

PROJECT DATA SHEET

A Add C = Change D = Delete 3

2. COUNTRY/ENTITY Sudan

3. PROJECT NUMBER 650-0043

4. BUREAU/OFFICE AFR 06

5. PROJECT TITLE (maximum 40 characters) Southern Road Maintenance and Rehab. I

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)
MM DD YY
09 30 89

7. ESTIMATED DATE OF OBLIGATION
(Under 'B.' below, enter 1, 2, 3, or 4)
A. Initial FY 83 B. Quarter 4 C. Final FY 85

8. COSTS (\$000 OR EQUIVALENT \$1 =)

A. FUNDING SOURCE	FIRST FY <u>83</u>			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total	18,237		18,237	19,700		19,700
(Grant)	(18,237)	()	(18,237)	(19,700)	()	(19,700)
(Loan)	()	()	()	()	()	()
Other U.S.						
1.						
2.						
Host Country		3,000	3,000		9,400	9,400
Other Donor(s)						
TOTALS	18,237	3,000	21,237	19,700	9,400	29,100

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) ARDN	183	030				19,700		19,700	
(2)									
(3)									
(4)									
TOTALS									

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)

11. SECONDARY PURPOSE CODES

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

13. PROJECT PURPOSE (maximum 400 characters)

To improve and preserve critical access on primary roads within southern Sudan.

14. SCHEDULED EVALUATIONS
Interim MM YY 03 84 Final MM YY 07 89

15. SOURCE/ORIGIN OF GOODS AND SERVICES
 000 941 Local Other/Specify

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment.)

17. APPROVED BY
Signature ARTHUR W. MUDGE
Title DIRECTOR, USAID/SUDAN
Date Signed MM DD YY 07 31 83

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

ACTION MEMORANDUM FOR THE DIRECTOR, USAID/SUDAN

From: Steven P. Mintz, Project Operations

Subject: Project Authorization - Southern Road Maintenance and Rehabilitation I (650-0043)

Problem:

Your approval is required to authorize a grant to the Government of Sudan (GOS) in the life-of-project amount of \$19,700,000 from section 103 of the Foreign Assistance Act (ARND) for the Southern Road Maintenance and Rehabilitation I Project (650-0043). The FY 1983 obligation for the project will be \$18,237,000.

Discussion:

The Southern Road Maintenance and Rehabilitation I (SORMAR I) is the first phase of a long-term effort on the part of the GOS, with A.I.D. assistance, to rehabilitate and maintain priority primary roads in the southern Sudan. The long-term goal of the project is to increase agricultural production and incomes in the southern Sudan. Specifically, the purpose of this six year, Phase I activity is to improve and preserve critical access on primary gravel roads within Equatoria and Bahr El Ghazal Regions.

The bulk of A.I.D. development assistance support in southern Sudan is directed toward overcoming infrastructural and institutional constraints to agricultural production in areas with the greatest potential for increases in production. The proposed maintenance and rehabilitation is for primary roads which serve areas producing cotton, sorghum, fruits, coffee and other marketable commodities. The major components that will assist in achieving the project's goal are: (1) road maintenance, (2) road rehabilitation, (3) central and sub-regional workshop development and support, (4) equipment, commodities, fuel and supplies to support project activities, (5) private sector development in maintenance and construction activities and in equipment component exchange program and (6) training.

Phase I of the project will concentrate its efforts in Equatoria and Bahr El Ghazal Regions. The outputs of the road rehabilitation and maintenance program will have region-wide impacts that support the establishment of a more reliable transportation infrastructure.

To accomplish the above stated purpose the GOS and A.I.D. will provide assistance as summarized in the budget table below:

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Project Input	Budget (US \$000)		
	Total AID	Total GOS	Total Project
1. Technical Assistance	6248.6	968.2	7216.8
2. Training	381.0	40.0	421.0
3. Commodities and Equipment	5259.3	50.0	5309.3
4. Petroleum, Oil, Lubricants	2000.0	2048.0	4048.0
5. Construction/Site Development	707.0	968.0	1675.0
6. Ocean/Inland Freight	1521.0	145.0	1666.0
7. Procurement Fees	365.2	-	365.2
8. Private Sector Development	700.0	1650.0	2350.0
9. Local Salaries	-	1743.0	1743.0
10. Other (Evaluation, aircharter, environmental monitoring program)	370.0	50.0	420.0
11. Contingency	1267.9	512.0	1779.9
12. Inflation	880.0	1225.8	2105.8
Total	<u>19,700.0</u>	<u>9400.0*</u>	<u>29,100.0</u>

The following special conditions precedent and covenants are included in the project authorization:

Conditions and Covenants:

The Project Grant Agreement will contain, in substance, the following conditions and covenants:

Conditions Precedent:

Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement to finance the long-term technical assistance contract, the Cooperating Country will:

1. Provide evidence that it has allocated the land necessary for shops, housing and other required buildings and storage space.
2. Provide the road workshop and office compound facility in Juba (formerly known as the CIDA workshop and office) for the sole use of Project personnel.

*Sudanese Pounds (LS) 12,220,000
of which: (1) LS 10,283,000 CIP local currency generations
(2) LS 1,937,000 from regular GOS budget

Covenants:

The Cooperating Country shall covenant to:

1. Provide required counterparts for the TA team plus needed personnel (equipment operators, mechanics, drivers, laborers, etc.) to achieve the project objectives.
2. Provide an adequate petroleum, oil and lubricant (POL) supply to the project for the life-of-project for the operation of project-funded new and rehabilitated equipment.
3. Provide adequate financial resources from the GOS FY 88/89 budget, and thereafter, to cover annual incremental fuel costs required to operate AID financed equipment at efficient and effective levels after the life-of-project.
4. Prepare annual estimates of expenditures utilizing a format that will clearly distinguish road maintenance expenditures from other expenditures and organize and participate in a joint annual road program budget review with AID.
5. Provide, before the mobilization of the technical assistance contractor, sufficient radio communications frequencies for the sole use of the contractor and this project.
6. Select qualified candidates for training in a timely manner.
7. Use equipment, commodities, supplies, petroleum, oil and lubricants financed under the project solely for project purposes. Reserve all vehicles and field support equipment procured under this project for: (1) follow-on road construction activities to be financed by AID, if appropriate; (2) other road rehabilitation and maintenance activities in furtherance of the objectives of the project; or (3) disposed of with full consultation with AID.
8. Establish a project coordinating committee which will schedule meetings as necessary to ensure effective coordination of project activities in Equatoria and Bahr El Ghazal Regions.
9. Establish, in cooperation with AID, an evaluation program as part of the Project. Except as the Parties otherwise agree in writing, the program will include, during the implementation of the Project and at one or more points thereafter:
 - (a) Evaluation of progress toward attainment of the objectives of the Project;
 - (b) Identification and evaluation of problem areas or constraints which may inhibit such attainment;
 - (c) Assessment of how such information may be used to help overcome such problems; and

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(d) Evaluation to the degree feasible, of the overall development impact of the project.

10. Conduct periodic consultation meetings with all donors in the Southern Regions engaged in road improvement works, to discuss collectively matters of mutual interest.

11. Legally enforce load limitations on project roads. In addition, establish a procedure for limiting the movement of traffic while the Project road is wet. The load limitations will be as follows:

(a) Maximum Gross Vehicle Weight:

1. 2 or 3 axles	--	22,500 kg.	
2. 4 or 5 axles	--	38,000 kg.	
3. 6 or more axles	--	43,000 kg.	

(b) Maximum Axle Loads:

1. Front Steering Axle	--	6,400 kg.	
2. Single Rear Axle	--	8,000 kg.	
3. Tandem Axles	--	14,500 kg.	Total
4. Triple Axles	--	21,000 kg.	Total

12. Permit AID the right to review and approve in advance all plans, specifications, bid documents, contracts and subcontracts, as well as prequalification of contractors for local construction and labor contracts.

13. In recognition of the importance of compensation levels sufficient to attract and keep qualified and productive personnel, work with the AID-funded technical assistance contractor in developing and installing a system of compensation, benefits and discipline that will accomplish this objective.

14. The Parties agree to undertake an Environmental Review of the Project for completion by no later than December 13, 1983. Based on the findings of the review, the Grantee and AID will decide jointly on the need for and the extent of long-term monitoring of the effect of project activities on the physical environment. If deemed necessary, and as may be agreed upon between the parties, the monitoring activity will be incorporated into the implementation of the Project, utilizing financial resources made available by, and to the extent of availability under the Project.

One waiver is being requested for your approval: A source waiver to allow the purchase of two U.S. manufactured project vehicles from AID Geographic Code 899 countries. A discussion of the justification for this waiver is included in the Project Paper as Annex R.

It has been determined by the analyses in the Project Paper that:

(1) the project is technically, economically, socially, administratively sound and environmental concerns are adequately addressed;

(2) the technical design, specifications and cost estimates are reasonable and adequately planned pursuant to Section 611(a) of the Foreign Assistance Act (FAA);

(3) the procurement of goods and services for project activities are adequately planned for and scheduled;

PROJECT AUTHORIZATION

Name of Country: Sudan

Name of Project: Southern Road Maintenance and Rehabilitation I (SORMAR I)

Number of Project: 650-0043

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Southern Road Maintenance and Rehabilitation Project for Sudan involving planned obligations of not to exceed nineteen million seven hundred thousand dollars (\$19,700,000) in grant funds over a three year period from date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the project. The planned life of the project is six years from the date of initial obligation.

2. The principal purposes of the project are (1) to improve and preserve the primary road network in southern Sudan, and (2) to improve the institutional capacity of the Sudanese to implement future maintenance and rehabilitation programs. To achieve these purposes A.I.D. will finance technical assistance, training, major equipment, construction, vehicles, commodities, fuel and other related costs. The project consists of four principal components. These are:

(a) Road Rehabilitation:

Under the road rehabilitation component, A.I.D. will finance the rehabilitation of key sections of the primary road network in southern Sudan, principally within the sections: (1) Juba-Torit-Kapoeta and (2) Mundri-Rumbek-Tonj-wau.

(b) Road Maintenance

Under this component, road maintenance will be concentrated on previously constructed sections of the region's primary road network plus roads rehabilitated under the Project.

(c) Juba Equipment Workshop:

This component of the project will finance the upgrading of the Juba workshop operations in equipment rehabilitation; equipment maintenance; and identification, procurement, inventorying and storage of spare parts.

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(d) Project Headquarters and Administration:

This component of the project will provide financial assistance for headquarters support in Juba for the direction and management of project activities.

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

4. A. Source and Origin of Commodities, Nationality of Services:

Commodities financed by A.I.D. under the project shall have their source and origin in the Cooperating Country or in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have the Cooperating Country or countries included in A.I.D. Geographic Code 941 as their place of nationality, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States, the Cooperating Country, and other countries included in Geographic Code 941.

B. Conditions Precedent:

Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement to finance the long-term technical assistance contract, the Cooperating Country will:

(1) Provide evidence that it has allocated the land necessary for shops, housing and other required buildings and storage space.

(2) Provide the road workshop and office compound facility in Juba (formerly known as the CIDA workshop and office) for the sole use of Project personnel.

C. Covenants:

The Cooperating Country shall covenant in substance to:

(1) Provide required counterparts for the TA team plus needed personnel (equipment operators, mechanics, drivers, laborers, etc.) to achieve the project objectives as outlined in the Grant Agreement Annex 1, Amplified Project Description.

(2) Provide an adequate petroleum, oil and lubricant (POL) supply to the project for the life-of-project for the operation of project-funded new and rehabilitated equipment as detailed in the Grant Agreement Annex 1, Amplified Project Description.

(3) Provide adequate financial resources from the GOS FY 88/89 budget, and thereafter, to cover annual incremental fuel costs required to operate AID-financed equipment at efficient and effective levels after the life-of-project.

(4) Prepare annual estimates of expenditures utilizing a format that will clearly distinguish road maintenance expenditures from other expenditures and organize and participate in a joint annual road program budget review with AID.

(5) Provide, before the mobilization of the technical assistance contractor, sufficient radio communications frequencies for the sole use of the contractor and this project.

(6) Select qualified candidates for training in a timely manner.

(7) Use equipment, commodities, supplies, petroleum, oil and lubricants financed under the project solely for project purposes. Reserve all vehicles and field support equipment procured under this project for: (1) follow-on road construction activities to be financed by AID, if appropriate; (2) other road rehabilitation and maintenance activities in furtherance of the objectives of this Project; or (3) dispose of with full consultation with AID.

(8) Establish a project coordinating committee which will schedule meetings as necessary to ensure effective coordination of project activities in Equatoria and Bahr El Ghazal Regions.

(9) Establish, in cooperation with AID, an evaluation program as part of the Project. Except as the Parties otherwise agree in writing, the program will include, during the implementation of the Project and at one or more points thereafter:

(a) Evaluation of progress toward attainment of the objectives of the Project;

(b) Identification and evaluation of problem areas or constraints which may inhibit such attainment;

(c) Assessment of how such information may be used to help overcome such problems; and

(d) Evaluation to the degree feasible, of the overall development impact of the Project.

(10) Conduct periodic consultation meetings with all donors in the southern regions engaged in road improvement works, to discuss collectively matters of mutual interest.

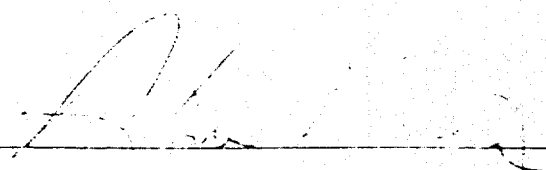
(11) Legally enforce load limitations to protect project roads from destructive overloads. In addition establish a procedure for limiting the movement of traffic while the Project road is wet.

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(12) Permit AID the right to review and approve in advance all plans, specifications, bid documents, contracts and subcontracts, as well as prequalification of contractors for local labor and construction contracts.

(13) In recognition of the importance of compensation levels sufficient to attract and keep qualified and productive personnel, work with the AID-funded technical assistance contractor in developing and installing a system of compensation, benefits and discipline that will accomplish this objective.

(14) Undertake an Environmental Review of the Project for completion by no later than December 31, 1983. Based on the findings of the review, the Grantee and AID will decide jointly on the need for and the extent of long-term monitoring of the effect of project activities on the physical environment. If deemed necessary and as may be agreed upon between the parties, the monitoring activity will be incorporated into the implementation of the Project, utilizing financial resources made available by, and to the extent of availability under, the Project.



Arthur W. Mudge
Director, USAID/Sudan

7/31/83

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Southern Road Maintenance and Rehabilitation I Project

I. Summary and Recommendations

A. Summary Project Description

The Southern Road Maintenance and Rehabilitation I Project (650-0043) is designed as the first phase of a long-term effort on the part of the Government of Sudan (GOS), with A.I.D. assistance, to improve and preserve critical access on primary roads within the southern Sudan. These objectives will be achieved by implementing the following project components:

Road Rehabilitation - Approximately 290 kilometers (kms) of the primary road network in the south will be rehabilitated to modified Minimum Commercial Access (MCA) standards. This component of the project will focus on two road links identified as high priorities by the GOS and AID: Juba-Torit-Kapoeta and Mundri-Rumbek-Wau. Based on potential economic returns and political priorities, two sections of these roads, Juba-Torit and Rumbek-Tonj, have been selected for intensive rehabilitation activities during the first phase of the project. During Phase II, or earlier if the mid-project evaluation so determines, the rehabilitation program will be extended to cover either the Torit-Kapoeta or the Tonj-Wau routes.

Road Maintenance - During the life of project, approximately 1470kms of primary roads will be maintained to MCA standards. In addition to those roads rehabilitated, existing roads, constructed primarily by other donors, will be maintained. These roads include: (1) Juba-Mundri-Yambio; (2) Juba-Yei and (3) Juba-Nimule. The road between Mundri and Rumbek will receive spot maintenance in order to open a supply route for the Rumbek-Tonj rehabilitation activity and maintenance efforts will be extended from Torit toward the Boya Hills, an area where drainage structures are being installed under the Southern Access Road Project. The maintenance program will be supported by three sub-regional equipment maintenance shops to be constructed under the project, at Torit, Mundri and Rumbek. Finally, labor-intensive maintenance camps will be improved to handle routine maintenance.

Juba Workshop - The workshop facility at Juba will be upgraded in such areas of equipment repair, equipment maintenance and spare parts procurement and control. The workshop will conduct major equipment repair that cannot be performed at the sub-regional shops.

To support and direct the total program, a project headquarters office will be developed. Overall project management, record keeping, spare parts control and commodity storage will be concentrated at project headquarters.

B. Project Funding

In summary, the GOS and AID will fund the following project inputs.

	<u>AID Grant (\$000)</u>	<u>GOS (\$000)</u>
Technical Assistance	6248.6	968.2
Training	381.0	40.0
Equipment/Commodities	5259.3	50.0
POL	2000.0	2048.0
Site Development/Construction	707.0	968.0
Freight Services	1521.0	145.0
Procurement Fees	365.2	-
Private Sector Development	700.0	1650.0
Local Salaries	-	1743.0
Other	370.0	50.0
Contingency	1267.9	512.0
Inflation	<u>880.0</u>	<u>1225.8</u>
Total	19,700.0	9400.0

C. Summary Findings

It has been concluded from the analyses included in this Project Paper that:

1. the project approach is technically, socially and economically sound; administratively feasible, and environment concerns are adequately addressed;
2. the technical design, specifications and cost estimates are reasonable and adequately planned pursuant to Section 611(a) of the Foreign Assistance Act;

3. the procurement of goods and services for project activities are adequately planned for and scheduled;
4. sufficient planning has been made for the evaluation and monitoring of the project;
5. all statutory criteria have been satisfied; and
6. sufficient funds are included in the project budget to cover the recurrent costs during the six-year life of project and adequate plans have been made to cover recurrent costs after the termination of the project.

D. Recommendations

It is recommended that the Director, USAID/Sudan approve the project and authorize a grant of \$19,700,000 (life of project funding). Additionally, approval of the following waiver by the Director is recommended: A source/origin waiver to permit the procurement of two project vehicles from Code 899 countries at an approximate cost of \$48,000. Finally, the Project Paper design team recommends that a Proprietary Procurement Waiver be prepared for the Administrator/AID to allow the purchase of approximately \$2,000,000 of road construction equipment from the Caterpillar Tractor Company.

II. Project Background

A. Economy of Southern Sudan

Southern Sudan has a population estimated at six million people living in an area of 650,000 square kilometers. The three southern regions contain about a fourth of the country's population and a third of its land area. Ninety percent of the people are traditional farmers or pastoralists who produce a wide range of food and cash crops and engage in livestock production.

Annual per capita income is approximately \$150, or less than one-third of the national average. Industrial activity contributes less than 5 percent to the regional economy in terms of GDP and capital accumulation is minimal. The area as a whole has a net trade deficit with the northern part of Sudan as well as the neighboring countries of Kenya and Taire.

Agriculture has historically been the predominant economic activity in the south; but the regions, which were once net exporters of food and cash crops, now import about 15 percent of food requirements. A principal cause of the decline in agricultural productivity and total agricultural production was the seventeen year civil war which isolated the south from 1955 to 1972. Physical infrastructure was destroyed throughout the region and the war brought about physical and social dislocations which have not been easily redressed. Even after ten years of donor assistance and major efforts on the part of the Government of Sudan (GOS), the transportation network and other capital plant are not as good as in 1955.

Another problem affecting productivity has been previous national economic policies favoring parastatals and government operated enterprises to the detriment of the development of private enterprise and initiative. The GOS is now moving vigorously to encourage the development of a vibrant private sector, a move which will strengthen the role of private businesses in the production, processing, marketing and transport of agricultural and related commodities.

Furthermore, the Regional Governments in the south have placed a high priority on private sector development, and wish to de-emphasize direct government involvement in economic production activities.

Major subsector constraints continuing to inhibit economic development in southern Sudan include the following:

1. a grossly underdeveloped and inadequate transportation network;
2. poor marketing systems which limit access to inputs and markets;

3. lack of public sector institutional capacity to plan and implement key economic development activities;
4. an economic policy environment not conducive to increasing farm output or investment in productive enterprises; and
5. low yielding farm technology limiting the ability of farmers to produce marketable surpluses.

A major AID-funded project is now being implemented to address some of these constraints. The Southern Agricultural Development Project (SRAD I) is the first phase of a long-term, sectoral project to address key constraints to increasing the production of both food and cash crops and the development of agri-businesses in the Southern Region. The project includes components dealing with: (1) farming systems research to improve the technology available to farmers; (2) market infrastructure improvements designed to increase marketing efficiencies, including the rehabilitation of a limited number of feeder roads; (3) policy changes needed to provide adequate production and marketing incentives; (4) manpower development in order to improve the capacity of the GOS to effectively plan and implement activities; (5) the promotion of agri-business by providing direct assistance (e.g. technical assistance, credit) to such enterprises as grain grinding mills and storage facilities.

A major need not being addressed by SRAD I is the improvement of the primary road network in the south and the development of a viable road maintenance program. Due primarily to the deteriorated condition of the road network in the south, transportation constraints exist that severely limit productive potential, particularly in the agricultural sector.

B. Transportation Systems in the South

Access to and from the southern Sudan includes seven main routes. The principal link in terms of tonnage and north-south trade is barge traffic on the Nile River, generally accessible except for several months at the end of the dry season. Most of the southbound traffic consists of sorghum with northbound barges often empty. The other major north-south link is the railroad to Wau. For the last few years traffic has been diminishing on this route due largely to management problems and unreliable service. Again the dominant flow is southward. There are two other overland routes linking the northern and southern portions of the country, one via Wau and the other on the east bank of the Nile, but these are passable only for about four months during the dry season. A significant quantity of petroleum products and consumer goods enter the south overland either directly from Kenya, or from Kenya via Uganda. Departing trucks are frequently

empty, and these routes become almost impassable during the wet season. A final route connects the south with Zaire, but this is primarily a conduit for smuggled Zairian coffee and tea and carries little trade. Thus there is a certain complementarity between wet and dry season access via the Nile on the one hand, and the roads and railway on the other. But in sum, there is no all-weather land, rail or water route that connects southern Sudan with the outside world.

For imported commodities, trade routes are shorter and transport costs are usually lower between Juba and the Indian Ocean port of Mombasa, Kenya than between Juba and Sudan's main port of entry-Port Sudan. However, access through Uganda is not without problems. From 1977 to the present, transport through Uganda has, at worst, been totally impassable because of the war, and, at best, subject to harassment, theft, two border crossings, and indiscriminate charges and payoffs. Even today a few truckers prefer the badly deteriorated gravel road through Lodwar directly from Kenya into Sudan rather than the asphalt surfaced road within Uganda through Kampala to the Sudanese border. This route could assume much greater importance if and when, as in 1978-79, the Uganda route were closed.

The southern Sudan's internal road network includes approximately 4300kms of primary road and another 2900kms of important secondary or feeder roads. While significant reconstruction efforts have been made by a number of donors, the network is still deficient. For much of the rainy season, travel on the main links is impossible for weeks at a time as streams and marsh areas flood inadequate roadbeds which turn into a sea of mud with potholes sometimes over one meter deep. Markets are constrained for lack of produce, commerce slows to a crawl, and food supplies cannot readily be moved from areas of surplus to deficit. In short, for much of the six-month rainy season the south's commercial and social intercourse comes to a standstill.

Transportation services are significantly more expensive in the south than in the northern portion of Sudan or other areas in East Africa. This situation is partly due to the high price of fuel to consumers and the high cost of imported vehicles. Poor road conditions result in slow operating speeds which reduces the ton-kilometers and passenger-kilometers handled per vehicle per year. Table II-1 depicts estimated financial operating costs per kilometer for various types of vehicles as well as ton-kilometer and passenger-kilometer costs. The ton-kilometer cost of cargo transport for one-ton pickups is approximately three times the cost of large lorries, thereby creating a bias against small loads. This is of particular importance in the south where, with an area of diffuse population engaged primarily in agricultural production with only small farm surpluses, the cost differential may create a further obstacle to smallholder development.

Futhermore, since fixed costs are such a small percentage of the total costs of operating a transportation service in the south, operators must charge high prices to cover high marginal (operating) costs. This results in a situation where operators let trucks remain idle during periods of relatively slack demand rather than cutting prices to help generate further demand and additional revenue. A further complicating factor is the price fluctuations for petroleum on the open market. Since fuel costs are a large part of both the total and marginal costs of operating a transport service, these fluctuations are translated into highly unstable transportation costs. Operators cannot predict with any degree of certainty whether they will be able to obtain a fairly constant supply of fuel at reasonable prices.

In summary, it is a generally accepted fact that transportation constraints in the southern part of the Sudan are among the most serious impediments to general economic growth, particularly to increasing agricultural production and productivity.

Table II-1

Estimated Financial Vehicle Operating Costs in the ^{1/}
Southern Region of Sudan

Operating Cost

	<u>Per Kilometer</u>	<u>Per Ton-Kilometer</u>	<u>Per Passenger Kilometer</u>
<u>Non-Motorized</u>			
Bicycle	Ls. .023	Ls. .456	Ls. .011
<u>Motorized</u>			
Motorcycle	.170	1.704	.105
Cargo Motorcycle*	.209	1.255	.083
One-ton Pick-up	.705	.705	.071
Souq Lorry	1.538	.246	-
Lorry-Bus	1.587	-	.040

Note: Cost estimates include: fixed costs including registration, taxes, comprehensive insurance, cost of capital, and provision for replacement; drivers' wages, fuel and oil; and maintenance. Based on interviews with transport operators, it is assumed that most but not all gasoline is obtained on the unofficial market, while most diesel is purchased at government prices. Cargo loads are: bicycle, 50kg.; motorcycle, 100kg.; cargo motorcycle, 200kg.; one-ton pick-up, 1000kg.; and souq lorry, 6300kg. Passenger loads are: bicycle, 2; motorcycle, 2; pick-up, 10; lorry-bus, 40. Tons are metric tons. Assumes full loads, passengers with baggage.

* Cargo motorcycles are not used in the Southern Region at present. These costs are estimated by modifying data collected on regular motorcycle costs and are included to facilitate the evaluation of the potential viability of such vehicles. See Appendix C for further explanation.

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Compiled November/December, 1982. Data compiled for the former Southern Region prior to the June 1983 reorganization creating three new separate regions.

III. Project Description

A. Overview

The Southern Road Maintenance and Rehabilitation Project is the first phase in a long-term effort by the GOS and AID to improve and preserve the primary road network in southern Sudan. In addition to actual road maintenance and rehabilitation activities, the project will begin the process of improving institutional capacities to implement future maintenance and rehabilitation programs. This first phase effort will be implemented over a six year period and will include the following major components:

1. Road Rehabilitation

Approximately 290kms of roads will be rehabilitated to Sudan's modified Minimum Commercial Access (MCA) standard during the life of project. This component of the project will be implemented by the AID-technical assistance team and GOS roads department staff with equipment, fuel and commodities funded by AID. Based on economic rates of return, current road conditions and political priorities sections of the Mundri-Rumbek-Wau (south-north) road and the Juba-Torit-Kapoeta (west-east) road have been selected by the GOS and AID for priority attention during the first phase of the project. In total, 150kms will be rehabilitated on the Mundri-Wau road. This activity will involve light rehabilitation of the southern portion of the road, principally to improve it enough to serve as a supply link to the northern portion between Rumbek and Tonj where major rehabilitation efforts will be concentrated. On the west-east link, 60kms will be rehabilitated between Juba and Torit.

After the rehabilitation program is completed, shops established at Torit and Rumbek will serve as area equipment maintenance shops for both roads and will cover other road sections in addition to those rehabilitated during the project (e.g. the Torit shop will maintain the road eastward toward Boya Hills). During the major, mid-term evaluation, the desirability of expanding the rehabilitation program from Torit to Kapoeta will be examined. It is currently estimated that 80kms of this 140km road link will require major rehabilitation.

2. Road Maintenance

The road maintenance component of the project will concentrate on roads already constructed primarily by other donors, as well as those to be rehabilitated under the project. Routine maintenance will be conducted through existing labor maintenance camps which will be provided with handtools and limited technical assistance under the project. Heavier maintenance activities will be covered by AID provided equipment, technical assistance and

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operating cost support in conjunction with regional roads department staff. AID-funded technical assistance will focus on the development of a maintenance program for the Juba-Yambio road. This road, constructed with aid from the Federal Republic of Germany, passes through a productive agricultural area including the AID-funded SRAD I Project area which concentrates on increasing agricultural production around Yambio. An equipment maintenance shop at Mundri will serve as the center for this activity which will maintain approximately 429Kms. of roads during the life of project. A second part of the maintenance component of the project will rehabilitate existing GOS road equipment for use in maintaining such roads as Juba-Yei and Juba-Nimule, both important commercial links connecting market centers and passing through rich agricultural areas. The equipment will be under the control of the GOS roads department with the AID-funded technical assistance team available to advise on special problems. These two roads represent some 406Kms. of the total maintenance program. Finally, the road sections to be rehabilitated under the project, Juba-Torit and Rumbek-Tonj will receive periodic maintenance. Equipment maintenance shops established at Torit and Rumbek during the rehabilitation program will continue to serve as centers for maintaining 634Kms. along the Juba-Kapoeta and Mundri-Tonj roads (290Kms. of which will be rehabilitated during the project).

3. Juba Workshop

The capacity of the workshop at Juba to provide major repair and maintenance services will be improved. Tools, equipment and spare parts will be funded by AID in addition to technical assistance. Equipment that cannot be repaired at one of the sub-regional facilities (e.g. major overhaul) will be brought to the Juba facility which will service road equipment from the three southern regions. Equipment provided and/or rehabilitated by AID for this project will, of course, receive priority attention. The shop will be available to service road equipment from all three Ministries of Works and Communications in the Equatoria, Bahr El Ghazal and Upper Nile Regions.

In addition to the central workshop operations, a major service contract may be signed with the Sudan Tractor Co. (Caterpillar dealer) in Khartoum. The contract will include the establishment of a service center for minor repairs in Juba, an engine, transmission component replacement service, dozer track rebuild service, and engine replacement for non-Caterpillar equipment. Major equipment repairs will be conducted at the Caterpillar shop in Wad Medani, with the level of component exchange parts and spare parts to be determined during the early phases of the project by the technical assistance team. Finally, Caterpillar will conduct on-the-job training at the Wad Medani center and Juba shop.

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From the project headquarters, the technical assistance team and GOS counterparts will provide overall project direction and management, including the development of working relationships with the Regional Ministries of Works and Communications. Project accounts and records will be kept at headquarters, including financial analyses related to cash-flow requirements, the Trust Fund Account and local currency project account. Spare parts will be ordered, stored, distributed and controlled from project headquarters as will fuel, handtools and other project-financed commodities.

4. Private Sector Involvement

The substantial amount of construction required in connection with the various project activities provides an opportunity to involve private sector construction contractors. The activities will include sub-regional workshop and residence development, local transportation, installation of simple drainage structures, and labor for road maintenance (e.g. road shaping, grass cutting, embankment construction). A few local contractors are already working in the south, mainly around the Juba and Torit areas. For the most part, these contractors are working under expatriate supervision constructing such structures as residential housing. Local contractor capability is limited due to a lack of adequate capital, equipment and management skills. However, it has been determined that with assistance in the form of equipment, construction materials and technical supervision, contract labor groups could undertake selected construction jobs.

It is planned in the early states of project implementation that local labor contracts, funded with local currency, will be let for the construction of project housing, compound fencing, small warehouses and simple equipment maintenance facilities. These contracts would be under project technical supervision and administration. The technical assistance team, in conjunction with the appropriate GOS Ministries, will develop a simplified labor contract package. Simple equipment needs, such as small concrete mixers and handtools, will be provided by the project along with construction materials. Logistical support will be provided through the project; labor management and supervision will be the responsibility of the labor contractor.

If the program proves satisfactory, it will be expanded to include the installation of simple drainage structures as part of the road rehabilitation and maintenance activities. The private contractor development activities anticipated during the Phase I Project are modest, but will be expanded during the Phase II Project, if feasible. A total of \$2.3M (foreign exchange and local currency) is provided for this development activity which will include the execution of about 25 private contracts.

5. Project Administration and Support

To direct and support the above activities, a project headquarters will be established in Juba at a facility to be provided by the Regional Ministry of Works and Communications and will include office space, parts storage, fuel storage and other project support facilities.

B. Logical Framework Narrative

1. Goal

The goal of the project is to increase agricultural production and incomes in the southern Sudan. Goal achievement will be indicated by: (1) an increase in total agricultural production in the project area; (2) increased productivity per land area; and (3) increased per capita farm income.

2. Purpose

The purpose of the project is to improve and preserve critical access on primary roads within southern Sudan. Achievement of the Project's purpose will be measured by the following End of Project Status (EOPS) conditions: (1) the GOS will be capable of implementing road rehabilitation programs; (2) the GOS will be capable of maintaining approximately 1500 kilometers of road; (3) an increase in the total volume of agricultural products and agricultural inputs marketed in the project's sphere of influence and (4) an increase in the total volume of traffic on rehabilitated roads.

3. Major Purpose to Goal Linkages and Assumptions

Several key assumptions must be made if the linkage between the achievement of project's purpose and goal are to be established. The most critical assumption is that improved access will actually stimulate both the increased sale of agricultural inputs, such as improved seeds and fertilizer, and increased farm production. Previous AID impact evaluations of road projects have pointed out that increased production is usually associated with the construction of new rural roads, not with road rehabilitation activities. However, in the case of the southern Sudan, it can be argued that the roads to be rehabilitated under the project are in such a poor physical state that rehabilitation efforts will actually create access where it does not now exist. Furthermore, assuming that the new roads constructed by other donors in the South will have a positive impact on agricultural production, the maintenance element of this project becomes crucial since it preserves the economic viability of previous investments. Finally, AID and other donors fully realize that one project intervention alone may be necessary but not sufficient to accomplish goal level objectives in the long term. This project is seen as complementary to other projects in the South, especially the AID-funded Southern Region Agricultural Development Project which focuses directly on increasing agricultural production and incomes through the provision of marketing and extension services, promotion of agri-business, agricultural research and construction of feeder roads that connect with the primary road network. It is worthwhile to note that prior to the 17 year civil war from 1955 - 1972, the southern Sudan was a net exporter of both food and cash crops. The destruction of much of the physical infrastructure in the south, combined with the disruption of productive

endeavors, has created a situation where substantial imports are necessary to meet the region's food requirements. The productive potential exists but realization of this potential will require the rehabilitation and continued maintenance of physical infrastructure along with other efforts to promote increased economic activity.

Another important assumption is that commercial transport services and fuel will be available in the south to take advantage of improved, well-maintained roads. Indications are that several private firms, both large-scale and single-unit, owner-operated companies are interested in doing business in the South. During the PP preparation, the design team had discussions with a major American-Sudanese joint venture company that operates a large transport fleet. Given the volume of goods flowing into the South, combined with the outlook for improved road conditions, this firm is planning to expand its truck fleet and begin transport services to and from southern Sudan. Assurances that adequate amounts of fuel will be available in the south and, consequently, to the Regional Ministries of Works and Communications is much more problematic. Currently, the regions in the south are allocated only a small share of the total refined petroleum available in the Sudan and at times, even this small allocation does not reach the south. Project funds have been earmarked to cover POL to operate the equipment during the project. A system to provide adequate supplies for future operation is the subject of other AID initiatives through the Energy Management and Planning (EPM) Project. One of the components of the EPM project will work to develop a national energy pricing policy as well as a more efficient, equitable fuel allocation system. This subject will be covered by a covenant in the SORMAR I Project Grant Agreement (See Section VII, Conditions and Covenants). The Project Paper team is confident that a reasonable plan can be developed and implemented that will assure that budget resources and POL will be available to keep the road equipment operating effectively after the project.

A final, major assumption that warrants attention is that reduced transport costs resulting from improved road conditions will translate into cheaper, more readily available farm inputs and a better farmgate price for crops. Evidence to date, based partially on several detailed transport economics studies conducted in the south, suggests that part of the transport cost savings will be passed on to farmers. Currently, transporters must charge extremely high prices and require large loads to make a profit since road conditions are often so poor that travel speeds are well below acceptable levels. Given estimated price elasticities, a goodly portion of the transport cost reductions should be passed on to both producers and consumers. Furthermore, many of the producers in the south are small, traditional farmers who are discouraged from producing a surplus because it is not economical for transporters to handle small loads. The project will alleviate this constraint, making the production of even a small farm surplus profitable for both the farmer and transporter.

4. Project Components

For the sake of presentation, the projects outputs are broken down among four major categories of activity: (1) road rehabilitation; (2) road maintenance; (3) Juba equipment workshop operations; and (4) project headquarters and administrative development.

A. Road Rehabilitation

This component of the project will rehabilitate key sections of the primary road network in the south. In accordance with priorities set by the Equatoria and Bahr El Ghazal Regional Governments as corroborated by two AID funded transport studies, two road links have been identified for rehabilitation: (1) Juba-Torit-Kapoeta and (2) Wau-Rumbek-Mundri. Economic analyses have defined those segments of these primary roads that will yield the highest economic rates of return after being rehabilitated. The level of effort on each segment will, of course, depend on current road conditions. While some sections will require an intensive effort, others may require only minor work to bring the road up to 75 percent access standards. (See section IV.B., Economic Analysis, for a priority listing of road sections and Section IV.A., Technical Analysis for a description of the road rehabilitation methodology and standards to be applied.)

In total, 290 kilometers along the above road links will be rehabilitated to Sudan's modified Minimum Commercial Access standard during the life of project. The rehabilitation effort will be supervised by a technical assistance team provided by a U.S. construction supervision firm in conjunction with GOS personnel. Sudanese staff will be trained to the B.S. level in engineering and construction foremen will receive short-term training in a third country. Additionally, the technical assistance team will provide on the job training to construction foremen, equipment operators, mechanics and other skilled workers.

- Inputs to support the road rehabilitation component are:

(1) <u>Technical Assistance</u>	<u>Person Months</u>
1 - Road Construction Foreman/Equipment Operator	51
1 - Master Mechanic/Field Operations	48
1 - Construction Supervisor (TCN) (Third Country National)	55
1 - Equipment Mechanic/Trainer (TCN)	51
Total	205

(2) Equipment, Commodities, Fuel and Supplies

(See Technical Analysis, Section IV. A., for a description of a typical heavy equipment spread and Annex F for a detailed equipment list and itemized costs).

(3) Training

Degree, third-country and on-the-job training for GOS staff. (See Annex H for details).

(4) Construction

To support road rehabilitation/maintenance efforts, area equipment maintenance shop/camps will be constructed during late 1984 in Torit and Rumbek. At both sites, resident housing will be built with project funds.

B. Road Maintenance

Road maintenance activities will concentrate on previously constructed sections of the south's primary road network. Priority road links identified for the maintenance component are as follows:

1. Juba-Mundri-Maridi-Yambio	429kms
2. Juba-Kapoeta	275kms
3. Mundri-Rumbek (Limited "spot" maintenance to open a supply line for the Rumbek- Tonj major rehabilitation effort)	235kms
4. Rumbek-Tonj	124kms
5. Juba-Nimule	187kms
6. Juba-Yei	219kms

Total 1469kms

The program will allow for both road maintenance and regravelling operations to be conducted concurrently over a continuous road section. Equipment and maintenance crews will work out of three equipment maintenance camps to be established at Mundri, Torit and Rumbek. Additionally, labor intensive maintenance camps will be supported by the provision of handtools and limited technical assistance. These camps are responsible for routine maintenance such as grass cutting and cleaning out drainage structures.

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- Inputs required to implement the road maintenance component are:

(1) Technical Assistance

1 - Road Construction Foreman/ Equipment Operator	55pm
1 - Equipment Mechanic/Trainer (TCN)	55pm
1 - Construction Supervisor (TCN)	60pm
	<hr/>
Total	170pm

(2) Equipment, Commodities, Fuel and Supplies

(See Technical Analysis, Section IV. A., for a description of a typical heavy equipment spread and Annex F for a detailed equipment list and itemized costs).

(3) Training

Degree, third-country and on-the-job training will be provided for GOS staff. (See Annex H for details).

(4) Construction

The construction of one equipment maintenance shop/camp and resident housing at Mundri.

C. Juba Equipment Workshop

This component of the project will upgrade the Juba workshop operations in the areas of equipment rehabilitation; equipment maintenance; and identification, procurement, inventorying and storage of spare parts. The workshop will provide major equipment repair services that cannot be performed at the sub-regional camps at Torit, Mundri, and Rumbek (with the exception of the Caterpillar service program described below). Workshop construction was begun under the IBRD Second Highway project which is also providing technical assistance and some workshop tools and equipment.

- AID funded inputs required to upgrade the operations of the Juba workshop are:

(1) Technical Assistance

1-- Shop Foreman/Master Mechanic	58pm
1 - Spare Parts/ Warehouseman (TCN)	31pm
1 - Office Administration/Accountant (TCN)	6pm

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(2) Shop Equipment, Tools, Commodities, Fuel and Supplies

(See Annex F for details)

(3) Training

On-the-job training will be provided for mechanical engineering, shop/stores section, accounting section staff (See Annex H for details).

(4) Caterpillar Component Exchange and Rebuild Program

In order to make maximum use of the private sector for equipment service and maintenance, the project will provide funds to establish an equipment component exchange program. The program may be established with the Sudan Tractor Company/Khartoum (Caterpillar Agent in Sudan). This arrangement is based on the assumption that a proprietary procurement waiver will be granted to standardize on certain lines of Caterpillar equipment for the GOS. The program will include engine, transmission, dozer track rebuild service, including engine replacement for non-Caterpillar equipment. Additionally the program will call for a shelf inventory to be specified by project technicians. As part of this component of the project, Caterpillar/Sudan will open a small shop facility in Juba for minor repairs; major repair work will be done at the main shop in Wad Medani. Caterpillar will also provide training for GOS equipment operators and mechanics.

D. Project Headquarters and Administration

This component of the project will focus on headquarters support in Juba for the implementation of project activities. The Ministry of Works and Communications will provide a compound for office space, warehousing, spare parts storage and fuel storage for the project.

The project headquarters will be established by the technical assistance team leader and his counterpart from the GOS (senior engineer) during the initial stages of project implementation. The team leader will also continue the procurement process (begun during project mobilization) for equipment, spare parts, fuel and other commodities. The GOS counterpart engineer and team leader will be responsible for overall project direction and implementation. They will develop all working relationships for project implementation including the assignment of personnel for field operations and determination of priorities for road maintenance and rehabilitation.

Two TCNs from the technical assistance team will spend part of the time working at the project headquarters. One will establish an accounting and record keeping system, including a projected cash flow requirements analysis. The accountant will also maintain the Project Trust Fund and Project Account and will administer the local

contracts account. A second TCN will establish a spare parts ordering, storage, inventory and retrieval system at project headquarters. This technician will also be responsible for supervising a security program by establishing security inspection and monitoring procedures for the project headquarters compound, Juba workshop and field operations.

- Inputs required to implement this component of the project are:

(1) Technical Assistance

1 - Team Leader(Senior Highway Engineer)	65pm
1 - Civil Engineer	55pm
1 - Office Administrator/Accountant (TCN)	58pm
1 - Spare Parts/Warehouseman (TCN)	<u>31pm</u>
Total	209pm

(2) Equipment, Commodities, Fuels and Supplies

(See Annex F for details)

(3) Training

On the job training will be provided in the areas of spare parts management and accounting/record keeping for 2 GOS staff members. (See Annex H for details).

E. Summary of Rehabilitation and Maintenance Programs Outputs

<u>Road Section</u>	<u>Total Length Kms.</u>	<u>Kms. Rehab.</u>	<u>Kms. Maintained</u>
Juba-Torit	135	60	135
Rumbek-Tonj	124	100	124
Mundri-Rumbek 1/	235	50	235
Torit-Kapoeta 2/	140	80	140
Juba-Uambiq 3/	429	-	429
Juba-Yei 4/	219	-	219
Juba-Nimule 4/	187	-	187
Totals	<u>1469</u>	<u>290</u>	<u>1469</u>

1/ Spot rehabilitation will be necessary to open a supply line between the base camp at Mundri and the major rehabilitation program for Rumbek-Tonj (operating from Rumbek equipment center).

- 2/ Possible rehabilitation activity for last two years of project if determined feasible by the mid-term project evaluation. If not, major rehabilitation of this link will be considered during the development of the Phase II Project. In any case, once rehabilitation is completed to Torit, the maintenance program will work in both directions from the Torit camp (i.e. toward Juba and Boya Hills).
- 3/ To be maintained with technical assistance, equipment, commodities, fuel, supplies and tools funded by AID.
- 4/ Spare parts to rehabilitate existing equipment to be funded by AID. Staff and operating costs will be under the direction of, and provided by, the Regional Ministry of Works and Communications, and Road and Bridges Public Corporation (RBPC).

IV. Project Analyses

A. Technical Analysis

1. Background for Rehabilitation Efforts

The major portion of funding under this project is for road rehabilitation. Efforts under the Southern Rural Infrastructure (650-0031) Phase I and Southern Access Road (650-0036) projects provide the basis for assigning top priority to rehabilitation activities. By the end of the Southern Access Road project activities (June 1984) 55 culverts, 4 bridges and 3 drifts will have been constructed in Sudan. These structures represent a significant initial AID investment (US \$10.0 million) and provide the starting point for the continuation of primary road rehabilitation in the southeastern portion of Southern Sudan. The Southern Rural Infrastructure Phase I project road design provides a basis for rehabilitation in the northeastern and central areas of Southern Sudan. The proposed project deviates from the design provided under Phase I, however, there are significant portions of the design that will be utilized under this project such as the bills of quantities, roadway and bridge technical specifications, suggested road and drainage structure improvements, existing terrain data, road earthwork tables, general soils reports and hydrological data.

2. Proposed Approach to Road Maintenance and Rehabilitation

The approach to road rehabilitation and maintenance will benefit from AID experience elsewhere with similar projects, particularly Tanzania and Kenya. There is a substantial need for mechanized equipment to first rehabilitate deteriorated road sections followed by a more labor intensive program of scheduled maintenance activities. The Project phases and integrates equipment-intensive road rehabilitation work with the parallel establishment of labor-intensive road maintenance operations. Equipment spreads will be self-contained, supported by a minimum level of technical assistance and GOS personnel, and under the direct control of the project organization which will also provide engineering support as needed for alignments, roadway embankment design, material sources and drainage requirements. Maintenance section camps, utilizing centrally-controlled GOS labor, will also be self-contained and have limited mobility.

This six-year project is considered as the first phase of a long-term program. Mechanized equipment and labor will be utilized in a "leap-frogging" approach. As an equipment spread progresses on a section, adhering to established maintenance and rehabilitation priorities, certain key sections may be extensively rehabilitated while adjacent sections may initially receive only light grading. This approach will allow a minimum amount of equipment to upgrade a maximum number of kilometers

to a standard within acceptable limits. Because the equipment spread will also be employed for routine maintenance on the same sections previously maintained or rehabilitated, the road crew should gain familiarity with road conditions peculiar to particular sections and be able to develop a consistent routine for periodic maintenance.

After mobilization, the technical assistance Team Leader will prepare a detailed road conditions survey. The Team Leader will travel all project roads and comment in detail on the conditions, level of effort required to upgrade and suggested prioritization of rehabilitative and maintenance activities. This survey will be reviewed by the GOS and AID and will result in a road operations plan and schedule.

3. Description of Standards for Road Rehabilitation

Roads will be rehabilitated to Sudan's modified Minimum Commercial Access standard which provides for an overall 6.0 meter wide roadway with a designated travelway of 4.0 meters and 1 meter shoulders. It is impossible to differentiate between the travelway and shoulders of a gravel laterite road. However, the designation between travelway and shoulder does reflect driving habits on low-volume roads; that is, virtually all the traffic uses the middle of the road except to pass, which is done on the shoulders. The same select surface materials will be used across the entire 6.0 meter surface to accommodate a design speed of 60 kph. International standards indicate a 4.0 meter travelway will adequately serve up to two hundred fifty vehicles per day. The sections rehabilitated are not expected to exceed this volume during the next 15 years.

The minimum embankment elevation associated with all-weather gravel roads is 0.6 meters above the surrounding ground level to protect the roadbed from nearby surface water drainage. Normally, at least 0.3 meters of embankment freeboard above the high water level is employed in design criteria. The project will utilize this standard wherever practical depending on easy accessibility to material sources and numerous other considerations. However, realistically there may be sections of rehabilitated road that are elevated 0.3 meters or less. If deviation from standard engineering design becomes necessary for consideration, AID and GOS will review on a case by case basis each suggested alteration before granting approval of standard modification. Although, this approach may result in short sections of road being constructed to lesser standards it is felt that this is the most realistic approach to rehabilitation in these cases while adhering to an overall 75 percent accessibility criteria.

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Of the total 1469kms. of road to be maintained during the project, at present, approximately 60 percent permit all weather access. However, there are some road sections to be rehabilitated that permit only seasonal access. Given this drastic variation, by the sixth year of the project access will be improved to a point where cumulative road closures will be limited to approximately three months per year for an overall yearly accessibility of 75 percent.

Adequate drainage away from the road embankment is as important to preserving the quality of the rehabilitated road as is a sufficient wearing course of gravel. Along the 210kms. of road proposed to be rehabilitated there is a requirement for over 2000 drainage treatments to provide all-weather access. The magnitude and cost of this number of drainage solutions is beyond the scope of this phase I project. Drainage structures will be rehabilitated or replaced on a priority basis with low cost fords (Irish bridges) and project-cast concrete pipe.

The wearing course thickness is proposed to be 15 centimeters of select lateritic or gravel materials. Due to re-gravelling the actual pavement thickness may exceed this minimum requirement. In road sections where CBR are less than 20, sub-base materials should be increased in thickness up to 30 centimeters.

Ideally load restrictions should be adhered to on the Project roads. Although a weigh station will be installed at Juba under the Southern Access Road Project, the enforcement and degree of success in limiting commercial loads depends heavily upon the effectiveness of local authorities.

4. Technical Assistance Approach for Road Maintenance and Rehabilitation

The proposed technical assistance team will be made up of experienced personnel under the direction of a team leader/engineer representing a professional engineering, construction management or construction contracting firm from the United States. The proposed TA staff will be both US and Third Country Nationals (TCNs). The US engineers, road construction foreman/equipment operators and mechanics will bring with them a level of expertise not readily available within the Southern Regions. In addition, local hire TCNs will be recruited to fill key positions on the team such as construction technician and mechanic/operator/equipment trainers. The TA team will have counterparts to foster free exchange of information and experience. This level of technical assistance is required since the contractor's staff and the assigned GOS personnel must be able to function as a self-contained unit.

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Other donors have tried a labor-intensive, force-account approach to road construction in the Southern Sudan. This approach was eventually abandoned for a self-contained contractor type of operation with some seconded DRB operators, mechanics and laborers. The same modis operandi is utilized by the Dutch and their involvement in the road construction, rehabilitation maintenance program in the Upper Nile Region. A final example of a self-contained unit found in Southern Sudan and one more similar to that proposed for this project is the Norwegian Church Aid feeder road construction and maintenance program.

All of the above mentioned units have their shortcomings and this project's self-contained unit will likely develop a few problems of its own. However, given the background associated with the post civil war era it appears to be the only realistic method of introducing programs such as these to guarantee assured and dependable availability of financial and human resources.

One of the goals of this project is to progressively evolve all of the project operations into activities under the operational control of the GOS. This however, will take time and requires constructive guidance from an outside technical group.

5. Capital vs. Labor Intensive Rehabilitation and Maintenance Of Roads

There are examples of roads rehabilitated through labor-intensive practices. The minimum requirements are a low-wage labor force, ample labor supply and a willingness to work, suitable soil conditions and sufficient local currency. Although it can be argued these are available in certain parts of Southern Sudan it would be difficult to mount a large-scale program hoping to achieve any level of success. This approach was tried without success several years ago by the West Germans during the initial years of their road rehabilitation efforts. The sparseness of population along the project route inhibits total labor-intensive construction along with reminiscence of forced labor practices from days gone by. Conflicts created by infringement on tribal boundaries by outside labor forces also supports the reluctance of the GOS to mount large scale labor-intensive construction. Road rehabilitation with mechanized equipment provides a higher quality product than those that utilize only a labor-intensive approach. In addition, if time is a critical factor or constraint, mechanized equipment is better suited for the task. For these reasons mechanized rehabilitation is more appropriate in the Southern Regions of Sudan.

The shortage of fuel, spare parts and trained mechanics strongly support utilizing labor-intensive methods as much as possible. These ideas, however, must be tempered with reality. The rapid occurrence and reoccurrence of severe corrugations over long sections of road dictates the need for mechanized grading equipment for routine blading and shaping. Quarrying and hauling aggregates requires the use of mechanized collection and transportation equipment. There are, however, operations of maintenance best suited to labor-intensive practices in Southern Sudan. A few of these are hand ditching, cleaning culverts and bridge drains, erosion repair, small scale material stockpiling, hauling, patching and seasonal grass and bush cutting.

This project proposes to utilize labor-intensive practices as much as possible. The project will progressively introduce more and more labor-intensive operations, but due to the present limited capacity of the Southern Regions' road operations the project must start as a mechanized operation.

6. Other Donor Roads

The gravel roads constructed by other donors in the area during the last five years represent a significant investment toward improving post civil war conditions. Typically the programs involve complete turnover to a Regional Directorate of Works and Communications. Unfortunately the Directorates do not have adequate operable equipment, financial resources or skilled personnel to meet the level of input necessary to maintain the roads at a minimum acceptable standard. As a result of optimism on the part of the donors and limited resources from the Regions, the roads are quickly deteriorating. The IBRD originally intended to directly address this problem through the Third Highway Project. However, during negotiations in March and April of 1983, the IBRD and the GOS could not reach mutual agreement on the conditions of the credit agreement and negotiations were terminated, thereby postponing the project for at least one year. Unfortunately, the deterioration of already constructed roads dictate that maintenance efforts cannot be postponed until new agreements are arranged. This project will provide a means to focus donor and GOS efforts to address the road maintenance and rehabilitation requirements in the south.

7. Equipment Spread Description

a. Juba-Torit-Kapoeta

The efforts between Juba and Torit will focus on road rehabilitation with routine maintenance. New equipment will be procured to form this equipment spread. The spread will consist

of: 1-D7 Bulldozer, 2-Graders-120G, 1-Caterpillar 930 Front-end Loader, 1-Caterpillar 950 Frontend Loader, 3-Dump Trucks 5 cu. yd., 2-Dump Trucks 8 cu.yd., 1-Water Truck 1500 Gal., 2-Towed Compactors, 13 Wheel, 1-Field Service Lube Truck, and 5-Pickup Trucks. The equipment spread size was established based upon the criteria of rehabilitating 6kms per month or performing heavy maintenance at a rate of 20kms per month. The equipment spread will initially undertake road maintenance and rehabilitation between Juba and Torit. During the first three years of the project, work between Torit and Kapoeta will be limited to maintenance with minor rehabilitation. This schedule will allow the 127kms between Juba and Torit to be rehabilitated over 23 operational months and the 137kms between Torit and Kapoeta to be maintained in approximately 7 operational months. During the two year evaluation, future levels of effort required for the Torit-Kapoeta section and need to rehabilitate the 112kms stretch from Kapoeta to the Kenyan border will be determined. Seventy GOS personnel will be trained to operate the unit.

b. Juba-Mundri-Maridi-Yambio Unit

The results of the road conditions survey and operations plan should indicate that the road maintenance crew will commence activities at the Juba junction and proceed toward Mundri. It is anticipated that a portion of the spread will proceed directly to Mundri and operate toward Maridi. The spread will consist of: 1-D7 Bulldozer, 2-Graders-120G, 1-Caterpillar 930 Frontend Loader, 1-Caterpillar 950 Frontend Loader, 3-Dump Trucks 5 cu. yd., 2-Dump Trucks 8 cu. yd., 1-Water Truck 1500 Gal., 2-Towed Compactors, 13 Wheel, 1-Field Service Lube Truck, 1-Utility Truck 4WD, and 3-Pickup Trucks. Seventy-three GOS personnel will be trained to operate the unit.

The maintenance operations will consist of three categories; light, intermediate and heavy grading. The level of effort required for the different categories will be clarified through the road conditions survey. Light grading consists of three passes at a production rate of 10kms per day. Intermediate grading operations are estimated to produce 1½ to 2kms per day of reshaped and profiled roads and reshaped and cleaned ditches. The heavy grading operation consists of the intermediate grading operation plus minor rehabilitation with regravelling. Heavy grading operations are estimated to produce 20kms per day month of maintained road. To maintain the 429kms of primary roads from Juba to Yambio will require approximately 12 operational months. During the first three years of the project a portion of this equipment spread will be diverted to the Rumbek-Tonj area to commence rehabilitation. The actual timing of the Rumbek-Tcnj rehabilitative effort is dependent upon the road operations plan and schedule prepared by the TA contractor.

As with the Juba-Torit-Kapoeta maintenance and rehabilitation effort, the two year evaluation will define the future project years' activities.

c. Juba-Nimule and Juba-Yei Unit

The GOS will undertake the maintenance of these sections under the supervision and control of GOS personnel. A portion of the Caterpillar component exchange program and spare parts for non-U.S. equipment are the project funded activities supporting this effort with foreign exchange. Local currency will be utilized to provide funds for GOS procured petroleum, oil and lubricants. The equipment spread formed from rehabilitated GOS equipment is proposed to consist of 2-Fiat-Allis Bulldozers Model 16B, 4-Caterpillar 12F Graders, 2-Caterpillar 930 Front-end Loaders, 1-Caterpillar 950 Frontend Loader, and 5-International Harvester Dump Trucks. Other pieces of required major and support equipment will be provided by the GOS from additional existing non-U.S. equipment.

GOS estimates for complete road maintenance of the 187kms. between Juba and Nimule and the 219kms. between Juba and Yei indicate approximately 15-20 operational months are required. During the two year evaluation the level of continued support for this activity will be determined. In conjunction with the equipment spread, the GOS will also supervise the operation of labor-intensive road camps along these same sections. Local currency will be provided for local off-shelf procurement of handtools.

B. Economic Analysis Summary

Since the project involves the establishment of maintenance programs on already constructed/rehabilitated road links as well as rehabilitation of severely deteriorated roads, the economics of both activities are summarized below. Detailed economic analyses have been performed by Louis Berger International, Inc. (LBII) and are included as Annexes M, N and O.

Maintenance

Unlike paved roads, gravel roads begin to deteriorate as soon as they are constructed. A road will revert to its initial state in five to seven years if unmaintained. As it deteriorates the vehicle operating cost savings are lost, as are indirect development benefits. Routine maintenance is not being performed in the southern regions, and hundreds of kilometers of recently reconstructed primary roads are currently being washed out and worn away.

Calculations taking into consideration the weather, usage, design standards, etc. of roads in the south indicate that in the absence of maintenance a 40-50% decline in the internal rate of return (IRR) of a project can be anticipated. This is to say, that projects with an IRR of 20% with maintenance might show an IRR of 30% without maintenance. This result holds for virtually any reasonable set of economic assumptions and for virtually any southern road link. Without question, maintenance activities yield high rates of return for the important primary roads in the South.

Rehabilitation

Economic analyses were performed on both road links, Juba-Kapoeta and Wau-Mundri, prior to PID development (See Annexes M & N). During the preparation of the PID it became apparent that, not only were some sections of these two road links much more important in terms of net economic benefits generated from rehabilitation, but absorptive capacity considerations dictated a phased approach initially concentrating on certain key sections of the roads.

Based on these conclusions, a refinement of the PID economic analyses was performed for the final project design (See Annex O). The analysis independently examines nine road sections under varying assumptions as to rehabilitation cost per kilometer. In order of priority (based on IRR calculations), the road sections considered in the analysis are as follows:

<u>Road Section</u>	<u>Length</u>	<u>IRR(%)</u>
Juba-Torit	135	58.2
Torit-Kapoeta	140	24.4

<u>Road Section</u>	<u>Length</u>	<u>IRR(%)</u>
Rumbek-Tonj	124	22.3
Wau-Mundri	457	18.2
Wau-Rumbek	221	17.5
Kapoeta-Lokichokio	123	10.7
Wau-Tonj	97	7.8
Rumbek-Mvolo	122	5.6
Mvolo-Mundri	113	1.0

The above figures assume a cost per kilometer of \$30,000. Should costs/km. rise to \$40,000, the first three sections still have IRRs well above 15% (36.1%, 17.7%, 19.0%, respectively). It should be noted that "sunk costs" associated with the road sections that are part of the Southern Access Road Project are not included.

Based on the above findings, in conjunction with the PP team's assessment of the regional governments' manpower and financial absorptive capacities, the GOS and USAID have selected the Juba-Torit and Tonj-Rumbek road sections for major rehabilitation during this Phase I Project. Progress in project implementation will be measured during the major, mid-term evaluation at which time a decision will be made on expanding the rehabilitation program to other road sections (e.g. Torit-Kapoeta, Tonj-Wau).

The above analysis is based on economic benefits accruing primarily from user savings, with benefits due to increased economic activity (e.g. services and agricultural production) included to the extent quantifiable. The potential for increased agricultural production and farm income is considered high, based on the fact that the area was a net exporter of food and cash crops prior to the destruction of the physical infrastructure base during the civil war. Furthermore, impact evaluations of AID-financed road projects in other countries have demonstrated that transportation projects can yield significant increases in agricultural production when accompanied by other efforts, such as those being provided in the Southern Region Agricultural Development Project. The impact evaluations also emphasized the critical importance of road maintenance (due to high economic returns on investments) and recommended that AID finance road maintenance projects.

An efficient transportation network is unquestionably necessary to link farmers and markets in order to increase commercial production. In addition to the project's affect on agricultural production by stimulating supply and demand, market centers will be connected, thereby laying the foundation for increased commercial activities of all types and providing a mechanism for supplying inputs to farmers. Finally, improved and well maintained roads will provide the rural population easier access to credit, agricultural extension, schools, health care

facilities and other social services.

In summary, the PP team finds the project approach sound and concludes that the project is viable on economic grounds.

C. Institutional, Administrative Analysis

Specific responsibilities of the GOS, the AID-funded contractor and AID are more fully described in Section VI, Implementation Plan, including a project implementation schedule. This section will concentrate on the current institutional framework within which the project will be implemented, including a delineation of required GOS counterparts, training objectives and a description of the institutional improvements expected as a result of the project.

1. Institutional Profile

Until recently, the responsibility for construction and maintenance of all primary and important secondary roads in the former Southern Region rested with the Directorate of Roads and Bridges (DRB) in the Southern Regional Ministry of Communications, Transport and Roads (SRMCTR). Classified staff of the DRB consisted of 17 engineers, 21 technicians, 5 foremen plus storekeepers and clerks. Only six of the engineering posts are filled and the other posts are filled by people with varying qualifications and skills. In addition to classified staff, over 400 personnel composed of superintendents, foremen and semi-skilled personnel, excluding unskilled laborers, are scattered throughout the three southern regions.

The recently announced division of the Southern Region into three new regions has significantly changed the organizational framework under which road construction and maintenance programs will be implemented. Now, all road projects in the Equatoria, Bahr El Ghazal and Upper Nile Regions will be the responsibility of the Roads and Bridges Public Corporation (RBPC). The RBPC is a division of the central Ministry of Construction and Public Works and is currently responsible for road projects in the northern regions. The RBPC will assign a Regional Manager to each of the new regions along with a cadre of engineers and office personnel. The Regional Ministries of Works and Communications will second staff to the RBPC and all roads projects will be coordinated with the Regional Director of Works.

Staff for the Regional Ministries of Works and Communications will be taken from the current staff of the SRMCTR/DRB. In conjunction with new personnel provided to the RBPC, the Regional Ministry staff will provide the human resources required to implement the project. A similar organizational structure now exists in two

northern regions where major roads programs are being implemented. The PP team has examined these programs and consider the organizational structure sound. However, since the re-assignment of personnel has not actually taken place and organizational relationships between the Regional Ministries have not been formally defined, a covenant regarding the provision of GOS counterpart and project implementation staff will be included in the Grant Agreement. The covenant will include a time schedule for appointing key personnel.

2. Counterpart and Other GOS Staff Requirements

Within the proposed RBPC/Regional Ministry of Works and Communications (RMWC) organizational plan, the following counterparts will be required to implement the project:

<u>AID Technical Assistance Team</u>	<u>GOS Counterpart Positions</u>	<u>Date Counterparts Required By</u>
Team Leader (Senior Highway Engr.)	Project Manager(2) Equatoria and Bahr El Ghazal Regions	Feb. 1984
Civil Engineer	Senior Engr. (2) Equatoria and Bahr El Ghazal Regions	June 1984
Master Mechanic/ Field Operations	Senior Mechanic Equatoria-Torit	April 1985
Road Construction Fore- man/Equipment Operator	Senior Foreman Equatoria-Torit	Jan. 1985
Road Construction Fore- man/Equipment Operator	Senior Foremen(2) Bahr El Ghazal-Rumbek Equatoria-Mundri	Sept. 1984
Shop Foreman/Master Mechanic	Shop Foreman/Senior Mechanic/Juba Workshop	June 1984
Equipment Mechanic/ Trainer (TCN)(Rehab)	Senior Mechanic Equatoria-Torit	Jan. 1985
Equipment Mechanic/ Trainer (TCN) (Maintenance/Rehab)	Senior Mechanic(2) Equatoria-Mundri Bahr El Ghazal-Rumbek	Sept. 1984
Construction Supervisor (TCN) (Maintenance/Re- hab)	Construction Foremen(2) Equatoria-Mundri/Bahr El Ghazal-Rumbek	April 1984

<u>AID Technical Assistance Team</u>	<u>GOS Counterpart Positions</u>	<u>Date Counterparts Required By</u>
Construction Supervisor (TCN) (Rehab)	Construction Foreman Equatoria-Torit	Aug. 1984
Administrator/Accountant (TCN)	Senior Accountant RMWC-Equatoria Region	March 1984
Spare Parts/Warehouseman (TCN)	Spare Parts Supervisor/Warehouseman-Juba Workshop	May 1984

In addition, the following Regional Ministries of Works and Communications personnel will be required to achieve project objectives.

<u>a. Road Rehabilitation Component*</u>	<u>Juba-Torit Equatoria</u>	<u>Tonj-Rumbek Bahr El Ghazal</u>
Assistant Foremen	-	2
Equipment Operators	15	7
Mechanics	-	2
Mechanic Assistants	5	3
Drivers	10	3
Driver Assistants	10	2
Warehousemen	5	2
Laborers	15	5
Guards, Misc.	10	4
Total	70	30
<u>b. Road Maintenance Component</u>	<u>Juba-Yambio Equatoria</u>	
Assistant Foreman	3	
Mechanics	3	
Equipment Operators	13	
Drivers	7	
Warehousemen	3	
Mechanic/Operator Assistants	5	

* Personnel listed for rehabilitation will also be utilized for the maintenance of same section plus additional maintenance activities as required (See Project Description).

Road Maintenance Component (Continued)

Laborers	5
Guards, Misc.	<u>4</u>
Total	43

c. Juba Workshop

Mechanics	25
Welders	15
Electricians	15
Misc.	<u>50</u>
Total	105

d. Project Headquarters (Juba)

Office Manager	1
Clerks	5
Typists	3
Messengers	4
Drivers	2
Guards, Misc.	<u>8</u>
Total	23

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All of the above staff are currently on the roles of the GOS and will be specifically assigned to project activities. While overall direction will be provided by the technical assistance team, day to day supervision of GOS personnel will be the responsibility of RBPC Senior Foremen and, in the case of Project Headquarters, the Office Manager.

In addition to the RMWC staff assigned to the project, support staff will be hired on a non-permanent basis using CIP generated local currency to be provided under the project.

3. Training and Institutional Development

Training to be provided with project funds is focused at the operational, field level. The four engineers to receive degree training will spend some of their time in planning functions but will concentrate on design and supervision of road rehabilitation and maintenance work. RBPC construction and shop foremen will receive short-term

Training in a third country and extensive on-the-job training will be provided by the technical assistance team. Otherwise, the project is heavily biased toward on-the-job training for operators and mechanics.

The PP team has determined that this is an appropriate training approach and that institutional development at the field operations level is the most appropriate place to start in Phase I of the project. By the end of the project, the Regional Ministries of Works and Communications (Equatoria and Bahr El Ghazal) will have the capacity to: rehabilitate and maintain roads; set standards, including the capability for structural design; supervise construction activities; operate and maintain equipment; order, control and distribute spare parts; operate and manage warehouse and workshops; and keep accurate financial records.

It is anticipated that once field capabilities are satisfactory, a Phase II project, if forthcoming, might place more emphasis on improving planning and management at higher levels in the Regional Ministries.

Given the current organization framework, numbers and qualifications of personnel, and logistical support constraints, the PP team has concluded that the project approach is the most reasonable one and is administratively sound.

D. Social Soundness Analysis Summary *

1. Setting and Background

Two cardinal features of the sociocultural environment of the south are the physical isolation and the cultural diversity of the population. Isolation is caused by seasonal rains, poor and nonexisting roads, and physical barriers such as mountains, rivers, swamps and forests which crisscross the south. Arising in part from physical isolation and in turn reinforcing it, is cultural particularism. Roughly 60 percent of the southern population is semi-nomadic, combining agriculture with animal husbandry. The cultural practices and social institutions of this farmer/pastoralist segment are sharply divided along tribal lines with distinctive languages, economic practices, and social allegiances readily apparent. The remaining 40 percent of the population that do not herd cattle subsist mainly by agriculture. Some tribes are almost entirely sedentary while others are semi-nomadic.

The pastoralists combine sorghum (dura) with cattle, and tend to operate at the subsistence level. Among the nonpastoralists, however, is found wide range of both food and cash crops including cotton, tobacco, oil nuts and sesame as well as dura, maize, rice, cassava and groundnuts. Unlike the more traditional pastoralists, the sedentary farmers, especially those of the Equatoria Region, tend to be market-oriented petty capitalists. Small-scale, commercial agriculture is found around Yambio, Yei, Torit, and Juba.

2. Beneficiaries

Rehabilitation and maintenance efforts will benefit primarily the commercial interests who presently use the road system to move their commodities. Local and regional merchants and traders should realize lower transport costs and more timely deliveries; villages and towns presently cut off by the collapse of roads during the wet season should be isolated less frequently. Transporters should find their vehicles lasting considerably longer, thereby reducing maintenance/replacement costs.

Theoretically, reduced transport costs and increased volume should lead to lower prices for agricultural inputs and consumer goods. Easier access to the hinterlands should increase competition among haulers for farmgate goods, thereby reducing producer costs and

* The complete Social Soundness Analysis is found in Annex P.

raising profits - in theory, leading to a greater productivity. Whether or not reduced transport costs will be passed on to consumers in the form of lower prices remains to be seen. The issue of whether or not road improvement will stimulate farmers to produce more, and thereby increase their income, will be discussed in the next section.

The project's benefit to women and dependent children is also problematic. If costs decline and/or farm family income rises, women may benefit from greater disposable wealth. If improved roads lead to greater outreach by such social service agencies as primary health care, rural water, education, veterinary medicine, etc., women and dependent children will benefit proportionately more since they are presently more disadvantaged by the absence of these services. To the extent that improved roads are used by males to sojourn in towns, or to reach the labor-short areas of the north, rural women will bear a greater labor burden since they will have to take over some traditional male tasks.

3. Socio-Cultural Feasibility

From a narrow perspective, the project is socioculturally feasible; that is, there is little or nothing about a capital and equipment intensive activity that is unacceptable to local practices and institutions. People living along the roads which will be rehabilitated and maintained already have extensive interaction with exogenous practices and institutions; adaptive cultural evolution has been going on for a long time and there is nothing very traumatic or immediate likely to happen as a result of improving existing roads.

That achieving the purpose of the project (improving and preserving roads) will lead to achieving its goal (increased income and production for farmers and pastoralists) is not, however, a given.

Along the Juba-Torit-Kapoeta road, we have seen a growing concentration of population over the past few years. The presence of the road may be one of the factors pulling people into the areas. This growing concentration has spawned frequent tribal conflicts. This fighting points to another sociocultural factor which may attenuate the hypothetical economic significance of roads. Almost all of the apparently unoccupied or sparsely settled land of the south is part of one tribe or another's traditional range. Where tribes are basically sedentary farmers (e.g. along the Juba-Maridi-Yambio

road), there is little land which is not already allocated to somebody. Where semi-nomadic pastoralists are involved (e.g. the Kenya access road, and Wau-Mundri), there is a tradition of intertribal hostility and violence arising from historical struggles to retain and protect seasonally-significant range and water rights. Thus, interventions which tend to draw pastoralists of different tribes (or even, as in the case of the Dinka, subtribes of clans) together often result in conflicts.

Two major trunk roads, Juba-Torit-Kapoeta and Wau-Rumbek--Mundri, pass through areas largely populated by transhumant pastoralists. These people are some of the south's most traditional pastoralists and sometimes react at variance with classic economic behavioral models.

This does not mean the Dinka are immune to commercial interests; their search for cash to buy cattle, veterinary medicine, dura when short, and their growing desire for western clothes, radios, bicycles and the like, bespeak the inevitability of joining the market economy. What is needed is a market system that rewards them for producing and marketing dura and cattle. The prevailing system does not do this; the returns from marketing are, in their eyes, an inadequate tradeoff to the social rewards of holding herds and drinking dura beer convivially. Efforts to stimulate production-extension and credit services, transport improvements, and so forth, combined with price policy incentives - could over a decade or two prove successful, but only if monetary returns are great enough to offset the social costs of modifying traditional practices. Small interventions or incremental reforms such as constructing a road or a storage center are not likely in the short run to provide incentives of sufficient scale to induce any marked increase in the commercial off-take of cattle or dura, particularly from the hinterland where tradition holds most firmly. Marginal increases are most likely to occur in areas adjacent to market centers such as Rumbek where practices and values may be in transition.

Reservations surrounding the production response along the Juba-Torit-Kapoeta and Wau-Mundri roads, or at least the immediacy of a

productive response, do not apply to the roads to be maintained under the project. Roads, such as the Juba-Mundri-Yambio, Juba-Yei and Juba-Nimule lines pass through rich agricultural areas with tremendous potential. In the Yambio area, for example, cassava sorghum, millet, groundnuts, sesame, cotton, coffee, pineapples, tomatoes, and yams are all grown. Since the mid-fifties, the people of this area (the Azande) have consistently responded to change and economic incentives, as evidenced by the widespread development of coffee as a cash crop during the past 4-5 years.

The Juba-Yei road passes through areas which have witnessed significant increases in agricultural production, partially because of the efforts of the IBRD-supported agricultural extension and seed improvement center at Yei. Coffee, tea, groundnuts and fruits are being grown for market throughout the Yei River District. Local farmers respond actively to market incentives.

The Juba-Torit-Nimule roads encompass an area which has received nearly a decade of development assistance from the Norwegian Church Aid (NCA). NCA's agricultural extension and community development activities have spurred productivity and improved trunk roads should further improve access to markets.

4. Impact

From a sociocultural perspective, the project is benign; if stretches of road to be upgraded are carefully selected with an eye to the commercial potential of local farmers, there is a good chance that over a decade or two we shall witness increased agricultural productivity in contiguous areas.

Whether or not the project's institution building attempts are successful will be determined largely by the political forces presently at play throughout the south. The decision to divide the south into three regions has resulted in a major shifting of human and capital resources from Juba as well as a new relationship between the regional governments and Khartoum. The role of national agencies, such as the Roads and Bridges Corporation, in the implementation process is evolving. It is too soon to say with certainty what form counterpart organizations will take at Wau and Juba.

There is a growing security problem in the south, one made worse by re-division. Army garrisons have mutinied and many hundreds of armed insurgents are in the bush. Tribal fighting over land and water has taken on serious proportions in some areas, including the Torit-Kapoeta areas and some observers believe that the south is entering a period of major unrest and instability.

Given the current situation, it is accepted that the institutional development orientation of the project is the first step in a long-term process. The training, organizational and implementation interventions proposed will develop field-level capabilities to rehabilitate and maintain roads as well as operate, maintain, and repair equipment. This approach helps to ensure that the gains made during the project will continue after the life of project.

E. Environmental Considerations

The PID for the SORRMAR I Project included an Initial Environmental Examination which recommended that a review of environmental conditions be conducted along the road sections to be rehabilitated and maintained. The recommendation was based partly on the fact that the two major road links receiving attention under the project have already been subjected to Initial Environmental Examinations and Environmental Assessments. It was proposed that instead of repeating these analyses, the review would determine the need for future environmental monitoring along project roads.

USAID/S proposes to initiate the review during November/December 1983 with the assistance of the REDSO/ESA Environmental Officer and the AID/W Science and Technology Bureau. If a long-term environmental monitoring program is determined to be desirable, the review team will prepare a scope of work, work plan and estimated budget. USAID will seek assistance through the ST/FNR centrally funded environmental project (936-5517) to implement the program.

F. Energy Analysis

1. Analysis of the Energy Elements Used by the Project

<u>Project Inputs Item (Elements)</u>	<u>Energy Resources</u>	<u>Options</u>
1. Mechanized Construction Equipment	Fossil Fuel (Non-renewable)	None
2. Road Vehicles	Fossil Fuel (Non-renewable)	None
3. Construction Materials	Converted form of fossil fuel (Site delivery - fossil fuel)	None
4. Spare Parts	Converted form of fossil fuel	
5. Mechanized Support Equipment Generators	Fossil Fuel (Non-renewable) Transformation into project consumed secondary forms of energy-electricity	Solar Cells (partial)
6. Resident Support (Life Support)	Fossil fuels - generators Solar Cell Units - Lights/ radio/refrigerator/Natural gas - cooking	Renewable fuel (partial)
7. Technical Assistance (Human)	Not Applicable	
8. Workers (Human)	Not Applicable	
9. Office Operations	Fossil Fuel (Non-renewable)	Solar Cells (partial)
10. Portable Pumping (Construction)	Fossil Fuel (Non-Renewable)	None

2. Analysis of the Energy Efficiency, Cost Implications and Appropriateness

The project inputs require a high capital cost to underwrite the investment in mobile road construction equipment, vehicles to support the operation and management of this equipment and stationary or semi-stationary support equipment to maintain the life system of the equipment, vehicles and human resource inputs. The road construction technology being applied, i.e. equipment intensive road construction, was selected on the basis of being the most efficient approach to achieving project outputs considering the potential project implementation constraints. The technology being applied is then limited to consumption of a fossil fuel non-renewable energy resources. This represents high capital cost in terms of the equipment and equipment support requirements; high operational costs in terms of fossil fuel consumption; and high costs in terms of life system delivery. All of these activities require scarce foreign exchange. The use of the capital intensive technology is predicated upon: (a) time constraints related to the protection of present road improvements within the project area; (b) physical problems related to road maintenance and construction technology which preclude the use of a labor intensive road construction approach; and (c) vast distances and low population densities coupled with harsh climate conditions such as extreme heat, dust and minimal water availability for life support precludes the use of a high labor/equipment mix ratio. The technology selection for the project was made on the basis that no effective options exist to obtain the project outputs.

Within the selected technology marginal options do exist for the utilization of energy resources. These options can only be tested from a technical perspective during the life of the project to determine energy efficiencies. The project will introduce the use of solar photovoltaic cells for sunlight to electricity conversion. This application, which has been successfully applied by other donor groups working in the southern Sudan, will be initially utilized for battery charging, 12V and 24V electric lights in Project staff residence, radio transmission and fan and refrigeration use. The cost effectiveness of this renewable energy resource has not been determined.

3. Analysis of the Overall Energy Efficiency, Cost and Appropriateness

The capital intensive technology to be utilized for the project, with its operational efficiency but high cost, indicates that the host government cannot replicate the project approach in the near term without donor assistance. Start-up costs, foreign exchange requirements, recurrent costs and projected balance of payment problems will continue to constrain the ability of the GOS to replicate project outputs. Termination of the use of fossil fuels is, of course, out of the question for the type of work required for the primary road network. The formula for an optimum labor mix can only be determined by testing and measurement during the life of the project.

V. Financial Plan and Analysis

A. Summary

Financial tables depicting the sources and uses of funds and costs by project component are presented below. A detailed budget is included as Annex G and Annex F provides an itemized equipment list, including unit prices.

The total project cost is \$29,100,000 over six years. Of this total, \$9,400,000 (about 32 percent) represents the host country contribution. The GOS will contribute 1,937,000 Sudanese pounds (LS) (\$1,490,000) from the routine budget and LS 10,283,000 (\$7,910,000) from Commodity Import Program local currency generations.

B. Budget Tables

V.1 - Source and Use of Funds

- Project Expenditures by Fiscal Year (See Annex S)

C. Recurrent Budget Analysis

Highway expenditures, both construction and maintenance, are financed from three sources: (1) government general revenues; (2) donor aid; and (3) highway tax revenues. Nationwide, road user charges reached 69 million Sudanese Pounds in 1981. However, since most road construction/rehabilitation expenditures are financed by the donor community, the bulk of road user revenue is used for general budget purposes. Revenues from road charges are listed in Table V.2 for the period 1978-81; Table V.4 gives expenditures on road facilities for both the RBPC in the north and the former southern region Ministry of Communications, Transport and Roads (SRMCTR) for the 1981-83 period.

TABLE V.2

Revenues from Road User Charges (LS Million)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
<u>Import Duties</u>				
- Vehicles	10.34	25.01	19.76	26.80
- Fuel	2.75	2.18	6.13	8.40
- Others	7.47	10.62	9.02	14.61
Total	<u>20.56</u>	<u>37.81</u>	<u>34.91</u>	<u>49.81</u>
<u>Excise Duties</u>				
- Fuel	19.51	25.02	27.72	14.60
- Licences	0.85	0.74	1.01	1.08
- Others				
- (incl. tolls)	0.09	0.10	2.20	2.96
Total	<u>20.45</u>	<u>25.86</u>	<u>30.93</u>	<u>18.64</u>

TABLE V.1Source and Use of Funds

<u>Source</u> <u>Use</u>	<u>AID (US\$000)</u>	<u>GOS (US\$000)</u>
I. Technical Assistance		
A. Long-Term (US)	4381.0	99.0
B. Long-Term (TCN)	1388.0	624.6
C. Short-Term	100.8	-
D. Home Office Support	210.8	8.0
E. Local Support Staff	-	236.0
F. Personal Services Contractor (PSC)	168.0	-
Subtotal	<u>6248.6</u>	<u>968.2</u>
II. Training		
A. Degree	320.0	10.0
B. Short-Term (Third Country)	36.0	20.0
C. In-Country	25.0	10.0
Subtotal	<u>381.0</u>	<u>40.0</u>
III. Equipment and Commodities		
A. Major Road Equipment	2695.0	
B. Support Equipment	863.0	
C. Workshop Tools and Equipment	375.0	
D. Engineering/Testing Equipment	50.0	
E. Spare Parts	1245.1	
F. Handtools	31.2	50.0
Subtotal	<u>5259.3</u>	<u>50.0</u>
IV. Petroleum, Oil, Lubricants	2000.0	2048.0
V. Site Development/Construction	707.0	968.0
VI. Ocean/Inland Freight	1521.0	145.0

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Table V.1 (Continued)

<u>Source</u> <u>Use</u>	<u>AID (US\$000)</u>	<u>GOS (US\$000)</u>
VII. Procurement Fee		
A. Offshore	320.2	-
B. Kenya Shelf Items	45.0	-
Subtotal	<u>365.2</u>	<u>-</u>
VIII. Private Sector Development	700.0	1650.0
IX. Local Salaries	-	1743.0
X. Other		
A. Evaluation	100.0	
B. Air Charter	250.0	
C. Environmental Monitoring	20.0	50.0
Subtotal	<u>370.0</u>	<u>50.0</u>
XI. Contingency		
A. Major Equipment (10%)	269.5	
B. Line Items III. B.C.D.E.F.G., IV, V, VI, VII (15%)	998.4	
Subtotal	<u>1267.9</u>	<u>512.0</u>
XII. Inflation	880.0	1225.8
TOTALS	<u>19,700.0 (68%)</u>	<u>9400.0* (32%)</u>
TOTAL PROJECT		<u>29,100.00</u>

* Sudanese Pound (LS) Equivalent (\$1.0 = LS 1.3): LS 12,220,000

- LS 10,283,000 from CIP Local Currency Generations

- LS 1,937,000 from Routine GOS Budget

TABLE V.3

Expenditure on Roads Facilities (LS Million)

	<u>FY 1978</u>		<u>FY 1979</u>		<u>FY 1980</u>		<u>FY 1981</u>		<u>FY 1982</u>		<u>Estimated FY 1983</u>	
	<u>RBPC</u>	<u>SRMCTR</u>	<u>RBPC</u>	<u>SRMCTR</u>	<u>RBPC</u>	<u>SRMCTR</u>	<u>RBPC</u>	<u>SRMCTR</u>	<u>RBPC</u>	<u>SRMCTR</u>	<u>RBPC</u>	<u>SRMCTR</u>
Construction	30.56	NA	34.30	NA	31.11	NA	23.59	0.98	28.30	0.22	38.00	0.83
Improvement and strengthening	0.29	-	0.35	-	0.30	-	0.41	-	1.60	-	2.00	-
Maintenance	0.28	NA	0.30	NA	0.32	NA	0.37	0.21	2.00	0.22	1.50	0.23
Administrative expenses and training	0.27	NA	0.68	NA	0.97	NA	1.25	1.83	1.06	2.81	2.00	2.97
<u>Total Expenditure</u>	<u>31.41</u>	<u>NA</u>	<u>35.63</u>	<u>NA</u>	<u>32.70</u>	<u>NA</u>	<u>25.62</u>	<u>3.02</u>	<u>32.96</u>	<u>3.25</u>	<u>43.50</u>	<u>4.02</u>

In the south, most new road construction and road rehabilitation projects have been financed by bilateral aid agencies and are usually implemented by semi-independent labor units, managed by consultants. Institutional capacity has improved somewhat in recent years as a result of equipment and spare parts provided under the IBRD first Highway Project, but there are still many constraints, including the lack of adequate budget resources and fuel. The construction/rehabilitation activities that have been undertaken directly by the GOS have been primarily concentrated on limited sections of the Kenya access road running eastward from Juba.

Government budget resources for road maintenance are spent almost entirely on salaries. While it is difficult to separate maintenance expenditures from total expenditures, it appears that, excluding wages and salaries, approximately LS 212,000 and LS 217,000 was spent on road maintenance in GOS fiscal years 1981 and 1982, respectively.

Although the GOS has historically placed emphasis on infrastructure, and has continually recognized the role of transport infrastructure in country development, a realistic appraisal of their budget and planning abilities provides little hope that they will be able to meet all recurrent costs incurred by this project.

During the life of the project, the major portion of the recurrent costs will be met by the AID grant or by GOS allocations from CIP generated local currency. The exception to this is salary payments which are already being covered through GOS budget allocations. At this time, it is uncertain whether the salaries of staff seconded to work on the project will be covered by the Regional Ministries of Works and Communications budgets or by the Roads and Bridges Public Corporation. In either event these salaries are already established line items in the GOS budget.

Major incremental costs after completion of the project are continuing road rehabilitation and maintenance activities. To continue on the scale approaching the program work schedule initiated during the project, the following costs must be covered:

1. FUEL:	\$300,000 per year	Beginning FY 89/90
2. SPARE PARTS:	\$200,000 per year	Beginning FY 89/90
3. EQUIPMENT		
REPLACEMENT	\$2.0 mil	FY 91/92
	\$2.0 mil	FY 92/93
	\$4.0 mil	FY 93/94
	\$.5 mil	FY 94/95

The first item, fuel, will be met by GOS beginning FY 89/90. The AID-funded Energy Planning and Management Project is addressing such policy issues as fuel pricing and the allocation, and use of fuel in the southern Sudan. Studies resulting from this project will suggest ways to improve the allocation system and rationalize energy prices. One plan currently under consideration includes allowing private traders to adjust profit margins on fuel sales to reflect actual marketing costs. Currently, profit margins are controlled in terms of nominal monetary value per gallon, thereby creating a disincentive to market scarce fuel in such distance areas as the southern Sudan.

Spare parts and equipment replacement for an estimated total cost of nearly \$10 million will require foreign currency, and will almost certainly be met by donors. USAID intends to assist the GOS with these costs under a second phase road rehabilitation/maintenance project in the south following the completing of SORMAR I in 1989.

The AID-funded Regional Finance and Planning Project is designed to strengthen regional budgeting, financial management, and revenue systems in the Sudan and will emphasize restructuring regional planning activities. The recent financial crisis of the central government has drawn more attention to general questions of government financing and revenue needs. USAID is concentrating efforts of the Regional Finance and Planning Project in the southern and western regions of the Sudan. Financing through this project could provide technical assistance to identify revenue sources and appropriate systems to pay recurrent costs associated with road maintenance.

The existence of rural roads and their use will, in effect, demonstrate whether economic benefits are worth allocation scarce GOS budget resources to maintain them. During a budget crisis such as the one currently faced by the GOS, priorities determine which portions of the total budget requests will be funded. The GOS must determine that road rehabilitation and maintenance is high enough priority to receive a share of the annual budget.

In the long run, increased economic activity resulting from increased market commodity and passenger traffic should expand potential tax bases and provide revenue sources from which to fund recurrent costs of road maintenance. For example, one important source of regional revenue is a tax on marketed agricultural produce. To the extent that the project's goal of increased agricultural production is achieved, revenues available for financing the recurrent costs of road maintenance will increase. Additionally, the increased traffic flows will yield additional revenues in the form of licensing fees and other user charges.

Given the severe budgetary constraints faced by the GOS, it is unrealistic to expect that all foreign exchange costs associated with spare parts and major equipment replacement can be covered without donor assistance. However, the required budgetary resources to pay for incremental fuel costs to operate road construction equipment is within the GOS financial capacity. Between 1979 and 1980, GOS revenues from road user charges above increased by LS 1,970,000; in 1981 there was a further increase of LS 3,110,000 to a total of LS 68,950,000 (See Table V.3). Given the high priority currently assigned to improving and maintaining the primary road network in the south, it is expected that the estimated \$300,000 (LS 231,000) required annually to operate AID-funded equipment will be provided from the GOS budget. A covenant will be included in the Project Grant Agreement requiring the GOS to increase the budget line item from fuel for the Ministries of Works and Communications, Equatoria and Bahr El Ghazal Regions, starting with the GOS fiscal year 1988/1989 (July 1, 1988 - June 30, 1989). Satisfaction of this covenant will be instrumental in determining the viability of an AID-funded Phase II project.

VI. Implementation Plan

A. Implementation Schedule

The following schedule presents the actions to be implemented during the first 36 months of the six year project along with the responsible entity. A detailed procurement implementation plan and schedule is included as Annex I to the Project Paper.

No.	Actions	Date	Responsible Entity
1	P.P. Approved, Project Authorized	July 83	USAID/S
2	Project Agreement Signed	July 83	USAID/GOS
3	RFP for Technical Assistance Developed, Selection and Contract Signed	Aug. 83 Jan. 84	USAID/GOS/AID/W (See Annex I)
4	C.P.'s To Initial Disbursement Satisfied	Oct. 83	GOS
5	IFB for Procurement of Equipment and Project Commodities Drafted and Finalized	Aug. 83 Jan. 84	USAID/GOS/Contractor/AID/W (See Annex I)
6	Project Operation Sites, Office Facilities and Resident Compound Sites Assigned to Project by the GOS	Oct. 83	GOS
7	Fuel Ordered for 2 Project Vehicles	Nov. 83	USAID
8	Selection of Technical Assistance Contractor	Nov. 83	USAID/GOS
9	Caterpillar Equipment Ordered	Nov. 83	USAID
10	USAID/Juba PSC Assigned to Project	Nov. 83	USAID
11	Vehicles on Site for TA Team Leader and USAID PSC	Dec. 83	USAID

Implementation Schedule (Continued)

<u>No.</u>	<u>Action</u>	<u>Date</u>	<u>Responsible Entity</u>
12	GOS Counterparts Assigned	Jan. 84 - April 85	GOS/USAID(See Section IV C.2)
13	Technical Assistance Team Leader on Site	Feb. 84	Contractor/USAID
14	Procurement Initiated Equipment (Except Caterpillar)	Feb. 84	USAID/GOS/TA Contractor (See Annex I)
15	First Project Evaluation Summary (PES)	Mar. 84	USAID/GOS Evaluation of: Preparation Phase/Pro- curement and Implementation Planning
16	Trust Fund and Project Account Established for Local Currency Dis- bursements	Feb. 84	GOS/USAID/TA Contractor
17	Major Fuel Contract Executed	Feb. 84	USAID(See Annex I)
18	Equipment and Con- struction Materials Iden- tified for Kenya Off- shelf Procurement and Procurement Initiated	Feb. - Aug. 84	TA Contractor/GOS/USAID
19	L/Comms Opened for Procurement Payment	Mar. - May 84	USAID/GOS/AID/W
20	Review of Ministry RBPC Budget, FY-84/85 For Fuel, Personnel, Road Maintenance Support, Project Area	Feb. - April 84	GOS/USAID
21	IBRD Hwy 2 Project Phase-Out	June 84	GOS/IBRD
22	AID Project T.A. for Juba Shop Operation on Site	May - June 84	TA Contractor/USAID/GOS
23	Project On-Site Equip- ment Rehabilitation Program Continues	June - Oct. 84	GOS/TA Contractor/ USAID/Cat. Co.

Implementation Plan Schedule (Continued)

No.	Action	Date	Responsible Entity
24	T.A. Contractor Fully Mobilized on Site	Feb. 84 - April 85	TA/USAID/GOS (See Annex I)
25	Road Maintenance and Road Labor Camp Programs Commence	Feb. 84 - April 85	TA/GOS/USAID
26	Selection and Processing of Candidates for Training	Feb. - June 84	GOS/USAID
27	Caterpillar Training Course Conducted	Sept. 84 - April 85	Cat/Khartoum/GOS/USAID
28	First Tranche of Project Equipment Arrives Project Site	Aug. - Dec. 84	TA/USAID
29	Sub-Regional Workshops/ Camp Facilities Constructed: Torit	Sept. - Dec. 84	TA/USAID/GOS Labor Contractor
	Mundri	July - Nov. 84	"
	Rumbek	Sept. - Dec. 84	"
	Juba Resident Facilities	June 84 - June 85	"
30	All Equipment Mobilized at Project Sites, Counterpart Personnel and Technical Assistance Team at Sites. Field Operations Underway	Aug. 84 - April 85	GOS/TA/USAID
31	Fuel Stockpiled Juba-Torit-Mundri for 6-Month Operation	84 - Jan. 85	TA/USAID
32	Labor Intensive Road Maintenance Camps Established: Juba-Nimule/Juba-Yei	Jan. - Feb. 85	GOS/TA
33	Labor Intensive Maintenance Camps Established: Rumbek Torit Mundri	Jan. - April 85	GOS/TA

Implementation Plan Schedule (Continued)

No.	Action	Date	Responsible Entity
34	Project Completes Start-Up Phase. Shop and Road Rehabilitation, Maintenance Programs Underway	April 85	TA/GOS/USAID
35	Road Maintenance Priority Sections Established for Project Corridor Kapoeta-Torit-Juba, Juba-Mundri-Maridi-Yambio Section	Sept.-Nov. 84	T.A. Team Leader, RBPC Regional Manager, T.A. Engineer, USAID Project Manager
36	Project Evaluation Summary (PES)	April 85	USAID/GOS/TA Project Evaluation Focus on Project Inputs, Constraints, Needed Project Modifications
37	Review of GOS FY 85/86 Budget Inputs to Project and Proposed FY 85 Budget	Mar. - April 85	USAID/GOS/
38	Road Rehab. and Maintenance Programs Operational	April - 85-86	TA/GOS/USAID (Rains in May-Sept. Curtail Operations) Rate of Progress During This Phase Determines Level of Input and Direction of Final 3 Years of the Project Life
39	Major Project Evaluation	April 86	GOS/USAID/Outside Consultants. Evaluation Determines Level of Input and Direction of Remaining Three Years of the Project
40	In Conjunction With Project Evaluation, GOS FY 86/87 Budget and Resources Provided to Project Reviewed.	Mar. - April 86	USAID/GOS
41	Project Direction and Required Funding Determined for Remainder of Project	May - June 86	USAID/GOS

B. Implementation Responsibilities

1. GOS

The primary GOS implementing organization will be the Ministry of Construction and Public Works acting through the Roads and Bridges Public Corporation (RBPC). At the regional level, the Regional Ministries of Works and Communications will appoint full-time Project Managers who will report to the Director of Projects, RBPC. The two Project Managers will be responsible for directing and managing the project at the operational level for the GOS. The principal liaison officials between the GOS and the AID contractor team leader will be the Project Managers who will also be responsible for the administration of the CIP local currency Project Account and RBPC will be responsible for all accounting and disbursing procedures related to the use of Project Account funds.

The RBPC and Regional Ministries of Works and Communications will be responsible for providing the personnel required to implement the project. The following is a list of the required counterparts to the AID-funded technical assistance team and other GOS personnel requirements:

AID Technical Assistance Team	GOS Counterpart Positions	Dates Counterparts Required By
Team Leader (Senior Hwy. Engr.)	Project Manager(2) Equatoria and Bahr El Ghazal Regions	Feb. 1984
Civil Engineer	Senior Engr. (2) Equatoria and Bahr El Ghazal Regions	June 1984
Master Mechanic/ Field Operations	Senior Mechanic Equatoria-Torit	April 1985
Road Construction Foreman/Equipment Operator	Senior Foreman Equatoria-Torit	Jan. 1985
Road Construction Foreman/Equipment Operator	Senior Foreman(2) Bahr El Ghazal-Rumbek Equatoria-Mundri	Sept. 1984
Shop Foreman/Master Mechanic	Shop Foreman/ Senior Mechanic Juba Workshop	June 1984
Equipment Mechanic/ Trainer (TCN) (Maintenance/Rehab)	Senior Mechanics(2) Equatoria-Mundri Bahr El Ghazal-Rumbek	Sept. 1984

AID Technical Assistance Team	GOS Counterpart Positions	Dates Counterpart Required By
Construction Supervisor (TCN) (Maintenance/Rehab.)	Construction Foreman(2) Equatoria-Mundri/Bahr El Ghazal-Rumbek	April 1984
Equipment Mechanic/Trainer (TCN) (Rehab.)	Senior Mechanic Equatoria-Torit	Jan. 1985
Construction Supervisor (TCN) (Rehab.)	Construction Foreman Equatoria-Torit	Aug. 1984
Administrator/Accountant (TCN)	Senior Accountant Equatoria	March 1984
Spare Parts/Warehouseman (TCN)	Spare Parts Supervisor Warehouseman-Juba Workshop	May 1984

In addition, the following Regional Ministries of Works and Communications personnel will be required to achieve project objectives.

	<u>Juba-Torit Equatoria</u>	<u>Tonj-Rumbek Bahr El Ghazal</u>
<u>a. Road Rehabilitation Component*</u>		
Assistant Foremen	-	2
Equipment Operators	15	7
Drivers	10	3
Mechanics	-	2
Mechanic Assistants	5	3
Drivers Assistants	10	2
Warehousemen	5	2
Laborers	15	5
Guards, Misc.	10	4
Total	70	30
<u>b. Road Maintenance Component</u>		
	<u>Juba-Yambio Equatoria</u>	
Assistant Foremen	3	
Mechanics	3	
Equipment Operators	13	
Drivers	7	
Warehousemen	3	
Mechanic/Operator Assistants	5	
Laborers	5	
Guards, Misc.	4	
Total	43	

*Personnel listed for rehabilitation will also be utilized for the maintenance of same sections plus additional maintenance activities as required (See Project Description).

c. <u>Juba Workshop</u>	<u>Equatoria</u>	<u>Bahr El Ghazal</u>
Mechanics	25	
Welders	15	
Electricians	15	
Misc.	<u>50</u>	
Total	105	

d. Project Headquarters (Juba)

Office Manager	1
Clerks	5
Typists	3
Messengers	4
Drivers	2
Guards, Misc.	<u>8</u>
Total	23

The GOS, through the RBPC and Regional Ministry of Works and Communications will, in conjunction with AID, select the technical assistance (TA) contractor and equipment suppliers for the Project. All sites for: (1) TA housing, (2) the headquarters compound, (3) workshops, (4) maintenance camps and (5) other required facilities will be provided by the Regional Ministries of Works and Communications. Participants to be trained under the project will be selected by the RBPC and RMWC.

For maintenance activities not under the supervision of the AID-funded technical assistance team, e.g. the Juba-Yei and Juba-Nimule roads, supervision and all staff support requirements will be the responsibility of the Equatoria Ministry of Works and Communications.

Finally, the private sector contracts for construction activities such as housing, compound fencing, maintenance camps and drainage structures will be the responsibility of the Regional Ministries of Works and Communications in Equatoria and Bahr El Ghazal.

2. AID

Project managerial responsibility on the part of AID will rest with the Project Operations Office, USAID/Sudan. During the period between the signing of the Grant Agreement and the arrival of the Technical Assistance Team Leader, a Personal Service Contractor (PSC) engineer will be employed to initiate those actions that are prerequisites to successful project implementation. The PSC will be stationed in Juba for a period of approximately one year, starting in November, 1983, in order to overlap with the technical assistance team.

Responsibilities of the PSC will include, inter alia; (1) assisting in the preparation of Project Implementation Orders (PIOs); (2) working with GOS authorities to select construction sites; (3) establishing coordinating relationships among the parties concerned with project implementation; and (4) developing a logistical support plan and schedule for the first year of project implementation. USAID direct project management will be the responsibility of the Engineer, Project Operations Office. USAID will monitor the project implementation schedule and provide overall guidance to the technical assistance contractor.

3. Technical Assistance Contractor

The firm selected to provide the technical assistance will implement the project in accordance with the implementation schedule, job descriptions and overall objectives as defined in this Agreement and the Project Paper. In addition to achieving road rehabilitation and maintenance objectives, the contractor will conduct on-the-job training for GOS staff and assist in the selection of training locations for the degree and third country training to be funded under the project. The contractor will be responsible for ensuring that logistical support requirements for project implementation are provided in a timely manner. A major responsibility of the contractor will be the procurement of certain project equipment items and commodities as described in the follow section.

During the first three months in the field, the contractor, in conjunction with GOS counterparts, will develop and submit to USAID a detailed work plan for the first year of the project. Quarterly and annual progress reports will be submitted to USAID by the contractor.

4. Contracting/Procurement Methodology

a. Technical Assistance

A direct AID contract will be executed with a construction supervision firm to implement the technical assistance and certain procurement components of the project. The firm will be selected on a competitive basis from AID Geographic Code 000(U.S. only). The Request for Proposals (RFP) will be prepared by USAID with technical advise provided by AFR/TR/ENG. After the RFP is finalized by USAID, its availability will be advertized in the appropriate business publications; the RFPs will be available from AID/ Washington. The evaluation of proposals will be conducted in AID/Washington by a panel of USAID and GOS staff. The contractor selected will then send a representative to Khartoum for final contract negotiations.

b. Equipment and Commodities

(1) Caterpillar Equipment

A proprietary procurement waiver for certain items of

Caterpillar equipment will be requested. USAID may initiate procurement of this equipment through the Khartoum Caterpillar agent, Sudan Tractor Company. The equipment will be ordered from Caterpillar, International through a Direct Letter of Commitment.

(2) Other Equipment and Commodities

Other road equipment and certain commodities will be purchased in the United States. The Invitations for BID (IFB) will be prepared by USAID and the TA contractor and will be made available to prospective bidders by the TA contractor. After receipt of all bids at the home office in the United States, the TA contractor will evaluate the bids and recommend suppliers. These recommendations will be reviewed in Khartoum by a GOS/USAID panel which will make the final selection. Based on the GOS/USAID selections, the TA contractor will then place the equipment orders. A Bank Letter of Commitment will be opened for the procurement of equipment and ocean shipping. The TA contractor will be authorized to instruct the bank to open Letters of Credit in favor of equipment suppliers and, along with USAID, will be responsible for reviewing payment documents following normal AID regulations. It should be noted that some large equipment items, e.g. dump trucks, will be bid on a Cost, Insurance, Freight CIF basis while smaller items may be bid only to the U.S. port of departure where the TA contractor will consolidate the equipment/commodities and arrange for shipping. (See detailed Budget, Annex G, and Equipment/Commodity List, Annex H).

(3) Fuel

Fuel to be purchased from dollar project funds will be procured from a Code 941 source. With technical advice from the TA contractor, USAID will select a fuel supplier on a competitive basis. The contractor will be signed directly between the supplier and USAID. Payment will be through a USAID-issued Purchase Order.

(4) Freight

The shipment of project equipment and commodities will involve several mechanisms: (1) where practicable, equipment suppliers will bid on a CIF basis (e.g. Caterpillar and other major equipment); (2) smaller U.S. - source equipment items, the TA contractor will be responsible for consolidating items and arranging ocean transport from a U.S. port; (3) inland freight to the project site will be provided by a freight forwarder selected on a competitive basis. The contract will be directly between USAID and the freight forwarder.

(5) Shelf-Item Commodities and Materials

Some commodities, materials and supplies will be purchased "off-shelf" from Kenya. Procurement of these items will be through a USAID-issued Purchase Order. This procurement component will include such items as handtools, concrete mixers, portable soil compactors, furniture and office equipment.

C. Evaluation Plan

Periodic in-house evaluations will be conducted to assess project implementation progress. The first evaluation will be conducted in May 1984 to determine the adequacy of the implementation planning. At this time, adjustments will be made in the implementation/procurement methodology and schedule, if necessary. This evaluation will be an informal, in-house assessment followed by a PEC in 1985.

A major evaluation is scheduled for April/May 1986. This evaluation will, inter alia, assess the performance of the GOS, TA contractor and USAID in terms of: (1) the provision of required inputs (quality, quantity and timeliness); (2) achievement of project outputs; (3) rate of institutional development; (4) adequacy of project funding and (5) overall project performance. During this major evaluation, a decision will be made on the possible expansion of the road rehabilitation program, e.g. from Torit-Kapoeta or Tonj-Wau. The major evaluation will be conducted jointly by the GOS, USAID and outside consultants. The Project budget includes \$100,000 to finance the evaluation.

VII. Conditions and Covenants

The Project Grant Agreement will contain, in substance, the following conditions and covenants:

Condition Precedent

Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement to finance the long-term technical assistance contract, the Cooperating Country will:

- (a) Evidence that the regional ministries have allocated the land necessary for shops, housing and other required buildings and storage space.
- (b) Provide the road workshop and office compound facility in Juba (formerly known as the CIDA workshop and office) for the sole use of Project personnel.

Covenants

The Cooperating Country shall covenant in substance to:

- (1) Provide required counterparts for the TA team plus needed personnel (equipment operators, mechanics, drivers, laborers, etc.) to achieve the project objectives as outlined in the Grant Agreement Annex 1, Amplified Project Description.
- (2) Provide an adequate petroleum, oil and lubricant (POL) supply to the project for the life-of-project for the operation of project-funded new and rehabilitated equipment as detailed in the Grant Agreement Annex 1, Amplified Project Description.
- (3) Provide adequate financial resources from the GOS fy 88/89 budget, and thereafter, to cover annual incremental fuel costs required to operate AID-financed equipment at efficient and effective levels after the life-of-project.
- (4) Prepare annual estimates of expenditures utilizing a format that will clearly distinguish road maintenance expenditures from other expenditures and organize and participate in a joint annual road program budget review with AID.
- (5) Provide, the mobilization of the technical assistance contractor, sufficient radio communications frequencies for the sole use of the contractor and this project.
- (6) Select qualified candidates for training in a timely manner.
- (7) Use equipment, commodities, supplies, petroleum, oil and lubricants financed under the project solely for project purposes. Reserve all vehicles and field support equipment procured under this project for: (1) follow-on road construction activities to be financed by AID, if appropriate; (2) other road rehabilitation and maintenance activities in furtherance of the objectives of this Project; or (3) dispose of with full consultation with AID.

(8) Establish a project coordinating committee which will schedule meetings as necessary to ensure effective coordination of project activities in Equatoria and Bahr El Ghazal Regions.

(9) Establish, in cooperation with AID, an evaluation program as part of the project. Except as the Parties otherwise agree in writing, the program will include, during the implementation of the Project and at one or more points thereafter:

(a) Evaluation of progress toward attainment of the objectives of the Project;

(b) Identification and evaluation of problem areas or constraints which may inhibit such attainment;

(c) Assessment of how such information may be used to help overcome such problems; and

(d) Evaluation to the degree feasible, of the overall development impact of the Project.

(10) Conduct periodic consultation meetings with all donors in the southern regions engaged in road improvement works, to discuss collectively matters of mutual interest.

(11) Legally enforce load limitations on project roads. In addition, establish a procedure for limiting the movement of traffic while the Project road is wet. The load limitations will be as follows:

(a) Maximum Gross Vehicle Weight:

1. 2 or 3 axles	--	22,500 kg.
2. 4 or 5 axles	--	38,000 kg.
3. 6 or more axles	--	43,000 kg.

(b) Maximum Axle Loads:

1. Front Steering Axle	--	6,400 kg.	
2. Single Rear Axle	--	8,000 kg.	
3. Tandem Axles	--	14,500 kg.	Total
4. Triple Axles	--	21,000 kg.	Total

(12) Permit AID the right to review and approve in advance all plans, specifications, bid documents, contracts and subcontracts, as well as prequalification of contractors for local labor and construction contracts.

(13) In recognition of the importance of compensation levels sufficient to attract and keep qualified and productive personnel, work with the AID-funded technical assistance contractor in development and installing a system of compensation, benefits and discipline that will accomplish this objective.

(14) The Parties agree to undertake an Environmental Review of the Project for completion by no later than December 13, 1983. Based on the findings of the review, the Grantee and AID will decide jointly on the need for and the extent of long-term monitoring of the effect of project activities on the physical environment. If deemed necessary, and as may be agreed upon between the parties, the monitoring activity will be incorporated into the implementation of the Project, utilizing financial resources made available by, and to the extent of availability under, the Project.

ORIGIN AID 06

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AID/AFR/PO, MCCOMB
AID/AFR/EA, EDWARDS
AID/AFR/TR, BREILLY (DRAFT)
AID/AFR/IR/MS, JSNEAD (DRAFT)
AID/GC/AFS, BROBERSON
AID/PPC/PDPR, ELIEMSKA (DRAFT)
AID/AFR/EA, OHENDLSON (DRAFT)
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TAGS:
SUDANESE ECONOMIC REFORMS ROAD REHABILITATION AND MAINTENANCE PROJECT USD-ROAD

1. SUMMARY: THE IDEA FOR THE SUBJECT PID WAS HELD APRIL 15, 1982. IT WAS RECOMMENDED THAT THE PID BE APPROVED. HOWEVER, THE ECPR REQUESTS THE MISSION TO AID IN GENERAL ECONOMIC JUSTIFICATION FOR THE PROJECT BEFORE THE MISSION EXERCISES ITS FIELD AUTHORITY TO APPROVE THE PP. THE ECPR ALSO RECOMMENDED THE PP ADDRESS SPECIFIC QUESTIONS, DETAILED BELOW. ECONOMIC ANALYSIS, SRC INSTITUTIONAL CAPACITY, CHALLENGES FOR PRIVATE SECTOR INVOLVEMENT, NEEDS FOR MAINTENANCE OF THE PROJECTS AND, THE PROCUREMENT PLAN. END SUMMARY.

2. THE ECPR APPROVED THE DEFECT PID AND BECAME ONE THAT THE PP BE DEVELOPED IN ACCORDANCE WITH THE SCHEDULE FOR FY 1983 CONSTRUCTION OF ILO PROJECT. HOWEVER, ECPR BELIEVES PID LACKS SUFFICIENT DISCUSSION OF 1, HOW WILL ROAD REHABILITATION AND MAINTENANCE PROJECT IMPROVE OR EAST SUDAN'S MICRO-ECONOMIC PROBLEMS ESPECIALLY THE FOREIGN EXCHANGE NEEDS AND 2, HOW WILL THIS INVESTMENT COMPARE WITH OTHER INVESTMENTS. ECPR UNDERSTANDS SUCH QUESTIONS HAVE BEEN CONSIDERED BY MISSION. THEREFORE, THE MISSION IS REQUESTED TO OBTAIN A GENERAL ECONOMIC JUSTIFICATION FOR ITS CHOICE OF THIS PROJECT OVER THE USE OF LIMITED RESOURCES IN OTHER AREAS WHICH CONSEQUENTLY HAVE A MORE DIRECT IMPACT ON BALANCE OF PAYMENTS PROBLEMS. THIS SHOULD BE DONE BEFORE THE MISSION EXERCISES ITS FIELD AUTHORITY TO APPROVE THE PP. AID/M IS INTERESTED IN THE MIX OF INVESTMENT IN THE TRANSPORT SECTOR IN THE SOUTHERN REGION AND IN THIS PARTICULAR ROAD INTERVENTION. WHY IS THIS LEVEL OF INVESTMENT THE BEST USE OF AID RESOURCES AND WHAT WERE THE ALTERNATIVE INVESTMENTS CONSIDERED AND REJECTED?

3. THE ECPR ALSO RECOMMENDED THAT THE MISSION ASSURE THE PP ADDRESSED THE FOLLOWING AREAS OF CONCERN:

A. ECONOMIC ANALYSIS: THE DIFFICULTY OF THE GOAL TO MAINTAIN INFRASTRUCTURE IS WELL KNOWN AND ADEQUATE PROVISION MUST BE MADE TO ENSURE SUCH MAINTENANCE IN THE CASE OF THE SUBJECT PROJECT. THEREFORE THE ANALYSIS SHOULD INCLUDE ADEQUATE DETAILS IN THE DETERMINATION OF BOTH COSTS AND BENEFITS. BASIC MATERIAL SHOULD BE MADE AVAILABLE IN AN APPROPRIATE FORM SO THAT CALCULATIONS ARE CLEARLY UNDERSTOOD. THE FINANCIAL ANALYSIS SHOULD FULLY EXAMINE ALL EXPLICIT COSTS IMPLICATIONS AND UP-EDGE AND DOWN-EDGE BENEFITS. IT SHOULD CONSIDER MECHANISMS SUCH AS A CHECKED ROAD MAINTENANCE FUND, OR PERMANENT ROAD FUND, 1982, OR OTHER MECHANISMS TO INCREASE THE LIKELIHOOD OF CONTINUED GOOD MAINTENANCE.

B. INSTITUTIONAL CAPACITY:

(1) GIVEN THE KNOWN WEAKNESSES OF THE SRC, THE ECPR WAS CONCERNED ABOUT ITS ABSORPTIVE CAPACITY TO DEAL WITH A PROJECT THIS SIZE. THERE SHOULD BE A THOROUGH ANALYSIS OF THIS QUESTION IN THE PP. THE AVAILABILITY OF AN ESTIMATING REQUIREMENTS OF SRC COMPONENTS SHOULD BE THOROUGHLY DEFINED. THE PP SHOULD ALSO ADDRESS ACTIONS NECESSARY IF THE IBRD THIRD HIGHWAY PLAN DOES NOT DEVELOP AS PROJECTED.

(2) GIVEN THE KNOWN WEAKNESSES OF THE PUBLIC SECTOR, THE DESIGN MUST BE FEASIBLE FOR THE LOCAL PUBLIC SECTOR IN ROAD MAINTENANCE AND REHABILITATION. AN ALTERNATIVE TO CONSIDERATION OF ALTERNATIVE POTENTIAL CONTRACTORS TO PROVIDE MAINTENANCE SERVICES SHOULD BE CONSIDERED AND APPROPRIATE LOCAL PUBLIC SECTOR CAPACITY AND INTEREST IN ROAD WORKS SHOULD BE FULLY EXAMINED. CONTACTS TO EQUIPMENT SUPPLY CONTRACTORS TO FACILITATE MAINTENANCE TECHNICAL ASSISTANCE ARRANGEMENTS AND INVOLVING PEOPLES CORP TO WORK WITH LOCAL FIRMS TO IMPROVE CONTRACTOR CAPACITY, ETC.

(3) CLEAR MEASURES AND THE MEANS FOR THE LOCAL INVESTMENT INCLUDING CLEAR MEASURES SHOULD BE EXPLORED, PARTICULARLY FOR ROAD MAINTENANCE AND REHABILITATION.

C. IMPLEMENTATION:

(1) THE MISSION SHOULD CONSIDER THE CURRENT USE OF CONDITIONS AND COVENANTS RELATED TO THE CONCERNED OUTLINED IN PARAS 3A AND 8 ABOVE.

(2) THE PP SHOULD ADDRESS HOW THE MISSION WILL BEST MONITOR THIS ACTIVITY IN THE CONTEXT OF THE ALTERNATIVES SUGGESTED BY THE ECPR. THE APPOINTMENT OF A USER ENGINEER TO THE STAFF AT KHARTOUM, OR THE HIRING OF A 200 SALARY ENGINEER TO HELP MONITOR THE PROJECT AND PROVIDE CRITICAL TECHNICAL GUIDANCE WITH THE PROJECT.

(3) THE PP SHOULD INCLUDE A PROCUREMENT PLAN THAT DETAILS THE FEASIBLE COURSE OF WORK FOR THE ACQUISITION OF GOODS AND SERVICES. A STATEMENT OF WORK WILL DO THE ACTUAL PROCUREMENT, A STATEMENT OF WORK IS A PROCUREMENT RULED WILL APPLY, AND THE NECESSARY CALLERS WRITTEN OUT IN FULL. AID/M UNDERSTANDS THAT THE MISSION IS PLANNING TO ADDRESS THESE PROCUREMENT QUESTIONS IN THE PP.

4. PLEASE ADVISE WHEN AID/M CAN EXPECT TO RECEIVE THE MISSION'S RESPONSE TO THE REQUEST IN PAR 2 ABOVE. DAN

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Project Title: Southern Road Rehabilitation and Maintenance Project

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS
<p>Program Goal: The broader objective to which this project contributes:</p> <p>To increase agricultural production and incomes in the southern Sudan.</p>	<p>Measures of Goal Achievement:</p> <ol style="list-style-type: none"> 1. Increase in total agricultural production 2. Increased farm productivity 3. Increased per capita farm income
<p>Project Purpose:</p> <p>To improve and preserve critical access on primary roads within southern Sudan.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <ol style="list-style-type: none"> 1. GOS capable of implementing road rehabilitation/maintenance programs southern Sudan. 2. GOS capable of operating and maintaining road construction equipment in southern Sudan. 3. Increased total volume of traffic on rehabilitated roads. 4. Increased total volume of marketed agricultural surpluses and agricultural inputs.
<p>Outputs:</p> <ol style="list-style-type: none"> 1. Institutional development of the GOS technical/operational capabilities. 2. Rehabilitation of roads to minimum commercial access (MCA) standards. 3. Establishment of sub regional maintenance camps; central workshop upgraded. 4. Roads maintained to MCA standards. 5. Development of capabilities of local private construction contractors for the construction of small drainage structures 6. Service of Caterpillar Equipment. 	<p>Magnitude of Outputs necessary and sufficient to achieve purpose.</p> <ol style="list-style-type: none"> 1. Procedures for the continued application of a technically sound road rehabilitation/maintenance program operational. GOS personnel functioning in jobs for which trained. 2. 290 kms of roads rehabilitated. 3. 3 Section maintenance camps/equipment maintenance shops established and operating. 1 central workshop upgraded. 4. 1470 kms of roads maintained. 5. Local private construction contractors involved in labor contracts. 6. Service relationship established and operational.
<p>Inputs: Activities and Types of Resources</p> <ol style="list-style-type: none"> 1. Technical assistance. 2. Mechanized equipment, spare parts and fuel for five road rehabilitation/maintenance units. 3. Equipment, supplies, construction materials, tools and operating costs financing for maintenance camps and equipment workshop. 4. Training. 	<p>Level of Effort/Expenditure for each activity.</p> <ol style="list-style-type: none"> 1. Twelve advisors - Total of 679 person months 2. See Annex 3. See Annex 4. 4 staff: B.S. degree in engineering 20 foremen: short-term, third-country 300: operators and mechanics, central workshop staff, accounts/records section staff trained on the job.

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DESIGN

MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<ol style="list-style-type: none"> 1. Regional Ministry of Agriculture and Natural Resources Records. 2. Market observation. 3. Project Impact Evaluations. 4. Other donor reports/evaluations. 	<p>Concerning long term value of program/project:</p> <p>Potential exists for sustained economic growth in the southern Sudan through agricultural development.</p>
<ol style="list-style-type: none"> 1. Project evaluations. 2. Traffic counts, origin and destination studies. 3. Site inspections. 4. Market observation. 	<p>Affecting purpose-to-goal link:</p> <ol style="list-style-type: none"> 1. Commercial transport and fuel will be available to take advantage of improved transport infrastructure. 2. Reductions in transport costs will be reflected in higher farm-gate prices and lower kitchen-door prices. 3. Increased market access will result in increased agricultural production which in turn will result in increased farm income. 4. Social and political stability will be maintained.
<ol style="list-style-type: none"> 1. AID evaluations. 2. GOS reports. 3. Contractor reports. 4. Site inspections. 	<p>Affecting output-to-purpose link:</p> <ol style="list-style-type: none"> 1. The use of road maintenance resources by GOS will be allocated in an efficient, economical manner. 2. Fuel allocations by the GOS will be adequate to operate roads rehabilitation/maintenance programs. 3. Adequate, competent labor will be available from the GOS. 4. Participants and counterparts trained under the project will remain in the positions for which trained.
<ol style="list-style-type: none"> 1. AID evaluations. 2. Contractor reports. 3. USAID Project Manager reports. 4. Site inspections. 	<p>Affecting input-to-output link:</p> <ol style="list-style-type: none"> 1. Small private construction contractors are available and interested in providing labor for the construction of small drainage structures. 2. Technical assistance will be provided in a timely, effective manner. 3. Equipment and commodities will be ordered and delivered in adherence to the project implementation schedule.

Logical Framework - Outputs (Cont'd)

7. GOS personnel trained and functioning in positions for which trained.
8. Adequate fuel allocation system established and implemented.

5C (1) - COUNTRY CHECKLIST

Listed below are statutory criteria applicable generally to FAA funds, and criteria applicable to individual fund sources: Development Assistance and Economic Support Fund.

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

1. FAA Sec. 481. Has it been determined that the government of the recipient country has failed to take adequate steps to prevent narcotic drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully? 1. NO

2. FAA Sec. 620 (c). If assistance is to a government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) the debt is not denied or contested by such government? 2. NO

3. FAA Sec. 620 (e) (1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?

3. NO

4. FAA Sec. 532 (c), 620 (a), 620 (f), 620D; FY 1982 Appropriation Act Secs. 512 and 513. Is recipient country a Communist country? Will assistance be provided to Angola, Cambodia, Cuba, Laos, Vietnam, Syria, Libya, Iraq or South Yemen? Will assistance be provided to Afghanistan or Mozambique without a waiver?

4. NO
NO
NO

5. ISDCA of 1981 Secs. 724, 727, 728 and 730. For specific restrictions on assistance to Nicaragua, see Sec. 724 of the ISDCA of 1981. For specific restrictions on assistance to El Salvador, see Secs. 727, 728 and 730 of the ISDCA of 1981.

5. NA

6. FAA Sec. 620 (j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction by mob action of U.S. property?

6. NO

7. FAA Sec. 620 (k). Does the program furnish assistance in excess of \$100,000,000 for the construction of a productive enterprise, except for productive enterprises in Egypt that were described in the Congressional Presentation materials? 7. NO
8. FAA Sec. 620 (l). Has the country failed to enter into an agreement with OPIC? 8. NO
9. FAA Sec. 620 (o); Fishermen's Protective Act of 1967, as amended, Sec. 5. (a) Has the country seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters? 9. (a) NO
- (b) If so, has any deduction required by the Fishermen's Protective Act been made? 9. (b) NA
10. FAA Sec. 620 (g); FY 1982 Appropriation Act Sec. 517. (a) Has the government of the recipient country been in default for more than six months on interest or principal of any AID loan to the country? (b) Has the country been in default for more than one year on interest or principal on any U.S. loan under a program for which the appropriation bill appropriates funds? 10. (a) NO
(b) NO

11. FAA Sec. 620 (s). If contemplated assistance is development loan or from Economic support Fund, has the Administrator taken into account the amount of foreign exchange or other resources which the country has spent on military equipment? Reference may be made to the annual "taking into consideration" memo: "yes, taken into account by the Administrator at time of approval of Agency OYB." This approval by the Administrator of the Operational Year Budget can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.)

12. FAA Sec. 620 (t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?

13. FAA Sec. 620 (u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget?

11. NA

12. The GOS severed diplomatic relations with the United States in 1967, but they were resumed in 1972. The 1958 bilateral assistance agreement was reconfirmed and remains in effect.

13. Current

14. FAA Sec. 620A; FY 1982
Appropriation Act Sec.
520. Has the country
aided or abetted, by
granting sanctuary from
prosecution to, any
individual or group which
has committed an act of
international terrorism?
Has the country aided or
abetted, by granting
sanctuary from
prosecution to, any
individual or group which
has committed a war crime? 14. NO
15. FAA Sec. 666. Does the country
object, on the basis
of race, religion, national
origin or sex, to the presence
of any officer or employee of
the U.S. who is present
in such country to carry
out economic development
programs under the FAA? 15. NO
16. FAA Sec. 669, 670. Has
the country, after August
3, 1977, delivered or
received nuclear enrich-
ment or reprocessing
equipment, materials, or
technology, without specified
arrangements or safeguards?
Has it transferred a nuclear
explosive device to a non-nuclear
weapon state, or if such a state,
either received or
detonated a nuclear
explosive device, after
August 3, 1977? (FAA
Sec. 620E permits a
special waiver of Sec.
669 for Pakistan). 16. NO

17. FAA Sec. 720. Was the country represented at the Meeting of Ministers of Foreign Affairs and Heads of Delegations of the Non-Aligned Countries to the 36th General Session of the General Assembly of the U.N. of September 25 and 28, 1981, and failed to disassociate itself from the communique issued? If so, has the President taken it into account?

17. YES

18. FAA Sec. 721. See special requirements for assistance to Haiti.

18. NA

B. FUNDING SOURCE CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria.

1. NO

a. FAA Sec. 116. Has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, can it be demonstrated that contemplated assistance will directly benefit the needy?

2. Economic Support Fund Country Criteria

2. a. NA

a. FAA Sec. 502B. Has it been determined that the country has engaged in a consistent pattern of gross violations of internationally

recognized human rights?
If so, has the country
made such significant
improvements in its human
rights record that
furnishing such
assistance is in the
national interest?

b. FAA Sec. 620B. If
ESF is to be furnished to
Argentina, has the
President certified that
(1) the Govt. of
Argentina has made
significant progress in
human rights; and (2)
that the provision of
such assistance is in the
national interests of the
U.S.?

b. NA

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

c. NA

5C(2) PROJECT CHECKLIST

Listed below are statutory criteria applicable generally to projects under the FAA and project criteria applicable to individual funding sources: Development Assistance (with a subcategory for criteria applicable only to loans); and Economic Support Funds.

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

Country Checklist updated for this Project Paper: Standard Item Checklist has been reviewed.

A. GENERAL CRITERIA FOR PROJECT

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

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

1. (a) FY 83 Congressional Presentation

(b) YES.

2. FAA Sec. 611 (a) (1). Prior to obligation in excess of \$100,00, will there be (a) engineering, financial or other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

2. (a) YES

(b) YES

3. FAA Sec. 61 (a) (2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

3. No further legislative action is required.

4. FAA Sec. 611 (b); FY 1982 Appropriation Act Sec.

4. NA

501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973?

5. FAA Sec. 611 (e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?

5. YES

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

6. Project is regional in scope and involves multilateral donor financing.

7. FAA Sec. 601 (a).

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

8. FAA Sec. 601 (b)

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

9. FAA Sec. 612 (b), 636(h);

FY 1982 Appropriation Act Sec. 507. Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.

7. Project activities will increase international trade by inducing efficiencies in transport sector. Private companies will be encouraged to supply commodities for road rehabilitation.

8. U.S. technical assistance and commodities will be used.

9. See financial plan. Local currency generated through the Commodity Import Program will be used in lieu of U.S. dollars to finance local costs.

10. FAA Sec. 612 (d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release? 10. NO
11. FAA Sec. 601 (e). Will the Project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise? 11. YES
12. FY 1982 Appropriation Act Sec. 521. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity? 12. NA
13. FAA 118 (c) and (d). Does the project take into account the impact on the environment and natural resources? If the project or program will significantly affect the global commons or the U.S. environment, has an environmental impact statement been prepared? If the project or program will significantly affect the environment of a foreign country, has an environmental assessment been prepared? Does the 13. YES

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

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

14. NA

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

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

1. a. Better transportation system will provide better access to: Markets for farm production, agricultural inputs, and social services needed by poor people. Certain road maintenance activities will be relatively/intensive.
labor

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

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

b. YES

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

c. Appropriate technology is being used to accomplish project objectives.

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

d. YES

e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"?

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

g. FAA Sec. 281 (b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.

F. YES

g. Development of transportation system will allow for economic integration. Institution building component of project will allow for more effective local planning and implementation of road building and maintenance programs.

2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122 (b)
Information and conclusion on capacity of

2. a. NA

the country to repay the loan, at a reasonable rate of interest.

b. FAA Sec. 620 (d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

b. NA

c. ISDCA of 1981, Sec. 724 (c) and (d). If for Nicaragua, does the loan agreement require that the funds be used to the maximum extent possible for the private sector? Does the project provide for monitoring under FAA Sec. 624(g)?

c. NA

3. Project Criteria Solely for Economic Support Fund

a. FAA Sec. 531 (a). Will this assistance promote economic or political stability? To the extent possible, does it reflect the policy directions of FAA Section 102?

3.a. NA

b. FAA Sec. 531 (c). Will assistance under this chapter be used for military, or paramilitary activities?

b. NA

c. FAA Sec. 534. Will ESF funds be used to finance the construction of the operation or maintenance

c. NA

of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives?

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

d. NA

Job Descriptions

Southern Region Road Maintenance and Rehabilitation I Project

1. Job Title: Senior Highway Engineer (Team Leader)
- Place of Assignment: Juba, Sudan, Min. of Public Works and Communications, Equatorial Region
- Type of Employment: U.S. Technical Assistance Contractor (U.S.)
- Period of Employment: 3-5 years; starting: Feb. 1984
- Type of Control: Counterparts with the Regional Director of Roads and Bridges, Ministry of Public Works and Communications in both Equatorial and Bahr El Ghazal Regions

Scope of Work

1. Serves as a team leader for a team of twelve (including the team leader) U.S. and T.C.N. road and equipment multi-disciplined technicians and professionals.

Coordinates with the Regional Ministry of Public Works and Communications of both Equatorial and Bahr El Ghazal Regions.

The team will consist of the following:

- (a) 1 - Civil engineer/road maintenance engineer.
- (b) 1 - Shop foreman/light and heavy road construction equipment.
- (c) 1 - Master mechanic, light and heavy road construction equipment.
- (d) 2 - Road construction foremen/equipment operators.
- (e) 2 - TCN, equipment mechanic technicians.
- (f) 2 - TCN, construction supervisor technicians.
- (g) 1 - TCN, office administrative/accountant technician.
- (h) 1 - TCN, equipment spare part, warehouse man.

The Sudanese staff coming under the guidance of the Team Leader will consist of approximately:

- (a) 6-10 - Counterparts, professional technicians
- (b) 300 - Mechanics, equipment operators, laborers, clerks and other shop and field personnel.

2. Prepares and supervises the schedules and implementation of project activities related to: a) procurement of equipment, b) road section improvements, c) procurement of fuel, d) project support, e) workshop and camp development, f) training, g) equipment disposition, h) staffing, i) project headquarters operations.

3. Is responsible for the coordination of the work and use of project resources, between the Southern Regions and the project priorities.

4. Plans and coordinates project work and commodity procurement schedules of the team in accordance with the project approved implementation plan.
5. Establishes and implements the OJT training programs.
6. Supervises the preparation and implementation contracts for workshop and camp construction, road maintenance and drainage work being done by local contractors.
7. Overall, provides direction to all project operations, reports to the USAID/Project Manager and coordinates all project activities with the Regional Roads Engineer and between regions.

Employment Factors

1. Familiar with third world highway project operations under AID funding procedures. The position will require a minimum of 5 years experience as a team leader working in a third world country on road construction and maintenance projects. The position requires a knowledge of contracting and procurement procedures related to third world country conditions.
2. Sensitivity and ability to get along and work well with people of other cultures.
3. Ability to maintain momentum under adverse working conditions.
4. Ability to train others resulting in the development of their technical and management skills.
5. Good health and ability to work and live under difficult conditions of heat, dust, and limited life support systems in a pioneer style.

Education Requirements

B.S. Degree in Civil Engineering
Registered Professional Engineer

Salary

Salary range \$45,000 - 60,000

- | | |
|-----------------------|--|
| 2. <u>Job Title:</u> | Civil Engineer |
| Place of Assignment: | Juba, Sudan, Ministry of Public Works and Communications, Equatorial and Bahr El Ghazal Regions. |
| Type of Employment: | U.S. Technical Assistance Contractor (U.S.) |
| Period of Employment: | 3-5 years; starting: June 1984 |
| Type of Control: | Reports directly to the Project Team Leader, (Senior Highway Engineer). |

Scope of Work

1. Serves as the T.A. teams Road Maintenance Engineer, in charge of project field operations. a) Road rehabilitation work Juba-Torit-Juba and the b) Road Maintenance and Rehabilitation work Juba-Mundri-Maridi-Yambio and Mundri-Rumbek-Tonj.
2. Serves as Deputy Team Leader and acts as Team Leader during his absence.
3. Supervises personnel and equipment management at the field operations sites.
4. Carries out with the Project Team Leader and the Regional road engineers for the two Regions of Equatorial and Bahr El Ghazal, road conditions surveys, prepares work inputs, schedules of work and resource requirement to complete road maintenance, regravelling and rehabilitation work on the sections surveyed.
5. Works with the Regional Road Directors of the two Regions and the Team Leader in establishing road maintenance standards and schedules of maintenance.
6. Assists in the preparation of design, quantities and contract conditions for local labor contracts for workshop and camp development, drainage improvements and road maintenance work, and supervises the work performed under these contracts.
7. Plans and implements material surveys on local gravel materials to undertake road regravelling work.
8. Supervises the on-the-job training (OJT) program being performed under the field operations.

Employment Factors

1. The position requires a civil engineer having a minimum of 5 years experience working in third world countries on similar projects, previous experience as a deputy project manager, and familiarity with AID project implementation and procurement procedures.
2. The position requires previous experience in road maintenance and road construction work using labor intensive or labor and equipment mixed methods of which a minimum of two years of this experience was in third world countries.
3. Sensitivity and ability to get along and work well with expatriates and people of other cultures.
4. Ability of maintain momentum under adverse working conditions and daily frustrations.
5. Ability to train others resulting in the development of their technical and management skills.
6. Good health and ability to work and live under difficult conditions of heat, dust and limited life support system in a pioneer style.

Education Requirements

B.S. Degree in Civil Engineering
Registered Professional Engineer

Salary

Salary range \$35,000 - 50,000

3. Job Title: Shop Foreman/Master Mechanic.
- Place of Assignment: Juba, Sudan, Juba Central Shop southern Region.
- Period of Employment: 3-5 years; starting: June 1984.
- Type of Control: Reports directly to the Team Leader of the AID funded T.A. team and counterparts with the chief mechanical engineer for the shop, Regional Roads, Min. Public Works and Communications.

Scope of Work

1. Serves as the project technical assistant Shop/Foreman/Mechanic in the Juba Central Shop in a supervisory position. Comes under the direct supervision of the project Team Leader. Counterparts with the Regional chief mechanical engineer for the shop.

2. Plans, sets-up and implements the shop work operations for equipment rehabilitation, equipment repair and equipment maintenance work being funded under the project.

3. Supervises the team's warehouse and spare parts man (TCN) assigned to the Juba Shop operation.

4. Assists in the installation, start-up and operation of shop tools being funded under the project.

5. Assists in planning, supervision and implementation of the OJT program for the operation, maintenance and utilization of shop tools, equipment rehabilitation, equipment repair, and equipment maintenance.

6. Is responsible for the planning and implementing of the equipment maintenance and repair program for the project. This will be carried out by working with the field construction foreman, spare parts technicians and other project personnel responsible for equipment operations.

Employment Factors

1. A minimum of five years experience on automotive and heavy equipment repair, at least one year being a supervisory position in a workshop operation. Similar to this project requirements.

2. At least two years experience working in third world countries doing automotive and heavy equipment repair and maintenance.
3. The ability to plan and schedule the repair and maintenance of construction equipment, vehicle, support equipment, and spare parts requirements.
4. Experience in spare part identification and ordering.
5. Sensitivity and ability to relate to and get along and work well with other people of other cultures.
6. Ability to train others resulting in the development of their skills and talents.
7. Good health and ability to live in a hot, arid dusty climate with minimum life support facilities.

Educational Requirements

High school graduate and graduate of a equipment training course, including diesel mechanic certification. Class 'A' mechanics certificate required.

Salary

Salary range \$25,000 - 35,000

- | | |
|-----------------------|---|
| 4. <u>Job Title:</u> | Master Mechanic/Field Operations
(This position can be interchanged with the Shop Foreman) |
| Place of Assignment: | Southern Sudan, Equatorial or Bahr El Ghazal Regions.
Project Support Headquarters, Juba, Sudan. |
| Type of Employment: | U.S. Technical Assistance Contractor
(U.S.C) |
| Period of Employment: | 3-5 years; starting: April 1985 |
| Type of Control: | Reports to the Field Construction Foreman, under the field equipment operation. |

Scope of Work

1. Assigned to the field operations, for Project required equipment repair, equipment maintenance, spare parts identification, and general responsibility for all equipment condition.
2. Will prepare equipment maintenance schedules, conduct OJT, implement maintenance schedules, and maintain spare parts inventory at field sites for site operations.
3. Will repair heavy construction equipment, automotive equipment support equipment at the project field sites, using the range of shop tools.

4. Will supervise the spare parts activities and carry out an OJT program for counterpart personnel in mechanical repair and mechanical maintenance activities.

5. Develops a standard for evaluating at field maintenance program.

6. Functions in an operational role in providing service, repair and maintenance for Project equipment while providing in-service and OJT to field unit mechanics.

7. Supervises the camp and work shop operations.

Employment Factors

1. A minimum of five years as a workshop/field service mechanic.

2. A minimum of two years as a mechanic on heavy equipment and automotive units, third world country projects.

3. A minimum of two years in the maintenance, repair and testing of diesel engines, light and heavy duty.

4. Sensitivity, and ability to relate to and get along and work well with people of other cultures.

5. Ability to train others in mechanical operation, repair and maintenance of equipment.

6. Good health and ability to live and work under difficult conditions of heat, dust and minimum life support systems.

Educational Requirements

Certificate of training or associate degree from a vocational school in heavy equipment, automotive and diesel, repair and maintenance. Class 'A' mechanic qualifications required. Short term training courses desirable.

Salary

Salary range \$30,000 - 40,000

5. Job Title: Road Construction Foreman/Equipment Operators - 2

Place of Assignment: Southern Sudan, Equatorial and Bahr El Ghazal Regions.
Project Headquarters Juba, Sudan

Type of Employment: T.A. Contractor (U.S.)

Period of Employment: 3-5 years; starting: (1) Sept. 1984
(2) Jan. 1985

Type of Control: Reports to the team Project Road Maintenance Engineer. Coordinates with the Regional road assigned counterparts.

Scope of Work

1. Responsible for the supervision, management, implementation and maintenance of equipment spreads, personnel and support requirements to carry out field operations.
2. Responsible for planning, scheduling and carrying out field work as divided by the project maintenance engineer and the project Team Leader.
3. Assists in the planning and supervises OJT programs for equipment operators, mechanics. Directly supervises counterpart foreman in road maintenance and rehabilitation in OJT programs.
4. Plans, coordinates and implements all field project activities, within the project geographical sector, pertaining to project support and logistical support required for project implementation.
5. Supervises other T.A. team members assigned to the field sector operations.

Employment Factors

1. A minimum of 10 years as a construction foreman/equipment operator on road construction, road maintenance, heavy duty equipment operator. Not less than three years will have been in third world country operations similar to this project.
2. A wide range of equipment operation and utilization experience and must be able to transfer these skills to expatriate and host country personnel.
3. Sensitivity and ability to get along and work well with people of other cultures.
4. Ability to maintain momentum under adverse working conditions.
5. Good health and ability to work and live under difficult conditions of heat, dust and a limited life support system.

Educational Requirements

High school diploma
Two year technical school diploma
Trade school certifications
Mechanic certification

Salary

Salary range \$30,000 - 40,000

6. Job Title: Equipment Mechanic/Trainer - 2
(Third Country National TCN)
- Place of Assignment: Southern Sudan, Equatorial or Bahr
El Ghazal Regions, Project field
sites.
Juba Headquarters.
- Period of Employment: 3-5 years; starting: (1) Sept. 1984
(2) Jan. 1985

Type of Control:

Under the control of the Project Team Leader or delegated authority of supervision to team members.

Scope of Work

1. Will carry out heavy equipment, automotive and support equipment repair and maintenance on project funded equipment, as directed and under the supervision of the team site mechanic or foreman.
2. Will train (OJT) Regional road project assigned personnel in the operation, maintenance and repair of project equipment.
3. Will identify, order, store and inventory spare parts required for project equipment.
4. Will determine fuel requirements and order for project operation.
5. Will plan and conduct an OJT program for preventive maintenance of equipment.
6. Under the supervision and approval of the site foreman will design and implement on a continuous basis an anti-theft program for equipment, spares, tools, fuel etc for the safety and conservation of project commodities and resources.

Employment Factors

1. Five years previous experience as a mechanic/equipment operator of heavy equipment, automotive and construction support equipment.
2. Experience in the operation maintenance and repair a U.S. manufactured heavy equipment, including diesel engine repair.
3. Two years experience in working in equipment maintenance on African projects for road construction and maintenance.
4. Reading, writing and speaking knowledge of English. Knowledge of tribal language or Arabic desirable.
5. Sensitivity and ability to get along and work with people of other cultures.
6. Ability to maintain momentum under adverse working conditions.
7. Good health and ability to work and live under difficult conditions of heat, dust and a limited life support system.

Education Requirements

Command of English
Secondary school diploma
Diploma of vocational training in equipment - 2 year school

Salary

Salary range \$25,000 - 35,000

7. Job Title: Construction Supervisors - 2
(Third Country Nationals - TCN)
- Place of Assignment: Southern Sudan, Equatorial or Bahr
El Ghazal Regions, Project assigned
- Type of Employment: In-country contract with the project
T.A. contractor. (Hired at site).
- Period of Employment: 3-5 years; starting: (1) April 1984
(2) Aug. 1984
- Type of Control: Under project control of the project
Team Leader or delegated authority of
supervision to team members

Scope of Work

1. Will carry out construction inspection and technical supervision of project funded local labor contracts or local construction contracts for building project elements, i.e. shop sites, resident sites, drainage improvements, roadway maintenance, etc, under the supervision of the site foreman and the team civil engineer.
2. Will design, prepare quantities, cost estimates for local contracts for construction, and order construction materials.
3. Will locate road surfacing material pits, determine quantities, quality and estimate haul requirements to fulfill road surfacing construction requirements.
4. Will work with project assigned personnel in OJT programs.

Employment Factors

1. Five years previous experience in construction work, labor supervision as a supervisor.
2. Command of English reading, writing, speaking.
3. Two years working in a third-world African country.
4. Sensitivity and ability to get along and work with people of other cultures.
5. Ability to maintain momentum under adverse working conditions.
6. Good health and ability to work and live under difficult conditions of heat, dust and a limited life support system.

Educational Requirements

Command of English
Secondary school diploma
Two year technical school diploma

Salary

Salary range \$25,000 - 35,000

8. Job Title: Office Administrator/Accountant - 1
(Third Country National - TCN)
- Place of Assignment: Southern Sudan, Juba, Equatorial
Region, Project Headquarters
- Type of Employment: In-country contract with Project
T.A. contractor. (Hired at site).
- Period of Employment: 3-5 years; starting: March 1984
- Type of Control: Project assigned, directly supervised
by the project Team Leader.

Scope of Work

1. Serves as the project headquarters personnel/office manager for local hired personnel.
2. Designs, plans, implements, and supervises a program, for project fund accounting, procurement tracking, payrolls, filing system, record keeping, reports scheduling.
3. Is supervised by the Project Team Leader, who assigns his work.
4. Plans, designs and carries out tracking requirements for field operation accountability of funds, expenditures, personnel costs.
5. Maintains project records of financial flows, disbursements etc.
6. Provides an advisory service for record keeping, accountabilities for the Juba Maintenance Center and Regional road office, as directed by the Team Leader.
7. Maintains housing rental contracts, other contracts required under the project operations.
8. Maintains the petty cash fund, the project Trust Fund and the project fund.
9. Supervises all local personnel in the Headquarters office operation, other than expatriate personnel.
10. Travels as directed by the Team Leader.

Employment Factors

1. Five years experience in office management, accounting, office records, personnel management. Desirable to have knowledge of AID procedures for project operations or host country procedures.
2. Two years experience in African countries in similar office operations.
3. Ability to supervise, manage personnel of various culture background.
4. Fluency in English and U.S. accounting systems.
5. Ability to maintain work momentum under adverse conditions.
6. Good health and the ability to work and live under difficult conditions of heat, dust and a limited life support system.

Educational Requirements

Fluency in English

B.S. in accounting or equivalent from a university

Salary

Salary range \$30,000

9. Job Title: Spare Parts/Warehouseman
(Third Country National - TCN)
- Place of Assignment: Southern Sudan, Juba, Equatorial
and Bahr El Ghazal Region
- Type of Employment: In-country contract with Project
T.A. contractor. (Hired at site).
- Period of Employment: 3-5 years; starting: May 1984
- Type of Control: Project assigned directly supervised
by T.A. team Shop Foreman, Juba Shop.

Scope of Work

1. Works primarily at the project headquarters as spare parts, warehouse man for all project equipment and spare parts funded under the project. Works under the supervision of the Shop Foreman.
2. Works part-time, as directed the team Shop Foreman, in assisting the Regional shop personnel in maintaining spare parts ordering, inventory, control.
3. Designs, plans and implements, under the supervision of the team Project Civil Engineer, a security, accountability system for tracking and maintaining control of project funded spare parts, tools, fuel, equipment, etc, at project headquarters, Juba shop and field operations.

4. Maintains parts books, ordering Cardex inventory control for the project funded equipment, tools, spares, commodities.

Employment Factors

1. Five years experience in spare parts supplying ordering, inventory warehousing to include tools, equipment, construction commodities.

2. Two years working in third world countries in spare parts, warehouse work.

3. Ability to supervise and manage personnel of various culture background.

4. Ability to train, by OJT programs, unskilled people of different culture backgrounds.

5. Fluency in English and understanding of the U.S. parts system method.

6. Ability to maintain work momentum under adverse conditions.

7. Good health and the ability to work and live under difficult conditions of heat, dust and a limited life support system.

Educational Requirements

Fluency in English

Secondary school diploma and preferred a university degree

Salary

Salary range \$25,000 - 35,000

Major Project Equipment

Item No.	Description	May 1983 Unit Price US Dollars	Comments
1	<u>Crawler Dozers - Caterpillar</u>		
	A. D-8S Angle dozer/drawbar Ripper/hyd	276,000 32,000	FAS New Orleans
	B. D-7-S Angle dozer/drawbar Ripper/hyd	180,000 18,000	FAS N. Orleans 200 HP - Torque Comt. 22-Tons wt.
	C. D-6-S Angle dozer/drawbar Ripper/hyd hyd.	124,000 11,000	FAS N. Orleans 140 HP-16 Tons Same engine as D-7
2	<u>Motor Graders, Caterpillar</u> Diesel engine, 12' Moldboard w/scarifer and rear mounted ripper air compressor on engine		
	A. Model 12 G Articulated	129,000	FAS N. Orleans
	B. Model 120 G Straight frame	102,000	FAS N.O.
	C. Model 14 G Articulated	178,000	FAS N.O.
3	<u>Front End Loader-Caterpillar</u> Rubber tired, 4 WD, diesel 1½ or 2 cu. yd. bucket w/teeth		
	A. Model 930	78,000	FAS N.O. 100 H.P.
	B. Model 953 - on track	125,000	FAS N.O. 155 H.P.
Caterpillar prices would be discounted 10 to 15% in 1983 Sales. Caterpillar estimates 8% FAS value for Shipment/Insurance to East African Ports.			
4 A.	<u>Generator Sets - Caterpillar</u>		F.O.B.
	A. 100 KW model 3208	22,000	
	B. 80 KW	20,000	
	C. 60 KW Models 3304	19,000	
	A. 80 KW	21,000	F.O.B.
	B. 60 KW	20,000	
	C. 50 KW Model 3306 - Turbo-Charged	19,000	
	A. 100 KW	24,000	F.O.B.
	B. 105 KW	25,000	
	C. 130 KW	26,000	
B.	<u>Tractors</u>		
	Farm Tractor	25,000	FAS U.S. Port

<u>No.</u>	<u>Description</u>	<u>Unit Price</u> <u>US Dollars</u>	
5.	<u>Dump Truck</u>		
	A. Diesel, minimum 8 cu.yd., tandem drivel axle; w/pintle hook	80,000	FAS Port U.S.
	B. Diesel, minimum 5 cu.yd., Sgl. axle w/pintle hook	45,000	FAS Port U.S.
6.	Truck, fuel tanker, Diesel 1200 gallon min., 4 WD w/pintle	75,000	FAS - US
7.	Truck, water tanker, Diesel 1500 gallon, 4 WD, w/pintle	75,000	FAS
8.	Truck, Pick-up, Diesel, 4 WD, 3/4 ton with pintle and front winch	18,000	FAS
9.	Truck, K20-40, Surburban, 4 WD diesel, w/pintle	20,000	FAS
10.	Vehicle, 4 WD, diesel, land cruiser, passenger	20,000	FAS
11.	Truck, Flat bed, 7 ton, diesel 4 WD/w/hoist	55,000	FAS
12.	Truck, Tractor w/lowboy, 25 ton diesel, 5th wheel, w/winch loader	75,000	FAS
13.	Truck, wrecker, diesel 5 ton, W fifth wheel hydr. boom	60,000	FAS
14.	Roller, Rubber tired, 11 wheels Self propelled, diesel	60,000	FAS
15.	Roller, Sheeps foot, to dbl drum/weighted	25,000	FAS
16.	Trailer fuel/water towed, 500-750 gallon Sgl. axel, rubber tired	10,000	FAS
17.	Tank, fuel storage Steel/2000 gallon	10,000	FAS
18.	Vans/Cargo/Storage w/dolly/7 ton	15,000	FAS

19.	Container/Steel/Storage flat btm/	5,000	Juba CIF From freight delivery containers
20.	Utility Vehicle, fully enclosed body, 4 WD 5 ton, diesel	40,000	FAS
21.	Truck, mechanic field service diesel, 4 WD	30,000	FAS
22.	Truck mounted lubrication unit, Manual operated fuel tanks, diesel, small compressor, lube unit, manual/air 4 WD, diesel, incl. hose reels	50,000	FAS
23.	Roller, 11-13 wheel rubber, tired towed	35,000	FAS

Support Equipment

24.	Crane, Portable hydraulic for mounting on Pick-up truck, manual operated swing boom, lifting capability #1500	3000	FAS
25.	Chain hoists, endless pull, cap. 5 ton, 3 ton 10' lift	1500	FAS
26.	Water pump/centrifugal, gasoline/diesel operated, portable 100 gpm	5000	FAS
27.	Generator Sets 25 KW, Mobile	10,000	FAS
28.	Generator Sets 12 KW, Mobile	5000	FAS
29.	Generator Sets 10 KW, Mobile	3000	FAS
30.	Water distillation Unit	2000	FAS
31.	Welder, 200 Amp/H DED, TLR mtd	5000	FAS
32.	Welding Set Gas-oxy-Act type	1000	FAS
33.	Tanks/oxy/Act	300	FAS
34.	Fuel transfer pumps hand open, endless turn	200	FAS

35. Photo voltaic Energy Unit incl. Batteries/Converters/light units 12 or 24 volt w/bulbs spares	3000	FAS
36. House trailer, resident Super 32-32' long, one bedroom	20,000	FOB Nairobi, Kenya
37. SSB Radio Sets/VHF 2 way transmission/base set	4000	FAS
38. Air Compressor, 125 CFM/shop/field	8,000	FAS

COST ESTIMATE
ROAD MAINTENANCE HAND TOOLS

Road Camp Tools	Quantity/ Crew	Unit Price (FOB US \$)	Total Cost (FOB US \$)
WheelBarrow	5	75.00	375.
Water Drum	2	6.00	12.
Shovel, Round Point	6	14.00	84.
Shovel, Square Point	6	17.00	102.
Rake, Garden	6	9.00	54.
Slasher	6	10.00	60.
Pick	3	26.00	78.
Pry Bar	3	21.00	61.
Hammer, Sledge 4lbs.	3	17.00	51
Chisel, Masonry	3	6.00	18
Broom, Long Bristle, Push	6	11.00	66
Tamper, hand	2	13.00	26
Toria or Mattock	2	25.00	50
Bucket, Water, 9.5 liter	2	8.00	16
Axe, Burh	2	21.00	42
Rope, 10 meter	1	5.00	5
Stone, Sharpening	2	4.00	8
Crown Board, w/level	1	20.00	20
Can, Watering, 9.5 liter	2	6.00	12
Subtotal			\$1140.

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Bridge Crew Tools

Pick	4	6.00	24
Shovels, Round Point	3	14.00	42
Shovels, Square Point	3	12.00	36
Water Drum, 200 liter	2	6.00	12
Water Bucket	2	8.00	16
Chisel, Masonry	2	6.00	12
Hammer, Masonry	2	15.00	30
Trowel, Concrete Finishing	3	11.00	33
Trowel, Painting	2	7.00	14
Hoe, Concrete Mixing	2	24.00	48
Wheel Barrow .15m ³ (5 Ft ³)	2	75.00	150
Level - 1 meter (3 Ft)	2	20.00	40
Tamper, Hand	3	13.00	39
Aprons, Nail	3	13.00	39
Hammer, Claw	3	15.00	45
Total			580

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Hand Tools per Road Camp (1982 prices)

3	Wheel borrows	Ls 100 each	Ls 300.00 *
4	Shovels	Ls 10 each	Ls 40.00
4	Picks	Ls 15 each	Ls 60.00
3	Hand Hammers	Ls 10 each	Ls 30.00
3	Rakes	Ls 20 each	Ls 60.00
2	Crow bars	Ls 15 each	Ls 30.00
1	Cross Cut Saw	Ls 30 each	Ls 30.00
2	Forks	Ls 25 each	Ls 50.00
2	Long Handle Spades	Ls 15 each	Ls 30.00
4	Pangas	Ls 10 each	Ls 40.00
6	Grass Slashes	Ls 10 each	Ls 60.00
Total Cost per Road Camp			Ls 730.00

* Preferably foreign exchange

Assume hand tools replaced every 4-5 years.

Annual Cost per km of maintenance spaey of camps 10 km 750/5x10:
Ls 15.00 per km

- (1) Refer to May 1982 Programme for 3rd Highway Project.
Cater for 5200 kms of road. cost per annum $15 \times 5200 =$ Ls 78,000
Cost per the programme period Ls 390,000.
(Budget Allowance 1982 = Ls 77,000 p.a)
- (2) Refer to JDA Appraisal 1983
Cater for 900 km + additional 250 + 200 + 250
over the programme period
re 730 (90 + 25 + 20 + 20 + 25)
= Ls 131,400

I Technical Assistance

Team Leader @ \$ 15,000 mm.

Salary \$ 50,000 PA
Differential (25%) \$ 12,500 PA

L.C. * Housing \$ 14,000
Edu. Allowance (2 children) \$ 20,000
R.R./Home Leave (Air transportation)
4 people) \$ 12,000

Medical Insurance 2000
Defense B.A.W. Compensation (6.4% x salary) 3200

Inter Travel (1 trip year) \$ 3000

Inter Per-diem \$ 1500

U.S. Travel/per diem 4500

Visa 100

Medical Physical Exam. (4-people) 400

Baggage Allowances (Unaccompanied) \$ 5000
800 #

- Provided by USAID Furniture/Appliances (one
time)

(No shipment of P.O.V.)

Food allowance - (2000\$) (one time) \$ 10,000

Home Office Overhead: 2.0 x base Salary

Field overhead \$ 174,200

12 months

Principal (Home Office Assignment)

Short Term Specialized Consultant Needs - 15 months

PROPOSED WORKSHOP TOOLS AND EQUIPMENT

I. General Shop

Item No.	Quantity	Description	FOB U.S.\$	
			Unit Price	Total Price
1	1	Wrench, giant adjustable, 24"	93.55	93.55
2	1	Wrench, giant adjustable, 36"	449.00	449.00
3	1	Air hammer	46.95	46.95
4	1	Tester, voltage/amperes, portable	152.80	152.80
5	1	Pressure blow gun	5.65	5.65
6	1	Tester, compression, gas and diesel	21.00	21.00
7	1	Tester, fuel injection	115.20	115.20
8	1	Spark plug cleaner	396.00	396.00
9	1	Glaze breaker, engine cylinder	14.45	14.45
10	1	Ring groove cleaner, engine	24.10	24.10
11	1	Ring compressors	14.50	14.50
12	1	Ring spreader	17.75	17.75
13	1	Grinder, valve seat	5.95	5.95
14	1	Reamer, ridge, cylinder	5.30	5.30
15	1	Valve resurfacer	25.95	25.95
16	1	Hone, engine cylinder	2561.00	2561.00
17	1	Tester, battery, 600 amp. capacity	191.05	191.05
18	1	Charger, battery, constant current	160.00	160.00
19	3	Flashlight	515.95	515.95
20	1	Carrier, battery	4.75	14.25
21	4	Filler bulb, battery	14.35	14.35
22	4	Filler, battery	8.75	35.00
23	3	Apron, acid proof, each mechanic	8.75	35.00
24	3	Pair, acid proof gloves, each mechanic	9.00	27.00
25	1	Balancer, wheel, static	1.92	5.76
26	1	Wheel alignment set HD	849.00	849.00
27	1	Tire demounter, air operated, HD	1540.20	1540.00
28	2	Tire inflator w/guage	5000.00	5000.00
29	1	Vulcanizer	25.20	50.40
30	1	Welding set, electric, portable	600.00	600.00
31	1	Welding set, oxy-acetylene, portable	439.98	439.98
32	1	Set, body & fender tools	246.93	246.93
33	1	Set, blacksmithing tools	335.60	335.60
34	1	Set, body repair jack, hydraulic	400.00	400.00
35	1	Forge, coal fired	769.85	769.85
36	1	Anvil, 140-150 lbs.	800.00	800.00
37	1	Tube bending set	240.00	240.00
38	1	Metal snips (shear set)	6.40	6.40
39	1	Grinder, disc type, electric, portable	38.35	38.35
40	1	Grinder, bench type, electric	215.49	215.49
41	1	Sander, electric, portable	313.30	313.30
42	1	Drill, electric 1/2", w/2 sets drill bits	88.32	88.32
43	1	Drill, electric, 3/4" w/2 sets drill bits	235.00	235.00
44	1	Bolt cutter, HD	792.00	792.00
			69.20	69.20

Best Available Copy

1. General Shop (Cont.)

FOB U.S.S

Item No.	Quantity	Description	Unit Price	Total Price
45	3	Blow torch	248.95	746.85
46	3	Soldering gun, electric, HD	79.30	237.90
47	1	Punch & chisel set	137.00	137.00
48	1	Extractor, screw/bolt/stud, set	11.75	11.75
49	1	Set, C-clamps, steel, deep-throat	108.00	108.00
50	1	Set, pipe & adjustable wrenches	120.30	120.30
51	1	Set, paint spray gun, 1 Qt. capacity	154.80	154.80
52	1	Set, tap & die, Eng. & Metric	157.25	157.25
53	1	Set, micrometers, 1-6", outside	251.95	251.95
54	1	Micrometer, 1½-6", inside	66.99	66.99
55	1	Caliper, 0-6" Eng. and Metric	32.99	32.99
56	2	Set, master feeler gauge	4.50	9.00
57	1	Set, carpenter tools	224.67	224.67
58	1	Engraver, electric, vibrating	24.40	24.40
59	1	Set, steel stamping, letters & numbers	34.70	34.70
60	6	Air hose w/quick coupler ends, 3/8" X 35'	57.35	344.10
61	1	Set, combination center drill & countersink, 1/8", 3/16", 1/2", 5/16" and 7/16"	45.00	45.00
62	2	Vise, bench type, 6"	182.50	365.00
63	1	Vise, drill press	34.99	34.99
64	1	Vise, blacksmith	40.00	40.00
65	1	Vise, combination pipe and bench	165.10	165.10
66	1	Vise, tool room	24.99	24.99
67	1	Vise, bench, chain type	36.99	36.99
68	1	Vise, woodworking, 12" capacity	69.99	69.99
69	1	Sling, engine lift	172.50	172.50
70	1	Stand, engine/transmission, repair, portable	2720.00	2720.00
71	6	6' X 4' shields, welding/painting, portable	63.30	379.80
72	4 pr.	Stand, safety	96.00	384.00
73	2	Jack, hydraulic, floor, 5 T	626.25	1252.50
74	2	Jack, hydraulic, floor, 10 T	848.40	1696.80
75	2	Jack, hydraulic, floor, 20 T	982.95	1965.90
76	1	Dolly, dual wheel	710.00	710.00
77	1	Hoist, ratchet, hand, 3 T	282.50	282.50
78	1	Hoist, ratchet, hand, 1½ T	146.00	146.00
79	4	Grease gun, hand	10.10	40.40
80	2	Pump, oil recovery, suction type	8.50	17.00
81	2	Pump, rotary, hand	67.99	135.98
82	3	Set, oil filler measure	20.00	60.00
83	4	Set, funnel	12.00	48.00
84	3	Fuel can w/nozzle, 5 gallon	14.40	43.20
85	3	Fuel can w/nozzle, 2.5 gallon	11.20	33.60
86	2	Helmet, welding (arc)	25.25	50.50
87	4	Goggles, welding oxy-acetylene	6.55	26.20
88	8	Face shield, general purpose	4.15	33.20
89	3	Set, general shop tools: creeper; trouble light; hammer; crowbar; wrecking bar; tape and steel rules, Eng. & Metric; pipe taps; cutter; reamers	235.00	705.00
90	1	Kit, tire patching, all sizes	25.00	25.00

Best Available Copy

I. General Shop (Cont.)

Item No.	Quantity	Description	FOB U.S.S	
			Unit Price	Total Price
91	2	Sledge hammers, 8 lbs.	28.80	57.60
92	2	Sledge hammers, 10 lbs.	33.75	67.50
93	8	Kit, first aid	42.46	339.68
94	12	Fire extinguisher, dry powder	32.97	395.64
95	2	Set hex key wrenches, Eng. & Metric	12.35	24.70
96	2	Drop cord	36.25	72.50
97	2	Gloves, welding (arc)	13.75	27.50
98	2	Floor mops, pail, wringer	112.97	225.94
99	1	½" Impact wrench, heavy equipment	154.95	154.95
100	2	Step ladder, wood, 6', HD	63.95	127.90
101	3	Sweeper broom long handle, 18-24" wide	8.00	24.00
102	1	Brake fluid pump	25.00	25.00
103	1	Brake bleeder tank	209.15	209.15
104	1	Bearing packer	99.50	99.50
105	3	Mechanic's seat	30.50	91.50
106	2	Oil drain pans, set	12.00	24.00
107	1	Transmission/differential floor jack	1325.00	1325.00
108	1	Air chisel	32.60	32.60
109	8	Waste cans	70.25	562.00
110	1	Safety cage, tire inflation	209.00	209.00
111	1	Oil seal driver set	444.00	444.00
112	1	Set, bearing/gear puller	250.35	250.35
113	1	Set, riveting tools	33.45	33.45
114	1	Set, pilot bearing tools	50.00	50.00
115	1	Set, axle nut sockets, 6 & 8 point, 2-3/32" - 4 7/8"	510.00	510.00
116	1	Steam cleaner outfit	1759.00	1759.00
117	1	Headlight aimer/tester	215.40	215.40
118	1	Tester, radiator pressure	83.10	83.10
119	1	Tester, hydraulic flow/pressure/temperature	1102.30	1102.30
120	3	Mechanic's tool cabinet/work bench, rollaway	455.75	1367.25
121	2	Mechanic's workstands	421.80	843.60
122	1	Hydraulic floor press, 5 T	670.85	670.85
123	1	Drill press, floor, HD, drills to 1" diameter	749.80	749.80
124	1	A-frame hoist w/dual chain falls, manual	1192.38	1192.38
125	1	Guage, brake drum	22.20	22.20
126	1	Power hack saw, floor type, semi-portable	1514.97	1514.97
127	1	Small parts recirculating wash tank	624.00	624.00

II. Stockroom

Item No.	Quantity	Description	FOB U.S.S	
			Unit Price	Total Price
1-S	100	Bin, spare parts storage	5.00	500.00
2-S	15	File, Cardex type, stock record card	20.00	300.00
3-S	3	Bins, rotary, hardware storage	825.00	2475.00
4-S	1000	L.F. 12" metal storage shelves & support hardware	2.50	2500.00
5-S	1000	Bin tags, identification/transactions	.01	10.00

III. Office

1-0	3	Typewriters, 12" carriage	200.00	600.00
2-0	6	Chairs	70.00	420.00
3-0	3	Calculator, electronic, rechargeable	100.00	300.00
4-0	4	Desk lights	35.00	140.00
5-0	2	Embossing machine w/extra tapes	18.00	36.00
6-0	3	File cabinets, steel, lockable, w/folders	220.00	660.00
7-0	3	Desks, metal, lockable drawers	230.00	690.00
	1	Office Safe (Kenya)	2000.00	2000.00

IV. Mechanics Hand Tools

1-M	3	Tool set, general purpose	511.23	1533.69
2-M	3	Wrench, torque, 3/4" Square drive	224.05	672.15
3-M	3	Tools, socket set 3/4" drive	423.90	1271.70
4-M	3	Wrench, oil filter	5.45	16.35
5-M	3	Timing light, ignition	104.90	314.70
6-M	3	Ignition wrench set	33.75	101.25
7-M	3	Spark plug guage set	4.40	13.20
8-M	3	Hydrometer/battery	7.50	22.50
9-M	3	Pliers, battery cable terminal	7.00	21.00
10-M	3	Brush, battery terminal	4.35	13.05
11-M	3	Set, jumper cable	31.45	94.35
12-M	3	Brake-spring pliers	23.80	71.40
13-M	3	Tire pressure guage	3.60	10.80
14-M	3	Tire tread guage	2.30	6.90
15-M	3	Tire tool set	75.05	225.15
16-M	3	Wheel lug wrench, 4-way, HD	35.40	106.20
17-M	3	Hacksaw frame, handle, w/blades	26.65	79.95
18-M	3	Set, screwdrivers, square & Phillips	47.85	143.55
19-M	3	Pliers, snap ring	18.40	55.20
20-M	3	Remover, valve core	1.85	5.55
21-M	3	Carrier battery	5.80	17.40
22-M	3	Set, deep sockets, spark plug	30.00	90.00
23-M	3	Tester, electric light wiring system (circuit tester)	4.50	13.50
24-M	3	Set, metric socket 1/2" drive	96.05	288.15
25-M	3	Set, metric socket, 3/4" drive	26.30	78.90
26-M	3	Set, feeler guage	5.00	15.00
27-M	3	Set, metric wrenches, 6mm-19mm, combination	100.65	301.95
28-M	3	Set, pliers	34.25	102.75

7. Field Service Truck Tools

			<u>FOB U.S.S</u>	
<u>Item No.</u>	<u>Quantity</u>	<u>Description</u>	<u>Unit Price</u>	<u>Total Price</u>
1-FS	1	Oxy-acetylene cutting/brazing/welding outfit	306.98	306.98
2-FS	1	Portable, gasoline powered welding outfit	966.03	966.03
3-FS	1	3/4" drive socket set, Standard & Metric	468.45	468.45
4-FS	1	1/2" drive HD torque wrench w/English & Metric read-out. Sears DIGITORK or approved equal	59.99	59.99
5-FS	1	HD come-along, 2-ton Cap. Min., Porto-Power or approved equal	390.80	390.80
6-FS	1	12 piece mechanic's HD screw driver set, including Phillips head	52.84	52.84
7-FS	1	Tap & die set, standard and metric. Set includes 41 piece English and 36-piece Metric. Sears part numbers 9H5201 and 9H52102, or approved equal	114.98	114.98
8-FS	1	Set pliers including diagonal-cut, slip-joint, arc-joint and ignition system pliers	28.94	28.94
9-FS	1	5-ton hydraulic jack	31.60	31.60
10-FS	1	10-ton hydraulic jack	48.00	48.00
11-FS	1	Chain hoist, 2000 lbs. Cap.	199.50	199.50
12-FS	1	HD bolt cutter	69.20	69.20
13-FS	1	HD, cartridge-type manual grease gun	10.10	10.10
14-FS	3	HD, 5-gallon Cap. fuel cans w/discharge spout	14.40	43.20
15-FS	1	HD punch & chisel set	119.60	119.60
16-FS	1	Set, deep-throat welding C-clamps	113.63	113.63
17-FS	1	6-inch HD vise	182.50	182.50
18-FS	1	Oil recovery suction pump	8.50	8.50
19-FS	1	10-gallon Cap. oil drain pan	8.00	8.00
20-FS	1	2-Qts. oil filler can	10.00	10.00
21-FS	1	Set sledge hammers (4 & 8#)	47.60	47.60
22-FS	1	Brake bleeder kit	25.00	25.00
23-FS	1	Electric tester	4.50	4.50
24-FS	1	Hydraulic system portable tester. (GPM flow rate/oil temperature/oil pressure).	1102.30	1102.30
25-FS	1	Oil filter wrench	5.45	5.45
26-FS	1	Ignition timing light	104.90	104.90
27-FS	1	Battery hydrometer tester	7.50	7.50
28-FS	1	HD, 4-way wheel lug wrench	35.40	35.40
29-FS	1	Set larger tire removal tools	58.85	58.85
30-FS	1	Tire patching/field vulcanizing kit	30.00	30.00
31-FS	1	HD battery strap	5.80	5.80
32-FS	1	HD tire pressure guage	3.60	3.60
33-FS	1	Tire tread depth guage	2.30	2.30
34-FS	1	10-Qts. pail w/cleaning brush	12.00	12.00
35-FS	1	Set HD, 12-foot battery jumper cables	31.45	31.45
36-FS	1	Battery cable terminal pliers	7.00	7.00
37-FS	1	Spark plug guage set	4.40	4.40
38-FS	1	Set mechanic's hammers	65.20	65.20
39-FS	1	Brake-spring pliers	23.80	23.80
40-FS	1	Set oil seal removal/installation tools	622.05	622.05
41-FS	1	Set bearing pullers	401.20	401.20
42-FS	1	Set deep-sockets, spark plug, English & Metric	30.00	30.00
43-FS	1	Engine-driven air compressor	600.00	600.00

OTHER SHOP EQUIPMENT

The following items have been removed from the original list of proposed workshop equipment contained in Table H-7 from the report by USAID. It was felt that these items should be included under the architectural recommendations for the design of the workshop.

- extractor fans: Table H-7 calls for 12 - 18" diameter fans. The size and number of fans should be determined from the volume of the proposed workshop.
- stationary lube unit: A centralized, pneumatic delivery type, reeled and wall mounted should be considered.
- shop compressor: Table H-7 calls for 60 CFM capacity. The following air powered tools are on the proposed list: 20 ton truck service jack, tire changer, air hammer, impact wrench, and pressure blow gun. The air hammer and impact wrench use 4 CFM each. The tire changer requires 140-150 psi and the jack 90-180 psi. The compressor should have 120 gallon capacity min. tank with 200 psi working pressure and safety guards if belt drive. A DeVilbiss 175 psi, two stage horizontal air compressor, 20 HP, with 75 CFM delivery was priced at \$8,164.00.
- generator: The Caterpillar 3304 naturally aspirated diesel generator was priced at \$18,770.00.
- 100,000 liter fuel storage tank: The following should be determined: metal or fiberglass; underground or above ground; venting system; location and size of filler caps, which should be a lockable type; antirust coating, if underground; color and type support system, if above ground; size and location of pump island including pump mounting base diagram, and the make model pump(s) to assure they will match the pre-cast island base mounting system.
- gasoline pump: The following should be determined: make and model or approved equal; pump delivery capacity; length hose; type nozzle; filtration system and water trap; color, etc. Pumps should be lockable and meet general safety standards.
- diesel pump: Same as above. A spare hose complete with nozzle should be provided along with quantity of filter elements.

Not in Table H-7, but required for the workshop:

- portable ramps: These ramps should support a dump truck, which are specified at 27,500 lbs. GVW in the vehicle specifications (empty weight approximately 15,000 lbs). The ramps should be custom built as they are not readily available in this capacity range. Units should be fabricated on site or if fabricated elsewhere, shipped dismantled with bolts and hardware for assembly.

Detailed Budget

<u>Activity</u>	<u>Quantity</u>	<u>Unit US(\$)</u>	<u>Cost LC(\$)</u>	<u>Total US(\$000)</u>	<u>Cost LC(\$000)</u>
I. Technical Assistance					
A. Long-Term (U.S.)	PM				
1 - Team Leader/Senior Highway Engineer	65	14,000	300	910	19.5
1 - Civil Engineer	55	13,000	300	715	16.5
2 - Road Construction Foreman/ Equipment Operator	106	13,000	300	1378	31.8
1 - Shop Foreman/Master Mechanic	58	13,000	300	754	17.4
1 - Master Mechanic/Field Operations	48	13,000	300	<u>624</u>	<u>14.4</u>
Sub-total				4381	99.6
B. Long-Term (TCN)	PM				
2 - Construction Supervision	115	4,000	1800	460	207
2 - Equipment Mechanic/Trainer	106	4,000	1800	424	190.8
1 - Spare Parts/Warehouseman	62	4,000	1800	248	111.6
1 - Office Administrator/Accountant	64	4,000	1800	<u>256</u>	<u>115.2</u>
Sub-total				1388	624.6
C. Home Office	PM				
Principals	4	9,500		38	
Project Manager	18	9,600		<u>172.8</u>	
Sub-total				210.8	
D. Short-Term	PM				
Equipment Specialist	1.5	20,000	1600	30	2.4
Hydrologist	1.5	20,000	1600	30	2.4
Others	2	20,000	1600	<u>40.8</u>	<u>3.2</u>
Sub-total				100.8	8
E. Local Staff	PM				
Office Manager	65		15,000		15
5 - Clerk	250		31,000		31
3 - Typist	180		144,000		144
4 - Messenger	220		13,000		13
2 - Driver	120		15,000		15
8 - Guard	440		18,000		<u>18</u>
Sub-total					236
F. PSC Contract	12	14,000		<u>168</u>	
Technical Assistance Grand Sub-total				<u>6248.6</u>	<u>968.2</u>

<u>Activity</u>	<u>Quantity</u>	<u>Unit</u> <u>US (\$)</u>	<u>Cost</u> <u>LC (\$)</u>	<u>Total</u> <u>US (\$000)</u>	<u>Cost</u> <u>LC (\$000)</u>
II. Training	PM				
A. Long-Term					
2 - B.S. Degree Civil Engineer	100	1,600	5,000 ^{1/}	160	5
2 - B.S. Degree Mech. Engineer	100	1,600	5,000 ^{1/}	160	5
B. Third Country Short-Term					
20 - Foreman; 6 mo each	120	300	20,000 ^{1/}	36	20
C. Caterpillar Instructor Short-Term	4	6,250	10,000	25	10
Sub-total				381	40
				=====	=====

III. Equipment and Vehicles^{2/}

A. Equipment^{3/}

Item No.

1 Bulldozer, D7 w/ripper	2	200,000		400	
2 Grader, 120G	4	102,000		408	
Front End Loader					
3 Caterpillar 930	2	78,000		156	
4 Caterpillar 953	2	125,000		250	
Dump Trucks, diesel					
5 5 cu. yd. single axle	6	45,000		270	
6 8 cu. yd. double axle	4	80,000		320	
7 Truck, fuel tanker, diesel, 1200 gal., 4WD	1	75,000		75	
8 Truck, flat bed, 7 ton, diesel, w/hoist, 4WD	1	55,000		55	
9 Truck tractor, w/lowboy 25 ton, 5th wheel, diesel w/winch ^{4/}	1	75,000		75	
10 Water truck, 1500 gal, diesel	2	50,000		150	
11 Truck, mechanic, field service lube	2	50,000		100	
12 Pick-up, 3/4 ton, 4WD, diesel	12	18,000		216	
13 Utility truck, fully enclosed, 4WD, 5 ton, diesel	1	40,000		40	

1/ Airfare - Sudan Airways

2/ Excludes equipment and commodities related to private sector construction

3/ FAS, U.S. Port

4/ Tractor new equipment, lowboy excess property

	<u>Quantity</u>	<u>Unit</u> <u>US(\$)</u>	<u>Cost</u> <u>Lc(\$)</u>	<u>Total</u> <u>US(\$000)</u>	<u>Cost</u> <u>Lc(\$000)</u>
14 4WD vehicle	2	20,000		40	
15 Compactor, 13 wheel, towed ^{1/}	4	35,000		140	
Sub-total				2695	
B. Support Equipment ^{2/}					
16 Trailer, water, towed 500 gal ^{1/}	8	5,000		40	
17 Trailer, fuel, towed, 1,700 gal ^{1/}	6	10,000		60	
18 Vans, cargo, storage ^{1/}	4	15,000		60	
19 Container, storage	17	4,000		68	
20 House trailer, mobile	2	20,000		40	
21 Crane, portable, mechanical	7	3,000		21	
22 Chain hoist	15	1,500		22.5	
Sub-total				311.5	
Water Pump					
23 100 gpm	6	5,000		30	
24 50 gpm	11	2,500		27.5	
25 25 gpm	10	1,500		15	
Generator Set					
26 100 KW	3	22,000		66	
27 50 KW	6	19,000		114	
28 25 KW	4	10,000		40	
29 12 KW	10	5,000		50	
30 Welding set, 200 Amp	4	5,000		20	
31 Welding set, gas w/tanks	3	3,000		9	
32 Water distillation unit	3	2,000		6	
33 Air compressor	6	8,000		48	
34 Radio set, VHF mobile/base	18	4,000		72	
Sub-total				497.5	
35 Photovoltaic set	16	3,000		48	
36 Fuel transfer pumps	30	200		6	
Sub-total				54	
C. Workshop tools and equipment					
37 Juba, Mundri, Maridi ^{3/}	3	50,000		150	

^{1/} Excess property procurement

^{2/} FAS, U.S. Port

^{3/} Tractor equipment, lowboy excess property

	<u>Quantity</u>	<u>Unit US(\$)</u>	<u>Cost LC(\$)</u>	<u>Total US(\$000)</u>	<u>Cost LC(\$000)</u>
38 Torit ^{1/}	1	70,000		70	
39 Kapoeta ^{1/}	1	40,000		40	
40 Special tools, Juba	1	25,000		25	
Diesel injection repair and testing					
41 Select component replacement	1	90,000		90	
Engineering/testing equipment		50,000		<u>50</u>	
Sub-total				425	
Site, bulk fuel storage tanks, supplied in-kind by DRB					
Equipment Grand Sub-total				<u>3983</u>	
Spare Parts					
Items 1-15 30% FAS	.3	2,695,000		808.5	
Items 23-34 20% FAS	.2	497,500		85	
Spare parts for existing equipment		300,000		300	
Project administration spare parts		51,600		<u>51.6</u>	
Sub-total				<u>1245.1</u>	
Handtools				<u>31.2</u>	50
Private Sector Development					
A. Equipment for private contracting ^{2/}				150	75
B. Construction materials for private contracting				150	175
C. Local labor construction contracts					1000
D. Caterpillar exchange program				200	400 ^{3/}
E. Caterpillar rehabilitation program				<u>200</u>	
Sub-total				<u>700</u>	<u>1650</u>

See sample list on sep. page
Includes spare parts/replacement
In-country transportation charges

	<u>Quantity</u>	<u>Unit US(\$)</u>	<u>Cost LC(\$)</u>	<u>Total US(\$000)</u>	<u>Cost LC(\$000)</u>
VII. GOS Labor Force		PM			
1 - Project Director	32		38,000		38
2 - Senior Engineer	120		90,000		90
2 - Engineer	110		39,000		39
1 - Chief Mech. Engineer	58		42,000		42
1 - Asst. Director Accounts	20		2,000		2
2 - Senior Foreman	110		36,000		36
3 - Senior Mechanic	174		58,000		58
2 - Construction Foreman	110		36,000		36
5 - Assistant Foreman	275		62,000		62
35- Equipment Operator	1865		532,000		532
5 - Mechanic	275		93,000		93
5 - Assistant Mechanic	255		31,000		31
20- Driver	1060		232,000		232
10- Assistant Driver	510		45,000		45
10- Assistant Mechanic/Operator	510		67,000		67
11- Warehouseman	588		140,000		140
25- Laborer	1275		146,000		146
18- Guard, Misc.	950		54,000		54
158 Sub-total					<u>1743</u>

	<u>Quantity</u>	<u>Unit</u> <u>US(\$)</u>	<u>Cost</u> <u>LC(\$)</u>	<u>Total</u> <u>US(\$000)</u>	<u>Cost</u> <u>LC(\$000)</u>
II. Petroleum - Oil - Lubricant ^{1/} (\$1.5M included for operation of rehabilitated DRB equip.)				2000	2048
Sub-total				<u>2000</u>	<u>2048</u>
IX. Site Development/Construction					
A. Juba administrative office				25	60
B. Juba residence development ^{2/}				292	123
C. Torit-Kapoeta workshops ^{3/}				50	150
D. Mundri workshop - 1				25	75
E. Torit-Kapoeta residence develop- ment ^{2/}				225	410
F. Mundri residence development ^{2/}				90	150
Sub-total				<u>707</u>	<u>968</u>
X. Shipment					
A. U.S. Port - Port of Mombasa				859.9	
B. Port of Mombasa - Juba				661.1	145 ^{3/}
Sub-total				<u>1521</u>	<u>145</u>
XI. Procurement Fee					
A. Offshore				320.2	
B. Kenya off-shelf				45	
Sub-total				<u>365.2</u>	
XII. Contingency					
A. Major equipment (10%)				269.5	
B. All line items except TA, training and major equipment (15%)				998.4	512.0
Sub-total				<u>1267.9</u>	<u>512.0</u>

^{1/} POL procured by contractor and GOS. Transportation and procurement included in POL cost.

^{2/} Includes house construction, compound development, maintenance, furniture and appliances.

^{3/} In-country transportation charges

	<u>Quantity</u>	<u>Unit</u> <u>US(\$)</u>	<u>Cost</u> <u>LC(\$)</u>	<u>Total</u> <u>US(\$000)</u>	<u>Cost</u> <u>LC(\$000)</u>
II. Inflation				<u>880</u>	<u>1225.8</u>
V. Other Expenses					
A. Evaluation				100	
B. Air Charter				250	
C. Environmental Review				<u>20</u>	<u>50</u>
Sub-total				<u>370</u>	<u>50</u>
Grand Total				<u>19700</u>	<u>9400</u>

Training Program

A. Introduction

The training program proposed for the project will focus on the need for skilled personnel in two major sectors: equipment and roadway maintenance. The program will be planned, implemented and administered by the technical assistance (T.A.) contractor under the project shop and field activities using on the job training (OJT) methods. More formalized training proposed under the project will consist of out-country training for 4 participants to study for a BS engineering degree and for third country training of 20 supervisor/foreman staff. The GOS will select and process these participants with USAID approval and assistance.

The IBKD Second Highway program started on the job training activities, mainly concentrated at the Juba workshop in the areas of equipment repair and spare parts warehousing. This will be continued under the project with the OJT being administered at the Juba shop facility by the T.A. shop foreman and the spare parts and warehousing specialist. It is planned that, Sudan Tractor Co./ Khartoum (Caterpillar) will provide short-term on the job training using a Caterpillar Co. training technician available from the Khartoum office.

This program is funded under the project and will be planned and scheduled with the arrival of the T.A. team leader. This short-term training will be conducted in segments of one week or two week programs, applicable to: (1) equipment rehabilitation work (2) new equipment start-up and (3) shop spare parts and warehousing activities.

B. Training Methodology - OJT

The major training activity for the project is the on-the-job training program. As the project is designed to develop a road maintenance capability within the roads department by "doing", the OJT program will start at the Juba shop with equipment rehabilitation and maintenance. The OJT will then be expanded to the field sites with arrival of new equipment and the start-up of the road maintenance and rehabilitation activities.

Because of the informal nature of OJT; no formal testing program will initially be applied. GOS employees will be tested by skill-application with the employee demonstrating technical competence and being evaluated by the T.A. staff.

The OJT training will cover the following areas:

1. Shop tools and rehabilitation of deadlined equipment;
2. New equipment familiarization (including Caterpillar training)

3. Field equipment operations and field maintenance (including Caterpillar training);
4. Field repair of equipment and spare parts identification and ordering (including Caterpillar training);
5. Roadway maintenance (light and heavy maintenance);
6. Roadway regravelling; and
7. Roadway rehabilitation.

Training outlines and programs developed under recent AID-financed studies will be used for the OJT activities. The following outline describes a typical OJT program for mechanics:

TRAINING PROGRAM FOR MECHANICS

SUBJECT	COMPONENTS	EXTENT
Ignition System - Conventional and electronic, 6 and 12 volts	<u>Distributor, sparkplugs, primary and secondary wiring</u>	Inspection, testing, troubleshooting, cleaning, adjustments, repairs, lubrication etc.
Fuel System, Gasoline - Conventional carburation and fuel injection; single through four barrels	<u>Fuel tank, lines and valves, filtration system, fuel pump, carburator, air inlet filter, governor, fuel injection, controls, etc.</u>	Inspection, trouble-shooting adjustments, repairs, etc.
Fuel System, Diesel - Variable depending upon fleet make-up	<u>Fuel tank, lines and valves, pump, injection distribution system, governor, injector and HP lines, return lines, filtration system, water separator, etc.</u>	Inspection, trouble-shooting injector calibration, timing adjustments, minor repairs.
Charging Systems - Alternator and generator, 6 through 24 volts	<u>Housings and internal parts; cooling and shielding; drive mechanism; regulators, switches and wiring system, etc.</u>	Inspection, trouble-shooting testing, adjustments, repair component replacement
Starting System - Electric, pneumatic and hydraulic, 6 through 24 volts	<u>Housings; armature and brushes; field; look-out and overheat, protective devices; Bendix drive; solenoia and starting switches; batteries and carriers; cables and wiring systems.</u>	Inspection, testing and troubleshooting, adjustments, cleaning procedures; general repairs; lubrication.
Clutch - Dry and wet, single, dual and multi-plate	<u>Pressure plate, discs, pilot bearing and facings; clutch brake; application and release mechanism power-assist mechanism.</u>	Inspection, testing and troubleshooting; adjustment; disassembly and re-assembly procedures; in stallation; repair; lubrication.

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Training Program for Mechanics (continued)

SUBJECT	COMPONENTS	EXTENT
Torque Converter and Fluid Coupling- Single and Dual stage.	Housing, rotors, stator disc; bearings and seals; shafts, valves, cooling and filtration systems; pump; oil reservoir if required.	Inspection, purging and testing; adjustments; minor repair; trouble-shooting, lubrication.
Transmission, Auxiliary and Transfer Case - Mechanical, semi-automatic, automatic and power shift. Single and compound gearcase, multi-range, gear splitter, 3 through 20 speed versions, mechanical single or dual lever, pneumatic, hydraulic or electric shift control.	Housings; gears, shafts, bearings and gears; synchronizers; levers, linkage and controls; seals; filters and coolers; lubrication and purging; oil pump.	Inspection, trouble-shooting and minor adjustments; repair and overhaul of the smaller simpler mechanical types.
Axles, Drive Type - Single, Double and triple reduction; worm, planetary, chain-and sprockets and ring and pinion gear type; hydrostatic; hydraulic and electric drive system. Single, tandem and front.	Generally restricted to the common mechanical versions such as differential case, gears, shafts, bearings and seals; oil pump and filter; single and 2-speed; shift and control mechanism; power and lock-out mechanism; traction-assist devices; axles and shafts.	Inspection, trouble-shooting and adjustments; purging; lubrication. (Note: Machine requirements excluded.)
Driveline Servicing and Maintenance - Conventional light, medium and heavy duty versions.	Tubing, splined ends and yokes; U-joint crosses and needle bearings; slip-spline joints; flanges; center bearing and hangar.	Inspection, vibration troubleshooting; angle-check and adjustment; balancing, indexing and alignment; lubrication.

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Training Program for Mechanics (Continued)

SUBJECT	COMPONENTS	EXTENT
Axles, Steering and Trailing- Single and tandem steer or trailing.	Tubular and I-beam, independ- ently sprung; spindles, hubs, wheel bearings and seals; King pin and bushings.	Inspection, guaging, steer geometry checks; adjustmen lubrication. (Note: Straig ing not a required part of <u>course</u>).
Steering System - Manual, hydraulic and power- assist.	Wheel, column and gearbox; linkage, tierods and Pitman arm and radious rods.	Inspection, trouble-shooti and adjustments; geometric alignment; wheel and tire ance; lubrication. (Note: Overhauling hydro-steering pumps and/or integral gear not a course requirement).
Brake System - Mechanical pneumatic, hydraulic and powe assist.	Compressor, vacuum pump, hy- drauvac power units; drums, discs and rotors; wet or dry system; reservoirs, valves and controls; linkage, hoses and lines; cylinders, dust shields; brake linings; ad- justment mechanism.	Inspection, trouble-shooti and adjustments; brake rel ing and drum replacement; general repairs; lubricati (Note: compressor overhaul and brake drum/disc rotor grinding and dressing need not be part of the trainin course).
Air Inlet System - Wet and dry, single or dual phase filtration systems.	Housings and filter elements; guage; hoses and clamps; inlet manifolds; hangar and fixtures.	Inspection and trouble-sho ing; servicing and minor a justments; replacements as required.

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Training Program for Mechanics (Continued)

SUBJECT	COMPONENTS	EXTENT
Air Injection System - Natural aspiration, turbocharged and supercharged.	Turbocharger and supercharger pumping mechanism; air conduits; drive and cooling mechanism; lubrication system.	Inspection, trouble-shooting, servicing, minor repairs and adjustments. (Note: Overhauling of air charging system need not be part of the course).
Cooling System - Liquid and/or air cooled systems.	Radiator Ass'y; fan and fan drive system; shutters and thermostates; water pump; cowling; filtration; water jackets, hoses, clamps and lines.	Inspection, testing, troubleshooting; adjustments; general repair. (Note: Major core tank overhauling not a course requirement).
Hitches and Coupling Devices Fifth wheels, pintle hooks; drawbars; couplers.	Mounting plates; king pins; locking devices; safety chains; tow slings and hooks; shock absorbers.	Inspect, adjust and lubricate; general repairs.
Suspension System - Leaf spring; coil spring; air bag; leveling beam.	Spring leaves; U-bolt hangars; center bolts; coil spring units; shock pads and insulators; shock absorbers; torque and radius rods; rigid beams.	Inspect, replace, repair, tighten, adjust.
Framework Rails and Crossmembers - Passenger vehicle truck and trailer; channel and I-beams; straight and tapered.	Longitudinal rails; reinforcement rails and fish plates; cross members and gussets.	Inspect; drilling and weld basic procedures for minor straightening.
Engine Maintenance	Block and cylinder head assemblies.	Inspect, test and adjust; frame minor overhauling; tune ups. (Note: Major overhauling including machining of block, cylinder head and crankshaft not a course requirement).

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Training Program for Mechanics (Continued)

SUBJECT	COMPONENTS	EXTENT
Diagnostic Shop Equipment	Testers and analysers; tune-up machines.	General familiarity with testing procedures to determine and correct mechanical condition; perform routine adjustments to various systems; assure that equipment is in proper condition for reliable service.
Exhaust System-Conventional	Manifolds; gaskets and seals; exhaust piping, clamps and hangars; mufflers; shields; rain caps; spark arrester.	Inspect and repair as required.
Power take-offs-Crankshaft direct drive; transmission mounts; belt driven; electric	<u>Gear reduction housing, internal shafts and gears; spacers and seals; driveline shafting and U-joints; driveline hangars; control mechanism; purging devices.</u>	Inspection, trouble-shooting; adjustments; general repair as required; lubrication.
Drive Belts and Sheaves-Single, double and multi-belt drives.	<u>Sheaves and belts; adjustment mechanism; mounting hardware.</u>	Inspection and trouble-shooting; adjustments and replacements.
Instruments and Gauges - Instrument panel switches, lights, gauges, etc. such as odometers; tachometers; fuel; oil pressure and temperature; brake system reserve pressure; volt-meter/amp-meter; pyrometer; engine hour meter, etc.	N/A	Inspect and test; change as required.

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Training Program for Mechanics (Continued)

SUBJECT	COMPONENTS	EXTENT
Tires-Bias-ply and radial, all types of equipment.	Tires, tubes, flats and core values	Change and repair; inspect mate and match; balance; maintain required pressure; remove in time for recapping salvage.
Wheels and Rims-Spoke and disc.	Wheel hubs, bearing and seals; wheels and rims; lock rings; spacer bands; rim clamps; nuts and studs.	Inspect, tighten, balance and install.
Lights and Accessories	Head;tail; stop; directional; instruments; fan; air conditioner; defogger; bulbs and sealed beams; motors; switches; wiring; safety fuses; mounting hardware.	Inspect, test and adjust; repair/replace as needed. (No Major electrical repair functions not part of course).
Hydraulics - Low, medium and high pressure; on-demand power systems.	Accumulators; tanks, lines, filters and valves; pumps, motors and cylinder assemblies; mounting brackets, braces and hardware; oil coolers; controls.	General inspection, testing and minor repair, lubrication..(Note: Pump, motor and cylinder overhauling not required in the course).
Welding, Brazing, Cutting and Soldering.	N/A	General basic instruction, arc and oxy-acetylene.
Body and Painting	Cab and passenger body; van, dump and platform body	Minor repair and painting; glass replacement; seat cushion rebuilding; rebuilding/repairing dump box, platform and trailer decks, tail gates, etc.

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Training Programs for Mechanics (Continued)

SUBJECT	COMPONENTS	EXTENT
On-board Electronics	Electronic speed controls, automatic engine shut-down systems, central lube analysers, automatic brake application mechanism, fuel consumption analysers, etc.	Understanding of basic functional characteristics and placement of electronic components.
Battery Maintenance - All automotive models.	Batteries; battery case; cables.	Testing, inspection, cleaning terminals, replenishing electrolyte solutions (non-sealed types); general repair of battery compartments.
Shop Documents and Reports	N/A	General instructions in the preparation of the reports, orders and other documents in equipment and shop operations. Includes the maintenance of individual equipment repair and operating costs, equipment labor charges, etc.
Housekeeping Instruction	N/A	Includes safety programs; responsibility and accountability for keeping all shop areas clean and orderly condition; return of designated tools and equipment to the tool storage area, etc.

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The OJT program is planned to continue throughout the life of the project and will involve 300 GOS personnel. Since the project focus will be on field operations and developing a capacity for road maintenance, the OJT is designed to train personnel to competency levels consistent with those needed for project operations. Expansion of the training program will be considered as part of the March-April, 1986 evaluation.

C. Formalized Training

The formalized training component of the project will send 4 participants, selected by the GOS, for undergraduate training leading to a BS of engineering. These participants will be approved by USAID as to the type of engineering and qualification of the candidate. It is expected that 3 candidates will receive training in civil engineering and one candidate in mechanical engineering. If this type of training is determined to be beneficial, the program will be considered for expansion. Upon completion of their training, participants are expected to return to the jobs for which they were trained for a minimum of four years.

The short-term training of up to 20 supervisory and management personnel will be carried out in third countries. One possibility is to conduct the training in Kenya, under ILO or other formalized training programs established with the Kenyan Government. The length of training would not exceed 6 to 9 months for each participant. USAID will approve all candidates and courses based upon qualification, need and language ability. Although Kenya has been preliminarily identified as a desirable third country training location, other countries, such as Egypt, may also be appropriate. The GOS, USAID/S and the TA contractor will determine the appropriate site for third country training during the early stages of project implementation.

SORMAR IProcurement Implementation PlanA. Contracting Modes

The Project Paper design team has determined that the GOS does not have the required institutional capability to effectively implement a host country contract for the multitude of complex activities proposed for this project. The implementing agency for the GOS, RBPC, has had little experience with AID contracting procedures and procurement regulations. The recent reorganization of the former Southern Region into three new regions will create a situation where it will be several months before regional government responsibilities and relationships to the central government are clearly defined and implemented. Furthermore, it will also take several months to effect the transfer of regional government personnel now stationed in Juba to the new regional capitals in Wau and Malakal, and it will probably take even longer to adequately staff the new regional governments to even the minimum levels.

Therefore, it is planned that, with the exception of the small, local contracts for such activities as housing and workshop construction, drainage structure installation etc., all contracts will be direct AID contracts.

1. Technical Assistance

A direct AID contract will be executed with a construction supervision firm to implement the technical assistance and certain procurement components of the project. The firm will be selected on a competitive basis from AID Geographic Code 000 (U.S. only). The Request for Proposals (RFP) will be prepared by USAID with technical advice provided by AID/Washington - AFR/TR/ENG and REDSO/ESA. After the RFP is finalized by USAID, its availability will be advertised in

the appropriate business publications; the RFPs will be available from AID/Washington. The evaluation of proposals will be conducted in AID/Washington by a panel of USAID and GOS staff. The contractor selected will then send a representative to Khartoum for final contract negotiations.

The technical assistance (TA) team will consist of twelve members, six of whom will be Third Country Nationals (TCN).

The following schedule depicts major technical assistance contracting events:

<u>Activity</u>	<u>Date</u>	<u>Responsibility</u>
1. PIO/T Prepared	July 1983	USAID
2. RFP (Draft)	July 1983	USAID
3. RFP Reviewed	July/Aug. 1983	REDSO/ESA, AID/W
4. RFP Finalized	Sept. 1983	USAID
5. CBD Notice Published	Sept. 1983	USAID
6. Closing Date for Receipt of Proposals	Oct. 31, 1983	
7. Evaluation of Proposals and Selection of Contractor	Nov. 1983	GOS/USAID/REDSO/ESA
8. Contract Negotiations in Khartoum	Dec. 1983	Contractor/USAID
9. Contract Executed	Jan. 1984	Contractor/USAID
10. Arrival Dates at Project Site for TA Team		
(1) Team Leader - Juba	Feb. 1984	
(2) Administrator/Accountant (TCN)- Juba	March 1984	
(3) Construction Supervisor (TCN)- Mundri/Rumbek	April 1984	
(4) Spare Parts/Warehouseman (TCN)- Juba	May 1984	
(5) Civil Engineer - Juba	June 1984	
(6) Shop Foreman/Master Mechanic - Juba	June 1984	

- | | | |
|------|--|------------|
| (7) | Construction Supervisor (TCN)-
Torit | Aug. 1984 |
| (8) | Road Constr. Foreman/Equipment
Operator - Mundri/Rumbek | Sept. 1984 |
| (9) | Equipment Mechanic/Trainer (TCN)-
Mundri/Rumbek | Sept. 1984 |
| (10) | Road Constr. Foreman/Equipment
Operator - Torit | Jan. 1985 |
| (11) | Equipment Mechanic/Trainer (TCN)-
Torit | Jan. 1985 |
| (12) | Master Mechanic - Field Opera-
tions - Torit | April 1985 |

2. Procurement of Equipment, Commodities and Related Services

The procurement of equipment, commodities and related services for project use will consist of the following components:

<u>Item</u>	<u>Source and Origin</u>
1. Equipment and Spare Parts	U.S.
2. Fuels, Oils and Lubricants, Kenya, U.S.	Code 941
3. Vehicles - (Two)	Code 899
4. Caterpillar Component Exchange Program and Rehabilitation	U.S./Sudan
5. Equipment, Off-shelf, Kenya	Code 941
6. Construction Materials, Off-shelf, Kenya	Code 941
7. Hand Tools, Off-shelf, Sudan	Sudan
8. Hand Tools, Off-Shelf, Kenya	Code 941
9. Inland Transport Costs, Kenya-Sudan	Code 899
10. Shipping Costs, US-Kenya	U.S.
11. Procurement Service Costs	U.S.
12. Local Construction	Sudan

a. Equipment and Spare Parts

The equipment, tools, vehicles and spare parts for procurement in the U.S. will be purchased under three procurement mechanisms:

(1) IFB Procurement

Procurement, bid analysis, and recommendations for award are to be carried out by the T.A. contractor. The GOS and USAID/S will approve all awards. The contractor will consolidate and coordinate all shipments from the U.S. Port to either Port Sudan or Mombasa. Certain items of equipment under this procurement may be bid CIF, Mombasa or Port Sudan, i.e. vehicles, dump trucks. This is to be determined at the time the IFB is prepared.

Payment for equipment procured from this source will be by a Bank Letter of Commitment/^(L/Comm) with the T.A. Contractor authorizing Letters of Credit to be opened for suppliers. The L/Comm will also cover U.S. inland transport costs, marine insurance, ocean freight costs to the Port of entry, plus all clearance, taxes, documentation etc. related to CIF delivery. The GOS and USAID will approve all items procured under this mechanism. The L/Comm will also cover the foreign exchange cost component of inland transportation, port clearances, documentation, border clearances etc. from the port of entry to the project sites in the southern Sudan.

The approximate cost of the above procurement of equipment is \$4,500,000.

(2) Proprietary Procurement from Caterpillar Tractor Co., USA

Proprietary procurement of certain road construction equipment from Caterpillar Tractor Co. will be requested, consisting of (1) 2-dozers, (2) 4-graders and (3) 4-front end loaders. A Proprietary Procurement Waiver will be requested from AID/Washington for this equipment.

The negotiated procurement of these 10 units of equipment may be implemented by USAID/Sudan through the Sudan Tractor Co. (local

Caterpillar agent) and the International Offices of Caterpillar Co. at Geneva, Switzerland and Peoria, Ill. A list of required equipment will be submitted to Sudan Tractor Co.; the company will be responsible for providing detailed specifications which will be reviewed and approved by USAID and the GOS. Following negotiations USAID/S will sign a contract with Sudan Tractor Co. and request the issuance of a Direct Letter/Commitment to Caterpillar. Caterpillar Tractor Co. will be responsible for the manufacture and delivery of this equipment to site along with fulfillment of the equipment warranty conditions. Delivery of this equipment to the project site will be coordinated between the Caterpillar Co. and the T.A. Contractor. The estimated cost of this procurement is \$2,000,000.

(3) U.S. Excess Property Equipment Under Section 608 of the FAA

The procurement of this component equipment will be initiated and implemented by USAID/S under the procedures contained in AID Handbook 16- Excess Property Section.

USAID/S will prepare the search list of equipment and advise SER/COM/GPR, New Cumberland. The equipment listed below represents the anticipated excess property to be procured for the project:

- | | |
|--|---------------|
| 1. Towed fuel and water tankers, 400-750 gallon size | - 8-10 units |
| 2. Towed compactors, 13 wheel | - 4-6 units |
| 3. Track tractor, lowboy, 25 ton | - 1 unit |
| 4. Storage vans | - 2 units |
| 5. Chain hoists | - 10-15 units |
| 6. Pumps - E-1 condition | - 6-8 units |
| 7. Generators - E-1 condition | - 8-10 units |
| 8. Dozer-D7 Caterpillar E-1 condition (only to be procured as back-up equipment availability/condition exceptional). | - 2 units |

Prior to the issuance of a Disbursing Authorization by USAID/S, the T.A. Contractor will review the equipment list, inspect the equipment and determine that spare parts are available. A condition inspection report will be provided USAID/S prior to shipment of any excess property equipment from the AID storage facility.

All spare parts required for E.P. equipment will be obtained, on a proform procedure from one of the following three firms:

1. Global Expediting and Marketing Co. P. O. Box 611, Avondale Estate, Ga. 30002.

2. Southeast Service and Supply Corp., 5820 Jimmy Carter Blvd., N.W. Norcross, Ga. 30071.

3. Southeastern Equipment Co., 2950 Old Savannah Rd, P. O. Box 5438, Augusta, Ga. 30906.

The estimated cost of excess property is \$1,000,000.

The T.A. contractor will be responsible for coordinating with SER/COM/GPR the shipment of this equipment from the AID storage facility to the consolidating or holding point at the U.S. Port of embarkation. The T.A. Contractor will pick-up the equipment at this point and arrange for shipment to the Sudan project site.

b. Petroleum, Oil and Lubricants (POL)

POL will be procured by USAID/S with assistance from REDSO/ESA and the T.A. contractor. USAID/S will prepare an IFB for implementation through C.B.D. advertising in the U.S. for Code 941 suppliers response. The notice will also be advertised in Kenya.

The T.A. contractor will receive bid responses, analyze bids and recommend a supplier for USAID/S approval. A direct contract for fuel procurement will be signed between USAID/S and the supplier. Delivery to the project site will be the responsibility of the supplier.

The T.A. contractor will assume responsibility for receiving POL shipments at site and preparing payment documents. Payment will be made through a USAID-issued purchase order. Establishing the schedules of delivery and types and quantities of fuel, oils and lubricants to be purchased will be the responsibility of the T.A. contractor. The estimated cost of this component is \$2,000,000.

c. Vehicles (Code 899)

Two U.S. manufactured vehicles will be procured from a Code 899 source. A source waiver to allow this procurement will be included in the Project Authorization. The remaining vehicles will be procured from the U.S. The estimated cost of the two vehicles is \$48,000.

d. Caterpillar Component Exchange Program and Rehabilitation

This component of procurement will be initiated and implemented by the T.A. contractor after mobilization to site in February, 1984. A negotiated contract between USAID/S and Caterpillar Tractor Khartoum Sudan will be executed to include component exchange, component rebuild, spare parts service and Juba Site Maintenance Service. The local cost portion of this program will be paid by the T.A. contractor from the project trust fund; foreign exchange costs will be paid for through a Direct Letter of Commitment to Caterpillar.

The estimated cost of this component is: US \$400,000 (foreign exchange) US \$400,000 (local currency - trust fund).

e. Off-Shelf Procurement- Juba

This component of procurement has been partially identified by USAID/S at the time of Project Paper preparation and consists of Code 899 Origin equipment available off-shelf in Kenya. Examples of shelf items to be procured in Kenya include:

1. Concrete Mixers and Vibrators
2. Handtools
3. Portable Soil Compactors
4. Furniture and Office Equipment
5. Expendable Items, etc.

The T.A. contractor will be responsible for identifying suppliers for this procurement component; contracts will be directly between the supplier and either USAID/S or REDSO/ESA. The estimated total project costs for this procurement over the six year life of the project is \$600,000 which exceeds the shelf waiver per AFR/DR Notice Number 81-13 dated September 30, 1981, for "Procurement Waiver for Shelf Items". A special waiver will be requested to cover the above amount during August 1983.

f. Off-shelf Construction Materials from Kenya

Construction materials will be procured in the same manner as the equipment in Section e. above.

Construction materials will consist of:

1. Cement
2. Reinforcing Steel
3. Lumber
4. Nails, Hardware
5. Fencing, etc.

The estimated cost of this component is US \$600,000.

g. Handtools - Sudan

Handtools will be procured in limited quantities in th Sudan.

The T.A. contractor will identify tools available in Sudan and request quotations. The tools will consist of the following items:

1. Shovels
2. Grass Cutting Tools
3. Rakes, Picks, etc.

Tools will be purchased using local currency from the project Trust Fund. The estimated amount of the procurement is \$50,000.

h. Inland Transportation Costs

This service, for the clearance and transport of all project commodities, from Mombasa Port, Kenya to the Juba or Torit project sites in the Sudan will be performed by an AID Geographic Code 899 Nationality firm operating in Kenya (per Nationality Waiver approved in the Project Authorization). Contract negotiations will be held between USAID/S and the freight company resulting in a direct USAID contract. The firm will be selected on a competitive basis. The estimated cost of this component is US \$661,000. Payments will be made through the Direct Letter of Commitment opened for freight services with the T.A. contractor authorized to instruct the Bank to open a Letter of Credit in favor of the transport/freight forwarding firm.

i. Shipping Costs: U.S. Port of Entry

The T.A. contractor will be responsible for scheduling and arranging all commodity shipments from the U.S. to the port of entry (Mombasa or Port Sudan), except for the shipment of Caterpillar construction equipment and certain other large equipment items. The T.A. contractor will consolidate and containerize all items applicable to this shipment mode.

Shipping costs will be paid on the basis of actual costs with the T.A. contractor authorizing Letters of Credit to the shipping firms from the Bank L/Comm established by AID for this purpose. The estimated cost of this component is U.S. \$860,000.

j. Procurement Service Costs

Procurement service costs are identified in the PIO/T T.A. contract. Payment for procurement services will be included with in the Direct L/Comm for payment of the T.A. services under this scope of work. These services will be identified in the contractor's monthly statement, approved by USAID/S with payment to the contractor initiated by USAID/S. The estimated cost of this component is US \$365,000.

k. Local Construction Contract Services

Local construction contract services for the construction of buildings, minor drainage structures, road maintenance labor, local transportation, etc. by local Sudanese contractors will be paid from the local currency Project Account. Contracts will be executed between the GOS and the contractors. The T.A. contractor will help administer these contracts and approve periodic payments to the contractors. The estimated cost of this component is \$1.0 million (LS 1.3 million).

3. Project Procurement Events

<u>No.</u>	<u>Activity</u>	<u>Date</u>
1	RFP for TA contract prepared	July 1983
2	RFP reviewed by AID/W and REDSO/ESA	July/Aug. 1983
3	Two project vehicles procured	Oct. 1983
4	Draft IFB for equipment prepared	Aug.-Dec. 1983
5	Caterpillar equipment ordered	Nov. 1983
6	TA contractor reviews IFB package	Dec. 1983
7	TA contract signed	Jan. 1984
8	Letters of Commitment for TA contract, equipment procurement and freight services opened	Feb.-May, 1984
9	CBD notice placed for equipment procurement	Feb. 1984
10	Closing date for receipt of bids (IFBs available from TA contractors)	April 1984

11	Bid analysis	April-June 1984
12	Awards to equipment suppliers	June 1984
13	Shelf-item equipment identified/ orders placed	Aug.-Sept. 1984
14	Caterpillar equipment arrives in Juba	Aug.-Dec. 1984
15	a. First tranche of equipment to U.S. port (non-AT)	Nov. 1984
	b. First tranche of equipment to Mombasa or Port Sudan	Dec. 1984
	c. First tranche of equipment to project site	Feb. 1985
16	All major equipment and U.S. source support/ small equipment items at project site	April 1985

Excess Property Procurement Schedule

1	Equipment list prepared and forwarded to AID/SER/COM/GPR	Aug.-Sept. 1983
2	GPR search	Oct-Nov. 1983
3	Excess property list provided to T.A. contractor for review	Jan. 1984
4	Final equipment list approved	Jan. 1984
5	USAID/S requests issuance of Disbursing Authorization (DA) for rehabilitation of equipment, certification 607(c)	Feb. 1984
6	Excess property rehabilitated and collected at AID storage area	Feb.-Aug. 1984
7	T.A. contractor inspects all excess property units, spare parts package and determines spare parts availability	June-Aug. 1984
8	Equipment shipped	Oct-Dec. 1984
9	Equipment at project site	Jan. 1985

Petroleum, Oil and Lubricants (POL) Procurement

1	Fuel ordered for first two project vehicles	Nov. 1983
2	Fuel requirements estimated and draft IFB prepared by USAID for Code 941 procurement	March 1984
3	Advertisement	April 1984
4	Closing date for bids	June 1984
5	Bid evaluation	July 1984
6	Bid award/contract signed	Aug. 1984
7	First fuel shipment to Sudan - storage site and bulk tanks available at Juba-Project Headquarters	Sept. 1984
8	Major fuel shipment - storage sites established at Torit, Mundri and Rumbek	Nov. 1984

SUDAN

Khartoum •

Upper Nile

Jonglei

Wau

Rumbek

Juba

Yambio

Yei

Eastern Equatoria

Lakes

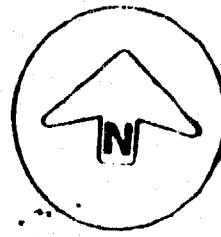
Western Equatoria

SOUTHERN REGION PROVINCES

Bahr el Jebel

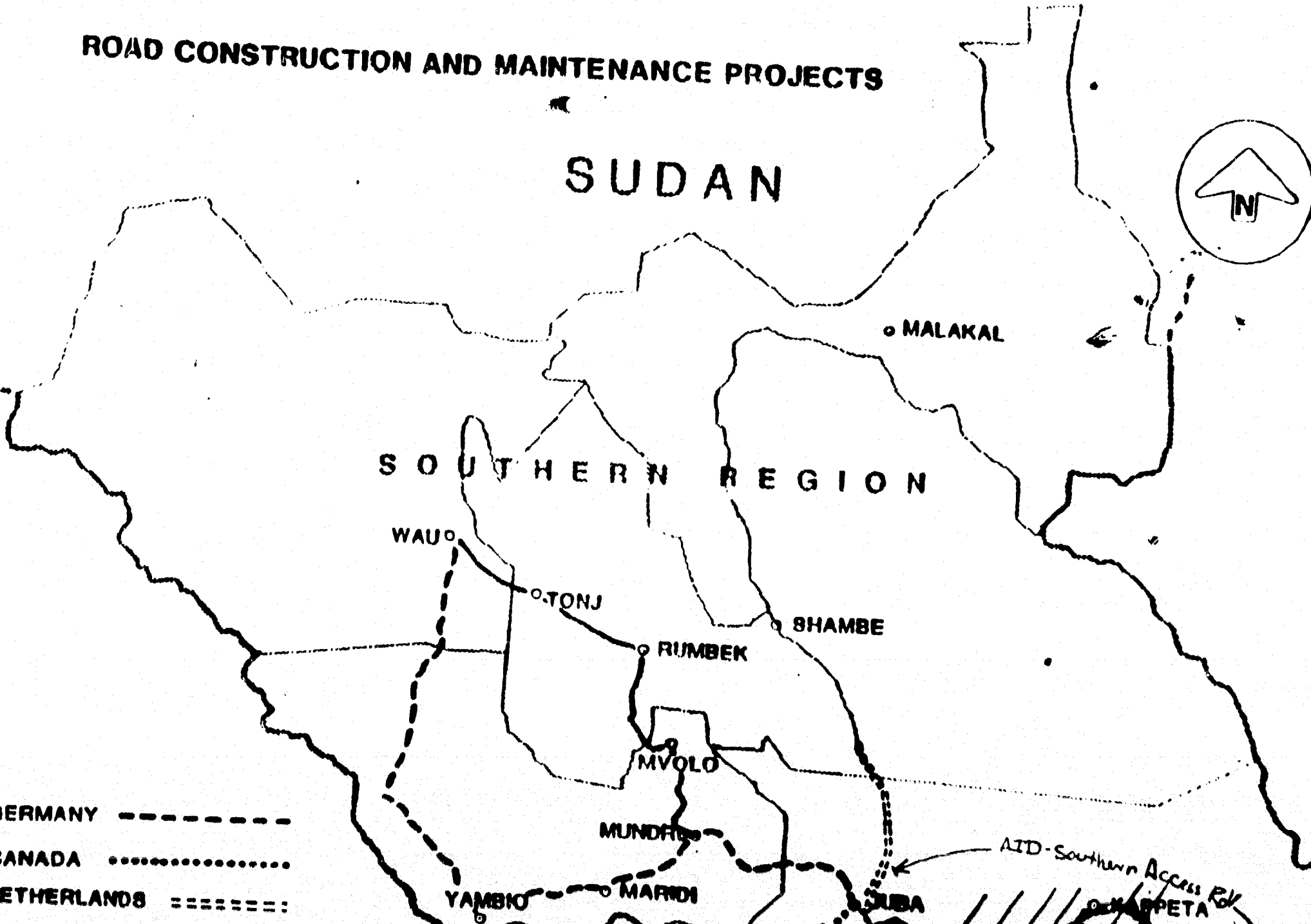
ROAD CONSTRUCTION AND MAINTENANCE PROJECTS

SUDAN

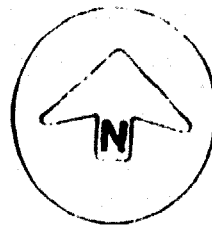


SOUTHERN REGION

- GERMANY - - - - -
- CANADA
- NETHERLANDS = = = = =



SUDAN



SOUTHERN REGION

MALAKAL

WAU

TONJ

SHAMBE

RUMBEK

BOR

MVOLO

MUNDRI

YAMBIO

MARIDI

JUBA

KAPOETA

TORIT

YEI

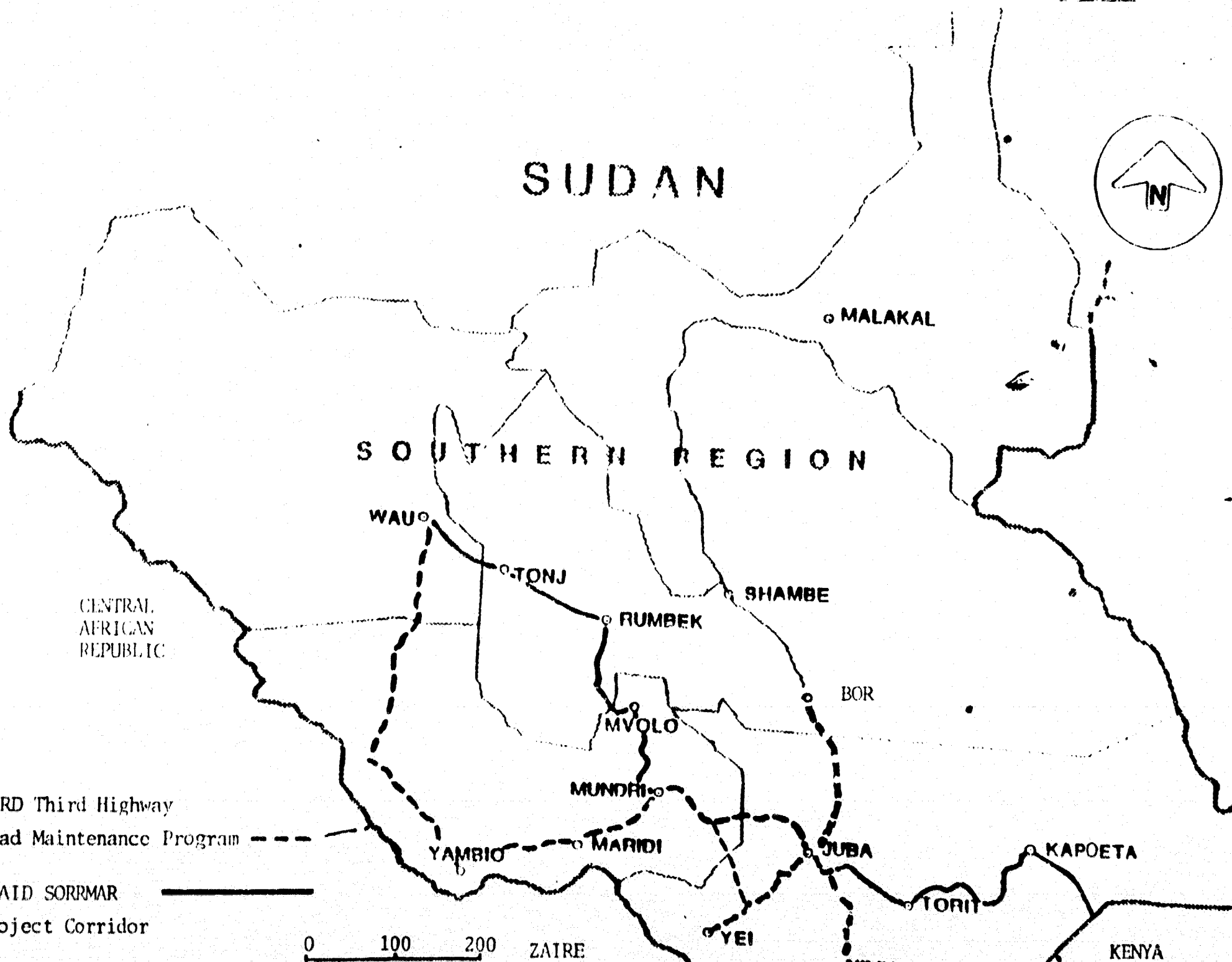
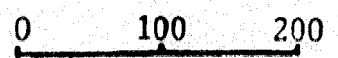
CENTRAL AFRICAN REPUBLIC

ZAIRE

KENYA

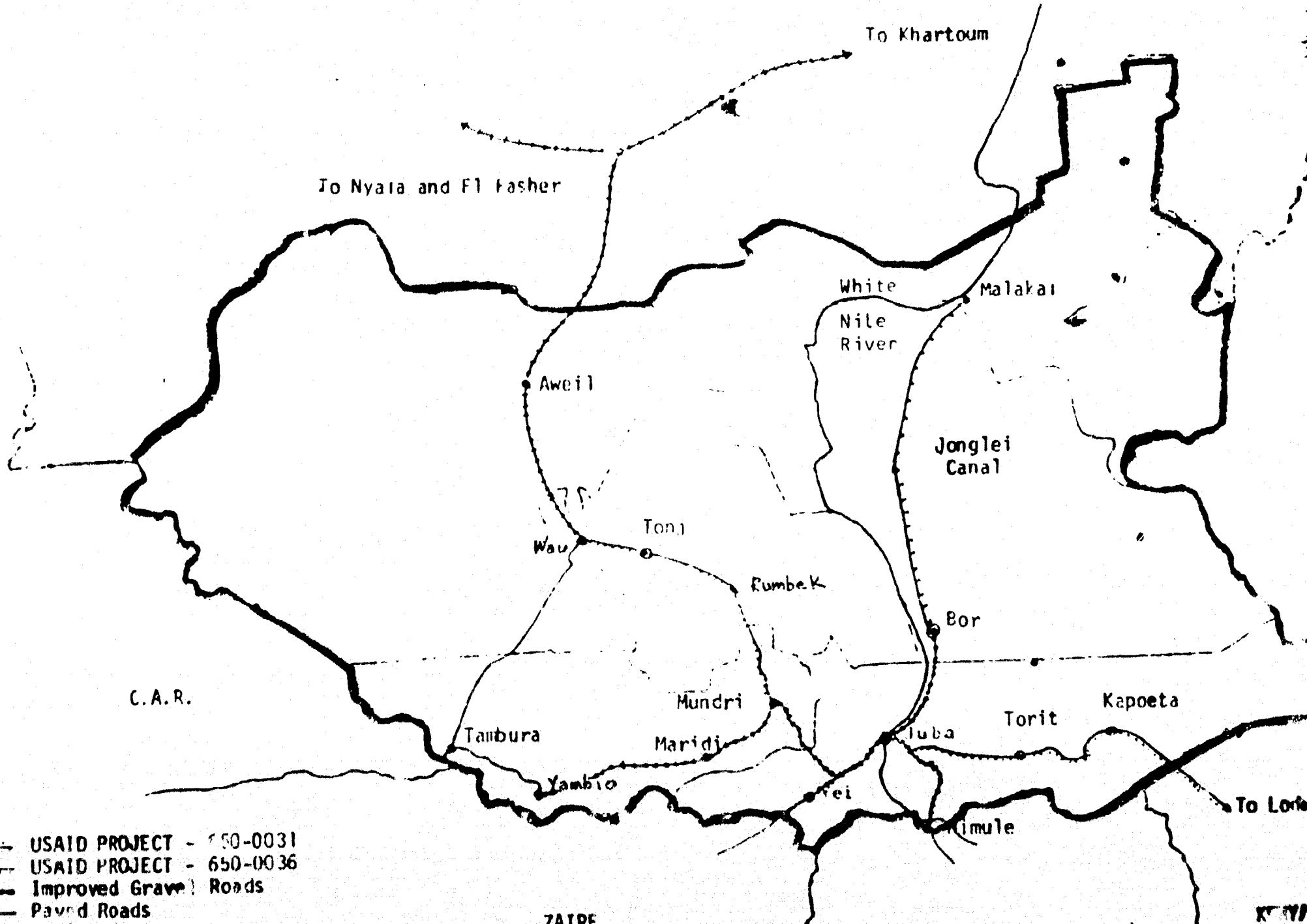
IBRD Third Highway
Road Maintenance Program

USAID SORPMAR
Project Corridor



SOUTHERN REGION TRANSPORTATION NETWORK

J-4



C.A.R.

To Khartoum

To Nyala and F1 Fasher

White Nile River

Jonglei Canal

Aweil

Malakal

Tona

Wau

Rumbek

Bor

Mundri

Tambura

Maridi

Torit

Kapoeta

Yambio

Luba

To Loka

Fei

Simule

- USAID PROJECT - 650-0031
- USAID PROJECT - 650-0036
- Improved Gravel Roads
- Paved Roads
- Road

ZAIRE

KENYA

Technical Analysis Supplement

1. Description of Current Conditions on Roads to be Rehabilitated

a. Juba-Torit

The 8.5 meter wide drainage structures being built under the Southern Access Road provide major culverts, and bridges to allow rainy season accessibility over this 135km section. However, the road itself has deteriorated to such a degree that rehabilitation followed by routine maintenance is required to bring the road up to a serviceable standard. The road is heavily corrugated for 85-90 percent of its 137 kilometers and overall can be classified as in poor condition. The width of the useable travelway averages 6 meters. The terrain can be classified as generally flat with a section near Liria in the foothills of the Liria Mountains. The soils found between Juba and Torit vary from black to brown sandy clayey soils to red lateritic gravel.

b. Torit-Kapoeta

This section (140kms) on the whole, is in fair to poor condition. The improved condition of this section is attributable to the minor maintenance completed by the Southern Access Road contractor during daily contract operations in the area. From Torit to the Kidepo Plain (60kms) the soils are mainly sandy clays and lateritic gravels. The average width is 5 meters. Little to no gravelling by the DRB was done during the last few years. The contractor, under the Southern Access Road Project, has constructed diversion roads connecting the new drainage structures with the old road alignment. The new structures, in most cases, have been built parallel to existing but deteriorated drainage structures. Within this section, 32kms of road with a new alignment has been built. The alignment shortens the old road by 25kms. Under the scheme proposed for the Southern Access Road a 125 meter drift to cross the Thingaita River at Kapoeta was constructed. All of the major drainage structures for this section will have been built by the completion of the Southern Access Road Project. The newly completed 7.0 meter wide structures are a higher standard than those proposed for construction under this project. The rationale behind reducing the standard for the new structures is: 1) the major drainage structures already built are well suited for the eventual road upgrading process that will occur on this section as economic justification increases and; 2) as traffic and area benefits increase the lower standard structures will be upgraded to eventually with time and financial resources result in uniform standard consistent with the major structures. The soils along the road from the end of the Kidepo Plain to Kapoeta (48kms) are brown to black sandy silt and clay. About 40 percent of the soils along the roadway are expansive or black cotton soils. The characteristics of these soils and the flatness of the land make effective road construction techniques more costly than in other sections. In this section

are also numerous small seasonal rivers and streams that will require new drainage solutions to replace deteriorated structures.

c. Mundri-Rumbek

The first 40kms of road from Mundri to Rumbek were partially rehabilitated last year by the DRB. The entire 235kms will require light to heavy grading to improve the standard to a level that will allow minimally acceptable access to the northern regions. Based on a recent economic evaluation, extensive upgrading on this section is not justified. The road will however be maintained to a level that will provide efficient dry season access. The soils along this section of road vary from red and brown lateritic gravels to yellow and grey sandy clays and present no obstacle to the level of improvement envisioned for this stretch.

d. Rumbek-Tonj

The first 50kms out of Rumbek are classified as in poor condition. On the average the road width from Rumbek to Tonj is 6 meters. The soils vary from grey and brown sandy clays to light yellow clay. Regravelling and occasional sub-base reconstruction is required. Suitable quantities and qualities of road building materials are found along the route.

For the next 40 to 50kms the road is classified as poor to very poor condition. During the rainy season this section, being very flat and a catchment area for surface runoff becomes a highway of ruts, mud and water. Little to no maintenance has occurred during the last few years. The prevalence of tsetse flies in this area helps explain the condition of the road and absence of human activity. The soils found in this section are sandy clays. Significant gravelling and sub-base road reconstruction is required.

The remaining 25kms of the total 124kms to Tonj cross a torc or flood plain area. This section contains three major drainage structures. The private sector construction activity will be utilized to rehabilitate the bridges to an acceptable standard. The existing road base constructed through the torc requires spot rehabilitation. Suitable construction materials are found on both sides of the torc and will require one way haulage of 15kms or less.

e. Tonj-Wau

The 97kms from Tonj to Wau are classified as poor to fair condition. A significant feature of this section is the iron stone hills. The abundant rock outcroppings result in a rough but dependable route. Significant rehabilitation and regravelling are required.

2. Description of Sub-Regional Workshop Facilities

Presently, the road equipment maintenance facilities in Mundri, Torit and Rumbek are sparse. The Norwegian Church Aid (NCA) feeder road and maintenance program has been working with Eastern Equatoria Province to establish a provincial workshop in Torit. AID will coordinate with NCA's effort to establish this facility. The development of workshop facilities in Torit as well as Mundri and Rumbek are viewed in much the same way as is the project standard for road maintenance and rehabilitation. As the numbers of skilled personnel, amount of traffic and levels of financial resources and economic productivity increase the support facilities, such as sub-regional workshops, will be upgraded. However, as a starting point, the workshops will be modest with limited repair capabilities. For major overhauls or extensive rebuild of components the central workshop facility in Juba will be utilized.

Each sub-regional workshop area will consist of a fenced compound, equipment storage area, workshop and materials storage facility. During the life of the project each compound will develop a permanent source of water to increase its capability. The approximate 45m² workshop will consist of two to three open work bays under a shed type shelter. Facilities will exist to store minimal spare parts, tools, cement and other construction materials requiring security and protection from the elements. In Torit and Rumbek a small area in the proximity of the compound will be developed for casting concrete pipe sections for drainage structures.

There are no developed workshop facilities in Mundri and a sub-regional headquarters will be established to allow coordination of maintenance operations west toward Yambio and to the north toward Rumbek.

Under the Southern Rural Infrastructure Phase I Project a workshop facility area was designated in Rumbek. This project will utilize that area with a simplified approach to the workshop facility.

A workshop facility in Maridi developed by the West Germans and is now under the control of the Regional Directorate of Roads and Bridges. This facility will be utilized for road maintenance activities. No additional financial support of the Maridi facility is planned under Phase I.

The TA Contractor will be mobilized in early 1984. Shortly thereafter one of the TCN construction supervisor technicians will finalize a construction schedule of the workshop and residential compound facilities. Torit, Mundri and Rumbek construction activities should be under way by September 1984. Facilities required to mount the initial road rehabilitation and maintenance efforts will be completed by April 1985.

3. Description of Sub-Regional Residential Compounds

In the outlying areas of southern Sudan housing and guest quarters are seldom available. For project staff assigned to Mundri, Torit and Rumbek residential compounds will be developed. Each sub-regional compound will consist of four to six residence toukals. Each toukal is built in an oval shape of stone or bricks with a thatched grass roof. The toukal is a traditional dwelling found in southern Sudan with many variations on style and building materials. Depending on the area and materials availability, the project toukals will be constructed with local bricks, concrete blocks or cut-stone for walls and foundations. Each toukal will contain approximately 130m² of living space with two bedrooms, living-dining area, kitchen and bath. The long stemmed coarse grass for thatching is found throughout the regions and as a roofing material provides insulation from the intense tropical heat. A well constructed thatched roof can be expected to endure five to eight years before replacement is necessary. Toukals built with adequate ventilation and thatched roofs remain relatively cool throughout the year.

The project staff living in toukals will find them both convenient and comfortable. Each compound will have a generator, fuel storage facility and an adequate water supply. Several additional smaller toukals will be built for support staff. The compound will be fenced to provide additional security. See Annex K for typical sketch of sub-regional residential compounds.

4. Description of Maintenance Camps on Roads Maintained by GOS and TA Team

Maintenance camps will be established for maintenance operations on the Juba-Torit-Kapoeta, Juba-Mundri-Maridi-Yambio and Rumbek-Tonj roads. The work crews will operate out of Juba, Torit, Mundri and Rumbek. These crews will be the same personnel associated with the mechanized equipment spreads. Given the distance between major populated centers small intermediate lodging and storage sites will be developed approximately every 40kms. These modest overnighting accommodations will be similar to the road labor camps. The dwellings will be traditional toukals with thatch fencing for security. The laborers, operators, and drivers are able to effectively establish their own system for food preparation and camp chores. The GOS project counterparts will establish a system to insure a continued supply of basic food stuffs for the maintenance personnel.

5. Description of Labor-Intensive Road Camps

The present road maintenance modis operandi by the Southern Regions is focused on the utilization of road labor camps every 10kms. At each camp are eight to ten men. A head supervisor may oversee up to twelve of these camps. The supervisor ideally visits all camps by bicycle every two weeks to inspect each camp's activities. Each camp is to be equipped with six to seven shovels and three to four picks. However, observation of many road labor camps indicate handtools are few to nonexistent, the laborers tend to be occupied with other wage earning activities and little labor intensive road maintenance is occurring.

The Southern Regions Ministries of Works and Communications believe the 10 kilometer approach will work with additional handtools and some mechanized equipment. It has been determined to mount a modest GOS effort using the traditional 10 kilometers road labor camp approach. This effort will be limited to the Juba-Yei (219kms) and Juba-Nimule (187kms) roads.

The sections between Juba-Torit-Kapoeta, Rumbek-Tonj and Juba-Mundri-Maridi-Yambio will be managed with a modification to the traditional approach. Handtools will be provided to one out of four existing 10 kilometer work camps. Project personnel will not be assigned to directly supervise these laborers activities. The labor-intensive maintenance workforce will be supported as much as practical by project personnel and the equipment spreads. This approach is demonstrational to see the effectiveness or ineffectiveness in limiting inputs and providing some mechanized equipment support. The two year evaluation should indicate the level of effectiveness of this approach and justification for continuation.

6. Description of Juba Maintenance Center

There are presently 472 personnel working at the Juba Maintenance Center. Only 105 of these personnel will be directly associated with the project. The present physical operation consists of numerous open work bays, small workshops and minimal office accommodations. The facilities are to a large degree in-operational due to irregular power and water supplies and lack of diesel fuel and standby generators. The level of productivity is low due to the above reasons and lack of spare parts and ineffective management of personnel. Equipment is routinely cannibalized for spare parts when minor equipment failures have sidelined a particular piece. The

result is often cannibalization to the point the piece of equipment will never again be operable.

A U.S. shop foreman and warehouse/spare parts man (TCN) will be assigned to work in the Juba Maintenance Center. Through the regional chief mechanical engineer counterpart the project TA staff will assist in planning and implementing shop operations for equipment rehabilitation, repair and maintenance.

Under the IBRD Second Highway Project a master mechanic and spare parts man are working in the existing Maintenance Center. The AID funded TA personnel will be in place to coordinate with the IBRD's team departure in 1984.

The ongoing IBRD project is funding the construction of a new workshop facility at the Juba Maintenance Center. To date limited progress has been made in advancing the activity. AID is optimistic the 1,300m² workshop, storage and office facilities will be completed before the IBRD Highway II project is completed.

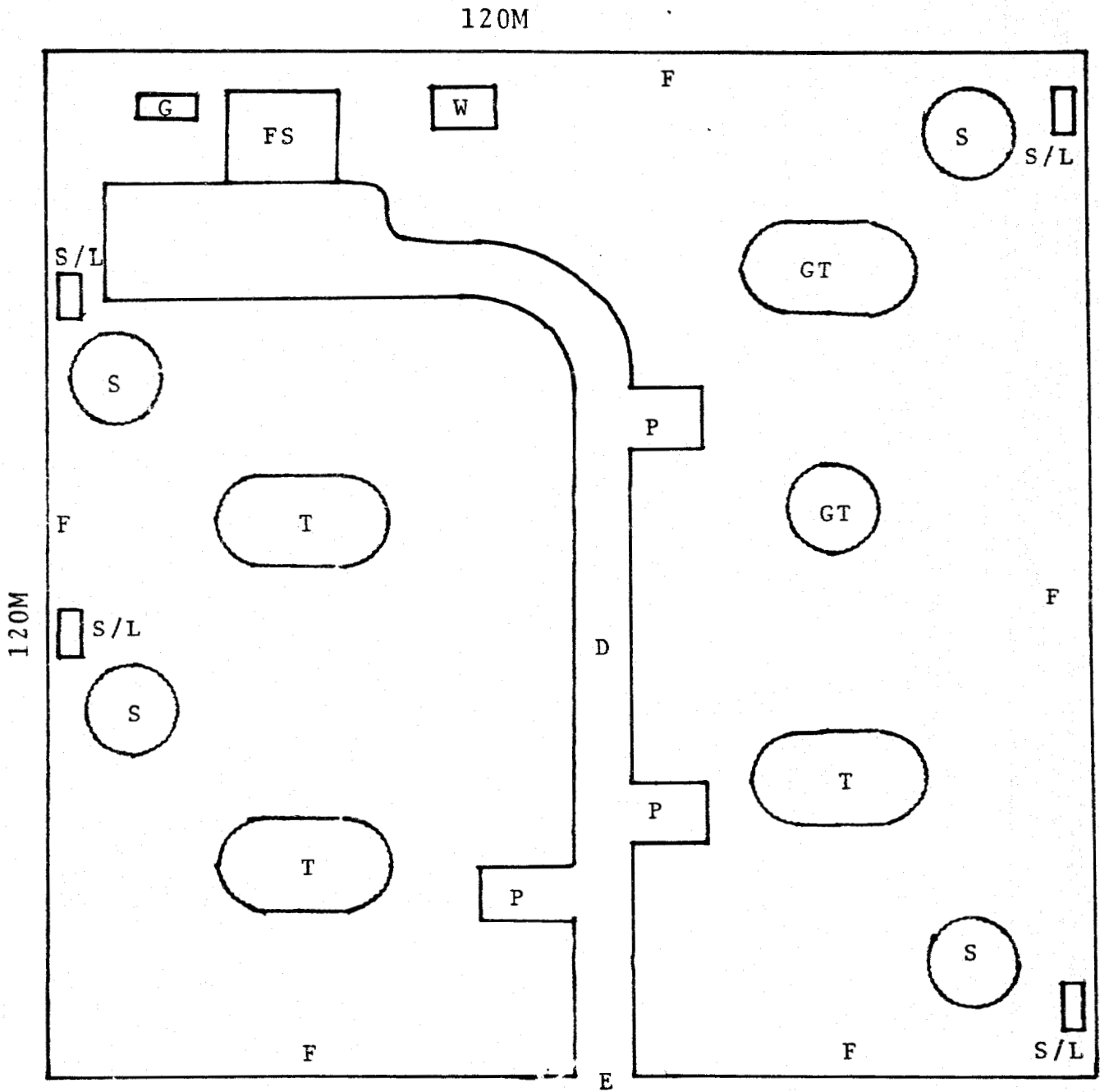
7. Description of Juba Project Staff Housing

The TA contractor will be responsible for overseeing the construction of four T2 residences for some of the project staff residing in Juba. Each 100M² T2 residence will consist of 2 bedrooms, dining-living room, kitchen, verandah and bath. The T2 house proposed for this project has already been designed and utilized in Juba by AID on previous projects and therefore will not require significant modification. The Third Country National (TCN) staff residing in Juba will live in rented housing.

Typical Sub-Regional Residence Compound

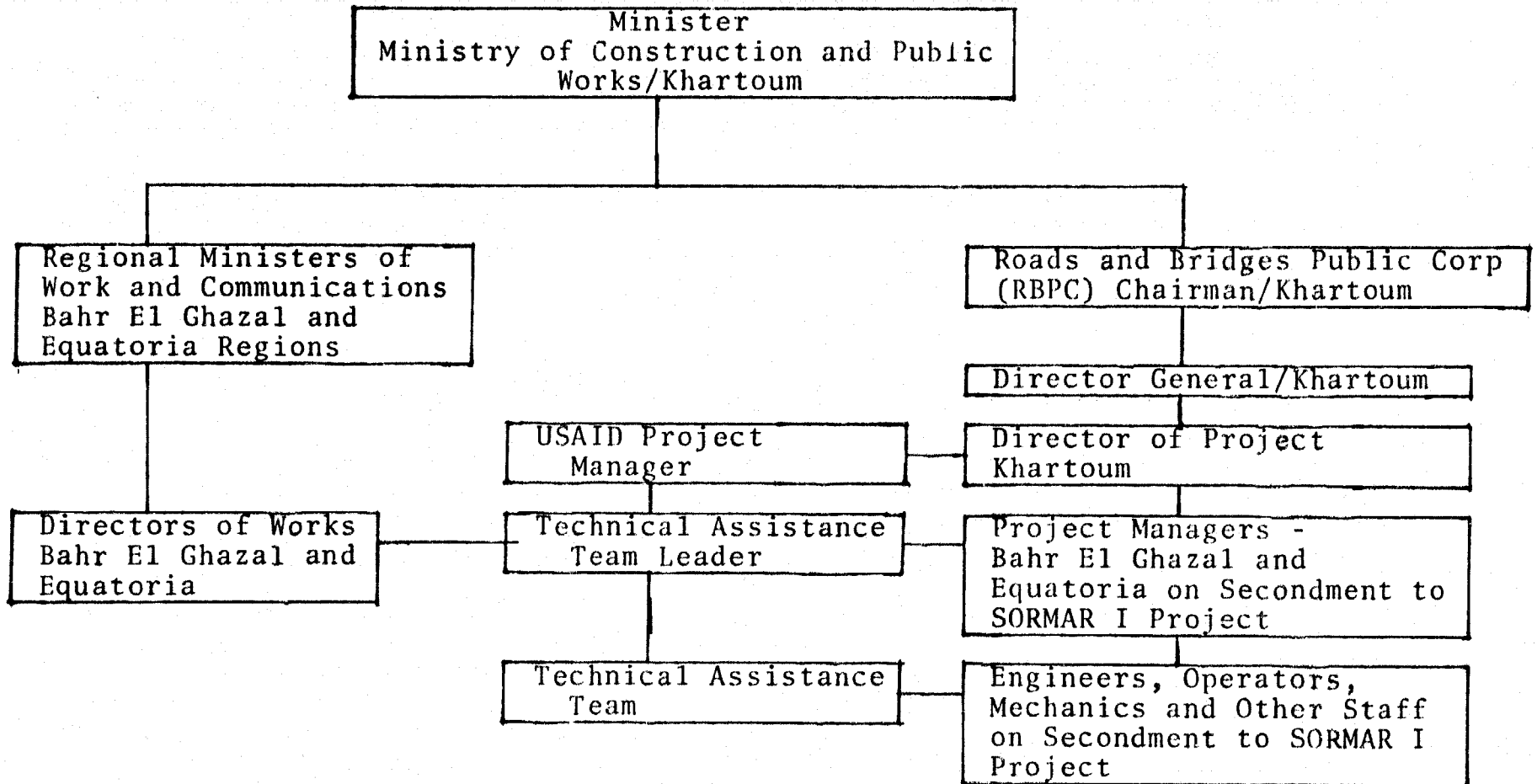
- T Resident Toukal
- GT Guest Toukal
- FS Fuel Storage
- G Generator
- W Water Supply and Tank
- S Compound Staff Toukals

- S/L Staff Shower and Latrine
- E Entrance
- D Compound Driveway
- P Parking
- F Compound Fence



ANNEX L

SORMAR I - PROJECT ORGANIZATION CHART



Economic Reappraisal of the Wau-Rumbek-Mundri Road

Louis Berger International, Inc.

December 1982

Available from USAID/Sudan - Project Operations

OR

AID/W from AFR/PD/EAP

Sudan Southern Access Road Economic Reappraisal

Louis Berger International, Inc. March 1983

Available from USAID/Sudan Project Operations

OR

AID/W from AFR/PD/EAP

ECONOMIC ANALYSIS

The IRRs for each road link and combinations of links, with and without sunk cost, are shown in Table 1.

A. Wau-Mundri Corridor

Rehabilitation of the road section Wau-Rumbek should have high priority. It serves to link the commercial center and railhead at Wau with Rumbek District, an area with relatively high population density and agricultural activity. The length of this road is 221 km, and the range of IRR is 11.5-17.5%.

Rehabilitation of the link Tonj-Rumbek has the highest IRR range, about 16-23%, whereas the Tonj-Wau link has a low IRR. The attribution of benefits to these two links separately however, is somewhat misleading. Although the Tonj-Rumbek link serves the area of highest economic activity, good access to Wau is essential to achieving the postulated benefits.

Rehabilitation of the road links, Rumbek-Mvolo and Mvolo-Mundri, alone are not justified. These links serve areas with relatively low population density and poor agricultural potential. The main rationale for rehabilitation would be to complete a road system, linking Wau and points north with Juba and points south and east.

Construction of the entire road length of Wau-Mundri, by 1988, would exceed the resources available under this project. However, the possibility of completing the road rehabilitation at a later date should not be dismissed. Although the links between Rumbek-Mundri alone cannot be justified, they may be after rehabilitation of Rumbek-Wau links. This follows from the assumption that through traffic (i.e., traffic with origins/destinations Wau, Juba and points beyond) would select the Wau-Mundri route, once rehabilitated over its entire length, in preference to the longer routing via Yambio, a route now under reconstruction. With benefits to diverted traffic added to the analysis, the IRR range for rehabilitation of the entire road are similar to that for the Wau-Rumbek section alone, namely 11-18%.

B. Southern Access Road Corridor

Rehabilitation of the road sections Juba-Torit and Torit-Kapoeta should have high priority. When analyzed as marginal cost, rehabilitation of Juba-Torit has a very high IRR (31-58%) and Torit-Kapoeta is lower but still very feasible (15-25%). When sunk costs are added to marginal

rehabilitation costs, the IRRs for both sections are more similar, 11-13% and 10.0 - 11.5% respectively. These computations do not assume any improvements on the Kopoeta to Kenya border link.

That link, Lokichokio-Kapoeta, has a low IRR range (about 4-11%). This section is not included in the Wimpey contract, and therefore has no sunk investment. Additional traffic which might divert from the present Sudan-Uganda-Kenya route has not been included in this analysis. Even after the proposed level of rehabilitation on the Southern Access Road, the Uganda route would remain the shorter and better surfaced route. Therefore, the diversion to the Southern Access Route would increase rather than decrease total vehicle operating costs. Diversions, which might occur, would be motivated by transporters' judgement that the risks of transiting through Uganda were sufficiently serious to warrant rerouting despite higher total vehicle operating costs.

C. Summary Recommendation

As shown on Table 2, the three links which have the highest IRR's total 374 kms and can be rehabilitated for a cost ranging between \$11 - 20 million. If the combination of total funding and average cost per km permits, the Wau-Tonj link should also be rehabilitated in whole or at least in spots where flooding normally occurs.

**Table 1
EVALUATION SUMMARY**

Assumption:		IRR					
		W/O SUNK COST			W/SUNK COSTS		
Rehab cost/km (\$000)'s		30	40	50	30	40	50
<u>Link</u>	<u>Length (kms)</u>						
Lokichokro/ Kapoeta	123 ^{1/}	10.7	7.1	3.9	N/A	N/A	N/A
Kapoeta/Torit	140 ^{2/}	24.4	17.7	15.0	11.5	10.8	10.1
Torit/Juba	135	58.2	36.1	30.8	12.9	11.7	11.1
Wau/Tonj	97	7.8	2.8	-0.1	see note		
Tonj/Rumbek	124	22.3	19.0	15.9			
Rumbeck/Mvolo	122	5.6	-1.3	-4.1			
Mvolo/Mundri	113	1.0	-4.2	-7.3			
Wau/Rumbek	221	17.5	14.0	11.5			
Wau/Mundri	457	18.2	14.0	11.1			

Note: If the approximately \$3 million spent for detailed engineering services were included for the Wau-Mundri road, IRR's for its road links would be 2-3% lower.

^{1/} Link length after Kidepo Plain realignment

^{2/} Correction from 152 km shown in LBI report, March 1983

Table 2
SUGGESTED IMPROVEMENT PLAN

<u>LINKS</u>	<u>LENGTH (kms)</u>	<u>COST (\$MILLION)</u>		
		<u>\$30K/KM</u>	<u>\$10K/KM</u>	<u>\$50K/KM</u>
Rumbek/Tonj	124	3.7	4.9	6.6
Juba/Torit	135	4.1	5.4	7.2
Torit/Kapoeta	115 ^{1/}	3.5	4.6	6.1
Min. Total	<u>374</u>	<u>11.3</u>	<u>14.9</u>	<u>19.9</u>
Wau/Tonj	9.7	2.9	3.9	5.1
Max. Total	<u>471</u>	<u>14.2</u>	<u>18.8</u>	<u>25.0</u>

1/ Length remaining to be rehabilitated after Kidepo Plain realignment.

**LINK EVALUATION
JUBA-TORIT**

	<u>BENEFITS (\$000)</u>			<u>COSTS (\$000)</u>			<u>NET BENEFITS(\$000)</u>		
	<u>Devel.</u>	<u>VOC</u>	<u>Total</u>	<u>30/km</u>	<u>40/km</u>	<u>50/km</u>	<u>30/km</u>	<u>40/km</u>	<u>50/km</u>
1983 1/				14,500	14,500	14,500	(14,500)	(14,500)	(14,500)
1984				1,650	2,200	2,925	(1,650)	(2,200)	(2,925)
1985				600	800	1,000	(600)	(500)	(1,000)
1986				600	800	1,000	(600)	(500)	(1,000)
1987	180	1,560	1,740	800	1,000	1,200	940	740	540
1988	250	1,750	2,000	800	1,000	1,200	1,200	1,000	800
1989	360	1,960	2,320	200	200	200	2,120	same as for 30k/km	
1990	600	2,190	2,790	(constant 1989-2001)			2,590		
1991	700	2,460	3,160				2,960		
1992	800	2,750	3,550				3,350		
1993	900	3,080	3,980				3,780		
1994	1,200	3,450	4,650				4,450		
1995	1,350	3,865	5,215				5,015		
1996	1,470	4,330	5,800				5,600		
1997	1,650	4,850	6,500				6,300		
1998	1,850	5,430	7,280				7,080		
1999	2,000	6,080	8,080				7,080		
2000	2,180	6,810	8,990				7,880		
2001	2,310	7,630	9,940				9,740		

w/o sunk costs:	NPV @ 15% = 11,519	9,631	8,540
	IRR = 58.2	36.1	30.8
w/sunk costs:	NPV @ 15% = (2,980)	(4,870)	(5,995)
	IRR = 12.9	11.7	11.1

1/ Values for sunk investment cost. These are deleted from discounted cash flow analysis to obtain IRR w/o sunk costs.

ANALYTIC ASSUMPTIONS

A. Rehabilitation Costs

We have assumed that approximately 40% occur in 1984, for mobilization of equipment and other resources, and that the remaining expenditures for rehabilitation works are spread evenly over the subsequent four years. This accords approximately with the expenditure and work schedule estimates contained in the PID. Maintenance expenditures would begin during the third year of rehabilitation work and would have to be fully budgeted at about \$1,500 /km/yr. commencing in 1989.

B. Benefits

1. Wau-Mundri Road

The values for benefits are those contained in the Consultants' earlier report, Economic Reevaluation of the Wau-Rumbek-Mundri Road. For separate analysis of road sections, only road user benefits from existing and generated traffic are included. Benefits from increases in agricultural yield and livestock off-take have been allocated 90% to the Wau-Rumbek section, 75% of which occurs between Rumbek-Tonj. This is considered a reasonable estimate, justified by the settlement patterns along the area of influence of the road corridor explained on p. 7-8 of the earlier report.

For analysis of rehabilitation of the entire 457 km road, road user benefits arising from diverted traffic are included. These values are therefore the same as those shown on Table 9 of the above referenced report.

2. Torit-Kapoeta

The benefits analysis for the Torit-Kapoeta section has been treated uniquely, because the works under contract (sunk costs) include replacement of about 55 kms of existing road, in poor or very poor condition, across the Kidepo Plain with a new alignment of approximately 25 kms. Therefore, the benefits created by reallignment (shortening distance and road improvement) must properly be credited to the sunk investment. Additional rehabilitation investments will generate benefits, therefore, only on the remaining 115 kms between Torit and Kapoeta. The latter are the marginal benefits and are added to the benefits from reallignment to obtain total benefits from investment inclusive of sunk costs. The total savings per vehicle for this link were recalculated as follows:

For 115 km yet to be rehabilitated:	L.S. 47.15
For 30 km distance shortened:	L.S. 10.25
For 25 km new Kidepo Plain alignment:	L.S. 27.50

Thirty percent of development benefits have been allocated to this road link. While the IRRs including, sunk costs, are lower than those with marginal costs, the differences for the two assumptions are less pronounced than for the Torit-Juba link, because benefits have been recalculated as explained above.

C. Sunk Costs

1. Wau-Mundri Road

One could argue that the costs incurred for final design of this road should be included in total costs when preparing an economic evaluation. In fact, these designs are probably of marginal value now that the design and construction concept has changed dramatically. Were these to be included, and be allocated to each section proportioned to road length, the IRRs would be reduced about 2 to 3% for each cost/km construction assumption.

2. South Access Road

The anticipated contract cost of Wimpey construction works for Sections D and E plus pro-rata engineering costs for the design and supervision is estimated at \$24 million (see LBI report, March 1983). For purposes of link analysis, these costs were assigned 61% (\$14.5 million) to Juba-Torit and 39% (\$9.5 million) to Torit-Kapoeta based on the estimates for drainage structures and temporary road works shown in Norconsult's Construction Progress Report Number 3.

D. Salvage Value

No residual or salvage value of construction works, after 15 years use, is included. This is appropriate for low-cost rehabilitation works which are not designed to withstand long-term use.

BALANCE OF PAYMENTS IMPACTS

The effect of this project on the national balance of payments should be inconsequential. Sudan's total value of imports and exports of goods and non-factor services is now running at about \$2 billion/yr. The subject project impact might involve a few million dollars.

The positive and negative project impacts may have a self-cancelling effect on net foreign exchange. Directly, the project will require the Government to purchase or allocate \$4 million in fuel/lubricants to operate SRG owned equipment over 5 to 6 years. This is additional to POL funded by AID donors and a substantial increment over present Government expenditures. POL must be imported. Improvement of the roads will at first reduce vehicle operating costs, which are mostly foreign exchange costs, by about \$ 3 million/year. However, the improved roads will gradually cause an increase in vehicle purchase and vehicle use which will, after 3 to 5 years, probably raise the total expenditure on vehicle transport up to or above that existing before road rehabilitation.

The additional agriculture and livestock development attributable, in part, to the road improvements will largely be used to alleviate food deficits in the project area, i.e., substitute for purchases from other parts of Sudan or food supplied by relief agencies. Surpluses will probably be sold to other parts of the Southern Region. None of the additional food is expected to be exported or serve as substitutes for purchased imported foodstuffs.

Social Soundness Analysis:

Southern Regional Road Maintenance and Rehabilitation
Project 1/

By

Jerry L. Weaver

U.S. Embassy, Khartoum

1. Background and Setting

The project is designed to increase agricultural production and incomes in the Southern Region (SR) of the Sudan by improving and preserving access on the Region's primary road system. Transport has been identified as a major constraint to the economic development of this potentially productive area. A number of factors including size, ecology, limited resources and socio-cultural practices and institutional weaknesses combine within the Region to attenuate road maintenance and rehabilitation.

The territory of the SR comprises one third of Sudan's total area and contains approximately 6 million of its 18 million people. Ecological systems with the Region range from near desert to tropical rain forest. The White Nile bisects the SR south to north and draws most of its down stream volume from the Sudd-a vast low-lying swampy area that is flooded for 6-8 months each year when it effectively cuts off land transport between the SR and the northern two-thirds of the country.

The ecological heterogeneity of the SR is matched by an equally diverse human population. While roughly 60% of the SR population combine agriculture with animal husbandry, the cultural practices and social institutions of this farmer/herder segment are sharply divided along tribal lines with distinctive languages, social organizations and economic practices readily apparent. The remaining 40% of the Region's population, who do not herd cattle, subsist mainly by agriculture; some tribes are almost entirely sedentary while others are semi-nomadic. Pastoralists are largely confined to the three northern provinces of the SR where their societies are based on cattle and dura. The non-pastoralist communities, generally found in the Equatorias, produce a wide range of both food and cash crops. Notable among the food crops are maize, rice, cassava, fruits and garden vegetables, groundnuts, millet, beans and sorghum. The cash crops include cotton, tobacco, oil nuts and sesame. Unlike the upper south where cattle and dura raising provide the common means for diverse communities, a much broader range of produce and agricultural practices is to be found in the lower south; this range extends from rudimentary subsistence farming east of the Nile to relatively complex farming systems which combine several food crops along with one, two or more cash crops.

When Sudan became independent in 1956, the SR produced both a net surplus of food and a variety of export commodities. Commerce flowed smoothly along the Nile as well as several of its major tributaries, and most of the

region south of the Sudd and west of the Nile was connected by an all-weather road network. Juba, Wau, Yambio, Malakal, Yei and Rumbek were important market centers harboring scores -- in the case of Juba, hundreds -- of merchants, transporters, traders and other commercial entrepreneurs. Plantation and small-scale commercial agriculture flourished in the Equatorias. Twenty-five years after independence, little of this physical and human infrastructure remains. A region which once was an exporter of food now must import basic foodstuffs such as dura from the north; districts which once exported food now suffer periodic shortages and, in some cases, severe deficiencies which reduce inhabitants to borderline malnutrition; areas which produced cotton and other cash crops have reverted to subsistence farming.

The principal cause of the decline of agriculture is the 17-year civil war which ravished the SR between 1955 and 1972. During this struggle, and especially after 1964, physical infrastructure was destroyed throughout the region. As many as 1.5 million southerners fled the conflict into neighboring countries, and most of the northern (i.e. Arab or "jellaba") and European traders, merchants and transporters who formed the bulk of the region's commercial sector left the south. Peace was restored and the semi-autonomous Southern Regional Government (SRG) was created in 1972. The physical and social dislocations occasioned by the fighting, however, were not so easily corrected. The sheer magnitude of destruction, especially of the road network, was beyond the financial capacity of the regional government to replace. At the same time, few of the entrepreneurs who had dominated the region's market system returned. The national regime which assumed power in Khartoum in 1969 adopted a program of nationalization and confiscation of private property. In the agricultural sector the national government promoted large-scale public and parastatal corporations, price controls and parity support, and collectivization of farming. These public policies effectively discouraged large-scale private investment in the south. Thus, at just the time when financing and human resources were critically needed to restore agriculture and commerce in the SR, the government offered only a multitude of disincentives.

The newly established SRG found the 1970s a period of inadequate and even declining resources: revenues languished, infrastructure deteriorated, population increased. Regional ministries were unable to meet personnel budgets and development funds were almost non-existent; expanding organizations recruited fewer and fewer appropriately trained staff; out-reach programs, such as agricultural extension, were hamstrung by lack of spare parts and fuel; scarce capital was invested in large mechanised agricultural schemes and in processing plants which almost uniformly failed to produce efficiently. The SRG was unable to secure financial relief from the national government whose treasury at the end of the decade had been emptied by the combination of its misguided development program, dysfunctional intervention in the economy, and a set of international economic fluctuations that resulted in increasing prices for imports and declining export earnings.

By the end of the 1970s, the national government had begun to take a series of steps to slow and reverse the nation's deteriorating economic condition. Notably, it began to return confiscated properties, to remove some of the disincentives to private enterprise and to reduce the public sector's role in agriculture. In the SR, this new policy was reflected in efforts to encourage small-

scale commercial private holdings while withdrawing from the large-scale mechanized projects previously favored. Today, international donors are asked to support such programs as the training of extension workers, construction of trunk and feeder roads, and improvement of the river/rail transport systems which, over the long run, will stimulate the latent agricultural capacity of this potentially very productive region. Nevertheless, the magnitude and scope of the task to rehabilitate the region is truly massive.

The socio-cultural diversity characteristic of the Region is reflected in the SRG. After ten years of rule by a Dinka-Nuer-Shilluk upper-South coalition, a government based on the Equatorians took office in July 1982. The new administration campaigned on a platform of accelerating decentralization and devolution of decision-making and resources to provincial and area-council governments. Many leaders of the new government advocate division of the South into three separate regions - a step they say is a logical extension of the creation of five new regional governments in the North during 1981.

Given the SRG chronic shortage of funds, limited technical and administrative personnel, and sharp differences of opinion about governance which follow tribal lines, there has been little progress to date on implementing decentralization. Whether termed decentralization or division, the issue of who will control what is a major item on the political agenda of the South. It calls attention to the dissatisfaction with the status quo felt by many Southerners and underlines the socio-cultural cleavages that remain a cardinal feature of southern society.

Any program of decentralization or regionalization has serious implications for the project. At best, devolution will create a demand for greater technical assistance and possibly equipment than the project presently foresees. Given the current limited staff and equipment of the SRMCTR, and especially the DRB, plus chronically short operating budgets, the creation of new quasi-ministries with its incumbent reallocation of resources would seriously overextend the Juba ministry's capacity, and would result in a major, although perhaps temporary, dislocation in the present project's implementation plan.

The political instability which has produced three Regional governments in as many years has been exacerbated by a growing security problem. Violence and lawlessness have increased over the past two or three years until currently they have reached significant proportions in several areas of the Region. The Wau-Bentiu-Bor-Malakal strip along the northern frontier has witnessed increased acts of violence of both an intertribal and paramilitary nature. The tribal fighting is mainly over pasture and water rights, and is traditional -- what is troubling, however, is the evolution from combat with spears to rifles and automatic weapons. Armed bands are operating in the area and have attacked Arab merchants, Cheron crews, and lorries. A recent mutiny by southern soldiers near Bor resulted in a number of mutineers fleeing to the bush with their weapons.

The area around the southern access road, especially between Torit and the Kenya border, has experienced a serious outbreak of intertribal fighting and a growing frequency of bandit holdups of lorries. The tribal violence, again over land and cattle, became so serious in April 1983 that the construction camps along the access road were temporarily closed. Both tribesmen and bandits (they are often the same individuals) are armed with modern weapons.

With passions running high over the redivision issue, the fighting and troop movements take on a more ominous character. As yet, no individual or party holds leadership or sets an ideological tone for the disparate malcontents. But unless sensitive and effective leadership arises from Juba and Khartoum, the separate and often local grievances which provoke and sustain lawlessness and violence could coalesce into a formidable security problem. The South may be entering a period of political and social disorder the direction of which might parallel the events of 1955-57 when governance broke down completely and the proffered military solution plunged the region into 17 years of civil strife.

2. Beneficiaries

Rehabilitation and maintenance efforts will benefit principally the commercial interests which presently use the road to move their commodities. Local and regional merchants and traders should realize lower transport costs and more timely deliveries; villages and towns presently cutoff by the collapse of roads during the wet season should be isolated less frequently. Transporters should realize considerable maintenance savings and longer useful lives for their vehicles which are now literally beaten to pieces after a year or two. Consumers should benefit from lower prices given the competitive nature of the Region's commercial trade sector; and farmers will have improved access to agricultural inputs. The combined effect of the project will produce a set of incentives that may increase marketable farm surpluses and farmers' incomes.

The 95-99% of the population who survive at the subsistence level will benefit from road improvements if (1) the regional government is successful in providing the human and financial resources to deliver agricultural extension, health, education and other social and productive services to the rural population; (2) agricultural pricing policies are changed to provide greater incentives to small producers; and (3) policy reforms and other incentive producing programs stimulate private sector activities in the agricultural sector. Agricultural productivity and the level of agri-business activity is currently constrained by a complex set of inter-relationships, among them: transport bottlenecks, lack of inputs and policy disincentives. USAID, in conjunction with other donors, is mounting a comprehensive approach to resolve these problems that includes: (1) assistance in developing and implementing policy reform measures; (2) marketing system improvements; (3) programs to improve budget planning and revenue collection; (4) farming systems research; (5) credit for rural enterprises; (6) expansion of the role of the private sector in processing agricultural products; and (7) strengthening extension systems to extend technologies that will increase small holder productivity.

In part because of social and economic dislocations accompanying the seventeen-year civil war in the Region, and in part because growing numbers of Southerners have migrated to urban areas to work in construction and have not wished to return to the bush, most of the region's towns and cities have expanded greatly since the 1972 peace treaty. This trend may reflect a lack of employment opportunities in rural areas. Improving income earning opportunities and living conditions in rural areas could conceivably slow, or even reverse, this trend.

To the extent that improved roads are used to sojourn in towns, or for reaching the labor-short areas of the North, rural women will bear a greater labor burden since they will have to take on the labors of the male. However, to the extent that improved roads lead to increased farm productivity and off-take, and greater access to health care, education and so forth, the proportional advantage to women will be greater since they are more deprived.

While it is arguable that direct social benefits from improved roads will be limited, improvement of transportation and communications will be of major significance in promoting the integration of the South. Increased commerce will help bring the diverse communities and isolated areas together; political leaders and administrators will be able to visit their constituents and vice versa. More frequent contacts and the intended increase in the flow of goods and services will help combat the ethnocentrism and particularism which undermine the collaboration and cooperation needed to build a viable regional society. Improved transport and communication will benefit the entire region by promoting economic, social and political integration.

3. Participation

The equipment-intensive nature of the project admits to limited local participation. Aside from the laborers attached to the maintenance camps, few rural families will participate directly in the project. An assessment made by the PID design team in the South showed that very difficult climate, small potential labor living along the road and resistance to laboring are deterrents to organizing effective labor intensive works. However, efforts will be made in the project to adopt labor intensive methods for routine road maintenance.

The project's institution-building orientation requires close participation of the SRMCTR, and especially the DRB. Meaningful collaboration necessitates a coherent policy structure and administrative organization capable of guiding, planning, controlling and implementing the SRG's participation. This, in turn, implies the availability of technical and administrative personnel and other supporting resources. A significant problem of the SRMCTR, pervasive elsewhere in the SRG, is an insufficient budget to meet its recurring personnel and commodity needs. This project's institution building efforts will improve the planning and managing capabilities at the SRMCTR and DRB senior staff levels. USAID, through the Regional Finance and Planning Project, and the UNDP are helping to address the budgetary problems that currently hamper the SRG's ability to finance its needs. This assistance will substantially improve the institutional capacity of the SRMCTR to participate in important decision-making and management matters.

4. Socio-Cultural Feasibility

From a narrow perspective, the project is socio-culturally feasible; that is, there is little or nothing about a capital - and equipment intensive activity that is unacceptable to local practices and institutions. People living along the roads which will be rehabilitated and maintained already have extensive interaction with exogenous practices and institutions: adaptative cultural evolution has been going on for a long time and there is nothing very traumatic or immediate likely to happen as a result of improving existing roads.

That achieving the purpose of the project (improving and preserving roads) will lead to achieving its goal (increased income and production for traditional farmers and pastoralists) is not, however, a given.

A. Socio-Cultural Constraints to Productivity

Along many miles of existing trunk road there are few farmers. This sparse population reflects several factors including the rather limited amount of suitable agricultural and pastoral lands in some areas of the south -- the Wau-Rumbek-Mundri line, for example. The vast space of the south is deceptive: USAID and other donor projects have discovered that much of the unoccupied land is vacant

because it is subject to seasonal waterlogging which makes dura planting impossible or only marginally productive. And much of the same area which is too wet part of the year is without water the remainder. Hence traditional farmers and herders may not be able to move in great numbers alongside the improved roads, and will not, therefore, benefit from price and transport incentives.

Along the Kenya access road, we have seen a growing concentration of population over the past few years. The presence of the road may be one of the factors pulling people into the area. This growing concentration has spawned frequent tribal conflicts. This fighting points to another socio-cultural factors which may attenuate the hypothetical economic significant of roads: almost all of the apparently unoccupied or sparsely settled land of the south is part of one tribe or another's traditional range. Where tribes are basically sedentary farmers (e.g., along the Juba-Maridi-Yambio road), there is little land which is not already allocated to somebody. Where semi-nomadic pastoralists are involved (e.g., the Kenya access road, and Wau-Rumbek-Mundri), there is a tradition of intertribal hostility and violence arising from historical struggles to retain and protect seasonally-significant range and water rights. Thus interventions which tend to draw pastoralists of different tribes (or even, as in the case of the Dinka, sub-tribes or clans) together often results in conflict.

In order to increase production and income, a series of interventions may be required to prompt and protect security, to provide water, health care, education and other social services, and to adjudicate disputes.

Shifting from the collective to individual farmer level, the project assumes that economic incentives in the form of lower costs and easier access to markets will stimulate greater productivity. This assumption is fundamental to the cost-benefit and other economic analyses. However, prevailing socio-cultural behavior in some areas of the south call its validity into question.

Reservations surrounding the production response along the Juba-Torit-Kapoeta and Wau-Mundri roads, or at least the immediacy of a productive response, do not apply to the roads to be maintained under the project. Roads, such as the Juba-Mundri-Yambio, Juba-Yei and Juba-Nimule lines pass through rich agricultural areas with tremendous potential. In the Yambio area, for example, cassava, sorghum, millet, groundnuts, sesame, cotton, coffee, pineapples, tomatoes and yams are all grown. Since the mid-fifties, the people of this area (the Azande) have consistently responded to change and economic incentives, as evinced by the widespread development of coffee as a cash crop during the past 4-5 years.

Among the Azande, tribal organization is well articulated; chiefs work diligently to secure resources for their constituents and require their followers to work on roads, pay taxes, pay back loans and fulfill other social obligations.

The other roads to be maintained, constructed primarily by donor funding, also pass through productive areas and connect important service center towns. Thus, as demonstrated in the economic analyses performed on roads in the SR, the maintenance program reinforces an already existing productive bias in these areas and will allow for continued increases in productivity and the marketing of agricultural surpluses.

B. Pastoralists Response to Economic Incentives

Two major trunk roads, Wau-Rumbek-Mundri, and the Kenya access road, pass through districts largely or exclusively populated by transhumant pastoralists. These people are some of the Region's most traditional, and they have mores and practices which are at variance with classic economic behavioral models. If we take the Dinka as a case in point, we will see socio-cultural features common to the Nuer, Shilluk, Toposa, Mondari, Latuka and other cattleherders.

The Dinka are not farmers: they are herders who also grow dura and a limited variety of minor food crops. Cattle stand at the center of the Dinka culture, religion and economy. Sacrificed, they are the medium through which the living confront god and ancestral spirits. In the form of bridewealth, cattle and to a lesser degree goats and sheep are important to maintaining lineage and kinship bonds; in order to marry, a man must transfer an agreed number of animals to the bride's family. Cattle are also used as collateral for in-kind or cash loans. Healthy cattle are rarely slaughtered for home consumption.

As recently as a decade ago, a Dinka almost never sold an animal commercially; but this is changing. Today growing numbers of Dinka cattle appear in local markets, some for urban consumption, some to be trekked as far north as Omdurman. Although this commercial off-take is well below potential, its growth reflects an increased demand for cash stimulated by the lure of a widening variety of consumer goods, a desire for veterinary medicines to protect the herd and, perhaps, a necessity to buy dura in needy times.

During the dry season most herds accompanied by the men and some teenaged girls leave their homesteads for the wetlands. Only a few cows are left behind to provide milk to the women, children and elderly. Thus, for 3-5 months most able-bodied males are absent and can not be tapped for any contribution to developmental activities. At the onset of the rains, men and cattle return and the planting of dura begins.

Historically, the region between Rumbek and Wau produced a food surplus; it now yields insufficient dura to meet local demands. This state of affairs results from a combination of factors: the poor roads and inadequate transport which prevent potential buyers from reaching producers or vice versa, the absence of on-farm or local storage facilities, and the shortage of improved seeds, credit and extension services. The civil war caused great disruption as hundreds of thousands of Dinka families fled the fighting or lost cattle and dura to marauders. In the war's aftermath large mechanized farming schemes were introduced across the upper south and the Dinka were assured by government officials that these would not only satisfy local needs but generate surpluses for export. Without exception the schemes failed to meet expectations.

The casual observer travelling across the upper region of the south is struck by the vast expanse of apparently uninhabited territory and may well conclude that there exists an almost limitless possibility for expanding cultivation. In fact, however, much of the land is subject to waterlogging which precludes tillage. Additionally, the Dinka prefer to cluster in villages or closely spaced homesteads because of the communal social activities they enjoy and for protection from often hostile neighboring tribes who move their herds through Dinka territory. As the population has grown over past decades, new families have tended to join existing settlements. A result of this growing concentration is competition for nearby farm land and in some areas a concomitant reduction in the acreage which

can be left fallow for the 5-6 years necessary to regenerate its nutritive capacity.

Studies have shown that the shortage of labor, especially for weeding, is the major on-farm constraint to dura production. Dura is weeded thrice during its growth cycle and research reveals that yields are directly related to the timeliness and efficiency of this operation. Even where suitable land is available, it may not be cultivated because of the labor shortage.

Although the Dinka population has increased markedly over the past several decades, there is also much urbanization and outmigration. Most trading centers of the upper south have doubled or tripled in size during the past 20 years, added to by Dinka abandoning the rural life for urban pursuits and thereby becoming consumers rather than agricultural producers. Young herdless males journey as far as Khartoum/Omdurman to earn cash to buy the cattle that will enable them to marry. Such outmigration provides an important source of labor to the national economy but deprives the region of an equally significant, and unreplaced, labor pool for agriculture.

For all the recent outmigration and urbanization, the Dinka's traditional way of life has only marginally been transformed. British colonial administration, based on indirect rule, left local administration in the hands of tribal chiefs. In contrast to the Equatorias where the British encouraged plantation agriculture, built roads, schools, and generally opened the area to outside influences, the upper south remained largely untouched. A history of tribal warfare over range and water use also helped to reinforce Dinka tribal structure since they had constantly to be prepared to repel invaders. Consequently the Dinka entered the 1980s retaining far more of their heritage and values than did the tribes west of Juba.

One expression of this cultural continuity is the primacy given to livestock over farming -- witness the abandonment of the farm for migration in search of cash to buy cattle. Prevailing values also dictate sharing crop surpluses with kin, either through loaning dura or brewing surplus into beer contributed to periodic feasts, instead of selling for cash. Among Dinka there is little commercial spirit. During the colonial period, the Dinka did indeed produce and sell surplus dura because they were compelled by the British to pay a cash hut tax collected by the chiefs whose position was at stake if he failed. Since independence no commensurate "incentive system" has appeared.

This does not mean the Dinka are immune to commercial interests; their search for cash to buy cattle, veterinary medicine, dura when short, and their growing desire for western clothes, radios, bicycles and the like, bespeak the inevitability of joining the market economy. What is needed is a market system that rewards them for producing and marketing dura and cattle. The prevailing system does not do this; the returns from marketing are, in their eyes, an inadequate tradeoff to the social rewards of holding herds and drinking dura beer convivially. Efforts to stimulate production -- extension and credit services, transport improvements, and so forth, combined with price policy incentives -- could over a decade or two prove successful, but only if monetary returns are great enough to offset the social costs of modifying traditional practices. Small interventions or incremental reforms such as constructing a road or a storage center are not likely in the short run to provide incentives of sufficient scale to induce any marked increase in the commercial off-take of cattle or dura, particularly from the hinterland where tradition holds most firmly. Marginal increases are most likely to occur in areas adjacent to market centers such as Rumbek where practices and values may be in transition.

C. Local Labor for Road Work

The project assumes that there will be local labor available during the initial maintenance and rehabilitation phase, and that at least some minimal level of continuing maintenance can be done regularly by people living along the roads. We have already noted that lengthy stretches of roads pass through sparsely settled areas. Hiring laborers from nearby villages, or establishing permanent maintenance camps are possible options during the initial phase. Throughout the domains of transhumant pastoralists, however, the construction season coincides with the annual migration to the wetlands. Few if any men remain on the farmsteads. This problem of securing laborers might be overcome either by importing outsiders or, and this would be the desired option, arranging well in advance with traditional leaders for cattleless young men and others seeking cash to remain behind for road work. Cash, rather than food-for-work, is repeatedly stressed by local leaders as the preferred form of payment.

Establishing ongoing local maintenance camps, or assigning responsibility for road maintenance to local headmen and subchiefs, while quite effective among the Azandi and Kakwa of Western Equatoria, would face hard going among the Dinka and other pastoralists. In part, this difficulty arises from the traditional migrations to wetlands during the dry season. In addition, there is a close association in the minds of many Dinka between road work and the colonial period. During the days of the British administration each chief and subchief was assigned a portion of road and held strictly accountable for its maintenance. This system hampered annual movements by interrupting and competing with the Dinka's major preoccupation of herding. As a result of the conflict of interests and British enforcement of theirs, the Dinka appear particularly reluctant to do any type of road work. One chief in Rumbek put the case succinctly: "We worked on the roads during the British time; now we are free".

5. Impact

Significant resources are being allocated to institution-building within the Southern Regional Ministry of Communications, Transport and Roads. While an assessment of the Ministry's institutional capability is presented elsewhere, the prevailing political instability within the Region and the Regional Government bears underscoring. Whether or not the project will be sustained and replicated by the SRG is part of the broader issues of redivision and regional security over which the project has no control. It is difficult to work on roads in the middle of combat. It is also difficult to work if local personnel are not available or are alienated by lack of pay. It is equally difficult to carry on if personnel and equipment are being dispersed to provincial or new regional capitals. Any or all, or none, of these political issues could arise during the life of project. Each has been closely considered in the present design effort. While they combine to form a less-than-optimal environment in which to operate, the political and economic significance of improving road transport is so great that it warrants proceeding.

6. Issues

* Political factors beyond the project's control may attenuate or even terminate it.

* Direct and indirect economic gains to traditional farmers and pastoralists may be limited due to socio-cultural factors and absence of supporting services such as water, health care, and agricultural extension. The benefit incidence rate

for traditional farmers should be closely monitored; it may be necessary to introduce other development activities to obtain the optimal return on the road project.

* Rural-to-village and village-to-urban movement may be stimulated by improved roads. One result of this movement could be increased labor by women and children. The demographic impact of road improvements should be evaluated periodically.

* In order to minimize the potential for intertribal violence which might result from population movements towards the Kenya access road, early and continuous dialogue should be established among tribal leaders, local political officials, and security forces.

* Recruiting and retaining laborers in some areas may be difficult. Working through local traditional leaders may improve cooperation and participation.

1/ This analysis was prepared in May 1983 prior to the announcement that the Southern Region would be divided into three separate regions: Equatoria, Bahr El Ghazal and Upper Nile. The Social Soundness Summary in the text of the Project Paper takes the new government structure into account, as do all other components of the project design.

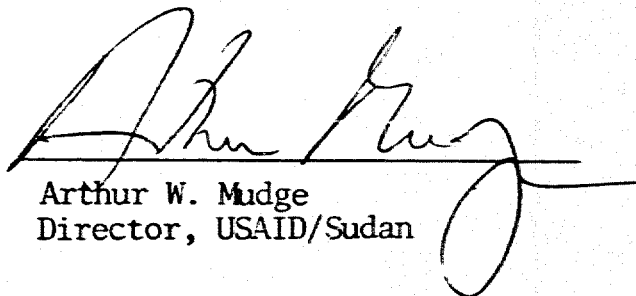
Sudan: Southern Road Maintenance and Rehabilitation I Project (650-00

611(e) Certification

The Southern Road Maintenance and Rehabilitation Project is designed to improve and preserve the primary gravel road network in the southern part of Sudan. During the six-year life of project, approximately 290 kilometers of roads will be rehabilitated and 1500 kilometers will be maintained. AID will finance technical assistance, training, equipment and commodities to accomplish the project's objectives. Formal and on the job training programs will help develop the local institutional capacities required to implement future road rehabilitation and maintenance activities.

The Project will be implemented by the Ministry of Construction and Public Works through the Roads and Bridges Public Corporation with the assistance of the Equatoria and Bahr El Ghazal Regional Ministries of Works and Communications. Adequate staff resources are available in these ministries to implement the project, but many of the personnel lack the job specific knowledge and work experience to effectively carry out road rehabilitation and maintenance works. The project expressly deals with this problem through the training and technical assistance inputs. Financially, the GOS has committed local currency generated through the Commodity Import Program (CIP) to finance local costs above those already covered in the recurrent budget. Plans will be developed over the course of the project to ensure that, to the extent practicable, the GOS covers future recurrent costs from the regular budget.

With the understanding that: (1) institution building at the field operations level is an integral part of the project; (2) CIP local currency will be allocated for certain local costs during the implementation of the project; (3) a plan will be developed to cover at least the incremental fuel costs associated with project-funded equipment after the life of project and (4) recognizing the Sudan's severe balance of payments crisis, recurrent costs associated with spare parts and major equipment replacement will require donor assistance in the near term, I hereby certify that the Government of Sudan has the financial and human resources capability to successfully and effectively maintain and utilize the project.



Arthur W. Mudge
Director, USAID/Sudan

June 22, 1983

Date