that the target population is scattered throughout Monrovia. An indication of the intensity of interest was the June 1979 response to the NHA announcement that 183 low income rental units were available at New Georgia. During the three days when applications were accepted, 600 applications were submitted and at least another 400 persons were turned away. The same type of response is anticipated for the sites and services project.

The basic indicator used for defining the target group is family income. For purposes of AID financing, beneficiaries must have incomes which fall below the median for the city in which the project is located.

Overall Monrovia income data are collected infrequently and subject to a relatively large margin of error. The last census was conducted in 1974. During the 5 years since this census spot samples have been conducted but no official update for Monrovia has been completed. Therefore, based on NHA sample surveys, consumption patterns and general cost increases, the 1979 Monrovia income distribution has been estimated as follows:

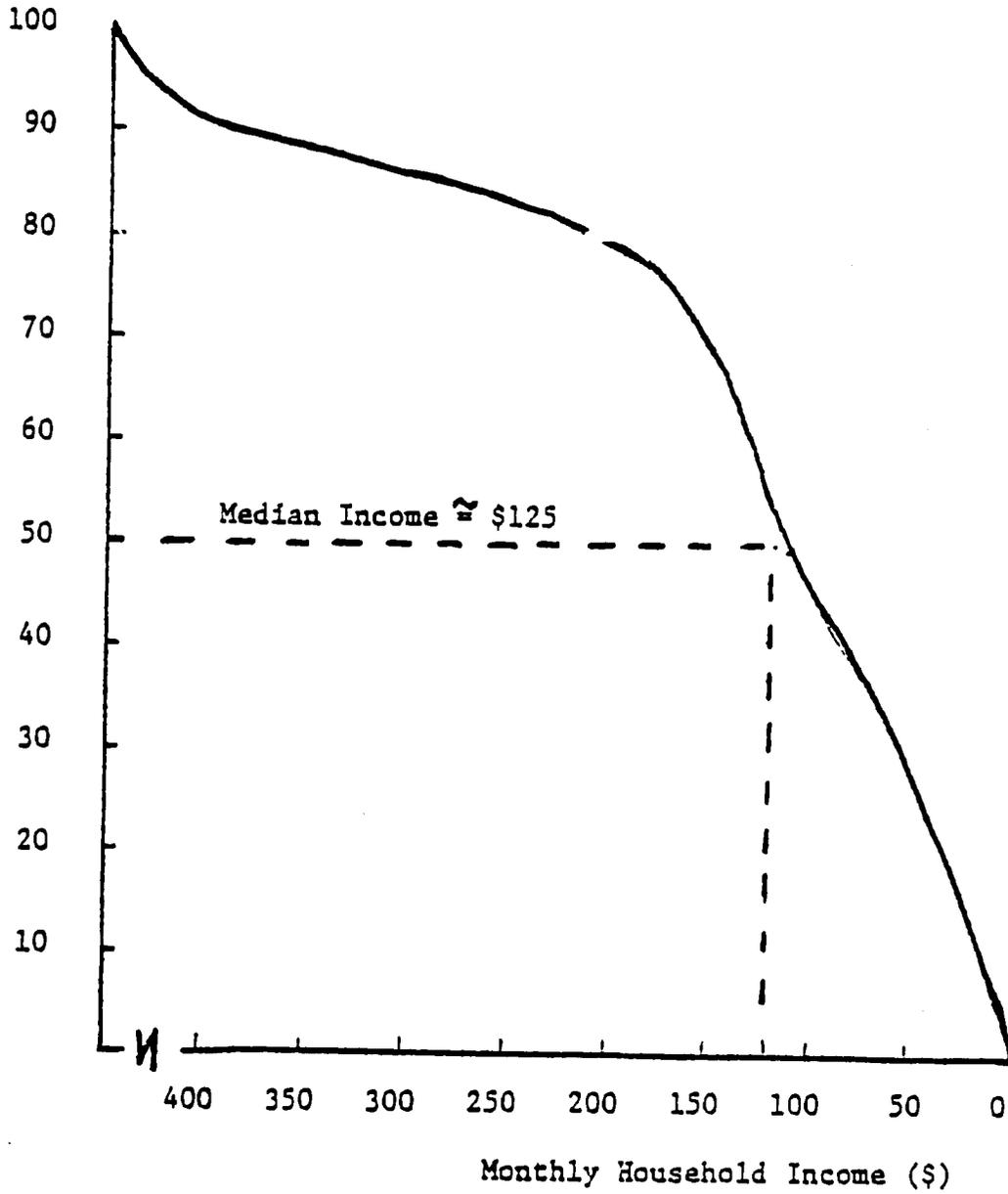
1. Population for Liberia was assumed to grow at a 3.3% rate starting from a base of 1.5 million in 1974, resulting in population for 1979 of 1.76 million persons. See World Bank Report 1642a-LBR
2. Per capita gross domestic product was assumed to grow at a rate of 10.21% per year from 1976, the rate of growth which occurred from 1975 to 1976. This assumption is relatively conservative as the five year growth rate from 1971 to 1976 was 16.5% per year. 1975 and 1976 figures taken from World Bank Report 1642a-LBR
3. Using the above figures the Gross Domestic Product per capita for 1979 is \$701.82, or 51% higher than the 1974 figure of \$465.73. Assuming a 5

person household in Liberia the average household income in 1979 would be \$3509. per year or \$292.45 per month.

4. The figures for income distribution shown in this page are arrived at by taking the N.H.A. estimated income distribution for 1974 and adjusting it in the above described manner. Using the most conservative estimate the 1979 median income is estimated at approximately \$113.25 per month based on an estimated median in 1974 of \$75. If the five year average growth in gross domestic income is used to project incomes from 1976 to 1979, then 1979 median income would be \$133.50 based on an estimated level of \$75. Given the paucity of data and the difficulty of projections an estimated median of \$125 per month is used as the best estimate.

ESTIMATED HOUSEHOLD INCOME DISTRIBUTION
MONROVIA 1979

Percent of
Monrovia
Families
with
Lower
Income



NHA surveys conducted in 1977 and 1978 provided sample estimates for representative low income communities as follows:

MONTHLY INCOME/ HOUSEHOLD IN \$100 INCREMENTS	% OF TOTAL HOUSEHOLDS SURVEYED COMPOSITE DERIVED FROM NHA DATA			
	1977 LORMA QUARTER	1977 WEST POINT	1978 PLUNKOR	1978 NEW KRU TOWN
Under \$50	18	28	7.9	5.5
50 - 150	65	59	56.5	55.4
150 - 250	12	9	18.7	19.4
250 - 350	3	-	5.3	5.5
350 & Over	2	4	2.4	5.2
	LORMA QUARTER	WEST POINT	PLUNKOR	NEW KRU TOWN
Approximate Population	11,892	19,667	4,201	27,458
Approximate Median Income	\$99.-	\$87.-	\$98.-	\$118.-

These NHA surveys also collected data on household composition which indicates an overall average permanent household size of 5 persons. The following table shows the distribution by household size:

HOUSEHOLD COMPOSITION TABLE (%)								
NUMBER OF PERSONS	LORMA QUARTERS (1977) NUCLEAR EXTENDED BOTH			WEST POINT (1977) NUCLEAR EXTENDED BOTH			PLUNKOR (1978) BOTH	NEW KRUI (1978) BOTH
1	16.3	-	16.3	14.6	-	14.6	13.6	16.5
2	11.6	-	11.6	18.6	-	18.6	21.5	15.0
3 - 4	25.3	8.7	34.0	29.3	6.2	31.5	31.8	26.4
5 - 8	7.9	17.3	25.2	10.0	14.5	24.5	24.6	26.8
9 - 12	1.8	8.3	10.1	1.6	3.2	4.8	6.0	10.8
13 - 16	0.4	1.1	1.5	1.2	0.8	2.0	1.8	4.5
17 - 20	-	0.7	0.7	0.7	0.8	1.5	0.9	-
21 - 24		-		0.5	1.1	1.6	-	-
25 & Over		-		0.8	0.3	1.1	-	-

A detailed 100 percent survey was conducted in New Kru Town during 1978. These data (tabulations included as Social Soundness Annex) provide a representative description of the target group. The 100 percent census was conducted as the first step in the process of designing the community upgrading project.

Two constraints to project implementation could be affordability and cost recovery. The project design incorporates minimum acceptable standards that are affordable to the target group at prices that are consistent with their current shelter expenditure. Since all costs are built into the sales price, the project will not be dependent on budgetary allocations.

To improve the possibility of maintaining a high level of buyer responsibility, the NHA and NHSB will maintain a project office on site staffed with loan officers, business and self-help construction advisors and other advisors trained to assist buyers in budgeting and other responsibilities of home ownership. A pre-savings program will develop the habit of making regular payments as pre-condition to responsible home ownership. This will assist the transition of recent rural migrants into the urban monetary economy.

B. Spread Effects and Benefit Incidence

Prior to 1976, GOL efforts were directed towards middle income subsidized shelter solutions. A combination of increased cost inflation and increased pressure from low income families whose quality of life was deteriorating convinced the GOL to begin focusing on low income shelter needs. Initial attempts at construction of conventional estates for rental incorporated large subsidies which severely limited the number of beneficiaries. Even with the subsidies, rents charged on units averaging a cost of \$18,000 ranges from \$40 to \$70 per month, excluding a majority of the Monrovia population.

At this time, GOL requested AID to assist in finding less costly solutions that could address the shelter needs of low income families. The sites and services and community upgrading solutions suggested by AID reduce standards to the minimum acceptable level allowing full cost incorporation in the selling price. This allows full recovery of costs which provides a model and funds for replication in Monrovia and other emerging regional growth center. At the same time, it incrementally improves the standard of living of the beneficiary population. Prototypes of beneficiary payment mechanisms, delivery of health, education and socio-economic services will provide a model for introduction in follow-on projects.

The project components will impact the beneficiary population as follows:

1. Government will construct markets within the overall project areas. This will provide local access to basic consumer goods and local employment for market women.
2. Individual water connections will be a great improvement over the general existing pattern of carrying water from common stand pipes. Overall health of family members should improve with direct access to safe water.
3. Health of women and their families should improve with provision of sewerage disposal to each lot.
4. Easy access to clinics will encourage women to utilize maternal health services for themselves and their children.
5. Schools will be available on site as part of the greater Monrovia Consolidated School System.
6. The wet core option on the serviced sites will provide flush toilet, wash and kitchen area. This will be a substantial improvement over the unmaintained pit privies and over hang toilets; the use of tin shelters without concrete slab for washing and food preparation that occurs directly on the ground with no raised work area generally found in low income

areas of Monrovia.

7. Neighborhood road system will minimize thru traffic therefore providing safe play and congregation areas.
8. Public transportation will be easily available to residents.
9. Land has been allocated for church and parochial school construction.
10. Neighborhood parks and playgrounds have been incorporated into site design.
11. Construction materials manufacturing will take place on site and provide employment to residents.
12. Street lights and individual connections will be provided which will add to the security of the community.

C. Role of Women

Women in Liberia are active in government and commerce. They can legally hold title to land and engage in its sale or purchase. NHA socio-economic surveys reveal that approximately 15% of the total working population in the lower income sectors are women. Self-employment of women in market activities is typical of the low-income families in Monrovia. Most market activities are handled by women, enabling them to gain experience in simple business transactions and to attain a degree of financial independence.

Women will participate actively in the program and will have equal access to shelter and small-business loans.

It is expected that they will play an important role in program promotion as well as in self- and mutual help activities. Many of the social service programs to be implemented in the project area will directly benefit women and women will be a key factor in the determination of community priorities in the development of social service programs.

Many elements of the project have been specifically designed to take account of the special needs of women. These include programs such as family planning programs, availability of water and sewerage facilities, access to small-business loans and others as described in detail in the previous section will greatly contribute to improving the living conditions of women from the low-income sector.

D. Availability of Family Planning Service and Information

The project will provide sites and services lots to approximately 600 families, most of them relatively young. A clinic and health facilities are planned for this development. As is typically the case in Monrovia, maternal health and family planning services will be available in this clinic. The home economics service of the Department of Agriculture, which is also involved in lifestyle education including dissemination of child

spacing information, will be active in the area. Schools will also be provided on site as an expansion of the existing school system. Residents of the project will have access to information and services which will allow them to make family planning decisions that can influence their ability to provide adequate health care and education to their families. The necessary commodities and services are available in country.

3.3 Technical Feasibility

A. Sites and Services

(1) Introduction

The sites and services program will be conducted in two locations both of which are accessible from the Freeway for roads and water, and have employment centers at the Free Port area. The site closest to the Free Port is known as New Georgia, and the other one is Barnersville. Both have existing housing present on site.

The original infrastructure design developed by the NHA and resident TA team utilized absolute minimum standards for a 1000-lot project in which all the lots would be sold to low income families. Priority was given to water, sewer and sewage disposal facilities, with access primarily by pedestrian ways rather than roads. This minimal solution costed out at less than \$1700 per lot, including contingencies.

Several problems were identified with the initial approach. This design would have concentrated 1,000 low income families, resulting in an unacceptable economic segregation that is inconsistent with general settlement patterns in Monrovia. There were also serious questions as to the social soundness feasibility

of this proposal.

Therefore, in order to avoid these problems a new design was created for mixed-income lots. The redesign eliminated the economic segregation and provided for a viable community mix of one middle-income lot for each two low-income lots.

With the introduction of the middle income component, it then became necessary to upgrade the level of services by paving access and interior roadways and providing a complete electrical system. This resulted in a basic lot cost of \$2400, including contingencies.

In order to achieve marketability of the low-income portion, it will be necessary to sell the middle-income lots at market value, rather than cost. This avoids a concealed subsidy to purchasers of the larger lots, while permitting sale at cost minus for the lower income lots. Overall, the project will recover its costs.

Based on estimates of market price of the middle income serviced lot, this cross subsidy will bring the low income serviced lot price down to below the original estimate of \$1700--assuming best case on market price of the middle income unit, to as little as \$1000. Obviously, depending on market conditions, basic lot prices will be adjusted in accordance with market conditions.

An analysis of affordability to the low income group and the impact of the cross subsidy is included in Section 4.1 Housing Finance and Affordability.

In addition to infrastructure, NHA will offer to purchasers a wet sanitary core/shelter option.

NHA has estimated that the cost of the construction materials required for a low income shelter unit is approximately \$4.70/sq. ft. This cost per square foot is based on the following type of construction:

- a. trowel finished concrete floor slab.
- b. unplastered sandcrete or soil cement block walls.
- c. corrugated steel roof on poles or local lumber.
- d. local wood doors and windows.
- e. minimal electrical installation.
- f. one water closet, one precast lavatory,

one precast kitchen sink and one shower plus the necessary piping, fittings and couplings.

It is assumed that the low income beneficiaries will carry out a substantial amount of the construction work required on a self-help basis. NHA will provide the necessary technical support and guidance throughout the duration of the project in addition to other support related to garbage collection and repairs to the infrastructure whenever necessary.

(2) New Georgia Sub-Project

The New Georgia site, located approximately 1.5 miles north of the Freeway road is on moderately high ground relative to the wet marshy area which surrounds part of the site. A new graded road connects the Freeway to the existing housing area. The site is 3.8 miles from the Free Port, a major employment center.

It is proposed that collector roads will link all units of the site together, and that all roads in the housing site be considered as neighborhood roads.

Drainage will generally be sheet flow (non

concentrated) and discharge from culvert pipes dispersed.

An 8" water line has been brought from the Freeway to serve the existing housing. This 8 inch connects to an existing 16" water main belonging to Liberia Water and Sewer Corporation. The existing 8" water main on site will be sufficient for the whole site and will generally be looped around the site with 4" and 6" connectors and 2" minor lines. All of the distribution system will serve the individual house water connections as well as providing some fire protection.

The individual house sewer connection from the sanitary core flush toilet is taken through 8" and 10" sewerage collection systems to sewage treatment plants located near the wet marshes. The design selected was the waste stabilisation pond.

Electricity as supplied by Liberia Electric Corporation is on site supplying the existing housing.

(3) Barnersville Sub-Project

The Barnersville site, located approximately 3 miles east of the Freeway road is on moderately high ground.

A new graded road connects the Freeway to the existing housing area which contains some 580 units. It is proposed that the existing housing site be expanded to the north by neighborhood roads as well as infilling.

An additional 90 acres to the South is also available for housing.

An 8" water line connecting to the 16" water main on the Freeway exists on site. This 8" water main will be extended as required to feed 2" laterals.

Individual house sewer connections from the sanitary core flush toilet will connect to existing 6" pipes and septic tanks for minor site infilling. For the expansion areas, 6" house lines will connect to septic tanks or preferably to a waste stabilisation pond.

Electricity supplied by Liberian Electric Corporation is on site supplying the existing housing and will be used for the expanded housing.

B. Community Upgrading

(1) Introduction

The areas to be upgraded are located on Bushrod Island, adjacent to the United Nations Drive. Structures in the areas are overcrowded, most of them constructed of scrap lumber, corrugated galvanized iron sheets, concrete blocks or of mixed construction. All of them lack one or more of the essential facilities such as water, sewer or electrical power. Sanitary facilities are not present at all. Access to units is through crooked alleys or unpaved road.

The areas also present an inadequate street pattern, an obsolete street lighting system, inadequate supply of potable water and fire hydrants, stagnation of run-off waters due to an inadequate storm sewer system, inadequate and obsolete electrical distribution system and lack of recreational and community facilities.

The choice of technology and level of infrastructure services has been influenced by a number of factors indigenous to Monrovia, Liberia. Constraint factors include: (1) the financial affordability of the target population to repay capital and user charges; (2) cultural traditions, social expectations and willingness to assimilate technological changes; (3) low cost operation and maintenance of equipment; (4) complications

due to phased construction and fragmented ownership; and (5) variable physical features of the site including topography, water table, soils and marsh.

The choice of site is also conditioned by the level of community organization as an index of the potential for self-help activities. Most low-income neighborhoods have voluntary associations based on family or place of origin. In addition, political power at community level is represented by a Governor, appointed by the President of Liberia and six councilmen selected by the community to four year terms.

The Governor has a salaried position while Councilmen hold honorary positions. The residents look up to the Governor and Councilmen for leadership in community and personal decision-making, a pattern common to most low income areas where opinion leaders bear a strong influence on community affairs. This political structure will be utilized in the design of the project promotion strategies since opinion leaders acceptance of project contents and goals, will have a definite impact on over-all community response.

Although economic segregation is not a feature of the social pattern of older Monrovia neighborhoods, the median income of some of the neighborhoods selected for upgrading is significantly lower than the city

average of about \$125, according to surveys conducted in 1978 by NHA.

	<u>Lorma Quarters</u>	<u>West Point</u>	<u>Plunkor</u>	<u>New KruTown</u>
Population	11,892	19,667	4,201	10,404
Median Income	\$99	\$87	\$98	\$110

(2) New Kru Town

The New Kru Town community is located on Bushrod Island adjacent to the port area, a major source of employment. The community was established in 1945 when Kru people were relocated by the government from their previous quarters in the area of the present port facilities in Bushrod Island. The community is culturally and socially homogeneous with most members being descendants of the Kru people and speaking the same tribal dialect.

New Kru Town is a well-established community with families sharing common interests and aspirations. An analysis of the distribution of head-of-households informing length of residence in the community shows that 3 out of every four families have lived in New Kru Town for at least four years. Over 28% of families have lived in the community for 20 or more years while only 3% of families have lived there for less than a year. This provides evidence of interest in the

community and suggests that probably an upgrading project will be welcomed and backed by residents.

A typical New Kru Town family consists of five members with the head of household usually being the only income provider. In only 16% of households is the wife involved in any income-producing activity. The median family income is \$110.72 per month which is spent approximately as follows: 15.3% for rent, 56.1% for food, 15.3% for transportation and 13.3% for clothing, medicines and other expenses. Families have no access to credit and do their shopping mostly on a day-to-day basis. The head-of-household is usually a paid employee and goes to his place of work by bus or similar transport. (See Annex 3D for more detailed analysis.)

Most New Kru Town families live in substandard housing conditions with a household inhabiting one or two rooms and sharing kitchen, bathroom and toilet facilities with several other families.

The majority of houses are block walls with galvanized iron sheet roofing or houses made solely from galvanized iron sheets. At these lower income houses which contain one or two rooms, the floor is of earth and food is cooked outside. Waste disposal is by wooden seat over a pit privy and shelter again

of iron sheets. Wash areas are earth floors surrounded by sheets. Disposal is to the ground. Other houses have one or more similar defects.

Possible improvements are as follows:

Brick or concrete floor

New Kitchen facilities

Improvement to pit privy

Improvement to wash areas and disposal
by soakaway

Expansion of building

Replacement of walls or roof

Repair to walls and roof

New doors and windows.

Estimates of costs will vary with the individual house, its need for repair and improvement and the owners willingness to undertake the loan and construction.

Access to New Kru Town is via United Nations Drive, a major paved road. There are two accesses from that road, one major and one minor. The topography is moderately high with ground sloping down to a center low area and to the northern and western perimeters or river and coastal beach. Soils are sandy and drainage pipes appear to exist only at the center low area.

The water system belonging to Liberia Water and Sewer Corporation have 2", 4" and 6" lines with 1" metered standpipes. This system does not serve the whole community. A scheme is in preparation to extend the system especially in a north and west direction and to increase the number of standpipes. The 6" line connects to an existing 16 inch line located in Tubman Street.

The sewerage system is a combination of wet and dry systems. The sewer collection lines belonging to Liberia Water and Sewer Corporation are 8", 10", 12" leading to a lift station near United Nations Drive where it is lifted into an 18" line and down to the Sinkor Treatment Plant (the lift station is presently not functioning). The collection lines are limited to a few streets.

The private systems vary; a pour flush toilet disposed of by septic tank and wash water to soak away; pit privy with direct ground disposal and wash water to ground; raised pit privy; borehold privy; overhung toilets; direct excreta.

The Ministry of Health has a campaign to eliminate overhung toilets, direct excreta, and wash water being discharged directly on the ground.

Electricity supplied by Liberia Electric Company

is on the major streets together with some street lighting. A substation is immediately adjacent to New Kru Town.

Proposed for New Kru Town are such items as upgrading of individual sewage disposal units as directed by the Ministry of Health; materials for improvement and/or expansion of existing structures; road improvements; street lighting extension; community toilets in dense areas, with maintenance and cleaning to be conducted by the community; and the filling of the center low lying area (approximately 13 acres) for a sites and services project.

Neighborhood development has been hindered by this strip of land 150 to 200 feet wide and some 3600 feet long between the head of the depression and the second walkway bridging the two halves of New Kru Town. Layout of through streets has been severely affected by this depression which contains little water during the dry season but some 2 feet during the rainy season. Filling of this land will be necessary beginning at the head point. The new sites thus developed will be designed to be affordable to low income families.

The level of infrastructure is minimal, but additional services (i.e. more street lighting, street paving etc.) can be added in response to community

requirement and as GOL cost-recovery capacity improves.

(3) Other possible Sites

Additional community upgrading areas, also located on Bushrod, include the Point Four and Duala neighborhoods adjacent to New Kru Town, and Logan Town and Jamaica Road neighborhoods at the southern end of the island. All these communities have essentially the same soil conditions and access to primary utility lines as does New Kru Town, and project development and implementation is not expected to pose any special technical problems.

C. Revolving Loan Fund

At the present time the major organization concerned with low income housing in Liberia is the National Housing Authority. While substantial progress has been made by the Housing Authority, a major weakness in effectively providing low income housing is the lack of a financial institution to service this sector of the housing market. The primary mortgage lending institution in the country of Liberia is the National Housing and Savings Bank, having total assets of approximately \$15.5 million. The NHSB has not so far been active in the financing of low income housing. It is a relatively new organization and has financial resources inadequate to the national demands for housing funds. The typical mortgage loan made by the NHSB in 1977 averaged over \$14,000.

One of the principle objectives of the project will be to create a viable mechanism for the financing of low income housing services by expanding the facilities, improving the capabilities, and providing an incentive for NHSB to become active in this sector of the market.

A portion of the accompanying grant is being used to provide funds for staff training and recruitment, and \$2.5 million are being provided to NHSB as

seed capital for new low-income lending programs.

A total of \$1.5 million HG funds will also be on-lent by NHSB for the following two programs:

1. Loans to occupants of the sites and services project for the purpose of acquiring construction material for building.
2. A home improvement loan program for residents of existing low income neighborhoods (initially New Kru Town).

NHSB can onlend these funds as part of its regular loan program at its regular rate of 12% and at terms of 15 to 20 years. However smaller loans suitable for the type of improvements anticipated in the upgrading areas will be for smaller amounts and for shorter terms, partly to ensure more rapid recovery and with it the potential for increasing the flow of relloanable funds, and partly because of preferences observed in the behavior of low-income families.

Incremental home improvements can thus be financed in accordance with a beneficiary's means and inclinations. Construction materials or the home improvements identified for the upgrading areas can be financed within the general perimeters of the NHSB on-going

installment loan programs, which provides for loans of up to \$2,500 for terms of up to 24 months.

A brief description of the existing NHSB small loan program follows. The outstanding balance of installment loans at the bank as of December 31, 1978 was \$237,065, indicating a substantial degree of activity. The bank is presently making these loans without regard to the borrower's purpose, however it is believed that a substantial portion of these loans are used to finance home improvements.

Installment loans are generally short- to medium-term loans having a typical duration of 12 months. The loans are made on a discount basis, i.e., the interest rate is charged on the original amount of the loan and is deducted before the loan is disbursed. The loan is collected in equal monthly payments. At the present time the bank is charging an interest rate of 10% based on the discount approach. The effective interest rates resulting from this practice range from 17.8% for a six-month loan to approximately 22-25% for a 24 month loan. These effective rates are quite reasonable given the nature and cost of making loans of this type. The interest rates compare favorably with those found in developed economies including the United States.

The maximum amount of loan granted under this program is \$2,500. The bank takes as security for the loan a mortgage on real property and requires that the borrower have real property available to pledge for this purpose. Indications are that the program has been successful and that collection and delinquency problems are not excessive.

Based on the experience in the installment lending area it appears that the present program of the NHSB can be modified to be suitable for low income home improvement lending. Alternative terms for amortization and approach to interest charges may be necessary but the basic structure of small scale installment lending exists.

NHSB requires borrowers to have been regular savers for one year and to have a savings balance equal to 10% of the amount to be borrowed. This permits NHSB to develop a knowledge of a customer's habits and to accustom him to the necessity of making regular payments, this is standard practice for credit unions and is necessary inasmuch as NHSB's other credit check--a request to the other banks for their experience with the loan applicant--is not likely to be applicable for low-income applicants.

D. Secondary City Pilot Project

The social economic survey which is being conducted in Phase I of the program will provide data on the conditions and age of housing, the construction materials and methods used and will develop information on income distribution and percentages of family income traditionally devoted to shelter. This will be a national survey and therefore will yield information on urban as well as the rural patterns of behavior with respect to shelter. This survey will also include information on the types of existing infrastructure and community facilities that currently exist in various sections of the country. It is scheduled to be completed in July 1979 and the results will be used to help select the location for the secondary city pilot project that will be initiated with funds made available from the EG. It is planned to use the experience gained in the New Georgia sites and services and the community upgrading projects adjusted by the implications drawn from the analysis of the results of the social economic survey to begin to address the shelter needs of the rural population. This element of the project is being undertaken to develop a model and mechanism for extending shelter assistance into the

rural areas as a means of introducing some of the basic urban amenities into the more populous and growing rural-based communities.

The choice of location of the secondary city will be made during detailed project design in accordance with the following criteria:

- a) it must function as a regional center for an agricultural area producing cash crops;
- b) it must have transportation access to Monrovia so goods can be marketed and
- c) it must either have or have potential to develop other sources of employment within the center to assure its economic viability.

The three most likely locations for the pilot project are Voinjama, Gbarnga, and Saniquellex although Foya has also been mentioned as a possible candidate. These are all areas that would meet the criteria and all have basic piped water systems and electricity. GOL, USAID and other donors development programs are active in these areas. All three sites have populations of around 10,000. Project funds will be used to carry out the location analysis and the detailed design of the pilot project as well as the initial implementation.

The pilot project will develop a mix of the following components to be extended to the low income areas of the city. Specifically, piped water will be extended, street lights installed, roads and drainage upgraded, and garbage collected. These general improvements will apply to the low income community. Costs of these services will be recovered either directly or indirectly through property assessments and utility rate charges. A basic purpose of this project will be to design a method of recovering costs related to the extension of services.

A small loan program will also be developed and funding provided through existing financial institutions operating in the area. Small loans for construction materials and other home improvements will be made to the low income residents.

Technical assistance will be available to the residents to assist them upgrade their privies, cooking and wash areas and decide on the type of improvements that should go into their dwelling unit.

The rural focus of this element of the project is responsive to government's increased concerns to develop the rural areas and is designed to provide it with an additional tool to help realize the objectives spelled out in Executive Order No. 1.

It will also be an integral part of USAID's overall program to direct assistance at improving the lives of the rural poor.

3.4 Administrative Feasibility

A. Introduction

Both organizations have strengths and weaknesses which are almost identical. Their strengths include strong leadership, a small, well-trained cadre of personnel, generally good morale, and an emerging reputation of being organizations that want to get the job done. Their weaknesses include insufficient numbers of trained personnel and a shortage of funds (or capitalization) to increase their staff to the levels that will be required to implement the expanded program. The Grant funded project provides budgetary support for salaries for additional personnel and training of the expanded staffs over a 2 year period. This activity will help to moderate the impact of the constraints described above.

The NHA and NHSB have Boards of Directors responsible for providing policy to each institution. Activities of the institutions will be coordinated through their Boards by the Ministry of Finance which has the ultimate "say" in resolving issues between the two.

Each organization has as its primary purpose the mandate to provide housing to low income families. To date, neither organization has fulfilled this commitment

but the NHA has made great strides in redirecting its course and the NHSB is willing and able to increase its low income housing portfolio given the support provided by the Grant program. The NHA has a proven record in selecting and administering housing contractors both local and foreign. The NHSB has demonstrated that it is able to manage its current loan programs but both organizations need strengthening.

B. The National Housing Authority

(1) Background

The NHA was created in 1960 by an act of the Legislature to plan and execute housing development programs. It was, however, not until 1972 that the Authority began to realize the extent of Monrovia's housing problems and the urgency of finding solutions. In 1974 the first Liberian government sponsored program was completed. It provided accommodation for 72 middle income families. To date, with the limited funds allocated to the Authority by the government, the NHA has been able to complete 1500 family housing units, the average cost of which has been \$18,000. These units have been designed for and are occupied by middle income families, and the Authority has so far had very little experience

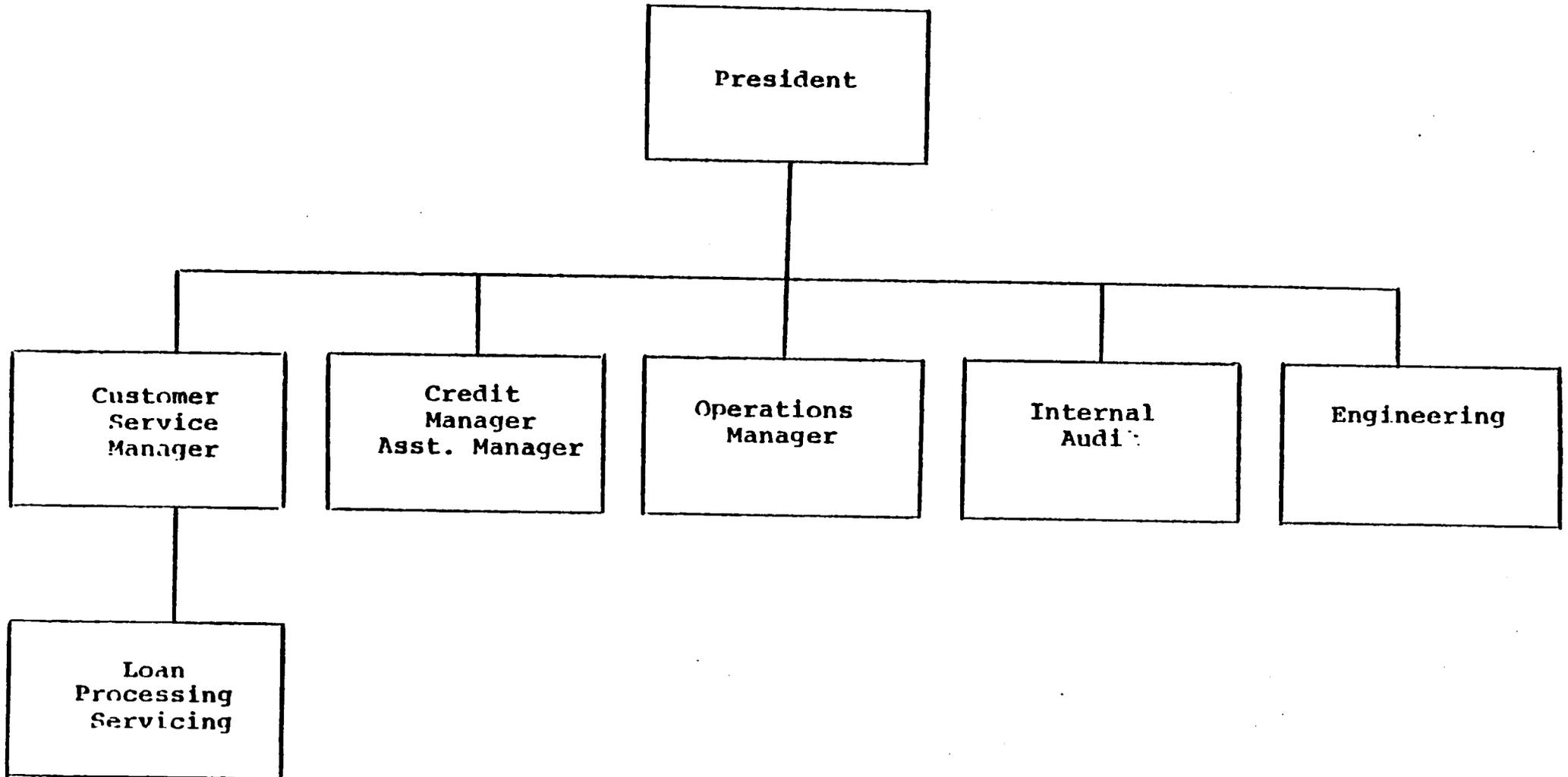
in providing low-income housing. Over the past three or four years there has, however, been a growing awareness on the part of the government that there is an urgent need to address the shelter needs of the poor.

In 1976 the President and the NHA Board specifically instructed the Authority to focus on shelter for low income families. The recognition of the importance of finding shelter solutions for the growing number of urban poor was broadened and stimulated when Liberia hosted the 5th Conference on Housing in Africa in May of last year. Also in 1978 a number of key government officials from the Ministries of Finance, Planning and Public Works accompanied NHA officials on inspection visits of sites and services projects in Kenya, Ivory Coast and Senegal. The group came back convinced more than ever that Liberia needed to aggressively attack the deplorable housing conditions under which most of its people are forced to live, both in the urban and rural areas.

(2) Present Organization

The NHA is headed by a Managing Director and Deputy Director, both of whom are appointed by the

Organization Chart
National Housing and Savings Bank



President of Liberia. The Director reports directly to the Board of Directors. The Board is made up of Ministers of Finance, Planning, Local Government, and Justice. In addition, managing directors of Liberia Water and Sewer Corporation and Liberia Electric Corporation are members of the Board. The Board makes policy and authorizes implementation of NHA housing projects.

The accompanying exhibit shows in abbreviated form of the organization chart of the NHA. There are presently six major departments under the Director and Deputy Director, consisting of research and planning, operations, finance, property management, legal, and administration. The NHA staff up to this time has mainly been responsible for projects inspections and supervision of management at developed sites. In the future, in order to more closely control costs and more efficiently develop projects and produce shelter solutions, the NHA will become more fully operational along the lines of its organizational chart. The planning and legal departments are presently in the process of being staffed and the Authority is considering the development of a construction unit to carry out projects on a force account basis. A more complete discussion

of present and proposed department responsibilities will provide further insight to administrative capability.

The Research and Town Planning Department will consist of two divisions and three sections, namely: (1) Planning and Design Division (2) Socio-Economic Research Division (3) Research and Social Work Section (4) Statistics Section (5) Drafting Section.

The main duties and responsibilities of this Department will be the selection and analysis of sites, master planning, site planning, housing design, coordinate availability of infrastructure, undertaking of socio-economic surveys, tabulation and analysis of data, community organization, re-location and relocation planning, social interaction, market analysis and statistics.

The Operations Department will be responsible for the field operations of the NHA in respect to construction activities. To fulfill the above, the Department will consist of three divisions and one section, namely: (1) Construction Design (2) Project Inspection and Supervision (3) Construction Division and (4) Survey Teams Section. The Department will be responsible for the preparation of construction drawings, specifications and bidding

documents, project inspection and administration during the construction phase, and force account project construction. Survey teams will be directly attached to the Construction Design Division but servicing other units of the NHA. Drafting services will be obtained from the Research and Town Planning Department.

The Administration and Office Management Department will be responsible for the general administration of the National Housing Authority. The Department will be divided in two divisions with six supporting units namely: Personnel Division, Recruitment Section, Changes, Payroll and Records Section, Office Management Division, Transportation and Maintenance Section, Printing and Supply Section, Records and Mail Control Section, and Janitors and Messengers Section.

The Legal Department, a new unit created under the new organizational scheme, is needed to expedite the processing of lease purchase agreements and also of eviction cases. These functions are at present performed under contract and budgetary savings will result from the change. The Department will be responsible for all legal aspects of the NHA including mortgages. Two divisions will be included in this Department, namely the Acquisition Division and the

Real Estate Division. In addition to being charged with the legal aspects of the NHA, the Department will be also responsible for: land acquisition, title search, negotiate land values, prepare cases for acquisition through eminent domain procedures, and will undertake the necessary legal action in eviction and land squatters cases.

The Estate Management Department will assume all the functions of management previously undertaken by the Administration Division. This Department will be responsible for the administration of all NHA owned projects, and will include housing unit maintenance, the tenants-owners selection and rent collection. In order to fulfill the above, the Department will include the following divisions: (1) Tenants and Owners Selection Division, (2) Services and Maintenance Division, (3) Project Administration Division. The NHA will appoint one project administrator per project so as to increase the tenant-NHA relationship and also to increase collections. This Department will also be charged with the provision of social services within the project areas in coordination with the Research and Town Planning Department.

The Finance Department will administer and control all the financial aspects of the NHA. To fulfill the above, five divisions are included within the Department, namely: Budget Division, Disbursement Division, Purchase and Inventory Division, Accounting Division and Collections Divisions. These units will be directly under the supervision of the Head of the Department, who in turn will be responsible to the Executive Director for all activities undertaken by the Department.

Other supporting units will also be created as part of the new organization scheme of the NHA. These units are: the Public Relations Office; the Auditing Office; Consultants Office and the Bidding Board.

The Bidding Board will be an ad hoc Board that will meet only to consider project bidding proposals and to select contractors.

(3) Past Experience in Low Income Housing

The Authority's first low income housing project consisted of 183 units and was completed in May of 1979. The Authority acted as general contractor and supervisor on the project. However, development and construction work was largely accompanied by private contractors. Forty-three of the units are

now occupied by low income families who lost their homes in the December 1977 West Point slum fire. The remaining 140 units will be occupied by households having incomes of \$150 per month or less. This income is only slightly above the estimated median income in the Monrovia area of \$125 per month which sets the basis for AID target shelter recipients.

The successful completion of this project required substantial adaptability on the part of the NHA. One result has been that the Research and Town Planning Department has been reorganized to focus on low income housing. This first low income project (New Georgia Estate) was originally designed by a private firm with an average cost per unit of about \$14,000. The design was revised and a new concept introduced reducing cost per unit to around \$6,000 with rents of \$36.00 per month allowing families with income of \$125.00 to occupy the units.

In response to a recent Commonwealth Development Corporation (CDC) proposal to develop a low income housing project which CDC would finance, NHA with the cooperation and guidance of the TA Team, has been able to produce designs for 5 and 6 room units that will cost around \$5,000. The units are to be constructed in the New Georgia site.

The Socio-Economic Research Division of the Town Planning Department is another one of the NHA units that has been reorganized. This unit has been divided in two sections namely: the Research and Social Work Section and the Statistics Section.

Since their first socio-economic survey undertaken in the West Point area (fire-victims), the unit has been increasing their capability to carry out necessary studies. Studies are presently being conducted in other low income areas of Monrovia. In order to have a complete knowledge of the housing conditions and needs throughout the Republic, the Research and Social Workers Section is undertaking a socio-economic survey that will determine among other things (1) housing conditions (2) construction materials (3) family income (4) family composition (5) community needs (6) infrastructure requirements (7) housing needs in areas outside Monrovia.

This data, once analyzed, will be used in determining the best location for an upcountry pilot project. The data will also be used as a background for the National Housing Policy to be prepared by the NHA.

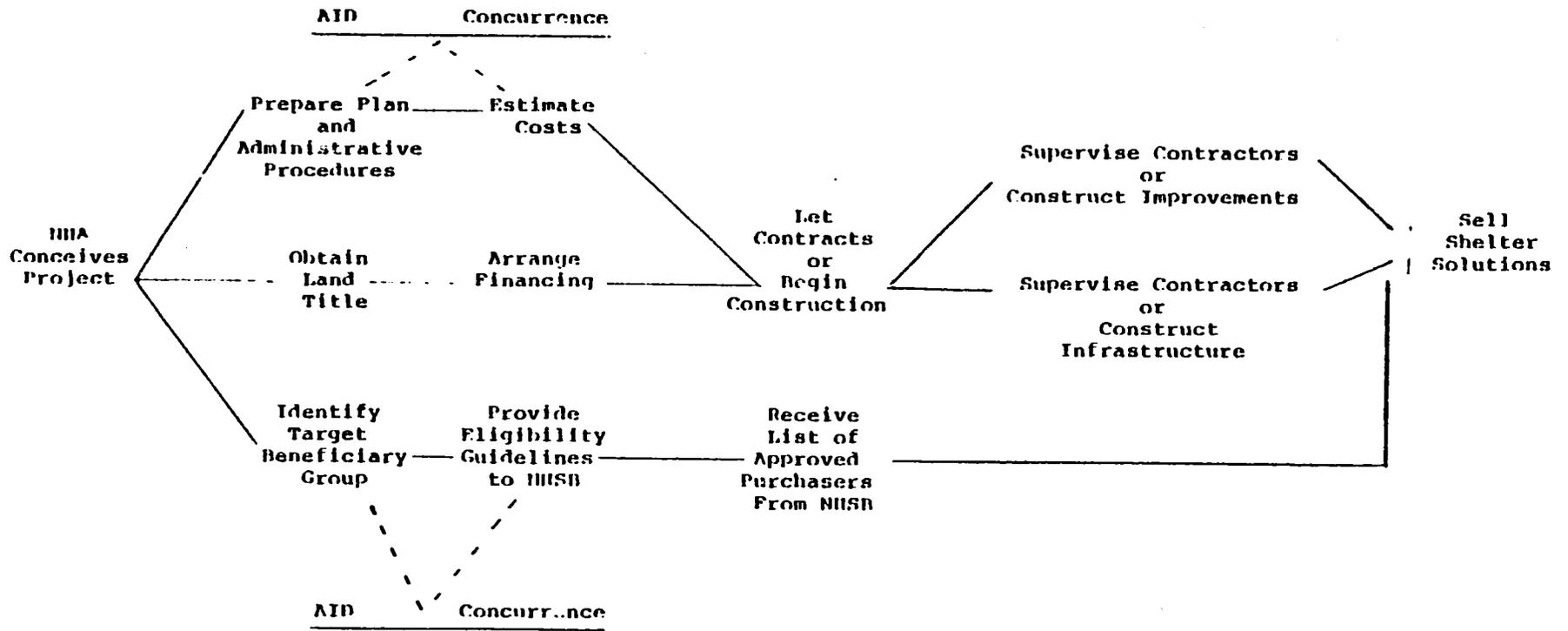
While these new directions have generated a high degree of enthusiasm within the government and

have served to build the morale and confidence of the NHA management and staff, they must be recognized as a small beginning. The NHA's management abilities and production capacity will have to be substantially increased in order to meet the expanding housing problems and growing demand in Liberia. The HG project is designed to complement other efforts in increasing the administrative capacity of the Authority to effectively produce low income shelter solutions.

(4) NHA Operating and Administrative Responsibilities Under the HG Program

The attached flow chart provides a diagrammatic representation of the operating and administrative responsibilities of the NHA. As the diagram shows, from the time of conception of the HG project, a number of administrative and management operations will be required of the NHA. In the early phases these will include plan preparation and cost estimation, obtaining of land titles and financial arrangements, and the establishment of processes to identify and target beneficiary group. After the preliminary phases of the project have been completed, construction contracts will be let and construction commenced. From this phase forward, the role of the NHA will be concentrated in the areas of coordination

NIA
 OPERATIONAL RESPONSIBILITIES
 IIG PROGRAM



and supervision of contractors and performance of inspections to insure compliance with contract requirements.

C. The National Housing and Savings Bank

(1) Description and Background

The National Housing and Savings Bank of Liberia was established in 1972 to mobilize domestic savings and to attract foreign capital to finance housing. The Bank is to provide the financing required to satisfy the housing and building needs of Liberia.

Specifically it was charged with the responsibility of making loans for:

- 1) home ownership
- 2) single and multiple family dwelling units intended for ownership and occupancy on a permanent basis
- 3) land acquisition and development
- 4) provision of infrastructure on the land
- 5) provision of community facilities.

The Bank is also authorized to conduct and transact many of the normal functions of a commercial bank.

The act setting up the Bank establishes lending priorities in terms of income brackets. First

priority is given to persons whose income is below \$250.00 a month. Second priority to persons between \$250.00 and \$450.00 a month, and third priority to persons with incomes over \$400.00

Although the Bank was created in 1972, it was not until 1976 that it became fully operational. To date the number of savings accounts has increased from 5,755 in 1976, and 9,688 in 1977 to approximately 17,000 in 1978. At present the total amount of savings is \$6 million against \$4.9 million in 1977 and \$2.5 million in 1976.

As the Bank has grown it has had to recruit more staff in order to handle the increased number of loans and savings accounts. From a staff of 44 in 1977, the number has increased to 62 staff members in 1979. The Bank just recently has changed its accounting system to a computerized system in order to be able to carry this greatly increased number of accounts in an efficient manner.

The Bank currently has limited experience in making low income high loan to value ratio loans. In order to successfully originate and service new loans contemplated under this project, the Bank will obtain additional staff and training which is being provided under the Phase II grant. It is

planned to hire 29 persons for positions as loan officers, small business loan officers, and collections officers. They will be trained and later transferred to the project area offices that will be established. By setting up and training the people to operate these new specialized branch offices and increasing the home office backstopping capabilities for these types of loans it is anticipated that the NRSB will have the institutional capacity to originate and service the loans that will be generated by this project.

However, the Bank does have a very active and rapidly growing installment loan program, which offers loans of up to \$2500 for terms of up to two years. This program with certain modifications as to amortization, and approach to interest charges, does offer an experience suitable for low-income lending.

(2) Financial Capacity of the National Housing and Savings Bank

Based on its financial record the Bank appears to have the financial capacity and adaptability to easily assimilate the approximately \$15 million which will be channeled through this organization as a result of the combined grant and housing guaranty.

The Bank has a record of growth and ability to handle increased financial sums in a profitable manner. The Bank, for practical purposes, began operations in 1976 and now has approximately 2 1/2 years operating experience. The attached table provides a summary of selected financial factors for the bank.

National Housing and Savings Bank
Selected Financial Factors

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>June 6</u> <u>1979</u>
Assets	\$8,683,751	\$14,616,267	\$31,514,325	\$66,000,000
Net Income	(268,607)	(197,175)	451,396	
Mortgage Loans Outstanding	301,913	2,122,757	4,970,353	
Installment Loans		109,347	237,065	

As the table shows, the assets of the Bank have grown from approximately \$8.7 million in 1976 to a level of \$31.5 million at the end of 1978. Even more impressive than this operational growth has been the performance during 1979. Estimated assets as of June 1979 were \$66 million, more than double from the year-end figures. The Bank has also demonstrated the ability to expand its financial base in a profitable manner. In a period of three

years the Bank has been able to move from a \$268,007 loss to nearly a half million dollar profit by 1978.

While the Bank is engaged in most commercial Banking operations, it also has a proven ability in both mortgage lending and the installment loan areas. Mortgage loans outstanding increased from approximately \$300,000 in 1976 to a level of nearly \$5 million by 1978.

(3) Moderate Income Mortgage Lending Experience

The NHSB has demonstrated experience in moderate income mortgage lending. As the attached table shows, the Bank had over 350 mortgage loans outstanding, virtually all of which have been originated since 1976. The average loan balance, both at the end of 1978 and 1977, was approximately \$13,850. The average in this case substantially overstates the typical loan balance in the Bank's portfolio. For both 1977 and 1978 the median loan balance for outstanding mortgage loans was less than \$8,000 and in both years approximately sixty percent of the mortgages fall in this category.

Mortgage Loans NHSB

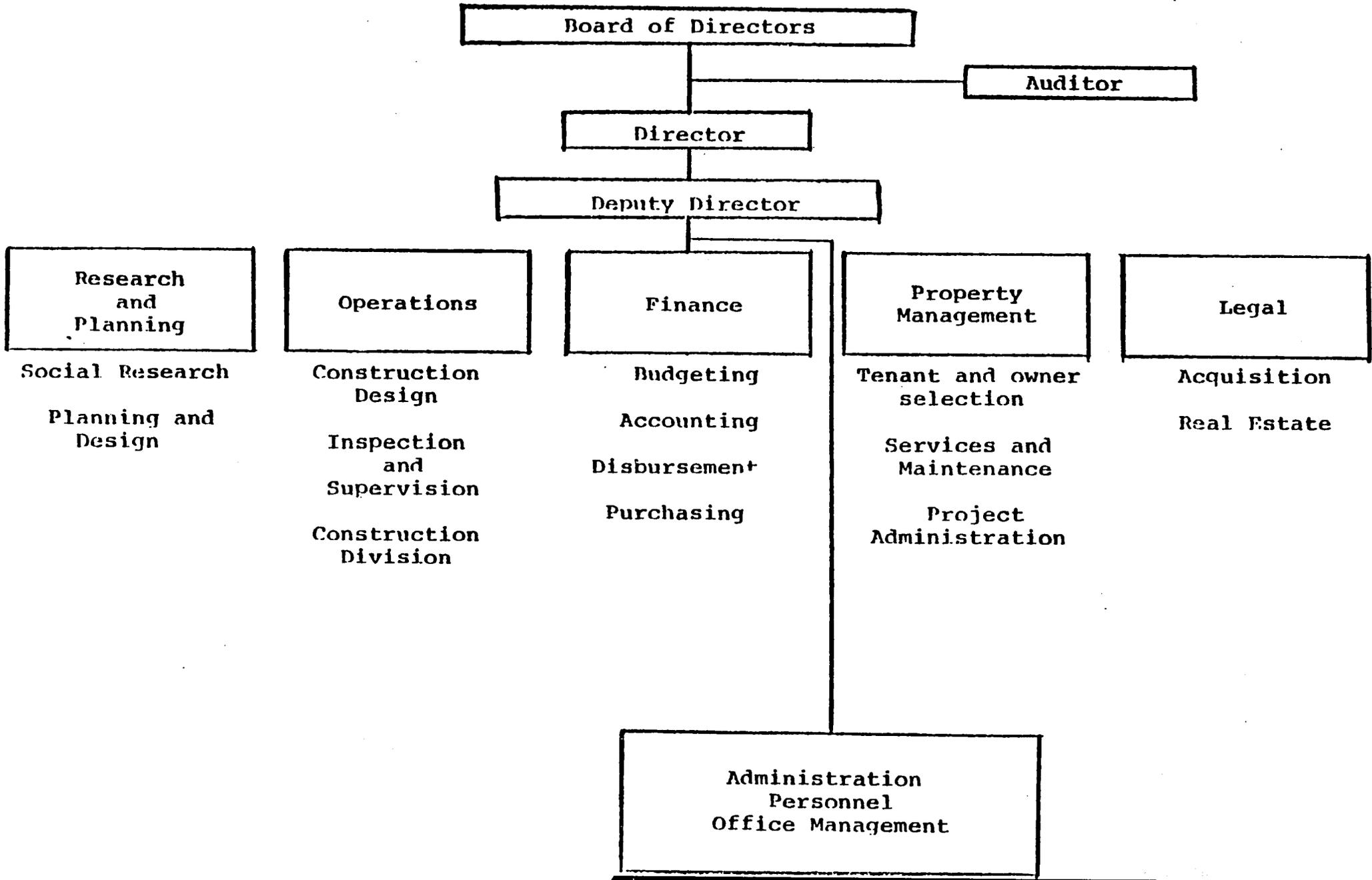
	<u>1977</u>	<u>1978</u>
Number of Mortgage Loans (Dec. 31)	153	359
Average Balance	\$13,874	\$13,845
Median Balance	less than \$8,000	less than \$8,000

While this does not conclusively prove moderate income lending, inasmuch as income figures of borrowers are not reported, it does provide strong evidence of substantial lending activity in the moderate income price sectors. The level of the loans in the low income shelter project is substantially below the present median of the Bank, but within the same general range of magnitude. The Bank's experience in mortgage lending appears to be adequate background to adjust to low income mortgage operations.

(4) Organizational Structure, Capabilities, and Responsibilities Under the Projects

The NHSB appears to be a well organized institution able to perform mortgage lending in an efficient manner. The organization chart of the Bank is attached. Discussion with bank officers and examination of bank documents and records indicate that the institution was structured in a manner to perform

Organization Chart
National Housing and Savings Bank



all necessary services. Incorporated with the organization are established abilities to do:

1. Real estate appraisal.
2. Receipt of loan applications and processing loan applications.
3. Legal documentation of loans, probating of deeds and preparation of closing statements.
4. Loan servicing, which has functioned effectively and which presently has less than 1/2 of 1% of its loans delinquent.
5. A fledgling ability to collect problem loans and to evict delinquent borrowers when necessary.

The administrative functions of the Bank seem to be effectively geared to performing all facets of mortgage lending in an efficient manner.

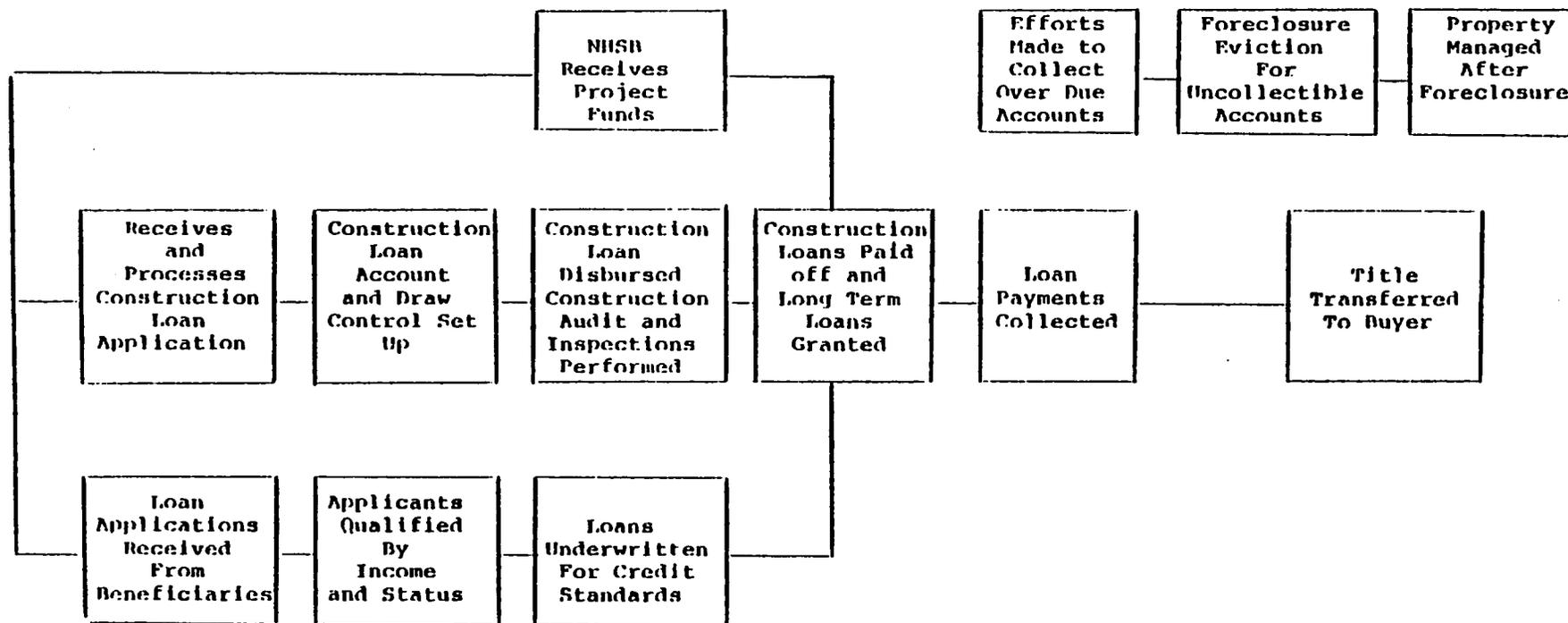
The administrative and operational responsibilities of the Bank are graphically illustrated in the attached flow chart which indicates the administrative acts and financial operations which will be necessary

in providing financial services to the low income shelter projects. While the Bank is not fully staffed at this time to handle the volume, nor all of the operations involved in the low income projects, their record of past successes and general experience in the mortgage and installment lending areas indicate that these abilities and the required personnel can be acquired as provided in the associated Grant project.

NHSH

Operational Responsibilities

Project Start to Project Completion



3.5 Environmental Concerns

An initial environmental examination carried out in conjunction with a proposed HG/DL for the same project area concluded that an Environmental Assessment was required for the proposed water supply and sanitary collection disposal improvements. This Environmental Assessment has been prepared and the recommendations and conclusions of this study will be incorporated into project design activities. A condition precedent to the disbursement of the HG will include environmental compliance with the recommendations of this E.A.

Environmental concerns have been minimized on the New Georgia site by waste stabilisation ponds which are compatible with the receiving waters, and by the drainage which is sheet flow.

On the Barnersville site which is expansion of the existing housing, sewage disposal is to well designed septic tanks and leaching fields.

Projects in New Kru Town increase the health and general being of the residents. Sanitary waste disposal will be handled by a dry system and will not add to the load on the public sewer system.

4.0 The Financial Plan

This section includes an analysis of the affordability of the project to the target group and the impact of the project on the poorest of the poor; the project budget and the multiplier effects of the project in terms of resources generated for reinvestment in the sector.

4.1 Housing Finance and Affordability

A. Sites and Services

The project has been designed to provide a number of shelter solutions consistent with the ability to pay in the Monrovia society. As discussed elsewhere in detail and as summarized in the following exhibit, five basic low income shelter options are provided, ranging in cost from \$2377 to \$4346.

1)	Serviced Site Only	\$2377
2)	Serviced Site plus Wet Core	3010
3)	Serviced Site, Wet Core plus Shelter	3906
4)	Serviced Site, Wet Core, Materials Loan	4346
5)	Serviced Site plus Construction Materials Loan	4346

(1) Mortgage Financing Program

In Liberia, as in many developing nations, low income households are not accustomed to the purchase of shelter on a long term installment basis.

This project incorporates an affordable understandable mortgage finance system for shelter purchase. The finance system might require monthly deposits to a savings account equal to the loan payment for a one year period prior to the granting of the loan. The amount accumulated in the savings account then becomes a portion of the down payment.

Two advantages are provided by this integrated savings-loan program savings approach. Borrowers will be conditioned to making regular monthly installments and those households which find the discipline of such payments impossible can be identified before the loans are granted. This should greatly mitigate subsequent loan collection problems. The savings deposit also adds substantially to the borrower's down payment. In addition to the accumulated savings account, the borrower will be asked to pay an additional 10% of the sales price of the shelter unit as down payment. The combined savings account and additional down payment approximates a 20% down payment on the property.

As an alternative to this program the household may make a 25% down payment. The final program design will be subject to AID approval prior to disbursement of funds for the sites and services project. The accompanying table provides a complete example of the combined savings-loan program both on the basis of \$1

of monthly household income and on the basis of the median household income of \$125 per month. As the exhibit shows, the interest rate on the savings deposit is assumed to be 8%, mortgage interest rates 12% and loan terms ranging from 15-30 years.

(2) Affordability

As is detailed in the Social Analysis section of this paper, the median monthly household income for the Monrovia area has been determined to be approximately \$125 per month.

The attached table entitled "Affordability of Shelter Options" details the affordability of the 5 example shelter solutions. As the table shows, shelter solutions 1 and 2 are available to all median income households. Shelter solution 3 exceeds median income affordability by only \$98 per unit and is available to 48% of Monrovia households. Solutions 4 and 5 exceed the affordable cost by \$538 for the median income household expending no more than 25% of household payment. These solutions are available to 35% of the Monrovia households.

ILLUSTRATIVE MORTGAGE FINANCING PROGRAM *

Per \$1 Of Monthly Household Income

Affordable Shelter	Loan Amount	Loan -- Value	Accumulated Savings	Additional Down Payment	Loan Term	Monthly Payment
26.60	20.83	73%	3.11	2.66	15	\$.25
28.69	22.70	79%	3.11	2.87	20	.25
29.83	23.74	80%	3.11	2.98	25	.25
30.46	24.30	80%	3.11	3.05	30	.25
For Median Income Of \$125 Month						
3325	2604	78%	389	333	15	\$31.25
3586	2838	79%	389	359	20	31.25
3729	2968	80%	389	373	25	31.25
3808	3038	80%	389	381	30	31.25

*Assumptions

- A. Borrowers will pay 25% of income for housing payments.
- B. For the first 12 months borrowers will pay 25% of income into savings account earning 8% interest compounded monthly.
- C. Accumulated savings at the end of one year will become part of down payment.
- D. Borrowers will pay 10% of shelter cost as down payment in addition to accumulated savings account.
- E. Interest rate on loan is 12% compounded monthly.

AFFORDABILITY OF SHELTER OPTIONS

Shelter Solution	Cost	Loan Maturity (Years)	Interest Rate %	Income Required ¹	% Households Qualify
1	2377	20	12	82.85	60%
2	3010	25	12	100.91	55%
* 3	3906	30	12	128.23	48%
* 4	4346	30	12	142.68	35%
* 5	4346	30	12	142.68	35%

NOTE 1. Computed from table entitled "Illustrative Mortgage Financing Program"

*Under this set of parameters, these units are not affordable to the IIG target group.

(3) Affordability under conditions of cross subsidy

As discussed in the technical feasibility section of the paper it is believed that a substantial cross subsidy can be generated within the project. Based on perceptions of conditions in the local construction industry and in the local land market it is believed that each mid-income lot can be sold at market price of \$7500 which will generate a margin over direct cost of as much as \$2748 per lot. Assuming this to be the case and assuming a ratio of two low income lots per mid-income lot a cross subsidy of \$1374 per low-income lot can be generated. Under these conditions the low income lots can be sold for \$1,003 on a break even basis.

The table entitled "Affordability of Shelter Options (assumes cross-subsidy of \$1374 per lot)" shows the affordability of the five suggested shelter solutions with the cross-subsidy included. As the table shows, the gamut of shelter solutions is completely available to households earning less than the median income. The lowest cost solution is available to 90% of Monrovia householders and the highest cost shelter solution is available to 55% of Monrovia households.

This analysis has indicated that with or without the proposed cross-subsidy mechanism, the sites and services shelter project is feasible and affordable

providing shelter solutions of a high quality
to Monrovia households having less than or equal
to the median income.

AFFORDABILITY OF SHELTER OPTIONS*

(Assumes Cross Subsidy of \$1,374 per lot)

Housing Option	Cost	Loan Maturity (Years)	Interest Rate %	Income Required ¹	% Households Qualifying
1	\$1003	15	12	\$37.71	80
2	1636	20	12	57.02	70
3	2532	25	12	84.88	60
4	2972	25	12	99.63	55
5	2972	25	12	99.63	55

*Assumes 1979 prices and incomes.

¹Computed from "Illustrative Mortgage Financing Program"

B. Upgrading

The following analysis, based on available New Kru Town data, demonstrates the feasibility of the solution, with special analysis on the problems of families in the lowest 30 percentiles. The analysis is illustrative of that to be developed in the other upgrading communities.

The proposed basic upgrading of the existing area of New Kru Town, exclusive of the new lots where cost recovery will be through sales, will cost approximately \$450,000.

Street paving and storm drainage	\$270,000
Pedestrian walkways	27,000
Public toilets	37,000
Additional street light-standards	<u>40,000</u>
S/T	374,000
20% contingencies, inflation	<u>75,000</u>
Total (rounded)	\$450,000

Assuming cost recovery at the same effective rate as amortization of the HG loan (11%, 20 years) cost recovery necessary totals \$4,650 a month.

This comes to less than \$2.20 per month for each of the 2151 households in the community, or \$3.50 per month to be collected from each of the 1327 properties in the neighborhood.

Actually, assuming that Liberian landlords are not immune to the world-wide proclivity of landlords to pass on all cost increase to their tenants, the following is an analysis of the impact of the improvement on the different categories of residents by tenure and by type of unit.

Occupancy in New Kru Town by Structure

	<u>%</u> <u>Structures</u>	<u>No.</u> <u>Structures</u>	<u>No.</u> <u>Housing Units</u>
Single-family	36%	475	475
Duplex	22%	289	578
Multiple	38%	514	1,097
Other	<u>4%</u>	<u>49</u>	<u>-</u>
Totals	100%	1,327	2,150

Occupants of single-family units--whether owned or rented will pay \$3.50 a month more. Occupants of duplex units will pay \$1.75 or \$3.50 a month, depending on whether the unit is owner-occupied and how much of the increase the owner decides to pass on to his tenant. It is assumed that most of the above median-income families in the community live in these units.

The 1097 presumably low-income families will be responsible for repaying \$1800 a month ($\3.50×514), or \$1.65 per month per household, an increase of 11% over the median rent of \$15.30. This is affordable by the 70% of the rental households in New Kru Town who, according to the NHA Survey, earn \$75 a month or more.

Actually the impact of the increase will be uneven. For example, there should be no impact on the 17% of the tenant families, presumably with more or less the lowest incomes, who are lodged free (relatives? apprentices?) and whose landlords presumably will absorb the increase.

According to the NHA survey, about 30% of the tenant families in New Kru Town make less than \$75 and are potentially those most likely to be adversely affected by possible rent increases. However, it is assumed that among these are the 17% lodged free, as well as households earning from \$50 to \$74 a month (approximately the 15th to the 30th percentile) who may be among the other 17% paying less than \$10 a month rent. A \$1 to \$2 a month rent increase appears affordable for families earning \$50 to \$74 a month and paying \$5 to \$10 a month rent.

The problem of providing shelter for "the poorest of the poor" needs to be reviewed in the context of how this shelter actually is provided under present conditions. Programs limited to self-help and home ownership are not always applicable to this group. Studies of existing low-income communities show that the shelter needs of the very lowest income groups, whose problems may often be difficult to reach effectively through the provision either of shelter or of public services, are largely met through the provision of rental facilities with shared services and access to community facilities. The increase in the general supply of rental units, which will be encouraged both in the sites/services area and through expansion of existing units in the upgraded neighborhoods, and by general improvements in the environment resulting from increased access to potable water, better drainage and sanitation, improved refuse collection, etc.

4.2 Project Budget

The following table sets forth the project budget identifying source of funds and the costing or project outputs.

SUMMARY COST ESTIMATE AND FINANCIAL PLAN

Phase III HG and Phase II DG

(US \$000)

<u>Source</u>	<u>AID</u>	<u>HG</u>	<u>Total</u>
1. Sites and Services	\$1,500	\$4,000	\$5,500
2. Community Upgrading	-	4,000	4,000
3. Secondary City Pilot	-	500	500
4. Construction Materials and Home Improvement Loans	1,500	1,500	3,000
5. Small business Loans	1,000	-	1,000
6. Training	400	-	400
7. Salary Support to NHA & NHSB	<u>600</u>	<u>-</u>	<u>600</u>
Total	<u>\$5,000</u>	\$10,000	\$15,000

4.3 Multiplier Effects of Combined Programs

In addition to the \$10 million HG, about \$4 million of the Phase II DG will be directly injected into the financial circuits through loans or construction payments.

The injection of this approximately \$14 million of housing funds through the grant and HG project will generate a large volume of loanable housing capital over and above the direct lending of the AID project funds. The attached table provides an outline of the cash flows which will be generated in the National Housing and Savings Bank and the implications which these flows have for the availability of housing units.

The first two rows of the table show the direct disbursement of funds from the grant and the HG. Once these funds have been disbursed monthly, repayments will provide additional capital for relending in low income housing projects. Row 3 of the table shows the simulated repayments from the original lending while row 4 shows the interest required to service the HG loan. Rows 5 and 6 of the table show the cash generated over the required debt service. This yearly surplus grows from a low of \$247,000 in the second year of the program to a high of \$830,000 per year by the seventh year. Assuming these annual cash increments are reinvested, and after allowing for a substantial cost of servicing and delinquency, the pool grows to a considerable sum. By the end of the seventh year, \$4,506,000 will be available as cumulative excess over required

debt service. By the 12th year, nearly \$12,000,000 is available in this pool.

Rows 7 and 8 of the table show the additional sites which can be financed from the accumulated pool. On a yearly basis the pool will allow from 80 to 378 additional units per year over and above those detailed in the direct project analysis. As a cumulative factor, by the seventh year the pool of excess funds will have been able to provide financing for 1502 units. By the 12th year nearly 4,000 housing units will have been financed from this source.

After the 12th year, principal debt service will be required on the HG loan. The annual debt service on the loan beginning in the 13th year will be approximately \$2,886,000 per year. By this time the outstanding balances remaining on the direct project loans plus the excess pool will have a balance of approximately \$21.5 million. By the 12th year, if this \$21.5 million could be invested at only 2%, the cash flows from this investment would be sufficient to service the total debt service of the Housing Guaranty Loan.

With the increased management ability of NHSB and NEA, developed through the proposed programs, there is every hope that the pool of excess funds generated by these projects will become seed capital for a viable, dynamic program for low income housing in Monrovia.

MULTIPLIER EFFECT-PROJECT CASH FLOWS (\$000)

NATIONAL HOUSING AND SAVINGS BANK

<u>Row</u>		<u>Year</u> <u>1</u>	<u>Year</u> <u>2</u>	<u>Year</u> <u>3</u>	<u>Year</u> <u>4</u>	<u>Year</u> <u>5</u>	<u>Year</u> <u>6</u>	<u>Year</u> <u>7</u>	<u>Year</u> <u>12</u>
1	Grant Funds Lent ¹	1793	1540	333	333				
2	HG Funds Lent ¹		1193	3069	3401	1634	700		
3	Cash Flow From Loans ²		247	624	1093	1608	1833	1930	1930
4	HG Interest Payments ³			131	469	843	1023	1100	
5	Net Yearly Cash Flow After Debt Service		247	493	624	765	810	830	830
6	Total Pool Of Funds Available ⁴		247	762	1455	2351	3372	4506	11,900
7	Yearly Units Financible From Yearly Cash Flows ⁵		82	172	231	299	340	379	
8	Cumulative Number Of Units Financed From Pool ⁵		82	254	485	784	1124	1502	3967

¹ Taken from project schedules.

² Assumes composite of 18 year loans @ 12%.

³ Assumes interest at 11% for years 3-12.

⁴ Assumes that pool is invested at 12% but yield after servicing is 9% which is assumed to be net growth rate of pool. Pool is overstated to extent total servicing costs of loans are not fully accounted for.

⁵ Assumes \$3000 per unit.

5.0 Project Implementation

5.1 Administrative Arrangement

The Borrower will be the NHSB. Major Implementing Agencies will be the NHSB and NHA. In accordance with AID practice four agreements will be required:

- a) Contract of Guaranty between AID and the U.S. Investor
- b) Loan Agreement between NHSB and the U.S. Investor
- c) Implementation Agreement among AID, GOL, NHSB and NHA
- d) Host Country Guaranty between AID and GOL.

Immediately after Authorization of the Guaranty, RHUDO will prepare a draft of the basic Implementation Agreement which, within policy guidelines established by USAID and DS/H, will be negotiated and will spell out the use of the funds for the various sub-projects and various obligations of AID, GOL, and the Implementing Agencies.

When project development has reached an appropriate stage and in order to assure timely disbursement of HG funds, NHSB will initiate the procedure for selecting a U.S. Investor in accordance with AID procedures and for executing the remaining contracts.

Plans and specifications for the first stage of the New Georgia sites/services sub-project will have been prepared by the Technical Division of NHA, assisted by the TA Team, in convection with the Phase II Grant project. Plans and specs

for the remainder of the sites/services sub-projects and for the upgrading will be similarly prepared. NHA will submit for concurrence all plans involving works within their areas of competence to the Liberia Water and Sewer Company and the Liberia Electric Company.

In accordance with AID procedures, PHUDO in conjunction with USAID will retain the right to review and approve plans and specifications, cost estimates, and as required bidding procedures and contractor selection.

NHA has analyzed its experience in carrying out construction work with its own forces versus the traditional system of contracting the work out through competitive bids.

Its experience with contractors up to now has been uniformly bad. Among the problems encountered are the following:

1. All bids are substantially higher than the NHA estimated cost. The reasons for this are:
 - a) Because construction work is seasonal all contractors add a substantial percentage to their costs to tide them over the slack period.
 - b) Since there are few large construction jobs available contractors tend to extract the maximum profit possible from each job.
 - c) Finally, since payments of work certifications in government jobs has a very low (and slow)

priority, contractors will then tend to offset this by adding to their bids an additional markup.

2. In addition to the construction costs, NHA has found it has to pay a substantial sum to cover supervision and inspection costs on each project.

Taking into account above considerations, NHA has decided to undertake this project on a force account basis thereby keeping a tight control on all project costs and simultaneously eliminating costs accruing from contractor's profit.

Disbursement will be made upon presentation by NHSB of evidence of actual expenditure, based on its internal reports and reports from NHA.

5.2 Implementation Plan

The following events are scheduled for negotiation of the necessary agreements and start of HG disbursements.

Negotiate Implementation Agreement	Sept/Nov 1979
Execute IA	December
Advertise for Investor	December
Investor Selection	January 1980
Negotiate Loan Agreement	March/April
Contracts of Guaranty	
Execute Loan and Guaranty Agreements	May
Request First Closing	July
First Closing	August

Timing of project implementation is set forth on the following Planned Performance Tracking Network Chart.

PPT FORM
(May be Expanded as Appropriate)

Country:	Project No:	Project Title:	Date:	Original / Revision #	PPT approved																					
Liberia	1980																									
or FY:	1979	1980																								
Month:	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7							
0	1. Sites & Services												12	24												36
Prior Actions	a. New Georgia												12	24												36
	Recruit Staff Set up Field-Office Plans Set up Purch. Agent Construction																									
	b. 2. Goodridge Escapes (Barnesville Site)																									
	Delivery of Units Plans													Set up Field Office Construction												
	2. Community Upgrading a. New Krotown																									
	Plans													Set up Field Office Construction												
	b. Project 2																									
	Plans													Set up Field Office Construction												
Prior Actions	3. Secondary Cities Project*																									
	Set up Field Office Bids													Construction												
	*Authorize DL																									
Financial Plan:																										
Evaluation Plan:																										

Post Action
 Apr 30, Ch 3, IM 3, Pt 1 (IM 3:15)
 Post Action
 (IM 3:19)

PROJECT PERFORMANCE NETWORK

MICROFILMED FROM ORIGINAL
 AVAILABLE COPY

5.3 Evaluation Plan

A. The Evaluation Plan will include:

1. An evaluation of progress towards attainment of the objectives of the Project.
2. Identification and evaluation of constraints which may inhibit such attainment.
3. An assessment of how such information may be used to help overcome such problems, and
4. Evaluation to the degree feasible, of the overall development impact of the Project.

B. Project performance will be routinely monitored by the USAID Housing Advisor and will include regularly scheduled project site visits in company with NHA officials.

C. Project performance evaluation will be done periodically, usually once a year in conjunction with the existing grant projects. The Housing Advisor in conjunction with NHA officials will develop project status assessment to address items 1 and 2 in the above evaluation plan, focusing on project outputs, objectively verifiable indicators, implementation schedule and disbursement of funds.

D. At the conclusion of the project in FY 1983, a formal evaluation of the project will be conducted in accordance with the standards and format developed for FG projects. The Evaluation Team will include representatives from The DS/H Regional Housing and Urban Development Office, USAID, a high level officer of the National Housing Authority, representatives from the Ministry of Finance, the Ministry of Planning and Economic Affairs, and the Ministry of Public Works Engineering Division. TDY specialized consultant services will be utilized as required in the preparation and execution of this final evaluation.

6.0 Conditions, Covenants and Negotiating Status

Negotiations on the HG Implementation Agreement will follow execution of the Project Grant Agreement for the accompanying grant. GC/H review will assure compatibility with the covenants contained in the PGA.

Section 5.1 Administrative Arrangements sets forth the procedures for AID concurrence with technical plans and specifications, cost estimates, and construction. The Implementation Agreement will also incorporate mutually agreed upon procedures necessary to assure project objectives, such as beneficiary selection, cost recovery, etc.

LOGICAL FRAMEWORK

Annex 1-1

PROJECT DESIGN SUMMARY

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
SECTOR GOAL:	<u>Measures of Goal Achievement</u>		
Improve living environment for lower income families	<ol style="list-style-type: none"> 1. Increased access to utilities 2. Increased access to GDL services for lower income areas 	<ol style="list-style-type: none"> 1. Socio-economic surveys conducted by the NIA Research Department 2. Records of Liberia Electric Co. and Water & Sewer Corp. 	The President and legislature will adopt the recommended national housing policy
PROJECT PURPOSE:	<u>End of Project Status (Grant):</u>		
Establish and strengthen a coordinated Liberian operation to design, implement, finance and manage replicable shelter projects for lower income families	<ol style="list-style-type: none"> 1. Expanded and trained staff fully functional and totally funded by NIA and NISB 2. Infrastructure in place for \pm 600-900 serviced plots for low income families at the New Georgia site 3. Seed capital drawn down to finance construction materials, small business development and home improvement loans 	<ol style="list-style-type: none"> 1. Project monitoring and evaluation 2. NIA construction reports and audits 3. Physical inspection 4. NISB loan records 	<ol style="list-style-type: none"> 1. Necessary personnel can be recruited, trained and assimilated into NIA NISB 2. NIA will have the capacity to supervise and monitor construction 3. Cost recovery is sufficient to ensure adequate rollover 4. The projects will stimulate sufficient community pride and organization, i.e., neighborhood associations and self-help efforts to assure adequate maintenance of community facilities
	<u>End of Project Status (IG):</u>		
	<ol style="list-style-type: none"> 1. Shelter related ministries and agencies cooperate to deliver project components on schedule 2. Implementation of IG financial components follows IG activity on schedule 3. Shelter institutions prepare proposals for future low income housing projects 4. Cost recovery principle firmly established and effective collection mechanisms in place 5. PP for DL authorized to fund secondary city pilot project 6. Project units affordable by low income beneficiaries 		

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
PROJECT OUTPUTS	<u>Magnitude</u>		
	(Grant)		
1. Staff expanded and trained for NIA and NISB	1a. 22 hired and 40 trained for NIA	1. Personnel records	1. The GOL accepts a concept of slum upgrading and sites and services as viable alternative to slum clearance
	b. 29 hired and 40 trained for NISB	2. Project monitoring	
2. Completed projects in:		3. On-site inspection	2. Middle and low income sites developed and sold simultaneously to assure recovery of full costs
a. Sites and services	2a. \pm 600-900 sites and services plots, owner or rental		
b. Settlement upgrading			
3. Construction material, home improvement and small business loans	3a. \pm 2,000 low income families receive loans		
	b. \pm 150 businesses receive loans		
4. Secondary city pilot design (PP)			
	(HIG)		
	2a. \pm 1,100-1,400 sites and services plots owned or rented		
	b. \pm 5,000 families receive improved infrastructure in existing low income neighborhoods		
	3. \pm 2,000 low income families receive loans		
	4. City selected, detailed design completed, and PP drafted for DL funding of project		

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
<u>PROJECT INPUTS</u>	<u>Implementation Target (Type and Quantity)</u>		
Grant:	Grant:	1. Disbursement records	1. Within two years the GOL/NIA will be able to cover total operating costs and NISB will be self-supporting
(a) NIA and NISB training and staff support:	(a) \$1 million		
1. 1 IT US training advisor (24 mo)			
2. Training for 80 NIA and NISB staff			
3. Salary support for additional NIA (22) and NISB (29) staff			
4. Provision of four vehicles			
(b) Sites and services infrastructure	(b) \$1.5 million		
1. Commodities - waterworks pipe and fittings, conductors and other electrical equipment, manhole covers/gratings, asphalt, cement, lumber, concrete pipe, sand, gravel, etc.			
2. Local construction worker salaries			
(c) Seed capital for low income housing and small business loans	(c) \$2.5 million		

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
<u>PROJECT INPUTS, cont.:</u>	<u>Implementing Target (Type and Quantity, cont.):</u>		
IG:	IG:	2. Evaluation of secondary city project	2. NIA will be able to successfully involve and schedule activities of COL ministries and agencies essential to project execution
(a) Sites and services infrastructure	(a) \$4.0 million		
(b) Upgrading infrastructure	(b) \$4.0 million		
(c) Capital for low income housing loans	(c) \$1,5 million		
(d) Secondary city pilot project	(d) \$.5 million		

TELEGRAM

PROJ. FILE

AMEMBASSY MONROVIA

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ACTUARY/D
INFO: AMB, DCM, ZCON, CHRON
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TO AMEMBASSY MONROVIA 0608
BT
UNCLAS STATE 148163

UNCLASSIFIED

Classification

STATE 148163
25 JUN 77 0915Z

DUE DATE: 7/1/77
ACTION: ID
INFO: AD
PR
CON
CHRON
RF

AIDAC

E.O. 11652: N/A

TAGS:

ACTION FILE COPY
RETURN TO C & R

SUBJECT: LOW INCOME HOUSING - LIBERIA PID REVIEW MEETING

REFS: (A) MONROVIA 3884, (B) TOAID A-34, (C) STATE 111441,
(D) MONROVIA 3461

1. PROJECT REVIEW COMMITTEE HAS REVIEWED SUBJECT PID AND RECOMMENDED ITS APPROVAL. MISSION IS AUTHORIZED TO PROCEED WITH PROJECT DESIGN AND DOCUMENTATION FOR AUTHORIZATION.

2. COMMITTEE RECOMMENDED THAT NEXT DOCUMENT ADDRESS FOLLOWING ISSUES IN SOME DETAIL:

A. HOW DL AND HG LOANS WILL BE BLENDED.

B. HOW TWO TYPES OF TA (I.E. ASSISTANCE IN DEVELOPMENT OF NATIONAL HOUSING STRATEGY AND ASSISTANCE IN DEVELOPMENT AND IMPLEMENTATION OF SHELTER PROGRAMS) WILL BE PHASED SO THAT POLICY AND IMPLEMENTATION COMPONENTS SHOW A CLEAR AND LOGICAL CONNECTION TO EACH OTHER.

C. IMPLEMENTATION PHASE OF PROJECT SHOULD BE LINKED TO REALISTIC GOAL POLICY EMPHASIS ON LOW-INCOME HOUSING IN NATIONAL HOUSING STRATEGY.

D. GOALS OF HOUSING STRATEGY TO BE DEVELOPED SHOULD BE STATED ALONG WITH CRITERIA FOR MEASURING GOAL ACHIEVEMENT.

E. JUSTIFICATION FOR AND METHOD OF ARRIVING AT LEVEL OF HIG (DCLS 5 MILLION) AND DL (DCLS 4 MILLION) SHOULD BE PRESENTED, INCLUDES LEVELS RELATIONSHIP TO GOAL ABSORPTIVE CAPACITY, INCOME LEVEL OF TARGET POPULATION AND EFFECTIVE DEMAND.

3. FYI: THIS PROJECT IS NOT ~~BUDGETED~~, OR PLANNED, FOR UNCLASSIFIED

NAN
6-28-77
m.j.

TELEGRAM

AMEMBASSY MONROVIA

~~PAGE 2~~

UNCLASSIFIED

STATE 148163

Classification

A FY 78 START AND IS NOT IN FY 78 CP. HOWEVER, SHOULD
PROGRESS ON SUCCESSFUL DESIGN WARRANT, SOME OF OR ALL TA
MONTHS REQUIRED MIGHT STILL BE PROGRAMMED FOR FY 78,
DEPENDING ON AVAILABILITY OF FUNDS.

VANCE

BT
#8163

LMG

UNCLASSIFIED

Classification



REPUBLIC OF LIBERIA
 MINISTRY OF PLANNING AND ECONOMIC AFFAIRS
 P. O. BOX 9014
 MONROVIA

OFFICE OF THE MINISTER

MPEA-714/D-7.13/177

April 25, 1977

Rec'd 4/25/77

 ACTION: ID
 INFO: D/AD
 PF
 CP
 CON
 RF

Mr. Director:

I am pleased to acknowledge with thanks your letter, dated April 12, 1977, transmitting two copies of the Shelter Sector Analysis prepared for Liberia under the auspices of the AID Housing Office.

Although the Report has not been thoroughly studied and discussed by the National Housing Authority Board, our impressions on preliminary review are that it merits commendation and forms an acceptable basis for cooperation with your Agency in our housing development and improvement program. Indeed, in many respects it reinforces Government's own analysis of issues facing our housing delivery system.

We note that as part of the Report, the U.S. Housing Assistance Program to Liberia could take two forms: technical assistance comprising the development of institutional capacity and policy framework and financial assistance comprising grants and loans. The Government of Liberia finds this preliminary offer of assistance acceptable and wish to inform you of the designation of the National Housing Authority as the recipient Agency of such assistance.

Accordingly, we request that your Housing Office and the NHA proceed with the preparation of Government's Housing assistance request to the U.S. Government along the lines of the two parallel programs - Technical and Financial Assistance - as suggested in your letter and attachment.

The Director
 USAID/Liberia
 Monrovia, Liberia

.../2

REPUBLIC OF LIBERIA

MINISTRY OF PLANNING AND ECONOMIC AFFAIRS

Mr. Director

- 2 -

April 25, 1977

Under Technical Assistance, National Housing Policy Formulation could be strengthened if your assistance would take the form of making available some experienced consultants to the NHA to assist the Authority in preparing a comprehensive housing policy recommendation covering both urban and rural housing for consideration by Government. With regard to assistance for development of institutional capacity, you might wish to look into the possibility of seconding technical assistance personnel to the NHA in critical areas such as:

- Community Development
- Collection and collation of socio-economic data needed for development and monitoring of programs of sites and services and neighborhood improvement.
- Site and Services administration
- Construction technique
- Financial planning and control

Some possible initial projects that could be financed in the framework of your Financial Assistance are:

A. Neighborhood Improvement Project

1. Bishop Brooks
2. Slipway
3. New Kru Town
4. Sones-wehn
5. Logan Town

B. Site & Services Project

1. New Georgia
2. Barnersville
3. Mensah Property

In addition, as a part of the program for the development of rural cities, we would want to look into the development of growing cities such as Foya, the initial action being concentrated on Sites and Services and planning for urban settlement.

Mr. Director

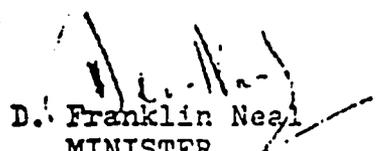
- 3 -

April 25, 1977

While thanking you for your cooperation and assistance, we wish to impress upon you that time is of essence in this matter. We would therefore appreciate whatever action you might take to accelerate the implementation of your proposal.

With kind personal regards,

Sincerely yours,


D. Franklin Neal
MINISTER

/lkm

ANNEX 3

Technical Detail

- A. Sites and Services
- B. Waste Water Design
- C. Community Upgrading
- D. New Kru Town Survey

SITES AND SERVICES

(1) Introduction

The GOL has authorized the NHA to purchase and develop a 200-acre tract located about 3.8 miles west of the Free Port area and about 1.5 miles north of the Freeway that runs parallel to the North Shore of the Mesurado River.

Within this tract, known as the New Georgia Low Income Estates, NHA has developed a low density-low income housing scheme for 180 families. These existing facilities take up approximately 12 acres of the total available area.

NHA's development plan for the remaining 188 acres is as follows:

- 15 acres will be transferred to the Ministry of Education which will provide the school facilities.
- 10 acres will be retained by NHA for commercial development and general activities for subsequent rental.
- 163 acres will be set aside for housing and housing support facilities, such as roads, playgrounds, etc.

The project to be developed within this 163-acre tract will provide a mix of both low and mid-income, fully serviced,

lots on the basis of one mid-income lot to two low-income lots. The underlying idea of this scheme is that the mid-income purchaser will pay more than cost for his lot, therefore making it possible to sell the low-income lot at less than cost. This cross-subsidy arrangement, hopefully, will bring the low-income lots within the affordability range of the very low-income households in Monrovia.

(2) Description New Georgia Site

a. Land Use

1) Total acres to be developed	163 acres
2) Housing acres	114 acres
3) Roads	30 acres
4) Playgrounds and other uses	19 acres

b. Road widths

1) Collector roads (loop system)	30 feet
2) Neighborhood roads	26 feet

Note: Neighborhood roads width is designed to provide a total of six feet pedestrian walks width, a 10 foot wide street parking lane and a 10 foot wide one way traffic lane. Neighborhood roads are designed to block thru traffic at all times.

c. Lot sizes

- 1) Mid-income - 44 foot frontage by 75 foot depth,
3300 sq. ft.

- 2) Low-income - 22 foot frontage by 75 foot depth,
1650 sq. ft.
 - 3) Total number of mid-income lots - 752 lots
 - 4) Total number of low-income lots - 1504 lots
 - 5) Total number of lots - 2256 lots
- d. Civil infrastructure facilities to be provided by this project
- 1) Paved roads
 - 2) Individual water connections
 - 3) Individual electrical connections
 - 4) Water borne sewer and sewage treatment
- e. Socio-economic infrastructure to be provided by GOL as funds become available
- 1) Market building (to be leased to the private sector)
 - 2) Location for movie house (ditto)
 - 3) Location for church (to be sold)
 - 4) Dispensary building (GOL contribution)
 - 5) Bus terminal (ditto)
 - 6) Post office station (ditto)
 - 7) Commuter shelters, one at Freeway entrance, several within project area (ditto)
 - 8) Elementary, junior and high schools (ditto)
 - 9) Police station (ditto)
 - 10) Garbage collection (to be paid by beneficiaries on a fee or use basis)

11) Bus shuttle service to Freeway and back to project site (ditto)

In addition to the New Georgia Site, the NHA will develop within the E. Goodridge Estates, an existing 580-unit mid-income community located in the Barnersville area, approximately 90 low income lots and 45 mid-income lots in order to complete the sites and services program to be funded with the HG loan money.

The E. Goodridge Estates, also known as the Barnersville site, is located approximately 3 miles east of the Freeway road and about 6 miles south of the Freeport area.

This proposal contemplates that the existing housing site be expanded to the north by neighborhood roads and that the new lots be tied in to the existing civil infrastructure.

A recently graded road connects the E. Goodridge Estates with the Freeway Road previously mentioned.

The GOL plans to provide the E. Goodridge Estates with a market building, now under construction, primary and secondary schools, post office station and a bus terminal. Garbage collection is now being carried out by NHA in house personnel. No change is foreseen in this garbage collection arrangement.

(3) Costs (3-year project)

Costs are based on a production of 250 mid-income and 500 low income lots per year. Half of the low income lots will have wet cores and the other half will have both wet core plus basic shelter option. The wet core and the basic shelter option will be constructed with HG funds, which hopefully will be available during Year 1 of the construction schedule. Construction costs have been distributed between GOL and AID sources. The distribution is based on lot frontage, where the mid-income lot has twice the frontage of the low income lot.

1) <u>Year 1 costs</u> <u>(New Georgia Site only)</u>	GOL	<u>Source of Funds</u>	
		DG	HG
a) Paved road	\$ 311,000	\$ 311,000	-
b) Water	283,500	283,500	-
c) Sewer & sewage disposal	311,000	311,000	-
d) Electrical	110,000	110,000	-
e) Grading & drainage	27,500	27,500	-
Sub-total	1,043,000	1,043,000	-
f) Project management & overhead (7% of above combined total)	146,000	-	-
g) Interest cost on GOL construction (11%)			
Sub-total (0.5x1,043,000x0.11)	57,365	-	-
h) Land cost (1/3 of total)	87,000	-	-
Sub-total	1,333,365	1,043,000	-

	<u>GOL</u>	<u>DG</u>	<u>HG</u>
i) 500 wet core units @ \$600	-	-	300,000
j) 250 basic shelters @ \$850	-	-	212,500
k) Interest cost on HG disbursement (\$512,500x0.5x0.11)	\$ 28,187	-	-
TOTALS FOR FIRST YEAR	<u>\$1,361,552</u>	<u>\$1,043,000</u>	<u>\$ 512,500</u>

Costs per:

a. Mid-income lots + infrastructure	\$4,752
b. Low income lot + infrastructure	\$2,376

Sales price - cross subsidy scheme (lot plus infrastructure only)

a. 250 mid-income lots @ \$7,500 =	\$1,875,000
b. 500 low-income lots @ \$1,003 =	\$ 501,500
TOTAL SALES PRICE	\$2,376,500
TOTAL COST TO PRODUCE	\$2,376,365

Sale price per:

a. Low-income lot and wet core unit (\$1,003 + \$633) =	\$1,636.
b. Low-income lot, wet core and basic shelter unit (\$1,003 + \$633 + \$896) =	\$2,532.

2) Year 2 costs
(New Georgia site only)
They include a 10.3%
inflation adjustment.

	<u>GOL</u>	<u>Source of Funds</u>	
		<u>DG</u>	<u>HG</u>
a) Construction (\$2,086,000x1.103)	\$1,150,429	\$ 457,000	\$ 693,429
b. Project management & overhead	146,000	-	-

	<u>GOL</u>	<u>DG</u>	<u>HG</u>
c) Interest cost on first year amount (\$1,555,000x0.11)	\$ 171,000	-	-
d) Interest cost on second year amount (\$1,843,858x0.5x0.11)	101,412	-	-
Sub-total	1,568,841	457,000	693,429
e) Land cost (1/3 of total)	87,000	-	-
Sub-total	1,655,841	457,000	693,429
f) 500 wet core units @ \$662	-	-	331,000
g) 250 basic shelters @ \$938	-	-	234,500
h) Interest on HG funds (\$565,500x0.5x0.11)	31,102		
TOTALS FOR SECOND YEAR	<u>\$1,686,943</u>	\$ <u>457,000</u>	<u>\$1,258,929</u>

Costs per:

a. Mid-income lots infrastructure only	\$5,612
b. Low income lots infrastructure only	\$2,806

Sale price - cross subsidy scheme (lot plus infrastructure only)

a. 250 mid-income lots @ \$9000	\$2,250,000
b. 500 low income lots @ \$1113	<u>\$ 556,500</u>
	\$2,806,500

Sale price per:

a. Low income lot and wet core unit (\$1113 + \$698) =	\$1,811
b. Low income lot, wet core and basic shelter unit (\$1113 + \$698 + \$989) =	\$2,800

3) Year 3

These costs include the final phase of the New Georgia site (250 mid-income and 500 low income lots) and the small additional development to be carried out in the F. Goodridge Estates (also known as the Barnersville site). These additional lots amount to 44 mid-income and 89 low income lots. Total lots to be developed in Year 3 will be: 294 mid-income and 589 low income lots. All costs include a 10.3% inflation adjustment.

	<u>Source of Funds</u>	
	<u>GOL</u>	<u>HG</u>
a) Construction	\$1,492,344	\$1,487,075
b) Project management & overhead	146,000	-
c) Interest cost on first year amount	171,000	-
d) Interest cost on second year amount (\$2,409,358x0.11)	265,030	-
e) Interest cost on third year amount (\$2,987,225x0.5x0.11)	164,297	-
f) Land cost	102,399	-
Sub-total	2,341,070	1,487,075
g) 545 wet core units x 730	-	438,000
h) 294 wet core & basic shelter units x 1,034	-	303,996
i) Interest on f&g HG Funds	40,810	-
TOTALS FOR YEAR 3	<u>\$2,381,980</u>	<u>\$2,229,071</u>

Costs per:

a. Mid-income lot + infrastructure	\$6,518
b. Low income lot + infrastructure	\$3,259

Sale price - cross subsidy scheme (lot + infrastructure)

a. 294 mid-income lots @ \$10,650	\$3,131,100
b. 589 low income lots @ \$1,200	706,800
TOTAL SALES PRICE	\$3,837,900
TOTAL COST TO PRODUCE	\$3,835,952

Sale price per:

a. Low income lot and wet core unit (\$1,200 + \$770) = \$1,970
b. Low income lot, wet core and basic shelter unit (\$1,200 + \$770 + \$1,090) = \$3,060

Housing Options Available

	<u>Price*</u>	<u>Cost</u>
Option 1 Serviced Site Only	\$1003	\$2377
This option includes the 150 square meter lot, plus paved road, street lights and individual access to water, sewer and electrical connections.		
Option 2 Serviced Site plus Wet Core	\$1636	\$3010
This option includes option 1 plus a 110 square feet wet core providing a reinforced concrete floor slab, sandcrete or soil cement block walls and a corrugated steel roof on a lumber frame. The estimated cost of the wet core including a		

water closet, a precast concrete lavatory and a shower enclosure is \$633 including labor and materials, and financial carrying cost.

Option 3 Serviced Site, Wet Core and a partially enclosed shelter area \$2532 \$3906

This option includes option 2 plus a 375 square feet shelter area providing a reinforced concrete floor slab, two sandcrete or soil cement block walls and a corrugated steel roof on a lumber frame. The estimated cost of the shelter area is \$896 including materials and labor and financial carrying cost.

Option 4 Serviced Site, completed wet core and a construction materials loan, maximum loan allowable on this option amounts to: \$2972 \$4346

Option 5 Serviced Site plus construction materials loan, maximum loan allowable on this option amounts to: \$2972 \$4346

*Assumes a cross subsidy of \$1370 per low income lot.

SUMMARY CONSTRUCTION COSTS

NEW GEORGIA AND BARNERSVILLE

NEW GEORGIA

Year	Production		Source Of Funds	
	No. Of Lots	Option Types	<u>DG</u> 1.5 MIL	<u>HG</u> 4.0 MIL
1	250	SITE/WET CORE	521,500	150,000
	250	SITE/WET CORE/SHELTER	521,500	362,500
TOTALS YEAR 1			1,043,000	512,500
2	250	SITE/WET CORE	457,000	283,664
	250	SITE/WET CORE/SHELTER	-	975,052
TOTALS YEAR 2			457,000	1,258,716
3	250	SITE/WET CORE	-	816,953
	250	SITE/WET CORE/SHELTER	-	1,075,482
TOTALS YEAR 3			-	1,892,435
TOTALS FOR NEW GEORGIA			\$1,500,000	\$3,663,651
<u>BARNERSVILLE SITES & SERVICES PROJECT</u>				
3	45	SITE/WET CORE	-	147,064
	44	SITE/WET CORE/SHELTER	-	189,285
TOTAL FOR BARNERSVILLE				\$336,349
TOTAL			\$1,500,000	\$4,000,000

WASTE WATER DESIGN OF WASTE STABILISATION POND

$$\frac{\text{BOD contribution (g/person/day)} \times 1000}{\text{Effluent flow (lit/person per day)}} = \text{BOD in mg/l}$$

$$\frac{0.08 \times 464 \times 1000}{3.78 \times 30} = 328$$

Anaerobic Ponds

$$\lambda_v = L_1 Q/V$$

Since Q/V is the retention time

$$\lambda_v = L_1/t^*$$

Range of permissible loading is 100 to 400 g/m³ per day.
Below 100 it is difficult to maintain the pond fully anaerobic.
Above 400 there is the danger of odor release.

Consider 250 for design purposes.

$$250 = 328/t^* \quad t^* = \frac{328}{250} = 1.3 \text{ days}$$

The relation between retention times and BOD removal is 1 day 50%, 2.5 days 60% for temperatures between 20° to 25°. Suggested removal close to 60%.

Make the anaerobic pond 1.5 day retention with secondary anaerobic pond 0.5 days. BOD removal 57%.
The secondary anaerobic pond would act as a solids catch tank to prevent solids carry out into the facultative pond.

Pond dimensions

Length to breadth 2:1 to 3:1 to ensure good wind mixing.

Depth of pond 6 to 13 feet.

For New Georgia and Barnersville sites try 10 feet.

Facultative Pond

Equation is $L_e = \frac{L_i}{1+k_i t^*}$ where L_e is effluent BOD, L_i is influent BOD (mg/l) k_i is first order rate constant for BOD removal per day and t^* is mean hydraulic retention time in days.

Rearranging $t^* = \left(\frac{L_i}{L_e} - 1 \right) \frac{1}{k}$ Consider $L_e = 60$ and $k_i = 0.30$

$$t^* = \left(\frac{2.50 \times .43}{60} - 1 \right) \frac{1}{0.30} = 0.79 \times 3.33 = 2.6 \text{ days}$$

Minimum mean temperature of Monrovia per month is 23°C.

$$k_{i_t} = 0.30(1.05)^{23-20} \quad k_{i_t} = 0.30 \times 1.158 = 0.35$$

$$\text{Revised } t^* = 0.79 \times \frac{1}{.35} = 2.25 \text{ days}$$

Pond Dimensions

Length to breadth 2:1 to 3:1 to ensure good wind mixing

Depth of pond 3 to 5 feet

For New Georgia and Barnersville sites try 5 feet. No deeper!

Maturation Ponds

Maturation Ponds are responsible for the quality of the final effluent. Design should try and obtain BOD < 25 mg/l, Faecal Coliforms < 5000. These standards are high standards for the New Georgia and Barnersville sites and may not be required dependent on point of discharge.

The rate at which faecal bacteria die off in stabilisation ponds are represented by a first order model $N_e = \frac{N_i}{1+k_b t^*}$

where N_e is number of faecal coliforms per 100 ml of effluent, N_i represents influent, k_b is first order rate for faecal coliform decay and t^* is mean hydraulic retention time.

For a series of ponds (anaerobic, facultative, maturation)

$$N_e = \frac{N_i}{(1+k_b t^*_{an})(1+k_b t^*_{fac})(1+k_b t_{mat})^2} \quad \text{for 2 maturation ponds}$$

Raw sewage generally has counts of 5×10^6 to 5×10^7 for N_i .
For design use N_i at 10^8 .

$$k_b(T) = 2.6(1.19)^{T-20} \quad \text{or} \quad 2.6(1.19)^3 = 4.38$$

$$N_e = \frac{10^8}{(1+4.38 \times 2)(1+4.38 \times 2.25)(1+4.38 \times 9)^2}$$

$$= \frac{10^8}{9.76 \times 10.86 \times 200.7}$$

$$= 4700 \quad \text{OK}$$

Pond Dimensions

Length to breadth 2:1 to 3:1 to ensure good wind mixing.

Depth of pond 3 to 5 feet. Try 5 feet.

Waste from 500 household units at 30 gpcd and 5 persons per household = $500 \times 5 \times 30 = 75,000$ gpd or 10,000 cfd.

Anaerobic Pond

Primary $1.5 \times 10,000 = 15,000$ cf

With depth 10 feet, area = 1,500 sf

Possible Dimensions 60' x 25'

Secondary $0.5 \times 10,000 = 5000$ Depth 10'

Possible Dimensions 20' x 25'

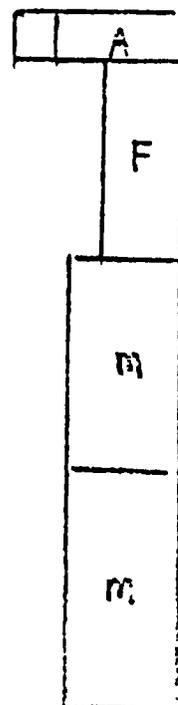
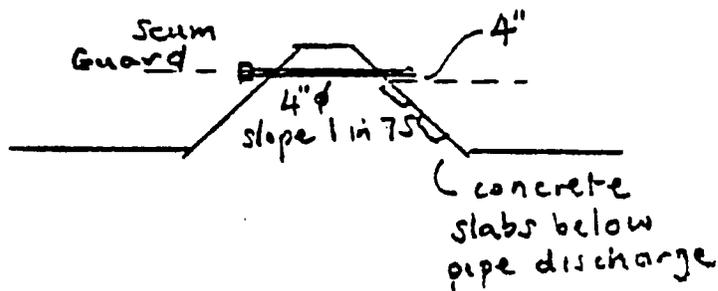
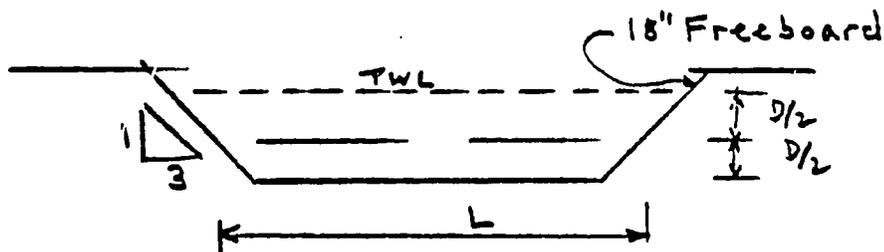
Facultative Pond

2.25 x 10,000 = 22,500 cf
With depth 5 feet, area = 4,500 sf
Possible dimensions 100' x 45'

Maturation Ponds

3 x 10,000 = 30,000 cf
With depth 5 feet, area = 6,000 sf
Possible dimensions 110' x 55'

If the maturation ponds discharge in a water marsh with minimum continuous water 1 foot depth minimum, one maturation pond may be eliminated as the water marsh itself will act as a maturation pond due to the shallow depth.



Waste from 1000 household units at 30 gpcd and 5 persons per household = $1000 \times 5 \times 30 = 150,000$ gpcd or 20,000 cfd

Anaerobic Pond

Primary $1.5 \times 20,000 = 30,000$ cf

With depth 10', area = 3,000 sf

Possible dimensions 80' x 40'

Secondary $0.5 \times 20,000 = 10,000$ cf

Depth 10', area = 1,000 sf

Possible dimensions 40' x 25'

Facultative Pond

$2.25 \times 20,000 = 45,000$ cf

With depth 5', area = 9,000 sf

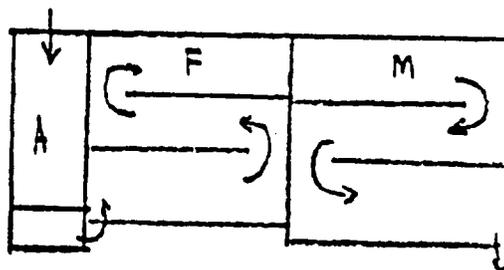
Possible dimensions 140' x 70' or 100' x 90' divided into 3 compartments

Maturation Ponds

$3 \times 20,000 = 60,000$ cf

With depth 5', area = 12,000 sf

Possible dimensions 160' x 80' or 110' x 110' divided into 3 compartments



Waste from 750 households at 30 gpcd and 5 persons per household = $750 \times 5 \times 30 = 112,500$ gpcd or 15,000 cfd.

Anaerobic Pond

Primary $1.5 \times 15,000 = 22,500$ cf
With depth 10', area = 2,250 sf
Possible dimensions 70' x 35'

Secondary $0.5 \times 15,000 = 7,500$
Possible dimensions 22' x 35'

Facultative Pond

$2.25 \times 15,000 = 37,500$
With depth 5', area = 7,500
Possible dimensions 125' x 60'

Maturation Pond

$3 \times 15,000 = 45,000$
With depth 5', area = 9,000
Possible dimensions 140' x 65'

New Georgia Site

Elevation of outlet pipe 5.0

Loss of elevation through plant 1.0

Minimum inlet elevation 6.0

Erosion of embankment prevented by placing precast concrete slabs at top water level.

Pond systems to have standing wave flume to measure influent, vee notch for effluent.

Screen at influent is necessary.

Pond maintenance is cutting embankment grass and removal of scum from the surface.

Anaerobic ponds must be desludged when they are half full (every 3 to 5 years). Facultative ponds require desludging every 10 to 15 years.

Maturation ponds do not require desludging.

Waste Stabilisation Ponds

Waste Stabilisation Ponds are large shallow man made lakes in which raw sewage is treated entirely by natural processes involving both algae and bacteria.

There are 3 different kinds of ponds.

Anaerobic pretreats strong wastes.

Facultative has the main removal of BOD.

Maturation destroys the faecal pathogens.

The facultative and the anaerobic govern the level of nuisance (odor, fly breeding)

The quality (especially bacteriological) of the final effluent is governed by the maturation ponds.

Anaerobic Ponds act in the same way as septic tanks. It removes 50 to 60% of the BOD. It does however gradually accumulate sludge. No odor is experienced if good design is used.

Facultative Ponds

BOD is removed by the normal process of aerobic biological oxidation. The oxygen supply for the bacteria comes not from the atmosphere but from the photosynthetic activity of the algae which grow so that the pond liquid is colored bright green. Facultative ponds should never be built in sheltered areas. It needs wind action.

COMMUNITY UPGRADING

NEW KRU TOWN HOME IMPROVEMENT, ROAD PAVFMENT AND FACILITIFS
PROJECT SCHEME

General

New Kru Town is an existing low income community located in the Northernmost tip of Bushrod Island, within the Metropolitan area of Monrovia in Montserrado County of Liberia.

This community has a population of approximately 2,000 households and 10,000 inhabitants housed in approximately 1,100 structures. The major income producing activities of the community are fishing, trade services and light manufacture. The median income of this community is \$110/month.

The existing civil infrastructure consists of:

1. Potable water - A 6" diameter main to which a network of communal service standpipes are connected. The Government of Liberia now has under design a project that will expand the distribution network and also increase the number of standpipes in order to obtain a more satisfactory ratio of households/standpipe. It is anticipated that these improvements will become available by 1981.

2. Sewer - 8", 10", 12" sewer lines approximately 2,500 feet long, run along the existing New Kru Town loop road and connects to the 18" sewer located on United Nations Drive. These sewer lines are not apparently being used. Excreted disposal is carried out by means of the open privy system although there are a few individual cesspools located within the area.
3. Roads - The community is served by a collector loop road about 32 feet in width. This road is now paved to approximately 15% of its length. Unpaved, arterial roads and neighborhood streets feed into the loop road. These roads have widths that fluctuate between 20 and 30 feet. Roadside ditches that would normally take care of drainage are silted up and only partly functional.

The existing social infrastructure consists of a Government Administration Building with auditorium facilities, a dispensary, one primary and one secondary school, police headquarters and postal office. In addition there are several churches located at various places within the community and one cinema house. Other Government services include a united weekly solid waste disposal scheme. The community has numerous stores which handle dry goods, food stuff, patent medicines, construction materials, cloth and articles of clothing. There is also a

typical West African market area which handles traditional Liberian fresh foodstuffs and smoked fish and meats.

The topography of New Kru Town is essentially flat with an average elevation of 12 feet above mean sea level. The soil is sandy with excellent percolation. Natural drainage follows the existing slope which runs into the sea shore on the west and into the swamps of the St. Paul River estuary on the North.

SCOPE OF THE PROJECT SCHEME

The Project Scheme will be divided into three phases, they are:

PHASE 1

Dadastral Survey will include:

- a. identification of individual properties and property holders
- b. physical inventory of housing stock
- c. location of existing civil and social infrastructure
- d. costing of proposed pavement and other facilities.

PHASE 2

- a. Pavement - to be carried out over the now inpaved portion of the collector loop road and other through streets including whatever additional drainage structures is required to prevent ponding of rain water. Drainage

structures will be designed so as to minimize erosion. Existing roadside ditches will be regraded.

- b. Pedestrian Walkways - Arterial unpaved roads would be provided with pre-cast concrete tiles 36" x 36" x 2 1/2" thick set on hand-tamped sand beds. These walkways would be located on both sides of each arterial road at an elevation that would minimize interference with the existing surface run-off condition.

PHASE 3

Home Improvement or Home Addition Loans.

This program will include the creation of a loan counselor, under-writer, processing and disbursement team. No actual monies will be disbursed, only equivalent amounts of construction materials will be made available from the Government of Liberia warehouse to be located on the site.

Beneficiaries will receive technical assistance and support including training in building skills to interested groups within the community.

Cost Section: New Kru Town

A. Sites and Services

170 housing units on 13 acres @ \$1,240 \$210,800

Cost analysis per unit

Cost per unit = \$892	Fill	\$890
Cost of Raised privy		350
Cost of land		<u>-</u>
Total		\$1240/unit

B. Other Upgrading Costs

Paving Collector Loop Road including drainage ditches

1. To United Nations Drive Entrance (18' pavement)

1950 l.f. @\$25 = \$48,750

2. Loop Road entrance extension, ocean and
back to Tubman Drive

5650 l.f. @\$25 = 141,250

3. Loop extension, ocean and to President's
house

3200 l.f. @\$25 = 80,000

S/T \$270,000

C. Cost of Community Bathrooms (toilets, showers, laundry)

3 - 10 seater bathrooms to service 500 people

3 x 1800 sf @6.30 = \$34,020

Sewage disposal 3,000

\$37,000

D. Street Lighting

Street lamps on poles spaced 200 feet apart

40 lamps @250 = \$10,000

(pole lines exist)

Ditto where no elect-icity exists 30,000

\$40,000

E. Pedestrian Walkways - on one street side only

10,000 sq. yds. @2.50 = \$27,000

S/T Upgrading \$374,000

All Costs Total \$584,800

ANNEX 3D

SOCIO-ECONOMIC SURVEY

NEW KRU TOWN

1978

The socio-economic data gathered in New Kru Town by NHA reveals that there are 10,424 persons living in this area. The number of households is 2,151 and therefore, the average number of persons per household is 4.85, close to the average household size of 5 persons for all of Monrovia according to the 1974 census data.

The working population is 2,527 persons which is 24% of the total population. Out of this group, 67.6% are paid employees while 19% are self-employed. Most workers are employed in Monrovia proper, Freeport and New Kru Town with 71% of those reporting place of employment working in these three areas. The total labor force is 2,822 with 521 persons reported as unemployed or others in the distribution of the population by economic activities.

The total female working population is 347 women with 64.8% of these employed as sales workers. 63.1% of all employed women are self-employed mostly as market women and 36.9% are paid employees.

57.7% of households in New Kru Town have incomes below the \$125 median income figure for Monrovia while 42.3% have incomes of \$125 and above. Median income is \$110.72.

The 2,151 New Kru Town households are sheltered in a total of 1,327 structures. The average number of households per structure is 1.62 and the average number of persons housed per structure is 7.86.

There are 4,797 rooms in the 1,327 structures recorded for New Kru Town, for an average of 3.61 rooms per structure. This means that the average household has 2.23 available rooms. The average number of persons per room is 2.17. These figures are evidence of extremely crowded living conditions when we consider that the two rooms available must be used as living area, dining area and sleeping quarters. The situation is particularly difficult for large families and there are 700 households having from 6 to over 14 members.

The following table summarizes the population and housing situation in New Kru Town.

RESIDENTS OF NEW KRU TOWN, NUMBER OF HOUSEHOLDS
AND HOUSING FACILITIES, MONROVIA, 1979

<u>Item</u>	<u>Total Number</u>	<u>Average Number</u>
Residents	10,424	
Households	2,151	
Persons per household		4.85
Households with one person	350	
Households with 2 or more persons	1,801	
Persons per household with 2 or more persons		5.59
Structures	1,327	
Households per structure		1.62
Persons per structure		7.86
Rooms in structures	4,797	
Rooms per structure		3.61
Rooms per household		2.23
Persons per room		2.17

DISTRIBUTION OF INCOME OF HOUSEHOLDS
IN WHICH THE OCCUPANTS OWN THE HOUSE,
NEW KRU TOWN, MONROVIA, 1979¹

<u>Income Level</u>	<u>Number</u>	<u>% of Total</u>	<u>Cumulative Frequency</u>
Under \$25	25	4.50	25
\$ 25- 49	30	5.41	55
50- 74	67	12.07	122
75- 99	66	11.89	188
100-124	76	13.69	264
125-149	59	10.63	323
150-174	39	7.03	362
175-199	30	5.41	392
200-224	47	8.47	439
225-249	15	2.70	454
250-274	12	2.16	466
275-299	11	1.98	477
300-324	20	3.60	497
325-349	9	1.62	506
350-374	6	1.08	512
375-399	7	1.26	519
400-424	4	0.72	523
\$425+	32	5.77	555
TOTAL	555	100.00	
No Information	105		
GRAND TOTAL	<u>660</u> (Owners)		

Median Income: \$130.72

¹Information based on the universe, in this class

DISTRIBUTION OF INCOME OF HOUSEHOLDS WHICH ARE TENANTS,
OCCUPYING THE PROPERTY BY PAYMENT OF RENT
NEW KRU TOWN, MONROVIA, 1979¹

<u>Income Level</u>	<u>Number</u>	<u>% of Total</u>	<u>Cumulative Frequency</u>
Under \$25	120	8.47	120
\$ 25- 49	123	8.69	243
50- 74	210	14.83	453
75- 99	243	17.16	696
100-124	200	14.12	896
125-149	145	10.24	1041
150-174	112	7.91	1153
175-199	63	4.45	1216
200-224	63	4.45	1279
225-249	14	0.99	1293
250-274	16	1.13	1309
275-299	16	1.13	1325
300-324	25	1.77	1350
325-349	0	-	1350
350-374	14	0.99	1364
<u>375-399</u>	3	0.2	1367
400-424	5	0.4	1372
\$425+	44	3.11	1416
TOTAL	1416	100.00	
No Information	75		
GRAND TOTAL	<u>1491</u> (Owners)		

Median Income: \$101.88

¹ Based on 33.33% sample of the universe, or 1 out of every 3 cases

DISTRIBUTION OF HOUSING UNITS
BY TYPES OF STRUCTURE¹
NEW KRU TOWN

Type of Structure	No. of Structures		Percent
	In Sample	Projected to Total	
Total	405	1327	100.00
Single Family Residence	145	475	35.80
Retail Store	4	13	.99
Apartment Residence	94	308	23.21
Duplex Residence	88	289	21.73
Commercial Residence	59	193	14.57
	15	49	3.70

¹ Determined by a 30.52% sample, equivalent to 1 out of every 3.28 structure.

DISTRIBUTION OF HOUSEHOLDS

BY PLACE OF WORK

NEW KRU TOWN

<u>Place of Work</u>	<u>No. of Persons</u>	<u>Percent</u>
<u>Total</u>	<u>2527</u>	<u>100.00</u>
<u>Monrovia Proper</u>	<u>479</u>	<u>18.96</u>
<u>Freeport</u>	<u>506</u>	<u>20.02</u>
<u>New Kru Town</u>	<u>326</u>	<u>12.90</u>
<u>Sinkor</u>	<u>91</u>	<u>3.60</u>
<u>Dwala</u>	<u>194</u>	<u>7.68</u>
<u>Gardnersville</u>	<u>34</u>	<u>1.35</u>
<u>Point Four</u>	<u>8</u>	<u>.32</u>
<u>Bentol</u>	<u>6</u>	<u>.24</u>
<u>Via Town</u>	<u>44</u>	<u>1.74</u>
<u>Paynesward</u>	<u>16</u>	<u>.63</u>
<u>Logan Town</u>	<u>68</u>	<u>2.69</u>
<u>Clara Town</u>	<u>38</u>	<u>1.50</u>
<u>Virginia</u>	<u>13</u>	<u>.51</u>
<u>Others</u>	<u>34</u>	<u>1.35</u>
<u>No Information</u>	<u>670</u>	<u>26.51</u>

DISTRIBUTION OF POPULATION

BY ECONOMIC ACTIVITIES

NEW KRU TOWN

<u>Economic Activities</u>	<u>No. of Persons</u>	<u>Percent</u>
<u>Total</u>	<u>5301</u>	<u>100.00</u>
<u>Working Population</u>	<u>2527</u>	<u>47.67</u>
<u>Keeping House Population</u>	<u>2051</u>	<u>38.69</u>
<u>Retired Population</u>	<u>202</u>	<u>3.81</u>
<u>Unemployed and others</u>	<u>521</u>	<u>9.83</u>

DISTRIBUTION OF WORKING POPULATION

BY WORK STATUS

NEW KRU TOWN

<u>Work Status</u>	<u>No. of Persons</u>	<u>Percentage</u>
<u>All Households*</u>	<u>2527</u>	<u>100.00</u>
<u>Self-Employed</u>	<u>478</u>	<u>18.92</u>
<u>Paid Employees</u>	<u>1708</u>	<u>67.59</u>
<u>Unpaid Family Workers</u>	<u>15</u>	<u>.59</u>
<u>Others</u>	<u>326</u>	<u>12.90</u>

*Households total base on all reported working in the household and not only household heads.

DISTRIBUTION OF HOUSEHOLDS

BY OCCUPATIONS

NEW KRU TOWN

<u>Occupations</u>	<u>No. of Persons</u>	<u>Percent</u>
<u>Total</u>	<u>2527</u>	<u>100.00</u>
<u>Professional, Technical & Related Workers</u>	<u>409</u>	<u>16.19</u>
<u>Administrative & Managerial Workers</u>	<u>32</u>	<u>1.27</u>
<u>Clerical & Related Workers</u>	<u>236</u>	<u>9.34</u>
<u>Production & Related Workers</u>		
<u>Transport Equipment Operators & Labourers</u>	<u>764</u>	<u>30.23</u>
<u>Agriculture, Animal Husbandry and Forestry Workers, Fishermen & Hunters</u>	<u>103</u>	<u>4.08</u>
<u>Sales Workers</u>	<u>368</u>	<u>14.56</u>
<u>Service Workers</u>	<u>321</u>	<u>12.70</u>
<u>Workers not Classified by Occupation</u>	<u>82</u>	<u>3.24</u>
<u>No Information</u>	<u>212</u>	<u>8.39</u>

DISTRIBUTION OF HOUSEHOLDS

BY INCOME

NEW KRU TOWN

<u>INCOME LEVELS</u>	<u>NUMBER</u>	<u>CUM. FREQUENCY</u>
<u>Under - 25</u>	<u>98</u>	<u>98</u>
<u>25 - 49</u>	<u>123</u>	<u>221</u>
<u>50 - 74</u>	<u>281</u>	<u>502</u>
<u>75 - 99</u>	<u>277</u>	<u>779</u>
<u>100 - 124</u>	<u>239</u>	<u>1018</u>
<u>125 - 149</u>	<u>171</u>	<u>1189</u>
<u>150 - 174</u>	<u>142</u>	<u>1331</u>
<u>175 - 199</u>	<u>92</u>	<u>1423</u>
<u>200 - 224</u>	<u>105</u>	<u>1528</u>
<u>225 - 249</u>	<u>29</u>	<u>1557</u>
<u>250 - 274</u>	<u>34</u>	<u>1591</u>
<u>275 - 299</u>	<u>30</u>	<u>1621</u>
<u>300 - 324</u>	<u>33</u>	<u>1654</u>
<u>325 - 349</u>	<u>13</u>	<u>1667</u>
<u>350 - 374</u>	<u>12</u>	<u>1679</u>
<u>375 - 399</u>	<u>14</u>	<u>1693</u>
<u>400 - 424</u>	<u>11</u>	<u>1704</u>
<u>425 +</u>	<u>59</u>	<u>1763</u>
<u>Total</u>	<u>1763</u>	

Median = \$110.72

DISTRIBUTION OF HOUSEHOLDS BY NUMBER

OF PERSONS OF AGE 14 YEARS & UNDER

NEW KRU TOWN

<u>Types of Households</u>	<u>No. of Households</u>	<u>Percent</u>
<u>All Households</u>	<u>2122</u>	<u>100.00</u>
<u>Households with no persons of age 14 & under</u>	<u>857</u>	<u>40.39</u>
<u>Households with 1 persons of age 14 & under</u>	<u>400</u>	<u>18.85</u>
<u>Households with 2 persons of age 14 & under</u>	<u>301</u>	<u>14.18</u>
<u>Households with 3 persons of age 14 & under</u>	<u>218</u>	<u>10.27</u>
<u>Households with 4 persons of age 14 & under</u>	<u>133</u>	<u>6.27</u>
<u>Households with 5 persons of age 14 & under</u>	<u>82</u>	<u>3.86</u>
<u>Households with 6 persons of age 14 & under</u>	<u>57</u>	<u>2.69</u>
<u>Households with 7 persons of age 14 & under</u>	<u>36</u>	<u>1.70</u>
<u>Households with 8 persons of age 14 & under</u>	<u>17</u>	<u>0.80</u>
<u>Households with 9 persons or more of age 14 & under</u>	<u>21</u>	<u>0.99</u>

DISTRIBUTION OF HOUSEHOLDS

BY NUMBER OF PERSONS

LOCATION: NEW KFU TOWN

<u>Types of Households</u>	<u>No. of Households</u>	<u>Percent</u>
<u>All Households</u>	<u>2122</u>	<u>100.00</u>
<u>Households with 1 Person</u>	<u>350</u>	<u>16.49</u>
<u>Households with 2 Persons</u>	<u>318</u>	<u>14.99</u>
<u>Households with 3 Persons</u>	<u>319</u>	<u>15.03</u>
<u>Households with 4 Persons</u>	<u>242</u>	<u>11.40</u>
<u>Households with 5 Persons</u>	<u>193</u>	<u>9.10</u>
<u>Households with 6 Persons</u>	<u>149</u>	<u>7.02</u>
<u>Households with 7 Persons</u>	<u>121</u>	<u>5.70</u>
<u>Households with 8 Persons</u>	<u>106</u>	<u>5.00</u>
<u>Households with 9 Persons</u>	<u>98</u>	<u>4.62</u>
<u>Households with 10 Persons</u>	<u>54</u>	<u>2.54</u>
<u>Households with 11 Persons</u>	<u>45</u>	<u>2.12</u>
<u>Households with 12 Persons</u>	<u>31</u>	<u>1.46</u>
<u>Households with 13 Persons</u>	<u>18</u>	<u>0.85</u>
<u>Households with 14 Persons & above</u>	<u>78</u>	<u>3.68</u>

DISTRIBUTION OF HOUSING UNITS BY NUMBER OF ROOMS

NEW KRU TOWN

<u>Types of Housing Units</u>	<u>No. of Housing Units</u>	<u>Percent</u>
<u>All Housing Units</u>	<u>2122</u>	<u>100.00</u>
<u>Housing Units with 1 Room</u>	<u>1241</u>	<u>58.48</u>
<u>Housing Units with 2 Rooms</u>	<u>320</u>	<u>15.08</u>
<u>Housing Units with 3 Rooms</u>	<u>235</u>	<u>11.07</u>
<u>Housing Units with 4 Rooms</u>	<u>173</u>	<u>8.15</u>
<u>Housing Units with 5 Rooms</u>	<u>81</u>	<u>3.82</u>
<u>Housing Units with 6 Rooms</u>	<u>46</u>	<u>2.17</u>
<u>Housing Units with 7 Rooms</u>	<u>12</u>	<u>0.57</u>
<u>Housing Units with 8 Rooms</u>	<u>12</u>	<u>0.57</u>
<u>Housing Units with 9 Rooms</u>	<u>2</u>	<u>0.09</u>
<u>Housing Units with 10 Rooms</u>	<u>0</u>	<u>0.00</u>

DISTRIBUTION OF HOUSEHOLDS
BY RENT LEVELS OF HOUSEHOLD HEADS
LOCATION: NEW KRU TOWN

<u>Monthly Rent Levels</u>	<u>No. of Households</u>	<u>Percent</u>
<u>All Households</u>	<u>1324</u>	<u>100.00</u>
<u>1 - 9</u>	<u>225</u>	<u>16.99</u>
<u>10 - 19</u>	<u>548</u>	<u>41.39</u>
<u>20 - 29</u>	<u>186</u>	<u>14.05</u>
<u>30 - 39</u>	<u>31</u>	<u>2.34</u>
<u>40 - 49</u>	<u>16</u>	<u>1.21</u>
<u>50 - 59</u>	<u>34</u>	<u>2.57</u>
<u>60 - 69</u>	<u>11</u>	<u>.83</u>
<u>70 - 79</u>	<u>10</u>	<u>.76</u>
<u>80 - 89</u>	<u>2</u>	<u>.15</u>
<u>90 - 99</u>	<u>2</u>	<u>.15</u>
<u>100 & Above</u>	<u>30</u>	<u>2.26</u>
<u>Households Rent for Free or other arrangement.</u>	<u>229</u>	<u>17.30</u>

DISTRIBUTION OF HOUSEHOLDS
BY RENT LEVEL OF HOUSEHOLD HEADS

LOCATION: NEW KRU TOWN

<u>Rent Levels</u>	<u>Frequency</u>	<u>Cum. Frequency</u>
<u>1 - 9</u>	<u>225</u>	<u>225</u>
<u>10 - 19</u>	<u>548</u>	<u>773</u>
<u>20 - 29</u>	<u>186</u>	<u>959</u>
<u>30 - 39</u>	<u>31</u>	<u>990</u>
<u>40 - 49</u>	<u>16</u>	<u>1006</u>
<u>50 - 59</u>	<u>34</u>	<u>1040</u>
<u>60 - 69</u>	<u>11</u>	<u>1051</u>
<u>70 - 79</u>	<u>10</u>	<u>1061</u>
<u>80 - 89</u>	<u>2</u>	<u>1063</u>
<u>90 - 99</u>	<u>2</u>	<u>1065</u>
<u>100 +</u>	<u>30</u>	<u>1095</u>

Media Rent = \$15.30

DISTRIBUTION OF FEMALES WORKING POP 1ⁿ

BY TYPES OF OCCUPATION

NEW KRU TOWN

<u>Types of Occupation</u>	<u>No. of Persons</u>	<u>Percent</u>
<u>Total</u>	<u>347</u>	<u>100.00</u>
<u>Professional and Technical Workers</u>	<u>25</u>	<u>7.20</u>
<u>Administrative and Managerial Workers</u>	<u>6</u>	<u>1.73</u>
<u>Clerical and Related Workers</u>	<u>18</u>	<u>5.19</u>
<u>Sales Workers</u>	<u>225</u>	<u>64.84</u>
<u>Service Workers</u>	<u>39</u>	<u>11.24</u>
<u>Agriculture, Animal Husbandry and Forestry Workers, Fishmen, and Hunters</u>	<u>1</u>	<u>.29</u>
<u>Production and Related Workers, Transport Equipment Operators and Laborers</u>	<u>33</u>	<u>9.51</u>

DISTRIBUTION OF FEMALE WORKING POPULATION

BY WORK STATUS

NEW KRU TOWN

<u>Work Status</u>	<u>No. Persons</u>	<u>Percent</u>
<u>Total</u>	<u>347</u>	<u>100.00</u>
<u>Paid-employees</u>	<u>128</u>	<u>36.89</u>
<u>Self-employed</u>	<u>219</u>	<u>63.11</u>

DISTRIBUTION OF FEMALES WORKING POP 1st

BY PLACE OF WORK

NEW KRU TOWN

<u>Places of Work</u>	<u>No. Persons</u>	<u>Percent</u>
<u>Total</u>	<u>347</u>	<u>100.00</u>
<u>Monrovia Proper</u>	<u>59</u>	<u>17.00</u>
<u>New Kru Town</u>	<u>152</u>	<u>44.00</u>
<u>Dwala</u>	<u>69</u>	<u>20.00</u>
<u>Sinkor</u>	<u>20</u>	<u>6.00</u>
<u>Point Four</u>	<u>4</u>	<u>1.00</u>
<u>Logan Town</u>	<u>8</u>	<u>2.00</u>
<u>Free Port</u>	<u>16</u>	<u>5.00</u>
<u>Vai Town</u>	<u>6</u>	<u>2.00</u>
<u>Virginia</u>	<u>4</u>	<u>1.00</u>
<u>Others</u>	<u>9</u>	<u>2.00</u>

INITIAL ENVIRONMENTAL EXAMINATION
PROPOSED LIFE LINE
AID DEVELOPMENT GRANT/DEVELOPMENT FINANCING/HOUSING GUARANTY PROGRAM

PREPARED FOR
USAID/MONROVIA AND OFFICE OF HOUSING
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

PREPARED BY
JEFFORY G. BOYER, ENVIRONMENTAL CONSULTANT
NATIONAL SAVINGS AND LOAN LEAGUE
DECEMBER 1977

INITIAL ENVIRONMENTAL EXAMINATIONProject Location: Monrovia, LiberiaProject Title: Technical Assistance: Liberia Low-Income Housing (Development Grant)Funding:

FY 78-81: Total Project Cost \$2,517,000 of which \$1,672,000 is to be provided by A.I.D. and \$845,000 by the Government of Liberia.

Life of Project: Thirty months commencing September 1978IEE Prepared by:

Jeffory Boyer
Environmental Consultant

Date

December, 1977

Reviewed by:

Howard V. Guiot
USAID/L
Environmental Officer

Date

May, 1978

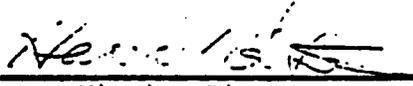
Environmental Actions Recommended:

The proposed technical assistance actions involve a general range of activities which are directed towards institutional building, skill development, and policy definition. These types of actions are identified in AID Regulation 16 (Section 216.2(a)) as not representing a major federal action significantly affecting the human environment. Therefore, a Negative Determination is recommended for the Technical Assistance (DG) portion.

We recommend a Negative Determination for the Project.

Concurrence:

Date:


Mission Director

7/25/78

Assistant Administrator's/Director's decision:

Date:

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I. COUNTRY BACKGROUND AND DESCRIPTION OF PROPOSED AID DEVELOPMENT AID HQ PROGRAM

A. Existing Environmental Conditions in Liberia

Two physical factors influence significantly the status of environmental quality in the region surrounding Liberia's national capital--its physical setting and climatic conditions. Monrovia is situated in a low-lying coastal belt which extends about 50 miles inland. This geographic area is characterized by its numerous tidal creeks, shallow lagoons and mangrove marshes. The tropical climate is typified by sustained heat, high humidity, and one of the heaviest seasonal rainfalls in the world. The combination of factors creates a set of natural conditions which pose major constraints on the development and maintenance of human settlements and the well-being of inhabitants in this region.

It is estimated that more than 50 percent of the land within a five-mile radius of central Monrovia (Mamba Point) is naturally unsuitable for development without major investments in land reclamation and drainage improvements. The limited availability of buildable land combined with the traditional Liberian value of holding land for purposes of economic security and social status create a severe shortage of land to accommodate urban growth pressures. Consequently, low-income families are forced to reside in areas where environmental hygienic conditions pose serious risks to their health. Numerous low-income communities have been established in marginally suitable areas along streams, rivers, and wetland marshes. These areas are subject to perennial flooding in the wet season and ponding and stagnant water in the dry season. The absence or limited availability of basic public services has forced residents: (1) to depend upon contaminated private wells or a limited number of community standpipes for their water supply; (2) to dispose of human waste in the "bush" or into pit-privy latrines which malfunction because of high groundwater; (3) to dump solid waste material (garbage) between buildings or onto undeveloped lots since public collection service is non-existent or infrequent; and (4) to discharge wastewater into the streets or open drainage ditches for lack of a storm drainage or sanitary collection system.

These environmental health conditions are made worse by a wet and humid climate that favors the breeding of insects, parasites, and other disease organisms. As a result, malaria is hyperendemic in the Monrovia area, and the occurrence of other diseases is very high including filariasis, dengue fever, cholera, dysentery, diarrhea, hepatitis, hookworm and tuberculosis. The effect of these conditions on the quality of the human environment causes life expectancy to be only 45 years. In addition, it poses particularly high risks to infants, young children less than five years

of age, and mothers of child-bearing age (15-44 years). A 1971 health survey conducted by Liberia's Ministry of Planning and Economic Affairs found that the rate of infant mortality was 159 per 1,000 births.

3. Monrovia's Shelter Needs

An analysis of Liberia's shelter needs focuses on the situation in the nation's capital because it is the most rapidly growing urban center in the country. Within the past fifteen years Monrovia's population has increased from 81,000 persons in 1962 to an estimate of 250,000 persons in 1977. This rate of urban growth is equivalent to approximately seven percent annually, or roughly twice the national growth rate. One of the most significant factors contributing to the city's rapid population growth is the influx of rural migrants. As much as two-thirds of the increment in Monrovia's population in this period is attributable to rural-to-urban migration. This phenomenon is in part stimulated by a rejection of conditions in the rural countryside and a corresponding expectation that aspirations will be fulfilled in an urban setting such as Monrovia. The principal "pull" factors influencing Liberia's urban migration trends are economic--such as employment opportunities, differentials in wage scales, expendable income, and related educational opportunities. In turn, these factors are the prime determinants of the standard of living, level of health care, and social status.

The 1974 Census data indicate that 56 percent of Monrovia's existing housing stock was constructed of temporary or semi-permanent materials. The balance was built of permanent materials such as stone, concrete or cement block. In addition, the Census data reveal that 34 percent of all units are without any utilities, and 32 percent had only piped water inside or electricity. Approximately 25 percent of the dwellings had a combination of water, electricity and flush toilet. In conclusion, Monrovia's current housing stock of about 30,000 units is comprised roughly of 18,000 substandard units. A "substandard" unit is defined as one deficient in one or more basic utilities and/or constructed of non-permanent materials.

Future projections of Monrovia's population growth suggest that the urban housing and environmental health conditions will become even more critical unless corrective steps are taken immediately. It is estimated that the city's population will expand to approximately 500,000 persons by the year 1990. Approximately 2,700-3,700 units will be required annually to accommodate this rate of growth in addition to the number of replacement units eliminated annually because of their deterioration, obsolescence and changes in land use. Between 1977 and 1981, when the proposed project is expected to be completed, Monrovia's housing stock must be increased by 11,800 to 14,800 units to meet the shelter needs of new households and units to be replaced.

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A number of factors have limited GOL's efforts to expand the available housing supply to meet growth demands. These factors include the scarcity of developable land, the Liberian tradition of retaining ownership of property, and the high delivery cost of new housing construction. These conditions have primarily forced the City's growing population to use Monrovia's existing housing stock to meet its basic shelter needs.

C. Target Population

The target population is identified as those households in Monrovia earning less than the median income of \$93 per month, which represents about 125,000 persons or 18,000 households. The Shelter Sector Assessment of January 1977, concluded that 25 percent was a reasonable estimate of household expenditure for shelter. Available socio-economic data provide the following demographic profile of the target population:

1. Principal concentrations of low-income households are found in central Monrovia's tenements, Bussi Quarter, and along Newport Street as well as in outlying marginal areas of the city which include the communities of Duala, New Kru Town, Point Four, Logan Town, Jamaica Road, Fonti Town, West Point, Clara Town, Bassa Community and Sinkor;
2. The tenure of housing is predominantly rental, whereas home ownership is limited mostly to higher-income families;
3. Extended family relationships and tribal identity are important cultural values that play vital functions in family structure, household size, number of households per dwelling, and in local government structure; and
4. Heads of households are relatively young with approximately 50 percent under thirty years of age, have limited formal education, and a majority are classified as unskilled or semi-skilled.

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Proposed AID Development Grant/Development Loan/Housing Guaranty Program

The proposed actions are designed to accomplish a three-fold purpose:

1. A national housing policy will be developed by the GOL beginning in 1978 with technical assistance from consultants funded by an AID grant. The policy will be designed to provide for a long-range comprehensive approach to meet Liberia's present and future shelter needs. It will consider Liberia's rural-urban migration trends as well as the related rural and urban shelter needs. Concurrent development of the urban low-income shelter program will help to formulate an overall policy development process. The policy will allow for adjustments during implementation of the AID-funded demonstration projects as new experience is gained and as "feedback" becomes available through the evaluation system;

2. The institutional capacity of the National Housing Authority (NHA) to carry out low income shelter projects will be expanded by the technical assistance component of this program. The NHA will serve as borrower and will be responsible for demonstration project design, implementation, monitoring and evaluation. NHA's prior experience has been limited to the production of approximately 900 units of conventional middle-income housing; and

3. A demonstration program will be developed to provide improved shelter and community services to low-income families in Monrovia. The main components of the demonstration program include:
 - Service Sites and Core Units
Approximately 1,775 serviced sites with expandable core units will be provided in two large projects and in a series of scattered "vest pocket" projects in existing low-income communities. Supportive facilities such as schools, clinics, markets will be constructed to complement the housing activities.

 - Community Upgrading
Approximately 4,953 families in existing low-income communities will benefit through the provision of water, storm and sanitary sewers, electricity, graded access streets and community facilities.

• Home Improvement Loans:

Approximately 3,900 small loans will be made to assist the residents of the new "sites and services" projects to expand and complete the core units and to assist residents of existing communities to expand and improve their homes.

The proposed program will involve a total cost of \$11.825 million to be financed by the AID resources, the beneficiaries and the host country. The total of the program funding of \$11.825 million will be distributed among the three components as shown below:

AID Technical Assistance Grant	\$ 1,175,000
AID Development Loan	4,000,000
AID Housing Guaranty	<u>5,040,000</u>
TOTAL AID	\$10,175,000
Beneficiaries and Host Country	<u>1,650,000</u>
TOTAL	\$11,825,000

II. ENVIRONMENTAL IMPACT IDENTIFICATION AND EVALUATION

This section of the IEE sets forth the reasonably foreseeable effects that the proposed program will have on the human environment in Liberia. To assure that the environmental consequences of these actions have been fully considered, AID's Office of Housing recently conducted field investigations of potential project sites in the country. A description of existing environmental conditions is summarized briefly in the preceding section, while the complete findings are set forth in the Liberia Shelter Sector Analysis (January 1977) and Supplement (August 1977).

The actions of the proposed program can be divided into three basic areas:

- Technical assistance for development of a draft National Housing Policy;
- Technical assistance for strengthening the institutional capacity of the National Housing Authority;
- The development of three types of demonstration shelter programs.

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For purposes of this evaluation, the first two actions are discussed jointly, while the third is examined separately, as it represents an entirely different type of activity. An impact identification matrix was developed for the proposed demonstration shelter programs as a means of identifying potential impacts on critical areas of environmental concern likely to result from specific components of the proposed program. For the summary findings of the environmental analysis process, see Table 1. This evaluation procedure serves to answer three basic questions:

1. What are the most critical environmental concerns indigenous to the area of Liberia in which the proposed program is to be implemented?
2. What specific components of the proposed program will affect areas of identified environmental concern?
3. How will the proposed program components affect existing environmental conditions in terms of the nature and extent of probable environmental impacts?

A. Identification and Description of Critical Concerns Related to the Technical Assistance Component of the Shelter Program

AID will grant \$1.175 million to Liberia's National Housing Authority in the form of 122 person-months of technical assistance to strengthen this institution's capabilities and to assist in development of a national housing policy. The selective training and skill development include management and programming, credit and collection, loan procedures, physical design, low cost construction techniques, socio-economic surveys and analyses. The policy development component is designed to help NHA formulate a set of broad housing objectives, priorities, institutional responsibilities, delivery systems, levels of funding, and financial terms and conditions.

The conclusion of the Initial Environmental Examination (IEE) on the Technical Assistance component of the proposed shelter program is as follows:

The proposed technical assistance actions are not project-specific, nor are they activities which will directly affect the environment. They are within the range of actions designed to improve skill development, build institutions and define policy. As such they are the types of activities which Regulation 16 designates as not requiring an Environmental Assessment (EA). Therefore, a Negative Determination of environmental impact is warranted.

end of T/A portion

TABLE 1
CHECKLIST FOR
ENVIRONMENTAL IMPACT IDENTIFICATION AND EVALUATION

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
LIST OF SELECTED CRITICAL ENVIRONMENTAL CONCERNS	LEVEL OF PROJECT CONCERN*	PROGRAM/PROJECT COMPONENTS LIKELY TO CAUSE CHANGES	ENVIRONMENTAL NATURE OF PROBABLE IMPACTS--NEGATIVE (-) POSITIVE (+)
PROGRAM/PROJECT IMPACTS ON THE ENVIRONMENT			
<u>NATURAL ENVIRONMENT</u>			
1. EXISTING WATER RESOURCES:			
a) SURFACE (RIVERS, LAKES, RESERVOIRS)	P	STORM DRAINAGE SEWERAGE SYSTEM	(+) ELIMINATION OR REDUCTION IN THE AMOUNT OF RAW SEWAGE & SEDIMENT LOADING DISCHARGED INTO SURFACE WATERS MAY BE EXPECTED
b) UNDERGROUND (AQUIFERS)	P	SEWERAGE SYSTEM	(+) PROTECTION OF GROUNDWATER RESOURCES
c) ESTUARY	C	STORM DRAINAGE AND SEWERAGE SYSTEM	(+) IMPROVEMENT IN WATER QUALITY
d) OCEAN	P		
2. ENVIRONMENTALLY SENSITIVE AREAS:			
a) BAYS, COASTAL MARSHES, AND OTHER SENSITIVE AREAS	NA		
b) MANGROVE MARSHES, COASTAL ESTUARIES, AND OTHER SENSITIVE AREAS	C	TOTAL HOUSING PROGRAM	(+) CONSERVATION AND PROTECTION OF MANGROVE MARSHES & COASTAL ESTUARY

*COLUMN 2 SYMBOLS: NA -- THE AREA OF CONCERN IS NOT APPLICABLE TO THE CATEGORY, REGION, OR THE COMPONENT OF PROJECT
 S -- THE AREA OF CONCERN IS SIGNIFICANTLY SENSITIVE
 P -- THE AREA OF CONCERN IS OF HIGH IMPORTANCE
 C -- THE AREA OF CONCERN IS OF MODERATE IMPORTANCE
 S -- SIGNIFICANT ENVIRONMENTAL IMPACT WILL OCCUR UNLESS ALTERNATIVE ACTION OR MITIGATION MEASURES ARE INSTITUTED

TABLE 1
CHECKLIST FOR
ENVIRONMENTAL IMPACT IDENTIFICATION AND EVALUATION

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
LIST OF SELECTED CRITICAL ENVIRONMENTAL CONCERNS	LEVEL OF PROJECT CONCERN*	PROPOSED/PROJECT COMPONENTS LIKELY TO CAUSE CHANGES	ENVIRONMENTAL NATURE OF PROBABLE IMPACTS--NEGATIVE (-) POSITIVE (+)
c) AQUIFER RECHARGE AREAS	P	SEWERAGE SYSTEM	(+) POTENTIAL PROBLEMS TO BE AVOIDED THROUGH SITE SELECTION PROCESS AND PROJECT DESIGN DECISIONS
d) RARE OR ENDANGERED PLANT AND ANIMAL SPECIES AND THEIR HABITATS	U		
e) HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES	U		
3. INFLUENCE ON EXISTING AND/OR FUTURE LAND USE ACTIVITIES AND DEVELOPMENT PATTERNS WHICH MAY AFFECT:			
a) WILDLIFE RESOURCES	U		
b) PASTURE AGRICULTURAL LANDS	NA		

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*COLUMN 2 SYMBOLS: NA -- THIS AREA OF CONCERN IS NOT APPLICABLE TO THE COUNTRY, REGION OR THE PROPOSED PROJECT
 U -- THIS AREA OF CONCERN IS UNLIKELY TO BE OF IMPORTANCE
 P -- THIS AREA OF CONCERN IS POTENTIALLY OF IMPORTANCE
 C -- THIS AREA OF CONCERN IS CONSIDERED CRITICAL
 S -- SIGNIFICANT ENVIRONMENTAL IMPACT WILL OCCUR UNLESS ALTERNATIVE ACTIONS OR MITIGATING MEASURES ARE INSTITUTED

CHECKLIST FOR
ENVIRONMENTAL IMPACT IDENTIFICATION AND EVALUATION

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
LIST OF SELECTED CRITICAL ENVIRONMENTAL CONCERNS	LEVEL OF PROJECT CONCERN*	PROGRAM/PROJECT COMPONENTS LIKELY TO CAUSE CHANGES	ENVIRONMENTAL NATURE OF PROBABLE IMPACTS--NEGATIVE (-) POSITIVE (+)
c) VALUABLE NATURAL RESOURCES--FORESTS, WETLANDS, MINERALS, ETC.	C	TOTAL HOUSING & INFRA-STRUCTURE	(+)REDUCTION IN EXISTING LEVELS OF POLLUTION FROM URBAN RUNOFF AND MALFUNCTIONING SEWAGE DISPOSAL SYSTEMS
d) OPEN SPACE/RECREATION LANDS	U		
e) ECOLOGICAL BALANCE OF THE AREA/REGION	P	TOTAL HOUSING PROGRAM	(+)PHYSICAL LAYOUT OF PROPOSED IMPROVEMENTS WILL BE UNDERTAKEN IN RECOGNITION OF ENVIRONMENTAL SENSITIVITY OF ADJACENT WETLANDS.
f) STABILITY AND PRESERVATION OF HUMAN SETTLEMENT AREAS	P	TOTAL HOUSING PROGRAM	(+)DEMONSTRATION EFFECT OF PROGRAM'S VALUE IN ASSISTING NIA TO MEET LIBERIA'S CURRENT/FUTURE HOUSING REQUIREMENTS

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 C -- THIS AREA OF CONCERN IS CONSIDERED CRITICAL

TABLE 1
CHECKLIST FOR
ENVIRONMENTAL IMPACT IDENTIFICATION AND EVALUATION

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
LIST OF SELECTED CRITICAL ENVIRONMENTAL CONCERNS	LEVEL OF PROJECT CONCERN*	PROGRAM/PROJECT COMPONENTS LIKELY TO CAUSE CHANGES	ENVIRONMENTAL NATURE OF PROBABLE IMPACTS--NEGATIVE (-) POSITIVE (+)
4. ECOLOGICAL CONSEQUENCE FROM INTRODUCING NEW OR DIFFERENT TECHNOLOGICAL SYSTEMS ASSOCIATED WITH COMMUNITY INFRASTRUCTURE & SERVICES:			
A) WATER CONSUMPTION VERSUS SUPPLY LIMITATIONS	U	SEWERAGE SYSTEM	(+-) CONVERSION FROM ON-SITE WATER SUPPLY AND SEWAGE DISPOSAL SYSTEMS TO A PUBLIC WATER SUPPLY AND WATERBORNE SEWAGE COLLECTION/TREATMENT SYSTEM WILL INCREASE WATER CONSUMPTION. SUPPLY WILL BE ADEQUATE TO MEET INCREASED DEMANDS.
B) ENERGY REQUIREMENTS	NA		
C) AMBIENT AIR QUALITY	NA		
D) WATER QUALITY	U	SEWERAGE SYSTEM	(+-) COLLECTION AND TREATMENT OF RAW SEWAGE FROM PROJECT SITES PRESENTLY NOT CONNECTED TO EXISTING WATERBORNE SANITARY SYSTEM WILL IMPROVE WATER QUALITY CONDITIONS IN ADJACENT WETLANDS. TREATMENT PLANT HAS ADEQUATE CAPACITY TO HANDLE INCREASE IN WASTEWATER FLOWS. SLIGHT DETERIORATION IN WATER QUALITY MAY BE EXPECTED IN THE IMMEDIATE VICINITY, HOWEVER, ASSIMILATIVE CAPACITY OF RECEIVING STREAM IS BELIEVED ADEQUATE TO ACCOMMODATE INCREASED SEWAGE FLOWS.
E) CHANGE IN AGRICULTURAL PRACTICES AND USE OF HUMAN WASTE FOR FERTILIZER	NA		

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<u>HUMAN ENVIRONMENT</u>			
1. TRADITIONAL CUSTOMS & SOCIO-CULTURAL CONDITIONS:			
a) COMMUNITY CHARACTER & COHESION	C	TOTAL HOUSING PROGRAM	(+) ENHANCEMENT IN IMAGE OF COMMUNITY AND REINFORCEMENT OF SENSE OF IDENTITY
b) SOCIAL ORGANIZATION	U		
c) INSTITUTIONAL STRUCTURES	U		
d) LIFE STYLES & CULTURAL TRADITIONS	U		
e) FAMILY PATTERNS & VALUES	U		
f) DEMOGRAPHIC & SOCIAL PROFILE	U		

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* -- THIS AREA OF CONCERN IS NOT APPLICABLE TO THE COUNTRY, REGION OR THE PROGRAM PROJECT
 U -- THE AREA OF CONCERN IS OF MINOR IMPORTANCE
 P -- THE AREA OF CONCERN IS OF MODERATE IMPORTANCE
 C -- THIS AREA OF CONCERN IS OF MODERATELY CRITICAL
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CHECK LIST FOR
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g) LEVEL OF PERSONAL SAFETY & CONVENIENCE	P	ROADS & PEDESTRIAN PATHS, WATER & SEWER SERVICES, & COMMUNITY FACILITIES	(+) MINIMIZE PHYSICAL HAZARDS AND IMPROVEMENT IN CONVENIENCE OF BASIC SERVICES
2. ESTABLISHED HOUSING CONCEPTS AND PRACTICES:			
a) BUILDING MATERIALS	U	STANDARD	
b) CONSTRUCTION TECHNIQUES	U	STANDARD	
c) HOUSING FORM AND STYLES	U	STANDARD	
d) INTERIOR DESIGN OR STRUCTURE	U	STANDARD	
e) SPATIAL RELATIONSHIPS OF STRUCTURE TO OTHER SHELTER COMPONENTS (COURTYARDS, COOKING AREA, BATH, ETC.)	U	STANDARD	

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C -- THE AREA OF CONCERN IS NOT APPLICABLE TO THE CATEGORY, CLASS OR TYPE OF PROJECT.
 U -- THE AREA OF CONCERN IS NOT LIKELY TO BE SIGNIFICANT.
 P -- THE AREA OF CONCERN IS ESSENTIALLY OF IMPORTANCE.
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CHECKLIST FOR ENVIRONMENTAL IMPACT IDENTIFICATION AND EVALUATION

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
LIST OF SELECTED CRITICAL ENVIRONMENTAL CONCERNS	LEVEL OF PROJECT CONCERN*	PROGRAM/PROJECT COMPONENTS LIKELY TO CAUSE CHANGES	ENVIRONMENTAL NATURE OF PROBABLE IMPACTS--NEGATIVE (-) POSITIVE (+)
g) POPULATION SIZE	S	TOTAL HOUSING PROGRAM	(+) THE ESTIMATED NUMBER OF BENEFICIARIES OF THE PROGRAM (6720 HOUSEHOLDS) REPRESENT 30% OF MONROVIA'S BELOW MEDIAN POPULATION OR 19% OF THE CITY'S TOTAL POPULATION.
h) HOUSING LOCATION	C	TOTAL HOUSING PROGRAM	(+) DEMONSTRATION EFFECT ON SITE SELECTION PROCESS & PROPOSED DEVELOPMENT ACTIVITIES CONSIDERING ENVIRONMENTAL CONSTRAINTS/ OPPORTUNITIES
3. EFFECT ON PUBLIC HEALTH AND GENERAL WELL-BEING:			
a) COMMUNICABLE DISEASE CONTROL AND ENVIRONMENTAL HEALTH CONDITIONS	C	TOTAL HOUSING PROGRAM	(+) IMPROVEMENT IN ENVIRONMENTAL HYGIENE CONDITIONS IN SELECTED PROJECT AREAS REPRESENTS A POSITIVE STEP TOWARD GREATER CONTROL OF COMMUNICABLE DISEASES, BUT EXTENSIVE ABATEMENT IS UNLIKELY BECAUSE OF OTHER DISEASE SOURCES & VECTORS OF TRANSMISSION FOUND BOTH ON-SITE AND OFF-SITE
b) DISPLACEMENT AND RELOCATION OF POPULATION	P		(+/-) MINIMUM DISPLACEMENT & NUMEROUS MITIGATING MEASURES DESIGNED INTO PROGRAM TO AVOID OR REDUCE EXTENT OF ADVERSE EFFECTS

*COLUMN 2 SYMBOLS: E -- THIS AREA IS CONSIDERED TO BE ESSENTIAL TO THE CITY'S ECONOMY, HEALTH OR ENVIRONMENTAL QUALITY
 U -- THIS AREA IS CONSIDERED TO BE OF MODERATE IMPORTANCE
 P -- THIS AREA OF CONCERN IS POTENTIALLY OF IMPORTANCE
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CHECKLIST FOR
ENVIRONMENTAL IMPACT IDENTIFICATION AND EVALUATION

COLUMN 1

COLUMN 2

COLUMN 3

COLUMN 4

LIST OF SELECTED CRITICAL ENVIRONMENTAL CONCERNS	LEVEL OF PROJECT CONCERN*	PROGRAM/PROJECT COMPONENTS LIKELY TO CAUSE CHANGES	ENVIRONMENTAL NATURE OF PROBABLE IMPACTS--NEGATIVE (-) POSITIVE (+)
c) EMPLOYMENT/INCOME GENERATION	P		(+) STIMULATION OF SHORT-TERM EMPLOYMENT & LIMITED SKILL DEVELOPMENT. CREATION OF OPPORTUNITIES FOR LONG-TERM INCOME GENERATION
d) LAND TENURE AND/OR STABILITY OF HUMAN SETTLEMENT AREAS	U		
e) INCOME EXPENDITURE PATTERN	C		(-) THE REPAYMENT OF SHELTER & COMMUNITY UP-GRADING IMPROVEMENTS ARE EXPECTED TO CAUSE SOME CHANGES IN ESTABLISHED INCOME EXPENDITURE PATTERNS BECAUSE OF THE REQUIREMENT FOR COST RECOVERY.

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- *CODE FOR SYMBOLS:
- C** -- THIS AREA IS CONSIDERED CRITICAL TO THE COUNTRY, PART OF THE PEOPLE'S PROJECT
 - U** -- THIS AREA OF CONCERN IS ONLY OF LOCAL IMPORTANCE
 - P** -- THIS AREA OF CONCERN IS POTENTIALLY OF IMPORTANCE
 - S** -- THIS AREA OF CONCERN IS CONSIDERED CRITICAL
 - S** -- SIGNIFICANT ENVIRONMENTAL IMPACT WILL OCCUR UNLESS ALTERNATIVE ACTIONS OR MITIGATING MEASURES ARE INSTITUTED

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LIST OF SELECTED CRITICAL ENVIRONMENTAL CONCERNS	LEVEL OF PROJECT CONCERN*	SPECIFIC ENVIRONMENTAL CONCERNS TO BE CONSIDERED IN AID/NHA SITE SELECTION AND LAND DEVELOPMENT FEASIBILITY INVESTIGATIONS AS WELL AS IN THE PREPARATION OF SITE DEVELOPMENT PLANS	
LOCATIONAL FACTORS POTENTIALLY IMPACTING PROGRAM/PROJECT			
1. PRESENCE OF SIGNIFICANT NATURAL HAZARDS:			
a) SEISMIC DISTURBANCES	NA		
b) FLOODING/HIGH WATER TABLE	C		
c) DROUGHTS	NA		
d) TORNADOES, HURRICANES, OR SIROCCOS	NA		
e) LANDSLIDES, ROCK SLIDES, OR UNSTABLE SLOPE CONDITIONS	NA		SELECTED LOW-LYING AREAS IN TARGET COMMUNITIES SHOULD BE EVALUATED FOR THEIR SUITABILITY FOR HABITATION OR OTHER RELATED MAN-MADE USES.
f) FIRES	NA		
g) SOIL STABILITY- SHIFTING SANDS, EXPANDING CLAY, EROSION, ETC.	C		

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2. EXISTENCE OF MAJOR ENVIRONMENTAL HEALTH PROBLEMS:			
A) WATER QUALITY/SUPPLY	P	PRIMARY RELIANCE WILL BE PLACED ON THE USE OF LWSC'S WATER SUPPLY AND DISTRIBUTION SYSTEM WHICH MEETS WHO STANDARDS. IF GROUNDWATER RESOURCES MUST BE UTILIZED IN ANY SELECTED SITES AND SERVICE PROJECTS, APPROPRIATE TESTING WILL BE CONDUCTED TO ASSURE AN ADEQUATE AND SAFE POTABLE WATER SUPPLY.	
B) CLIMATE AND AMBIENT AIR QUALITY	U		
C) COMMUNICABLE DISEASES	C	THE MULTIPLICITY OF POTENTIAL DISEASE VECTORS POSES SERIOUS HEALTH PROBLEMS TO THE TARGET POPULATION. RECOGNIZING THAT AID'S ACTIONS WILL ONLY HAVE A LIMITED EFFECT ON DISEASE PREVENTION. THE ASSISTANCE OF LIBERIA'S MUNICIPAL AND NATIONAL GOVERNMENT AGENCIES MUST BE SOLICITED IN CONJUNCTION WITH AID'S PROPOSED IMPROVEMENTS TO EFFECTIVELY COMBAT THE HIGH INCIDENCE OF COMMUNICABLE DISEASES.	
D) MAN-MADE NUISANCE - NOISE, ODORS, TOXIC MATERIALS, ETC.	NA		

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3. AVAILABILITY AND CAPACITY OF BASIC COMMUNITY INFRASTRUCTURE AND SERVICES:			
A) TRANSPORTATION - ACCESSIBILITY TO JOBS, SERVICES, ETC.	P	EXISTING LOW-INCOME COMMUNITIES ENJOY REASONABLE ACCESSIBILITY TO EMPLOYMENT OPPORTUNITIES, SERVICES, MARKETS, ETC. PLANNED FUTURE SITES AND SERVICE PROJECTS WILL REQUIRE TRANSPORT SERVICES TO BE ARRANGED AND AVAILABLE AT THE TIME OF THE ANTICIPATED OCCUPANCY OF UNITS.	
B) WATER SUPPLY AND DISTRIBUTION	U		
C) SEWAGE COLLECTION, TREATMENT AND DISPOSAL	S	PRIMARY TREATMENT PROVIDED BUT LIMITED CAPACITY OF PUMP STATIONS & TRANSPORT SYSTEM ON BUSHKOD ISLAND POSES POTENTIAL LIMITATIONS ON SEWER HOOK-UPS	
D) HEALTH CARE	U		
E) SOLID WASTE COLLECTION AND DISPOSAL	U	PROGRAM PLANNING AND IMPLEMENTATION SHOULD BE COORDINATED WITH THE MUNICIPAL GOVERNMENT OF MONROVIA TO ASSURE THE PROVISION OF APPROPRIATE PUBLIC SERVICES.	

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<p>4. URBAN/REGIONAL GROWTH AND LAND USE CONSIDERATIONS:</p> <p>A) STRAINS ON THE CAPACITY OF EXISTING NATURAL SYSTEMS (FOOD PRODUCTION, WATER SUPPLY, ETC.) OR MAN-MADE SYSTEMS (PUBLIC TRANSPORT, ELECTRICAL SUPPLY, SCHOOLS ETC.) DUE TO PREVAILING PHYSICAL GROWTH PATTERN OF URBAN CENTER (S) ANTICIPATED TO BE POSSIBLE HG SITES</p>	U		
<p>B) IDENTIFIABLE IMPORTANT ENVIRONMENTAL RESOURCES THREATENED BY THE PROCESS OF URBANIZATION</p> <ul style="list-style-type: none"> • RARE OR ENDANGERED PLANT AND WILDLIFE HABITATS 	U		
		GOL PROGRAM WILL NOT STIMULATE URBAN GROWTH AND WILL BE PLANNED TO BE CONSISTENT WITH MONROVIA'S PLANNING AND HOUSING POLICIES.	

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*COLUMN 2 SYMBOLS:

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• WETLANDS	C	UNCONTROLLED URBAN DEVELOPMENT POSES A POTENTIAL THREAT TO THE LONG-TERM PRODUCTIVITY OF MONROVIA'S COASTAL ESTUARY. THE PROGRAM WILL REDUCE THE CUMULATIVE IMPACT OF SELECTED INHABITED RESIDENTIAL AREAS AND OFFER DEMONSTRATION EFFECT ON CONSIDERATION OF ENVIRONMENTAL CONCERNS IN FUTURE PLANNING AND DEVELOPMENT DECISIONS.	
• AGRICULTURAL LANDS	U		
• FLOOD PLAINS	U		
• FOREST	U		
• HISTORIC, ARCHAEOLOGIC AND CULTURALLY SIGNIFICANT SITES	U		
• UNIQUE NATURAL AREAS	U		
• SCARCITY OF CRITICAL RAW MATERIAL	U		

*COLUMN 2 SYMBOLS:
 NA -- THIS AREA OF CONCERN IS NOT APPLICABLE TO THE COUNTRY, REGION OR THE PROJECT.
 U -- THIS AREA OF CONCERN IS OF LIMITED TO BE OF IMPORTANCE.
 P -- THIS AREA OF CONCERN IS POTENTIALLY OF IMPORTANCE.
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 S -- SIGNIFICANT ENVIRONMENTAL IMPACT WHICH OCCURS UNDER ALTERNATIVE ACTIONS OR MITIGATING MEASURES ARE IDENTIFIED.

3. Identification and Description of Critical Concerns Related to the Demonstration Shelter Programs

The focus of this part of the IEE is directed towards the proposed project level actions. The establishment of existing baseline conditions from which to judge probable environmental impacts is based on field investigations of a number of potential project sites in outlying areas of Monrovia. They included New Georgia, Barnersville, New Kru Town, Point Four, Duala, Logan Town, Jamaica Road and Plonkor. Because existing environmental conditions in Monrovia (except the downtown section) are generally consistent, the findings of the IEE can be applied to other sites that may be identified during project design.

The following discussion is presented on those environmental issues identified in Column 2 of Table 1 as being a potential (P) or a critical (C) concern. The relationship between these areas of environmental concern and specific program components is examined, and the probable nature and extent of the environmental impacts are stated in Column 4. In addition, special mitigating measures to be incorporated into the project design to minimize potential adverse impacts are identified.

Impact Rating

1. NATURAL ENVIRONMENT

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(+)

● Existing Water Resources

The lack of or improperly functioning sanitary and/or storm drainage systems in target communities is the primary cause of water pollution in the Monrovia area. The maintenance of good water quality is particularly critical to the country's fisheries, which are directly tied to the coastal mangrove ecosystem. In addition, protection of existing water resources is important since Liberian officials contemplate utilizing groundwater in the near future to supplement Monrovia's existing surface water supply sources. Implementation of the community upgrading program will cause a reduction in the quantity of raw sewage and sediment being discharged into the coastal estuary. This program will therefore contribute towards improved water quality management in Monrovia.

(+)

● Environmentally Sensitive Areas

The proposed actions are primarily directed towards the upgrading of existing low-income communities rather than to new housing construction. Since the process of community building has already taken place, the primary impacts on the natural

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environment have already occurred. Monrovia's low-income communities are located close to environmentally sensitive areas-- mangrove marshes and coastal estuary. To avoid or minimize potentially adverse impacts, the land selected for project sites will not be physically expanded beyond its present habitable boundaries. The anticipated effects of community upgrading and basic infrastructure will minimize or eliminate a number of pollutional sources which are damaging to the coastal ecosystem. Surfacing of local streets and the installation of storm drainage systems are expected to reduce the amount of sediment discharged into adjacent wetlands from unpaved laterite streets and erosion-prone hillsides. Similarly, the extension of the City's waterborne sewage collection system into areas with malfunctioning or non-existent sewage disposal systems will eliminate the runoff of raw sewage potentially detrimental to both terrestrial and aquatic plant and animal life in the coastal estuary.

(+)

● Influence on Current/Future Land Planning and Development Decisions

Recognition and integration of environmental factors and values in the site planning and development process of the demonstration projects could serve to increase environmental awareness and provide a positive approach to be followed. Specifically, the technical assistance personnel will represent the opportunity to strengthen the National Housing Authority (NHA) staff's awareness and sensitivity to environmental concerns.

(+)

● Ecological Consequence of Introducing Technological Changes

The ecological consequences of introducing waterborne sanitary and storm drainage systems into unsewered or partially sewerd low-income communities is not expected to result in any significant adverse impact on existing environmental conditions. The anticipated effects will be primarily twofold. First, the city's total volume of water consumption will increase proportionally with the number of new consumers added. The present consumption level per capita is 30-50 gallons per day. Based on current expansion plans, the Liberian Water and Sewer Corporation (LWSC) is expected to have sufficient production capacity to meet the additional water demand. Secondly, the transport of raw sewage from the target areas to a central point of treatment and discharge into the Mesurado River will increase the current level of effluent loading. However, the estimated increment in sewerage flow (1.3 million GPD) is not believed to be sufficient to significantly affect existing water quality conditions. Use of Monrovia's waterborne sewerage system will be far less damaging to the environment than uncontrolled and untreated sewage from malfunctioning privies and septic tanks.

Impact
Rating

2. HUMAN ENVIRONMENT

(+)

● Community Character and Cohesion

The proposed upgrading program of existing low-income areas will be directed towards the elimination or reduction of existing physical deterioration by means of improved infrastructure services and accommodations while preserving the community character. Field investigations and discussions with Liberian officials indicate that a strong sense of identity is an important aspect of the Liberian culture. It is anticipated that the process of community upgrading will increase participation of local residents in community affairs and strengthen community cohesiveness.

(+)

● Population Size

The number of residents of the target communities affected by the proposed program is estimated to be approximately 6,728 households. Assuming the average household size is seven (7) persons, 47,000 persons, or 38% of Monrovia's existing below-median-income-level population (125,000) will be affected. This represents 19 percent of the City's total population in 1977. Since the project includes a number of sites and relocation of population will be insignificant there will not be a positive significant effect.

(+)

● Housing Location

Monrovia's current rate of population growth and physical expansion poses potential environmental problems, given its natural physical setting and scarcity of buildable land. Since marginal areas will be utilized to accommodate future growth, the program may have a demonstration value of how ecological considerations may be integrated with other development factors in the planning and design of housing projects.

3. PUBLIC HEALTH AND GENERAL WELL-BEING

(+)

● Communicable Disease Control and Environmental Hygiene

The proposed community upgrading and home improvement effort will substantially intervene in the chain of transmission of

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Rating

prevalent communicable diseases which commonly afflict inhabitants of low-income communities. All waterborne and some water-based diseases depend on faecal access to domestic water sources. The extension of a community wastewater collection and disposal system and safe potable water supply to individual dwellings may substantially reduce both opportunities for breeding of insect vectors and transmission of waterborne, water-washed and water-based infections. However, the potential improvement in community health may be somewhat limited because of several conditions: (1) the limited area to be improved and the presence of extensive wetlands within and surrounding the target communities; (2) the level of public health education; and (3) the slow process of acceptance of disease prevention.

(-)

● Displacement and Relocation of Families

It is expected that no more than 566 families, i.e., not more than 10% of the households in any one community will have to be relocated in order to accommodate the improvements proposed in the community upgrading program. To minimize the extent of dislocation of people and property, the following mitigating measures, among others, have been incorporated into the project's design:

- 1) adoption of a policy to minimize right-of-way easements in the street upgrading, use of pedestrian paths and limiting the extent of new street construction;
- 2) implementation of a socio-economic survey to identify the characteristics and conditions of the families to be displaced in order to develop a suitable relocation plan;
- 3) integration of "vest pocket" sites and services units in selected communities where community upgrading improvements will be made to minimize disruption of established socio-economic patterns and cultural ties;
- 4) provision of transport by NHA for relocation of households to prepared resettlement areas; and
- 5) advanced installation of essential infrastructure and construction of new housing accommodations prior to demolition of existing housing structures.

Considering the limited extent of displacement and the incorporated mitigating measures, the cumulative effect of the proposed action will not significantly affect the human environment.

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• Employment/Income Generation

Unemployment and underemployment are considered serious socio-economic problems in Monrovia's low-income communities. It is anticipated that the labor force in the target communities is mainly represented by unskilled laborers. The proposed improvements will provide opportunities for the project area's skilled and unskilled laborers to participate in construction of the 1,775 sites and services units and installation of basic infrastructure. Similar employment generation is expected through the 3,900 home improvement loans.

Because completion of the program is not anticipated to exceed a period of five years, the creation of direct employment benefits is expected to be short-term. However, long-term benefits may be expected through on-the-job training and advancement of existing cottage industries.

In addition, the program will enable the target population to generate additional income by renting part of their quarters. This will provide some long-term income stability and financial security against unexpected economic fluctuations.

(+)

• Income Expenditure Pattern

The 1977 median income in Monrovia is estimated at approximately \$93 per month, or \$1,115 annually. The target population is identified as those families earning less than this amount. A 1974 income distribution survey, conducted by the Ministry of Planning and Economic Affairs, indicates that a large portion of the target population earns substantially below the median income. Accurate survey data are not presently available regarding the target population's income expenditure pattern. It is estimated that the average family spends approximately 25 percent of income for meeting its shelter needs.

A number of alternative shelter solutions have been formulated which should be both culturally acceptable and financially affordable. The following describes each of these shelter solutions and its costs. Table 2 shows the comparison of shelter cost and affordability by the target population.

Sites and Services Program Options:

- a) A 20'x60' lot serviced with water and septic tank and a 5'x8' sanitary core with a shower faucet installation, a drain, and a water closet connected to a septic tank.

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The walls will be made of 8"x8"x16" concrete blocks on strip foundations and a 4" concrete pad. The roof will be constructed of termite-treated poles or milled lumber and metal sheet roofing.

- b) A serviced lot with a sanitary core and a 6'x15' unenclosed, but covered cooking/utility area comprised of strip foundations, a 4" concrete slab, 4"x4" termite-treated wood columns, and a similarly treated roof structure of 2"x4" plates and pole or milled lumber frame. The roof cover will be metal sheets.
- c) A serviced lot with a sanitary core, cooking/utility space and a 12'x18' multifunctional space comprised of strip foundations, a 4" concrete slab, 4"x4" termite-treated wood columns, and a roof structure with metal sheet cover. A three-course high concrete block wall around the perimeter of the multifunctional space will be provided as a splash guard for organic wall materials presently used or as a base for full height block walls.

Community Upgrading Program:

The basic infrastructure improvements include provision of water supply, sewage collection and disposal, electricity, street pavement, curbs, and storm drainage.

Small Home Improvements Program:

Improvements may include installation of a septic tank or connection to a waterborne sewage disposal system, construction of a 14'x14' concrete slab, building materials for completion of a two-room addition, and four concrete block walls.

TABLE II

FINANCIAL COST/AFFORDABILITY ANALYSIS

<u>Type of Program</u>	<u>Loan Amount</u>	<u>Monthly Payment</u>	<u>Required Monthly Income</u>
SITES AND SERVICES			
Option A*	\$ 1,280	\$ 12.25**	\$ 49.00
Option B*	\$ 1,490	\$ 14.25**	\$ 57.00
Option C*	\$ 1,820	\$ 17.40**	\$ 70.00
SMALL HOME IMPROVEMENTS			
Average Loan	\$ 500	\$ 10.15***	\$ 40.00
COMMUNITY UPGRADING			
Average Loan	\$ 665	\$ 6.36**	\$ 25.00

- * See description of sites and services options above.
- ** Terms are 8% interest rate, 15 years (average).
- *** Terms are 8% interest rate, 5 years (average).

The use of one or several methods of cost recovery will cause some changes in established expenditure patterns. Therefore, special care must be taken to assure that the additional costs for urban services and shelter improvements are within the beneficiaries' ability and willingness to pay.

4. LOCATIONAL FACTORS POTENTIALLY IMPACTING PROGRAM/PROJECT

• Natural Hazards--Flooding/High Water Table and Soil Instability

The encroachment by Monrovia's low-income population into marginal areas poses potential dangers of flooding from nearby surface waters and/or storm water runoff. In addition, these areas are noted for unstable soil conditions and limited bearing capacity. These potential development constraints should be recognized and evaluated. It is recommended that the analysis of hydrologic and geologic/soil conditions be carried out in concert with Liberia's Geologic Survey.

• Environmental Health Problems--Water Quality/Supply

For the New Georgia site where it may be impossible to connect to the existing public water distribution system, a local water supply system will be developed. Cooperation of Liberia's Geologic Survey in assessment of groundwater capacity and reliability on this and other sites with similar conditions will be required.

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Special consideration must be given, however, to effective protection of aquifer recharge areas, particularly if the Liberian Water and Sewer Corporation decides to utilize the groundwater to increase Monrovia's water supply.

● Environmental Health Problems--Exposure to Communicable Diseases

Since the proposed program envisions both upgrading of existing low-income communities and possibly two new sites and services projects, consideration must be given to communicable disease problems and to use of both curative and preventive measures. Families exposed to poor hygienic conditions due to locational disadvantages may be relocated to areas where the proposed infrastructure improvements are to be installed to eliminate such health hazards as flooding, ponding of high water, and hillside erosion.

To avoid unnecessary health risks to future residents of any new projects, initial site feasibility investigations should consider such factors as:

- 1) proximity to bodies of surface water known to be seriously contaminated or breeding areas for water-related insect vectors posing a high health risk;
- 2) permeability of soils to avoid a high water table or periodic ponding of water;
- 3) surface drainage patterns; and
- 4) other similar environmental design constraints.

● Availability and Capacity of Basic Community Infrastructure and Services

Considering the transportation service difficulties NHA has experienced with its Siporex II project at Barnesville, it may be expected that similar problems may initially develop with the two proposed sites and services projects.

It appears that the Siporex II transportation problems are attributable to the distance from downtown Monrovia to the freeway, poor conditions and maintenance of the access road and low ridership demand. It is, however, anticipated that these conditions will substantially improve once the Siporex II project is fully occupied.

The proposed New Georgia site will have similar, possibly even more difficult, problems. It is therefore mandatory that the site evaluation and feasibility studies carefully analyze the potential availability and efficiency of transportation for future residents.

● Sewage Collection, Treatment and Disposal

Monrovia's municipal sewerage disposal system provides a primary level of treatment and its operational performance is reasonably good. The treatment reduces the biochemical oxygen demand (BOD) of raw sewage from an average of 250 parts per million to 25 PPM. However, the system does have a number of operational problems:

- 1) Excess infiltration of groundwater which causes average dry weather flows to increase from 3.0 million gallons per day (MGD) to 6.0 MGD in the wet season.
- 2) The capacity of the sewage collection system is limited by the capacity of the two pump stations and transport system serving the Bushrod Island area.

The latter is expected to represent a potentially critical constraint to the proposed improvement program.

It is expected that the existing two pump stations and interceptor sewers will not handle the additional sewage flow generated by the proposed improvements. Preliminary estimates indicate that the present hydrologic capacity of the pumping stations will be exceeded by the increment in sewage flow from the proposed community upgrading action and the capacity of the interceptors will reach or nearly equal their capacity.

Other potential programs related to the capacity of the existing primary treatment plant and the additional demand generated by the improvement program must be considered. The plant which discharges effluent into the Mesurado River appears presently to have sufficient capacity to handle the increased flow during the dry season. Infiltration during the rainy season, however, causes the present sewage flow to reach the plant's rated capacity leaving practically no excess capacity for any additional demand.

As to the disposal of partially treated effluent into the Mesurado River, it can be assumed that because of the augmentation in flow during the wet season, the stream will have enough assimilative capacity to handle the expected additional effluent load. However, it must be realized that its assimilative

capacity and its use as a receiving stream are limited. Monrovia's growth and continuous use of the River as the sole body of water receiving its sewerage effluent could critically affect the coastal estuary which its fishing population depends upon for employment and economic security.

C. Special Environmental Performance Standards Incorporated Into Program Design

A number of potential adverse effects were recognized in the early stages of program design, and appropriate mitigating measures were incorporated to eliminate or reduce their impact. Both have been identified and discussed in the preceding impact analysis section. However, the Initial Environmental Examination process has identified additional actions to be undertaken to further protect and enhance the quality of the environment on project sites.

The selection of project sites in close proximity to environmentally sensitive wetlands shall be guided by regulations controlling the alteration of land and removal of vegetation by specific guidelines for site drainage, erosion and sedimentation control, and sewage effluent disposal.

1. Environmental Objectives

- a. Project development should not have a significant detrimental effect on environmentally sensitive areas or ecologically important natural resources including Monrovia's coastal waters, tributary streams, and adjacent uplands.
- b. Development process should minimize alteration of natural site conditions to preserve and protect the environment.
- c. Site development plans should demonstrate a recognition of physical features and environmentally sensitive areas both on-site and off-site.

2. Specific Development Guidelines

- a. Preliminary and final site development and construction plans will identify the location and type of environmentally sensitive areas and will take appropriate preservation and protection steps.

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- b. No alterations to the existing character of environmentally sensitive areas, such as wetlands, mangrove marshes will be made except in those cases where the natural ecological function has already been substantially changed.
- c. A buffer zone will be established along the boundaries of environmentally sensitive areas. In most cases, the buffer will be sufficient to minimize significant adverse impacts resulting from storm runoff and sedimentation. No development activity will occur in this restricted zone unless the proposed use can be shown to be compatible.
- d. During development and construction, cut and fill operations or grading will not encroach upon natural water courses, flood plains, or constructed channels to adversely affect adjacent land areas.
- e. Land development will occur in increments which can be completed during a single construction season.
- f. Erosion and sediment control measures will be coordinated with grading and construction operations. Control measures will be established prior to the initiation of each increment of the development/construction process. These measures will be maintained through the development process to avoid any deleterious effects on vegetation, water quality and aquatic life.
- g. In the design of drainage and runoff control systems consideration will be given to alternative methods of on-site storm water retention, such as:
 - seepage basins
 - unpaved ditches
 - grading of lots and streets to achieve dispersion rather than concentration of runoff into swales, terraces, or open space areas
 - use of natural gravel deposits for the lower portions of storm collection basins
 - flattening of drainage slopes.
- h. The design of all on-site drainage facilities will minimize the need for maintenance and the creation of nuisances or public health hazards, such as stagnant water with concomitant algae growth, insect breeding, and odors; discarded debris; or a threat to public safety.
- i. Outlet control structures will be designed to keep storm water runoff velocities at a minimum.

- j. Soil and subsoil conditions will be examined for suitability of planned uses, excavations, and site preparations.
- k. The quality of sewerage effluent which may be discharged from any on-site disposal system will be commensurate with environmentally sound standards to assure protection of both land and water resources.

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III. THRESHOLD RECOMMENDATION

Based upon the preceding environmental evaluation, it is recommended that the Technical Assistance portion of the Liberia Program be given a Negative Determination requiring no further environmental review and the Housing Guaranty and Development Loan portion to be given a Positive Determination.

A. Technical Assistance/Development Grant (DG)

The proposed technical assistance actions which are non-project related, involve a general range of activities which are directed towards institution building, skill development, and policy definition. These types of actions are identified in AID Regulation 16 (Section 216.2(a)) as not representing a major federal action significantly affecting the human environment. Therefore, a Negative Determination is recommended for the Technical Assistance (DG) portion.

B. Housing Guaranty (HG) and Development Loan (DL)

The IEE has concluded that the physical size and the potential number of beneficiaries of the Shelter Program will significantly affect Monrovia's waterborne sewage disposal system's ability to effectively function. It is therefore concluded that an Environmental Analysis should be conducted.

The objective of the recommended EA should be to identify the probable impacts of the Shelter Program on Bushrod Island's sewage collection, and transport system, and on the treatment facilities in Sinkor. The following specific issues should be discussed in the EA:

1. Estimate of available capacity of existing sewage collection/transmission system (lines and pump stations) to accommodate future sewage flows;
2. Estimate of potential increment to existing flows as a result of sewer hook-ups from the Program;

3. Assessment of the environmental effects generated by the proposed actions on Monrovia's existing sewage collection/transmission and treatment facilities and by any future planned improvements which may occur within the anticipated implementation period;
4. Review of alternative courses of feasible action in terms of:
 - Contribution towards Achievement of Environmental Goals
 - Capital and Operating Cost
 - Environmental Effects--Physical, Social, Economic and Cultural
 - Operability, Reliability and Flexibility of Transport and Treatment Components/Systems

It is further recommended that the EA be conducted in collaboration with GOL personnel as a part of program feasibility studies. This would most logically occur after placement of the technical assistance personnel funded under the DG portion of the Liberia Program.

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ENVIRONMENTAL DETERMINATION SHEET

PROJECT TITLE AND NUMBER: HOUSING GUARANTY (HG) AND DEVELOPMENT LOAN (DL)
COMPONENTS OF THE LOW INCOME HOUSING PROGRAM
669-HG-001 and 669-0146

LOCATION: LIBERIA

ENVIRONMENTAL DETERMINATION/DECLARATION: (CHECK ONE)

ON THE BASIS OF THE ATTACHED SUPPORTIVE MATERIALS, I RECOMMEND THAT YOU
MAKE THE FOLLOWING THRESHOLD DECISION:

1. THE PROPOSED OFFICE OF HOUSING ACTION IS NOT A MAJOR FEDERAL ACTION,
WHICH WILL HAVE A SIGNIFICANT EFFECT ON THE HUMAN ENVIRONMENT
(NEGATIVE DETERMINATION).
2. THE PROPOSED AGENCY ACTION IS A MAJOR FEDERAL ACTION, WHICH WILL HAVE
A SIGNIFICANT EFFECT ON THE HUMAN ENVIRONMENT (POSITIVE DETERMINATION)
AND:
- A. AN ENVIRONMENTAL ASSESSMENT IS REQUIRED; OR
- B. AN ENVIRONMENTAL IMPACT STATEMENT IS REQUIRED.
3. THE PROPOSED AGENCY ACTION QUALIFIES FOR A NEGATIVE DECLARATION. SEE
UPPER:

SUPPORTIVE MATERIALS PREPARED BY:

APPROPRIATE OFFICIAL CONFERENCE:
APPROVED:

Peter H. Kimm
Peter H. Kimm

2/17/79
DATE

ASSISTANT ADMINISTRATOR'S DECISION:
APPROVED:

Goler T. Butcher AA/AFR

MICROFILMED
AND
SERIALIZED

Clearances:

SER/H:DMcVoy DM 2/19/79 AFR/DR:DDibble _____
SER/H:Frankel FR 2/19/79 AFR/DR:GThompson _____
CC/H:MKitay Kitay CC/AFR:JPatterson _____
AFR/CAEA:SAnderse SAnderse 2/19/79

DS/ENCR:PStearns _____
DS/OST:APratz _____

ENVIRONMENTAL ASSESSMENT

AN EVALUATION OF PROBABLE ENVIRONMENTAL IMPACTS
OF ALTERNATIVE SEWERAGE SYSTEMS IN THE
NEW KRUTOWN AND NEW GEORGIA SHELTER PROJECTS
(Housing Guaranty Program 525-HG-001)

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

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ENVIRONMENTAL ASSESSMENT STATEMENT

An Initial Environmental Examination (IEE) was carried out on the proposed U.S. AID/Liberia shelter program in December 1977. A Positive Determination was recommended for the New Krutown upgrading component of the shelter program. The principal environmental concern was identified to be the project's potential increase in sewage flows into the existing overloaded Bushrod Island sewerage collection and transmission system and the limited treatment capacity of the Sinkor plant.

Based upon the findings of a recent Environmental Assessment (EA) of the sanitary collection, treatment and disposal problems related to the New Krutown subproject, the EA recommends that the sanitary actions set forth in the Project Paper be implemented. In recognition of New Krutown's reliance upon a standpipe water distribution system, it is recommended that the part of the HG monies designated for sanitary infrastructure be used only to finance the repair and new construction of self-contained sanitary waste disposal systems mainly of the dry type. Environmentally acceptable sanitary systems may include the following types -- bore holes, pit privies or septic tanks with soakaways. Connection to the existing waterborne sewerage collection and transmission system leading to the Sinkor treatment facilities should be expressly prohibited until a facilities plan is completed in the future on the city-wide sewerage system of Monrovia.

- * Final Environment Assessment Report will be distributed at Project Paper meeting June 21, 1979.

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in Preparation of the Environmental Assessment

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ACKNOWLEDGEMENT
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PARTICIPANTS ASSISTING
IN THE
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I. INTRODUCTION

A. DESCRIPTION OF THE PROPOSED ACTIONS

The segment of the USAID/Liberia Shelter Program covered by this EA is the capital portion composed of (1) development of sites and services lots with basic core housing; (2) upgrading infrastructure in existing low-income communities; and (3) provision of home improvement and construction material loans to beneficiaries. These capital activities will be financed by \$4 million of a grant and \$10 million of a HG. These activities are a continuation of a grant funded technical assistance project authorized in FY 78.

B. FINDINGS AND RECOMMENDATIONS OF THE IEE

An Initial Environmental Examination (IEE) was carried out on the proposed U.S. AID/Liberia Shelter Program in December 1977. The institutional building technical assistance components were given a negative determination. A Positive Determination was recommended for the capital component of the shelter program. The principal environmental concern was identified to be the New Krutown sub-project's potential increase in sewage flows into the existing and overloaded Bushrod Island collection and transmission system and the limited treatment capacity of the Sinkor plant. The EA would also examine the environmental effects of the waterborne sanitary collection and treatment system proposed for the New Georgia sites and services project. The sanitary design standards established for these two types of projects will be considered prototypical for the follow-on activities planned for the project on similar sites.

In addition, it was recommended that the Environmental Assessment (EA) be conducted in collaboration with GOL personnel as an integral part of project design activities and in support of the technical analysis for the Project Paper. It was stipulated that the logical timing of the EA's investigations occur after placement of the technical assistance team in Monrovia, Liberia.

C. GENERAL OBJECTIVES OF THE EA

In preparing the plan of study to be carried out in the field by the selected technical team, AID's Office of Housing set forth the following purpose of the EA: "establish a comprehensive understanding of the probable environmental effects of all feasible sewerage collection and treatment alternatives and based upon an evaluation of their short- and long-term impacts recommend the preferred alternative to be implemented in each subproject site."

Based upon this directive, the environmental consultants established three (3) general objectives to be accomplished by the EA investigation:

1. Identify and evaluate if any potential significant impacts are likely to occur from the proposed sewerage collection and treatment facilities to be used in the Liberia/USAID Housing Program in the New Georgia sites and services subproject and the community upgrading subproject in New Krutown.
2. If any significant adverse impacts are likely to occur from the proposed subprojects, sewerage collection and treatment facilities, reasonable alternative actions will be studied and appropriate mitigating measures adopted to reduce or to eliminate these potential adverse effects.
3. To ensure overall project soundness, a set of environmental engineering guidelines describing standards of sewerage collection and treatment will be prepared for use as an integral part of project design. These will be taken into consideration by the design team in the physical design of each subproject.

D. OUTLINE OF THE APPROACH USED IN CONDUCTING THE EA

1. Project Background

In collaboration with resident TA team, NHA staff and AID Mission officials review and discuss subproject design of sewerage collection and treatment facilities. Conduct brief field reconnaissance of subproject sites with TA team and NHA staff for specific location and general familiarization of physical and social settings of project sites.

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2. Formulation and Analysis of Alternatives

Types of alternatives to be considered may include: 1) waste collection and treatment systems -- individual, semi-public and communal facilities; 2) siting of treatment facilities; and 3) disposal of sludge. Brief statement of justification of rejected alternatives. Feasible alternatives will be compared on basis of capital and operating costs, social acceptability, reliability and environmental effects on human health and natural biological communities.

3. Selection of Preferred Alternative Sanitary Waste Collection and Treatment Systems in Each Shelter Project

4. Description of the Potential Environmental Impacts of the Preferred Alternatives

E. SPECIFIC ENVIRONMENTAL ISSUES AND CRITICAL CONCERNS TO BE CONSIDERED IN THE EA

The following environmental issues and critical concerns were examined as part of the EA scope of work. These issues and concerns were identified as a result of the Initial Environmental Examination's findings, subsequent field investigations and discussions carried out with the assistance of the NHA/AID design team and other Liberian officials over the period May 22-June 15, 1979.

1. Major Issues and Critical Concerns

- a. Determine the ecological importance and environmental sensitivity of the tidal estuaries, mangrove areas and upland marshes in the vicinity of the New Georgia and New Krutown cities, relative to proposed sewerage treatment and disposal system.

Size and biological importance of the wetlands in the vicinity of each subproject site;

Extent and type of interdependency between the wetland areas and indigenous population groups living on-site and/or in the immediate vicinity of the subproject sites;

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Type and significance of any anticipated changes in water quality and/or biological communities caused directly or indirectly by proposed stormwater and/or sewerage facility improvements;

Reasonable alternatives for handling the wastewater collection/disposal requirements in each subproject; and

Selection of preferred wastewater and stormwater alternatives and rationale for the preferred alternatives in each respective subproject area.

- b. Determine the adequacy of the Liberian Water and Sewer Corporation's (LW+SC) supply and distribution system to meet the projected water requirements of the future inhabitants of the New Georgia subproject.

Capacity of the existing water supply system and its ability to furnish safe potable water to the present and future population in the New Georgia subproject area;

Size and capacity of the existing water transmission line along the freeway and the access road leading into the New Georgia housing site;

Type of existing water distribution system and level of service provided existing residents in Phase I and planned in Phase II;

Preferred method of sewerage treatment system given existing and planned construction of wet sanitary core units.

- c. Determine the most culturally acceptable, cost-effective, and environmentally sound method of wastewater collection and/or disposal for New Krutown.

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Types of existing water supply systems, their respective geographic service areas, and estimated population served by each system;

Environmental health problems associated with the location of these facilities, method and quality of construction, use and maintenance by their users or public officials;

Types of existing sewage collection and/or disposal systems and estimated population using each respective type;

Environmental health and social problems associated with the location, design and construction, use maintenance and cleaning of these sanitary facilities by their respective users;

Reasonable alternative sewage collection and/or disposal solutions;

Prototype designs and estimated cost of construction of preferred alternative solutions.

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II. BACKGROUND AND ENVIRONMENTAL SETTING CONDITIONS

A. IDENTIFICATION OF STUDY AREAS

The focus of the EA is on two proposed housing development sites-- New Krutown and New Georgia. These sites are geographically located north of Monrovia, the capital of Liberia. Their locations are shown in Figure 1. Both sites are situated in the peripheral area of the metropolitan region of Monrovia. New Krutown is approximately $4\frac{1}{2}$ miles from downtown Monrovia, and the New Georgia site is a distance of 6 miles. This part of the region is one of two primary growth areas conveniently located to the capital. Highway access to the sites is by means of a 4-lane undivided highway which links Bushrod Island and Monrovia and a 2-lane circumferential expressway which circles north of the capital and ties into the Bushrod Island highway.

B. NATURAL SETTING CONDITIONS

1. New Krutown

New Krutown is an existing low-income community located in the northernmost end of Bushrod Island. Its prominent physical features are shown in Figure 2. The topography of the site is basically flat with a long linear lagoon or marshy area situated in the middle of the community and parallel to the coast. The average elevation is 12 feet above mean sea level. The natural drainage pattern of the perimeter areas of the site follows existing contours towards the Atlantic Ocean on the west and the St. Paul River and adjacent estuary to the north. The interior area of New Krutown drains into the marshes located approximately 500 meters inland from the shoreline. Soils are sandy with excellent percolation except in high water table areas near the St. Paul River estuary and along the wet marshes in the center of New Krutown.

The natural vegetative cover has been largely removed by the urbanization process which occurred years ago. Scattered palms and other indigenous shade trees are commonly found throughout the community. The only existing unspoiled biological communities intact near New Krutown are the mangrove and related marshes in the St. Paul River estuary. This area is considered to be ecologically sensitive and important in the food chain cycle of Liberia's coastal fisheries.

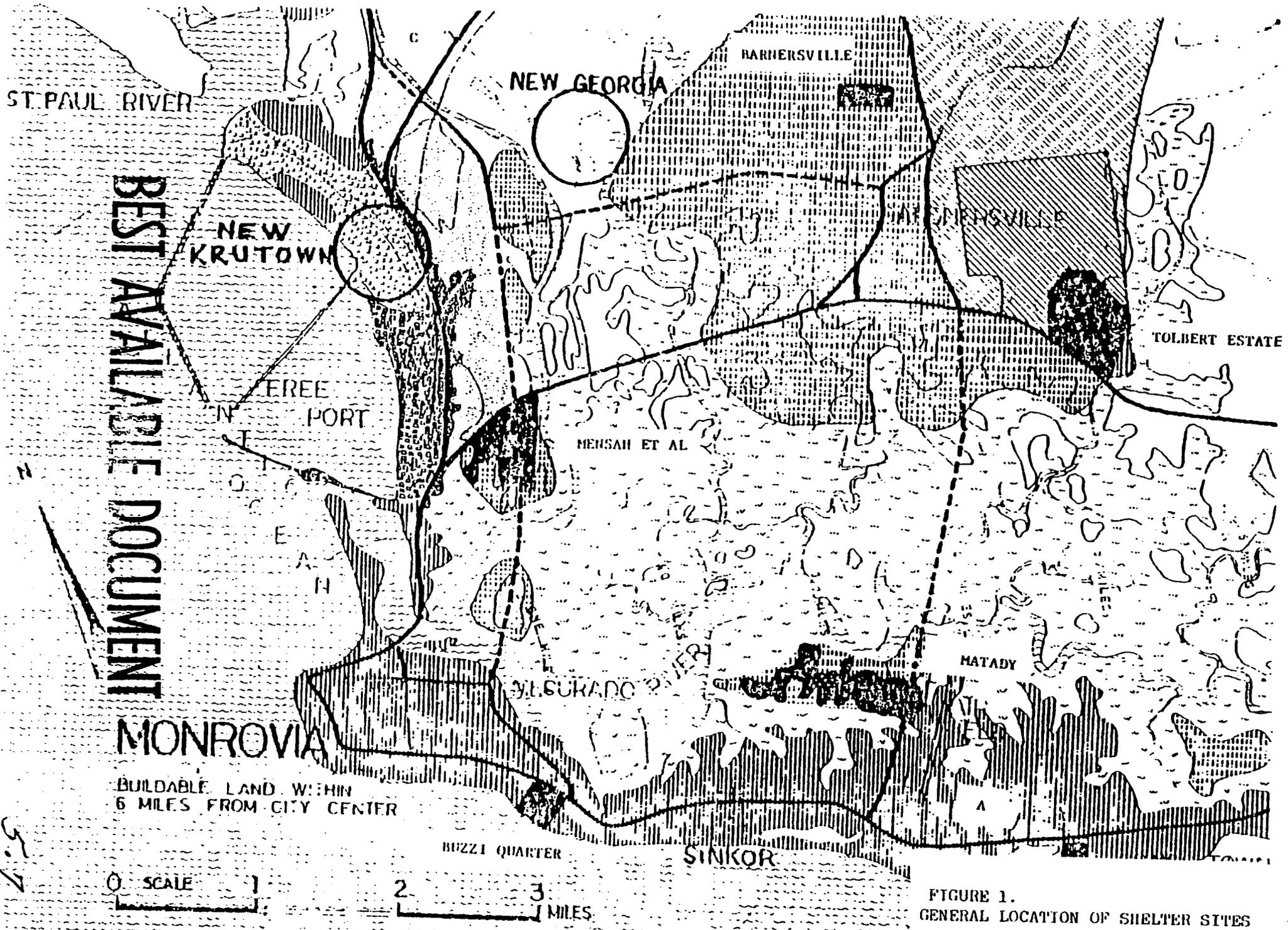


FIGURE 1.
GENERAL LOCATION OF SHELTER SITES

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2. New Georgia

The New Georgia site is located approximately 1 mile north of the freeway and approximately 2 miles east of Stockton Creek (see Figure 3). The 50-acre site selected by the Liberia National Housing Authority for the sites and services project is adjacent to the Stockton Creek estuary. The topographic elevation of the site is approximately 18 feet above mean sea level. The site is basically flat and well drained. Soils are generally characterized as sandy with high permeability except in a few scattered areas which are lowlying and marshy. Groundwater investigations show the depth of the site's water table ranges from 1.2-3.5 meters from the surface. Figures 4 and 5 illustrate the primary type of vegetative and aquatic communities that exist on or adjacent to the project site. Due to subsistence agriculture which has been practiced by small plot farmers on the site, the existing vegetative community has been modified substantially with the exception of the large palms. The only relatively undisturbed area near the site is the Stockton estuary. This is a freshwater estuary in the vicinity of New Georgia, but tidal in flow fluctuation. It was observed that this part of the estuary is used by some local residents to catch small fish to supplement their diets. Principal fish species include peach perch, catfish, and others.

C. SOCIO-ECONOMIC CHARACTERISTICS AND MAN-MADE CONDITIONS

1. New Krutown

- Socio-Economic Profile

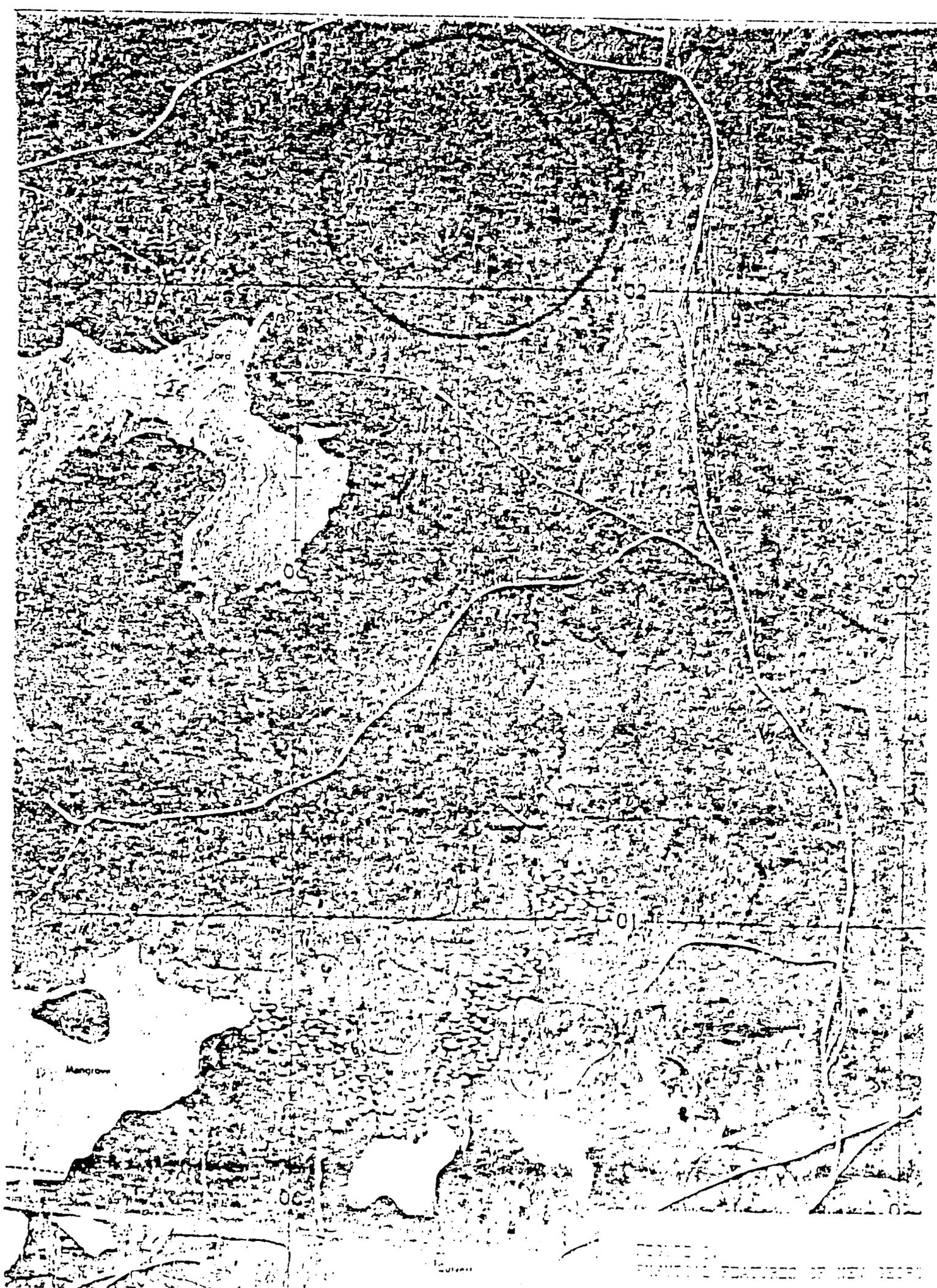
The existing population of New Krutown is estimated to be approximately 10,100 inhabitants. Based upon a socio-economic survey completed in May 1979, the number of households was determined to be 2,122. The average number of persons per household is 4.7 occupants. Sixty-two percent of these households rent their shelter. Of the existing 2,122 residential structures 58.5 percent consist of 1-room dwellings. Only 18.2 percent of the structures consist of 3 rooms or more. Nearly half of the households (47.9%) reported monthly incomes below \$124. The median income in Monrovia is approximately \$125.

ST. PAUL RIVER

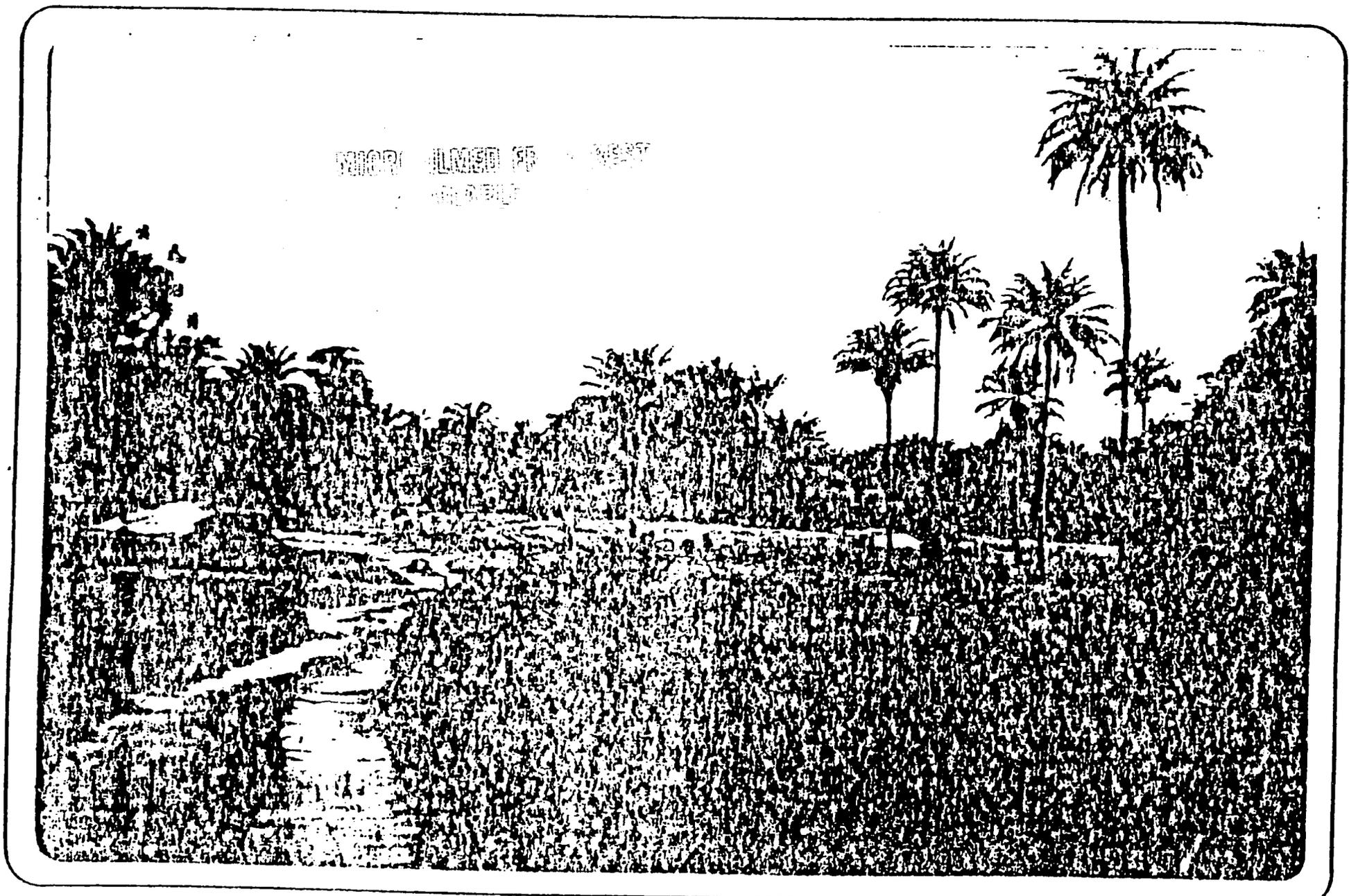
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FIGURE 2.
PRINCIPAL FEATURES OF NEW KRUTOWN

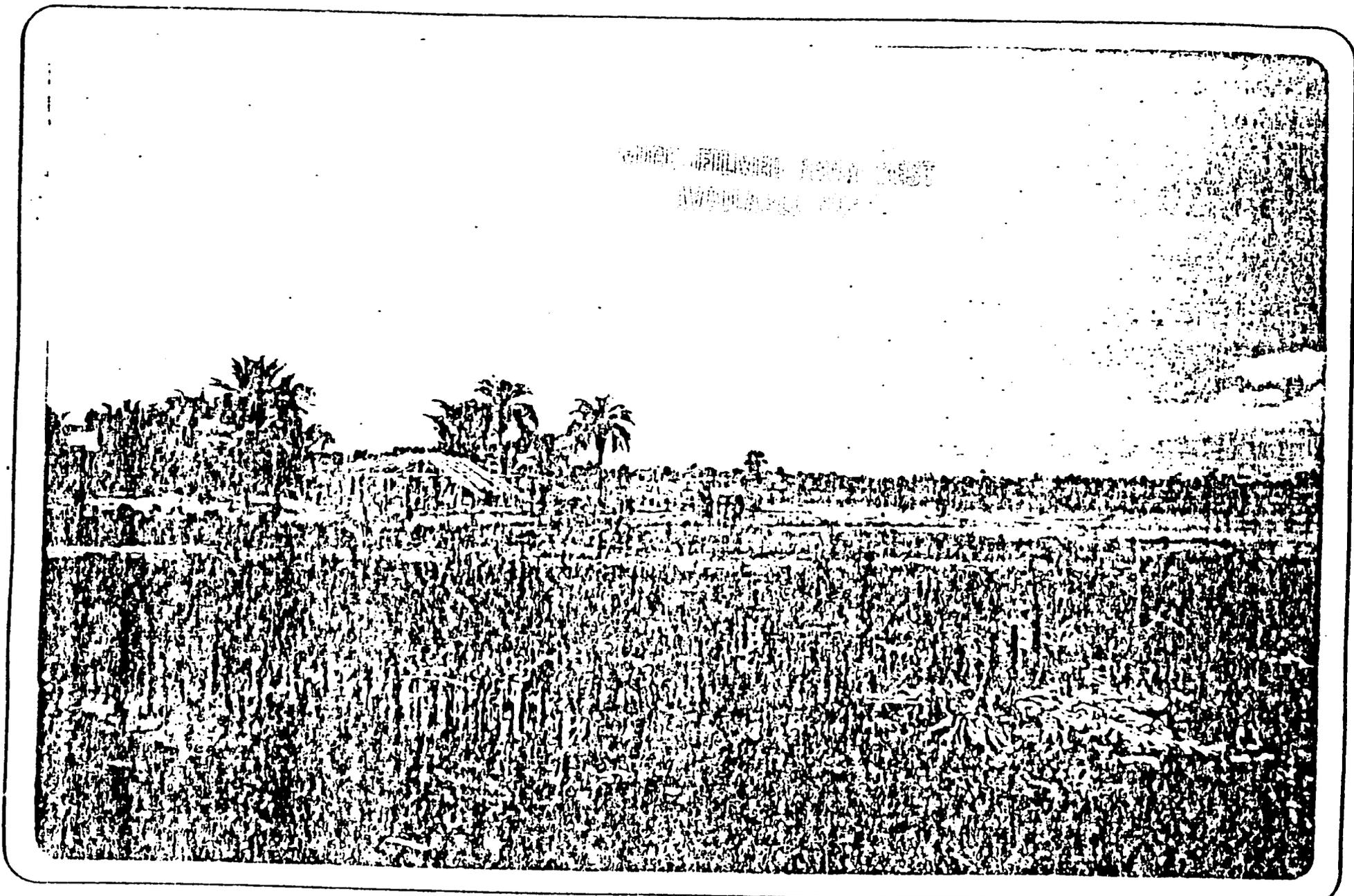


Mangrove



5.11

FIGURE 4.
TERRAIN OF THE NEW GEORGIA SITE



5.12

FIGURE 5.
STOCKTON CREEK ESTUARY ADJACENT
TO NEW GEORGIA SITE

- **Supporting Infrastructure System**

Water Supply Systems. The existing water supply system in New Kru town comes from the 16" transmission line which parallels the Bushrod Island Road. From this transmission main, the distribution system in serviced areas of the community consists of 2", 3", 4", and 6" lines. It is estimated that 25 percent or 530 households have direct house connections to the Liberian Water and Sewer Corporation's (LW+SC) water system. Of the remaining households (1,592), 50 percent use the existing but limited number of public standpipes and 25 percent depend on wells for meeting their water requirements.

The wells are usually shallow, improperly constructed and poorly maintained. Because of the above deficiencies plus the frequent location in close proximity to malfunctioning sanitary facilities, water quality is extremely poor and poses high risks to the health of local residents.

In 1980-1981 the World Bank plans to expand LW+SC's existing water distribution system in selected areas throughout the Monrovia metropolitan region. Specifically, New Kru town has been designed as a community to be benefitted. The proposed expansion of the water distribution system will include extension of the existing service area to the west and south to provide potable water to areas which have been developed in recent years. In addition, standpipes will be constructed in greater numbers to increase service convenience. The planned water distribution system is adequate to serve the projected future population of New Kru town except for isolated areas not included in the proposed service area.

Sewerage Facilities. The existing sewerage facilities located in New Kru town consist of both a waterborne waste collection system and accompanying transmission facilities (pump station) as well as private and semi-private on-site waste disposal systems. On-site disposal systems consist mainly of a variety of pit latrine-type facilities (pit privies, raised privies, borehole privies), overhung toilets, or water-flushed toilets with septic tanks and soakaways. Some of these sewerage systems are illustrated in Figures 6-8. The principal types of sewerage systems and estimated population served by each are shown in Table 1.

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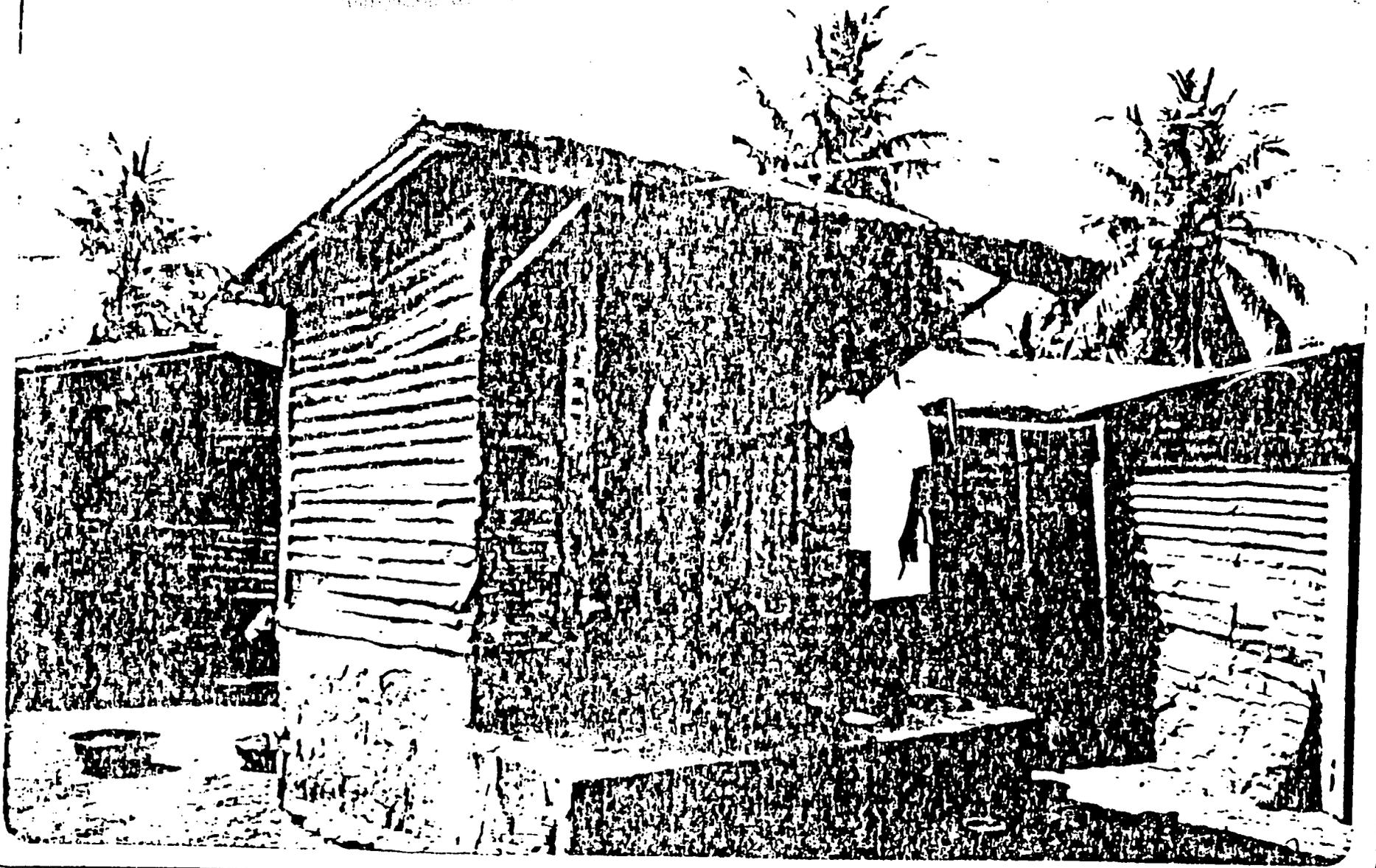


FIGURE 6.
RAISED PIT PRIVY

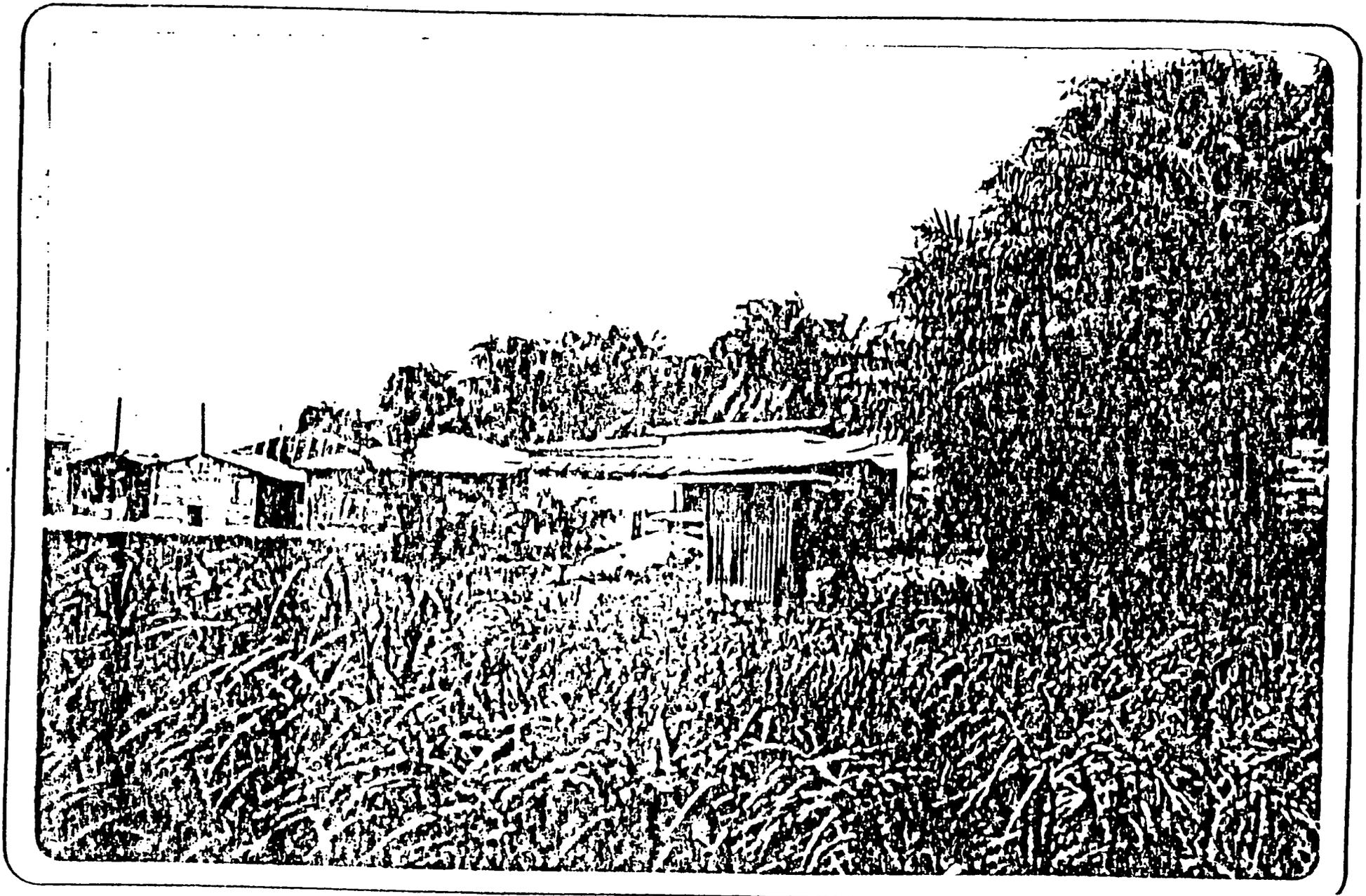


FIGURE 7.
NEW KRUTOWN: OVERHUNG LATRINE

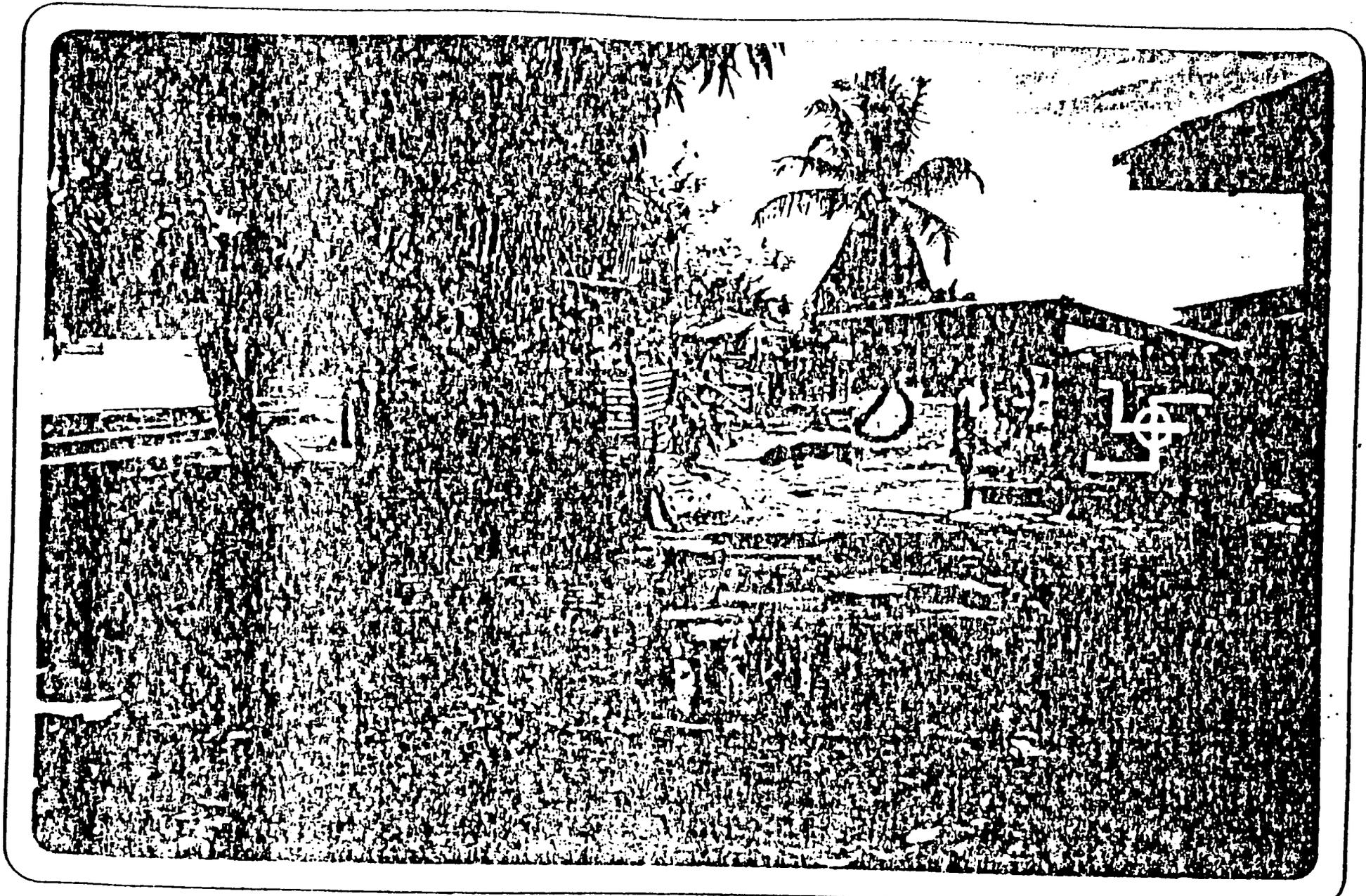


FIGURE 8.
NEW KRUTOWN: FLUSH WATER-
SEPTIC TANK

5.16

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TABLE 1

Existing Sewerage Systems Serving New Krutown

<u>Types of Sewerage System</u>	<u>% of Population Served</u>	<u>Number of Persons Served</u>
Waterborne collection system	5.0	504
Flush Water-Septic Tanks	10.0	1,008
Pit Privies	70.0	7,063
Raised Privies	2.0	202
Borehole Privies	1.0	101
Overhung Toilets	7.0	707
No Facilities	5.0	504
TOTAL:	100.0	10,089

New Krutown's waterborne waste collection system is comprised of 8", 10", and 12" collectors which are connected to the 18" Bushrod Island interceptor and the Sinkor treatment plant. Sewage is conveyed to the treatment plant by means of a system of pump stations, force mains and gravity sewers. In the absence of statistical records of metered flows, design capacity of existing facilities, etc., discussions with LW+SC's technical personnel indicate that the Bushrod Island sewerage facilities are overloaded, largely due to stormwater infiltration. However, the collection system in New Krutown is believed to be largely unused. Where individual house water connections exist, flush toilets are employed, but they generally discharge into on-site septic tanks. Gray waters from bathroom and kitchen facilities may or may not be discharged into separate runaways or septic tanks. Where individual house water connections are not employed and reliance is placed on private wells and/or public standpipes, then dry sewage systems are used. A number of critical environmental health and related social problems are directly associated with the use of these sewerage disposal systems. The major problems are outlined below:

- The lack of sewerage disposal facilities in selected high density areas has led to the common practice of indiscriminate disposal of excreta along beach and other common open space areas.

- The open-type pit privies and improperly constructed closed privies provide convenient access for insect vectors to human excreta;
- The locational proximity of existing waste disposal systems to food preparation and inhabited rooms poses serious environmental health dangers to local residents; and
- Fecal contamination and danger of spreading of communicable diseases are attributed in part not only to improper design and construction but also to the lack of proper maintenance and periodic cleaning of waste disposal systems.

2. New Georgia

- Socio-Economic Profile

Since the sites and services project is located in a sparsely populated area and largely undeveloped, a socio-economic profile can not be prepared.

- Supporting Infrastructure System

Water is supplied to the New Georgia site from the 12 mgd White Plains treatment Plant via a 16" main located in the freeway right-of-way. An 8" line built by NHA to the site supplies water to the existing housing. An 8" loop main around the whole site would supply water to all of the proposed population. A booster station built previously and now in operation will more than support the whole site in pressure and capacity. Size of existing water mains in Phase I housing is 2" and 4". Size of water main proposed for Phase II housing is 2", 4", 6", and 8" system. Sewage treatment existing in Phase I housing is a series of septic tanks with leaching fields and 6" collection system.

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DATE 10/12/2011 BY 60322

III. EVALUATION OF REASONABLE ALTERNATIVE SANITARY WASTE DISPOSAL SYSTEMS AND THEIR POTENTIAL ENVIRONMENTAL IMPACTS

In order to ensure that the proposed shelter program component, if implemented, will cause the least detrimental effects and will not foreclose prematurely other options, a number of alternative sanitary waste disposal systems were formulated and evaluated by the assessment team. The following analysis examines the comparative benefits, costs and risks associated with these alternative courses of action.

A screening process was used to evaluate the compatibility and feasibility of each alternative in meeting the waste disposal needs of New Krutown and New Georgia and the maintenance and enhancement of long-term productivity of Monrovia's water resources. The evaluation criteria and the ability of each structural alternative to meet these performance standards are outlined below.

- Ecological Factors:

The system must preserve the ecological balance of the region and not pose a significant threat to rare or endangered plant and/or wildlife species and their habitats. The self-regenerative capacity of the region's ecosystem must not be exceeded.

- Health Factors:

The collection and disposal of human waste must be carried out in such a way that pathogens will not pose a serious health hazard to any human population.

- Nuisance Factors:

Odors and unsightly conditions must not exceed reasonable limits where these uses are incompatible with surrounding developments and activities.

- Cultural Factors:

Methods of collecting and treating human wastes must be acceptable and consistent with local habits and cultural practices.

- Operational Factors:

The system must not require technical skills and materials not normally found or available in Liberia. In addition, the system must have a high degree of operational reliability under the conditions indigenous to Monrovia, Liberia. The system must be capable of fitting into or adequately serving existing built-up areas.

- Cost Factors:

Capital investment and operating costs should be compatible with the general income level of its users and their ability to pay.

A. NEW KRUTOWN UPGRADING SUB-PROJECT

1. No-Action or Deferred Action Alternative

This alternative means that the proposed community upgrading component would not include measures to change existing methods of handling sewage disposal in New Krutown. The net effects of this action would allow the problems of widespread sewage contamination throughout the project area to persist and to increase in magnitude in direct relation to population growth. The probable environmental consequences of this alternative include: (1) a significant increase in the incidence of both waterborne and water-related diseases which depend on access to human wastes (excreta and wastewater); and (2) creation of the risk of significant health hazards of potential epidemic proportions for residents of both New Krutown and the metropolitan area of Monrovia.

The "no-action" alternative does not conform with Monrovia's urban growth plans or its shelter improvement strategy. For the above reasons, the no-action alternative is rejected from further consideration.

2. Structural alternatives:

- Use of a Conventional Waterborne Sewerage Collection and Disposal System:

Possible use of the existing waterborne sewage collection and transport system now in place in New Krutown and Bushrod Island was considered. However, when examined closely a number of major constraints raise serious questions of its practical feasibility in meeting the needs of New Krutown's residents.

Technical Feasibility. This type of system is dependent upon a high volume of water consumption to ensure conveyance of the raw sewage to a common treatment point. If combined sewage and gray water flows are not of sufficient quantities to prevent settling of solids in laterals, collectors and interceptors, the conveyance system will simply clog up

and not function. Given GOL and World Bank plans to expand the use of standpipes as the means of water distribution in New Krutown, the quantity of wastewater flows are estimated to be insufficient to transport the quantity of raw sewage which would be potentially discharged into the collection system.

In addition, the existing gravity and force main transport system, located in Bushrod Island, would require major overhauling including replacement of undersized pumps; possible cleaning of the interceptor gravity sewers and control of the infiltration problem. The increase in sewage flows through the Bushrod Island transport system from New Krutown require treatment. The current level of sewage flows into the Sinkor treatment plant exceed the design capacity of this facility. Any movement to these sewage flows from New Krutown would further lower existing quality of treatment and the environmental impacts of the effluent discharge into the Mesurado River. For the previously stated reasons, use of a conventional waterborne sewerage system on-site or off-site is not considered to be technically feasible.

Cost Feasibility. The cost of constructing and maintaining a waterborne sanitary collection system is expected to be prohibitively expensive and impractical because of the financial burden it would place on the residents of New Krutown and/or the Liberian Water and Sewer Corporation. The limited use of the existing sanitary collection system by residents of New Krutown who have individual house water connections and flush toilets attests to the constraint that costs play in local acceptance of infrastructure services. Without the financial means of repayment for amortization and operation and maintenance of the collection system this alternative is considered not to be financially feasible.

Use of on-site sewerage disposal systems:

A wide range of excreta disposal methods fall under the category of on-site sewerage systems including dry pit privies, aqua privies, septic tanks, and cesspools. The two common features of all of these systems is that: (1) human waste is disposed of in the ground with or without water use; and (2) its construction, operation and maintenance are carried out within the confines of an individual's private property. However, in selected areas of the world such as in Monrovia, Liberia, it is not uncommon that these disposal methods are either semi-private/shared facilities among a number of families (tenants living in rented housing) or public facilities constructed and maintained by public bodies (City Corporation of Monrovia). An analysis and evaluation of this generic class of sewerage

disposal methods concluded the following:

Technical Feasibility. Proper performance of on-site waste disposal systems depends on the ability of the soil or soil material to absorb and purify the wastewater and/or fecal material. Failure will occur if either of these functions is not properly performed. Influencing factors include slope conditions, depth of bedrock and soil layer, water table, etc. Field investigations of New Krutown's site conditions confirm that all physical requirements are satisfactory for the proper functioning of these disposal methods. Existing sanitary facilities now in use showed that they performed technically very well when properly designed, located, constructed and maintained. Some marginal high water table areas will require the use of elevated sand mounds to increase hydraulic conductivity in wet or moist soil conditions. Soil and hydrology testing throughout the New Krutown area will delineate permissible areas for use of these disposal systems.

Environmental Health Considerations. On-site disposal of human excreta does pose some potential health hazards if not properly carried out. Direct human contact and access of insect and other vectors to disposed sanitary waste must be avoided to minimize the spread of numerous communicable diseases. Protection of human health against these and other related nuisance problems (odors) can be avoided through community health education and proper technical training/supervision of the design, installation and maintenance/inspection of sanitary disposal systems.

Cultural and Cost Feasibility. The existing use of these types of waste disposal systems in New Krutown point out that they are culturally acceptable and financially affordable to the area's residents. It is estimated that the upgrading of existing sanitary facilities and construction of new facilities would cost in the range of \$50-\$300 for individual family closed pit latrines (shelter over the latrine). Cost of the semi-private and communal type facilities will be higher depending on size. These facilities would be built by landlords for tenants renting housing or by public authorities in those areas where the physical limitations of space (high density residential pockets) do not afford possibilities of constructing private or semi-private disposal facilities.

Environmental Suitability. On-site land disposal of sanitary wastewater in New Krutown will avoid the creation of new environmental problems of degrading existing water quality conditions in the St. Paul River and tidal estuary. Resident fishermen of the community, including members of the Kru and Fanti tribes, are dependent upon local waters in the vicinity of New Krutown for their economic livelihood and preservation of their cultural heritage. Use of the on-site disposal methods

will avoid the potential ocean or shoreline outfall of raw or partially treated sewage. Similarly, if the Bushrod Island and Sinkor wastewater collection and treatment facilities were to be used, the pollution loading into the Mesurado River would be increased. Recognizing the sedimentation build-up at the mouth of the Mesurado River and the tidal characteristics of the waters at this location, the water pollution problems to the residents living in the adjacent Westpoint community would be made worse. These environmental costs are not considered acceptable or desirable.

3. NEW GEORGIA SITES AND SERVICES SUBPROJECT

The existing water distribution system now in place in the Phase I section of the New Georgia site and GOL/NHA's plans to extend the same system into the Phase II sites and services area with accompanying individual house connections dictated that a conventional waterborne sanitary collection and transport system would be the principal supporting infrastructure systems. The main issue to be addressed by the Environmental Assessment is the question of the analysis and selection of the preferred method of wastewater treatment. The following sewerage treatment and disposal alternatives were examined and technical findings summarized:

1. Conventional Treatment Plants:

- Equipment:

Any required treatment equipment would have to be imported and paid with foreign currency at four to five times domestic U.S. prices. Use of conventional treatment is dependent upon a reliable electrical supply system and a high level of technical maintenance. The availability of technical training and maintenance experience does not exist in Liberia.

- Process:

Conventional treatment plants are primarily designed to remove organic matter (BOD), but from the standpoint of public health, they do not provide sufficient removal of disease organisms and viruses. This factor plus development and release of noxious odors can be intense in hot climates. These problems are common with low rate trickling filters and can be breeding areas for Psychoda flies.

2. Aerated Lagoons:

This type of treatment system is based upon an activated sludge process without sludge recycle to decompose human wastes. The treatment system consists of a facultative pond (but deeper) to provide for the mechanical aeration of the wastewater by either fixed or floating aerators. This step in the treatment process is followed by a facultative maturation polishing pond. The electrical power requirements are high as well as maintenance and operation expenses. Aerated lagoons cost two to three times as much as waste stabilization ponds but require less physical space for construction.

3. Waste Stabilization Ponds:

The waste stabilization pond method of sewage treatment consists of a series of large, shallow man-made lakes into which raw sewage is progressively treated by natural processes of algae and bacteria decomposition. This method of treatment consists of three different kinds of ponds-- anaerobic, facultative and maturation. The physical layout of the ponds is sequential and interconnected. Raw sewage enters the anaerobic pond followed by the facultative pond, and final treatment (polishing) occurs in the maturation pond. See Figure 9 for an illustrative layout of a waste stabilization treatment system.

The technical function of each pond is briefly described below:

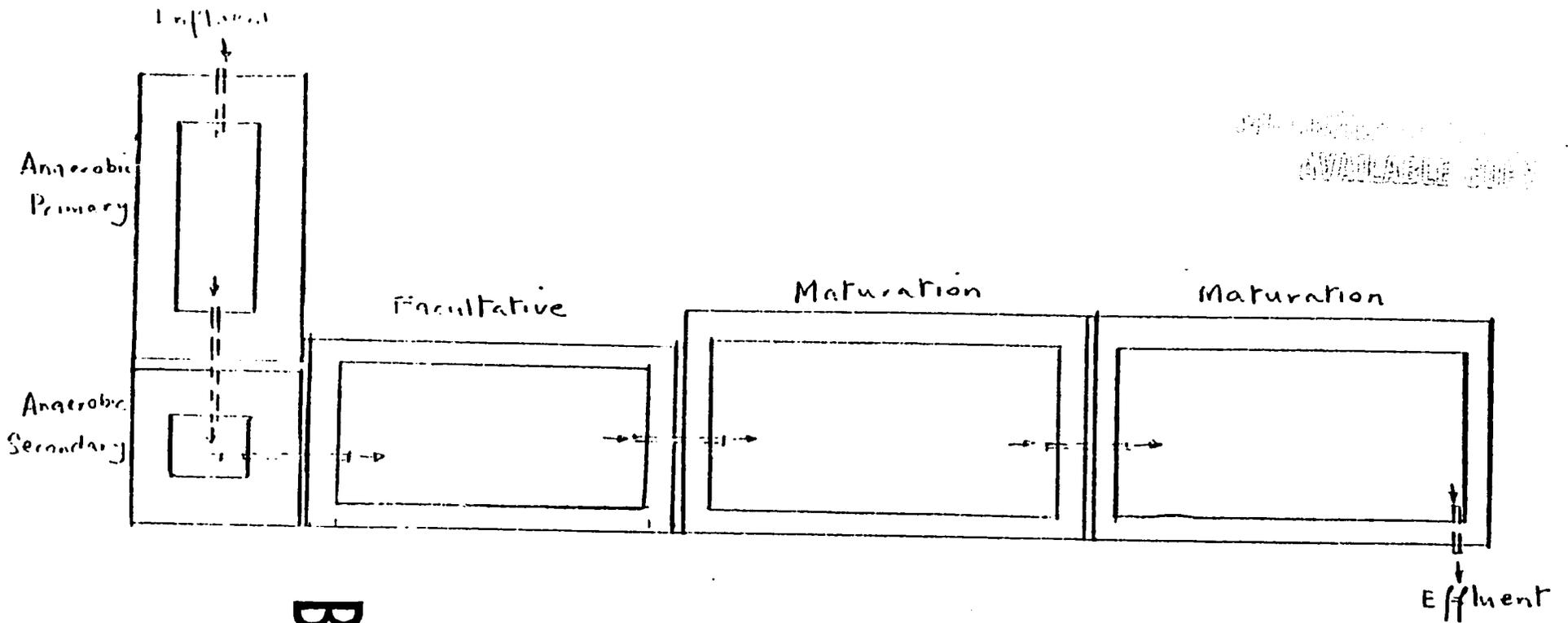
Anaerobic Pond acts in the same way as septic tanks. It removes 50 to 60% of the BOD. It does accumulate sludge, which is removed every three to five years. No odor is experienced if good design is used.

Facultative Pond. BOD is removed by the normal process of aerobic biological oxidation. The oxygen supply for the bacteria comes not from the atmosphere but from the photosynthetic activity of the algae which grow so that the pond liquid is colored bright green. Facultative ponds should never be built in sheltered areas. They require wind action.

Maturation Pond. The maturation pond is responsible for the quality of the final effluent BOD and destruction of fecal pathogens. The longer the retention time, the greater number of pathogens will be destroyed.

4. Septic Tanks:

Septic tanks are closed concrete tanks into which raw sewage is collected and anaerobically digested. After a number of hours or days of detention, the tank's effluent is discharged normally into a leaching field for final soil treat-



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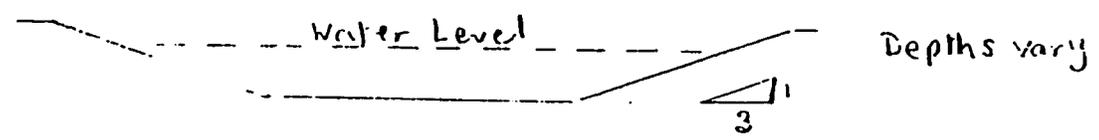


FIGURE 9.

WASTE STABILIZATION PONDS

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ment. This type of treatment system is commonly used in servicing a few number of houses or a small subdivision.

The quality of treatment is highly variable depending on the detention period, temperatures, and the frequency of maintenance and cleaning. Septic tanks can achieve upwards of 30-50% BOD removal. However, a number of technical disadvantages are associated with its use in the New Georgia site. Septic tanks are relatively expensive to build given the number of units served. In addition, they require periodic inspection and desludging. When not adequately maintained, the quality of BOD removal can drop dramatically and, if not discharged into a properly designed leaching field, the seepage of partially treated sewerage to the ground surface or surface waters may pose potential health risks or damage to nearby ecological communities.

5. On-Site Land Disposal Systems

The potential use of a variety of on-site sewerage disposal systems similar to those considered in New Krutown were evaluated for the New Georgia sites and services project. Based upon the site's physical characteristics, it was determined that the necessary soil or soil material conditions to absorb and purify sewerage discharges by ground treatment are suitable over most of the site. However, caution must be exercised in locating these facilities near identified methods and/or high water table areas. Use of these facilities are not necessarily precluded in these areas because raised mound privies may be technically feasible. These types of disposal systems are inexpensive to construct, require low technical skills, and widely acceptable by the local population. If properly constructed, maintained and cleaned, they will not pose any health hazards to their users or the community in general. Based upon the above analysis, it is concluded this alternative is technically feasible, cost-effective and environmentally sound.

IV. RECOMMENDATIONS OF THE EA

A. SELECTION OF PREFERRED WASTE DISPOSAL SYSTEMS

1. New Krutown Subproject

Continued use of existing improved and newly constructed, on-site waste disposal systems is recommended to be financed by the proposed HG loan in the New Krutown community up-grading subproject. Specifically recommended are pit privies with closed shelter and ventilation pipes, raised pit privies in areas of high groundwater, borehole privies, and septic tank-soakaway systems. These are all self-contained dry and wet systems which will not connect into the existing sewerage collection system leading to the Sinkor treatment plant. Recommended for removal are overhung toilets which dispose of sewage on the ground or water surfaces.

In selected high density areas where insufficient land area does not permit erection of individual disposal facilities, construction of semi-public and/or community toilets should be carried out. Maintenance and cleaning of all community toilets should be the responsibility of the Governor's office and implemented by local residents. These communal toilets should be connected to a septic tank and soakaway.

2. New Georgia Subproject

The preferred method of wastewater treatment in the New Georgia subproject is the use of waste stabilization ponds. Based upon an analysis of the site's topography, physical features (wet marshes) and the proposed preliminary housing layout, five different areas having desirable discharge points were selected for construction of the ponds. Waste stabilization ponds were considered less capital intensive, more reliable, requiring minimal maintenance, operation and cleaning, and providing a higher quality of treatment than all other reasonable alternatives. Furthermore, this waste disposal system is self-contained and does not require the aid of mechanical or electrical equipment. Therefore, it is recommended that waste stabilization ponds be financed under the proposed HG loan and approved development grant.

B. RECOMMENDED ENVIRONMENTAL ENGINEERING GUIDELINES TO BE USED IN PROJECT IMPLEMENTATION

1. New Krutown Waste Disposal System

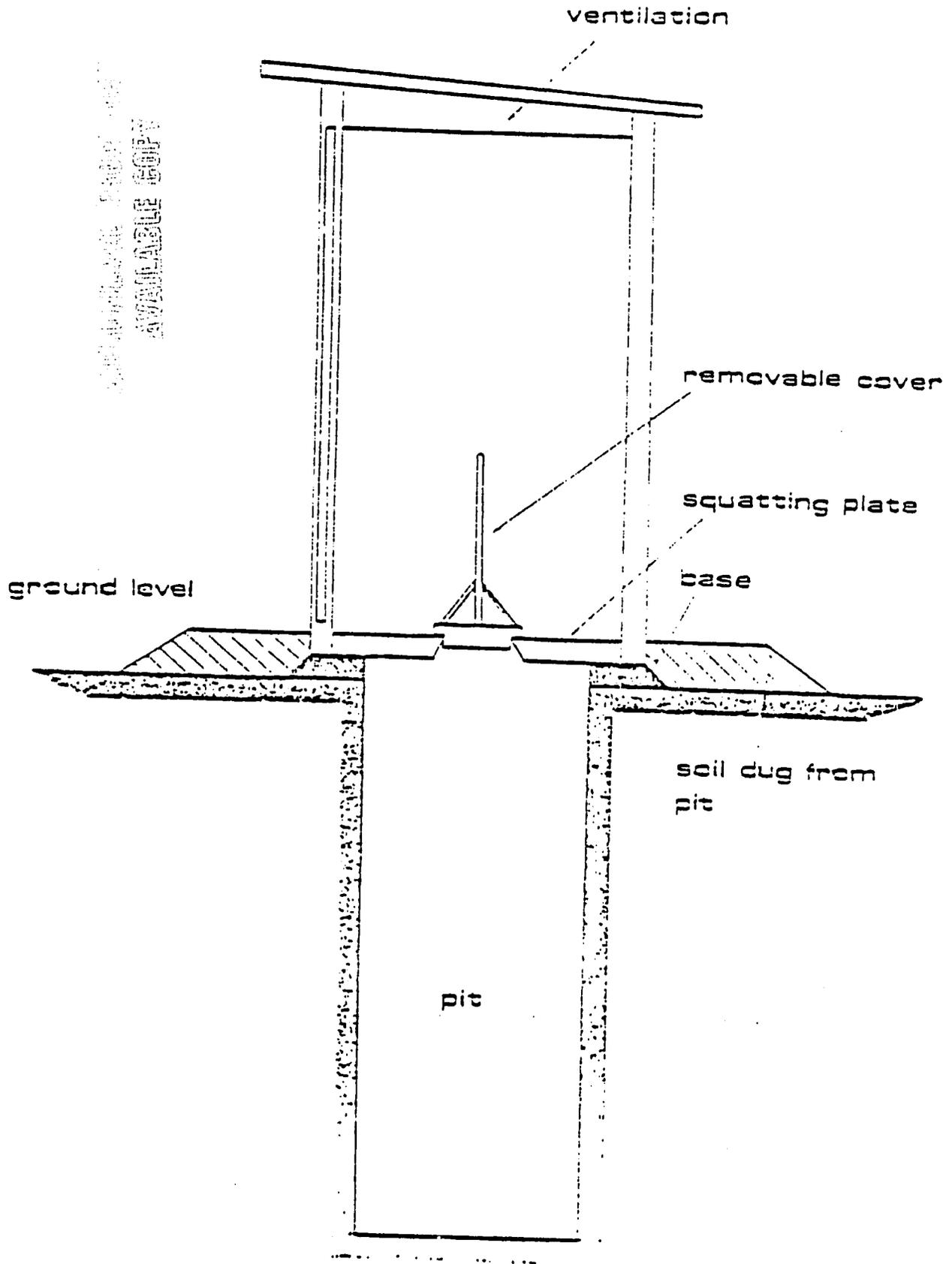
• Design and construction of pit privies

- The principle of the pit privy is that the sewage remain dry with the moisture filtering away through the bottom.

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- At and above ground surface, wall joints should be closed to prevent groundwater penetration. (See Figure 10)
 - An enclosure should be constructed with a ventilation pipe to prevent entry of insect vectors. (See Figure 12)
 - If a wash facility is constructed with the pit privy a separate concrete floor should be built and the grey water exists outside and into a soakaway disposal.
- Periodic inspection, maintenance and cleaning
 - The Ministry of Health should establish a formal and regular inspection program to ensure existing waste disposal facilities are properly maintained and cleaned and the public health and well-being is protected.
 - Existing overhung privies should be condemned and removed. In cases when overhung privies are condemned, consideration should be given to the use of raised pit privies (See Figure 11) for their replacement.
 - Environmental health education and technical training
 - The appropriate division of the Ministry of Health should collaborate in the upgrading program through involvement in an extensive community health education program.
 - To ensure proper design, construction and implementation of the sanitary component, it is recommended that appropriate technology training in the sanitary/health field be carried out.
2. New Georgia Waste Disposal System
- Design and construction of waste stabilization ponds
 - The ponds should not be constructed directly in any wet marsh areas but preferably in adjacent low lying areas to minimize earth movement difficulties and to prevent water infiltration from subsurface groundwater.
 - The final effluent from the ponds may be discharged

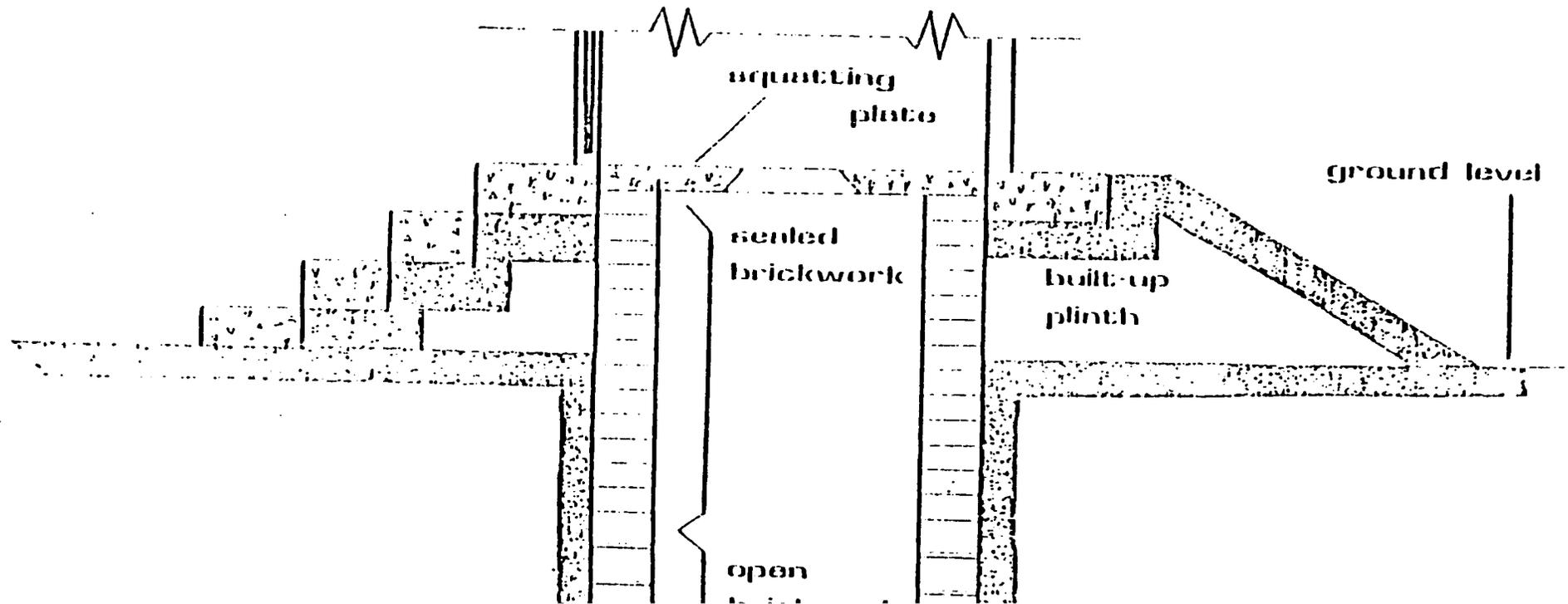
FIGURE 10.
CONVENTIONAL UNIMPROVED PIT LATRINE



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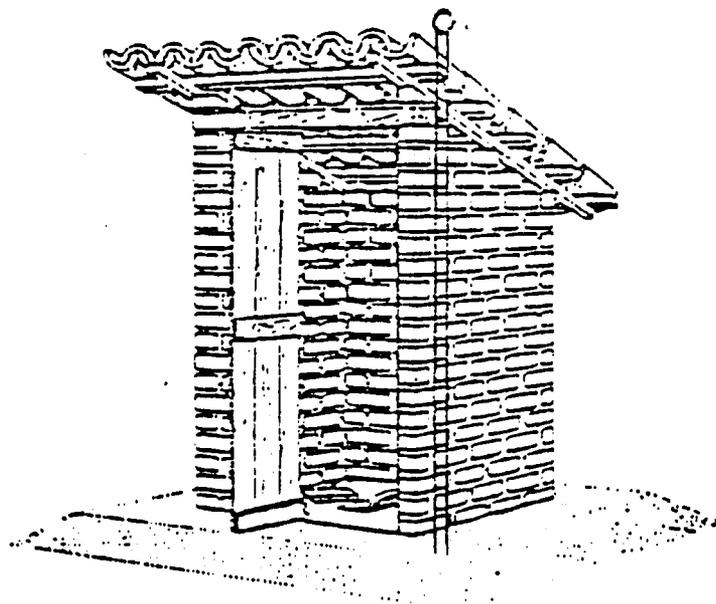
FIGURE 11.

RAISED PIT LATRINE FOR USE IN AREAS OF HIGH
GROUND WATER TABLE



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FIGURE 12.
ALTERNATIVE TOILET
SUPERSTRUCTURE DESIGNS



D. Brick Walls and Tile Roof (an Alternative
is Concrete Block Walls and Corrugated Iron
or Asbestos Cement Roof)

Source: (From Wagner and Llorca)

directly into selected areas of the Stockton Creek estuary due to the high quality of treatment and the beneficial use of discharged nutrient materials by various aquatic species. However, the discharge should be directed into the water channel to afford maximum assimilation.

- A minimum distance of 50 feet should be maintained between the ponds and the nearest plot lines to avoid safety hazards to project residents.
- Embankment walls should be constructed no steeper than 3:1 to ensure soil stability.
- If water is encountered in the bottom of any ponds during construction, arrange for temporary pumping and line the bottom with sealed plastic sheeting.
- Place concrete slabs under pipe outlets to prevent soil erosion as well as on the top of the earth walls around the ponds.
- Conveyance of the waste stabilization ponds from the National Housing Authority to the Liberian Water and Sewer Corporation for maintenance and operation activities should occur after completion of construction and initial operation testing.

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DEPARTMENT OF STATE
 AGENCY FOR INTERNATIONAL DEVELOPMENT
 WASHINGTON, D.C. 20523

THE HOUSING GUARANTY PROGRAM

STATUTORY CHECKLIST

Answer YES/NO

LIBERIA

A. General Criteria Under HG Statutory Authority.

Section 221 (a)

Will the proposed project meet the following criteria:

- (1) is intended to increase the availability of domestic financing by demonstrating to local entrepreneurs and institutions that providing low-cost housing is financially viable;
- (2) is intended to assist in marshalling resources for low-cost housing;
- (3) supports a pilot project for low-cost shelter, or is intended to have a maximum demonstration impact on local institutions and national policy; and
- (4) is intended to have a long run goal to develop domestic construction capabilities and stimulate local credit institutions to make available domestic capital and other management and technological resources required for low-cost shelter programs and policies?

YES

YES

YES

YES

Section 222(a)

Will the issuance of this guaranty cause the total face amount of guaranties issued and outstanding at this time to be in excess of \$1,180,000,000?

NO

Will the guaranty be issued prior to September 30, 1980?

YES

Section 222(b)

Will the proposed guaranty result in activities which emphasize:

- (1) projects providing improved home sites to poor families on which to build shelter and related services;

YES

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- (2) projects comprised of expandable core shelter units on serviced sites;
- (3) slum upgrading projects designed to conserve and improve existing shelter;
- (4) shelter projects for low-income people designed for demonstration or institution building; and
- (5) community facilities and services in support of projects authorized under this section to improve the shelter occupied by the poor?

YES

YES

YES

YES

Section 222(c)

If the project requires the use or conservation of energy, was consideration given to the use of solar energy technologies, where economically or technically feasible?

YES

Section 223(a)

Will the A.I.D. guaranty fee be in an amount authorized by A.I.D. in accordance with its delegated powers?

YES

Section 223(f)

Is the maximum rate of interest allowable to the eligible U.S. Investor as prescribed by the Administrator not more than one percent (1%) above the current rate of interest applicable to housing mortgages insured by the Department of Housing and Urban Development?

YES

Section 223(h)

Will the Guaranty Agreement provide that no payment may be made under any guaranty issued for any loss arising out of fraud or misrepresentation for which the party seeking payment is responsible?

YES

Section 223(i)

- (1) Is the host country a country that is presently receiving development assistance under chapter I of part I of the Act or one that has received such assistance in the preceding two years?
- (2) Will the proposed Housing Guaranty be coordinated with and complementary to other development assistance in the host country?
- (3) Will the proposed Housing Guaranty demonstrate the feasibility of particular kinds of housing and other institutional arrangements?

YES

YES

YES

(4) Is the project designed and planned by A.I.D. so that at least 90 percent of the face value of the proposed guaranty will be for housing suitable for families below the median income, or below the median urban income for housing in urban areas, in the host country?

YES

(5) Will the issuance of this guaranty cause the face value of guaranties issued with respect to the host country to exceed \$25 million in any fiscal year?

NO

(6) Will the issuance of this guaranty cause the average face value of all housing guaranties issued in this fiscal year to exceed \$15 million?

NO

Section 238(c)

Will the guaranty agreement provide that it will cover only lenders who are "eligible investors" within the meaning of this section of the statute at the time the guaranty is issued?

YES

B. Criteria Under General Foreign Assistance Act Authority.

Section 620/620-A

1. Does the host country meet the general criteria for country eligibility under the Foreign Assistance Act as set forth in the country eligibility checklist prepared at the beginning of each year?

YES

2. Is there any reason to believe that circumstances have changed in the host country so that it would now be ineligible under the country statutory checklist?

NO

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON

THE ADMINISTRATOR

GUARANTY AUTHORIZATION

PROJECT 669-HG-001

Provided From: Housing Guaranty Authority

For : The Government of Liberia

Pursuant to the authority vested in the Acting Administrator, by the Foreign Assistance Act of 1961, as amended (FAA), and the delegations of authority issued thereunder, I hereby authorize the issuance of guaranties pursuant to Section 222 of the FAA of not to exceed ten million dollars (\$10,000,000) in face amount, assuring against losses (of not to exceed one hundred percent (100%) of loan investment and interest) with respect to loans by eligible U.S. investors (Investor) acceptable to A.I.D. made to finance housing projects in Liberia. This guaranty will assist in financing the low income housing program of the Government of Liberia, the National Housing Authority of Liberia (NHA), and the National Housing and Savings Bank (Borrower). The sub-projects receiving the guaranteed loans will emphasize slum upgrading and core housing solutions, affordable by below median income families.

This guaranty shall be subject to the following terms and conditions:

1. Term of Guaranty: The loans shall extend for a period of up to thirty years (30) from the date of disbursement and may include a grace period of up to ten years on repayment of principal. The guaranty of the loans shall extend for a period beginning with the first disbursement of the loans and shall continue until such time as the Investor has been paid in full pursuant to the terms of the loans.
2. Interest Rate: The rate of interest payable to the Investor pursuant to the loans shall not exceed the allowable rate of interest prescribed pursuant to Section 223(f) of the FAA and shall be consistent with rates of interest generally available for similar types of loans made in the long term U.S. capital markets.
3. Government of Liberia Guaranty: The Government of Liberia shall provide for a full faith and credit guaranty to indemnify A.I.D. against all losses arising by virtue of A.I.D.'s guaranty to the Investor or from non-payment of the guaranty fee.

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4. Fee: The fee of the United States shall be payable in dollars and shall be one-half percent (1/2%) per annum of the outstanding guaranteed amount of the loans plus a fixed amount of one percent (1%) of the amount of the loans authorized, or any part thereof, to be paid as A.I.D. may determine upon disbursement of the loans.
5. Other Terms and Conditions: The guaranty shall be subject to such other terms and conditions as A.I.D. may deem necessary.

The Implementation Agreement shall contain covenants and/or conditions precedent to disbursement which in effect require:

1. Coordination with the Liberia Project Grant (669-0167): Negotiations on the HG Implementation Agreement will follow execution of the Liberia Project Grant Agreement and the Implementation Agreement will be compatible with the covenants contained in the Project Grant Agreement.
2. Procedures for Approval of Plans, Specifications, Cost Estimates and Certain Construction Procedures: The Implementation Agreement shall provide that the regional Assistant Director of the Office of Housing (AD) in conjunction with USAID will retain the right to review and approve plans and specifications, cost estimates, and, as required, bidding procedures and contractor selection.
3. Project Objectives: The Implementation Agreement shall incorporate mutually agreed upon procedures necessary to assure project objectives, including beneficiary selection, and cost recovery procedures.

Robert H. Nooter
Acting Administrator

Date

Clearances:

AA/AFR:GTButcher _____ Date _____
DS/H:PKimm _____ Date _____
DS/H/Abidjan:SFrankel _____ Date _____
FM/LD:ASmith _____ Date _____
AFR/DR:JWKoenring _____ Date _____
AFR/DR/CAWARAP:LBond _____ Date _____
AFR/CAWA:FScordato _____ Date _____
GC:MBall _____ Date _____
GC/AFR:ESpriggs _____ Date _____
AFR/DP:CWard _____ Date _____
STATE/AFR:RHart _____ Date _____

GC/H:BBDAVIS:prj:06/19/79