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

CAPITAL ASSISTANCE PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

MALAWI ROADS Phase I

690-035

AID-DLC P-108

UNCLASSIFIED

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

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AID-DLC/P-1084

May 10, 1973

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Malawi Roads Phase I

Attached for your review are the recommendations for authorization of a loan in an amount not to exceed \$8,300,000 to the Government of the Republic of Malawi (GOM) to assist in the final engineering, construction supervision, and construction of the Chikwawa-Bangula Road.

This loan proposal is scheduled for consideration by the Development Loan Staff Committee at a meeting on Friday, May 18, 1973.

Development Loan Committee
Office of Development Program
Review

Attachments:
Summary & Recommendations
Annexes I - XVIII

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MALAWI ROADS (PHASE I)

SUMMARY AND RECOMMENDATIONS

1. Borrower: The Government of the Republic of Malawi (GOM)
2. Loan Amount: \$8,300,000
3. Terms:
 - a. Maturity: Forty (40) years including a ten (10) year grace period.
 - b. Interest: 2 percent per annum during the grace period, and 3 percent per annum thereafter.
 - c. Repayment: Interest and principal payable in U.S. dollars.
4. Financial Plan:

A.I.D. Loan	\$8,300,000
GOM Contribution	<u>1,240,000</u>
Total	\$9,540,000
5. Description of the Project: The proposed project consists of final engineering, construction supervision, and construction of the Chikwawa-Bangula Road. The construction phase will include upgrading the existing earth surfaced road to a bituminous road, realignment of three sections, thereby reducing the total road length from 59 miles to 52 miles and the construction of several bridges. The project also includes final engineering design for the Lilongwe Mchinji Road.
6. Purpose of the Loan: To finance all foreign exchange costs and a portion of the local costs of the project.
7. Background of the Project: The Chikwawa-Bangula Road is the main road in the area of the Shire Valley Agricultural Project located in southwestern Malawi. The present road cannot efficiently service the area, especially with the increased agricultural production resulting from the Project. Consequently, the GOM requested A.I.D. assistance and in October 1972, A.I.D. financed a technical and economic feasibility study to determine whether the road should be upgraded to a bituminous road. The feasibility study findings supported improving the road and the GOM officially requested A.I.D. financial assistance for final engineering, road construction, and engineering supervision for the project. The Lilongwe Mchinji Road is the primary road crossing the IDA financed Lilongwe Agriculture Development Project

in central Malawi. This road is also the principal highway connecting the new capital at Lilongwe with Mchinji near the Zambia border. The GOM has assigned high priority to improving this road in order to support the Government of Zambia's efforts to find alternative transportation routes for its imports and exports which previously have been transported through Rhodesia. The feasibility study for this road was financed by the United Nations Development Program (Special Fund). The draft final report of this study was completed in April, 1973. In January A.I.D. agreed to consider financing for the final engineering for the Lilongwe Mchinji Road subject to the findings of the final report.

8. Export-Import Bank Clearance: Received May 7, 1973.
9. Country Team Views: Country Team strongly endorses the project.
10. Statutory Criteria: Satisfied; see Annex I.
11. Recommendations: Authorization of a loan not to exceed \$8,300,000 to finance final engineering construction supervision and construction of the Chikwawa-Bangula Road and the final engineering design of the Lilongwe Mchinji Road.

CAPITAL ASSISTANCE COMMITTEE

REDSO / EA

Loan Officer: P. Guedet -

Engineer: R. Fedel -

Lawyer: R. Meighan -

AID/W

Desk Officer: E. Gales -

Project Designer: S. Whitmer -

Program Analyst: R. Archi -

Engineer : P. Stearns -

Lawyer: R. Johnson -

I. INTRODUCTION

A. Background

The development of the Shire Valley (Southwestern Malawi) has been economically neglected in the past, lacking basic infrastructure for agricultural and rural development. The GOM recognizing this problem has recently considered the Shire Valley as an important developmental priority. In 1968 the GOM requested IDA (IBRD) assistance which led to IDA partially financing a \$4.6 million agricultural project designed to increase crop production and provide the essential infrastructure needed for this development. A second phase (Lower Shire II) to this project designed to further extend and intensify this effort estimated at a total cost of \$13.5 million has been agreed to by the IBRD and the GOM.

The proposed improvement of the Chikwawa-Bangula Road, located in the Valley and in the center of the ongoing agricultural scheme is a road development project that the GOM considers high priority for 1973. It has been the topic of official discussions among the USG, GOM, and IBRD officials on several occasions. In 1972 the USG in close collaboration with the IBRD financed an economic and technical feasibility study that has recently been completed. The study confirmed the general economic viability and technical feasibility to improve this road as well as its essential relationship to Lower Shire II. During Mr. G. Gondwe's, GOM Secretary to Treasury, visit to the United States in January 1973, A.I.D. held joint consultation with the IBRD and at that time Mr. Gondwe requested that the U.S. finance final engineering and construction of the road. The GOM officially requested U.S. assistance for the Chikwawa-Bangula Road on March 21, 1973.

This road is the major transportation link for the Shire Valley Agricultural Project that is financed by IDA. The Shire Phase I Agricultural Project was started in 1968 to develop the potentially rich Lower Shire Valley area with primary emphasis on increasing crop production, mainly cotton. The project was concluded on March 30, 1973 after successfully meeting the project's objectives nine months ahead of schedule. Because of the favorable results of Phase I, the IDA has agreed to continue the project with a Phase II scheme that will attempt to further increase production of cotton and other crops, including expanding the project's objectives to provide other supporting elements of rural development. It is this anticipated increase of agricultural products expected from Phase II as well as the increase in sugar production that is causing acute transport problems to the already inadequate Chikwawa-Bangula Road.

The improvement of the Chikwawa-Bangula Road is part and parcel of the design for the Lower Shire II Project. Very substantial increases in projected incremental crop production are attributable to the improvement of this corridor road. The viability of the Project depends on the link between the network of small crop extraction and evacuation roads to be

constructed under the Project and an all-season spine road to the major transport network gateways. In discussions with the IBRD, A.I.D. agreed to consider financing for the Chikwawa-Bangula Road.

The Shire Valley is virtually an isolated geographic unit located in Southwestern Malawi, about 200 ft. above sea level. It is bounded by escarpments to the east and west and is bisected by the Shire River. Approximately 300,000 people live in this area, representing 6% of Malawi's population, with a population density of about 120 persons per square mile. This Valley is accessible from the north (Blantyre) by two poorly surfaced roads and a railway. Both roads make practically a direct descent of the Thyolo Escarpment, a drop of approximately 3,000 feet in about 20 miles. The routes are steep, difficult and expensive to maintain. The railway takes a more circuitous route and enters the Valley at Bangula. (See Map, Annex XVI.) The more important of the two roads is the M8 from Blantyre via Chikwawa and Bangula where it meets the other main road (M9) and then continues through the southern border of Malawi to Mozambique.

The escarpment section of the Chikwawa-Blantyre is gravelled, but because of the gradient, sharp curves and inadequate drainage the surface is very rough. The steep gradient and sharp curves also limit the size of trucks that can safely use the road. During the rainy season only four-wheel drive vehicles can negotiate the escarpment section of the road to Chikwawa. Between Chikwawa and Bangula (59 miles) the road follows the western edge of the Shire River. Parts of this road experience flooding during the rainy season. The road is gravelled in some sections, but is rutted during the wet season and can only be used with difficulty by four-wheel drive vehicles. From Bangula to Nsanje the road follows the river, and from Nsanje to the Malawi-Mozambique border the road reaches higher ground and is less affected by rain and floods. The rudimentary state of these roads, especially the Chikwawa-Bangula section, has no doubt impeded development of the Lower Shire Valley. The GOM is conscious of this situation and therefore has requested the Government of Portugal to assist financially in the improvement of the Blantyre-Chikwawa section and the U.S. Government to finance the final engineering and upgrading of the Chikwawa-Bangula Road. The IDA in continuing with their agricultural project will construct feeder roads to connect to the Chikwawa-Bangula Road.

The improvement of the Lilongwe-Mchinji Road will also increase trade linkages between the new capital at Lilongwe and another major agriculture development area. The proposed alignment for this road passes through the IDA financed Lilongwe Agriculture Development Project area. This project, established in 1968, is an integrated agriculture development project aimed at increasing the efficiency and productivity of small holder agricultural (in food crops and cash crops). The project provides

basic services, improved inputs, and management and technical staff, including the essential infrastructure for an area of 160,000 acres west and southwest of the new capital at Lilongwe. In 1971, IDA approved a Phase II project which expended the project area to a total of about 1.1 million acres and included a livestock ranch to develop improved feeder stock.

The improvements to the Lilongwe-Mchinji-Zambia border road, will also have the effect of providing an alternative route to the sea for / Zambia's international traffic. Even in its unfinished state, this road has at times carried as much as 6,000 tons a month of Zambian imports and exports. After completion of the pipeline from Dar-Es-Salaam to Zambia's copperbelt and successive improvements in the Tanzania-Zambia road (the Great East Road) the use of the route via Malawi has declined. However, with the paving of the 400 mile road from Lusaka, Zambia to the Malawian border now largely completed, and with the newly constructed Zomba/Lilongwe road passing through the new rail junction at Liwonde, this road effectively links Lusaka and the copperbelt, to Lilongwe, to the railheads to the Indian Ocean ports, to the Blantyre/Zomba population centres, and to the tourist resorts on the central and southern shores of Lake Malawi.

B. Relationship of Project to U.S. Assistance Strategy

As the most populated independent, majority-ruled state in southern Africa, Malawi forms an important link in our strategy of supporting economic development relative to the minority-ruled states of the region. U.S. assistance in the transportation sector will assist Malawi to further expand its economic, social and political development. Furthermore, the proposed project would complement both the IBRD's (IDA credit) Shire Valley Agricultural Scheme and the Lilongwe Agriculture Development Project.

C. Borrower and Implementing Agency

The Borrower will be the Malawi Government (GOM), acting through the Ministry of Finance. The Ministry of Works and Supplies, Roads Department will be the implementing agency. The main and secondary roads are maintained by the Roads Department and the minor roads are the responsibility of the local authorities. Feeder roads constructed under the IDA project are maintained by the project manager.

D. Export-Import Bank Clearance

The Export-Import Bank's Board of Directors considered this proposed loan on May 7, 1973, and concluded that in view of the need for local cost financing and concessional lending terms, the project was not appropriate for Export-Import Bank financing.

II. TECHNICAL ANALYSIS

A. General Description of Project

The project will provide for the financing of foreign exchange and a portion of local costs necessary to carry out four distinct services.

1. Engineering Design and Preparation of Tender Documents for the realignment and reconstruction of the 59-mile section of road between Chikwawa and Bangula in the southwestern section of Malawi.

2. Construction of the foregoing realignment and road reconstruction by a U.S. or other Geographic Code 941 construction contractor.

3. Engineering Supervision to assure the proper construction of the highway.

4. Engineering Design and Preparation of Tender Documents for the 73-mile realignment and reconstruction of the road extending westerly from Lilongwe, the newly designated capital of Malawi, to Mchinji, on the Zambian border.

B. Detailed Description of Chikwawa-Bangula Project

1. Location. The road to be designed and reconstructed is a 59-mile north/south section of the Malawi road system designated route M-8 which extends southward from Blantyre to Beira. The project starts at Chikwawa, about 30 miles south of Blantyre after M-8 has descended the Thyolo Escarpment and crossed the Shire River on a recently constructed bridge. The proposed alignment generally follows the existing route corridor which lies west of the Shire River. The improvement will consist of about 25 miles on new location and 27 miles

on existing location, resulting in a distance saving of about 7 miles. The terrain traversed by the project is relatively flat at elevations ranging from 250 to 300 feet above sea level. Escarpment drainage into the Shire River generally crosses the proposed route at right angles necessitating extensive culverting with varied heights of roadway embankment to eliminate periodic closures during heavy rains which flood the present low-lying road.

2. Blantyre-Chikwawa Access Road to Project. The section of road connecting Blantyre to the proposed project is about 30 miles in length, of which about 5 miles is paved near the Blantyre end. The remaining roadway is of gravel and/or earth composition in varying degrees of condition.

The worst section is about 4 miles in length during which the major descent of the Thyolo Escarpment takes place. This section is located about 15 miles south of Blantyre and consists of grades in excess of 10%. The undefined roadway varies from 8 to 15 feet in width with occasional passing bays. The surface is generally made up of irregular rock fragments of sizes up to 15 inches. Curvature is poor with two 180 degree hairpin turns. There are no constructed drains.

The remaining 26 miles of road are generally passable and capable of being graded, shaped and drained to acceptable design standards. At the present time (April, 1973) the GOM is negotiating the improvement of the Blantyre-Chikwawa Road with the Government of Portugal. The proposed improvement will consist of shaping and ditching the existing route and providing an 18 foot bituminous treated carriageway. There will also be additional roadway widening at the major curves.

3. Preliminary Engineering. This work was performed by the engineering firm of Daniel, Mann, Johnson and Mendenhall (DMJM) as part of the general feasibility study conducted in the fall of 1972. In addition to ground inspection and review of existing geologic studies of the area, DMJM sought and evaluated possible sources of materials of construction required for the recommended pavement design. Construction and design standards were developed by DMJM after a review of present standards of road construction in Malawi together with the forecasted traffic and an analysis of present maintenance costs on various types of pavement structure.

4. Design Details. A roadway constructed to a Malawi Class I Standard is justified on the basis of present and anticipated character and volume of traffic. The Class I Standard provides for a surfaced carriageway of 22 foot wide with two 5 foot shoulders. These widths are compatible with U.S. standards for design of rural highway carrying similar traffic volumes, designed to support a 9,000 pound wheel load which is consistent with the character of anticipated traffic and sound engineering design for similar primary highways abroad as well as in the U.S. In view of the flat terrain there are no vertical alignment restrictions and grades of less than 5 percent will prevail. Horizontal alignment design will be such as to provide for a design speed of 60 MPH. The project will generally be a "borrow" type construction with the roadway constructed above the existing ground level. The embankment height will vary in order to clear cross drainage culverts and provide structural support over areas of unstable "black cotton" type soils. Preliminary pavement designs were based on the British Road Research Laboratory Report LR-279 and the Asphalt Institute Series MS-1 dated December 1969.

Two alternative types of pavement structures have been considered by DMJM, both of which involve six inches of select material subbase. The base design decision, however, has not yet been finalized. Materials tests are presently being conducted by the GOM Ministry of Works. Results of these tests will be made available to the engineering design firm at such time as tests are completed and the consultant selected. The two alternative designs being studied will provide either (i) six inches of cement stabilized gravel with asphalt prime and double bituminous surface treatment (DBST) with crushed stone, or (ii) 3-1/2 inches of sand asphalt base with one inch of sand asphalt pavement. The difference in cost is the sand asphalt estimated by the consultant to be about \$186,000 higher for the sand asphalt. The higher figure has been used in the construction cost estimates. However, the sand asphalt pavement is considerably better in rideability, skid resistance and durability than the double bituminous surface pavement.

Quality control of materials will be based on testing in accordance with the American Society of Testing Materials and American Association State Highway Officials (AASHO) standards.

5. Bridges. The existing alignment includes several sub-standard bridges in addition to paved drifts crossing six rivers. These structures, particularly the drifts, restrict traffic flow to the dry season and/or periods of medium rainfall and runoff into the Shire River. The recommended alignment will provide for the

construction of fourteen bridges, from 45 to 315 feet in length, totaling 1,620 feet, nine of which would be on new locations. Structural design of bridges will be based upon the Malawi Standard Bridge Design Loading of 0.8 UK HA loading which is essentially equivalent to the recommendations of AASHO utilizing the lane loading designated H-20. Bridges will be designed to provide a 22 foot wide carriageway with separate 3 foot cycle and pedestrian walkways on both sides. This latter provision was recommended by DMJM following field investigations which indicated a high volume of pedestrian and bicycle traffic. All bridges will be of a standard type of construction consisting of a cast-in-place reinforced concrete deck placed on steel beams resting on concrete abutments. For purposes of estimating the costs, all abutments were considered to require a foundation of steel shelled cast-in-place piles. The actual extent of piling required will be determined by soil borings taken at all bridge sites during the design phase. Steel beam and slab construction is particularly adaptable to this project since they are speedily erected and require a minimum of falsework.

C. Engineering Services

1. Design Engineering: The GOM is expediting the engineering contract award to the extent possible. The contract will be of a lump sum type and services to be provided will include:

- (a) Field surveys and soils boring and investigations
- (b) Preparation of Design and Construction plans
- (c) Preparation of detailed costs estimates of construction
- (d) Prequalification of prospective construction bidders
- (e) Preparation of bidding documents
- (f) Advise GOM on bid analysis and contract award

The purpose of expediting the design contract award is to minimize construction time loss due to inaccessability of project area for field work and construction during the rainy season. This timing is discussed in greater detail in Section E, below. The estimated time needed to carry out this phase of the project is about six months. The estimated cost of these services is \$450,000.

2. Supervisory Engineering: Construction of the project is expected to take about 20 months due to the four to five months rainy season during which little or no construction can take place. Supervisory engineering, therefore, should be available for about 22 months. The work will be carried out by expatriate engineers as well as local technicians if available. It is estimated that the time-rate, lump sum, supervisory engineering contract will cost \$675,000.

D. Construction Services

Construction of this project is expected to be carried out by a U.S. or other Code 941 contractor prequalified for bidding following public notice in the Commerce Business Daily and other appropriate publications. Bids will be prepared on a competitive unit price basis with award to the lowest responsive unit price, lump sum bidder.

U.S. procurement of steel beams, reinforcing, culverting and possibly cement is anticipated. These materials, as well as POL and contractor's construction plant, can be mobilized on the site by rail from Beira to Bangula. The railroad then continues to Blantyre from which other mobilization requirements can be met.

E. Cost Estimates

Construction costs were developed on a unit cost basis by the consultant's analysis of existing MOW records of recent construction together with cost data on MOW force account work and construction in neighboring countries. Calculations for quantities of work items were based upon the following:

1. Earthwork and Subbase - Since the majority of earthwork construction consists of fill for the embankment, the consultant investigated the availability of materials from sites adjacent to the route. Several existing pits were sampled as to adequacy and quantity of available materials. Average haul distances to work sites were calculated along with quantities necessary for the embankment.
2. Drainage - The consultant reviewed extensive data concerning flooding, rainfall, and irrigation in the Shire River Valley, together with topographic maps in order to establish 56 catchment areas and calculate the expected runoff. From these runoff data flows the necessary culvert or structure opening requirements were determined.
3. Structures were estimated on a linear foot basis with inputs of standardized steel beams, slab material components and the estimated number and length of spans.
4. Pavement base for each alternative design was calculated on a per mile basis from quantities of materials and cementing agents required to meet the mix.
5. Miscellaneous costs for mobilization clearing, maintenance of traffic, etc., were calculated on a lump sum basis.
6. Right-of-way costs will be assumed by the GOM and are not included as a project cost.

A summary breakdown of construction costs (January 1973) is as follows:

a. Mobilization and General	\$1,088,000
b. Earthwork (820,000 cubic yards)	
Embankment	941,000
Subbase	549,000
c. Pavement (base and surface)	2,083,000
d. Bridges	912,000
e. Culverts	113,000
f. Miscellaneous	<u>59,000</u>
	\$5,745,000
13% Quantity Contingency	<u>770,000</u>
Construction Cost	\$6,515,000
20% Cost Escalation	<u>1,300,000</u>
Total	\$7,815,000

The above cost is based on January 1973 prices for purposes of calculating an economic analysis. However, the construction cost price index has risen on an average of 10 percent per year. Since construction won't be expected to start until early 1974, a 20 percent cost escalation is applied to the construction cost thereby covering estimated price increases for the 1973 and 1974 period. This extends practically to the mid point of the construction contract.

F. Implementation Schedule

The construction schedule, as noted above, provides for a two year construction period including an estimated 4 to 5 months of inactivity due to rains. It is to the advantage of the GOM as well as A.I.D. that engineering be initiated as soon as possible to facilitate the construction contractor mobilizing during the months of January to March 1974 in the rainy season.

The following schedule will meet this timetable

Authorize Loan	<u>May 1973</u>
Engineer selection by GOM	<u>June 1973</u>
Execute Engineering Design	<u>June 1973</u>
Complete Design Work	<u>November 1973</u>
Prequalify Construction Contractors	October/November 1973
Issue Bidding Documents and Plans	<u>December 1973</u>
Execute Engineering Supervision Contract	January 1974
Open Bids (60-day period)	<u>February 1974</u>
Award Construction Contract	February/March 1974
Contractor Mobilization	March/April 1974
Start Construction	May 1974
Complete Construction	December 1975

G. Maintenance

The Roads Department, within the GOM Ministry of Works, is responsible for maintaining the Malawi road system. The GOM Ministry of Works has a competent staff and sufficient equipment to maintain Malawi's road network. The Ministry's heavy equipment section has recently been strengthened with about \$2 million of AID-financed equipment that was turned over to the Ministry of Works after the completion of the Lakeshore Road. This equipment together with extensive equipment owned by the GOM Public Vehicle Hire Organization (PVHO) is considered adequate to handle and carry out the maintenance of the proposed project.

The pavement design for the proposed road is such as to require a minimum of maintenance for the first few years following construction. Maintenance required during this period consists principally of hand labor for clearing and shaping ditches and culverts. With respect to the MOW capability to carry out maintenance of bituminous surfaced roads the MOW is presently engaged in the bitumen surfacing and chipping of the recently completed 126 mile Lakeshore Road. The work is being carried out by the MOW forces and equipment. Prior to AID approval

of this action both the consulting engineer and the construction management firm administering the force account construction of the Lakeshore Road, evaluated and affirmed the MOW capabilities to undertake the surfacing with their own work force and supervisory personnel. In view of the foregoing there is every indication to believe the project as proposed can be efficiently maintained by the MOW.

H. Engineering Design Services - Lilongwe/Mchinji/Zambian Border Road

1. Background. In early 1972 the GOM requested UNDP to finance a feasibility study on the improvement of a 73-mile route in central Malawi extending westward from the capital of Lilongwe through Mchinji to the border with Zambia. The IBRD in administering the UNDP grant, contracted with the firms of Scott, Wilson, Kirkpatrick & Partners (SMK) and The Economist Intelligence Unit to carry out the engineering and economic investigation.

The existing route is of substandard design on several sections and consists of an earth surface which requires extensive maintenance. The present alignment also crosses into Zambia territory for a short stretch, thus creating potential border problems. In addition to connecting with the paved Great East Road on the Zambian border to Lusaka, the route provides access to the towns of Namitete and Tembwe located in an area of existing and planned agricultural development.

As a result of the recent Zambia/Rhodesia border closure this road has taken on greater importance since the Zambia import/export traffic requires new transport routes to the ocean. The Mchinji/Lilongwe road has been selected as one of Zambia's new external routes to the ocean. This route will provide for truck movements of cargo between Lusaka and the Malawi railheads at Salima or Balaka, thereby providing railroad access to the port of Beira. A paved road now exists between Lilongwe and Balaka so this route is primarily used rather than the gravel Lilongwe/Salima route.

2. Engineering Services Required. Both the GOM and the GOZ are anxious to improve the alignment and structure of the Lilongwe/Mchinji route to facilitate a more efficient, economical truck transport link to the railhead. Additionally the GOM wants this route improved to assist in the movement of agricultural products in this area. The GOM has requested that AID consider financing the engineering and construction of an improved alignment. The economic/engineering consultants will consider two alignments. The first alignment is improving the existing road, realigning it to take a small section of the road out of Zambia. The second alignment is virtually a new road. Preliminary findings

of the consultants indicate that improving the first alignment is economically justified. SWK presented their final findings in April to A.I.D., GOM, IBRD and UNDP for review. Following these reviews an alignment and design standard will be agreed upon.

To permit the expeditious initiation of the design for the improvement of the Lilongwe/Mchinji road this CAP includes financing for such design services.

It is expected that the design will take 8 or 9 months and the preliminary engineering investigations carried out by SWK will serve as the base for the more detailed soils and alignment surveys. A U.S. engineering firm will be selected by the GOM to perform the work. This project design is similar to that required for the Chikwawa/Bangula Road as far as soils investigations are concerned. The cost of such design is estimated to be \$600,000 and will be contracted on a lump sum basis including services providing for bid document preparation and advice to the GOM. Preliminary findings of SWK indicate the construction cost to be about \$8.5 million.

I. Technical Soundness

The U.S. firm of Daniel, Mann, Johnson and Mendenhall (DMJM) entered into a contract with AID in October 1972 to carry out technical and economic feasibility study of the Chikwawa/Bangula Road including the preparation of a preliminary design and lay out an order-of-magnitude cost estimate. This study was submitted in final draft to AID and the GOM for review. The final approved report was issued in April.

An analysis of the cost data for the methodology used by DMJM in developing these costs was made and summarized in Section "E" above. The engineers contingency factor of 10 percent which is included in the construction cost was increased to 20 percent based on road construction experience in Southern and eastern Africa. With this change the cost estimate and method were found to be reasonably accurate within the intent of Section 611a of the Foreign Assistance Act of 1961, as amended. Similarly, the technical investigations associated with development of the project were found to be acceptable and sufficient to provide the basis for further detailed engineering and subsequent construction.

J. Labor Intensive Considerations

During the feasibility study, the Consultant considered the use of labor intensive methods. The consultant concluded that labor intensive methods are feasible for much of the bridge construction and culvert installation. On the other hand, all earthwork, base and

surfacing must be capital intensive because of the long haul distances, compaction requirements, and other requirements governing the specification for the base and surface courses which cannot be met by labor intensive methods. Many of the minor items of work are subject to labor intensive methods such as roadside development, backfill at bridge abutments, etc.

The construction methods adapted are considered necessary to the success of the project and should not be changed to permit a greater ratio of labor intensive to capital intensive methods.

The tender documents for construction of the project will be based on end result specifications. A possible problem if the tender documents specified labor intensive methods is that the potential contractor might be restricted to operations which are not the most economical and the incentive for the contractor to devise methods to allow his firm to bid lower may be reduced. A major problem in the past when the tender document did specify the construction methods to be used and also included end result specifications has been to open the contract to disputes during or upon completion of the project.

III. Economic Analysis

A. Transportation Sector

Malawi is a physically small landlocked country with a total area of 45,747 square miles of which Lake Malawi occupies approximately one fifth. Its length and its lake lie north-south, which encourages a natural emphasis on longitudinal lines of internal transport. The lack of an indigenous sea outlet requires considerable transportation integration with Mozambique.

The transportation infrastructure that Malawi inherited at the time of independence was incapable of handling the volume of goods produced by Malawi. The need for new and improved roads was widespread. Since independence considerable road construction and road improvements have been effected. Although there is still serious pressure on the transportation system in specific areas, many of the necessary road improvements have been completed. Between 1964-1971 the GOM committed \$62.5 million or over one-third of its development budget to the transportation sector.

Historically, the central core for commodity transport for Malawi has been the railway with the road transport industry providing a feeder service to the railway. This general distinction between long haul rail service and feeder-service road transport had decreased considerably since independence. This development has occurred because of a number of interrelated factors - particularly the removal of the railways special preference along scheduled routes in 1966 and the accelerated increase in road transport capacity that was both a cause and effect of this change. Rail, however, will

continue to remain the sole practical outlet to the Indian Ocean ports of Nacala and Beira for bulk commodity movements.

Road Transport. Malawi's total road network consists of 7,440 miles of which 502 are bitumen, 515 gravel and 6,423 miles of dirt roads. These routes are connected to focal points at Blantyre/Limbe in South and Lilongwe in the Central region. Road development strategy has partly followed a north-south direction conforming to the physical design of the country. There are still some missing links and inadequate sections are being given high priority by the government. The principal road links with adjacent territories are south-west to Rhodesia, (M 2) and north-west from Lilongwe to Zambia (M 4). The existing network of feeder roads, (principal function is to facilitate the despatch of agricultural produce from farmers or estates to markets) is mostly low grade, earth surfaced with limited drainage and sub-standard bridging.

Commercial vehicle ownership is primarily made up of two major transport companies controlling 30 percent of the total road haulage capacity. Numerous small operators owning only one or two vehicles account for the industry's remaining capacity. Vehicle payload capacity indicates that the majority (some 55 percent) of private vehicles have payloads of over five and under seven tons, while just over one-third have payloads of more than seven tons.

Rail Service. The Malawi Railway system is a single line 3'6" track which runs from Salima in the Central Region through Blantyre and Nsanje to the Southern border with Mozambique (a distance of 291 miles) where it joins up with the Mozambique Railway and continues to the Indian Ocean port of Beira. The railway distance from Beira to Salima and from Beira to Blantyre is 515 miles and 353 miles respectively. A second ocean rail link from Balaka to the Port of Nacala extends for 447 miles from Balaka Junction through Mozambique to Nacala. The distance from Nacala to Salima and Blantyre is 554 miles and 502 miles respectively. Nacala is a large sheltered harbour with deep water and has a far greater potential for Malawi than the port of Beira which requires constant dredging and normally is subject to serious congestion. Moreover, from the railway operating aspect, the Nacala rail link is much more efficient than the Beira route since it is devoid of severe gradients and curvatures. On the Nacala route train loads of up to 1,200 tons can be hauled by one locomotive compared to 450 tons on the "hill" section south of Blantyre.

The British have provided a \$2.7 million development loan to be disbursed over a 5-year period (1971-1975) for the improvement of the railway between Balaka and the southern border. The GOM is contributing \$300,000 from its own resources for this project.

TABLE I ANNUAL TONNAGE CARRIED BY MALAWI RAILWAYS

	<u>Total Tonnage</u>	<u>Zambian Traffic</u>	<u>Excluding Zambian Traffic</u>
1965	565,089	-	565,089
1966	743,207	72,738	670,469
1967	910,685	115,804	794,881
1968	991,322	104,204	887,118
1969	883,540	8,690	874,850
1970	1,041,550	6,677	1,034,873

Air Service. Malawi has some twenty-three airports of which the primary ones are the international airport at Chileka (Blantyre) and Lilongwe, the remainder being largely improved grass access strips.

Air Malawi, a wholly Government statutory body, operates a network of internal services based in Chileka, whose schedules (both passenger and freight) cover the central and northern regions. The airline also operates international services from Chileka to Salisbury, Beira, Lusaka, Nairobi and Johannesburg. Air Malawi's fleet now comprises two Viscounts, two H.S. 748's, two Britten Norman Islanders and a BAC 1-11. The construction of a \$320,000 maintenance base at Chileka Airport has allowed Air Malawi to undertake maintenance not only of its own aircraft fleet but also those of visiting airlines and locally based light aircraft. Several international airlines service Malawi. At present there is no evidence of any unfulfilled demand for internal or external air service. Air Malawi is producing a workable net operating surplus.

Lake Service. The Lake Service has been operated by Malawi Railways Ltd. since 1953, although full ownership of assets was only achieved in 1969. Its primary function has been to serve the transportation needs of the northern region. The principal lake service fleet consists of four ships. In addition, there are also five tugs, six barges and several oil pontoons. Lake Service headquarters is at Monkey Bay, where dockyard and other facilities exist. The only other port facilities are at Chipoka - the present rail/lake interchange point and Nkhata Bay. The Lake Service has operated at a financial deficit for some time.

B. Requirements and Justification for Road

The growth of Malawi's economy is dependent on the availability of an efficient and reliable transportation system. This is particularly so in relation to a good road network and railway system since Malawi, being both land-locked and dependent on an agricultural economy, relies on roads and railways to

provide the only satisfactory means of moving its agricultural products to domestic markets and also for agricultural exports to the Indian Ocean ports of Beira and Nacala.

Improved transportation facilities are needed not only for the more efficient collection and distribution of agricultural produce and merchandise but also to support the GOM efforts now being made to develop the tourist industry. The Lower Shire Valley has a number of game and forest reserves, but these are of little economic benefit unless adequate all-weather roads are available to transport tourists to these areas.

The vast majority of Malawi's 4.6 million population depends for its livelihood on farming. Out of an economically active population of approximately 1.5 million, it is estimated that approximately 900,000 farmers and their dependents derive their income from small-scale agriculture (250,000 are in paid employment in Malawi and about 350,000 are working in neighboring countries). Agriculture accounts for over 90 percent of total exports, which in 1971 amounted to \$61 million. It is in this sector that the national development effort is being concentrated. In order to increase agricultural productivity the GOM, with the assistance of the IDA and the British Government, is operating high-productivity agricultural projects such as irrigation, settlement schemes, extension and marketing operations and constructing farm to market feeder roads.

The IDA's Shire Valley Agricultural Development Project is an example of a project that is dependent on the existing Chikwawa-Bangula Road as the main route for transporting agricultural produce to markets. The objectives of the IDA Phase I project have been virtually achieved without improvements to this road, although extensions and improvements have been made to the feeder roads in the area. The estimated incremental production of field crops, and to a lesser extent of livestock and fish during Phase II of the Project is expected to be several times greater in volume than the incremental production of cotton during Phase I. Sugar, with an estimated 259 percent increase between 1972 and 1980, will be the most important single commodity insofar as transportation requirements are concerned. Incidentally, in 1972 Malawi received an annual 15,000 ton U.S. sugar allotment to commence in 1973.

The viability of the Lower Shire Valley Agricultural Project depends on an adequate network of farm-to-market feeder roads. This, in turn, requires an all-weather main road from Bangula to Chikwawa and onward to Blantyre. Without improvements to the road, which is practically impassible during the rainy season, it would be nearly impossible, and certainly very costly to bring all of the incremental production to market.

In addition, with the growth of the Malawian economy, the "normal" traffic (traffic not directly generated by Phase II) is estimated to grow at 9 percent annually. Transportation, marketing, and distribution services play a critical role in an economy so largely dependent on small-holder agriculture.

The economic and technical feasibility study prepared by DMJM has determined that the Chikwawa-Bangula Road is economically viable, yielding an internal rate of return in excess of the 12 percent opportunity cost of capital in Malawi. Furthermore, the study justifies the technical feasibility and the geometric standard of an all-weather road. The IDA has and will continue to establish a network of feeder roads in the area. And under present plans, the road from Blantyre to Chikwawa will be improved and given a bituminous surface thereby upgrading it to an all-weather road. This latter project will be financed through a loan from the Portuguese Government.

The DMJM study attributes the lack of adequate transportation facilities between the Shire Valley and the rest of the country as a major impediment to economic and social development of the entire region. Improvement of road transport will help not only to accelerate economic development of the region but will play a vital role in raising health and sanitary standards of the population; improve educational opportunities; reduce isolation of individual settlements; raise the standard of living of the population in the region; promote soil conservation measures; place additional land areas under cultivation; and improve the ecology by eliminating traffic-generated dust along the road and prevent soil erosion. Improving this road will transform it from a present bottleneck to a vital route connecting the Lower Shire Valley with the rest of the country.

Lilongwe-Mchinji-Zambian Border Road (Final Engineering Design). The Lilongwe-Mchinji-Zambian border road (M-4) is the main road link between Malawi and the eastern region of Zambia. It forms part of the route between Zambia and the railhead at Salima and also forms part of the road linking the new capital of Malawi at Lilongwe with Lusaka, the capital of Zambia.

Between Lilongwe and Mchinji the road passes through one of the most productive agricultural areas in Malawi. The Lilongwe Plain is the largest maize growing area in the country and it is also the source of a large proportion of Malawi's exports of groundnuts and tobacco. In 1970 this area produced approximately 60 percent of the country's gross maize surplus. Top priority is being given to increasing agricultural productivity through the establishment of agricultural projects and settlement schemes.

The IDA has been involved in the Lilongwe Development Project since 1968. This \$6 million project covered the financing for the first four years of the 13 year program for the integrated development of agriculture on about 1.1 million acres of land around Lilongwe. Field development was completed ahead of schedule in September 1971 and the funds have been fully disbursed. All aspects of the project have progressed satisfactorily and crop yields have met the original goals. Some 24,000 farmers are now receiving seasonal credit with loan repayments in excess of 99 percent. Also a good network of feeder roads was constructed. Because of the success of this project a \$7.3 million Phase II project was initiated in 1971.

C. Road Related Agricultural Sector

Traditionally the cropping pattern in the Shire Valley involved the growing of maize, sorghum and millet using shifting cultivation. Cotton was introduced as a cash crop sometime around 1932. In the 1960's a British agricultural scheme expanded cotton production and this was followed in 1968 by the IDA's Lower Shire Agricultural Project. The five-year project (completed March 31, 1973), provided agricultural extension, credit to farmers, construction of 156 boreholes, 7 markets, 160 miles of feeder roads and improving 24 miles of existing roads. The primary objective and subsequent accomplishment was increasing cotton production, by using improved methods, from 4,000 to 17,000 tons by 1973 (cotton strain Albar 637 strong medium/long staple). Also the number of farmers using these improved methods increased from 200 to 4,000 over the same period.

The current Phase II Agricultural Development Project envisions an expansion of Phase I agricultural objectives and also includes fisheries development, improved health services, livestock development and game conservation. The increased agricultural component would provide improved extension services, seasonal and medium term credit and market facilities to approximately 16,300 farmers who have not benefited under Phase I. A total of 131,200 acres, consisting of 49,000 acres of cotton, 52,000 acres of maize, 19,000 acres of sorghum, 7,000 acres of rice, 4,000 acres of groundnuts and 200 acres of cocoa will be included in Phase II. Beef cattle production ~~would be~~ increased by about 1,800 head per year and 1,000 fishermen would increase annual fresh fish production by the equivalent of 1,400 tons of smoked/dried fish. Staff housing, offices, workshops and 108 miles of feeder roads would be constructed and a railway bridge over the Shire River converted also for road use. Also 23 miles of main and secondary roads would be improved. Rural development involving the drilling of 140

boreholes and establishing a health center, seven sub-centers, 30 health posts and improving the service center at Chikwawa Hospital are also included under Phase II. Finally, a research program for irrigated and rainfed crops, pastures and fish farms would be instituted. Total project costs are estimated at \$13.5 million, spread over five years. IDA contribution would be \$10.5 million with the remaining \$3 million coming from GOM sources.

Additionally the production of sugar (not part of the IDA project) is estimated to increase from 39,000 short tons in 1972 to 140,000 tons in 1980. Present plans for the expansion of sugar production do not extend beyond 1980. The marketing of agricultural produce and supplying farm inputs for the farmers will be handled by the Agricultural Development and Marketing Corporation (ADMARC), a parastatal body owned by the GOM.

D. Economic Evaluation

The DMJM study has used two methods to determine the economic viability of improving the road. The methods are based on road user savings (including savings in road maintenance costs) and incremental agricultural benefits from the IDA Shire Valley Agricultural Project - Phase II. In both of these methods three types of traffic movements are considered: normal traffic, diverted traffic, and traffic generated by incremental production in the IDA Phase I and II Projects.

1. Existing and Projected Traffic. The average total 24 hour traffic count for this road at three census points in 1971 was 139 vehicles. Since the count was conducted in 1971, and past vehicle counts indicate a historical increase in excess of ten percent, the estimated 1972 average daily traffic (ADT) of 154 vehicles for the 59 miles of existing road appears reasonable (see Table II). There are no major differences in the traffic census figures between the wet and dry seasons. In some instances the wet season count exceeded the dry season count. Eighty percent of the 1972 estimated traffic consisted of commercial vehicles and forty percent of these would be classified as heavy vehicles.

TABLE II

ESTIMATED AVERAGE DAILY TRAFFIC (ADT) BY VEHICLE TYPES

Vehicle Class	<u>1972</u>	<u>1976</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>
Cars	27	38	54	83	127	196
Trucks (Under 3 ton)	53	75	105	162	250	385
Buses	4	6	8	12	19	29
5 Ton Trucks	26	40	57	85	128	194
7 Ton Trucks	39	34	51	73	105	154
10 Ton Trucks	5	19	28	33	42	56
28 Ton Trucks	-	<u>26</u>	<u>45</u>	<u>45</u>	<u>45</u>	<u>45</u>
	154	238	348	493	716	1,059

The DMJM study assumes that future normal traffic will contain the same percentage by vehicle types as for 1972. Table II indicates this traffic growth plus the anticipated sugar cane traffic and incremental traffic resulting from IDA's Shire Valley Phase II Project. DMJM recognized that traffic generated by the expansion of sugar production and IDA's Phase II incremental agricultural production would exceed the normal percentage increase (9 percent) of existing traffic in the 1976 to 1980 period and that this traffic growth would not continue at the same rate beyond 1980. Therefore traffic projections were developed separately for total sugar production from IDA's Phase II project. Normal traffic increase is estimated at 9 percent and is based on the Economic Intelligence Unit's "Malawi Road Transport Regulation Study" (1970) which estimates annual traffic growth of 8 to 10 percent. Yearly detailed traffic projections (1976-1995) for normal traffic, sugar production traffic and IDA's Phase II incremental production traffic are shown in Annex IV. From 1976 to 1980 total traffic is projected at an annual average increase of 10 percent and for the entire 1976 to 1995 period total traffic increases at an average annual rate of 8.2 percent. Thus a 9 percent per year increase appears reasonable.

2. Vehicle Operating Costs. The following table gives vehicle operating costs for two major vehicle classes - vehicles from 1½ ton to 5 ton including passenger vehicles and vehicles from 7 ton to 28 ton. The difference, for comparison purposes, is that only running costs are considered for vehicles from 1½ ton to 5 ton when determining road improvement benefits since fixed costs for these vehicles are similar on most road surfaces. DMJM study assumes that fixed costs including insurance, crew wages, overheads and interest to be the same on both unimproved and improved roads for these lighter vehicles. However, fixed costs

are considered for vehicles exceeding 5 tons because this size vehicle is more likely to be involved in comparisons between different modes of transport. Therefore, for heavy vehicle transport total economic costs consisting of both running and fixed cost savings are considered. See Annex X for a detailed cost breakdown.

TABLE III VEHICLE OPERATIONAL COSTS

<u>Vehicle Type</u>	<u>Existing Road</u>	<u>Improved Bituminous Road</u>
<u>Running Costs</u> (U.S. Cents per mile)		
Passenger car	11.5	5.9
1½ ton truck	15.9	8.0
3 ton truck	21.5	10.8
5 ton truck	24.5	11.9
<u>Running and Fixed Costs</u> (U.S. Cents per mile)		
7 ton truck	36.9	21.1
10 ton truck	46.5	26.5
28 ton truck	77.9	44.1

3. Road Maintenance Costs and Savings. Maintenance costs are \$996 per mile for the existing road and \$713 per mile for an improved bituminous road. Maintenance replacement cost for the existing road is now about \$2,400 per mile and will increase to over \$12,000 per mile by 1995, assuming normal traffic growth. In comparison the replacement cost for the improved road is estimated at \$4,838 once every five years or \$1,210 per year for resealing. Accordingly total maintenance savings for the improved road range from \$162,500 in 1976 to \$508,826 in 1995. (See Annex XI for a detailed costs and savings breakdown.)

4. Road User Benefits. With improvements to both the Chikwawa-Bangula and the Chikwawa-Blantyre roads, road user savings will primarily arise from three types of traffic movements: (1) transport of sugar and cane; (2) transport of cotton and maize; and (3) normal traffic. The possible savings involved in transport of incremental production of such other commodities as livestock and fish are negligible.

The specific elements that would account for such savings are: (a) improvement of the road surface resulting in lower per mile cost of vehicle operation; (b) improved alignment which would reduce the distance traveled; and (c) a shift to heavier types of vehicles, subsequently, a cost reduction per ton-mile of goods transported. Not all of the traffic movements mentioned above would benefit equally from each of these factors.

a. Transport of Sugar and Cane. Currently, the Sucoma plant ships one-third of its prepackaged sugar by road directly to Blantyre, under an arrangement with the trucking companies, and pays \$6.25 per ton. This is nearly \$2.50 per ton less than when shipment is made via Bangula. The only apparent reason why more sugar is not shipped by road directly to Blantyre is that the escarpment road between Chikwawa and Blantyre is in a very poor condition and its capacity is limited. With the improvement of both the Chikwawa-Bangula and Chikwawa-Blantyre roads, and using 10-ton instead of 7-ton trucks, the cost of shipping sugar by road directly to Blantyre would be reduced by at least one-third to one-half of the \$6.25 per ton presently paid. Obviously, a major re-routing of sugar shipments may be anticipated, with only export sugar shipments going via Bangula. Therefore, sugar, as a single commodity, will be by far the major recipient of benefits arising from improving the road. In all instances, the distances will be reduced and the trucks used will be of larger capacity, resulting in considerable savings. With production scheduled to rise from 39,000 tons in 1972 to 106,000 tons in 1976 and 140,000 tons in 1980, road user savings should be \$255,000 in 1976 and are expected to rise to \$338,750 by 1980 and to remain constant thereafter, barring further expansion of sugar output. (See Annexes VI and VII)

In 1972, only one-third of prepackaged sugar, amounting to 5,000 tons was shipped directly to Blantyre. With road improvements, the tonnage may rise to 66,000 tons in 1976 and to 100,000 tons in 1980, with the balance for exportation going to Bangula by road or barge for further transshipment by rail. With both of the roads improved, only export sugar, estimated to reach 40,000 tons by 1975 and to remain constant therefore, will be shipped to Bangula and the rest directly from Sucoma to Blantyre by road.

Aside from a reduction in distance, there will be a switch to heavier trucks. At present, most of the sugar is hauled in 7-ton trucks, with a carrying capacity of 7.84 short tons. With the improved roads, shipments to Blantyre will be made in 10-ton trucks, with carrying capacities of 11.2 short tons. Assuming a 50 percent load factor, to account for no back-haul, the running costs are 9.40 cents per ton-mile for a 7-ton truck and 4.73 cents per ton-mile for a 10-ton truck, a saving of about 50 percent on a per ton-mile basis alone.

On shipments to Bangula the change will be from a 7-ton truck to a 28-ton truck trailer, with the carrying capacity of the latter at 25.2 short tons (due to legal axle loading limitations). The running cost per ton-mile for the truck trailer with a 50 percent load factor is only 3.50 cents. The savings in this case on a ton-mile basis would amount to about 63 percent. (See Annex VII.)

b. Cane Sugar. Savings in the haulage from the new fields to the sugar factory arise only from the difference in type of road. The distances would not change and the same type of vehicle will be used in both cases, a 28-ton trailer truck with a carrying capacity of 20 tons of cane. Since cane is not a compact material, an 80 percent utilization of carrying capacity or 25.2 tons is assumed.

Without road improvements, it is anticipated that the Sucoma plant would have to construct a private earth road to haul cane. However, with the Chikwawa-Bangula road improved and realigned, the road will pass through the new cane fields and not far from the factory.

The cost per ton-mile for a 28-ton trailer truck, with a 20-ton load and a 50 percent load factor to account for no-back-haul is 7.79 cents for an earth road and 4.41 cents for a bituminous road, a saving of 43 percent. Although the average distance involved is short, varying from 7.9 miles in 1976 to 8.8 miles in 1980, the tonnage of cane to be hauled is considerable, rising from 387,000 short tons in 1976 to 693,000 tons in 1980 and assumed to remain constant thereafter. As a result of road improvement, the total savings in the haulage of cane are estimated to rise from \$103,250 in 1976 to \$205,750 in 1980. (See Annex VII.)

c. Cotton and Maize Haulage. Cotton and maize are the other two agricultural products where user benefits arising from the proposed road improvements, though not very large, are nevertheless significant. They occur primarily because of the difference in transport costs on earth and bituminous roads.

Additional savings, in the case of cotton, will be derived from a shorter average haul; 21 miles after the road is realigned versus 26 miles on the existing road. It has been assumed that cotton is now and will continue to be transported in 7-ton trucks, with a carrying capacity of 7.84 short tons, and maize in 5-ton trucks, with a carrying capacity of 5.60 short tons.

For incremental production of both products, savings in transport costs arising from the proposed road improvements, have been estimated to rise from \$24,625 in 1976 to \$43,250 in 1978 and to remain constant thereafter. Cotton accounts for about two-thirds of the savings and maize one-third. (See Annex VIII.)

d. Normal Traffic. In addition to incremental production of agricultural products generated by Phase II of the Shire Valley Project and the rapidly increasing outputs of cane and sugar, there should be a steady growth of output of other agricultural products in the valley, such as timber and fruits

and vegetables. There should also be a growing supply of agricultural inputs, consumer goods and construction materials which are brought into the valley to supply the needs of its inhabitants. There is also some through traffic consisting of buses and passenger cars. All these movements are considered "normal traffic." This traffic, which is expected to grow at an annual rate of 9 percent will likewise benefit greatly by the projected road improvements.

Road user benefits are estimated to start in 1976, the first year when the improved road is expected to be in operation. These estimated savings were based on a shorter distance of 52 miles on the relocated road compared to 59 miles on the existing road and also taking into consideration the difference in running costs per vehicle-mile on an earth versus bituminous surface. The estimated savings in normal traffic for 1976 is estimated at \$406,125. (See Annex IX)

The 1976 benefits were projected through 1995, on the basis of the same 9 percent annual growth rate. Throughout nearly all of the 1976-1995 period, the estimated normal traffic savings account for the bulk of all estimated road users' savings.

5. Incremental Agricultural Benefits and Costs.

a. Benefits. Because of improvements to the road, the Shire Valley Phase II Project will realize incremental agricultural benefits due to a more efficient service and lower cost of transporting agricultural products to markets.

The incremental agricultural output in 1978/79 is expected to equal 19,215 tons of cotton, 12,585 tons of maize, and 1,160 tons of sorghum/millet. The corresponding farmgate values are \$2,834,250, \$314,625 and \$36,250 or a total of \$3,185,125.

The value of incremental output is based on the farmgate prices paid by the Agricultural Development and Marketing Corporation (ADMARC) to farmers during 1972 and adjusted to the 1973 level by allowing a 5 percent annual increase to account for inflation. (See Annex V.)

Improvements in livestock production are expected to be achieved mainly through improved breeding, better veterinary care and the wide use of dipping tanks. There is also a difference in hide utilization. Without the IDA Project, hide utilization is taken at 30 percent, whereas with the Project, hide utilization is taken at 75 percent.

The fishing grounds comprise the Elephant Marsh, Bangula Marsh, Ntindi Marsh and the Shire River. Only a small part of these areas are within the area of the Chikwawa-Bangula road. The incremental fish catch in the Shire Valley is estimated to increase from 300 tons of fresh fish in the first year of development to 3,900 tons in the fifth year. To provide facilities for smoking 80 percent of this incremental catch, the Fisheries Department of the Ministry of Agriculture intends to construct 50 new kilns, of which about 12 will be in the area of the Chikwawa-Bangula road. DMJM estimates that only 25 percent of the incremental catch and its value at landings will be from within the area of the road. Therefore, the benefits shown in Annex V reflect only 25 percent of total benefits. The figures were set back, however, by one year to provide a year lag between investment and incremental production.

b. Costs. To sustain the incremental agricultural benefits that will accrue to the road, a portion of the Shire Valley Agricultural Project's investments and operating expenses are chargeable to the road. See Annex XII for an itemized breakdown of incremental investment and operational costs charged to the road.

E. Benefit-Cost Analysis and Internal Rate of Return.

1. Benefits. Two approaches to benefit analysis have been used in the evaluation of this project. In the first approach, the benefits are confined to road users' savings and the anticipated reduction in road maintenance costs. The former consists of estimated savings involved in normal traffic, sugar and cane haulage, and in the transport of cotton and maize. See Annex XIII.

In the second approach, the benefit stream includes the farmgate value of incremental production arising from Phase II of the IDA's Shire Valley Agricultural Project consisting of field crops, livestock and fish. All benefits used in the first approach are also included here except road users' savings involved in the transport of cotton and maize. These latter are excluded since it is assumed that such savings are already reflected in the farmgate prices received by farmers for these products. If road improvements are not made, transport costs would rise and the prices received by farmers would be lower than those used in this study in order to absorb higher transport costs. See Annex XIV.

2. Costs. In the first approach, the only cost items are the cost of final design, construction and construction supervision of the road. They are estimated in the Technical

Analysis Section and divided approximately equally between 1974 and 1975, the two years during which the road construction is expected to take place.

In the second approach, the cost stream includes, in addition to the construction and engineering, all appropriate incremental investments during Phase II of the Agricultural Project to be made within the area of the road during the six-year development period, 1973-1978 inclusive, and the corresponding annual operating expenses during the entire evaluation period, 1973-1995. Included in this cost are one-quarter of IDA's Shire Valley Phase I Project, developmental costs and administrative costs. These costs have been charged to the present project on the assumption that a part of such expenditures, particularly those of an investment nature, made during Phase I will continue to be utilized and yield benefits during Phase II.

The cost streams for the two methods of approach are shown in the same Annexes as the benefit streams.

3. Internal Rate of Return

Calculations of internal rate of return were made for each of the two methodologies employed. The internal rate was determined by finding an interest rate which, when used to discount the data in the column showing the difference between benefits and costs, brings the sum of discounted values to zero.

In the first method of approach, where benefits are confined to user savings and a reduction in road maintenance costs, the internal rate of return was found to be 14.7 percent.

In the second method, where incremental agricultural benefits from Phase II development are included, the internal rate of return was calculated at 18.2 percent. See Annex XV.

Since the GOM is actively involved in final loan negotiations with the Portuguese Government for improving the Chikwawa-Blantyre road, we believe it is not relevant to calculate on Internal Rate of Return based on the unlikely event that this road not be improved in the near future. GOM officials indicated that construction to upgrade this road would probably start at the end of 1973.

F. Incidence of Other Benefits. At independence, Malawi had a grossly inadequate transportation system, but massive investments in all transportation modes have since eliminated most of the bottlenecks. The largest portion of public sector investment since 1964 has been for transportation. The expansion of the transport system has been a prerequisite for raising agricultural production and exports, and subsequently raising the standard of living of small farmers. It is estimated by the IDA that average annual net cash incomes of farm families within the area of the road and involved in the IDA Shire Valley Agricultural Project should increase from about \$11 to between \$95 and \$120 per annum. Malawi's per capita GDP in 1971 was estimated at about \$84 and its per capita rural income at about \$50. It would appear that the small farmers and primarily the poorer part of Malawi's population will benefit. Not only will the small farmer realize an increase in his cash income due to improved agricultural practices and an all-weather road but also other benefits to road users such as an increased mobility of people and a greater movement of goods and services.

IV. Financial Analysis

A. Financial Requirements. The following financial requirements are based on DMJM's preliminary 1973 cost estimates plus a 20 percent construction cost escalation provision added since construction will not start until mid-1974. Also a 13 percent contingency is added for any unexpected increases of quantities and costs in materials.

	<u>FX COSTS</u>	<u>LOCAL COSTS</u>	<u>TOTAL COSTS</u>
Final Engineering	\$ 405,000	\$ 45,000	450,000
Engineering Construction Supervision	540,000	135,000	675,000
Road Construction	<u>5,077,800</u>	<u>2,737,200</u>	<u>7,815,000</u>
Chikwawa-Bangula Road Sub-total	6,022,800	2,917,200	8,940,000
Lilongwe Mchinji Road Sub-total Final Engineering	510,000	90,000	600,000
Total	\$6,532,800	\$3,007,200	\$9,540,000

B. Financial Plan. The following is the proposed financial plan for the project. The GOM's financial contribution resembles closely the project cost percentage assumed in the IDA Shire Valley Phase II Agricultural Project.

	<u>FX COSTS (%)</u>	<u>LOCAL COSTS (%)</u>	<u>TOTAL (%)</u>
AID	\$6,532,800(100%)	\$1,767,200(58%)	\$8,300,000(87%)
GOM	-	1,240,000(42%)	1,240,000(13%)
TOTAL	\$6,532,800	\$3,007,200(100%)	\$9,540,000

C. Other Sources of Assistance. In the absence of any budgetary savings most of the development outlay during 1964-71 was financed by external assistance. Throughout the period, the United Kingdom remained the single main source of foreign aid, both in absolute and relative terms, although of diminishing importance. Aid from the U.K. to Malawi has gradually changed from grants to soft loans, and from contributions to the recurrent budget to aid to the development budget. In this process, total aid disbursements from the U.K. decreased from \$21.3 million (70 percent grants) in 1964 to \$15 million (10 percent grant) in 1971/72. In the same period, aid to the recurrent budget decreased from \$17.5 million to \$5 million and aid to the development budget increased from \$3.8 million to \$10 million. While the U.K. reduced its aid, Malawi was able gradually to mobilize finances from other foreign sources, both bilateral (mainly South Africa, Germany and U.S.A.) and multilateral (mainly World Bank Group), so that sources other than the U.K. now provide about 70 percent of Malawi's external finances for development.

South Africa has become an important creditor since 1969, largely as a result of the loans extended to finance the Nacala railway project and the new capital at Lilongwe. One loan for the equivalent of \$12 million was extended by the Industrial Development Corporation of South Africa to finance the Nacala railway project and another for \$2.3 million was extended for the purchase of rolling stock for the line. In 1969 the South African Government extended a \$11.2 million to finance the new capital of which \$7 million had already been disbursed by the end of 1970. The loans outstanding from the IDA have been used for the Lilongwe and the Shire Valley agricultural development schemes, as well as for education, road and electric power projects. A large part of the loans from Germany have been used for the Salima agricultural scheme and

road construction. These loans carry rates of interest ranging from 2 percent to 5 percent and have maturities ranging from 15 to 30 years. A.I.D. has extended a \$8.2 million loan to finance a section of the Lakeshore Road and a loan of \$1.2 million to finance construction of seven university dormitories.

D. Prospects for Repayment. At the end of 1971, Malawi's external public debt was U.S. \$175.9 million, including undisbursed commitments of U.S. \$35.5 million. Interest and amortization payments in 1971 amounted to U.S. \$6.3 million or 7.8 percent of the value of exports of goods and non-factor services. The distribution of external debt is as follows:

TOTAL EXTERNAL PUBLIC DEBIT BY SOURCE, 1971

<u>Source</u>	<u>Amount</u>	<u>Percent</u>
IDA	\$ 40.0	22.7
<u>Bilateral</u>		
U.K.	66.3	37.7
South Africa	22.9	13.0
Federal Republic of Germany	10.8	6.1
Denmark	7.9	4.5
U.S.A.	7.2	4.1
Suppliers, Private Banks & Others	<u>20.8</u>	<u>11.9</u>
TOTAL	\$175.9	100.0

The GOM's projection of the debt service over the 1970s assumes that over half of the required public capital inflow will be available on the softest terms available and the rest on increasingly harder terms, with 10 percent on full commercial terms. Based on these assumptions the total debt service will amount to \$14.4 million in 1975 and \$25 million in 1980. As a percentage of exports of domestic goods and services, the debt service ratio will rise to 13.7 percent in 1975, peaking at 15.9 percent in 1978 and easing to 14.6 percent in 1980. Any shortfall in exports or an increase in the rate of growth of imports would necessitate higher capital inflows and raise the debt service ratio. Based upon the foregoing, it is concluded that there are reasonable prospects for repayment of this loan.

V. Economic Effects of the Loan.

A. Effect on U.S. Economy and Balance of Payments.

This loan will assist the U.S. economy by employing a U.S. engineering firm to prepare final design and construction supervision for the road. Furthermore, it is likely that a U.S. construction contractor or a U.S. contractor in joint venture with a local or 941 Code country firm will probably construct the road since it is doubtful that any local contractor has the construction capabilities to carry out the job.

B. Effect on Private Enterprise. The proposed loan will finance a contract with private engineering and construction firms. Additionally, once completed, the road will assist in the development of privately-owned farms and increase commerce in the area of the road.

ANNEX I

CHECKLIST OF STATUTORY CRITERIA
DEVELOPMENT LOAN FUND

Many of the questions require only yes or no answers. Others, however, must be answered more fully. In those cases, a specific reference to explicit discussion of the matter in the loan paper will suffice. But where the loan paper does not deal explicitly with a matter that clearly requires more than a yes or no response, sufficient response must be made to indicate that the matter has been appropriately considered.

The following abbreviations are used in the checklist:

FAA - Foreign Assistance Act of 1961, as amended, incorporating amendments effected by the Foreign Assistance Act of 1971.

App. - Foreign Assistance and Related Agencies Appropriations Act, 1971.

MMA - Merchant Marine Act of 1936, as amended

Space for answers is provided in the margin to the right of each question. This form must be made a part of the Capital Assistance Paper.

I. COUNTRY PERFORMANCE

A. Progress Towards Country Goals

1. FAA §§ 201(b)(5), 201(b)(7), 201(b)(8), 208. Discuss the extent to which the country is:

(a) Making appropriate efforts to increase food production and improve means for food storage and distribution.

Satisfied. Malawi has given appropriate emphasis to increasing food production. Road construction and improving road network will directly contribute. Malawi recently signed 2 loans with IBRD/IDA to develop agricultural schemes.

(b) Creating a favorable climate for foreign and domestic private enterprise and investment.

Satisfied. Malawi has signed an Investment Guarantee Agreement with the U.S. It has established the Malawi Development Corporation which assists and encourages investment.

(c) Increasing the people's role in the developmental process.

Satisfied. GOM has established a corps of young pioneer groups now actively participating in Malawi's development. Developmental programs have been intended to benefit the general population.

(d) Allocating expenditures to development rather than to unnecessary military purposes or intervention in other free countries' affairs.

Satisfied. Major budget allocations are to development and recurring non-defense budgets.

(e) Willing to contribute funds to the project or program.

Satisfied. The GOM will make a substantial contribution to this project and other projects financed by the IDA, U.K. and FRG.

(f) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangement; and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.

Satisfied. Within the limits of the segment of its population in the money economy, a tax system has been established. New lands are developed outside of the traditional tribal holdings. Land tenure is not a major problem in Malawi.

(g) Responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

Satisfied. GOM has assumed responsibility for local costs of external assistance projects and the 1971-80 Development Plan is reasoned response to the needs of Malawi.

B. Relations with the United States

1. FAA §620(c). Is the government indebted to any U.S. citizen for goods or services furnished or ordered where: (a) such citizen has exhausted available legal remedies, including arbitration, or (b) the debt is not denied or contested by the government, or (c) the indebtedness arises under such government's, or a predecessor's unconditional guarantee?

Satisfied. No such indebtedness exists.

2. FAA §620(d). If the loan is intended for construction or operation of any productive enterprise that will compete with U.S. enterprise, has the country agreed that it will establish appropriate procedures to prevent export to the U.S. of more than 20% of its enterprise's annual production during the life of the loan?

Satisfied. Not applicable.

3. FAA §620(e)(1). Has the country's government, or any agency or subdivision thereof, (a) nationalized or expropriated property owned by U.S. citizens or by any business entity not less than 50% beneficially owned by U.S. citizens, (b) taken steps to repudiate or nullify existing contracts or agreements with such citizens or entity, or (c) imposes or enforced discriminatory taxes or other exactions, or restrictive maintenance or operation conditions? If so, and more than six months has elapsed since such occurrence, identify the document indicating that the government, or appropriate agency or subdivision thereof, has taken appropriate steps to discharge its obligations under international law toward such citizen or entity? If less than six months has elapsed, what steps if any has it taken to discharge its obligations?

Satisfied. Malawi has not taken such steps or actions.

4. FAA §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, and failed to take appropriate measures to prevent a recurrence and to provide adequate compensation for such damage or destruction?

Satisfied. There has been no such action against U.S. property in Malawi.

5. FAA §620(l). Has the government instituted an investment guaranty program under FAA §221(b)(1) for the specific risks of inconvertibility and expropriation or confiscation?

Yes.

6. FAA §620(o); Fisherman's Protective Act of 1954, as amended, Section 5. Has the country seized, or imposed any penalty or sanction against, any U.S. fishing vessel on account of its fishing activities in international waters? If, as a result of a seizure, the U.S.G. has made reimbursement under the provisions of the Fisherman's Protective Act and such amount has not been paid in full by the seizing country, identify the documentation which describes how the withholding of assistance under the FAA has been or will be accomplished.

Not applicable. Country is land-locked.

7. FAA §620(q). Has the country been in default, during a period in excess of six months, in payment to the U.S. on any FAA loan?

Satisfied. Malawi is not in default on any FAA loan.

8. FAA §620(t). Have diplomatic relations between the country and the U.S. been severed? If so, have they been renewed?

Satisfied. The U.S. and GOM have maintained diplomatic relations since Malawi's independence.

C. Relations with Other Nations and the U.N.

1. FAA §620(i). Has the country been officially represented at any international conference when that representation included planning activities involving insurrection or subversion directed against the U.S. or countries receiving U.S. assistance?

Satisfied. The GOM has attended no such conference.

2. FAA §§620(a), 620(n);

Has the country sold, furnished, or permitted ships or aircraft under its registry to carry to Cuba or North Viet-Nam items of economic, military, or other assistance?

Satisfied. Malawi has taken no such actions.

3. FAA §620(u); App. §108 What is the status of the country's U.N. dues, assessments, or other obligations? Does the loan agreement bar any use of funds to pay U.N. assessments, dues, or arrearages?

Satisfied. Malawi is not in default on its international obligations. The loan agreement suits the use of loan funds for the specific project.

D. Military Situation

1. FAA §620(i). Has the country engaged in or prepared for aggressive military efforts directed against the U.S. or countries receiving U.S. assistance?

Satisfied. Malawi is neither engaging in nor preparing for aggressive military efforts.

2. FAA §620(a). What is (a) the percentage of the country's budget devoted to military purposes, and (b) the amount of the country's foreign exchange resources used to acquire military equipment? Is the country diverting U.S. development assistance or P.L. 480 sales to military expenditures? Is the country diverting its own resources to unnecessary military expenditures? (Findings on these questions are to be made for each country at least once each fiscal year and, in addition, as often as may be required by a material change in relevant circumstances.) Has the country spent money for sophisticated weapons?

Satisfied.

(a) 2.5%

(b) Negligible

It has been determined that Malawi is not expending an unnecessary or excessive portion of its budget for military purposes. Malawi has not purchased sophisticated weapons systems.

II. CONDITION OF THE LOAN

A. General Soundness

-- Interest and Repayment

1. FAA §§201(d), 201(b)(2). Is the rate of interest excessive or unreasonable for the borrower? Are there reasonable prospects for repayment? What is the grace period interest rate; the following period interest rate? Is the rate of interest higher than the country's applicable legal rate of interest?

Satisfied. The rate of interest is not excessive or unreasonable. The rate of interest is not higher than the legal rate. Also see Section IV.D of CAP and "Summary and Recommendations".

-- Financing

1. FAA §201(b)(1). To what extent can financing on reasonable terms be obtained from other free-world sources, including private sources within the U.S.?

Satisfied. See Section IV.C of CAP.

-- Economic and Technical Soundness

1. FAA §§201(b)(2), 201(e). The activity's economic and technical soundness to undertake loan; does the loan application, together with information and assurances, indicate that funds will be used in an economically and technically sound manner?

Satisfied. See Sections II and III of CAP.

2. FAA §611(a)(1). Have engineering, financial, and other plans necessary to carry out assistance, and a reasonably firm estimate of the cost of assistance to the U.S., been completed?

Satisfied. See Sections II and III.

3. FAA §611(b); App. §101. If the loan or grant is for a water or related land-resource construction project or program, do plans include a cost-benefit computation? Does the project or program meet the relevant U.S. construction standards and criteria used in determining feasibility?

Not applicable, however see Section III.E of CAP.

4. FAA §611(e). If this is a Capital Assistance Project with U.S. financing in excess of \$1 million, has the principal A.I.D. officer in the country certified as to the country's capability effectively to maintain and utilize the project?

Satisfied. See Annex II to CAP.

B. Relation to Achievement of Country and Regional Goals.

-- Country Goals

1. FAA §§207, 281(a). Describe this loan's relation to:

a. Institutions needed for a democratic society and to assure maximum participation on the part of the people in the task of economic development.

Although this loan has direct relation to this goal, improving a transportation system is certainly a prerequisite to any serious efforts to increase the involvement of its people in the task of development

- b. Enabling the country to meet its food needs, both from its own resources and through development, with U.S. help, of infrastructure to support increased agricultural productivity.*
- Satisfied. This project will help agricultural development.
- c. Meeting increasing need for trained manpower.*
- No direct relation.
- d. Developing programs to meet public health needs.*
- Not applicable.
- e. Assisting other important economic, political, and social development activities, including industrial development; growth of free labor unions; cooperatives and voluntary agencies; improvement of transportation and communication systems; capabilities for planning and public administration; urban development; and modernization of existing laws.*
- Satisfied. This project and the previously authorized Lakeshore Road project provide assistance in all these areas.
2. FAA §201(b)(4). *Describe the activity's consistency with and relationship to other development activities, and its contribution to realizable long-range objectives.*
- Satisfied. See Sections I.A. and I.B. of CAP.

3. FAA §201(b)(9). How will the activity to be financed contribute to the achievement of self-sustaining growth?

Satisfied. See Section III.B and C of CAP.

4. FAA §201(f). If this is a project loan, describe how such project will promote the country's economic development, taking into account the country's human and material resource requirements and the relationship between ultimate objectives of the project and overall economic development.

Satisfied. See Section I.A. and III.B.

5. FAA §201(b)(3). In what ways does the activity give reasonable promise of contributing to development of economic resources, or to increase of productive capacities?

Satisfied. See Section III.E.

6. FAA §281(b). How does the program under which assistance is provided recognize the particular needs, desires, and capacities of the country's people; utilize the country's intellectual resources to encourage institutional development; and support civic education and training in skills required for effective participation in political processes.

The A.I.D. program in Malawi has been developed with all of these criteria in mind. The most recent project is the A.I.D. loan to the University of Malawi.

7. FAA §601(a). How will this loan encourage the country's efforts to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, 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?

Satisfied as to (a), (b), (c), (d) and (e). See Sections II and V of CAP. No direct relationship as regards (f).

8. FAA §202(a). Indicate the amount of money under the loan which is: going directly to private enterprise; going to intermediate credit institutions or other borrowers for use by private enterprise; being used to finance imports from private sources; or otherwise being used to finance procurements from private sources.

Satisfied. The entire loan amount will finance goods and services from private sources.

9. FAA §611(a)(2). What legislative action is required within the recipient country? What is the basis for a reasonable anticipation that such action will be completed in time to permit orderly accomplishment of purposes of loan?

Satisfied. No action required.

-- *Regional Goals*

1. FAA §619. *If this loan is assisting a newly independent country, to what extent do the circumstances permit such assistance to be furnished through multilateral organizations or plans?*

The IDA is financing an agricultural project which will directly benefit from improving the road. See Section I.A. of CAP.

2. FAA §209. *If this loan is directed at a problem or an opportunity that is regional in nature, how does assistance under this loan encourage a regional development program? What multilateral assistance is presently being furnished to the country?*

Satisfied. Malawi's geopolitical setting does not readily lend itself to regional projects. However, see Section I.A of CAP.

C. Relation to U.S. Economy

-- *Employment, Balance of Payments, Private Enterprise*

1. FAA §§201(b)(6); 102, Fifth. *What are the possible effects of this loan on U.S. economy, with special reference to areas of substantial labor surplus? Describe the extent to which assistance is constituted of U.S. commodities and services, furnished in a manner consistent with improving the U.S. balance of payments position.*

Satisfied. See Section V.A of CAP.

2. FAA §612(b), 636(h). What steps have been taken to assure that, to the maximum extent possible, foreign currencies owned by the U.S. and local currencies contributed by the country are utilized to meet the cost of contractual and other services, and that U.S. foreign-owned currencies are utilized in lieu of dollars?

Satisfied. The GOM contribution is the maximum contribution permissible given the country's stringent financial situation. No U.S.-owned local currency is available.

3. FAA §601(d); App. §109. If this loan is for a capital project, to what extent has the Agency encouraged utilization of engineering and professional services of U.S. firms and their affiliates? If the loan is to be used to finance direct costs for construction, will any of the contractors be persons other than qualified nationals of the country or qualified citizens of the U.S.? If so, has the required waiver been obtained?

Satisfied. See Sections II and V of CAP. The loan agreement will contain the standard A.I.D. clause in regard to third-country nationals.

4. FAA §608(a). Provide information on measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items.

Satisfied. Not practical in construction projects of this type.

5. FAA §602. What efforts have been made to assist U.S. small business to participate equitably in the furnishing of commodities and services financed by this loan?

Satisfied. A.I.D. procedures will be followed to provide notice of intended procurement to U.S. small business.

6. FAA §621. If the loan provides technical assistance, how is private enterprise on a contract basis utilized? If the facilities of other Federal agencies will be utilized, in what ways are they particularly suitable; are they competitive with private enterprise (if so, explain); and how can they be made available without undue interference with domestic programs?

Satisfied. The loan contains no financing for technical assistance.

7. FAA §611(c). If this loan involves a contract for construction that obligates in excess of \$100,000, will it be on a competitive basis? If not, are there factors which make it impracticable?

Satisfied . USG competitive procurement procedures will be followed.

-- Procurement

1. FAA §604(a). Will commodity procurement be restricted to U.S. except as otherwise determined by the President?

Yes.

2. FAA §604(b). Will any part of this loan be used for bulk commodity procurement at adjusted prices higher than the market price prevailing in the U.S. at time of purchase?

No.

3. FAA §604(e). Will any part of this loan be used for procurement of any agricultural commodity or product thereof outside the U.S. when the domestic price of such commodity is less than parity?

No.

D. Other Requirements

1. FAA §201(b). Is the country among the 20 countries in which development loan funds may be used to make loans in this fiscal year?

Yes.

2. App. 1106. Does the loan agreement provide, with respect to capital projects, for U.S. approval of contract terms and firms?

Satisfied. The loan agreement will contain such provisions.

3. FAA §620(k). If the loan is for construction of a productive enterprise, with respect to which the aggregate value of assistance to be furnished will exceed \$100 million, what preparation has been made to obtain the express approval of the Congress?

Not applicable.

4. FAA §620(b), 620(f):

Has the President determined that the country is not dominated or controlled by the international Communist movement? If the country is a Communist country (including, but not limited to, the countries listed in FAA §620(f)) and the loan is intended for economic assistance, have the findings required by FAA §620(f) been made and reported to the Congress?

Satisfied. Malawi is not a Communist or Communist-dominated country.

5. FAA §620(h). *What steps have been taken to insure that the loan will not be used in a manner which, contrary to the best interest of the United States, promotes or assists the foreign aid projects of the Communist-bloc countries?*

Satisfied. The project has no relation to any Communist-bloc project.

6. App. §110. *Will any funds be used to finance procurement of iron and steel products for use in Vietnam other than as contemplated by §110.*

No.

7. FAA §636(i). *Will any part of this loan be used in financing non-U.S.-manufactured automobiles? If so, has the required waiver been obtained?*

No.

8. FAA §§620(a)(1) and (2), 620(p); No.
*Will any assistance
 be furnished or funds made avail-
 able to the government of Cuba or
 the United Arab Republic?*
9. FAA §620(a). *Will any part
 of this loan be used to compensate
 owners for expropriated or nationalized
 property? If any assistance has
 been used for such purpose in the
 past, has appropriate reimbursement
 been made to the U.S. for sums diverted?* No; only project costs
 will be financed.
10. FAA §201(f). *If this is a
 project loan, what provisions have
 been made for appropriate partici-
 pation by the recipient country's
 private enterprise?* Satisfied. Local contract-
 ors and suppliers will be
 eligible to bid on goods
 and services financed
 under the loan
11. App. §104. *Does the loan
 agreement bar any use of funds to
 pay pensions, etc., for persons
 who are serving or who have served
 in the recipient country's armed
 forces?* Satisfied. The loan
 agreement will bar such
 use of funds.

12. MMA § 901.b. Does the loan agreement provide, for compliance with U.S. shipping requirements, that at least 50% of the gross tonnage of all commodities financed with funds made available under this loan (computed separately by geographic area for dry bulk carriers, dry cargo liners, and tankers) be transported on privately owned U.S.-flag commercial vessels to the extent such vessels are available at fair and reasonable rates for U.S. flag vessels. Does the loan agreement also provide for compliance with U.S. shipping requirements, that at least 50% of the gross freight revenues of goods shipped under this loan must be earned by privately owned U.S.-flag commercial vessels to the extent such vessels are available at fair and reasonable rates for U.S.-flag vessels?
- Satisfied. The loan agreement will require compliance with U.S. shipping requirements.
13. FAA. Section 481. Has the country failed to take adequate steps to prevent narcotic drugs from entering the U.S. unlawfully?
- No.
14. FAA. Section 604.e. Has there been compliance with restriction against procuring with AID funds agricultural commodities outside the U.S. when the domestic price of such commodity is less than parity.
- No agricultural commodities will be procured with funds provided under this loan.



Department of State

TELEGRAM

UNCLASSIFIED 061

PAGE 01 MRABAN 00848 021307Z

47
ACTION AID-59

INFO OCT-01 ADP-00 AF-05 L-03 ER-01

R 021245Z MAY 73
FM AMEMBASSY MRABANE
TO SECSTATE WASHDC 4871
INFO AMEMBASSY NAIROBI
AMEMBASSY BLANTYRE

UNCLAS MRABANE 0848

AIDAC

NAIROBI FOR REDSO/EA

E. O. 11652: N/A

SUBJ: CHIKWAWA-BANGULA ROAD 611 (E) DETERMINATION

REF: A) STATE 79104; B) NAIROBI 2759; C) NAIROBI 2711

1. SUBJECT CERTIFICATION SIGNED BY RDO ON MAY 2, 1973 READS AS FOLLOWS: QUOTE I, CHARLES D. WARD, THE PRINCIPAL OFFICER OF THE AGENCY FOR INTERNATIONAL DEVELOPMENT IN THE SOUTHERN AFRICA REGION (OSARAC), HAVING TAKEN INTO ACCOUNT, AMONG OTHER THINGS, THE MAINTENANCE AND UTILIZATION OF PROJECTS IN MALAWI PREVIOUSLY FINANCED OR ASSISTED BY THE UNITED STATES (SPECIFICALLY THE LAKE SHORE ROAD), THE PERFORMANCE OF THE MINISTRY OF WORKS AND SUPPLIES WHICH HAS RESPONSIBILITY FOR MAINTAINING ROADS THROUGHOUT MALAWI, AND THE PREVIOUS ASSISTANCE FROM OTHER DONORS SPECIFICALLY DIRECTED TO ROAD CONSTRUCTION AND MAINTENANCE, DO HEREBY CERTIFY THAT IN MY JUDGMENT THE GOVERNMENT OF MALAWI HAS BOTH THE FINANCIAL CAPABILITY AND THE HUMAN RESOURCE CAPABILITY TO EFFECTIVELY MAINTAIN AND UTILIZE THE CAPITAL ASSISTANCE PROJECT TO BE CONSTRUCTED UNDER THIS LOAN, THE CHIKWAWA-BANGULA ROAD. END QUOTE.

2. POUCHING COPIES OF SIGNED DOCUMENT TO AID/W AND

MALAWI'S ECONOMIC PERFORMANCE

Although endowed with relatively modest natural resources, Malawi has made considerable economic progress since attaining independence in 1964. This progress has been widespread and has stemmed largely from an increase in agricultural production and exports, an improvement in the supporting infrastructure, and the development of manufacturing industries geared to processing domestic crops and to producing import substitutes. There has also been expansion in practically all other sectors of the economy. As a result, during the period 1964-70 the gross domestic product at market prices rose at a compound annual rate of 10.2 per cent at current prices and of 5.4 per cent in real terms. Gross national product (GNP) increased at a slightly faster pace, reflecting a gradual reduction in net factor payments abroad owing mainly to rising remittances from migrant Malawian workers. GDP per capita rose from about \$50 in 1964 to \$ 84 in 1971, representing an annual rate of increase of 68 per cent.

These developments involved some significant changes in the structure of the economy. The value added of the monetary sector expanded at a much faster pace than that of the subsistence sector. Consequently, the contribution of the monetary sector to GDP at market prices rose from 52.2 per cent in 1964 to 62.5 per cent in 1970. In the case of agriculture, forestry and fishing, the rate of increase of marketed production was more than twice as large as that of subsistence production, the expansion in the agricultural sector as a whole was lower than that of GDP. Hence the share of this sector in GDP showed a steady decline from 57.9 per cent in 1964 to 51 per cent in 1970. Over the same period the share of manufacturing increased from 8.3 per cent to 12.6 per cent and that of distribution from 8.1 per cent to 9.6 per cent.

In 1970 Malawi's economic growth was lower than in most recent years. Although GDP at current market prices rose by 10.3 per cent to \$356 million, in real terms the rise was equivalent to 1.8 per cent, compared with 7.5 per cent in 1969. The slowdown in the rate of growth was attributable largely to unfavorable weather conditions, which adversely affected production of food crops, particularly maize. However, production of most export crops expanded considerably, and with generally favorable export prices, total exports continued to increase. Other factors in the slowdown in 1970 were a leveling off of building and construction activity, mainly as a result of the completion of the Nacala railway project providing a second link for the Malawi rail system with that of Mozambique, and a lower rate of expansion in the distribution sector.

In 1971 there was a marked acceleration in the growth of the economy. With better weather conditions and an increase in areas under cultivation,

production of food crops showed important gains, while output of most export crops also increased considerably. According to certain forecasts prepared by the authorities on the basis of 1970 prices, the value added of agriculture and its related activities was expected to increase by 11.8 per cent in 1971. As in previous years, the most dynamic section of agriculture was expected to be the estates, partly reflecting the favorable response of growers to expanding opportunities in the tobacco market as well as the success in establishing Malawian growers on an estate basis. The substantial expansion in agricultural production was expected to contribute importantly to the growth of other sectors of the economy, particularly distribution whose value added was forecast to rise by 9.9 per cent. Growth in manufacturing was expected to slow down somewhat, largely on account of decline in demand for construction materials and the absence of any new large producing units coming into operation. Altogether it was forecast that in 1971 GDP would show an increase of 17.1 per cent at current market prices and of some 9 per cent in real terms.

The rapid growth in GDP since 1964 was accompanied by an even larger increase in gross domestic expenditure. During the period 1964-70 such expenditure rose at a compound annual rate of 11.2 per cent at current prices, owing mainly to a very marked increase in both private and public investment financed largely from abroad. Total gross fixed investment rose from 8.7 per cent of GDP in 1964 to 17.9 per cent in 1970. Consumption expenditure also increased but at a slower pace than GDP, permitting a gradual expansion of domestic savings which rose from a negligible amount in 1964 to 6.7 per cent of GDP in 1970. As the increase in gross domestic expenditure outstripped the growth of GDP, the resources gap rose from \$14.6 million in 1964 to \$48.0 million in 1970.

With the anticipated growth in output and incomes, in 1971 consumption expenditure was expected to grow markedly. However, as a decline was forecast in private investment and as public investment was expected to increase only moderately, gross domestic expenditure was forecast to expand by 14.1 per cent, or at a lower rate than GDP. Consequently, it was envisaged that the resources gap would be reduced by 8.2 per cent to \$ 44.0 million in 1971.

ESTIMATED TOTAL AVERAGE DAILY TRAFFIC (ADT) FOR 1976 - 1995

Year	Normal <u>a/</u>	Sugar <u>b/</u>	Cane <u>b/</u>	Phase II		Total
				Incremental Cotton	Maize <u>d/</u>	
1976	191	19	19	6	3	238
1977	208	20	22	8	4	262
1978	226	22	27	11	5	291
1979	247	24	32	11	5	319
1980	269	25	38	11	5	348
1981	293	25	38	11	5	372
1982	320	25	38	11	5	399
1983	348	25	38	11	5	427
1984	380	25	38	11	5	459
1985	414	25	38	11	5	493
1986	451	25	38	11	5	530
1987	492	25	38	11	5	571
1988	536	25	38	11	5	615
1989	584	25	38	11	5	663
1990	637	25	38	11	5	716
1991	694	25	38	11	5	773
1992	757	25	38	11	5	836
1993	825	25	38	11	5	904
1994	899	25	38	11	5	978
1995	980	25	38	11	5	1,059

Note: a/ 9% Annual Growth of Normal Traffic (Sugar Transport Excluded)

b/ Represents the number of trucks required multiplied by the ratio of the distance hauled to the total length of the road (52 miles for improved road), divided by 310 days and then doubled to allow for the return haul. The figures shown for sugar cane apply only to the improved road since, if the road is not realigned, cane from the new fields, it is assumed, will be transported on private earth roads. Transport requirements for sugar and cane between 1980 and 1995 are assumed to remain constant.

c/ Represents the number of trucks required for cotton, fertilizers and insecticides multiplied by the ratio of 26/59, that is the ratio of the average distance hauled on the existing alignment to the total length of the existing road, divided by 310 days and then doubled to allow for the return haul. This, in effect, represents the number of trucks required multiplied by 0.00284. With the new alignment, the ratio of the distance hauled to the total length of the improved road would be 21/52 and the corresponding coefficient 0.00261.

d/ Represents the number of trucks required for maize, seed and fertilizers multiplied by the ratio 15/59, that is the ratio of the assumed average distance hauled to the total length of the existing road, divided by 310 days and then doubled to allow for the return haul. This, in effect, represents the number of trucks required multiplied by 0.00164. It is deemed that the changes in the average length of haul produced by the new road alignment would be inconsequential in this case.

Source: DMJM Report.

ANNEX V

INCREMENTAL AGRICULTURAL, LIVESTOCK AND FISH PRODUCTION
FROM IDA'S PHASE II SHIRE VALLEY AGRICULTURAL PROJECT IN THE AREA OF THE ROAD
1974 - 1995

PRODUCT	PRESENT AND FISCAL YEAR				
	Year 2 1974/75	Year 3 1975/76	Year 4 1976/77	Year 5 1977/78	Year 6 1978/79 a/
Incremental Production (tons):					
Cotton	3,700	7,270	11,100	15,220	19,215
Maize	1,790	4,385	6,840	9,830	12,585
Sorghum/millet	150	530	770	910	1,160
Total	5,640	12,185	18,710	25,960	32,960
Farmgate Value (1,000 dollars):					
Cotton	545.8	1,072.4	1,637.3	2,245.0	2,834.3
Maize	44.7	109.6	171.0	245.8	314.6
Sorghum/millet	4.8	16.5	24.1	28.5	36.2
Total	595.3	1,198.5	1,832.4	2,519.3	3,185.1

a/ The figures are assumed to remain constant for subsequent years.

Source: DMJM Report.

PROJECT AND CALENDAR YEAR	L I V E S T O C K		F I S H	
	Incremental Off-take, Head of Cattle (number)	Farmgate Value (1,000 dollars)	Incremental Catch (tons)	Farmgate Value (1,000 dollars)
2 - 1974	--	--	75	10.0
3 - 1975	--	--	175	23.8
4 - 1976	--	1.5 ^{b/}	400	54.1
5 - 1977	20	4.5	687	92.9
6 - 1978	77	9.0	975	131.6
7 - 1979	286	24.0	"	
8 - 1980	500	39.0		
9 - 1981	741	55.5		
10 - 1982	965	73.5		
11 - 1983	1,167	89.3		
12 - 1984	1,341	101.2	"	
13 - 1985	1,522	112.5		
14 - 1986	1,711	123.8		
15 - 1987	1,907	135.0		
16 - 1988	2,111	147.7		
17 - 1989	2,324	160.5	"	
18 - 1990	2,395	164.3		
19 - 1991	2,466	168.7		
20 - 1992	2,537	173.3		
21 - 1993	2,609	177.7		
22 - 1994	2,740	181.5		
23 - 1995	2,751	186.0	975	131.6

b/ Based on the assumption of 75 percent utilization of hides at \$1.50 per hide as compared with 30 percent utilization at \$1.38 per hide without the IDA Phase II Project.

Source: DMJM Report.

ACTUAL AND PROJECTED PRODUCTION AND SALES OF SUGAR PRODUCED AT
THE SUCOMA SUGAR PLANT, 1966 - 1980
 (1,000's of short tons)

<u>Year</u>	<u>Output</u> <u>a/</u>	<u>Domestic Consumption</u>		<u>Exports, In Bags, c/</u>				
		<u>Shipped In b/</u>		<u>To:</u>	<u>To: Other Markets</u>			<u>Total</u>
		<u>Bags</u>	<u>Prepackaged</u>	<u>Zambia</u>	<u>Portugal</u>	<u>U.S.A.</u>	<u>I.S.A. d/</u>	
1966	3.8	3.8						
1967	18.1	18.1						
1968	21.9	21.9						
1969	29.6	29.6						
1970	35.7	35.7						
1971	36.1	31.6		2.5	2.0			2.0
1972	39.0	20.0	15.0		4.0			4.0
1973	63.0	26.0	17.0	5.0		15.0		15.0
1974	70.0	30.0	20.0	5.0		15.0		15.0
1975	100.0	30.0	30.0	5.0		15.0	20.0	35.0
1976	106.0	33.0	33.0	5.0		15.0	20.0	35.0
1977	112.0	36.0	36.0	5.0		15.0	20.0	35.0
1978	120.0	40.0	40.0	5.0		15.0	20.0	35.0
1979	130.0	45.0	45.0	5.0		15.0	20.0	35.0
1980	140.0	50.0	50.0	5.0		15.0	20.0	35.0

Source: Based on information supplied by the Sucoma sugar factory.

a/ Actual through 1971, partly estimated for 1972, and projected through 1980. Disregarding further possible expansion of the Sucoma factory, sugar output from 1980 through 1995 is assumed to remain constant.

b/ Figures on shipment of prepackaged sugar for the years 1966 - 1971 are not available separately. For the years 1973-74, shipments of prepackaged sugar are taken at 40 percent of domestic consumption, and henceforth at 50 percent.

c/ Total exports and by individual markets from 1980 and through 1995 are assumed to remain constant.

d/ International Sugar Agreement.

Source: DMJM Report.

ANNEX VII

TRANSPORT OF SUGAR FROM THE SUCOMA PLANT AND HAULAGE OF CANE, AND SAVINGS IN
TRANSPORT COST RESULTING FROM THE IMPROVEMENTS TO ROAD

1976 - 1995

<u>ITEM</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980-1995</u>
<u>SUGAR SHIPMENT</u>					
Without Road Improvements:					
Direct to Blantyre, in 7-ton Trucks, 21.6 miles (1,000 tons)	11	12	13	15	17
Via Bangula, in 7-ton Trucks, 37.4 miles (1,000 tons)	95	100	107	115	123
Total Cost (1,000 dollars)	356.4	375.9	402.5	434.9	466.9
With Road Improvements:					
Direct to Blantyre, in 10-ton Trucks 16.6 miles (1,000 tons)	66	72	80	90	100
Via Bangula, in 28-ton Trailer Trucks, 35.4 miles (1,000 tons)	40	40	40	40	40
Total Cost (1,000 dollars)	101.4	106.1	112.4	120.1	128.1
Difference in Transport Cost (1,000 dollars)	255.0	269.8	290.1	314.8	338.8
<u>CANE HAULAGE</u>					
Quantity Hauled in 28-ton Trailer Trucks (1,000 tons)	387	441	513	603	693
Average Distance Hauled (miles)	7.9	8.1	8.4	8.6	8.8
Total Cost on Earth Road (1,000 dollars)	238.1	278.1	335.6	403.9	474.9
Total Cost on Bituminous Road (1,000 dollars)	134.9	157.6	190.1	228.9	269.1
Difference in Haulage Cost (1,000 dollars)	103.2	120.5	145.5	175.0	205.8
Total Savings in Transport of Sugar and Cane Due to Road Improvements (1,000 dollars)	358.2	390.3	435.6	489.8	544.6

NOTE: All truck designations represent carrying capacity in long ton. Due to legal axle load limitations, a 28-ton trailer truck can carry only 25.2 short tons. When used for hauling cane, an 80 percent utilization is assumed so that a 28-ton trailer truck will haul 20 short tons of cane.

Source: DMJM Report.

TRANSPORT OF COTTON AND MAIZE WITHIN THE AREA OF THE
ROAD, AND SAVINGS IN TRANSPORT COST RESULTING
FROM ROAD IMPROVEMENTS 1976 - 1995

<u>ITEM</u>	<u>1976</u>	<u>1977</u>	<u>1978-1995</u>
<u>WITHOUT ROAD IMPROVEMENTS</u>			
Quantity Shipped (short ton):			
Cotton, in 7-ton Trucks, 26 miles	14,652	20,090	25,364
Maize, in 5-ton Trucks, 15 miles	8,016	11,521	14,750
Total	<u>22,668</u>	<u>31,611</u>	<u>40,414</u>
Total Cost of Transport (1,000 dollars):			
Cotton	35.8	49.1	62.0
Maize	10.5	15.1	19.4
Total	<u>46.3</u>	<u>64.2</u>	<u>81.4</u>
<u>WITH ROAD IMPROVEMENTS</u>			
Quantity Shipped (short ton):			
Cotton in 7-ton Trucks, 21 miles	14,652	20,090	25,364
Maize, in 5-ton Trucks, 15 miles	8,016	11,521	14,750
Total	<u>22,668</u>	<u>31,611</u>	<u>40,414</u>
Total Cost of Transport (1,000 dollars):			
Cotton	16.6	22.7	28.7
Maize	5.1	7.4	9.4
Total	<u>21.7</u>	<u>30.1</u>	<u>38.1</u>
Savings in Transport of Cotton and Maize Due to Road Improvement (1,000 dollars)	24.6	34.1	43.3

NOTE: All truck designations represent carrying capacity in long tons.

Source: DMJM Report

ROAD USERS' SAVINGS IN NORMAL TRAFFIC RESULTING FROM
IMPROVEMENTS TO THE ROAD, 1976

<u>TYPE OF VEHICLE</u>	<u>PROJECTED 1976 ADT NORMAL TRAFFIC</u>	<u>T O T A L C O S T</u>		<u>Difference In Total Cost (1,000 dollars)</u>
		<u>Unimproved</u>	<u>Improved</u>	
		<u>Road</u>	<u>Road</u>	
		<u>(1,000 dollars)</u>		
		<u>59 Miles</u>	<u>52 Miles</u>	
Passenger Car	38	79.9	36.0	43.9
Truck, 3 ton- or Less	75	219.5	96.7	122.8
Bus	6	38.9	17.4	21.5
5-ton Truck	37	165.7	70.9	94.8
7-ton Truck	28	188.9	95.4	93.5
10-ton Truck	7	59.5	29.9	29.6
Total	191	752.4	346.3	406.1

NOTE: All truck designations represent carrying capacity in long tons.

Source: DMJM Report.

ANNEX X

VEHICLE OPERATIONAL COSTS

<u>Vehicle Type</u>	<u>Existing Earth Road</u>	<u>Improved Bituminous Road</u>
	<u>Running Cost (U.S. Cents Per Mile)</u>	
Passenger car	11.5	5.9
1½ ton pick-up	15.9	8.0
3 ton truck	21.5	10.6
5 ton truck	24.5	11.9
7 ton truck	27.1	13.8
10 ton truck	35.2	18.0
28 ton truck and trailer	60.9	31.4
	<u>Fixed Cost (U.S. Cents Per Mile)</u>	
7 ton truck	9.8	7.3
10 ton truck	11.3	8.5
28 ton truck and trailer	17.0	12.7
	<u>Running and Fixed Costs (U.S. Cents Per Mile)</u>	
7 ton truck	36.9	21.1
10 ton truck	46.5	26.5
28 ton truck and trailer	77.9	44.1
<u>Cost Per Short Ton Per Mile (50% Load Factor to Account For No Back-haul)</u>		
a/		
7 ton truck (7.84 short ton capacity)	9.40	5.40
a/		
10 ton truck (11.2 short ton capacity)	8.31	4.73
b/ 28 ton truck and trailer (25.2 short ton capacity)	6.19	3.50

- (a) Vehicle type has goods carrying capacity in long tons (1 long ton = 1.12 short ton)
- (b) Vehicle capacity of 28 long tons cannot be utilized due to 8 ton legal axle-load limit. Legal capacity is 25.2 short tons.

For this analysis yearly mileage for heavy commercial vehicles were 30,000 miles for the existing road and 40,000 miles for bituminous improved road.

Source: Malawi Economic Planning Division.

ESTIMATED ROAD MAINTENANCE COSTS AND SAVINGS

YEAR	MAINTENANCE COSTS PER MILE (1973 Prices)				TOTAL MAINTENANCE COST		SAVINGS		
	Ordinary Maintenance ^{a/}		Maintenance Replacement		59 Mi.	52 Mi.			
	Existing	Improved	Existing	Improved	Existing	Improved			
	\$	\$	\$	\$	\$	\$	\$		
1976	996	713	2,388		3,384	713	199,656	37,076	162,580
1977	996	713	2,600		3,596	713	212,164	37,076	175,088
1978	996	713	2,825		3,821	713	225,439	37,076	188,363
1979	996	713	3,087		4,083	713	240,897	37,076	203,821
1980	1,015	725	3,363	4,838	4,378	5,563	258,302	289,276	(30,974)
1981	1,039	744	3,663		4,702	744	277,418	38,688	238,730
1982	1,066	762	4,000		5,066	762	298,894	39,624	259,270
1983	1,094	783	4,350		5,444	783	321,196	40,716	280,480
1984	1,126	805	4,750		5,876	805	346,684	41,860	304,824
1985	1,160	829	5,175	4,838	6,335	5,667	373,765	294,684	79,081
1986	1,196	856	5,638		6,834	856	403,206	44,512	358,694
1987	1,237	885	6,150		7,387	885	435,833	46,020	389,813
1988	1,281	916	6,700		7,981	916	470,879	47,632	423,247
1989	1,329	950	7,300		8,629	950	509,111	49,400	459,711
1990	1,381	989	7,963	4,838	9,344	5,827	551,296	303,004	248,292
1991	1,439	1,029	8,675		10,114	1,029	596,726	53,508	543,218
1992	1,501	1,074	9,462		10,963	1,074	646,817	58,848	587,969
1993	1,569	1,123	10,313		11,882	1,123	701,038	58,396	642,642
1994	1,643	1,175	11,238		12,881	1,175	759,979	61,100	698,879
1995	1,724	1,232	12,250	4,838	13,974	6,070	824,466	315,640	508,826

^{a/} Based on Malawi Roads Department

Source: DMJM Report.

INCREMENTAL INVESTMENTS IN AGRICULTURE, LIVESTOCK AND FISHERIES AND IN OTHER
RELATED ITEMS ASSOCIATED WITH INCREMENTAL PRODUCTION WITHIN THE AREA OF
ROAD, 1973/74-1979/80
(1,000 Dollars)

INVESTMENT ITEM	YEAR OF DEVELOPMENT						Total
	1	2	3	4	5	6	
Agricultural Development:							
Field Crops	133.4	65.5	24.0	48.6	24.1	-	295.6
Incremental Working Capital For Field Crops	263.6	(43.7)	23.7	20.0	(11.2)	-	252.4
Livestock	--	129.6	64.3	48.0	43.9	8.4	294.2
Fisheries	62.8	7.0	0.9	1.6	2.0	-	74.3
Total	<u>459.8</u>	<u>158.4</u>	<u>112.9</u>	<u>118.2</u>	<u>58.8</u>	<u>8.4</u>	<u>916.5</u>
Other Investments Chargeable to the Project:							
Market Improvements	17.6	8.0	23.5	5.9	--	-	55.0
Health and Community Development	82.4	23.7	18.3	2.1	1.0	-	127.5
Rural Water Supply	22.5	22.5	22.5	22.9	--	-	90.4
Road Improvements	112.5	37.5	--	--	--	-	150.0
Total	<u>235.0</u>	<u>91.7</u>	<u>64.3</u>	<u>30.9</u>	<u>1.0</u>	<u>-</u>	<u>422.9</u>
Project Administration	<u>208.8</u>	<u>106.3</u>	<u>70.2</u>	<u>39.4</u>	<u>24.1</u>	<u>-</u>	<u>448.8</u>
Grand Total	<u>903.6</u>	<u>356.4</u>	<u>247.4</u>	<u>188.5</u>	<u>83.9</u>	<u>8.4</u>	<u>1,788.2</u>
Grand Total Plus 5% Contingency	<u>948.6</u>	<u>374.3</u>	<u>259.8</u>	<u>197.9</u>	<u>88.1</u>	<u>8.8</u>	<u>1,877.5</u>

Source: DMJM Report.

SUMMARY OF BENEFITS AND COSTS, EXCLUDING AGRICULTURAL BENEFITS
AND COSTS FOR THE CHIKWAWA-BANGULA ROAD, 1973-1995
(In thousand dollars)

<u>End Of Evalua- tion Year</u>	<u>End Off Calen- dar Year</u>	<u>B E N E F I T S S T R E A M</u>			<u>Cost of Final Engineering, Supervision & Road Con- struction</u>	<u>Difference Between Benefits And Costs</u>
		<u>Road Users' Savings</u>	<u>Savings In Road Main- tenance</u>	<u>Total Benefits</u>		
0	1972					
1	1973				495	-495
2	1974				4,161	-4,161
3	1975				4,161	-4,161
4	1976	789	163	952		952
5	1977	867	175	1,042		1,042
6	1978	961	188	1,149		1,149
7	1979	1,059	204	1,263		1,263
8	1980	1,161	-31	1,130		1,130
9	1981	1,213	239	1,452		1,452
10	1982	1,269	259	1,528		1,528
11	1983	1,330	281	1,611		1,611
12	1984	1,397	305	1,702		1,702
13	1985	1,470	79	1,549		1,549
14	1986	1,549	359	1,908		1,908
15	1987	1,636	390	2,026		2,026
16	1988	1,730	423	2,153		2,153
17	1989	1,833	460	2,293		2,293
18	1990	1,945	248	2,193		2,193
19	1991	2,067	543	2,610		2,610
20	1992	2,200	588	2,788		2,788
21	1993	2,345	643	2,988		2,988
22	1994	2,504	699	3,203		3,203
23	1995 a/	2,676	509	3,185		3,185

a/

No residual value is attributed to the road.

Source: DMJM Report.

ANNEX XIV

SUMMARY OF BENEFITS AND COSTS, INCLUDING AGRICULTURAL BENEFITS AND COSTS, FOR THE
CHIKWAWA-BANGULA ROAD, 1973-1995
(In thousand dollars)

End Of valuation Year	End Of Calendar Year	B E N E F I T S T R E A M				C O S T S T R E A M				Difference Between Benefits And Costs
		Value Of Incremental Agricultural Production	Road Users' Savings	Savings In Road Main- tenance	Total Benefits	Incremental Investment In Agriculture	Incremental Operating Expenses	Road Con- struction Cost	Total Costs	
0	1972					898 a/			-898	-898 a/
1	1973					949	608	495	-2,052	-2,052
2	1974	605			605	374	940	4,161	-5,475	-4,870
3	1975	1,222			1,222	260	1,242	4,161	-5,663	-4,441
4	1976	1,888	764	163	2,815	198	1,605		1,803	1,012
5	1977	2,617	833	175	3,625	88	1,867		1,955	1,670
6	1978	3,324	918	188	4,430	9	1,788		1,797	2,633
7	1979	3,341	1,016	204	4,561		1,752		1,752	2,829
8	1980	3,356	1,118	-31	4,443		1,720		1,720	2,723
9	1981	3,372	1,169	239	4,780		1,721		1,721	3,059
10	1982	3,390	1,226	259	4,875		1,721		1,721	3,154
11	1983	3,406	1,287	281	4,974		1,721		1,721	3,253
12	1984	3,418	1,354	305	5,077		1,723		1,723	3,354
13	1985	3,429	1,427	79	4,935		1,724		1,724	3,211
14	1986	3,441	1,506	359	5,306		1,724		1,724	3,582
15	1987	3,452	1,593	390	5,435		1,725		1,725	3,710
16	1988	3,465	1,687	424	5,576		1,725		1,725	3,851
17	1989	3,477	1,790	460	5,727		1,725		1,725	4,002
18	1990	3,481	1,902	248	5,631		1,725		1,725	3,906
19	1991	3,486	2,024	543	6,053		1,725		1,725	4,328
20	1992	3,490	2,157	588	6,235		1,725		1,725	4,510
21	1993	3,495	2,302	643	6,440		1,725		1,725	4,715
22	1994	3,498	2,460	699	6,657		1,725		1,725	4,932
23 b/	1995	3,503	2,633	509	6,645		1,725		1,725	4,920

ATD-DIC/P-1004

ANNEX XIV

a/

Represents one-quarter of Phase I development and administration costs which in a sensitivity analysis may be charged to Phase II

b/ No residual value attributed to any investments.

Source: DMJM Report.

CALCULATION OF INTERNAL RATE OF RETURN FOR THE CHIKWAWA-BANGULA ROAD, WITH AND WITHOUT AGRICULTURAL BENEFITS AND COSTS, 1972-1995

(Value figures in thousand dollars)

End Of Project Year	End Of Calendar Year	WITHOUT AGRICULTURAL BENEFITS AND COSTS				WITH AGRICULTURAL BENEFITS AND COSTS			
		Difference Between Benefits And Costs a/	Discount Factor At 14%	Discounted Value At 14%	Discount Factor At 20%	Discounted Value At 20%	Difference Between Benefits And Costs	Discounted Value At 14%	Discounted Value At 20%
0	1972		1,000	-	1,000	-	-898 a/	-898 a/	-898 a/
1	1973	-495	.877	-434	.833	-412	2,052	-1,800	-1,709
2	1974	-4,161	.769	-3,200	.694	-2,888	-4,870	-3,745	-3,380
3	1975	-4,161	.675	-2,809	.579	-2,409	-4,441	-2,998	-2,571
4	1976	952	.592	564	.482	459	1,012	599	488
5	1977	1,042	.519	541	.402	419	1,670	867	671
6	1978	1,149	.456	524	.335	385	2,633	1,201	882
7	1979	1,263	.400	505	.279	352	2,829	1,132	789
8	1980	1,130	.351	397	.233	263	2,723	956	635
9	1981	1,452	.308	447	.194	282	3,059	942	594
10	1982	1,528	.270	413	.162	248	3,154	852	511
11	1983	1,611	.237	382	.135	218	3,253	771	439
12	1984	1,702	.208	354	.112	191	3,354	698	376
13	1985	1,549	.182	282	.093	144	3,211	584	299
14	1986	1,908	.160	305	.078	149	3,582	573	279
15	1987	2,026	.140	284	.065	132	3,710	519	241
16	1988	2,153	.123	265	.054	116	3,851	474	208
17	1989	2,293	.108	248	.045	103	4,002	432	180
18	1990	2,193	.095	208	.038	83	3,906	371	148
19	1991	2,610	.083	217	.031	81	4,328	359	134
20	1992	2,788	.073	204	.026	73	4,510	329	117
21	1993	2,988	.064	191	.022	66	4,715	302	104
22	1994	3,203	.056	179	.018	58	4,932	276	89
23	1995	3,185	.049	156	.015	48	4,920	241	74
				223		-1,839		3,037	-1,300

a/ Represents one-quarter of Phase I development and administrative costs. b/ No residual value attributed to any investments.

NOTE: The internal rates of return (by interpolations) are as follows:

1. Without agricultural benefits and costs 14.7%
2. With agricultural benefits and costs and including one-quarter of Phase I development and administrative costs charged to the Road 18.2%

Environmental Impact - Malawi Roads

SUMMARY AND RECOMMENDATIONS

Borrower: The Government of the Republic of Malawi (GOM)

Loan Amount: \$8,300,000

Terms:

- a. Maturity: Forty (40) years including a ten (10) year grace period.
- b. Interest: 2 percent per annum during the grace period, and 3 percent per annum thereafter.
- c. Repayment: Interest and principal payable in U.S. dollars.

Financial Plan:

A.I.D. Loan	\$8,300,000
GOM Contribution	<u>1,240,000</u>
Total	\$9,540,000

Description of the Project: The proposed project consists of final engineering, construction supervision, and road construction of the Chikwawa-Bangula Road. The construction phase will include upgrading the existing earth surfaced road to a bituminous road, realignment of three sections, thereby reducing the total road length from 59 miles to 52 miles and the construction of several bridges. The project also includes final engineering design for the Lilongwe Mchinji Road.

Purpose of the Loan: To finance all foreign exchange costs and a portion of the local costs of the project.

Background of the Project: The Chikwawa-Bangula Road is the main road in the area of the IDA's Shire Valley Agricultural Project located in southwestern Malawi. The present road cannot efficiently service the area, especially with the increased agricultural production resulting from the IDA project. Consequently, the GOM requested A.I.D. assistance and in October 1972, A.I.D. financed a technical and economic feasibility study to determine whether the road should be upgraded to a bituminous road. The feasibility study findings supported improving the road and the GOM officially requested A.I.D. financial assistance for final engineering, road construction, and engineering supervision for the project. The Lilongwe Mchinji Road is the primary road

crossing the IDA financed Lilongwe Agriculture Development Project in central Malawi. This road is also the principal highway connecting the new capital at Lilongwe with Mchinji near the Zambia border. The GOM has assigned high priority to improving this road in order to support the Government of Zambia's efforts to find alternative transportation routes for its imports and exports which previously have been transported through Rhodesia. The feasibility study for this road was financed by the United Nations Development Program (Special Fund). The draft final report of this study was completed in April, 1973. In January A.I.D. agreed to consider financing for the final engineering for the Lilongwe Mchinji Road subject to the findings of the final report in order to assist the GOM in their efforts to support the GOZ.

Impact of Project on Environment: Construction of the Chikwawa-Bangula Road and the Lilongwe-Mchinji Road will have some effect on water resources, air pollution, crop production, living conditions, and esthetic appearances, and may result in the relocation of a few farmers. But these effects are not so serious as to consider abandoning the projects. Maximum practicable steps will be taken in each case to minimize adverse environmental effects.

All existing water sources and conveyances are polluted. Streams are silt-laden because of the natural heavy rainfall, erosive quality of the soil, and techniques used for crop cultivation. The area has no modern means for sewage disposal and water courses and deep wells are polluted. There are occasional outbreaks of water-borne diseases.

Contract specifications governing construction methods will contain provisions to prevent the introduction of additional contaminants into surface water. Water draining from the highway surface will be conveyed into natural water courses. Existing water courses will be passed through the roadway without altering their characteristics. No additional water will be added to waterways by the planned construction. Surface and ground water supplies in the corridor are not expected to be adversely affected by highway water runoff. The contractor will be required to guard against the deliberate or accidental loss into the waterways of deleterious building materials such as cement and petroleum products.

Soil erosion is not expected to be a serious problem during construction of the roads due to the relatively small quantities of earthwork involved. Nevertheless, native soils are susceptible to erosion, and the contractor will be required to exercise care during the earthmoving phase to assure that no additional silts are introduced into the streams. Settling basins and impoundments will be used where necessary to control silt transport.

Despite their pollution, rivers and streams of this region support fish that are part of the human diet. Channel relocations will be avoided to preserve fish levels in local streams. However, on the Chikwawa-Bangula Road it will be necessary to construct a number of bridge crossings and this construction is expected to reduce fish levels during construction. This reduction in fish levels should last only for about two years and is not expected to significantly affect the human diets in the area.

One of the more noticeable and unpleasant features of highway travel in the corridors is air pollution. This is due to the existing inadequate and dusty roads and will be reduced through bituminous surfacing. In addition, many vehicles are old and need repairs. They frequently use low quality fuels such as kerosene. Many emit clouds of black, coarse smoke that hangs heavily in the damp air. The quantity of vehicular air pollutants will not be altered by the construction or location of the new roads. The number of people exposed to the pollutants will, however, be reduced because the new highway will pass through rural areas several miles from the more heavily populated old road corridors. Air pollution in the towns of Chikwawa, Bangula, Lilongwe and Mchinji is expected to be reduced by diversion of traffic away from the towns to the new roads.

Harmful effects of dust on crops during construction will be guarded against as much as possible. The contractor will be required to perform dust abatement during work periods such as sprinkling haul roads with water.

The land acquired for the highway right-of-way where relocation of the roads is necessary will not involve existing crop land but rather land that is not presently established for cultivation. Areas of cultivation presently crossed by the existing roads, which are to be relocated, will eventually revert to more efficient crop production.

A few people may be relocated by the realignment of the roads. Right-of-way acquisition in Malawi provides for compensation based on fair land values, and the former owner is then left to his own devices to find replacement housing and occupation. In this instance, however, the people relocated by the Chikwawa-Bangula and Lilongwe-Mchinji road realignments will be encouraged by better opportunities due to the economic development anticipated in the area because of the new roads and the Shire Valley Agriculture Development Project and the Lilongwe Agriculture Development Project.

During construction of the roads, disposal areas for waste soil material will be graded. Levelled and seeded. Borrow areas will also be graded, levelled and seeded.

The new roads and their increased passenger traffic will open a new pathway for disease-bearing organisms that affect humans, plants and animals. The two existing roads, however, already provide such disease vectors; the construction of the new road is therefore unlikely to affect the incidence of disease in people, plants or animals very much. Construction impoundments are not expected to be hazardous to human health because their additional contribution to the already large local mosquito population will be relatively small. Native soils are absorptive and many impoundments are expected to dry quickly. The roads will have no impact on wildlife habitats or migratory routes because there is no wildlife in this region. The highway project will have no affect on timber or logging resources because the land is entirely agricultural or residential.

Overall, based on the review of the environmental factors, we are satisfied that the environment impact of the new road will not be significant and adequate provision is being made in design and construction procedures so as to minimize any adverse environmental features.

DRAFT

ANNEX XVIII

AID-DLC/P-1094

A.I.D. LOAN No.:
Cap. Asst. Paper No. AID/DLC/P-
Project No.:

CAPITAL ASSISTANCE LOAN AUTHORIZATION

Provided from: Development Loan Funds
Malawi Roads Phase I

Pursuant to the authority vested in the Administrator of the Agency for International Development (hereinafter called "A.I.D.") by the Foreign Assistance Act of 1961, as amended, and the delegations of authority issued thereunder, I hereby authorize the establishment of a loan pursuant to Part I, Chapter 2, Title I, the Development Loan Fund, to the Government of Malawi ("Borrower") of not to exceed Eight Million Three Hundred Thousand Dollars (\$8,300,000) to assist in financing the foreign exchange and local currency costs of final engineering, construction supervision, and road construction of the Chikwawa-Bangula Road and also final engineering design of the Lilongwe-Mchinji Road.

This loan is subject to the following terms and conditions:

1. Interest Rate and Terms of Repayment. Borrower shall repay the loan to A.I.D. within forty (40) years from the date of the first disbursement under the loan, including a grace period of not to exceed ten (10) years. Borrower shall pay to A.I.D. interest

on the unrepaid principal and interest accrued thereon at the rate of two percent (2%) per annum during the grace period and three percent (3%) per annum thereafter.

2. Currency of Repayment. Provision shall be made for repayment of the loan and payment of the interest in United States dollars.

3. Other Terms and Conditions.

(a) Equipment, materials and services financed by the loan shall be procured from Malawi and from countries included in Code 941 of the A.I.D. Geographic Code Book as in effect at the time orders are placed for such equipment, materials and services.

(b) The loan shall be subject to such other terms and conditions as A.I.D. may deem advisable.

Assistant Administrator for Africa

Date